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FINAL ENVIRONMENTAL IMPACT STATEMENT

UINTAH BASIN SYNFUELS DEVELOPMENT

DEPARTMENT OF THE INTERIOR

FINAL ENVIRONMENTAL IMPACT STATEMENT

on the

UINTAH BASIN SYNFUELS DEVELOPMENT

Prepared by

Bureau of Land Management

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State Director, Utah

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CONSULTATION AND COORDINATION

The Bureau of Land Management (BLM) consulted with many governmental agencies, private organizations, and individuals during the development of the Draft and Final Environmental Impact Statement (EIS). Initially, BLM formed an EIS steering committee, an interagency advisory group composed of federal, state, local, and Ute Tribe officials. This group followed the progress of the EIS and provided input on various issues during the EIS process.

Private citizens, organizations, and additional governmental agencies were involved at two stages - during the scoping process and the Draft EIS review. Public scoping meetings held in Vernal and Salt Lake City, Utah, and Rangely, Colorado, during August 1981, involved citizens and groups in identifying the significant issues that should be addressed in the EIS. (A detailed report on the scoping process, EIS Scoping Report: Uintah Basin Synfuels Development, can be obtained from Bureau of Land Management, Vernal District, 170 South 500 East, Vernal, Utah 84078. Public hearings held in the same communities during September 1982 provided an opportunity for citizens and groups to publicly express their comments on the adequacy and accuracy of the Draft EIS. In addition, written comments were solicited during the 60-day public review period (August 18 through October 19, 1982).

The oral testimony from the public hearings and written comments were considered in preparation of this Final EIS and are responded to in this section.

Federal decisions on the synfuel project rights-of-way applications will not be made until at least 30 days after the Environmental Protection Agency (EPA) Final EIS Notice of Availability has appeared in the Federal Register. During that 30-day period, written comments on the Final EIS may be submitted to be considered in the decision process.

Persons and groups from whom oral and written comments were received are listed on Table C-1. Following this listing is a copy of substantive comments made at public hearings that were not duplicated in a follow-up letter, and all comment letters received. (Copies of the complete public hearing transcripts, along with attendance lists, are available for public review at the BLM offices in Salt Lake City and Vernal, Utah.) Responses to the comments appear after the respective oral testimony or comment letter.

Table C-1

PUBLIC HEARING TESTIMONY AND COMMENT LETTERS

Reference Number	Follow-up Letter	Speaker/Author	Representing
		PUBLIC HEARING TESTIMONY	
H-1	--	Bob Nicholson	Vernal City and Uintah County Governments
H-2	20	Charles Cameron	Ute Indian Tribe
H-3	19	Dennis Montgomery	U.S. Bureau of Indian Affairs, Fort Duchesne Agency
H-4	--	Merrill Mecham	Uintah County Commission
H-5	40	Gaylon Cook	self
H-6	--	George Fosdick	Cathedral Bluffs Shale Oil Project
H-7	18	Peggy Rector	Town of Rangely, Colorado
H-8	15	Mark Bubriski	Rio Blanco County (Colorado) Board of County Commissioners
H-9	2,4,5	Peter Hovingh	self
H-10	8	Dorothy Harvey	Intermountain Water Alliance
		COMMENT LETTERS	
1		W.E. McIntire	U.S. Dept. of Health & Human Services, Region VIII
2		Peter Hovingh	Wasatch Mountain Club
3		Fred Hempel	U.S. Federal Highway Administration, Region 8
4		Peter Hovingh	Utah Nature Study Society
5		Peter Hovingh	Intermountain Water Alliance
6		Robert Dudiak	Sohio Shale Oil Company
7		Robert Lee	Syntana-Utah Project
8		Dorothy Harvey	Intermountain Water Alliance
9		William Dixon Shay, Jr.	Tosco Development Corporation
10		James Devine	U.S. Geological Survey
11		Robert Matuschek	U.S. Dept. of Housing and Urban Development, Region VIII
12		Helen Robison	Humane Society of Utah
13		Harry McCarthy	Synfuels Engineering and Development, Inc.

Table C-1 (continued)

PUBLIC HEARING TESTIMONY AND COMMENT LETTERS

Reference Number	Speaker/Author	Representing
14	Stephen Ellis	State of Colorado Clearinghouse
15	Mark Bubriski	Rio Blanco County Dept. of Development
16	Robert Heistand	Paraho Development Corporation
17	George McMillan	U.S. Soil Conservation Service
18	Peggy Rector	Town of Rangely, Colorado
19	Henry Cuch	U.S. Bureau of Indian Affairs, Uintah and Ouray Agency
20	Floyd Wopsock	Ute Indian Tribe
21	Scott Matheson	State of Utah
22	David Deisley	self
23	Diana Bender	Union Oil Company
24	Rusty Lundberg	Geokinetics, Inc.
25	Clark Johnson	U.S. Fish and Wildlife Service, Colorado-Utah Area Office
26	Carse Pustmueller	State of Colorado Natural Areas Program
27	Lorraine Mintzmyer	U.S. National Park Service, Rocky Mountain Regional Office
28	John Plog, Alan Dresser	Colorado Dept. of Health
29	Thomas Forsgren	Utah Power and Light
30	Robert Yuhnke, Richard Hughes	Environmental Defense Fund
31	George Brown	U.S. Minerals Management Service
32	Phyllis Fox	J. Phyllis Fox Consulting Services
33	Frances Green	National Wildlife Federation
34	Dennis Sims	Town of Dinosaur, Colorado
35	D.A. Dennis	U.S. Army Corps of Engineers, Sacramento District
36	Frank Lisella	Center for Disease Control
37	----	Friends of the Earth
38	Michael San Miguel	Mono Power Company
39	Frank Knell	U.S. Bureau of Reclamation, Upper Colorado Regional Office

Table C-1 (concluded)

PUBLIC HEARING TESTIMONY AND COMMENT LETTERS

Reference Number	Speaker/Author	Representing
40	R.E. Greffenius	U.S. Forest Service
41	Gaylon Cook	self
42	Robert Davies	U.S. Department of Energy
43	Don Peach	Town of Rangely, Colorado
44	Steven Durham	U.S. Environmental Protection Agency
45	George Oslund	Indian Health Service

PUBLIC HEARING COMMENTS

Many people who presented oral testimony at a public hearing also submitted a written comment letter. Comments that were duplicated in a letter are not reprinted and responded to here. All comments presented at the Vernal hearing and the majority of the comments presented at the Rangely and Salt Lake City hearings were duplicated in follow-up letters from the speakers. They are responded to in the letter section as identified on Table C-1. The following comments were not duplicated in a follow-up letter.

COMMENT H-1-1: "The residents of Uintah County generally will command support of Synfuels' development in their county. We recognize that relying heavily on foreign countries for America's needed energies supplies is a very precarious situation. The City and County Planning Commissioners and the County Impact Council believe that the projected population growth and attendant problems can be adequately managed with the assistance of the energy development companies. The above-mentioned groups, as well as county residents in general, are concerned that our water, wildlife, and other natural resources be properly managed and protected. However, various laws and state and federal agencies exist to manage these resources, and local government entities have little or no jurisdictional authority over such resources. Therefore, my comments will deal with our biggest concern: managing socioeconomic impacts. Uintah County, Uintah County School District, Vernal City, Naples, City, Ballard City, and the various water and sewer districts in the county are concerned about the potential impact on our schools, roads, water and sewer systems, parks, police and fire systems, and housing facilities. Managing the socioeconomic impacts from the potential population growth will require a strong commitment from the energy development companies to be responsible for mitigating their direct and indirect impacts. We believe that with the new Vernal to Bonanza highway, and in light of the population distribution experienced by the Bonanza Power Plan work force, that the Ashley Valley area will receive possibly as much as 90 percent of the population growth from the proposed fuel developments." Bob Nicholson, Vernal City and Uintah County Governments.

RESPONSE: The views expressed will be considered in the decisionmaking process. The socioeconomic impact analysis in the EIS confirms the comment that significant population growth would occur in the Ashley Valley area.

COMMENT H-1-2: "On page 33 of the summary, mention is made of Utah law S.B. 170, regarding the required socioeconomic impact statement and alleviation plan which must be filed by major developers with state and local governments. Reference is made to the 'process of mitigation plan preparation and approval' by industry, state, and local government officials. Under S.B. 170, as it presently exists, no formal approval of the impact alleviation plan is required from state and local government before a project gets underway. We hope that industry will willingly assume their mitigation responsibilities. With the cooperation of industry, we feel that new growth can be managed in a way to benefit both the present and future residents of Uintah County." Bob Nicholson, Vernal City and Uintah County Governments.

RESPONSE: S.B. 170, passed by the 1981 Utah Legislature, requires a socioeconomic impact and alleviation plan to be filed with the Utah Department of Community and Economic Development. It is correct that no formal approval is required. While S.B. 170 has no regulatory control to require companies to establish a mitigation plan that complies with the wishes of local and state government, it is assumed that industry will willingly undertake its responsibility to mitigate the negative impacts the projects may cause.

The Summary has been revised to clarify that the mitigation plan would not require approval.

COMMENT H-3-1: "As a matter of public record, we are requesting a review period for public comment on this document (Ford, Bacon, and Davis Native American Study) before the issuance of the final impact statement." Dennis Montgomery, Bureau of Indian Affairs, Fort Duchesne Agency.

RESPONSE: In response to the request, a two-week period (10/5/82-10/19/82) was granted to BIA and other involved agencies for reviewing the draft supplemental Indian study, since the document was not completed in time for results to be incorporated into the Draft EIS. This was followed by a discussion of comments with interested parties in Vernal on October 22, 1982, in which BIA participated.

The supplemental Indian study has been incorporated in its entirety into the Final Socioeconomics Technical Report and pertinent results have been incorporated into appropriate sections of the Final EIS. There will be a 30-day period after issuance of the Final EIS to receive comments on items in the EIS, including results of the Indian study.

COMMENT H-4-1: "I would like to express the appreciation of the residents of Uintah County and the Uintah County Commission to the Bureau of Land Management for holding this public hearing in Uintah County among the people who will be most affected by the decisions that you make at the conclusion of this process. This specific draft environmental impact statement combines the cumulative impacts and an analysis of the environmental consequences of nine proposed specific site projects in Uintah Basin with presently approved and on-going projects. This is a first of its kind and certainly exceeds the normal processes used to demonstrate compliance with the spirit and purposes of the National Environmental Policy Act and the regulations of the council on environmental quality. Information accumulated by this EIS will be of extreme value to all who are concerned with and responsible for the future environment and economy of this area. We have examined and studied the material submitted in the draft EIS and accompanying supplemental technical reports and agree and support the analysis and conclusion set forth in the draft statement. The analysis in the EIS suggests that the most challenging consequence of the development of the Synfuels Project would be orderly growth management and a paved highway system. The Uintah County Commission is fully aware of the challenge of providing orderly growth management and the necessity of paved dust-free highways if we are to maintain air quality and essential traffic facilities. We believe Uintah County has demonstrated its understanding of this broad challenge first by the construction of a first-class paved highway interconnecting the Vernal area, White River Shale Plant, Bonanza, Deseret Power Plant, Greater Red Wash, and close connections to the Paraho and Syntana proposed project sites. This highway will hold down the particulate matter that is essential to maintain acceptable air quality, provide access to adequate housing, complete community services, and relieve substantially all the impact pressures on our good friends to the east. The Uintah County Commission believes they have demonstrated that their role is to manage the growth and allow and encourage private industry to provide housing and service facilities, which private industry has done adequately to more than meet the needs of the expected near-term growth." Merrill Mecham, Uintah County Commission.

RESPONSE: BLM appreciates the cooperation it has received from Uintah County. The County's efforts to plan for and manage area growth are commendable.

COMMENT H-4-2: "From the socioeconomic impact side, the county's transportation plan substantially isolates seven of the proposed synfuel projects from the Colorado area, and distributes their impacts into the Uintah and Duchesne existing communities. We believe the population distribution used in the EIS is reasonable. However, the latest monitoring reports from the Deseret Power Plant, Bonanza and White River Shale indicate that the vast majority of the employees are choosing the Vernal area for their residence." Merrill Mecham, Uintah County Commission.

RESPONSE: BLM is aware that Vernal is now receiving most of the growth associated with energy development and believes that the Vernal area would get the majority of growth from synfuel development. However, because of the sheer magnitude associated with the synfuels development addressed in the EIS, Vernal would be strained to accommodate all of the growth and some spillover would occur into other communities such as Roosevelt and Rangely.

COMMENT H-4-3: "The regional cumulative analysis of all nine Synfuel projects adequately addresses the threshold level and socioeconomic constraints and mitigation measures that are reasonable and probable to allow for the eventual production of almost one-half million barrels per day. Uintah County agrees and supports these findings and conclusions and suggests, that with experience and improved technology, this level of production could be substantially exceeded. In conclusion, we believe the approach used by the BLM to combine the known and expected impacts from all industries into one statement is essentially a desirable approach and provides the communities, the public and industry with guidelines of some real value for both present and future planning. We commend you for your foresight and efforts in assembling this assessment." Merrill Mecham, Uintah County Commission.

RESPONSE: The views expressed will be considered in the decision-making process.

COMMENT H-6-1: "With regard to air quality, the modeling effort is to be commended in that several state-of-the-art models were used to cover the range from site-specific to regional results. Furthermore, a range of uncertainty, up to a factor of ten, was cited in the modeling result. All too often, unrealistic worst cases are assumed for model input in other EISs which are too far removed from reality--yielding results showing violations of air quality standards as the bottom line. And the public has the right to understand these, the uncertainty in these modeling results and that it's not an absolute number. And you're to be commended that it's an EIS with foresight with this factor of ten. We have examined work by others regarding three or four cases of oil-shale industry carrying capacity in barrels per day in the Piceance Basin using today's conservative and approximate models, all of which appear to limit daily production to less than 800,000 barrels, consistent with the general results of the present EIS." George Fosdick, Cathedral Bluffs Shale Oil Project.

RESPONSE: The views expressed will be considered in the decision-making process.

COMMENT H-6-2: "As the oil-shale industry matures, the need for more realistic and accurate models in rough terrain and better understanding of regional meteorology will be fulfilled. This, in turn, will remove some present-day model conservatism and raise the carrying capacity lid to more realistic values, still in presence of significant deterioration compliance. The non-modelers reading this draft environmental impact statement need to understand this fact.

The draft environmental impact statement points up the unresolved issue of long-range pollutant transport across state boundaries which, in this case because of prevailing westerlies, means transport of pollutants from Utah into Colorado. Inasmuch as this tends to worsen the carrying capacity lid in Colorado, the states of Utah and Colorado need to mutually face up to this problem.

Up front, to the resolution of the issue, we will require more complete meteorological and air dispersion experience specific to the sites and regions along with model validation, and I know that we don't have budget in BLM, we don't have budget in EPA, we don't have budget in the State of Utah, and we don't have budget in industry, but believe me, if we don't stick together on this, we're all going to hang together.

It's a great, big, expensive deal, and in hundreds of thousands of dollars, and it's a long lead time and we better get on with the models and the regional meteorological studies so when we're up against the stops like the State of North Dakota is right now, we have the model and the meteorological to meet it." George Fosdick, Cathedral Bluffs Shale Oil Project.

RESPONSE: A cooperative effort between developing industry and agencies responsible for various aspects of air quality would be very useful to develop an adequate meteorological data base and employ the most appropriate, validated, and cost-effective production tools for both the NEPA and regulatory process. This would enable the most efficient development and use of synfuel resources within the constraints of environmental compatability.

Lacking this, regional impacts may be so conservatively estimated that development is prohibited on the one hand, or underestimated, creating significant environmental impacts on the other.

COMMENT H-6-3: "...the draft environmental impact clearly states that the present particulate violations in the town in the region are due to fugitive dust in the absence of any oil shale industry.

It is not clear, however, that modeling results for fugitive dust from unpaved roads and other sources for the applicants would fully utilize the required application of best available control technology. The required BACT, as it's called, reduces emissions to approximately 50 percent by regular application of water as a control device or to 20 percent of their uncontrolled value by regular application of dust palliatives." George Fosdick, Cathedral Bluffs Shale Oil Project.

RESPONSE: The estimate of emissions from unpaved roads within the project sites, for the most part, took into account fugitive dust controls (road watering, etc.) on project roads because the synfuel companies' PSD applications stated that such controls would be carried out. However, watering and dust suppressants are not likely to be feasible for all (or a majority) of unpaved roads in the region due to cost or other considerations. Where the applicant did not specify such controls or the control was not feasible, the emissions were modeled and analyzed.

COMMENT H-6-4: "Furthermore, it appears that fugitive dust particulates were not settled out according to Stokes Law, which admits heavy dust particulates settle out quickly, close in to the emissions source." George Fosdick, Cathedral Bluffs Shale Oil Project.

RESPONSE: The commenter's statement is true. Large particles were not settled out and, hence, TSP impacts may be overstated. See also the response to Comment 6.2.

COMMENT H-6-5: "Furthermore, plume rise associated with fugitive dust is low, also contributing to its settling close in. Applicants are required to utilize revegetation and reclamation practices to limit dust on both raw and spent shale piles. There may very well be an acreage limitation on the unrevegetated portion of such piles." George Fosdick, Cathedral Bluffs Shale Oil Project.

RESPONSE: The commenter's statement concerning plume rise is correct.

Land disturbance and exposed areas would be kept to a minimum. Effective wind and water erosion control measures, such as crop residue mulches, rock mulches, surface roughness, and slope length reduction measures would be used to protect disturbed and exposed areas until vegetation cover can be reestablished. No specific acreage limitations are identified for the unvegetated portions. However, applicants would reclaim areas in stages concurrent with project construction activities and operations to minimize the size of exposed areas.

Refer to Section R-4.A.4, Soil and Reclamation.

COMMENT H-6-6: "The C-b Tract has successfully utilized busing to the reduce vehicular traffic from commuter centers. Over 70 percent of our personnel utilized these buses. Such utilization reduces air emissions substantially. Busing for commuter purposes was not utilized in the draft environmental impact statement modeling, at least that I could uncover." George Fosdick, Cathedral Bluffs Shale Oil Project.

RESPONSE: Busing and carpools for commuting purposes would be successful methods of reducing vehicular emissions from transportation of project employees. These were not used in the EIS analysis as it is not certain to what extent they would occur. Additionally, it would be the secondary population increases indirectly related to the growth in the synfuel industry which would result in the vast majority of future vehicular emissions.

COMMENT H-6-7: "In view of all of the above mitigation measures which would have been utilized to reduce particulate concentrations, but apparently were not used in the modeling results of the draft statement, we submit that all or most of the anticipated exceedances in the tables for Class I areas probably would vanish." George Fosdick, Cathedral Bluffs Shale Oil Project.

RESPONSE: Particulate emissions projected by oil shale developers were used in the analysis. To the extent that gravitational settling would reduce plume concentrations, particulate concentrations in the report are considered to be conservative, upper-bound estimates. See also responses to Comments R-1-3, R-1-4, R-1-5, R-1-6, and 6.2.

COMMENT H-6-8: "Point No. 2. Apparently linear interpolation between the morning and afternoon upper air data -- that is, you have an afternoon sounding and a morning sounding and they linearally interpolate this--was utilized in the modeling. This large uncertainty in meteorological data points up the need for basin-wide, hourly, real-time meteorological networks in the Uintah and Piceance basins utilizing Doppler acoustic radars or their equivalent for an extended time period, say one year.

A need for an improved validated regional air diffusion model also exists, for both short-term and annual runs at reasonable run costs. If you don't watch yourself in this regard, you pay the gross national product to make a model run and nobody can quite afford that." George Fosdick, Cathedral Bluffs Shale Oil Project.

RESPONSE: BLM concurs. The present meteorological data base is very fragmentary and is one of the large uncertainties in pollution dispersion modeling, not only in the Uintah and Piceance basins, but throughout much of the West where energy development and related NEPA and PSD processes are or would be occurring.

COMMENT H-6-9: "Point No. 3. It needs to be pointed out that some non-EPA-guideline models were used for the analysis. Furthermore, a demonstration of model validation--there's two models in particular that are used by SAI, the complex terrain wind model and regional transport model--neither of these were demonstrated to be validated for the basin in question in the draft statement." George Fosdick, Cathedral Bluffs Shale Oil Project.

RESPONSE: See the response to Comment 30.42. The discussion in both the Air Quality Technical Report and the Final EIS have been expanded to further quantify the fact that the air quality analysis performed for the EIS was done under the requirements of NEPA. It was not performed for the purpose of obtaining a PSD permit and would not satisfy the requirements of that process. The text was further clarified to recognize that some non-EPA-guideline models were used for the analysis.

COMMENT H-6-10: "Point No. 4, and the final point. The draft statement alludes to exceedances of the PSD near Tract C-b due to C-b emissions, and I can assure you that we put that in its most recent PSD application, which was later withdrawn, but nevertheless, when it was put in, no such exceedances existed. So I would suggest that the statement be softened in that regard." George Fosdick, Cathedral Bluffs Shale Oil Project.

RESPONSE: BLM recognizes that the currently postponed Cathedral Bluffs project would not be permitted unless the responsible PSD permitting agency is convinced on the basis of approved modeling approaches that PSD increments and ambient air quality standards would not be exceeded. The Final EIS has been expanded to discuss this further as it related to the Cathedral Bluffs proposal.

COMMENT H-8-1: "We do have some concern about the potential for a threshold level to be reached where the multiple development of projects could impose difficulties on local governments to adequately and orderly manage the population growth and the potential impacts." Mark Bubriski, Rio Blanco County.

RESPONSE: It is recognized that the utilization of percentage growth rates is a judgmental method for analyzing impacts since the quantity and quality of a community's existing infrastructure is variable. However, for reasons of consistency of the analysis, a 10 percent growth rate was used as the significance criteria. It is assumed that impacts can and would be felt on some of a community's infrastructure prior to reaching a 10 percent growth rate but that at this point a threshold would be reached that would tax the ability of most communities to manage growth.

COMMENT H-8-2: "The EIS states that the Rangely school system now operates at 52 percent capacity and can handle substantial growth. The Rangely school system is presently feeling the effects of growth. There are tentative plans being considered, or at some point in the near future, to build an additional elementary school and an addition to the middle school. To assume that current capacities are adequate is incorrect." Mark Bubriski, Rio Blanco County.

RESPONSE: EIS data on Rangely was derived from the Colorado Cumulative Impact Task Force draft community profiles. This data source was used at the request of the Colorado Department of Local Affairs and the Colorado State Bureau of Land Management to ensure consistency with the Federal Oil Shale Management Program EIS (BLM 1983) and other Colorado studies. The school enrollment data and capacity data was for 1981. It is true that the 1982 school enrollment figures show a substantial increase in Rangely, Colorado, as a result of the Western Fuels project.

COMMENT H-9-1: "...One of the first questions I have is, when you measure energy efficiencies of these operations, you have taken an input and divided it by output times a hundred and I was wondering; is this standard procedure for measuring--it would seem like you would want to put input divided by output plus input times a hundred. I am not sure of this. I have a hard time of taking a ratio and calling it a percent." Peter Hovingh

RESPONSE: The standard formula for energy efficiency is the energy "out," divided by energy "in," times 100 (Section R-4.A.13). This is discussed in more detail in the Energy Analysis Handbook for Preparation of Oil Shale Development Environmental Impact Statements (BLM 1982a).

COMMENT H-9-2: "...Another concern of mine was revegetation and I was not sure after reading this impact statement whether revegetation was going to be natural events or whether it was actually going to be reseeded or--and planted." Peter Hovingh

RESPONSE: Revegetation would be accomplished through the reseeding and planting of adapted native species and using applicable effective measures and techniques to provide a vegetative cover that would withstand the arid climate and soil conditions typical of the area (Appendix A-8).

COMMENT H-9-3: "...I had a hard time--20 years revegetation or 10 to 40 years for full growth. I am not quite sure of the effectiveness of the revegetation and I would like more information on that." Peter Hovingh

RESPONSE: The time periods identified in the Draft EIS refer to the time required for certain vegetation types to achieve full growth. The longer period relates to shrub types and trees (Appendix A-8).

COMMENT H-9-4: "There was, again, some concerns in that you would mention the Gibson and Linhurst 1982 effects of acid precipitation on the North American continent and you didn't mention any publishers and I was wondering where one could get hold of such documents." Peter Hovingh

RESPONSE: A complete bibliographic citation for this report has been added to the reference list.

COMMENT H-9-5: "...I think there was one other reference you had listed, Turk and Adams 1982, and there wasn't anything in the reference on that." Peter Hovingh

RESPONSE: The bibliographic citation for the Turk and Adams study has been added to the Final EIS References section.

COMMENT H-9-6: "Again, I am very interested in acid rains and we keep hearing that there is no baseline data on acid rains and yet there is an awful lot of material known." Peter Hovingh

RESPONSE: Acid deposition has been of growing concern since the 1970s, and assessment of environmental effects is still in the very early stages. The majority of work on effects has been conducted in the northeastern United States and southeastern Canada. Much less information is available for western environments where ecosystems are much different relative to soil pH, buffering capacity, precipitation amounts and distribution, and vegetation types. As discussed in response to Comment H-9-8, there is a monitoring network which was organized in 1978 and presently has 100 stations in 42 of the 50 states. In addition, there are a number of studies presently underway in the West, some of which have been cited in the EIS (Section R-4.A.2). The discussion in the Final EIS (Section R-4.A.2) has also been expanded to include additional data.

COMMENT H-9-7: "...One of the comments you make in the paper--its's on RG 20 and watershed soils which alkaline, containing alkaline or bicarbonate to buffer or neutralize incoming acid deposits--lakes and streams would all be acified and aquatic news will be less susceptible to the harm. I think this is quite false at this time.

When you are taking acid rains and using the rain store for buffering, it releases calcium and a lot of your heavy metals--aluminum, lead--and they come into the streams in a very toxic force and this toxicity does have a great effect on aquatic communities without changing the pH. I think this is quite well-documented in some of the acid rain literature." Peter Hovingh.

RESPONSE: While it is true that some loss of minerals and mobilization of trace elements may occur as the result of natural weathering and leaching processes, these processes can be greatly accelerated by change in pH toward greater acidity. The presence of calcium in soils formed from highly fossilferous sediments, limestones, dolostones, etc., provides carbonate minerals which constitute the acid-neutralizing (buffering) capability of the soil and, therefore, its resistence to pH change. The commenter is referred to the following references, as cited in the references section, for more detail (Gibson and Linhurst 1982, Norton et al. 1982, Turk and Adams 1982).

COMMENT H-9-8: "One of the things I am wondering, again, in acid rains, is will there be any mitigations for monitoring? I can--the EPA says there is no baseline data and I would like very much to see baseline data in the Intermountain West. I understand there is quite a bit of biological monitoring at the Rocky Mountain Biological Station in Colorado. I understand that there aren't any instruments measuring acid rain in Utah and I could easily envision if this oil shale comes really to full bloom with all the commitment to a coal development is that we need established monitoring of acid rains in, say, Cedar Breaks, Alta, Logan, and perhaps Vernal, just to find out where the acid rains are coming from and to get good baseline data." Peter Hovingh

RESPONSE: Two major networks designed to measure precipitation chemistry exist in North America. These are the Canadian Network for Sampling Precipitation (CANSAP) organized in 1977, and the National Atmospheric Deposition Program (NADP) organized in 1978. The NADP is supported by the Bureau of Land Management, National Park Service, Environmental Protection Agency, U.S. Geological Survey, National Oceanographic and Atmospheric Administration, state agencies, electric utilities, and the wood products industries. Each of these stations is located at a site that is selected to be representative of the region. At the present time, the network consists of 100 stations representing 42 of the 50 states with plans to expand to 150 sites. At the present time, there is one station in Utah operated by the BLM. BLM has plans underway to install an additional two stations in Utah in fiscal year 1983.

COMMENT H-9-9: "...When it comes to some of your wildlife things you do mention amphibians and reptiles. One aspect that's misunderstood about amphibians is, because they can go out on land, they don't need water and therefore they can readily rehabit any disturbed area and this is--some amphibians can do this. The great spade-foot toad can do this. In fact, the spade-foot toad lives in disturbed soil as long as there is some water around for breeding. But the other amphibians that are mentioned in Stephen's Guide to Amphibians and Reptiles of the Western United States do require permanent water for breeding and one of my concerns is, that if you remove this permanent water, you may greatly affect the distribution of these amphibians, wiping out a population for a hundred miles around." Peter Hovingh

RESPONSE: No permanent water would be removed through the implementation of the synfuels projects. There is virtually no chance that these species would be eliminated by the projects.

COMMENT H-9-10: "...Some of these amphibians are very localized. I note that there is no current status of distribution of amphibians in Utah and for that matter, the Intermountain region, Nevada, Idaho, and Utah. It would be very useful to know about the amphibian distribution in the oil shale region to know what is being affected before it disappears." Peter Hovingh

RESPONSE: The EIS analysis does not predict any significant effects to amphibian species (Section R-4.A.5). However, distribution of amphibians in Utah can be found in Vertebrate Wildlife Species (Utah Division of Wildlife Resources 1981).

COMMENT H-9-11: "There is another concern of recreation on the White River. You talk about the water-oriented activities that the construction crew and the people who work on-site will greatly appreciate, the White River Reservoir, and yet I would certainly like to know if they would appreciate canoeing. I wonder where these people are going to come from that they won't know about canoeing." Peter Hovingh

RESPONSE: The potential impacts of the White River Dam are addressed in detail in the White River Dam Project EIS (BLM 1982b).

COMMENT H-9-12: "There is mention of salinity--increased salinity and how much it costs; $4,720,000 annual. I would certainly like to know who pays this. And one of the side aspects of acid rains is that if it neutralizes alkaline soil that means there would be an acid increase, salinity in the region. Maybe perhaps the question is, are we producing more salinity in the Colorado River system than we are removing from the Colorado River system under the present programs." Peter Hovingh

RESPONSE: The correct estimate of damages to downstream users is $472,000 per mg/l increase in salinity at Imperial Dam, California. This is not an annual assessment or payment, rather it is an estimate of damage primarily from crop loss and increased pumping costs to flush salt from the soil. Because of this, these damages are shared by many downstream users.

COMMENT H-9-13: "...One of the things I have done here is I have prepared a table comparing the various oil shale companies with their capacity per year, barrels of oil; water consumption per year, barrels of oil produced per acre-foot of water consumed; surface disturbance. I guess that would be total surface disturbance per barrel of oil produced, per acre of disturbed soil; and the sulfur dioxide emission against barrels of oil produced per year per kilogram of sulfur dioxide released per hour. If the state were interested in selecting good industry in the oil shale field they certainly have a tool here to handle. The tar sands would go down the drain very fast. Magic Circle would stand out quite prominent. If they were concerned about water use, being the second dry state in the nation, they would certainly eliminate all projects that waste water and, of course, in this state, one doesn't concern about industry wasting water, it's as long as one keeps California from getting it." Peter Hovingh.

(Note: Table referred to in this comment is reprinted with Comment Letter 5.)

RESPONSE: The views expressed will be considered in the decisionmaking process.

COMMENT H-9-14: "But one of the big concerns, of course, with all of this water in use, is that the river runners are going to be left stranded more and more often." Peter Hovingh

RESPONSE: There would be no noticeable effects to river running on the Green or Colorado rivers as a direct result of the proposed synfuels development. Indirectly, however, the White River, as it exists today, would be different due to the construction of the White River Dam and subsequent regulated flows. The impacts of the White River Dam are analyzed in detail in the White River Dam Project EIS (BLM 1982b). See also the response to Comment H-10-4.

COMMENT H-10-1: "It is imperative that oil shale and tar sands development and growth of eastern Utah takes place that invaluable and irreplaceable river resources be addressed. The historical approach to management of Utah's water resources, one of constructing dams on every river as the only means of supplying water, is not acceptable to many Utah citizens. Development of surface waters first, neglect of conjunctive water management using available ground water supplementally, and failure to address and include conservation of water to reduce demand and water use--all of which practices contribute unnecessary depletion of our rivers--is no longer tenable." Dorothy Harvey, Intermountain Water Alliance.

RESPONSE: The water model that was used in this study addresses water use as proposed by the applicants. The issue of using surface water versus ground water or of requiring certain conservation measures is an issue that is considered by the State Engineer during the application process. It is not intended that this EIS evaluate Utah State water policies that may be set by the State Legislature, State Engineer, or State Division of Water Resources.

COMMENT H-10-2: "Both the Bureau of Reclamation and GAO, General Accounting Office, document the availability of already-stored water both in Flaming Gorge and in Lake Powell. Utah's share of Flaming Gorge is 452,000 acre-feet of unsold water. It is almost--there is over 900,000 acre-feet of unsold water in Lake Powell.

What are we waiting for? Why isn't this water used? Why is the water not released from Flaming Gorge down to the Green to be pumped by industry? If we need more than that, why is no exchange made of some of this available stored water in Lake Powell and that to be released from Flaming Gorge?" Dorothy Harvey, Intermountain Water Alliance.

RESPONSE: The water that is stored in the Colorado River System is intended to ensure that uses at downstream points are met, based upon compact and international agreements. The net effect of using Flaming Gorge storage water rather than flowing water from the Upper Colorado River Basin would not change the salinity increases nor would it change the depletions at the inflow to Lake Powell. It would simply shift the burden from the White River to the Green River or another source. See also the EIS Preface concerning the position of the U.S. Bureau of Reclamation and the Utah Division of Water Rights on the availability of Flaming Gorge water.

COMMENT H-10-3: "Information on ground water resources in the draft EIS on ground water sources appears to be inaccurate, since apparently it is taken from U.S.G.S., Division of Water Resources hydrology in the northern Uintah Basin, not the south. U.S.G.S. ground water studies for the southern basin are not completed or completely reviewed. This study was completed and it was sent for review two years ago and there is some need to revise the modeling so it's still not reviewed. What this means is not all data is available to the public." Dorothy Harvey, Intermountain Water Alliance.

RESPONSE: The EIS ground water resource information is based on the USGS hydrology for the northern basin. The survey's southern Uintah Basin report is not available. However, according to U.S.G.S, this report will not change the description of the occurrence of ground water, nor the effects on ground water as predicted in the EIS.

COMMENT H-10-4: "Since impacts on ecosystems of the rivers involved in supplying water for synfuel development cannot be pre-determined without more precise management recommendations which address criteria required to maintain flows and kinds of flows for river recreation, the EIS is remiss and inadequate. It is essential that the agencies and industries participating in this kind of energy development evaluate the hydrological requirements which meet recreationists' needs and use such information as a basis for planning their water requirements." Dorothy Harvey, Intermountain Water Alliance

RESPONSE: The EIS states that flow reductions would range from 0 to 30 percent on the White River, 0 to 4 percent on the Green River, and about 1 percent at the inflow to Lake Powell. Significant impacts would result if reductions in flow exceed 10 percent (significance criteria identified in Chapter R-4). There would be no noticeable effects to river running on the Green or Colorado rivers. However, the White River as it exists today would be different due to the construction of the White River Dam and subsequent regulated flows. This point has been clarified in Section R-4.A.8. Also, please see the recreation discussion in the White River Dam Project EIS (BLM 1982b). That EIS has been incorporated by reference and is available from the BLM Vernal District and the BLM Utah State Office.

COMMENT LETTER 1

DEPARTMENT OF HEALTH & HUMAN SERVICES

Office of the
Principal Regional Official

Region VIII
Federal Office Building
1961 Stout Street
Denver CO 80294
ROFEC

September 17, 1982

Mr. Lloyd Ferguson
District Maneger
Bureau of Land Management
170 South 500 Eest
Vernel, Utah 84078

Dear Mr. Ferguson:

We have reviewed the DEIS on the Ointe Basin Synfuele Development.

1.1 As discussed in this DEIS, the impact of the synfuels development on certain countiee in Utah and Coloredo will be very eignificant, particularly in Utah. In generel, an edverse effect on houeing, education, mentel health and social servicee, and community services is projected. The projected demand for additional eociel workers, for example, is high where ehortagee of trained steff elreedy exist. Given the status of Federal/State budget conetrainte, the prospects for increeeed staffing in the effected communitiee are very limited.

The DEIS included an appendix entitled "Uncommitted Mitigetion Measures," which would address potential environmental effecte of the proposed development. It ie suggested that the synfuels projecte provide direct assistence in housing, lew enforcement, Indian job training, funding for eociel workers, etc.

We encourage an approach that would result in specific eynfuels project commitments to the above, given the decreaeing availability of Federal/ State financiel reeourcee.

Sincerely yours,

E. W. McIntire
Director, ROFEC

RESPONSE LETTER 1

U.S. Department of Health and Human Services, Region VIII

1.1 The types of direct assistance suggested to be provided by synfuels applicants are listed under the Socioeconomics section of Appendix A-7, Uncommitted Mitigation Measures. Although the BLM would encourage the applicants to work with the affected communities and groups to alleviate social and economic problems, we have no legal authority to require their commitment to specific socioeconomic measures. However, the State of Utah's S.B. 170 mandates a socioeconomic mitigation process in Utah that requires applicants to work with potentially affected communities to deal with shortfalls in community service and facilities associated with development.

COMMENT LETTER 2

WASATCH MOUNTAIN CLUB
3155 HIGHLAND DRIVE
SALT LAKE CITY, UTAH 84106

Mr. Lloyd Ferguson, District Manager
Bureau of Land Management
170 South 500 East
Vernal, Utah 84078

Dear Mr. Ferguson:

Concerning the Draft Environmental Impact Statement on the Uintah Basin Synfuels development:

The Wasatch Mountain Club is actively involved in river recreation. Withdrawals of water from rivers without planning for river recreation destroys recreation opportunities in Utah. River-related recreational activities in arid regions have greatly increased in the last decade while the number of river miles have declined drastically. Furthermore the existin flows of rivers have left river runners stranded on the rocks because of low waters and water consumption upstream.

2.1 It is noted that water resources are not being plannned in the Draft EIS. It is noted that all the projects adjacent to ano south of the White River have preferred alternatives from the White River no matter how close these projects are to the Green River and the abundance of stored water in Flamming Gorge Reservoir. Since the Draft EIS assumed the construction of the White River Dam and Reservoir, it is obvious to the reader that all water consumption then must come from the White River whether or not the source is the best source. It is even more clear that this is the case when 30% of the White River will be consumed by the Synfuels projects while the impact on the Green River would be less than 2%. Obvious rivers, river recreation, and riparian habitat was not planned for in the Draft EIS.

2.2 Because of the importance of river recreation for members of the Wasatch Mountain Club and for many others who live throughout the country, the Wasatch Mountain Club urges that in the granting of the right-of-way permits and other permits, that only permits to those synfuels projects be given which are the least destructive to the land, to the air, and to the riparian habitat. Furthermore the Wasatch Mountain Club urges that no waters be withdrawn from streams and rivers that are in excess of 1% of the average flows. Additional water for synfuels must be obtained from the numberous existing reservoirs.

Sincerely,
Peter Hovingh
Conservation Director
Wasatch Mountain Club

WASATCH MOUNTAIN CLUB FOUNDED IN 1921

RESPONSE LETTER 2

Wasatch Mountain Club

2.1 The impacts from the proposed White River Dam Project are discussed in the EIS for that project. The White River Dam is the proposed source of water for most of the synfuels projects described here. Information from the White River Dam Project EIS (BLM 1982b) has not been duplicated here, but it is referenced and is available to the readers and decisionmakers.

The Uintah Basin Synfuels EIS addresses potential impacts to river recreation in the various Chapter 4 Recreation sections; impacts to riparian habitat are addressed in the Vegetation, Soils, and Reclamation sections and Wildlife sections.

The alternatives of obtaining water from the Green River are analyzed for each of the site-specific projects. Please refer to the EIS sections related to the following alternatives:

Enercor--Green River Alternative Supply System
Green River Southern Loop Alternative Water Supply System

Magic Circle--Proposed Action
Green River Alternative Water Supply System

Paraho--Bonanza Power Plant Alternative Water Supply System

Syntana-Utah--Green River Alternative Water Supply System

Tosco--Green River Section 23 Alternative Water Supply System

2.2 The views expressed will be considered in the decision-making process.

COMMENT LETTER 3

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION EIGHT
555 ZANG STREET, BOX 25246
DENVER, COLORADO 80225

October 1, 1982

IN REPLY REFER TO
HEP-08

U.S. Department of the Interior
Bureau of Land Management
Mr. Lloyd Ferguson, District Manager
170 South 500 East
Vernal, Utah 84078

Dear Mr. Ferguson:

Thank you for the opportunity to review your Draft Environmental Impact Statement on Uintah Basin Synfuels Development. While the document appears to be well constructed and covers the impacts of the synfuel projects, we have the following comments.

3.1 There appears to be no list of those agencies consulted during preparation of this document nor a list of those agencies who will review it and the final document. Since there apparently will be significant highway and road impacts from the proposed development, we would encourage that you work closely with the Utah Department of Transportation (UDOT) and affected county highway agencies in the review of this draft and the development of a final document.

3.2 Page R-4.8 indicates that the impact to roads would be considered significant if the Level of Service dropped to Level "D" as defined in the AASHTO Capacity Manual. Current highway design practices dictate that roads be at a Level of Service "B". We again encourage close coordination with UDOT and county highway agencies to assure proper highway capacity for the proposed development.

3.3 The document recognizes the significant impacts on the highways caused by the development but does not specify mitigation measures to alleviate these conditions (i.e., what measures would be required, by whom, when, to what degree). These measures should be included in the final document.

Sincerely,

Fred Hempel

Fred Hempel

RESPONSE LETTER 3

U.S. Federal Highway Administration, Region VIII

3.1 Consultation and coordination was discussed in Appendix R-E of the Draft EIS. Utah Department of Transportation and the affected county governments were requested to review the Draft EIS and also will receive copies of the Final EIS.

3.2 BLM appreciates the commentor's point that roads are designed at a Level of Service "B." The rationale for using Level of Service "D" for existing roads as the breaking point for a significant impact is that, by definition, this is the point at which deficiencies become critical (American Association of State Highway and Transportation Officials 1965). BLM agrees that close coordination with Utah Division of Transportation is important (see response to Comment 3.1).

3.3 Mitigation of highway impacts is addressed in Appendix A-7, Uncommitted Mitigation, and Appendix A-11, General Measures for Grants and Permits.

COMMENT LETTER 4

UTAH NATURE STUDY SOCIETY

721 Second Avenue
Salt Lake City
Utah 84103

11 October 1982

Mr Lloyd Ferguson, District Manager
Bureau of Land Management
170 South 500 East
Vernal, Utah 84078

Dear Mr Ferguson:

Concerning the Draft Environmental Impact Statement on the Uintah Basin Synfuels Developments:

Utah Nature Study Society is an organization dedicated to the understanding of natural worlds, promotion of education of nature study, and to the wise use of natural resources.

4.1 We note that natural streams are becoming a rare habitat and ecosystem in arid regions. It is noted that the preferred alternative of all users (except Sohio which is too far from the White River) of water is the White River even when one user prefers the Green River (Magic Circle). Is this wise use of water resources to impact one river by over 25% whereas a second river (the Green River) is impacted less than 4%? Furthermore by withdrawing water from the White River one impacts the Green River anyway. It seems that wise use of water and preservation of a unique and rapidly diminishing ecosystem (desert riparian) would dictate the use of the Green River water directly. Or has the State of Utah told you that only White River water could be used for synfuels just so the State of Utah could rationalize the use of taxpayers monies for the costly studies on the White River Dam?

4.2 The White River Dam Final Environmental Impact Statement only allowed for 75,000 acre-feet of water to be used from the White River (Biological Opinion). Is not the 103,000 acre-feet of water in the high level scenario exceeding the use as dictated by the Biological Opinion? By utilizing the data in Table 4-2 (White River Final Environmental Impact Statement) and increasing the usage to 103,000 acre-feet, it seems that during December and January the flows would be reduced to less than 250 cfs. For December the flows in an average year woudl be 231 cfs and in January the flows would be 229 cfs. Then if one proceeds to Table 4-3 of the Final Environmental Impact State on the White River, it seems that the flows would be reduced every month to less than the 250 cfs instead of the proposed July, August, and September as stated in Table 4-3. The major flaw in the Biological Opinion is that the flows are adjusted to what enters the reservoir. If oil shale developments occur in Meeker and

4.2 (cont) and Rangely as suggested in the Draft Environmental Impact Statement for the Synfuels Developments, depletion of the White River above the reservoir would be severe- allowing for no protection of the endangered species of fish.

Consequently Utah Nature Study Society asks that:

1) the Final Environmental Impact Statement for the Synfuels Program in the Uintah Basin include a table for the flows below the dam with 103,000 acre-feet consumption of water from the White River (a Table similar to Table 4-2 in the Final White River Environmental Impact Statement).

2) the Final Synfuels Environmental Impact Statement include a table comparable to Table 4-3 in the Final White River Environmental Impact Statement for flows below the dam with 103,000 acre-feet of water consumption occurring in the White River.

3) That the Final Environmental Impact Statement for the Synfuels Program include a Table showing the flows of the White River below the dam with 103,000 acre-feet of water consumption for a 25% draught year (flows half way between the mean and year 1977).

4) the Final Synfuels Environmental Impact Statement include a table for flows below the dam with 103,000 acre-feet of water consumed in Uintah Basin synfuels developments from the White River and for the proposed synfuels developments in Colorado that would use the White River water. Both average year and 25% draught and year 1977 should be used.

4.3 We still suggest that a better alternative is to allow the White River waters to be used, if necessary, for the construction phase of the synfuels developments and to pipe all the operational uses of water from the 10-times larger Green River together with the huge Flamming Gorge reservoir for backup. If the oil shale industry wants a reliable source of water, the Green River is the only source of water that can be considered reliable. Reliability of course includes many factors as a system already in operation and acceptible by many people who use the waters for recreation.

4.4 The Draft Environmental Impact Statement for the Synfuels Developments included a section on acid rains. This is certainly a step forward. However in R-G-20 it is stated, "In watershed soils which are alkaline (containing limestonc or bicarbonate) to buffer or neutralyze incoming acid deposition, lakes and streams will be acidified less rapidly and aquatic communities will be less susceptable to harm." It should be noted that neutralization of alkaline soils solubilizes many cations which 1) poisons the biological communities directly or 2) deprives the biological communities of necessary nutrition. For example, the solubilization of calcium from limestone changes the phosphate content in aquatic systems. If the phosphate content is limiting for biological communities, then these communities will die. This occurs without changes in pH.

4.5 We have heard that conservation pools in reservoirs in Utah are very common. We also understand that during draught, the conservation pools in Utah are not used by wildlife but are drawn down for municipal and industrial and agriculture uses. If this is so, what is the value of conservation pools? Utah Nature Study Society would like a record of conservation pools during 1977 draught to determine if the conservation pool of the White River Reservoir is a meaningful procedure to preserve the minimal flows. We would also like to know what is the life-expectancy of the conservation pool with the high degree of siltation that the reservoir will receive.

4.6 It is noted that Parahoe-Ute project will dispose of waste in side canyons of the White River. It is proposed that dams (barriers) will be used to keep the waste from entering the White River. Who will maintain these dams after Parahoe-Ute pulls out of the operations? What will these barriers look like from below? What will a water pumping station look like?

4.7 It is noted that Tosco White River Source will use a 3 inch screen. What will pass through the 3 inch screen? How will the 3-inch screen affect aquatic life during low water? What portion of aquatic life in the White River will pass through the 3-inch screen?

4.8 It is noted that reclamation of the waste lands could only be successful with a highly successful Federal and State compliance program. Who pays for this compliance program? Who will assure that reclamation will be complete? Will reclamation withstand draught? Does the reclamation program actually include reseeding or natural revegation (tumbleweeds, halageton, and dandelions)? How much water will be required for successful reclamation of waste lands?

These are some of our concerns. It is useful to be able to compare the various projects in the Uintah Basin. The Draft version is a good version with the exception of requiring all the users in the region to use White River water just so the State of Utah can build its dam and pay off a Water Developer.

Sincerely,

Peter Hovingh

Peter Hovingh

President, Utah Nature Study Society

RESPONSE LETTER 4

Utah Nature Study Society

4.1 The views expressed will be considered in the decisionmaking process. Also refer to the response to Comment H-10.1.

4.2 The following responses correspond to the four items enumerated in the comment.

1) A memorandum of agreement has been completed regarding fish and wildlife conservation measures associated with the White River Dam Project. That agreement is between BLM, U.S. Fish and Wildlife Service, Utah Board and Division of Water Resources, Utah Division of Wildlife Resources, and Utah Department of Natural Resources and Energy. Copies of that agreement are available on request to the BLM Vernal District. The agreement outlines water flow release provisions consistent with the biological opinion for the White River Dam project.

(2 and 3) These two items refer to the driest period on record and 25 percent of the driest period on record, respectively. This EIS made a modeling effort to predict flows from the applicants' and interrelated projects far into the future. Changes in flows are given in Section R-4.A.3 for 1983, 1985, 1990, 1995, and 2000. These changes are shown graphically in Figure R-4-4. This establishes a water consumption trend.

In the modeling that BLM did for this EIS, a computer run was made that represented drought conditions. This run was not used as the basis for determining impacts, because it was thought to overemphasize the worst case. For this EIS, worst case is defined as all the applicants withdrawing water from the same source (rather than withdrawing during a drought year). Therefore, this EIS presents two worst cases - Maximum White River Development and Maximum Green River Development. Also, maintaining a 250 cfs minimum flow as agreed to for the White River Dam Project would result in mitigation of most drought year impacts to less than a worst case.

4) The data presented in this EIS considers significant water use impacts in Colorado on the White River. Baseline water use is projected to increase considerably from 1985 to 1990 (Figure R-4-4). Part of this represents oil shale, agriculture, and other water development in Colorado.

In summary, the BLM chose to show changes in flows based upon two situations: Maximum Green River and Maximum White River Development. This was done due to the long time span of this project and due to its complexity.

4.3 The Green River Maximum Development case used in the water resources analysis assumed maximum use of the Green River by the synfuels projects (Section R-4.A.3). The views expressed in this comment will be considered in the decisionmaking process.

4.4 Available calcium in the soil solution from natural weathering and leaching processes can interact with phosphorous to make phosphorus unavailable for uptake by plant roots. This can lead to a phosphorous deficiency which, if severe enough, can cause the demise of the organism. An example is phosphorous and iron deficiencies of roses planted close to concrete structures such as house foundations. Calcium availability from the lime in concrete can reduce phosphorous and iron availability for root uptake, leading to chlorosis, necrosis, or even death of the plant.

The role of calcium from highly calcareous soils and related buffering capacity is a different matter as discussed in response to Comment H-9-7.

4.5 The concerns raised in this comment relate to operation of the White River Dam. Please refer to the White River Dam EIS (BLM 1982b) for a discussion of the information known about sedimentation and the use of conservation pools in drought years.

4.6 The dams and spent shale pile would be constructed on private land owned by Paraho. Paraho would maintain them.

Figure SS-1 gives a general idea of what the barriers would look like.

A plan view and cross section of Paraho's river intake structure and pumping station is shown on Figure C-1.

4.7 Fish, twigs, and similar sized materials would pass through. The only aquatic species that would experience significant effects from the intake structure would be the fish species discussed in Section T-4.A.5 under the heading, Threatened or Endangered Species.

4.8 Appendix A-8 discusses the applicants' erosion control and reclamation programs. The applicants are committed to the total cost of reclamation. The state and federal agencies involved would have monitoring, inspection, and certification responsibilities requiring time and costs that would be reimbursed by the applicants. Inspection and certification would be determined by landowner or authorized agency official.

The reclamation programs include reseeding to adapted native species.

Revegetation is based on use of adapted native species and use of applicable and effective measures to provide a vegetative cover that would withstand the arid climate and soil conditions typical of the area. Supplemental water (source from process) would be used mainly in the leaching process associated with preparing a suitable plant growth condition in the upper layer of the spent shale piles. This amount of water required has not been quantified.

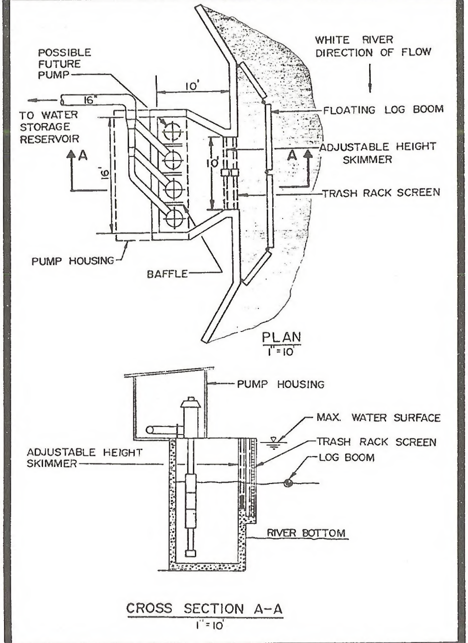

FIGURE C-1 PARAHO RIVER INTAKE STRUCTURE AND PUMPING STATION

COMMENT LETTER 5

INTERMOUNTAIN WATER ALLIANCE

Box 1713
Salt Lake City
Utah 84110

12 October 1982

Mr Lloyd Ferguson, Oistrict Manager
170 South 500 East
Vernal, Utah 84078

Oear Mr Ferguson:

Concerning the Oraft Environmental Impact Statement for the Uintah Basin Synfuels developments:

5.1 In reviewing the Oata in the Oraft Environmental Impact Statement, the Intermountain Water Alliance has compared the various developers of synfuels with respect to:

1) the barrels of oil produced per year per acre-feet of water consumed (column 2)

2) the barrels of oil produced per year per acre of disturbed surface for the project's life (column 3)

3) the barrels of oil produced per year per kilogram of sulfur dioxide emitted per hour (column 4)

Table 1 summarizes the data. In each case the large the number, the greater is the productivity of oil in relation to the stress the development places upon the environment. Intermountain Water Alliance is concerned about the inefficiency of oil production in relation to water consumption, in the deterioration of natural water courses due to poor land reclamation and great land disturbances, and to the deterioration of aquatic resources due to acid precipitation.

From this data we note:

1) tar sands development has much more impact on water, land and air than oil shale development

2) there is a ten fold difference amoung various oil shale processes in their consumption of water

3) there is a six fold difference among various oil shale processes in their disturbance of the terrain

4) there is a 240-fold difference among the various oil shale processors in the emissions of sulfur dioxide into the air

S) (not listed) there is only about a two fold difference in employment among the various synfuels processors

IMPACTS ON WATER

5.2 The Intermountain Water Alliance nots that the Oraft Environmental Impact Statement lists Enercorainbow, Enercor-Mono Power, Paraho-Ute, Syntana-Utah, Toxco, and White River Oil Shale Corp as requiring their water from the White River. We also see that the State and the Bureau of Land Management are trying to coerce Magic Circle into taking water from the White River instead of the Green River.

For water resources we note:

	average annual flow (acre-feet/year)	High level scenario (acre-feet/year
Ouchesne River	473,000	0
White River	479,000	10S,000
Green River	4,563,000	132,000*

* Includes the 10S,000 acre-feet from the White River

Both the Ouchesne River and the Green River have an abundance of stored and unused and uncommitted water in reservoirs. The White River is still an unregulated river the runs the natural cycles. Consumption of water from the White River assumes that a dam will be built and will be built by state funding and taxes.

We then note that taking water from the White River and assuming the STate of Utah will build the dam that the Bureau of Land Managements preferred alternatives will:

1) destroy the White River for canoe and rafting recreation

2) destry the riparian habitat along the White River for wildlife and the Fremont cottonwood ecosystem

3) impact the Green River by removin g 10S,000 acre-feet

By pumping water from the Green River the synfuels industry would only impact the Green River by a small amount. By pumping water directly from the Green River and having the equivalent amount of water released from Flamming Gorge might not impact any river. The Intermountain Water Alliance has supported this last notice.

The Intermountain Water Alliance ask if:

1) the destruction of the White river and the Impaction on the Green River is President Reagans new water policy?

2) the destruction of the White River and the Impaction on the Green River is the Oepartment of Interiors new water policy?

3) the destruction of the White River and the impaction on the Green River is the Bureau of Land Managements new water policy?

4) or is the destruction of the White River and the impaction on the Green River the continued policy of the State of Utah in water resource management?

5.3 The Intermountain Water Alliance wonders just how the preferred alternatives were arrived at and why did the Bureau of Land Management assume the White River Dam would be built? Was this same assumption present when the Bureau of Land Management formulated the Draft Environmental Impact Statement and the Final Environmental Impact Statement on the White River Dam and Reservoir? Is the the purpose of the Environmental Impact Statement to determine the effect on lthe environment and the mitigation of these effects in the least destructi ve manner?

ELECTRICAL ENERGY REQUIREMENTS

5.4 The Intermountain Water Alliance notes that Sohio, Syntana-Utah, Tosco-Utah, Enercor-Rainbow, and Enercor-Mono Power will require 430.1 megawatts of electricity. This electrical demand will require an additional 6800 acre-feet of water for these projects (assuming the ratio of 3000 megawatts requires 50,000 acre-feet of water - Intermountain Power Project requirements). We also note that whenever large blocks of electrical energy is required in Utah, the rates for all customers, including residential and commercial users, increases. Furthermore, if industry does not use what was built for them, either by strikes, or by shut-downs, the cost of that capacity is then spread among the existing customers.

PARAHOE-Ute

5.5 Why does Parahoe-Ute wish to put its spent oil shale and terrain waste in the steep side canyons of the White River? Would it not be better for Parahoe-Ute and Syntana-Ute combine their spent oil shale solid waste site?

****

5.6 With the exception of the water resource analysis and the preferred alternatives of water resources, the Bureau of Land Management has put together a good document that for the first time describes some of the combined effects of large scale synfuels development. We think that the water analysis either is non-existent or that the Bureau of Land Mnanagement was told what to say so that J. Bingham can build his dam.

Sincerely,

Peter Hovingh

Peter Hovingh, Board of Trustees
White River consultant

Intermountain Water Alliance

	CAPACITY PER YEAR (BARRELS OF OIL)	WATER CONSUMPTION (BARRELS PER ACRE-FOOT)	SURFACE DISTURBANCE (BARRELS PER ACRE)	SULFUR DIOXIDE EMISSION (BARRELS PER kg/hr)
MAGIC CIRCLE (oil shale)	11,025,000	20,417	4426	75,000
GEOKINETIC (oil shale)	23,980,000	17,760	2566	13,330
Lofrecco	16,425,000	(infinite)		1,074
Agency Draw	7,555,500	5,600		27,980
PARAHO-UTAH (oil shale)	13,797,000	4,758	12692	75,800
SYNTANA-UTAH (oil shale)	18,755,000	2,679	4276	146,000
TOSCO-UTAH (oil shale)	14,767,000	1,641	2989	157,000
ENERCOR-MONO (tar sands)	16,425,000	1,314	1969	?
SOHIO (tar sands)	4,444,000	1,228	97	11,900
WHITE RIVER SHALE (oil shale)	32,850,000	1,212	?	242,000
ENERCO-RAINBOW (tar sands)	1,650,000	330	950	14,864

Intermountain Water Alliance

5.1 Generally, the statements made in the comment are true. However, it should be recognized that there are some differences in what is being compared.

In the case of water, some projects upgrade the oil more than others and some generate steam for on-site power production, both of which change the water use.

The acres of disturbed lands depends on what the company has proposed to do. The disturbance depends on things such as length of water and product lines (and whether any other pipelines are proposed); how much the spent shale will be spread out versus how high it will be stacked; and similar factors.

The sulfur dioxide figures are for controlled emissions, not necessarily what the different processes put out.

5.2 Impacts of the White River Dam are discussed in the White River Dam EIS (BLM 1982b). Impacts of the proposed synfuel development to canoeing and rafting are discussed in this EIS in Section R-4.A.8; impacts to riparian habitat and the cottonwood ecosystem are discussed in Sections R-4.A.4 and R-4.A.5.

The Department of the Interior has adopted a "good neighbor" policy to increase cooperation with state and local governments. The policy gives emphasis to making federal decisions in consultation with governors, county commissioners, and various elected or appointed local governing bodies. With specific regard to water resources, the policy recognizes the primary authority of the state to allocate water resources and the role of the state in major water planning functions.

The Department of the Interior is emphasizing the primacy of state water law and increased state responsibility in managing, planning, and financing water projects.

5.3 The practicality of obtaining water from a number of sources (including the Green River) for synfuels development was analyzed in the White River Dam EIS (BLM 1982b). A decision was made upon completion of that document to issue the State of Utah a right-of-way for construction of the dam. At this time, it appears to be a viable project, and BLM has no reason to believe it will not be built. Based on this information, BLM's preferred alternatives are to obtain water from this reservoir.

5.4 The additional power requirements and the demand for water have been analyzed in the Moon Lake Power Plant Project EIS (BLM 1982c).

5.5 The proposed location of the disposal site is on private land owned by Paraho. Current federal law does not allow disposal of spent shale on federal land, outside of federal oil shale lease areas. This restricts project sponsors, like Paraho, whose private land is surrounded by federal land, limiting the options for disposal sites.

5.6 The water system changes predicted to occur due to the proposed synfuels development are presented in Section R-4.A.3. As is evident, both flow and salinity would change at several points. These results came from inputs based upon current water useage and projected future useage. The results reflect the plans of the various applicants.

SOHIO SOHIO SHALE OIL COMPANY

50 SOUTH MAIN STREET, SUITE 930
SALT LAKE CITY, UTAH 84144
TELEPHONE (801) 328-3700

October 14, 1982

Mr. Lloyd Ferguson, District Manager
Bureau of Land Management
170 South 500 East
Vernal, UT 84078

Dear Mr. Ferguson:

Sohio Shale Oil Company would like to thank you for this opportunity to comment on the Draft Environmental Impact Statement which the BLM wrote for the Uintah Basin Synfuels Development. In general, the Draft EIS is well-written and thorough in its coverage of the pertinent issues.

We do, however, offer the following comments and technical corrections which we feel would make this EIS more accurate and more complete:

<u>Air Quality</u>:

6.1 o An error was found in the publication, "Air Quality Impact Analysis or Synthetic Fuel Development in the Uinta Basin," (Table 4-1, P. 4-9). Sulfur dioxide emissions from Sohio's project are listed as being 373 kg/hr. We believe that the maximum SO_2 emission rate from this project would be 55 kg/hr and the average emission rate would be 31 kg/hr. On P. R-4-26 of the UBS DEIS, the following statement is made: "...The sulfur dioxide concentration increases to dinosaur and Colorado National Monuments would be largely from the conceptual projects (Sohio and Geokinetics respectively)..." If we are correct, the SO_2 impact on these two areas from the Sohio project will probably be shown to be insignificant.

6.2 o P. R-4-32 Total suspended particulates (TSP): In this section, it is stated that the Sohio project will exceed the Class II increment for TSP a distance away from the plant site. It is speculated that both the Dinosaur National Monument and Uinta and Ouray Indian Reservation may be affected. Since the majority of the TSP emissions from the Sohio project are fugitive (95%), it is unlikely that the TSP impact on these two locations will be significant. Only the TSP emissions from process operations (34.2 kg/hr) should be used to calculate the impacts on distant locations. Most of the fugitive emissions will settle within the plant site boundaries.

6.3 o P. R-4-61 Surface Mining Disturbances: In this section, the Sohio project is labeled as a "tar sand strip mine." Strip-mine techniques will not be used on the Sohio project. The phrase should be changed to either "tar sand surface mining operations" or "tar sand open pit mining operations."

6.4 o P. R-4-75 Livestock Grazing: The third paragraph in this section states that impacts could be significant to two individual operators who use the allotments on state lands where open pit mines and plant sites proposed by Sohio and Geokinetics would be located. Later in the paragraph, it is stated that the overall impact is insignificant. Since this is the case, it should be stated first that there will be no significant impact.

6.5 o P. R-4-90 Table R-4-27: The last item in this table, "Oil From Tar Sand Strip Mines," should be changed to either "Oil From Tar Sands Open Pit Mines" or "Oil From Tar Sand Surface Mines."

<u>Socio-economic</u>:

6.6 o The Uintah School District has spent more than it has received in revenues in the last two years. Since they do not have any debt, did they finance this deficit from a previous surplus? If so, what is the status of their surplus account presently?

6.7 o The socio-economic <u>benefits</u> of the project are not quantified.

<u>Tosco Shale Oil Product Pipeline</u>:

6.8 o An eventual localized oil "glut" could develop if all projected shale oil plants in Utah came on line. Reversal of Chevron's pipeline to move excess volume to Rangely would only be able to accommodate a fraction of this excess. Therefore, your study should investigate the impacts of a pipeline leading east. Because of the limited product demand and the limited refinery capacity in Salt Lake City, this would be a more long term solution.

-3-

Appendix R-A (Maps):

6.9 o On Map R-A-3, in Section 32 of Range 22 East, Township 5 South, you have incorrectly identified land being owned by the federal government when in fact Sohio Shale Oil Company owns feel title to this land.

General:

6.10 o Is the hunting income of $3.7 million per year used in that study realistic?

6.11 o Fiscal pressures on communities are anticipated by the study yet the cities seldom receive a growth rate of more than 10 percent per year. Are these fiscal pressures inherent in the present structure or are they actually caused by this anticipated growth?

Again, we appreciate the opportunity to make these comments. If you have any questions concerning these comments, please do not hesitate to contact me.

Sincerely,

Robert L. Dudiak

Robert L. Dudiak, Manager
Program Services and
Community Development

RLD:cs

RESPONSE LETTER 6

Sohio Shale Oil Company

6.1 Emission data for the Sohio project were developed from the most recent information available when the study began--a letter dated December 28, 1981, from Mr. R.L. Dudiak, Sohio, to Mr. J.D. Edwards, BLM. The major emission point contributing to the maximum SO_2 emission rate for the 20,000 barrel/day facility was the steam generator reported at 361 kg/hr (796 lb/hr, excluding SO_2 emissions). BLM recognizes industry plans are evolving and that the emission data for several of the projects are continually changing. It is uncertain from the comment whether the 31 to 55 kg/hr values represent a proposed revision to the figures given originally. Section R-4.A.2 has been expanded to recognize the later emission estimates.

6.2 The fugitive particulate matter emissions from the Sohio project are primarily from ground level sources including truck hauling, storage piles, and other operations affected by wind erosion. For the high-level scenario, total particulate matter emissions consist of truck hauling on roads (81 percent), storage piles (14 percent), and steam generation (5 percent).

The effect of particulate gravitational settling on ambient concentrations can be evaluated if the particle size distribution is known. However, very little is known about the specific size distributions of particles emitted from the proposed synfuel facilities.

Since gravitational velocities are proportional to the square of the particle diameter (Stokes Law), large particles can settle out rather quickly.

To evaluate the effect of gravitational settling, the fraction of particles remaining airborne from a ground-level release were calculated. This fraction can be calculated as follows:

$$= \exp\left[-\frac{1}{2}\left(\frac{V_d\, x}{\sigma_z u}\right)^2\right]$$

This fraction was evaluated for three particle sizes--6, 10, and 20 um, having gravitational settling velocities of 0.19, 0.75, and 4.8 cm/s, for a 2.5 m/s wind and neutral (Pasquill D) stability. The results are shown in Table C-2.

Table C-2
PARTICLES REMAINING AIRBORNE FROM A GROUND-LEVEL RELEASE

Downwind Distance (km)	Fraction of Particles Remaining Airborne 6 um	10 um	20 um
0.5	1.00	1.00	0.88
1	1.00	1.00	0.84
2	1.00	0.99	0.76
5	1.00	0.99	0.63
10	1.00	0.98	0.36
20	1.00	0.96	0.16
50	0.99	0.90	0.01
100	0.98	0.78	0.00

Source: Systems Applications Inc. 1983.

Thus, if the synfuel TSP emission inventory is primarily particles less than 10 um, the model calculations, assuming no gravitational settling, are not particularly conservative. If, however, a significant fraction of the emission inventory is greater than 20 um, one would expect the model calculations to be quite conservative.

6.3 Section R-4.A.4 has been revised.

6.4 This paragraph in Section R-4.A.5 has been rewritten to clarify the intended meaning.

6.5 Table R-4-27 in Section R-4.A.13 has been revised.

6.6 Uintah School District officials indicated that deficits for 1979 and 1980 (Socioeconomics Technical Report, Table R28-24) were financed from a previous surplus. Their surplus account had a balance of $1,029,646 at the end of 1981.

6.7 The primary benefits of the proposed synthetic fuel projects within the Uintah Basin EIS communities are in the area of increased job opportunities, increased personal income, and increased revenues from taxes. Section R-4.A.1 and Table R-2-1 cite the increase in job opportunities and increased per capita personal income as a result of the proposed projects. An analysis of revenues and expenditures is considered by the BLM to be in the realm of mitigation planning and, thus, the purview of state and local government.

6.8 The potential for an oil glut is speculative. Present trends indicate that production of crude oil within the Uintah Basin will begin to decline around 1985, about the time production of shale oil would begin. However, the EIS analyzes product pipelines to carry oil east and west. New pipelines to the east are preferred by Magic Circle, Syntana-Utah, and Tosco. New pipelines to the west are proposed by Magic Circle (as a second preferred route) and Tosco (as an alternative). Only two applicants, Magic Circle and Paraho, propose to tie into the Chevron pipeline, and for Magic Circle, this is only one of three paths the shale oil could follow.

Refinery capacities, market locations, additional product pipelines and other future marketing-related needs are briefly noted in the technical report on the Tosco Salt Lake City Alternative Pipeline (BLM and FS 1982). The impacts of these or other similar facilities would be analyzed in detail and documented when and if they are proposed.

6.9 Review of the BLM land records in the Utah State office indicate that the E 1/2 and the NW 1/4, Section 32, Township 5 South, Range 22 East, was passed from federal ownership to a state grant in 1896. These same sections were again verified on April 12, 1962, as being State of Utah lands. As the BLM does not track subsequent title changes, after the original patent, Sohio could now hold fee title to this land without our land status reflecting it, which is why it would still show as State of Utah lands. The records show that the SW 1/4 is pending application for a state grant but has not left federal ownership yet. It would, therefore, still show as public land on the land status map.

6.10 All hunting income data are based on figures furnished by the Utah Division of Wildlife Resources and are assumed to be correct.

6.11 The fiscal pressures that accompany rapid growth are the product of lag time between the demand for services generated by growth and the time that new facilities are constructed and begin to generate tax revenues. Although such pressures exist within the present community, any additional stress from more rapid growth will accentuate the problem. It is for this reason that the Uintah Basin communities are expected to receive fiscal stress.

COMMENT LETTER 7

SYNTANA-UTAH PROJECT
QUINTANA MINERALS CORPORATION
MANAGER
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R. E. LEE
PROJECT DIRECTOR
(713) 651-8878

October 14, 1982

Mr. Lloyd Ferguson
District Manager
Bureau of Land Management
170 South 500 East
Vernal, Utah 84078

Re: Comments on Draft Environmental Impact Statement on the Uintah Basin Synfuels Development; 1792-UBS (U-910)

Dear Mr. Ferguson:

7.1 Syntana-Utah believes that the draft Environmental Impact Statement (EIS) on Uintah Basin Synfuels Development is an ambitious undertaking that generally complies with the requirements of the National Environmental Policy Act. We believe further, however, that the tone of the draft EIS, especially as regards the socioeconomic impacts associated with the proposed development, is unduly negative. Substantial benefits that will result are in some instances either ignored or subjectively devalued. To objectively describe the impacts associated with the proposed development, the EIS should recognize the significant benefits that will result.

In particular, the proposed synfuels development will lead to increased jobs, taxes, and disposable income. The infusion of these funds should result in a net benefit to all aspects of the local economy and should improve the standard of living of those currently residing in the affected area. Moreover, the quality of life of those people who move into the area as a result of the proposed projects will be improved in many respects because those people will find new or improved employment. We do not believe this increase in the standard of living should be considered an adverse impact as the draft EIS tends to imply.

7.2 Furthermore, the proposed development also will have significant positive effects on the nation as a whole. Not only will there be energy produced from these plants that can be used by the nation at a time when there are substantial imports from unreliable foreign sources, but also the basis of a whole new industry will be established. These projects will commercialize the synthetic fuel business, providing a domestic technological capability in a new, commercially viable synfuel industry.

In addition to these general comments, Syntana-Utah submits the following comments on particular sections of the draft EIS.

7.3 Draft Technical Report, Pages I-55 through I-82

There is no introduction to the fiscal section and the purpose of the information presented is unclear. In addition, "mill levy" is not defined and there is no information on what assessment ratio is used for valuing property. The mill levy reported on pages 59 and 60 is 16.63. However, the mill levy in table R2B-23 on page 75 is 16.36. The values reported in the text for taxes collected are not supported by the table, and there is no way to multiply the assessed valuation by the mill levy to reach the reported taxes received.

7.4 Page R-3-1 (Regional Affected Environment)

The introduction to Chapter R-3 discusses some of the effects of oil shale development. One effect not discussed is the possible decrease in oil and gas production.

7.5 Socioeconomics

Population & Employment

Page R-3-2 - The 10% threshold population figure is based on studies indicating that an annual population increase of 10% or greater stresses communities' ability to meet the needs of that population. The population numbers in this DEIS area based on peak construction and operation years for the projects and are cumulative rather than annual population increases. While the cumulative increase in population for the duration of the project may be greater than 10%, the annual increase may not exceed the threshold level. Appropriate planning, however, could mitigate any potential negative impacts.

7.6 Page R-3-6 - The draft EIS indicates there is a 52% unemployment rate for reservation Indians due to the lack of economic opportunities. This figure of 52% is misleading. In fact, the available data indicates that only 86 Utes out of 1860 are actively seeking employment--a real figure of less than 5%. In any event, the employment opportunities that would result from the proposed projects could have substantial positive impacts on Indian unemployment.

7.7 Page R-4-14, R-4-21 -- Increased employment in the area could have positive impacts on the reservation Indians. Tribal finances could improve and increased wages and employment opportunities would be available for those with the needed job skills for the various projects. Although not all reservation Indians may now have the necessary skills to qualify for the anticipated opportunities, training could be provided for them to be qualified by the time jobs are available.

Housing

7.8 Pages R-4-15, R-4-17, S-5-2 - The increase in population would bring about an increased need for housing. This increased need, however, should beneficially affect the housing construction industry resulting in a corresponding increase in employment.

Government Services

7.9 Pages R-3-13, R-4-20 - The positive impacts from increased taxes generated by the projects should be discussed. The anticipated problems of timing in meeting population growth demands (i.e., housing, schools, etc.) could be resolved with the prepayment of taxes.

Quality of Life

7.10 Pages R-4-23, S-5-3 - The classification of potential impacts on the quality of life as negative is highly subjective. The quality of life may well be improved through diversity in population and also through the increased money supply. The population diversity will offer increased learning opportunities. The problems of housing, education, etc. will be mitigated by the increase in revenues. This section arbitrarily concludes that change necessarily is bad.

Safety and Health

7.11 Page R-4-106 (Table on Occupational Hazards Associated with Oil Shale Development) - This table attempts to summarize occupational hazards associated with oil shale development. We believe that the medium level of risk values assigned to the refining category are incorrect. Refining is one of the lowest hazard areas in all manufacturing, and all the classifications should be low. In addition, there is no basis for believing that retorting would be worse than refining. Finally, the EIS should take into account proposed controls by the Occupational Safety and Health Administration (OSHA) that further control the risks and hazards that may exist.

Recreation

7.12 Table R-2-1 (page R-2-3) - The land required for the proposed projects presently is not used by recreationalists. It therefore is not clear how the listed recreational acreage would be affected.

7.13 Pages R-4-81, R-4-83, R-4-85 - Increased use of recreational facilities will lead to increased expenditures and thus an increase in taxes. There will be increases in hunting and fishing licenses and this could, for instance, help fund the fish hatchery. There could also be an increase in the number of facilities (camping and other forms of recreation). Assuming that two hours is the maximum people will drive for recreation, it would be useful to know the distances from the population centers to the recreation area. The Flat Tops Wilderness Area, for example, is more than two hours away from Vernal (see also Table R-3-15).

Table R-3-15 (page R-3-47, 48) - The table does not show the distances from the population centers to the recreation areas. It would be useful to know how many people visit the areas annually.

7.14 Page R-3-49 - The visitor use data should be put into perspective. The information presented here should somehow be separated into use levels, i.e., very low use (as in paragraph one), low to moderate, etc.

7.15 Page R-4-9 - In discussing the impacts to recreation and using the term "public" it would be useful to know how many people constitute the "public." It is implied that a sample was taken to determine the impacts to recreation and it would be desirable to know the number of respondents polled.

Wildlife

7.16 Pages R-4-22, R-4-67 - Increased expenditures in the area should make possible increased wildlife. There would be money generated from license fees which could be used for restocking, increased management, better law enforcement, etc.

Air Quality

7.17 Page R-3-22 - There is no indication of the distances from the proposed projects to the listed Class I areas. It would be useful to know the location of the park and wilderness areas and the prevailing wind direction to determine possible air quality impacts by the proposed projects.

7.18 Page R-4-33 (Combined Applicants' Impacts) - The information presented that Vernal and the Indian Reservation would be significantly impacted by air emissions from the Syntana-Utah Project is not supported by the data presented on page R-G-2. Wind directions shown on the figures indicate that neither Vernal nor the Indian Reservation would be significantly affected since both occur upwind.

7.19 Page R-4-40 and Page R-4-41 (Acid Deposition) - The presentation on acid deposition is irrelevant. Four separate statements are made that the data is "inconclusive", and that "very little is known" about the chemistry and transport of the sources. A report pertinent to these statements was prepared by Mr. Alan W. Katqenstein for the Edison Electric Institute which appeared in "Green Lands" titled "An Updated Perspective on Acid Rain."

7.20 Page R-5-5 - The table on page R-5-5 tries to summarize overall benefits and trade-offs in a number of areas with regard to these projects. We believe that many of these determinations are misleading or incorrect.

Contrary to the table, road quality should improve because of the additional tax base that will support improved road development and because improved roads will be needed due to their greater use and the increase in population. Cultural resources should be improved rather than decreased since few now exist and a wider variety will be present upon completion of the projects. Agriculture quality and quantity should increase rather than decrease because of the increased irrigation potential that results from the improved infrastructure. Paleontological resources also should improve because of improved access in the area.

Outdoor recreation will be improved in that there will be more parks and better access. Therefore, more people will be able to take advantage of the resources. The analysis in the draft EIS raises the broader philosophical question of the value assigned to increased public use. In our view, the improved ability of the public to use a resource improves the resource and is a positive benefit. Unfortunately, the EIS seems to assume that, in most instances, increased accessibility to the general public is a detriment rather than a benefit and that "the quality of recreation experiences" of the few is superior to increased numbers of positive experiences for the many. The EIS should at least acknowledge that the value judgment assigned to increased public use is open to different interpretations.

7.21 Page SS-1 (Site Specific Analysis Introduction)

The statement of need for these projects should be expanded to reflect the important national interest in their completion.

7.21 (cont) As Congress declared in the Energy Security Act, Public Law 96-294, Section 100, the achievement of energy security for the United States is essential to the health of the national economy, the well-being of the citizens, and the maintenance of national security. The Act itself was passed ". . . to utilize to the fullest extent the constitutional powers of the Congress to improve the Nation's balance of payments, reduce the threat of economic destruction from oil supply interruptions and increase the Nation's security by reducing its dependence on imported oil." 42 U.S.C. § 8701(b) (1).

Congress found that these purposes can be served, among other things, by: (1) demonstrating at the earliest feasible time the practicality of commercial production of synthetic fuels from domestic resources employing the widest diversity of feasible technologies; (2) fostering the creation of commercial synthetic fuel production facilities of diverse types with the aggregate capability to produce from domestic resources in an environmentally acceptable manner the equivalent of at least 500,000 barrels of crude oil per day by 1987 and at least 2 million barrels of crude oil per day by 1992; (3) encouraging private capital investment and activities in the development of domestic sources of synthetic fuel and fostering competition in the development of the nation's synthetic fuel resources; and, (4) fostering greater energy security in reducing the nation's economic vulnerability to disruptions in imported energy supplies. The plants that are the subject of this EIS in the development of the synfuels industry and the Uintah Basin are precisely suited to meeting these Congressionally-mandated goals.

7.22 Page S-3-1 - The introduction to the chapter says that only resources which are significantly affected are discussed. The Syntana-Utah section does not consider paleontology in the area to be significantly affected. However, information presented on pages R-3-57 and R-4-89 disagree with this and says that all proposed projects would be in contact with one or both of two main fossil formations and tbat there would be unquantifiable losses to these formations.

7.23 Page S-3-1 (Socioeconomics) - This section implies the Syntana-Utah Project is close to the Uintah and Ouray Indian Reservations. In fact, the project is over 16 air miles and over 30 road miles from the reservation.

7.24 Page S-3-3 (Wildlife) - The section pertaining to bald eagles is unsupportive. Our investigations have uncovered no winter roost trees on or near the Syntana-Utah site.

7.25 Cumulative Impacts (Chapter S-5) Conclusions in this section seem to be inconsistent and fail to include the positive impact that the proposed facility will have on the surrounding area. Population

Mr. Lloyd Ferguson - 7 -

7.25 (cont) and employment as well as the demand for goods and services clearly will increase should the project go forward. However, the increase in tax revenue generated by the project would largely mitigate any negative impacts.

Appendices

7.26 Page R-L-1 and R-L-2 (Energy Analysis) - The Energy Analysis on Page R-1-1 and R-12 discusses the increased energy consumption by the additional population of the area. The draft EIS fails to note that this increased population consists of people who are using energy some place else prior to coming to the project. That energy consumption is simply being transferred, not created. There may be some increase in energy use by these individuals because of the increase in their standard of living. However, we do not view this as necessarily being an adverse impact. Finally, the whole purpose of this project is to produce more usable energy. Therefore, the energy consumption is but a small investment in a much greater energy production.

We appreciate the opportunity to make these comments and commend the BLM for its substantial efforts in preparing the draft EIS. We hope the BLM will consider our comments in the preparation of the final EIS.

Very truly yours,

SYNTANA-UTAH PROJECT

By Robert E. Lee /jm
Robert E. Lee

REL/jg

RESPONSE LETTER 7

Syntana-Utah Project

7.1 Increases in job opportunities, personal income and tax revenues are beneficial aspects of the proposed synfuel projects in the Uintah Basin. Section R-4.A.1 and Table R-2-1 show the increase in employment opportunities and increase in per capita personal income as a result of the proposed projects. Local governments would be called upon to provide additional service and facilities to meet the needs of additional people in the area. Careful planning would be required to ensure that funding is available to provide the additional infrastructure needs to coincide with the development. Communities could be better off or worse off depending on how well the new growth is accommodated through the planning and mitigation process.

People who are directly employed by the synfuels companies or benefit through increased business activity may be better off. Others in the community (i.e., those on fixed incomes and those in non-energy sectors such as agriculture) may be worse off. In summary, there are beneficial and adverse effects of synfuels development on communities and individual residents. Whether the standard of living of residents in the affected communities is improved depends on how they share in the benefits (jobs, income, service) and costs (taxes, change in life styles, etc.). Also see the response to Comment 6.7.

7.2 The proposed developments have the potential for increasing the nation's energy independence. When any of the projects become a reality, they will form the initial basis for establishing a commercial synthetic fuel industry. These points are made in the Need for Project section of the Site-Specific Analyses Introduction.

7.3 The mill levy figures shown on I-59 and I-60 are incorrect and should be 16.36 as shown in Table R2B-23. Multiplying the assessed valuation by the mill levy in several of the tables yielded property tax amounts close to but not the exact amounts shown in the tables. To rectify these minor differences would require checking the source in the State Auditors Office or checking with the respective counties but would not subsequently change the fiscal profile for an individual governmental entity. The mill levy is the amount (one mill equals one-tenth of a cent) imposed by a legal taxing authority against the assessed valuation of taxable property within the geographic bounds of the taxing unit to obtain revenues needed to provide the designated services. The assessed valuation data were obtained for the major governmental units, but no attempts were made to obtain or determine the assessment ratios used in valuation of the real property. The assessment ratios used for valuing property can be obtained from the county assessors.

7.4 The Chapter R-3 introduction states the EIS assumption that oil and gas development will continue at a similar rate of growth until approximately 1985 and then will have a slower or diminished rate of growth (State of Utah 1983). (The decreased oil and gas production would not result from the synfuels development.) This projected oil and gas impact is included in the baseline.

7.5 The cumulative increases in population (Table R-4-12) over the respective baseline populations in 1985 and 1995 are greater than 10 percent, although the annual increase for some entities does not exceed the threshold level. Appropriate planning would be needed to mitigate potential negative impacts associated with rapid population growth.

7.6 The 52 percent figure is for those "not employed, able to work." The 5 percent figure is correct if Job Service methods are employed. If Indian preference hiring is used, then the employment opportunities would reduce unemployment.

7.7 Increased employment in the area could have positive impacts on tribal employment. However, since fewer than 10 members of the tribe are employed in the oil and gas industry, it is not likely that synfuels development would appreciably improve the tribe employment picture. Training programs would improve chances for employment. This is identified in Appendix A-7 as a recommended, but as yet uncommitted, mitigation measure.

7.8 Increased housing demand would have a beneficial effect on the housing construction industry with a corresponding increase in employment. This point has been clarified in Section R-4.A.1 and each of the site-specific sections 5.A.1.

7.9 The fiscal pressures that accompany rapid growth are the product of lag time between the demand for services generated by growth and the time that new facilities are assessed and begin to generate revenues. Although such pressures exist within the present structure, any additional stress from more rapid growth would accentuate the problem. It is for this reason that the Uintah Basin communities are expected to receive fiscal stress. Prepayment of taxes is one approach that has been utilized in other rapid growth areas for offsetting anticipated problems of timing in meeting population growth demands.

7.10 Economic development and industrialization activities result in communities receiving benefits such as increased employment and income opportunities. These changes are widely seen as positive and are forecast in the various Chapter 4 Socioeconomics sections in the document.

Simultaneously, however, population growth of the scale expected with a single project or several projects in the Uintah Basin can result in local social changes and disruptions of the sort discussed in the Quality of Life sections. Such changes are not universally seen as benefits. These changes are discussed to provide the reader with a more complete review of the entire array of consequences.

7.11 Table R-4-30 is based on a similar table included in An Assessment of Oil Shale Technologies (Office of Technology Assessment 1980). This is the most complete, up-to-date source of information BLM is aware of. OSHA requirements and MSHA requirements would further control and reduce risks. See Appendix A-7 for details on this subject.

7.12 The land affected by the proposed projects is used primarily for dispersed recreation opportunities such as off-road vehicle use, rockhounding, dispersed camping, sightseeing, and hunting (primarily for small game animals, although some deer and antelope hunting is also known to occur). Along the river bottoms of the White and Green rivers, river running (rafting, canoeing, floatboating), fishing, and hunting are the predominant recreational opportunities. (Refer to Section R-3.A.B for additional details.)

7.13 Although there would be increased use of recreational facilities and licenses with increased expenditures and thus an increase in the tax base, there is no guarantee that these new funds would be used in the affected counties. For example, the Utah Division of Wildlife Resources is not obligated to spend funds in Uintah County for a new fish hatchery. These new funds could be used in a Utah county not affected by oil shale and tar sand development.

The intent of Table R-3-15 is to depict those major recreational attractions within the secondary zone of influence. All of the areas listed are within a two-hour driving distance from either Vernal, Roosevelt, Westwater, Utah, or Rangely, Colorado. The Flat Tops Wilderness Area is within a two-hour driving distance from Westwater.

According to the Council on Environmental Quality regulations for preparing EISs (Section 1500.4(b)), EISs are to be analytic rather than encyclopedic. Including the distance from each of the population centers and visitation statistics for each recreation area identified in Table R-3-15 would not significantly add any major analytical conclusions or enhance understanding of impacts.

7.14 It is difficult to place value on the magnitude of existing recreation resource use within the secondary zone of influence and compare this against potential future use assuming proposed synfuels development. The region is known to have nationally significant recreational value (Dinosaur National Monument, High Uintas Primitive Area, water-oriented opportunities on several lakes and streams in the region). However, the predominant recreation use is for dispersed recreation. To compare the amount of recreation use occurring on BLM public lands to another regional area becomes a relative question. For example, if one were to compare the amount of recreation use occurring within the Uintah Basin secondary zone of influence on BLM public lands with the California Desert (15.4 million visitor use days) then visitation in the Uintah Basin would be considered very low. However, when comparing other regions of the nation having fewer visitations than the Uintah Basin secondary zone of influence, visitation in the Uintah Basin region could be considered high.

7.15 The term "public" is used in a generic sense, referring to local, state, regional, or national population, depending on the issue. For example, impacts to a river with potential Wild and Scenic River status are not only of local concern, but also have state, regional, and national implications. Increased demand on municipal recreation facilities is a local and state "public" concern.

Surveys were not taken to determine significance of recreation impacts. The determinations were made based on scoping and other public contacts and professional expertise.

7.16 The expenditures generated by increased population are not all license fees. The bulk of the expenditures are monies to local retailers that do not return to the Division of Wildlife Resources. In spite of increased license revenues, more people generally means less habitat (refer to Section R-4.A.6) and a resulting lowered overall wildlife population base. No studies to our knowledge support the commenter's statement. Also see the response to Comment 7.13.

7.17 Distances and directions of the Class I areas from the proposed developments have been added to Section R-3.A.3.

7.18 The information presented on Draft EIS page R-4-33 was not intended to imply Syntana-Utah would significantly affect Vernal and the Indian reservation but rather that the impact, considering all seven applicants' proposed projects, would be significant. Although BLM agrees that winds do not often blow toward the reservation from the Syntana-Utah site (easterly winds), winds from the Syntana-Utah site toward Vernal commonly occur (southeasterly winds).

7.19 Many uncertainties related to acid deposition and its potential short-term and long-term effects in the environment still remain. These uncertainties include knowledge related to wet and dry acid formation and deposition, and environmental effects related to any specific acid deposition rate. This is particularly true in the West, where ecological components are, in many cases, significantly different than those of the East and Northeast, where much of the effects work has been done thus far. These uncertainties, however, do not argue for ignoring the problem as a potential impact in the West and, more specifically, what may or may not be the impact from acid deposition resulting from synfuel development in the Uintah Basin. The purpose of the discussion in the EIS is to make the public aware of the uncertainties and recognize the analysis as a conservative first approximation because of the uncertainties. The final answer as it applies to synfuel development in the Uintah Basin, if it occurs, will be ground truth resulting from monitoring and study as development takes place.

7.20 Table R-5-1 has been revised based on the information provided by this commenter and others. Those mitigations committed to have been assumed in the analysis. However, where mitigation has not been committed to, the analysis has been affected, even to the use of worst-case analysis in some instances. For example, while the additional tax base could support road development or parks construction, there has been no commitment that roads or parks would be improved.

Outdoor recreation has been modified to better indicate the benefits and trade-offs.

As used in this document and, therefore, this table, cultural resources means archaeological and historical resources. Cultural amenities for fine arts and humanities are considered to be a component of socioeconomics and are considered in the analysis of quality of life and service infrastructure.

7.21 The section on project need has been revised.

7.22 Although development of the Syntana-Utah project would result in an unquantifiable fossil loss, this loss is not predicted to be significant. This conclusion was reached based on studies done in the area by Utah Division of State History (Madsen 1981; Madsen and Nelson 1980).

7.23 Section S-3.A.1 was not intended to imply that the Syntana-Utah project area is "close" to the Uintah and Ouray Indian Reservation. However, the Syntana-Utah project would have socioeconomic effects beyond the actual project site which would also include the Uintah and Ouray Indian Reservation. Section S-4.A.1, Uintah and Ouray Indian Reservation, states that primary and secondary effects could be felt by the Ute Tribe and references Section R-4.A.1 for discussion of those impacts.

7.24 According to maps and data furnished by the Utah Division of Wildlife Resources (current as of 12-9-81), there are general bald eagle roost areas near the Syntana-Utah site.

7.25 Refer to the response to Comment 6.7.

7.26 The energy consumption by the additional population would be transferred, not created. However, local energy needs would increase as people relocate from other areas and, therefore, would cause local and regional impacts even though national needs remain the same.

The energy analysis used is a standard method presented in the <u>Energy Analysis Handbook For Preparation of Oil Shale Development Environmental Impact Statements</u> (BLM 1982a). This method allows one to compare a project in Utah with one in Kentucky, for example, on equal terms; it is not necessarily an adverse impact.

COMMENT LETTER 8

INTERMOUNTAIN WATER ALLIANCE

324 Judge Building
8 East Broadway
Salt Lake City, Utah., 84111
801-531-7330

September 23, 1982

Lloyd Ferguson, District Manager
Bureau of Land Management
170 South 500 East
Vernal, Utah 84078

Dear Mr. Ferguson:

8.1 I would like to make comments at this hearing on Synfuels development in the Uinta Basin on behalf of Intermountain Water Alliance. My name is Dorothy Harvey and I am Coordinator of this organization which is dedicated to wise management of Utah's water resources in the broad public interest. Such management recognizes changes in society which includes uses of water to provide aquatic and terrestrial habitat for fish and wildlife as well as provides hydrological flows for river recreation - floating, canoeing, kayaking.

This statement will be submitted in more detail to BLM before October 19. (This detail is now included here.)

Even though some of Utah's rivers have national recognition and enjoyment, Utah is one of the few remaining western States which has no instream flow legislation to allow water to remain in rivers for fish, wildlife and recreation uses. Utah has no designated Wild and Scenic Rivers. This oversight does disservice to certain Utah citizens and taxpayers who have a legitimate interest in Utah's rivers although these are not recognized as beneficial.

The number of river recreationsts running rivers alone has increased dramatically since World War II. Both commercial and non-commercial uses make significant widespread contributions to local, state and national economies. Let me quote some 1981 figures.

For the Green River stretch which includes the Green through Dinosaur National Monument and portions of the Yampa there were some 10,000 commercial and non-commercial patrons and 11 commercial operations supporting this.

For Desolation Canyon, in the Green, there were 5,374 patrons; 2911 private, and 2463 commercial, with 26 outfitters.

For Westwater portion of the Colorado River, there were 9,097 people; 5,754 private, and 3,742 commercial, with 20 outfitters dependent for their livelihoods on use of this resource.

The National Park Service reports that 4,538 people, commercial and private, floated Dinosaur National Monument. 11 outfitters operate here.

8.1 (cont) River runners in Canyonlands National Park in 1981 numbered 5,764 - both commercial and private, with 17 outfitters providing the opportunities.

The Park Service gives a figure of 13, 147 commercial and private river runners in the Grand Canyon with 22 outfitters.

Considering monies spent by commercial patrons to be, conservatively, $200 for a five day river trip - the economics for such a run down Desolation Canyon amounts to nearly one half a million dollars. We have no figures to present at this time on the economics from the private sector for any of these river reaches. This would be dollars spent for food, gasolene and other services to and from rivers as well as for equipment.

Of importance, also, in river recreation enjoyment is the presence of birds and mammals associated with floodplain and riparian vegetation sustained by the river. These western cold desert river ecosystems are unique. The flora and fauna provided through their functions, some now endangered, is of considerable significance to recreationists and scientists, alike.

This information is detailed here in order to reinforce mandated responsibilities of land and resource management Agencies, such as the Bureau of Land Management. While western water law requires use of a State's water for beneficial purposes, there is in fact considerable leeway in the actual policies and practices by which this water is used and managed. We are finding that Utah's practice of developing all surface waters first (storage from rivers by dams and reservoirs) is not necessarily the needed or only solution for industrial water supply. We know that Utah neglects conjunctive water management; utilizing available ground water sources where the quality of the ground water will suffice for some industrial processes, is neglected in State planning. We know that conservation of water to reduce uses of water - recycling, pricing incentives, adoption of water saving fixtures in homes and businesses - is an unexplored field in the State. We know that available water is already stored in Colorado River Storage Projects on the River. Large quantities remain unsold in both Flaming Gorge and in Lake Powell - even though a justification for construction of these storage facilities was one of meeting Upper Basin states needs for water. Why is this water still unsold?

This statement is an introduction to information we are submitting on the issue of the proposed White River Dam to supply water for oil shale development. The White River Dam issue exemplifies the points we wish to make for consideration in the BLM Draft EIS on Synfuel Development.

1. Information presented at the Conference on Water and Energy, Technical and Policy Issues, Pittsburgh, Pennsylvania, May 24-26, 1982 and at Fort Collins, Colorado, June 28-30, 1982, demonstrates that more information on aquifer sources in the Upper Colorado River Basin is needed but that both industry and States have the technologies to manage ground and surface water sources conjunctively in ways which can preserve instream flows for fish, wildlife and recreation and serve industry at the same time.

8.1 (cont) The issue of water supply in this region is really not one of shortage of water; it is unwillingness of State water managers to coordinate all criteria for water supply - biological as well as beneficial uses - with and among all interested entities.

2. The White River Dam Final EIS did not address all available water supply alternatives. It therefore did not supply the public all information needed to conclude that water stored by a dam on the White River is not necessary and that destruction of the White River ecosystem is unnecessary.

3. The BLM has a mandated responsibility to manage for preservation of riparian and aquatic (and migratory) habitat associated with rivers flowing through its lands under FLPMA without regard for the politics of water management. The BLM also has mandated responsibilities for management of recreation on lands under its jurisdiction. In the case of the White River and the proposed dam, the BLM was negligent and remiss in carrying out its mandated responsibilities. In bowing to perceived constraints on its management options, the BLM supported perpetuation of existing State water management policies and practices - even though these are ill advised and unnecessary. Neither State or Federal entities are bound to support subsidization of water supply for industry.

Since the BLM Draft EIS on Synfuel Development continues to support the need for a dam on the White River to support an oil shale industry, we are submitting the following information as our comment.

1. The statement of the Environmental Defense Fund on the availability of water for oil shale development without a dam to the Corps of Engineers on the issue of granting a 404 dredge and fill permit.

2. A letter to Governor Matheson, signed by nearly 50 organizations and individuals, asking his reconsideration of the proposed dam in light of information presented by EDF and in light of actions and procedures perceived to have taken place by the public in the development of the proposed dam.

Thank your for this opportunity to submit a statement for consideration in preparation of the Synfuel Development EIS.

Sincerely,

Dorothy Harvey

Dorothy Harvey
Coordinator

ENVIRONMENTAL DEFENSE FUND

July 23, 1982

Colonel Paul F. Kavanaugh
District Engineer
Department of the Army
Sacramento District, Corps of Engineers
650 Capitol Mall
Sacramento, CA 95814

Re: Comments in Response to Public Notice No. 7845: Utah Board of Water Resources-White River Dam Project.

Dear Colonel Kavanaugh,

The Environmental Defense Fund (EDF) has reviewed the public notice and the environmental impact statement for the placement of fill material in the White River and its adjacent wetlands in order to construct the proposed White River Dam Project. EDF's review shows that 1) the record establishes no need for the water in the Uintah Basin, 2) that other water supply alternatives are both reasonably available and less environmentally destructive, and 3) reasonable alternatives were not addressed by the EIS. Therefore, on the record made to date, it would be arbitrary, capricious and an abuse of discretion for the Corps to issue a permit for the White River Dam Project. EDF respectfully requests that the permit be denied.

I. The Record Contains No Evidence Establishing A Need for Water in the Uintah Basin.

The stated purpose on the proposed White River Dam is to provide a way of delivering some 75000 acre-feet annually to the highly speculative oil shale industry. To date, while several companies have indicated a general "expression of interest" in obtaining water for its proposed project, not a single company is close to constructing a commercial oil shale or tar sand facility.

A brief review of the corporate proposals indicates that: the White River Shale Company which has expressed an interest in obtaining 13000 to 26000 ac-ft. a year has placed its plans on the "back burner" (Rocky Mountain News, July 11, 1982), the TOSCO Sand Wash Unit is currently delayed as TOSCO searches for another partner (press release by TOSCO, May 7, 1982), the Magic Circle facility has indicated an intention to use groundwater even though the EIS indicates there is insufficient groundwater available (Resubmittal to the Synthetic Fuels Corp. by Magic Circle, May 31, 1982, p.5-30), the Paraho Development Corp. is attempting to bid for loan support

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from the Sythetic Fuels Corporation and their funding is uncertain (Rocky Mountain News, July 11, 1982), Sytana -Utah proposes a phased plan not to begin until 1986 (FEIS, p. 7), the Enercor-Mono plan for tar sands development calls for a demonstration module in order to determine success before commercial development (FEIS, p. 7), and finally, the Ute Indian Tribe has concluded that irrigation is not economically feasible (Ute Indian Irrigation Project, McKee and Morgan, 1978). Such a limited record to demonstrate need for water storage is wholly inadequate for the Corps to conclude that there is an actual need for water resources at the rate of 70,000 to 75,000 acre feet per year.

The Utah Water Resources Board has adopted a policy requiring pre-purchase commitments from prospective users prior to commencing construction of the project. Dan Lawrence, Utah Director of Water Resources, recently reported to the Utah Board that the negotiation of pre-purchase commitments had been terminated because of questions of need for the project water. To date, Utah has obtained no firm commitments to purchase water from the project.

Similarly, the FEIS prepared by the BLM fails to identify any commitments to purchase water from the project. Comment 56.2 notes this deficiency in the EIS record. The response identifies no commitment to purchase water from the project.

Thus the EIS record, and as far as we are aware, the record of this permit proceeding, contain nothing more than gross estimates of water uses associated with various projects, and speculation that a) each project will go forward, and b) that water will be obtained from the White River dam rather than other sources. In addition to not being willing to make firm commitments to purchase project water, many of the projects for which water is said to be needed have not applied for or obtained necessary approvals or permits under other environmental laws. Neither have they obtained financing to commence the respective projects.

Given the long-history of false-starts in the oil shale industry, the recent withdrawal of major project sponsors, the denial of Synfuel Corp. financing for some of the Utah applicants, current high interest rates and low world market prices for liquid fuels, and combined with the failure of the supposed users' to make any firm commitments to purchase project water, there is no reasonable basis in the EIS record or the record of this proceeding for the Corps to find a need for the proposed project. Accordingly, it would not be in the public interest and would be arbitrary and capricious for the Corps to issue a permit for the project at this time.

II. The Record Establishes That Other Practicable Alternatives Will Have Less Adverse Impact on the Aquatic Ecosystem.

The EPA guidelines governing the issuance of fill permits require that

> ...no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed

> discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.

40 CFR § 230.10(a).

The EIS record clearly demonstrates that construction of the dam will have adverse impacts on endangered species by severely limiting remaining habitat. In addition, the dam will cause significant changes in water quality, stream bed stability, reverine habitat and result in the loss of wetlands both in the flood pool and along the river below the dam. The comparative listing of impacts in Table 2-1 of the EIS identifies no other alternative with equally severe impacts.

In addition to the impacts of the dam documented in the EIS, EDF is filing for the record a recent study, "Impact Assessment of the White River Dam" (April, 1982), by Ecosystem Research Institute which provides further documentation for the conclusion that the dam will likely result in eutrophication of the reservior and possibly cause heavy metal accumulations which will adversely affect downstream water quality. The "Impact Assessment" is marked Exihibit I.

The EPA guidelines create a legal presumption that "practicable alternatives to the proposed discharge which do not involve a discharge into special aquatic site are presumed to have less adverse impact on the aquatic ecosystem, unless clearly demonstrated otherwise". 40 CFR § 230.10(a)(3). In this case, all the alternatives considered in the EIS except No. 3 do not involve either the discharge of fill into wetlands or the loss of wetlands. They must each therefore be presumed to have less adverse impact on the aquatic ecosystem.

The only question, then, is whether the alternatives are practicable. Both alternatives 2 and 5 are practicable, and 4 maybe depending on how one construes current water allocations. Alternative No.5 is not subject to the water rights questions that might threaten the practicability of No.4. Alternative No.4 would entirely eliminate the anticipated adverse impacts on the White River, while drawing on water stored in a project which has already caused damage to the ecosystem of the Green River system. The EIS concludes that Alternatives 4&5 are capable of delivering sufficient water to meet the projected demand for 75,000 ac.ft./yr. The EIS also concludes that the incremental costs of this alternative compared to the dam "would cause a minimal increase in the costs of producing oil shale." Response 56.8. Alternatives 4&5 are also consistent with current plans to pump 18,000 ac.ft. directly from the Green River to provide water for the Moon Lake electric power plant near Bonanza. Thus, even if the Corps determines that the alleged demand for water is real and not speculative, Section 404 of the Act and regulations governing the issuance of fill permits prohibit the issuance of a permit in this case because a less harmful, practicable alternative is available to meet the alleged needs on which the proposal is based. We note that EPA's final comment on the EIS supports our conclusion by recommending the selection of alternative No.4 "as a more environmentally preferable solution to provide the necessary water for the emerging Uintah Basin Synthetic Fuels industry." S. Durham to L. Ferguson, July 22, 1982 (Exihit II).

In addition to Alternatives 4&5 EDF believes there is ample evidence to support a finding that regional groundwater sources are available to supplement direct diversions from the White River, thus allowing a determination that alternative No.2 is also practicable.

As the EIS indicates there is currently just over 500,000 acre-feet of water available during normal years from the White River. Also, somewhat unique for western rivers, the baseflow is high compared to peak flow, and low flow occurances are not frequent due to the contribution from groundwater. The delivery of 75000 ac-ft.per year could be assured from direct flow from the White River during many average years, and supplemented by pumping from regional aquifer and alluvial flow during the short periods of low flow conditions.

It is known that the White River Shale Company which could be the primary user of this water, plans to install an alluvial well field to obtain this reliable source for its facility use until 1992 (under its most optimistic development schedule).* In addition, EDF has received information from reliable sources that additional groundwater tests conducted by VTN on the Ua-Ub site show substantially greater flows of groundwater on site than had been reported earlier. The EIS relies on the earlier VTN findings to support the conclusion that groundwater might not be available in sufficient volume to meet projected needs. Prior to a final decision in this matter, EDF believes Corps has a duty to request any additional data regarding groundwater flows which have not been reported to date. These data may well demonstrate that groundwater supplies are at least adequate to supplement direct diversion from the White River during low flow periods, even though it may not be sufficient to meet the full demand of a fully developed industry.

In further support of the presence of adequate groundwater supplies, Magic Circle has reported in its May 1982 submittal to the Synfuels Corporation that it believes it can meet its water needs by pumping from on-site aquifers. These new data, when analyzed in conjunction with the recent VTN results at Ua-Ub may well provide the evidence to resolve some of the uncertainties in the EIS regarding the volume and quality of both the Bird's Nest and Douglas Creek aquifers. If local groundwater reserves are adequate, then the costs of pumping from the Green would be substantially reduced and the adverse impacts associated with depletions from the Green

* Reported in the preliminary draft Uintah Basin EIS.

under option 5 would be eliminated. As discussed below, the groundwater alternative as well as other dam sites on the White were not adequately addressed in the EIS, and should be before the Corps makes a final decision. On the basis of 40 CFR § 230.12(a)(3)(iv), we therefore request that you investigate further the question of whether adequate groundwater supplies are available, and in the interim either deny the permit or withhold action on the ground that there does not exist sufficient information to make a reasonable judgment that Alternative No.2 is or is not a practicable alternative to the dam. Such an investigation is justified if you do not decide that Alternatives 4 or 5 are practicable alternatives because there is already new evidence which provides reasonable cause to believe that substantial groundwater supplies exist, and it will not require a protracted effort to obtain and evaluate such new data as may have become available since the preparation of the EIS record.

III. The EIS Record Did Not Consider All Reasonable Alternatives, and Is Not Adequate to Sustain Final Agency Action Under § 404 and NEPA.

The EPA guidelines identify as practicable alternatives those which 1) do not involve the discharge of fill material and 2) discharges at other locations. 40 CFR § 230.10(a)(1). The regulations require that such alternatives be considered by the Corps through the NEPA process. Where the "NEPA documents may not have considered the alternatives in sufficient detail,...it may be necessary to supplement these NEPA documents with this additional information." 40 CFR § 230.10(a)(4).

The EIS record fails to consider at least three alternatives which are sufficiently reasonable to justify more careful examination than that given in the EIS. These include:

A) The option discussed above which would allow direct pumping from the White River supplemented by available groundwater supplies;

B) The USBR Watson site; and

C) A single dam site in Colorado, such as the Yellowjacket site, designed and managed to meet the water needs of all anticipated industrial development in the White River basin, both in Colorado and Utah.

A. The Groundwater Supply Option.

The EIS summarizes available data regarding groundwater quantity and quality. FEIS, p.15. The use of groundwater was considered only as a source of the total 70,000 ac.ft. projected demand. Given the assumption that the entire demand would have to be met by groundwater supplies, the EIS concluded that the Douglas Creek member of the Green River formation "appears to contain a reasonable amount of fair quality water..." Given the measured flow rates from the Douglas member, it was concluded that about 20 to 30 wells would be needed to meet the full projected demand. Thus, the EIS implies that sufficient water is available, but that the supply would be scattered and such large rates of withdrawl would probably cause depletion.

Comment 56 proposed that the EIS consider using identified groundwater supplies as a short-term supplement to water drawn primarily from the White. This option was not considered. It would appear, however, from the limited data presented that groundwater supply from the Douglas member alone should be more than adequate to meet short-term needs during the critical flow periods on the White. Historically, the critical flow periods do not occur every year, and usually last for weeks or a few months. During the 1977 worst-case, the EIS reports that 39,000 ac.ft. would have been required to supplement the flow available from the White to meet both minimum downstream flow requirements and the full projected industrial uses. In more typical low flow years, only 5,000 to 10,000 ac.ft. would be required from groundwater supplies. During hi-flow years and the months in low-flow years when groundwater is not required, recharge would occur. Thus significantly lower total withdrawls of groundwater and periods of no withdrawls should substantially eliminate concerns over depletion of water available from the Douglas member. Given available data, it would appear that the Douglas is more than adequate to serve as a supplementary supply during the anticipated 30 year project life of the oil shale projects.

In addition, the EIS does not provide an adequate evidentiary basis for rejecting the Birds Nest aquifer as an additional source of industrial water. In the brief summary provided, supply from the Birds Nest aquifer was rejected because the quality "is unsuitable for domestic, commercial or agricultural purposes." This bald,unexplained statement is not adequate as a factual basis for dismissing the Bird's Nest Aquifer as a source of supply for many of the water uses intended by the oil shale industry. Substantial volumes of water will be used for dust suppression and quenching of the hot spent shale. Neither of these activities require the use of high quality water. A proper evaluation of the groundwater supply option should evaluate the suitability of the Birds Nest quality for those and similar uses. It would certainly make no environmental or economic sense to build a species-threatening dam to provide high quality water for road dust suppression when other suitable supplies are available.

Furthermore, new data developed by VTN Colorado, Inc., and Magic Circle (see discussion above) may serve to further amplify our knowledge of the groundwater resource so as to provide additional evidence showing the suitability of the Douglas and Birds Nest supplies.

Failure to carefully consider the potential for groundwater as a secondary source to supplement White River flows is a major deficiency of the FEIS. This deficiency becomes particularly glaring in view of the specific request that such an analysis be performed. Comment 56. Until such an analysis is completed, the EIS record is not legally sufficient to sustain final agency action on the permit.

B. **The USBR Watson site.**

This option and other sites up-river to the Colorado stateline were not addressed as alternatives. The FEIS dismissed them with the conclusion that "the other dam sites appeared to offer no environmental advantages over the applicant's proposed site, and were, therefore, not considered in this EIS." No further discussion was presented to support this conclusion.

The enclosed "Impact Assessment" (Exhibit I) suggests that eutrophication of the reservoir is related to high inputs of phosphorus, nitrogen and organics from the Mancos & oil shale formations. Similarly it is reasonable to assume that some of the metals measured in the White River by the investigators is derived from those formations. Assuming these formations contribute contaminants which will cause or aggravate eutrophication, and are the source of metals which can be expected to accumulate in the reservior, then substantial environmental benefits would be obtained from shifting the dam site upriver to a location which would less likely be influenced by runoff from the critical formations of concern. Siting options selected to avoid the adverse consequences identified in the "Impact Assessment" should be considered prior to a final decision on the permit.

C. A Single Damsite Designed to Meet All the Industrial Water Needs of the White River Basin.

In the cumulative impacts section, the FEIS makes passing reference to the diversion of 90,000 to 172,000 ac.ft. of water from the White River in Colorado to support oil shale development. There is no discussion, however, of where or how those diversions will be made. Clearly, development of the White River in Colorado will include some storage facilities. A permit has already been processed for the Taylor Draw Project. Other projects, such as the Yellowjacket, have been under consideration by the Colorado River Conservation District for many years.

Each of these projects, if undertaken, will have impacts on the environment of the White River Basin, including cumulative impacts on the riverine habitat, endangered or threatened species and total wetland losses. EPA guidelines require that the cumulative impacts of projects on the aquatic ecosystem be evaluated. 40 CFR § 230.11(g). Similarly, NEPA also requires an analysis of the cumulative impacts of related developments on an effected region. 40 CFR § 1508.25, and Kleppe v. Sierra Club, 427 U.S. 390 (1976). In this case, both the effected region and the resource to be developed are clearly defined by the natural boundaries of the river basin.

Given your legal duty to not approve a project if a less environmentally harmful "practicable alternative"is available, and your obligation under NEPA to evaluate all reasonable alternatives, it would be inappropriate for you to make a final decision on this permit without first undertaking the cumulative impact analysis required by law.

This issue was raised in comments on the EIS (comment 56). In response, BLM contended that such a project would not be feasible because "water use compacts have not been developed between Utah & Colorado and the water from such a dam could be obligated to other purposes." This is not an adequate reason for failing to perform the cumulative impact analysis required by law. NEPA is intended to provide an analysis of the environmental impacts of reasonable options so as to guide decision-making. BLM has stood NEPA on its head by arguing that because no decisions have been made (i.e. no compact), therefore no analysis should be performed. EDF believesthis is clearly contrary to the spirit and letter of NEPA.

The very fact asserted by the BLM, i.e., that water from an upriver reservoir could be diverted to other uses than the proposed Uintah Basin developments is subject to dispute and requires analysis before any conclusions can be made. First, it would appear that if the Corps denied a permit for the White River dam in favor of a single White River storage project, the Corps could impose discharge requirements as a condition of the permit to ensure that the express purposes of the project are met. Second, it is clear from an analysis of the data contained in the Water Resources Council report (Colo.DNR,1979) that Colorado's diversions from the White will be constrained by its obligations under the 1948 Upper Basin Compact because of other diversions already planned or completed on other tributaries of the Colorado. Given these constraints, it would appear that the 172,000 ac.ft. of diversion estimated in the FEIS is certainly an upper bound for future consumption in Colorado. See Exhibit III. Given this practical limit on water use in the White, it would appear that a single project in the Basin to meet both Colorado's & Utah's legitimate needs is more than feasible.

IV. CONCLUSION.

For the above-referenced reasons, EDF objects to the issuance of a § 404 permit for the White River Dam Project at this time. The project should be denied because there is no proven need for the water, and because practicable alternatives which would cause substantially less harm to the aquatic environment are available. In the alternative, a final decision on the project should be withheld until a supplemental EIS is prepared which addresses the alternatives outlined above.

Thank you for your consideration of these comments. Please provide written notice of the action you take on this matter.

Sincerely yours,

Robert E. Yuhnke
Robert E. Yuhnke
Regional Counsel

REY:ob
Enclosures
cc: Stephen Durham, Regional Administrator, EPA
Lloyd H. Ferguson, District Manager, BLM
Dan Lawrence, Director of Water Resources (UT)
Dee Hansen, State Engineer (UT)
Monte Pascoe, Director, Department of Natural Resources (CO)

INTERMOUNTAIN WATER ALLIANCE

324 Judge Building
8 East Broadway
Salt Lake City, Utah., 84111
801-531-7330

August 30, 1982

Governor Scott Matheson
State Capitol
Salt Lake City, Utah

Dear Governor Matheson:

We, the signers of this letter, wish you to know that we approve of and commend your strong stand in determining an acceptable site for nuclear waste disposal. We applaud your appreciation of the significance of Canyonlands National Park as an outstanding scenic and geologic wonder. We share your concern that there be no hurried and inadequately studied decision to locate the nuclear dump in the vicinity of this Parkland in Utah. However, we would like to see the State give equal consideration to other resource areas, less exotic perhaps, but of great value to the public.

We are referring to the White River and the issue of constructing a dam on it for water supply for an oil shale industry. Because the whole story of alternatives has not been told, there are still many contradictory positions being taken about the necessity for the dam, between the State water planners, the Bureau of Land Management, the Bureau of Reclamation, the oil shale industry, biological researchers, and the public. The issue needs to be resolved by evaluating all up-to-date information, some not stated in the EIS, and doing so openly and honestly with no hidden agendas - a situation which has not characterized many past procedures. (Documentation enclosed.)

We justify this letter to you on the basis of our support for both facts and conclusions presented by the Environmental Defense Fund as stated in their comment to the Corps of Engineers on the granting of a 404 Permit for dredge and fill purposes on Bureau of Land Management land. We will be quoting from their statement and information and enclose a copy of their documents (July 23, 1982).

Environmental Defense Fund (EDF) statement: The record establishes 1) no need for the water in the Uintah Basin, 2) that other water supply alternatives are both reasonably available and less environmentally destructive, and 3) that reasonable alternatives were not addressed by the EIS".

This is contrary to positions being maintained by State water developers, the State Engineer, and by Jay Bingham. The position of Mr. Bingham is reported in a

" A citizens group dedicated to wise use of Utah water resources in the broad public interest with citizen involvement in water policy decisions for environmentally and economically sound management."

Deseret News article (Enclosed). Mr. Bingham was former Director, Division of Water Resources, where planning for the dam was initiated. After retirement from that Agency, his company was awareded the contract to design the dam without competitive bidding.

The White River Ecosystem

Biologists consider the White River and its Basin to be an irreplaceable desert/riparian ecosystem which sustains a remarkable diversity of wildlife species, some whose habitat is endangered. Over 126 bird species use the riparian, cliff and upland bench habitat - a unique bird watching area. Nutritious bottomland forage for nursing does of the White River deer herd contributes to the high fawn survival rate. Peregrine falcon were recently seen in courtship behavior along the cliffs. Golden eagles nest in cottonwoods on the floodplain. The presence of river beaver and waterfowl swimming with their young delight the canoeist and kayaker who run this beautiful western river canyon. River runners have spotted some of the thousands of sandhill cranes overhead which migrate and roost along sandbars along the Green River from Stewart Lake (Jensen area) and south to Ouray Refuge. Whooping cranes, raised by the sandhills at Grays Lake Refuge, Idaho, also stop along this stretch of the river. One spent two summers at Pelican Lake, not 13 miles away from the White. This type of ecosystem sustains remnants of once prolific native fish such as the Colorado squawfish, now endangered.

River runners use this river for recreation from early spring until well into September - contrary to the position maintained by Temple Reynolds, Director, Department of Natural Resources. He states it is runnable for only 60 days of the year and, in any event is not worth saving. This opinion is not supported by the fact the the entire White River, 100 miles in Colorado and in Utah, was on the Wild and Scenic Rivers study list prior to its removal without public knowleged by then Director of Outdoor Recreation, James Watt. It was removed sometime prior to 1975-1976 after oil shale tracts Ua and Ub were located along it on BLM land.

Impacts from the Dam Construction

Of all the alternatives for water supply, construction of the White River dam will be the most destructive of these natural resources. "The dam will cause significant changes in water quality, stream bed stability, riverine habitat, and result in loss of wetlands both in the flood pool and along the river below the dam. The EIS clearly demonstrates that construction of the dam will have adverse impacts on endangered species by limiting remaining habitat." (EDF)

No Demonstrated Need for the White River Dam

It is our position that this cold desert river ecosystem in its natural state should not be destroyed when there is no demonstrated need for the wnter to be stored by the dam.

Environmental Defense Fund states:

1. "The White River Shale Company, which could be a primary user of this water, plans to install an alluvial field to obtain this reliable source for its facility use until 1982 (under its most optimistic development schedule)."

2. "Magic Circle has reported in May 1982 in submittal to the Synfuel Corporation, that it believes it can meet its water needs by pumping on-site aquifers even though the EIS indicates there is insufficient groundwater available. Information indicating there are substantial sources of useable ground water is not in the EIS."

3. "Moon Lake electric power plant near Bonanza plans to pump 18,000 acre feet of water directly from the alluvium of the Green River." It is the understanding of Intermountain Water Alliance, unverified, that this company was denied opportunity to purchase unsold water out of Flaming Gorge.

4. Geokinetics, working with shale oil just south of the White River in the Book Cliffs, uses little water in its process. In fact, its process produces water as a by-product and will have a problem of disposal.

No Demand for the Water

Environmental Defense Fund states that "no single company is close to construction of commercial oil shale or tar sands facilities or is pre-purchasing water.

1. The White River Shale Project plans are on the back burner.

2. Tosco Sand Wash Unit is currently delayed as Tosco searches for another partner.

3. Magic Circle is attempting to bid for loan support from the Synfuels Corporation and their funding is uncertain.

4. Sytana-Utah proposes a phased plan not to begin until 1986.

5. Enercor-Mono plan for tar sands development calls for a demonstration module in order to determine success before development. (We understand that existing Canadian tar sands production is in economic trouble.)

6. The Ute Indian Tribe has concluded that irrigation is not economically feasible.

7. Dan Lawrence, Director, Department of Water Resources, recently reported to the Water Board that the negotiation of pre-purchase commitments had been terminated because of questions of need for the project water.

8. The EIS fails to identify any committments to purchase of water from the project."

Reasonable Alternatives

I. Ground Water

Recent ground water tests by VTN on Tracts Ua and Ub show that local ground water reserves exist in substantial volume and quality in the Bird's Nest and Douglas Creek aquifers. (EDF)

In the EIS, ground water sources were presumed 1) to be inadequate in volume, 2) to be of unusable quality, 3) to present unsurmountable problems in their development, and 4) ground water was considered only as a sole water supply. New evidence, based on VTN studies, indicates that (a) substantial ground water supplies do exist, and (b) that their development will not require protracted effort. (EDF)

II. Pumping Water from the White River and Supplementing Supply from Ground Water Sources: Conjunctive Water Management

(This alternative was not considered in the EIS)

In calculating the special hydrological character of high and low flows of the White River, the Environmental Defense Fund has determined the following information:

1. That ground water can be a secondary source to supplement pumping from the White River during critical flow periods.

2. That the 39,000 acre feet of ground water stated in the EIS as being required for instream flows and full industrial uses is a miscalculation.

3. That, in fact, only 5,000 to 10,000 acre feet would be required from ground water. During high-flow years and the months in low-flow years when ground water is required, recharge would occur. Thus, significantly lower total withdrawals of ground water and periods of no withdrawals would substantially eliminate concerns over depletion of water available from the Douglas Creek aquifer. Given available data, it would appear that the Douglas is more than adequate to serve as a supplementary supply during the anticipated 30 year project life of the oil shale projects.

No Consideration Given to Use of Lower Quality Water for Industrial Purposes (Conjunctive Water Management)

Substantial volumes of water will be used for dust suppression and quenching of the hot spent shale. Neither of these activities require the use of high quality water from the rivers. Yet, in the EIS, the suitability of the Bird's Nest aquifer source for domestic, commercial and agricultural

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purposes was rejected.

It would certainly make no environmental or economic sense to build a species-threatening dam to provide high quality water for road and dust suppression when other suitable supplies are available. (EDF)

IV. Pump Water from the Green River

A. Alluvium

Moon Lake electric power plant near Bonanza plans to pump 18,000 acre feet of water from the alluvium of the Green to assure it a steady water supply. (EDF)

B. Green River Water Released from Flaming Gorge (IWA Data)

The Bureau of Reclamation stated in the EIS, and clarified by letter, that significant amounts of unsold water already stored in Flaming Gorge Reservoir* can be released down the Green River to a pumping station.** (Documentation enclosed.)

Amount State in EIS	500,000 acre feet
Amount Available (Affirmed by Letter) Of 4,000,000 a f aquired by the Bureau to develop Flaming Gorge (1958)	
Present Estimated Yield for sale	1,004,000 a f
For Utah	452,000 a f
For Wyoming	352,000 a f
For future uses of Colorado River Storage Act Purposes	200,000 a f

Dee Hansen, State Engineer, refutes Bureau information in the EIS stating that all 500,000 a f of Flaming Gorge water is required for development of the CUP and for irrigating Leland Bench (part of compensation to the Ute Tribe for deferring use of their water for development of the Bonneville Unit, CUP). Neither the Bureau's or our calculations verify need for 500,000 a f of water for these purposes.*** Leland Bench is not yet authorized. Moreover, Mr. Hansen tells us if we want White River water for fish, wildlife and recreation purposes, we must purchase it.

* The Federal government is not recouping costs of constructing water projects by sale of developed water: "Changes in Federal Water Project Repayment Policies Can Reduce Federal Costs" - GAO Report, August 7, 1981, CED-81-77

** Protection of the Blue Ribbon fishery below Flaming Gorge Dam with additional water releases is required.

*** The State Engineer has not clarified his position for us.

C. The State of Utah Contract for Flaming Gorge Water and Sell to Industry

If the State f Utah wants to retain rights to the water and make dollars on sale of it to industry, it might duplicate actions of Wyoming in contracting for sale of water from Fontanelle Reservoir for resale to industry. This Bureau of Reclamation information is stated below.

The following are existing contracts for Fontenelle Reservoir water:

1. Master agreement with the State of Wyoming for 60,000 acre-feet per year at $38,000 per year. Water under this contract has been assigned as follows:

a. Contract between the State of Wyoming and Sun Oil Company - not to exceed 25,000 acre-feet per year at $4.50 per acre-foot.

b. Contract between the State of Wyoming and Pacific Power and Light Company - not to exceed 35,000 acre-feet of which 18,000 acre-feet is currently being delivered in accordance with incremental increases as agreed by contract at $6.50 per acre-foot.

2. Second master agreement with the State of Wyoming for an additional 60,000 acre-feet at $503,000 per year. Several requests have been made to the State for use of this water. None of the requests have been approved.

This Alternative was not considered in the EIS.

V. Other Alternatives Not Considered in the EIS

A. The Bureau of Reclamation Watson Site (EDF)

"The enclosed independent research prepared by Ecosystem Research Institute* suggests that eutrophication of the White River Reservoir at the proposed location is related to high inputs of phosphorous, nitrogen, and organics from the Mancos and oil shale formations. Substantial environmental benefits would be obtained from shifting the dam site upriver to a location which is less likely to be influenced by runoff from these critical formations and their contaminants.

B. Single Damsite on White River to Meet Industrial Development: Bureau of Land Management Position is Based on Faulty Premise

NEPA requires evaluation of cumulative impacts from a project development. Proposed or likely diversion from the White River in Colorado of 90,000 to 172,000 a f of water for oil shale development will have impacts on the White River Basin environment, including

*"Impact Assessment of the White River Dam" - April 1982, prepared for White River Shale Corporation

cumulative impacts on riverine habitat, endangered and threatened species, and total wetlands losses. EPA guidelines require that cumulative impacts of projects on the aquatic ecosystem be evaluated. NEPA also requires an analysis of the cumulative imacts of related developments of a region. Both the affected region and the resource to be developed are clearly defined by the natural boundaries of the River Basin."

BLM has erroneously taken the position in the EIS that in the absence of any interstate compact on water rights to White River water, no such analysis is required. EDF believes that this is clearly contrary to the spirit and letter of NEPA.

Serious Degradation of Reservoir and Downstream Water Quality

Documentation of Ecosystem Research Institute of expected degradation of water quality of a White River Reservoir reinforces conclusions from existing studies of the serious problems which are developing in Lake Mead and in Lake Powell. Research papers presented at a Utah State University Conference on "Aquatic Resources Management of the Colorado River System"* (Nov. 16-18, 1981, Las Vegas) gave advance warning of fish survivial problems in Lake Mead as well as potential accumulations of toxic and carcinogenic elements impounded in silt behind Glen Canyon Dam. There is evidence of additional salt build-up in this silt resulting from formations of new salt producing compounds.Some conditions are energy supply related.

We have here, then, an issue of degradation of the quality of water to be delivered to downstream users. We have an issue of perpetual maintenance of bodies of stored water, some of enormous length and depth. We have an issue of costs to redress all these conditions. When these storage facilities were proposed and developed, neither the water quality problems or their possible magnitude were seriously addressed, let alone the issue of who is going to pay the ultimate costs in perpetuity.

Intermountain Water Alliance and signers of this letter believe we have presented serious discrepancies and ommissions of information in the premises justifying construction of the White River Dam. We see in the Salt Lake Tribune, September 4, 1982, that construction of the White River Dam is to be delayed due to slower than anticipated development of the State's oil shale resources. We believe that you, Governor Matheson, representing the public interest, must take the issues of reasonable alternatives into consideration - now that there is adequate time to review them - and reverse the long history paving the way for the dam construction without presenting all relevant facts.

Very truly yours,

Dorothy Harvey

Dorothy Harvey, Coordinator

*Sponsors:
Office of Water Research and Technology, Department of Interior
Utah Water Research Laboratory, Utah State University

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History of White River Dam Development Procedures

1. In the leasing of Tracts Ua and Ub under President Nixon's "Project Independence", these were located along the White River on Bureau of Land Management land.

2. Prior to 1975 or 1976, then Director of Outdoor Recreation, James Watt, withdrew the river from the Wild and Scenic Rivers study list without public knowledge. This ineluded the 100 mile length in Colorado and in Utah.

3. At early hearings as well as at a 1977 meeting of the Oil Shale Development Committee* both the public attending who valued the natural resources and biologists were incensed at the posture of unwillingness on the part of proponents of both oil shale development and construction of the dam to consider alternatives.

4. Jay Bingham was director of the Department of Water Resources where the dam was planned. After leaving the Department, his company was awareded the contract to design the dam without competitive bidding. He has since publicly supported the necessity for the dam, knowing full well alternatives exist.

5. A year and a half after U.S.G.S. ground water studies were supposedly completed, and were "under review" in Denver or Washington, the studies have still not been released.

6. Even though ground water research on Tracts Ua and/or Ub was being reported to U.S.G.S. as "steady flow of ground water", this information was abruptly concluded.

7. The State Division of Wildlife Resources initially carried out the research to determine the presence of Colorado squawfish in the White River. Even though squawfish were known to migrate up to the Colorado portion of the River, the State Agency concluded that squawfish were not present. The same research methodologies were available to them as to U.S.Fish & Wildlife Service who later established the use of this River by squawfish. (There are still unanswered questions as to total habitat requirements in the Green, the White and the Yampa of all four endangered fish: Colorado squawfish, Humpback chub, Razorback sucker, Bonytail chub. Their habitat has disappeared since construction of the high dams on the Colorado.)

8. Information on the safety of the White River Dam was suppressed. We still have obtained no verification that a new design is safer although this information was requested from the State Engineer.

9. In order to assure preparation of a fully adequate EIS, a citizen had to prepare a document, at her own expense ($600 for printing and mailing to Agencies and interested parties). Rumors were around that State money was being passed under the table to BLM to control information included or excluded.

10. A competent fisheries biologist, BLM, was transferred out to the Forest Service - probably for participating, as State Director* of the Utah Fisheries Society in decisions affecting instream flows. The transfer occurred sometime after the report appeared of U.S. Fish and Wildlife Service documentatinn of the presence of squawfish in the White River.

* Not complete name.

11. As early as 1974, in the Escalante Case, Professor William Lockhart, University of Utah Law School, made an appeal to the State Engineer, Dee Hansen, to develop rule making procedures available to his office to allocate water in the broad public interest. Professor Lockhart made this appeal twice since (again this spring). Mr. Hansen was asked to make this administrative regulation by early in June - and has still not done so. We have a very real question whether such action on his part is being delayed pending construction of a White River Dam.

The role of citizens in this issue is not one of trying to obstruct development of an oil shale industry. Today, citizens are placing different values on some kinds of natural resources and are seeking alternatives to traditional development answers to problems of land and water uses. We feel cheated when "insiders" use their power to exclude or try to circumvent viable citizen positions.

Sincerely,

Dorothy Harvey

Dorothy Harvey
IWA Coordinator

September 6, 1982

JRK Carter
Utah Wilderness Assn.

Richard Schmitt

Peter Hovingh
Peter Hovingh, Director
Utah Nature Study Society
Wasatch Mountain Club
Intermountain Water Alliance

Henry Mcfarlan

Moki Mac
River Expeditions

Cindy Appel

Water Chairman
Utah Audubon

Ken Sleight, Director
Utah Chapter
Western River Guides
Association, Inc.

Leslie A. Jones
Western Whitewater Mapping

Alan Miller
Chairman, Utah Chapter
Sierra Club

Don Neff
Don Neff River Co.

Dave B. Gorham
Jayne B. Gorham

Hermoine Lex
Utah Association of
Neighborhood Councils

Chester Morris
Canoeist

Sierra Club
The Wilderness Society
Utah Public Lands Office

Bob Johnson
President
Stonefly Society
of the
Wasatch Fly Fishing Club

Myrtle Steele, Board
Intermountain Water Alliance
Member-Utah Audubon
Bird Watcher

Richard W. Dougherty
Utah Chapter
Sierra Club.

Kathleen Piper

Barbara + Archie Arnold

Piute Creek
Outfitters, Inc.

Fly Fisherman

Lillian Y. Hayes

Utah Environmental Center

Jim Pissot
Valerie Pissot

Dean Petoza
George Nickas

Mark Harvey
Historian Laramie, Wyo.

Kristie J. Thorp

Pat + Don Beck, Canoeists
Santa Cruz, CA.

Pamela Harvey
Canoeist

Richard Kiementz
Charles Luff
Doug Selby
Robert Hinchee
Beth Potter
Jill Selby
Rose M. Milovich
Janet L. Kozak
Joan S. McLean
Alberta Seierstad
Noel Lerner
Jeffy Curtis

Intermountain Water Alliance

8.1 BLM concurs that river recreation use is an important aspect and that the increasing use trend focuses needed attention on this aspect of resource management. The data provided in the comment substantiates the magnitude of the amount use throughout the region.

It is noted, also, that this matter was the subject of considerable discussion during the environmental impact statement process for the proposed White River Dam project. That project is not the prime subject of the Uintah Basin Synfuels Development EIS, but it is indirectly involved since it is a potential water source for several of the synfuels project. Therefore, the White River Dam Project EIS is incorporated by reference; however, there is no intent to re-analyze that project.

It is not intended that this EIS evaluate Utah State water policies which may be set by the State Legislature, State Engineer, or State Division of Water Resources.

COMMENT LETTER 9

TOSCO DEVELOPMENT CORPORATION
11100 EAST BETHANY DRIVE
P O BOX 441464
AURORA COLORADO 80014-1439
303/696-2700

October 14, 1982

Mr. Lloyd Ferguson
District Manager
Bureau of Land Management
170 South 500 East
Vernal, Utah 84078

Re: Uintah Basin Synfuels Development --
Draft Environmental Impact Statement

Dear Mr. Ferguson:

Tosco Development Corporation (Tosco) formally submits the following comments to the draft Uintah Basin Synfuels EIS (DEIS) prepared by the Bureau of Land Management (BLM):

9.1 With very little supporting explanation, the BLM has recommended a proposed alignment for rights-of-way required for access roads, water supply systems and power transmission lines immediately northeast of the Sand Wash Shale Oil Project which is completely inconsistent with the general location of the rights-of-way for these facilities recommended in Tosco's Technical Report. Tosco has also been orally notified that a similar recommendation has been made for the alignment of the product pipeline, despite the fact that the DEIS states that the BLM had accepted Tosco's preferred alignment. The right-of-way corridor recommended by the BLM would, without exception, require Tosco to relocate all of these rights-of-way to areas beyond the jurisdiction of the BLM within the boundaries of the Uintah and Ouray Indian Reservation. For the reasons set forth below, Tosco believes that the BLM's recommended changes in alignment are both inappropriate and inadvisable.

A comparative analysis of potential environmental impacts reveals no significant difference between the BLM's preferred alternatives and Tosco's preferred alternatives. A table detailing environmental impacts of the two alternatives abstracted from the Technical Report and DEIS is appended hereto. This analysis demonstrates that the total disturbed acreage, as well as the visual and recreational resource impacts, of the alternatives are comparable.

9.1 (cont) BLM's discussion of the preferred alternatives in the DEIS corroborates this conclusion. At page T-4-32, BLM states that the "effects to all resources from this alternative [i.e. BLM's preferred alternative for the access roads] would be similar to those of the proposed action." On page T-3-7, it is stated that the alternative water system right-of-way preferred by BLM has an affect on the environment similar to Tosco's proposed action. On page T-3-8, the BLM notes that the environmental effects of the BLM's preferred transmission line right-of-way do not vary significantly from Tosco's preferred alternative for the following resources: socioeconomic, air quality, water resources, vegetation, soil, agriculture, transportation networks, recreation, wilderness, cultural resources, mineral and energy resources, and existing land use plans.

The only apparent justification for the BLM's recommendations is the inconsistency between Tosco's preferred alignment and the land use classifications set forth in the BLM's existing management framework plans (MFP's). The BLM's recommendations however, are subject to the same objection. As indicated in the DEIS, the BLM's recommended right-of-way locations for transmission lines and the water supply system are also inconsistent with the provisions of applicable MFP's (note page T-4-18, page T-4-27, Table T-2-1, and Table T-2-2, DEIS). Although the DEIS does not clearly state whether the BLM's preferred alignment for access roads is consistent with existing MFP's, we assume that they are not. In summary, it would appear that existing MFP's will have to be amended to accommodate <u>either</u> the BLM's recommended, or Tosco's preferred, right-of-way alignment. Tosco believes, based on the considerations noted below, that any future amendments to the MFP's should accommodate Tosco's preferred corridor location.

9.2 As indicated previously, the BLM's recommended alignment crosses the Ute Reservation. This action has been taken in the absence of any effort to communicate with the Tribal governing body and, apparently, without the Tribe's concurrence. In Tosco's opinion, the BLM's tentative decisions on corridor location may intrude upon the jurisdictional prerogatives of the Tribe. Unless the corridors identified by the Tribe according to its land use planning policies are consistent with the BLM's proposed corridors, corridor planning by energy project sponsors in the vicinity of BLM and Tribal lands will become extremely difficult. Because the BLM has no control over right-of-way definition within Indian lands, we believe it is unwise for the BLM to plan rights-of-way on public land based on any preconception of how corridors may be located within the reservation until it has coordinated its actions with the Tribe.

Mr. Lloyd Ferguson
October 14, 1982
Page 3

9.3 Tosco's proposed corridor locations are also more consistent with multiple use planning principles applicable to federal lands. We believe that it is the obligation of the BLM and the Department of the Interior to promote mineral development, as appropriate, on public domain lands. Included in this obligation is the responsibility to provide adequate transportation and utility corridors in the vicinity of federal mineral reserves on land within the BLM's jurisdiction to allow for the development of these reserves. The preferred right-of-way locations analyzed in Tosco's Technical Report are as important to the viability of development plans for federal oil shale reserves in the central Uintah Basin as they are to the development of Tosco's state leases. For this reason, Tosco strongly recommends that the BLM concur with Tosco's preferred right-of-way locations and that exisiting MFP's be amended accordingly.

Very truly yours,

Tosco Development Corporation

By ______________________
William Dixon Shay, Jr.

ATTACHMENT

BLM's PREFERRED ALIGNMENT

	Length (mi.)	Acres	Visual Class	Recreation
Access Roads	46	900[1] [867]	12 acres significantly affected (Class III). Within 1/2 mile of Green & White[2] Rivers.	Nothing mentioned for water resources.
Water Section 17	6	47[3]	70 ac VRM Class II 27 ac VRM Class III. 2 miles outside of BLM proposed corridor.	1 mile of Wild + Scenic River classification affected.
Transmission	46	169[5]	[6]73 ac VRM Class II & 20 ac VRM Class III. 6 acres VRM Class II 6 acres VRM Class III.	1/2 mile either side of White River.
Pipeline[4]	43	324	Considered same as below.	Considered same as below.
	TOTAL	1407		

TOSCO's PREFERRED ALIGNMENT

	Length (mi.)	Acres	Visual Class	Recreation
Roads	49	888	12 acres significantly affected (Class III) (6 within Reservation). Within 1/2 mile of Green + White River Zones.	Construction of bridge. 13 miles of White River affected for Wild + Scenic classification. Devil's Rock House.
Water	5.9	41	70 ac VRM Class II 27 ac VRM Class III.	Same as above.

ATTACHMENT (Concl.)

	Length (mi.)	Acres	Visual Class	Recreation
Transmission	43	157[8]	9 mi. outside of BLM proposed corridor. 6 acres VRM Class II, 6 acres VRM Class III.	Contrast w/ vegetation clearing from power trans. and roads. 1 mile of White River[7] affected.
Pipeline	42	320	Pipeline crosses White River (1 mile). 64 ac Class II 6 ac Class III.	
	TOTAL	1406		

1 900 - BLM calculated using the wrong number for western access route (251 acres instead of 218 acres).

2 Statement p. T-4-32 that the land affected by alternative access roads would not differ from Tosco's choice; and on p. T-1-28 - mentions less disturbance and fewer potential problems at single river crossing point.

3 P. T-4-18, impacts from White River Section 17 alternative stated as similar to Tosco's choice. In addition this alternative conflicts with BLM's Bookcliffs Management Framework Plan. (2 miles outside of proposed corridor).

P. T-3-7, affected environment similar to proposed action.

4 Product pipeline not considered in EIS; north-south segment same as S. L. C. pipeline and east-west segment same as other Rangely route except for 2 miles (p. T-1-28).

5 P. T-3-8, Statement areas affected do not vary significantly from Tosco's choice (including recreation and land-use).

P. T-4-22, Conflicts with existing MFP cited, 1/2 mile of White River Zone.

6 Data from two different tables in Draft EIS.

7 P. T-4-16, one mile where north lines crosses River and one mile where south line crosses river.

8 P. T-3-5, "Devil's Rock House" within 1 mile of proposed transmission line (and product pipeline and eastern access road). 60 acre-parcel nominated in 1975 for "outstanding natural area,"still under consideration by BLM.

RESPONSE LETTER 9

Tosco Development Corporation

9.1 BLM's preferred alternatives were developed to be as consistent as possible with existing land use planning decisions, one of the most important being the protection of the scenic corridor along the White River. These preferred alternatives are not necessarily the same as may result from decisions on actual locations for the rights-of-way. Right-of-way grants can only be issued after the analysis of all alternatives has been completed, the Final EIS published, and a record of decision executed. At that time, full consideration will be given to all available information so that, should a right-of-way be granted, it will be environmentally acceptable as well as usable.

9.2 BLM's recommendations as to preferred corridor locations were intended to be as consistent as possible with existing land use plans. BLM recognizes that the Ute Tribe's approval is needed before any linear facility can be built across tribal land. It is understooding that a land use plan for the Uintah and Ouray Reservation is being prepared at this time. When this planning progresses to a point that corridors common to both entities can be identified, every attempt will be made to do so.

9.3 Refer to the response to Comment 9.1.

COMMENT LETTER 10

United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VA. 22092

In Reply Refer To:
EGS-Mail Stop 423

OCT 14 1982

Memorandum

To: District Manager, Bureau of Land Management
Vernal, Utah

From: Assistant Director for Engineering Geology

Subject: Review of draft environmental statement for Uintah Basin Synfuels Development, Utah and Colorado

We have reviewed the draft statement as requested in the notice from the State Director.

10.1 The statement should assess more thoroughly the potential ground-water impacts for projects involving the oil shale resources of the Uintah Basin, particularly impacts on the Douglas Creek aquifer which lies below the Mahogany zone (p. T-4-7). Analyses from a recent deep drilling and testing program indicate that ground water in the Douglas Creek aquifer within the interior of the basin has a total dissolved solids content on the order of 1,DDD milligrams per liter. Water from the shallower Bird's Nest aquifer, which lies above the Mahogany zone, has about 1D,DDD milligrams per liter of total dissolved solids in the interior of the basin (Holmes, W.F., 19BD, Results of test drilling for ground water in the southeastern Uinta Basin, Utah and Colorado: U.S. Geological Survey Dpen-file Report BO-951, p. 1, 34). Water in the confined Douglas Creek aquifer is under considerable hydrostatic pressure and in places has a piezometric surface more than 1DD feet above land surface (Holmes, W.F., 19BD, op. cit., p. 34). The statement should address the significance of the removal of confining impermeable shale layers overlying the Douglas Creek aquifer and should evaluate the potential for impacts from: (1) mixing the waters of the two aquifers; (2) loss of pressure in the Douglas Creek aquifer; and (3) changes in water quality in the Douglas Creek aquifer as a result of in-situ methods in the overlying oil shales.

for James F. Devine

RESPONSE LETTER 10

U.S. Geological Survey

10.1 The oil shale zone to be mined is believed to be separated from both the overlying Birds Nest and underlying Douglas Creek aquifers by a sufficient thickness of relatively impermeable layers so that mining would not encounter water from either aquifer. This does not exclude the possibility, believed to be remote, of encountering an unpredictable fracture zone or fault extending to either aquifer which is sufficiently open to transmit water. Should this occur, measures such as dewatering and use of the intruding water, or re-injection would mitigate any impact.

COMMENT LETTER 11

U.S. Department of Housing and Urban Development
Denver Regional/Area Office, Region VIII
Executive Tower Building
1405 Curtis Street
Denver, Colorado 80202

October 15, 1982

Mr. Lloyd Ferguson
District Manager
Bureau of Land Management
170 South 500 East
Vernal, UT 84078

Dear Mr. Ferguson:

Thank you for the opportunity to review and comment on the draft Environmental Impact Statement (EIS) for the Uintah Basin Synfuels Development impacting the areas of northeastern Utah and northwestern Colorado.

11.1 Your EIS has been reviewed with specific consideration for the areas of responsibility assigned to the Department of Housing and Urban Development (HUD). This review considered the proposals compatibility with local and regional comprehensive planning and impacts on urbanized areas. Within these parameters this EIS is found adequate for our purposes.

If you have any questions regarding these comments, please contact Mr. Carroll F. Goodwin, Area Environmental Officer at (303) 837-3102 or FTS 327-3102.

Sincerely,

Robert J. Matuschek
Director
Office of Regional Community
Planning and Development, 8C

RESPONSE LETTER 11

Department of Housing and Urban Development, Region VIII

11.1 The views expressed in this letter will be considered in the decision-making process. BLM appreciates the assessment that the EIS is adequate for the needs of the U.S. Department of Housing and Urban Development.

COMMENT LETTER 12

THE HUMANE SOCIETY OF UTAH
4613 South 4000 West
P.O. Box 20222
Salt Lake City, Utah 84120
Phone 968-3548

October 15, 1982

Mr. Lloyd Ferguson,
District Manager
U.S. Bureau of Land Management
170 South 500 East
Vernal, Utah 84078

Dear Mr. Ferguson,

The following letter expresses the views and concerns of the Humane Society of Utah in regards to the E.I.S. for Uintah Basin Synfuels Developement.

12.1 These projects are primarily experimental in nature. It is unknown if loss of habitat for 35-plus years is a reasonable trade-off with relationship to the projects worth in energy developement. Loss of habitat affects all aspects of the impact to this area and its wildlife.

We find a definite lack of information concerning the following areas. These should be better defined, examined and evaluated in the final draft of this E.I.S..

12.2 1) Wildlife has been described very generally (i.e. small mammals, birds, raptors). There are few specific species mentioned or considered. With the exception of Syntana, there are no wildlife population counts. This is needed to estimate loss to wildlife.

12.3 2) There are no impact details concerning power lines needed for these projects. Such power lines would have a large impact to the raptors in the project areas, unless properly constructed.

12.4 3) The Tosco Sand Wash has resting areas for the Whooping Crane. There is no indication of where these areas are or how they will be protected.

12.5 4) Mention was made on page R-3-44, that there were 100 wild horses in the project areas. No further information is provided as to the location of these animals or the possible impact to the animals.

12.6 5) There are three related projects that are mentioned (R-B, R-C, R-D). There is no impact information on these projects. These projects should not be considered without a draft of their proposed impacts.

12.7 6) Grouse habitat is listed as unqualifiable with no explanation of "unqualifiable".

12.8 7) There is possible habitat for the Black-footed ferret. It is unknown if the ferret exists in this area. This should be evaluated because of its endangered status.

12.9 There was considerable projected loss of wildlife due to poaching and harrassment. This problem could be reduced though the use of the Uintah and Quary Indian requirement restricting the carrying of weapons. This requirement is on page SS-A-8. This restriction could be used by all the project companies and their employees. This would definitely limit poaching and harrasement.

12.10 The Humane Society of Utah objects to the massive loss of life to Songbirds, Mourning doves and small rodents. The total percentage of animals affected is not large, but we find the potential numbers of dead and/or injured to be staggering.

All five projects list alternatives for water useage. They include use of White River, Green River or ground and well water. We would oppose the diversion of water from either river, because of the adverse affects and possible loss to the three endangered aquatic species.

Your review of these concerns is appreciated.

Sincerely,

Helen D. Robison

Helen D. Robison .
Senior Investigator

RESPONSE LETTER 12

Humand Society of Utah

12.1 Although these projects are somewhat experimental, they are serious commercial efforts. One of the purposes of an EIS is to point out trade-offs to the decision maker. It is up to the decision maker to decide whether the trade-offs are reasonable. The point of view expressed in this comment will be considered in the decision-making process.

12.2 In most cases, numerical estimates of wildlife population losses are not available. The Utah Division of Wildlife Resources cannot census the various wildlife species (with the possible exception of pronghorn) to get more than a population trend. Therefore, the Division does not estimate total populations. Estimates of losses caused by the applicants' projects cannot be reliably made because of the present levels of knowledge about wildlife populations.

12.3 It is currently standard practice for power lines to be constructed to minimize raptor electrocution. Chapter 1 (Section 1.D.1) of each site-specific project discussion states that power lines would be so constructed.

12.4 Neither the Fish and Wildlife Service nor the Utah Division of Wildlife Resources identifies the Sand Wash area as a resting area for whooping cranes.

12.5 Because of the small number of feral horses in the Uintah Basin and the large area they occupy, no impacts are anticipated to these animals. For a more complete inventory of feral horse range, see Range Management Allotment Status Report, Bonanza Planning Unit, Vernal District (BLM 1981b).

12.6 The three projects referred to in the comment are conceptual at this time. Their impacts were analyzed to the extent possible in the regional part of the Draft EIS (referred to as the Nine-Project Cumulative Analysis in the Final EIS). Supplemental environmental assessment of these projects will be required when project designs are more complete and specific actions on the right-of-way applications are requested (EIS Preface).

12.7 The word used in the Draft EIS (page M-4-11) is "unquantifiable." Unquantifiable means that a number cannot be determined for the loss, but that a loss would occur.

12.8 The black-footed ferret is discussed in Section R-3.A.5.

12.9 BLM has no authority to regulate carrying of firearms on state or private lands. As noted, this mitigation measure would be included in tribal authorizations. Each company would determine the necessity and enforceability of such mitigation as a matter of company policy for employees on all lands (state, public, and private).

12.10 The views expressed will be considered in the decision-making process.

SYNFUELS ENGINEERING & DEVELOPMENT, INC.
a subsidiary of Magic Circle Energy Corporation

October 12, 1982

Mr. Lloyd Ferguson, District Manager
Bureau of Land Management
170 South 500 East
Vernal, Utah 84078

Dear Mr. Ferguson:

Synfuels Engineering and Development has reviewed the Draft Environmental Impact Statement for Uintah Basin Synfuels Development for Magic Circle Energy Corporation. On the whole, we are impressed with the high level of competence reflected in the Draft EIS, and are pleased with the favorable recommendations regarding our proposed Cottonwood Wash oil shale project. However, we believe that the final EIS could be improved by incorporation of the following suggestions. We recognize instances in which data regarding our plans were not made available to BLM in sufficient time for incorporation in the Draft EIS. We also realize that a few of our comments relate to subjective aspects of the EIS, and we are submitting comments on these aspects to help ensure that BLM has the opportunity to consider all sides of such issues. Our comments, with references to specific pages in the Draft EIS or the supplementary technical reports (Reference 1 through 3), are grouped by subject matter.

13.1 1. Air Quality - From the standpoint of the Cottonwood Wash project, the main problem with the air quality section of the Draft EIS is the background air quality assigned to the Cottonwood Wash site. For example, the baseline data given in Table M-4-2, page M-4-6, are in conflict with monitored data determined by the Utah Bureau of Air Quality (Reference 4) to be representative of the Magic Circle site. Comparative data are presented below, with all values expressed in units of $\mu g/m^3$.

POLLUTANT	EIS (Table 6-13) ASSIGNED BASELINE	MONITORED DATA
Sulfur dioxide		
24-hour	23	2
annual	0	1
Total Suspended Particulates		
24-hour	222	84
annual	55	19
Carbon Monoxide		
1-hour	200	7400
8-hour	200	4500
Ozone		
1-hour	70	16

1667 Cole Boulevard, Building 19, Suite 400, Golden, Colorado 80401 (303) 238-5304

13.1 (cont) The values of most concern are those for TSP, which according to the EIS, are near or above ambient air quality standards. Actually, according to monitored data, TSP levels are well within state and federal ambient air quality standards. Therefore, statements such as that given on page M-4-7 regarding "the high existing levels" [of TSP] are inconsistent with monitored data, and should be deleted or modified.

13.2 The second paragraph of par. M-3.A.2 (page M-3-1) should be revised to read: "Drainage flows would carry emissions to the northeast." The meteorological characteristics of the site are described in Reference 6.

13.3 The footnote to Table M-1-S, page M-1-20, should read: "[a]Based on maximum expected daily emissions during peak operation."

13.4 The second and third paragraphs of par. M-4.8 (page M-4-18) together with associated portions of Table M-2-2 (page M-2-3), unfortunately were based upon preliminary estimates which were changed significantly as design progressed. It is recommended that the following changes, which are consistent with page 280 of Reference 7, be made:

> "By using the small-scale Paraho retorting process, air emissions would be virtually the same as those identified for the proposed action. (Emission rates for both processes are identified on Table M-1-S.) Air quality impacts of this alternative are summarized in Tables M-4-S and M-4-6, which show that no NAAQS or PSD increments would be exceeded. Visibility impacts would be similar to those of the proposed action.
>
> Water consumption for the small-scale Paraho retorts with water recovery would be approximately the same as that of the proposed action (540 ac-ft/yr)."

TABLE M-2-2

ENVIRONMENTAL ELEMENT	PROPOSED ACTION	SMALL-SCALE PARAHO PROCESS ALTERNATIVE
Air Quality	174 kg/hr of SO_2 68 kg/hr of TSP 974 kg/hr of NO_x 24 kg/hr of THC 56 kg/hr of CO (PSD incremental limitations and NAAQS would be met for all pollutants)	174 kg/hr of SO^2 69 kg/hr of TSP 974 kg/hr of NO_x 24 kg/hr of THC 56 kg/hr of CO (PSD increment consumption and NAAQS impacts would be same as for proposed action)

Note: ... kg/hr = Kilograms per hour (maximum)...
SO_2 = sulfur dioxide; TSP = total suspended particulates

13.5 2. Vegetation and Wildlife - Certain portions of the Draft EIS could lead to gross misunderstanding of the vegetation and wildlife characteristic of Cottonwood Wash. Specifically, Figure R-3-1 (page R-3-29) implies that the Magic Circle site consists of about 40 percent Pinyon-Juniper vegetation type. Actually, the site contains neither pinyon nor juniper nor most other vegetation characteristic of the type. Surveys conducted by a local consultant, Bio-Resources, Inc. (Reference 5) show that the entire site is best characterized as mixed-desert shrub.

Although Cottonwood Wash lies within a broad area classified as "high-
13.6 priority year-long pronghorn antelope" habitat (cf. Table R-4-20, page R-4-63), studies by our wildlife specialists (Ref. 5) have shown that the Cottonwood Wash site has little or no present or potential use as a year-round pronghorn antelope habitat. In fact, the site is almost totally devoid of big-game species.

13.7 Several other portions of the EIS give the impression that the site contains significant riparian acreage. Riparian vegetation comprises plants that are normally associated with surface flowing water. Except for runoff occasionally flowing through Cottonwood Wash, there is no surface flowing water on or in the immediate vicinity of the site. To minimize confusion, it might be best to classify Riparian areas with subscripts to distinguish between on-site riparian (greasewood) and corridor riparian areas.

This change would help clarify Table R-3-11 (p. R-3-35). For example, the peregrine falcon, being a bird hawk, is found where prey are found, i.e., in riparian and aquatic habitats, not in the mixed-desert shrub areas unless these areas are immediately adjacent to Riparian areas. Also, mule deer are transient on the Magic Circle site, which is not a preferred habitat for any big game.

13.8 The misunderstanding extends to the statement on page M-4-8 that "... 20 to 75 years would be required to return brush and tree species to preconstruction height and population densities." No trees are found in the area to be disturbed. We recommend the statement be changed to read "...20 to 25 years would be required to return vegetation to preconstruction height and population densities."

13.9 Also, please note that Table R-3-10 erroneously indicates that Magic Circle's access road traverses riparian as well as mixed-desert shrub vegetation. In fact, the 0.75-mile access road traverses only DS-type vegetation.

13.10 Also, no sage grouse have been seen on site during year-round surveys, so it is difficult to understand the statement on page M-4-11 "... 277 acres of the substantial value, year-long sage grouse habitat would be disturbed by project activities."

13.11 3. Energy Efficiencies - The BLM analysts did a good job with very limited data in attempting to estimate the energy efficiency of the Magic Circle project. We were unaware that such calculations were being made, and hence did not supply all the data needed for a thorough, consistent analysis. We originally selected the Improved NTU/T3 process in part because of its relatively high energy efficiency (computed on a different basis from that used by BLM), as shown in the following tabulation.

PROCESS	NET ENERGY EFFICIENCY *
Lurgi	66.5%
T3	63.7
Paraho, Direct	63.0
Union SGR-3	62.7
Tosco II	62.3
VMIS	61.9
Union B	61.4
Superior, Direct	61.1
Galoter	60.7
Paraho, Indirect	60.6
Petrosix	60.2
Kiviter	52.7

* 25.6 GPT Utah Shale

As part of our review of the Draft EIS, we have computed overall energy efficiency using the methods outlined and referred to in the Draft EIS, and recommend that the following changes be made:

On page R-4-92, for "Magic Circle" summary

As written is:	111.400	+	41.744	=	153.140	65.260	42.6
Should be:	111.400	+	15.091	=	126.491	69.925	55.3

On page M-4-17, delete the second paragraph.

On page M-4-17, change the small table to read as follows:

Net Output	69.925
Energy in Shale	(111.400)
Other Fuels Used	(1.408)
Indirect Energy	(5.222)
Infrastructure	(8.461)
Total Input	126.491
Percent Efficiency	55.3

On page R-L-3, opposite "Magic Circle" and under "Hydropower," change "1.134E13." to "1.134E12." Under "Totals," change "1.866E13" to "8.461E12."

The major differences between the Draft EIS data and assumptions and the project plan are these:

13.11 (cont) 1. Power Plant. The BLM analyst assumed, on the basis of inaccurate information on page M-1-15, that the powerplant used off-gas as its sole fuel, with total power generation of 108 MW and excess power of 44 MW. Actually, the plant burns both off-gas and raw shale fines, and produces an average output of 314 MW and an average excess of 200 MW.

2. Spent Shale. The analyst assumed 18.42 E6 tons/year of spent shale. The project estimate is 16.75 E6 tons per year.

3. Underground Crushing. The analyst used the standard factor of 8 percent loss of fines. Actually, all fines are burned in fluidized bed combustion unit rather than being lost, and are expected to amount to 12 percent of mined tonnage.

4. Infrastructure. The BLM analysis appears to be incorrect by a factor of 10 in the use of the "hydropower" factor.

5. Total External Energy as Resources in Ground. As noted in the guidelines referred to in the EIS, on-site power developed from the principal oil shale resource does not require any entry under this heading, because it comes from resources within the basic "trajectory." The BLM analysis in effect doubly accounts for energy expended in extracting this portion of the principal energy source.

6. Water Supply. The BLM analyst used peak water consumption rather than annual-average consumption in his calculations.

7. ANFO usage. The BLM analyst used a standard factor. The project estimate is somewhat higher.

8. Diesel consumption for underground mining. The BLM analyst used the standard factor, which is based on underground haulage by truck. We used the project estimate, which is based on transport by conveyor.

9. Energy in Materials for Retort. The BLM analyst appears not to have divided the total materials requirement by the expected life of 20 years, as advocated in the guide book.

4. Mining and Processing Details

13.12 a. The depth of the underground mine (item 1, par. M-1.C-1) is 1500-1900 feet, rather than 880 feet.

13.13 b. Full production (p. M-1-9) is scheduled for 1990, not 1988.

13.14 c. The first sentence on page M-1-15 should be: "When full production is underway, the Magic Circle project would generate (by burning shale fines and low-Btu gas) approximately 200 megawatts of electric power that could be exported to the utility grid." Table M-1-4 (page M-1-19) should be revised accordingly

13.15 d. Paragraph M-1.E.1 (page M-1-15) should be revised to read: "This alternative would be identical to the proposed action except that small-scale Paraho retorts with water recovery would be used instead of Magic Circle's Improved NTU/T^3 retorts."

13.16 e. On page M-1-12, the phrase "...the retorting process's complete carbon utilization..." should read "... the retorting process's carbon utilization..."

13.17 f. The first sentence of second paragraph under "Improved NTU/T^3 Process" on page SS-15 should be changed to: "The Improved NTU/T^3 process can be visualized as consisting of two identical retorts which operate in alternating retorting and cooling modes as shown in Figure SS-3."

13.18 g. Page SS-4, last sentence, states: "It is this substance which, when heated to about 900 degrees Fahrenheit, emerges from the rock as a slow flowing liquid that can be converted to a synthetic crude oil." This statement is incorrect since the kerogen is naturally occurring organic polymer which is thermally cracked to produce products.
This statement could read: "The kerogen is thus a naturally occurring polymer which when heated to about 900°F in the absence of oxygen thermally decomposes to produce liquid, gas and residual carbon. The liquid is a crude oil type material similar to naturally occurring crudes but requires upgrading prior to refining in a conventional refinery."

13.19 h. The first paragraph beginning on page SS-18 mentions Fischer assay. For a typical shale, Fischer assay will yield something like the following:

Oil	=	66%
Gas	=	16%
Residual Carbon	=	18%

To arrive at a Paraho process yield of 103%, one would compute (weight of oil plus weight of gas) / Fischer assay oil.

To be correct, one should compute the results as: 1) wt. of oil produced/Fischer assay oil (normally about 88-92% for Paraho) or 2) (wt.of oil plus wt. of gas produced) /(Fischer assay oil plus gas)

The corrected yield would be:

$103\% * \frac{.66}{.82} = 82.9\%$ or 83% of the energy in the form of gas and oil as produced by Fischer assay.

5. Water Consumption and Wastewater

13.20 a. Although average water consumption is about 540 ac-ft/yr, waste water will amount to 52.3 ac-ft/yr rather than 540 ac-ft/yr as indicated on page M-1-13. The remainder is lost to evaporation or is discharged to the atmosphere in the stack gas.

13.21 6. Benefits and Trade-offs - We recognize the comparative difficulty in assessing the positive versus the negative impacts of energy development in any area. Without mitigation, negative impacts of various types are certain to occur. With proper mitigation techniques, the costs of which could easily be met by the use of revenues from the proposed projects, many or most of these potentially negative impacts could be turned into positive impacts. The EIS authors appear to have taken the viewpoint that, since implementation of approriate mitigation measures is not assured, it is proper to assume they will not be implemented. Conversely, Magic Circle believes that the preponderance of evidence (e.g., the reclamation plans noted in the EIS, the socioeconomic mitigation measures instituted by Uintah Basin projects that are currently under way, the provisions of SB170, and the project mitigation plans such as that outlined by Magic Circle in Fort Duchesne and Vernal on September 8, 1982) is that appropriate mitigation measures will be taken. Accordingly, we believe that Table R-5-1 should be revised as follows:

TABLE R-5-1
BENEFITS AND TRADE-OFFS

Resource/Item	Quality or Quantity Increase Probable	Decrease Probable	Variable Impact
Oil/Energy Production	X		
Oil Shale/Tar Sand Resources		X	
Oil Shale/Tar Sand Reserves	X		
Employment Opportunities	X		
Income Levels	X		
Local Prices and Wages	X		
Service Infrastructure Needs	X		
Public Revenues	X		
Quality of Life			X[a]
Air Quality			
PSO Increment Availability		X	
Visibility		X	
Water Quality			X[a]
Vegetative Production			X[a]
Wildlife Populations		X	
Agriculture		X	
Traffic and Transportation	X[b]		
Road Quality			X[a]
Outdoor Recreation			X[a]
Wilderness		X	
Cultural Resources/Facilities			X[c]
Paleontolgical Resources		X	

13.21 (cont) Footnotes - Table R-5-1

a] Most indicators commonly used to describe this resource/item are likely to improve with proper planning and use of project revenues, but would likely deteriorate in the absence of such measures.

b] Traffic increase expected; transportation indicators may improve or deteriorate, depending upon use of project revenues.

c] Accessibility of non-renewable cultural resources likely to increase; increase in cultural facilities (those devoted to fine arts, humanities, and broad aspects of the sciences) likely as consequence of population growth and increased public revenues.

7. Environmental Impacts

13.22 a. Land Spills. Pages R-4-97 and R-4-98 mention the possibility of a rupture of the proposed Magic Circle product pipeline within the marsh area of the Ouray National Wildlife Refuge. Actually, the pipeline does not pass within a mile of the Refuge, as can be seen from Figure R-A-3 of EIS Appendix R-A. If the Refuge should be expanded to include part of the path of the proposed pipeline, and if the intent to expand in such a way were made public in sufficient time for Magic Circle to change the route of the proposed pipeline, we would be happy to do so. We certainly would not knowingly endanger the Refuge, even though the potential for such a rupture is very small and our spill prevention and control system would minimize the spill if a rupture were to occur.

13.23 b. Disturbed acreage. On Table M-1-1, page M-1-6, the access road mileage and acreage should be moved to the "State of Utah" column, as can be seen from Map M-1-1 on page M-1-7.

Footnote h on Table M-4-3 could be added to Table M-1-2, page M-1-17, to clarify the duration of land disturbance for the spent shale pile.

13.24 c. Visual Resources. The statement on page M-3-6, to the effect that "The project area is not viewed from highly sensitive areas, other than from the two rivers..." may be misleading. The project site is not visible from any point along either river.

13.25 In the EIS report negative references (e.g., page M-4-14) are made to intake structures required to utilize water from the Green River. These structures are assumed to detract from the scenic appearance of the river. Magic Circle has taken into account these negative impacts and has elected to drill wells in the alluvium some 100 to 200 feet back from the river's edge. Since the river is some 6 to 10 feet below the level of the wells and the pumps will only extend 3 to 4 feet above the ground level, it is probable that one cannot see these structures from the water level. In addition, there are trees and underbrush between the intakes and the river's edge, further obscuring these "small" pumps.

13.25 (cont) Also, approximately 2 miles north of these hidden intakes there exists an old bridge structure not in use. This existing structure is visible from the water and has already produced a negative impact on the scenic beauty. Therefore, we believe the comments in the report are unjustified for the Magic Circle project.

13.26 d. Threatened or Endangered Species. The note regarding the hookless cactus (page R-4-58) should be expanded to note that the cactus is usually found on the Green River Formation, not the Uintah Formation as on the Magic Circle property.

Very truly yours,

Dr. Harry E. McCarthy
Project Manager of the
Cottonwood Wash Project

HEM/pm

REFERENCES

1. Draft Environmental Impact Statement, Uintah Basin Synfuels Development, Bureau of Land Management, August 1982.

2. Draft Technical Report, Air Quality, Uintah 8asin Synfuels Development, Systems Applications, Inc., August 1982.

3. Draft Technical Report, Uintah 8asin Synfuels Development, Socioeconomics (two volumes), State of Utah, August 1982.

4. Letter, Brent C. Bradford, State of Utah, Division of Environmental Health, April 5, 1982.

5. Flora and Fauna of the Cottonwood Wash Project Area, Bio-Resources, Inc. Logan, Utah, September 1982.

6. Representativeness of Off-Site Meteorological Data for the Utah Cottonwood Wash Oil Shale Project, Uintah County, Utah, VTN Consolidated, Inc., Irvine, California, December 1981.

7. Commercial Shale Dil Production from the Utah Cottonwood Wash Project, Project Description, Magic Circle Energy Corporation, July 14, 1982.

Synfuels Engineering and Development, Inc.

13.1 The texts of the Air Quality Technical Report and the Final EIS have been modified to take into account appropriate monitoring data as it relates to TSP background analysis.

13.2 Section 6.2 of the Air Quality Technical Report states, "Drainage flows in the local area would carry emissions to the north and west." This statement is supported by the wind field modeling performed by Systems Applications Inc., for drainage flow conditions (see Figure 2-5, Air Quality Technical Report) which shows flow to the north toward the White River then turning westward toward the Green River. The VTN analysis considered topography only in the immediate vicinity of the site and would be applicable only for near ground-level releases of pollutants. For elevated releases, such a stack releases, mesoclimatological rather than microclimatological winds need to be considered due to the higher plume height and greater transport distance.

13.3 The Table M-1-5 footnote has been revised.

13.4 Section M-4.B and Table M-2-2 have been revised to reflect the new information.

13.5 Figure R-3-1 has been revised.

13.6 Table R-4-20 is based upon general distribution maps furnished by the Utah Division of Wildlife Resources. Under the broad classification, islands or voids within the larger areas are not broken out. Impact analysis in Section M-4.A.5 indicates that Magic Circle project activities would disturb only 0.7 percent of this type of habitat, which is an insignificant impact.

13.7 The riparian vegetation type as described for this project includes the narrow riparian zone (floodplains of intermittent streams) of greasewood plant communities of the mixed-desert shrub type and bottomland sagebrush of the pinyon-juniper/mountain shrub type (Section R-3.A.4).

13.8 Section M-4.A.4 has been revised.

13.9 Table R-3-10 has been revised.

13.10 Based upon sagegrouse distribution maps furnished by the Utah Division of Wildlife Resources (1981), a line demarking substantial-value, yearlong sagegrouse habitat goes through the southern portion of the lease site.

13.11 The analysis used for the "hydropower" factor was, in fact, incorrect. This error stemmed from a mistake in the Energy Analysis Handbook (BLM 1982a) and has been corrected.

With the new information provided, all the energy calculations have been recomputed, using the same method for all comparisons. Using the same assumptions used for the other projects, "Other Fuels Used" was calculated to be 3.980 trillion Btu's/year, which would only change the final efficiency 0.1 percent. One of the factors (product pipelines) used in the "Indirect Energy" calculation was low by a factor of 10. This resulted in a final efficiency of 52.9 percent rather than 55.3 percent as calculated by the commenter.

13.12 Section M-1.C.1 has been revised.

13.13 Section M-1.D.1 has been revised.

13.14 Section M-1.D.2, Table M-1-4, and Table R-1-10 have been revised.

13.15 Sections M-1.E.1 and M-4.B have been revised accordingly.

13.16 Section M-1.D.2 has been revised.

13.17 The Site-Specific Analyses Introduction has been revised.

13.18 The Site-Specific Analyses Introduction has been revised.

13.19 The Fischer Assay (FA), termed "the standard for the oil shale industry," is designed to assay the oil potential of geological deposits. It is not designed for process control nor process evaluation. Yet, traditionally, the calculation "oil field, volume percent Fischer Assay" is used. The product split between oil and gas in the Fischer Assay does not relate to any known oil shale retorting process. The Fischer Assay is a laboratory test; heat is transferred through the reactor wall; it is a batch process in which the energy products are separated by cooling to 0 degree C. (Heistand 1979)

To calculate product yield, the following equation was used along with data supplied by the applicant.

$$\text{Product yield, \% assay} = 100\% \times (O_R + G_R) / (O_A + G_A)$$

Where

$O_R + G_R$ = oil retort + gas retort = 123
$O_A + G_A$ = oil assay + gas assay = 126

Then

$$\text{Product yield, \% assay} = 100\ \% \times 126/123 = 102.4\%.$$

13.20 Section M-1.D.2 has been revised.

13.21 Table R-5-1 has been revised based on the information provided by this commenter and others. Those mitigations committed to have been assumed in the analysis. However, where mitigation has not be committed to, the analysis has been affected, even to the use of worst-case analysis in some instances. National Ambient Air Quality Standards (NAAQS) have been added to Air Quality in order to fully address air quality changes. Water quality and vegetative production analyses indicate minor instances of improvement over present conditions but overall probable decrease in quality and production. Outdoor recreation has been modified to better indicate the benefits and trade-offs. As used in this document and, therefore, this table, cultural resources means archaeological and historical resources. Cultural amenities for fine arts and humanities are considered to be a component of socioeconomics and are considered in the analysis of quality of life and service infrastructure.

13.22 A rupture of the Tosco Salt Lake City Alternative Product Pipeline rather than the Magic Circle product pipeline could affect the Ouray National Wildlife Refuge. This error has been corrected in Section R-4.A.15 of the Final EIS.

13.23 Tables M-1-1 and M-1-2 have been revised.

13.24 The confusion may relate to the use of the term project area, which is defined as the lease area and all rights-of-way required for the proposed action (Site-Specific Analyses Introduction). In this case, the rights-of-way for the proposed action pipeline to Roosevelt would cross the White River and then the Green River near their confluence. The proposed action water pipeline would cross the White River and terminate at the Green River near the confluence of the two rivers. The proposed action product pipeline leading eastward would cross the White River on the Tosco lease area.

13.25 Sections M-1.D.2 and M-4.A.8 have been revised to include the information provided about the wells and pumps. The amount of underbrush screening between the river and well and pump structures would determine the degree of impact. Concerning the old bridge structure, should the Green River be designated as a Wild and Scenic River, the bridge could be removed if it is found to diminish the river running experience. The bridge could also be considered to enhance the river running experience based on its historic value.

13.26 This information has not been added to the EIS, because it does not alter nor enhance the impact assessment. The plant on the Magic Circle property is the only hookless cactus that has been located in the area of influence.

COMMENT LETTER 14

STATE OF COLORADO

Department of Local Affairs

DIVISION OF LOCAL GOVERNMENT
Pat Ratliff, Director

Richard D. Lamm
Governor

October 15, 1982

Mr. Lloyd Ferguson
District Manager
Bureau of Land Management
170 South 500 East
Vernal, Utah 84078

SUBJECT: Uintah Basin Synfuels Development
Draft Environmental Impact Statement

Dear Mr. Ferguson:

14.1 The Colorado Clearinghouse has received the above-referenced Draft Environmental Impact Statement and has distributed it to interested state agencies. Comments received from the Colorado Natural Heritage Inventory, Colorado Department of Highways, Colorado Historical Society, Colorado Ceological Survey and the Colorado Division of Water Resources are enclosed for your information.

Thank you for the opportunity to review this matter.

Sincerely,

Stephen O. Ellis
Chief Planner

SE/PN/vt
Enclosures

cc: Office of the Governor
Department of Highways
Colorado Historical Society
Department of Natural Resources

1313 Sherman Street, Room 520, Denver, Colorado 80203 (303) 866-2156

COLORADO NATURAL HERITAGE INVENTORY

1550 Lincoln Street, Room 106
Denver, Colorado 80203
(303) 866-5887

MEMORANDUM

TO: STEPHEN O. ELLIS

FROM: J. SCOTT PETERSON, BETH LAPIN, BILL BAKER

DATE: 13 OCTOBER 1982

SUBJECT: UINTAH BASIN SYNFUELS OEVELOPMENT EIS

CC: S. BISSELL/CARSE PUSTMUELLER

14.2 SPECIAL ANIMALS

Pg. R-3-43, Table R-3-11
Razorback sucker (Xyrauchen texanus) is considered Endangered by State of Colorado.

14.3 SPECIAL PLANTS

Pg. R-3-32
Sclerocactus glacus is a Listed Threatened species, not a Category 1 plant.

14.4 Chapter S-2, Pg. S-4-18
This proposed alternative could have a negative impact on Raven Ridge, a registered Colorado Natural Area. This Natural Area should be considered in the document. Raven Ridge is also a proposed BLM Area of Critical Environmental Concern (ACEC).

AQUATIC AND TERRESTRIAL ECOSYSTEMS

14.5 The Atriplex confertifolia / Elymus ambiguus plant community, a plant community of Special Concern for the State of Colorado. occurs 5 - 15 miles east of Rangely. This endangered vegetation type could occur in the project area in Colorado on Green River shale substrata.

RECEIVED
OCT 14 1982
Division of Local Government

STATE OF COLORADO

DEPARTMENT OF HIGHWAYS

Grand Junction, Colorado 81502
(303) 242-2862

October 12, 1982

RECEIVED
OCT 14 1982
Division of Local Government

Mr. Stephen O. Ellis
State Clearinghouse
520 State Centennial Building
1313 Sherman
Denver, CO 80203

RE: UINTAH BASIN SYNFUELS DEVELOPMENT DEIS

Dear Mr. Ellis:

The Department of Highways District Office has reviewed the Uintah Basin Synfuels Development Draft EIS and has the following comments.

14.6 It is apparent from reviewing the Draft EIS that the cumulative impacts to the State highway system (and county roads) will be both significant and adverse -- particularly to SH 64 between Rangely and Dinosaur. SH 64 would go from a Level of Service of C to D, E or F even with the low scenario of energy development.

We would note that there appears to be some erroneous traffic volume figures and level of service information presented in Tables R-4-24 and R-4-25. There would also be increases in congestion, accidents, road damage, deer/vehicle accidents and other adverse factors associated with increased traffic and heavy loads.

To mitigate these impacts at least three major funding options are available, which are:

1. Earmark a certain percent of the revenues (taxes) paid to the State from energy development companies to go for roadway improvements (state and county).

2. Require that energy development companies contribute to an escrow account for roadway improvements on a percentage basis, according to their size (impact) and as they come on line.

3. Set up a special funding program at the federal level to pay for improvements resulting to

Mr. Stephen O. Ellis
October 12, 1982
Page 2

roadways which are impacted by the various federal leasing/subsidy programs.

14.6 (cont) Of the above three options, the State can immediately use the first two options to mitigate energy development impacts.

However, in the short term and to insure the mitigation of site specific impacts, all energy developments will be required to comply with the new State Access Code and fund improvements to the State highway system that result directly from their development projects (i.e., replacement of substandard bridges, intersection channelization and signalization, adding climbing lanes, etc.). But, it should be noted that these improvements will do nothing to improve or maintain an entire section or roadway or reduce accidents or congestion.

We appreciate the opportunity to review this document.

Very truly yours,

R. P. MOSTON
DISTRICT ENGINEER

Laurence R. Abbott
By LAURENCE R. ABBOTT
DISTRICT ENVIRONMENTAL MANAGER

LRA/jme

cc: Torp
Clevenger
Chocol/Geddy
Moston/Sturm
File

2

COLORADO
HISTORICAL
SOCIETY

The Colorado Heritage Center 1300 Broadway Denver, Colorado 80203

September 17, 1982

RECEIVED
SEP 22 1982
Division of Local Government

Mr. Stephen O. Ellis
Principal Planner
A-95 Clearinghouse
523 State Centennial Building
1313 Sherman Street
Denver, Colorado 80203

RE: Uintah Basin Synfuels Development, #82-116.

Dear Mr. Ellis:

14.7 The majority of the above proposed project is to take place in Utah. However, several pipelines may traverse parts of Colorado. Cultural resource surveys should be completed in those areas in Colorado where ground disturbing activities will occur.

All cultural resources located in the impact area must be evaluated in terms of the National Register criteria, 36CFR60.4. The effect of the project is then determined for all those cultural resources eligible to the National Register. The above is done in consultation with this office.

If this office can be of further assistance, please contact the Compliance Division at 866-3392.

Sincerely,

Arthur C. Townsend
Arthur C. Townsend
State Historic Preservation Officer

ACT/WJC:ss

STATE OF COLORADO

RICHARD D. LAMM
GOVERNOR

JOHN W. ROLO
Director

COLORADO GEOLOGICAL SURVEY
DEPARTMENT OF NATURAL RESOURCES
715 STATE CENTENNIAL BUILDING – 1313 SHERMAN STREET
DENVER, COLORADO 80203 PHONE (303) 839-2611

September 15, 1982

RECEIVED
SEP 16 1982
Division of Local Government

Mr. S. O. Ellis
Colorado Clearinghouse
Colorado Division of Local Government
1313 Sherman St., Room 523
Denver, CO 80203

Dear Mr. Ellis:

Re: Uintah Basin Synfuels Development, Draft EIS (EIS #82-116)

We have received and reviewed this subject document.

14.8 Because most of this EIS concerns impacts to be made in the Utah part of the oil-shale-development area, we think that a detailed review of this document by us is unnecessary and out of place. However, the effects of Utah oil-shale development will be felt in some extreme western Colorado communities and the assessment of these effects in this document, which make up only a small part of it appear, in our opinion, to be adequate.

Sincerely,

James M. Soule
James M. Soule
Engineering Geologist

JMS/bn

GEOLOGY
STORY OF THE PAST . . . KEY TO THE FUTURE

RICHARD D. LAMM
Governor

JERIS A. DANIELSON
State Engineer

OFFICE OF THE STATE ENGINEER
DIVISION OF WATER RESOURCES

1313 Sherman Street-Room 818
Denver, Colorado 80203
(303) 866-3581

October 14, 1982

RECEIVED
OCT 15 1982
Division of Local Government

MEMORANDUM

TO: Stephen O. Ellis, State Clearinghouse

FROM: Hal D. Simpson, Assistant State Engineer

SUBJECT: Uintah Basin Synfuels Development, Draft Environmental Impact Statement

14.9 As requested, our office has reviewed the above referenced Draft Environmental Impact Statement. We believe the environmental impact statement is well presented and adequately addresses the issues that concern our office at this stage of planning.

HDS/JRH:ma

cc: Wes Signs, Div. Eng.

RESPONSE LETTER 14

State of Colorado

14.1 BLM appreciates the Colorado Clearinghouse coordination efforts. The comments provided were considered in revising the EIS.

14.2 The comment is correct. However, it is not anticipated that the Utah projects would affect this species in Colorado.

14.3 This error in Section R-3.A.1 has been corrected.

14.4 Information about the Raven Ridge Natural Area has been added to Sections S-3.B and S-4.D.

14.5 The plant community of special concern identified in the comment lies outside the area to be affected by the proposed projects and has not been identified within the affected area.

14.6 It is unclear which data are erroneous. The numbers were checked and no errors were found. These data were obtained from Utah Department of Transportation (Traffic on Utah Highways 1977, 1979, and 1981) and Colorado Department of Highways (Colorado Traffic Volume Study 1980) to Tables R-4-24 and R-4-25.

Section R-4.A.7 has been revised to include the other types of impacts that would be associated with increased traffic.

The suggested mitigation has been included in Appendix A-7, Uncommitted Mitigation.

The information regarding the requirements of the Colorado Access Code has been added to Section R-4.A.7.

14.7 Surveys would be completed before BLM would permit disturbance on public land. BLM would coordinate any survey in Colorado with the State Historic Preservation Officer.

14.8 BLM notes the assessment that the EIS analysis of impacts to western Colorado communities is adequate.

14.9 BLM notes the assessment that the EIS adequately addresses the issues that concern the Office of the State Engineer.

COMMENT LETTER 15

RIO BLANCO COUNTY DEPARTMENT OF DEVELOPMENT

Rio Blanco County Courthouse
Post Office Box 599
Meeker, CO 81641
(303) 878-5081

October 12, 1982

Mr. Lloyd Ferguson
District Manager
Bureau of Land Management
170 South 500 East
Vernal, UT 84078

Dear Mr. Ferguson:

15.1 Thank you for the opportunity to comment further on the Uintah Basins Synfuels Development Draft Environmental Impact Statement. Enclosed are Rio Blanco County Colorado's comments and concerns regarding certain assumptions and findings in the EIS. I would also like to bring to your attention that those sections of the EIS directly pertaining to the Town of Rangely and the Districts in the Rangely areas have been forwarded to them directly for their review and comment. We will be submitting shortly a joint letter outlining our collective comments and concerns.

On behalf of Rio Blanco County I would like to concentrate my comments specifically to assumptions made and data included in the sections on workforce allocations and population projections.

15.2 I would first like to address the assumptions and findings of the "spatial allocation model" and the UPED model referred to in the EIS. The model does not appear to take into account that with the current sdvent and continuation of residential and commercial development now occurring in Rangely, Colorado (housing, shopping and recreation) that there will be more liklihood of Rangely becoming a more competitive and more attractive town for people to reside in and commute from. The EIS statea that the Bonanza-Rangely road is insufficient to accommodate heavy levels of traffic and that county (Uintah) officials have indicated that they will not maintain this road for use by commuter trsffic. Although, presently this road on the Utah side is in need of repair and maintenance, Rio Blanco County has just this summer spent $200,000 improving the road from the Colorado border to Highway 64 just north of Rangely. The map referred to in the EIS as Msp R-1-1 omits entirely the existence of the Bonanza-Rangely road. Any potential worker population allocstion to Rangely depends considerably on the access provided by this road.

15.2 (cont) The "impedence factor" that the EIS attributes to this road does not take into consideration the possibility that as both synfuel projects Syntana-Utah and Paraho Development go into construction in the next couple of years, these companies themselves may opt to assist in improving and maintaining that small segment of the Bonanza-Rangely road that is close to their projecta in Utah. This possiblity should not be ignored given the proximity of both Syntana and Paraho to the Colorado border and if improving the road would prove to be beneficial in planning transportation needs of their respective commuting workforce.

On the same note the recently published Electric Power Research Institute February 1982 report "Socioeconomic Impacts of Power Plants" has some interesting observations regarding the utility of gravity models such as the spatial allocation and UPED models use in the Uintah Basin EIS.

The report states:

> "Gravity models should not be used without a substantial amount of field work in the areas in order to assess the capability and desire of communities to attract and house construction workers and induced employees."

In summary on this subject Rio Blanco County feels that the Uintah Basin Synfuels Development Draft EIS is substantially underestimating the potential population and workforce allocation in Rangely and therefore underestimating the coinciding impacts that would be felt.

15.3 Regarding specific data and assumptions on population impacts made in the draft EIS Rio Blanco County questions the statement made on page 11-6 of the Socioeconomic Technical Report stating that "The impacts for Rangely are not significant using the criterion of an impact of 10% or greater as being significant". I believe the 10% figure is taken from a Jack Gilmore study that attributed certain impacts under certain conditions as significant at 10-15%. The Uintab Basin EIS interpretation of Mr. Gilmore's assessment is misleading. After discussion with Jack Gilmore and his associates and a closer reading of the report that the 10% figure is taken from, it is apparent that impacts are greater in smaller rural communities where the basic infrastructure is nearer capacity. For any small community the rate of growth and corresponding "significance" as related to impact is entirely a function of thst town's ability to absorb the growth snd associated impacts.

On the same subject of populstion impscts the Draft Technical Report Volumn II Socioeconomics states that the impscts for Rangely will not be significant using the criterion of 10% or greater as being significant. My concern with this statement is that it conflicts directly with the State of Utah's Impact Mitigation Law that stipulates 5% growth as its criterion for significsnt impact. Given that the State of Utah's Office of State Planning had a direct role in prepsring the Draft Uintah Basin Synfuel EIS there appears to be a serious conflict in estsblishing a consistent growth impact criteria.

Mr. Ferguson
Page 3

15.4 Also, with regard to population impacts in the affected communities and counties I refer to Tables R-4-4 and R-4-6 on pages R-4-12 and R-4-16 respectively in the EIS. Table R-4-4 according to the UPED model projects a 1985 baseline population of 3,193 for Rangely with an applicant (projects) increase of 577 for an 18.1% increase and an interrelated project increase of 82 for a cumulative increase of 659 people or a 20.6% increase. Similarly, in Table R-4-6 Housing Demand the UPED model shows a baseline household number in Rangely of 1,116 in 1985 with an applicant increase of 196 or 17.5%. With the interrelated project household demand included this number is increased by 28 for a cumulative total of 224 additional households needed and a corresponding 20.1% increase for Rangely.

Both of these tables appear to be substantially different in their data projections and conclusions from the data and assumptions made in the Draft Volumes 1 & 2 Technical Reports on Socioeconomics that show significantly lessor impacts for Rangely. Again, the statement that Rangely will not be significantly impacted based upon the 10% impact criterion seems to be seriously at odds with the conclusions reached in both Tables R-4-4 and R-4-6.

Additional comments will be forthcoming regarding specific sections of the Draft EIS that more directly effect the Town of Rangely and the various special Districts in and around Rangely.

Thank you for the opportunity to comment on the Uintah Basin Synfuels Draft EIS.

Sincerely,

Mark Bubriski

Mark Bubriski
Director
Department of Development

MB:ta
xc: Mr. Brad Barber
Office of State Planning Coordinator
State of Utah

RESPONSE LETTER 15

Rio Blanco County Department of Development

15.1 BLM received comments on the Draft EIS from the Town of Rangely. They are letters 18 and 43.

15.2 The Spatial Allocatinn Model (SAM) used in allocating synfuels impact projections does take into account current data concerning the availability of commerical and service activity in the Rangely area. In fact, the SAM model's main objective is to simulate the local economy and how it interacts with other areas in the region. For information concerning the future growth of commercial and service activity in Rangely, the State of Utah has relied upon baseline projections provided by the State of Colorado. If these baseline projections (without synfuels development) have adequately captured Rangely's planned commercial and service development, then the attractiveness of Rangely as a residential community has been accounted for.

Another input into the spatial allocation model is the result of a gravity model which examines distance between communities and new basic employment opportunities (e.g., the synfuels plants) and the size of a community which serves as a surrogate for the attractiveness of the community. In examining distances to be used in the gravity model, highway engineers indicated that the road from Bonanza to Rangely could not accommodate large volumes of traffic. Therefore, the distance along the more indirect route to Rangely was used in calibrating the gravity model. This is not to say that workers will not use the Rangely-Bonanza road, but, rather, that the gravity model be calibrated based on the better transportation link which could accommodate large volumes of commuter traffic.

It is conceivable that the Bonanza-Rangely road could be improved. However, it could not be assumed that the road would be improved. In fact, the Uintah Basin Transportation Study (Van Wagoner and Associates 1980) lists numerous transportation project improvements for the Uintah Basin over the next decade. No mention of plans to upgrade, improve, or maintain the Bonanza-Rangely road is found in this study.

If the road is improved and the gravity model recalibrated, it would somewhat alter the projections, with increased traffic to Rangely. However, this change would not create a significant difference, because this was only one of many assumptions used in developing these projections. The Ashley Valley will continue to be the dominant attractor of population because of its size, the availability of retail and service activity, and its current investment in infrastructure.

It should once again be noted that the gravity model is only one input into a much more comprehensive "Spatial Allocation Model." The inherent weaknesses of a gravity model are understood, and it is realized that there is no ideal technique for distributing impacts. All the communities in the area of influence have the desire to attract growth and are investing in infrastructure to accommodate growth. However, given the resources made available for this aspect of the modeling effort, the gravity model is acknowledged for its ability to incorporate important fundamental location factors. (For full discussion of all models used to project impacts, please see Appendix M of the Socioeconomics Technical Report (State of Utah 1983).)

The purpose of Map R-1-1 is to show the generalized location of the proposed projects. The Bonanza-Rangely road is shown on the three more detailed maps of the Uintah Basin (Maps R-A-1-, R-A-2, and R-A-3). However, because of the concern expressed, it has also been added to Map R-1-1.

15.3 Substantial impacts have been projected for Rangely. Under any scenario, oil shale development is likely to double the size of Rangely and create a significant impact to the community. The statement in the footnote of Table SSA-4 (Socioeconomics Technical Report) that Rangely is not significantly affected is in reference to individual projects, which alone do not significantly affect Rangely. However, cumulative impacts definitely would significantly affect the community of Rangely under any scenario or under any definition of significance (see population figures for Rangely in the EIS, Table R-4-4).

The 10 percent significance criterion was established by BLM based on a Denver Research Institute (1975) study by Gilmore and Duff. This study identified 10 percent as a general threshold level in which a government's ability to meet increased service demands breaks down (EIS Section R-3.A.1). The rate of growth and capacity levels of basic infrastructure have a direct bearing on a community's ability to absorb growth (or change) and associated impacts. The population and household site-specific impacts projected for Rangely and Dinosaur are presented in Table SSA-4 in the Socioeconomics Technical Report, even though they are less than 10 percent.

15.4 In regard to the comments concerning Tables R-4-4 and R-4-6, it should be noted that population growth rates can differ with household growth rates. This occurs because, as evidence has shown, in-migrants from energy development are younger and many times have differing household sizes than existing populations. Tables R-4-4 and R-4-6 are not inconsistent.

Given the available time and modeling techniques, the impacts from synfuels development on Rangely have been projected as objectively as possible. No bias is present simply because the communities lie in the State of Colorado. The latest available empirical evidence supports the EIS projections. The Bonanza Power Plant monitoring system indicates, out of a work force of 659, that no employees live in Rangely. The White River Shale Project indicates, out of a work force of 41 employees, only 3 employees or 7 percent are living in Rangely. The EIS projections for Rangely fall well within the range indicated by this data.

COMMENT LETTER 16

PARAHO DEVELOPMENT CORPORATION
FOR THE GOOD OF MANKIND

October 18, 1982

Mr. Lloyd Ferguson, District Manager
U.S. Department of Interior
Bureau of Land Management
170 South 500 East
Vernal, UT 84078

Dear Mr. Ferguson:

Paraho's Development Corporation feels that the Uintah Basin Synfuels Development Draft Environmental Impact Statement is generally well-written. Paraho's enclosed comments include:

- °Additional information concerning alternatives that have been presented in the Paraho-Ute Technical Report, and
- °General comments regarding the DEIS.

We trust these comments will be helpful to the BLM, and are looking forward to the completion of the FEIS on schedule. Thank you for the opportunity to review and comment on the DEIS.

Sincerely,

Robert N. Heistand

Robert N. Heistand
Vice President of
Environmental Affairs

RH:ks

enclosure

183 INVERNESS DRIVE WEST • SUITE 300A • ENGLEWOOD, COLORADO 80112 • (303) 694-4949 • TWX: 910 931 2537

PARAHO DEVELOPMENT CORPORATION GENERAL COMMENTS AND CONCERNS ON UBS-DEIS

		Page No.	Comment/Concern
16.1	1.	xxvii	The preface should recognize that the EIS presents site-specific and cumulative impacts in sufficient detail such that right-of-way and § 404 (dredge and fill) decisions can be made for the projects analyzed on a site-specific basis.
16.2	2.	xxxv	The "proposed action" of BLM and the Corps relating to the Paraho-Ute Project, should include all rights-of-way and permits (§ 404) now covered by the EIS.
16.3	3.	xxxiv	Potential Land Exchanges. Paraho Development Corp. should be identified as the fourth applicant which has identified potential exchange areas in the site-specific section of the EIS for the Paraho-Ute project. (See Site-Specific Alternatives Section). Maps R-A-1, R-A-2 and R-A-3 should be revised to show the additional lands described in the Paraho Site-Specific Alternative.
16.4	4.	R-1-1	Paragraph 2 of the Overview states that alternatives to the proposed projects are not included in the Regional Cumulative Analysis. We would suggest that the BLM include an analysis of a "no action alternative" based on the assumption that the proposed actions for all of the applicants projects would be denied.
16.5	5.	R-1-5	Paragraphs 1 through 3 on the referenced page describe the "interrelated projects" included in the Regional Cumulative Analysis. Throughout the DEIS, it is unclear which interre-

16.5 (cont)			lated projects are considered in the "area of influence" with respect to a particular resource. The BLM should clearly identify those specific projects considered in its analysis of each resource being impacted in the EIS.
16.6	6.	R-3-34 and R-3-35	The chart on page R-3-35 is deceiving as it would suggest that the identified terrestrial and aquatic species have in fact been located on lands to be utilized by the projects identified. Section R-3.A.5 on page R-3-34 should state more clearly that the wildlife and aquatic species identified on the chart have not necessarily been located on the sites for the projects identified.
16.7	7.	R-3-42 and R-3-43 and R-4-71	Threatened and Endangered Species. Paraho, on the basis of its baseline data, is aware of no basis for the absolute worst case analysis contained in this section. If BLM has data which supports or requires such an analysis, that data should be provided.
16.8	8.	R-3-49 through R-3-50, R-4-81	Water-Oriented Activities. For those river segments which have been recommended for inclusion in this system and which are pending further action, the EIS should note the authority of the Department of Interior or the Department of Agriculture to impose appropriate safeguards in the area in the event it is subsequently included in the system.
16.9	9.	R-3-57 and R-4-93	Existing Land Use Plans. Please specifically describe the method by and time frame within which BLM land use management framework plans would be amended to avoid land use conflicts with decisions made pursuant to this EIS.

16.10	10.	R-4-4	The last sentence of the third paragraph is inaccurate. It reads that "[t]he increment limits for these state categories are the same as the PSD Class I, II, and III increments for sulfur dioxide." While this is true for Class I and Category I increments, the Class II increments differ from the Category II increments, and the annual and 24-hour Class III increments differ from those of Category III.
16.11	11.	R-4-32	Since the draft does not predict the NAAQS to be exceeded in the areas of Flat Tops and Mount Zirkel, the phrase on the fourth to fifth line of the third paragraph, "it is possible that significant impacts could occur," should be clarified or deleted.
16.12	12.	R-4-33	In the first full paragraph on this page, the draft states that EPA has notified the public that "secondary emissions do not include any emissions which come directly from a mobile source." Further, on page R-4-120, third paragraph, the draft states that "[n]ot all of those (secondary) emissions would necessarily be considered by EPA to consume increment." Throughout the regional analysis for TSP, however, BLM assumes that emissions from mobile sources should be included in determining consumption of increment. The BLM should resolve the inconsistency, preferrably by deleting the category of mobile sources from secondary impacts. See Tables R-4-12 and R-4-39.
16.13	13.	R-4-38	The DEIS describes a series of visibility analyses not only for Class I areas, but also for other areas of special concern, such as

16.13 (cont)

the Dinosaur and Colorado National Monuments, the Unitah and Ouray Indian Reservation, and the proposed High Uintas Wilderness Area. The draft should clarify that neither the federal nor state air acts require any visibility protection for other than Class I areas. Since none of the areas of special concern are Class I areas, the DEIS is much more conservative in analyzing visibility impacts than is currently required under federal or state law.

16.14

14. Tables R-4-7 to R-4-12 and Pages R-4-34 to R-4-39

In the regional analysis, Tables R-4-7 through R-4-12 and Pages R-4-34 through R-4-39 contain concentrations due both to the baseline andto the secondary growth effects of the projects. However, there is no mention in the report of development of a 1990 "no-action" emission inventory. Therefore, it must be assumed that some of the concentrations present from baseline sources are again included in the secondary concentration impacts. This additive effect contributes to the large impacts estimated in these tables.

16.15

15. R-4-56

The first sentence in the last paragraph on the referenced page should be revised to read as follows: "loss of vegetation from construction and spent shale disposal piles would be temporary, since reclamation and revegetation practices would be initiated as soon as reasonably practicable after disturbance . . ." It would be incorrect to state, that in all cases, reclamation and revegetation practices would be "intensively" initiated within one year after disturbance.

16.16

16. R-4-92

Please describe the method by which the BLM arrived at the energy efficiency input and outputs identified in Table R-4-28 on the referenced page.

16.16 (cont)

16.17

17. SS-3

No-Action Alternative. Please describe further how the no action alternative would be "intended to accommodate further definition (or firming up) of actual energy demands . . . as well as additional definition of interrelated projects in the Uintah Basin." The meaning of this sentence is unclear.

16.18

18. SS-5 through SS-8

Table SS-2 contained on the referenced pages suggests that all projects will require the permits identified on the Table unless otherwise noted. Paraho will not require the following permits and the Table should be revised to indicate the same:

a) Resource conservation and recovery permit for treatment, storage or disposal of hazardous wastes;

b) Permit for reinjection of mine water from either the EPA or Utah Department of Health;

c) Air space permit and air space obstruction clearance from FAA;

d) Permit to cross federal-aide highways;

e) Section 10 permit for structures or work in or affecting navigable waters;

f) Well drillers permit;

g) Burning permit during closed fire season;

16.18 (cont)

h) Permit to treat hazardous waste issued by State Bureau of Solid and Hazardous Waste.

16.19 19. General — The DEIS does not contain a discussion of the increased tax base for the impacted communities. Estimates of the increased tax base and the benefits associated therewith are appropriate for inclusion in the EIS.

16.20 20. General — Throughout the DEIS and Air Quality Technical Report the word "baseline" frequently includes Moon Lake emissions. These emissions would not be included within baseline under the PSD program because they consume increment. Including Moon Lake within the baseline in the vicinity of Paraho-Ute results in the overpredictions of 44 ug/m^3 TSP annual average and 175 ug/m^3 TSP 24 hours average. Monitored data from the Paraho site indicate that the TSP annual average actually is less than 20 ug/m^3 and the 24 hour average less than 75 ug/m^3.

16.21 21. P-1-4 — Paraho has filed for most of the permits required for construction. Several of these applications have been approved. A list showing the status of permits is as follows and the EIS should be revised to reflect the same:

PARAHO-UTE PROJECT

PERMITS

Permit		Application Date	Status
R-O-W	Main Access Rd.	May 1981	Anticipated Approval Feb 1983
	Oil Pipeline	Sept 1981	

16.21 (cont)

Permit		Application Date	Status
	Camp Access Rd.	(Nov 1982)	
	Water	(Nov 1982)	
Exploratory Drilling		July 1980 Dec 1980 Aug 1982	Approved Aug 1980 Approved Jan 1981 Approved Sept 1982
NPDES		May 1982	Anticipated Approval Nov 1982
Hazardous Waste		May 1982	June 1982 Generator Number Acquired
404		(Oct 1982)	Anticipated Approval Apr 1983
PSD		Nov 1981	Anticipated Approval Nov 1982
Mining		Mar 1982	Anticipated Approval Nov 1982
Solid Waste		May 1982	Approved June 1982 (Construction) Approved Sept 1982 (Operations)
Dam & Impoundments		(Dec 1982)	
Alter Natural Stream		May 1982	Approved June 1982
Wastewater Disposal		(Dec 1982)	
Drinking Water		(Dec 1982)	
Labor Camp Sanitation		(Dec 1982)	
Building Permit		(Dec 1982)	
Floor Service Sanitation		(Dec 1982)	

16.22 22. P-1-9 — <u>Construction, Operations, Maintenance, Abandonment</u>. Insert after,

16.22 (cont)

"The general construction procedures that would be followed for this project are:"

"- All construction procedures would be in compliance with local, State, and Federal regulations.

- Surface disturbance would be restricted to areas only required for construction.

- Construction precautions would be taken during adverse weather conditions.

- Off-road vehicle travel would be minimized.

- As conditions require, eroision control devices e.e. dikes, berms, and bank stabilization would be implemented to control and minimize soil erosion.

- Upon completion of construction activities, all disturbed areas not required for permanent surface facilities would be reclaimed and revegetated in accordance with the reclamation plan.

Other construction procedures that would be implemented in order to minimize adverse environmental impacts are:

- During rights-of-way and site preparation, areas of surface disturbance would be minimized.

- Topsoil would be removed, stockpiled and protected. Topsoil would be replaced as soon as reclamation and revegetation measures can be implemented.

16.22 (cont)

- Measures to insure successful revegetation would be implemented such as, soil conditioning, fertilizing, seed bed preparation, and suitable mulching.

- Disturbed areas would be seeded with adapted and/or native plant species.

- A maintenance and monitoring program would be implemented to ensure successful revegetation."

16.23

23. P-1-13 <u>Project Components</u>. Add the following new paragraph:

"<u>Above Ground Fines Storage</u>

Raw shale reject materials would be stored on Section 32. The storage area presently is a natural, bowl-shaped depression that faces towards the south and has a storage capacity of approximately 17 million cubic yards. The present elevation of the topography surrounding the storage area ranges from 5700 feet on the north to 5400 feet on the south. The final elevation of the shale fines pile would be approximately 5700 feet."

16.24

24. P-1-13 480,000 mmcfd should be 480 mmcfd.

25. P-1-14 385,000 mmcfd should be 385 mmcfd.

26. P-1-25 Natural Gas: 29,000 mmcfd should be 29 mmcfd.

16.25

27. P-3-1 <u>Socioeconomics</u>. Paraho believes the majority of socioeconomic impacts resulting from the Paraho-Ute project would occur in Uintah County, with some in the Colorado area. Much less impact is expected

C-75

16.25 (cont)

in Duschene County and the Uintah and Ouray Indian Reservation. The condition of the road between Bonanza and the Colorado state line would not preclude commuter travel on this road. Although Paraho agrees with BLM's conclusion of reduced population allocation for the Colorado area we do not feel the road condition is the major cause. We feel a major factor will be the existing infrastructure available in the Vernal area (stores, shopping centers, restaurants, churches, etc.). Residence profiles of the American Gilsonite workforce and Bonanza Power Plant construction workforce confirm the BLM population impact projections.

16.26 28. P-3-1 Water Resources. Specific descriptions of the affected water bodies should be included in this section.

16.27 29. P-3-3 Threatened or Endangered Species. Although the U.S. Fish and Wildlife Service has indicated that several federally listed species could occur in the project area, this section should specifically note that no species have, in fact, been located on the Paraho-Ute site.

16.28 30. P-3-4 Cultural Resources. This section should be revised as follows:

"Prehistory

The Paraho project area lies within the Uintah Basin of the Colorado Plateau as described in Section R-3.A.10, Cultural Resources. The lease tract and approximately 9 miles of access road, pipeline and utility corridor were surveyed by Nickens and Associates (Tucker 1980; Tucker 1982). No prehistoric sites

16.28 (cont)

were identified by them in these areas. The survey report concluded that the Paraho project area was rarely used by prehistoric peoples. This conclusion is supported by other work in the area that correlates in low site density with desert shrub vegetation (Jones and MacKay 1980; Larralde and Chandler 1981). No prehistoric sites were found along the White River in the Paraho lease area.

History

The general history of the area is included in Section § 3.A.10, Cultural Resources. One historic site and three isolated artifact finds were recorded during the Nickens and Associates investigations (Tucker 1980; Tucker 1982). Background information the historic site can be found in Russell (1980).

The historic site is the remains of the Ute Oil Company shale retort facility, which is located on the north bank of the White River on Section 7, on the Paraho sub-lease. It was under construction between 1917 and 1922, but never began operations due to a variety of financial, material and construction problems. It was the largest shale-retorting facility under construction at the time.

The Ute Oil Company site is recommended for nomination to the National Register of Historic Places (Tucker 1982).

The three isolated artifact finds contained glass fragments and tin cans. A purple glass fragment and three hole-in-top cans date the

16.28 (cont)

finds between 1880 and 1920. The artifacts are probably associated with gilsonite mining or sheep-herding activities in the area."

16.29 31. P-3-6

Paleontology. This section should be revised to read as follows:

"Paleontological investigations have been conducted for the Paraho project lease area, access roads, pipeline corridor, and portions of the utility corridor. These investigations located several vertebrate, invertebrate and paleobotanical fossil specimens in outcrops of the Uintah and Green River Formations (Madsen and Nelson 1980; Madsen 1981). The fossils are not of scientific interest because they are poorly preserved and commonplace. Their presence, however, indicates that other, more important fossils may exist subsurface."

16.30 32. P-4-4

The third line "Increment consumption including baseline" is mislabeled, and should correspond to Table 6-1 in the AQTR, where it is specified this increment includes only Moon Lake Unit 1. Since this table gives increment consumption for Paraho only, this line should be left off.

16.31 33. P-4-6

A footnote defining "baseline" would be helpful; the term should be used in a consistent fashion.

Why doesn't "Paraho Impact" SO_2 agree with "Paraho Increment consumption" on the previous table? Changing the 3- and 24-hour numbers on this table to 317 and 40 would make them agree and make the "Total" column correct.

16.32 34. P-4-7

Groundwater. This section should be revised as follows:

> "The proposed mine shafts could encounter a more premeable zone of the Bird's Nest Acquifer. However, on-site coring tests in the mine zone were dry and the mine shafts will be sealed in any event. Therefore, dewatering of the mine will not be necessary."

16.33 35. P-4-13

Recreation. Identify, specifically, the three miles of the White River, described in the second paragraph, which will be "permanently lost" from further consideration as a national wild and scenic river. Further, state whether this river segment is presently included in the inventory for inclusion in the wild and scenic river system. If such river segment is not included in the present inventory, any reference to the wild and scenic river system should be deleted. Finally, if reference to this three mile segment of the White River must be included in this section, the ability of the Department of Interior or the Department of Agriculture, as the case may be, to protect the area and the river, should it ultimately be designated for inclusion in the wild and scenic river system, must be noted.

16.34 36. P-4-14

Cultural Resources. The Paraho project would cause land modification that could adversely affect cultural resources as described in Section R-4.A.9, Cultural Resources. The historic site of the Ute Oil Company retort will not be disturbed by any Paraho activities. The lease area and approximately 9 miles of

16.34 (cont)			access road, pipeline and utility rights-of-way have been surveyed for cultural resources in compliance with 36 CFR 800, E.O. 11593 and other historic preservation legislation. The remaining rights-of-way would be surveyed and evaluated for significant cultural resources.
16.35	37.	R-G-5	There is a discrepancy between the Paraho emissions in Table R-G-1 and those given on pages P-1-11 and P-1-26. The emissions in Table R-G-1 are those assumed for the UBS-DEIS analyses. Table P-1-6 corresponds to the approved PSD Paraho emissions after the UBAQ's BACT analysis. Since modeled emissions are higher than permitted ones, results should be conservative.
16.36	38.	R-I-1	BLM should list mitigation measures for air quality impacts (for example, pave dirt roads, restrict wood stoves (page 5-127 AQTR), restrict off-road use, etc).
16.37	39.	SS-A	The conditions specified in this Appendix should be recognized in the EIS as general and not site-specific or process-specific. They should be viewed as a basis for negotiation on a case-by-case basis.
16.38	40.	AQTR-2-15	The last line on this page should read ". . .measured one mile from the proposed site. . ."
16.39	41.	AQTR-4-31 and 4-44	The secondary emissions calculated from the use of dirt roads in the impacted counties seem high. The fugitive dust emissions from motor vehicles in Uintah County alone are estimated to be nearly 50,000 tons/year in 1980 and over 100,000 tons/year in 1990. The 1980 values may be part of the reason the baseline

16.39 (cont)			levels are too high. However, the huge exceedances predicted for the future scenarios also imply that some estimates are too large; it seems reasonable that the more frequently used dirt roads in the area would be paved. These predictions give the report an overall negative outlook for the development of these projects, when it is actually a solvable situation.
16.40	42.	STR-I-152, I-160, I-163 I-166, I-169 I-171, I-194 I-198, I-199 I-203, I-209 I-212, I-214 I-216	These sections should clarify whether the direct low or high-level scenario project impact, the interrelated projects impacts or cumulative impacts are being discussed. The DEIS fails to identify clearly which scenario is being considered.
16.41	43.	STR-I-98	1% annual change numbers should be explained. It is unclear how these numbers were derived.
16.42	44.	STR I-127 and I-176	The percentage of employees estimated to live in construction housing onsite during the high-level scenario (p. STR I-176) is not consistent with the description in the text of 75% camp residency (p. STR I-127).
16.43	45.	STR I-130 and I-133	The STR text (p. STR I-133) should reflect the data in table R3A-2. The employment multiplier derived from the table is 1.7, which is not consistent with the 2.14 employment multiplier stated in the text.
16.44	46.	STR I-130	Employment Impact - Basic in 1987 should be 7,950 per Table R3A-I on p. STR I-125.

16.45	47.	STR I-137	Employment Impact - Basic in 1987 should be changed to 7,800 per Table R3A-I on p. STR I-125.
16.46	48.	STR I-178	Employment Impact - Basic in 1992 should be changed to 12,915 per Table R3A-16 on p. STR I-176.
16.47	49.	STR II-68 and II-69	The numbers in the text do not seem to correspond to the numbers listed in Table P-3.

NEW REFERENCES

Madsen, J.H., Jr. 1981. Supplementary paleontological survey report for the Paraho-Ute project site, Uintah County, Utah. Montrose, Colorado: Nickens and Associates.

Russell, P.L. 1980. History of western oil shale. East Brunswick, New Jersey: The Center for Professional Advancement.

Tucker, G.C., Jr. 1982. A cultural resource inventory of lands for the proposed Paraho Commercial Shale Oil Project, Uintah County, Utah. Montrose, Colorado: Nickens and Associates.

Paraho Development Corporation

16.1 While every effort is being made to coordinate the EIS effort with the environmental assessment needs of all agencies with authorizing actions (refer to the Authorizing Actions section of the Site-Specific Analyses Introduction), some agencies, such as the Corps of Engineers (agency responsible for granting Section 404 permits), require surveyed locations of facilities prior to making decisions. This EIS does not analyze impacts of surveyed locations, because this level of engineering detail currently is not available. When a surveyed facility location is identified, some agencies may require additional site-specific analyses.

16.2 The meaning of the comment is unclear. The BLM-preferred alternative identified in the Draft EIS for the Paraho-Ute project was selected based on a review of the impact analysis presented for the proposed project and its alternatives. This EIS is not the document to specify whether the Corps of Engineers would grant a Section 404 permit or the specific location of a permitted action.

16.3 Based on the new data provided to BLM during the Draft EIS public comment period, a new alternative (Additional Lands Alternative) has been analyzed in the Final EIS. The EIS Preface has been revised accordingly. However, because Maps R-A-1, R-A-2, and R-A-3 were not reprinted, the Additional Lands Alternative is only shown on Map P-1-2 in the Final EIS.

16.4 The purpose of the Regional Cumulative Analysis (renamed the Nine-Project Cumulative Analysis in the Final EIS in order to correct the confusion created by the original term) is to analyze the impacts that would result should all the applicants' proposed projects and the interrelated projects planned for the Uintah Basin be developed. The concept of no-action does not relate to a cumulative impact analysis, only to no-action as one of a range of alternatives to the proposals. A no-action alternative has been analyzed for each of the site-specific projects (Section R-1.A, paragraphs 1 and 2).

16.5 All the projects listed on Table R-1-2 and R-1-3 were factored into the analyses for all resources. However, due to the location and/or nature of some of the interrelated projects, the interaction for some resources was considered to be negligible or nonexistent. This point has been clarified in a note for Table R-1-3.

16.6 A footnote has been added to Table R-3-11 in Section R-3.4.5 to clarify how the project determinations were made.

16.7 The sections identified in the comment include general regional statements and are not site-specific. The only threatened and endangered species mentioned in the EIS as possibly being affected by the Paraho project are three fish species that might be affected by the water diversion (Section P-4.A.5).

16.8 The authority of the Department of the Interior has been cited in the text as references NPS 1982, Federal Register 1980a, and provisions under the Wild and Scenic River Act.

16.9 The land use planning amendment process and the EIS are being completed simultaneously. Both processes include notices of intent, public involvement, analysis of alternatives, and a decision upon completion. If a decision is made to amend the plan and issue the desired right-of-way grants, a notice will be published announcing that action. This is followed by a 30-day protest period after which right-of-way grants can be issued, if the amendment is not protested. Right-of-way grants could be issued as early as 60 days after publication of the Final EIS. For additional information, see 43 CFR 1601.6-3b.

16.10 A correction has been made in the Chapter R-4 Significance Criteria section of the Final EIS to properly reflect the relationship between the federal PSD Class I, II, and III and Colorado Category I, II, and III. The Category II and III incremental limitations are more stringent as they appear in Colorado regulations promulgated in 1977. Colorado law now restricts the enforcement of more stringent incremental limitations than those of the federal regulations. Therefore, the SO_2 increment limits enforceable by the State of Colorado are the same as the federal PSD Class I, II, and III.

16.11 The NAAQS and PSD limitations were used as guidelines for assessing significance of impacts, as discussed in the Chapter R-4 Significance Criteria section of the EIS. Because the range of uncertainty in the calculated ground level concentrations brackets the incremental limitations of PSD Class I, it cannot be said unequivocably that the PSD Class I limitation would be exceeded. Therefore, it was indicated that significant impacts could not be ruled out. If subsequent detailed modeling performed during the PSD permit regulatory procedures determined that the requirements were to be exceeded, the position of the Forest Service on the significance of the impacts would be determined before a permit could be approved or denied.

16.12 In their comments on the Draft EIS, the EPA (letter 44) and State of Utah (letter 21) have indicated that under current PSD regulating requirements, secondary emissions from the facilities are to be considered when calculating emissions from the source. The Federal Register notice of June 25, 1982, does not allow fugitive dust created by mobile sources to be excluded as secondary emissions. The notice specifies that only those emissions that come directly from a mobile source, such as tailpipe emissions, may be excluded. Under current regulations, therefore, it is not possible to exclude secondary emissions from increment consumption. This point has been clarified in Section R-4.A.2 of the Final EIS.

The EPA Region VIII also has indicated:

> The predicted National Ambient Air Quality Standards (NAAQS) and Prevention of Significant Deterioration (PSD) Class II increment violations for Total Suspended Particulates (TSP) would not be allowed to occur. However, the primary cause of the high TSP values appears to be windblown dust and this fact may allow for the use of a lower background TSP value when

calculating air quality impacts from the proposed projects. Approval for the use of lower TSP background values would be given on a case-by-case basis when companies are applying for PSD permits. (All applicants siting in Utah would apply to the State for their PSD permits.) This approach is consistent with EPA's fugitive dust policy. A prediction of a NAAQS violation after discounting for rural fugitive dust would likely lead to a permit denial unless the company could find additional ways of reducing TSP emissions to bring ambient values down below the NAAQS. Other options exist for ameliorating PSD Class II violations including redesignation of the areas as Class III.

16.13 It is true that present regulations provide visibility protection in Class I areas only. This is discussed in the Chapter R-4 Significance Criteria section. The discussion of visibility impacts in Section R-4.A.2 has been expanded to further explain Class I visibility protection and relationship to other Class II areas of special concern.

BLM does not agree that the EIS is much more conservative in analyzing visibility impacts than is currently required under federal or state law. The Clean Air Act, Section 165e(3)(B), requires "... an analysis of the ambient air quality, climate and meteorology, terrain, soils and vegetation, and visibility at the site of the proposed major emitting facility and in the area potentially affected by the emissions from such facility...." PSD regulations for state implementation plans also require a visibility analysis that is not restricted to Class I areas only (Federal Register, Vol 43, No. 118, page 26380, June 19, 1978). In addition, the National Environmental Policy Act requires EISs to consider a broader range of issues that includes any potentially significant impacts to the environment, including those not required by other laws.

16.14 Concentrations from baseline sources are not included in the secondary concentration impacts. Similarly, secondary impacts, generally emissions resulting from increased population, are not included in the baseline. The concentrations given under the heading "Increment Consumption Above Baseline" in Tables R-4-7 through R-4-12 include primary and secondary emission impacts only from the applicants' and interrelated projects. Thus, no baseline sources are counted twice.

16.15 Section R-4.A.4 has been revised.

16.16 The energy efficiency inputs and outputs were derived using the procedures identified in the Energy Analysis Handbook for Preparation of Oil Shale Development Environmental Impact Statements (BLM 1982a) (EIS Section R-4.A.13).

16.17 Predictions of future energy demands, in general, and demands for shale oil, in particular, have been questioned due to recent trends in energy consumption and economic growth. Denial of the requested rights-of-way would provide additional time for the strength of current trends to be analyzed. Additional time would also aid in identifying which of the interrelated projects listed in Tables R-1-2 and R-1-3 were most likely to be developed.

16.18 Tables SS-2 and SS-3 have been revised to clarify that Paraho would not require the permits identified in the comment.

16.19 Projecting the increased tax base would be an initial step in projecting revenue levels. Similar projections of expenditure levels would also be needed to show the cost side of the fiscal analysis. Revenue and expenditure level projections are appropriate for inclusion in EISs. However, they were not made in this EIS, since this would be an integral part of the detailed mitigation process required under S.B. 170 in Utah. A discussion of the likelihood of long-term beneficial fiscal effects associated with the increased tax base has been added to Section R-4.A.1.

16.20 The word "baseline" as used in the EIS is not meant to be the "baseline" defined in PSD regulations. The EIS baseline refers to the environmental conditions expected to exist without any of the applicants' proposed projects being developed (refer to the Chapter R-3 Introduction).

It is true that the Moon Lake power plant consumes some of the PSD increment--about 1 and 0.02 ug/m^3 for the maximum 24-hour average and annual average TSP concentrations, respectively, at the Paraho site. The assumed baseline TSP concentrations of 175 and 44 ug/m^3 were calculated on the basis of estimated TSP emissions, primarily from unpaved roads, and an empirical model that relates emissions and ambient concentrations. The Air Quality Technical Report and Final EIS have been revised to use measured TSP baseline values near the Paraho site and other sites where such data are available.

16.21 Section P-I.B.2 has been revised to include all permits that had been applied for as of November 30, 1982.

16.22 Section P-1.D.I has been revised to include the first six items identified in the comment. The last five items were not included, because they are identified in Appendix A-8, which is referenced in the EIS.

16.23 Section P-I.D.2 has been revised.

16.24 The numbers in Section P-1.D.2 have been revised.

16.25 The Bonanza Power Plant and American Gilsonite employee information, as well as the relative complexity of the infrastructure and availability of resident-serving industries in Vernal, Rangely, and Dinosaur, were considered in developing the population impact projections presented in the EIS. Assumptions concerning the transportation network are only part of the input into the gravity model which, in turn, are only part of the input in the Spatial Allocation Model which is employed to allocate impact information on the regional economy (available retail and service activity) and the interactions between the sub-areas of the local economy. Vernal serves as the regional trade center and many goods and services are available in Vernal which are not available in the smaller communities. This fact definitely affects the allocation of total population impacts among the communities in the study area.

It should also be noted that although the Vernal area is projected to receive the majority of the impacts associated with the development of the synfuels projects, the ability of Vernal to accommodate the enormous growth associated with the high or even the low scenario is questionable. Communities would have to assist in the accommodation of this growth. The Roosevelt area in Duchesne County, because of its size and availability of services, is likely to receive spillover from the Vernal growth, as would the communities of Rangely and Dinosaur.

16.26 Specific descriptions of the water bodies were not included in Section P-3.A.3 in order to reduce duplication of material within the EIS. The affected bodies are simply a smaller portion of the Green and White rivers, which are described in Section R-3.A.3.

16.27 Section P-3.A.5 has been revised.

16.28 Section P-3.A.9 has been revised.

16.29 Section P-3.A.11 has been revised.

16.30 The line "Increment consumption including baseline" is correct. It corresponds to Table 6-7 of the Air Quality Technical Report. The line in Table 6-7 reading "Impact with Moon Lake Unit 1" gives the cumulative impact of Paraho and Moon Lake Unit 1. In this case, the time period of maximum impact from the Paraho project had very little impact at the same location as Moon Lake Unit 1. Therefore, the cumulative impact is only very slightly more than the impact considering the Paraho project alone.

16.31 The "total" values were incorrectly given as "Paraho Impact." Paraho Impact should read 317 and 40 for 3- and 24-hour concentrations. This has been corrected in the Final EIS.

The use of "baseline" is discussed in the response to Comment 21.20.

16.32 Section P-4.A.3 has been revised based on the information provided.

16.33 The three-mile segment is the segment that would be affected by Paraho's proposed side canyon benching for the spent shale disposal site adjacent to the White River as described in Section P-4.A.8. Section P-3.A.8 refers the reader to Section R-3.A.8 which states, "The White River from the Colorado-Utah state line to its confluence with the Green has been identified as an Inventory River Segment which meets the criteria for study for inclusion in the National Wild and Scenic Rivers System (NPS 1982)."

Under the provisions of the Wild and Scenic Rivers Act, the proposed side canyon benching could be considered incompatible with potential Wild and Scenic River designation for the three-mile segment in question. Actions on private lands, over which the Department of the Interior has no control, could preclude the indicated segment from inclusion in Wild and Scenic Rivers System; therefore, the Department of the Interior would not be involved in protecting river resource values with regard to Wild and Scenic River designation for this segment. The remaining 65 miles of the 68-mile inventoried segment could be eligible for inclusion into the Wild and Scenic Rivers System, excluding other proposed projects. Refer also to the response to Comment 16.8, above.

16.34 Section P-4.A.9 has been revised.

16.35 The emissions given in Table P-1-6 were not available when the air quality modeling was performed. BLM concurs that the analysis results are conservative because the assumed emission rates were higher than the BACT emission rates. The reason for the discrepancy in numbers included in Chapter P-1 and Appendix A-5 (Draft EIS Appendix R-G) has been clarified in Appendix A-5.

16.36 A section on air quality has been added to Appendix A-7.

16.37 Appendix A-11 (Draft EIS Appendix SS-A) is intended to provide standard, not site-specific, provisions for mitigating impacts. Some of the measures may be negotiated with the permitting agency; however, the agencies who submitted these general measures did not indicate the need for negotiating these measures. Although these general measures are not legally binding, they are typical of the type of mitigation that likely would be incorporated with the legally binding right-of-way grants and other permitting actions which typically have specific stipulations.

16.38 Section 2.3 of the Air Quality Technical Report has been revised.

16.39 As discussed in Section 4.1.6.2, there is a large uncertainty in the estimates of particulate matter from unpaved roads; one reason for this uncertainty is that an unknown number of miles of road are likely to be paved in the future. However, BLM is unaware of any commitments to pave dirt roads in the region, and notes that the costs for paving a significant number of miles of road would be substantial.

The best information from the Utah Department of Transportation was used to estimate baseline and future unpaved road emissions. Although these particulate matter emission rates are large, new information for estimating emissions is necessary to develop a revised emission rate for this source.

On the basis of a comparison of observed and calculated concentrations in the Uintah Basin, our best-estimate calculation (using the empirical model described in Section 2 of the Air Quality Technical Report), may be too high by about a factor of 2. This conservatism may have resulted from overestimates of the TSP emissinns or from the stated uncertainty of the model. Elevated TSP concentrations would probably not be observed far from unpaved roads; it is possible that the model estimates are overpredictions of typical ambient TSP concentrations.

16.40 Within the Draft Socioeconomics Technical Report, pages I-152 to I-174 cover only low-level scenario impacts as labeled. The high-level scenario impacts are discussed on pages I-175 to I-219 as labeled. The low-level or high-level project impacts, interrelated project impacts and cumulative impacts are given within specific tables (i.e., housing, education).

16.41 The percentage annual changes in Table R2C-3 on page I-98 reflect three different periods of analysis. The first column, % 1981/1979, reflects the annual growth rate between 1979 and 1981. The second column represents the annual growth rate between 1977 and 1979 and the third, between 1977 and 1981.

16.42 Page I-127 of the Socioeconomics Technical Report states that approximately 75 percent of the construction work would be housed in construction camps. This percentage applies to the low-level construction work force numbers on page 1-125 (1,430) and the high-level construction work force (2,075) on page I-176. This information was derived directly from information provided by Paraho in a letter dated January 22, 1982.

16.43 The employment multiplier discussed on page I-133 is correctly calculated at 2.14. This multiplier is derived from the information in Table R3A-2 on page I-130. The multiplier is derived by dividing total employment impacts (12,810) by basic employment (6,000). The 2.14 multiplier may approximate 1.7, but it must be recognized that the process by which the multiplier concept works is a dynamic process and can increase over time.

16.44 In Table R3A-2, basic employment for 1987 should be 7,950 per Table R3A-1. Also, basic employment in 1990 should be 5,775. These errors have been corrected.

16.45 Table R3A-6 is correct as is; the error lies in Table R3A-1. The Uintah Basin total for construction--non-camp should be 1,215, which makes total basic employment 6,430 for Uintah County. This error has been corrected.

16.46 Table R3A-17 is correct as is; instead, the error lies in Table R3A-16. Total employment for 1992 should be 11,940. This error has been corrected.

16.47 The text of the Socioeconomics Technical Report (Chapter P, Health) has been changed from two to one additional ambulance.

COMMENT LETTER 17

United States Department of Agriculture | Soil Conservation Service | P. O. 8ox 1135D Salt Lake City, Utah 84147

Dctober 14, 1982

Lloyd Ferguson, District Manager
Bureau of Land Management
17D South 50D East
Vernal, Utah 84078

Dear Mr. Ferguson:

We have reviewed the draft environmental impact statement on the Uintah 8asin Synfuels Development prepared for the 8ureau of Land Management August 1982. Following are our comments:

17.1 1. On page xxxi and Table R-4-18, it is stated that there will be an increase of 5 mg/l at Imperial Dam. The impact this will have on the Colorado River 8asin Salinity Control Program needs to be addressed.

17.2 2. The impacts on wetlands need to be addressed. On page R-4-73 the reduction in cropland is addressed, however, irrigation on these areas support wetlands both in crop fields and in return water areas.

17.3 3. No mention is made of alternatives to obtaining water from the White River Dam. If any wholesale or supplemental purchase of irrigation water rights were made the impact on agricultural land and associated wetlands could be significant.

Thank you for the opportunity to comment on the Environmental Impact Statement.

Sincerely,

Harold I. Brown, acting
GEDRGE D. MCMILLAN
State Conservationist

cc:
Vernon Hicks, Natl Environ. Speclst, Wash. DC
Charles Lemon, Director, WNTC, Portland
Dale Hanberg, DC, Roosevelt

The Soil Conservation Service is an agency of the Department of Agriculture

RESPONSE LETTER 17

U.S. Soil Conservation Service

17.1 Changes in salinity are stated for several locations (Table R-4-18). The impacts that this will have on the Colorado River Basin Salinity Control Program will either be in dollars of damages or increased need to desalt water. Section R-4.A.3 identifies salinity would increase up to 8 mg/l, with a 1985 to 2000 average increase of 5 mg/l and explains a 1 mg/l increase could cause damages of $472,000.

17.2 No proposed project facilities would cross, or be located on, wetlands. The somewhat poorly drained areas bordering the irrigated croplands and occurring along the Duchesne, Uintah, and Green rivers are used mainly for pasture and hay production and are considered as cropland in this EIS. Refer to Sections R-4.A.6 and M-4.A.6 for discussion of impacts.

17.3 The alternative of obtaining water from the Green River, either through direct withdrawal or purchase from a holder of an existing water right, was analyzed for each of the site-specific projects (Sections E-4.C, E-4.E, M-4.A, M-4.E, P-4.B, S-4.B, and T-4.D).

COMMENT LETTER 18

TOWN OF RANGELY

P.O. BOX 580
RANGELY, COLORADO 81648
Phone 303/675-8476

October 19, 1982

Mr. David Moore
Vernal District Office
Bureau of Land Management
170 South 500 East
Vernal, UT 84078

Re: Uintah Basin Synfuels Development Draft Technical Report, August, 1982, (Socioeconomics): Comments of Town of Rangely, Rio Blanco County, and Districts of Western Rio Blanco County, Colorado.

Dear Mr. Moore:

The Town of Rangely, Colorado wishes to convey the following comments relative to the Socio-Economic Technical Report for the Uintah Basin Synfuels Environmental Impact Statement, dated August, 1982, and submitted by the Utah State Energy Office. Appended to this letter are statements by Rio Blanco County, Rangely School District Re-4, Western Rio Blanco Metropolitan Recreation and Park District, and Rangely Junior College District. These statements supplement original testimony given by Rio Blanco County and the Town of Rangely at a hearing conducted in Rangely, Colorado on September 15, 1982. Our comments are specifically directed to the social and economic impacts projected for Rangely and Western Rio Blanco County.

Data Collection and Analysis Methodologies

A. Lack of Current Dates.

18.1 Town, County, and Districts' staff acknowledge that no direct personal contacts were made during data-collection; phone surveys were the principal source of information. Data references do not accurately represent current population and housing conditions in Rangely and Rio Blanco County. There are no apparent references to the use of official documents. Some information provided by Town Staff has been inaccurately applied. Appended are copies of reports prepared through the Rangely Community Development Office which represents the most current data available.

B. Lack of Uniform Analysis.

18.2 The bulk of the socio-economic analysis is directed at Uintah and Duchesne Counties, Utah, and not toward Rangely. Almost without exception, Utah Counties and municipalities are analyzed with a degree of consistency which permits ready comparison in all areas of analysis; no such uniformity is afforded Rangely and Western Rio Blanco County. (One obvious example of this ommission is the lack of a fiscal profile for Rangely, beginning on p. 1-55).

18.3 To further complicate the analysis, the report liberally combines Rangely and Dinosaur into "Colorado Impacts." Why are not Uintah, Duchesne, and

18.3 (cont) Daggett Counties, and their respective municipalities similarly lumped into one category as "Utah Impacts?" Rangely and Western Rio Blanco County certainly deserve equitable consideration.

18.4 The report lacks continuity in the utilization of data for the Town of Rangely/Dinosaur, or Rio Blanco/Moffat County data yet in other instances. Table R28-1, for instance, provides data for the Town of Rangely only; yet, comparable Tables for Uintah and Duchesne Counties include unincorporated areas.

18.5 Lastly, references are made in Table R28-1 to information given by Rangely Town Staff for the Town of Dinosaur. The Town of Rangely has no data available relative to Dinosaur, and made that representation to the telephone interviewer.

C. Special Allocation Model; UPED Model.

The Town of Rangely wholeheartedly concurrs with comments of Rio Blanco County Director of Development Mark Bubriski relative to the shortcomings of these Models and related assumptions (see attachment) as they apply to projected impacts from both the Syntana-Utah and Paraho Projects. Equally applicable to those project impacts are comments directed by the Town of Rangely to the USGS Oil Shale Office on October 31, 1981, for the White River Shale Project (WRSP), (copy attached). The Uintah Basins report is guilty of many of the some shortcomings of the WRSP Development Plat report, and are referenced as follows: (References to WRSP)

1.) Item #6, p. 4. No Cost/Revenue Analysis or Community Services Impact Analysis. Similarly, the Uintah Basin Study makes little attempt to deal with the tax lead time problems associated with the projected growth and no suggestions are made to handle the growth.

18.6 More important is Rangely's unique problem of interstate impacts due to U-a, U-b, Paraho, and Syntana-Utah operations. In the absence of any interstate sharing compacts between Utah and Colorado, how are any bonus and royalty payments to be directed to Rangely? Certainly, sales and property taxes are not expected to offset increased operational expenditures from both a direct and induced population.

2.) Item #8, p. 6. Termination. Analysis for Paraho, Syntana, and White River are carried through projected peak development, but do not indicate when termination or phase-out might be anticipated.
18.7 Phase-out programs should be addressed so that Rangely, and other impacted communities, can take the disappearance of these industries into account in long-range fiscal and community planning.

3.) Item #10, p. 7. Housing Strategy. The Uintah study makes no reference to a housing program to accommodate new growth for Rangely. Western Fuels-Utah, Inc., and the Town of Rangely expended considerable time and effort in developing a Housing
18.8 Strategy and housing agreement to mitigate against Western's impacts on both the permanent and temporary housing market. Similarly, strategies for White River, Paraho, and Syntana-Utah impacts need to commence immediately.

D. Report Discrepancies.

The report contains what we feel are serious and substantial misapplications of data, and apparent inconsistencies reflected between various sections of the report. The following are brief, sketchy notes on some of those
18.9 discrepencies:

1.) p. I-26, Table R2A-7. Rangely population overstated for 1982. (We project approximately 950 units by the end of 1982) 1983 projections appear valid.

2.) p. I-38 Table R2B-I. Source of number of Housing Units for Rangely/Dinosaur is indicated as John Pagini of the Rangely Staff. No information on Dinosaur is available, or has been dispersed through the Rangely office. Rangely and Dinosaur are communities which should be treated separately, as Utah communities are treated separately. Rangely's most recent count is as follows (as of July 31, 1982):

Single-Family	Mobile Homes	Duplex (units)	Apartments (units)
492 (61%)	229 (28.4%)	34 (4.2%)	51 (6.3%)

18.10 Temporary Housing
17 - 11 M. H./6 RVs

TOTALS: 806 permanent units; 17 temporary units; 100 motel units.

TOTAL ALL UNITS - 923 units.

Applying these figures to the study's criteria, the mix for Rangely alone is as follows (excluding RV units):

Conventional	Mobile	Multi-Family	Hotel
492	240	85	100

Also, the report is consistently guilty of providing data for CCD's on some occasions, and data for municipalities at other times.

3.) p. I-39 Table R2B-2. Information credited to Rangely Community Development Director Pagini has been inaccurately applied to the study. The information was apparently derived from a study entitled: "Survey of Existing Housing Stock and Other Structures in the Town of Rangely", prepared by Brent R. Snyder, Building Inspector, Town of Rangely, with the assistance of John Pagini, Community Development Director, Town of Rangely, dated February 8, 1982. The following information, derived from this report, was
18.11 submitted during the Uintah Basins telephone survey, and is outlined on p. 15 of the report (copy attached):

Substandard Units	Raw Number	% of Total
Mobile Home Units	85	37.1
Recretional Vehicle Units	7	100.0
Apartment units	21	35.0
Duplex Units	4	13.3
Single Family Units	57	12.0

Of 801 permanet dwelling units identified at that time, 174, or 21.7% were judged to be substandard.

18.11 (cont) No information was given to those conducting this study on the number of "new" units, nor was any attempt made to define the parameters for "new", "standard", "deficient", or substandard" units. It is also curious that the report chooses only to judge housing conditions for so-called "standard" units only; it seems that the condition of mobile homes and any multi-family housing are important factors in gaging overall community housing conditions, especially where the report has estimated the region's combined mobile home and apartment housing total at nearly 30% of total housing (p. 1-30).

18.12 4.) p. I-48 Table R28-8. No breakdown of the number of books and square feet of space is provided for the Rangely Library - why is the information "not applicable" for Rangely, but applicable for other jurisdictions?

18.13 5.) p. I-61 thru 1-80. The report fails to treat Rangely and Dinosaur with fiscal analysis which parallel those presented for all Utah Counties, Municipalities, and Districts!

18.14 6.) p. I-84 thru I-88. Section R2C Transportation - No mention is made of the Rangely Airport and pending expansion plans. Also, it should be noted that Colorado Air Freight Express provides passenger and freight service to Rangely.

18.15 7.) p. 1-94. Characterizes road between Highway 64 to Bonanza as substandard. Does not consider fact that County has improved Colorado portion of road during 1982, expending $200,00C.

18.16 8.) p. I-93. Transportation Data Chart. Provides poor information on Colorado Highways serving Rangely and Dinosaur. Does not address road leading from Highway 64 to Bonanza.

9.) p. 141 CDD Level Impacts. Relative to the comment attributed to "local planners" concerning the distance from Bonanza to Rangely, and use of the Morman Gap Road, are "local planners" Rangely and Dinosaur officials, or Uintah County officials.
18.17 Rio Blanco County has performed substantial improvements to the Colorado portion of the road. Secondly, Bonanza workers may be restricted from residing in either Rangely or Dinosaur by Company policy, and, therefore, should not be used as an indication that the road may not be utilized by others.

10.) p. 1-144 Table R3A-11 and R3A-13 are inconsistent.

18.18 11.) p. I-147 The former alleges to represent community impacts for Rangely and Dinosaur CCDs while the latter represents impacts to incorporated areas. In both instances, the population is identical for both Cdds and incorporated areas while number of households for incorporated areas exceeds the total number projected for each CCD.

18.19 12.) p. I-163 & 164. Baseline projections are for 51 police officers serving Rangely. These figures are inconsistent with baseline population projections found in Table R2A-7 and how enforcement standards noted on p. I-7.

18.20 13.) p. I-165. Similarly, projections for patrol cars are not consistent with the above-referenced baseline population and standards noted elsewhere in the report.

18.21 14.) p. I-183. Two County Impacts are combined, while Utah jurisdictions are addressed separately.

18.22 15.) p. I-186. Projections are for considerable induced worker impacts, but no direct construction worker impacts. This does not fall into generally accepted formulae for direct/induced worker ratios.

18.23 16.) p. I- 191 & 193. Community and County impacts are freely intermixed; these impacts should be clearly separated by jurisdiction.

18.24 17.) p. I-194. The analysis in this section fails to address High Level Scenario impacts for Rangely and Western Rio Blanco County.

18.25 18.) p. I-197. Baseline demand for students is listed as 5,293. This demand does not seem possible. If we assume that baseline projections found in Table R2A-7 are accurate, total population is as 3,192; it is, therefore, highly improbable that 5,293 school-age individuals could be found in the Rangely area.

18.26 19.) p. I-200. Table R3B-19. Baseline data seems highly inaccurate for the same reasons as stated immediately above relative to law enforcement and school age populations projects. The same comment is applicable for p. I-201, 202, 207, 208, and 215.

18.27 20.) Volume II of the Socio-economic Impact analysis fails to make any mention of either Rangely or Rio Blanco County in their analysis. Particularly, we feel that analysis of Paraho and Syntana-Utah, which are situated in closest proximity to Rangely and Western Rio Blanco County, must address impacts to Rangely in the same manner as Duchesne and Uintah County, Vernal and Roosevelt impacts are addressed.

18.28 In closing, we wish to emphasize the importance of making close personal contact with jurisdictions which might potentially be impacted, and to obtain and utilize official documents as credible data base. You will find that Rangely, Rio Blanco County, and various District officials are more than willing to devote their time to provide accurate and current data. For the Town's part, I can guarantee our participation and the fostering of open communication.

Thank you for your consideration of Rangely's concerns.

Very truly yours,

TOWN OF RANGELY, COLORADO

Peggy J Rector JDP.

Peggy J. Rector
Mayor

pl

Attachments:

A. Statement of Mark Bubriski, Rio Blanco County
B. Statement of Western Rio Blanco Metropolitan Recreation and Parks District
C. Statement of Rangely Public Schools
D. Statement of Rangely's Junior College District
E. Copy of letter to Peter A. Rutledge, USGS, from Peggy J. Rector, Mayor, Town of Rangely, dated October 31, 1981, relative to White River Shale Porject.
F. Copy of Report entitled: "Survey of Existing Housing Stock and Other Structures in the Town of Rangely"
G. Copy of report entitled: "Town of Rangely: Housing and Population Count, July 31, 1982"
H. Copy of Report entitled: "Breakdown of Housing Units Currently under Construction, September 1, 1982"

October 14, 1982
Statement of Mark Bubriski, Rio Blanco County Director of Development
Re: Uintah Basins Synfuels Development EIS

On behalf of Rio Blanco County I would like to concentrate my comments specifically to assumptions made and data included in the sections on work-force allocations and population projections.

I would first like to address the assumptions and findings of the "spatial allocation model" and the UPEO model referred to in the EIS. The model does not appear to take into account that with the current advent and continuation of residential and commercial development now occurring in Rangely, Colorado (housing, shopping and recreation) that there will be more liklihood of Rangely becoming a more competitive and more attractive town for people to reside in and commute from. The EIS states that the Bonanza-Rangely road is insufficient to accommodate heavy levels of traffic and that county (Uintah) officials have indicated that they will not maintain this road for use by commuter traffic. Although, presently this road on the Utah side is in need of repair and maintenance, Rio Blanco County has just this summer spent $200,000 improving the road from the Colorado border to Highway 64 just north of Rangely. The map referred to in the EIS as Map R-1-1 omits entirely the existence of the Bonanza-Rangely road. Any potential worker population allocation to Rangely depends considerably on the access provided by this road.

18.29

The "impedence factor" that the EIS attributes to this road does not take into consideration the possibility that as both synfuel projects Syntana-Utah and Paraho Development go into construction in the next couple of years, these companies themselves may opt to assist in improving and maintaining that small segment of the Bonanza-Rangely road that is close to their projects in Utah. This possiblity should not be ignored given the proximity of both Syntana and Paraho to the Colorado border and if improving the road would prove to be beneficial in planning transportation needs of their respective commuting work-force.

On the same note the recently published Electric Power Research Institute February 1982 report "Socioeconomic Impacts of Power Plants" has some interesting observations regarding the utility of gravity models such as the spatial allocation and UPED models use in the Uintah Basin EIS.

The report states:

> "Gravity models should not be used without a substantial amount of field work in the areas in order to assess the capability and desire of communities to attract and house construction workers and induced employees."

In summary on this subject Rio Blanco County feels that the Uintah Basin Synfuels Development Draft EIS is substantially underestimating the potential population and workforce allocation in Rangely and therefore underestimating the coinciding impacts that would be felt.

Regarding specific data and assumptions on population impacts made in the draft EIS Rio Blanco County questions the statement made on page 11-6 of the Socioeconomic Technical Report stating that "The impacts for Rangely are not significant using the criterion of an impact of 10% or greater as being significant". I believe the 10% figure is taken from a Jack Gilmore study that attributed certain impacts under certain conditions as significant at 10-15%. The Uintah Basin EIS interpretation of Mr. Gilmore's assessment is misleading. After discussion with Jack Gilmore and his associates and a closer reading of the report that the 10% figure is taken from, it is apparent that impacts are greater in smaller rural communities where the basic infrastructure is nearer capacity. For any small community the rate of growth and corresponding "significance" as related to impact is entirely a function of that town's ability to absorb the growth and associated impacts.

18.29 (cont)

On the same subject of population impacts the Draft Technical Report Volumn II Socioeconomics states that the impacts for Rangely will not be significant using the criterion of 10% or greater as being significant. My concern with this statement is that it conflicts directly with the State of Utah's Impact Mitigation Law that stipulates 5% growth as its criterion for significant impact. Given that the State of Utah's Office of State Planning had a direct role in preparing the Draft Uintah Basin Synfuel EIS there appears to be a serious conflict in establishing a consistent growth impact criteria.

Also, with regard to population impacts in the affected communities and counties I refer to Tables R-4-4 and R-4-6 on pages R-4-12 and R-4-16 respectively in the EIS. Table R-4-4 according to the UPEO model projects a 1985 baseline population of 3,193 for Rangely with an applicant (projects) increase of 577 for an 18.1% increase and an interrelated project increase of 82 for a cumulative increase of 659 people or a 20.6% increase. Similarly, in Table R-4-6 Housing Demand the UPED model shows a baseline household number in Rangely of 1,116 in 1985 with an applicant increase of 196 or 17.5%. With the interrelated project household demand included this number is increased by 28 for a cumulative total of 224 additional households needed and a corresponding 20.1% increase for Rangely.

Both of these tables appear to be substantially different in their data projections and conclusions from the data and assumptions made in the Draft Volumes 1 & 2 Technical Reports on Socioeconomics that show significantly lessor impacts for Rangely. Again, the statement that Rangely will not be significantly impacted based upon the 10% impact criterion seems to be seriously at odds with the conclusions reached in both Tables R-4-4 and R-4-6.

WESTERN RIO BLANCO
METROPOLITAN RECREATION AND PARK
DISTRICT

P.O. BOX 1003 - RANGELY, COLORADO 81648

October 13, 1982

Town of Rangely
John Pagini
Community Development Director
P.O. Box 580
Rangely, CO 81648

RE: E.I.S. reports for Unitah Basin Synfuels and White River Oil Shale Project

Dear John:

18.30 I am writing in regards to the two E.I.S. reports. I will comment first about the White River Shale Project. The first problem is the figure of 203 acres of both developed and undeveloped land within the Parks and Recreation District in Rangely. Actually, the District presently owns 24.5 acres of developed parks and 21 acres of undeveloped land. The total is 45.5 acres, which is far short of 203 acres. All assumptions made by them must be reevaluated with better figures.

The Uintah Basin Synfuels E.I.S. is a totally different idea as far as the Parks and Recreation District is concerned. They create more problems than they answer. First, they use a figure on page I-169 of 179 acres as a total demand for neighborhood parks. Where did they get that figure? Since I only now have 45.5 acres both developed and undeveloped, that means they would owe me 133.5 acres by 1993. They then must have quite a model to choose from. Thats only 174 acres difference.

18.31 The second problem I have is they lump Dinosaur and Rangely together. We are in different counties and have nothing to do with each other. They don't pay our bills or build our parks and vice-versa.

18.31 (cont) The next question I have is where did they get their baseline projections? With regard to this question, (1) Where did they get their figures? (2) How can you develop an E.I.S. over the phone? (3) If you can lump Rangely and Dinosaur together, then why not lump Vernal and Roosevelt together? (4) When did these people come to Rangely and how did they develop these figures?

18.32 This statement is typical of the energy people. Why do anything? They already have it covered. We want everything free and will give nothing. I guess the old axiom is true in this case, "Figures lie and liars figure." I hope my point has been made concerning this study. At least, White River Shale came to talk to us.

Thank you for your consideration in this matter.

Sincerely,

Richard Simmons pp

Richard Simmons
Director

RS:pp

Accredited Through Colorado Department of Education Contract — May, 1974

RANGELY PUBLIC SCHOOLS

DISTRICT NO. RE-4
RANGELY, COLORADO 81648

GENE YOUNG
SUPERINTENDENT

WILLIAM PALMER ELEMENTARY SCHOOL PRINCIPAL	WILLIAM McDANIEL MIDDLE SCHOOL PRINCIPAL	PAUL STRADLEY HIGH SCHOOL PRINCIPAL

October 12, 1982

Town of Rangely
Attn: John Pagini
P. O. Box 580
Rangely, CO 81648

Dear Mr. Pagini:

18.33 In regard to comments regarding the White River Oil Shale Project, I have several comments to make. Our design capacity at the high school is 380 students, not the 500 shown on I-41. Because of this and our other increased enrollment our utilization is running much higher than the 52 percent as shown in the study. Our junior high enrollment is very close to total capacity at 177 students. Our elementary student population is now 320 not 211 as shown in the study, and we currently have over 200 students in the senior high, up from the 152 shown in the study. Because of this increase in enrollment we are much closer to our building capacity and our pupil teacher ratio is higher than shown.

Please pass these comments on to the proper authorities.

Sincerely Yours,

Gene Young

Gene Young, Ed.D.
Superintendent

AEY/ll

(Insert ..)

Colorado Northwest Community College is located in Rangely. Northwestern Colorado, served by CNCC encompasses an area approximately 8,800 square miles, or about 8.5 percent of the Colorado Land Area.

Although the tax supporting Rangely Junior College District encompasses only the western half of Rio Blanco County, the institution serves a three-county area composed of the counties of Rio Blanco, Moffat, and the western section of Routt County. CNCC is designated by the State Board for Community Colleges and Occupational Education assumes the responsibility for providing the assessment of needs and instruction for the defined service area.

Colorado Norhtwestern Community College confers Associate Degrees in General Studies, Liberal Arts, specialized vocational programs and awards certificates in occupational program certificates. The post-secondary instruction programmed through the service area includes degree and certificate offerings and avocational individual-interest courses.

Unique programs that are programmed at the college include Aviation Maintenance Technology (2 year certificate), Aviation Flight (Associate Degree), Dental Hygiene (Associate Degree), Instrumentation Technology (Associate Degree) and Petroleum Technology (Associate Degree).

Presently, the campus facilities total 13 which include classroooms, laboratories, housing, athletics and maintenance. The community college is pursuing an expansion plan that would address the needs of student life and curricular programs.

VII. POST-SECONDARY EDUCATION

A. EXISTING

The Uintah-Duchesne County area is able to offer post-secondary education and training on a fairly large and diverse scale. Utah State University Extension Service teaches courses in Vernal and Roosevelt. Also, various Certificates of Completion can be earned through the Vocational Centers in Vernal and Roosevelt. The degrees or completion certificates that are offered through these institutions are listed in Tables VII-1 and VII-2. Enrollment for the Extension courses is approximately 380 students, while the Uintah Basin Area Vocational Center has approximately 860 enrolled. These programs have already begun to focus their training programs on skills which will be needed in the shale oil industry, as well as on medical and other fields which will have increased demand locally as energy-related growth proceeds.

Colorado Northwest Community College is located in Rangely. ~~This institution~~ is operated as a special district covering the entire western side of Rio Blanco County.

The community college is pursuing an ambitious expansion plan, including construction of a dormitory, athletic facilities and academic buildings totaling over $8 million by 1984.

B. FUTURE NEEDS FOR POST-SECONDARY EDUCATION

Baseline growth in the study area will present employment opportunities for increasing numbers of local workers in the oil and gas industry. This will require continued growth of post-secondary training programs in oil field related skills.

As the White River Shale and other synfuels projects proceed, many of the jobs they create will require specialized training. Some of these positions during project construction stages will be of short duration and will necessitate bringing in temporary workers from outside the area. However, most others, particularly during project operation, will be more permanent and, therefore, more attractive to natives of the area. It will be important to have the training programs available locally, especially for these long-term jobs, so that local residents can fill many of the available positions.

Attention should also be given to maintaining the variety and quality of those post-secondary educational programs which are not associated directly with the energy industry. These programs could be an important leisure time outlet for the energy workers and their families.

Table VII-1

DEGREES OFFERED THROUGH UTAH STATE UNIVERSITY EXTENSION SERVICE

Bachelors Degrees

Accounting	Health, Physical Ed., Recreation
Animal Science	Instructional Media
Art	Mathematics
Biology	Music
Business Administration	Office Administration
Chemistry	Outdoor Recreation
Dairy Science	Psychology
Distributive Education	Secondary Education
Elementary Education	Social Work
English	Sociology
Family and Human Development	Special Education
Forestry	Theater Arts
General Education	Wildlife Science

Master of Arts Degrees

Art	Sociology
Elementary Education	Business Administration
Psychology	Business Education
Secondary Education	Communications
Special Education	

Table VII-2

CERTIFICATES OF COMPLETION OFFERED THROUGH THE UINTAH BASIN AREA VOCATIONAL CENTER

Area of Study	Certificate Offered
Allied Health:	
Emergency Medical Technician	State Certificate Emergency Med. Tech.
Licensed Practical Nurse	One-year Certificate of Completion
Nurses Aide Program	Certificate of Completion
Prenatal Workshops	Red Cross Card
Business:	
Accounting Clerk	One-year Certificate of Proficiency
Administrative Secretary	Two-year Certificate of Proficiency
Automotive Service Station Manager	One-year Certificate of Proficiency
Bookkeeper	One-year Certificate
Business Manager	Two-year Certificate of Proficiency
Clerk, General	One-year Certificate of Proficiency
Clerk, Typist	One-year Certificate of Proficiency
Fashion Merchandise & Interior Designer	One-year Certificate of Proficiency
Marketing and Sales Manager	One-year Certificate of Proficiency
Real Estate	One-year Certificate of Proficiency
Receptionist	One-year Certificate of Proficiency
Secretary	One-year Certificate of Proficiency
Trades and Industry:	
Antique Custom Riflesmith	Certificate of Proficiency
Automobile Mechanic	Two-year Certificate of Proficiency
Automotive Specialist	One-year Certificate of Proficiency
Automotive Spellperson	One-year Certificate of Proficiency
Cabinet Millwork	One-year Certificate of Proficiency
Carpentry	Two-year Certificate of Proficiency
Masonry	Certificate of Proficiency
Diesel and Heavy Duty Mechanic	Two-year Certificate of Proficiency
Farm Equipment Repair	Certificate of Proficiency
Architectural Drafting	One-year Certificate of Proficiency
Mechanical Drafting	One-year Certificate of Proficiency
Leather Work	One-year Certificate of Proficiency
Saddlemaking	One-year Certificate of Proficiency
Shoe Repair	One-year Certificate of Proficiency
Materials Handling	Certificate of Proficiency
Motorcyc.e Repair	Certificate of Proficiency
Outboard Motors & Small Engine Repair	One-year Certificate of Proficiency
Welding, Industrial	Two-year Certificate of Proficiency
Welding Specialist	Certificate of Proficiency
Welding, Gas	One-year Certificate of Proficiency

(Table III-3)

DEGREES AND CERTIFICATES OFFERED THROUGH

COLORADO NORTHWESTERN COMMUNITY COLLEGE

Area of Study	AAS	Voc. Cert.	AS	AA
Aviation Technology (Pilot Training	X			
Aviation Maintenance Technology (Air frame & Power plant Mechanic)		X		
Dental Hygiene	X			
Instrumentation Technology	X	X		
Office Occupations	X	X		
Petroleum Technology	X			
General Business			X	
Mathematics/Physical Science/ Geology			X	
Physical Education			X	
Pre-Dental/Pre-Medical				
Pre-Veterinary			X	
Liberal Arts			X	X
Community Development/Human Affairs				X

AAS Associate of Applied Science
Voc.Cert. Vocational Certificate
AS Associate of Science
AA Associate of Arts

TOWN OF RANGELY
P O BOX 580
RANGELY, COLORADO 81648
Phone 303/675-8611

October 31, 1981

Mr. Peter A. Rutledge
Deputy Conservation Manager
U.S. Geological Survey
Oil Shale Office
Suite 300
131 North 6th Street
Grand Junction, CO 81501

ENERGY IMPACT:
WHITE RIVER OIL SHALE

Dear Mr. Rutledge:

The Town of Rangely, Colorado wishes to make the following comments on the Detailed Development Plat (DDP) for the White River Shale Project (WRSP) for federal lease tracts U-a and U-b in Uintah County, Utah. Specifically, the Town wishes to concentrate on the social and economic impact study which was prepared as a supplement to the Detailed Development Plan, which is intended to describe the potential social-economic impacts that may result from the construction and operation of the WRSP. The study under review is by Gibbs & Hill, Inc.[1], and assigns the total impact to Uintah County, Utah, and Rangely, Colorado.

I. Proposed Action

The White River Shale Project is a joint venture of Phillips Petroleum Company, Sohio Shale Oil Company, and Sunoco Energy Development Co., to construct and operate an oil shale mine and retort facility on tracts U-a and U-b. It is our understanding that the joint venutre is or will soon be called the "White River Shale Oil Corporation". For purposes of our review, we will continue to refer to White River Shale Project or WRSP.

[1] "White River Shale Project; Community and Infrastructure Support Study", Gibbs & Hill, Inc., August, 1981.

The entire project is intended to be a phased development over an approximate 25-year period from time of development to termination. The time frame goes from 1982 to 2007 in the following three phases:

Phase	Development Years	Important Years	BPD
Phase I	1982-1987	1985 - Modular Operations	15,000 (1986)
Phase II	1988-1992	1989 - Construction Peak 1991 - Population Peak	57,000 (1989)
Phase III	1991-1994	1994 - Commercial Operations	106,000 (1993)
Phase Out	------	2007	-0-

The total direct WRSP employment is expected to peak at 5,083 workers in 1989, including 3,797 construction workers and 1,286 operation workers. By 1994, the construction work force is projected to be phased out and the operation work force is projected to reach 3,353.

II <u>Population Projections and Distribution</u>

Gibbs & Hill used an attraction-constrained gravity model in an attempt to project the likely distribution of direct incoming population between Uintah County, Utah, and Rangely, Colorado. Under the Gibbs & Hill gravity model, about 76 percent of the direct incoming population was assigned to Uintah County, and, more specifically, the Ashley Valley which encompasses Vernal, Utah; and 24 percent of the direct incoming population was assigned to Rangely, Colorado. White River Shale Project induced population distribution was assigned only to these two locations.

In addition, WRSP intends to develop a construction camp on the site which is expected to house as many as 2000 "singles" during the 1982-1993 construction period. Gibbs & Hill assigned 50 percent of the singles or bachelors in the construction work force to the camp, and the remaining 50 percent was distributed to Rangely and Ashley Valley in a 24 - 76 ratio.

III. <u>Summary of Issues and Concerns by the Town of Rangely</u>

The Town of Rangely wishes to make the following 15 points as they relate specifically to Rangely on the social-economic analysis supplemental material to the Detailed Development Plan for the White River Shale Project:

1. <u>No In-depth Analysis</u>. Secondary sources are used to a considerable degree. There were few personal contacts with Rangely local government officials and use of official documents (e.g., audits and budgets) is virtually non-existent. Such an approach means that qualitative analysis and insight into the operational, budgetary, and political processes that are unique to Rangely are not taken into account. Ashley Valley and Uintah County are given much more in-depth analysis. This shortcoming should be corrected in further analyses.

2. <u>Uintah County Emphasized</u>. As stated, the bulk of the social-economic analysis is directed at Uintah County, and specifically, the Ashley Valley, not Rangely. The same conclusion holds true with respect to mitigation statements. This despite the fact that the Gibbs & Hill Gravity Model shows Rangely with 24 percent of the WRSP population impact or approximately 4,000 population at the operational stage starting in 1994. The population growth is double Rangely's current size. The specific shortcomings are detailed in paragraphs 3, 4, and 5 below. See Appendix A for a comparison of what was covered and not covered in Gibbs & Hill with respect to Rangely versus the Ashley Valley.

3. <u>Direct Impact Only Covered</u>. The Town of Rangely believes that one of the most serious shortcomings of the study is the fact that only the social-economic effects of the direct population are covered for Rangely. Indirect population impact added to direct impact means that 4,000 instead of 2,000 population will need to be served in Rangely. The fact that indirect population is not taken into account skews the entire effects analysis. There appears to be an assumption that somehow the existing population will, in fact, satisfy the secondary employment base and that, therefore, service and infrastructural requirements of the secondary population will be minimal. In short, there would be no in-migration of secondary population. Indirect population impact was taken into account for the Ashley Valley.

4. Extrapolation of Ashley Valley Data. In most instances the only way in which data for Rangely is derived is to extrapolate comparable data given for the Ashley Valley. We find this to be extremely cumbersome and the comparables not necessarily interchangeable.

5. Comparison of Planning Standards. Existing, comparable, and Gibbs & Hill proposed planning standards for projecting service needs of the WRSP are developed for Ashley Valley and some, but not nearly as many, are developed for Rangely. The standards for Ashley Valley cover housing type mix and dwellings per acres; community support facilities; recreation; and utilities. These standards are intended to present measurement factors for determining land area needs for schools, housing, public service employment, flow rates for water and wastewater treatment, etc. Ashley Valley ratios give a basis for determining by local planners and managers which of the comparative planning standards are applicable to Ashley Valley -- they serve as a basis for measuring the relative adequacy of the existing service level. In summary, what are shown and discussed at length for Ashley Valley are:

a. Existing planning ratios;

b. Comparative or optimal planning standards; and

c. Proposed standards, as customized by Gibbs & Hill.

The Town of Rangely believes that similar detail and scope of planning analyses should be accorded Rangely where one quarter of the WRSP projected population will reside.

6. No Cost/Revenue Analysis or Community Services Impact Analysis. Chapter 4.0 and accompanying tables set out local governments' budgets and tax base for Uintah County. Where is the comparable date for Rangely? What is the fiscal impact of the WRSP on Rangely? Though tax lead time is recognized as a problem, there are no suggestions for mitigating the problem. It is generally claimed that Rangely's existing infrastructural capacity will be sufficient to handle the new growth. The following statement from Gibbs & Hill effectively sums up how new growth will be handled and funded by the public sectors:

> The capacity of Ashley Valley and Rangely to raise the present level of services and to accommodate the increased needs will be enhanced by the increased revenue generated by the incoming populations. The general tax base growth in Ashley Valley will be supplemented by the money that Uintah County will receive from WRSP's bonus and royalty payments, much of which can be sued for local impact mitigation needs. (emphasis added)[2]

Bonus and royalty payments from the WRSP may be distributed by the State of Utah to the Ashley Valley, but probably not to Rangely since there is presently no mechanism for interstate sharing. We fail to see how increased sales tax and property tax, the principal sources of revenue for Rangely, will off-set increased operational expenditures, resulting from a construction and permanent work force and the attendent indirect population increase, much less provide the bonding capacity necessary to meet the capital improvement requirements of the new population. If revenue will off-set expenditures this needs to be shown.

Will there be positive fiscal balances for Rangely School District RE-4, Rio Blanco County, and special districts affected by the WRSP?

There are special circumstances created when the industrial tax base is located in one state and must be addressed by local governmental entities located in another state, such as the case with respect to the WRSP and Rangely. Capital and operational standards, developed by the State of Colorado, estimate that about \$10.8 million dollars is required for capital costs and another \$1.0 million per year is required for operations and maintenance for each 1000 new residents in order to provide necessary government services. Operations and maintenance go on, of course, each year for the life of the project, while capital costs are considered one time expenditures either before, during, or after the population arrives. Part of the on-going operation costs are for maintaining the new capital improvements. With approximately 4,000 new residents coming to Rangely by 1989 or 1990 as a result of the WRSP, it is incumbent upon the White River Oil Shale Corporation to show how, when, or whether a positive or break-even public fiscal balance will be achieved in Rangely by the various governmental entities involved, since about \$40 million of capital projects may be required to serve this new population plus an annual outlay of about \$4.0 million over the life of the project. This total dollar

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[2] Ibid., Page XVII.

amount, plus such issues as tax lead time and bonding capacity are very real concerns for Rangely and other governmental bodies in Colorado. Unless such issues are addressed, the other options available for the Town of Rangely are higher taxes and service fees for current residents, a cutback in existing service levels, and a deferral of planned capital improvements, or any combination of the three.

Both a cost/revenue analysis and a community service impact analysis is necessary. It is unacceptable to merely state, as in Gibbs & Hill, that increases in earnings in Rangely will amount to $31.3 million by 1994. How does that translate into tax dollars to maintain the public fiscal balance?

7. Federal Leasing Provisions. The Gibbs & Hill social-economic analysis is not required under the terms of the U-a and U-b federal shale oil leases, nor is mitigation required. The Town of Rangely believes that future oil shale federal leases should contain requirements for social-economic identification and mitigation. Such requirements would be particularly helpful in the case of interstate impact situations, such as the U-a and U-b tracts.

8. Termination. Unless other shale oil resources are developed in the mean time, the WRSP will end about the year 2007. There should be addressed termination or phase out programs so that communities such as Rangely and Vernal are not suddenly left as ghost towns, with extensive, expensive, and elaborate social and economic structures and infrastructures. The termination issue should be addressed in the social-economic analysis as well as provided in future leasing programs. At the very minimum, the bust or down cycle should be analyzed so that local government can take the disappearance of a natural resource-based industry into account in long-range community planning, long-term debt, and fiscal planning.

9. Gravity Model and Monitoring. The Gravity Model contained in Appendix F of the Gibbs & Hill analysis, shows Rangely getting about 24% of the population and the Ashley Valley about 76%. The model assumes that even though Rangely is closer than Vernal, the latter overcomes the distance deterent by the perceived advantages of a larger community. As recognized in Gibbs & Hill this could change. The only way the Gravity Model can be verified over time is through a monitoring program such as the one being developed by the State of Colorado for the Cumulative Impact Committee or the Moon Lake Power Plant Project coincident to the Western Fuels agreement. This is especially true since only Rangely and Ashley Valley were used as potential settlement sites in the Gibbs & Hill report.

10. Housing Strategy. There is no housing program to accommodate the new growth for Rangely, nor even a recognition that the need for one may exist, other than to make brief mention of the problem Rangely will have with temporary housing during the construction peak. Strategies for this most complex public-private issue need to commence almost immediately.

11. Cumulative Impact. There is no cumulative impact information on Rangely so such statements as the following on page XVI are not accurate: "Because of Rangely's existing facilities, no additional schools and only 9 additional teachers may be required".

12. Overstating Rangely's Current Capacity. Rangely's existing capacity is overstated in many instances. For example, on page 7-28 it is stated that Rangely will have a water treatment capacity of 4.32 million gallons per day and the sanitation treatment plant will have a capacity of 1.0 mgd. It is asserted in both instances that sufficient existing and planned capacity will be more than enough to take care of the WRSP population impact. We are unaware of firm plans for expansion in either the case of water treatment or wastewater treatment, other than the deferred capital program contained in the Western Fuels agreement. We suggest that the capacity analysis be done again in conjunction with the Town Manager and other responsible local officials on a face to face basis. Only then can accurate conclusions be drawn.

13. No Oil Shale. What does the public sector do if financial obligations are made, particularly long-term capital debt, and the project fails to materialize or is stopped after the Phase I prototype stage?

14. Campsite S-E Impact. Due to the construction campsite's proximity to Rangely, it is likely that the Town will experience impact on services (police, social services, etc.). It is suggested that operational rules and regulations be reviewed by the Town prior to their adoption by WRSP.

15. Water Rights. By Phase III of the project, according to the Detailed Development Plan, consumptive water use will approximate 31 cfs, taken in all likelihood from the White River or the White River Reservoir if built. The Town of Rangely is concerned about the potential adverse impact that such consumptive use might have on the Town's water rights, particularly its

Mr. Peter Rutledge
October 31, 1981
Page Eight

28.5 cfs rights. This problem is not addressed in the Detailed Development Plan, the Gibbs & Hill social-economic supplement, the Draft EIS for the White River Dam Project, or any other document to the Town's knowledge. We believe that an analysis of the WRSP and a cumulative impact analysis of other known or potential energy users on Rangely water rights is essential if the Town is expected to handle substantial energy population growth. For instance, Gibbs & Hill projects Rangely population to be approximately 12,000 by 1994. Are Rangely's water rights adequate to handle such growth? Or will upstream and downstream senior consumptive users effectively impede the Town's ability to meet the projected growth? The Town of Rangely believes that it is in the interest of the White River Shale Project and the Bureau of Land Management to determine water supply capabilities and limitations of the Town of Rangely.

Conclusion

As a closing note, we wish to point out that officials of the White River Shale Project have already met with a member of the Town Council, the Town Manager, and myself in an effort to start an essential dialoque between the corporation and the local governmental entity most affected by the WRSP. We can only hope this effort is maintained on an on-going basis and extended to include other local governments involved in Colorado. For the Town's part, I can guarantee our participation and the fostering wherever possible of such communication. The contents of this statement should form a basis of the issues that local government industry need to address jointly in the ongoing effort.

Thank you for your time and consideration of Rangely's concerns.

Very truly yours,

TOWN OF RANGELY

Peggy J. Rector

Peggy J. Rector MJT
Mayor

PJR/mks

APPENDIX A

Rangely Service Units Needed
(Direct Impact Only)
Not Covered or Inadequately Covered in Gibbs & Hill

(Areas shown as not covered at all for Rangely but were covered for Vernal are asterisked (*))

1. Housing - no strategy was included or, indeed, recognized for shortfall in temporary and permanent housing.

2. Water:

   a. Supply - water rights and effect of White River Dam consumptive use.

   b. Storage - no detail.

   c. Distribution - no detail.

   d. Treatment - assumes 4.32 mgd capacity.

3. Waste Water Treatment - assumes 1.0 mgd and excess capacity.

*4. Solid Waste Collection

5. Solid Waste Disposal

*6. Natural Gas

7. Electricity

8. Telephone

*9. Social Service - youth, adult, drug and alcohol, mental health, family, day care.

*10. Recreational Facilities - urban-type and outdoor.

*11. Transportation (not covered at all)

   a. Impact on Rio Blanco County road system.

   b. Transportation alternatives to WRSP.

   c. Impact on Rangely Streets and Alleys

*12. Planning strategy for new growth, e.g., temporary housing during peak years versus steady state years - how to even out, qualitative growth factors in service units not analyzed.

*13. Air quality impact (DDP) on Colorado, Rio Blanco County, and Rangely.

*14. Rio Blanco County impacts completely ignored -- road system, social system, operations, land use planning and capital needs.

*15. Schools - (cumulative impact analysis not taken into account).

*16. Community College - not mentioned at all.

SURVEY OF EXISTING HOUSING STOCK

AND OTHER STRUCTURES IN THE

TOWN OF RANGELY

Prepared by

Brent R. Snyder
Building Inspector
Town of Rangely

with the assistance of

John D. Pagini
Community Development Director
Town of Rangely

Presented to the Board of Trustees
of the Town or Rangely
February 8, 1982

Field Observations Conducted:
January 23-22, 1982
January 28-29, 1982

SURVEY OF EXISTING HOUSING STOCK
AND OTHER STRUCTURES IN THE
TOWN OF RANGELY

I. INTRODUCTION AND SUMMARY

This report has been prepared in response to the request of the Town Manager that a survey be made of the existing housing stock and other structures that may be found in Rangely. The survey was intended to provide the municipal government of the Town of Rangely with a basis for establishing a program of enforcement of the Town's building and sanitary codes. It was also anticipated that the survey would provide a data base for the solicitation by the Town of housing rehabilitation grants from appropriate state and federal agencies.

We feel that the survey results also demonstrate, however, that one or more "slum or blighted areas," as those terms are defined at Colo. Rev. Stat. §§ 31-25-103(2), (7) (1977 Repl. Vol. 12),[1/] exist within the Town

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1/ The cited statutory sections provide that:

> "'Blighted area' means an area which, by reason of the presence of a substantial number of slum, deteriorated, or deteriorating structures, predominance of defective or inadequate street layout, faulty lot layout in relation to size, adequacy, accessibility, or usefulness, unsanitary or unsafe conditions, deterioration of site or other improvements, unusual topography, defective or unusual conditions of title ren-
> [continued]

of Rangely, and we therefore present these survey results to the Board of Trustees in an effort to inform the Board of Trustees in its determination whether an urban renewal authority should be established in the Town of Rangely.

We stress that the survey results are conservative, being based only on exterior observations. Also,

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> dering the title nonmarketable, or the existence of conditions which endanger life or property by fire and other causes, or any combination of such factors, substantially impairs or arrests the sound growth of the municipality, retards the provision of housing accommodations or constitutes an economic or social liability, and is a menace to the public health, safety, morals, or welfare in its present condition and use.
>
> * * *
>
> "'Slum area' means an area in which there is a predominance of buildings or improvements, whether residential or nonresidential, and which, by reason of dilapidation, deterioration, age or obsolescence, inadequate provision for ventilation, light, air, sanitation, or open spaces, high density of population and overcrowding, or the existence of conditions which endanger life or property by fire or other causes, or any combination of such factors, is conducive to ill health, transmission of disease, infant mortality, juvenile delinquency, or crime and is detrimental to the public health, safety, morals, or welfare.

it must be made clear that the survey results have been determined primarily on the basis of the informed judgment of Brent Snyder, the Town Building Inspector.2/ It is also important to note that although we determined, as a result of our survey, that a significant number of the structures in Rangely are substandard, it is also our belief that many more structures in Rangely could be identified as substandard if a thorough house-to-house survey were conducted and interior plumbing, wiring, heating, and construction features could thereby be evaluated.3/

Nevertheless, the principal conclusion of the survey is that of a total of 801 dwelling units within the Town limits,4/ fully 174 of them, or 21.7%, are clearly

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2/ Mr. Snyder is a certified building inspector; a certified plumbing inspector; a certified electrical inspector; a certified mechanical inspector; a certified plans inspector; and a certified combination inspector. Mr. Snyder is also the recipient of a special certificate of achievement from the International Conference of Building Officials -- he is one of only approximately 20 persons who have been so honored.

3/ For example, on February 5, 1982, an explosion of as-yet-unknown origin destroyed a single family house located in a neighborhood that we had previously deemed to be devoid of substandard units.

4/ There are 475 single family units, 30 duplex units, 229 mobile homes, 60 apartment units, and 7 recreational vehicles used as permanent dwelling units within the Town limits. This total of 801 units does not include the 22-25 motel units that are presently being used as dwelling units by the same persons for indefinite periods of one month or more.

substandard in some respect.5/ Furthermore, the substandard housing units are not segregated into discrete areas within the Town; with a few exceptions, substandard units can be found in almost every neighborhood in Rangely.

In addition to evaluating obvious housing stock, we have also determined that of the 100 motel units that are available for occupancy in Rangely, 22 to 25 of them are continuously occupied by the same individuals for indefinite periods of one month or more. To the best of our knowledge, only five of these 22 to 25 units can be classified as having kitchenettes. Therefore, the 17 to 20 motel units that may not be classified as having kitchenettes and that are occupied by the same persons on an indefinite basis should also be considered to be substandard dwelling units, because they lack basic cooking facilities.

Finally, of the 114 existing structures in Rangely that are not used as dwelling units, we have determined

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5/ The breakdown of substandard housing units is as follows:

Single family	57
Duplex units	4
Mobile homes	85
Apartment units	21
Recreational vehicles	7
TOTAL	174

that at least 14, or 8.1%, are also substandard in some respect (primarily noncompliance with the Flood Plain Ordinance).

II. GENERAL METHODOLOGY OF SURVEY

The survey of existing dwelling units and other structures in Rangely (see attached data sheets, which constitute Exhibit "A") was conducted on January 21, 22, 28 and 29, 1982; the photographs that supplement the survey were all taken on January 21 and 22, 1982.

A number of specific criteria, all of which are detailed below, were relied upon for the determination in every instance that a dwelling unit or other structure is substandard. In this regard, all judgments relating to (1) structural inadequacy, (2) susceptibility of structures or lots to major subsidence or erosion, (3) inadequacy of infrastructure, (4) susceptibility of structures or lots to drainage problems, (5) compliance of structures with applicable housing and building codes, (6) susceptibility of structures to condemnation as nuisances, and (7) the non-cost-effectiveness of rehabilitation of deteriorated structures, are based solely on exterior observation.

Because minute inspection was not made of each structure, and because interior inspection was not made in any instance, all determinations were made on a very conservative basis. If there was any doubt whether a structure was deficient in any regard, it was deemed not to be deficient for the purpose of this survey.

Flood prone structures were classified on the basis of general field observations relative to the 100-year flood plain that has been identified in Rangely by the United States Department of Housing and Urban Development. Structures identified in this survey as deficient with respect to their location within the 100-year flood plain do not include those structures which appeared to us to have been "flood proofed" or to have been elevated so as to be in general compliance with the existing Town of Rangely flood plain ordinance. Flood-prone structures that have been identified in this survey therefore exhibited one, or more, of the following deficiencies:

1. Mobile Homes: (a) not elevated to, or above, level of 100-year flood plain zone; or (b) not tied down to guard against flotation; or (c) apparent that utilities of identified unit not "flood proofed."

2. Single-family/multiplex: (a) same as 1(a) and 1(c) above; or (b) apparent that identified unit has full or half basement.

3. Other structures: (a) not elevated to, or above, level of 100-year flood plain zone, or (b) apparent that identified unit not "flood proofed."

III. SPECIFIC CRITERIA USED IN SURVEY

The criteria described below are the criteria that were used in compiling the data sheets that comprise Exhibit "A" to this report.

A. Structural Inadequacies. Determination of deficiency based on visible foundation or external wall cracking; visible evidence of settling; or "racking" of structure.

B. Code Compliance. Determination of deficiency based on judgments relating to compliance with the Uniform Building Code and local ordinances. Most judgments related to lack of sanitary facilities, or to accumulation of trash and other debris or refuse around existing structures.

C. Cost-Effectiveness of Rehabilitation. Determinations of deficiency made on this basis are extremely conservative, because of subjectivity of judgment involved.

Structures so identified have very serious, obvious structural defects.

D. Condemnation as Nuisances. Determination of deficiency based on definition of "nuisance" in Uniform Building Code. Most observations were based on extreme deterioration, accumulation of junk and debris, and lack of adequate sanitary facilities (e.g., all of the recreational vehicles used as permanent dwelling units are susceptible to condemnation on this basis).

E. Flood Plain. Determination of deficiency explained in detail above.

F. Susceptibility to Major Subsidence or Erosion. Determination of deficiency based on visible evidence of cracking, or "racking"; susceptibility to erosion was also judged on the basis of historical localized drainage problems which have affected buildings. Moreover, where the outfalls of major drainageways were located so as to cause probable erosion to structures, these structures were assumed to be susceptible to subsidence or erosion.

G. Inadequate Infrastructure. No fixed structures could be judged deficient due to lack of sewer, water or fuel facilities. All of the recreational vehicles used as permanent dwelling units were determined to be deficient with respect to this criterion, however.

All other infrastructure inadequacies related to narrowness of roads, or difficult circulation patterns by which dwelling unit or structure was served.

H. Unpaved Roads. Self-explanatory.

I. Inadequate Lots. One or more recreational vehicles used as permanent dwelling units were determined to have poor accessibility to Route 64; several fixed structures that are situated abutting or immediately adjacent to the Route 64 right of way were also judged to be deficient.

J. Inadequacy of Drainage. Determination of deficiency based on same justification for Susceptibility to Erosion, as described above.

IV. BREAKDOWN OF SURVEY RESULTS

A. Total housing stock6/ within town limits:

Single-family units	475
Mobile home units7/	229
Duplex units	30
Apartment units	60
Recreational vehicle units8/	7
TOTAL	801

6/ Based on 1980 census data, Town of Rangely utility billing records, and recent Building & Zoning Permit records.

7/ Includes eight temporary mobile home sitings.

8/ Mostly unlawful sitings.

B. Other surveyed structures:

Hotel units9/	*
Commercial/industrial/governmental/ institutional structures10/	114

C. Dwelling units (and percentage) in need of structural repair, as viewed from the exterior only.

Apartment units	21
Duplex units	4
Single-family units	18
	43
Percentage of total dwelling units	5.4%

D. Number and percentage of dwelling units that are not in compliance with applicable housing or building codes (without regard to the need for structural repair):

Mobile home units	13
Recreational vehicle units	7
Apartment units	14
Duplex units	2
Single-family units	4
	40
Percentage of total dwelling units	5.0%

9/ Units set aside as permanent or semi-permanent dwelling units -- addressed separately in Section I of this report.

10/ I.e., all principal structures not used as dwelling units.

E. Number and percentage of dwelling units and other existing structures that are so deteriorated that rehabilitation thereof would not be cost-effective:

Single-family units	5
Apartment units	21
	26
Percentage of total dwelling units	3.2%
Other structures	2
Percentage of total of all other structures	1.8%
Total dwelling units and other structures	28
Percentage of total of all dwelling units and other structures	3.1%

F. Number and percentage of dwelling units and other structures that are subject to condemnation as nuisances:

Mobile home units	1
Recreational vehicle units	7
Apartment units	21
Single-family units	7
	36
Percentage of total dwelling units	4.5%
Other structures	2
Percentage of total of all other structures	1.8%
Total dwelling units and other structures	37
Percentage of total of all dwelling units and other structures	4.0%

G. Number and percentage of dwelling units and other structures that are not in compliance with the existing Flood Plain Ordinance:

Mobile home units	53
Recreational vehicle units	1
Duplex units	2
Single-family units	29
	85
Percentage of total dwelling units	10.6%
Other structures	12
Percentage of total of all other structures	10.5%
Total dwelling units and other structures	97
Percentage of total of all dwelling units and other structures	10.6%

H. Number and percentage of dwelling units and other existing structures that are on sites where the lot or the improvements thereon are susceptible to major subsidence or erosion problems:

Mobile home units	14
Recreational vehicle units	1
Apartment units	21
Duplex units	2
Single-family units	7
	45
Percentage of total dwelling units	5.6%
Other structures	1
Percentage of total of all other structures	0.9%
Total dwelling units and other structures	46
Percentage of total of all dwelling units and other structures	5.0%

I. Number and percentage of dwelling units and other structures that are served by inadequate street, sewer, water, or heating facilities:

Mobile home units	25
Recreational vehicle units	7
Duplex units	2
Single-family units	10
	44
Percentage of total dwelling units	5.5%
Other structures	0
Percentage of total of all other structures	0%
Total dwelling units and other structures	44
Percentage of total of all dwelling units and other structures	4.8%

J. Number of dwelling units and other existing structures that may not be reached except by use of unpaved roads:

Mobile home units	33
Recreational vehicle units	7
Duplex units	2
Single-family units	10
	52
Percentage of total dwelling units	6.5%
Other structures	0
Percentage of total of all other structures	0%
Total dwelling units and other structures	52
Percentage of total of all dwelling units and other structures	5.7%

K. Number and percentage of dwelling units and other existing structures that are inadequate with respect to size, access to light, or proximity to Highway 64:

Recreational vehicle units	4
Single-family units	3
	7
Percentage of total dwelling units	0.9%
Other structures	0
Percentage of total of all other structures	0%
Total dwelling units and other structures	7
Percentage of total of all dwelling units and other structures	0.8%

L. Number and percentage of dwelling units and other structures that are sited on lots that suffer from chronic problems of inadequate drainage:

Mobile home units	14
Recreational vehicle units	1
Apartment units	14
Single-family units	4
	33
Percentage of total dwelling units	4.1%
Other structures	3
Percentage of total of all other structures	2.6%
Total dwelling units and other structures	36
Percentage of total of all dwelling units and other structures	3.9%

V. COMPILATION OF RESULTS -- HOUSING STOCK

Substandard Units	Raw Number	% of Total
Mobile home units	85	37.1
Recreational vehicle units	7	100.0
Apartment units	21	35.0
Duplex units	4	13.3
Single-family units	57	12.0

Primary Conclusion: Of the 801 permanent dwelling units within the Town of Rangely, 174, or 21.7%, are substandard in some respect that evidence conditions of "blight," as statutorily defined.

Respectfully submitted,

Brent R. Snyder
Town Building Inspector

John D. Pagini
Community Development
Director

Dated: February 8, 1982

ADDENDUM

Other conditions contributing to blight. Reference to Exhibit "A" photographs: Nos. 14, 22, 28, 29, 31, 35A, 36A, 8A, 11A.

During the survey, certain other factors were also identified as contributing to blight, although these factors could not be quantified in terms of the count of dwelling units and other structures. These factors include vacant lots and portions of commercial/industrial lots which are badly littered with refuse and other debris.

Furthermore, one example of extreme physical structural impact also fails to fit into the statistical format that was adopted. We refer to a defective foundation on Lot No. 26, Hillcrest Subdivision. In this instance, the residence has physically shifted off the foundation.

Other Evidence of the Demand for Increased Supply of Safe and Sanitary Housing. Reference to Exhibit "A" photographs: Nos. 9B, 10B, 11B, 12B, 4A, 5A.

The demand for housing in Rangely is so great that some persons have apparently been forced to site recreational vehicles, and other makeshift accommodations, in a random and generally uncontrolled fashion in the vicinity of Rangely, albeit outside of the Town limits. Although some such units may be fully self-contained, it may be determined that a majority of them do not possess even the most basic sanitary facilities. The numbers and types of such units identified during the survey are as follows: (a) 22 recreational vehicles (various types, could accommodate various numbers of persons); and (b) one army tent (may accommodate up to 10-12 persons).

EXHIBIT "A"

Data Sheets for Survey of Existing Housing Stock and Other Structures in the Town of Rangely

Town of Rangely

HOUSING AND POPULATION COUNT

July 31, 1982

A.) Count as of June 26, 1981:

Single-Family	Mobile Homes	Duplex	Apartments	Temporary Housing
460	220	30 (15 Bldg)	60 (10 Bldgs)	0
59.7%	28.6%	3.9%	7.8%	0%

POPULATION: 2,184

B.) Count as of July 31, 1982:

	Single-Family	Mobile Homes	Duplex	Apartments	Temporary Housing
	+30 (new)	+8 (new)	+4 (new)	+6 (new)	+11 (Mobile Homes)
	+ 5 (annx)	+1 (annx)		-15 (demol)	+ 6 (R.V.)
	- 2 (demol)				
	- 1 (fire)				
Balance	+32	+9	+4	- 9	+17
6/26 Tot.	460	220	30	60	0
	492	229	34	51	17
	(61%)	(28.4%)	(4.2%)	(6.3%)	-

GRAND TOTAL: 806 (823 with temp.)

POPULATION:

Vacancies as of 8-28-82: 11 (1.4%)

2.836 persons/household (1980 census)

2.836 x 806= 2,286
2.836 x 823= 2,334 (with temp.)
less 11 vacancies x 2.836= 2,303 (with temp)
2,255 (without temp)

Breakdown of Housing Units Currently Under Construction
September 1, 1982

60 units -	Sagewood West Apartments
20	Sagewood West (single family)
3	Hank Wilson (single family)
3	Lifestyle Homes (single family)
2	Lorain Brady (duplex)
2	Bill Ward (duplex)
4	Neiberger Construction (single family)
2	Tamarron Subdivision (Mark - single family)
24	Senior Citizens (Housing Authority) - attached
1	The Ridges (Caruso) - single family
121 Units	

* * *

Breakdown of Pending Housing Units Currently Under Consideration
September 1, 1982

1 unit -	Neiberger Construction - final plat approval
6	(3 duplexes - Kuck) final plat approval
288	(124 single family; 164 multi family) Western Fuels - final plat approval
64	Townhomes (Redwood Estates) - preliminary sketch plan approval
88	The Ridges - townhomes - Benchmark Homes - pending
60-70	Townhomes - Kirk Hill - pending
658	100 RVs; 252 mobile homes; 144 multi-family; 162 single-family - Titus - pending - schematic only.
12	Tamarron Subdivision - final plat approval
1,187 Units	

Town of Rangely, Colorado

18.1 The Socioeconomics Technical Report and the EIS data for Rangely and Dinosaur came from the Colorado Cumulative Impact Task Force community profiles. This source was identified by the Colorado Department of Local Affairs as its preferred source for accuracy and consistency with other on-going analyses such as the Federal Oil Shale Management Program EIS (BLM 1983). The Colorado State BLM concurred with this source to avoid duplication and limit costs.

18.2 The projections of growth from the proposed projects in the Uintah Basin are forecast to occur primarily within Uintah and Duchesne counties in Utah. The analysis of Uintah and Duchesne counties is more detailed for this reason. See also the response to Comment 18.3.

18.3 When accomplishing impact projection, the Colorado communities were treated exactly as Utah communities and the methodology was applied equally. Community-specific projections can be found in Tables R2A-7, R3A-13, R3A-27, R3A-42, R3A-45, SSA-2, and SSA-4 of the Socioeconomics Technical Report. These projections allow comparison with other communities throughout the technical report. The Colorado area was an area derived for modeling purposes similar to the CCD's in Utah (the Utah CCD's also contained several communities). The "Colorado Area" was used, because it was believed that the impact would be centered in this area, which consisted of the Rangely CCD plus the town of Dinosaur. The 1980 census was used to establish the calibration data for this area; no uncomparability should be created by using such a designation, because allocations between counties and communities were accomplished and can be found in the tables listed above. In all cases, Rangely was given equitable consideration in the impact projection efforts.

18.4 Table R2B-I has been modified in the Final Socioeconomics Technical Report to portray housing data for Rangely and Dinosaur, respectively, based on data submitted with comments received from both communities.

18.5 Dinosaur and Rangely dwelling unit data in Table R2B-I have been separated to show data for each community in the Final Socioeconomics Technical Report. This is based on additional housing information submitted by Rangely and Dinosaur with their comments. The sources of the data are shown on revised Table R2B-I.

18.6 The BLM perceives that cost/revenue analysis of community services is an integral part of mitigation, and, thus, the purview of state and local government. For this reason, such analysis is not part of this EIS nor the accompanying Socioeconomics Technical Report.

The assessment that federal bonus and royalty payments from tracts U-a and U-b would be distributed by the State of Utah to the Ashley Valley rather than Rangely is valid. It is also true that in the absence of an interstate sharing mechanism, Rangely would not share in the royalty payments to the State of Utah from the Paraho and Syntana-Utah projects, which are situated on State of Utah lands.

18.7 Anticipated project life for Syntana-Utah is 30 years and for Paraho, 10 years as shown in Table R-1-1. An Additional Lands Alternative (described in Section P-1.E.4), which would extend the life of the Parho project for 20 additional years, has been added to the Final EIS. The Detailed Development Plan for the White River Shale Project projected a 25-year project life. However, additional oil shale reserves (federal and state) in the region provide a potential for extending the life of these and other proposed oil shale projects, depending upon economic and resource conditions after the year 2000.

18.8 Housing strategy is a mitigation measure that the BLM perceives is within the purview of state and local government. It is assumed that the proposed projects will comply with state and local laws relative to socioeconomic mitigation. While the BLM does not consider itself as the appropriate agency to dictate those measures, BLM encourages the Town of Rangely to initiate discussions with White River, Paraho, and Syntana-Utah on potential housing strategies.

18.9 Baseline projections for Rangely which appear in Table R2A-7, page I-26, were provided by the State of Colorado through the Cumulative Impact Task Force.

18.10 The dwelling unit data furnished in the comment has been incorporated into Table R2B-1 in the final technical report.

18.11 The housing numbers for Rangely have been changed in Table R2B-2 of the Socioeconomics Technical Report to show the existing conventional (single-family units) housing conditions from the Survey of Existing Housing Stock and Other Structures in the Town of Rangely prepared by Brent Snyder, Building Imspector, Town of Rangely, dated February 8, 1982.

18.12 The Rangely Library presently has 12,000 books and about 3,000 square feet of space (a 900-square-foot addition is nearing completion) (Chambers 1982). Table R2B-8 has been amended accordingly.

18.13 The Socioeconomics Technical Report presents summary fiscal data for Rangely and Dinosaur and for Moffat and Rio Blanco counties in Section R2B, Fiscal, Colorado Area, of the Socioeconomics Technical Report. It does not furnish fiscal profiles for the Colorado counties, municipalities,and school districts similar to those presented for Utah.

18.14 Information aboût the Rangely airport has been added to Section R2C of the technical report and Section R-3.A.7 of the EIS.

18.15 Information about the improvements to Colorado Highway 64 has been added to Section R2C of the technical report and Section R-3.A.7 of the EIS.

18.16 Information concerning Colorado Highway 64 (between Dinosaur and Rangely); Colorado Highway 139, the Douglas Pass Road, (between Loma and Rangely); and County Road 21, the Mormon Gap Road (between Colorado Highway 64 and Bonanza, Utah) has been added to the Transportation Data Chart.

18.17 All language referring to local officials has been removed in the Socioeconomics Technical Report, Transportation sections. BLM is unaware of any company policy for any of the applicants' proposed projects that would restrict workers from residing in Rangely or Dinosaur.

18.18 Tables R3A-11 and R3A-13 are not inconsistent; they portray different information. Table R3A-11 shows population and employment impacts by county census division, while Table R3A-13 shows population and household data by community. The number of households for incorporated areas does not exceed that projected for the CCD, as no household projections were completed by CCD. Instead, employment information was provided for each CCD in Table R3A-11.

18.19 Given a 1985 projected baseline population for Rangely/Dinosaur of 3,194, a baseline demand of 49 (rather than 51) is too high, based on the law enforcement standards of two police officers per 1,000 population. However, the low-level scenario impact of two police officers for the increased population of 1,176 is consistent with the law enforcement standard.

18.20 This same rationale as identified in the response to Comment 18.19 (above) would apply to the patrol car projections. The baseline is in error but the impacts are valid based on the standards.

18.21 Table R3A-21 does illustrate the total Colorado impacts. However, Table R3A-27 shows these impacts are allocated to communities in the same manner as Utah communities.

18.22 Table R3A-24 shows employment impacts for Colorado. It is true that only induced employment impacts occur in Colorado and not direct employment impacts. This is due to the fact that employment is measured by place of work and all synfuels development jobs analyzed in this EIS occur within the boundaries of Utah.

18.23 Refer to the response to Comment 18.21.

18.24 Housing impacts for Rangely/Dinosaur are not addressed on page I-194 nor in Table R3B-16 in the technical report. Housing impact data for Rangely/Dinosaur are presented in Table 4-6 in the EIS and, for consistency, have been added to Table R3B-16 in the technical report.

18.25 The baseline demand of 5,273 students for Rangely in 1985 is incorrect, given a baseline population projection of 3,192 for Rangely in 1985. This error has been corrected in Section R3B of the final technical report. However, the high-level scenario impact of 205 students in 1985 is valid, and would translate into a need for 8 additional teachers (205 divided by 25) as shown on Table R3B-18.

18.26 While the baseline demand for hospital beds is inaccurate based on the combined baseline population projections for Rangely and Dinosaur in 1985, the high-level scenario impact of two hospital beds is valid, based on the combined project related population increase of 1,176 for Rangely/Dinosaur (hospital bed standard - 2 beds per 1,000 population). The baseline demand error has been corrected in Section R3B of the final technical report.

18.27 The impacts from individual projects on Rangely and Rio Blanco County are discussed in Section II in Tables SSA-1 through SSA-4. As noted in these tables, none of the individual projects by themselves would create a 10 percent increase in Rangely population over the expected baseline growth. Because of the 10 percent significance criteria used, no further site-specific analysis was done on the community of Rangely.

18.28 Selected data furnished with the comments has been utilized in revising sections pertaining to Rangely in the Socioeconomics Technical Report and EIS. BLM appreciates and encourages the submittal of additional data from any entity involved in review of these documents.

18.29 This statement was also submitted to BLM in the form of a letter. Refer to Letter 15 for responses.

18.30 The analysis procedures and standards utilized in the White River Shale Project EIS differ from those used in the Uintah Basin Synfuels Development EIS. The 203 acres of developed and undeveloped land within the Parks and Recreation District in Rangely is a projection for the year 1993 based on a standard of "65 acres of park land per 1,000 people." This standard was derived by the Colorado Department of Local Affairs. Although the Parks and Recreation District in Rangely currently has 45.5 acres, the projected population increases by the year 1993 would require an addtional 157.5 acres to keep pace with forecasted demand, utilizing the Colorado Department of Local Affairs standard.

18.31 Population baseline and impact projections (Table R-4-4) and Housing Demand baseline and impact projections (Table R-4-6) present data for Rangely and Dinosaur separately. Employment baseline and impact projections (Table R-4-5) combine the Rangely and Dinosaur portions of Rio Blanco and Moffat County under the heading of Colorado Area.

Several of the tables in the Infrastructure section of the Draft Socioeocnomics Technical Report that lumped Rangely/Dinosaur data together, have been split out to present data for each in the final techical report. (See Tables R2B-1, R2B-2, R2B-3, R2B-8, R2B-9, R2B-10, R2B-11).

(1) Baseline population projections were obtained from the State of Colorado Cumulative Impact Task Force data base. Infrastructure data were obtained from city, county, school, hospital, police, and sewer district officals as shown in the footnotes to each table. As discussed in the preceding paragraph, data in several of these tables were revised, refined, or disaggregated between Rangely and Dinosaur based on additional data furnished with comments on the Draft EIS.

(2) While an environmental impact statement cannot be developed over the phone, it is possible to obtain some data and sources of data over the phone, often saving time and money.

(3) See the first paragraph of this response concerning the lumping of Rangely and Dinosaur.

(4) The State of Utah personnel working on the Socioeconomics Technical Report were in Rangely in February and March 1982. The baseline figures were developed from information obtained from the Colorado Cumulative Impact Task Force data base and the various officials listed in (1), above.

18.32 The intent of the Uintah Basin Synfuels Development EIS and its supporting technical reports is to present, to the best of our knowledge, the most up-to-date and factual information for public review and comment. The highest code of ethics, in support of the public interest, is demanded. An unbiased and objective approach for impact analysis is required, while utilizing the latest state-of-the-art scientific methods and procedures. There are no secondary or hidden motives behind this EIS or its supporting technical reports.

18.33 The design capacity of Rangely High School is 380 per the October 12, 1982, letter from Superintendent Young. This would make the present capacity of the Rangely Public Schools 980 rather than 1,100 (Socioeconomics Technical Report Table R2B-3). Using the 1981 enrollment figures (1981 was used for all school analysis) obtained from school officials results in operation at 52 percent of design capacity in 1981, or 48 percent excess capacity rather than 52 percent as shown in the text (Section R-3.A.1). This has been changed. Using the 1982 enrollment figures furnished by Superintendent Young results in operation at 71 percent of design capacity in 1982. This confirms a substantial increase in the 1982 school enrollment for Rangely as a result of the Western Fuels project.

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
UINTAH AND OURAY AGENCY
Fort Duchesne, Utah 84026
(801) 722-2406 Ext. 260

IN REPLY REFER TO:
Land Operation

October 18, 1982

Mr. Lloyd Ferguson, District Manager
Bureau of Land Management
170 South 500 East
Vernal, Utah 84078

Dear Mr. Ferguson:

We have reviewed your Draft Environmental Impact Statement (EIS) on the proposal Uintah Basin Synfuels (Oil Shale and Tar Sand) projects and alternatives dated August, 1982 (1792-UBS, U-910).

General Comments:

19.1 It is the opinion of this agency that this draft does not adequately address the secondary impacts which will result following the partial or overall development of the Uintah Basin. The socioeconomic resources are of main concern to the Ute Tribe followed by air quality, soils, agriculture, vegetation, water quality and wildlife. As you are aware, the topics just mentioned have been of great importance to the Ute Tribe and have yet to be address fully to the satisfication of the Tribe and Agency. The Bureau of Land Management (BLM) commissioned a special project to detail the socioeconomic impacts that may occur to the Uintah and Ouray Reservation because of the proposed development. However, the Ute Tribe is concerned that this document will not be included properly and in supporting context in the final EIS. We strongly suggest that the Ford, Bacon & Davis Utah, Inc. document be included in its entirety within the body of the final EIS.

Specific Comments:

19.2 R-3-1. Regional Affected Environment. Paragraph 1. "the area described for a particular element is referred to as the area of influence, which is the area that would be significantly affected, either directly or indirectly, by the proposed projects". What criteria was utilized to make the determination "area of influence" for these projects? We feel that the entire Ute Indian Reservation will be significantly affected and should be more specifically addressed as to the adverse impacts.

-1-

19.3 R-3-1. Regional Affected Environment. Paragraph 2. It is stated "Energy Development, primarily oil and gas development, has already changed the environment of the Uintah Basin in a significant manner". Is this impact irreversible? What cumulative impact will the synfuels development have on this already significant change in the Uintah Basin?

19.4 R-3-1. High-Level Scenario. Paragraph 2. The communities of Myton, Ballard, Vernal, and Roosevelt are listed in the area of influence, however, there is no mention of the predominantly Indian Community e.g. Fort Duchesne, Whiterocks, Randlett, and Ouray. Is there reason for the oversight as we feel these communites are within the area of influence.

19.5 R-3-1. High-Level Scenario. Paragraph 2. Last sentence. The discussion here establishes that the project utilized a Denver Research Institute Study, identifying 10 percent as a general threshold level. The State of Utah recognized the need for mitigation for projects resulting in a 5 percent growth rate, which constitutes evidence of probable impact. By failing to address this the draft EIS has possibly eliminated areas of probable impact.

19.6 R-3-3. High-Level Scenario. Socioeconomics. Last paragraph. We agree that there are distinct difference between socioeconomic statistics and that methods used to project impacting to non-reservation entities do not reflect actual reservation conditions, situations and needs. Therefore, why weren't research techniques developed that would address conditions, situations and needs for the reservation? We feel the statement "it is not possible to fully quantify baseline data and baseline projections for all aspects of the reservation's socioeconomic environment that would be affected" is true. Contained in same paragraph, last sentence, how can there be discussion on baseline conditions on the reservation where "specific baseline data is unavailable?"

19.7 R-3-3. Population and Employment. Paragraph 5. "To qualify as an enrolled tribal member of the Ute Indian Tribe, a person must have at least 5/8 part, insert Ute here, Indian Blood.

19.8 R-3-5. Baseline Population by Community. Table R-3-2. The UPED model excludes Indian communities. We feel that Indian communities should be listed and address through-out the EIS.

19.9 R-3-9. Baseline Housing Demand by Community. Again, Tribal communities are not included in table.

19.10 R-3-10. Government Services and Facilities, Education. The entire section addresses a very serious existing problem which will only become more intense with the proposed development. We recommend additional study as to the conditions creating this event and what recommended action needs to be taken to correct this condition before it get worse.

-2-

19.11 R-3-12. Government Services and Facilities. Law Enforcement. Paragraph 1. "The area of influence presently requires expansion of existing jail facilities; there is also need for additional police officers, etc." With these increases in service there is also the economic factor to support Law Enforcement. The question is: What mitigation is being offered by the proposed developers to financially support these expansions? The burden should not be imposed on the federal government or tribe?

19.12 R-13-12. Government Services and Facilities. Fire Protection. The statement as presented in regards to Ute Tribe is incorrect. The Bureau of Indian Affairs is responsible for all fire prevention and suppression on the reservation. The Ute Tribe provides equipment which is manned by B.I.A. Employees. By verbal agreement with the towns of Neola, Tridell, Lapoint, Myton and Roosevelt the party nearest a fire will respond regardless of the Indian or Non-Indian status of the property owner, i.e. if an Indian's home was on fire in Neola, the Non-Indian fire department will respond and will provide initial attack until B.I.A.'s units arrive and they will provide support. We feel this area needs additional study.

19.13 R-3-13. Government Services and Facilities, Water. Paragraph 2. It should be stated that Roosevelt purchases culinary water from the Ute Tribe, and experience water shortage problems especially in the summer months.

19.14 R-3-13. Government Finances. There is no mention in this section as to how the Ute Tribe finances its governmental operation. We feel additional study is needed in this area in that the tribe does not assess on income tax or property tax upon its members. The tribal government is financed from income derived from tribal resources. A basic understanding of tribal finances is needed before impacts and mitigation can result.

19.15 R-3-15. Other Sections, Hunting, Fishing, and Nonconsumptive use Expenditures. Paragraph 1, last sentence. The cited Section R-3.A.4, Wildlife is incorrect. That cited Section is Vegetation and Soils. The correct Section is R-3.A.5, Wildlife.

19.16 R-3-16. Quality of Life, General Comment. It is our viewpoint that the majority residents of the Ute Indian Reservation would not be in favor of large industrial sites in close proximity to their reservation for several reasons. These include, but are not limited to, air quality, agriculture, hunting and fishing recreation, changes by man to the earth and education of the Indian people.

19.17 R-3-23. Water Resources, Surface Water. This section does not provide sufficient water chemistry data in which to assess environmental impact. The total Dissolved Solids and Suspended Solids will be increased due to construction activity. Measures to limit and protect the rivers from

19.17 (cont) run off by the activity need to be addressed in much greater detail. Soil Conservation Service is sponsoring a 20 million (+) dollar project to reduce salinity in the Colorado River Drainage.

19.18 R-3-25. Ground Water. Paragraph 2. It is stated "there is approximately 300,000 ac-ft/yr. of potential ground water supplies available for use in the Basin". Does this statement imply that the project will require any or all of this water?

19.19 R-3-27. Vegetation Types, Riparian. "The riparian type of vegetation occupies approximately 6,150 acres, which is less than 1 percent of the area of impact". What protection is being taken to protect all riparian areas? What mitigation is offered if any of the riparian habitat is impacted?

19.20 R-3-32. Threatened and Endangered Species. Paragraph 2. The Statement "Category 1 and Category 2 plant species that have been located in the region, and could be affected by the applicant's proposed project" should provide more detail. What has resulted from Section 7 consultation with the U.S. Fish & Wildlife Service? What recommendations to remove and reestablish these species have been offered, if any?

19.21 R-3-33. Soils. Paragraph 2. Your statement "Revegetation is difficult for most of the soils in the region...." What impact will this offer to the overall reclamation program?

19.22 R-3-34. Wildlife; Habitat Types. This entire section was addressed quite well, however, it did not address fully the impact the Synfuels development will have on wildlife populations and habitat. Moreover, it discussed only consumptive species and loss of habitat.

19.23 R-3-42. Threatened or Endangered Species. The section should address procedures taken in regards to Section 7 consultation as required by the Endangered Species Act. What impact on nesting, feeding and resting areas will be Synfuels Development have on these species? This area will need to be studied further.

19.24 R-3-44. Transportation Networks. It should be mentioned that the Uintah and Ouray Reservation will have to be considered as far as right-of-ways, road improvement, maintenance and expansion of rights-of-way are concerned prior to crossing reservation lands.

19.25 R-3-46. Recreation. Paragraph 3. The statement "Due to lack of information, baseline projections on recreation within the Uintah and Ouray Indian Reservation cannot be made". We feel that the impact of recreation from the projected increases in populations in the area of influence needs further study to adequately address this issue.

19.26 R-3-49. Visitor Use Data. This section could be addressed with further study.

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19.27 R-4-2. Impact Significance Criteria/Socioeconomics. Paragraph 2. This paragraph justifies the need to include, "A Socioeconomic Assessment of Uintah Basin Synfuels Development on the Uintah and Ouray Reservation: by Ford, Bacon & Davis Utah Inc., October 1982 in complete form within the body of the final Environmental Impact Statement. We strongly recommend that this assessment become, in full context, part of the final EIS.

19.28 R-4-65. High-Level Scenario-Wildlife. This section attempts to justify the loss of habitat, reduction in wildlife populations, loss of winter range, movement of animals into adjacent areas with below carrying capacity numbers, increased poaching activities, reduction in income to the region, harassment on animals already in a stress situation, mortiality to small burrowing rodents is okay because natural population turnover occurs rapidly, reducation of ring-necked pheasant, loss of nesting habitat for morning doves, sage grouse populations receiving harassment from project personnel watching or trying to take pictures of strutting grounds. Due to the fact that all the above cited areas will be impacted, what mitigation does the synfuels development offer to compensate for these losses? Moreover, the indirect impact the Uintah and Ouray Reservation will inherit from illegal activities has not been addressed or mitigation offered. The tribe will have to hire more law enforcement people (rangers, too) and equipment to handle this secondary impact. Where will the funds be derived from to manage the results of economic development by synfuels development? This issue is of great concern to both the Ute Tribe and B.I.A.

19.29 R-4-69. High-Level Scenario-Wildlife, Reptiles and Amphibians. There appears to be much speculation here without any specific research or studies backing the statements. We would suggest before you automatically write off populations of unknown species and population densities that you first find out exactly what species are there and their numbers. To suggest the unknown populations would quickly be replaced has to be substantiated. Moreover, without scientific data, how can you speculate by saying "no significant impacts to these species are anticipated".

19.30 R-4-69. High-Level Scenario-Nonconsumptive Uses. The Ute Tribe is not mentioned through-out the High-Level Scenario-Wildlife portion in this section as well as other sections under the heading. The second paragraph discusses poaching and it's "adverse impact on a $20 million a year re-newable resources". Who plans on reimbursing the Uintah Basin Communities for this loss in revenue?

19.31 R-4-70. High-Level Scenario-Wildlife - Threatened or Endangered Species. Paragraph 1. Because of the significence of loss of the black-footed ferrets due to destruction of their food source and habitat, we strongly suggest further study of the prairie dog colonies for signs of black-footed ferrets prior to destroying this habitat.

Conclusion:

19.32 We are extremely concerned that since the Ute Indian Tribe is not afforded the protection of Law under S.B. 170, and that proposed development is not on reservation lands, they will not receive compensation for secondary adverse impacts from Synfuels Development. Until a means for compensation is developed the Bureau of Indian Affairs must support the no action alternative.

The opportunity to comment of this draft EIS is appreciated. If Bureau comments need clarification, please contact Mr. Dennis Montgomery, Acting Land Operation Officer, who is assigned the responsibility of coordinating the Bureau efforts in this matter.

Sincerely yours,

Henry J. Cuch
Acting Superintendent

U.S. Bureau of Indian Affairs, Uintah and Ouray Agency

19.1 The Ford, Bacon, and Davis study has been included in the Socioeconomics Technical Report. Information from this report has also been included in summary form in pertinent sections of the Final EIS.

19.2 The area of influence for a particular element encompasses the area to which impacts of the proposed projects can be traced. The determination was made by the principal author or contractor for that element, based on generally accepted standards or the author's professional expertise. (Refer to the List of Preparers for names of authors and contractors.)

An additional study of impacts to Native Americans has been completed (refer to the response to Comment 19.1). The EIS discussion of impacts to the reservation has been expanded based on the information provided by the study.

19.3 The socioeconomic impact of oil and gas development is primarily related to population and would vary as oil and gas development induced population varies; therefore, this impact is not irreversible. Other resource impacts, such as effects on vegetation, visual resources, and air quality, would have both reversible and irreversible impacts; those changes that have already occurred are probably irreversible.

The cumulative impacts of the nine applicants' projects on baseline conditions (described in Chapter R-3) are discussed in Chapter R-5 and summarized in Chapter R-2.

19.4 The Uintah and Ouray Indian Reservation is definitely in the area of influence; projections of impact were developed by the UPED and SAM models for the Roosevelt and Uintah-Ouray County Census Divisions, which encompass the majority of the reservation, including the communities of Fort Duchesne, Whiterocks, Randlett, and Ouray. However, no community-specific allocations of these projections were completed for these communities, because no economic and demographic information was readily available from which to do so. Census demographic information used for the calibration of the UPED model is available only for incorporated communities. The supplemental Indian study, which is included in the Final Socioeconomics Technical Report and summarized in the Final EIS, addresses reservation-specific projections more completely.

19.5 The 10 percent criterion is based on a standard generally accepted within the professional socioeconomic community (for example, the Denver Research Institute (Gilmore and Duff 1975)). This figure represents a general threshold where a government's ability to meet increased service demand breaks down. Even so, much of the Final EIS data gives growth figures well below the 10 percent threshold to enable possible impacts to be assessed. All areas, regardless of the level of impact, are included in this study. The 5 percent threshold figure used by the State of Utah is for its mitigation purposes. Mitigation measures will need to be addressed by each synfuel company.

19.6 Based on the results of the Ford, Bacon, and Davis study, Section R2D of the Socioeconomics Technical Report and the Native American sections in the Final EIS have been expanded. Wherever possible, baseline information is quantified; it is qualified where specific data is unavailable.

19.7 Section R-3.A.1 has been revised to clarify Ute Indian blood is required.

19.8 The Final Socioeconomics Technical Report, Section R2D, Indians, explains how the UPED model was used to obtain data for the Final EIS, in which the Indian communities are addressed more thoroughly.

19.9 Housing demand data for the reservation is included in the figures of Table R-3-3. For explanation, see the response to Comment 2D.59. For disaggregation of these data, please see the appropriate site-specific sections 4.A.I, Section R-4.A.1, Housing, or the Socioeconomics Technical Report, Section R2D.

19.10 As indicated by the comment, the pre-existing conditions are addressed in Section R-3.A.1. CEQ regulations do not require analysis of the creation or correction of these pre-existing conditions. However, the effects of the proposed projects on these pre-existing (baseline) conditions are discussed in the EIS. Impacts are outlined Section R-4.A.1 and detailed in the SocioeconomicsTechnical Report, Section R-3. Uncommitted mitigation measures, which are the prerogative of the individual company or an authorizing agency, are suggested in Appendix A-7.

19.11 Uncommitted mitigation measures pertinent to the Ute tribe are found in Appendix A-7. The Governor of Utah is on record as supporting the intent of SB170, related to the Ute tribe. As noted in the EIS Summary (Unresolved Issues, Socioeconomics), mitigation may be negotiated between the tribe and project developer, but are considered an unresolved issue. Also, Federal agencies cannot require socioeconomic mitigation; that is the purview of state and local government.

19.12 The information provided was used to revise Sections R-3.A.1 and R-4.A.1 concerning fire protection on the reservation. BLM greatly appreciates the help provided by Dennis Montgomery in revising these sections.

19.13 Sections R-3.A.1 and R-4.A.1 have been revised to clarify that Roosevelt purchases water from the Ute Tribe and that the State of Utah has awarded Roosevelt $4 million to develop its own water sources. (Wells are now being drilled).

19.14 Section R-3.A.1 (Tribal Jurisdiction and Finance) has been revised to clarify this point.

19.15 The incorrect cross reference in Section R-3.A.1 has been corrected.

19.16 The magnitude of the impacts to the reservation are addressed in various parts of the EIS and in Chapter R2D, Indians, of the Socioeconomics Technical Report. These concerns will be considered by the decision maker.

The tribe is doing a study on this issue now. Unfortunately, the data will not be available this year.

19.17 Total dissolved solids (salinity) and suspended solids (sediment) are expected to be increased slightly due to construction. However, as discussed in Section R-4.A.4, compliance with the applicants' reclamation plans is expected to keep this impact short-term and insignificant. Similarly, some soil materials would be loosened due to construction in floodplains and potentially would add to the sediment supply. Compliance with the reclamation plans is also expected to keep the impact short-term and insignificant.

19.18 This section describes the environment in which the proposed actions would occur. The statement in question was not meant to imply any or all of this water would be required.

19.19 Riparian areas disturbed by project activities are expected to be successfully revegetated with implementation of the intensive reclamation program outlined in Appendix A-8. These areas are usually the more favorable areas for revegetation due to more favorable soil conditions and the additional moisture they receive due to position on the landscape (refer to revegetation discussion in Section R-3.A.4).

19.20 Section 7 Consultation has been initiated with the U.S. Fish and Wildlife Service. Their Biological Opinion has been included in Appendix A-9 of the Final EIS. It was not available to print in the Draft EIS.

19.21 To achieve successful erosion control and reclamation on lands disturbed by project activities in the Uintah Basin (an area subject to unfavorable climate and soil conditions) could require an intensive reclamation program with implementation of applicable, effective measures and a strong compliance program. Refer to Appendix A-8.

19.22 Nongame species are discussed in Section R-3.A.5.

19.23 Refer to the response to Comment 19.20.

19.24 A statement that the Uintah and Ouray Reservation should be considered regarding rights-of-way has been added to Section R-3.A.7.

19.25 No information regarding recreation visitor days is provided, because no data are available. However, baseline data and impact analysis are incorporated where possible. For example, Section R-3.A.8 identifies 2,703 fishing permits at the Bottle Hollow Reservoir, 90 campsite units at the Bottle Hollow Resort, and the Ute Indian Tribe Wilderness Area of the Hill Creek Extension.

Regional and site-specific recreation impact analysis on Ute Indian lands also are addressed based on available data. For example, Section R-4.A.8 discusses access, camping, and wilderness impacts on tribal land. Section M-4.A.8 analyzes Magic Circle product pipeline impacts on the Bottle Hollow Resort and Section T-4.A.8 discusses controlling ORV use and hunting impacts on tribal lands due to the Tosco project.

19.26 Additional visitor use data was analyzed and is in the project files. The information presented in the EIS was felt to be the data needed to understand cumulative environmental consequences of the nine projects.

19.27 Refer to the response to Comment 19.1

19.28 Indirect impacts to wildlife in the area of influence (which includes the Uintah and Ouray Reservation) are discussed in Section R-4.A.5. The discussion indicates that increases in poaching and other illegal activities would increase in all portions of the region at the same rate, including reservation lands. BLM has no authority to require any mitigation on state, private, or Indian lands.

The statement that more law enforcement people and rangers would have to be hired is correct. At the present time, there are no provisions for funds or other mitigative measures to assist in solving these problems.

19.29 Reptile and amphibian species lists for the area are available from the Utah Division of Wildlife Resources and were used to prepare this section. To our best knowledge, no research data presently are available to give density estimates. Since the 36,911 acres of herpetological habitat that would be disturbed by the various projects make up about 2 percent of the total habitat in Uintah County, a straight-line projection would indicate that significant impacts to indigenous populations of reptiles and amphibians are not anticipated.

19.30 The Uintah and Ouray Indian Reservation is included in the baseline conditions discussed in Section R-3.A.1. Since the reservation is included in baseline calculations in the Socioeconomic section, other sections that use this baseline data do not specifically break out the reservation.

BLM is not aware of any plans to reimburse the reservation or the county for their portions of the estimated $4 million a year loss to Uintah County caused by anticipated impacts to wildlife. Further, BLM has no knowledge of any program to reimburse any entity for these types of losses.

19.31 Section 7 consultation procedures described in the Fish and Wildlife Service's Biological Opinion (Appendix A-9) provide for this.

19.32 The views expressed will be considered in the decision-making process.

COMMENT LETTER 20

Uintah and Ouray Agency
Ute Indian Tribe
P.O. Box 190
Fort Duchesne, Utah 84026
(801) 722-5141

October 18, 1982

Mr. Lloyd Ferguson, District Manager
Bureau of Land Management
170 South 500 East
Vernal, Utah 84078

Dear Lloyd:

Please find attached the response of the Ute Indian Tribe on the Uintah and
Ouray Reservation concerning the draft Environmental Impact Statement prepared
for development of the Uintah Basin Synfuel Resources. We wish to compliment
the BLM for the preparation of the Air Quality section of the DEIS. We cannot
20.1 hold the same compliment for the socioeconomic section as it does not adequately
address those impacts that will befall the Tribe and the reservation. Without
the inclusion into the body of the Draft EIS of the additional socioeconomic
study being prepared by Ford, Bacon and Davis Utah, Inc., we do not have a
working decision-making document to use in planning a management strategy for
the impending development of synthetic fuel resources in the Uintah Basin,
as is required by the National Environmental Policy Act.

We, therefore, must go on record as being in opposition to any acceptance of
the Uintah Basin Synfuels Draft Environmental Impact Statement until such time
20.2 as this statement is corrected to accurately identify the impacts that may
and will affect the Ute Indian Tribe on the Uintah and Ouray Reservation.

Respectfully,

Floyd Wopsock

FLOYD WOPSOCK, Chairman
Business Committee

SUMMARY

The Draft Uintah Basin Synfuels Development Environmental Impact Statement (EIS) was reviewed. Although some significant issues of concern are identified by the Ute Tribe, the Bureauof Land Management (BLM) has made progress in recognizing the impact of synfuels development on the Uintah and Ouray Indian Reservation. The Draft EIS indicates that tribal environmental and socioeconomic resources can be impacted by the proposed development. Given that the use of regional data and regional analyses could overshadow and ignore local impacts, the tribe feels that some of the localized impacts to the reservation from the proposed development could be understated in the document.

Information on air quality, soils, vegetation, and, to a lesser degree, wildlife
will be very useful to the tribe in making decisions about our future. However,
20.3 information on important water quality, water quantity, and socioeconomic areas
is not of sufficient quality to make such decisions. The issues on water quantity,
water quality and socioeconomics have been made previously for the Preliminary
Draft EIS, and are still unresolved.

The Ute Tribe acknowledges that the BLM has commissioned a special contract to correctly address socioeconomic concerns and impacts of synfuel development pertaining to the Ute Indian Tribe and the Uintah and Ouray Reservation. However, due to the lateness by BLM in providing this study, the Ute Tribe is concerned about the ability to incorporate this new data into the proper places within the Uintah Basin Synfuels Development Final Environmental Impact Statement. Response to comments on the draft EIS placed in the final EIS does not comply with the requirements of NEPA in addressing environmental conditions of an area.

The tribe would like to particularly acknowledge the efforts of the BLM to address the tribe's air quality concerns. The process used by the BLM in resolving air quality issues should have been used for the other issues of concern.

These comments are offered by the Ute Tribe on the Draft EIS in the continuing spirit of cooperation and in a furthering effort to produce a document which provides quality, useable information to decision makers.

AIR QUALITY

General Comments:

The air quality components of the Draft EIS for the Uintah Basin Synfuels Development were reviewed. Pursuant to earlier comments made by the tribe, the document attempted to address most of the issues raised by the tribe. The dispersion methodology used seems to be adequate, appropriately subscribing to sound scientific principles. The tribe commends the BLM for the open and responsive approach taken in addressing the tribe's air quality concerns. The following comments are made in order to resolve the remaining issues in the Draft EIS.

20.4 The regional analysis performed is adequately performed, but may understate maximum worst-case local impacts. Regional scale air quality analysis can only be used in the general sense in making decisions concerning the cumulative air quality "carry capacity" of proposed development. This is particularly true in areas where the terrain is complex. Accordingly, the general regional approach used in the EIS is not compatible with the existing regulatory decision process used by the EPA and state agencies in permitting air pollution sources. Recent data would indicate that the regional modeling approach used may not be as conservative as those more local scale models used by the regulatory agencies for PSD permits.

20.5 The use of a short-term meteorological record taken from the White River Oil Shale Project site may not reflect the worst-case meteorological conditions that could be expected at sites located in different terrain. Again, regulatory agencies usually require the collection and use of site-specific meteorological data in the modeling approach used by permit applicants.

Therefore, the results of this regional analysis, using generalized short-term data, may not necessarily coincide with the results of analyses required by permitting agencies who ultimately make key air quality decisions. The tribe recommends that this issue be more directly discussed in the Final EIS.

Specific Comments:

	PAGE	PARA	COMMENT
20.6	R-1-14	R.1.C	The low scenario for development may not reflect realistic air quality impacts associated with a lower bound estimate of development in the area. An across-the-board decrease of emissions may underestimate the actual emissions inherent in a total basin-wide production of 248,000 bpsd scenario.
20.7	R-3-1	2	The statement that "Energy Development, primarily oil and gas development, has already changed the environment of the Uintah Basin in a significant manner" needs to be quantified. Does this statement apply to air quality?

AIR QUALITY
(continued)

	PAGE	PARA	COMMENT
20.8	R-3-17	R-3.A.2	The use of 1978 and 1979 upper wind data needs to be correlated with long-term climatological data to determine the representativeness of the data. Of particular interest is the question of whether this data represents a typical or worst-case year (This comment also applies to other short-term data records used in the air quality analysis).
20.9	R-4-25	R-4.A.2	An explanation of the rationale for the elimination of the Arches National Park Class I PSD Area as an area of interest is needed. Many of the projects in the Uintah Basin are closer to Arches than to the Flat Tops Wilderness Area.
20.10	R-4-27	Table R-4.7	An explanation on how the air pollution concentrations at the various locations were derived would be helpful.
20.11	R-4-125	Table R-4.40	The units for Table R-4-40 need to be included.

Specific Comments on Draft Air Quality Report:

	PAGE	PARA	COMMENT
20.12	4-60	2	The use of the COMPLEX Model for calculating SO_2 concentrations needs to be clarified.
20.13	4-61	2	An explanation of what GPM modeling results (regional or subregional) were used in the tables and figures is needed. Also, are the results of the GPM subregional analysis different from the regional analysis?
20.14	4-65	4.2.1.3.1	The calculated worst day(s) for the regional GPM model are in the summer. Intuitively, one would expect worst-case meteorological events to occur in winter. A winter worst-case RTM analysis addressing Class II impacts would be helpful. Of particular interest would be the air quality impact to the areas east of the oil shale development in the Uintah Basin.
20.15	5-8	P	The applicant's PSD modeling results for the Moon Lake #2 and White River oil shale projects should be included for comparison purposes.
20.16	5-103	Table 5-2	The maximum Class II SO_2 impact in the third row of data seems to be less than that identified for the Uintah and Ouray Indian Reservation. This needs to be explained.

WATER QUALITY

General Comments:

20.17 The Draft EIS does not provide adequate surface water data or criteria upon which an assessment of potential environmental impacts can be made, particularly in the area of development. Minimal information is presented with respect to groundwater systems and, thus, no conclusion with regard to potential impacts can be made. The only water quality parameter presented is salinity, which cannot be used as the sole basis for determining or quantifying impacts.

20.18 No information is presented on the water model used. Stream segments are not identified, nor their representative importance with respect to the study area discussed. An arbitrary baseline water condition is generated and unsupported.

20.19 Numerous unsupported and subjective statement are made throughout the document. Supportive data should be presented.

20.20 The evaluation of water impacts as presented does not consider periods of low-flow (worst-case conditions), nor is it clear that the interrelationships of the White and Duchesne Rivers with Green River were fully considered.

Specific Comments:

	PAGE	PARA	COMMENT
20.21	xxxi	Preface	The statement that "under the high-level scenario, water would be utilized at a rate of about 36,000 ac-ft/yr from the White River and about 32,000 ac-ft/yr from the Green River" is misleading. The above values represent the maximum quantities of water that could be withdrawn from the respective rivers, either as a primary or alternate source, and does not represent the actual water demand for the nine proposed projects totaling 40,870 ac-ft/yr (35,900 ac-ft/yr from the White River and 4,970 ac-ft/yr from the Green River, table R-1-8).
20.22			The reported average salinity increase of 5 mg/l ($2.36 million per year in damages, assuming constant 1982 dollars, pg R-4-54) at Imperial Dam for the years 1983 to 2000 indicates the proposed developments, plus baseline changes, plus interrelated projects will have an impact outside the area of development. Is this an acceptable impact?

WATER QUALITY
(continued)

	PAGE	PARA	COMMENT
20.22 (cont)			Regardless of the projected salinity change at Imperial Dam, the question of potential water quality impact in and surrounding the area of development remains. Are the salinity levels as projected for the White and Green Rivers (table R-4-18) representative of the area of development and are such changes acceptable from a water use standpoint? It is suggested that the Utah Water Quality Standards, Wastewater Disposal Regulations, Utah State Division of Health, Part II, be used as a measure of impacts and/or constraints to water use due to the proposed development. Additionally, water quality criteria developed by the U.S. Environmental Protectioin Agency—specifically Water Quality Criteria, 1972, EPA-R3-73-033, March 1973, and Quality Criteria for Water, 1976, could be used as a measure of the suitability of the water for designated or potential uses.
20.23	R-1-15	Table R-1-8	Note C indicates water is withdrawn from the Green River for the White River Shale Project. Is this correct?
20.24	R-2-3	Table 12-2-1	Groundwater requirements of 3,800 ac-ft/yr (as indicated in table R-1-8) should be included under cumulative impact.
20.25	R-4-7	Water Resources	It is stated that a 10% flow decrease for any individual stream would be significant based upon experiences of critical flow decreases, but there is no indication that the impact of water withdrawal during low-flow (worst-case) conditions were evaluated. During low-flow water years, such as 1977 when total annual flow in the White River at mouth measured 403,700 ac-ft, the respective project and cumulative flow reductions would be 8.9% and 25.5%. The average White River flow of 479,600 ac-ft/yr (table R-3-8) would be reduced only 7.5% (35,900 ac-ft/yr, table R-1-8) due to proposed project development, but would be reduced 21.5% (103,000 ac-ft/yr, table R-1-8) due to cumulative development. Would a 21.5% reduction in flow be considered significant?
20.26	R-4-7	Water Resources	It is stated that "significant impacts also were considered to result if salinity would be increased". Table R-4-18, pg R-4-52 show sizeable increases in salinity in the White River and Green River due to both baseline increases and projected development. Are significant impacts thus projected to occur?

WATER QUALITY
(continued)

	PAGE	PARA	COMMENT
20.26 (cont)			Salinity increases and, thus, significant impacts are also projected at Imperial Dam.
20.27	R-4-45	R-4.A.3 Water Resources	The Green River and White River reaches used in the Colorado River Simulation Computer Model, or as modified for this evaluation, should be shown graphically or at least described. Up to the modeling effort it appears that flow and salinity data for the Green River at Green River and the White River at mouth (near Ouray) are used to represent conditions in the project area. For modeling purposes it appears that while the White River at mouth is still used, the representative site for the Green River has been shifted to the confluence with the Colorado River. The Green River at the confluence with the Colorado River is not representative of water quality or quantity in the proposed project area.
20.28	R-4-45 R-4-48	R-4.A.3 Water Resources & Table R-4-16	The 1983 baseflow conditions for the White River and the Green River are significantly higher than the flow data presented in Table R-3-8. If the flow data for the Green River reflects baseline conditions as measured at the confluence with the Colorado River it is <u>not</u> representative of the project area. The changes in baseline conditions with time for both the White River and Green River in table R-4-16 are not consistent with the project baseline depletions in table R-4-17. No data is presented to support the 1983 baseline salinity values shown in table R-4-18. What is the source of the baseline salinity (TDS) values?
20.29	R-4-46	Maximum White River Development	It is stated that current depletions on the White River are 37,000 ac-ft/yr. <u>USGS Water Resource Data for Utah</u> (1977) states that there are diversions for irrigation of about 37,800 acres above the station (09306900). Allowing a minimum of 3 feet of water per acre per year would imply a current depletion of about 113,000 ac-ft/yr from the White River. Has there been a significant reduction in the quantity of land irrigated with water from the White River?

VEGETATION, SOILS AND RECLAMATION

General Comments:

Vegetation, soils and reclamation issues are generally satisfactorily identified in the DEIS. Most of the previous comments made by the tribe in the Preliminary Draft EIS were addressed. The following specific comments for the remaining unresolved aspects of the DEIS are offered.

Specific Comments:

	PAGE	PARA	COMMENT
20.30	R-3-27	1	The vegetation types should be depicted on a map to show location of each and extent.
20.31	R-3-27	4	The land use for each vegetation type should be discussed.
20.32	R-3-33	2	The source of information used to group the soils is not referenced. The soils should be delineated and classified in accordance with a conventional classification system.
20.33	R-3-34	4	The "detailed soil surveys" mentioned here should have been used to describe the soils in the DEIS.
20.34	R-3-43	—	The cash value of crops and livestock should be presented.
20.35	R-4-58	4	Reclamation of disturbed land is assumed to be successful upon "implementation of erosion control and reclamation programs," compliance with—reclamation plan—," and "compliance with—requirements and stipulations—." The enforcement mechanism for the aforementioned should be discussed. It should include inspections, reclamation performance bond, and penalties.
20.36	R-4-73	3	Cash value of the crops should be presented.
20.37	R-J-1	4	The assumptions presented here regarding successful reclamation are based on a compliance program. The enforcement procedures in the event of noncompliance situations were not addressed. Enforcement measures should include inspections, reclamation, performance bond, and penalties.
20.38	R-J-4	1	Replace the word "would" in the sentence "The following—applicant and landowner" with the word "may".
20.39	R-J-4	1	The statement is made that "The compliance program would be conducted by the authorizing agencies and landowners for their lands." What is the mechanism by which the authorizing agencies and landowners can deal with operators who violate

20.39 (cont) the compliance program? A method of deterring and providing for assessment of penalties for violators should be discussed.

WILDLIFE RESOURCES

General Comments:

Wildlife resource evaluations made in the DEIS are adequate for regional impact assessment. However, information presented may be too general to fully evaluate the potential site specific impacts of the proposed projects. Specific inadequacies include:

20.40

- The adjacent Uintah and Ouray Reservation wildlife resources should be given specific mention since they will be impacted from the proposed projects.
- References to the effect that "impacts will be insignificant due to the ratio of impacted lands to the total region" should not be made. Site-specific impacts could be significant on the Uintah and Ouray Reservation.
- Corridors within the Uintah and Ouray Reservation need to be fully assessed before adequate determination of impacts can be made.
- Mitigation for Uintah and Ouray Reservation wildlife resources needs to be addressed, including financial aid for wildlife management and enforcement.

Specific Comments:

	PAGE	PARA	COMMENT
20.41	R-3-36	6	The small flowing streams and intermittent small tributaries may not support any fish but would still be important to other wildlife.
20.42	R-3-37	6	This sentence makes no reference to the Uintah and Ouray Reservation, which depends heavily on the revenues derived from their recreation programs to manage the Ute Tribal Fish and Wildlife Department (fishing, camping, and small-game hunting). Section R-3, A-1 does not discuss the importance of the monetary value of the wildlife resources to the Uintah and Ouray Reservation. Proposed population increases will probably cause the Ute Tribal Business Committee to close and/or restrict camping, fishing, and small-game hunting to non-members of the Ute Indian Tribe.
20.43	R-4-62	6	The statement "Therefore, project disturbance would not cause significant adverse impacts to deer habitat" should not be made until site-specific studies (particularly adjacent to proposed project areas) have been made. Any impacts to a key wintering area could be significant particularly if deer numbers and habitat are already limited within site-specific areas. Site-specific studies will be necessary in order to determine impact mitigation measures to protect the big game resources of the Uintah and Ouray Reservation.

	PAGE	PARA	COMMENT
20.44	R-4-63	Table	The numbers 359 and 1,335 under the column "Limited Value Year-long" should be placed across from the "Deer" instead of the "Elk" row.
20.45	R-4-65	1	Same as the comment on page R-4-62, paragraph 6, except for antelope.
	R-4-65	2	Same as above except for elk.
20.46	R-4-65	3	Site- or corridor-specific impacts could be significant.
	R-4-67	2	Same as above.
	R-4-67	3	Same as above.
20.47	R-4-69	5	"Non-game fish" referenced in this paragraph should be accompaned with a non-game fish species list.
20.48	M-3-3	3	The ring-neck pheasant is reported as common near Randlett, which is located along the proposed product pipeline.
20.49	M-3-3	3	Sage grouse habitat within the Uintah and Ouray Reservation need to be fully assessed before impacts of the product pipeline can be determined.
	M-3-3	3	Same as above except for chukars.
20.50	M-4-14	6	Impacta to the reservation'a wildlife resources could be significant.

SOCIOECONOMICS

General Comments:

20.51 The assessment of regional and project-specific socioeconomic effects has been conducted rigorously and in accordance with generally accepted "state-of-practice" methods for the counties and communities within the Uintah Basin. While there are some methodological and conceptual problems associated with these assessments (e.g., the study uses a 10 percent growth criterion of impact in contrast to the State of Utah's requirement that 5 percent growth constitutes evidence of probable impact), a rigorously quantitative investigation was conducted of the levels of growth from synfuel development and the effects of this growth on the economies and infrastructures of the counties and communities in the Basin.

Unfortunately, no such comparable investigation was conducted for the largest identifiable entity in the Uintah Basin: the Uintah-Ouray Reservation. First, the reservation—in contrast to the analysis of air quality issues in the draft EIS—was not treated as a separate comprehensive entity for socioeconomic impact assessment purposes. Secondly, as demonstrated by the specific comments and observations which follow, no quantification of either the levels of growth or the effects of prospective growth on the reservation and its government has been provided. Instead, broad generalized comments are offered that lack both statistical and data foundations and exist in marked contrast to both the analyses done for other jurisdictions and commonly accepted "state-of-practice" procedures for socioeconomic investigation. Without question, the failure of this document to treat comprehensively the Uintah-Ouray Reservation as an entity that may be impacted by regional synfuels development and to attempt to quantify the socioeconomic effects in a manner even reasonably consistent with the levels of analyses presented for other, smaller entities undermines the intent of the NEPA.

20.52 The Ute Tribe has worked throughout the EIS process with the authors of the socioeconomic study. They have devoted, freely and willingly, their time and the data in their possession to and in making possible the best possible assessment of impacts on their reservation. These efforts are extensively documented. Unfortunately, the efforts extended by the Ute Tribe are not reflected in the assessment performed of socioeconomic impacts on the reservation.

20.53 Given the substantial failures of the socioeconomics sections to address reasonably the impacts on the reservation, it may require a full year to bring the assessment of socioeconomic impacts on the reservation up to acceptable standards comparable to those used in assessing other jurisdictions. It is strongly suggested that this process begin immediately.

Specific Comments:

	PAGE	PARA	COMMENT
20.54	xxxiii	1	Three unresolved aspects of the socioeconomic portion of the EIS are mentioned. The second is a description of the

20.54 (cont)

unresolved issues from the standpoint of the Ute Tribe. This description is incomplete and should include the following:

- The need for a complete consideration of the impacts on the entire reservation in which the reservation is treated as a separate and sovereign entity;
- An enumeration of services and facilities offered and used by the tribe;
- A description of the population growth—both Indian and non-Indian—on the reservation;
- Distribution of this growth within the reservation including incorporated and unincorporated communities (Roosevelt, Ft. Duchesne) and other geographic areas;
- A complete description of how this is done;
- Inclusion in the analysis of all indirect basic, and induced economic activity and employment resulting from regional and site-specific activities;
- An accounting of the effects of direct synfuels, indirect basic, and induced economic activity, employment, and population on all Indian-used and Indian-provided services; and
- An assessment of the effects of direct, indirect, and induced growth on special conditions related to the management and governance of the reservation including:
  - unauthorized squatting within reservation boundaries.
  - special traffic problems on the I-40 corridor through the reservation and related public safety and security issues.
  - housing needs.
  - general government needs.
  - police and fire impacts.
  - school requirements.
  - water and sewer needs.
  - solid waste disposal issues.

20.55 | xxxvii | 3 | It is stated that specific narrative is included in this EIS to "clearly present information pertaining to the reservation . . ." However, none of the prospective information described in the preceding comment is presented for the reservation as a separate entity.

20.56 | R-2-2 | The figures comparing low and high scenario impacts on population, employment, and service needs fail to indicate:

- Which years are compared and whether these are annual or cumulative data; and
- Whether these figures related to the direct effects of synfuels and do not include indirect and induced effects. If these "multiplier" impacts are not included in these totals, the figures are meaningless. It is a long and well-established principal in socioeconomic impact assessment that the growth impacts associated with any given project or projects include: the direct population and employment associated with the facility (direct); the incremental growth in other regional industries and firms as a result of the demaands for goods and services from the impacting facility (indirect); and, the increase employment and population resulting from the expansion of retail, commercial, service sectors as a result of the increased personal incomes arising from employment at the facility and the incremental employment at the indirectly expanded firms and industries.

  For a region as large as the Uintah Basin it is not unrealistic to expect that direct construction employment of 10,000 people may lead to a secondary (indrect plus induced) growth impact of another 10,000-12,000 jobs. Thus, the total regional employment impact would be appropriately designated to be 20,000-22,000 persons.

20.57 | R-3-1 | 4 | The areas of influence for socioeconomics do not include the reservation as a separate entity. Instead, only smaller and non-sovereign entities such as counties and communities are considered. Failure to include the Uintah and Ouray Reservation in the "Regional Affected Environment" of the DEIS severely limits it as an environmental impact planning and decision document. Data difficulties, as pointed out on page R-3-3, paragraph 2, in no way excuse the omission of consideration of the effects of regional synfuels development on the reservation. Instead, they need to be resolved.

20.58 | R-3-2 | 1 | The tribe disagrees with the use of the 10% criteria value as indicating acceptable impacts. It would seem that the rate of growth that can be accommodated in an area is a function of the area itself. More importantly, the state of Utah in the Impact Mitigation Plan specifies the use of 5% as the

20.58 (cont)

indicator of potential impact. The use of 10% would understate the number of potentially impacted areas in the state when the state's own criteria is used. Shouldn't the designation of impact areas conform to state standards? If the answer is yes, the entire analysis of socioeconomic impacts will have to begin from a baseline specification of all areas meeting this criteria.

20.59 — R-3-3 to R-3-16

Throughout the section describing baseline conditions, specific results are reported only for Utah and Colorado counties and communities. Comments on conditions on the Uintah and Ouray Reservation are superficial and, more importantly, cannot be related to the data reported for these other entities—many of which lie within the borders of the reservation. Thus, a strong impression of double-counting is given.

20.60 — R-4-10

In this section dealing with the impacts of the high-level scenario, the UPED model was used to project population and employment and its spatial allocation to counties and communities. No attempt has been made to identify the reservation as a separate entity within the model with the result that none of the quantitative estimates produced by the model permit impact estimates for the reservation as a whole. See, for example, Tables R-4-4 and R-4-5 in which population and employment projections produced by the model are reported for all separately analyzed entities and no estimates of reservation impacts are provided.

20.61 — R-4-14 to R-4-24

The evaluation of impacts on specific services and facilities within the Uintah Basin is again done on a county and community basis. There is no quantitative consideration of reservation-specific impacts. Instead, broad generalizations about impacts on the reservation are made without support of analysis. The level of this analysis is totally inconsistent with that presented for the counties and communities.

As an example, consider the section on new household growth (R-4-15 to R-4-17). Table R-4-6 describes in detail the housing demands resulting from the projects in absolute numbers and percentage terms for the counties and communities. For example, the town of Rangely, Colorado currently has 1,116 households and that as a result of high-level scenario growth the number of households will increase by exactly 224 or 20.1% in the year 1985.

No such figures are presented for the reservation. Instead, the observation is made of the housing and household impacts on the reservation: "There is currently a housing shortage on the reservation. Any new growth on the reservation would seriously exacerbate this shortage" (page R-4-17, paragraph 2). This statement is obvious, but does not provide any

20.61 (cont)

decision maker with quantifiable information on the magnitude of the potential problem.

20.62 — R-4-109 — 3

The section (R-4.B.1) covering the socioeconomic impacts of regional synfuels development associated with the low-level scenario does not mention the reservation. Instead, in the introduction to this section is found this singular reference to impacts from low-level development on the Uintah-Ouray Reservation: "Effects on the Ute Indian Tribe would be similar to those discussed for the high-level situation with no appreciable differences in magnitude of impact." The reader is reminded that effects discussed for the high-level situation with respect to new households and consequent housing demands were that a serious shortage exists which may get worse. No where can it be found how many new households might be expected and how many housing units may be required.

20.63 — E-4-1 & 2

With respect to the treatment of the socioeconomic impacts from site-specific projects, no data is presented to indicate whether impacts will occur on the reservation. Instead, the reader is told to refer back to section R-4.A.1 for a description of the impacts related to the reservation from regional development but to remember that "—they would be much less in magnitude for a (specific) project alone."

RESPONSE LETTER 20

GENERAL MEASURES FOR GRANTS AND PERMITS

	PAGE	PARA	COMMENT
20.64	SS-A-3	All	The reference to Uintah and Ouray Tribal Requirements should not be construed as the only issues of concern for the tribe. The tribe may wish to develop at a later date environmental requirements for such development. Currently, the tribe is considering the development of a Tribal Review Process for on-reservation development.

Ute Indian Tribe

20.1 Refer to the response to Comment 19.1. In addition, a Department of the Interior EIS is not a decision-making document. It provides information to the decision maker. All the factors considered in the decision-making process are documented in a decision document, which is separate from the EIS.

20.2 BLM acknowledges the Ute Tribe's concerns. Additional information on impacts to the tribe has been added to the Final EIS.

20.3 The views expressed will be considered in the decision-making process. The specific concerns raised are addressed in subsequent comments. The special Indian study has been completed and the results have been incorporated in the EIS.

20.4 It is true that the approach used in this study is considerably different from that used for regulatory permitting activities by the EPA and some state agencies as indicated in the Draft EIS and further expanded in the Final EIS (Chapter R-4, Significance Criteria and Section R-4.A.2). The analysis was performed for the purpose of NEPA and not for the purpose of obtaining a PSD permit and would not satisfy that process. The objective of the analysis was to provide the BLM decision maker with information to understand trade-offs involved in the right-of-way decision which must be made. The analysis was developed utilizing what BLM (and Systems Applications Inc.) considered to be the best and most appropriate existing data base and state-of-the-art modeling techniques available at the time the study was begun. The site-specific analysis in the EIS has been compared with available PSD analysis as additional source information and an effort was made to make the overall analysis as compatible with the regulatory decision process as possible through coordination with the EPA and appropriate state regulatory agencies. Existing and subsequent PSD permit studies using more intensive site-specific analysis on a case-by-case basis may result in different concentration estimates as more refined data become available.

20.5 The commenter's statements are correct, as discussed in response to Comment 20.4 above. Chapter R-4, Significance Criteria, and Section R-4.A.2 have been expanded to more directly discuss this concern.

20.6 The low-level scenario assumed a reduction in production from each of the applicants' proposed projects. This resulted in a reduction of emissions from each project. Because emission rates per bpsd of production vary by project, total emission rates for 248,000 bpsd also vary depending on the combinations of projects assumed. If some projects produced at full potential while other projects were not built, emission rates and spatial distribution of impacts would be different than assuming all projects are operating, but at a reduced level. However, because there is no accurate way for BLM to guess which projects would actually be built, reduced production rate from each project was determined to be the most reasonable way to construct a low-level scenario. While emissions may be underestimated, it is equally likely that emissions are overestimated.

20.7 The baseline characteristics of the Uintah Basin, including the effects of oil and gas development, are described in detail in this chapter (Chapter R-3). The negative effect that oil and gas development has had on air quality is part of the measured baseline conditions to which the proposed projects and the interrelated projects are added in order to determine cumulative effects.

20.8 Examination of wind and persistence roses for a number of years indicated that 1978 and 1979 were not atypical years. Whether or not they are worst-case years cannot be determined without modeling all of years. However, the results of other years are not expected to be significantly different. The narrative in Section R-3.A.2 has been expanded to include this qualification.

20.9 Refer to the response to Comment 30.44.

20.10 The air pollutant concentrations at the locations shown in Table R-4-7 are derived from the regional scale GPM model runs. The maximum 3-hour average SO_2 concentrations estimated at the grid point closest to each town or within each Class I or special concern area was determined from the one year of modeling results. The high number in each range of values is the actual modeled results. The low number is a factor of 10 less to account for expected model conservatism. This method of using a range of concentrations is discussed in detail in Section 5.1 of the Air Quality Technical Report.

20.11 The units of measurement have been added to Table R-4-40.

20.12 The use of COMPLEX I is described in Section 4 and Appendix C of the Air Quality Technical Report.

20.13 The values given in the tables in Chapter 5 of the Air Quality Technical Report were obtained from the regional GPM analysis. The values given in Chapter 6 (site-specific analysis) are from the subregional results. The square (110 x 110 km) figures in Chapter 5 are subregional results, while the rectangular (180 x 268 km region) figures represent the regional scale results.

Comparisons of impacts predicted in the subregional GPM with the regional GPM applications revealed differences of only about 20 percent near the boundaries of the subregional grid. Closer to the emissions sources, differences were greater due to differences in the treatment of stability and terrain/plume interactions.

20.14 Three additional RTM model analyses have been made since the publication of the Draft EIS and the Draft Air Quality Technical Report to further define the relationship between the GPM analysis and the RTM analysis. Three scenarios were selectively chosen with the assistance of the EIS Air Quality Technical Advisory Committee. The three scenarios chosen for the RTM runs were:

- Maximum sulfur dioxide concentrations determined by GPM in the Flat Tops Wilderness Area (Class I)
- Maximum sulfur dioxide concentrations determined by GPM in the Dinosaur National Monument (an area of special concern)
- Impacts in the Uintah Basin and an area of special concern, the Uintah and Ouray Indian Reservation during a wintertime stagnation episode.

The results of these three additional analyses have been added to the existing RTM analysis and are discussed in the Final Air Quality Technical Report and the Final EIS (Section R-4.A.2).

20.15 These comparisons have been added to Section 5.8 of the Air Quality Technical Report.

20.16 Technical Report Table 5-2 has been revised and the changes reflected in EIS Section R-4.A.2.

20.17 The water model measures two parameters - flow and salinity. These parameters are the basis for determining the impacts. Flows would begin to change where the water is withdrawn (some 30 different points). Similarly, salinity would slowly change progressively downstream. The changes in flow and salinity represent a continuum of change beginning in the mountain uplands and terminating at the mouth. Not only is it impractical to think of impacts in certain small areas, it is also impossible, because adequate gauges do not exist.

Ground water discussions are purposely brief, because ground water use is so small. The analysis and presentation in the EIS (Section R-4.A.3) corresponds to the magnitude of the determined impact. Table R-1-8 shows potential ground water use to be 3,800 ac-ft/yr. When compared to the potential of withdrawing 103,000 ac-ft/yr from the White River (same table), the relative importance of the two water systems is put in perspective.

Salinity is the only quality parameter that is discussed in detail, because it is the only one that is expected to change. To estimate changes in other quality parameters would be highly speculative.

20.18 The water model that was used in this study is the Colorado River Simulation System as maintained by the Bureau of Reclamation. EIS Section R-4.A.3 cites a source for summary information about this model.

Measuring quantitative changes can only be made at existing gauging stations which, generally, are at the confluence of major streams and at the inflow and outflow of reservoirs. Therefore, the effects of the applicants' water withdrawals are evident at the first downstream gauging station. These gauging points are given as column headings on Table R-4-16 and discussed throughout the text.

The baseline condition is not arbitrary. It is maintained by the Bureau of Reclamation and serves as the standard for water development plans in the Colorado River Basin. The Bureau of Reclamation has a staff of engineers and scientists that continually update the model based upon development in the basin and gauge data.

20.19 The water resouces impact analysis is intended to be objective and is based on the best available data.

20.20 Three model runs were made based on a wet year, a normal year, and a dry year. The data and results for the normal year were presented in the EIS. In this EIS, worst-case was determined to be all projects withdrawing water from the White River (Maximum White River Development) or all projects withdrawing water from the Green River (Maximum Green River Development), not withdrawal from a combination of sources during a drought year. This is a valid worst-case situation, because water withdrawal would be some combination of the two sources. (See also the response to Comment 20.18.)

20.21 The statement in the Preface has been clarified.

20.22 Determining the "acceptability" of an impact is not the purpose of an EIS; rather it is to analyze and discuss impacts that would occur. Because the proposed developments utilize public lands, these impacts are discussed to inform the public and the decision maker. It will be the BLM decision maker's responsibility to consider these impacts when deciding to grant or deny rights-of-way on BLM-administered land.

As with any numerical model, parameters are measured at points. In the case of this model, measuring points for salinity are the confluence points of major drainages. These points show definite increases in salinity, which represent significant impacts, particularly in a river system that already shows salinity increases. Again, the acceptability of the salinity increases is not the point; rather, the point is impacts would occur and would require some type of desalting to restore water quality to prior conditions.

The Utah standards or EPA standards were not used as a significance criteria, because it was determined that any increase in salinity levels would represent a significant impact.

20.23 This statement is correct. Both the White and Green rivers are potential water sources for the White River Shale Project.

20.24 Table R-2-1 has been revised.

20.25 The water flow figures that were used in the modeling represent impacts assuming average year of projected flows. These projected flows are somewhere between average and worst-case due to the following reasons:

1) Worst-case is represented by the two development scenarios - White River Maximum Development and Green River Maximum Development (refer to the response to Comment 20.20).

2) Due to rounding off water use figures to the nearest thousand, approximately 3,000 ac-ft/yr more went into the model than is actually projected to be used (for example, Magic Circle's proposed use of 540 ac-ft/yr was rounded to 1,000 ac-ft/yr).

3) Water estimates shown to be used for municipal and industrial uses and agriculture are generous.

4) The water model considers every project operating at maximum capacity - the probability of this, given current economic conditions, is remote.

Due to these reasons, figures for impacts assuming low flow (drought) were not given in the EIS; however, they are available upon request from the BLM.

Based on the stated impact criteria (Chapter R-4, Impact Significance Criteria section), a 21.5 percent reduction in flow would be significant.

20.26 Significant impacts are projected to occur.

20.27 The Green and White rivers are shown on a number of EIS maps, including Map R-A-1 (Appendix R-A). In order to show a change in flow or salinity, a stream gauge is needed. In this study area, the gauges (and the resultant available data) are at the confluence of the White and Green rivers, at the confluence of the Green and Colorado rivers, at the inflow to Lake Powell, and at Imperial Dam.

These are major landmarks, and due to the wide geographical distribution, it was not thought necessary to show these locations on a map.

The change in flow and salinity of the Green River at the confluence with the Colorado River is representative of the changes in the project area. At the confluence, the incremental change in flow and the differences in salinity are shown. These can be compared with existing data to determine changes due to the applicants' projects, other related projects, or both as is done in Section R-4.A.3.

20.28 The 1983 baseline flow conditions were developed by a hydrological model that the Bureau of Reclamation uses. The baseline model run entered existing stream gauge data, and based upon current trends, created a baseline from the present to the year 2000 (Section R-4.A.3). The changes in flow and salinity shown in this report are representative of the changes caused by additional water use from the applicants' and interrelated projects. Where they are reported is not significant; rather, the amount of change which can be directly attributed to increased water development in the upper portions of the basin is significant.

The data on Tables R-4-16 and R-4-17 are consistent. Differences in depletions and flow do not necessarily mirror each other. Depletions change in a predictable manner, because people have control over them. This is not the case for flows, because flows are caused by climate.

The 1983 baseline salinity values were determined by the flows that were created by the above-mentioned hydrological model.

20.29 The 37,000 ac-ft/yr depletions discussed in the EIS would occur above the gauge-recorded data that are shown in the USGS records. The 37,000 ac-ft/yr represent current water depletions as maintained for the Colorado River Simulation System. There is no evidence to indicate that the number of acres irrigated has changed.

20.30 The extent of vegetation types and the amounts disturbed are identified in Table R-4-19 for the high-level scenario and Table R-4-41 for the low-level scenario. A map would not appreciably enhance the reader's understanding of the impacts.

20.31 Land use for vegetation types is discussed in Section R-3.A.5, Wildlife (habitat type), and Section R-3.A.6, Agriculture (livestock grazing).

20.32 All the soil surveys used were conducted and prepared in accordance with the National Cooperative Soil Survey Program, USDA, Soil Conservation Service (EIS Section R-3.A.4).

20.33 The detailed soil surveys were used to evaluate potential impacts and would be used by the applicants to determine applicable reclamation measures as stated in the EIS (Appendix A-8).

Identifying the complete soils inventory would be very voluminous and would detract from the more significant information included in this section. In keeping with CEQ guidelines to reduce bulk, only information which contributes to the reader's understanding of the impacts was included.

20.34 The impact to agriculture (cropland and grazing) is the predicted annual cropland and cropland production loss as identified in Tables R-4-23 and R-4-42 and the loss of AUMs for livestock grazing (Table R-4-22). Information from these tables was used to compute the total cash value loss to agriculture as identified in Section R-4.A.1 (Other Socioeconomic Impacts, Agriculture). Cash loss for specific crops was used to determine the total cash value loss. However, because CEQ guidelines state that EISs should not be encyclopedic or include unnecessary detail, the economic loss data was not presented by crop in the EIS.

20.35 Refer to Appendix A-8, Maintenance and Monitoring section. Inspection, monitoring, and certification of successful revegetation and erosion control would be determined by the landowner or authorized agency official. It is not within the scope of the EIS to discuss the enforcement mechanism, including inspections, reclamation performance bonding, or assessment of penalties for violation of compliance, because enforcement is predicated on decisions not yet made, which are to be based upon the EIS and related documents and data. In the event of noncompliance or any other violations, the authorizing agency official or landowner would take appropriate action.

20.36 Refer to response to Comment 20.34.

20.37 Refer to response to Comment 20.35.

20.38 "Would" more correctly expresses the meaning intended. Should a right-of-way be granted, BLM and the Forest Service are committed to stipulating these guidelines. The applicants have committed to implementing these guidelines on other lands subject to any modification deemed necessary by the landowner.

20.39 Refer to response to Comment 20.35.

20.40 Where impacts to the wildlife resources of the Uintah and Ouray Reservation are predicted to occur due to development of a site-specific project, they are presented in the EIS (for example, Section M-4.A.4). Additional information regarding habitat disturbance within corridors (Magic Circle and Tosco) that would cross the Uintah and Ouray Reservation has been added to Sections M-4.A.5, T-3.A.5, and T-4.A.5.

Habitat disturbances on a regional basis are anticipated to be insignificant due to the small percentage of each type of habitat that is disturbed. Site-specific habitat disturbances that occur on the Uintah and Ouray Reservation were analyzed in light of total amounts of habitat available.

BLM has no authority to require mitigation measures on tribal lands. Any measures required by the Uintah and Ouray Indian Tribe would have to be stipulated by the tribe as part of a permit to cross the reservation.

20.41 The commenter's statement is true. Discussions of additional uses of this habitat are included in the Section R-3.A.5 riparian habitats discussion and the Section R-3.A.5 aquatic wildlife discussion.

20.42 The Ute Tribe was requested to provide all available data related to wildlife resources on the reservation. The tribe was able to furnish numbers of fishing permits and numbers of game bird hunting permits. No information was furnished to give data for total numbers of hunters, days hunted, expenditures per day, or similar data.

20.43 On a regional basis, the statement is proper. From the standpoint of "habitat," total regional disturbances are a very small percentage of the available habitat to mule deer. Analysis of site-specific impacts has been done. The significant site-specific impacts are discussed in Section 4.A.5 for each project.

20.44 Table R-4-20 has been revised.

20.45 Refer to the response to Comment 20.43.

20.46 This chapter discusses nine-applicant cumulative impacts. Site-specific impacts are discussed under each specific project. Additionally, neither site-specific impact analysis nor analysis of impacts of the nine projects considered together show any adverse impacts from applicant projects to black bear, cougar, nongame mammals, or bird species.

20.47 According to CEQ guidelines, an EIS is not to be encyclopedic. Therefore, long lists of species have not been included. Lists of species occurring in the area can be obtained from the Utah Division of Wildlife Resources.

20.48 Section M-3.A.5 has been revised.

20.49 According to sage grouse and chukar partridge distribution maps for Uintah County furnished by the Utah Division of Wildlife Resources, no sage grouse or chukar habitat is found along the product pipeline route.

20.50 Impacts to wildlife within the area of influence, which includes portions of the reservation, are addressed in Section M-4.A.4. Section M-4.A.8 also addresses potential recreational wildlife related impacts upon the Uintah and Ouray Indian Reservation.

20.51 Additional Uintah and Ouray Reservation data have been integrated in the Final EIS based on the results of the Ford, Bacon, and Davis study of Native American issues. Please see the Final Socioeconomics Technical Report, Section R2D, and the Socioeconomics sections of the Final EIS.

20.52 BLM is well aware and appreciative of the time and effort that the tribe has given in helping develop the socioeconomics analysis. The Final EIS reflects the cooperative efforts that have been completed in the period between the Draft EIS and the Final EIS.

20.53 A supplemental study was undertaken and the results of that study are summarized in the Final EIS. See also the response to Comment 19.1.

20.54 Section R-3.A.1 enumerates the magnitude of migration into the Uintah Basin. Additional information that disaggregates the migration and impacts to the reservation has been added to Section R-4.A.1 of the EIS and Section R2D of the Socioeconomics Technical Report. The data addresses all the unresolved issues identified by the commenter. See also the response to Comment 19.1.

20.55 The Final EIS treats that portion of the Uintah and Ouray Reservation most likely to be affected by synfuel development as a separate entity. Refer to Section R-4.A.1 and the various site-specific Socioeconomics sections.

20.56 The years compared for the high-level scenario are 1985 for construction and 1995 for operation (Section R-1.B). For the low level scenario, the years compared are 1985 for construction and 1993 for operation (Section R-1.C). The results presented are cumulative. Comparison of the direct employment figures in Tables R-1-5 (High-level) and R-1-12 (Low-level) with corresponding employment figures in Table R-2-1 show that multiplier effects are included. A summary description of the Utah Process Economic and Demographic (UPED) Model, including the way the multiplier effects are incorporated into the UPED Model, is given in Appendix A-4 of the EIS. A more detailed description is presented in Appendix M of the Socioeconomics Technical Report.

20.57 The Final EIS and Socioeconomics Technical Report attempt to disaggregate data to make the influence on reservation communities easier to assess. Please see the appropriate Socioeconomics sections.

20.58 The 10 percent criterion is based on a standard generally accepted within the professional socioeconomics community. For further detail, refer to response to Comment 19.5.

The analysis is consistent in utilizing the 10 percent significance criterion for impact assessment for both Indian and non-Indian entitities. Detailed data are available in the Socioeconomics Technical Report for various socioeconomics factors and entities, in the event that a different significance level criteria (i.e., 5 percent) is utilized in the mitigation planning process

20.59 Baseline data that are specific to the reservation are found in all subsections of Section R-3.A.1. The "relating" of the data presented for communities, counties, and the reservation should be approached cautiously; data are presented separately for these three units, because they are separate and distinct. The data presented for these three types of units are total for the unit; community data is a part of data for its encompassing county; reservation data is a part of data for any county, or community which encompasses or lies within the reservation. This is not double-counting, but rather disaggregation of data into separate but interrelated units. For example, any one person may be counted as a part of each of the populations of the reservation; of Unitah County and of the town of Ouray. Only if one tried to add the community data to the county data, to the reservation data would data be double counted and an incorrect total result.

20.60 Tables R-4-4 and R-4-5 display, for comparison, different units of the set (Duchesne County, Uintah County, and other counties) and the reservation, having no subsets, is addressed only in the text. Impacts that are specific to the reservation are found throughout Section R 4.A.1, Socioeconomics.

20.61 Information on baseline housing demand within the reservation has been added to Section R-3.A.1.

20.62 Housing data have been added. Please see Sections R-3.A.1 and R-4.A.1, Housing, and the appropriate site-specific section for population and household demand increases. For full details, refer to the Socioeconomics Technical Report, Section R2D.

20.63 Information on the projected population impacts to the main reservation areas has been added to Section 4.A.1 for each site specific project.

20.64 The Uintah and Ouray Tribal Requirements section of Appendix A-11 has been revised to include this potential requirement.

COMMENT LETTER 21

STATE OF UTAH
OFFICE OF THE GOVERNOR
SALT LAKE CITY
84114

SCOTT M. MATHESON
GOVERNOR

October 19, 1982

Mr. Lloyd Ferguson
District Manager
Bureau of Land Management
170 South 500 East
Vernal, Utah 84078

Dear Lloyd:

21.1 I am pleased to transmit the comments of the state of Utah on the Uintah Basin Synfuels Development Draft Environmental Impact Statement. As you know, this document is the culmination of a unique cooperative effort between the Bureau of Land Management and the state of Utah. The EIS Steering Committee, co-chaired by the state and BLM, and including representatives from affected federal agencies, local government and the Ute Indian Tribe, provides an effective forum for discussing issues related to the EIS process and for shaping the scope and content of the final document.

Our involvement throughout the impact statement process does not relieve us from the responsibility to carefully review the document, providing comments which we hope will be reflected in the final environmental impact statement. This is particularly important in the area of socioeconomic impact evaluation. The state of Utah, under contract to BLM, provided a socioeconomic technical report, forming the basis for analysis of site-specific and cumulative socioeconomic impacts. Our comments in this area are primarily directed toward statements in the DEIS which are not consistent with or substantiated by our technical report.

The draft environmental impact statement demonstrates that significant synthetic fuel development can proceed in the Uintah Basin without violation of existing environmental standards. We support that development and will work with local government, project developers and the federal government to encourage the development of synthetic fuel projects in a manner that will minimize environmental impacts or disruptions.

21.2 Of course, at this point, it is not possible to accurately predict which projects may ultimately proceed to commercial development. In this context, the combination of

21.2 (cont) site-specific and cumulative regional analysis is particularly useful. However, as each proposal moves forward, it must meet applicable state permitting requirements. Thus, the DEIS should state that the document does not necessarily satisfy the information and permitting requirements of the state of Utah.

Again, we appreciate the opportunity to participate in this effort and hope that our comments will be helpful in preparing the final environmental impact statement.

Sincerely,

Governor

SMM:jb

I. ENVIRONMENT

AIR QUALITY

General Comments

21.3 ° In several places in the technical report and the EIS it is stated that the Gaussian Puff Model (GPM) is conservative and an appropriate model to define the upper bound estimates of worst case impacts. Some rationale on why GPM should be considered conservative is provided; however, theory and assumptions do not validate that the model is conservative and there is no data that would suggest otherwise.

21.4 ° The Regional Transport model (RTM) was used only once due to cost considerations. We are not convinced that the meteorological conditions on the day the RTM was used was the worst case day. Other RTM calculations should be made to include at least the worst case winter time condition.

21.5 ° A disclaimer should be put into the introduction of the technical report indicating that the report and EIS are for general planning information and do not satisfy state, local, and federal rules for regulatory/permitting purposes.

Oraft Air Quality Technical Report

21.6 ° Page 1-2; It is stated that Flat Tops Wilderness Area is the only federal PSO Class I area in the study region. Arches National Park is as close to the Uintah Basin as is Flat Tops. Any potential impacts on Arches should be noted.

21.7 ° Page 2-15, Paragraph 2.3; The statement is made that "the measured long-term average concentrations of the criteria pollutants in the Uintah Basin are well within ambient air quality standards except in populated areas where windblown dust and emissions from dust and general roads cause routine exceedance of the standards".

This is a very speculative statement. Perhaps the windblown dust contributes to other man-caused emissions that result in high concentrations, but dust and roads are not the only sources. Routine exceedances are not validated by state monitors on the Utah portion of the study area or on site monitoring.

21.8 ° Page 3-1, Paragraph 3.1; The federal hydrocarbon standard has been deleted.

21.9 ° Page 4-63, Paragraph 1; The GPM was run using stability 0, which was assumed to be conservative. We do not agree that stability 0 is worst case and would like to see runs made of winter and more stable conditions for comparison.

21.10 ° Page 4-66; Table 4.21 indicated RTM was used on 6 days. Clarification should be made to indicate the single day for which RTM was utilized.

21.11 ° Page 5-6; The concept of using a range of pollutant values has merit; however, the conclusion that the upper bound is defined by GPM, due to its conservatism, and the arbitrary assignment of reduction factors to the GPM predictions and calling those numbers the lower bounds is very troublesome. It is difficult to know how much trust and good faith one must have in order to accept the assumptions made in the use of GPM.

Section 6, Site Specific Analysis

21.12 ° A further explanation should be made as to how the baseline concentrations were calculated (modeled values not measured). Tables 6-5, 6-8, and 6-13 indicate the 24 hour baseline for Paraho, Magic Circle, and TOSCO exceed the NAAQS even before the projects are constructed. This does not agree with monitored data.

21.13 ° If SAI feels comfortable with the high background levels they have calculated, a stronger point should be made that the NAAQS are exceeded. It would also appear that the high values are not of major concern in the EIS since Page V of the Executive Summary states that all the site specific projects will be less than all applicable air quality standards and PSD increments. The Executive Summary and Section 6 are, therefore not consistent with each other.

21.14 ° It would be a great aid in reviewing Section 6 if an overlay were provided showing the company boundaries.

Oraft Environmental Impact Statement

21.15 ° Page R-4-33; It is not clear what sources comprised the secondary emission total. For instance, were company generated mobile sources considered as a direct or secondary source? Were emissions by company or contract vehicles on haul roads, etc., and all other sources which are necessary to plant operations considered as secondary emissions? Emissions that are caused by the source as a result of their routine operations are all direct sources whether they come from mobile or stationary sources (i.e., haul trucks, front end loaders, etc.). If SAI's analysis considered these emissions to come from secondary sources, the conclusions, made throughout the document, that direct emissions are small and insignificant when compared to secondary sources is totally in error.

21.16 ° Additional study and clarification should be made concerning comments made in reference to the EPA Federal Register notice of June 25, 1982. This notice does not allow fugitive dust created by mobile sources to be excluded as secondary emissions. The notice specifies that only those emissions that come directly from a mobile source such as tail pipe emissions may be excluded as secondary sources. Under current regulations it is not possible to exclude secondary emissions from increment consumption as stated in the EIS.

21.17 ° Page R-4-37; The statement that Tables R-4-10 and R-4-11 show that the ambient air quality standards are exceeded in many locations is incorrect. The baseline concentrations in the tables were calculated and only provide a projection of concentrations, not a validation of exceedances.

21.18 ° Perhaps some comment should be made of the EPA rural fugitive dust policy that would allow elimination of high wind days in determining background concentrations. Otherwise, if the SAI predictions on NAAQS exceedances are true, the Synfuels areas would be non-attainment and the PSO rules would no longer apply.

21.19 ° Page E-5-2, Paragraph E-5.A.2; The statement that cumulative PSO increment consumption shows no violation would occur is only true if secondary sources are assumed not to consume increments. Also, verification must be made by SAI that all project generated emissions including those from mobile sources were not included in their analysis as secondary sources (see earlier comment). The same comments apply to the other site specific projects.

21.20 ° Page M-4-4, Table M-4-1; This table shows Magic Circle increment consumptions for SO_2 24 hour as 32 ug/m^3, annual 1 ug/m^3, and 24 hour TSP less than 32 ug/m^3, and annual TSP less than 4 ug/m^3. The table shows the increment consumption including baseline as 33, 1, less than 32, and less than 4, respectively. Ooes that mean that the baseline concentrations are the difference in these numbers? (i.e., 24 hour SO_2 33 - 32 = ug?) These numbers are not even close to the baseline numbers given for Magic Circle in Table 6.5 of the technical report or Table M-4-2 in the EIS. The same questions applies to Tables M-4-5, S-4-1, and T-4-1.

Water Quality

21.21 ° The EIS states that the projects' consumptive water use may increase the Colorado River Basin salinity by 5 mg/1 at Imperial Oam. Therefore, the companies should investigate the use of intercepted groundwater from their mines and neighboring operations. Intercepted groundwater from American Gilsonite should be considered for Paraho and Syntana on a permanent basis in addition to the construction and start up phases.

21.22 ° In addition to the stated Water Pollution Control Committee construction permits, certification of Federal NPOES and OOE 404 (dredge and fill) permits must be obtained from the Committee. These requirements should be added to the EIS Table SS-3. In the certification of these federal permits, additional State recommendations on pipeline spill prevention and stream crossings may be specified.

21.23 ° The analysis of the Vernal sewer system seems to be incorrect. The state has only approved a sewerage system for 20,000 people and not

21.23 (cont) 40,000 as reported in the EIS. Therefore, the Vernal sewer system would not be capable of handling the additional impact of the combined synfuel projects. This apparent contradictory evaluation of the sewerage system capacity needs to be resolved and the correct evaluation stated in the final EIS

Solid and Hazardous Waste

21.24 ° Page E-1-15; The EIS states that for the Enercor Rainbow Proect the major solid waste generated would be spent tar sand which would be mixed with the scrubber sludge waste and deposited back into the mine and that no known hazardous wastes are to be generated. This statement seems unsupported in light of the fact that the other projects expect to generate hazardous waste.

21.25 ° Hazardous and toxic wastes for the Paraho Project would be transported and disposed of in an approved off-site location, yet the specific quantities and wastes are not addressed by the BLM in this EIS.

21.26 ° The site specific description of the Syntana Project states that the wastewater would be treated using the "Chevron wastewater treatment system". The details of this system were not outlined. The non-hazardous sludges, "green coke" from the retorting process, and general garbage would be mixed into the spent shale pile. The initial layer of spent shale would be compacted to produce an impervious layer. A clay layer might be preferable in preventing leachate from reaching the groundwater.

II. SOCIOECONOMICS

General Comments

21.27 ° Scope of the analysis is far more extensive than any previous EIS reviewed to date. The implications and impact analysis drawn from the data could have been expanded. Generally, however, the length and depth devoted to socioeconomic issues represents a marked improvement over the standard EIS treatment. Hopefully, the document will help to establish a stronger precedent in thoroughly addressing socioeconomic issues in further EIS's.

21.28 ° A key assumption employed by BLM is the manner in which "significant impact" is defined. We recognize the practical importance of establishing a percentage growth ceiling for purposes of conducting the analysis; but the assumed definition of "significant impact" requires one important caveat. It is the existing infrastructural and fiscal capacities of any community which really define a community's capacity to absorb growth. Consequently, the significance of demographic changes, when analyzed in isoloation from those conditions characterizing the fiscal and infrastructural capabilities, may result in inadequate identification of relevant issues.

21.29 ° It is assumed that many direct project employers will reside in work camps on-site. It should be noted that occupancy in on-site work camps often is below predictions made by companies, and consequently, community impacts can be underestimated. This has been documented in several instances throughout the West. Construction and work camp populations

21.29 (cont) should require close monitoring, and some sort of company policy developed to help insure that the assumed occupancy actually occurs. Otherwise, community impacts will have been understated in the EIS.

21.30 ° The EIS document does not identify any mitigation measures which might be undertaken to manage growth in the region. We understand that the decision not to include mitigation proposals was based on practical considerations and constraints of time and money. Reference should be made to the Utah Resource Development Code (63-51-10) which will require all of the proposed projects to submit to the Department of Community and Economic Development and affected local governments a socioeconomic and fiscal impact statement as well as a plan to alleviate impacts.

Population and Employment

21.31 ° R-4-11; The report indicates that the cumulative impact of the High Scenario is 33,930 in 1985 and 72,857 in 1995. According to the Socio-Economic Technical report, these numbers should be 32,005 and 67,868 respectively.

21.32 ° R-4-11; The DEIS defines the area of Socioeconomic influence as being Duchesne, Uintah Counties, Dinosaur and Rangely, Colorado. However, the indicated total impact of 26,973 in 1985 and 47,906 in 1995 includes the Grand County impacts. The cumulative impacts without Grand would be 22,941 and 43,943 respectively.

21.33 ° R-4-11; Again the area of influence is misrepresented. Population increases without Grand County should be 73.4% and 100.5%.

21.34 ° R-4-12; The impact of interrelated projects for Grand County should be 915 not 4915. This wrong figure is also used in the area of influence total for interrelated projects. Also the cumulative increase for Dinosaur should be 1744. The table also indicates that the remainder of Rio Blanco Moffatt County has some impact when in fact all Colorado impact was projected only for the communities of Rangely and Dinosaur. The source for the table should read 'Utah State Planning Coordinator's Office'.

21.35 ° R-4-13, Table R-4-5; The percentage increases for the area of influence for 1995 should be 73.4 and 100.5% rather than 54.6 and 74.5%. Also the source should read 'Utah State Planning Coordinator's Office'.

21.36 ° R-4108, Paragraph 4; According to the DEIS the cumulative impact of the Low Scenario plus interrelated projects is 27,904 in 1985 and 14,905 in 1993. According to the Socio-Economic Technical report this impact should be 25,169 and 24,593 respectively.

21.37 ° R-4-111, Table R-4-32; The applicants increase for Uintah County should be 9641 not 4641 and the cumulative impacts should be 15,085 not 14,085. Also the percentage increases for Uintah County should be 81.1% and 126.8% rather than 72.6% and 84.4%.

21.38 ° T-1-31; Personnel numbers for the construction workforce for the Tosco project do not agree with documented numbers for this project and those used to compute the Econ-Demographic impacts.

21.39 ° P-5-2, S-4-1; A telephone conservation with Brad Barber is cited as reference as the rationale for the allocation of population. The socio-economic technical report includes a lengthy discussion of the assumptions and methodology used in making population allocations. It would provide a better reference to cite the appropriate page(s) in the Socio-Economic Technical report (page 141-147).

21.40 ° R-2-2, Table R-2-1; Construction/operation figures presented yearly per capita income data; they appear to look more like average monthly wage. Figures are not consistent with those in the technical report. The source of the BLM's figures is unknown as well as the underlying assumptions used in making those calculations

21.41 ° R-3-6, Paragraphs 4 & 5; There is no description as to how average per capita income was calculated. The figures presented do not come directly from the technical report and attempts to use data provided in the technical report fail to generate the same average per capita incomes cited when using the defined area of influence to be Duchesne and Uintah Counties in Utah and Rangely and Dinosaur towns in Colorado. The number cited include Grand County. For example, in paragraph 5 of the projected per capita income for the area of influence is stated as being $9,373 in 1985 and $10,436 in 1995. These projected incomes could not be generated with the data provided in the technical report. (1) If an unweighted average from the area of influence were calculated using county per capita incomes, the results would be $11,065 per capita income in 1985 and $11,597 in 1995. (2) If a weighted average per capita income were calculated based on county per capita incomes and county population projections, the result would be an average per capita income of $9,437 in 1985 and $10,410 in 1995. (3) If a weighted average per capita income wer calculated based on county per capita incomes and county populations projections for only the towns of Rangely and Dinosaur in the Colorado counties, the results would be $8,961 in 1985 and $10,367 in 1995. This would appear to be the most appropriate.

This type of data problem occurs in the other sections calculating per capita income impacts on the following pages:

> R-4-14, R-4-15, R-4-11 - para. 3: A baseline 1985 per capita income firgure of $9,437 is cited. This is not consistent with the data on page R-3-6 because the definition of the area of influence is different. This creates confusion when citing two different baseline figures for the same year.

Community Infrastructure Capacity

21.42 ° The Draft UBEIS doesn't generally deviate from the findings of the socio-economic technical report in the area of community infrastructure capacity. There are some misinterpretations of the data but overall they appear minor. The major deficiencies within the socio-economic section are a result of predetermined decisions by the BLM on the scope of the EIS. These deficiencies include the lack of a fiscal impact analysis of the proposed synthetic fuels project on local tax structures and the lack of any discussion on potential mitigation alternatives for the "significant" socio-economic impacts. These deficiencies, however, are the result of policy decisions that the state of Utah was already

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cognizant of at the outset of the EIS. Within the Draft EIS the following misinterpretation of data was found relative to community infrastructure impacts of synfuel development:

21.42 (cont)

° Page R-3-11; Medical data on the Rangely area has been misinterpreted. The projections forecast additional demand for hospital beds beyond the current utilization rate. This doesn't necessarily indicate the need for new beds at the Rangely Hospital but could be handled through improving the utilization rate or through the use of tertiary facilities. Forecasting of health care needs only shows the increased demand potential. It doesn't necessarily follow that the existing "acute care" hospital facilities within the area need to expand. The data also reflects the demand that is served by the tertiary care facilities along the Wasatch Front or in Grand Junction. It is impossible at this time to disaggregate the portion of the forecast that represents an overflow to the Wasatch Front for tertiary care.

Further, this same misinterpretation is reflected in other areas of the socio-economic section of the DEIS. Demand for services is only one criteria in determining the level of services a community should offer. The availability of more sophisticated, tertiary services in a nearby metropolitan area often offsets a substantial amount of demand for community infrastructure. The Draft EIS doesn't differentiate between services that must be available at the local level such as water and sewer and those services which may be supplied to some degree outside the area.

III. PHYSICAL RESOURCES

Mineral and Energy Resources

21.43 ° Section R-3.A.13 (page R-3-57) refers to hydrocarbons as oil shale and tar sands but only oil shale resources are identified. Also this section refers to hydrocarbons including oil, gas, and coal, but no information is available in this report on the resources nor their impact on the area.

21.44 ° In this report, amounts of oil per ton, depth of zone to be mined, distances for transportation of water and distances for transportation of finished product are presented, but no details on these important factors are included.

21.45 ° The State is concerned about the terminology used with reference to resources of hydrocarbons. In the petroleum industry reserves are usually recorded as barrels of oil in place rather than tons of ore to be mined and there is no reference to this terminology at all.

21.46 ° Most of the mineral and energy resources for the individual projects refer to section R-3.A.13 for identification. We cannot comprehend how one simple paragraph (R-3.A.13) can be inclusive enough to be the guide to all the resources to this enormous area.

21.47 ° The Draft EIS contains little detailed information on the physiography, geology, hydrology, and soils of those areas of the Uintah Basin to be

21.47 (cont)

affected by synfuel development. As a result, the document is of limited use in evaluating the geotechnical considerations of importance to these projects, i.e. facility siting (both mine plants and new towns), waste disposal, geologic hazards, and the potential for ground water pollution. The brief and often cursory coverage given these subjects may in part be due to the project specific and often site specific nature of such considerations and the need for detailed investigations to adequately identify and characterize them. If such data is not to be provided in this generic EIS, it should be submitted and reveiwed on a project-by-project basis as synfuel development proceeds in the basin.

21.48 ° Reference is made to page R-J-1 of the document under item (1) of "Assumptions." This implication of the text is that the Utah Mined Land Reclamation Act applies only to State-owned lands. For clarification, this Act's application is not merely to State-owned lands but "to all lands in the State of Utah lawfully subject to its police power", U.C.A. 40-8-20.

21.49 ° In addition, a continual reference is made in Chapter R-J to the "Utah Land Reclamation Act". This Act, (40-8-1 et seq.) is more properly referred to as the "Utah Mined Land Reclamation Act."

Water Resources

21.50 ° Numbers used for water resources supply and projected use generally agreed with our own, but it should be recognized that estimates of consumptive use have been revised frequently and should not be taken as final. We appreciate particularly the caveats relating to the "Law of the River" introduced on page R-4-45.

Wildlife Resources

21.51 ° The regional summary of environmental consequences for wildlife habitat (page R-4-62) concludes that 36,911 acres of mule deer habitat will be disturbed. Since this constitutes only two percent of the 2,318,560 acres of total deer habitat, the conclusion is reached that this would not significantly impact mule deer. This constitutes an extremely simplistic assessment of impact. This approach to impact assessment fails to recognize that habitat value is not uniformly distributed throughout any area. Even within areas presently designated as critical habitat for particular species, there are undoubtedly some areas where wildlife traditionally concentrate more than others, and are thus more critical to the welfare of existing populations. Present information in the Bookcliffs is not adequate to clearly define such concentration areas; however, the Division of Wildlife Resources is presently conducting intensive studies for BLM that will provide the basis for defining the most critical habitats for big game. Future planning must provide protection for those areas.

21.52 ° The discussion of impacts on wildlife also fails to consider the cummulative effects of these proposed and interrelated projects, and past and present oil and gas development as was done in the air quality and socioeconomic sections. In our view, the potential impacts of the proposed and interrelated projects are definitely significant. When

21.52 (cont) viewed in relation to past and present oil and gas development, they are highly significant.

21.53
- The statement is deficient in its treatment of mitigation, both on a regional and site specific basis. Mitigation measures should be identified and evaluated for minimizing and/or compensating for both direct and indirect effects of proposed projects. For example, range improvement of areas of critical habitat prior to project disturbance in such areas can offset some of the direct losses that will undoubtedly occur by providing increased forage on adjacent areas. Busing of employees from residential areas to mine sites can reduce the indirect impacts of increased traffic. Energy companies can do much, through training programs and firearms control, to create a greater respect for wildlife and reduce poaching.

Cultural Resources

21.54
- Page P-3-53; The draft EIS for the Uintah Basin Synfuels Development possibly presents a misleading assessment of site density to vegetaton zone relationships taken from Jones and Mackay (1980). It may be misleading as Jones and Mackay (1980) dealt with 990 recorded sites and the EIS states that an additional 1,300 sites have been recorded since the study in 1980. Adding the 1,300 sites to the 990 sites and then relating site type to vegetation zone may show a different density of site type/zone than what Jones and Mackay described (1980). Perhaps it should be mentioned in the EIS report that site density to vegetation zone will change from area to area; for instance, in a given area where both sand dunes and their associated vegetation zone and pinyon juniper vegetation zones exist there may be a higher density of sites associated with sand dune biota and a low density associated with pinyon juniper zone (Jones and Mackay state that there is [generally] a correlation between a higher site density for pinyon juniper zones than other vegetation zones) (Holmer 1979; Chandler and Nickens 1979; Simms 1979).

21.55
- The EIS states in several different sections (BLM: R-4-86. R-4-132. R-5-3) that the proposed projects will have a dramatic effect on the existing cultural resources; the high-level scenario having a greater impact (higher level of development and production)than the low-level scenario. Potential impacts to cultural resources include "... land modification, vandalism, and relic collection". It is believed that impacts "would affect all known and unknown cultural resources within the region". Further, "Cultural resources are nonrenewable: consequently, the loss of any information could have a significant impact on efforts to reconstruct the prehistory and history of the region" (BLM 1982: R-4-86).

IV. AGRICULTURE

21.56
- The anticipated 8% to 10% loss of irrigated cropland within the Uintah Basin is referred to as a moderate adverse effect to the local area. We feel the statement and accompanying figures for values lost are misleading in at least three counts. First, the linkage between the cropland sector and the livestock sector was ignored as is the connection between those two sectors and the various agriculture processing, distribution

21.56 (cont) and marketing sectors. Since agriculture production is a primary economic activity, such linkages are very significant. Second, though the loss to the base may be 8 to 10% region wide, it will be a much greater percentage in localized areas such as Ashley Valley. Third, the cummulative effect of losses in the Uintah Basin, coupled with similar impacts in other areas of the state, are resulting in a significant impact to Utah's total agricultural productivity.

V. TRANSPORTATION

21.57
- Page R-3-44, Section R-3.A.7; Last paragraph, first sentence, change leases to lanes.
- Page R-4-76, Section R-4.A.7; Third paragraph should read as follows: The roadway segment on U.S. 40 (Utah) from the County Line to County Road 264 would be the most severely (affected, impacted) dropping from C to F unless improvements were made. ...Adding the interrelated projects would make the traffic impacts worse and would cause the U.S. 40 section from County Road 264 to SR-88 to drop from a baseline of B to E under the cummulative situation. The SR-64 (Colorado) section from Rangely to Dinosaur would become unacceptable with the applicants' projects and interrelated projects, dropping from a baseline level of C to 0.
- Page R-476, Section R-4.A.7; Fourth paragraph changes should read as follows: (second sentence) ... These are from the County Line to County Road 264 and Vernal to Jensen.
- Page R-4-79; Fifth sentence: ...From the County Line to Jensen ...
- Page R-4-127, Section R-4.8.7; First paragraph, fourth sentence should be changed to read: "The U.S. 40 segment from the County Line to County Road 264 would be reduced from a baseline level of C to F."
- Page R-4-131; First paragraph first sentence: "In 1995, baseline levels of service remain acceptable except for the U.S. 40 (Utah) segments between the County Line and County Road 264..." Last sentence: "The U.S. 40 (Utah) segment between County Road 264 ..."

State of Utah

21.1 BLM appreciates the State of Utah's input throughout the EIS process.

21.2 This information has been added to the EIS Preface.

21.3 The Air Quality Technical Report (Section 4.2.1.2) presents the rationale for the judgment that GPM does indeed develop a conservative analysis of ground-level concentrations. There are no data that would suggest otherwise. Unfortunately there are insufficient data available at the present time in the study region to provide ground truth for the purposes of validating the model. This is also the case in the majority of rural areas of the West (see responses to Comments 30.46 and 30.47 for further discussion).

21.4 Three additional days have been simulated with RTM. Please see the response to Comment 20.14.

21.5 The fact that the EIS air quality analysis does not satisfy state, local, and federal rules for regulatory/permitting purposes has been clarified in the final technical report (Preface, page iii) and the Final EIS (Chapter 4 Significance Criteria section and Section R-4.A.2). It should be noted, however, the EIS is not a planning document but rather analysis of environmental impacts. The EIS becomes part of the body of information used by the BLM decision maker in making the decision, in this case regarding rights-of-way authorizations. The EIS also is used by other decision makers as part of a body of information considered in other regulatory/permitting processes.

21.6 Refer to the response to Comment 30.44.

21.7 The Air Quality Technical Report (Section 2.3) and Final EIS (Section R-3.A.2) have been revised.

21.8 The Air Quality Technical Report (Section 3.1) and Final EIS (Section R-3.A.2) have been revised.

21.9 Only the regional scale application of GPM was run using constant D stability. On a regional scale, persistent well-organized flow is required to cause elevated 24-hour concentration impacts at distant receptors. These conditions are not typically associated with winter stable conditions. Furthermore, the use of Pasquill-Gifford Class D plume dispersion parameters should be representative of more stable conditions for elevated plumes in complex terrain.

21.10 Table 4.21 of the technical report has been revised. RTM simulations have been performed for four two-day periods.

21.11 It is commonplace in air quality modeling analyses to use a model or modeling approach known to be conservative to calculate numbers that are interpreted to upper-range estimates. With these upper ranges, one can separate possibly significant impacts from insignificant ones. It is known that air quality model estimates are uncertain, but if a modeling approach is designed to be conservative, it is likely that concentrations predicted by the model are upper ranges. Several reasons are presented in the Air Quality Technical Report (Section 4.2.1.2) for the judgment that GPM is conservative. Estimates of lower ranges were made using factors of 10 and 4 below the GPM predictions; these estimates are not based on any hard scientific evidence, because there is no existing data base (and, indeed, few existing sources) in the Uintah and Piceance basins with which to evaluate regional model performance. These estimates are based on four RTM runs for worst-case episodes and the qualitative statements presented in the Air Quality Technical Report and in responses to other comments.

21.12 These baseline values were calculated on the basis of an empirical model in the Draft Air Quality Technical Report. In the final report, monitored data from the Tosco Sand Wash and White River sites have been used to represent baseline air quality in the Uintah Basin.

21.13 Section 6 of the technical report has been revised.

21.14 A lease area boundary overlay has been included in the Final Air Quality Technical Report

21.15 Section R-4.A.2 has been revised to clarify what sources comprised the secondary emission sources. BLM agrees that emissions resulting from facility operations should be considered direct, rather than secondary, sources whether they are stationary or mobile sources. Therefore, mobile source emissions generated by the project applicants were identified as direct sources, and company vehicle emissions were not considered to be secondary sources.

21.16 Additional discussion and clarification regarding the impacts of emissions from secondary sources has been added to Section R-4.A.3 in the Final EIS. Additional emphasis has also been made that from a regulatory standpoint, the use of the PSD increment would be decided on a case-by-case basis by the State of Utah when companies apply to the state for their PSD permits.

21.17 Section R-4.A.3 has been expanded to provide this qualification.

21.18 The EPA rural fugitive dust policy allows the discounting of days with high TSP concentrations if it can be shown that high concentrations are due to windblown dust, not project-caused emissions. Section R-4.A.2 of the Final EIS has been expanded to recognize this consideration.

21.19 It is true that for each of the site-specific analyses, secondary emissions were not included in the analysis. Secondary emissions were included only in the regional impact calculations.

21.20 Yes, the baseline concentrations are the difference in these numbers. The baseline in Table M-4-1, which compares increased concentrations to PSD increments, considers only PSD permitted sources that have begun construction (Moon Lake Unit I). The baseline in Table M-4-2, which compares total concentrations to the NAAQS, are modeled values and include all sources in the region such as cities and mobile sources, because these sources must be considered when comparing to the NAAQS. In summary, the Table M-4-1 baseline includes PSO sources, while Table M-4-2 includes all pollutant sources to compare with the NAAQS. This also applies to Tables M-4-5, S-4-1, and T-4-1.

21.21 The modeling effort presents results that are expected from the applicants' proposed action and alternative water sources. The concept of intercepting ground water has been considered as part of the White River Dam EIS, and it may be further considered by the applicants and various state officials.

21.22 Table SS-3 has been revised.

21.23 The sewer analysis in Section R-4.A.1 has been changed to reflect the state-approved sewerage system of 20,000 people for Vernal. The analysis evaluates sewer capacity in relation to this correction.

21.24 Hazardous waste would be generated by some oil shale upgrading processes. Tar sand extraction is accomplished by using hot water and some solvents. Therefore, no hazardous waste would be generated.

21.25 The types of hazardous wastes and quantities to be disposed of have been added to Table P-1-7.

21.26 The Chevron plant is a standard, extended aeration, package treatment plant, which would meet secondary treatment standards.

Syntana-Utah's objective is to have an impervious layer. If this cannot be obtained with just shale, then clay could be used either by mixing with shale or by using it totally.

21.27 BLM notes that the State of Utah finds the scope of the socioeconomics analysis to be acceptable. The impact analysis presented is summarized from the Socioeconomics Technical Report.

21.28 The 10 percent change in population is used as a threshold factor for screening the counties and communities for inclusion within the area of influence for further impact analysis. The existing infrastructural and fiscal capacities for communities are considered concurrently with population changes in the impact analysis of various infrastructure components.

21.29 The impact analysis is based on applicant projections of numbers of employees that would reside in on-site work camps. If actual occupancy falls short of projections, then some of the community impacts could be understated in the EIS. Monitoring of work camp populations and policies to ensure that assumed occupancy occurs could be incorporated into the mitigation planning required by Utah Law (S.B. 170). This uncommitted mitigation measure has been added to Appendix A-7.

21.30 Mitigation that would be stipulated by governmental agencies are identified in the Site-Specific Analyses Introduction and Appendix A-10, General Measures for Grants and Permits. Refer to Table SS-3 and item 1 under State of Utah in Appendix A-10.

21.31 The numbers in Section R-4.A.1 have been revised to agree with the technical report.

21.32 The area of influence for socioeconomics includes Grand County (for population, income, and employment) for the high-level scenario (Section R-3.A.1). Grand County has been added to the area of influence to make the definition of the area of influence consistent. Grand County population impacts are correctly included as shown in the area of influence totals in Table R-4-4.

21.33 Grand County is included in the socioeconomic area of influence under the high-level scenario (Section R-3.A.1). The error in the definition of the area of influence on the cited page in Section R-4.A.1 has been corrected.

21.34 Table R-4-4 has been corrected.

21.35 Table R-4-5 has been corrected.

21.36 The numbers in Section R-4.B.1 have been changed to be consistent with the technical report.

21.37 According to Table R3A-6 of the technical report, the applicants' increase for Uintah County should be 8,641 in 1993, and the cumulative impacts should be 14,085 (8,641 plus 5,444) as shown. The percentage increase for Uintah County is correct for the applicants' percentage impacts in 1993, 72.6 percent (8,641 divided by 11,895); the cumulative percentage impacts in 1993 should be 118.4 percent (14,085 divided by 11,895). The errors on EIS Table R-4-32 have been corrected.

21.38 The personnel numbers for the construction work force for the Tosco project in Table T-1-4 correspond very closely with the work force estimates in Table 3.2.1 in the Sand Wash Oil Shale Project Description Technical Report (Tosco 1982). There are differences of 1 or 2 (e.g., 3,462 rather than 3,460), well within the assumed range of plus or minus 25 percent of the actual number.

21.39 The reference has been changed in Sections P-4.A.1, P-5.A.1, and S-4.A.1.

21.40 The per capita income figures by construction/operation presented in Table R-2-1 are annual increases in per capita personal income. This has been clarified in the Final EIS.

21.41 The average per capita personal income (PCPI) figures were developed using an unweighted average of the county per capita incomes, but did not include Grand County ((7161 + 7307 + 10,094 +9861)/4 = 8606 average per capita income for 1979). However, since Grand County is included in the socioeconomics areas of influence under the high-level scenario (Section R-3.A.1), several of these PCPI figures have been changed accordingly. The 1979 average PCPI for the socioeconomics area of influence (as defined) was $8,596. This is 95 percent of the average income of Colorado and Utah (Section R-3.A.1, Personal Income). In 1985, the increased PCPI (in 1980 dollars) would be $10,637; in 1995, this would increase to $11,400 (Section R-3.A.1, Personal Income). Changing the baseline PCPI figures to incorporate Grand County requires changes in the Personal Income discussion in Section R-4.A.1. Using data from Table R3A-29, the effect of the applicants' proposed projects would raise the PCPI level to $17,730 in the area by 1985, as compared with the baseline projection of $10,637. This is a 67 percent increase (Section R-4.A.1, Personal Income). For 1995, PCPI within the area of influence would be lower, with a level of $13,040 as a result of the applicants' proposals. This compares to a baseline projection of $11,400 (Section R-4.A.1, Personal Income).

21.42 Section R-3.A.1 has been revised to accommodate the concern about the interpretation of the medical data for Rangely.

21.43 Oil shale resources are identified, because they are the principal hydrocarbon source in the Green River Formation and the resource that has an estimated tonnage. Quantities of oil shale are shown to display the difference between the amount of oil shale to be utilized (affected environment) and the amount of resource remaining after mining (environmental consequences). No attempt was made to indicate quantities of resources other than oil shale.

The other hydrocarbons (oil, gas, and coal) are mentioned, because they occur in close association with the oil shale, generally below. They would not be mined and would not be affected by the various mining operations.

21.44 Details about these factors are found in the Chapter 1 discussion of each site-specific project and the related technical reports.

21.45 The petroleum industry records reserves as barrels of oil in place. However, the oil shale industry refers to reserves in terms of tons of ore.

21.46 In keeping with CEQ guidelines to include only significant information rather than to be encyclopedic, the Mineral and Energy Resources section focuses on major resources of the area that would be affected. See also the response to Comment 21.43.

21.47 The EIS contains the significant geotechnical data needed to understand the impacts of the proposed projects. Regional physiography is evident in Map R-A-1 and on Figure R-3-1. Physiography of the proposed projects is shown on each project's map (located in the various Sections 1.A.2). Hydrology is described in the various Water Resources sections (Sections 3.A.3) and Soils are described in the Vegetation and Soils sections (Sections 3.A.4). In addition, each of the applicant's technical reports has a section devoted to geology and/or geotechnical site evaluation. Geotechnical design of mines is an ongoing process that will evolve as the applicants proceed with mining.

The plans and designs for these projects are based on existing data and will be modified to accommodate unforeseen conditions if they are discovered. Mitigation measures are provided as foreseen. Right-of-way permit conditions include measures for compliance and provisions for mitigation of impacts discovered throughout the life of the projects.

21.48 Appendix A-8 (Draft EIS Appendix R-J) has been revised.

21.49 Appendix A-8 (Draft EIS Appendix R-J) has been revised.

21.50 Consumptive use figures, as well as all other project description data, included in the EIS are each company's best estimates based on current levels of project design.

21.51 Each site-specific project analysis takes into consideration the fact that these are "islands" within broad habitat classification that would be affected by a site-specific project but are too small to be considered in an overall, nine-project analysis. When more areas of critical habitat are defined, more detailed site-specific analysis can be made. Future long-range planning must, as stated in the comment, provide management and consideration for these critical areas on a site-specific basis.

21.52 Cumulative effects of proposed and interrelated projects are discussed in Section R-4.A.5. The introduction to Chapter R-3 explains that past, present, and future oil and gas development was included as part of baseline conditions.

21.53 These potential mitigation measures have been added to Appendix A-7, which includes measures that could be stipulated as part of a permitting process or committed to by an applicant. BLM has no authority to require habitat enhancement on the oil shale or tar sand lease areas, which are all located on state or private land. Where rights-of-way occur on BLM land, compliance with a reclamation plan to ensure the land returns to preconstruction densities and forage production would be required.

21.54 Section P-3.A.9 has been revised to clarify the intended meaning.

21.55 The comment notes conclusions reached in the EIS analysis. Such conclusions reflect the view that while some artifacts and other cultural information may be salvaged, time constraints and accidential damage (as well as increased disturbance from greater populations) may result in lost information. Expedited salvage archaeology is not necessarily the most effective long-term archaeology.

21.56 As discussed in Section R-4.A.6, the major agricultural concerns related to synfuel development are: (1) the loss of cropland and the accompanying production of crops, mainly livestock feed, and (2) grazing reduction. These are discussed and substantiated with realiable figures and reference sources. How this would affect individual farms and ranches is also discussed in this section.

Effects on the total agricultural sector (local economy) are discussed in Section R-4.A.1 under Agriculture.

The Ashley Valley is recognized as the area most strongly affected by cropland conversion, with accompanying acreage figures and percentages. All figures are based on a ten-year projection of land use change as determined by local groups

It is not within the scope of this EIS to identify and discuss cumulative effects for the entire state of Utah.

21.57 Sections R-3.A.7, R-4.A.7, and R-4.B.7 have been revised.

COMMENT LETTER 22

422 1st Avenue #2
Salt Lake City, UT 84103
October 18, 1982

Mr. Lloyd Ferguson
District Manager
Bureau of Land Management
170 South 500 East
Vernal, UT 84078

Dear Mr. Ferguson:

22.1

I am writing in response to the Bureau of Land Management's (BLM) solicitation of public comments on the Uintah Basin Synfuels Development Draft Environmental Impact Statement (DEIS). The comments I am submitting focus on the air quality, wildlife, wilderness, vegetation and soil and visual resources sections of the DEIS. In general, I am concerned that the criteria adopted by the DEIS to assess the environmental impact of the proposed action are inadequate and that the analysis of the environmental impacts of the proposed action is based on unwarranted assumptions and, as a result, that the DEIS fails to consider fully the environmental implications of the proposed action.

Significance Criteria. Other than a general reference to subjective professional judgment, the DEIS does not explain the basis on which the significance criteria employed in its analysis were adopted. Consequently, it is not possible to determine whether destroying not more than 5 percent of the Uintah Basin's wildlife habitat, experiencing an increase in the harrassment of wildlife of 15 percent, decreasing the flow of either the Green River or the White River by 10 percent, or allowing 10 to 20 years for revegetation of the land disturbed by the proposed projects is reasonable.

On the whole, the significance criteria appear to permit a project that anticipates minimal resource development-- only 0.5 percent of the Uintah Basin's recoverable oil shale resources will be affected-- to impose extensive environmental impacts on the Uintah Basin without those impacts being considered significant. Thus, the DEIS appears to have avoided a critical assessment of the proposed action's environmental impacts by adopting permissive significance criteria under which most of the project's environmental consequences can be dismissed as being insignificant.

22.2

Air Quality. The discussion of the proposed action's impact on regional air quality is extremely vague. The potential impact reportedly ranges from virtually no change to consumption of half of the allowable Class II increment. The DEIS cites the complexity of atmospheric dispersion modeling, limited meterological data, lack of knowledge concerning the types of pollutants emitted by oil shale facilities and uncertainties concerning synfuel emission control technology as factors that make an assessment of air quality impacts difficult. Considering the high quality of the Uintah Basin's air resources and the potentially significant impact on those resources if the proposed action is approved, further discussion of those factors is essential.

For example, the processes and technology identified in the site-specific projects undoubtedly have been tested on a smaller scale. The results of those tests should be discussed in the DEIS so that BLM and the public have some factual basis for assessing the impacts that may result from operating a large scale unit. Similarly, a discussion

22.3

of the exisiting and developing synfuels emission control technology would reveal the strengths and weaknesses of that technology and thereby permit BLM and the public to identify the pollution problems that technology cannot mitigate.

22.4

Similarly, the conclusion that the impact of the proposed action on acid precipitation is difficult to assess obscures the need to consider carefully the impact of acid deposition before proceeding with the proposed action. The DEIS recognizes that the Rocky Mountain area, including the Uintah Basin, receives the least acidic precipitation in the nation. The link between sulfur dioxide and nitrogen oxide emissions and acid deposition also is recognized in the DEIS. Although the effect of acid deposition on plants and soils may be inconclusive as yet, the incidence of adverse impacts on aquatic ecosystems in Canada, the eastern United States and Sweden demonstrates that acid deposition presents a serious threat to the environment.

The results of the analysis of the proposed projects on acid deposition reported in the DEIS indicate that the area around the proposed projects will experience acid deposition 5 to 10 times greater than background levels. The levels reported approximate those experienced in the

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22.4 (cont) eastern United States. In view of the dramatic changes that have been observed in the aquatic ecosystems in the north-eastern United States and Canada, acid deposition levels approaching those of the eastern United States cannot be considered insignificant. Indeed, the DEIS states that a study of two lakes in the Uintah Basin revealed that the proposed action would increase the acidity of those lakes.

If the proposed action succeeds in demonstrating the viability of a Uintah Basin synfuels industry and that development occurs, the impact of acid deposition will becoming increasingly severe as cumulative effects are realized. Absent evidence that acid deposition will not affect the environment adversely, approval of the proposed action must be understood to irrevocably and irretrievably affect the Uintah Basin environment.

<u>Vegetation-Soil.</u> Throughout the DEIS the proposed action's impact on vegetation and soil is described as temporary and insignificant. That conclusion assumes complete and successful implementation of extensive re-vegetation and reclamation programs by the project participants. Conditions in the project area, however, make revegetation extremely difficult and expensive. Thus, the DEIS' assumption
22.5 is unrealistic. Moreover, compliance with the revegetation and reclamation plans will be difficult, if not impossible to ensure because the projects are located primarily on non-federal land.

The unreasonableness of the assumption that the proposed reclamation and revegetation programs will mitigate the impact of the proposed projects is revealed by the DEIS. Over 75 percent of the land area covered by the proposed action receives between 4 and 8 inches of precipitation annually. Yet, it is generally accepted that revegetation requires 12 inches of precipitation annually. The DEIS recognizes the inadequacy of precipitation in the area, citing a study that found that favorable seeding years occur as infrequently as once every 20 years.

The lack of precipitation is compounded by the low inherent fertility of the soil found throughout the project area. Not only is the soil of poor quality, but it also is not very deep in most areas. The combined effect of these characteristics is illustrated presently by the fact that only 20 to 25 percent of the ground in the project area is covered by vegetation.

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The revegetation problem is further exacerbated by the need to isolate over 10,000 acres of spent shale that will be generated by the proposed projects. The revegetation plans contemplate covering the spent shale piles-- that may
22.5 (cont) be up to 500 feet deep-- with 12 to 18 inches of topsoil. The DEIS mentions, but fails to resolve the problem of acquiring enough topsoil to accomplish that task. The area's natural conditions make it highly unlikely that the quantity of soil required could be acquired from local sources without destroying the environment of the source area. The cost of transporting topsoil from other areas makes it unlikely that the project participants will be able to afford importing topsoil.

Although the DEIS recognizes all of the problems associated with efforts to revegetate the land disturbed by the projects, it describes the loss of vegetation as temporary and concludes that revegetation and reclamation are expected to be successful. As the facts presented in the DEIS indicate, that confidence is unfounded.

The likelihood that the revegetation plans will not be implemented as assumed in the DEIS has significant environmental consequences that the DEIS does not address. Absent revegetation, erosion will present a significant problem. The DEIS recognizes that windblown dust presently is a major source of air quality degradation. That condition would be exacerbated by the removal of the existing ground
22.6 cover. In addition to posing a greater health threat, increased wind erosion would affect adversely the visual resources of the area.

Destruction of existing ground cover also would result in greater water erosion, thereby increasing the silt burden of the area's rivers. Water erosion also would increase the possibility that contaminants from the spent shale piles would be washed into the area's ground water and rivers. Finally, the failure to restore vegetative cover would permanently eliminate valuable wildlife habitat. As a consequence, existing wildlife populations would be depleted and the likelihood of overgrazing on other range areas would be increased.

The facts developed in the DEIS strongly suggest that the assumption that revegetation and reclamation plans will be implemented effectively and will mitigate the adverse impacts caused by destruction of the existing ground cover is untenable. The DEIS, therefore, should discuss completely the environmental consequences of the proposed action in the absence of revegetation and reclamation of the area.

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22.7 Wildlife. The DEIS describes the impact of the proposed action on wildlife in terms of the percentage of wildlife habitat disturbed by the projects. Although the total acreages involved are characterized in terms of the quality of the range disturbed, the present analysis fails to consider the characteristics of the wildlife that inhabit the area and the availability of accessible substitute range for the displaced wildlife. That is, the DEIS does not assess the density, age or health of the existing wildlife population, the ability of other range to support an added population burden, or whether the location of the proposed projects interferes with migration patterns or mating grounds used by the existing wildlife population. Discussion of those topics is necessary to assess the qualitative impact of the proposed action on the area's wildlife resources.

22.8 Summary. The DEIS presents an inexplicably optimistic assessment of the environmental impacts of the proposed action on the Uintah Basin. The background facts contained in the DEIS strongly suggest that the determination that the majority of the environmental impacts will be insignificant and the assumption that revegetation of disturbed areas will be successful are unrealistic. A critical examination of the basis on which the significance criteria were selected and a thorough evaluation of the environmental impact on the area if the revegetation plans are not implemented are required to enable the BLM and the public to make an informed assessment of the environmental impact of the proposed action.

Sincerely,

David L. Deisley

David L. Deisley

David Deisley

22.1 The significance criteria for most resources were established based upon professional experience and judgment. These criteria have been used in other EISs and have been generally accepted. There are no universally mandated criteria for all environmental impacts such as those examined in this document.

22.2 In some cases, small, laboratory-, bench-, or pilot-scale studies of the proposed synfuel processes and technologies have been performed. Information from such testing was generally used to help derive emission factors and control technology reductions for the "larger scale units" when data were available. However, the results from pilot-scale studies are often proprietary. Furthermore, scaling of data and manipulation of information from pilot tests are usually not appropriate methods for estimating emissions from larger units, because the data are not linear functions of the source processes. For these reasons, knowledge of refinery and related processes is often used for selecting emission factors and control efficiencies for synfuel processes.

22.3 It must be recognized that there presently are no oil shale or tar sand facilities operating at a commercial-scale level. Synfuel emissions control technology is an evolving process and must address two key issues: (1) defining potential emissions from a given commercial-scale process, and (2) determining the best available control technology that could be employed for emission species determined to be significant from the standpoint of human health, welfare, and other air quality related values. One focal point for research and analysis of current and future efforts is the Department of Energy Oil Shale Task Force which consists of four national laboratories and two universities.

Data on potential gaseous and particulate emissions are presently being obtained from a variety of sources, including the efforts of the Oil Shale Task Force as well as publications, detailed development plans and PSD permit applications, and reports by DOE and EPA. These data have limitations in that they are taken from pilot-, prototype-, or bench-scale experimental retorts and processes and, as such, must be used with caution when extrapolating to commercial-scale processes. Except for the major gaseous pollutants, most of the other types of emissions have been studied in either the Paraho process or one of the in-situ processes. These are all basically the direct combustion type. Fewer data are available on other basic types of retorting such as indirect heated processes (TOSCO II, Union B, and Lurgi), and fluidized bed processes such as Chevron. Thus, emissions from the full range of retorting processes and starting shales have not yet been fully characterized. Even in those processes which have been better characterized, uncertainties exist, particularly in the area of particulate and organic emissions. These emissions are strongly dependent on both the exact retorting conditions and on the types of abatement equipment which are operated. A rigorous evaluation of these types of air emissions must wait until operation of the first commercial retorts.

As data are obtained on commercial-size units, it will be possible to develop and select more efficient and cost-effective control systems. Most of the emphasis to date in control of emissions has been placed on the criteria pollutants such as sulfur dioxide, total suspended particulates, nitrogen oxides, hydrocarbons, and carbon monoxide. More uncertainty exists over potential emissions of toxic pollutants such as polyaromatic hydrocarbons (PAH). These PAHs are found in some petroleum streams. Potential emissions of some trace elements such as mercury and arsenic tend to be associated with particulate matter which places additional emphasis on efficient TSP controls. Even though there are no commercial-scale oil shale or tar sand facilities in operation at the present time, there are data available from similar processes which have extensive experience in emission control technology. For example, many of the mining operations for oil shale would be similar to mining activities for coal and other minerals. Products of retorting processes would be similar to those used in petroleum refining.

Control of particulate emissions will be a major challenge to an oil shale project largely because of the magnitude of the solids handling involved.

Sulfur dioxide control appears to be a less significant problem, but sulfur recovery controls are expected to be the largest single category of air pollutant control expenditures for an oil shale plant. A commercial-scale oil shale facility, however, would be a less significant source of sulfur dioxide emissions than a moderately sized power plant meeting the New Source Performance Standards.

Generally, typical control facilities that would be used in a synfuel project will be adoptions of those that have been proven in mining, refining, and chemical processing. It still remains the case, however, that experience with a commercial-scale operation in synfuel emissions recovery is necessary to make actual assessments of emissions recovery effectiveness and efficiency.

As discussed in the EIS in the regulatory permitting process, permitting agencies would apply best available control technology analysis to each facility, whether it employs the TOSCO II, Union, Superior, fluidized bed, or an in-situ process, and specify the necessary control efficiency required to meet applicable standards.

The analysis in this Final EIS has used what, to our knowledge, is the best available data on emissions and emission source terms. For additional discussion, see response to Comment 22.2.

22.4 In the acid deposition section of the Draft EIS, the qualification as to the present uncertainties involved in any analysis of potential impacts from acid deposition was not intended to obscure the need to consider potential impacts as carefully as the present state of knowledge would allow. Rather, it was intended to allow recognition by the public that there are indeed many unknowns in the data base, prediction tools, and effects assessment. In the absence of a more definitive data base, the analysis was intended to be conservative, as discussed in comment responses 30.53, 30.54, and 30.55. The acid deposition discussion has been expanded in the Final EIS (Section R-4.A.2 and Appendix A-5).

22.5 The assumption of achieving successful erosion control, reclamation and revegetation on land disturbance caused by project activities in the Uintah Basin is based on the intensive implementation and compliance with a realistic and effective erosion control and reclamation program. The effectiveness and reliability of the measures and procedures outlined for reclaiming for land disturbance caused by installation and construction of right-of-way facilities and plant facilities are based on research, field trials, and experiences of many years. Specific measures associated with surface mining and spent shale disposal areas are based on recent research and field trials. All practices and procedures identified are well documented and have been demonstrated to be reliable and feasible in making assumptions regarding effectiveness. (Refer to notes and references associated with Table A-8-2 and to erosion control treatment analysis in Table A-8-3).

Compliance would be consistent on all lands since inspection and certification of successful erosion control and revegetation would be determined by the land owner or authorized agency official.

Volumes of topsoil and suitable plant growth materials necessary for reclamation are available within the disposal areas. Detailed on-site investigation and special stripping and stockpiling procedures would need to be utilized.

22.6 Section R-4.A.4 acknowledges that impacts to soils and vegetation would be significant if applicable erosion control and reclamation procedures are not implemented due to lack of compliance with approved plans or if adverse weather conditions (mainly heavy rainstorms) would occur during construction before erosion control measures could be installed.

Since the applicants have committed to implement an applicable and effective reclamation program, it is unnecessary to present a complete impact discussion as though no reclamation program would be implemented.

22.7 There are no data available on densities, sex, age, and health of resident wildlife species. In most cases, the Utah Division of Wildlife Resources does not collect these data. Fawning areas, strutting grounds, and similar areas are identified in a site-specific analysis if they would be affected.

22.8 As discussed in the responses to Comments 22.1 through 22.7, the EIS analysis is intended to be an objective analysis based on the best available data.

COMMENT LETTER 23

Union Energy Mining Division

Union Oil Company of California
2777 Crossroads Boulevard, Suite 100
Grand Junction, Colorado 81501
Telephone (303) 243-0112

union

James S. Cloninger
Manager of Administrative Services

October 18, 1982

Mr. Lloyd Ferguson, District Manager
Bureau of Land Management
170 South 500 East
Vernal, Utah 84078

Dear Mr. Ferguson:

Union Oil Company appreciates the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for Uintah Basin Synfuels development. Our comments revolve primarily around the DEIS's Air Quality Impact Assessment.

23.1 We strongly support the use of ranges of values in the presentation of potential impacts. This is a realistic approach which recognizes the uncertainty in results, and allows more informed planning to occur than presenting worst case impacts alone. The DEIS should have carried this approach further, however, clarifying the high degree of uncertainty inherent in quantifying particulate emissions from secondary sources.

23.2 The summary document would also be more consistant if it acknowledged the discussion contained in the Air Quality Technical Report, Section 4.2, which recognizes the uncertainty in presenting the high impact end of the range air quality impacts. As stated in the Technical Report, the Gaussian Puff Model (GPM) yields results of a higher degree of uncertainty than the Systems Applications' Regional Transport Model (RTM) in "treating the dispersion of pollutants from many sources over large transport times and distances.". Therefore, using the results from the GPM to represent the high impact level introduces more uncertainty and is more conservative than necessary.

23.3 Finally, the correct development scenario for Union Oil Company's Parachute Creek Shale Oil Project is 90,000 barrels per day, rather than the 50,000 barrels per day used. It is unclear whether the emissions from Union's mine, retorting, and upgrading

23.3 (cont) facilities are all included in the emissions estimates. However, the totals appear to underestimate those emissions projected by Union Oil by a factor of between 2 and 7 depending on the parameter. We would be happy to meet with you to provide more detailed information.

Again, Union Oil Company appreciates the opportunity to comment, and would welcome an opportunity to discuss the items mentioned above. Please feel free to contact me or Terry Larson at (303) 243-0112.

Sincerely,

Diana O. Bender

Diana O. Bender
Environmental Coordinator

DOB:tw

Union Oil Company

23.1 Section 4.1.6.2 of the technical report discusses the large degree of uncertainly in the estimate of particulate matter emissions for vehicle travel on class "D" roads. The report indicates a range in class "D" road activity of four to one on the basis of population increases. Furthermore, uncertainty exists in the emission factor for class "D" roads (discussed in Section 4.1.5.1). For these reasons, it is projected that the estimate of future particulate matter emissions from travel on class "D" roads could vary by a factor of two, with the single estimate needed for modeling purposes (e.g., see category 470 in Table 4-14) representing approximately the midpoint of the range.

23.2 The discussion of the expected conservatism of the GPM values has been expanded in both the Final Air Quality Technical Report (Section 4.2.1.2) and the Final EIS (Section R-4.A.2), including the use of three additional scenarios which compare GPM results with those of RTM.

While BLM agrees that RTM is a more sophisticated model and probably more realistic than GPM, RTM results are available for only a few days, while GPM results are for every day in a year. Thus, RTM cannot be relied upon solely for worst-case episodes. BLM does not concur that GPM is in all cases unnecessarily conservative. In some cases, RTM predicts higher concentrations at certain locations than GPM (see Final Air Quality Technical Report, Section 5).

23.3 Emission values were developed by PEDCo for the Union oil shale facility on the basis of best available information at the time when the estimates were made. Since that time, Union's plans have changed from 50,000 to 90,000 barrels per day, but the Colony project, which was planned to produce 47,000 barrels per day, was cancelled. It is possible that the net effect on regional air quality of these two changes is nearly zero, because Union's emissions are larger and Colony's are smaller and both projects are located in the same portion of the Piceance Basin.

The values for Union shown in Table 4-5 of the Draft Air Quality Technical Report were incorrect and not the values used in the modeling analysis. The numbers given in the Draft Air Quality Technical Report were about 3 to 7 times lower than those used in the modeling. The Final Air Quality Technical Report has the correct values for a 50,000 barrels per day facility.

COMMENT LETTER 24

GEOKINETICS INC. shale oil development and production

582 north vernal avenue • p.o. box 889 • vernal, utah 84078 • telephone (801) 789-0806

October 15, 1982

Mr. Robert E. Pizel
UBS EIS Project Leader
Bureau of Land Management
3rd Floor, East
555 Zang Street
Denver, CO 80228

Dear Bob:

24.1 Enclosed are a few pages of the DEIS containing changes that reflect data consistency between the written text of our project descriptions and the appropriate tables. Please incorporate such changes into the final EIS.

I hope the brief tour of our current research site proved to be of some benefit to you and those accompanying you.

Sincerely yours,

Rusty Lundberg

Rusty Lundberg
Environmental Coordinator

RL/ks

Enclosures (5)

TABLE R-1-9

OIL SHALE AND TAR SAND MINED
High-Level Scenario

24.2

PROJECT	Oil Shale tpsd	Oil Shale tpy	Tar Sand tpsd	Tar Sand tpy
Enercor (Rainbow)			13,650	4,505,000
Enercor-Mono Power (P.R. Springs)			154,320	50,000,000
Geokinetics	~~72,000~~ 22,000*	23,652,000		
Magic Circle	70,000	24,500,000		
Paraho	75,000	24,000,000		
Sohio			48,130	16,161,000
Syntana-Utah	84,500	28,066,675		
Tosco	66,000	21,681,000		
Combined Applicant Total	367,500	121,899,675	216,100	70,666,000
Interrelated Projects	178,500[a]	68,637,250	67,500[b]	22,173,750
CUMULATIVE TOTAL	546,000	180,536,925	283,600	92,839,750

NOTE: tpsd = tons per stream day; tpy = tons per year.

[a]White River Shale Project.

[b]Western Tar Sand and C and A Tar Sand Projects.

* See Project Description p. R-C-5 - It should be noted that no shale is mined for the LOFRECO Projects or for the secondary in situ work for the Agency Draw Project.

C-148

TABLE R-1-16

OIL SHALE AND TAR SAND MINED
Low-Level Scenario

Project	Oil Shale tpsd	Oil Shale tpy	Tar Sand tpsd	Tar Sand tpy
Enercor (Rainbow)			13,650	4,505,000
Enercor-Mono Power (P.R. Springs)			46,300	15,000,000
Geokinetics	1 ~~3~~0,000*	9,855,000		
Magic Circle	35,000	12,264,000		
Paraho	20,000	6,570,000		
24.3 Sohio			12,030	4,040,000
Syntana-Utah	26,630	8,180,850		
Tosco	35,237	11,573,350		
Combined Applicant Total	146,867	48,445,200	71,980	23,545,000
Interrelated Projects	178,500[a]	58,637,250	67,500[b]	22,173,750
CUMULATIVE TOTAL	325,367	107,082,450	139,480	45,718,750

NOTE: tpsd = tons per stream day; tpy = tons per year.

[a]White River Shale Project.

[b]Western Tar Sand and C and A Tar Sand Projects.

* Shale is mined for surface retort for Agency Draw project only. All other work is in situ (no shale mined.).

MINE AND PROCESS DESCRIPTION

In the construction of a true in-situ retort, a pattern of blast holes would be drilled from the surface through the overburden into the oil shale bed. The holes would be loaded with explosives and fired using a carefully planned blast system. The blast results in a fragmented mass of oil shale with a high permeability. The void space in the fragmented zone would come from lifting the overburden and producing a small uplift of the surface.

The fragmented zone constitutes a true in-situ retort. The bottom of the retort would be sloped to provide drainage for the oil to a sump where it would be lifted by a number of oil production wells. Air injection holes would be drilled at one side of the retort and off-gas and oil production holes drilled at the opposite side.

The oil shale would be ignited at the air injection holes and air injected to establish and maintain a burning front that occupies the full thickness of the fragmented zone. The front is moved in a horizontal direction through the fractured shale towards the off-gas wells at the far side of the retort. As the burn front moves from the air-in to the gas-out wells, it would burn the residual coke in the retorted shale as fuel. The burning front would heat the oil shale ahead of the front, producing gas and driving out the shale oil which drains to the bottom of the retort, where it would then flow along the sloping bottom to the oil production wells. The gas would be combustible and would be used for power generation. Progress of the burn front would be monitored by thermocouples set in thermocouple wells.

FEEDSTOCKS

There are no feedstocks contemplated for use at the plant site.

PRODUCTS/BY-PRODUCTS

The primary product for the proposed retorting operations would be 5,000 barrels per stream day (bpsd) of shale oil per section of land. When all 10 sections are in production in 1994 the maximum output would be 50,000 bpsd. The by-products from the operation of the proposed project would be the product gas which could be used for on-site energy production and water, part of which could be used as a viable resource (quantity of water equivalent to oil production). A pipeline to transport the shale oil to a refinery may be necessary.

UTILITIES AND OFF-SITE CORRIDORS

Each unit would use existing access roads. These existing access roads would be used to the extent possible, however Geokinetics may need to develop additional access to the sites. Utility and product pipeline corridors may be needed, but the needs have not been defined.

AGENCY DRAW PROJECT

Geokinetics also holds oil shale leases on 22,000 contiguous acres located in southern Uintah County, Utah. Over one billion barrels of shale oil are contained in this area.

The proposal is to mine and surface retort 22,000 tons per stream day (tpsd) of oil shale from a 13-foot thickness containing between 28 and 33 gallons of oil per ton. Room-and-pillar mining would be used and the mine would probably be developed from an adit entrance. It is further proposed that the mine would facilitate subsequent secondary recovery of the remaining resource by means of controlled blasting and in-situ retorting of the pillars and of the lower grade oil shale located below the high-grade, mined-out bed.

LOCATION

The site is located in Uintah County, in the northeastern portion of Utah (about 70 miles south of Vernal (Map R-1-2, back cover pocket). Approximately 19,200 acres of this area was leased in April 1977 to Geokinetics by the Utah Shale Lands and Minerals Company; the remainder was leased in July 1978 from the State of Utah. This area is located in T. 12 and 13 S., R. 20 and 21 E. in the Agency Draw vicinity.

MINE AND PROCESS DESCRIPTION

The following processes would be used in this project:

1) Room-and-pillar mining
2) Mined shale transportation and crushing
3) Surface retorting
4) Spent shale disposal
5) Waste gas treatment and disposal
6) Secondary recovery by horizontal in-situ retorting

The transportation and crushing of the mined oil shale would be done with conventional belt conveyors and jaw and gyratory crushers, respectively.

24.4 Retorting ~~may~~ will be performed by the ~~Paraho Direct Heat~~ TOSCO II process.

Additional development would involve the blasting of mine support pillars and shale underlying the mined zone in preparation for modified in-situ retorting.

FEEDSTOCKS

There are presently no plans to construct or use feedstocks.

TABLE R-1-1

SUMMARY OF APPLICANTS' PROPOSED PROJECTS

24.5

Project Name	Project Type	Mine Type	Water Source	Power Source	Process Type	Upgrading	Product Transportation	Anticipated Full Production Date/ Project Life[c]
Enercor (Rainbow)[b]	Tar Sand	Open Pit	White River	Bonanza Power Plant	Hot Water	Delayed Coking	Truck	1985/20 years
Enercor-Mono Power (P.R. Springs)[b]	Tar Sand	Open Pit	White River	Bonanza Power Plant	Hot Water	Delayed Coking	Pipeline to Railhead near Westwater, UT	1990/23 years
Magic Circle (Cottonwood Wash)[a]	Oil Shale	Underground Room & Pillar	Green River	On-Site	Improved MIU/TI	Water Removal Only	Pipelines to Roosevelt, Chevron Pipeline, and Gary Refinery Pipeline (at Bonanza)	1992/30 years
Paraho (Paraho-Ute)[a]	Oil Shale	Underground Room & Pillar	White River	On-Site (at full production)	Paraho Direct Heat	Natural Gas Hydrotreating	Pipeline to Chevron Pipeline	1987/10 years
Syntana-Utah[a]	Oil Shale	Underground Room & Pillar	White River	Bonanza Power Plant	Superior and TOSCO	Natural Gas Hydrotreating	Pipeline to Rangely	1994/30 years
Tosco (Sand Wash)[a]	Oil Shale	Underground Room & Pillar	White River	Bonanza Power Plant	TOSCO	Fractionation Hydrotreating	Pipeline to Rangely	1989/35 years
Geokinetics (Agency Draw)[b]	Oil Shale	Underground Room & Pillar	Green River	On-Site	TOSCO	Unknown	Pipeline to Roosevelt	1987/30 years
		Secondary, In-situ						
(Lofreco)[b]	Oil Shale	In-situ	None	On-Site* ~~Bonanza Power Plant~~	In-situ	Unknown	Pipeline** ~~Truck to Agency Draw~~	1994/20 years
Sohio Shale Oil (Asphalt Ridge)[b]	Tar Sand	Open Pit	Green River	Utah Power and Light	Counter-current Solvent Extraction	Delayed Coking and Hydrotreating	Pipeline to Salt Lake City or Midwest U.S.	1989/20 years

[a]Site-specific projects analyzed in detail in the second part of this EIS.

[b]Projects proposed for later development which are analyzed conceptually in this EIS; see Appendices R-B, R-C, and R-D for a brief description of each.

[c]Project life based on current reserves under lease. Life of some projects may be extended with future aquisition of additional reserves.

* See Project Description p. R-C-3

** See Project Description p. R-C-2

RESPONSE LETTER 24

Geokinetics, Inc.

24.1 As noted below, the changes have been incorporated in the Final EIS.

24.2 Table R-1-9 has been revised.

24.3 Table R-1-16 has been revised.

24.4 Appendix A-2 has been revised.

24.5 Table R-1-1 has been revised.

COMMENT LETTER 25

United States Department of the Interior
FISH AND WILDLIFE SERVICE
AREA OFFICE COLORADO—UTAH
1311 FEDERAL BUILDING
125 SOUTH STATE STREET
SALT LAKE CITY, UTAH 84138-1197

IN REPLY REFER TO:

October 18, 1982

MEMORANDUM

TO: District Manager, Bureau of Land Management
Vernal, Utah

FROM: Area Supervisor, U.S. Fish and Wildlife Service
Salt Lake City, Utah

SUBJECT: U.S. Fish and Wildlife Service (FWS) Comments on the Uintah Basin Synfuels Draft Environmental Impact Statement (DEIS)

The Uintah Basin DEIS has been reviewed for technical adequacy pertaining to how the proposed developments may affect wildlife resources. Most sections of the document were found complete, well organized and easy to follow. The site specific analyses provided good reference to the proposed action and adequately addressed the consequences and potential losses of wildlife and habitat from the development on the sites. Also, the high-level and low-level scenarios allowed the reader to examine the proposal from different levels of development. This seemed appropriate considering the volatility of the current oil shale industry.

25.1 The FWS is most concerned that the DEIS does not adequately address the cumulative effects to wildlife in the Uintah Basin and mitigation for those potential losses. Our comments, therefore, will reflect these concerns and reiterate our position stated in our April 21, 1982 review of the preliminary DEIS.

The DEIS does not fully address the impacts of increased human population in the basin and their subsequent direct impacts on wildlife resources. In most respects, wildlife resources are limited by a small portion of the Uintah Basin (i.e. riparian habitat, critical deer winter range, critical summer range, etc.). The increasing human population will create more stress on critical habitats and attendent wildlife regardless of where the actual synfuels plants or mines will be. The acres of habitat lost or disturbed from the proposed developments is only one measure of the cumulative effects to wildlife. These other off-site losses must be addressed.

Only when off-site losses are recognized can off-site mitigation for the cumulative impacts of synfuels development be proposed. Population increases will, in turn, increase the demand for consumptive and nonconsumptive uses of wildlife on public and private land in the basin. Unless adequate measures are taken, more and more private land will be posted or closed for wildlife users creating more demand on fewer areas and resources. This situation can have a snow-balling effect until virtually all private land is closed to public access. This could result in economic and recreation losses from such sports as pheasant and quail hunting which occur almost totally on private lands as well as law enforcement problems from trespass violations.

25.2 Big game and sport fisheries are an important natural resource in the northeastern Utah region. In some areas, hunting and fishing pressures may already be at the highest point possible and still sustain the current population levels of fish and wildlife on the existing habitats. Increasing human populations in the Uintah Basin could raise the level of use beyond that point resulting in reductions in those current population levels. Increasing human population could raise the level of use beyond the point where those game species are self-sustaining.

Increasing wildlife law enforcement, purchasing easements and access for recreation users, land exchanges, and land use changes to acquire or create high-value wildlife habitats are some ways to mitigate or avoid the aforementioned problems.

A commitment to these types of programs should be spelled out in the EIS before any development, so all involved parties are aware of what is necessary to insure that the quality of wildlife habitat remains intact in the Uintah Basin. The FWS would welcome the opportunity to work with the Utah Division of Wildlife Resources, the county governments, the companies involved, and the BLM in developing this type of mitigation plan.

This concludes our comments on the Uintah Basin synfuels draft EIS.

Comments relative to threatened and endangered species is being provided by separate letter from our Endangered Species Field Office.

cc: BLM, SLC
DWR, SLC

Clark D. Johnson

RESPONSE LETTER 25

U.S. Fish and Wildlife Service

25.1 Each site-specific analysis has a section on cumulative impacts of human population increases on wildlife populations, habitat loss due to housing construction and similar factors. As stated in the comment, indirect impacts caused by people would be as great or greater than direct impacts caused by actual project construction and operation. This point has been re-emphasized in Section R-4.A.5.

25.2 BLM has no authority to require these types of mitigation on lands other than federal lands. The mitigation measures mentioned are all valid, but cannot be required under present laws.

STATE OF COLORADO

COLORADO NATURAL AREAS PROGRAM
Department of Natural Resources
1313 Sherman Street, Room 718
Denver, Colorado 80203

Phone (303) 839-3311

Richard D. Lamm
Governor

D. Monte Pascoe
Executive Director

Carol J. Pustmueller, Ph.D.
Program Director

October 18, 1982

Mr. Lloyd Ferguson, Oistrict Manager
Bureau of Land Management
170 South 500 East
Vernal, Utah 84078

Dear Lloyd,

We request your consideration of the following comments on the Uintah Basin Synfuels Development OEIS submitted by the Colorado Natural Areas Program, Colorado Department of Natural Resources.

The Colorado Department of Natural Resources and the 8ureau of Land Management have a memorandum of understanding which describes a process for the identification and protection of those areas managed by BLM which qualify as state natural areas (e.g., possess unique natural characteristics ofstatewide or national significance).

26.1 Raven Ridge Natural Area

Raven Ridge Natural Area, a 7840 acre site seven miles south of the Town of Oinosaur, is a registered Colorado Natural Area. Raven Ridge Natural Area contains unique and endemic plant communities, including Category II and special plant species. The "Morman Gap Alternative Natural Gas Pipeline" (S-4-18) plan would cross the Raven Ridge Natural Area, disturb the existing plant communities, and negatively impact the site. We recommend that this alternative not be implemented. The Colorado Natural Areas Program should be consulted prior to any development activity within the boundaries of the Raven Ridge Natural Area.

Threatened and Endangered Species

26.2 The razorback sucker (Xyrauchen texanus) is considered endangered by the State of Colorado (R-3-43). Appropriate steps should be taken to ensure its protection.

Sclerocactus glaucus (Uintah 8asin hookless cactus) is listed as threatened; it is not a Category I species (R-3-32).

Lloyd Ferguson
October 18, 1982
Page 2

Aquatic and Terrestrial Ecosystems

26.3 The Atriplex confertifolia/Elymus ambigus plant community is identified by the Colorado Natural Heritage Inventory as a plant community of special concern for the State of Colorado. This plant community occurs about 5-15 miles east of Rangely. This vegetation could occur in the project area in Colorado on Green River shale substrate.

Thank you for your consideration of these comments. Please call me if you require additional information.

Sincerely,

Carse Pustmueller

Carse Pustmueller, Ph. D.
Director
Colorado Natural Areas Program

RESPONSE LETTER 26

State of Colorado Natural Areas Program

26.1 Please refer to the response to Comment 14.

26.2 Refer to the responses to Comments 14.1 and 14.2.

26.3 Refer to the response to Comment 14.4.

United States Department of the Interior
NATIONAL PARK SERVICE
ROCKY MOUNTAIN REGIONAL OFFICE
655 Parfet Street
P.O. Box 25287
Denver, Colorado 80225

IN REPLY REFER TO
N3615(492)

OCT 1 9 1982

Memorandum

To: District Manager, Vernal District Office, BLM

From: Regional Director, Rocky Mountain Region

Subject: Uintah Basin Synfuels Development EIS

The National Park Service has reviewed the draft Uintah Basin Synfuels Development Environmental Impact Statement. These comments incorporate by reference NPS comments of April 22, 1982 (enclosed) on the preliminary draft EIS, many of which were not addressed, and remain of concern.

General

27.1 The Bureau of Land Management's preferred alternative is to approve the rights-of-way necessary to implement all of the proposed site-specific projects. The preferred alternative is based on the assumption (pg. xxxv) that "impacts due to the development of all the applicants' proposed projects would be manageable assuming ... compliance with existing regulations". We disagree with BLM's selection of a full-development scenario as the preferred alternative given that the EIS projects significant water quality, cultural, recreational and socio-economic impacts, and particularly since the EIS acknowledges the potential for exceedances of Prevention of Significant Deterioration increments and violations of the National Ambient Air Quality Standards.

Recreation

27.2 Our primary concern with the recreation portion of the DEIS is that it only addresses the user's perception of change in recreational facilities--it does not address the legislative and regulatory mandates for preservation of those resources.

27.3 The EIS should address the impacts of increased population growth on NPS units in the project area. For example, increased population growth will likely place tremendous demands on Dinosaur National Monument's 135 front-country and 35 back-country (excluding river) developed campsites, as well as on wilderness camping opportunities. The EIS should also include a discussion of the revenue associated with the various recreation activities in the study area, and an analysis of the likely change in recreation revenue level if all projects proceed as planned.

27.4 We are concerned with the number of discrepancies in the DEIS regarding local recreational facilities which will be impacted by population growth associated

Year of the Visitor

27.4 (cont) with project development. Page xxxi indicates that municipal recreation facilities and city park areas will likely become overcrowded and over-used as a result of large population increases, and page R-3-16 states that services are already strained by oil and gas development-induced growth and will likely be further stressed during the next few years. Thus we are puzzled by the numerous statements throughout the DEIS which refer to little or no impact resulting from the population increases associated with individual projects (pp. E-4-12, M-4-14, P-4-13). It seems contradictory that an increase of 1,000 workers for the Syntana-Utah project "could affect urban recreation facilities in Vernal, Rangely, and other surrounding communities" and yet population increases of over 5,000 people for the Magic Circle project "will not have impacts on local facilities in Vernal, Roosevelt, or Rangely".

27.5 We are concerned that no mitigation measures for recreational facilities have been committed to. For example, the DEIS (pg. R-4-85) projects possible "serious adverse impacts to the quality of the wilderness experience" at Dinosaur National Monument, but does not address possible mitigation measures for this impact. There is ample precedent for provision of recreational facilities by project sponsors, and a development at this scale certainly warrants such consideration. The final EIS should include a discussion of mitigation measures and commitments from local municipalities and/or project sponsors to provide adequate recreational facilities.

27.6 The chart of recreational attractions (page R-3-47) should include "proposed wilderness" for Dinosaur National Monument. Also, the EIS should note that the quality of river-rafting through Cataract Canyon in Canyonlands National Park could be affected by reduced flows in the Green River. Further, the references to the Dominquez-Escalante Trail on pages R-4-83 and T-4-29 should be revised to note that a final study report on the Trail was sent to the Congress on April 28, 1982 recommending against designation as a unit of the National Trails System at this time.

Air Quality

27.7 The National Park Service has provided detailed air quality comments and recommendations to the Bureau on this project in writing on at least four occasions (4/22/82, 4/28/82, 5/3/82, and 6/17/82), and has had frequent telephone conversations and meetings with the Bureau's air quality staff and SAI, the air quality consultant. Many of the concerns raised by the NPS throughout the development of the DEIS have still not been adequately addressed. In general we feel it is unnecessary to reiterate all of our previous comments, and instead refer the Bureau back to previous NPS memoranda detailing specific shortcomings of the air quality analysis.

27.8 However, we again wish to go on record regarding our concern about the modeling efforts which were used in the analysis. As has been discussed in previous memoranda, we do not accept the theory advanced in the DEIS that the Gaussian Puff Model (GPM) which was used for the initial air quality analysis "is recognized to be conservative", and that the Regional Transport Model (RTM) "is the more realistic" model, particularly when the analysis extrapolates the results of one RTM analysis, which was done for one 48-hour worst-case period, to all other scenarios analyzed in the report. We are therefore pleased that the BLM, at the request of members of the Technical and Policy Evaluation Committee, has agreed to do additional RTM runs to predict impacts on Dinosaur National Monument, 27.8 (cont) the Flat Tops Wilderness Area, and the Ute Indian Reservation. The results of the additional modeling analyses should be included in the final EIS. We appreciate the opportunity to be involved in the additional analyses, and request an opportunity to review proposed revisions to the air quality sections of the document before the final EIS is published.

27.9 The final EIS should also address the discrepancies in modeling results between analyses performed for BLM for this study and those performed for BLM's prototype oil shale EIS.

Wild and Scenic River Designations

27.10 We disagree with page E-4-12 of the EIS which states that construction of the White River Dam would eliminate the river from consideration as a National Wild and Scenic River. The segment of the White River under consideration is 68 miles long, extending from the Green River to the Colorado/Utah State Line. Since the White River Dam project would involve only 13.5 miles of the river, as noted on page 2 of the FEIS for the project, it does not follow that this single project would result in elimination of the entire 68-mile segment from further consideration.

27.11 Neither do we agree with the stance taken in the DEIS which assumes completion of the White River Dam project, especially since page xxxii notes that a certain degree of uncertainty still exists as to when and if the project will be completed. The DEIS, by assuming completion of the White River Dam, tends to minimize the degree of impact to the White River from the proposed synfuels projects, even though individual projects may cause significant adverse impacts to the river environment independent of the impacts which would result from the dam. The information in the DEIS and Map R-A-1 indicate that the Paraho, Tosco, and Syntana-Utah projects will involve access roads, transmission lines, construction camps, and spent shale disposal in proximity to the river in areas not associated with the White River Dam project. The impacts from these projects could themselves result in the elimination of a portion of the White River from further consideration for a Wild and Scenic River designation, even if the White River Dam were not build. Should the dam and the synfuels projects all be completed, adverse impacts would result to much more of the White River than just the dam and reservoir area.

27.12 The Salt Lake City alternate pipeline route crosses Rock Creek in Duchesne County, which is also included on the final list of the Nationwide Rivers Inventory. We recommend that enforceable mitigation measures be adopted if this alternative is selected as part of the Magic Circle project.

Historic/Cultural Resources

27.13 The Salt Lake City alternate pipeline route also passes through Emigration Canyon, which has been registered as a National Historic Landmark in addition to its listing on the National Register of Historic Places. National Historic Landmarks have been designated as illustrative of significant events in the history of the United States, and as such should be preserved in their natural state to the greatest extent possible. The EIS should also recognize that Emigration Canyon is part of the Mormon Pioneer National Historic Trail. Installation of pipeline in the canyon should be in accord with the approved comprehensive plan for the trail (dated 9/81) which was approved and forwarded

27.13 (cont) by the Secretary to the Congress in March 1982. We encourage project sponsors to take steps necessary to minimize visual and other impacts to the historical integrity of Emigration Canyon.

27.14 The DEIS indicates that cultural resource surveys have been carried out on portions of project sites, but that surveys have not been completed for all of the project lands. Such surveys should be completed prior to ground-disturbing activities, and preferably in time to be included in project planning prior to final approval. We recommend that the final EIS include the results of cultural resource surveys and show evidence of consultation with the Utah State Historic Preservation Officer (page SS-A-6).

We appreciate the opportunity to comment on the draft EIS. If you have any questions, or if we can be of further assistance, please contact Cecil Lewis of my staff at FTS 234-3067 or Mary Ann Grasser of the Air Quality Division at FTS 234-6419.

Lorraine Mintzmyer

L. Lorraine Mintzmyer
Regional Director

Enclosure

RESPONSE LETTER 27

U.S. National Park Service, Rocky Mountain Region

27.1 The analysis in the EIS determined that adequate mitigation would be available to allow all of the projects to proceed without doing serious damage to water quality, cultural, recreation and socioeconomic values. Proper stipulations and agreements must be included in the permitting process to assure that these safeguards are taken. This would be the responsibility of the various federal, state, and local agencies responsible for issuing the various permits.

The EIS does acknowledge that the potential exists for exceedances of the PSD increments and violations of the NAAQS. To state that the potential exists does not imply that violations cannot be avoided if the projects are developed. The possible exceedances include: (1) violations of Class II incremental limitations and NAAQS for particulates due primarily to emissions from unpaved roads, and (2) possible violations of Class I SO_2 limitations at Colorado portions of Dinosaur National Monument.

Violations of particulate standards could be avoided by paving or chemical stabilization of unpaved roads that have significant traffic volumes. The potential violations of Class I SO_2 increments at Flat Tops occur only when considering high-level oil shale development in Colorado and Utah. The Colorado development scenario has the potential to violate the Class I increment without any Utah development considered. The Utah sources contribute only about 10 percent of the total impact, the other 90 percent coming from Colorado sources. PSD increment use is currently allocated on a first come, first served basis. It is up to each company applying for a PSO permit to demonstrate it will not cause or add to an exceedance of the increments. Additional SO_2 control over what is assumed in the analysis may be possible and could reduce the potential for violating the SO_2 PSD increments at Flat Tops.

Although Colorado Category I limitations are enforceable in Colorado, it is presently unclear if sources located in Utah and permitted by the State of Utah are required to meet this provision of Colorado State law. This issue is being considered by the Governors of Colorado and Utah and has yet to be resolved. Utah sources must comply with PSD Class II SO_2 increments in Colorado for which no violations were predicted. Additional SO_2 control over what is assumed in the analysis could possibly prevent the Colorado Category I limitations from being exceeded at Dinosaur.

27.2 It is unclear how legislative and regulatory mandates have been neglected. The Draft EIS addresses the following National Park Service legal mandates: (a) identifies various rivers as possible candidates for study for inclusion into the Wild and Scenic Rivers System; (b) identifies formal studies completed for the Colorado, Yampa, and White Rivers; (c) identifies the Dominguez-Escalante Trail under the National Trail System; (d) identifies potential problems with increased visitation to the Dinosaur and Colorado National Monuments and to Arches National Park; and (e) discusses potential National Park Service wilderness units.

27.3 Potential impacts to the Dinosaur and Colorado National Monuments and Arches National Park related to increased visitation upon park values are discussed in Section R-4.A.9.

Based on coordinated efforts with the National Park Service, DSC Office of Statistics, linear projections for park visitation were only available up to 1983. Under the worst-case scenario (all proposed projects proceed as planned) and prediction that visitation to the three National Park Service units within the secondary zone of influence would increase, recreation revenues (park entry fees and users fees) due to the project-related population growth in the region could increase substantially. It is the responsibility of the National Park Service to attempt to quantify this projected revenue increase, particularly in terms of future appropriations for these Park Service units, and update its linear projections beyond 1983 as well as incorporating the effects of new energy development growth within the Uintah Basin upon the National Park Service.

27.4 When assessing the impacts of each site-specific project, the statements are correct that most impacts would not be long-term and significant. However, the point raised about the discrepancy in impact analyses between Syntana-Utah's project and Magic Circle's project upon municipal recreation facilities is valid. Text revisions have been made in Section M-4.A.8 so the Magic Circle impact analysis conforms with the other site-specific analyses with similar project-related population growth.

27.5 One of the questions that has been of concern is what does the word "adequate" recreational facilities mean. The project sponsors are reluctant to define this word for various reasons including financial commitments and need for direction from local municipalities.

Additionally, local municipalities are reluctant to commit to anything until they are certain that synfuels development will actually occur in the Uintah Basin and affect their communities. Therefore, the EIS includes only uncommitted mitigation measures for recreation and wilderness impacts (refer to Appendix A-7). Concerning possible mitigation for Dinosaur National Park, refer to Appendix A-7, Measure 1 under Wilderness and Measure 2 under Recreation.

27.6 Revisions concerning the proposed wilderness status for the Dinosaur National Monument and references to the Dominguez-Escalante Trail have been updated in Section R-4.A.8 of for the Final EIS. Concerning potential adverse affects upon river rafting opportunities through Cataract Canyon in Canyonlands National Park, the water model predicts no noticeable reduction in flow this far downstream; therefore, no effects upon river running opportunities would occur.

27.7 Anticipating the issues to be addressed in air quality, the limited meteorological data base and emission source term data from a new industry, and the need to push the state-of-the-art in regional scale modeling, BLM attempted to develop the air quality analysis with as much coordination between responsible state and federal agencies as possible. An informal air quality technical advising committee was established to provide a forum for discussion of issues, concerns, and analysis results. The NPS was asked to participate in the committee along with the U.S. Forest Service, EPA, Ute Indian Tribe, and the Utah and Colorado State Air Quality Bureaus. This effort began with the development of the analysis of the scope of work and involved selection of the contractor to develop the analysis, and review and comment on the analysis results. This did indeed involve a number of meetings, phone calls, and considerable effort on the part of the committee participants (including the NPS). BLM attempted to be responsive to all comments throughout this process. It must be recognized, however, that all concerns could not be fully resolved to everyone's satisfaction. Ultimately, BLM had to make what were felt to be supportable decisions and proceed with the process.

27.8 Additional RTM runs have been performed and have been included in the Air Quality Technical Report (see response to Comment 20.14). BLM accepts the fact that the commenter does not recognize GPM as conservative and RTM as more realistic; however, the rationale for BLM's judgment that GPM is conservative is discussed in detail in Section 4.2.1.2 of the Air Quality Technical Report.

27.9 Because different models, meteorological conditions, and somewhat different emission sources and geographic regions were used for the two EIS studies, one could not expect identical results. BLM is in the process of comparing the two analyses. It should be noted that in the Final Prototype EIS, the air quality analysis has been refined by using more realistic meteorologic conditions and minor model refinements to more appropriately treat stagnated wind field effects on pollutant concentrations.

27.10 Section E-4.A.8 has been revised to clarify that only 13.5 miles of the 68-mile segment of the White River identified in the final list of the Nationwide Rivers Inventory would be eliminated from further consideration as a potential Wild and Scenic River.

27.11 Impacts of the White River Dam Project are assessed in another EIS (BLM 1982b). Rather than repeat information, this EIS refers the reader to the White River Dam EIS for impacts due to that project.

The impacts of project components located across or near the White River are discussed in the site-specific analysis of the project in question. The combined effects of all the applicants' proposed projects and other interrelated projects are discussed in the Nine-Project Cumulative Analysis (Draft EIS Regional Cumulative Analysis). The cumulative impacts of the nine projects upon future consideration of the White and Green rivers as National Wild and Scenic Rivers are discussed in Section R-4.A.B.

27.12 The point where the Salt Lake City Alternative Product Pipeline crosses Rock Creek (Milepost 68, Map T-1-2) is not part of the 23-mile segment from the Ashley National Forest boundary to its source identified on the final list of the Nationwide Rivers Inventory. Therefore, no enforceable mitigation measures can be applied to Rock Creek based on its final list status.

27.13 The National Historic Landmark status of Emigration Canyon has been clarified in Section T-3.H.9.

Emigration Canyon's status as part of the Mormon Pioneer National Historic Trail is specifically discussed in Section T-3.H.8.

27.14 Results of all project-related cultural resource surveys completed to date have been included in the EIS. As required by law, surveys would be completed prior to ground-disturbing activities. The BLM Vernal District Office has assumed full responsibility for the on-going consultation with the State Historic Preservation Officer Advisory Council (BLM 1981h).

COMMENT LETTER 28

STATE OF COLORADO

COLORADO DEPARTMENT OF HEALTH

Richard D. Lamm
Governor

Frank A. Traylor, M.D.
Executive Director

MEMORANDUM

To: Bill Wagner
Bureau of Land Managment

From: John Plog/Alan Dresser JP AD
Air Pollution Control Division

Subject: Comments: Uintah Basin Synfuels Development Report

Date: October 19, 1982

1. Draft Environmental Impact Statement August 1982
2. Draft Technical Report: Air Quality August 1982

28.1 In the development of the emission inventory for the various study sources in Utah and Colorado, it is not clear from review of Table 4-8 in the Air Quality report if TSP emissions included fugitive emissions from ongoing mining and material handling activities. In general, neither document provides a break out of the various TSP emission sources; stack and fugitive emissions from construction-operational activities to make a determination if all emission sources were accounted for. It was also not possible to compare the inventories used with other inventories available except on a total or summation basis. In this case emission rates are significantly different than those used in the Prototype Oil shale leases DEIS reviewed earlier this year.

28.2 Two significant sources in the study area in Colorado were omitted from the cummulative impact study; namely, Mack-Ute Power Plant and Southern Colorado Power Plant in Mesa County. It is also noted that two sources, Cathedral Bluffs and Superior in Colorado, SO_2 emissions used are in excess of the Colorado standard of 0.3 lb SO_2 per barrel of oil produced.

28.3 The section on Site Specific Analysis in the DEIS reported significantly different emissions from some criteria pollutants than was used in the Air Quality report for Magic Circle, Paraho Ute, Geokinetics and Sohio. Minor differences were noted for some of the other sources. We feel the inventories used should be the same in both documents or the differences explained.

4210 EAST 11TH AVENUE DENVER,COLORADO 80220 PHONE (303) 320-8333

28.4 The Air Quality report included Enercor PR Springs, but not Enercor Rainbow site, even though both sites were addressed extensively in the DEIS. Is there any reason for this omission?

28.5 It was also noted that particulate emissions were not separated in the respirable and non-respirable fractions.

28.6 P.2-4 How were the upper air winds measured at Denver, Grand Junction, Salt Lake City, and Lander averaged? I assume the Grand Junction measurements carried more weight than the others.

28.7 P.2-7 How was the wind data at 150 m, 300m, 500m, and 1000m derived at the White River Oil Shale Project, Cathedral Bluffs, and Craig?

28.8 P.2-10 How was the stability at 500m determined at the above sites?

28.9 P.4-60 The report states for both Colorado and Utah facilities, the data collected at the site closest to the facility (C-a, C-b, U-a, or U-b) was used. If the closest monitoring site was in a significantly different terrain setting the sites whose terrain settings were most representative of that of the facilities were used. Were wind directions adjusted to reflect the valley orientation (and therefore drainage and up-valley flow) of the site being modeled?

28.10 4-70 It would seem the upper air winds at 6000 feet above ground-level have too great of influence on the gridded wind field. Using winds at a lower level, closer to the effective plume height of emissions, might better represent the transport of pollutants. In many cases there will be some horizontal wind shear with height.

28.11 P.5-103, P.5-110 The TSP impacts at Dinosaur National Monument are three times higher than those of SO_2, yet according to pages 4-9 and 4-12 SO_2 emissions are greater than particulate emissions. At this distance effective plume heights shouldn't have a great effect. Why the discrepancy?

28.12 Chapter 6. It would have been helpful if the tables summarizing the PSD increment consumption by the 5 proposed oil shale facilities included a column giving the Class 2 increment consumption at receptors of maximum impact in Colorado.

We look forward to reviewing the three additional RTM model runs which will provide additional information on "worst case" impacts at Flat Tops Wilderness Area and Dinosaur National Monument. Without these analyses it is impossible to comment further.

JP/AD/na

Colorado Department of Health

28.1 Table 4-8 is applicable to Utah area sources and excludes sources engaged in mining and material handling activities. No significant point sources for mining and material handling activities were located in Utah. PEDCo, however, included existing point source fugitive dust emissions from mining and material handling in the Colorado portion of the study region.

Emission rates are different from those used in the Prototype Oil Shale EIS (and other reports) as a result of the evolving state of the oil shale industry's plans for development and changes in proposed processes. As a result, the two studies used different assumed production levels and proposed project development scenarios. There were also incorrect values in the summation table (Table 4-5) which have been corrected in the Final Air Quality Technical Report and the Final EIS. The values appearing in final documents were the emission source terms used in the modeling analysis.

BLM air quality specialists in Colorado and Utah are in the process of comparing the two studies.

28.2 It is BLM's understanding that the Colordo-Ute proposal for its South-West Project was for a 500-MW power plant with a preferred site at Mack, Colorado and an alternative site near Oelta, Colorado. The Delta alternative site has been called both the Southern and Southwest power plant site. It is also BLM's understanding that Colorado-Ute has withdrawn from the project and has put the entire project on indefinite status, so the viability of a power plant at either site appears questionable at the present time.

The emission source terms used for the Superior and Cathedral Bluffs facilities were approximately 0.55 and 0.48 lbs. per barrel, respectively, which was the best information available to PEOCo at the time their study began. To the best of our knowledge, PEDCo considered both of these facilities as retorting (Colorado limitation 0.3 lbs/bbl)only, rather than retorting plus upgrading (Colorado limitation 0.3 + 0.3 equaling 0.6 lbs SO_2 per barrel). If the SO_2 emission estimates developed by PEOCo for Cathedral Bluffs and Superior in Colorado were found to violate Colorado SO_2 emission limits during permit reviews, then charges to each source would be necessary before the sources could be permitted. Using the PEDCo emission factors, the existing analysis is on the conservatively high side, and impacts would be reduced in relation to the differences in the assumed emissions in the EIS study and those actually permitted as a result of the regulatory process.

28.3 The emission rates in Tables M-1-5 and P-1-6 for Magic Circle and Paraho are different than the rates given in the Air Quality Technical Report, because they were revised by the applicants too late to be considered in the air quality analysis. (See responses to Comments 16.35 and 30.27.)

The Sohio emissions in Appendix A-3 are different from those given in the Air Quality Technical Report only for particulate matter. The Air Quality Technical Report used a revised number, and the Final EIS includes this revised particulate emission rate.

The emission rates for Geokinetics are consistent. The EIS divides the emissions between the Agency Draw and Lofreco projects. The emissions in the Air Quality Technical Report are the combined emission rates.

28.4 As explained in Section 4.1.1, the Air Quality Technical Report includes emissions from both the P.R. Springs and Rainbow sites.

28.5 It is true that particulate emissions are not separated into respirable and non-respirable fractions. Current particulate standards and incremental limitations are for total (respirable and non-respirable) suspended particulates. Because respirable and non-respirable particulates may have different health effects, EPA is considering a standard for respirable particulates only. It is likely that additional health related information could be obtained by estimating impacts separately. It is also noted that a high degree of uncertaintly would exist in any estimate of the fractions of non-respirable and respirable particulates due to the uncertainty of particle size distributions.

28.6 An unweighted vector-averaging procedure was used in the "composite" model.

28.7 Wind data were determined from pilot (weather) balloon (pibal) or radar wind sounding (rawinsonde) measurements.

28.8 Stability was determined from temperature gradient information and was classified by stability category using the Nuclear Regulatory Commission Regulatory Guide 1.23 criteria.

28.9 If a facility is located in a valley oriented differently than the closest monitoring station, then the next closest monitoring station not located in a valley was used.

28.10 The shear wind height is accounted for automatically within the model.

28.11 It is not clear why the commenter feels that effective plume heights should not have a great effect at Oinosaur National Monument. BLM believes the higher TSP impacts are due to differences in emission density distributions and effective plume heights.

28.12 This proposed addition to tables in Section 6 of the Air Quality Technical Report has been made.

COMMENT LETTER 29

UTAH POWER & LIGHT COMPANY
1407 WEST NORTH TEMPLE STREET
P. O. BOX 899
SALT LAKE CITY, UTAH 84110
801 535-4261

THOMAS W. FORSGREN
ASSISTANT CORPORATE SECRETARY

October 20, 1982

Mr. Lloyd Ferguson
District Manager
Bureau of Land Management
170 South 500 East
Vernal, Utah 84078

Dear Mr. Ferguson:

29.1 Utah Power & Light Company ("Utah Power" or "Company") is in receipt of that certain Draft Environmental Impact Statement ("EIS") for the Uintah Basin Synfuels Development dated August, 1982, and prepared by the Bureau of Land Management ("BLM"). We note in reviewing the same that the proposed power source for several of the projects is Deseret Generation & Transmission Co-Operative's ("DG&T") Bonanza Power Plant located in Uintah County, Utah. We take this opportunity to notify you that in our judgment DG&T may not lawfully serve the Enercor, Enercor-Mono Power, Magic Circle, Tosco or Geokinetics projects ("subject projects") for the following reasons:

1. Utah Power has a franchise from Uintah County and Certificate of Convenience and Necessity No. 6492 from the Public Service Commission of Utah ("Commission") authorizing the Company to serve all of Uintah County except as limited by Commission Certificate No. 1755 which grants to Moon Lake Electric Association ("Moon Lake") the right to serve exclusively the electrical requirements in the area described in the attached Exhibit "A" and jointly serve with Utah Power the electrical requirements in the area described in the attached Exhibit "B." Included within the exclusive service area of Moon Lake described in Exhibit "A" are the proposed Syntana and Paraho Projects. None of the proposed projects appear to be within the joint service area of Utah Power and Moon Lake. Inasmuch as DG&T is neither franchised nor certificated in the area in which the subject projects are located, rendering

29.1 (cont) electric service to them as specified in the EIS would be without right and contrary to law.

2. Additionally, the Commission, in its Report and Order in Case No. 81-506-01 regarding the Bonanza Plant, found that the construction and operation of the plant would not compete or interfere with other existing certificated public utilities in the State of Utah and based upon that finding, authorized construction and operation of the plant. Serving the aforementioned projects from the Bonanza Plant would be in direct conflict with the terms of the Order because such service would he in competition and interfere with the existing certificated service territory of Utah Power.

Based on the above, Utah Power submits that DG&T may not lawfully serve the electrical needs of the subject projects and, accordingly, the EIS does not accurately represent the impact that may occur to the subject Federal lands insofar as power supply for the five aforementioned projects is concerned.

If you desire further information regarding this matter or wish to discuss the same, please so advise.

Very truly yours,

Thomas W. Forsgren
THOMAS W. FORSGREN

TWF:hlr
cc: Roland G. Rohison
Merrill J. Millett

EXHIBIT "A"

EXCLUSIVE AREA

Beginning at the Northeast corner of Township 3 North, Range 25 East, SLBM, being the common boundary point between Utah, Wyoming, and Colorado, thence West along the Utah-Wyoming boundary to the Northwest corner of Township 3 North, Range 24 East SLBM, thence South along the West line of Range 24 East to the Northeast corner of Section 12, Township 2 North, Range 23 East, SLBM; thence West along the North line of Sections 12,11,10,9,8,7, to the Northwest Corner of Section 7, Township 2 North Range 23 East; thence South along the West line of Section 7 to the Southwest corner of said Section 7, Township 2 North , Range 23 East, SLBM; thence West along the South line of Section 12, 11, 10 of Township 2 North, Range 22 East, SLBM, to the intersection of said line with the Green River in said Section 10; thence in a general Westerly direction along said Green River to the intersection of the Green River with the West line of Range 21 East, Township 2 North, SLBM, said point being further described as approximately the Southeast corner of the Northeast 1/4 of Section 24, Township 2 North, Range 20 East; thence South along the West line of Range 21 East in Township 2 North and Township 1 North to the intersection of said West Range line with the Boundary line between Daggett and Uintah Counties; thence Easterly along the Daggett-Uintah County line to the intersection of said county line with the North line of Township 1 South, Range 22 East, SLBM, said point being further described as approximately the Northwest corner of the Northeast 1/4 Northwest 1/4 Northeast 1/4, Section 4, Township 1 South, Range 22 East, SLBM: thence East along the South line of Township 1 North across Ranges 22 E, 23 E, 24 E, and 25 E, SLBM to the Utah-Colorado Boundary; thence North along the Utah-Colorado Boundary to the point of beginning.

Also, beginning at the Northeast corner of Township 9 South, Range 25 East, SLBM and running thence West along the North line of Township 9 South of Ranges 25 East and 24 East, SLBM, to the Northwest corner of Township 9 South, Range 24 East, SLBM; thence South along the West line of Range 24 East, SLBM of Township 9 South, 10 South, 11 South, and 12 South to the Southwest Corner of Township 12 South, Range 24 East, SLBM; thence East along the South line of Township 12 South of Range 24 East and 25 East to the Southeast corner of Township 12 South, Range 25 East, SLBM; thence North along the Utah-Colorado Border to the point of beginning.

Also, beginning at the Northeast corner, Township 5 South, Range 23 East, SLBM, running thence South along the East line of Range 23 East, Township 5 South, and Township 6 South, to the Southeast corner, Township 6 South, Range 23 East, SLBM; thence East along the North line of Township 7 South, Range 24 East to the Northeast corner of Section 2, Township 7 South, Range 24 East, SLBM; thence South along the East line of Section 2, 11, 14, 23, 26, 35, to the Southeast corner Section 35, Township 7 South, Range 24 East, SLBM; thence West along the South line of Section 35 and 34, Township 7 South, Range 24 East, to the Northeast corner, Section 4, Township 8 South, Range 24 East, SLBM; thence South along the East line of Section 4, 9, and 16 to the Southeast corner Section 16, Township 8 South, Range 24 East, SLBM; thence West along the South line of Section 16, 17 and 18, to the Southwest corner Section 18, Township 8 South, Range 24 East, SLBM; thence South along the East line of Section 24, Township 8 South, Range 23 East, SLBM to the Southeast corner of said section; thence West along the South line of Section 24, 23, 22, 21, 20, and 19, Township 8 South, Range 23 East and Section 24, 23, 22, 21, 20 and 19, Township 8 South, Range 22 East, SLBM; thence South along the East line of Section 25 and 36, Township 8 South, Range 21 East, and continuing South until said line intersects with the White River being in the Northeast corner of Township 9 South, Range 21 East; thence Westerly along the White River across Township 9 South, Range 21 East, SLBM to a point where the White River intersects the East line of Township 9 South, Range 20 East being in the Northwest corner of Township 9 South, Range 21 East; thence South along the East line of Range 20 East, Township 9 South and Township 10 South to the Southeast corner of Section 13, Township 10 South, Range 20 East, SLBM; thence West along the South line of Section 13, 14, 15, 16, 17 and 18 to the Southwest corner Section 18, Township 10 South, Range 20 East SLBM; thence North along the West line of Range 20 East, Township 10 South, and Township 9 South to a point approximately the Southwest corner Section 18, Township 9 South, Range 20 East, SLBM; thence in a Northwesterly direction along what is commonly known as the Pariette Draw, being in Township 9 South, Range 19 East SLBM, to a point where said Pariette Draw intersects the South line of Township 8 South, Range 18 East, SLBM, said point being approximately Southwest corner, Section 36, Township 8 South, Range 18East, SLBM; thence West along South line of Township 8 South, Range 18 East SLBM, and Township 8 South, Range 17 East, SLBM to the Southwest corner Township 8 South, Range 17 East, SLBM; thence North along West line of Township 8 South, Range 17 East, SLBM to the Northwest corner, Section 19, Township 8 South, Range 17 East, SLBM; thence Easterly to the Southeast corner Section 19, Township 4 South, Range 1 West, USM; thence North along the West line of Township 4 South, Range 1 West, USM to the Northwest corner of Township 4 South, Range 1 West, USM; thence West along the South line of Township 3 South, Range 2 West, and Township 3 South, Range 3 West, USM to the Southwest corner Township 3 South, Range 3 West, USM; thence North along the West line of Township 3 South, Range 3 West to the Northwest corner, Township 3 South, Range 3 West, USM; thence West along the South line of Township 2 South, Range 4 West, USM and Township 2 South, Range 5 West, USM to the SW corner, Township 2 South, Range 5 West, USM; thence North along the West line of Range 5 W, Townships 2 South, 1 South, 1 North, 2 North, 3 North and 4 North to a point where said line intersects the Duchesne County line; thence Easterly along the Duchesne County line to a point where said line intersects the Uintah County line, said point being in Township 5 North, Range 1 West, USM; thence South along the Duchesne-Uintah County line to a point where said line intersects with the South line of Township 4 North, Range 1 West, USM; thence East along the North line of Township 3 North, Range 1 West, USM to the Northeast corner of said Township 3 North, Range 1 West, USM; thence in a Southeasterly direction to the Northwest corner of Township 3 South, Range 19 East, SLBM; thence East along the North line of said Township to the Northeast corner, Township 3 South, Range 19 East, SLBM; thence South along the East line of Range 19 East of Township 3 South, Township 4 South, Township 5 South, to the Southeast corner Township 5 South, Range 19 East, SLBM; thence East along the South line of Township 5 South, Ranges 20 East, 21 East and 22 East to the Southwest corner, Section 34, Township 5 South, Range 22 East, SLBM; thence North along the West line of Section 34, 27, 22, 15, 10 and 3, Township 5 South, Range 22 East to the Northwest corner, Section 3, Township 5 South, Range 22 East, SLBM; thence East along the North line of Township 5 South, Range 22 East and 23 East to the Northeast Corner Township 5 South, Range 23 East, SLBM the point of beginning.

EXHIBIT "B"

JOINT AREA

Beginning at the Northeast Corner Township 1 South, Range 25 East, SLBM, which point is common to the Utah-Colorado Boundary, thence West along the North Boundary of Township 1 South, to a point where the said line intersects the Daggett-Uintah County line; said point being further described as being approximately the Northwest Corner NE 1/4 NW 1/4 NE 1/4, Section 4, Township 1 South, Range 22 East, SLBM; thence in a Westerly direction along the Daggett-Uintah County line to a point where said boundary line intersects the center line of Township 1 North, Range 21 East, SLBM; thence South to the SW corner, Section 34, Township 1 South, Range 21 East, SLBM; thence East to the Northwest Corner Section 3, Township 2 South, Range 22 East, SLBM; thence South to the SW Corner Section 34, Township 4 South, Range 22 East, SLBM; thence East to the Northeast Corner Township 5 South, Range 23 East, SLBM; thence South to the Southeast Corner, Township 6 South, Range 23 East, SLBM; thence East to the Northeast Corner Section 2, Township 7 South, Range 24 East, SLBM; thence South to the Southeast Corner Section 35, Township 7 South, Range 24 East, SLBM; thence West to the Northeast corner Section 4, Township 8 South, Range 24 East, SLBM; thence South to the Southeast Corner Section 16, Township 8 South, Range 24 East, SLBM; thence West to the Southwest Corner Section 18, Township 8 South, Range 24 East, SLBM; thence South to the Southwest Corner Township 8 South, Range 24 East, SLBM; thence East to the Southeast corner Township 8 South, Range 25 East, SLBM; thence North along the Utah-Colorado Boundary to the point of beginning.

Also: Beginning at the Northwest Corner Township 3 South, Range 5 West, USM; running thence East to the Northeast Corner Township 3 South, Range 4 West, USM; thence South to the Southeast Corner Township 3 South, Range 4 West, USM; thence East to the Northeast Corner Township 4 South, Range 2 West, USM; thence South to the Southeast Corner Section 24, Township 4 South, Range 2 West, USM; thence Westerly to the Northeast Corner Section 24, Township 8 South, Range 16 East, SLBM; thence South to the Southeast Corner, Township 8 South, Range 16 East, SLBM; thence West to the Southwest Corner Township 8 South, Range 16 East, SLBM; thence North to the Northwest Corner Section 31, Township 8 South, Range 16 East, SLBM; thence Westerly to the Southeast Corner Section 34, Township 4 South, Range 3 West USM; thence West along the South line of Township 4 South to a point where said line intersects the Wasatch-Utah County boundary being in Section 33, Township 4 South, Range 12 West, USM; thence Northerly along the Wasatch-Utah County boundary to a point where said boundary intersects the North line of Township 3 South being in Section 6, Township 3 South, Range 12 West, USM; thence East to the Southwest Corner Section 33, Township 2 South, Range 12 West, USM; thence North to the Northwest Corner Section 4, Township 2 South, Range 12 West, USM; thence East to the Southwest Corner Section 34, Township 1 South, Range 11 West, USM, thence North to the Northwest Corner Section 3, Township 1 South, Range 11 West, USM; thence East to the Southwest corner, Township 1 North, Range 9 West, USM; thence North to the Northwest Corner Section 7, Township 1 North, Range 9 West, USM; thence East to the Northeast Corner Section 8, Township 1 North, Range 9 West, USM; thence North to the Northwest Corner Section 4, Township 1 North, Range 9 West, USM; thence East to the Northeast Corner Section 4; Township 1 North, Range 9 West, USM, being the common boundary point between Wasatch and Duchesne Counties; thence North along said county boundary to the Northwest Corner Section 3, Township 2 North, Range 9 West, USM: thence East to the Northeast Corner Township 2 North, Range 8 West, USM; thence North along the East range line of Range 8 to a point where said line intersects the Duchesne County-Summit County line; thence Easterly along said boundary line to a point where said boundary intersects the East range line of Range 6 West in Township 4 North; thence South along said East line of Range 6 West to the Northwest Corner Township 3 South, Range 5 West, USM the point of beginning.

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RESPONSE LETTER 29

Utah Power and Light Company

29.1 The matter of service area jurisdiction apparently is subject to further discussion and debate between Utah Power and Light Company, Moon Lake Electric Association, and the appropriate regulatory officials. The comment provides pertinent information from Utah Power and Light Company. Also, BLM has been advised that on October 2, 1981, Moon Lake Electric Association filed with the Utah Public Service Commission an application to place much of the territory in question into Moon Lake's designated service area. Moon Lake Electric Association filed the application for a number of reasons, not the least important of which is the physical location of the Bonanza Power Plant and the proximity of Moon Lake's facilities to the area.

The power sources listed in the EIS for each project are based on project descriptions furnished by the project sponsors. BLM has not revised that information for the Final EIS; however, it is anticipated that project sponsors may need to revise their power source plans in the future, depending on the outcome of further regulatory discussions regarding service area jurisdiction. Supplementary environmental assessment may be needed at that time if any such changes necessitate new right-of-way alternatives.

ENVIRONMENTAL DEFENSE FUND

October 18, 1982

Lloyd Feguson
Bureau of Land Management
Utah State Office
136 East South Temple
Salt Lake City, UT 84111

Dear Mr. Ferguson:

Enclosed please find a copy of our comments concerning the Draft Environmental Impact Statement of the Uintah Basin Synfuels Development. Please send a copy of the final EIS as well as any related decisions you might make. Please note that the enclosed comments are being filed on behalf of National Wildlife Federation and Friends of the Earth.

Sincerely,

Robert E. Yuhnke
Regional Counsel

Richard Hughes
Legal Intern

REY:ob

cc: R.J. Gollen (NWF)
K. Markey (FOE)

1405 Arapahoe Avenue Boulder, Colorado 80302 (303) 440-4901
OFFICES IN: NEW YORK, NY (National Headquarters); WASHINGTON, DC; BERKELEY, CA; RICHMOND, VA; BOULDER, CO

Comments

from

Environmental Defense Fund

National Wildlife Federation

Friends Of Earth

Re: Uintah Basin EIS

Submitted by:

Robert E. Yuhnke
Regional Counsel

Richard Hughes
Legal Intern

October 18, 1982

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insufficiently described.

5.2.2 The EIS fails to provide insurance of scientific integrity by using methods contrary to current scientific understanding.

5.2.2.1 Non-linear impacts are additively combined.

5.2.2.2 Long-range impacts are not included in the modeling domain.

5.2.2.3 The tiered used of CTWM, GPM and RTM leads to synergistic error and may involve incompatability.

5.2.2.4 Comparisons are made between model predictions, rather than between predictions and observations.

5.2.3 The EIS fails to provide support for conclusions reached and methods used.

5.2.3.1 There is insufficient support for the method of determining upper and lower bounds for concentrations.

5.2.3.2 Conclusions reached concerning compatability of m are unsupported and contradicted by the data reported in the EIS.

5.3 The EIS fails to provide an insurance of the scientific integrity of the CTWM model.

5.3.1 Characterization of regional wind direction was inaccurate.

5.3.2 Temporal interpolation of regional wind

direction yielded unrepresentative results.

5.3.3 Characterization of the slope wind was inaccurate.

5.3.4 Scaling and linear combination of windfields is mathematically unsound.

5.3.5 "Verification" of CTWM is insufficient.

5.3.6 To the index.

5.3.6 Recommended Application of CTWM.

5.4 Improper assumptions are made in the course of the modeling procedures.

5.4.1 Fields known to vary spatially are assumed to be uniform.

5.4.2 Acid deposition estimates rely on unfounded and unrealistic assumptions.

5.4.3 Deposition notes fail to consider variation in preciitation rates.

5.5 Models are used which are inappropriate for the application. (HC's)

5.5.2 The EKMA Model is not properly applied in the oil shale region.

6. Summary

7. Appendix A

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1. Introduction.

The following comments are filed on the Draft Environmental Impact Statement for the Uintah Basin Synfuels Development on behalf of the Environmental Defense Fund (EDF) and its members. EDF is a charitable, non-profit, public membership organization, composed of scientists, lawyers, economists, educators and other concerned citizens dedicated to the protection and enhancement of human health and the environment through research and education and through judicial, legislative and administrative action. Organized under the laws of the State of New York, EDF maintains regional offices in Boulder, Colorado; Washington, D.C.; and Berkeley, California. EDF has 46,000 active members nationwide, of whom more than 1,000 reside in Colorado and Utah.

30.1 The Draft Environmental Impact Statement for the Uintah Basin Synfuels Development, hereinafter called the Uintah DEIS, fails to meet the standards required by statute and regulation. The National Environmental Policy Act requires that the EIS provide information that is useful in restoring, maintaining and enhancing the quality of the environment.' 42 U.S.C.4332 (G). This EIS violates the usefulness requirement of the act.

30.2 Federal regulations governing the preparation of EIS's require that the statement "provide full and fair discussion of significant environmental impacts." 40 CFR 1502.1. Because of its failure to discuss several significant impacts, such as (1) the impact of secondary and hydrocarbon emissions on visibility and ozone formation, (2) the impact of emissions on Class I areas and Colorado Category I areas other than the Flattops Wilderness Area, such as Dinosaur National Monument and Colorado National Monument, (3) the impact of emissions on hydrogen ion deposition ("acid rain") in sensitive areas outside the so-called study area, and (4) the impact of TSP emissions and secondary sulfates on the non-attainment area in Grand Junction the EIS cannot be considered a full discussion of significant impacts. Because of the one-sided nature of the discussion of model "conservatism" and the effect of model assumptions, the EIS cannot be considered a fair discussion.

30.3 The regulations specify the criterion by which the sufficiency of the discussion of the affected environment is to be judged. It must provide that information "necessary to understand the effects of the alternatives." 40 C.F.R. 1502.15. Because of a failure to provide more than a cursory, incomplete, unscientific, and, in some cases, unintelligible discussion of present regional air quality, current and projected emissions and projected impacts, the EIS does not provide information necessary to an understanding of the alternatives.

Nor does the DEIS offer an adequate set of alternatives. In terms of both national policy alternatives to expanded oil shale development and local siting alternatives which would result in significant differences in the air quality impacts of proposed

30.3 (cont) sources, reasonably available alternatives are not considered.

Applicable federal regulations require that the "information must be of high quality. Accurate scientific analysis...(is) essential." 40 C.F.R. 1500.1.

30.4 Agencies shall insure the professional integrity, including scientific integrity, of the discussion and analysis in environmental impact statements. They shall identify any methodologies used and shall make explicit reference by footnote to the scientific and other sources relied upon for conclusions in the statement.

40 C.F.R. 1502.24.

These requirements are violated by the many instances of the failure to use sound scientific methods, to describe methodology, to justify conclusions and to cite sources.

30.5 2. Executive Summary

The draft EIS for the Unitah Basin Synfuels Development does not comply with federal statutory and regulatory requirements. Its major deficiencies are:

1. A failure to provide an adequate regional alternatives analysis.

2. A failure to specify methodologies or reconcile inconsistencies in the background air quality data and emissions data.

3. A failure to provide important backround air quality data, and emissions data.

4. Reliance on insufficient data and on improper assumptions when doing a worst case analysis.

5. Failure to describe modeling methodologies sufficiently to allow a reviewer to understand and meaningfully comment on the analyris.

6. The use of unscientific methods, improper assumptions and inappropriate models in the computer modeling of impacts.

7. One-sidedness in analysis of models results.

The remainder of these comments will discuss these deficiencies in particular.

EDF requests that these deficiencies be remedied prior to release of a final EIS. Failure to corrct these deficiencies, 30.5 (cont) we believe, will render the EIS record insufficient, as a matter of law, for the purpose of sustaining final agency action on the pending rights-of-way and other decisions which may be made in reliance on this EIS.

3. The EIS fails to identify and analyze reasonably available alternatives.

The alternatives identified for analysis in theDEIS are extremely limited and do not emcompass the scope of alternatives contemplated by NEPA. The deficiencies in the alternatives analysis are of two kinds: 1) the failure to consider alternate fuel sources as a substitute for oil shale development, and 2) the failure to consider the air quality impacts of alternate siting and technology options for projects not yet permitted or under construction, including the proposed C-11 and C-18 lease sites. The CEQ's NEPA regulations clearly outline the scope of the alternatives analysis. Together, 40 CFR SS 1502.14-.16 outline both the the types of comparisons to be made and the types of alternatives to be considered. 40 CFR S 1502.14 requires that "agencies shall (a) rigorously explore and objectively evaluate all reasonable alternatives..." The alternatives and comparisons to be analyzed as identified in 40 CFR S 1502.16 include, among others,

30.6

(d) the environmental effects of alternatives...,

(e) energy requirements and conservation potential of various alternatives and mitigation measures...,

(f) natural or depletable resource requirements and conservation potential of various alternatives and mitigation measures; and

(h) means to mitigate adverse environmental impacts...

Taken together, EDF contends that significant alternatives are available and should be evaluated to compare the impacts of each alternative on 1) the environment, 2) energy resources consumed to produce the energy product and 3) the need for development of the resource given available conservation options. These alternatives will be addressed as "national policy alternatives," and "regional development alternatives."

A. National Policy Alternatives.

30.7 The Secretary of Interior has statutory contol over the leasing and development of all federal energy resources. His responsibilities include the rate and geographic scope of leasing, on-shore and off-shore oil and gas leasing oil, shale and tar sands leasing. Each of these energy resources is subject to a separate statutory and regulatory scheme. But each will have significant impacts on the human environment, and each will contribute to the nation's total supply of liquid, gas and solid

fuels. Given the Secretary's control over the development of each of these resources, he is in a unique position to evaluate and compare the respective environmental impacts of each form of energy development, as well as the energy costs and other economic impacts which will be associated with each form of energy development.

Oil shale development will contribute mostly to the nation's supply of liquid fuels. The need for any additional oil shale development should be considered within the scope of the "no action" alternative. The current price of liquid fuels is largely the result of reduced worldwide demand. 1 / Reduced demand in the U.S. is, in part, a result of significant conservation in both the space-heating and transportation demand sectors. 2 / Reduced domestic demand has continued the trend of lowered annual imports. 3 / The reduced price has strongly influenced industry decisions to invest in synfuels projects, particularly oil shale. 4 /

30.7 (cont) The directive in the CEQ regulations that conservation be treated as a reasonable alternative to the development of natural, depletable resources should be taken seriously by the Secretary. Conservation should be evaluated as an alterantive to additional oil shale development. At a minimum, the nation's need for liquid fuels should be evaluated in light of the effects of 1) current law requiring substantial improvements in vehicle fuel efficiency by 1985, 2) reasonable programs for retrofitting residential and commercial structures with insulation and other energy-saving conservation measures, 3) adopting energy efficiency performance standards for new residential and commercial construction, and 4) the technological advances in secondary and tertiary oil production and coal liquification. It makes no sense to invest in mammoth energy products which will have predictable adverse impacts on human health from air pollution, cause "acid rain" and associated impacts on land, water and wildlife resources, impair visibility and otherwise degrade pristine environments in order to make heat that escapes out the window. If conservation alternatives can reduce or eliminate the need for further oil shale development, they will be the most effective mitigation measures, and must be considered as reasonable alternatives under NEPA. The fact that conservation alternatives may not be within the jurisdiction of the Secretary is irrelevant. The CEQ regulations make clear that the alternatives analysis must "include reasonable alternatives not within the jurisdiction of the lead agency." 40 CFR 1500.14(c).

1) Transportation

A starting point for an adequate conservation analysis should be the opportunities for reducing consumption of liquid fuels in the private transportation sector. Energy policy justifications for government support and expansion of oil shale development have been: to plug the capital drain from the United States; to reduce threats to national security; and to improve

30.7 (cont)

regional economic conditions.[5] Rather than investing resource dollars into oil shale development, these national security and energy efficiency improvement benefits may be more economically achieved by investing a fraction of the same capital into the U.S. automotive industry. Improving the efficiency of the U.S. vehicle fleet will meet energy policy objectives at a lower cost than oil shale development, while maintaining, if not raising the quality[6] of the natural environment and the economic health of the auto industry.

Recent research shows that vast quantities of oil are available from automobile manufacturers in Detroit. In an article published in Scientific American "The Fuel Economy of Light Vehicles" by Gray and VonHippel[6], the authors describe the technical feasibility of producing energy efficient automobiles which take into account demographic changes as well as evaluating improved automobile design by use of available best technologies and reasonably anticipated new technologies.[7] They suggest that a 60 mpg vehicle fleet, by 1995, is possible without major technological advances.[8] By the year 2000, fuel consumption would be two-thirds that of 1980 or approximately two million (m) barrels/day (bbl/d).[9] These fuel savings would be roughly more than twice the energy content of the Trans Alaska Pipeline.[10]

The economics of improved automotive efficiency are quite favorable when compared to investment in oil shale development. A 1980 Congressional Budget Office (CBO) study estimates that the incremental investment necessary to improve fleet fuel economies to 40 mpg ranges from $10-$27.5 billion (b) ($1980).[11] Savings resulting from a 40 mpg fleet, when compared to the 23 mpg standard,[12] are .5mbbl/day in 1990, 1mbbl/day in 1995, and close to 2mbbl/day in the year 2000.[13]

By comparison, the U.S. Office of Technology Assessment (OTA) estimates that the cost of a 1mbbl/day oil shale production facility could easily reach $456 ($1979).[14] Output is syncrude, which would then require additional energy and capital for conversion to useable liquid fuels.

The comparison of investment alternatives is: a maximum investment of $27.5 b ($1980) to save 1 mbbl/d in 1995 of liquid fuels versus $45 b ($1979) to produce 1 mbbl/d of syncrude.[15]

The policy goals of improved energy efficiency, reduced military tensions, improving regional economic conditions, and avoiding further degradation to the natural environment can be more economically achieved by revitalizing the U.S. automobile industry through judicious investment in efficiency improvements. These goals may or may not be achieved by public investment or pursuant to Congressional extensions of the fuel efficiency standards. But in either case, continued technological advances are likely to continue achieving redutions in consumption thereby keeping the price of liquid fuels in line with current real costs. At current prices, oil shale is not profitable. See OIA

30.7 (cont)

report. Absent evidence that the demand for liquid fuels cannot be met by other supplies, or that oil shale can become profitable in the near term, the Secretary should not risk the drastic environmental consequences that can result from increased oil shale development beyond that level currently planned by the industry.

2) Residential energy conservation

Energy conservartion measures in existing residential dwellings offer great opportunities for improving end-use energy efficiency. A variety of institutions have recognized the potential and made efforts to encourage or institute conservation programs. The U.S. Congress has directed DOE to develop the Residential Conservation Service (RCS) which sets guidelines for utility sponsored programs which will provide financing and installation of conservation and solar retrofit measures.[16] Many major electric utilities have instituted conservation programs designed especially for existing homes. Pacific Power and Light (PP&L) and TVA provide free and comprehensive home energy audits as well as information on finance arrangements and contractors to do the job. TVA offers interest free loans for conservation measures. The state of Oregon requires its utilities to finance retrofits themselves.[17] The major California electric utilities now offer zero and low interest loans as well as technical assistance to its customers.[18] Even General Public Utilities Corporation, the principle owner of the Three Mile Island Nuclear power plant has most recently instituted a conservation program which includes energy audits and minor installation done free of charge.[19]

The growing trend of utility participation in residential and commercial energy conservation programs indicates their recognition of both the large technical potential to conserve energy as well as the economic attractiveness of conservation being the least cost alternative to pursue. Appendix A lists major utility sponsored conservation programs.

3) Building performance guidelines

Several research organizations have investigated the effect of implementing various energy efficient building guidelines. Their performance guidelines, which are usually expressed in kWh/ft.2, apply to the whole building and provide great flexibility in design and implementation. Important work has been done by U.S. Department of Energy (DOE); Lawrence Berkeley Laboratory (LBL); American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE): and American Institute of Architects Research Corporation (AIARC).

In the DOE program minimized life cycle costs are the basis for the standards. A computer model is used to determine changes in heat transfer within the prototype unit for each measure added. The measures included in the model are designed to improve the thermal integrity of the building and be economically justifiable while maintaining, (or improving) human comfort. A comparison is made between the increased investment in energy conservation and the dollar (energy) savings during the life of the building. The energy requirements necessary to meet the efficient standards are referred to as the Design Energy Budget.

In this model conservation measures are added in order of decreasing benefit cost ratio (i.e., the ratio of dollar savings in energy to costs of conservation measure) until the ratio is just equal to one. The Design Energy Budget is the energy budget that minimizes life cycle cost. It is described in terms of BTU/ft2/yr. The model prepares energy budgets for different cities and building types. DOE has termed these energy budget as Building Energy Performance Standards (BEPS). They were issued in November 1979 in a Notice of Proposed Rule-making on Energy Performance Standards for New Building.20/

Sensitivity of performance standards to different building parameters and their applicability to different housing types are two of many issues still subject to discussion. But in its evaluation, LBL shows that BEPS are relatively insensitive to most variation in house design.21/

30.7 (cont) Although the DOE BEPS program was not implemented, the institutes and organizations listed above report that the technical potential for energy conservation in both residential and commerical buildings is very high.22/

4) Other technological alternatives to oil shale development

Equally important is an evauation of oil and gas drilling, including secondary and tertiary production techniques, and coal liquifaction as alternatives to oil shale development. Recent discoveries and new recovery technologies suggest that oil and gas development offers a much larger potential source of fuel in the near term than was considered likely only a few years ago. The rush to increased oil shale development may not be justified in the light of these discoveries. Oil shale projects already in the stages of advanced planning may be more than enough to meet current demand if traditional oil production rates can be sustained while conservation reduces demand. The air, water, soil and wildlife impacts of oil drilling and tertiary production techniques are substantially less than the impacts oil shale development will have on those resources. To the extent that oil reserves can meet more of the demand than anticipated a few years ago, the Secretary should consider whether oil shale development, and its attendant adverse impacts on the human environment, can and should be proportionally reduced.

With respect to coal liquifaction, it is much less clear how the respective environmental impacts of coal and oil shale will trade off. But given the minimal need for solid waste disposal in coal-based conversion technologies as compared with the massive volumes of spent shale which will be produced by even a modest level of oil shale development, it is quite possible that

a careful analysis will show that, on-balance, coal conversion will have a significantly smaller impact on soil and water resources, although air quality impacts may be similar. In comparing coal liquification with oil shale, it is also important to consider the wide-range of siting options available to coal projects, whereas oil shale can be economically developed in only a few confined regions of the country. Thus the analysis should evaluate the opportunity to reduce the environmental impacts of coal-based conversion by siting policies which separate the projects from sensitive environmental areas (such as parks, wilderness, non-attainment areas, geological formations sensitive to acid deposition and domestic or agricultural water supplies) and avoid over-concentration of pollution sources.

30.7 (cont) Finally, an analysis comparing various fuel supply and conservastion alternatives should include an evaluation of the rates of CO_2 production associated with each. The evidence is rapidly growing to support the conclusion that CO_2 accumulation in the earth's atmosphere will have a dramatic, if not catastrophic, impact on the human environment. The scientific debate has generally shifted in recent years from whether there will be a "greenhouse effect," to how wide-spread that effect will be. Included in the likely affects will be reduced precipitation, reduced agricultural production and increased food shortages for a growing world population.23/ Given the probability of such large-scale impacts within 50 years or less, it is critical that modern industrial society begin the search for either substitutes to current carbon-fuel combustion energy sources, or carbon-based fuels that reduce the rate of CO2 growth in the atmosphere. With this serious environmental problem in mind, alternate sources of fuel should be compared with respect to the amount of CO_2 formed by each process per unit of available energy produced. In addition, the economic and technical feasibility of the hydrogren fuel cycle should be considered as an alternate source of energy.

B. Regional Alternatives: Siting Scale and Technology Options.

The regional, cumulative impact study in this case is both a desireable and necessary part of the analysis. The proposed projects will be so large in scale and so geographiclly confined that anything less than a regional analysis would fail to fulfill the purpose of making available "information useful in...maintaining...the quality of the environment." This is so because:

30.8 (1) Owing to the confined area of development, interaction among pollutants is inevitable.24/

(2) Influences of topography on meteorology (especially channelling and valley trapping 25/will result in confinement of plumes, making interaction of plumes more likely, and increasing the duration of reaction times. (See 5.6).

(3) The proximity of sensitive areas (wilderness areas, low buffering-capacity lakes, 26/ ecologically sensitive tundra, etc.) make it more likely that any synergistic interactions will have an adverse impact. (See 5.4.2.).

(4) The proximity of urban sources (notably, Grand Junction) make it likely that synergistic interactions will occur whose frequency and severity would not be noted if sources are considered one at a time. (See 5.2.1).

(5) The proximity of numerous major sources tourban areas, including a non-attainment area for TSP (Grand Junction) substantially increases the liklihood that the cumulative impact of emissions will either cause or contribute to ambient concentrations in excess of national ambient air quality standards.

Since regional analysis is a necessary part of this EIS, it must conform to the same regulations as other parts of the EIS, viz, the EIS must "rigorously explore and objectively evaluate all reasonable alternatives." 40 .C.F.R. 1502.14. We praise the BLM for undertaking the regional analysis in these circumstances, but we are disappointed that important, reasonable alternatives were not considered.

30.8 (cont) In this case, the discussion of alternatives in the regional analysis is limited to two "scenerios." This approach is justified as follows:

[n]ormally, individual EISs would be prepared for each of the proposed projects, with each one containing a cumulative analysis. In this case, all of the proposed projects were combined into one EIS and one regional cumulative analysis was prepared. Therefore, this part does not address alternatives to the proposed projects. Alternatives for each site-specific project are analyzed in the site-specific part of this EIS.

The proffered two-scenario analysis is not an evaluation of all reasonable alternatives. The regulations specify that the analysis must include the proposed action, and the alternative of no action as well as all reasonable alternatives. 40 C.F.R. 1502.2. The solicitation of contract for this project specifies consideration of a high and low scenario in addition to consideration of the proposed action. Solicitation of Contract number YA 553-RFPI-1054, paragraph 5.2.4.1.4.

In order to comply with federal regulations, the EIS must include consideration of:

(1) the no action alternative

(2) the proposed activity

(3) all other reasonable alternatives to the action analyzed

on a regional cumulative impact basis.

This discussion of reasonable alternatives must include the cumulative and regional impacts of:

a) alternative siting for major components of each project

b) alternative production capacities (including a no development option for each project) and

c) alternative process and emission control strategies for each project.

30.8 (cont) Since the central goal of NEPA is to identify ways in which development can be achieved at the least environmental cost, 42 U.S.C. 4331, that goal cannot be met without considering the cumulative impacts of selecting major alternatives which will affect regional air quality. Alternatives for the siting of major emitting facilities will likely have significant impacts on air quality. Local valley inversions and the frequent decoupling of valley flows from regional air movement will result in frequent trapping of emissions from sources located below the elevations where inversions typically form. Such trapping is also likely to contribute to high short-term concentrations of emissions below the "free" atmosphere. Numerous sources located in the same or adjacent valleys will contribute to cumulative impacts that could have severe effects on local air quality. Such effects are projected by the Prototype oil shale leasing DEIS recently released (July, 1982) by the BLM's Colorado State office.

In contrast, locating major emitting sources close to ridge tops, above the elevation at which stable layers will most frequently form, will go a long way to avoiding the type of local effects which would result from lower elevation sites. Of course, there is a trade-off. Sources located at high elevations are more likely to contribute to higher concentrations of pollutants in the sensitive wilderness areas downwind which are generally more susceptible to sources at longer distances and are exposed to "free" atmosphere flows.

30.9 The BLM has some important options at this stage of the process that can mitigate some of the most serious adverse impacts attributable to emissions of air pollutants. First, BLM can select alternate lease tracts which can influence the siting of major emitting facilities within the Piceance Basin. Second, BLM can impose lease conditions which impose siting restrictions, such as the elevation of the major emission points in relation to surrounding terrain. Because of the important differences in air quality impacts which can arise from facility siting decisions, the significant siting options available to BLM at this stage of the leasing process should be evaluated to determine their air quality consequences. If NEPA means anything, it requires that real options available to the decision-maker which can be expected to have significantly different environmental consequences should be identified and compared. That analysis has not been done here.

30.10 Terrain features and elevations within the federal oil shale region include significant variations. Within that range of variation, modeling should be performed which evaluates valley trapping and inversion frequencies and durations in the area, and the impacts those phenomena will have on emissions from sources sited at different elevations. Similarly, rawinsonde and lower met data collected by

30.10 (cont) oil shale developers in the region should be evaluated to determine whether higher elevation sites will produce significant increases in concentrations in the Class I area. From these comparisons, rational judgments can then be made regarding tract selection and lease conditions affecting stack heights.

Two other major variables affecting air quality impacts are process technology and control technology. Different processes produce markedly different rates of emissions for equivalent product. This difference seems to be especially notable with respect to HC emissions.

As discussed in 4.2.2, the variations among emission estimates is not sufficiently explained. If the variations are due to differences in process technologies, the magnitude of these variations can be seen by normalizing the estimates in Table 4.1 of the A.Q.T.R. to a uniform production rate, say 50,000 bbl/da.

A.Q.T.R. TABLE 4.1 NORMALIZED TO

50,000 bbl/da PRODUCTION RATES

Emissions (kg/hr)

30.11

Project	SO_2	PM	NO	HC	CO
Enercor	101	212	112	34.5	30
Geokinetics	1285	114	531	28.5	16
Magic Circle	233	170	1306	6.3	86
Paraho	216	115	573	16.7	86
Sohio	932	1610	818	220.0	72
Syntana	112	113	654	71.0	56
Tosco	104	141	873	203.0	10

If these rates reflect the emissions variations inherent in choice of technologies, then the historical changes in the technologies of choice (see 4.1.3) argue even more strongly for analysis of a range of operating conditions and technologies much broader than the "low" and "high" production scenerios analyzed in this DEIS.

Similarly, different control technology options will achieve more or less emission reduction depending on the systems selected.
30.12 The emission inventory used for the air quality analysis is not explained and therefore the reader cannot tell what assumptions were made regarding either the processes that will be used on the proto-type tracts, or the control systems to be installed.

The modeling analysis for air quality impacts should attempt to evaluate the air quality differences that would result from increasing or decreasing emission rates within the range offered by reasonably available choices regarding processes and control technologies. This would require a clear statement of the processes under consideration,
30.13 and an assessment of available control technologies. If the analysis shows that air quality impacts are sensitive to the variation in emission rates that would result from consideration of these factors, then the decisionmaker should be informed of those differences and offered a choice of options as part of his consideration of alternatives and mitigating measures.

4.0 The EIS fails to provide a discussion of data sufficient to understand the alternatoves amd impacts.

4.1 The EIS fails to provide a sufficient description ofthe existing environment.

Federal regulations express an interest in providing a sufficient description of the existing environment. However, it is made clear that the description must include those facts "necessary to understand the effects of the alternatives." 40
30.14 C.F.R. 1502.15. The EIS fails to comply with this requirement in three ways. (1) Some data are reported in an unintelligible manner and are unreliable because of inconsistencies. (2) The methodology used to arrive at the reported numbers is not specified. The reader cannot be sure of the meaning of the numbers or the degree of reliance to be placed in them. (3) There is a lack of certain data which are necessary to form a minimally complete picture of the environment. These faults could be corrected with very little, in some cases with no expansion of the volume of the EIS.

4.1.1 Some data reported are unintelligible and unreliable.

A description of baseline concentrations of atmospheric pollutants is necessary to an understanding of the effects of the proposed projects. Baseline concentrations play a role : (1) in determination of compliance with the NAAQS standards, particularly TSP attainment status in Grand Junction (see 3), (2) as inputs for model determinations of effects--particularly for reactive species (ozone, SO_2, visibility). (see 5.2.1). The data reported in Table R-3-7 and R-3-6 fail to meet the regulatory requirements because

(1) Table R-3-7 does not indicate units of measure. In a telephone conversation on Sept. 17, 1982, SAI indicated that the GPM model was used for this purpose. This statement whould be confirmed in the Final EIS. Therefore, the figures are meaningless.

30.15 (2) The reliability of the data is not indicated (instrument detection limits, reliability, accuracy, etc. should be specified).

(3) Completeness of the data is not indicated--the reader does not know if the figures represent the totality of the data recorded, or some excerpt (eg. ozone data are not shown to represent a full year's data or the years of data unavailable).

(4) The representation of "mean" and "maximum 24 hour" in table R-3-7 is not meaningful. The reader is unsure if they refer to the entire measurement period, instantaneous maxima, three-hour maxima, running averages etc.

(5) The data are not presented in a format consistent with standards (by, e.g. expressing SO_2 as 3 hr, 24 hr and

annual values or reporting second highs for ozone) or consistent modeling efforts for use in comparison with model output.

To be useful in understanding the effects of the alternatives, the data should:

30.15 (cont)

1) be presented in a clear, comprehensible form, with all information necessary for understanding, including units, the data base represented, and the sampler locations;

2) show the reliability of the numbers;

3) be presented with an indication of the methodology used. The completeness of the record should be stated and the terms (e.g. "average" and "mean" should be defined.

4.1.2 The methodology used to arrive at the reported data is not specified.

30.16 It is stated in the Air Quality Technical Report,hereinafter referred to as AQTR, that annual average ambient SO2 concentrations were "modeled", using the regional emissions inventory. AQTR 2-27. In a telephone conversation on September 17, 1982, SAI indicated that the GPM model was used for this purpose. This statement should be confirmed in the final EIS.

4.1.3 Certain data necessary to an understanding of the environment and the impacts are not provided.

The description of the affected atmospheric environment is so cursory and incomplete that it does not comply with the requirement that the statement provide that information "necessary to understand the effects of the alternatives." 40 C.F.R. 1502.15.

30.17 The description of the climate is exceedingly short R-3-17. Because the climate can be important in consideration of radiation (and thus ozone formation), natural particulates (and thus visibility), vegetation (and thus turbulence) and other factors, Federal regulations require a more complete description of the climate.

Because the distribution and amount of precipitation in the region is important to an understanding of the amount, distribution and effects of acid deposition (see 5.4.2 (acid rain), there should be a description of regional precipitation patterns. An understanding of precipitation and wet deposition is also essential to supplement the results of the RTM model. RTM is "applicable only during periods of no precipitation", AQTR C-36, because the only removal process modeled is dry deposition. Acid deposition is most significant as a long-term phenomenon with total average deposition being the rate of greatest concern. But short-term wet deposition events can have significant impacts

30.17 (cont) on the most sensitive lake environments. If there is a significant possibility that the "worst case" day would have precipitation, (thus, increasing impacts from "rainout" and "wshout"), then the full impacts have not been modeled by RTM. There can be no assessment of the probability of this occurance without a discussion of precipitation in the region.

A minimally complete discussion of the environment should include an indication of the sources of climatological information used and their reliability.

4.2 The EIS fails to provide a meaningful, reliable description of the current and projected emissions.

30.18 Federal regulations require that the EIS provide a "full and fair discussion of significant enverinmental impacts", 40 C.F.R. 1502.1, and "insure the . . . scientific integrity of the discussion." 40 C.F.R. 1502.24. Estimates of impacts are greatly affected by emissions estimates. Regional workshop on air quality modeling, E.P.A., O.A.Q.P.S. p.3. The EIS fails to comply with regulations because it (1) fails to specify the methodology used in arriving at emissions estimates, making it impossible for the reader to understand the context of the numbers or evaluate their reliability, (2) fails to insure the scientific integrity of the data (3) fails to provide for a worst-case analysis, as mandated, (see 5.1) and (4) fails to provide data which are necessary to an understanding of the projected emissions.

4.2.1 The methodology used to arrive at the reported data is not specified.

30.19 In section 4 of the statement, there is a discussion of expected regional emissions. This discussion is important not only to an understanding of the type of action proposed, but also because these emissions projections provide an input for computer modeling of the impacts. There is a failure to insure the scientific integrity of this discussion because of insufficient discussion of sources of data and methodology.

The projected emissions are said to be "developed on an average basis of operating conditions" p. 4-6. This statement is too vague to give a meaningful idea of the methodologies used. In a telephone conversation with Bill Oliver of SAI on September 17, 1982, it was explained that this phrase means only that no attempt was made to account for emission variations in time resulting from such factors as weekday/weekend or day/night production changes and not full production, presumably ,meaning "100 percent design capacity," was assumed. Neither was any consideration given to the probability and effects of excess emissions from start-up/shut-down or malfunctions of control systems. These statements should be confirmed in the final EIS and documentation to support them should be provided.

30.20 The emissions levels projected will be dependent on

30.20 (cont) assumptions concerning the process and control technologies which will be used. Only one mitigation scenerio is considered for each project. R-4-1. This is inconsistant with the requirement that the EIS analyze all reasonable alternatives to the proposed actions. 40 C.F.R 1502.14. The effective acceptance of whatever mitigation procedures are proposed by applicants is an abdication of this responsibility.

The projects are anticipating first-phase retort start-up dates from 1883 (Magic circle) to 1994 (Syntana). The experience of previous oil shale projects has been that plans for siting, disposal, control technologies and even entire process technologies have changed in drastic ways in response to engineering test results, court decisions, changing regulations and economic conditions. See Dept. of Interior, Minerals Management Service, 1982 Report on The Oil Shale Leasing Program, iii,22,29,65-77 for a survey of some of these changes. Further, estimates of emission from a single process undergo changes as knowledge is gained and control technologies are developed. For example, compare estimates in A Preliminary Assessment of the Environmental Impacts from Oil Shale Developments, 1977, EPA-600/7-77-064 with the Uintah DEIS estimates.

Since estmates of emission from processes projected to start-up in 1994 are tentative at best, a decisionmaker can only form an opinion concerning expected impacts if a range of operational conditions is used in modeling. Indeed, consideration of a range of operating conditions is specified in Guideline on Air Quality Models, EPA-450/2-78-027, p.28.

30.21 There is insufficient description of the source and development of the final emissions data. It is stated that applicant-supplied data was "reviewed (and) checked as appropreate". p.R-G-4. There is not even an indication of what criteria were used in this review. The reader is left with no real assurance that the data supplied was realistic (especially in light of certain inconsistancies; See 4.2.2).

30.22 In a telephone conversation with Bill Oliver of SAI on September 17, 1982, it was indicated that the uncertainty for emissions in this study would be +/- 50 percent and that inventories tend to underestimate emissions. Given the impression of thoroughness and accuracy left by a reading of the EIS, a full and fair discussion in the final EIS should include a verification and documentation of these estimates, and consideration of the data which show that actual emissions tend to exceed inventories.

30.23 Further, it is stated that inventories were completed using "engineering judgment." AQTR 4-8. To comply with the requirement of insuring professional and scientific integrity, there must be at least a specification of where, to what effect, and on what bases this "engineering judgment" was applied.

30.24 In order to reduce cost and complexity of modeling,

30.24 (cont) "smaller" emission rates were consolidated into "fewer" emission points, "for cases in which this activity was technically justified," AQTR 4-8. To comply with requirements for specification of methodology, there should be some discussion of (1) what were the criteria for "technical justification" (2) which sources were consolidated, (3) where these sources were placed, (4) with which pollutants these sources were identified and (5) the effect this method will have on all types of modeling. See 5.2.1.

30.25 It is stated that "considerable judgment" was used to form an estimate of emissions from "conceptual" projects. R-G-4. While it is recognized that conceptual projects cannot provide exact emission estimates, "considerable judgment" is an insufficient description of the methodology used. It does not insure professional integrity. To comply with NEPA regulations, there must be some specification of (1) sources of data, (2) cases in which "judgment" was used, (3) the type and extent of this "judgment" and (4) its probable accuracy, error bounds and effect on estimates of impacts. Without some indication of the non-speculative nature of the estimates, the numbers cannot be relied on by the public for the purpose of preparing informed comments on the reasonablness of the judgment made. Neither are the estimtes 'useful in restoring, maintaining and enhancing the quality of the environment", 42 U.S.C. 4332 (G), because the reader cannot evaluate the range of possible estimates which might be reasonable if some assumptions are modified. Accordingly, neither the public nor the decision makers can assess the significance of the judgments underlying the estimates used in the analysis.

30.26 4.2.2. There is a failure to insure the scientific integrity of the emissions data.

Of the Utah baseline point sources identified, emissions from only two of these were explicitly considered. The others "were assumed to be covered adequately by the procedures used to derive the area source files." AQTR 4-11. However, there is no indication that any analysis was done to assure that this assumption was justified. To insure scientific integrity, there must be (1) a specification of what these "other" sources were, and (2) an explicit procedure to demonstrate that these sources were included in the area source files.

30.27 Modern scientific and enginnering investigations are never conducted in a vacuum. The insurance of professional and scientific integrity requires that, as a minimum, there be an explanation of significant apparent inconsistencies between different parts of the statement or between the statement and prior relevant studies.

The emission values reported in table 4-1 of the AQTR and used in the modeling for the Magic Circle project are generally lower than the values supplied by Magic Circle in a recent PSD application, especially the estimates for total hydrocarbons

(THC). These discrepancies are shown in table I.

TABLE I
Magic Circle Emissions (kg/m)

Source of data	SO2	PM	NOx	THC	CO
30.27 (cont) AQTR Table 4-1	147	107	823	4	53
Magic Circle PSD Application-4/82	173.2	67.09	973.75	23.88	55.43

Because effects of emissions are non-lineor, the final concentration cannot be simply scaled up to compensate for those discrepancies. This is particularly true for the effects of hydrocarbons on visibility and ozone formation (see 5.5). To comply with the requirements for a full and fair discussion of impacts, visibility and ozone analysis must be re-done, using the most recent estimates of emissions.

30.28 If the data from table R-G-1 are normalized to a 50,000 bbl/d production rate, it is estimated that TOSCO will emit only 10 kg/hr of CO and that Geokinetics will emit 15.7 kg/hr Normalized Emissions for the other 5 projects range from 72 kg/hr to 85.7 kg/hr. It is recognized that differences in processes will affect emission rates, but no such explanation is given for these large discrepancies. This failure to assure the scientific integrity of the estimates is particularly serious in the face of the previously noted failures to explain the methodology used in assuring the accuracy of the applicant's estimates.

30.29 The estimated emissions from Utah projects for CO and NO are smaller than those estimated for Colorado oil shale projects (normalized to Utah production rates) (compare table 4.5 with tables 4.1 and 4.2 in the AQTR). However emissions for SO2 and particulates are significantly larger for Utah projects than for Colorado projects. Similarly, it is unclear why the 1980 Colorado baseline emissions totals (see AQTR table 4-6 scenario 1) are significantly larger than Utah baseline area source emissions (AQTR table 4-18). To insure scientific integrity, there must at least be some explanation of these apparent inconsistencies.

4.2.3 The emissions data are inconsistent with a worst case analysis.

30.30 EPA modeling guidelines indicate that emissions data are to be developed in such a way as to be compatable with a worst-case analysis, where that is to be done. Regional Workshop on Air Quality Monitoring, April 1978, EPA O.A.Q.P.S., p.3-4. It is argued below that worst cases analysis must be done for this statement (see 5.1).However, emissions are developed on an "average basis." Even considering the ambiguity of that term

30.30 (cont) (see 4.2.1), average emissions do not represent worst case conditions. To comply with regulations there should be a development of both average and full-capacity [worst case] emissions.

4.2.4 Certain data, necessary to an understanding of the projected emissions, are not provided.

30.31 In order to comply with the requirement for providing information "necesary to understand the effects of the alternatives", 40 C.F.R. 1502.15, there must be some discussion of the degree to which other planned projects depend on the development of oil shale projects. Without this information, the reader is unable to understand the effects of alternatives. In particular, the reader cannot understand what will be the effect if development does not take place, since the impact on non-oil shale projects is not discussed. A discussion of the no-action alternative is required (see S-3).

30.32 The Department of Interior has proposed to lease two more prototype oil shale projects in Colorado. These tracts may produce up to 100,000 bbl/da of shale oil (DEIS for the prototype oil shale leasing program). However, this potential source is not included in the Colorado source inventory. To comply with the requirement for a full and fair dicussion, the emissions for these facilities must be included as a possible scenario in the EIS.

5. The EIS fails to provide sufficient description of, support for or insurance of scientific integrity of the computer modeling used.

5.1 The EIS fails to conduct mandated worst-case studies.

30.33 A worst case analysis is mandated by the regulations if; (1) the information relevant to adverse impacts is essential to a reasoned choice among alternatives and is not known and the overall costs of obtaining it are exorbitant or (2) the information relevant to adverse impacts is important to the decision and the means for obtaining it are not known (e.g. the means for obtaining it are beyond the state of the art].... 40 C.F.R. 1502.22. The mandate applies in this case because (1)) predictions of concentrations of pollutants are important to the decision because development cannot occur unless a permit is issued for Prevention of Significant Deterioration, and applicants in this case wil be required to submit predictions of concentrations of pollutants; (2) the means for obtaining the relevant information (Viz. accurate predictions of concentration) are beyond the state of the art of atmospheric modeling. Guidelines on Air Quality Modeling EPA-45/12-78-027, p. 26, p.15; Regional Workshop on Air Quality Modeling, April, 1981, EPA, OAQPS, p. 9. Modeling is not sufficiently accurate to inform decision makers or the public about the precise probabiities of pollutant concentrations. Largely for this reason, EPA explicitly recommends worst case analysis in complex terrain. Regional

30.33 (cont) Workshop,---p.9.

5.1.1 The "worst case" analyses are not pollutant-specific.

The methodology for determining worst cases does not distinguish among the primary pollutants. CTWM and GPM are used to determine a single day for further worst case study for SO_2, NO, and TSP. (AQTR fig. 4-5). This approach fails to recognize that conditions which are worst with respect to one pollutant may not be worst with respect to another. For example, particulates have a relatively high average deposition velocity and will tend to be important for short-range exceedances. SO_2 and NO have lower deposition rates and, thus, worst case scenarios for these pollutants might include longer range transport, chemical conversion, and impaction on distant, sensitive (class I) receptors. The requirement for a worst case analysis means that the determination of worst cases for these pollutants must be conducted independently, with consideration for the nature of the pollutant species.

30.34

5.1.2 The "worst case" analysis is based on insufficient data.

CTWM, which provides winds for selection of a worst case, uses only one year of data. The regulations require that the statement "shall include a worst case analysis and an indication of the probability or improbability of its occurance." 40 C.F.R. 1502.22.

The requirement that the probability of occurance be indicated implies that the worst case analysis should not be limited to the worst observed case in a single past year, for then the probability of that case occurring would be meaningless. The worst case analysis must be intended to include the worst case reasonably forseeable (along with an indication of its probability).

Use of only one year of data also violates the EPA recommendation that five years of NWS data be used. Guideline on
30.35 Air Quality models, EPA 450/2-78-027 p.32.

The data supplied to GPM, which forms the basis of the worst case analysis, consists only of hourly average wind fields. The CTWM/GPM is incapable of representing critical plume characteristics. This methodology is contrary to the EPA recommendation that:

> An analysis of worst case conditions should... consider such critical plume characteristics as looping, coning, limited mixing, fumigation, and aerodynamic downwash and plume impaction on terrain, Guideline on Air Quality Modeling page 33.

A full and fair discussion of the worst case should include explicit modeling of plume behavior. To comply with regulations

there must be:

(1) an analysis of at least five years of data to identify what the historical worst case of record has been and to allow a reasonable approximation of its frequency.

30.35 (cont)

(2) an analysis to determine whether the historical record provides data of sufficient duration to allow a conclusion that the historical worst case is the likely worst case, Guideline on Air Quality Modeling, EPA-45012-78-027, p. 9, and if it is not,

(3) a determination of the expected worst case, considering the regional meteorology, climatology and topography and the location of sensitive receptors.

(4) an explicit modeling of critical plume behavior, or a discussion of the likely effects of plume behavior on concentrations.

5.1.3 The "worst case" analysis makes improper assumptions.

5.1.3.1 The "worst case" visibility model makes assumptions about view or orientation, time of observation and stability that are incompatible with a worst case analysis.

Visibility impacts were modeled using the PLUVUE model. There is some question about whether this model is appropriate for the application (see 5.5). Setting aside appropriateness, there are problems with the way in which PLUVUE was applied. In the regional haze analysis the observer site was chosen to be Flattops Wilderness area. R-4-38. But the position of the observer within this region is not specified. This is of some importance because viewer orientation has an effect on predicted visual impacts. The viewer was assumed to be looking to the northwest. The flow was assumed to be from the southwest. The two source regions are specified only as the Unitah Basin and
30.36 Piceance Basin. It would appear from this that the viewer's line of sight is assumed to be approximately perpendicular to the plumeline. According to the PLUVUE user's guide, the magnitude of the visual impacts depends on the effective optical thickness of the plume, which varies depending on, among other things, the viewer orientation. Equation 15 on p. 16 of the user's guide indicates that the optical thickness is inversely proportional to the sine of the angle between the plume line and the line of sight. Thus, optical thickness [and thus visual impacts] will be minimized for a viewer looking perendicular to the plume line. To comply with the requirment for a worst-case analysis, the viewer orientation should be chosen to indicate the maximum visual impact a viewer at flattops will experience, i.e., looking from the wilderness toward the origin of the plume rather than across it.

The observer is asumed to be present in mid-July. This date is chosen to represent the period of maximum visitor use. While it may be acceptable that periods of no use should not be analyzed for impact, it does not follow that the maximum impact will occur when maximum use occurs. One determinant of the predicted visual impact is the amount of ultraviolet solar radiation. PLUVUE user guide. U.V. flux is calculated only on the basis of latitude, longitude, date and time of day. The requirement for a worst case study means that calculation must be done when the largest visual impact might be expected viz, in late-June when there is a higher sun-angle and a longer day.

Because SO_2 conversion rates depend on, among other things, both uv flux and O_3 entrainment, worst case modeling must represent an optimal balance such that dispersion (and thus O_3 entrainment) and maximum uv flux [at local noon] occur at periods of the plume's lifetime which will result in maximum concentration at the receptor time and location. Receptor time
30.36 (cont) is chosen as 3 PM. There is no assurance that concentrations would not be higher for a different assumption of receptor time. To assure true worst-case modeling, there should be runs at a sufficient number of receptor times to asure that worst case modeling has been done.

The worst-case scenario for regional haze is assumed to include class C stability [slightly unstable]. More stable categories [D and E] are climatologically more common 27/, and would produce less dispersion 28/. This is particularly important for modeling of NO_x impacts since the so-called "thermal" NO_x reaction is second order and is thus particularly sensitive (for near-source impacts) to concentration and, thus, to stability.

A worst case for NO_x analysis [see 5.1] must include specification of more stable D and E P-G categories.

Because the SO_2 conversion rate is related to relative humidity, a proper specification of methodology requires that the humidity used in the model be specified.

5.1.3.2. The "worst case" ozone analysis makes assumptions about background concentration and trajectories that are incompatible with a worst case analysis.

Ozone impacts were modeled by means of the EKMA model. EKMA was run assuming two "worst case" trajectories [AQTR 5-112]. A "high" and "low" background concentration was assumed. The "high" value for O_3 was 0.66 ppm, or about 130 mg/M^3. However, several
30.37 previous studies have monitored ozone vales in the region in exess of 200 mg/M^3. See, exhibit 4. In contrast to these ozone measurements, the modeling assumptions for the "high background" scenario are not supported by any analysis of available evidence or citation to site studies. Thus, the conclusion that "oil shale development does not lead to exceedance of the ozone standard", AQTR 5-115, is not supported by the data and does not meet regulatory standards for EIS preparation. This is particularly true in light of the fact that "background air quality conditions tend to dominate these simulations." AQTR

50115. A full and fair discussion must include conclusions based on known occurances of high background ozone concentrations. The various speculations concerning the origin of these high ozone concentrations have included stratospheric incursions, long-range transport and unknown local sources. Despite the paucity of ozone data reported in the EIS, there is a multi-year multi-site record of ozone data available for analysis. Exhibit 5. A frequency distribution analysis of these data might go a long way toward providing an estimate of the probability that NAAQS standards would be exceeded because of new emissions from the oil shale region. Besides possible (linear) contribution to NAAQS exceedances, an understanding of the time-distribution of high ozone values is important. Thus an adequate assesment of the available ozone data sould be performed because:

(1)as noted the Uintah EIS modeling, results are dominated by background condition, AQTR 5-115;

(2)background values are important "boundary" conditions for the EKMA model, See 5.2.1.4;

30.37 (cont) (3)the uncertainty of ozone concentration is exacerbated by the uncertain, but most likely elevated, concentrations of hydrocarbon which contribute to O_3 formation. See 5.5

Because of the multiple reason that a knowledge of background O_3 is important, the dicussion and analysis offered in the EIS is inadequate to "understand the effects of the alternatives." 40 CFR 1502.15.

To be in compliance with regulations, the EIS must contain an analysis of all available regional O_3 data with a view towards quantitatively estimating the frequency with which given high levels of O_3 have been mesured in the region.

The application of EKMA in this statement was improper because it failed to comply with recommendations in the EKMA user's guide. EPA 450/4-80-027. The guide states that since EKMA is not a predictor of worst cases, but rather an empirical model, it should be run on the five worst cases cite---. Even for the two trajectories actually run there is no demonstration that these represent the worst cases reasonably forsceable. To comply with the user guide and the requirement of worst case analysis, the EIS must include an analysis of at least five scenarios which are chosen to represent the worst forseeable ozone cases. In a telephone conversation on September 17, 1982, SAI indicated that the reference to recommended background conditions "Killus and Whitten (1981)." Should be an abstract to a paper by J.P. Killus intitled "Background Reactivity Estimates for Atmospheric Modeling Studies" presented in "XV informal conference on photo chemistry," Stanford, California, June 27-July 1, 1982. This statement should be verified in the final EIS.

30.38 5.2 The EIS fails to insure the scientific integrity of the modeling used.

5.2.1. The EIS fails to provide a sufficient decription of the methodologies used.

5.2.1.1 The emission consolidation methodology is insufficiently described.

As noted above, 4.2.1, certain emission sources are aggregated in the model. Bill Oliver of SAI stated in a telephone conversation, Sept. 17, 1982, that no source was moved more than 0.3 km, that ground-level and stack sources were never consolidated, and that "unusually large" sources such as the Sohio SO_2 source, were not consolidated. Those statements should be confirmed and documented in the final EIS. It is asserted that the consolidation results in over-estimates of concentrations, AQTR 4-61 and 5-2 to 5-3. However, such aggregation may result in under-estimates of concentration as well if [1] the sources are placed in a more exposed topography
30.38 (cont) and are thus more quickly dispersed 29/; [2] the sources are placed at a high elevation, [e.g. ground-level TSP sources might have been aggregated with stack emissions, which may result in unrealistically high dispersion rates 28/; [3] the sources are placed farther from sensitive receptors, (e.g. class 1 areas than their actual position). Bill Oliver in the phone conversation of September 17, 1982 indicated that no consideration was given to the relative topography of the source sites which were consolidated. These concerns are especially important because the EIS does not inform the reader which sources were aggregated, for what pollutants, and what locations were assigned to them.

The requirement of a description of the methodology means that the EIS must specify the manner in which sources were consolidated, including a table or graph of the consolidation process and the criteria used to decide on which sources to consolidate, and must discuss the likely impact of this procedure on the results of the modeling.

5.2.1.2 The wind field randomization methodology is insufficiently described.

The winds used in the GPM were obtained from the complex terrain wind model AQTR 4-59 [see 5.3]. Since this model, in the so-called "composite" mode, predicts synoptic winds in only 16 wind directions, AQTR 4-70, GPM winds were randomized about their predicted position to compensate for the lack of greater resolution AQTR 4-49. This method is unsatisfactory because:
30.39 The resultant wind variability will be unrealistically large, thus unrealistically increasing horizontal dispersion. In a telephone conversation of Sept. 17, 1982, SAI indicated that the wind direction at the centroid of each puff was randomized independently. This statement should be revised and documented in the final EIS wind direction at one point is dependent air wind directions at other points because (a) advection of momentum affects wind direction downstream (b) points near each other are affected by similar pressure gradients, surface influences, air

mass characteristics, etc. The assumption of independence ignore this effect and allows (a) two neighboring points to differ in U.D. by up to 12-1/2 % throughout the domain and (b) a single point to gave a wind direction ahift of up to 12-1/2 % each time step throughout the simulation. This results in much larger wind direction gradients than that observed in the real atmosphere. The puffs follow a more convoluted trajectory than they do in reality which can result in decreased estimates of concentration because;

30.39 (cont) (1) topographic continent effects such as channeling are weakened;

(2) stagnation points are less effective.

There is no description of the amount of wind direction variability that resulted. The reader is unable to evaluate the importance of (1). Insurance of scientific integrity requires that any randomization of winds be calculated to duplicate the empirical, statistical wind variability characteristics in the region.

5.2.1.3 G.P.M. mass loss and residual concentration methodologies were insufficiently described.

GPM puff mass loss is modeled using a first order decay equation AQTR 4-101. The decay rate is dependent on chemical conversion rate and deposition rate parameters supplied by the modeler, AQTR C-25. However, values for these parameters are never specified. In telephone conversations on Sept. 17, 1982, and Sept. 20, 1980, Mark Yahkee of SAI stated that the commission
30.40 rate was chosen to correspond to a 1-1/2% per hour conversion rate during the day and 0.1% conversion rate during the night. He also stated that the deposition rate was chosen to correspond to a 0.5 cm/Sec deposition velocity for TSP and a 1.0 cm/Sec deposition velocity for SO_2, using the mixing depth or a conversion factor. Their statements should be verified and documented on the final EIS. Because of the importance of the mixing height on this scheme, the values used should be specified on the description of the use of the GPM.

30.41 5.2.1.4 EKMA upper level concentrations are insufficiently described.

There is also a failure to specify methodology used in the EKMA ozone modeling. Since that model's concentrations are affected by entrainment of O_3 and NO_x from the upper model layer, the reader cannot make reasoned decisions on the basis of model
30.41 (cont) results without knowing the values for upper level O_3 and NO_x concentrations input to the model. This is especialy true in the region under consideration, since O_3undergoes wide fluctuations of concentration in the region,(section 5.1). Some of which might be related to entrainment from above, through the so-called "tropospheric folding" pheneomenon [see 5.1]. To comply with the requirement for specification of methodologies, the values assumed for upper layer O_3 and NO_x concentrations must be given in the EIS.

5.2.2 The EIS uses methods contrary to current scientific understanding.

5.2.2.1. Non-linear impacts are additivelly combined. Atmospheric reactions are known to be non-lincor in the sense that the impacts of two sources which combine may be made larger than the sum of the constituant impacts. But in two places of the analysis, total impacts are calculated as simply the sum of the impacts of the constituants.

For the plume discoloration analysis PLUVUE was run separately for each of the Unitah synfuels sources and some power
30.42 genereration sources. The total impact was not estimated, but the impact of each source was presented separately. This method fails to make clear the impacts which may arise from interactions between the different sources, some of which are synergistic in nature. PLUVUE user's guide. Much of the predicted impact depends on chemical transformations in the plume. The rate of these transformations depends on, among other factors, the proportions of different chemical spccies present [e.g. the concentration of ozone]. Thus, the impact of two interacting plumes may be more than the sum of the parts. A full and fair discussion must include an explicit modeling of the impacts resulting from interaction of the plumes.

There was a similar ommission in the analysis of regional impacts discussed the Air Quality Technical Report [p.5]. This analysis was done by conducting separate analyses of impacts of industrial growth and impacts of associated growth, AQTR 5-34A to 5-34Q. Cumulative impacts were then taken to be the sum of these. This simple summation method fails to provide a "full and fair discussion" of the impacts, because impacts may be larger than the sum of individually considered parts. Conversion rates
30.43 in plumes are,as for example, the conversion of SO_2 to SO_4, may increase abruptly upon interaction with urban pollution. 30/ The resulting concentrations could be much larger than the sum of the separately considered concentrations.

Insurance of scientific integrity requircs that there be an explicit consideration of the interactions of industrial growth and associated growth. Particularly, the interaction of Grand

30.43 (cont) Junction sources with oil shale sources must be explicitly modeled.

5.2.2.2 Certain sensitive receptors are not included in the regional modeling domains.

The regional modeling domain is shown in AQTR fig. 1-1. No justification is given for the choice of this particular modeling domain. Many airborn pollutants, particularly chemically reactive pollutants, have impacts hundreds of kilometers from the source. 31/ Indeed, the contract solicitation for this study stated an expectation that impacts would extend beyond the Piceance and Washakie basins. Solicitation of Contract No YA 553-RFPI-1054, paragraph 4.1. This is pointed up by the finding of the supplemental Prototype EIS that there may be exceedances in the Mt. Zirkel area even when there are no exeedances at Flattops. Prototype DEIS Table 3-3. There is no explanation for the excusion of an explicit modeling of the impacts on Arches National Monument of the West Elk, Maroon Bells, Black Canyon or Rawah areas. Although estimates are given for concentrations at Mt. Zirkel (AQTR Table 5-1) this area appears to be outside the modeling domain in fig 1-1, so that the numbers so not represent actual modeling results for Mt. Zirkel. Since only the western
30.44 part of the Flattops Wilderness is included in th domain, there is no assurance that impacts on the eastern part of the Flattops Wilderness will not be significantly higher. Indeed the Prototype DEIS indicated that plumes from the oil shale region may travel south of the wilderness area and then turn north so as to have an impact on the western half. Prototype DEIS fig. G-14. There is also an indication of a topographically forced stagnation point on the eastern side of Flattop, which can cause an accumulation of impacts on the eastern half even though the western half is relatively unaffected. Prototype DEIS fig. G-67.

The requirement of a "full and fair discussion" of impacts, 40 CFR 1502.1. makes it necessary for the EIS to include 1] an explicit determination of the geographical bounds of the affected regions, particularly the regions affected by acid deposition [see 5.4.2]. 2] modeling of the impacts on a domain large enough to include these areas.

5.2.2.3 The tiered use of CTWM, GPM and TRM leads to synergistic error and may involve incompatibility.

An array of models is used to predict various types of impacts. The methodolgy of this system is displayed in AQTR fig. 4-5. There are several problems with this scheme.

The CTWM model is used as an input for the GPM model which
30.45 is used to determine a "worst-case" day for further modeling by the RTM. As discussed in this section [see 5.2.1.2, 5.2.1.3, 5.2.2.1., 5.2.2.3.], each of these models has inconsistencies and problems in application. The tiering of several models, each with its inaccuracies and each used to provide a type of input for the next, can result in errors morc serious than the errors

30.45 (cont) in the individual models. For example, since only one "worst-case" day is modeled by the RTM, any inaccuracy in the GPM prediction of the worst case will result in a total failure of RTM to do a worst-case analysis.

A further problem is that apart from model inaccuracies, the models may not be compatible, in the sense that GPM,even properly applied and initialized, may have a different "idea" of what a worst-case is, than RTM does. RTM may well predict higher concentrations for a case day that GPM predicted was far less serious than the predicted worst case day. Insurance of scientific integrity requires that 1] choice of a worst case for analysis by RTM be based, not only on their model runs, but on a knowledge of the air quality meteorology of the region, keeping in mind the characteristics of RTM, and what factors it weighs most heavily. [see 5.1]. 2] there be a discussion of synergistic error derived from, e.g., model sensitivity studies 3] there be an analysis of the compatability of the modeling with respect to the worst case identification based on modeling theory, and knowledge of regional meteorology [see 5.5.1].

5.2.2.4 Comparisons are made between model prediction rather than between predictions and observations.

On the basis of a comparison of GPM and RTM model results, the DEIS concludes that "GPM calculates considerably greater impact, than soes TRM at distances beyond about 25 to 50 km. Although this conclusion is characterized as "tentative", a far ranging scheme of setting upper and lower confidence limits on the modeling results is based partly on this conclusion. Since, as discussed on 5.2.3.1, these bonds have great effect on the prediction of probable violations, this conclusion is not treated as tentative at all. The conclusion is at best tentative,
30.46 because; 1] different data were used as initial conditions for the two models, 2] as aknowledged on the statement, AQTR 5-3, a single run of each model is insufficient to make a comparison, and 3] comparisons between modes provides no information on the ability of either to predict reality. To present an accurate idea of the reliability of the models, there should be a comparison of the predictions of both models to measured concentrations in the region modeled. Regional Workshop on Air Quality Models, April, 1981, EPA, O.A.Q.P.S., p. 15; Guidelines on Air Quality Models p.4. A comparison of the results of two models ignores the risk that both may be unrealistic. Insurance of scientific integrity and EPA guidelines require that model predictions be compared with real data for runs conducted over terrain reasonably similar to the region of interest and where verifying data exist.

5.2.3. The EIS fails to provide support for conclusions reached and methods used.

30.47 5.2.3.1. There is insufficient support for the method of determining upper and lower bounds for predicted concentrations.

In an effort to discount the prediction of exceedances, the EIS sets upper and lower "bounds" on the prediction, basing these on the alleged conservativeness of the GPM model.

Considering the lack of an effective demonstration that GPM is a "conservative" model for this application [see 5.6], there is no basis for the procedure followed in the AQTR of setting up
30.47 (cont) GPM predictions as an upper-bound for projected impacts. The lower bound is set as 1/10 of the GPM projections, AQTR 5-6. The only justification given for this methodology is the writers' "professional judgment", AQTR 5-6. Reference to "professional judgment" does not comply with the requirements that agencies "shall make explicit reference...to the scientific and other sources relied upon for conclusions" 40 CFR 1502.24. If there is any basis in the literature for the "professional judgment", it should be cited. If not, the rationale underlying the judgment should be explained.

Even this thin justification is not given for the practice of using a factor of 2 as the error range for the TSP "empirical model" or a factor of 4 for annual concentrations. (AQTR fig. 5-2). The practice of setting bounds, though only sketchily discussed, is of great importance in the evaluation of impacts. It is concluded that for SO_2 at the Flattops, "if the upper-bound estimate were used, the Class I increments would be exceeded; if the lower bound estimate were used, the increments would not be exceeded." AQTR 5-105. Again

30.48 "judgement" is applied, relying on the previously defined "error bounds" to conclude that the probability of exceedance at Flattop and Mt. Zirkle is "small".

Since these "judgements" may have an effect on the choices of decision makers, it is important that the scientific integrity of the proceedure be insured by providing support for the procedure. Insurance of scientific integrity means that the EIS must either justify by citation or scientific argument the setting of bounds, or must refrain from this procedure.

5.2.3.2 Conclusions reached concerning comparability of model predictions are unsupported by and contradicted by the data reported in the EIS.

When RTM predictions were compared with GPM, it was concluded that the two "compare quite favorably for near-source maximum impact." AQTR 5-6. This conclusion seems unjustified. Though better than the 600%

30.49 differences in the far-source runs, the 20% differences in the near-source runs are still substantial. Looked at in absolute terms, the far-source models showed differences in the range 5-17 ug/m^{-3}. AQTR fig. 5-1. Intercomparison of models without reference to measured data is of doubtful usefulness (see 5.2.1.). This procedure fails to lend any weight to an insurance of scientific integrity.

The requirement of insurance of scientific integrity makes it necessary for a comparison of model results to be made quantitatively. Any characterization of the comparison must be substantiated.

5.3 The EIS fails to provide an insurance of the scientific integrity of the CTWM model.

The CTWM was used to provide wind field data to "drive" the GPM model. Rather than attempting to explicitly model wind directions for an entire year, a "composite" method was used as an expense-saving device. AQTR 4-70 to 4-72. Because of the plethora of problems with this method, it is treated separately in this section.

30.50

Briefly, the composite method yields winds at two levels. Sixteen upper and lower level wind fields were computed, one for each of 16 compass directions. Additionally 6 lower level wind fields were computed to represent 3 upslope and 3 downslope wind regiems. Each hour of the year was assigned one representative large-scale wind direction and one representative lower level slope wind category. These were based on synoptic and local wind data. As input for other models, the hourly wind field was taken to be (1) for upper level winds, the previously computed upper level wind field corresponding to the representative wind direction for that hour (scaled to observed wind speed)

(2) for lower level winds, the vector sum of (a) the previously computed lower level wind field corresponding to the representative wind direction for that hour (scaled to observed wind speed) and (b) the previously computed wind field corresponding to the representative slope wind for that hour (scaled to observed wind speeds).

5.3.1 Characterization of the regional wind field was inaccurate.

According to a telephone conversation with SAI on September 17, 1982, upper air data from the four stations was taken at the 6000 ft. AGL level. This statement should be verified and documented in the final EIS. The four winds were then averaged to arrive at a single wind direction which

30.50 (cont) was used to indicate one of the sixteen compass points. The problems with this method are:

1) Winds at a given height AFL may not be representative of the winds which determine trajectories of plumes. This is so because;

   (a) the degree of "coupeling" between upper and lower layers varies from station to station, particularly in complex terrain, so that the most representative level at one station is likely to be different from the most representative level at another, and

   (b) the level most representative of trajectories in a region varies from day to day, depending an meteorolgical conditions.

30.50 (cont)

(2) The stations are removed from the study area and may not be representative of regional winds. Particularly Denver, being on the eastern side of the continental divide, is often under an entirely different synoptic pattern than western slope stations.

(3) The averaging of four stations separated by many hundreds of kilometers may give a very misleading idea of the true wind direction characteristic of the region. For example, if four evenly distributed stations with uniform wind speeds reported N, S, E and W winds (as might happen if there were an ideal, closed high pressure area near the center of the region), the vector average would indicate calm winds.

(4) Characterization of the entire region by a single wind direction is an oversimplification of the data.[32] Even if there were no technique-related problems of averaging the data, winds across a large region, above complex terrain cannot be characterized by a single vector. This complexity of the atmosphere is exactly why numerical modeling is necessary for an understanding of the regional transport.

(5) Once an average is taken, the characterization is further coarsened by dividing all wind directions into one of 16 classes (for the 16 compass points). There is no reason to believe that wind variations of less than 22 1/2 degrees are insignificant in a complex terrain region where sensitive receptor areas may occupy less than 22½ degrees at the distances involved.

5.3.2. Temporal interpolation of regional wind direction yielded unrepresentative results.

Since upper air data is taken only twice daily, the wind directions for intervening hours are arrived at by interpolation. According to a phone conversation with SAI on Sept. 17, 1982, this was done by linear interpolation through the smallest angle. This statement should be verified and documented in the final EIS. The problems with this method are:

(1) There is no reason to believe that wind direction shifts occur in a linear fashion. More abrupt wind direction shifts could contribute to "doubling back" of a plume on itself that would not be resolved by the interpolation method.

(2) Significant wind direction changes occurring on a scale of less than twelve hours would be missed.

(3) Interpolation may give a misleading picture of actual wind direction. For example, if the twice daily reports indicate winds from the N and the SE, an interpolation will indicate a veering of the winds through the east, whereas the wind might have actually backed through a westerly direction.

5.3.3. Characterization of the slope wind was inaccurate.

The representative slope wind assignment is made by comparing surface-level wind directions from the Ua-Ub tracts with the averaged regional upper air wind directions. The problems with this method are:

30.50 (cont)

(1) The methodology is not sufficiently defined. Left unanswered are such questions as:

(a) are the surface winds hourly?

(b) are the surface winds collected at 10 m height?

(c) are comparisons made before assignment of upper air wind direction to the 16 compass points?

(2) Slope winds measured at a limited number of sites may not be characteristic of the slope winds for an entire region, particularly since the sites were chosen to represent conditions at an individual project, rather than to be characteristic of the region. Slope wind direction and intensity will vary depending on local topography, vegetation, cloud cover, etc. Further, it is conceivable that drainages from different slopes may combine if drainage flows begin at different times, while drainages beginning simultaneously might miss each other.[24] So that modeling assumptions that assume slope flows to be temporarily uniform will fail to simulate certain "worst case" plume interactions.

There is no assurance that six classes of slope flow are sufficient to resolve the intricacies of slope flows in complex terrain. Assurance of scientific integrity requires that sensitivity analyses be run to determine how many slope categories are necessary to resource important features.

5.3.4. Scaling and linear combination of wind fields is mathematically unsound.

The wind model is run for the sixteen wind directions, and for the six slope wind regimes, assuming an arbitrary wind speed (10 m sec-1). For each hour of the year, the assigned upper air wind direction output is scaled to the observed wind speed and vector-added to the similarly scaled slope wind output. The problems with this method are:

(1) Since there are only 96 possible synoptic/slope wind combinations for lower level winds and only 16 possible upper level winds, there may be insufficient resolution to model the complicated interactions that occur between synoptic and slope winds in complex terrain.

(2) There is no theoretical reason to believe that winds can be broken down into slope and synoptic winds (in the way that they can, mathematically, be divided into, say rotational and irrotational flow). Large and small scale flows interact in complicated non-linear ways, especially in complex terrain. A simple addition of separately modeled flows fails to account for those interactions which are so non-linear that the result cannot be predicted from the components (indeed, the very definition of "non-linear" implies that such addition of components will not be generally accurate). While it may be true that elliptical partial differential equations can be combined linearly, AQTR 4-72, this does not justify the procedure used in this case because:

(a) The equation (eg. C-34, AQTR C-18) is a simplification of the general atmospheric equations of motion. Solutions to these general equations cannot be combined linearly. Linear combinations of solutions to simplified equations may easily be more inaccurate than the sum of the inaccuracies of the constituant solutions.

(b) The elliptical equation (eq. C-34, AQTR C-18) was not solved. Rather, the wind fields represent an approximation, AQTR C-21, to the solution of the finite difference analogue (viz. eq. C-35, AQTR C-18) of the elliptical equation. Thus, the wind fields are an approximation of an analogue to a simplification of the equations of motion. That equation 3-34 is a "linear" system says nothing about the linearity of the approximate solution to equation 3.35, much less about the behavior of the real atmosphere which is known to be non-linear.

(3) There is no reason to believe that winds modeled at one wind speed can simply be "scaled up" to represent winds at another speed. Effects of wind speeds are also non-linear, which, by definition, implies that a simple scaling factor will not suffice. Higher wind speeds will affect such things as turbulence (and thus mixing height and stability), evaporation (and thus, convection), deposition, channelling, etc.

5.3.5. "Verification" of CTWM is insufficient.

Because of the many problems, theoretical and practical with this method, there is a failure to provide insurance of scientific integrity of this method. The "comparison" with observations offered does not suffice for this purpose. This "comparison" has the following faults:

(1) Comparison of surface winds gives no indication of the reliability of upper level wind prediction.

30.50 (cont) (2) Predictions of wind direction within 45° of observations (AQTR 4-72) is not an assurance of the accuracy of the model. No statistical measure of reliability is given. No indication of the deviation of the 8% of the comparisons which were greater than 45° was given, nor was there any indication of how many of the comparisons yielded agreement within, say, 22½° rather than 45°.

(3) Prediction of wind speed within 30% is not an assurance of the accuracy of the model. Again there is no statistical index given of the reliability. There is no indication of whether the 16% of the predictions that were in error by 30% - 60% would result in under-or-over-predictions.

Because of the lack of insurance of scientific integrity of the wind model, the results of the GPM model are suspect. Because the GPM model was used to determine worst-case days for RTM modeling, there is no assurance that RTM did, in fact, model a worst-case. Thus, the scientific integrity of the GPM when driven by the "composite" mode of the CTWM of the RTM on a day chosen by GPM is also open to serious questions.

5.3.6. Recommended Application of CTWM:

To meet the requirement of insurance of scientific integrity, the CTWM should be applied in this manner:

(1) Each hour of the year should be explicitly modeled.

(2) Regional wind should be input to the model based on upper air station data characteristic of the synoptic situation. An evaluation of the daily weather maps could be used to determine what inputs, given the model characteristics, will result in the most realistic representation of winds.

(3) Local (slope) winds should be input to the model based on all available regional wind stations and data available from oil shale sites in Colorado, as well as a knowledge of the characteristics of slope winds in complex terrain.

30.50 (cont) (4) Regional and slope winds should be combined by the model. For example, input data could be modified to insure convergence of the approximate solutions (using, say a balance equation); known data points could then be held constant while the rest of the wind field is solved.

(5) Temporal interpolation of the wind data should be done in such a way as to reflect the synoptic situation. Weather maps can be used to determine wind shifts that could be reasonably expected during periods for which no data are available.

(6) The model should be verified against regional data. The results should be analyzed to provide some statisitcal measure of reliability, such as correlation coefficients.

5.4 Improper assumptions are made in the course of modeling.

5.4.1. Fields known to vary spatially are assumed to be uniform.

For the regional scale applications, impacts were modeled by the GPM assuming a spatially uniform neutral stability for the entire region. AQTR 4-63. This assumption is unrealistic because:

(1) Stability is known to vary spatially,[28] especially over complex terrain.[27]

(2) Many studies show that on an annual or seasonal basis in the region, the next most stable category (P-G category E) is more common than category D.[27]

30.51 The RTM was run assuming a uniform mixing depth for the entire region. AQTR 4-67. This is especially unrealistic over complex terrain[33] as can be seen from the wide range of measured mixing depths for days 179-182 (AQTR table 4-21). To the extent that low mixing heights were not represented, an assumption of uniform mixing height will result in an under-prediction of concentration, at least in some places, because the model assumes the atmosphere is vertically well-mixed in the mixing layer. Therefore, when the model mixing layer is unrealistically deep, the model will predict excessive vertical dispersion of pollutants, thereby unrealistically reducing ground concentrations.

The requirements of insurance of scientific integrity and a full and fair discussion mean that (1) regional modeling should explicity simulate spatial variations in stability (2) regional modeling should use stability categories representative of the area, (3) spatially varying mixing heights should be calculated by, for example, interpolating from the four stations available (if this causes numerical instability problems, the field could be smoothed or "balanced").

30.52 5.4.2. Acid deposition estimates are not correlated with the sensitivity of receptor areas.

Acid deposition is of particular concern in the intermountain West because of the extreme sensitivity (because of low buffering capacity) of many of the mountain lakes and streams, Lewis, Wm. M. 1982: Limno. Oceanogr. 27, 167-172. A full and fair discussion of significant impacts must include a quantitative assessment of both wet and dry acid deposition. As discussed above, the analysis of acid deposition must include consideration of the effects of inversion trapping, valley drainage and other phenomena that can cause pollutant accumulation or prolong travel time. Because receptors vary widely in their sensitivity to acid deposition, impacts can only be assessed if both the rate of deposition and sensitivity of receptor areas are correlated. Without a specific and reliable analysis of acid deposition impacts, the public and the decision maker cannot make a reasoned decision among the alternatives without knowing what the impacts of projected emissions of acid-forming pollutants will be.

Two extreme methods can be used to estimate the amount of total acid sulfur deposition occuring in a region. These methods bracket from above and below the true value of sulfur deposition. One can use airborne SO_2 and sulfate concentrations to calculate the total dry deposition. Alternatively, we can add to this quantity an upper limit to the wet deposition, calculated by assuming that all aerosol and SO_2 which passes through an average rainstorm is deposited.

30.52 (cont) Dry deposition may be estimated from the expression:

$$F_D = [N(SO_2)V(SO_2) + N(SO_4)\,V\,(SO_4)]\,T$$

Where F_D is the total dry deposition per unit area, T is the length of the year, $N(SO_2)$ and $N(SO_4)$ are the ground level annual average airborne SO_2 and sulfate concentrations (in terms of weight of sulfur per unit volume), respectively and $V(SO_2)$ and $V(SO_4)$ are the deposition velocities of SO_2 and sulfate, respectively. Values of $V(SO_2)$ and $V(SO_4)$ for terrain in the west central U.S. have been compiled by Sheih et.al. (Atmospheric Environment 13, 1361, 1979). These values are time-averaged. In reality V will vary diurnally and seasonally. But for the purpose of estimating annual deposition, a single well-chosen value of V for each component will suffice. An upper limit on wet deposition may be calculated by assuming that the entire local mixing layer is cleared of sulfur during a local precipitation event of average size. Thus,

$$F_w = [N(SO_2) + N(SO_4)\,]\times H \times N$$

where F_w is the total wet deposition of sulfur per unit area, H is the mean mixing height and N is the number of rainstorms per year with size greater than some cutoff. Of course, since sulfur is fed into the local air parcel during extended rainstorms, this method may closely estimate wet deposition.

30.52 (cont) Experience in the eastern U.S. and in Europe suggests that F_w is about equal to F_D. So as a crude approximation, in the absence of western U.S. data, F_D may be doubled to get total sulfur deposition. In order to perform these calculations, background SO_2 and sulfate concentrations and incremental increases must be available. If only $N(SO_2)$ is available, a lower limit on total sulfur deposition may be calculated from

$$2\,N(SO_2)V(SO_2).$$

This DEIS analysis of deposition rates is generally consistent with the approach outlined here. However, the draft fails to adequately evaluate the impact of the predicted deposition rates.

Extensive studies have been performed on sensitive aquatic ecosystems in order to determine a level of sulfur deposition which is "safe", that is, which is not accompanied by acidification of surface waters. Based on studies in Europe and eastern North America values greater than 0.5 gmS/m^2-yr are accompanied by acidification of surface waters over a period of one to three decades while lower values may lead to acidification over a longer time scale or may not lead to any significant acidification. Thus, values above 0.5 may be regarded as unsafe, whereas values below 0.5 may or may not be regarded as "safe", but are much less likely to cause significant adverse impacts in the near-term.

Report of the 1982 Stockholm Conference on Acidification of the Environment, Stockholm, June 28-30, Swedish Ministry of Agriculture;

U.S. Canada Memorandum of Intent on Transboundary Air Pollution,

30.53 Report of the Working Group on Impact Assessment, February 1981.

In order to apply the current methodology for assessing impacts, one needs to determine the sensitivity of Colorado water resources to acidification compared to that of eastern and European aquatic systems. Such evaluations are generally based on the sensitivty to acidification of rock and soil types underlying the water resources. If the sensitivities are comparable to those found in low buffered areas of the Northeast such as the Adirondacks, then a value of 0.5 gm/m^2-yr may be compared with the results of predictions above to determine if damaging levels of acid sulfur deposition are approached.

The draft should indentify available geological surveys which would allow one to estimate the sensitivity to acidification of the underlying geology of western Colorado. If no such surveys are available, the lack of such data should be identified as a research need.

A second type of study which is more site-specific involves the direct measurement of the alkalinity of surface waters. Studies in the Adirondacks suggest that surface water with titratable alkalinity below 100 micro equivalents per liter are particularly sensitive to acidification. Waters with alkalinities in this range in western Colorado have been reported in the studies of Turk and Adams (Sensitivity to Acidification of Lakes in the Flat Tops Wilderness

Area, Colorado, 1982), and Harte, Lockett and Schneider (Acid Precipitation and Surface Water Vulnerability on the Western Slope of the High Colorado Rockies, 1982). The most significant aspects of the Harte et al study in the Galena Mtn/Mexican Cut preserve, is that alkalinities have decreased in the region over the last decade, suggesting that acid-
30.53 (cont) ification is already occurring at current deposition levels." Both Harte et al and Turk et al report lakes with alkalinities at or below those considered marginal in the Adirondacks. These values should provide a basis for estimating the effects of deposition rates calculated as proposed above. See Exhibit ___.

Of course the calculated deposition rates should be added to those now being measured in the region. Measured data should be evaluated to determine background rates of deposition from existing sources.

The calculation of "minimum lake pH values" AQTR 5-134, falls short of a "full and fair discussion of significant environmental impacts." 40 CFR 1502.1.

Under the assumption of identical distribution of wet and dry deposition, acid deposition is estimated to be "as high as 0.2 and 0.4 $g/m^2/yr$" in Flattops. AQTR 5-134. The actual rate of acid deposition may well exceed unsafe rates since

a) The wet deposition rate will vary according to the distribution or precipitation;

30.54

b) The location of sensitive receptors may be near or down wind from populated areas for which the dry only deposition rate is estimated to be "greater than 1 gram per square meter per year."

c) The safe level in the Colorado Rockies may be less than 0.5 $g/m^2/yr$, since some receptors have a low buffering capacity. Turk and Adams, 1982.

5.4.3. Deposition rates fail to consider variation in precipitation rates.

The rough calculations which lead to the conclusion that the wet deposition rate "is about equal to that for dry deposition",AQTR 5-131, fails to provide any information concerning the expected distribution of wet deposition. This fault is particularly significant in light of the later statement that

> if wet deposition rates are comparable to dry rates...wet
30.55 deposition values in the midst of the developed regions will be comparable to those measured currently in the eastern United States and in Europe, but deposition in wilderness areas will be at background values.

AQTR, p.5-134 (emphasis added). Implicit in this statement seems to be an assumption that the spatial distribution of wet deposition will mimic that of dry deposition. Given the admission that"higher elevations receive greater amounts of precipitation", AQTR 5-131, this assumption is particularly suspect. As noted above (4.13) the description of regional climatology is too cursory to allow an evaluation of this assumption or understand what regional precipitation data are available for such an evaluation.

5.5 Hydrocarbon Emissions are not Adequately Modeled.

5.5.1 The PLUVUE model is inappropriate for this application, where hydrocarbon may be a significant emission.

There is some question as to whether PLUVUE is an appropriate model for this application at all. The User's Guide states that the PLUVUE sulfur and NO_x conversion mechanisms are "not valid...for sources of significant quantities of reactive hydrocarbon" because PLUVUE does not contain the appropriate equations. The emission inventories used for the oil shale industry report significant emissions of hydrocarbon both in plant operation and in storage and transport activities, related to the plant operation.

In addition, studies of oil and gas wells have shown significant fugitive emission of hydrocarbons, with concentrations of non-methane
30.56 hydrocarbons being on the order of 40 ppm. Emissions of Producing Oil and Gas Wells, EPA 908/4-77-006. Since the major cause of these emissions was found to be leaking valves, it can be expected that project-related facilities such as pipelines and oil storage facilities ("tank farms") as well as the projects themselves will be significant sources of fugitive hydrocarbons. These sources should be explicity accounted for in visibility modeling.

Scientific integrity must be insured by 1) an evaluation of PLUVUE's ability to predict visibility impacts in a region with the type of hydrocarbon emissions that can be expected and 2) a modification of PLUVUE to incorporate expected hydrocarbon reactions or use of a more appropriate model.

5.5.2. The EKMA Model is not properly applied in the oil shale region.

The prediction of O_3 is strongly affected by the concentration, rate of emission, and reactivity of hydrocarbons. Killus and Whitten, SAI publication # 81245. Despite the fact that large amounts of "fugitive" hydrocarbon can be expected from oil shale developments, the chemical mechanics used in this application of EKMA was for "rural
30.57 area...involving methane, CO, and trace organics such as naturally emitted terpenes." AQTR 4-74. After development, the region, at least with repect to ozone formation, cannot realistically be described as "rural" nor can re-active hydrocarbons emission be handled by a chemical mechanism designed only for "trace organics." A full and fair discussion of significant impacts must include modeling which realistically predicts the effects of the expected emission of hydrocarbons.

5.6 The modeling used methods which are one-sided and tend to predict unrealistically small impacts.

The EIS justifies setting confidence "bounds" by an assertion that GPM is "conservative," i.e. that it predicts unrealistically large concen-
30.58 trations. No studies external to this EIS are cited to support this conclusion. There is some discussion of the theoretical reasons leading one to expect the model might over-predict. There is no balancing discussion of factors which would lead to an opposite conclusion, such as:

(1) failure of the GPM model to include certain terrain-constraining or concentrating effects, such as valley trapping and channeling effects,[25] and 2) synergistic effects of the interactions of plumes,[24] especially urban plumes. For this application, where terrain may play a large role in transport phenomena and where urban (notably, Grand Junction) sources may add significant contributions to emissions and conversion rates, there is as much theoretical reason to expect GPM to under-predict as over-predict concentrations. The requirement that the EIS provide a "full and fair discussion" of impacts, 40 CFR 1501.1 (emphasis added), makes a discussion of both possibilities necessary.

It is asserted that the GPM method of steering puffs at their centroid results in an over-prediction of concentrations because puffs are
30.58 (cont) modeled as being unrealistically coherrent. AQTR 5-2. However, there are cases in which an explicit modeling of puff divergence could result in higher concentrations of pollutants. The Gaussian assumption may be more diversive than a breakdown of cohesiveness. If in the atmosphere, a splitting of plumes occured, while each sub-plume nevertheless retained its identity (with less than Gaussian dispersion,) local concentrations could be higher than that predicted by GPM. If divergent sub-puffs from different sources mixed, optimal chemistry might result in larger concentration of reactive pollutants than concentrations predicted from Centroid-steered coherent puffs (which might never meet). (see 5.2.1).

The requirement of a full and fair discussion means that the EIS must discuss circumstances in which GPM will result in under-predicting circumstances of the models when drawing conclusions concerning liklihood of exceedences.

6. Conclusion

The Uintah DEIS fails to comply with statues and regulations governing its prepartion and contents because;

1) It does not "provide information that is useful in restoring, maintaining and enhancing the quality of the environment." 42 USC 4332 (G)

30.59

(2) It does not "provide full and fair discussion of siginificant environmental impacts." 40 CFR 8502.1.

(3) It does not provide information "necessary to understand the effects of the alternatives.' 40 CFR 1502.15

(4) It does not "insure the professional integrity...of the discussion." 40 CFR 1502.24.

(5) It does not "identify...methodologies...[or] make explicit reference...[to] sources relied upon... 40 CFR 1502.24.

Repectfully Submitted by:

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Legal Intern

FOOTNOTES

1
Wall Street Journal. "Saudis to Hold Oil Price at $34 Despite Slump." 15 September 1982. p. 35. Also; In the United States, 1980 oil consumption has dipped slightly below consumption levels of the preembargo period in 1973 (34.8 quad BTU in 1973 and 34.3 quad BTU in 1980). (Source 1981 Statistical Abstract of the United States, 1981 Abstracts, fig. 991).

2
In the residential sector, demand for fuel oil and kerosene for home heating has dropped 22 percent between 1979 and 1980. (1981 Abstacts, fig. 997). Additionally, oil used for electricity production has also decreased. The table below illustrates the trends.

OIL AS A SOURCE OF ELECTRIC ENERGY

Year	Percentage of Total Electric Energy Produced	Net Generation by Oil (bil. kWh)
1970	11.9	182
1975	15.1	289
1976	15.7	320
1977	16.8	358
1978	16.5	364
1979	13.5	303
1980	10.7	246

(Source: 1981 Abstracts, fig. 1011.)

In the transporation sector energy consumption is roughly the same as 1975. Even though 26.1 million more vehicles were registered in 1980 than 1975. In 1975, energy consumption was approximately 17.5 quads. While in 1980, 18.0 quads were consumed. (1981 Abstracts, figs. 1079 and 995.) In part, the trend towards reduced energy consumption can be attributed to technological improvements as well as price and income effects of the price increases for petroleum. (Between 1973 and 1980 oil prices have risen by a factor of 3.2 in constant 1972 dollars) Source: 1981 Abstracts, fig. 1001.

3
The table below illustrates this trend:

OIL IMPORTS AND DOMESTIC USAGE: 1973-1981

(Units: Average Million Barrels Per Day)

Year	Input to Refineries	Imports	Domestic Demand Refined Oil Products
1973	12.4	3.2	17.3
1974	12.1	3.5	16.7
1975	12.4	4.1	16.3
1976	13.4	5.3	17.5
1977	14.6	6.6	18.4
1978	14.7	6.2	18.8
1979	14.6	6.5	18.5
1980	13.5	5.2	17.0
1981*	12.6	4.3	16.2

*Figures are based daily average for first half of 1981.
Source: 1981 Statistical Abstract of the United States Department of Commerce.

4
See WSJ. "Exxon Scuttles Oil Shale with Tosco Corp." 4 May 1982, p.3. Also ; Western Colorado Report "Fortnightly Wrapup" 10 May 1982, p.3.

5
Office of Techonology Assessment, An Assessment of Oil Shale Technologies (Washington, D.C., 1980) p. 16.

6
Charles Gray, Jr. and Frnak VonHippel "The Fuel Economy of Light Vechicles." Scientific American May 1981, Vol. 244, No. 5, pp. 48-59.

7
Design Improvements includes reduction in vehicle weight, reduced acrodynamic drag, and power train redesign. For more detailed description see Solar Energy Research Institute. A New Prosperity: Building A Sustainable Energy Future. (Andover, Mass.· Brick House Publishing,1981) p. 300. See Scientific American Vol. 244, No.5, pp. 51-56. Also see Julius Harwood. MIT Technology Review. "Automakers Lighten the Load". July 1981. pp. 60-67.

Demographic changes include matching future car design with anticipated family size, ages, and driving patterns. See Scientific American Vol. 244, No. 5, p. 51.

8 Scientific American, May 1981, p.48. It should be noted that investments in these measures are cost-effective. See p. 58.

9 Ibid., p.49.

10 According to Gray and VonHipple (Scientific American, May 1981) 15 percent of U.S. oil production is from Alaska. In 1980, the roughly 1.5mbbl/d from Alaska has a BTU content of 8.7 E12/day (Assumes 5.8E6 BTU/bbl (Energy Data Card, Energy and Resources Group, Univ. of CA, Berkeley, 1981) and 42 gallons per barrel. Gasoline is assumed to have a BTU content of 125,000 BTU/gal. (Energy Data Card) or 5.3E6BTU/bbl. If energy savings are 2mbbl/d, then fuel savings are 1.83 greater than the energy content of TAPS.)

11 SERI. 1981 p. 304. Congressional Budget Office. Fuel Economy Standards or New Passenger Cars After 1985. (CBA: DC Dec. 1980).

12 Scientific American May 1981 p. 59.

13 Ibid., p.57

14 OTA. 1980 p. 218.

15 A synthetic crude is produced by adding hydrogen to crude shale oil. (OTA 1980 p.3).

16 National Energy Conservation Policy Act (NECPA), Pub. L. No. 95-619, 92 Stat. 3206 (1978); Federal Register Vol. 44 No. 217,7 November 1975

17 Tennessee Valley Authority. Program Summary. Division of Energy Conservation and Rates. (Knoxville, Tenn: April 1981); "Utility and Power Picture: Northwestern States Develop Energy Conservation Programs", Building Energy Progress. Jan/Feb 1980.

18 "California Orders its utilities to 'Unsell' Energy", Business Week, 26 May 1980; "Financing the Solar Transition, A Report to the California Legislature", (Sacramento, CA 2 January, 1980).

19 General Public Utilities Corporation, "Conservation and Load Management Master Plan". 28 March 1980.

20 U.S. Department of Energy (DOE). Energy Performance Standards for New Buildings. Notice of Proposed Rulemaking and Public Hearings. November 1979. Section 2.

21 Lawrence Berkeley Laboratory (LBL), University of California. Evaluation of Residential Building Energy Performance Standards. (LBL-9816). December 1979.

22 For an excellent summary see Solar Energy Research Institute, A New Prosperity: Building A Sustainable Energy Future. (Andover, Mass.: Brick House Publishing, 1981) Introduction and Chapter 1.

23 Council on Environmental Quality, Global Energy Futures and the Carbon Dioxide Problem (Washington, D.C., January, 1981).

24 System Application, Inc. Final Report: Prevention of Significant Deterioration Policy Implications for Projected Oil Shale Development. SAI # 81274, 6 November 1981.

25 Start, G.E., L.R. Dickson and L.L. Wendell, 1975: Diffusion in a Canyon Within Rough Mountainous Terrain. J. Appl. Meteor. 14, pp. 333-346.

26 Lewis, Wm. M. 1982: Changes in pH and buffering capacity at lakes in the Colorado Rockies. Limnol. Oceanogr. 27, pp. 167-172.

and M.C. Grant, 1980: Acid precipitation in the western U.S., Science 207, pp. 176-177. See Exhibits 1, 2 and 3.

Radion Corp., 1977: Emissions of Producing Oil and Gas Wells. EPA 908/4-88-006.

27 Rio Blanco Oil Shale Co. Final Baseline Report; Cathedral Bluffs First Year Environmental Report; Union Oil PSD Application for Upgrading Plant--meteorlogical report.

28 Turner, Bruce D., 1970: Workbook of Atmospheric Dispersion Estimates. U.S. Dept. Health and Human Services, Public Health Services Pub. #999-AP-26.

29 Guidline on Air Quality Models, U.S.E.P.A. EPA-450/2-78-027.

30 Wilson, William E., et at., 1977: Sulfates in the Atmosphere, Research, Traingle Park, North Caroling, U.S.E.P.A. Publications No. EPA-600/7-77-021.

31 Zeedijk, H. and C.A. Velds, 1973: The Transport of Sulphur Dioxide Over a Long Distance. Atmospheric Environment 7, pp. 849-869.

32 Goodin, William R., Gregory J. McRae and John Seinfeld, 1979: A Comparison of Metropolitan Methods for Sparce Data, J. Appl. Meteor 18 pp. 761-771.

33
A. Longhetto, ed. Atmospheric Boundary Layer Physics, "Gravity Waves and the Atmospheric Boundary Layer", F. Einaudi. Elsevier Scientific Pub. Co., 1980.

RESPONSE LETTER 30

Environmental Defense Fund

30.1 The Uintah Basin Synfuels Development EIS and supporting technical documents provide information that is useful in restoring, maintaining, and enhancing the quality of the environment. The BLM position is supported by responses to the more specific comments provided by the commenter.

30.2 The EIS provides full and fair discussion of significant impacts. Regarding the alleged omissions, refer to the responses to Comments 30.36 and 30.37 concerning the commenter's item 1; response to Comment 30.44 for item 2; responses to Comments 30.52 through 30.54 for item 3; and response to Comment 30.43 for item 4.

30.3 As discussed in the responses to Comments 30.14 through 30.32, the EIS provides information necessary to understand the effects of the alternatives.

30.4 As discussed in the responses to Comments 30.33 through 30.58, the EIS provides accurate scientific analysis of impacts based on available high quality data and sound scientific methods.

30.5 The EIS complies with federal statutory and regulatory requirements. As discussed in the responses to Comments 30.6 through 30.58, the allegations about deficiencies are invalid or the deficiencies have been remedied.

30.6 Considering development of alternate fuel sources is beyond the scope of the EIS. The purpose of this EIS is to analyze the impacts of oil shale and tar sand development projects and alternatives that would achieve the same objectives of these projects. In all cases these objectives are to develop the oil shale/tar sand resources of the Uintah Basin for which the applicants are requesting federal rights-of-way. None of the leases are federal oil shale leases, but rather State of Utah leases that have already been issued. It is also beyond the scope of this EIS to consider alternative locations of C-11 and C-18 leases and other projects that are not permitted or under construction. The Supplemental Environmental Impact Statement for the Prototype Oil Shale Leasing Program (BLM 1982d) analyzes the impacts of alternative federal lease locations. Environmental impact analyses prepared for other projects would analyze alternatives for these projects.

The Uintah Basin Synfuels Development EIS is not the proper forum to discuss national policy alternatives. Regional development alternatives are discussed in the Federal Oil Shale Management Program EIS (BLM 1983).

30.7 Evaluating the nation's need for liquid fuels and the effect of energy conservation on that need is beyond the scope of the EIS. The EIS includes an analysis of the energy efficiency of each of the site-specific projects, a factor which the decision maker will consider when making decisions on the rights-of-way applications.

30.8 The purpose of this EIS is not to conduct a regional analysis. The use of the Draft EIS term "regional" in reference to the cumulative impact analysis for the nine proposed projects proved to be misleading to readers. The term has not been used in the Final EIS to avoid this confusion.

It should be noted that this EIS is not a leasing or mine plan approval EIS; it was initiated as a result of requests for federal rights-of-way (refer to the EIS Preface). The Federal Oil Shale Management Program EIS (BLM 1983) analyzes the impacts of new Colorado leases.

The response to Comment 16.4 explains the purpose of the nine-project cumulative analysis and why a "regional" no-action alternative is not included.

CEQ regulations do not require that alternative cumulative impact analysis scenarios be addressed. However, two levels of cumulative impact analysis are presented in this EIS, because there is concern whether all projects would be developed to the levels proposed within the given time frames (refer to Section R-1.C). The high-level scenario, based on the applicants' full production, represents a worst-case situation. The low-level scenario, which considers a cumulative production level about one-half the size of the high-level scenario, represents a potentially more probable regional production level and level of impact. Since a worst-case and potentially more probable case are presented, this is considered to be a reasonable review of the range of cumulative impacts.

Alternative locations of some major project components were considered for each site-specific project. Alternative locations for project mines and processing plants are not considered, because each applicant has received approval from the State of Utah to mine these lands based on the fact that leases have been granted.

Alternative production capacities, including the no-action alternative, are considered for all site-specific projects. Full production is analyzed as the proposed action and as part of the high-level scenario. A lower production level is analyzed as part of the low-level scenario.

Alternative processes have been evaluated where they are considered to be viable options by the applicants. Alternative emission control strategies will be evaluated by the Environmental Protection Agency and/or by the respective state air quality agencies as part of the Prevention of Significant Deterioration permitting process. Approved projects will be required to use best available control technologies.

30.9 BLM has no control over the lease tracts on which the applicants' mines would be located, because they are state lease tracts. The State of Utah has already granted each applicant the right to develop the land by issuing the mineral leases.

BLM has no authority to impose siting restriction in order to control air emissions. However, EPA and/or the respective state air quality agencies can and will impose such restrictions as part of the Prevention of Significant Deterioration (PSD) permitting process if the restrictions are appropriate. No project will be able to proceed without a PSD permit.

30.10 To the extent that it is possible and notwithstanding deficiencies in the meteorological data bases, BLM has attempted to achieve in the study the same things suggested in the comment. The regional modeling methodology employed focuses on transport to Class I areas and encompasses the full range of terrain variations within the region. However, it should be noted that this EIS does not address tract selections or lease conditions. The developments being evaluated are on state leased lands. The analysis is for developments on already leased state lands which require BLM rights-of-way.

30.11 The best available data have been used to estimate emission rates. Because there are currently no commercial size oil shale or tar sand facilities, there is considerable uncertainty as to the magnitude of actual emissions for each technology. Although it may be desirable to analyze a broad range of technologies, with the uncertainties in emission rates, such an analysis would introduce many additional and complex variables thereby confusing the issues directly associated with the projects as proposed by the applicants. Each applicant has a specified (and to some extent proprietary) interest in and rationale for the choice of technologies proposed; therefore, technology change alternatives are not considered viable at this time for the projects in question.

30.12 The development of the emission inventories that were used in the EIS analysis is explained in the Air Quality Technical Report. The explanation has been expanded in the final technical report. The control systems proposed are explained in the applicants' technical reports and/or the PSD permit applications of those applicants that have begun or completed the PSD permitting process. However, it should be noted that there are no prototype tracts involved in this EIS except for the White River Shale project, which was included as an interrelated project for the purpose of assessing cumulative impacts.

30.13 A discussion of measures that could be used at various synfuel facilities to mitigate the impact of emissions to the atmosphere has been added to EIS Appendix A-7 and the Air Quality Technical Report (Appendix E). The effect of a proposed mitigation measure can be determined if the specific design is known. Ground-level concentrations are roughly proportional to the mass emissions rate of the given pollutant if stack parameters, such as flow rate, temperature, and stack height, do not change. Except for such generalities, however, specific comments concerning the air quality impacts of alternative mitigation measures cannot be made at this time. Refer also to the response to Comment 30.11.

30.14 As discussed in the responses to Comments 30.15 through 30.17, the EIS provides sufficient description of the existing environment to understand and evaluate the impacts of the proposed projects.

30.15 Tables R-3-6 and R-3-7 have been significantly revised. (The comparable tables in the technical report have also been revised.) The reliability of the data is evaluated in Quality Assurance programs in which each monitoring organization participates.

30.16 The Gaussian puff model was used to model the 1980 baseline annual average sulfur dioxide concentrations. Available measurements of baseline sulfur dioxide concentrations are also presented in the revised Table 2-3 of the Air Quality Technical Report and Table R-3-6 in the Final EIS. The text of the Final EIS (Appendix A-5) has been expanded to clarify the use of modeled and monitored parameters.

30.17 Section R-3.A.2 has been expanded to more thoroughly consider precipitation patterns and other climatic factors.

30.18 The process used in developing the emission estimates used in the EIS air quality analysis was explained in the Oraft Air Quality Technical Report. An expanded discussion has been made in the Final Air Quality Technical Report. It should be recognized that uncertainty exists as to the emission source terms, because no commercial scale synfuel development is presently in operation. Actual emission measurements that presently exist have been made only for pilot- or bench-scale facilities. Thus, emissions from a full-scale operation have not been fully characterized and a number of uncertainties exist, particularly in the area of particulate and organic emissions. These emissions are strongly dependent on both the exact processing conditions and on the type of abatement equipment used. Therefore, a more rigorous evaluation of these types of emissions will have to wait for the operation of the first commercial scale developments.

Every effort was made in the air quality study by Systems Applications Inc. to obtain currently accurate emission inventories at the time the study was begun. These data can be expected to change by the time potential sources apply for a PSO permit in the regulatory permitting process. Applicants have changed emission data several time during the course of the PSO permit application review. As it turns out, emission values used in the EIS modeling study were generally higher; and, therefore, the analysis is expected to be conservative.

30.19 The discussion of data sources and methodology has been expanded in the final technical report as discussed below and in the responses to Comments 30.20 through 30.25.

The average operating conditions assumed for developing the inventories means that variations in normal operations from hour to hour, day to day, and month to month were averaged in arriving at emission rates for point and area sources. Equipment upsets were also not used to modify the emission rates. This is a typical procedure commonly employed in deriving emission inventories.

Full production conditions--100 percent design capacity--were used to estimate all the components in the inventories. Unlike the variable effects of a malfunction, full capacity can be quantified and thus was used to derive the inventories. The effects of nonaverage conditions such as startups and malfunctions are covered during the permit review process by air pollution control agencies. The explanation has been added to the Final EIS (Appendix A-5).

30.20 Mitigation proposed by applicants and mitigation committed to and enforceable by an authorizing agency are assumed. To assume that any unenforceable mitigation would be implemented would not present a true picture of potential impacts. Since mitigation lessens impacts to include uncommitted mitigation would present a "rosier" picture than might actually occur. This would be misleading to the public and the decision maker.

30.21 Section 4.1.1 of the Air Quality Technical Report discusses the development of some of the final emission data; other sections (Sections 4.1.4 through 4.1.9) discuss area source-data development. For the projects, the major processes were reviewed, resulting in emissions, emission factors and control technologies, and other descriptions of each project. This information was then compared among the projects, to other oil shale/tar sand facilities, to reports on comparable sources, to data on control technologies, and to documentation on emission factors. As indicated, the final data set employed experience and judgment to derive the inventories. Refer to responses to Comments 30.23 and 30.25 for more information.

30.22 An order of magnitude estimate of the uncertainty in the overall inventory might be approximately plus or minus 50 percent--a value comparable to the inventory uncertainty in any complete set of emission estimates covering a region of hundreds of kilometers. Specific components of the inventory, such as each project, would probably have a lower level of emission uncertainty. The reasons for inventory uncertainties are complex and not well understood; the above estimates are simply based on experience in developing and using emission inventories.

Experience also indicates that true emission rates sometimes exceed inventory estimates. This is because sources are added to inventories over time, revisions to emission factors generally increase those factors with new information, and as more detailed data become available, they tend to result in increases to the older estimates. Refer to Section 4.1.10 of the Air Quality Technical Report for more related information.

30.23 Engineering judgment is always employed in a study such as this throughout the entire project. This is because choices always exist in selecting emission factors, estimating the effects of controls, selecting operational conditions and levels, and similar parameters. These parameters are often available as ranges necessitating a selection process. Furthermore, should 92 percent control be selected when knowing the technology can meet that efficiency almost all the time; or should 97 percent control be selected when knowing the equipment can achieve that efficiency, the risk of equipment failure is higher at that level, but 97 percent may not be achieved on a long-term basis? One choice underestimates and the other overestimates emissions under certain conditions. This is the type of engineering judgment that is always needed and is based on professional and scientific experience. Refer to the discussion on fugitive dust emission factors (technical report Section 4.1.5.1) for an example of the use of engineering judgment.

30.24 Many projects had 70 percent or more of their emissions (by pollutant) associated with one or two points; the remaining 30 percent was associated with 10 to 50 individual points at each project. Many of the smaller emission points were co-located, ground-level emitters; other points were also co-located or placed within 0.2 km of each other with nearly identical stack data. In such cases, the smaller emission rates were consolidated into like emission points during the regional modeling efforts to reduce the complexity of the modeling activities. For example, a point located at UTM coordinates 663.3, 4432.4 km with a stack height, diameter, velocity, and exit temperature of 10 m, 0.5 m, 12 m/s, and 400 degrees k, respectively, was consolidated with a point located at UTM coordinates 663.3, 4432.3 km with stack parameters of 10 m, 0.7 m, 15 m/s, and 400 degrees k; average stack data were then specified for the point. Points were not moved more than about 0.3 km; ground-level and elevated points were never aggregated; and large sources were not consolidated. Considering the precision inherent in the locations and stack parameters of the projects at this preliminary stage, the consolidation process used for all the criteria pollutants had little or no effect on modeling results.

30.25 Engineering judgment was used to derive emission estimates for the conceptual projects from the documentation provided by the applicants. However, judgment was also used throughout the entire inventory process for all projects and area source emission estimates.

As indicated, overall inventory uncertainty may be plus or minus 50 percent--typical for this type of inventory. More information would be necessary to estimate error bounds for specific components of the inventory. Refer to the response to Comment 30.24 for further elaboration.

30.26 During the study, Systems Applications Inc. carefully analyzed about 25 existing sources in Uintah and Grand counties that had been reviewed by the State of Utah staff and documented in their files. Each source was reviewed by Systems Applications Inc. for its processes and likely emissions. Most of these sources had emissions ranging from approximately 0.5 to 5 kilograms per hour; the typical emission rate was about 1 kilogram per hour. The types of point sources covered a broad spectrum, including quarries, pipelines, storage tanks, and associated fuel combustion activities.

These sources were handled by the procedures used to establish the area source files. For example, Systems Applications Inc. obtained data on the amount of fuel used by stationary sources in Grand and Uintah counties. Emissions were calculated on the basis of this information and placed in the area source files. Thus, "point" sources documented in the State of Utah files were included in the area source files for this study (except the Plateau refinery). This is also consistent with the common definition of a point source--a facility with emissions greater than 100 tons per year.

30.27 As a result of the evolving state of the synfuel industry's project plans, emission estimates are continually changing. Due to the study schedule, emission estimates for the project applicants are current as of January 1982. However, we note that the differences in emissions for Magic Circle as discussed in the reviewer's comment are small and are well within the uncertainty of the emission estimates.

Although the most recent THC emission estimates are a factor of 6 higher than given in the Air Quality Technical Report, they are still quite low compared to other proposed synfuels projects and a very small fraction of regional THC emissions (see Tables 4-1 and 4-3 in the Final Air Quality Technical Report). Therefore, this increase in THC emissions is not significant.

30.28 The concept of "normalizing" emission estimates for the same pollutant from similar sources is an overly simplistic and unscientific approach to assessing source emissions and controls. Simply stated, alternative process and control technologies are in fact the explanation for differences in emission rates. For example, even for a process type which is well known and well documented, uncontrolled emission factors for fluid catalytic cracking units (from the EPA report AP-42) vary substantially for NO_x (37 to 145), SO_2 (100 to 525) and particulate (93 to 340) in units of pounds of pollutant per thousand barrels. Moreover, the range in emission factors becomes even greater when different types of catalytic crackers are considered (such as fluid versus moving-bed).

Furthermore, emission controls introduce a multiplicative effect on the range in emission factors. Each project applicant proposes different types of control with varying levels of reduction. Such differences often result from the fact that some controls are not applicable to certain processes. These varying control levels are also acceptable to regulatory agencies as best available control technology (BACT), because regulators recognize that the definition of BACT inherently permits tailoring of control technology (and the conversion efficiencies resulting from such equipment) to an individual source.

As explained in Section 4.1.1, fuel sulfur and nitrogen levels also vary in the fuel burned in heaters and boilers, which affects emissions even on a per unit of production basis. Thus, because processes and controls are unique, emission rates will differ for sources employing alternative equipment.

30.29 Colorado and Utah baseline (and projected) emission totals for the study region differ, because sources in each region are completely different. For example, 1980 population in the Utah portion of the study region is 28,747, whereas in the Colorado portion 1980 population is 123,432. Figure 1-1 also shows the different area of these two portions of the study region. Thus, there is no inconsistency among the different emission totals.

Regarding variations in project emissions and the concept of "normalization," refer to the response to Comment 30.28.

30.30 Section 4.1 points out that average operating conditions were assumed in developing the emission data. The term average in this case refers to normal source operations rather than production capacity. The emission estimates were developed at full production capacity for each of the project applicants on the basis of average operations. For example, the effect of malfunctions in source operations was not factored into the emission rates. Normal daily changes in area source emissions, such as from day-to-day changes in motor vehicle use, were also not considered in the development of the emission data. Uncertainty in emissions was likewise not added to the emission inventory. However, use of the term average is not synonymous with the term full capacity, since emission estimates were developed for full production conditions as indicated in Table 4-1, 4-2, and 4-5.

It is inappropriate to use emissions representative of "upset" conditions to analyze worst-case impacts, because the applicants' stated maximum emission rates (used in this analysis) will be those upon which each source is permitted to operate. PSD permits will require that sources curtail operations during periods when equipment is malfunctioning. The probability that an increased emission rate would coincide with a period of adverse meteorology is approximately the product of the probability of each event, a very unlikely occurrence.

30.31 The only new interrelated project listed in Table R-1-2 and Table R-1-3 which depends on the development of the proposed oil shale projects is the White River Dam. That dependency is described in the White River Dam EIS dated May 1982. Construction of the second unit of the Bonanza power plant may or may not depend on oil shale development as it may reflect aspects of broader marketing considerations. Potential expansion of the Plateau refinery probably depends on the development of Utah oil shale or tar sand projects. No other interrelated projects are dependent on construction and operation of the nine proposals which are the subject of this EIS. A discussion of the no-action alternative is included in the EIS in each of the site-specific project analyses. See also the response to Comment 30.8.

30.32 The Uintah Basin Synfuels Development EIS is based on a sequential concept, in that it treats impacts from known and eminent projects, a separate EIS will treat any additive impacts from potential new federal prototype oil shale leasing in Colorado, and another separate EIS will treat additive impacts from a potential permanent federal oil shale leasing program. These documents are interrelated by reference. For example, page 109 of the Draft EIS for the Prototype Oil Shale Leasing Program states "Scenarios and emission factors used the Uintah Basin Synfuels EIS and the Programmatic Oil Shale EIS have been incorporated into the prototype analysis." To repeat the prototype analysis in the Uintah Basin Synfuels EIS would be duplicative and counter to the intent of Council on Environmental Quality regulations, which encourage concise EIS documents, "tiering," and "referencing." A "full and fair discussion" is included in the Uintah Basin Synfuels Development EIS as related to the issuance of federal rights-of-way for the projects identified therein. Please see the separate EIS noted above for discussion of impacts from potential federal prototype leasing. Also see response to Comment 27.9.

30.33 Our goal was to conduct realistic worst-case studies of air quality impacts on the basis of available emissions and meteorological data and advanced, state-of-the-art air quality models. In the air quality analysis work, realistic worst-case analyses were used to determine whether air quality standards or Prevention of Significant Deterioriation increments, many of which refer to worst-case, maximum concentrations (or concentrations that cannot be exceeded more than once per year), would be met or exceeded. Thus, by the very nature of the analysis, worst-case conditions had to be considered. Since information was indeed available regarding meteorological conditions in the region, an extreme worst-case analysis based on postulated worst-case meteorological data is neither warranted nor appropriate. Although state-of-the-art air quality models were utilized in the analysis, there still is considerable uncertainty in the results. This uncertainty was explicitly recognized in the study and was quantified with estimated ranges of concentrations, including conservative, upper-bound estimates and lower-bounds on worst-case concentrations. Although the EPA has approved a screening model (VALLEY) for complex terrain, there are no EPA-approved models for regional analysis in complex terrain. The modeling performed for this EIS was performed recognizing this and was based on advanced state-of-the-art models.

30.34 The worst-case days are indeed pollutant specific. Different worst-case days are specified for TSP and SO_2 for GPM. RTM was run on four worst-case days for SO_2. This information has been added to Section 5 of the Air Quality Technical Report and Appendix A-5 of the EIS.

30.35 Certainly it would be advisable to investigate a large number of historical years in determining the worst case. Several years of meteorological data (wind and persistence roses) were examined to determine that 1978 was not an atypical year, and consequently would contain typical worst-case conditions. Regardless of the year selected, some chance that a more severe worst-case might occur will remain. Furthermore, it was considered important to use the most recent year for which sufficient data were available and that was not considered atypical. The EPA regional meteorologist concurred that 1978 appeared to be a representative year and cautioned against the use of the 1976 and 1977 drought years.

GPM was used in a fashion that permits the explicit treatment of limited mixing and impact on terrain. These two are probably the most likely critical plume behavior characteristics given the source types, terrain involved, and location of critical receptors.

30.36 Visual effects were modeled assuming a line of sight perpendicular to the plumes from the proposed developments in the Uintah and Piceance basins. This is an EPA-recommended practice for evaluating worst-case visibility impairment (see Workbook for Estimating Visibility Impairment, pages 27 and 30). As noted in the EPA visibility workbook, visual impacts are greatest for perpendicular, rather than oblique, lines of sight because the distance between plume material and the observer is shortest for perpendicular lines of sight.

The comment is made that the analysis is not a worst-case analysis because a mid-July day, not June 21, the day with maximum UV flux, was used. However, the difference in UV flux between mid-July and June 21 would have an insignificant effect on aerosol production and resultant visibility impairment. The analysis is a reasonable worst-case analysis because several inputs, such as mixing depth and wind speed, were specified in an extremely conservative manner (as discussed in Section 5.6.2 of the Air Quality Technical Report). Performance of sensitivity analyses to determine the date/time of maximum impact is judged to be not necessary, since an extremely adverse combination of mixing depth and wind speed was assumed, as discussed in the Air Quality Technical Report.

A C-stability class was selected, because this stability class is representative of the dispersion on a summer day. Aerosol formation is at a maximum rate during summertime, well-mixed conditions; specification of D or E stability would have resulted in a smaller calculated impact, not a worst-case impact. For regional haze situations, visual range reduction is primarily a function of wind speed, mixing depth, and aerosol flux. The commenter is correct in stating that more stable conditions than C stability should be specified for the worst-case visual impact (plume height) of nitrogen oxides. This was in fact done in the Level-1 tests and in the frequency of occurrence analysis reported in the Air Quality Technical Report. E- and F-stability classes were selected for plume discoloration calculations.

A relative humidity of 40 percent was used in the modeling analysis. The observer in Flat Tops Wilderness was assumed to be located on Big Marvine Peak.

30.37 A discussion of existing ozone levels and measured O_3 data has been added to Section 5 of the Air Quality Technical Report.

Although the photochemical model used is the basis of the EKMA procedure, the EKMA procedure was not applied in this study. The model was used as a means to quantitatively describe the impacts of future oil shale development, not requirements to reach NAAQS. Therefore, the EKMA guidelines need not be followed to perform simulations on the five worst-case days. Also, the straightline trajectories were chosen such that all oil shale emissions are accounted for. Thus, five different trajectories would not lead to significant differences in model predictions.

The Killus reference has been changed.

30.38 Refer to the response to Comment 30.24.

30.39 The wind field randomization of wind direction is introduced to account for uncertainties in observed wind directions. The resolution of reported wind directions is typically at least as large as the plus or minus 12.5 degrees used in the GPM randomization. To use a single wind direction derived from upper-level soundings (which are representative of very short time periods) may lead to unrealistically low plume spread, expecially in complex terrain. For this reason, the concept of wind direction randomization or 22.5 degrees sector plume spread have been used in this study as well as in several EPA guidelines models (e.g., VALLEY, CRSTER, COMPLEX I, COMPLEX II).

30.40 The SO_2 to SO_4 conversion rates used in GPM were 1.5 percent for daytime and 0.1 percent for nighttime. Deposition velocities used in GPM were 0.5 cm/sec for TSP and 1.0 cm/sec for SO_2. Mixing height was not used in GPM calculations. Rather, a conversion factor was used which was:

$$\frac{\text{deposition velocity}}{\text{plume thickness}}$$

where plume thickness was calculated as the maximum of 4 sigma z or h + 2 sigma z. The value of h was the effective plume height.

30.41 Discussion of upper-level concentrations has been added to Section 5 of the Air Quality Technical Report.

The photochemical trajectory model can handle sophisticated chemical processes. Unfortunately, transport processes are treated in the model in a simplistic manner. Thus, transport processes associated with storm front or turbulent vertical mixing cannot be handled in a straightforward manner with a two-dimensional trajectory model.

30.42 The comment is made that because plume chemistry is a nonlinear process, the linear combination of impacts from several emission source categories is inappropriate. It is true that atmospheric chemical mechanisms are nonlinear, but for this analysis it is conservative to assume a linear combination (addition) of individual plumes. This is true because in concentrated plumes, such as when several individual plumes overlap, the formation of sulfate aerosol, the principal light scatterer, is slowed because plume NO_x decreases the concentration of hydroxyl (OH) radicals responsible for the conversion of sulfur dioxide to sulfate. Thus, summing the contributions from individual dilute plumes will tend to overstate the total aerosol burden in the atmosphere.

This conservatism can be confirmed by taking the EKMA model calculations of increased aerosol concentrations and computing the resulting visual range reduction. Using the increase in sulfate and organic nitrate aerosol concentrations from the 1980 baseline to the high oil-production scenario of 1.25 and 0.60 ug/m^3, respectively, from Table 5-6(a) of the Air Quality Technical Report, the visual range reduction can be calculated using formulas from Latimer and Ireson (1980):

$$-\frac{\Delta r_v}{r_{vo}} = \frac{\tau_{plume}}{3.912}$$

Using the width of the plume assumed in the EKMA model calculations (20 km) and a typical scattering-to-mass ratio for submicron aerosol of 6×10^{-6} m^{-1} (ug/m^3), we have

$$\frac{\Delta r_v}{r_{vo}} = \frac{(20\ \text{km})\ (1000\ \text{m/km})\ (6 \times 10^{-6}\ \text{m}^{-1}/(\text{ug/m}^3))\ (1.25 + 0.69\ \text{ug/m}^3)\ (100\%)}{3.912}$$

$$= 5.95\%$$

This value is in basic agreement with, but smaller than, the value of visual range reduction calculated using PLUVUE by summing individual plume contributions. Thus, there is no reason to suspect that the approach used is inappropriate.

30.43 The linear combination of impacts associated with industrial growth and associated population growth is justified since SO_2 and TSP can be reasonably treated as conservative (nonreactive) species. To the extent that SO_2 converts to $SO_4^=$, SO_2 concentrations will be reduced and TSP concentrations increased. The $SO_4^=$ fraction of TSP is extremely small so this effect does not significantly affect the calculated TSP concentrations.

Because of the high terrain between the Uintah Basin sources and Grand Junction, the interaction of these two source regions is not believed to be a reasonable scenario for analysis. It is reasonable, however, to expect an interaction between oil shale facilities in the Parachute-Roan Creek area of the Piceance Basin with the urban plume from Grand Junction. This interaction was not evaluated in this study, because the sources in the Uintah Basin, not the Piceance Basin, were the focus of the analysis.

30.44 The modeling performed for this EIS utilized a regional modeling domain that extended far beyond the Uintah Basin where the sources being evaluated would be located. The study region was made sufficiently large to include the Flat Tops Wilderness Area, the mandatory Class I area identified in previous studies as receiving maximum air quality impacts from oil shale development. Latimer and Doyle (1981) showed that other Class I areas in Utah and Colorado would not be affected by synfuel development to the degree that Flat Tops would. Table C-3, which follows, is a condensation of Table 14 from that study. Note that Flat Tops is the mandatory Class 1 area that was predicted to receive maximum SO_2 concentrations from oil shale sources (7.1 ug/m^3 from the combination of Uintah and Piceance Creek basin sources). In this earlier study, Arches National Park was predicted to receive higher SO_2 impacts than Flat Tops from the Uintah Basin sources, since the former is about 120 km distant while the latter is 140 km distant. The more recent study suggests that Arches National Park would receive incremental impacts similar to Flat Tops from Uintah Basin sources (see Air Quality Technical Report Figure 5-15). Arches National Park, located just south of the southwest corner of the modeling region, would receive maximum 24-hour average SO_2 concentrations from Uintah Basin sources of about 0.4 ug/m^3, approxmately equal to the maximum concentration predicted in the Flat Tops Wilderness Area. (The GPM calculations in the current study of concentrations in these two Class I areas are about a factor of 5 lower than the screening calculations performed by Latimer and Doyle (1981).)

Exceedances of the Class 1 increment in Mount Zirkel Wilderness predicted by Latimer and Doyle (1981) and in the BLM Prototype Draft EIS are due primarily to the Craig Power Plant, not the Uintah Basin oil shale facilities. If detailed modeling required for PSD permits indicates that the Mount Zirkel increment is indeed consumed, it may be most appropriate to consider retrofit SO_2 emission controls on the Craig and Hayden power plants, 60 and 40 km from Mount Zirkel, respectively, than similar controls on the Uintah Basin sources which are about 240 km away from Mount Zirkel.

The region selected for modeling air quality impacts for the Uintah Basin Synfuels Development EIS was a reasonable choice in that Class I areas with maximum impacts were evaluated, inferences could be made regarding impacts in other Class I areas from this and other studies, and the analysis considered realistically the cumulative effects of Uintah Basin and Piceance Basin sources.

TABLE C-3

Maximum 24-hour Average SO_2 Concentrations in Various Class I Areas due to Synfuel Development in the Uintah, Parachute Creek, and Piceance Creek Basins

Class I Area	Maximum 24-hr SO_2 Concentrations (ug/m^3) Uintah Basin Sources	Parachute Creek Sources	Piceance Creek Sources
Flat Tops Wilderness	1.9	6.8	5.2
Maroon Bells-Snowmass Wilderness	1.1	4.4	2.0
Rocky Mountain National Park	0.6	1.3	1.0
Mount Zirkel Wilderness	0.9	1.5	1.5
Rawah Wilderness	0.6	0.9	0.9
Eagles Nest Wilderness	0.9	2.1	1.3
Arches National Park	2.3	2.1	1.3
West Elk Wilderness	1.1	3.5	1.6
Black Canyon of the Gunnison Wilderness	1.2	3.5	1.6
Colorado National Monument*	3.0	5.7	2.9
Dinosaur National Monument*	6.1	3.5	4.3

*Potential Class I area.

Additional air quality analysis has been performed for the Prototype EIS since the draft air quality report was published. This additional analysis includes refined emission source terms, meteorological input, and minor modification to the model to more realistically treat specific topographic and stagnation cases. BLM air quality specialists are in the process of preparing a comparison of the Uintah Basin Synfuels Development EIS and Prototype EIS air quality analyses.

30.45 There is no evidence that the tiered use of CTWM and GPM or CTWM and RTM is compromised by incompatibility. Indeed, every effort was made to ensure their compatibility based on modeling theory and knowledge of regional transport characteristics. Selection of a GPM worst-case episode for application of RTM does not guarantee that some other episode might not yield higher RTM predictions. However, application of RTM to an entire year or longer (as suggested by the commenter in other statements) would be very expensive and time-consuming and prohibited by practical EIS preparation constraints. Furthermore, generally speaking, for regional-scale 24-hour average impacts, both GPM and RTM identify, as the worst-case, those days with the greatest persistence of trajectories from the emissions sources of concern to a given receptor. Therefore, since both RTM and GPM derive wind direction input from the same data sources, it is likely that during a worst-case GPM episode, RTM would also predict relatively high concentrations in the vicinity. The statement by the commenter that "any inaccuracy in the GPM prediction of the worst-case will result in a total failure of RTM to do a worst-case analysis" is incorrect and misleading.

30.46 Very little air quality monitoring data exists that would be useful for regional model verification in this or any other study area. Furthermore, most of the emissions sources modeled in this study do not yet exist, and, therefore, their impacts cannot be monitored. In general, there has not been sufficient data collected to verify the performance of regional-scale models, and, therefore, comparison models and their predictions rest on an assessment of theoretical aspects of model formulations and intercomparisons of model results (Schock 1981; EPA 1978). A comparison could be made of RTM predictions using 1980 baseline emissions with air quality monitoring data, but it would not be a very meaningful comparison because of the sparse monitoring network and the very low concentration levels observed.

30.47 Lower and upper bounds were set, with GPM results as the upper bound, on the basis of considerable documentation presented in the Air Quality Technical Report (see Sections 4.2.1.2 and 5.1). Since GPM is expected to be conservative for the documented reasons and, since RTM calculations support this expectation, it seems reasonable to set the upper range of the estimates on the basis of GPM results. The lower range of the estimates for short-term averages was nominally set at 1/10 the GPM calculation. This seems to be a reasonable estimate considering the qualitative discussion of GPM conservatism and the quantitative comparison of GPM, RTM, and COMPLEX I calculations. The specification of lower-range estimates is probably not as critical as the specification of upper range estimates, since few decisions in air quality management are made on the basis of lower-range estimates. The factor of 10 range of uncertainty was placed on the calculations to clearly communicate to the public that (1) there is uncertainty in regional air quality modeling, (2) GPM results are most likely on the conservative side of realistic expectations, and (3) actual impacts could be as much as a factor of 10 lower than GPM results.

30.48 Justification is provided in Section 5.1 of the Air Quality Technical Report for the smaller range of uncertainty for GPM annual average calculations: conservatism in the specification of the horizontal dispersion of individual puffs is cancelled out in the course of a year because of averaging over many puff trajectories. The factor of 2 error range for the TSP empirical model is an estimate based on the observed scatter of data points around the best-fit line shown in Figure 2-11 of the Air Quality Technical Report. All of the observed TSP concentrations in the region shown in Figure 2-11 fall within a factor of 2 range of the best-fit line except for two outliers, where the best-fit equation predicted significantly higher concentrations than those observed.

As noted in the response to Comment 30.46, there is considerable documentation and justification in the Air Quality Technical Report for the scientific judgment that GPM is conservative and for the use of a range of uncertainty for model calculations. Except for "turning-the-crank" exercises using the simplest of air quality models, scientific judgment is used in all air quality model simulations. BLM disagrees with the notion that the "scientific integrity" of the study approach may not have been "ensured."

30.49 Refer to the responses to Comments 30.44 and 30.46.

30.50 As stated in the Final Air Quality Technical Report, the "composite" mode of application of the CTWM is a carefully considered compromise between cost and accuracy. Certain problems may arise because of the simplifying assumptions attendant to the composite model and to its inadequacy of available data; the commenter correctly restates some of them. It is important, however, to recall that the use of a simpler approach has even more severe problems and that the preferred approach of running CTWM explicity for each hour of the year with fewer simplifying assumptions is prohibitively expensive. Since the latter was suggested by the commenter, it is estimated that the cost of 8,760 hourly (1 year) CTWM runs would be about $200,000 and would require several hundred magnetic tapes to store the results. Furthermore, the cost and complexity of annual GPM runs would be greatly increased because of the tremendous increase in report data manipulations.

It is also important to recall that the focus of CTWM, GPM, and RTM applications is the regional-scale transport of oil-shale-related emissions and impacts on distant, sensitive receptors. When considered in this context, many of the concerns raised by the commenter with regard to the characterization of regional wind fields are not of great significance. For example, comments were made about the spatial averaging and temporal interpretation of upper-level driving winds for CTWM; while it is true that the "composite" method employed may not be capable of accurately treating abrupt temporal or "chaotic" spatial variations in upper-level wind patterns, such conditions are not conducive to high 24-hour average regional-scale concentration impacts which generally are associated with well-organized and persistent flow patterns. Similar arguments can be made concerning the decoupling of upper- and lower-level winds.

Concerns were raised about the upper-level wind observations being outside the study area and available only twice per day. It is agreed that better spatial and temporal resolution in the input data is desirable; however, all useful data that were available during the study were used.

The comment was also made that division of wind directions into one of 16 classes may be too coarse because "there is no reason to believe that wind variations of less than 22.5 degrees are insignificant in a complex terrain region where sensitive receptor areas may occupy less than 22.5 degrees of the distances involved." BLM agrees with this comment and has attempted to account for variations of the wind in complex terrain using the CTWM and the randomization of wind directions in GPM.

The reviewer's discussion of the treatment of slope winds raises some interesting questions and concerns. First, answers to the questions that were raised are:

(a) surface winds data were hourly;
(b) surface winds were collected at 10 m;
(c) comparisons were made before assignment of the upper-air-wind direction category;

Six slope wind categories were determined to be sufficient after sensitivity analyses were carried out (see Section 4.2.1.4, Step 3), as suggested by the reviewer. The hourly slope wind category was selected by examination of all available surface data for the hour, and the determination of the slope wind conditions that were observed at the majority of stations. It is known that slope winds may sometimes be highly variable in space and time, but the available meteorological data were too sparse to resolve these variations within the study region. Furthermore, it is not clear that the chaotic flow situation hypothesized by the commenter is conducive to elevated 24-hour concentration impacts at distant receptors. Given the current state-of-the-art in modeling, an attempt to focus on complex, hypothetical scenarios at the expense of more likely scenarios would lack the "scientific integrity" we all seek.

Some criticism of the scaling and vector addition of wind fields used in the "composite" mode was expressed. The reviewer states that the procedure is mathematically unsound, but later admits that this procedure is mathematically correct for elliptical partial differential equations. Since CTWM is based on the numerical solution of an elliptical partial differential equation, it is mathematically correct, notwithstanding inaccuracies in the numerical solution technique. The question of whether CTWM elliptical equations can be expected to provide a fair representation of the motions in the real atmosphere is quite different from the issue of the mathematical soundness of the composite mode of CTWM application.

The reviewer's statement, that only 96 possible synoptic/slope wind combinations and only 16 possible upper-level winds are possible using the composite mode, is false. An infinite number of combinations are actually possible, because the synoptic scaling factor is allowed to vary continuously. In addition, the reviewer is misleading when implying that because CTWM is based on an elliptical partial differential equation which is linear with respect to boundary condition and superpositioning, it is incapable of predicting nonlinear wind-field effects. Clearly, the examples of the wind fields predicted by the model given in the EIS reveal considerable "non-linearities." However, we would not claim to be able to accurately treat all atmospheric phenomena that exhibit very nonlinear behavior.

It is readily admitted that the diagnostic wind model (CTWM) has imperfections and limitations as do all mathematical wind models. Indeed, CTWM has some theoretical limitations that more sophisticated, dynamic models do not, but it has many practical and computational advantages over them. On balance, a diagnostic model is much better suited to the needs of this study than a dynamic model because of the large modeling region and long time period modeled (i.e., huge computational expense for a dynamic model) and the sparse input data base available. Furthermore, CTWM has been shown to perform reasonably well in many complex-terrain settings similar to the present one (Yocke et al. 1977; Tesche et al. 1979; Yocke 1981; Yocke and Liu 1979) and under meteorological conditions of greatest importance to regional transport scenarios. This is not to claim that CTWM will perform well under all conditions that may exist.

30.51 The upper-level driving winds are assumed to be uniform, but the predicted wind fields included considerable spatial variations reflecting the presence of terrain, frictional and temperature effects.

Stability was constant Pasquill-Gifford D stability only for the regional GPM runs. Pasquill-Gifford dispersion estimates are known to be very conservative for elevated plumes in complex terrain (Hovind et al. 1974; Stuart et al. 1974; Reid 1976). While there is some evidence that annual average stability is somewhere between class D and E, the effect of this on dispersion does not compensate for the high degree of conservatism embodied in the Pasquill-Gifford plume dispersion estimates used.

RTM was not run with a uniform mixing depth but rather a uniform layer top. Mixing depth varied from grid cell to grid cell depending on the difference between the layer top and gridded terrain heights.

Furthermore, limited mixing and the presence of ground-based stable layers in the late night and early morning hours were explicitly treated in the RTM runs, contrary to the reviewer's statements.

30.52 The approach suggested for estimating wet and dry acid was, in fact, used in the analysis that was performed. A quantitative assessment of both wet and dry deposition was performed, taking into account trapping, drainage, and "other phenomena that can cause pollutant accumulation." The annual rate of deposition and its effect on the most sensitive (most poorly buffered) of the lakes in Flat Tops Wilderness was calculated.

30.53 Surveys of the buffering capacity of lakes in Flat Tops Wilderness Area (Turk and Adams 1982) were used in the Air Quality Technical Report to estimate the effect of acid deposition on lake pH. The estimate of wet and dry sulfur deposition in Flat Tops which is believed to be conservative is 0.2 $g/m^2/yr$, less than the criterion of 0.5 $g/m^2/yr$ mentioned by the commenter.

A recently published document by the National Atmospheric Deposition Program (Norton et al. 1982) addresses the sensitivity to acidification of underlying geology in the United States on a state-by-state basis. This document and the accompanying paper by Norton et al. has been used to expand the acid deposition analysis and discussion in the Final EIS (Section R.4.A.2 and Appendix A-5). BLM concurs that much more work needs to be done in the West to relate deposition rates to effects, particularly in areas where high environmental quality is of national importance.

30.54 Wet deposition rates are a function of the distribution of precipitation. Annual wet deposition rates were calculated on the basis of annual frequency distribution of significant rainfall events. For conservatism, it was assumed that all pollutants in the atmosphere, both sulfur and nitrogen oxides, would be completely deposited during precipitation events. In reality, the fraction of pollutants removed by precipitation will be a function of the precipitation intensity. It appears items b and c are the commenter's interpretation; BLM is unaware of sufficient data to substantiate either.

30.55 For the purposes of conservatism, it was assumed that wet deposition rates would be equal to those for dry deposition. The conservatism derives from the fact that all sulfur and nitrogen oxides everywhere in the region are assumed to be washed out during precipitation events of 0.01 inch or more in Grand Junction. This is certainly conservative for light precipitation events. Precipitation intensities increase with elevation because of orographic effects. Thus, the degree of conservatism decreases with elevation in the region.

30.56 Refer to the response to Comment 30.42

30.57 The mechanism used is the Carbon-Bond Mechanism developed for urban areas. Sections 4 and 5 of the Air Quality Technical Report have been expanded to clarify this point.

30.58 The discussion of the degree of conservatism does include comments about the strengths and weaknesses of GPM. Where one might expect the likely possibility of underestimation to occur, other models or variations in mode of model application were applied. The specific examples cited as factors which may cause GPM to underestimate concentrations are incorrect, GPM does explicitly account for the terrain effects given and the interaction of plumes. The logic of the discussion of "Gaussian plume coherency" is difficult to follow and, in parts, speculative.

30.59 The Uintah Basin Synfuels Development EIS complies with statutes and regulations governing its preparation and contents. Refer to the responses to Comments 30.1 through 30.58 regarding BLM's responses to these allegations to the contrary.

COMMENT LETTER 31

United States Department of the Interior

MINERALS MANAGEMENT SERVICE
RESTON, VA. 22091

IN REPLY REFER TO
MMS-Mail Stop 650

OCT 2 0 1982

Memorandum

To: Lloyd Ferguson, District Manager
Bureau of Land Management
Vernal, Utah

From: Acting Associate Director, Onshore Minerals Operations

Subject: Review of Draft Environmental Impact Statement, Uintah Basin Synfuels Development, Utah

31.1 The Minerals Management Service has reviewed the subject draft environmental impact statement (DEIS) both at headquarters and in the field. In general, we believe the document is comprehensive and addresses areas overlooked in previous synfuels EIS's, although certain significant oversights may be misleading. The following are our specific comments.

31.2 Page v. R.3.A.13., Mineral and Energy Resources should be indexed to page R-3-57 instead of page R-3-27.

31.3 Page R-1-6, table R-1-2. A recently approved development plan modification for the White River Shale Project will result in peak construction and operating work force occurring 2 years later than shown.

31.4 Page R-1-9, table R-1-3. The revised development plans for the Cathedral Bluffs Shale Oil Project to be prepared in 1983 will probably outlive a development scenario requiring a construction and operating workforce similar to the Union Oil Shale Project.

31.5 Page R-1-12, table R-1-6. It should be appreciated that, since the specific and related projects acknowedged in the EIS will pass through these initial development phases during the late 1980's and early 1990's and since they are geographically tied to Vernal as the principal residential community, there is a high probability that skilled workers will be able to move from one project to another as their particular trade is required. This will tend to lessen total regional population growth. The same considerations would apply to table R-1-13.

31.6 Page R-I-15, 16, and 17, tables R-1-8, 9, and 10. Should not these tables be in section R-1.8, High Level Scenario?

AIR QUALITY AND METEOROLOGY

31.7 There are two characteristics of this EIS which are unusual. First, the reported results of the impact analysis include a range of possible values which reflect the uncertainty inherent in air quality modeling. The second is that results are reported, in the summary sections and the individual project analysis sections, in a form consistent with the objective of each particular section and appropriate to the technical understanding of most readers and reviewers.

Uncertainty in computer modeling is absolutely unavoidable and ranges from a factor of 2 under ideal conditions and flat terrain to 10 or larger under complex terrain. Since most readers of EIS's will not have the experience to take this uncertainty into account, it is actually more accurate and realistic to report a range of potential values than the misleading single value usually reported.

We want to point out the conservative nature of the entire analysis. While we may assume worst-case conditions of meteorology and plant emissions, we are assuming best-case economic and social conditions for development of the projects. Therefore, we expect actual regional impacts to be substantially below even the low end of the range predicted.

31.8 Page xxx, paragraphs 3, 4, and 5. Will these impacts occur under the high level scenario, low level, or both?

31.9 Page R-2-2, Air Quality. Although we believe this method of presenting air quality impact results (exceed, probably exceed, etc.) is more appropriate to a summary than most other EIS's we have seen, we believe it will put some readers off. This may be especially true for those predisposed to a negative viewpoint. We suggest a paragraph on page R-2-1 explaining the scheme of presentation of results.

31.10 Page R-3-18, Existing Air Quality, paragraph 1. Insert "exceedances of the particulate standards."

31.11 Page R-3-20, table R-3-6. We cannot stress enough the inadvisability of comparing 3-year averages to annual (1 year) standards or, even worse, to 8-hour or 1-hour standards, as in table R-3-6. Comparisons of this sort are misleading in the extreme. We recommend deleting table R-3-6 or using averaging times equal to standards.

31.12 Page R-4-25. Part R-4-A.2. of the air quality section addresses the general impacts of proposed synfuels projects on National Ambient Air Quality Standards (NAAQS) and Prevention of Significant Deterioration Increments (PSD). While the manner in which the various proposals might impact NAAQS and PSD is addressed sufficiently, the potential impacts of the proposals relative to the National Elimination Standards for Hazardous Air Pollutants (NESHAP) is not discussed. Hazardous aerosol compounds are produced in synfuels processing. Thus, the potential for NESHAP impacts should be discussed briefly at a minimum. In addition, this part of the section on air quality does not seem to clearly address the combined cumulative impacts of all the synfuels proposals in the area. We

31.12 (cont) assume, based on information provided in the EIS, that the simultaneous operation of all facilities would completely consume and significantly exceed the available PSD increments. Such a potential impact, if valid, should be clearly stated in the EIS.

31.13 Page R-4-26, paragraph 2, line 2. The term "GPM Model" is used without introduction.

Other Pollutants

31.14 Page R-4-37. It is appropriate that the potential aerial emissions of arsenic, cadmium, mercury, lead, ployaromatic hydrocarbons (PAH), etc., are mentioned. The potential emission of these compounds or their impacts has rarely, if ever, been addressed in previous synfuels EIS's. However, the section needs to be expanded and made more consistent with the safety and health discussion on pages R-4-102 through R-4-104. Certainly, potential emission of such things as nitrous oxides, mercaptans, and benzene should be mentioned in both sections. Also, reference to the potential carcinogenicity of these compounds should be expanded to include a discussion of the potential impacts of these compounds on resident populations within close proximity of the installations. This could be accomplished by addressing potential impacts in several defined concentric circles ranging outward from the source.

Acid Disposition

31.15 Pages R-4-40 through R-4-41. The discussion of acid deposition addresses an ill-defined problem. It summarizes current knowledge of research and makes projections regarding acid disposition in the areas adjacent to the proposed projects. However, the discussiun fails to address potential impacts other than to suggest that they are unknown. Based on the information provided in the document, we believe that sufficient information should be available to draw some conclusions as to whether the impacts are significant or minimal. Such a discussion should be included in the final EIS. Furthermore, some projection of the impacts of the acid deposition produced by these projects on the overall acid deposition problem in the Western United States would be helpful if sufficient information is available.

WATER RESOURCES

31.16 Almost no detailed attention is given in the DEIS to the potential for degradation or pollution of water resources at the various sites. Many of the engineering procedures mentioned probably will not be effective in controlling water pollution over long periods of time.

31.17 Little or no data are given on the composition of the resource to be processed. Thus, we have no way of evaluating the estimated emissions or other waste materials insofar as their potential for pollution. For example, sulfur content in the oil shale and tar sands is not given, leading to great uncertainties in estimates of controls needed, to sulfur produced as by-product, and sulfur compounds remaining waste materials.

31.18 The EIS should clearly state the uncertain aspects of some operations (e.g., spent shale reclamation) and that the descriptions of proposed procedures have not yet proven to be satisfactory.

31.19 Most abandonment procedures are oversimplified, perhaps out of necessity of the present state of knowledge. Shaft abandonment should, at minimum, recognize the potential effects on aquifers, and mine working abandonment should address effects of eventual subsidence on water resources.

31.20 The discussions of "percent efficiency" should be supplemented with a discussion of resource recovery. Typical room-and-pillar mines in the basin will recover only about half of the oil shale resource.

31.21 Page R-3-25, paragraph 3. The "Birds Nest" aquifer occurs in the eastern part of the basin, where much of the ground water contains 2000-4000 mg/1 TDS (not the 9,870 noted). Much of the water in the Douglas Creek aquifer contains less than 2,000 mg/1 TDS. Near tracts U-a and U-b, limited data indicate the water contains less than 1,000 mg/1 TDS.

31.22 Page R-4-7, paragraph 5. The discussion on mining ground water is neither complete nor as unequivocal as implied. No mention is made of potential effects on water quality or on the potential for using ground water to supplement surface water supplies.

31.23 Page R-4-45. This section sufficiently discusses impacts relative to water consumption. However, the more traditional water quality impacts relative to pH, total acidity, heavy metals, other toxics, total dissolved solids, etc., are not addressed either for surface or ground water. On page R-4-55, under "Other Water Quality Impacts," the possible mitigation measures for leachates of the projects are addressed in a cursory manner. A much more complete discussion of these measures, including a realistic evaluation of their long-term effectiveness and resultant impacts, would be appropriate.

In addition, this section should fully address the potential impacts of leachates, particularly toxic leachates, on both the surface and ground water. Such a discussion should include the potential impacts for such things as acidity, salinity, total dissolved solids, heavy metals, PAH's, and other toxic leachates. It should be cross-referenced with the wildlife and endangered species discussion. Particular attention should be given to the potential impacts of these substances on aquatic habitat for endangered species and other aquatic life.

31.24 Page R-4-54, paragraph 6. Where quantifiable, the estimated annual cost to downstream users due to salinity should be stated, i.e., White River Dam $1,400,000 to $1,900,000, and total costs from all sources $3,800,000.

31.25 Page R-4-55, paragraph 1. The implication that spent shale can or will be reclaimed so as to produce "no leachate" is not supportable by data. A growing body of information indicates otherwise. The use of "average" precipitation and evaporation numbers in support of this is faulty reasoning. In summary, field and laboratory studies and the certainty of hydrogeologic processes in the area indicate that "no leachate" is a near-impossible achievement.

31.26 Page M-4-8, paragraph 1. Experience to date in utilizing mine inflow water indicates that any large inflows during early mining stages will exceed the need for water, thus disposal methods will be needed. The EIS should address this.

31.27 Page P-1-15, paragraph 16. No information is given on the slope of the spent shale surface, which is critical to its stability. The slope should be no greater than 4:1. The description of benches is not clear as to how many or what length of runoff from the slope feeds each bench. These descriptions, coupled with the lack of detail on the retention dams shown on the map on page P-1-3, make the proposed plan for spent shale disposal inadequate.

31.28 Page T-1-10, paragraph 1. The recognition in the TOSCO plan that "soils or weathered bedrock" are suitable plant growth materials is a great step toward reality in the uncertain field of land reclamation in this and other soil-short areas. The alluvium in washes, which is also a suitable plant growth material, should be added to this list at all sites.

31.29 Page T-1-10, last paragraph. Mining under rivers should be approached with extreme caution. Long-term subsidence is a near certainty, with resulting, probably undesirable, effects on streamflow, ground water, and perhaps the mining process.

31.30 Page T-1-13, last paragraph. There are sound reasons for the Bureau of Land Management to encourage injection of excess mine water into the producing aquifer, as described here. Such injection has proven feasible and has been done successfully on lease tracts C-a and C-b.

31.31 Page T-1-15, paragraph 6. The flood runoff precautions, as described, are conservatively realistic in view of the uncertainties in size of a rare storm.

31.32 Page T-1-27, paragraph 3. Has the alluvial aquifer system along the White River been tested? There appears to be a 2-mile reach of alluvium that is a potential aquifer in the project area. A 9,000 AF/year demand could potentially be met, at least in part, by a well field along this reach.

31.33 Page R-C-4, paragraph 5. No mention is made of the almost certain ground water degradation that will result from abandoned in-situ retorts where large volumes of soluble materials in the retort zone underlie a broken ground surface made more permeable by blasting and, thus, able to accept more recharge from precipitation.

31.34 Page R-3-9. The description of how spent shale would be converted to ". . . a stable, impervious, and erosion-resistant land mass" is oversimplified and misleading. Retorted shales generally require a great effort, perhaps prohibitively so, to compact them to very low permeabilities. The long-term stability of this low permeability, when subjected to fluid movement through it, has not been demonstrated.

VEGETATION, SOILS, ANO RECLAMATION

31.35 The time frames given for successful revegetation are not consistent between projects in similar vegetative and rainfall areas. One example is revegetation of timber species given as 75 to 300 years for different products in different parts of the report.

31.36 The use of data carried to one decimal point, i.e., 57.1 percent, for an estimate based on little more than judgment is not justified.

31.37 Use of the term "noxious weeds" in reclamation sections is incorrect. That term should designate only those weeds listed by the State as noxious. As used in the text, it should be simply "weeds."

31.38 Page R-1-15, table R-1-8. Does the ground water column refer to construction or operation?

Page R-1-22, table R-1-15. Does the ground water column refer to construction or operation?

31.39 Page R-3-31, table R-3-10. This would be more useful if combined with acreage disturbed.

31.40 Page T-4-7, paragraph 4, line 5. The sentence beginning "However, this impact" is confusing.

31.41 Page T-4-9, paragraph 1, line 1. Explain that the 2,000-acre disturbance takes place gradually and that reclamation on some parts can start while other parts are still being disturbed.

31.42 Pages T-4-10 and T-4-11. What about impacts to mammalian predators, such as coyotes, which are common in the area?

31.43 Page E-1-11, paragraph 1. The statement to return disturbed areas to "original contours" could be interpreted to be an unnecessary and expensive requirement.

WILDLIFE

31.44 While the EIS does an adequate job on the regional description of the environment, when the discussion switches to individual sites, no specific site data is presented on wildlife, habitat, or vegetation. It is assumed that the regional information presented for vegetation sites is sufficient for indivudal tracts without discussing any particular characteristics or dissimilarities of the natural resource on that specific tract.

31.45 The discussion of impacts on individual wildlife species is very general. For instance, it is stated that removal of vegetation will impact birds and small mammals, but the major species which will be involved are not listed. Nor is it stated which part of their life cycle will be affected or how different species react to revegetation efforts.

31.45 (cont) For example, removal of pinyon/juniper will affect nesting areas of pinyon jays, etc., which are year-round residents. The reclaimed areas will be vegetated grass, forbs, and young shrubs. This type of habitat will favor species such as horned larks and other open-habitat dwellers. Eventually, in 20 to 50 years, tall shrubs and trees will again provide nesting habitat for woodland species of wildlife. Something like the foregoing tailored to specific situations would provide a better description of impacts than that given.

31.46 The wildlife-habitat-revegetation scenarios are misleading and incorrect.

If a mine, which is on a 5,000-acre tract, will be developed over a 25-year period and have a maximum of 3,000 acres disturbed, then the statement in the EIS that 3,000 acres of vegetation, range, or wildlife habitat will last for the life of the mine--25 years--is incorrect.

The mine site or total tract will never have 3,000 acres out of production at any one time. The development schedule should be shown with acres disturbed compared with acres reclaimed. At first, disturbance is rapid, as roads, plant facilities, utility corridor, and mine site areas are cleared and overburden materials stockpiled. This would disturb probably less than 500 of the 3,000 acres over a 3- to 5-year period. When actual mining retorting and processing (if any) begin, then the spoil pile, raw rain material pile, and catchment pond areas begin to expand, but only by a few hundred acres per year up until full production.

After full production is achieved and a portion of the spoil pile reaches final configuration, it can be reclaimed. After this point is reached (possibly in 15 to 20 years), then for every acre disturbed there would be one being revegetated. Therefore, it is doubtful if over one-half of the 3,000 acres total disturbed will ever be out of production at any one time.

Even though livestock grazing may be prevented by fencing, it would be difficult and expensive to keep deer and antelope out of these areas and almost impossible to exclude birds and small mammals. This probably would not be necessary anyway.

Also, there is reason to believe that proper reclamation using water harvesting methods, superior seed or stock mulch, fertilizer, herbicides, and insecticides cannot provide much greater livestock and wildlife carrying capacity than before.

31.47 Page R-3-35, table R-3-11. Use of the acronym "ROW's" should be defined. Also, the list of birds is very short; what about season of use?

31.48 Page R-3-48, table R-3-15. Vega State Recreation Area is in Collbran, Colorado, not Rifle.

31.49 Page R-4-7, paragraph 6. The 10-year figure appears arbitrary. Why and how was it chosen?

31.50 Page E-1-9, paragraph 3. This states that 100-ton trucks would be used, but page E-1-11 states that 85-ton trucks would be used. Which is correct?

31.51 Page E-3-2, paragraphs 2, 5, and 6. The descriptions of vegetation and habitat type are too vague. What is the present carrying capacity of these areas for deer and elk?

31.52 Page E-3-3, paragraph 1. How do roads and utility corridors conflict with migratory routes?

31.53 Page S-5-6, paragraph 1. The estimate of a 61.2 percent increase in wildlife loss is highly speculative.

AGRICULTURE

The EIS addresses the subject of agriculture in several different sections under the various alternatives and/or proposals. This approach is highly desirable as it serves to clarify the impacts that the different alternatives and proposals may have on the aspect of agriculture. Several of our comments on agriculture are contained in our comments under "Vegetation, Soils, and Reclamation" and "Wildlife."

31.54 We believe the sections on agriculture are adequate. However, it would be beneficial if recommendations were made concerning possible mitigating measures and/or stipulations that may be necessary to alleviate the impacts to agriculture. While the EIS addresses the impacts, it does not clarify the effects that these impacts will have on the people in the area or on the field of agriculture as an important facet of the economy of the area. A more direct approach should be made concerning the actual impacts to agriculture that may result from the alternatives and proposals. It is also important to address mitigating measures and stipulations that may be necessary. This would help clarify a degree of vagueness that is now present in the EIS.

MINERAL AND ENERGY RESOURCES

31.55 Page R-3-57, R-3.A.13. This is not comprehensive and provides little information for use. This is the basic section, and all other site specific comments are referred here.

31.56 Page R-L-1, appendix R-1. It seems illogical to include food and clothes, etc., for the workers, as all people need these energy items, regardless of the location of their jobs.

31.57 Page R-1-10, table R-1-4. Compare R-1-16 and R-1-23. The high and low scenarios do not make sense. Production from U-a/U-b is higher in low scenario, as is tar sand.

31.58 Page R-3-57, R-3.A.12. Paleo is not useful and is too general.

31.59 Page R-4-10. The impact on paleontology is not significant.

31.60 Page R-4-89 and R-4-91. Resources left in the ground, i.e., not recoverable as a result of present day mining technology, should not be considered in determining project efficiency. Resources left in the ground make it possible to mine the recoverable resource.

31.61 Page R-4-91, paragraph 6. These energies would be consumed anywhere, not just at the project. The additional "cost" in energy might be legitimate.

31.62 How does "1-6" in the "Overall Energy Efficiency" differ from "1-4" in the "Final Project Efficiency"?

31.63 Page R-4-102, paragraph 2, last line. MIS does not involve miners being directly exposed to fire. This may overstate the risk.

31.64 Page SS-14, Pillar Design. The feasibility of pillar extraction is questionable with mining heights as indicated.

31.65 Page E-3-5, E-3. This section on Minerals and Energy Resources references section R-3.A.13. Similar cross-references are in each site section. The information is inadequate.

31.66 Pages E-4-12 and E-4-13. The efficiency analysis seems to consider the nonrecoverable resource, which gives a distorted picture (see comments for pages R-4-89 and R-4-91).

Page M-4-17. See comments for pages R-4-89 and R-4-91 and E-4-12 and E-4-13.

Page P-4-14. See comments for pages R-4-89 and R-4-91 and E-4-12 and E-4-13.

Pages S-4-15 and S-4-17. See comments for pages R-4-89 and R-4-91 and E-4-12 and E-4-13.

31.67 Page T-1-25. There is no attempt in the discussion of the "Blocking-Up" alternative to TOSCO's Sand Wash Projects to calculate the amount of oil shale resources that would be able to be mined on both the Federal and State lands as a result of this alternative or the amount of money saved by the company by not having to construct tunnels, more pipelines, conveyors, and powerline. No mention is made that this project would be able to operate for 9 more years at approximately 66,000 tpsd.

31.68 Page T-3-15, Geology. This has important conclusions on the seismic risk to the pipeline. This is not supported in the geology section in this EIS.

31.69 Page T-4-15. See comments for pages R-4-89 and R-4-91 and E-4-12 and E-4-13.

Page R-L-1. See comments for pages R-4-89 and R-4-91 and E-4-12 and E-4-13.

OPERATIONAL ASPECTS

31.70 The technical aspects of the mining and processing are covered adequately with the exception of quantification and discussion of impacts of polycyclic aromatic hydrocarbons.

Thank you for the opportunity to review this document.

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U.S. Minerals Management Service

31.1 BLM notes the comment on the comprehensiveness of the EIS.

31.2 The Table of Contents has been revised.

31.3 It is understood that perhaps the White River project may be delayed. Also, other projects have indicated changing work force plans. The synfuels industry is undergoing considerable change and is constantly faced with a great deal of uncertainty. The State of Utah, in preparing economic demographic projections of impact from synfuels development in the Socioeconomics Technical Report, has found it quite impossible to incorporate all changes in projects as they occur. Instead, the state was faced with using work force estimates as of January 1982. Changes in work force requirements after that date cannot be reflected in the EIS or the accompanying Socioeconomics Technical Report. White River Shale Project provided its best estimates of work force in January 1982, and these numbers are reflected in the EIS.

31.4 Based on a new submission for funding to the Synthetic Fuels Corporation, the Cathedral Bluffs project would have a scaled-down peak construction work force of 2,200, and a peak operational work force of 1,500. These new work force projections could not be incorporated into the socioeconomic impact analysis, but are recognized in this response. Because the figures used for analysis purposes were greater than current estimates, the analysis can be considered a worst-case situation.

31.5 Skilled workers would be able to move from one project to another as their skills are required. This is a very important consideration. It should be recognized, however, that the Utah Process Economic and Demographic (UPED) model takes into account the supply and demand for labor at every point in time and thus is able to simulate the shifting of workers from one project to another within the region before any new migration is induced. It is believed that the UPED model has adequately projected the total impact of synfuels development and that total regional population growth has not been overstated because of shifting workers from one project to another.

31.6 In keeping with usual editorial practices, the tables in question were placed immediately after the page on which they were referenced.

31.7 BLM notes that the Minerals Management Service believes the air quality analysis was well presented. The air quality analysis was designed to be conservative; however, because of the nature of the available data, BLM believed it was better for the analysis to potentially overstate rather than understate the impacts.

31.8 The impacts described in general terms in the Summary are appropriate for both the high- and low-level scenario. The actual magnitude of the impacts would be greater for the high-level scenario than for the low-level scenario.

31.9 This is intended to be a summary table. It is unclear how the method of presentation (exceeded, probably exceeded, not exceeded) would adversely affect the reader's understanding of the information ("put them off"). The meaning of the key words used in the table (exceeded, probably exceeded, not exceeded) is explained in table footnotes.

31.10 The subject paragraph in Séction R-3.A.2 has been expanded and the suggested insert has been incorporated.

31.11 Table R-3-6 has been replaced.

31.12 Additional information on hazardous air pollutants has been added to Section R-4.A.2 and Section 4.A.2 of the site-specific analyses. PSD regulations require determination of Best Available Control Technology (BACT) determination, and air quality analysis for all pollutants to which the National Emissions Standards for Hazardous Air Pollutants (NESHAPS) apply, unless emissions would be less than the "de minimis" emission rates set by EPA.

It is true that analysis results indicate some PSD increments could be exceeded from the cumulative impacts of all proposed synfuels facilities. However, the exceedances are not predicted to be as widespread as the commenter suggests. The problem of which PSD increments would be exceeded and at what locations is complex and should not be oversimplified.

31.13 The Section R-4.A.2 sentence in question has been corrected.

31.14 Section R-4.A.16 is a general discussion of safety and health impacts. Section R-4.A.2 has been expanded to include additional information on potential trace elements and other emissions (including PAH impacts).

31.15 Section R-4.A.2, Acid Deposition, has been expanded utilizing additional information and studies from the literature.

31.16 The water quality analysis was based on determinations that the engineering procedures would be effective in controlling water pollution and producing stable slopes, and that the reclamation and revegetation plans would be complied with. Given these determinations and existing regulations and forced compliance by authorizing officers, there is not a case for water pollution over long periods of time.

31.17 It is true that very few data on the raw shale are given; however, data on the composition of the products and by-products are included in the applicants' technical reports and PSD applications.

The method of analysis for this EIS was to review the major processes resulting in emissions, emission factors and control technologies, and other descriptions for each project. This information was then compared among the projects, to other oil shale/tar sand facilities, to reports on comparable sources, to data on control technologies, and to documentation on emission factors for its reasonableness. Engineering judgment was used to derive estimates for the conceptual projects.

In the final analysis, permits would be issued based on the applicants' submitted data, and the applicants would be responsible for meeting the emissions standards.

31.18 The EIS discussion of spent shale reclamation identifies major concerns, methods, and techniques with reference to reliable research and field trials conducted by leading researchers in the field of reclamation. The research on which the EIS conclusions are based is identified in the footnotes for Table A-8-2 and the associated reference list located in Appendix A-8.

31.19 All shafts would be sealed from any infiltrating ground water during construction. It can be assumed they would be maintained during operation, and adequately sealed at the surface upon abandonment. The mines are designed to prevent subsidence based on strength and thickness of overburden.

31.20 Resource recovery is discussed in Section R-4.A.13.

31.21 The ground water TDS values in Section R-3.A.3 have been corrected.

31.22 Contamination of ground water has been added to the Chapter R-4 Significance Criteria section. No applicant identifies ground water as its preferred water source. Magic Circle, the only applicant considering the use of ground water, proposes the Douglas Creek aquifer as an alternative water supply system (see Section M-1.E.2).

31.23 The EIS considers water usage from several rivers in the Upper Colorado River System (White, Green, Colorado, and Duchesne). The water model that was used to determine impacts to the Colorado River System is capable of predicting changes in salinity and flow. The "more traditional water quality...that are not addressed" are not included for the following reasons: (1) there is no evidence that these parameters would change, because the applicants' project would be non-discharging; and (2) water quality data that would be needed to determine current site-specific baseline conditions do not exist.

What the commenter referred to as mitigation measures for leachates are actually applicant disposal pile design parameters. More complete discussions of these parameters are contained in the referenced applicant technical reports.

The Section R-4.A.3 discussion on leachates has been expanded to include more data which support the conclusions in this section. (See also the response to Comment 32.11.)

31.24 Section R-4.A.1 states that a 1 mg/l increase would result in \$472,000 of annual damages. The largest annual damage from all sources (baseline plus applicants' projects plus interrelated projects), measured at Imperial Dam, would be \$46,633,600 in 1990. The largest annual increase in salinity damage from applicants' projects and interrelated projects as an increment above the baseline would be \$3,776,000 in 1995. See also the response to Comment H-9-12.

31.25 The reclamation of the spent shale is not the issue for leachate production, but rather the engineering of the spent shale pile. The engineering designs shown by the applicants have the potential of producing an inert plug of spent shale sealed from natural soil and rock by nearly impermeable liners.

The use of average precipitation figures is not faulty, but rather the best data that is available for the area. It is well known that recharge to the water system is through highly permeable zones, principally in high altitudes, which are not as well known as the "certainty of hydrogeologic processes in the area" would lead one to believe. Because the applicants' spent shale piles would not be highly permeable, would not occur in a zone of high recharge, and would have the runoff diverted plus use a nearly impermeable liner, the chance of leachate production would be remote. Refer to the response to Comment 32.11 for a more in-depth discussion.

31.26 Although existing data indicate little potential for a large inflow of water into the mine, any excess water would be stored in a holding pond and eventually used. (Refer to Sections 1.3 and 1.10.43 of the applicant's technical report.)

31.27 Spent shale disposal and retention dams are discussed in detail in the applicant's PSO application, Section 2.2.4. The company has proposed 1.5:1 slopes on the spent shale pile, along with a cemented shale and rip-rap covering. Also see response to Comment 44.32.

31.28 The statement as written includes "alluvium in washes." Weathered bedrock includes unconsolidated residues (regolith) which may consist of sedentary (in-situ) and/or materials transported by wind and water.

31.29 Tosco is also concerned about mining under the river as reflected in the paragraph cited by the commenter. Tosco's planned approach is to prevent collapses. See pages 5.1-10 and 5.1-11 of the Tosco Technical Report for more information.

31.30 This method of disposal of excess water also may be used in other places, where appropriate, reducing potential for significant impacts.

31.31 Tosco's design is purposely conservative to ensure maximum protection.

31.32 Whether or not the aquifer has been tested is a moot point. The hydrologic connection is so direct to the flowing river that it would respond as a surface water source.

31.33 The only data BLM has that is related to recharge over in-situ retorts is that after blasting and burning, a significant increase in soil bulk density occurs (ERO Associates, undated). This suggests a decrease in permeability and a corresponding decrease in infiltration/ recharge. This point has been added to Section R-4.A.3 (note the purpose of the appendix is to describe the applicant's proposed project rather than discuss impacts).

31.34 A more detailed description of the disposal pile design is not available for the Agency Draw Project. The project is conceptual and has not proceeded into a detailed design phase. It is assumed that the disposal design would be similar to those submitted by the other applicants (see applicants' technical reports) and that the reclamation procedures would be similar to those outlined in Appendix A-8.

Given these considerations and existing regulations enforced by the State of Utah, the disposal pile would be erosion resistant and stable. It may, however, be somewhat permeable. For the issue of permeability and fluid movement, see responses to Comments 31.25 and 32.11.

It also should be noted that no authorizing decisions will be made at this time for the conceptual projects. When project designs are sufficiently developed that action on the rights-of-way decisions is requested, BLM will request detailed project description data and, based on this, determine whether additional environmental analyses are necessary. Refer to the EIS Preface for additional explanation of this point.

31.35 Vegetation sections have been reviewed and revised to be consistent.

31.36 Generally numbers have been rounded to the nearest whole number. However, there are situations where detail to the nearest tenth is needed in resource display tables (for example, when a comparison of one component is made to another to ensure a 100 percent total).

31.37 Vegetation sections have been reviewed and the term "noxious weeds" has been eliminated.

31.38 Tables R-1-8 and R-1-15 have been revised so that the construction and nperation ground water requirements are clear.

31.39 Table R-3-10 recognizes vegetation types affected by applicants' project components, which is the purpose of Chapter R-3, Affected Environment. The amounts of acreage disturbed are considered to be impacts and, therefore, are included in Chapter R-4, Environmental Consequences (Section R-4.A.4).

31.40 The sentence in Section T-4.A.4 has been clarified.

31.41 The next two sentences of the paragraph in Section T-4.A.4 explain that disturbance and reclamation would occur in stages.

31.42 Since mammalian predators (such as coyotes and bobcats) are highly mobile and opportunistic species, no impacts are anticipated.

31.43 Enercor informed BLM that this was the company's intent. The statement pertains to abandonment procedures and should be complied with as nearly as possible.

31.44 Most site-specific areas have no inventories as to numbers, densities, and similar parameters for wildlife populations. Species occurrence is noted and estimates made as to general impacts to resident or transient populations.

Site-specific analyses, in most cases, do not present data on wildlife numbers present, as no data exist on these parameters on such small areas. Occurrence is noted on each site, but differences or similarities between tracts are not stated, as this document is not comparing one site against another for decision purposes.

31.45 Where appropriate, this type of impact is discussed in the EIS. Refer to Section T-4.A.5 for a discussion of numbers of small birds lost and speculation on different species returning to a revegetated area because of a new habitat type.

31.46 The reclamation and revegetation scenario identified in the comment is different from the operations proposed for the Uintah Basin synfuels projects. Reclamation of the spent shale disposal areas and surface mining disturbance is discussed in Section R-4.A.4. Even though the total area would not be disturbed or covered by spent shale in the early stages of the project and portions would be reclaimed during the later stages of the project, the entire area was considered to be removed from vegetation production due to the following: (1) stripping and storage of topsoil and suitable plant growth materials would require space; (2) procedures for placing spent shale in the disposal area would require parts of the area to remain disturbed for long periods of time; (3) reclamation would be accomplished in stages concurrently with project operations; and (4) the associated traffic would necessitate exclusion of other uses for most of the area for the life of the project. (Spent shale disposal areas would not be disturbed and reclaimed on an acre-by-acre basis.)

Through the intensive use of applicable and effective reclamation measures, there is a strong possibility that grazing carrying capacities would be increased. However, it is the primary objective to reach at least near preconstruction conditions.

31.47 The list of birds is not intended to be a complete species occurrence listing, only selected species. A complete listing of bird species occurring in the regional area can be obtained from the Utah Division of Wildlife Resources.

The definition of ROW has been added to Table R-3-11.

31.48 Table R-3-15 has been changed to indicate Vega State Recreation Area is in Collbran, which is near Rifle.

31.49 The 10-year figure was used, because it is based on experience and research results (Sims 1974) in areas with similar vegetation types, and climatic and soil conditions.

31.50 One-hundred-ton trucks would be used. Section E-1.D.2 has been corrected.

31.51 There is no data available on big game species carrying capacities on these areas.

As referenced in Section E-3.A.5, detailed descriptions of vegetative (habitat) types are included in Section R-3.A.4.

31.52 Because the applicant does not propose to fence roads or utility corridors, these facilities would not interfere with big game migrations.

31.53 The 61.2 percent increase is based upon a straight line projection of human population increase in the area. No better way presently exists to project effects of human population increases on wildlife populations.

31.54 The major impact to agriculture is the effect population increases would have on land use conversion of cropland to other uses (mainly urban uses) at the regional level.

Refer to discussion in Section R-4.A.6, Section R-4.B.6, and Section R-4.A.1 (Other Socioeconomic Impacts, Agriculture).

31.55 The purpose of the EIS is to identify impacts associated with the proposed action. The only impact to mineral resources that is expected to result from an oil shale/tar sand industry is consumption of the resource. This is discussed in Section R-3.A.13 and Section R-4.A.13. Also Table R-1-9 shows how much resource would be mined by each project.

31.56 These items are part of the standard inclusions called for in the Energy Analysis Handbook for Preparation of Oil Shale Development Environmental Impact Statements (BLM 1982a) adopted by BLM as the method to determine energy efficiency.

31.57 The commenter is not comparing similar tables. Table R-1-4 identifies high-level scenario oil production in barrels per stream day; Table R-1-16 identifies low-level scenario oil shale mined in tons per stream day. Table R-1-4 should be compared to Table R-1-11.

31.58 In such a depositional environment as that which took place in the Green River Formation, such generalities are necessary. Mitigation for unquantifiable losses recommends contacting a qualified paleontologist if necessary.

31.59 Under the conditions set forth in the Chapter R-4 Significance Criteria section, it appears that impacts may be significant. The commenter did not provide evidence to support the contention that impacts would be insignificant.

31.60 Resources left in the ground do indeed make it possible to mine the recoverable resource and therefore are an energy cost. Table R-4-27 does consider oil shale and other resources left in the ground. Table R-4-28 does not consider oil shale left in the ground, only that which is removed. This is also true for the energy efficency data provided in the Chapter 4 Minerals and Energy section included for each site-specific project.

31.61 Inclusion of infrastructure energy is part of the standard method used in the analysis (refer to Appendix A-10 for more information on methodology). This allows one to compare a project in Utah with one in Kentucky, for example, on somewhat equal terms.

31.62 Final project efficiency was not intended to refer to something different from overall energy efficiency. The intent of the paragraph in which the term "final project efficiency" was used was to point out what items included in the energy efficiency calculation have the greatest effect on the energy efficiency of a project. Items 1 and 2 in this paragraph would fall under item 1 in the previous paragraph, item 3 would fall under item 2 in the previous paragraph, and item 4 would fall under item 4 in the previous paragraph. Section R-4.A.13 has been revised to clarify the intended meaning.

31.63 It is conceivable gases or fire could exit the retort through an undiscovered opening, but standard safety requirements would include detection and warning devices, and provisions for escape and rescue.

31.64 This is intended to be a general statement. For a particular site-specific project, the final mine design would determine whether it would be possible to remove pillars.

31.65 Refer to the response to Comment 31.55.

31.66 Refer to the response to Comment 31.60.

31.67 Approximately 954 million tons would be mined under this alternative. This has been clarified in Section T-1.E.9.

As a result of the land exchange, no federal leases would be involved; only state land would be mined.

It is beyond the scope of the EIS to address such economic factors as money that could be saved by an applicant because of differences in project design.

Although the text does not state the project would operate for 9 more years, it does state that project operations would continue "about 44 years rather than 35," which implies the same meaning.

31.68 The documents cited in Section T-3.H.1I support this statement.

31.69 Refer to the response to Comment 31.60.

31.70 The potential risks of air emissions from a one-million barrel per day industry were examined in a public health and environmental effects risks analysis study (IWG 1982). The scenario analyzed was similar to the scenario in this EIS. Information from this study has been added to EIS Section R-4.A.2.

COMMENT LETTER 32

J. PHYLLIS FOX CONSULTING SERVICES

1988 California Street, Berkeley, CA 94703
(415) 845-0983

October 18, 1982

Lloyd Ferguson
District Manager
Bureau of Land Management
170 South 500 East
Vernal, Utah 84078

Dear Mr. Ferguson:

32.1 I have reviewed the draft environmental impact statement for the Uintah Basin Synfuels Development. My comments, which are attached, focus on air quality and water resources aspects of the oil shale projects. I did not review other portions of the EIS. The full bibliographic citation for the references used in my comments are given in the BLM report, "Literature and Data Search of Water Resources Information of the Colorado, Utah, and Wyoming Oil Shale Basins."

If you have any questions on these comments, please do not hesitate to call me on 415-845-0983.

Sincerely,

Phyllis Fox, Ph.D.
President

ENVIRONMENTAL SERVICES FOR • OIL SHALE • COAL • TAR SANDS • ENHANCED OIL RECOVERY

Comments on Uintah Basin Synfuels Development EIS

J. P. Fox

GENERAL

32.2 1. The pagination and figure, table, and section numbering system employed in this EIS are difficult to use. The accessibility of information, overall organization, and ease of use would be greatly improved if a numerical-sequential numbering system were employed, i.e., pages should be numbered from 1 to n, chapters from 1 to n, etc.

32.3 2. Adequate information is not presented on site hydrogeology in sections on affected environment to evaluate impacts on groundwater resources. As a minimum, a hydrogeologic cross section of each project site and the location of alluvial aquifers and floodplains should be provided.

32.4 3. The site specific and regional impact analyses do not adequately address groundwater and alluvial aquifer impacts. These sections should evaluate impacts due to percolation from raw and spent shale disposal piles, from seepage through process water containment ponds, from oil and process water spills, from reduction in local recharge due to location of facilities and disposal piles, and from modifications in local hydrogeology caused by blasting-induced fractures, mining, and overburden compression by disposal piles. Some of these issues are discussed further in subsequent comments.

32.5 4. The air quality analyses do not address volatilization of toxic and malodorous gases during construction of spent shale piles and from open-air process water containments. These emission sources are more significant than many of the fugitive sources considered in the air quality analyses. Process waters containing high concentrations of organic and inorganic contaminants will be used to moisturize spent shale for dust control, for cooling, and to facilitate compaction. Contaminants in these waters will be volatilized during spent shale spreading through mechanisms such as evaporation, photodecomposition, and microbial conversions. A less important, though related source of fugitive gaseous emissions is process waters stored in open-air equilizstion basins.

These sources/mechanisms will release large quantities of gases including NH_3, H_2S, hydrocarbons, methylated metals, pyridine, etc. Approximately 50% of the organics and inorganics in process waters may be released from disposal piles and ponds. This will result in a substantial local odor problem and may lead to worker health problems. These emissions can be controlled by proper pretreatment of process waters prior to spent shale wetting or containment in open-air basins. Most of the oil shale developments described in this EIS do not include sufficient pretreatment to adequately control such air emissions. This emission source should be quantitated.

32.6 5. Water units, i.e., ac-ft/yr, gpm, etc. are inconsistent in some parts of the report.

REGIONAL CUMULATIVE ANALYSIS

32.7 6. The first sentence on p. xxxi states that 32,000 ac-ft/yr of water will be required for the nine projects under the high-level production scenario from the Green River and that a total depletion of 132,000 ac-ft/yr would be required for proposed projects, associated interrelated projects, and their associated population increases. This seems to disagree with the information presented in Table R-1-8. That table indicates that about 5,000 ac-ft/yr will be consumed from the Green River and that 196,700 ac-ft/yr will be used for the projects and related growth.

32.8 7. There is an arithemetic error in the last column of Table R-1-8, p. R-1-15. The sum of the values in this column is 5,510 rather than 4,970. Also, it is not clear whether the column "groundwater" is under construction or operation.

32.9 8. On p. SS-3, in the second complete paragraph, it is stated that 180,500 bpsd of oil would be produced by the five projects in this EIS by 1991. Table R-1-4 is referenced. This table indicates that 319,053 bpsd of oil will be produced, presumably during full operation of all projects, and this table does not present production information by year.

32.10 9. The water resources significance criteria discussed on p. R-4-7 are inadequate to assess impacts that may result from oil shale development. These criteria should be expanded. The proposed spent shale disposal piles are located in and adjacent to alluvial valleys where significant recharge occurs. Thus, the recharge criterion should be expanded to consider reduction in recharge due to location of disposal piles, processing facilities, etc.

32.11 The oil shale projects also may be expected to result in significant groundwater degradation, and alterations in groundwater quality should be addressed in this EIS. Groundwater quality will be impaired by percolation from raw and spent shale disposal piles, by seepage from leachate catchment dams associated with the piles, and by seepage from evaporation basins and other structures containing process waters. Spills of oil and process waters also may affect groundwaters. There is an abundance of literature on these topics, and this should be consulted to quantify these impacts (see J. P. Fox, The Leaching of Oil Shale Solid Wastes: A Critical Review, 1982; Leenheer et al., 1981; Leenheer and Stuber, 1981).

32.12 10. The discussion of air quality significance criteria on p. R-4-4 indicates that state and federal air quality requirements, including prevention of significant deterioration standards, are used to assess air quality impacts. However, the EPA de minimis criteria, presented in Table R-4-3, apparently were not

32.12 (cont) considered. These values provide criteria for determining whether specific pollutants are significant. Some of these constituenta, particularly Hg, reduced S, and H2S may exceed these criteria for several of the proposed facilities. Adequate data are available to calculate emission of these de minimis constituents, and this EIS, as a minimum, should identify those constituents which exceed de minimis levels for each facility, or explicitly state that none are exceeded.

32.13 11. On p. R-3-25, first paragraph under "Ground Water", second sentence, it is indicated that for purposes of this EIS, water in stream alluvium is treated as surface water and that impacts on its use are discussed in the surface water section. I strongly disagree with this categorization, and I encourage you to either discuss alluvial aquifer impacts in a separate section or to combine them with groundwater impacts. This is important because the nature of alluvial aquifer impacts differs greatly from surface water impacts and because the alluvium at some sites discussed in this EIS is not hydraulically connected with stream channels. Self-purification and recharge of alluvial aquifers are very slow processes compared to analagous processes in surface water, thus altering the severity and magnitude of similar impacts to each system. In this EIS, this categorization has lead to the absence of criteria for judging impacts to the alluvial system (p. R-4-7) and to the absence of any discussion of impacts on these aquifers, in spite of the fact that disposal piles and other facilities are located adjacent to or over them.

32.14 12. The discussion of leachate production on p. R-4-55 in the section, "Other Water Quality Impacts," is inaccurate and incomplete, and it should be revised. It is very unlikely that percolation can be avoided through the combination of "impermeable" liners and local climatic conditions cited. First, the spent and raw shale liners proposed by the developers are not "impermeable". Rather, they have low permeabilities, on the order of 1 ft/yr, depending on compaction, shale characteristics, etc. This <u>reduces</u> the <u>rate</u> of leachate movement; it does not prevent it. Second, the argument regarding evaporation of precipitation at the pile surface is not correct. Precipitation that falls as snow would not be largely evaporated and would penetrate into the pile. Also, precipitation that falls during pile construction will form zones of higher than design moisture content, resulting in nonuniform moisture distribution throughout the pile. Higher capillary forces in drier zones will move water from wet to dry areas, resulting in water migration through the pile. This was recently studied by Battelle Pacific Northwest Laboratory (Wildung et al., 1982, "Oil Shale Solid Waste Disposal: Estimation of Embankment Physical Stability and the Movement of Water and Solutes") for a hypothetical disposal pile. This study found that leachate would be continuously discharged and reach a steady state of about 10 cm/yr after 20 years. Similarly, percolation has been observed in field lysimeters packed with spent shale (Kilkelly et al., 1981).

Percolation also will originate from raw shale stockpiles.

31.14 (cont) These piles are very permeable, and water will move readily through them. Liners proposed by some developers are not adequate to prevent percolation. Leachates from raw shales contain environmentally significant concentrations of F, Li, Mo, As, etc. (McWhorter, 1980; Stollenwerk, 1980; Saether, 1980), and bioassays using <u>D. pulicaria</u> and fathead minnows (Bergman, 1982) have shown that some raw shale leachates are toxic. Organic C and major ions also are elevated in raw shale leachates. These data suggest that raw shale leachates may be as important as or more important than spent shale leachates. Since raw shale piles are not carefully engineered to control leachate migration, the potential for significant environmental impacts from this source do exist. This EIS should review each developer's plans for raw shale stockpiling and assess the potential for leachate migration.

32.15 13. The discussion of irreversible and irretrievable commitment of water resources on p. R-5-2 should be expanded to include degraded groundwater resources resulting from leachate production. Disposal piles will be permanent additions to the landscape and will continuously discharge leachates, long after the sites are abandoned. Since groundwaters are not readily decontaminated, this represents an irretrievable loss.

SITE SPECIFIC ANALYSES

<u>Magic Circle</u>

32.16 14. The first complete paragraph on p. M-1-8 discusses water requirements for the Magic Circle project. It states that 120 ac-ft/yr would be obtained from wells for site preparation (i.e. construction) and that 1,000 ac-ft/yr would be obtained from the Green River for later construction activities. These figures appear to disagree with those presented in Table R-1-8. That table indicates that no groundwater is used and that 700 ac-ft/yr is used for construction.

32.17 15. On p. M-1-15, the source of the 2,842 ac-ft/yr of water for the Paraho alternative is not specified.

32.18 16. The note to Table M-1-2 on p. M-1-17 states that "All facilities required for the Paraho Process Alternative and On-site wells alternative would be located within the plant site." Since all of these alternatives have off-site facilities, a more accurate statement would be: "All additional facilities required for the Paraho Process Alternative and On-site wells alternative that are not in the Proposed Action would be located within the plant site."

32.19 17. The list of resources consumed in Table M-1-4 is very incomplete. A project such as this would also consume fuel oil, diesel, gasoline, etc.

32.20 18. Table M-2-2 indicates that there is no difference in water consumption for the Paraho alternative and proposed alternative

32.20 (cont) while p. M-1-15, section M-1.E.1 indicates that the Paraho alternative requires 2,842 ac-ft/yr, which is considerably higher than that required for the proposed alternative.

32.21 19. The controlled air emissions reported in Table M-1-5 differ from those summarized in Table M-2-1.

32.22 20. Tables M-2-1 and M-2-2 indicate that the 540 ac-ft/yr of water required by the proposed alternative represents 0.001% of the flow in the Green River. Page M-4-7, first paragraph under "Surface Water," indicates that this same 540 ac-ft/yr represents 0.01% of the flow of the Green River. Finally, the Technical Report for Magic Circle states that water requirement for the project amount to about 0.013% of the combined flow of the White and Green Rivers at their confluence. This should be resolved, and the discussion on p. M-4-7 amended to state at what point along the Green River the 0.01% (or 0.001%) refers to, i.e., specify the gaging station.

32.23 21. Page M-1-12, third paragraph under "Spent Shale Disposal" indicates that the disposal piles are underlain by "impermeable boundaries made from 18-inch layers of oven-dry shale fines." This description seems to conflict with a similar one on p. 111 of the Technical Report. That report indicates that raw shale fines are mixed with clay and compacted to 80 lb/ft3. I was unable to find any discussion of an oven drying process in the Technical Report. It should be pointed out that the liner is made of raw shale fines, rather than spent shale fines. Such a liner would not be "impermeable" as stated in the EIS and Technical Report. The liner would have a low permeability, probably around 1 ft/yr, but it certainly would not be impermeable. The word impermeable should be replaced by "low permeability." This liner also would not "remove the potential for groundwater contamination from percolation through the pile" as noted in the EIS. The liner would only reduce the <u>rate</u> at which underlying groundwaters are degraded.

32.24 22. The discussion of surface water impacts on p. M-4-7 should be expanded to include impacts on water quality due to consumptive use of water and on water quantity due to changes in overland runoff. These are at least as significant as the subsequently discussed groundwater impacts. The consumptive use of 540 ac-ft/yr of water will increase the TDS at the diversion point and all points downstream. The plant facilities, disposal pile, etc. will reduce the quantity of overland flow that reaches stream channels and alter its temporal and spatial distribution. This will affect local streamflows, particularly in the washes.

32.25 23. The discussion of the environmental consequences of the proposed action on groundwater resources is inadequate. The hydraulic properties and chemical quality of alluvial and deep aquifers will be altered by the proposed project by: (1) percolation through raw and spent shale disposal piles; (2) modification of hydraulic properties from weight of pile; (3) changes in permeability due to blasting and mining; and (4)

32.25 (cont) reduction of natural recharge.

The leachate from the NTU/T3 spent shale disposed of according to Magic Circle plans may result in groundwater degradation, contrary to implications in the Technical Report. The NTU/T3 spent shale will not be resistent to chemical leaching, as stated on p. 103 the Technical Report. Section 1.10.4.2 states that retorting temperatures of "1300 to 1600 F converts most of the existing calcium and magnesium oxides into silicates which are resistant to chemical leaching." These temperatures are not high enough to convert MgO, $CaCO_3$, CaO, etc. into high temperature silicates (see Park et al., 1979). This has been substantiated by a recent study which reported leaching data for spent shale from the LETC 10-ton retort operated under conditions similar to those proposed for the NTU/T3 process. That study (Hall, 1982) demonstrated that leachates from such spent shales have high concentration of both organic C and salinity.

32.26 A second important factor to evaluate when considering the quality of NTU/T3 leachates is the post-retorting handling received by the spent shale. The Technical Report indicates that untreated process water will be contacted with hot spent shale in cooling retorts to produce steam. Many of the contaminants in this process water stream will be transferred to the spent shale and thus will be available for leaching. (The Technical Report states that organic pollutants will be burned and inorganic pollutants will be removed by the shale (p. 64). However, available research suggests that it is more likely that many of the organics will not be burned and that many inorganics (i.e., NH_3, CO_2, H_2S) will leave the retort in the gas phase, altering anticipated emissions.) The spent shale is subsequently moisturized with additional process water during conveyance and spreading to cool it and to control dust. Contaminants in this water, plus those added during steam generation, will be leached from the spent shale and will eventually reach underlying groundwaters.

32.27 24. On p. M-4-18, second paragraph under section M-4.B, second sentence, it is stated that emissions for both processes are identified on Table M-1-5. Table M-1-5 shows emissions only for the proposed alternative.

32.28 25. The titles of Tables M-4-5 and M-4-6 are confusing. The phrase "Magic Circle Retort Alternative" should be changed to "Small-scale Paraho Process Alternative."

32.29 26. The on-site well alternative discussed on p. M-4-18 would increase flow in the Colorado River System and decrease the TDS, relative to the proposed alternative. This should be stated on p. M-4-18.

32.30 27. The project components section on p. M-1-11 does not discuss product gas recovery and cleanup. The discussion of the wastewater treatment system appears to address only mine drainage

32.30 (cont) and runoff (from processing plant). Many other wastestreams will be produced at this facility (i.e., retort water, gas condensate, gas cleanup effluents, oily waters, etc.) The treatment, if any, proposed for these other effluents should be discussed.

32.31 28. This project does not include on-site upgrading. The crude shale oil will be transported to any combination of three refineries (p. M-1-1). This upgrading will produce hazardous wastes such as As-laden catalysts, air emissions, and water effluents. These should be considered in the present EIS. In particular, one possible final destination for the crude shale oil is the Roosevelt refinery, which is within the study area.

<u>Paraho-Ute Project</u>

32.32 29. On p. P-1-10, fifth and sixth paragrapha, it is not clear to the reader why 39,500 bpsd of dry oil go into the upgrading facility and 42,000 bpsd of hydrotreated oil are produced.

32.33 30. The section on "Retorting Alternative" on p. P-1-19 states that the only resource that would be affected by using an indirect-mode process or a combination direct-indirect mode scenario would be air quality and that air emissions from these alternates would not be significantly diferent from those of the Proposed direct-heated mode. This is inaccurate. First, there are important differences between these alternatives in terms of water consumption and water quality impacts. The indirect mode process uses more water (125 gal/bbl) than the direct mode (89 gal/bbl) process does (McKee and Kunchal, 1976). The leaching characteristics of the two types of spent shale also differ significantly. And there are significant differences in offgas composition among these two processes, and it is not clear why controlled emissions would be similar, as suggested in the last sentence on p. P-1-19.

32.34 31. A sufficient number of alternatives to the proposed project were not considered. A single water supply alternative, from the Bonanza Power Plant, was considered (p. P-1-19) while for other projects, multiple water supply alternatives were considered. Similarly, alternates to the power transmission line and access roads were not considered.

32.35 32. The total controlled emissions in Table P-1-6 differ from those presented in the Air Quality Technical Report in Table 4-1.

32.36 33. The discussion of impacts on water resources on p. P-4-7 is inadequate and should be expanded to include the surface water impacts noted under comment 22 and the groundwater impacts noted in comment 3.

<u>TOSCO</u>

32.37 34. On p. T-1-12, third paragraph and in Table T-1-6, total suspended particulates are reported as 120 kg/hr while in table 4-1, p. 4-9 of the Air Quality Technical Report, it is reported

32.37 (cont) as 127 kg/hr.

32.38 35. The list of resources consumed in Table T-1-5, p. T-1-32, is incomplete and should be expanded to include diesel, fuel oil, etc.

32.39 36. In Tables T-2-1 and T-2-2, the employment figures under socioeconomics seem to conflict with personnel requirements summarized in Table T-1-4 and with those reported in the Technical Report in Table 3.2.1. The relationship between these three sets of figures is not clear.

32.40 37. In Table T-2-2, the air emissions for the Proposed Action were omitted and should be added.

32.41 38. The air quality section on p. T-3-1 does not address the volatilization of malodorous and toxic gases from process waters used for spent shale moisturization. Waste treatment proposed in the Technical Report (sour water stripping) will remove NH_3 and H_2S but will not effect any substantial reduction in organonitrogen and other organic compounds, many of which are volatile, malodorous, and toxic. Additional treatment, which must include substantial reduction of organics, would be required to eliminate volatilization of these compounds from spent shale disposal piles.

32.42 39. The discussion of impacts on water resources on p. T-4-3 is inadequate and should be expanded to include those impacts noted in comments 3 and 22.

J. Phyllis Fox Consulting Services

32.1 BLM has reviewed the comments provided. Responses to each follow.

32.2 The alpha-numeric system used to number chapters was adopted to accommodate potential changes in the scope of the EIS. The alpha-numeric pagination system is a logical extension of the chapter numbering system. It is often used in BLM EISs.

32.3 In view of the insignificant impacts on ground water, it was determined that detailed hydrologic illustrations were unnecessary.

32.4 Percolation from raw and spent shale piles would not be expected to take place (refer to the response to Comment 32.11). However, if it should, the applicants' plans to collect, treat, and use any water that should move through, or run off of the piles would prevent significant impacts. Also see response to Comment 32.14.

Water containment ponds are designed so they would not have seepage. They would be lined to prevent seepage, and the water in them would be in a continual state of treatment, reuse, and refilling by water from the applicable source (Green River or White River).

Oil and process water spills could occur on site (within the plant/process area boundaries). As identified in Section I.D.1 for each site-specific project, the plant sites would be diked to contain run-off (which would contain any spill) and the wash down water would be reprocessed through the oil-water separators. All plants would be required to develop detailed oil spill contingency plans.

Reduction in local recharge is not an issue. At most, 20 square miles (for roads, buildings, spent shale piles, and similar structures) would be "sealed" from percolation and potential recharge. This is so small a portion of the project area that it would have no noticeable effect. A similar situation exists for modifications in local hydrology.

32.5 BLM is unaware of an adequate data base that might be available for quantifying noncriteria emissions during the construction of spent shale piles and the operation of process water containments. A data base is being developed by the Department of Energy, Fossil Energy, with studies which were begun in 1982 to address both of these potential issues.

Emission controls such as surface covers would generally be employed at each project to reduce the evaporation of organic compounds from equipment like oil/water separators. Treatment of certain process water also would be a part of most of the projects. However, the rate of uncontrolled pollutant emissions from ammonia and methylated metals, for instance, is unknown. Section R-4.A.2 has been expanded to recognize these areas as possible concern.

32.6 The report has been checked for consistency. The units used are appropriate for the various sections.

32.7 The figures in Table R-1-8 represent the most likely maximum amounts of water that would be withdrawn from the individual rivers. Note that footnotes b and c indicate use figures for the White River Shale Project and for municipal and agricultural uses are included in the totals for both the Green and White rivers. Therefore, it is inaccurate to combine the totals of the various columns of the table. A footnote has been added to Tables R-1-8 and R-1-15 to clarify this point.

32.8 The error in Table R-1-8 has been corrected. The ground water column represents operation consumption. This has been clarified on the table.

32.9 As stated in the sentence in question, 180,500 bpsd is the full production figure for the five site-specific projects and is the rounded total of the production figures presented in Table R-1-4. The 319,053 bpsd figure is the total production for the site-specific and conceptual projects.

The year when all the site-specific projects first would reach full production is 1994 rather than 1991 as stated in the Draft EIS. This date is based on information presented in Table R-1-1. A reference to Table R-1-1 and the correct full production year has been included in the Final EIS Site-Specific Analyses Introduction.

32.10 Contamination of ground water has been added to the significance criteria.

Spent shale will be placed on rolling uplands and, in one operation, in a steep ravine tributary to the White River. Little or no alluvium occurs in the ravine. Spent shale on the uplands would cover only the uppermost heads of drainage which contain little or no alluvium. Significant recharge occurs in the lower reaches of these drainages where thicker alluvial deposits may be present. The total area of spent shale would be less than 12 square miles (0.0024 percent) of the nearly 5,000 square miles of the part of the Uintah Basin addressed in this statement.

32.11 Development of sufficient leachate in spent shale deposal piles to endanger either surface or ground water requires a quantity of water several magnitudes greater than available in this arid to semi-arid climate. It is well known that recharge in these climates occurs only in depressions or below stream or drainage courses. Studies (Freeze and Cherry 1979) acknowledge that effective recharge may not take place above a deep water table below a sand or gravel plain even in a humid climate.

Unfortunately, the bulk of investigation on the potential of water contamination by spent shale has dwelled on leachate, the production of which requires saturation. The few investigations addressing the potential for leachate production are adequate to show that any leachate produced would be limited to the upper few feet, or at maximum, few tens of feet, where 40 inches of water might be used initially to leach the root zone. Subsequent evapotranspiration would remove this moisture and leave any potential contaminants attached to the spent shale.

The hydrologic regime expected in the spent shale deposited on land surface in the southeastern Uintah Basin is similar to that described by Winograd (1981). He shows that ambient flow of moisture through thick, unsaturated zones in arid and semi-arid climates is extremely small; it may not be readily measurable with present instrumentation. He also indicates that ionic transport may be retarded by several orders of magnitude in comparison to moisture movement. The work is well-noted and contains a wealth of significant, worthwhile references. Section R-4.A.3 has been expanded to clarify these points.

32.12 Very little data are available to assess the magnitude of noncriteria pollutant emissions from oil shale and tar sand facilities. As a part of the PSD permit submittals, four project applicants supplied information and their best estimates of certain noncriteria pollutants. These values are given in Table C-4. Of the numbers reported, beryllium and sulfuric acid mist emissions exceed the EPA "de minimus" emission rates; several other values are close to the "de minimus" rates

The Chapter R-4 Significance Criteria section has been expanded to include discussion of EPA "de minimis" emission rates. Section 4.A.2 of each site-specific analysis has been expanded to include the projected emission rates of pollutants covered by the de minimis regulations.

32.13 Where an applicant considered using alluvial aquifers, there would be direct and intimate contact with the surface water. This type of contact would be required to ensure an adequate water source. The term alluvial aquifer may be somewhat misleading due to the applicants' designs. The proposed designs consist of a large diameter shaft sunk into the streamside alluvium with small diameter horizontal shafts radiating from it, thus the intimate hydraulic connection.

32.14 Because the applicants have stated they would contain and treat or use any runoff water from the spent shale disposal piles and raw shale stockpiles, the potential for leachate reaching a water source would be remote. (See also the response to Comment 32.11 regarding leaching potential.) Furthermore, these piles would accommodate much more water than would be available, and any moisture succeeding to infiltrate deeper than the root zone would return to the surface to be evaporated and transpired. In addition, the processing area would be compacted due to truck traffic, construction work, and by design. This would significantly reduce or eliminate infiltration.

32.15 Refer to the response to Comment 32.11.

32.16 Table R-1-8 has been revised to include Magic Circle's use of ground water during construction.

TABLE C-4

Emission Estimates for Selected Noncriteria Pollutants
(tons per year)

	Magic Circle	Paraho	Syntana-Utah*	Tosco
Lead	0.023	?	0.22	0.04
Fluorides	0.93	2.9	0.86	0.965
Asbestos	nil	nil	nil	?
Beryllium	0.001	nil	nil	0.00071
Mercury	0.05	nil	nil	0.0018
Vinyl Chloride	nil	less than 1.0	0.08	?
Hydrogen Sulfide	nil	less than 10.0	0.05	less than 9.8
Total Reduced Sulfur	nil	less than 1.0	0.07	?
Reduced Sulfur	nil	less than 1.0	0.10	?
Sulfuric Acid Mist	16.1	17.7	14	?

*Final expansion.

32.17 The Small-Scale Paraho Process Alternative is an alternative to the proposed retort process and would not affect the water supply source. It could be used in conjunction with the proposed water supply system or any alternative water supply system.

32.18 The statement is correct as written. Neither the On-Site Wells Alternative nor the Paraho Process Alternative would have off-site facilities.

32.19 The list of resources consumed is not intended to be all-inclusive but rather gives major known uses. Engineering details are not sufficiently developed to generate an all-inclusive list.

32.20 Section M-1-E.1 was in error and has been revised. There would be no difference in water consumption for the Paraho process alternative and the proposed action.

32.21 The values in Table M-2-1 and M-2-2 have been changed to correspond to Table M-1-5. See also the response to Comment 30.21.

32.22 The 0.01 percent figure is correct. Tables M-2-1 and M-2-2 have been revised. The gauging station for the Green River data has been specified.

32.23 The EIS discussion refers to the use of "shale fines;" spent or raw is not specified. The fact that they would be oven-dry raw shale fines has been clarified. However, it is the grain size (fines) that is important, not what stage of the processing they have come from.

The fact that the boundaries of the spent shale pile would be slightly permeable has been clarified in Section M-1.D.2.

32.24 The water quality parameter that was considered critical to this study was salinity. Withdrawal of these amounts of water are so small compared to the average annual flows (400,000 cfs), that salinity changes are beyond the detection limit of the CRSS model.

Overland runoff in this area, if decreased, could only improve water quality. The availability of sediment for transport is so high in these areas that it far outweighs the ability of streams and washes to transport sediment. Due to this, surface evaporative salts would not dissolve and move with run off, and less sediment would be transported.

32.25 Refer to the response to Comment 32.11.

32.26 Refer to the response to Comment 32.11.

32.27 Emission rates for the alternative have been added to Table M-1-5.

32.28 Tables M-4-5 and M-4-6 have been deleted based on updated information. Refer to the response to Comment 13.4.

32.29 The comment is true to the extent the aquifer is not a tributary to the Colorado River system.

32.30 Product gas recovery and cleanup is part of the internal shale processing process, and as such, its details were not included in the EIS. Refer to Section 1.10.2 of the applicant's technical report for the available details. Any wastewater contaminated with oil would be sent to the slop oil tank and reprocessed. Retort water, gas condensate, gas cleanup effluents, and similar substances were included in the term "wastewater from the processing plant," which would be treated by a conventional treatment plant and used on the spent shale pile.

32.31 Upgrading shale oil at existing refineries is not part of the actions proposed by the applicants and, therefore, is not covered by this EIS. The impacts due to upgrading shale oil may be covered by a refinery's existing PSD permit. If not, impacts would be analyzed as part of the process to amend the existing permit.

32.32 By adding hydrogen, the 39,500 bpsd of crude will swell to 42,000 bpsd.

32.33 The retorting alternative section was in error and has been deleted from the EIS. Paraho has developed two other modes of processing. However, the company has not proposed their use on this project, since the direct heated mode has been demonstrated over a longer period of time and a wider range of operation conditions. Paraho plans to continue its research in retorting technologies and at some future date, second generation retorts may be proposed as an improved alternative.

32.34 Additional alternatives for the Paraho project have been analyzed in the Final EIS. Refer to the discussions of the White River Alternative Water Supply System, Additional Lands Alternative, and Phased Approach Alternative. No alternative access roads or power transmission line was added, because no alternatives that would significantly reduce the proposed action impacts (which were generally insignificant) are evident.

32.35 The Air Quality Technical Report was only able to consider emission rate changes through January 1982 in order to complete the modeling analysis. The values appearing in Table P-1-6 were submitted to BLM by the applicant after this time, and it was too late to incorporate these new values into the Air Quality Technical Report. The more recent values are lower than the values used in the analysis; therefore, the analysis used conservatively high emission rates.

32.36 The level of detail of this discussion is in keeping with the available data and the regional impact analysis. Refer to the responses to Comments 32.4 and 32.24.

32.37 The number on page T-1-12 should also be 127 kg/hr. This has been corrected in Section T-1.D.1 of Final EIS.

32.38 The list of resources consumed is not intended to be all-inclusive, but rather lists major known uses. Engineering details are not sufficiently developed to generate an all-inclusive list.

32.39 There were some discrepancies in the Tosco employment figures shown in the Draft EIS and the Socioeconomics Technical Report. Tables T-2-1, T-2-2, and T-1-4 have been corrected to ensure consistency between the EIS and the supporting technical report.

32.40 The emission rates have been added to Table T-2-2.

32.41 Refer to the response to Comment 32.5.

32.42 Refer to the response to Comment 32.36.

COMMENT LETTER 33

NATIONAL WILDLIFE FEDERATION

NATURAL RESOURCE CLINIC
FLEMING LAW BUILDING
BOULDER, COLORADO 80309
303/492-6552

ROBERT J. GOLTEN
COUNSEL

FRANCES M. GREEN
COUNSEL

19 October 1982

Lloyd Ferguson, District Manager
Bureau of Land Management
170 South 500 East
Vernal, UT 84078

Re: Uintah Basin Synfuels Development

Dear Mr. Ferguson:

33.1 The National Wildlife Federation has reviewed the "Uintah Basin Synfuels Development" Draft Environmental Impact Statement (DEIS). The Federation is submitting these general comments for your consideration. In addition to these comments, we also adopt and incorporate by reference the comments on the DEIS filed by the Environmental Defense Fund.

33.2 The National Wildlife Federation (NWF) has over 4.6 million members and supporters, 22,000 of whom live in Colorado and Utah. Environmental impacts resulting from resource developments are a principal concern of NWF. We believe that the protection of the environment is best achieved through reasoned and judicious resource development decisions and that certain areas, due to their environmental quality and natural beauty, are best protected by excluding all development. The potential impacts associated with the proposed Uintah Basin Synfuels Development Project represent a central issue for our national membership, including our Colorado and Utah members, many of whom view the Green, White, and Yampa Rivers and surrounding areas as key links in maintaining the environmental integrity of northeast Utah and northwest Colorado.

NWF is principally concerned about two issues raised in the DEIS: (1) analysis of the alternatives and the selection of a preferred alternative, and (2) environmental impacts resulting from the development of the proposed projects.

Selection of Preferred Alternative

33.3 NWF takes issue with the fundamental premise of the DEIS: all proposed synfuels projects will proceed at their estimated levels. We assume that the granting of monies for the development

33.3 (cont) of tracts Ua and Ub from the Synfuels Corporation is driving the issuance of the DEIS. However, restricting the regional cumulative analysis to a discussion of a "high level scenario" and a "low level scenario" hardly constitutes a reasonable review of viable alternatives to the proposed project. In fact, given the present synfuels economy, we fail to understand the need for this synfuels development at this time. The DEIS should be withdrawn for that reason alone (i.e., no demonstration of need) or should be written to analyze the Ua and Ub projects only. Several of the projects analyzed in this DEIS are no longer being actively considered. The rush to permit these projects is premature. Other uses of the land are foreclosed by the uncertainty of the status of the projects; if and when the projects proceed, the land use situation may have changed and may require additional analysis.

33.4 The DEIS fails to evaluate other reasonable alternatives to the identified preferred alternative (full scale production levels for all projects). This deficiency in analysis violates NEPA requirements. For example, analysis of a no-action alternative does not occur in the regional cumulative analysis. Burying the no-action alternative analysis in the project specific analysis dilutes the thrust of the no-action alternative and fails to supply reviewers with sufficient data to assess the cumulative impacts of the proposal. 33.5 Concomitantly, the baseline analysis summarized in Tables R-1-2 to R-1-17 contains requirements for projects in Utah and Colorado, but most of the Colorado project requirements are listed as unknown. NWF is very concerned that a rigorous and definitive cumulative analysis be performed in Colorado and Utah. The jurisdictional mismatch issue means that Colorado will receive many of the impacts from synfuels development in Utah, without the means to mitigate them. It is the NWF's position that regional cumulative analysis presented in the DEIS is insufficient for making regional resource management and project impact mitigation decisions.

33.6 We can discover no rationale underlying the selection of a preferred alternative (i.e., the high level scenario) other than that the high level alternative would not exceed so-called resource "threshold levels," assuming "that mitigating measures would be incorporated to avoid 'worst-case' conditions" (xxix). Manageability of impacts from the proposed developments should not be the sole criterion for determining a preferred alternative. NWF's position is that a preferred alternative should specify committed mitigation measures. Existing regulations may be inadequate to deal with the projected environmental impacts from synfuels development. BLM has not traditionally leveraged socioeconomic impact mitigation agreements between projects and local or state governments. Identification of a preferred alternative based on the

33.6 (cont) assumptions that mitigation of impacts will occur, that existing environmental regulations are sufficient to ensure environmental integrity, and that socioeconomic impact mitigation agreements can be worked out on the "front end" of the project, belies the traditional role of BLM in implementing environmental and socio-economic impact mitigation. We have to look no further than the recently closed Colony Project in Colorado to see that the boom/bust cycle still exacts its economic, social, and environmental tolls despite the implementation of some committed mitigation measures. We need not repeat this scenario elsewhere in the West.

Environmental Impacts and Mitigation

33.7 The magnitude of the surface disturbance of the proposed action (36,911 acres) is downplayed in the DEIS analysis by the assertion that nearly 80% of the disturbed land can be reclaimed to grass (cover vegetation) in 3-10 years. The assumption of reclamation success in a region characterized by a semi-arid climate and unfavorable soils is tempered by the recognition that "revegetation is difficult on most of the soils in the region. . . . Unfavorable soil properties, such as rock-fragments on the surface, thin surface layers, moderate to strong alkalinity, and shallow depths, are very common in the region and would present problems for erosion control and revegetation." (R-3-34). NWF submits that reclaiming the disturbed lands to pre-project vegetation would take between 75 and 300 years. (R-4-59). No successful reclamation efforts have been demonstrated in this environment without intensive management or for that time period. Responsibility for reclamation management after completion of the project is not discussed. In all likelihood the federal government will have to assume the responsibility and costs of the reclamation effort after cessation of the project. The DEIS points out "that climatic conditions in the area of influence make establishment of vegetative cover difficult . . . [and that] favorable years for seedling establishment can be as variable as once every 20 years," (R-4-56).

33.8 Spent shale disposal reclamation research has not demonstrated a long term success rate and does not support the claim in the DEIS that "spent shale disposal areas would be reclaimed in stages . . . the surface of these areas would be stabilized and made suitable for plant growth through various reclamation measures and procedures." (R-4-60). In fact, no one knows if spent shale disposal sites can ever be reclaimed. Certainly, application of a 12 to 24 inch mantle to the spent shale will encourage vegetative cover in the short term. However, in an area of minimal topsoil depth (less than 6 inches), volumes of topsoil required to cover spent shale piles are not available.

33.9 NWF does not agree with the assertion in the DEIS that the loss of 52,631 acres of small non-game mammal habitat is not a significant adverse impact. Removal of that amount of habitat may have significant impacts on small mammal populations in the area. These potential impacts need to be defined and not summarily dismissed because of the total acreage of "available" habitat. (R-4-67). Similarly, potentially adverse impacts to bird habitat cannot be ignored due to the "total amount of habitat available to bird species." (R-4-67). Impacts on big game populations are analyzed in a similar vein. Impacts are dismissed "since big game animals can easily move into adjacent habitat . . . [and] would not cause significant problems if the adjacent habitat were below carrying capacity." (R-4-67). Definitive carrying capacity data should be presented in the DEIS. If carrying capacity data do not exist, they need to be gathered prior to any definitive analysis of project impacts on wildlife populations.

33.10 The magnitude of the proposed project requires a detailed presentation of reasonable alternatives and a thorough discussion of environmental impacts and impact mitigation measures. The DEIS should be revised sufficiently to correct these deficiencies.

Thank you for the opportunity to comment.

Sincerely,

Frances M Green /dh

Frances M. Green
Counsel

dh

National Wildlife Federation

33.1 The comments filed by the Environmental Defense Fund are included as Letter 30.

33.2 The views expressed will be considered in the decision-making process.

33.3 It is incorrect to assume that the granting of money from the Synfuels Corporation is driving the issuance of this EIS. As stated in the EIS Preface, the driving force for this EIS is the request for rights-of-way across public land to allow private development. This EIS does not address the development of federal oil shale leasing. The impacts of federal least tracts U-a and U-b were covered in the Final Environmental Statement for the Prototype Oil Shale Leasing Program (BLM 1973f). Development of these tracts is included in this EIS only as an interrelated project in order to assess cumulative impacts.

All the appplicants' proposed projects (the projects for which this EIS will be used in making a decision) would be developed on State of Utah leases or on private land. (No federal oil shale leases are involved.) The market place will actually determine whether these projects proceed at the indicated levels and timeframes. It is not the responsibility of BLM to make this determination for privately developed projects.

BLM is unaware of any other uses proposed for the land that would be affected by the projects that are being or would be foreclosed. All applicants currently have valid leases to develop the state land where the mine and processing facilities would be located. In general, the project facilities located off the state lease tracts (roads, power transmission lines and buried pipelines) would not limit public use of the affected land.

33.4 Refer to the responses to Comments 16.4 and 30.8.

33.5 Even though specific resource requirements are not included for all Colorado projects, this does not mean that these project were omitted from the cumulative analysis. Development in western Colorado would interact cumulatively with synfuels development in the Uintah Basin in three main areas--socioeconomics (population increase and associated pressures on community infrastructure and natural resources), air quality, and water quality and flow in the Colorado River system. The modeling efforts in each of these areas included assumptions about the cumulative effects of projects where no data were available (refer to the methodology sections of the air quality (Systems Applications Inc. 1983) and socioeconomics (State of Utah 1983) technical reports and the Colorado River Simulation System Executive Summary (Bureau of Reclamation 1981).

In addition, this EIS does not address a true regional plan of development. The "regional" part of the EIS was misnamed in the Draft EIS. It has been changed to Nine-Project Cumulative Analysis to better reflect its intended purpose.

33.6 It is BLM's contention that sufficient regulations exist to assure that adequate safeguards are taken when developing a project of this magnitude. It is the intent of this EIS to identify impacts and suggested mitigation that would reduce or eliminate those impacts. Determining the acceptability of an impact is not the purpose of an EIS, rather it is to analyze and discuss impacts. It will be the decision-maker's responsibility to consider these impacts and decide on mitigating measures that would be included as stipulations in any permits or grants issued.

The State of Utah has recently passed a law (S.B. 170) that requires companies to develop impact mitigation plans that cover socioeconomic changes associated with their activities. These plans are completed in advance of any on-the-ground activities.

33.7 Discussions throughout the EIS acknowledge that achieving successful reclamation and erosion control on lands disturbed in the Uintah Basin would require an intensive reclamation program due to the unfavorable climatic and soil conditions. The response to Comment 22.5 addresses the basis for determining that reclamation and erosion control would be successful. As stated by Sedgley (1974), "the successful revegetation of oil shale sites will not be easy, but obviously it can be done if present technology is fully utilized and research is planned to require necessary additional knowledge." The applicants are responsible for reclamation efforts throughout the project life and after abandonment, with inspection and certification determined by the landowner or authorizing agency (Appendix A-8).

33.8 Specific measures associated with surface mining and spent shale disposal area reclamation are based on recent research and field trials identified in a footnote to Table A-8-2. All practices and procedures identified are well documented and have been demonstrated to be reliable in making assumptions regarding effectiveness where properly implemented.

As discussed in Section R-4.A.4, volumes of topsoil and suitable plant growth materials (soil parent material - alluvial, aeolian, and sedentary) are available, but will require intensive stockpiling and use procedures.

33.9 No carrying capacity data exist for any wildlife species and areas in the Uintah Basin. The impact of the loss of 52,631 acres of small nongame mammal habitat would be the loss of most of the animals on the disturbed area; repopulation would be rapid once reclamation is completed. There are estimates of breeding bird losses in each site-specific analysis. Section R-4.A.4 is merely an overview of the whole area; specific details related to individual projects are noted in site-specific Wildlife sections.

33.10 Refer to the responses to Comments 16.4 and 30.8.

COMMENT LETTER 34

October 20, 1982

Mr. David Moore
Vernal District Office
Bureau of Land Management
170 South 500 East
Vernal, Utah 84078

Steven B. Golnar
Town of Dinosaur
P.O. Box
Dinosaur, Co 81648

Dear Mr. Moore:

Thank you for allowing the Town of Dinosaur to comment on the Uintah Basin Synfuels Development Draft Technical Report, August 1982.

34.1 It is evident in reviewing the Synfuels report that the base information used in generating projected impacts for Dinosaur is out dated and inappropriate. We appreciate the acknowledgement appearing in the report that Dinosaur will experience "significant" cummulative impacts from the five Synfuels projects discussed. The extend of this "significance" is where our figures differ.

34.2 A major factor which was not addressed in the Synfuels report is that the Town of Dinosaur is currently experiencing massive impacts from 3 projects:

1. The Western Fuels Deserado Coal Mine;
2. Deseret G & T's Unit 1 of the Moon Lake Power Plant Project; and
3. The railroad being constructed between these two sites to transport coal to the power plant.

Because a sizeable portion of the electricity generated by the Moon Lake Power Plant will be used by the Synfuels projects discussed in your report, don't these projects qualify as support industries for the Uintah Basin Synfuels effort? If these projects do, then isn't Dinosaur already experiencing population impacts associated with Uintah Basin Synfuels Development? If this is the case, then why aren't these impacts considered in the Synfuels report?

POPULATION/HOUSING

A. Problem

34.3 The root of the problem that socioeconomic researchers encounter when dealing with Dinosaur is that there is little documentation on the Town. It is difficult to determine impacts when few numbers are available. The population of the Town according to the 1980 census was 312. This figure, for that time, was fairly accurate. As base information for the projections appearing in the Synfuels report 1980 Census data was used.

34.3 (cont) B. Current Town Population/Housing

Our information shows that Dinosaur's population has tripled since the beginning of 1982. This population change over a ten month period works out to a 240% increase. This growth rate contrasts sharply with the historic growth rate of 1.7 percent (pI-22) used to predict "a population of just over 400 by the year 2000." The Synfuels report (pI-26) estimates 1982 baseline population to be 451 with 158 households. Conservative estimates of the Town's October 11, 1982 population, based on a housing inventory performed on this date, range from 966 to 1053 (Exhibit A). During this inventory, a housing stock of 411 dwelling units was identified. In addition 30 motel units were counted.

While it is true that a significant portion of dwelling units in Town are recreational vehicles, one must keep in mind that even R.V.s are serviced with permanent water and sewer taps. The R.V.'s are thus provided with the essential services to sustain long-term habitation, and in the event that one should vacate its lot, another can and probably will replace it. Currently, the RV park established by Western Fuels is being fully utilized. In fact, it is difficult,if not impossible at present,for the R.V. owner to find a space in either Dinosaur or Rangely.

HOUSING - MIX AND CONDITION

34.4 A. Existing Dwelling Unit Mix by Community (PI-38) does not identify the Town of Dinosaur as a separate entity. We are not aware of the Town being contacted for such information either.

The Dinosaur Housing inventory conducted on October 9, 1982 (Exhibit A) indicates:

Conventional	83
Mobile	325
Multi-Family	0
Hotel/Motel	30
Other	3
Total Units	441

34.5 B. Existing Housing Conditions by Community (PI-39) - Dinosaur is not included in this table.

Building Inspector, Darrell Williams estimates the following conditions:

	New	Standard	Deficient	Sub-Standard
Conventional	5%	40%	-	45%
Mobile Home	70%	15%	-	15%
Multi-Family	0	0	0	0
Hotel/Motel	-	10%	90%	-

SPATIAL ALLOCATION MODEL

A. Increased Population

34.6 As one of the primary variables considered in the Spatial Allocation Model, or in any gravity model, the current population of approximately 1000 (verses that projected 451, pI-26) will have substantial impact on the relative attractiveness of Oinosaur.

8. Town Expansion and Improvements

The Town has annexed approximately the same amount of property as that which constituted the old Town area in March of 1982 (Exhibit 8). Sewer and water systems are being upgraded to handle a capacity of 2000 people. According to pI-142, Community Level Impacts:

34.7 "Allocations to the community level were based on both existing boundaries and planned additions to the cities where such plans existed."

The recent annexations, coupled with infrastructure improvements would seem to increase the relative attractiveness of Dinosaur greater still.

TRANSPORTATION - HIGHWAY 40

8ecause:

A. "The majority of the traffic increases will occur along U.S. 40 and on I-70." (pI-106),
8. Oue to the condition of the 8onanza Road, "...the true impedance from Rangely to 8onanza should be measured via state route 45 and U.S. route 4D." (pI-141).
C. The Rangely Airport is making progress toward achieving expansion.
34.8 0. For rail service from Craig, U.S. 40 would be the most direct route to the Synfuels project sites (pI-88).

Oinosaur is in the middle of all of a great deal of transportation activity. It seems that the Town would experience a considerable increase in highway traffic. This should in turn, affect highway impacts and the attractiveness of the community as an intermediate location along a transportation route.

SEPARATION OF COLORADO ENTITIES

A. The Town of Oinosaur is separate and distinct from the Town of Rangely and should be identified as such. The two communities are located eighteen miles away from each other, in different counties - Moffat and Rio 8lanco County.
The magnitude of impacts experienced by them should also be identified and disaggregated from the "Colorado Communities" heading.

34.9

8. For purposes of project related allocation, the Dinosaur CCO area definition was changed from the official census area.

1. How will this affect the comparability of figures?
2. Why was the definition of this area changed from the official census designation?

SCHOOLS

A. Enrollment

The figure indicated in pI-41 stating that 86 students enrolled in Dinosaur Elementary (1-6) in 1981 is incorrect. Darrell Williams, Head Teacher - Oinosaur Elementary School commented that 65 students constituted peak enrollment for 1981. For the 1982 school year the break-down of Oinosaur students is as follows:

ELEMENTARY (K-6)	
September 1982	91 students
As of October 1982	108 students
MIDOLE SCHOOL* (7-8)	
As of October 1982	40 students
HIGH SCHOOL* (9-12)	
As of October 1982	45 students

34.10 8. Capacity

The Head Teacher of Oinosaur Elementary School, Darrell Williams, says that because the dining room and library, currently present in the school, were not included in the original school plans, this cuts down on school capacity. Williams states capacity is 175 students.

Or. Groves, Superintendant Moffat County Schools, estimates that student capacity is around 240 students if they are really packed in. The elementary school is a 14,500 square foot building.

C. Contacts

1. Darrell Williams, Head Teacher, Oinosaur Elementary School, (303) 374-2265.
2. D. Groves, Moffat County Schools, (303) 824-3268.
3. Gail Palmer, Secretary Rangely High School, (303) 675-2253.

PUBLIC SAFETY - LAW ENFORCEMENT

Again, there was nothing recorded for the Town of Oinosaur. The following information reflects the Law Enforcement Status as of October 20, 1982:

Number of City Police Stations	=	1
34.11 " " " " Staff	=	1a
" " " "Support Staff	=	0
" " " Patrol Cars	=	1

*Oinosaur transports its Middle School and High School students to Rangely Schools (Note: If Oinosaur continues to grow, there will be a point when Secondary School facilities are merited in Town). Currently two buses run from Dinosaur to Rangely daily.
The information for Middle and High School attendance was obtained from Gail Palmer, Secretary Rangely High School.

Mr. David Moore
Uintah Basin Synfuels Comment
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(Law Enforcement Status, Cont.)

Number of Highway Patrol Officers	=	2
" " " " Staff	=	NA[b]
Number of Highway Support Staff	=	NA
Number of Highway Patrol Cars	=	NA
Number of City Jails[c]	=	1
Capacity City Holding Tank	=	2
Staff City Jail	=	1[a]

Notes: [a]Police Staff and Jail Staff is the same person.
[b]NA = Information not available.
[c]Jail = Two 24 hours holding tanks.

SEWER (pI-49)

34.11 (cont)

Dinosaur is currently serviced by a new seweage system just recently completed by Uintah Engineering. My understanding is that the system is designed to serve a capacity of 2000 persons.

Contact Mr. Lawrence Kay with Uintah Engineering for details.

SOLID WASTE DISPOSAL (pI-51)

The Town of Dinosaur owns and maintains a Solid Waste Disposal site. The site covers 13.22 acres. Garbage collection is available and a solid waste disposal ordinance is in effect.

WATER SYSTEM (pI-54)

Source: Wells
Supply Amount: N/A
Storage Capacity: 400,000 gallons.

The Town recently received funds to proceed with a water system study. Contact: Bob Demos, Armstrong and Associates Engineers (303) 245-3861.

FISCAL PROFILES (pI-60)

A. Town of Dinosaur (Exhibit C)
B. Artesia Sanitation District (Exhibit C)
C. Artesia Fire Protection District
(Contact: Wilma Sims, Town Clerk, 374-2335.)

Mr. David Moore
Uintah Basin Synfuels Comment
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ASSESSED VALUATION (pI-80)

34.11 (cont)

A. Artesia Fire Protection District:

	1982	1981
Assesed Valuation	$ 1,156,320	$ 760,490
Taxes Collected	$ 2,416	$ 1,836
Mill Levy	2.1089	2.089
Percent Increase	31.6	N/A

B. Artesia Sanitation District:

	1982	1981
Assesed Valuation	$ 583,410	$ 408,370
Taxes Collected	$ 7,111	$ 5,158
Mill Levy	12.189	12.63
Percent Increase	34.2	N/A

C. Town of Dinosaur

	1982	1981
Assesed Valuation	$ 671,900	$ 427,840
Property Taxes	$ 8,248	$ 5,783
Mill Levy	12.276	13.52
Percent Increase	45.8	N/A

BONDED INDEBTEDNESS

For Town, Fire District and Sanitation District: None.

34.12

We realize that this comment does not comprehensively address all of the issues discussed in the Synfuels report. The BLM is encouraged to contact Dinosaur Town Planner, Steve Golnar, for additional assistance in developing an accurate portrait of the Town of Dinosaur, Colorado. It is our hope that BLM's analysis can begin with a current assessment of the Town's situation, and additional impacts can be identified and included with those that we are already experiencing.

Yours Truly,

Dennis E. Sims

Dennis E. Sims
Mayor

SBG:lg

Mr. David Moore — October 1982

EXHIBITS

A. Town of Dinosaur Housing Inventory
(October 11, 1982)

B. Map showing estimate of Town Boundaries, Identifying new annexations.

C. Annual Budget 1982, Town of Dinosaur

Town of Dinosaur P. O. BOX 108 - DINOSAUR, COLORADO 81610

Exhibit A
11 October 1982

I. Town of Dinosaur Housing Inventory (October 9, 1982)

Housing Type	Number of Units Town*	Blue Mtn. Village	Total
Single Family, wood frame	75		75
, stucco or masonary	8		8
, abandoned/vacant	3**		
Mobile Home, single wide	85	47	132
, double wide	18		18
, vacant/stored	4**		
Recreational Vehicles	78	97	175
Commercial/Residential	3		3
Total Permanent Housing	267	144	411
Motel Units	30		30
Total Housing Units	297	144	441

*Quantities in this category reflect how many housing units are in Town excluding Western Fuels' Blue Mountain Village Mobile Home and R.V. Parks.

**Abandoned, vacant or stored housing units were not included in Total Housing Stock.

II. Housing Mix

Housing Type	Absolute	% of Permanent Housi
All Recreational Vehicles	175	43
All Mobile Homes	150	36
All Single Family	83	20
Commercial/Residential	3	1
Totals	411	100

Dinosaur Housing Inventory
October 11, 1982
Page two

III. Population

High, medium and low population scenarios for the Town of Dinosaur, as of October 9, 1982, based on the housing inventory of October 9 are developed below. In these scenarios the average houshold size of 2.98 persons as reported in the 1980 Census of Population and Housing has been applied to mobile homes, single family units and commercial/residential units. The factor which is varied to develop these scenarios in the average number of persons residing in recreational vehicles. The high scenario assumes the average to be 2.0 persons, the medium 1.75 persons, and the low 1.5 persons.

Town of Dinosaur
Population Scenarios as of October 9, 1982

A. High Scenario

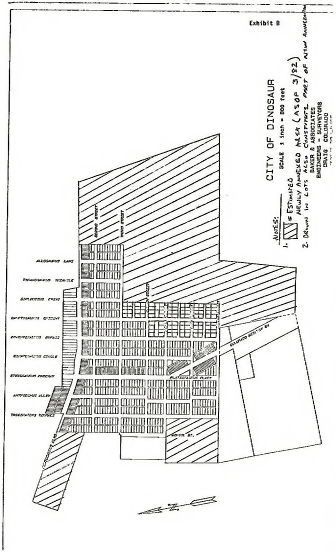
Housing Type	No. of Units		person/unit		Total
All Recreational Vehicles	175	X	2.0	=	350
All Mobile Homes	150	X	2.98	=	447
All Single Family	83	X	2.98	=	247
Commercial/Residential	3	X	2.98	=	9
	Total Population				1053

B. Medium Scenario

Housing Type	No. of Units		person/unit		Total
All Recreational Vehicles	175	X	1.75	=	306
All Mobile Homes	150	X	2.98	=	447
All Single Family	83	X	2.98	=	247
Commercial/Residential	3	X	2.98	=	9
	Total Population				1012

C. Low Scenario

Housing Type	No. of Units		person/unit		Total
All Recreational Vehicles	175	X	1.50	=	263
All Mobile Homes	150	X	2.98	=	447
All Single Family	83	X	2.98	=	247
Commercial/Residential	3	X	2.98	=	9
	Total Population				960



C-227

ANNUAL BUDGET 1982
TOWN OF DINOSAUR
STATEMENT OF ESTIMATED REVENUES
GENERAL FUND

Exhibit C

		1980 Actual	1981 Budget	1982 Proposed
Taxes				
311	Current General Property [illegible]	$ 4,804	$ 5,155	$ 5,783
312	Specific Ownership Tax	425	500	1,000
313	General Sales & Use Tax	10,274	9,000	13,000
314	Tobacco Tax	642	620	[illegible]
317	Road & Bridge Tax	846	560	[illegible]
318	Franchise Tax	100	100	100
319	Penalties & Interest on Delinquent Taxes	41	-0-	-0-
	Total Taxes	$ 17,132	$ 15,935	$ 20,258
Licenses & Permits				
321	Business Licenses	$ 376	$ 350	$ 600
322	Building Permits	-0-	-0-	2,000
323	Dog Licenses	332	200	[illegible]
	Total Licenses & Permits	$ 708	$ 550	$ [illegible]
Intergovernmental Revenues				
331	Moffat County Commissioners	$ 6,136	$ 7,975	$ 8,000
335	Highway Users Tax	5,327	5,300	[illegible]
336	Additional Motor Vehicle Registration Fee	1,314	1,500	3,000
337	Federal Revenue Sharing	1,325	1,340	[illegible]
338	Oil Shale Grants	-0-	-0-	197,500
	Total Intergovermental Revenues	$ 14,102	$ 16,115	$217,500
Fines and Forfeits				
341	Fines	$ 3,335	$ 3,800	$ 5,000
Charges for Services				
351	Equipment Rental	$ 328	$ 340	$ 600
352	Miscellaneous	196	50	-0-
353	Gravel	$ -0-	500	500
	Total Charges for Services	$ 524	$ 390	$ 1,100
	Total Revenues	$ 35,801	$ 37,290	$245,858

ANNUAL BUDGET 1982
TOWN OF DINOSAUR
STATEMENT OF ESTIMATED REVENUES
WATER FUND

		1980 Actual	1981 Budget	[illegible]
Revenues				
311	Water Sales	$ 13,393	$ 16,875	$ [illegible]
312	Water Tap Fees	900	1,200	[illegible]
313	Interest Income	1,103	-0-	[illegible]
314	Oil Shale Grants	91,692	146,250	[illegible]
	Total Revenues	$107,088	$164,325	$254,000

ANNUAL BUDGET 1982
TOWN OF DINOSAUR
STATEMENT OF ESTIMATED EXPENDITURES
WATER FUND

		1980 Actual	1981 Budget	1982 Proposed
Expenditures				
411	Salaries	$ 5,940	$ 6,932	$ 15,000
412	Supplies	4,659	800	[illegible]
413	Power	3,024	4,987	[illegible]
421	Capital Outlay - ½ Cost of Vehicle			[illegible]
422	Capital Outlay - Water Line Project			[illegible]
	Total Expenditures	$ 13,623	$ 12,719	$[illegible]

ANNUAL BUDGET 1982
TOWN OF DINOSAUR
STATEMENT OF ESTIMATED EXPENDITURES
GENERAL FUND

		1980 Actual	1981 Budget	1982 Proposed
General Government				
411	Dog Licenses	$ -0-	$ -0-	160
412	Court Salaries	660	1,500	[illegible],000
413	Legal & Accounting	1,792	1,800	3,000
414	Administration Supplies	196	700	1,500
415	Administration	174	-0-	-0-
416	Clerk & Treasurers Salaries	1,620	1,800	10,000
417	County Treasurers Fees	141	130	[illegible]
418	Publishing & Printing	-0-	310	2,000
419	Dues & Membership	330	390	400
420	Sanitation Fill	-0-	-0-	[illegible],000
421	Board Member Salaries	-0-	1,380	[illegible],380
422	Building Inspector Salary	-0-	-0-	[illegible],000
	Total General Government	$ 4,913	$ 8,010	$ 23,[illegible]
Public Safety				
431	Police Salary	$ 9,779	$ 12,900	16,000
432	Police Car Expenses	10,203	8,500	5,00[illegible]
433	Fire Department	259	500	1,000
434	Telephone & Postage	712	1,000	1,000
435	Insurance & Bonds	1,805	650	2,000
436	Street Lighting	2,164	2,000	4,000
437	Police Benefits	1,455	1,972	2,800
	Total Public Safety	$ 26,377	$ 27,522	$ 31,800
Public Works				
441	Street Equipment Expenses	$ 1,072	$ 1,972	$ 5,000
442	Gravel	-0-	300	300
443	Weed Control	-0-	100	500

(Continued)

ANNUAL BUDGET 1982
TOWN OF DINOSAUR
STATEMENT OF ESTIMATED EXPENDITURES
GENERAL FUND

		1980 Actual	1981 Budget	
Public Works (Continued)				
444	Town Hall Phone & Utilities	$ 1,750	$ 1,600	[illegible]
445	Maintenance Salary	1,185	1,320	[illegible]
	Total Public Works	4,007	$ 5,292	$ [illegible]
Health & Sanitation				
451	Cemetery	$ 250	$ 250	$ [illegible]
452	Senior Citizen Support	250	250	250
	Total Health & Sanitation	$ 500	$ 500	$ 500
Parks & Recreation				
461	City Park	$ 753	$ 800	$ 1,500
Other - Capital Outlay				
471	Capital Outlay - Town Park	$ -0-	$ -0-	$ 60,000
472	Capital Outlay - Comprehensive Plan	-0-	-0-	25,000
473	Capital Outlay - Streets	-0-	-0-	[illegible]
	Total Other - Capital Outlay	$ -0-	$ -0-	$ [illegible] 500
	Total Expenditures	$ 36,550	$ 42,124	$ [illegible]

ANNUAL BUDGET 1982
TOWN OF DINOSAUR
STATEMENT OF ESTIMATED REVENUES AND EXPENDITURES
GENERAL FUND

	1980 Actual	1981 Budget	1982 Proposed
Revenues			
Taxes	$ 17,132	$ 15,935	$ 20,258
Licenses & Permits	708	550	3,000
Intergovernmental Revenues	14,102	16,115	217,500
Fines and Forfeits	3,335	3,800	5,000
Charges for Services	524	890	1,100
Total Revenues	$ 35,801	$ 37,290	$246,858
Estimated Carryover of Unappropriated Surplus			
Due from Other Funds			
Total Estimated Revenuos			
Expenditures			
General Government	$ 4,913	$ 8,010	
Public Safety	26,377	27,522	
Public Works	4,007	5,292	
Health & Sanitation	500	500	
Parks & Recreation	753	800	
Other - Capital Outlay	-0-	-0-	[illegible]
Total Expenditures	$ 36,550	$ 42,124	$267,740

ANNUAL BUDGET 1982
TOWN OF DINOSAUR
STATEMENT OF ESTIMATED REVENUES
CAPITAL IMPROVEMENT FUND.

	1980 Actual	1981 Budget	1982 Proposed
Revenues			
311 Oil Shale Grants			

ANNUAL BUDGET 1982
TOWN OF DINOSAUR
STATEMENT OF ESTIMATED EXPENDITURES
CAPITAL IMPROVEMENT FUND

	1980 Actual	1981 Budget	1982 Proposed
Expenditures			
411 Capital Outlay - City Hall Building			$215,000

Town of Dinosaur

34.1 Data for Dinosaur was developed by the State of Colorado through the Cumulative Impact Task Force process. Refer to the responses to Comments 34.3 and 34.6 for additional details.

34.2 It is recognized that Dinosaur is and will continue to be heavily affected by the Deserado Coal Mine and Bonanza Power Plant. It is also recognized that these projects may be very closely related to the synfuels industry and the second unit of the Bonanza Power Plant. The related coal mining and associated impacts have been analyzed in the EIS as "interrelated projects." Refer to Section R-1.A and Section R-4.A.1 for clarification and information. The impacts of interrelated projects also can be found on pages I-258 through I-280 of the Socioeconomics Technical Report. This section states that Dinosaur is likely to receive an impact of over 1,000 people from the Deserado Mine and second unit of the power plant above baseline projections. This would make the population of Dinosaur over four times its 1980 census populations without any impacts from the applicants' proposed synfuel projects.

34.3 In relation to baseline projections and the 1.7 percent growth rate found in Table R2A-7 of the Socioeconomics Technical Report, it should be noted that these projections were not developed by the State of Utah, but rather by the State of Colorado as part of their Cumulative Impact Task Force process. These baseline projects should have included impacts from the first unit of the Bonanza Plant and Deserado Mine. These Cumulative Impact Task Force baseline projections were used as provided by the State of Colorado even though there are apparent differences between actual levels and projected levels.

34.4 Dinosaur has been identified as a separate entity in Table R2B-1 in the Socioeconomics Technical Report, and data from the Dinosaur housing inventory has been incorporated.

34.5 Existing conventional housing condition data furnished by the Town of Dinosaur has been incorporated in Table R2B-2 in the Socioeconomics Technical Report.

34.6 The current and baseline projected population of Dinosaur will make a difference in the attractiveness of the community when using a gravity model. If a current population of 1,000 had been used, then the gravity model would have attributed a higher population impact from synfuels development to Dinosaur. However, the State of Utah relied on census data and baseline projections provided by the Colorado Cumulative Task Force Process in their gravity model, since this is the data base recommended by State of Colorado for impact analysis. No other official data sources were available at the time the analysis was performed to substantiate the large increase in population in Dinosaur. State of Colorado has been informed of this discrepancy, but revised runs of the gravity model were not made.

34.7 When community allocations of synfuels impacts were accomplished for Dinosaur, it was assumed that all of the impact would be in the incorporated limits and none in the unincorporated area. (This was not assumed in the Utah areas.) Therefore, recent annexations in Dinosaur would not affect the impact projections for Dinosaur.

34.8 The EIS analysis (Section R-4.A.7) supports the statements that the proposed synfuels development would result in increased highway traffic and create highway impacts in the vicinity of Dinosaur.

34.9 Dinosaur and Rangely were treated as separate communities, and projections by community can be found in Tables R2A-7, R3A-13, R3A-27, R3A-42, R3A-45, SSA-2, and SSA-4 of the Socioeconomics Technical Report. The Colorado area was an area derived for modeling purposes similar to the CCOs in Utah. (The Utah CCOs also contained several communities). The "Colorado Area" was used, because it was believed that the impact would be centered in this area which consisted of the Rangely CCD plus the town of Dinosaur. The 1980 census was used to establish the calibration data for this area; no incomparability should be created by using such a designation, because allocations between counties and communities were accomplished and can be found in the tables listed above.

34.10 Using the 65-student peak enrollment and 175-student capacity figure for 1981 furnished by Darrell Williams results in a 1981 percent of capacity of 37.1. Using the same 65-student enrollment with Dr. Grover's estimated 240-student capacity results in a 1981 percent of capacity of 27.1. Since the capacity estimate of 31.3 calculated from data obtained from school district officials early in 1982 is bounded by the more recent estimates, Table R2B-3 has not been changed with respect to Dinosaur Elementary.

34.11 The additional information on public safety, sewer, solid waste disposal, water system, and fiscal data for the Town of Dinosaur has been incorporated into appropriate tables in the Socioeconomics Technical Report.

34.12 Selected data furnished by the commenter (October 20, 1982) have been utilized in revising sections pertaining to Dinosaur in the Socioeconomics Technical Report and the EIS. BLM appreciates the submittal of these additional data.

COMMENT LETTER 35

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
650 CAPITOL MALL
SACRAMENTO, CALIFORNIA 95814

REPLY TO ATTENTION OF SPKCO-O

20 October 1982

Mr. Lloyd Ferguson, District Manager
Bureau of Land Management
170 South 500 East
Vernal, UT 84078

Dear Mr. Ferguson:

The Draft Environmental Impact Statement for Uintah Basin Synfuels Development dated August 1982, was referred by the Office of Chief of Engineers, Washington, D.C., to Sacramento District Corps of Engineers for appropriate response.

35.1 We have reviewed the Draft Environmental Statement and have concluded that the developments, as proposed, will not conflict with flood control projects or flood control programs within our jurisdiction. Further, it appears that adequate consideration has been given to constructing flood plain facilities, diversion dams, roads, bridges, and pipeline crossings of streams, in a manner that should not adversely affect the passage of floodflows or significantly change hydrologic conditions as they relate to urban areas.

The proposed facilities would not cross navigable waterways of the United States or have any significant effects on navigability. The placement of dredged or fill material into waterways of the United States or adjacent wetlands will require a Department of the Army permit under Section 404 of the Clean Water Act (33 USC 1344). A final determination as to whether the activities are covered under a nationwide permit or whether individual permits may be required for the construction activities will be made by our office when detailed plans are provided to us.

35.2 It would be helpful to us and potential future applicants if the Final EIS discussed impacts on wetlands, if any. This section should be separate from the discussion of riparian impacts. It should focus on freshwater marshes. Thank you for the opportunity to review the EIS.

Sincerely,

D. A. DENNIS
Chief, Construction-Operations Division

Copy furnished:
Commander, South Pacific Division
ATTN: SPDCO-O

CDR USACE (DAEN-CWP-V)
Washington, D.C. 20314

RESPONSE LETTER 35

U.S. Army Corps of Engineers, Sacramento District

35.1 The Corps of Engineers' determinations that none of the proposed projects would conflict with flood control projects or programs within their jurisdiction will be considered in the decision-making process.

BLM appreciates the observation that areas of concern to the Corps have been adequately assessed.

The requirement for a Section 404 permit is noted in the Authorizing Actions section (Table SS-3).

35.2 No wetlands (as defined) would be affected by project construction or operation. The somewhat poorly drained to poorly drained areas along the Duchesne, Uintah, and Green rivers and areas bordering irrigated cropland are used mainly for pasture and hay production and are considered as cropland. Refer to Sections R-4.A.6 and M-4.A.6 for discussion of impacts.

COMMENT LETTER 36

DEPARTMENT OF HEALTH & HUMAN SERVICES — Public Health Service

Centers for Disease Control
Atlanta, Georgia 30333
(404) 452-4126
October 20, 1982

Lloyd Ferguson, District Manager
Bureau of Land Management
170 South 500 East
Vernal, Utah 84078

Dear Mr. Ferguson:

We have reviewed the Draft Environmental Impact Statement (EIS) for the Uintah Basin Synfuels Development, northeastern Utah. We are responding on behalf of the U.S. Public Health Service and are offering the following comments for your consideration in preparing the final document.

Regional Cumulative Analysis

36.1 Several unresolved environmental issues are identified in the EIS (p. xxxii). These include: (1) air quality concerns involving possible violation of the Colorado Category PSD Class 1 increment and possible limitation of future development on the Ute Indian Tribe Reservation, and (2) the availability and use of a satisfactory water supply without interfering with the prior commitment of water rights. We expect that these issues will be resolved and addressed in the final document.

36.2 According to the EIS, a number of hazardous compounds can be produced during the processing of oil shale and its conversion to shale oil. While an overview discussion is presented on the hazardous materials produced during this process, the efforts that will be taken to safely dispose of these hazardous materials and prevent the release of hazardous materials via environmental pathways should be addressed. Where potential releases of hazardous materials cannot be adequately controlled or prevented because of environmental or technological constraints, the significant risks to public health should be disclosed.

36.3 With all nine of the applicant's proposed projects and the interrelated projects, the EIS indicates that the Uintah Basin population is projected to increase about 2.2 times its present population or to as many as 151,739 people by 1995 This increase could create problems of ". . . substantial magnitude for local city and county governments as well as for the Ute Indian Tribal Council" (p. xxix).

Because of the housing demand to be created by the projects, efforts need to be taken by local governments to assure that existing planning, zoning, and building regulations are sufficient to prevent incompatible and haphazard development in the county. Are the existing local building and sanitary codes sufficient to insure the placement and/or construction of State housing, water supplies, and sanitary systems? What local regulations exist to control development in flood hazard areas, geologically unstable areas, in soil areas unsuitable for septic tank systems, and unacceptable noise impact zones?

Page 2 - Lloyd Ferguson, District Manager

36.4 The EIS should address the status and effectiveness of State and local planning efforts to prohibit noncompatible development of reclaimed lands producing radiation (i.e., radon and radon progeny concentrations) in excess of applicable State and Federal guidelines. If radon emissions are a potential problem in the study area, the potential indoor health effects of radon emissions from land to be reclaimed and used for development in the future should be discussed. The EIS should indicate if projected indoor radon progeny levels for slab-on-grade structures on reclaimed lands will exceed the U.S. Environmental Protection Agency's recommended levels.

36.5 We trust that measures will be implemented into the design and management of the proposed drainage system, holding ponds, disposal basins, and other facilities having vector breeding potential to prevent the increase of vector populations that could cause future vector-borne disease or nuisance problems in the vicinity. The capability of local health authorities to detect and prevent excessive onsite breeding of problem vectors should be discussed.

We appreciate the opportunity to review the Draft EIS. We are sending our copy of the Draft EIS to the Indian Health Service for their information.

Please send one copy of the final document when it becomes available. Should you have any questions about the comments above, please call Mr. Robert Kay of my staff at FTS 236-6649.

Sincerely yours,

Frank S. Lisella, Ph.D.
Chief, Environmental Affairs Group
Environmental Health Services Division
Center for Environmental Health

RESPONSE LETTER 36

Center for Disease Control

36.1 Because insufficient additional data were available, these issues remain unresolved in the Final EIS. As stated in the Summary, for the most part, these issues would need to be pursued outside of and independent from the EIS process in order to be resolved.

36.2 A small amount of hazardous waste would be produced by some of the projects (Paraho, Syntana-Utah, and Tosco), a result of upgrading operations. This waste would mainly consist of spent catalysts. The transportation, use and disposal, or recycling, of these products is regulated by both the EPA and the state under the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act. For more detail, see Sections 1.D.1 and 1.D.2 of the Paraho, Syntana-Utah, and Tosco discussions and Section R-4.A.16.

36.3 The communities within the study area have either recently completed or are undertaking a review and update of their planning and zoning ordinances to ensure their adequacy and compatibility with the proposed synfuel projects.

36.4 Radon emissions have not been found to be a problem in the study area.

36.5 Drainage systems, basins, and holding ponds would be small in these projects and would be designed with steep banks so that water depths would not be conducive to vector reproduction. Constant recycling of water would also discourage vector production. Therefore, problems with vector populations are not anticipated.

COMMENT LETTER 37

FRIENDS OF THE EARTH
COLORADO OFFICE
2239 EAST COLFAX AVENUE ROOM 209
DENVER, COLORADO 80206
(303) 322-2791

18 October 1982

COMMENTS ON THE UINTAH BASIN SYNFUELS DEVELOPMENT ENVIRONMENTAL IMPACT STATEMENT

These comments are necessarily brief because of the press of other business. However, we did not wish the opportunity to pass without expressing our concern about the single most serious (and we believe fatal) flaw in the environmental statement: **The statement either hides behind so-called "unresolved issues" or does not evaluate the effectiveness of proposed mitigating measures which are claimed to allow development to occur without significant impact.**

"Unresolved Issues"

The Uintah Basin statement states that issues still unresolved are:
(1) the extent to which impacts may be offset as a result of Utah's Senate Bill 170,
(2) issues raised and yet to be evaluated in response to concerns by the Ute Nation, and
(3) measures which will overcome revenue/cost imbalances.

37.1 Let's be honest with the public, BLM. The statement, except for its vague, general references to Senate Bill 170, does not contain any proposed, substantive socioeconomic mitigation measures. Such measures must be developed on a site-specific basis for each project. We have searched in vain for any project-specific social mitigation plans. Without such plans there is no hope for adequately avoiding serious community development problems.

The statement relies almost exclusively on Senate Bill 170's protections. However, these protections only address local government fiscal imbalances. They do not address housing, human service needs, phasing of construction, private sector service deficiencies, or the rate of growth. None of these problems have solutions within the non-mitigation of the proposed actions. **Indeed, each of the communities in the area will experience greater than 10% annual compound growth through 1985. Simple fiscal assistance will not relieve the boom this entails.** Without specific plans, how will the communities deal with runaway crime, runaway local inflation, seniors and other fixed income residents no longer able to afford housing, secondary service workers unable to afford housing, delinquency, disorderly conduct, strained roads and transportation networks, no sources for capital needed for new housing or new businesses?

With regard to these questions, BLM is silent. Worse, BLM only calls them "unresolved." With the information presented in the EIS, we would make the following conclusions and take the following actions:

Committed to the preservation, restoration, and rational use of the Earth.

37.1 (cont)

1 - The rate of growth expected in the Basin, greater than 12% annual compound growth with 18% in the two largest communities through 1985, will make impacts unmanageable for the high scenario.
2 - The applicants have not submitted adequate project-specific socio-economic mitigation plans. They and the communities are not adequately prepared for the magnitude of the proposed undertaking.
3 - We will withhold approval of proposed permits until adequate mitigation plans are submitted **and applicants commit to perform the proposed mitigation.**
4 - We will not approve all actions simultaneously, but will, based on the readiness of each project, issue permits in a phased, orderly manner to spread the impacts.

Other Mitigation

37.2 BLM also plays tricks with mitigation proposed for physical environmental impacts. It concludes that:
(1) Loss of vegetation and habitat due to construction and shale disposal will be temporary because of successful reclamation.
(2) "It is assumed effective erosion control and reclamation practices would be implemented..."
Yet, for the most part there is no assessment of the effectiveness of proposed reclamation. There are slight hints that their effectiveness will be less than desired. The EIS acknowledges difficult climatic conditions and that the application of mitigation procedures would be at the discretion of authorizing agencies. Still, BLM's analysis assumes success in these efforts.

An analysis of the situation should yield more sobbering results. In particular, Utah's reclamation laws is one of the least strict in the nation. It provides little substantive in the way of reclamation standards but miles of flexibility for the Oil and Gas Commision. This is particularly disturbing because the Uintah Basin will be very difficult to reclaim. Topsoil is almost non-existence. Spent shale reclamation is still experimental. Precipitation is sparse.

37.3 Similarly, the statement does not evaluate the effectiveness of such mitigating measures as:

- Stretford equipment for H_2S removal
- Compacted spent shale as an "impervious liner" for shale piles
- "Construction practices ... designed to minimize surface disturbance" (what are they? how well will they perform?)
- Fugitive dust ... supressed as necessary to "comply with air quality regulations" (if it is as effective as Colony's dust supression, the EIS had better calculate the cost of respirators.)
- "Paraho is coordinating with all regional, county, and local officials ...." (It can coordinate without taking mitigating action.)
- No process wastewater would be discharged. (What about accidents? What is the effectiveness of retort water cleanup?)
- Raw shale fines would be stockpiled .... (What about fires?)

EA's in the future

37.4 Given the little we know about the "conceptual" projects, there is no way BLM should condone an "environmental analysis" for final approval of proposed "conceptual" projects.

Friends of the Earth

37.1 Appendix A-7 presents 11 uncommitted mitigation measures that could be used to alleviate or minimize potential socioeconomic effects from the proposed developments. These measures are not committed to by the federal agencies or the applicants. They could be used by the applicants for voluntary implementation or by the authorizing officials in eventual permit stipulations. These and other more site-specific measures would be developed by the applicants and affected communities under the requirements of S.B. 170 and by the applicants in conjunction with the Ute Indian Tribe. BLM does not have the authority to require applicant committment to socioeconomic mitigation measures.

37.2 In Appendix A-8, footnote 2 of Table A-8-2 identifies the reliability and effectiveness of the measures and procedures outlined in the Erosion Control and Reclamation Program.

Table A-8-3 presents analysis identifying the effectiveness of several erosion control measures and combinations that would be implemented to control soil loss and promote revegetation.

It should also be noted the measures and procedures outlined in the erosion control and reclamation program are (1) based on years of experience, field trials, and research conducted by leading researchers in the field of reclamation; and (2) have been demonstrated to be reliable in making assumptions regarding effectiveness when properly implemented.

37.3 Because oil shale is still developmental, specific industry data on the effectiveness of Stretford equipment cannot be cited. Stretford equipment is an acceptable system and standardly used in the petroleum industry. Based on this use and research, 97 percent sulfur removal is expected.

Tests indicate compacted shale is a relatively impervious layer with 0.1 to 1.0 feet per year permeability. However, more importantly, under the conditions present in the area, moisture will move to the surface of shale piles and evaporate rather than penetrate the pile as leachate. This has been clarified in Section R-4.A.3, Ground Water. See also the response to Comment 32.11.

Construction practices that the applicant would use which would mitigate impacts are detailed in the individual project technical reports and Appendix A-8. Measures that would be required by permitting agencies are identified in Appendix A-11. Also, under Section 504 of the Federal Land Policy and Management Act, the applicant would be required to provide funding to the appropriate federal agencies for the purpose of financing one or more specialists for administration of construction activities (Appendix A-11).

Fugitive dust suppression is required to comply with state and federal air quality regulations, including the Clean Air Act, as amended (42 USC 7401).

Mitigation which is not committed to has not been used in analysis or determination of impacts. The impact analysis is, therefore, a worst-case analysis. Any mitigation measures which are later adopted, including those resulting from ongoing coordination between the applicants and federal, state, and local agencies, would result in impacts less severe than those presented in the EIS.

The applicants must comply with state and federal wastewater regulations, including the Clean Water Act (33 USC 1251). The likelihood of impacts due to accidental discharge is remote because of the safeguards of construction standards, automatic monitoring, area dikes, and other protective devices.

Recommendations by the Environmental Protection Agency concerning raw shale fines are included in Appendix A-11.

37.4 The level of detail required and the need for subsequent impact assessment for a conceptual project will be determined by BLM when a detail project description is submitted and action on a right-of-way application is requested (EIS Preface).

COMMENT LETTER 38

Mono Power Company

P. O. BOX 800
2244 WALNUT GROVE AVENUE
ROSEMEAD, CALIFORNIA 91770

October 18, 1982

Mr. Roland G. Robison
State Director
Bureau of Land Management
136 E South Temple
Salt Lake City, Utah 84111

Dear Mr. Robison:

Mono Power Company has completed the review of the Draft Environmental Impact Statement for the proposed Uintah Basin Synfuels Projects. As a conceptual project, it is important to recognize the tentative nature of the proposed P.R. Spring Tar Sand Project and that the viability of the project greatly depends upon the outcome of our resource evaluation.

38.1

At the onset and during preparation of the Draft EIS, Mono Power had a joint participation agreement with Enercor for the P.R. Spring Project. However, during the past month that arrangement has been dissolved. Each of the two companies may develop their leases as separate or possibly, in the future, joint projects. There should not be any significant changes to the text of the EIS. In other words the combined impacts of the projects under the various scenarios should remain much the same.

38.2

Generally speaking, we have found the EIS to be well done and adequately addressing Mono's concerns. However, we have identified a few items in the draft which need to be clarified. There are several references, particularly on Pg. R-4-85 and R-5-3 to the Winter Ridge area which is currently under consideration for wilderness designation. Some discussion about the potential impact to our leases or development of the Tar Sand resource in the event the wilderness status is granted should be addressed in the EIS. That is, do we lose the option to convert our P.R. Spring leases to combined hydrocarbon holdings.

38.3

There are several references throughout the text about the "new townsite" at Westwater. It should be clarified that Westwater is but one of many sites being considered for a new town. The EIS now reads as though this is the only site being considered (Para. 2, Pg. R-4-81).

38.4

It is not clear after reading the Air Quality sections of the report that the State of Utah will be issuing P.S.D. permits for the projects. Even though it is generally known that Utah has adopted EPA standards, reference to the Air Quality Tecnical Report or mention of Utah's permitting authority would be helpful.

We wish to thank BLM for allowing us to participate in this worthwhile project and look forward to seeing the final version of the EIS. Should you have any questions about or wish to discuss our comments, please call me at (213) 572-2149.

Sincerely,

Michael San Miguel
Environmental Engineer

RESPONSE LETTER 38

Mono Power Company

38.1 BLM recognizes the conceptual nature of the P.R. Springs project. Appendix A-1 has been revised to up-date the current status of the project.

38.2 Should the Winter Ridge Wilderness Inventory Unit receive Congressional designation as a Wilderness Area in its present configuration, the Mono Power leases that would be affected could be converted to combined hydrocarbon holdings. Nonetheless, the development of combined hydrocarbon holdings (i.e., strip mining) within a Wilderness Area would be considered incompatible with the purpose and intent of the Wilderness Act of 1964 and with the protection of wilderness-related values in the Winter Ridge area. Since the Interior Board of Land Appeals is reviewing the status of the Winter Ridge unit (whether the unit be returned to multiple use management or be designated as a Wilderness Study Area), it would be presumptuous at this time to assume the unit will become a Wilderness Area.

38.3 Appendix A-1 clarifies this point. Alternative townsites considered by Enercor-Mono Power (Webster 1981) were not assessed in the EIS due to the conceptual nature of this project. The Westwater townsite was selected for consideration in this EIS, because based on the rating of a study conducted for Enercor-Mono Power (Webster 1981), it was the applicant's preferred town site.

38.4 Reference to the fact that Utah is the PSD permitting authority has been added to the Air Quality Technical Report and Section R-4.A.2 of the Final EIS.

COMMENT LETTER 39

United States Department of the Interior

BUREAU OF RECLAMATION
UPPER COLORADO REGIONAL OFFICE
P.O. BOX 11568
SALT LAKE CITY, UTAH 84147

IN REPLY REFER TO: UC-150
120.1

October 28, 1982

Memorandum

To: District Manager, Bureau of Land Management, 170 South 500 East, Vernal, Utah 84078

From: Acting Regional Director
Bureau of Reclamation

Subject: Review of Draft Environmental Statement - Uintah Basin Synfuels Development (ER 82/46)

We have reviewed the above draft environmental statement for the Bureau of Reclamation and have the following comments to offer:

General

39.1 1. The route of the Salt Lake City Alternative Product Pipeline could cross rights-of-way under jurisdiction of the Bureau of Reclamation. Appropriate coordination would be required.

39.2 2. It is not clear whether or not the applicants would provide any fish and wildlife mitigation to compensate for habitat and population losses resulting from project development.

39.3 3. Development of the proposed projects would increase the demand for Central Utah Project water.

39.4 4. The social information and statistics are consistent with those being used by the Bureau of Reclamation. Because of its location, one project, the Sohio Project, could cumulatively interact with Bureau of Reclamation projects and create a housing shortage in Roosevelt, Utah, around the year 1988. During this peak construction year, given the high level development scenario, a labor force of about 475 would seek housing in Roosevelt. This demand could be added to that associated with the Upalco Unit, Duchesne River Area Canal Rehabilitation, Uinta Basin Water Systems Improvement, and construction of the Upper Stillwater Dam.

Specific

39.5 Page xxxii, Paragraph 2 under "Water Supply" - We believe this paragraph should be revised to read as follows: "Green River water could be used through execution of an interim water service contract from Flaming Gorge

39.5 (cont) Reservoir. According to the Bureau of Reclamation, water is available from the Flaming Gorge Reservoir for beneficial consumptive uses; however, interim contracts for the use of this water would first require the approval of the Utah Division of Water Rights (State Engineer) for use and place of diversion. Other institutional requirements would also have to be met. It is the opinion of the Utah Division of Water Rights (State Engineer) that water in perpetuity may not be available from Flaming Gorge Reservoir. This is due to commitments of water for the Central Utah Project, and water that would be withdrawn from the Green River to supply the Indian lands on the Leland Bench Project (Utah Division of Water Rights 1981)." This revision better explains contract policy and procedures for water supplies from Flaming Gorge Reservoir.

39.6 Page R-3-1 - It is not clear to us whether the baseline conditions described are existing conditions, or constitute future conditions without the proposed projects.

39.7 Page R-3-16, Quality of Life - We suggest mentioning the potential for cultural problems involving religious differences.

39.8 Page R-3-23, Surface Water - The Duchesne River is also being developed for in-basin use under the Central Utah Project.

39.9 Page R-4-15, Paragraph 4 - Would there be an active program of minority hiring?

39.10 Page R-4-20, Water - Vernal City and adjacent communities will get municipal water from the Jensen Unit of the Central Utah Project. Roosevelt, Myton, and other communities are also scheduled to get water from the Central Utah Project.

39.11 Page R-4-45, Surface Water - In-basin development of the Duchesne River drainage under the Central Utah Project should be mentioned. This development would provide some municipal water for impacted communities.

39.12 Page R-4-58, Soils and Reclamation - The credibility of commitments made would be significantly enhanced if applicants would provide up-front funding to ensure that adequate financial resources would be available.

39.13 Page R-4-62, Wildlife, Last Paragraph - The statement that disturbance of nearly 37,000 acres of mule deer habitat would not be significant does not seem supportable from a biological point of view. Severity of impact is not necessarily directly related to percentage of total available habitat. A more meaningful comparison would involve the most critical habitat type.

39.14 Page R-4-65, Paragraph 5 - Central Utah irrigation projects should be changed to Central Utah Project features.

39.15 Page R-4-69, Fisheries - A discussion of how water diversion structures would be designed to prevent entrapment of fish would be meaningful.

39.16 Page R-4-70, Threatened or Endangered Species - This discussion appears to be inconsistent with page R-K-4 of the memorandum from the Fish and Wildlife Service.

39.17 Pages R-4-81 and R-4-82 - There would also be a resultant increase in the cost of providing adequate law enforcement for management agencies and the Ute Tribe.

39.18 Page R-4-93, Ruptures and Spills - Should expand discussion to specify who would pay the costs of cleaning up spills.

39.19 Page R-4-110, Last Paragraph - Would there be an active hiring program for minorities?

39.20 Page R-4-114, Last Paragraph - A significant part of the needed water supply would come from the Central Utah Project.

39.21 Page R-4-115 - Under discussion of hunting and fishing expenditures, benefits would be offset somewhat by increased administrative costs.

39.22 Page R-4-124, Paragraph 3 - As with the discussion of wildlife impacts, the assumption that loss of 6,542 acres of vegetative habitat would be insignificant needs support.

39.23 Page R-5-1, Section R-5.A. - It would seem like the trend toward reduction of wildlife habitat and populations would be a significant concern, particularly at the cumulative level.

39.24 Page R-5-1, Section R-5.B. - It would appear that loss of wildlife habitat and populations would be an irreversible and irretrievable commitment of resources.

39.25 Page SS-9, Table SS-4 - It seems like the Ute Tribe should be included.

39.26 Page E-1-8, General - We suggest mentioning the provision of vegetative buffer strips along water courses.

39.27 Page E-1-8, Plant Site - We suggest including a requirement for development of plans for cleanup of product spills.

39.28 Page M-1-14, Paragraph 2 - Would the applicant be responsible for paying cleanup costs?

39.29 Page P-1-9 - We suggest the inclusion of a requirement to provide buffer strips along water courses as a construction measure.

39.30 Page S-1-13, Paragraph 3 - Who would be responsible to pay the cleanup costs?

39.31 Page T-1-10 - We suggest adding the requirement or provide protective buffer strips along water courses to the list of environmental safeguards. Also, who will monitor and enforce commitments made by the various applicants?

39.32 Page T-3-16, Table T-3-1 - Little Dell is a project being planned by the Corps of Engineers, not the Bureau of Reclamation.

39.33 Page T-4-11, Paragraph 5 - Harassment of golden eagles is prohibited by law.

39.34 Page T-4-11, Paragraph 7 - Instream diversion structures can be designed to prevent damage to fish.

39.35 Page R-E-3 - We suggest including Uintah Basin Association of Governments in the list of local government entities to receive a copy of the draft environmental impact statement.

39.36 Page R-I-1 - In order to give this section some real value, it appears necessary for the decisionmakers to determine which, if any, of the uncommitted mitigation measures would be implemented. Without this knowledge, the true net impacts cannot be identified.

39.37 Page R-I-2, Wildlife - Another potential mitigation measure would be to provide replacement habitat by increasing the productive capacity of adjacent lands.

39.38 Page R-I-2, Paragraph 4 - Landscape mitigation would be better insured if applicants were required to provide up-front funding and sign agreements to follow through on stated commitments.

39.39 Page R-I-9, No. 3 under River Crossings - If steep slopes are involved, right-angle crossings of streams should be avoided to reduce the potential for erosion of soil into the stream.

39.40 Page R-J-5 - We suggest adding a stipulation precluding right-angle stream crossings where steep slopes are involved. This measure would reduce soil erosion into water courses.

39.41 Page R-J-4 - We suggest including the objective of enhancing wildlife values in the revegetation guidelines. Such a commitment could function as a wildlife mitigation measure.

39.42 Page R-J-4 - Would temporary irrigation of reclaimed lands or retreatment of difficult areas be included in revegetation plans?

39.43 Page R-K-1 - It would be informative to explain why biological assessments have not been prepared to provide the impact data for this draft environmental impact statement.

39.44 Page SS-A-4, Vegetation - Mention of the Executive Orders covering floodplains and wetlands would be meaningful.

We appreciate the opportunity to review this draft environmental impact statement.

Frank W. Krell

cc: Commissioner, Attention: 150

U.S. Bureau of Reclamation, Upper Colorado Regional Office

39.1 Should Tosco's Salt Lake City Alternative Product Pipeline be approved, Tosco would need to coordinate with all affected governmental and private entities, including the Bureau of Reclamation, in order to acquire the necessary permits.

39.2 The applicants' revegetation plans (Appendix A-8) provide for revegetation with plant species that could be used by wildlife.

39.3 While the comment is correct that oil shale development would increase the use of Central Utah Project (CUP) water, it should be noted that all CUP water is not now being used. However, for analysis purposes the model considers the water as used. Water needed to support municipal and industrial concerns which are above the CUP's ability to supply were analyzed as coming from existing surface waters (the Green or White rivers).

39.4 The elements of the CUP were included in the Utah Interrelated Projects (Table R-1-2) and were considered in the nine-project cumulative analysis. Housing demand, high-level scenario (Table R-4-6) shows a cumulative increase in households in Roosevelt of 72.8 percent in 1985 and 148.3 percent in 1995. Given the light housing situation in Roosevelt presently (Section R-3.A.6), this could lead to a housing shortage in the late 1980s, depending upon the response of the housing industry to the need. Housing within the Roosevelt area would need to be carefully monitored to assure an adequate supply. Since Sohio is a conceptual rather than a site-specific project, no site-specific analysis was made of its impacts in 1988 considering other related projects, such as elements of CUP.

39.5 The EIS Preface has been revised.

39.6 The introduction to Chapter R-3 has been supplemented to clarify the parameters of the baseline conditions. (Also see Section R-1.A, paragraphs 1 and 2, Table R-1-2, Table R-1-3, and Section R-3.A.1, paragraph 2.)

39.7 The referenced discussion of Quality of Life focuses on existing conditions in the environment that would be affected by the nine proposed project. The Quality of Life discussion in Section R-4.A.1 discusses potential conflicts between persons of different backgrounds, including religious preference.

39.8 Section R-3.A.3 has been revised to reflect this point.

39.9 Hiring policies of the proposed synfuels projects are considered a mitigation measure that the BLM perceives is the purview of the applicants in consultation with state and local governments. In the EIS, this type of mitigation is identified in Appendix A-7, because neither the applicants nor an authorizing agency is presently committed to an active minority training/hiring program.

39.10 While it is true Vernal City and adjacent communities will get municipal water from the Central Utah Project, distribution and treatment facilities would have to be expanded to serve the increased population that would result from synfuels development.

39.11 This point has been clarified in Section R-3.A.3, which describes the environment that would be affected by synfuels development.

39.12 This is true; however, it is not within the scope of the EIS to obligate the applicants to up-front funding for mitigation measures.

39.13 Section R-4.A.5 gives a general overview of the impacts to the area to be affected by the nine proposed projects. Crucial habitats are identified and discussed if the analysis of site-specific projects shows they would be affected.

On a regional scale, the areas of identified critical habitats amount to about 777,614 acres for deer and 269,568 acres for elk (Table R-3-12). The total amounts of these habitats that are estimated to be disturbed are about 1.3 and 1.6 percent of the classified critical habitats available for deer and elk, respectively (Table R-4-20). It is not felt that this small amount of disturbance would adversely affect these species.

39.14 Section R-4.A.5 has been revised.

39.15 Refer to Appendix A-11 for a requirement for a mitigation plan to eliminate impacts to threatened and endangered fish species.

39.16 It is not known at the present time whether the black-footed ferret occurs in the area. Should a project be approved, surveys will be undertaken as directed by the U.S. Fish and Wildlife Service to determine the presence or absence of the ferret in the area. The U.S. Fish and Wildlife Service memorandum (Appendix A-9) indicates that the ferret may be present, because the area is in historical ferret range. Therefore, site-specific surveys will be required to clear the area prior to any construction.

39.17 This impact is noted in Section R-4.A.1 under the Government Services and Facilities section.

39.18 As discussed in the various site-specific Sections 1.D.1, the applicants would assume responsibility for cleaning up any spills. Under Section 311 of the Clean Water Act (USCA 1251), each company is responsible for the cost of cleaning up spills.

39.19 Refer to the response to Comment 39.9.

39.20 While it is true the Central Utah Project will add to the water supply, distribution and treatment facilities would have to be expanded to serve the increased population.

39.21 Benefits from increased hunting and fishing expenditures would be offset somewhat by increased administrative costs, although no attempt was made to estimate the magnitude of the increased administrative costs. Section R-4.B.1 has been amended accordingly.

39.22 Refer to the response to Comment 39.13.

39.23 The concern about the cumulative loss of wildlife habitat due to the combined effects of the applicants' projects is discussed in terms of an irretrievable loss of resources in Section R-5.B. In the Final EIS, this discussion has been expanded to include wildlife populations. In addition, the cumulative effects of individual site-specific projects and interrelated projects are discussed in the appropriate site-specific Chapter 5.

39.24 This point is made in the Lost Production discussion of Section R-5.B.

39.25 The actual permitting body for granting a right-of-way across Ute Indian lands would be the Bureau of Indian Affairs (BIA), not the Ute Tribe (see Table SS-2). Of course, BIA's issuance of any right-of-way grant across Indian lands would have to have the concurrence of the Ute Indian Tribal Council. Refer to Appendix A-11 for the Uintah and Ouray Tribal requirements.

39.26 The section referenced in the comment includes only project design features proposed by the applicant. Since the applicant has not committed to this type of mitigation, it would be inappropriate to add it.

39.27 The requirement for a Comprehensive Spill Prevention, Control, and Countermeasure Plan (SPCC) has been added to Section R-4.A.15. It would apply to all applicants' projects, including the Enercor Rainbow project.

39.28 Refer to the response to Comment 39.18.

39.29 Refer to the response to Comment 39.26.

39.30 Refer to the response to Comment 39.18.

39.31 Refer to the response to Comment 39.26. The land manager (such as BLM or State of Utah) or landowner would be responsible for monitoring and enforcing (on lands under their jurisdiction) the commitments made by the various applicants.

39.32 Table T-3-1 has been revised.

39.33 The comment is correct. No construction activities can be undertaken during the identified critical period because of the law, unless a special permit is obtained from the U.S. Fish and Wildlife Service.

39.34 The comment is correct. This type of mitigation would be required, as explained in Appendix A-11.

39.35 A copy of the Draft EIS was sent to the Uintah Basin Association of Governments. The list of groups identified in the Consultation and Coordination Appendix of the Draft EIS was not intended to be all-inclusive. The Final EIS has been sent to everyone who received a copy of the Draft.

39.36 The impact analysis did not assume any of the uncommitted mitigation measures would be implemented, because neither the applicants nor any authorizing agency are committed to the mitigation listed in this section. These uncommitted measures were identified during the impact identification process so that the applicants could voluntarily incorporate them into their projects or the authorizing officials could require them in eventual permit stipulations. Should any of these measures eventually be stipulated by an authorizing agency or committed to by an applicant, the severity of the impacts discussed in the EIS would be lessened. Assuming in the impact analysis that these measures would be implemented would result in a false picture of potential impact.

39.37 Refer to the response to Comment 21.53.

39.38 The concern of most people is that the proposed projects be completed in the most environmentally responsive manner. It is both the land manager's and the applicant's responsibility to require the best possible design and workmanship should the project be eventually permitted and implemented. The manager does have the prerogative of selecting the mitigative measures for inclusion in the permit requirements which will, in his or her judgment, assure the best job possible without overstepping the rights of the applicant. In most cases, up-front agreements are made, and by acts of accepting the terms and conditions of the rights-of-way agreements, the applicant agrees to follow through on stated commitments.

39.39 The concept behind these measures is that they should be used where appropriate and applicable, inferred by the "where possible" phrase in the measure. When applying the mitigating measures, the consequences of the measures themselves should be understood to assess the net value before being implemented.

39.40 Refer to Appendix A-8, Backfilling and Grading section, for discussion concerning restoration and erosion control associated with stream crossings.

Right-angle stream crossings are not precluded to allow for flexibility in construction techniques to site-specific conditions.

39.41 The intent and purpose of the Erosion Control, Revegetation, and Restoration Guidelines for use on federal lands is to assure that lands disturbed by construction and operation activities would be restored to a stable, productive, and aesthetically acceptable condition. Refer to the Reseeding and Planting section of the guidelines for discussion concerning revegetation.

39.42 Supplemental water would be used mainly in the leaching process associated with preparing a suitable plant growth condition in the upper layer of the spent shale piles. Supplemental irrigation would be very limited, since revegetation is based on use of adapted native species and applicable measures to provide a vegetative cover that would withstand the climate and soil conditions typical of the area.

Refer to Appendix A-8, Maintenance and Monitoring section, for the guidelines. The monitoring program would identify problem areas and corrective measures to ensure vegetation cover and erosion control.

39.43 The assessment and the U.S. Fish and Wildlife Service biological opinion have been incorporated in this Final EIS (Appendix A-9).

39.44 This point has been added to the Bureau of Land Management section of Appendix A-11.

COMMENT LETTER 40

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
324 25th Street
Ogden, UT 84401

1950

OCT 27 1982

Mr. Lloyd Ferguson, District Manager
Bureau of Land Management
170 South 500 East
Vernal, UT 84078

Dear Mr. Ferguson:

The review of the Uintah Basin Synfuels Development-Draft Environmental Impact Statement by personnel from this office and the concerned National Forests prompted no comments for text changes. General satisfaction with the DEIS was expressed.

We attribute our satisfaction with the DEIS to the following:

40.1

1) Active participation in the writing of the UBS - Tosco Alternative Product Pipeline Technical Report;

2) Sufficient time (2 full weeks) to review and comment on the Preliminary DEIS;

3) Participation in the "permission to print review" held in Denver, Colorado, with full cooperation by the EIS team leader in making appropriate changes as per that review and comments from the PDEIS review.

We appreciate the involvement, good coordination, and acceptance of applicable field data for the project by Thom Slater of the Utah State BLM Office. Thom provided full support for Forest Service concerns and, through his position, emphasized and secured cooperation from the Denver EIS team.

Sincerely,

R. E. GREFFENIUS
Deputy Regional Forester
State and Private Forestry

6200-11 (1/69)

RESPONSE LETTER 40

U.S. Forest Service

40.1 BLM appreciates the cooperation and many hours of work contributed to the EIS effort by Forest Service personnel.

COMMENT LETTER 41

COMMENTS ON UINTAH BASIN SYNFUELS DEVELOPMENT DRAFT ENVIRONMENTAL STATEMENT

41.1 Table R - 3 - 11 on Page R - 3- 35 of the Uintah Basin Synfuels Development Draft Environmental Statement indicates that the Uinta Ground Squirrel whose scientific name is Spermophilus armatus and the Least Chipmunk whose scientific name is Eutamias minimus were observed by all synthetic fuels companies that have leased land in the Uinta Basin. In Utah, the Uinta Ground Squirrel has been seen no further east than Fruitland, Duchesne County. It certainly does not occur east of the Green River. The Least Chipmunk has not been seen by all synthetic fuels companies that contributed data to the present EIS. It exists on synthetic fuels tracts in the Uinta Basin only in montane habitat. The Colorado Chipmunk (Eutamias quadrivittatus) is the commonly observed chipmunk occurring on the rock outcroppings of synthetic fuels leases.

41.2 Only 13 mammal, 12 avian, and four fish species were listed in Table R - 3 - 11. The Blue Grouse, one of those listed, has not been seen on any synthetic fuels tract because it occurs almost exclusively in montane forests which exist on a relatively small portion of those tracts.

41.3 I believe that all vertebrate species observed on synthetic fuels tracts in the Uinta Basin ought to be listed.

A. Gaylon Cook

A. Gaylon Cook, Ph.D.

RESPONSE LETTER 41

Gaylon Cook

41.1 A Field Guide to Mammals (Burt and Grossenheider 1976) and Vertebrate Wildlife Species of Utah (Utah Division of Wildlife Resources 1981) show the Uinta ground squirrel as occurring in the oil shale area. The scientific name of the Uinta ground squirrel is Citellus armatus.

41.2 Blue grouse are found on the Enercor-Mono Power P.R. Springs proposed strip mine site (Utah Division of Wildlife Resources 1981).

41.3 Long lists of animals or plant species are not needed to understand the overall impact analysis. Complete listings of animal species found in the area can be obtained from the Utah Division of Wildlife Resources.

COMMENT LETTER 42

Department of Energy
Washington, D.C. 20585

OCT 27 1982

Lloyd H. Ferguson
District Manager
Bureau of Land Management
170 South 500 East
Vernal, Utah 84078

Dear Mr. Ferguson:

42.1 We have reviewed the draft environmental impact statement on Uintah Basin Synfuels Development, released by the Bureau of Land Management in August 1982. It provides an extensive discussion of the expected impacts of a number of proposed projects in the area, consistent with their varied levels of development.

The Department of Energy's comments are provided in the attachments for your consideration. If you have any questions concerning the technical aspects of these comments, you may contact Mr. Tom Owen (FTS 328-4204) at the Department's Laramie Energy Technology Center.

We appreciate the opportunity to review and comment on this draft EIS, and look forward to receiving the final document.

Sincerely,

Robert W. Davies
Deputy Assistant Secretary for
Environment, Safety, and Health

Attachments(2)

GENERAL COMMENTS

1. Air Quality

42.2 The discussion of air quality impacts in the supporting technical document provides a thorough examination of this issue. However, the results arrived at through this modeling effort differ significantly from the results presented in the Supplemental EIS for the Prototype Oil Shale Leasing Program, also prepared by BLM. Because both BLM offices used the same air quality model this discrepancy in results is especially confusing. BLM should explain its use of different stability class assumptions and dimensions for the Uintah Basin Synfuels DEIS. We suggest that BLM select a model with uniform assumptions, dimensions, etc., in these NEPA documents and in the upcoming Oil Shale Programmatic EIS.

2. Tar Sand Impacts

42.3 The impacts discussed in detail in the DEIS are mainly associated with the development of oil shale. Impacts associated with tar sand are discussed under specific project sections. For example, impacts associated with spent sand disposal piles and the backfill of spent sand into surface mines should be discussed. In this regard, research conducted by the Department of Energy's Laramie Energy Technology Center has indicated the potential for acid leachates from spent sand piles. These acids would likely be light carboxylic acids, principally acetic acid. Such acids are excellent chelating agents for heavy metals which may be present in the tar sand formations. Additionally, some leaching of solvent from spent sand piles would occur if a solvent is used in the process, such as the Sohio extraction process.

3. Hydrologic Impacts

42.4 Backfilling of sand into a strip mine would mitigate terrain impacts associated with reclamation. However, the backfill of permeahle sand where a previously impermeable tar sand formation has been mined may pose problems. In addition to the leaching problems of spent sand piles, this permeable backfill changes the hydrologic characteristics of the local area surrounding the mine and, in some instances, the regional hydrology.

Locally, the potential for a new aquifer is created. Although this aquifer may not exist for years after the mine has been abandoned, the potential for the aquifer exists. This aquifer would leach any process solvents, oil, etc., left as a residual on the sand and contaminate the water.

42.4 (cont) The regional impacts of the new permeable formation would be dependent on the site specific geology. Depending on the other geologic formations such a backfill formation contacted, the area could act as a recharge area or a discharge area for existing aquifers. In either case, the potential for contaminant transport would be magnified.

4. Other

42.5 The resources associated with the various projects are not presented in sufficient detail to allow examination of projected project lives. The tar sand information is especially lacking in estimates of tons of ore required to produce a barrel of bitumen. It should also be noted that 20-25% of the bitumen is lost during refining and upgrading. This affects production numbers presented in the DEIS.

Water requirements for tar sand processing should also be presented in a uniform manner. The amount of water necessary to produce a barrel of crude bitumen or a barrel of upgraded bitumen is not the same.

	Page	Comments
42.6	R-3-23	The effect of the White River Dam and the proposed dam near Rangely, Colorado, on the levels of dissolved and suspended solids in Upper Colorado River System should be presented to supplement the discussion presented here.
42.7	R-3-25	The discussion of floodplains should be limited to areas affected by the projects. The width of the floodplain immediately below Dinosaur National Monument is irrelevant unless it extends to the Sohio Asphalt Ridge Project. The effects of the Flaming Gorge Dam, the White River Dam, and proposed dams in Colorado on these historical floodplains should be presented.
42.8	R-3-42	The existence of prairie dog colonies as habitat for black-footed ferrets does not guarantee the presence of ferrets in and of itself. Remote areas in the Uintah Basin should be searched, but in a uniform manner prescribed by the U.S. or Utah Fish and Wildlife Service. The intensity of these searches should be consistent with the reported occurence of the species.
42.9	R-3-50	The impact of these projects on the Colorado River from its confluence with the Dolores River, Utah, upstream to a point 19.5 miles in Colorado from the Colorado-Utah border and the Green River in Colorado as wild and scenic rivers is not presented. This impact should be discussed or these references eliminated.
42.10	R-3-57	Paragraph R-3.A.13 omits discussion of the gilsonite hydrocarbon resource.
42.11	R-4-21	The reduction of autonomy of the Uintah Indian tribe suggested here should be explained in greater detail. No supporting evidence is presented.
42.12	R-4-61	No discussion is presented for spent sand disposal, a problem which will exist with any surface tar sand processing plant. Depending on the process, the potential for acid runoff from spent sand piles, solvent leaching, and/or erosion exists.
42.13	R-4-61	Strip mining of tar sand and backfill of processed sand will drastically alter local and possibly regional aquifer characteristics. The backfill sand will replace a highly impermeabile formation of tar sand with a formation that is highly permeable. Over a period of time, the permeable formation could develop into a local aquifer. The water quality of this aquifer would be dependent upon the degree of contamination of the backfill sand.

	Page	Comments
42.14	R-4-61	The escape of gases from highly fractured in situ retorts should be monitored despite the anticipation of no adverse effects. Several small mammals are believed to have died from retort gas leakage in the past.
42.15	E-1-1	Paragraph E-1.A is incomplete.
		Information on the Enercor Rainbow project should be 5000 bpsd of bitumen and 4000 bpsd of upgraded crude.
42.16	E-1-3	A tar sand project will have spent sand to dispose of, not spent shale.
	E-1-6	Table E-1-1 has misspellings within it.
42.17	E-1-11	The enercor module has a capacity to recovory 1250 bpsd of bitumen or 1000 bpsd of upgraded bitumen.
42.18	E-1-16	Plant operation at the 5000 bpsd level would require a maximum 6250 acre-ft/yr. of water based on DOE/LETC research which funded the University of Utah study that developed the hot water extraction process used by Enercor.
42.19	E-1-21	Calculations using the data in Table E-1-3 indicate a bitumen production rate of 6235 bpsd. This should be reconciled with the rest of the discussion on Enercor.
42.20	E-3-5	The mineral and energy resources alluded to in paragraph E-3-A.11 are not identified in Section R-3.A.13.
42.21	E-4-6	Impacts to aquifer should be discussed in light of the general comment presented.
42.22	E-4-6	Site specific impacts to floodplains should be presented here.
42.23	E-4-6	There is no discussion of spent sand disposal and its associated impacts.
42.24	E-4-14	No methodology is presented for the energy efficiency discussion.
42.25	E-5-1	A judgment cannot be made on the cumulative impacts of the project without realistic resource data and subsequent determination of life of the project.
42.26	M-1-7	Map M-1-1 does not show all site roads.
42.27	P-1-12	The mining discussion does not address the effect of the White River Dam and Reservoir on water in the mine. The ore body at the Paraho site is likely to be affected by the increased water level which will also affect other hydrologic properties of the area.

	Page	Comments
42.28	P-4-3	Data submitted by Paraho for the Uintah Basin Synfuels EIS showed a high incidence of wind blowing from the south and southeast. These particular wind directions would cause process pollutants released into the air to travel toward Dinosaur National Monument. Paraho should consider air quality monitoring in or near Dinosaur N. M. to determine the effects of the project on air quality.
		Ambient monitoring should commence prior to the start of operation due to a high release of particulate matter into the air from fugitive dust associated with construction activities.
		Ambient monitoring should also monitor visibility. Although no standards for visibility yet exist in regulations, degradation of visibility has been a primary concern in eastern Utah and western Colorado.
42.29	P-4-7	The data presented by Paraho on water resources in the Uintah Basin Synfuels EIS and the Surface Oil Shale Demonstration (SOSD) reports have emphasized non-site specific data. It would be desirable to monitor the water quality of the various wet zones quarterly to establish a full year of baseline data.
		The proposed parameters to be monitored should include alkyl pyridines since these compounds have been previously associated with spent shale leachates.
42.30	P-4-7	Soils analyses presented in the Uintah Basin EIS and SOSD reports indicate high transmissivity in shallow soil horizons. Although the site is considered to be semi-arid to arid, flash flooding caused by heavy localized thunderstorms does occur. These shallow horizons could transport oils and other pollutants over time from the plant area and disposal piles. Paraho should consider a program of monitoring soil quality in susceptible areas.
42.31	R-3-17	The applicability of low level wind measurements taken outside the Uintah Basin is questionable. Prior discussion in the text has focused on the complex terrain of the region. Correlation of the ground stations in Colorado to the Uintah Basin should be presented to validate the use of this data.
		Although general wind patterns are from the west and west-southwest, data collected on the White River Oil Shale Project showed a tendency for winds originating from the southeast. These winds would transport pollutants from the Paraho-Ute, Syntana-Utah, and Bonanza Power Plant Projects toward Dinosaur National Monument. This data and specific wind roses should be included in the body of the NEPA document.

U.S. Department of Energy

42.1 BLM notes the Department of Energy's assessment that the EIS provides extensive discussion of the expected impacts of the proposed synfuels development.

42.2 It is not true that the Uintah Basin Synfuels Development EIS and Prototype EIS air quality analyses used the same model. Because of conflicting schedules, it was necessary that different contractors do the air quality analyses for the two EISs. Because each contractor used its own model, this resulted in different modeling approaches. With different approaches, one could not expect identical results. BLM air quality specialists are in the process of comparing the two analyses. Also see the response to Comment 27.9.

42.3 The type of material disposed (oil shale or tar sand) is less important than the probability of producing leachate. Given the results of the studies cited in the response to Comment 32.11, this probability would be very low or nil.

42.4 The major part of recharge in the southern Uintah Basin derives from runoff to alluviated valleys. The tar sand proposed to be mined underlies narrow ridges between incised drainage and does not extend to the depth of the valleys. Restoration will reproduce original slopes promoting runoff, and revegetation will enhance transpiration, both factors limiting or eliminating deep infiltration. Although highly improbable, any excess moisture succeeding to infiltrate to the bottom of the spent sand would be impeded downward by underlying less permeable layers, and, if sufficient, could appear as seeps on the valley sides, which would likely evaporate. The quantity of water available for deep infiltration is very small after runoff and evapotranspiration demands are satisfied and would be highly diluted when added to the bulk of recharge that occurs in the valleys.

42.5 Additional information about the resources associated with the site-specific projects are included in the applicants' technical reports.

For the Rainbow project, the tons of ore required to produce a barrel of oil can be determined from the tons of tar sand mined per day as identified on Table R-1-9. The average is 2.73 tons per barrel, with a process efficiency of about 80 percent. This figure has been added to Section E-1.D.1.

Water requirements shown are total use by project. If the analysis used only water required for processing, a true water use impact would not be presented. Total water use is the figure that must be considered in determining environmental impacts. While processing water requirements are useful in comparing different processes, the purpose of this EIS is not to evaluate the attributes of different processes, but rather to assess impacts of individual projects.

42.6 Impacts of the White River Dam are discussed in detail in the <u>White River Dam Project Final EIS</u> (BLM 1982b). However, determination of accurate sedimentation rates was cited as an unresolved issue. In the Uintah Basin Synfuels Development EIS, the effect of the White River Dam on total dissolved solids (salinity) is discussed in Section R-4.A.3. Salinity at Imperial Dam would increase from 3 to 4 mg/l. The increases in salinity are not discussed for the Upper Colorado River System, because the water model is not as reliable in these reaches.

The Taylor Draw Reservoir (referred to in the comment), which is under construction near Rangely, was considered to be an interrelated project (Table R-1-3). This project's effects on total dissolved solids (salinity) are considered in the cumulative impact analysis (Section R-4.A.3). However, as is the case for White River Dam, sedimentation or suspended solids in the Upper Colorado River system is an area that, at present, cannot be quantitatively determined. Nonetheless, there will be a net sediment decrease due to the trapping effect of the reservoir.

42.7 The description of floodplains referred to in the comment is a picture of the existing landform that was formed due to flooding. It is true that the chances of it flooding are more remote on the Green River due to the construction of Flaming Gorge Dam. (The Taylor Draw Reservoir, which is under construction in Colorado, will have very limited effects on flood control due to its small capacity.) The discussion as presented is still accurate in that there would be no impacts on flood stage. The effects of Flaming Gorge Dam, White River Dam, and Taylor Draw Reservoir are addressed in the EISs written about these projects.

42.8 The U.S. Fish and Wildlife Service has an approved black-footed ferret search technique to be used on any prairie dog colony that would be affected by project construction.

42.9 This impact is discussed in Section R-4.A.8 under the Water-Oriented Activities section.

42.10 Gilsonite was not discussed, because it is a mined-out resource on some of the applicants' leases and is not found on the other applicants' leases.

42.11 The word "antonomy" was not the correct word to use. The intended meaning was that a lessening of some definition of reservation services and facilities would occur because of the need to share them with other regional communities for adequate regional coverage. Section R-4.A.1 has been changed to reflect this intended meaning.

42.12 Section R-4.A.4 has been revised.

42.13 Refer to the response to Comment 42.4.

42.14 The oil shale and sedimentary rock layers above the shale would not be highly fractured. The possibility of small mammals dying from escaping gases is considered to be remote because of the lack of fracturing and the type of gas recovery system that would be used.

42.15 The 5,000 bpsd figure refers to the amount of upgraded crude oil rather than bitumen that would be produced. This has been clarified in Section E-1.A.

42.16 Section E-1.C.1 and Table E-1-1 have been revised.

42.17 This point has been clarified in Section 0-1.D.2.

42.18 The 5,000 acre-ft/year is an average water use figure furnished by the company. It is not the total water required to produce 5,000 bpsd, since the majority of the water would be recycled.

42.19 On the average, 6,000 bpsd of crude bitumen would be produced, which would be, on the average, 5,000 bpsd of upgraded bitumen. The words crude and upgraded have been added to the text.

42.20 The only mineral resources that would be significantly affected by the proposed project would be the hydrocarbons identified in Section R-3.A.13. See also the responses to Comments 31.55 and 42.10.

42.21 Refer to the response to Comment 42.4.

42.22 In order to reduce the volume of the EIS and avoid repeating similar information, the reader is referred to the Floodplains subsection of Section R-4.A.3.

42.23 The discussion of spent sand disposal in Section E-4.A.4 has been expanded.

42.24 As stated in Section E-4.A.11, methodology is discussed in Section R-4.A.13 and Appendix A-10.

42.25 More detailed resource data is included in the applicants' technical reports. Please refer to these reports.

42.26 The map shows the main access road. In order to emphasize major project components, no minor on-site roads have been included in any of the lease area maps.

42.27 The proposed upper limit (high water line) of the White River Dam Reservoir is just south of the Paraho site. Due to this, surface water levels in this area would not be very different than they are now, so the reservoir would not greatly increase the potential for ground water intrusion into the mine.

42.28 Pilot balloon data collected for EPA near Bonanza, Utah, indicates frequent wind directions at plume height that would transport pollutants toward Dinosaur National Monument from each of the applicant's proposed project. The visibility analysis (Systems Applications Inc. 1983) indicates that yellow discoloration is predicted to be visible at Dinosaur National Monument from one or more of the synfuel facilities from 5 to 50 mornings per year, depending upon the perceptibility threshold assumed. Because Dinosaur National Monument is not presently a Class I area, it is not afforded visibility protection by law under the Clean Air Act. The National Park Service Organic Act of 1960 states that it is the responsibility of the National Park Service "to conserve...the natural...objects and the wildlife therein, and to provide for the enjoyment of the same in such a manner...as will leave them unimpaired for the enjoyment of future generations." The National Park Service interprets this as a mandate to protect the natural resources under its jurisdiction from the effects of air pollutants. The National Park Service is currently monitoring visibility at Dinosaur National Monument. Because air quality could be affected to varying degrees by one or more of the projects, BLM concurs that the applicants should consider monitoring programs in or near the monument. The State of Utah has a requirement in their PSD permitting process for pre- and post-operation monitoring of major emissions from a permitted facility. Monitoring requirements are determined on a case-by-case basis by the executive secretary of the Air Conservation Committee.

Regarding fugitive dust emissions, due to the large size of most of the particles, it is unlikely a significant amount would reach Dinosaur before settling out and being deposited on the ground.

42.29 The BLM cannot require monitoring. The lands in question are state lands and monitoring is, therefore, a state issue.

42.30 Soils in the area are mainly moderately permeable to moderately slowly permeable, with the shallow and moderately deep soils underlain by interbedded, fine-grained sandstone and shale.

The transport of oils and similar pollutants through these soils would be very minimal to nonexistent. Runoff, due to thunder storms, could move sediments containing pollutants. However, the retention dams would control runoff and sediment.

42.31 Low-level winds measured outside the Uintah Basin were not used in the regional modeling exercise. These winds would not be applicable. Upper-level winds from four National Weather Service measurement sites, and lower-level winds from the site of the White River Oil Shale Project were used. The southeast winds measured at White River are likely to be nighttime and morning drainage winds.

Wind roses were not included in the EIS, because they would not contribute significantly to the layperson's understanding of the impacts. However, wind roses are included in Section 2.2 of the Air Quality Technical Report.

COMMENT LETTER 43

TOWN OF RANGELY
P.O. BOX 580
RANGELY, COLORADO 81648
Phone 303/675-8476

October 26, 1982

Mr. David Moore
Vernal District
Bureau of Land Management
170 South 500 East
Vernal, UT 84078

Re: Uintah Basin Synfuels Development Draft Technical Report, August 1982 (Socioeconomics): Comments of Town of Rangely, Rio Blanco County, and Districts of Western Rio Blanco County, Colorado.

Dear Mr. Moore:

I have reviewed the letter of 10-19-82 from Rangely Mayor Peggy Rector on the above. The analysis is thorough and accurate. No doubt errors and misconceptions in the Draft Technical Report can be readily addressed.

However, a far more critical issue is inability of the Towns, Counties, and Districts on this side of the border in Colorado to negotiate any kind of serious, realistic impact mitigation efforts.

43.1 None of us issue permits, licenses, or have any kind of clout in our dealings with companies the other side of the border in Utah. Only the United States Government Agencies have clout that could be used in our behalf.

I would request that as a condition of issuance of any permit or license from a federal agency, such as the Bureau of Land Management, any company seeking or receiving such license or permit would be required to negotiate a suitable impact mitigation agreement with any impacted jurisdiction, regardless of location.

Very truly yours,

Donald C. Peach

Don C. Peach
Town Manager

mld

cc: Mayor and Council
Community Devel. Director
County Devel. Director

RESPONSE LETTER 43

Town of Rangely, Colorado

43.1 BLM has no authority to require an applicant to negotiate mitigation of impacts with any town or county, regardless of whether it is located in Utah or Colorado.

COMMENT LETTER 44

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
1860 LINCOLN STREET
DENVER, COLORADO 80295-0699

OCT 20 1982
Ref: 8PM-EA

Mr. Lloyd Ferguson, District Manager
Bureau of Land Management
170 South 500 East
Vernal, Utah 84078

Re: Draft Environmental Impact Statement for the Uintah Basin Synfuels Development

Dear Mr. Ferguson:

44.1 The Region VIII Office of the Environmental Protection Agency has reviewed the above-referenced document and would like to offer the attached detailed comments for your consideration in preparing the final environmental impact statement. We understand that the preparation of this document within the strict time constraints was a difficult and demanding task. We feel that your staff has produced a document which identifies most significant environmental impacts and which is forthright in presenting the fact that there is a great deal yet to be learned about this emerging industry. EPA has three major areas of concern with respect to oil shale development in the Uintah Basin; Air Quality, Water Quality and Solid Waste Disposal (including spent shale and hazardous wastes as regulated under RCRA).

44.2 The potential National Ambient Air Quality Standard and PSD increment violations predicted in this and other documents can be a constraining factor on oil shale development in this region. There are alternative methods for approaching PSD increment consumption which the companies involved may want to consider. These options may be found in a recent EPA report; "Preliminary Evaluation of Alternative Prevention of Significant Deterioration Policies: A Case Study of Oil Shale Development in Colorado and Utah", May 1982 (copy enclosed). The air quality modeling discrepancies noted between this document and the Prototype Oil Shale Leasing Supplemental DEIS should be resolved if possible as they present a confused picture of future air quality in the region. As a result of the substantial uncertainties surrounding the potential air quality impacts associated with this industry, a comprehensive monitoring program (including worker health monitoring) would be a necessity in order to detect and eliminate adverse impacts to workers and the surrounding population.

44.3 The potential water quality problems of this industry have been identified but the extent of impacts are still unknown. The primary water quality concerns in the Uintah Basin are ground and surface water contamination from spent shale leachate, product spills, salinity increases and the reservoir contamination problems (previously identified) associated with the White River Dam project. EPA recommends that a monitoring program be established for the spent shale piles (see EPA's Draft Source and Ambient Monitoring Reference Manuals and the monitoring program established for the White River Oil Shale Project) so that potential problems can be detected early. It should be noted that each of the developers has identified a

44.3 (cont) reasonable and feasible method of water supply which does not depend on the development of the White River Reservoir. Upon further investigation, the use of suitable groundwater resources may also prove to be economically feasible and environmentally preferable.

44.4 The methods for handling spent shale and hazardous solid wastes need some refinement (see detailed comments). In general, there is not enough information on hazardous waste handling to assess potential environmental impacts. In instances where there are well-documented reclamation studies and a good monitoring program we feel the chances of successful spent shale disposal are enhanced. We are especially supportive of the suggestion that a reclamation specialist be charged with overseeing the program for each facility.

In summary, we feel that the potential environmental impacts from the industry and the lack of information on some aspects of the operations require us to rate this EIS as ER-2. (This means that EPA has environmental reservations about the impacts of the proposed projects and that the EIS should contain additional information, as outlined in our detailed comments, to assist in determining the extent of environmental impact.) We appreciate the opportunity to review this document. If you have questions, please contact Mr. Gary Voerman (FTS 327-4831) of my staff.

Sincerely yours,

Steven J. Durham
Regional Administrator

Enclosure

EPA's Detailed Comments on the
Draft Environmental Impact Statement for the
Uintah Basin Synfuels Development

AIR QUALITY

44.5 EPA has provided technical review of the air quality modeling techniques and results through participation on the technical advisory committee. There are some issues which should be clarified for the benefit of the public and the companies involved. The predicted National Ambient Air Quality Standards (NAAQS) and Prevention of Significant Deterioration (PSD) Class II increment violations for Total Suspended Particulates (TSP) would not be allowed to occur. However, the primary cause of the high TSP values appears to be windblown dust and this fact may allow for the use of a lower background TSP value when calculating air quality impacts from the proposed projects. Approval for the use of lower TSP background values would be given on a case-by-case basis when companies are applying for PSD permits. (All applicants siting in Utah would apply to the State for their PSD permits.) This approach is consistent with EPA's fugitive dust policy. A prediction of a NAAQS violation after discounting for rural fugitive dust would likely lead to a permit denial unless the company could find additional ways of reducing TSP emissions to bring ambient values down below the NAAQS. Other options exist for ameliorating PSD Class II violations including redesignation of the areas as Class III.

44.6 The projected PSD Class I violations at Flat Tops from the cumulative development in the Uintah and Piceance Basins could be offset in a variety of ways including the granting of a variance pursuant to section 165(d) of the Clean Air Act. It should be noted that EPA does not recognize the Colorado Category I Standards for the Dinosaur and Colorado National Monuments. These are federal Class II areas and will be so treated by EPA for PSD purposes (i.e. for facilities proposed for Colorado) until formally redesignated. Since the State of Utah now has the PSD program any "violations" of Colorado Category I Standards at Dinosaur and Colorado National Monuments caused by facilities siting in Utah would probably be resolved by an agreement between the two States.

44.7 The Draft Technical Report to the Air Quality portion of the Uintah Basin Draft EIS contains modeling performed by SAI, which does not show appreciable SO_2 increment violations at any of several Class I areas in Colorado and Utah. The Prototype Oil Shale EIS, on the other hand, contains modeling performed by Dietrich, Fox, Wood and Marlatt, which predicts higher concentrations of SO_2 (as much as double the Class I increment) at the Flat Tops Wilderness Area. The discrepancy by almost a factor of two between these respective modeling approaches is not to be unexpected. SAI's modeling was largely with Gaussian steady state models, while Dietrich, Fox, Wood and Marlatt, et. al. performed most evaluations using a varying flow field model. If adequate and appropriate meteorological data were available over the area of interest, a variable flow field modeling approach, which is capable of

simultaneously using data from more than one point, would therefore certainly be expected to better describe plume paths. Yet without these meteorological data, it is not clear that results from one model are superior to the other.

44.7 (cont) Further, differences in results in the two technical studies can be expected because the assumed meteorology in the models differed. SAI assumed "D" stability, while Dietrich, Fox, Wood and Marlatt, et. al. assumed "E" stability for 24-hour averaging periods. In our opinion, neither can be realistically expected to persist for 24 hours over the entire Region. However, one might intuitively expect persistent "D" stability to be more likely than persistent "E" stability. Thus, for realistic model estimates a neutral atmosphere should be assumed while use of a stable atmosphere leads to higher estimates and therefore likely errs on the side of protecting the environment.

44.8 The two studies also differ in their use of potential air emissions sources. The prototype EIS does not include any of the Uintah Basin Synfuels facilities and the Uintah Basin EIS includes only the multimineral development (only one of the two prototype lease tracts). This discrepancy should be rectified or its impacts on model predictions explained.

Although we recognize that every effort was made in both studies to obtain currently accurate emission inventories, these data can be expected to change by the time the potential sources apply for a PSD permit. In fact, applicants have changed emissions data several times during the course of the PSD permit application review.

44.9 In view of these meteorological and emission data uncertainties and with little or no idea as to the accuracy of the model itself, it is our opinion that further attempts to define a best modeling approach among several already adequate approaches may be futile. However, model discrepancies make it rather difficult to predict and understand the real tradeoffs involved in the many leasing and right-of-way decisions which must be made in the near future. It would be useful for all decisionmakers if a more accurate predicton of impacts could be made. One small step in this direction could be provided by making at least one more run of the RTM model to confirm the conclusions reached in the Air Quality Technical Report concerning GPM conservatism.

44.10 On page R-4-33 reference is made to consideration or secondary emissions during the PSD permitting process. The current PSD regulating requirements are that secondary emissions from these facilities are to be considered when calculating emissions impacts from the source. EPA assumes that the State of Utah will consider these emissions during the PSD permitting process.

44.11 EPA agrees with the statement that wet deposition rates deserve more detailed study. The EIS admits that the increased acidity of high mountain lakes in the Flat Tops will have unknown impacts. Given the limited buffering capacity of these lakes the potential exists for significant adverse impacts to biota. Again, it would be useful for the decision-maker to know what the potential environmental impacts of this leasing decision could be, expecially in areas where high environmental quality is of national importance.

44.12 The EIS correctly identifies the potential worker and societal hazards from an oil shale industry. EPA encourages each applicant to develop an extensive monitoring program covering those elements known to be toxic and carcinogenic in this industry, including unregulated pollutants. Applicants for Synfuels Corporation funding are required to develop a comprehensive monitoring program in consultation with EPA (Section 131(e), Energy Security Act). In addition, more detailed emission data will be required as part of the PSO permitting process. EPA supports the statement in the EIS that workers health would need to be carefully monitored if health damage is to be avoided and prevention techniques improved. The development of a mechanism for sharing health data (e.g. a cancer registry) should be an integral part of this health monitoring program.

44.13 On page R-4-37 the statement is made that, "No health effect potential was found for exposure to fluoride, mercury, lead, selenium or vanadium". Does this mean "no effect" or "estimatable risk factor" was found for the levels of these metals estimated to occur in ambient air and originating from the oil shale activities?

44.14 On page R-4-61 the statement is made that there will be no adverse effects due to gas escape from the Lofreco project because of the kind of gas recovery system to be used. A discussion of this system and how it will prevent this problem should be included in the final EIS or in the environmental assessment to be written for the Geokinetics projects.

WATER QUALITY

Monitoring

44.15 The potential exists for severe water quality impacts due to spent shale leachate, retention dam failure, product or by-product spills or shale pile reclamation failure. The EIS currently recognizes the necessity of having an effective monitoring program in place in order to detect any problems before they become unmanageable. Unfortunately, there are no monitoring details presented in the EIS. EPA recommends that the companies consult the monitoring program document produced for the White River Shale Project and EPA's draft versions of the Source and Amount Monitoring Reference Manuals for the Synthetic Fuels Industry. EPA would be glad to meet with any of the participating companies to review their air and water quality monitoring programs to help insure completeness.

Salinity

44.16 The analyses of salinity impacts is seriously deficient from three perspectives:

(1) The OEIS does not adequately acknowledge that salinity is the major, basinwide water quality problem in the Colorado River Basin causing an estimated $100,000,000 in annual damages. The Department of the Interior

estimates that annual damages will reach $237,000,000 by the year 2000 if adequate salinity control is not implemented. Opportunities to mitigate adverse salinity impacts should be discussed.

44.16 (cont)

(2) The OEIS does not evaluate salinity impacts from salt loading, only salinity impacts from consumptive water use are discussed. Salt loading could be very significant and could include, but not be limited, to the following:

(a) discharge of intercepted groundwater,
(b) leachate from raw shale and/or spent shale piles,
(c) runoff from disturbed areas,
(d) process water.

The salt loading impacts must be analyzed to fully assess the salinity impacts of synfuels scenarios.

(3) The OEIS assumes that water for the synfuels activities will come only from the Green River and/or the White River. The assumption ignores the policies of the seven-state Colorado River Basin Salinity Control Forum and the State of Utah which are to encourage the use of brackish and/or saline waters for industrial purposes (copies of these policies are attached). To be consistent with these policies, the EIS should examine alternative sources of water including "brackish and/or saline waters". This could include saline springs and seeps and groundwater sources (e.g., Birds Nest and Douglas Creek Aquifers).

Additional Comments

44.17 The relationship between 132,000 acre-feet depletion and a 5 mg/l increase in salinity is not clear and should be explained. A depletion of 132,000 acre-feet of good quality water would normally cause a salinity increase of approximtely 13 mg/l at Imperial. In any case, the salinity damages in dollars should be acknowledged (i.e., 5 mg/l increase at Imperial causes approximately $2,500,000 in annual damages).

44.18 Table R-4-18 (pg. R-4-52) should note that the water quality standard/numeric criteria for salinity at Imperial Dam is 879 mg/l. This standard has been adopted by all seven basin states and has been approved by EPA. Section 313 of the Clean Water Act requires that Federal agencies comply with all water pollution control requirements in the same manner as any non-governmental entity. This requirement applies to water quality standards.

44.19 The discussion on page R-4-54 of salinity increase is confusing with numerous different figures (19 mg/l, 4 mg/l, 10 mg/l, 5 mg/l, etc.) presented yet no explanation of how these figures were derived, or what they actually represent. Given the critical importance of salinity increases, the derivation of the mg/l increases must be explained.

44.20 The discussion of "Other Water Quality Impacts" (pg. R-4-55) is totally inadequate and ignores research on the subject. (For example, Lysimeter Study on the Disposal of Paraho Restored Oil Shale, EPA-600/7-79-188; and Environmental Perspective on the Emerging Oil Shale Industry, EPA-600/2-80-205a.

Wastewater Treatment

44.21 The EIS should be more specific regarding the status of the enlargement and upgrading of Vernal's wastewater treatment facilities. Specifically, it is important to clarify whether the construction timetable coresponds to projected growth needs.

44.22 There is insufficient information provided on wastewater treatment for oil shale process water (e.g. see pages E-1-13, M-1-13 and S-1-12) that will be used for spent shale or spent sand disposal. Some minimum wastewater quality criteria should be established for water to be used for spent shale/sand compaction.

44.23 It is not clear (pg. E-1-13) how the "impervious bottom" in the backfilled mine will prevent seepage of process water mixed with the sand. How impervious is this bottom (e.g. in cm. of liquid movement allowed per day)? What is the ultimate fate of leachate that seeps through the impervious layer? The EIS does not provide adequate information regarding disposal of spent sands, nature of leachates produced and site specific information to evaluate potential environmental impacts.

Groundwater

44.24 Potential impacts upon groundwater should be stated to be a significant criteria (pg. R-4-7). While there is not a great deal of information available on the groundwater hydrology of the Uinta basin, hydrologic test information has shown that groundwater can be found in the sandstone and siltstone beds above and below the oil shale and within fractions in the oil shale. The groundwater data presented in Section R-3.a.3 (pg. R-3-25) provides a little regional information on the groundwater hydrologic system. However, the limited discussion presented does not provide enough detail for a site-specific assessment.

44.25 As was pointed out in our comments on the Preliminary Draft EIS, the statement on page E-4-6 is misleading. Groundwater aquifers below the overburden can logically be impacted by mining leachate.

44.26 The EIS talks (pg. R-4-55) about "Temporarily disrupt normal groundwater flow until reinjection can begin". Rejection is talked about as a given. However, quality issues have not been defined enough to pass judgement on reinjection. It should be noted that any well reinjection would require an underground injection permit and would be covered by regulations found at 40 CFR 146.

44.27 Groundwater is eliminated as a water supply alternative on page E-1-18 and yet vital information for judging the basis for that decision is not provided. The aquifers are not characterized, the quantities of water expected are not noted and the costs for upgrading poorer quality water are not compared to pipeline and property costs. It is not possible for the reviewer to determine the basis for eliminating this alternative from consideration.

Other Water Quality Impacts

44.28 The EIS correctly states (pg. R-4-55) that sufficient data is not available to determine the potential for leachate production from spent shale disposal piles. However, the EIS then proceeds to dismiss the importance of leachate formation by saying it can be prevented by using impermeable linings, runoff diversion and sealing of the surface of the disposal piles. These two statements are in conflict. Further, not all the applicants are proposing the use of impermeable linings, surface seals and runoff diversion from the piles. (See specific comments on applicants technical reports). In addition, a definition of impermeable is not provided. Applicants also constantly ignore the installation of drains above and below the impermeable lining. Without drains the bottom of a pile may liquify causing failure with resultant heavy silt and salt loading into streams. The EIS also says that infiltration into the piles will occur only from high intensity thunderstorms. Most infiltration will likely occur from snow melt not thunderstorms. The EIS has ignored numerous EPA, DOE, and industry studies that bear upon this important question. Other water quality impacts of concern include volatile organic carbon contamination and spent shale pile bio-leaching.

44.29 Flow numbers (pg. R-3-23, paragraph 4, line 12) are different than in the preliminary draft. Are these correct?

44.30 The section on Ruptures and Spills (R-4.A.15) should recognize that the oil from the Magic Circle facility is a nontreated hydro oil and that its potential environmental impacts may be different than the product from the other facilities. Unhydrotreated crude shale oils contain more carcinogens and other elements that could cause more significant environmental impacts than hydrotreated oil.

Nonpoint Source Water Quality Impacts

44.31 Uintah Basin Association of Governments (UBAG) has identified and suggested solutions to nonpoint pollution sources in at least three 208 publications:

- Uintah Basin Areawide Water Quality Management Plan, October, 1977,
- Energy Resource Development Within the Uintah Basin (Interim Output Report No. 11), November, 1976,
- Technical and Institutional Alternative Management Practices for the Reduction of Point and Nonpoint Pollution Within the Uintah Basin 208 Planning Area (Interim Output Report No. 12), November, 1976.

44.31 (cont) The EIS could be clearer in relating management of the synfuels projects to these Uintah Basin Association of Governments (UBAG) planning efforts. Adequate implementation, monitoring, and follow-through for the conditions of BLM and the other applicable agencies will be needed.

Both the WQM Plan and Interim Report No. 12 cover urban nonpoint pollution sources. Sources such as septic systems, and urban runoffs and erosion, among others, are addressed. These publications are important tools for use in formulating the necessary public programs to prevent and control these growth-induced sources. The EIS could provide much stronger guidance to local officials in addressing this issue.

SOLID AND HAZAROOUS WASTE HANDLING

44.32 In general, the EIS covers on-site solid waste (especially spent shale) handling in an adequate manner, although more details will be needed on the monitoring programs. EPA supports those companies who have stated that they will dispose of construction and operation related solid wastes in a state approved on-site sanitary landfill. The EIS does not address solid waste impacts caused by off-site disposal of direct or induced (secondary) solid waste created by the projects. There is no mention of impacts to community solid waste disposal systems. These impacts should be addressed and appropriate mitigation measures identified in the Final EIS.

44.33 EPA has recommended that BLM include two additional items in its Erosion Control Reclamation and Revegetation program checklist (Table R-J-2); namely, Prevention of Auto-Oxidation and Prevention of Water and Air Infiltration into the Shale Piles. (See page SS-A-11 for recommended procedures to guard against auto-oxidation.) In this regard it is important to monitor temperatures of the raw shale and fines piles in instances where they will be stockpiled for a long period of time (e.g. Syntana-Utah and Paraho).

44.34 Vegetation grown on spent shale piles may contain trace elements toxic to grazing animals. Research upon this subject and a discussion of effects or mitigation measures should be included in the EIS (pg. R-4-56).

44.35 In the section covering the Magic Circle Project (page M-1-12), no mention is made of an impermeable cover for the spent shale disposal pile or of drains above and below the "impermeable boundaries". These structures are important to control leachate formation and assure disposal pile stability.

44.36 In the section covering Paraho-Ute project (page P-1-26), no mention is made of drains above or below the low permeability liner placed under the disposal pile. Such drains may be needed to prevent accumulation of moisture which would adversely impact pile stability.

44.37 Benches should be constructed at approximately 50 foot intervals not 200-300 foot intervals (page P-1-26), in order to control erosion and increase stability.

44.38 Will the runoff from the surface stored raw oil shale (page S-1-11) be contained, treated and reused?

44.39 In the Section covering the Syntana-Utah project, (page S-1-13), the EIS does not mention use of drains above and below the impervious layer under the disposal pile. Likewise there is no mention of an impermeable cover over the spent shale pile to prevent infiltration. There is no description of facilities to remove runoff from the benches and move it to the evaporation ponds.

44.40 In the section covering the TOSCO project (page T-1-15), the permeability of the compacted (95 lbs/cu. ft.) spent shale should be given. No drains are provided either above or below the spent shale bottom liners. Hence moisture which accumulates at this interface could lead to liquefaction of the pile bottom and failure of the pile. No information was provided on benching the face of the disposal area. There is no mention of an impermeable cover to prevent infiltration of precipitation into the pile. What measures will be taken to reduce the risk of auto ignition in the spent shale pile?

44.41 The EIS (p. R-C-4) says that no solid waste would be produced. This is not correct. Although the spent shale remains underground it is still a solid waste and its potential impacts on groundwater, surface water and air should be addressed along with appropriate control measures.

44.42 Information (page R-C-9) provided on the disposal of spent shale is not adequate to evaluate consequences of this activity.

44.43 In the section covering concerns of EPA (page SS-A-11), mention should be made of the need for drains above and below the impermeable liner under a spent shale disposal pile. Such drains are needed to remove moisture that may accumulate at this point due to moisture moving down through the pile or groundwater (springs, seeps, etc.) invading the pile from below the liner. If moisture is allowed to accumulate above or below this impermeable liner then the bottom of the pile may liquefy or slippage may develop or both leading to failure of the pile. Reference is made to the possible use of a pile underdrain for removing surface runoff from the spent shale pile. This is the concept at one time proposed by Colony and rejected by the Colorado Mined Land Reclamation Division. Surface runoff should not be passed under the pile since maintenance of such conduits is difficult and moisture may escape into the pile.

44.44 EPA supports the concept of a phased approach (e.g., Syntana-Utah) as it allows for the gathering of vital information on spent shale disposal and hazardous waste handling so that modifications can be made in the processes and used to minimize the environmental impacts of the full-scale project.

44.45 The EIS should include an explanation of the manner in which section 36 will be co-developed by Geokinetics and Enercor. It would seem that the in-situ oil shale retort would preclude tar sands mining in this section. The residue left by the in-situ process would have to be carefully disposed of before attempting to mine the tar sands.

44.46 The provisions for handling hazardous wastes are not well-documented in this EIS. Most companies state that they will either have an approved in-situ hazardous waste disposal facility or will ship their waste off-site to an approved facility. In no case is an on-site hazardous waste disposal site adequately analyzed and none of the companies identify an approved off-site hazardous waste disposal facility that will accept their wastes. The "details" of handling hazardous wastes will have to be approved before the participants can begin waste generation.

Noise

44.47 The EIS recognizes that noise can be a problem for workers on the job and states that OSHA standards will be followed. However, there is no mention made of secondary noise impacts associated with these projects. Impacts from automobile, truck and airline traffic in the surrounding communities and worker housing projects should be recognized and assessed. Appropriate mitigation measures should be proposed. One potential noise problem could involve the simultaneous expansion of the Vernal Airport and the community of Vernal.

Technical Report Review

The following comments are provided on the three Project Technical Reports which we had an opportunity to review. We feel that technical report review is an integral part of EIS review as these reports are often cited in the EIS as providing necessary details on a number of important environmental issues:

PARAHO UTE PROJECT - TECHNICAL REPORT

44.48 General Spent Shale Disposal - Previous studies have determined that salts may move upward through spent shale piles and kill vegetation on the surface. Paraho did not address measures to be taken to prevent this.

44.49 General - No lift thickness was provided for spent shale placement. Lift thickness should not exceed 18 inches for compaction to be effective.

	Page	Comment
44.50	2-6 Fig. 2.1.4 2-10 2-12 Table 2.2.1 2-89	The spent shale area is said to cover 340 acres, (providing a capacity of 110 million cu. yds.) From this area and the topography it appears that the disposal site will not contain all the spent shale produced over 30 years at 42,000 bbl/day (it is sufficient for only one-third of the spent shale produced.) Where will the additional spent shale be placed?

44.51	2-37	Air Emissions Control - Stretford Units will be used to remove H_2S from the product gas prior to combustion. Stretford will not remove non-H_2S sulfur species. What is the concentration and nature of non-H_2S sulfur species in the gas?
44.52	2-38	Solid Waste Management - Retorted shale will be used to construct low permeability retaining structures. How will these be constructed? What is the permeability of these low permeability structures?
44.53	2-38	Solid Waste Management - Non-laboratory sludges, garbage and scrap will be disposed of with the retorted shale. Materials high in either carbon or sulfur content should not be placed with the spent shale since they may increase the possibility of auto ignition.
44.54	2-43	Slope Stability - What grade will be used for slopes? What is the "high safety factor"? How will the highly compacted spent shale be made impervious? "Impervious" should be defined.
44.55	2-43	Runoff Control - "Benches will include high berms to provide containment of precipitation..." If precipitation is contained on the spent shale pile this will increase infiltration and production of leachate unless the appropriate impermeable liners are placed below the root zone.
44.56	2-45	Monitoring - A monitoring program will evaluate the stability and performance of the pile. Details on this monitoring program are needed to judge its effectiveness.
44.57	2-89	Solid Wastes - A low permeability lining will be provided for the retorted shale disposal area. However, no mention is made of drains above or below the liner. If moisture collects either above or below the liner it may lead to failure of the disposal pile.
44.58	2-91	Solid Waste - Benches will be provided every 200-300 feet of elevation for the retorted shale disposal area. This will result in long steep slopes between benches causing erosion. Benches should be placed about every 50 feet of elevation. The universal soil loss equation would be useful in designing these piles.

44.59 3-3 — Low Level Scenario - No details are provided regarding spent shale disposal for this scenario, it is implied that both raw shales and retorted shale will be co-disposed. They should be disposed separately to reduce auto ignition risks.

TOSCO - SAND WASH TECHNICAL REPORT

	Page	Comment
44.60	4.3-3	Erosion - Water diversion and containment systems are designed for 10 year, 24-hour storm event. It would be better to design for a 100-year storm event.
44.61	5.3-5	Table 5.3.1 - Note the high boron level (17.2 mg/l) for groundwater. Is this value substantiated by other tests?
44.62	6.12-12	Hazardous Waste Landfill - There is no provision for an impermeable membrane below the leachate collection drain.
44.63	7.2-4	Drains for retorted shale disposal area - What will be used for the core material? What is "low permeability" for core material?
44.64	7.2-7	Spent Shale Disposal - Two 18 inch lifts of spent shale will be compacted to 95 lbs/cu. ft. to serve as a liner and to prevent liquefaction of the pile. What is the permeability of this highly compacted material? Three feet of liner as proposed is very thin for this use. Six or more feet would be better. No mention is made of drains above or below the liner to prevent accumulation of water. Without drains the compacted shale itself will not prevent failure if water accumulates.
44.65	7.3-9	Erosion - The report states that "initial evaluation indicates that impounded water will not cause seepage from the pile". What are these calculations? What is the permeability of the material under the ponded areas?
44.66	7.3-9	Erosion - The runoff collected in the benches on the retorted shale pile face is to be directed down the sides of the bench slopes at selected points. These drainage points are to be seeded and planted to prevent erosion. It appears

	Page	Comment
44.66 (cont)		doubtful that the sparse vegetative cover achievable in this area can withstand any significant storm drainage. These channels down the pile face will need to be faced with riprap or lined.
	7.3-11	Monitoring - No detail is provided regarding monitoring activities.
44.67	22.1-10	Solid Wastes - Disposal sites will have surface and groundwater monitoring systems. Spent shale embankments will also have a mass stability monitoring system. Details regarding these monitoring systems should be provided.
44.68	23.1-3	Reclamation-spent shale - "C" horizon material should be stockpiled separately from top soil. It should also be placed separately over the spent shale before placement of the top soil.

MAGIC CIRCLE - TECHNICAL REPORT

"Commercial Shale Oil Production From The Utah Cottonwood Wash Project"

44.69 General - No lift thickness was provided for spent shale placement. Lift thickness should not exceed 18 inches for compaction to be effective.

	Page	Topic	Comments
44.70	5-82	Addendum	Magic Circle has correctly listed a number of important questions which require answers before proceeding with the project development. Identifying what needs to be learned is merely the first step in evaluating impacts and adequacy of solutions.
44.71	5-85	Placement of Spent Shale	There is no data provided to indicate that compacted fines will provide an adequate bottom seal (liner) for the spent shale pile. No drains are provided either above or below the compacted fines. Hence water that collects at this point would contribute to failure of the pile. Also the extent to which emplaced material will be compacted was not addressed.
44.72	5-91		The preleaching of the surface layer of spent shale sill probably be necessary as indicated. However this leaching should occur prior to placement so as not to contribute to the water leaching through the spent shale pile.

U.S. Environmental Protection Agency

44.1 BLM notes the EPA comment that the Draft EIS identified most significant environmental impacts and was forthright in presenting the fact that there is more to be learned about the emerging synfuels industry.

44.2 BLM has brought the cited EPA publication to the attention of the applicants. Refer to the response to Comment 27.9 regarding the discrepancies between the air quality analyses of this EIS and the Prototype Oil Leasing Supplemental EIS. Because of uncertainties of emissions and air quality impacts from commercial-scale synfuel development, there is a need for a comprehensive monitoring program for detection and elimination of adverse impacts to workers and the surrounding population. This need has been recognized by adding such a monitoring program requirement to the Uncommitted Mitigation section of the Final EIS (Appendix A-7).

44.3 Refer to the response to Comment 32.11 regarding the issue of spent shale leachate. The BLM cannot require a monitoring program on state land (where the disposal piles would be located).

44.4 Refer to responses to the detailed comments for BLM's position concerning spent shale and hazardous waste handling. BLM notes that EPA supports the EIS analysis of spent shale reclamation success.

44.5 The high predicted TSP concentrations are not primarily from windblown dust, as the commenter suggests, but are primarily from traffic on unpaved (dirt) roads.

44.6 It is true that the problem of PSD increment consumption and exceedance can be handled by various air quality management techniques such as reducing emissions from the proposed synfuel facilities, from other permitted facilities that are currently consuming increment, and from older sources that are part of the PSD air quality baseline but are not considered to be part of the increment. It is also true that a variance, pursuant to Section 165(d) of the Clean Air Act, would allow exceedances of Class I PSD increments if it can be shown that air-quality-related values of Class I areas are not adversely affected.

44.7 It is not true that the Systems Applications Inc. analysis did not indicate any SO_2 Class I increment violations at Flat Tops. The results show that this is a possibility (refer to Section R-4.A.2).

The remark that Systems Applications Inc. analysis was based on steady-state models and that the Dietrich, Fox, Wood, and Marlatt study used a varying flow field model is exactly reversed. BLM agrees that the varying flow field modeling approach (which was used in the Uintah Basin analysis) is the most realistic one.

44.8 It is true that the Prototype EIS analysis and the Uintah Basin Synfuels Development EIS analysis used a somewhat different mix of emission sources. It should be noted that for the Final Prototype EIS, the modeling was redone using somewhat different meteorlogical assumptions and minor refinements in the model to more realistically treat stagnation conditions. The results agree well with the analysis results of this EIS. A comparison study of the analyses is underway by BLM air quality specialists.

44.9 Additional RTM analyses have been performed and are included in the Final Air Quality Technical Report and summarized in the Final EIS (Section R-4.A.2). Please see the response to Comment 20.14.

44.10 The State of Utah does consider secondary emissions in the PSD increment. Further explanation has been added to the Final EIS (Section R-4.A.2) to clarify this point.

44.11 EIS Section R-4.A.2 and Appendix A-5 have been expanded to further assess the potential environmental impacts.

44.12 EPA is on record as encouraging and requiring certain monitoring programs of the applicants and should use regulatory and persuasive powers in developing the stipulations which result from decisions related to this EIS. The views expressed will be considered in the decision process.

44.13 This statement was quoted from the cited reference (IWG 1981). The study has been continued and expanded since the 1981 version. Results from the IWG 1982 study have been added to the Final EIS (Section R-4.A.2).

44.14 The statement is based on the results of research and testing conducted by Ero Associates. Reference to the supporting document (Ero Associates, undated) has been added to Section R-4.A.4.

44.15 The EIS uses committed mitigations in determination of potential impacts and presents other uncommitted measures for the decision maker's consideration. Refer to the response to Comment 44.12.

44.16 The EIS indicates that salinity is a major concern in the Chapter R-4 Significance Criteria section. This section indicates that <u>any</u> increase in salinity represents a significant impact. No measures to mitigate salinity impacts have been committed to by any authorizing agencies or applicants. However, potential mitigation that could be used to reduce salinity impacts is included in Appendix A-7.

There would not be any significant impacts due to salt loading. The applicants' processes would be nondischarging; therefore, process water would not be an issue. Similarly, intercepted ground water would be returned to the source aquifer or used in the retorting process. Runoff would be diverted to storage ponds, utilized in the process, or evaporated. For the issue of leachate, refer to the response to Comment 32.11.

The EIS examined two sources of water which are consistent with the applicants' proposed and alternative sources. Because some of the applicants have existing water rights or specific water purchase intentions, these sources are the most likely and realistic.

44.17 The 132,000 ac-ft depletion is somewhat unique in that there is no return flow; the applicants' projects would be nondischarging. Due to this, this depletion is different from the "normal agricultural" depletion where there is return flow and where a larger increase in salinity (mg/l) would be expected at Imperial Dam.

Section R-4.A.3 states that a 1 mg/l increase in salinity at Imperial Dam is estimated to cause annual damages of $472,000. This dollar figure can be applied to the various salinity increases shown in the text.

44.18 The standard/numeric criteria was not included, because it is not a concept that the general public is familiar with. However, based on the impact significance criteria assumed in this EIS, any increase in salinity (from any level regardless of mg/l) is a significant impact. Therefore, all salinity increases shown on Table R-4-18 are considered to be significant impacts.

44.19 Section R-4.A.3 states that changes to the water supply system and to water quality were estimated using the Bureau of Reclamation Colorado River Simulation System. This model is the standard for operating the Colorado River system. Depletions cause different salinity changes at differing points; therefore, it is necessary to identify many different values. In addition to this, the same depletions would have different effects on salinity, depending upon the flow of the river that year (due to precipitation). The average values given in the text are an attempt to make this more understandable.

44.20 Refer to the response to Comment 32.11.

44.21 The community of Vernal has undertaken a $749,250 expansion and upgrading of its sewer system, including sewer trunk line installation from Vernal Avenue to Ashley Creek Mobile Home Park and from Cobble Creek Development to 1500 East Street. The project is being funded through Community Impact Account of the Utah Department of Community and Economic Development. Completion of the work is expected prior to the influx of workers for the proposed synfuels projects.

44.22 Wastewater would be treated typically by a package treatment plant to secondary standard with land disposal of the effluent. Refer to the applicants' technical reports for additional details.

44.23 Part 7 of the applicants' technical report on the Rainbow project (Enercor 1982) indicates that Enercor would comply with the stipulations in the permit to mine. It is the responsibility of the authorizing official granting this permit (State of Utah) to ensure that adequate control measures are designed, monitored, and enforced. Specifics on the impervious mine bottom and water movement are not now available; however, they will need to accompany the permit to mine.

44.24 Present data is insufficient to make detailed site-specific analyses. The designs of the proposed actions and alternatives recognize and make provisions for unforeseen encounters with ground water. Refer to the applicants' technical reports for details.

44.25 Refer to the response to Comment 42.4.

44.26 This point is made in the Authorizing Action section, Table SS-2, Environmental Protection Agency, item 5.

44.27 The ground water source at the Rainbow site is high in total dissolved solids and pump tests show that it may be unreliable. Specific data were not released by the company. These two factors were determined to be just cause for eliminating this alternative water supply from further analysis.

44.28 These two statements are not in conflict. If no water moves through the spent shale (i.e., not brought to saturation), no leachate will be produced. (Also see response to Comment 32.11.)

44.29 The current figures are correct. The figures in the Preliminary Draft EIS were from an early computer run which did not include sufficient data.

44.30 The nontreated crudes are different from other products, and the text has been changed to reflect this (see Section R-4.A.15). However, since spills were analyzed on a worst-case basis and it is assumed that spills will be cleaned up, there would be no change in the impacts as stated. There could be a health hazard to the workers doing the clean up, but no more than at the processing plants.

44.31 The purpose of this EIS is to analyze potential environmental impacts so that decision makers can make informed decisions. This EIS presents a best estimate of water resource impacts, using the most current data available. The EIS predictions of changes in salinity and flow can be used by local governments as a guideline of what to expect. Using the EIS and other technical reports, local governments will be able to plan for synfuels development.

44.32 Monitoring program details would be required by the authorizing agency before a solid waste disposal permit would be issued.

Impacts to solid waste disposal facilities were determined to be insignificant, as discussed in the Socioeconomics Technical Report, Section R-2-B.

44.33 The checklist (Table R-J-2) was developed primarily to provide a guideline to review and evaluate project applicant's erosion control, reclamation, and revegetation programs as related to land disturbance. The concern relating to (1) prevention of auto-oxidation, and (2) prevention of water and air infiltration in shale piles are recognized and covered in Appendix SS-A "General Measures for Grants and Permits," which is the more appropriate section.

44.34 According to Dr. Frank Mumshower, Director, Reclamation Research Unit, Montana State University (1982), research to date has not indicated vegetation grown on spent shale would contain trace elements toxic to grazing animals.

44.35 The details of the spent shale disposal pile are included in Magic Circle's project description technical report (Magic Circle 1982); see also the response to Comment 44.71. As discussed in the response to Comment 32.11, leachate formation is not anticipated to be a problem. Also, it is not anticipated that even complete saturation would significantly affect pile stability.

44.36 No drains were mentioned, because none have been proposed by Paraho. See also the responses to Comments 32.11 and 44.57.

44.37 Paraho has proposed benches at 200- to 300-foot intervals with a 10-foot layer of cemented shale topped with a layer of riprap to control erosion and increase stability. See also the response to Comment 44.54.

44.38 As stated in Section S-1.0.1, all drainage in the plant site area would be controlled. This point has been clarified in Section S-1.D.2.

44.39 No drains are mentioned, because no drains have been proposed by Syntana-Utah. The details of the spent shale disposal design are discussed in the Syntana-Utah technical report (Syntana-Utah 1982, page 47).

44.40 In keeping with CEQ guidelines to minimize the length of EISs, the details of the spent shale disposal design are not included in the EIS. However, these details are included in Section 7 of the Tosco technical report. See also the responses to Comments 44.64 and 32.11.

With the method proposed for spent shale disposal, auto-ignition is not a problem. By cooling the spent shale, compacting it in thin layers, and eliminating excess moisture in the pile, all the conditions needed for auto-ignition would be eliminated.

44.41 The term "solid waste" is used in its conventional sense. Conceivably, spent oil shale found in place (in-situ) minus kerogen and other minor constituents could be considered by some as "solid waste." The statement in Appendix A-2 has been revised to clarify the intended meaning. See also the response to Comment 31.33.

44.42 The information provided is all that is available on this conceptual project. As stated in the EIS Preface, when project design is further developed and action on a right-of-way application is requested, additional environmental analysis may be necessary.

44.43 Appendix A-11 (Environmental Protection Agency section) has been revised to incorporate the need for drains under and below the impermeable liners under the spent shale disposal piles, as expressed in the comment.

44.44 The views expressed will be considered in the decision-making process.

44.45 Because the section in question is state land, development by Geokinetics and Enercor would be regulated by the State of Utah. Before a mine plan were approved, the state would ensure it met state standards for design safety, including disposal of overburden.

44.46 Hazardous waste disposal is controlled by federal and state regulation (RCRA) and involves specific analysis, procedures, and a pproval of these plans prior to waste generation.

44.47 While secondary noise impacts will occur, and are noted in Sections R-4.A.1 (Quality of Life) and R-4.A.8 of the EIS, they are believed to be insignificant and within acceptable federal or state standards. The text has been expanded to include noise in other appropriate sections (R-4.A.1, R-4.A.7).

44.48 The areas of the spent shale pile that would be revegetated would be covered with a six-inch layer of coarse material to prevent upward capillary movement of saline and sodic waters from the pile. Approximately 14 inches of soil material would be spread over the layer of coarse materials to provide a suitable plant growth medium. (Refer to Paraho Reclamation Plan (Paraho 1982b), an attachment to Paraho's Solid Waste Permit and Mine Permit, for additional details.)

44.49 A lift thickness of 8 inches is planned (p. 2-40, Paraho PSD Permit).

44.50 The proposed action project life is 10 years, not 30 years. The 340-acre spent shale area would contain all spent shale produced over 10 years. The alternative of a 30-year project life has been added to the Final EIS. Refer to the Additional Lands Alternative discussion. Under this alternative, a larger area would be allocated for spent shale disposal.

44.51 The composition of the product off-gas is identified in the Paraho PSD permit. The major non-H_2S sulfur species would be carbonyl sulfide (37 ppmv), sulfur dioxide (13 ppmv), and carbon disulfide (10 ppmv).

44.52 The low permeability structures would be constructed in the same fashion as the liners for the spent shale disposal piles (refer to page 2-89, Paraho Technical Report; page 2-40 Paraho PSD Permit Application).

The low permeability structures would be constructed by spreading retorted shale in 8-inch, loose, horizontal layers, uniformly moistening to approximately 20 percent moisture content, by dry weight of material, and compacting to 100 percent maximum density (ASTM D 1557). The compaction would be achieved using heavy vibrating rollers. Scarification between compacted layers would be utilized to minimize the possibility of weak zones or preferential seepage patterns between layers.

The permeability of this low permeability structure would range from 0.1 to 1.0 foot per year; strengths would be greater than 200 pounds per square inch; densities would be greater than 98 pounds per cubic foot.

44.53 Sulfur placed in a landfill operation would be recrystallized block sulfur; this is not expected to create any problems with leachate or auto-ignition. This landfill operation has been approved by the State of Utah.

44.54 The slope of the face would be 1.5:1.0 with 100-foot wide benches at 300-foot intervals. Refer to Section 2 of the Paraho Reclamation Plan (Paraho 1982b) for additional details.

"Impervious" in Paraho's discussion of spent shale always refers to the highly compacted moistened material having a permeability of less than 1.0 foot per year.

44.55 An impermeable layer would be provided. Refer to Section 2 of the Paraho Reclamation Plan (Paraho 1982b) for details.

44.56 The monitoring program has been described in Paraho's Reclamation Plan (Paraho 1982b, page 47-49).

44.57 The comment is based upon "if moisture collects..."; based upon regional climatic conditions and Paraho's design of the site, no moisture would collect. (Refer to the response to Comment 32.11.)

44.58 The exposed slopes between benches (1.5:1.0) approximate the naturally occurring slopes in the region. These slopes would be protected from erosion by a rock rip-rap facing (see Paraho 1982b, page 2-43). Because of the riprap facing over the compacted shale, the soils erosion equation would not apply in this case. The designs of slope grade, run-off control, benches, and material handling were prepared by Woodward-Clyde Consultants. Refer to the Paraho Reclamation Plan (Paraho 1982b), Section 2, for additional details.

44.59 Spent shale would not be co-disposed with the raw shale fines in the Low-Level Scenario; they would be separated. Refer to Figure 3.1.2 of the Paraho Technical Report (Paraho 1982a).

44.60 The diversion and containment structures described on page 4.3-3 are intended for runoff events which occur during the construction phase of the project only; therefore, some question exists concerning the need to design such structures to handle a 100-year storm event.

44.61 Water quality monitoring has been conducted at Corehole UC 215 on a monthly basis for the 1981-82 water year. Boron levels from October 1981 through September 1982 ranged from 3.65 to 1,300 milligrams per liter or parts per million (ppm), with the average being 154.23 ppm.

44.62 The final design of the hazardous waste landfill would include an impermeable membrane below the leachate collection drain as required by regulation. The designs for all facilities would be reviewed prior to permit application to assure compliance with existing regulations.

44.63 The diversion channels would be compacted spent shale with grouted riprap and a 2-inch thick gunite lining. However, it seems the comment refers to "dams" not "drains." As shown in Figure 7.2.3 of the Technical Report, each dam would consist of a clay core, a grout cap, a grouting curtain, compacted earthfill, a filter system, a riprap blanket for the upstream slope, a cobble blanket for the downstream slope, a freeboard, a concrete spillway with a stilling basin, and a toe drain system. The permeability of the core material is estimated to be 1×10^{-7} cm/sec.

44.64 Permeability of spent shale compacted to 95 lbs/cu ft, at 13 percent moisture content is 1×10^{-7} cm/sec. As indicated in the text, normal precipitation is substantially less than normal evaporation rates in the vicinity of the project. For this reason, percolation beneath the top two to three feet of spent shale is not expected to occur, and no water is expected to reach the liner to accumulate.

44.65 The permeability of the spent shale beneath the water impoundments (compacted to 85 lb/cu ft) is not expected to exceed 1×10^{-6} cm/sec. As indicated in the text, because normal evaporation rates substantially exceed precipitation rates, moisture is not expected to advance downward through the embankment.

Further evaluation of potential percolation rates for spent shale under varying degrees of compaction and moisture content would be made prior to construction of the embankments and during monitoring activity as the embankments are constructed.

44.66 As indicated in the text, runoff channels would be "seeded and planted and otherwise stabilized" to minimize erosion. "Otherwise stabilized" should be interpreted to include riprap or liners, as necessary. In addition, the vegetation to be planted in these areas would be species adaptable to low moisture conditions (species with extensive tap root systems which are able to withstand storm events common to the area).

44.67 It is premature to establish the details of monitoring programs until such programs have been discussed in detail with the appropriate state and local permitting authorities.

44.68 The "C" horizon material would be removed and stockpiled separately from the topsoil. Tosco's objective is to remove and stockpile separately as much "C" horizon material as pnssible as well as replace this material over the spent shale before placement of topsoil.

44.69 The stacker to be used on the Cottonwood Wash project would be capable of laying shale to practically any desired lift thickness. The present plan (Magic Circle Technical Report, page 108) is for the shale to be compacted in lifts no greater than 4 feet thick. If a thickness of 18 inches proves to be optimum, this thickness would be used.

44.70 The discussion referred to covers potential problems that are of concern to the entire oil shale industry. Various on-going projects and experiments may contribute to their solution.

Magic Circle has stated the company would cooperate with EPA and other interested agencies insofar as possible in the conduct of this research. It should be noted: (1) Magic Circle's plan has been reviewed by experienced consultants who agree that the project design is optimal given the uncertainties listed in the technical report, (2) there is adequate time in the project schedule to gather data from all sources before embarking upon possibly duplicative research, and (3) there is enough evidence indicating that properly conducted revegetation efforts would be successful to offset any doubts resulting from the existing uncertainties cited in the report.

44.71 EPA is currently sponsoring experimental work on liner materials from spent oil shales. It is possible that spent shale would need to be mixed with another substance (e.g., clay or fly ash) to obtain the proper characteristics of a liner substance. Drains would be provided as needed. Compaction would be continuous. As noted on page 111 of the Magic Circle Technical Report, the impermeable base would likely be composed of a mixed material, placed in a layer 18-inches thick and compacted to a density of 80 pounds per cubic foot.

44.72 The impermeable layers placed above and below the spent shale pile would effectively prevent the flow of water either into or out of the pile. Leaching of the spent-shale surface layer would remove the soluble salts from the region in which they might endanger the long-term success of the revegetation program. The runoff from the leach layer would be collected around the active leaching area and disposed of on the main body of spent shale. Thus, leaching prior to placement appears to be equivalent to leaching following placement, given the surface runoff control procedures outlined on pages 116-117 and 237-248 of the technical report.

COMMENT LETTER 45

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service
Health Services Administration

Phoenix Area Indian Health Service
3738 N. 16th St. Suite A
Phoenix, Arizona 85016-5981

November 8, 1982

Mr. Lloyd Ferguson, District Manager
Bureau of Land Management
170 South 500 East
Vernal, Utah 84078

Dear Mr. Fergusoo:

45.1 We appreciated the opportunity to attend the meeting held on October 22, 1982 on the Uintah Basin Sinfuels Development. We are submitting comments as per our discussion at the meeting. We realize that they are late but feel that the Indian Health Service should be on record on items that could affect the health conditions on the reservation.

We would appreciate a copy of the final documents when they are available. If there are any questions regarding the attached comments, please call FTS 261-2056 or commercial (602) 241-2056.

Sincerely yours,

George R. Oslund
Phoenix Area
NEPA Coordinator

Enclosures

GRO/btm

COMMENTS ON EIS

45.2 Comments will be limited to the basic items that pertain to the health of the Indian people.

There seems to be some unresolved issues pertaining to both the primary and secondary impacts for the air quality, health care facilities, water supply, sewer, solid waste and other socioeconomics.

The state law doesn't cover the Reservation so it seems to leave the Tribe with no real means of mitigation.

It seems that the Reservation does not fit into the computor program that was developed, so it is not included in any of the projections and effects that are provided for the adjacent community and counties.

The Reservation is mentioned in the study, but is not included in effects or mitigation possibilities. What assistance could be provided the tribe in developing appropriate codes and ordinances to assure orderly growth and development on the research regarding, housing, trailer parks, solid waste management, water, sewer, dog control, etc.

The following are items taken from the text of report with some questions and corrections to statements. No attempt was made to cover the entire report but to bring out some of the basic items that pertain to the Indian people and the Reservation.

Unresolved Issues

xxxii & xxxiii

Mitigation to offset socioeconomic impact on the Reservation.

State law requires mitigation for cities, counties but does not cover Indian Reservations. What arrangements will be made to obtain mitigation for these unresolved issues for the tribe.

45.3 "Additional information on impacts to Ute Indian tribe is expected to be obtained and included in final EIS." Will this happen? The consultants report doesn't seem to really address the problems of mitigation in fact the statement is made that it does not detail mitigation measures (see 1-5).

R-3 HIGH LEVELS SCENARIO

45.4 R-3-11 The clinic serves all enrolled Indians and their dependents from any recognized tribes. The same is true for dental service. The increased demand on medical facilities outside the Reservation could cause hardship because certain types of health care has to be sent to hospitals outside the Reservation for treatment and there may not be any facilities available.

45.5 R-3-13 Sewer: "The IHS has installed a sewer system for basic needs on Reservation." There are at least 6 separate systems and numerous individual facilities on the Reservation.

Probably could read "sewer facilities for the basic needs of the Reservation have been installed by BIA and IHS."

Water: Communities all around Reservation are mentioned regarding their water systems even to the extent that some are served from the Tribe but no mention of the tribal systems and any possible effect of influx of people to the area both outside and inside of Reservation.

It needs to be covered.

Government agencies and the Tribe have built water, sewer, and solid waste systems on the Reservation

The IHS has provided funds through the 86-121 program for new construction and updating to help the tribe keep up with the growth of housing and population on the Reservation. The Tribe does serve water to Roosevelt, Ballard and several other small communities around the Reservation and should be included in the study.

Air Quality: Will air quality monitoring stations be set up on Reservation - who will monitor for compliance. What about health program for protection against silicosis and other industrial related diseases.

46.6 R-4 REGIONAL ENVIRONMENTAL CONSEQUENCES

R-4-2 No standards established for U&O Reservation?

R-4-18 Mentioned significant impact in mental health on Reservation. What mitigation is possible.

R-4-20 Water: It is mentioned that several of the surrounding communities will have to upgrade their systems. Some of these are served by the Tribe which will necessitate an immediate expansion of Tribal system.

R-4-20 No mention of solid waste problem in communities and on Reservation.

R-4-21 Tribal finances, it mentions the problem but no solution.

R-4-102 Control test for industrial disease, silicosis, etc. should be mitigated.

R-4-114 What about tribal need especially water. The tribe supplies water to several of the communities around the Reservation. Also there is no mention of solid waste either on or off Reservation.

45.7 R-5 SIGNIFICANT IMPACTS

R-5-2 "Air quality would be irretrievable on U&O Reservation." What can be done about it. Will air quality monitoring stations be located on the adjacent to the Reservation? Who will review them? What about health screening programs for protection against silicosis and other related diseases.

45.8 E-5 CUMULATIVE IMPACTS

E-5-3 No tribal service demands?

What about solid waste?

T-1 PROPOSED ACTION

45.9 T3A.1 Socioeconomics refers to R3A1 which states it is not possible to quantify base line data because of different standards. (sounds like a run around).

45.10 R-1 UNCOMMITED MITIGATION MEASURES

R-1-1 Good list, how can tribe be helped to obtain the necessary mitigation measures.

RESPONSE LETTER 45

Department of Health and Human Services

45.1 Comments from the Indian Health Service are included in the record and are responded to in the EIS to the extent possible.

45.2 The unresolved issues primarily are those things which require further negotiation and refinement as each project sponsor proceeds with detailed implementation plans. Socioeconomic mitigation arrangement, of necessity, must be primary responsibility of local governments (including the Ute Tribe) and the individual applicants. The EIS provides a basic assessment of potential needs which may be useful in these subsequent negotiations. Assistance to the tribe in developing codes and ordinances for the reservation would be within the purview of the Bureau of Indian Affairs and the Indian Public Health Service.

45.3 The Socioeconomics Technical Report was not intended to solve mitigation problems. The consultant study was to address existing conditions and potential impacts. BLM has no legal mandate to prescribe or enforce mitigation measures on the reservation. Appendix A-7 outlines some uncommitted socioeconomic mitigation measures that may be considered by others, including the tribe.

45.4 This information is reflected in Section R-3.A.1 of the Final EIS.

45.5 This information has been added to Sections R-3.A.1 and R-4.A.2 of the Final EIS. Regarding air quality comment, refer to the response to Comment 45.7.

45.6 These items have been considered in the revised text of the Final EIS; however, those regarding mitigation or solution to tribal finances have not be incorporated. This is due to the BLM position expressed above in responses to Comments 45.2 and 45.3

R-4-2 - The impact significance criteria were used for <u>all</u> analyses including those related to the reservation.

R-4-20 - Sections R-3.A.1 and R-4.A.1 have been expanded on this subject.

R-4-114 - See response to comment above.

45.7 It is expected that the tribe and the Utah State Air Quality Bureau will work with the various applicants to locate and review air quality monitoring stations and programs. National Ambient Air Quality Standards have established air concentration standards for particulates (TSP) that are necessary for the protection of human health and welfare with an adequate margin of safety. These standards have been used in the air quality analysis to assess the significance of impact.

45.8 The impacts of the Enercor project on tribal services are not expected to be very significant given the substantial distance of the project from the reservation (Section E-5.A.1, Uintah and Ouray Indian Reservation).

Cumulative increases in solid waste disposal were not included, because they would not result in significant impacts. Refer to the Socioeconomics Technical Report, Section R2B, Solid Waste Disposal, for additional information.

45.9 The cross-reference is intended to avoid duplication of material.

45.10 The tribe can negotiate directly with each of the project sponsor's to obtain the necessary mitigation measures.

REFERENCES

The following symbols are used to help the reader locate copies of the references. The appropriate symbols will appear at the end of each citation.

C - Available for inspection at Bureau of Land Management, Colorado State Office, 1037 20th Street, Denver, Colorado 80202.

E - Available for inspection at Bureau of Land Management, Division of Environmental Impact Statement Services, 555 Zang Street, First Floor East, Denver, Colorado 80228. Copies of some items are available at cost for reproduction.

L - Available through public library loan system.

S - Available for inspection at Bureau of Land Management, Utah State Office, University Club Building, 136 East Temple, Salt Lake City, Utah 84111.

V - Available at Bureau of Land Management, Vernal District Office, 170 South 500 East, Vernal, Utah 84078.

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GLOSSARY

ACCELERATED EROSION--Erosion much more rapid than normal, natural geologic erosion, primarily as a result of the influence of the activities of man, or in some cases, of animals.

ALLUVIUM--Clay, silt, sand, gravel, or other loose stream-deposited material.

ANCILLARY FACILITIES--Structures (compressor stations, power and communcation lines, cathodic protection systems) which are necessary for the continuous operation or maintenance of the project.

ANIMAL UNIT--One cow, one horse, one burro; five sheep or goats all being over 6 months of age.

ANIMAL UNIT MONTH--The amount of forage of a cow and a calf (6 months of age and under) would consume in 1 month. This unit is used to calculate carrying capacity and serves as a basis for grazing fees.

ARTIFACT--Any object made, modified, or used by man, usually movable.

BASELINE--The existing information from which estimates, projections, etc., are based to analyze environmental impact.

BIOME--A geographical area where plants exhibit similar characteristics.

CAIRN--A mound of stones erected as a landmark or memorial.

CHISELING--The loosening of soil without inversion and with a minimum of mixing of the surface soil in order to shattter restrictive layers (below normal plow depth) that could inhibit water movement or root development (called "chiseling" when the restrictive layers are less than 16 inches deep).

CRITICAL AREA--An area of habitat that is essential to the survival of any wildlife species sometime during its life cycle.

DISPERSED RECREATION--Camping in undeveloped sites and informal daytime recreation.

EXISTING VEHICLE ROUTES--A BLM term used to describe an off-road vehicle route which is characterized with significant surface evidence of prior vehicle travel having a minimum width of 2 feet. If nature eliminates portions of these routes, it does not legally exclude vehicle use.

EXTIRPATE--To totally remove, exterminate, or destroy.

EYRIE--The nest of a bird or prey such as an eagle or hawk.

FORB--A low growing broadleaf plant.

FREEBOARD--The height above the recorded high-water mark of a structure (such as a dam) associated with the water.

FUGITIVE DUST--Airborne silt and clay particles.

GILSONITE--Also known as Uintaite, which is a black lustrous asphalt found mainly in Utah.

GRADE--Degree of a slope or a road, channel or natural ground.

HUNTER DAY--One hunter hunting for a day or part of a day.

KEROGEN--A tar like material which occurs in shale and when heated, produces oil.

MANAGEMENT FRAMEWORK PLAN--BLM land use planning document.

MITIGATION--The abatement of diminution of impact to the environment by (1) avoiding a certain action or parts of an action, (2) emloying certain construction measures to limit the degree of impact, (3) restoring an area to preconstruction conditions, (4) preserving or maintaining an area throughout the life of a project, or (5) replacing or providing substitute resources to the environment.

NATIONAL REGISTER OF HISTORIC PLACES--A list of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture.

NATIONWIDE RIVERS INVENTORY--The Nationwide Rivers Inventory was a preliminary screening process conducted by the Heritage Conservation and Recreation Service and now administered by the National Park Service to identify the best remaining free-flowing rivers in the nation that may be appropriate for protection at the federal, state, or local level.

NATURAL EROSION--Wearing away of the earth's surface by water, ice, or other natural agents under natural environmental conditions of climate, vegetation, etc., undisturbed by man (geologic erosion).

OFF-ROAD VEHICLE (ORV)--A vehicle (including four-wheel drive vehicles, trail bikes, snowmobiles, etc., but excluding helicopters, fixed-wing aircraft, and boats) capable of traveling off-road over land, water, ice, snow, sand, marshes, etc.

OIL SHALE--Shale from which oil can be recovered by distillation.

OVERSTORY--A layer of vegetation, usually shrubs or trees, that forms a secondary layer of vegetation.

PALEONTOLOGICAL SITE--The location of life forms that existed in former geologic periods.

PASSENGER DAY--A term used to measure the amount of use on a river equal to one person for any part of one day.

PETROGLYPH--Figures, symbols, or scenes pecked or etched on rock.

PRIME AGRICULTURAL LAND (also prime farmland)--Land that is best suited for producing food, forage, fiber, and oilseed crops. The inventory of prime agricultural land is maintained by the U.S. Department of Agriculture, Soil Conservation Service.

POWER PLANT--An electric utility generating station.
PYROLYSIS--A chemical change which is brought about by the action of heat.
RETORT--A closed vessel where oil shale is heated.

RIPARIAN VEGETATION--Plants situated on the banks of a stream or a body of water or wherever the water table comes into close proximity with the land surface.

RIPRAP--A foundation or erosion control device consisting of rocks thrown together without order.

ROCK FRAGMENTS--Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

SALINE SOIL--A soil containing soluable salts in a concentration that impairs growth of plants.

SCENARIO--An outline of natural or expected course of events.

SECONDARY ZONE OF INFLUENCE--The area within 100 miles, or 2 hours driving time, that is normally utilized by residents for recreation activities.

SHALE OIL--A crude dark oil obtained from oil shale by heating.

SHARD (also spelled "sherd")--A piece of broken up pottery.

SITE--A location showing evidence of past human activities or events.

SOIL MATERIAL (For purpose of this EIS)--Unconsolidated materials including surface layers, subsoil, and substratum materials that have favorable chemical and physical properties that can be used as a surface layer for a plant growth medium.

SPECIAL MANAGEMENT AREA--Areas managed for a special purpose by a governmental entity. Examples include Uintah and Ouray Indian Reservation, Wilderness Study Area, RARE II area.

SUBSOILING--The loosening of soil to depths greater than 16 inches (see also "CHISELING").

TAR SAND--Sand impregnated with heavy petroleum which dries up to viscous or solid bitumen.

TOPSOIL--The surface tilted layer in cultivated areas or the uppermost layer of soils containing organic matter.

UINTAH BASIN--Refers to a geographic/political area that generally includes Uintah County and adjacent areas of Duchesne and Grand Counties in Utah. Roughly equivalent to the geologic (structural) basin, which technically referred to as the Uinta Basin.

UNDERSTORY--An underlying layer of low growing vegetation.

VEGETATION TYPE--Various combinations of species which have similar stature and appearance and which dominate or appear to dominate a site.

VISITOR DAY--A recreation resource measurement equal to 1 person visiting an area for 12 hours.

VISUAL RESOURCE MANAGEMENT--The planning, design, and implementation of management objectives to provide acceptable levels of visual impacts for all resource management activities.

WATER YEAR--October 1 through September 30.

WILD AND SCENIC RIVERS ACT--Provides for the designation and protection of rivers of national significance if they are free-flowing and contain one or more outstandingly remarkable scenic, recreation, geologic, fish and wildlife, historic, cultural, or other similar values.

WILDERNESS--A wilderness, in contrast with those areas where man and his own works dominate the landscape, is recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain.

WILDERNESS AREA--An area formally designated by Congress as part of the National Wilderness Preservation System.

WILDERNESS STUDY AREA--A roadless area or island that has been inventoried and found to have wilderness characteristics as described in section 603 of the FLPMA of 1976 and section 2(c) of the Wilderness Act of 1964 (78 Stat. 891).

WORK FORCE--The total number of workers in a specific undertaking.

ABBREVIATIONS AND ACRONYMS

ac--acre

ac-ft/yr--acre feet per year

ACHP--Advisory Council on Historic Preservation

AUM--Animal Unit Month

BIA--Bureau of Indian Affairs, U.S. Department of the Interior

BLM--Bureau of Land Management, U.S. Department of the Interior

bpsd--barrels per stream day

bpy--barrels per year

BR--Bureau of Reclamation, U.S. Department of the Interior

Btu--British thermal unit (a measure of heat)

cfs--cubic feet per second

CEQ--Council on Environmental Quality

CO--carbon monoxide

COE--Corps of Engineers, U.S. Department of the Army

CUP--Central Utah Project

DOI--Department of the Interior

DOT--Department of Transportation

E--Enercor-Mono Power

EIS--environmental impact statement

EPA--Environmental Protection Agency

FLPMA-Federal Land Policy and Management Act

FS--Forest Service, U.S. Department of Agriculture

ft--feet

G--Geokinetics

gpm--gallons per minute

GPM--Gaussian Puff Model

$g/m^2/y$--grams per square meter per year

HCRS--Heritage Conservation and Recreation Service

hp--horsepower

Kg/hr--Kilograms per hour

km--kilometer, thousand meters

kV--kilovolts, thousand volts

kVA--kilovolt amps, thousand volt amps

M --Magic Circle

mcfd--thousand cubic feet per day

MFP--Management Framework Plan

mg--milligrams

mg/l--milligrams per liter

mi--mile

mmcfd--million cubic feet per day

MW--megawatt

NA--not applicable

NAAQS--National Ambient Air Quality Standards

NEPA--National Environmental Policy Act

NO_x--nitrogen oxides

NO_2--nitrogen dioxide

NPDES--National Pollutant Discharge Elimination System

NPS--National Park Service, U.S. Department of the Interior

ORV--off-road vehicle

P--Paraho

PAD--Petroleum Allocation District

PAH--polycyclic aromatic hydrocarbons

PCPI--per capita personal income

pH--parts hydrogenion (used to identify acidity and alkalinity)

P.L.--public law

PMOA--Programmatic Memorandum of Agreement

PSD--prevention of significant deterioration

psi--pounds per square inch (a measure of pressure)

R.--Range

RARE II--FS second roadless area review and evaluation

R.O.W.--right-of-way

RTM--Regional Transport Model

rvd--recreation visitor days

S.--Section

S--Syntana-Utah

SAI--Systems Applications, Incorporated

scf--standard cubic feet

scfm--standard cubic feet per minute

SCS--Soil Conservation Service, U.S. Department of Agriculture

SHPO--State Historic Preservation Office

SO_2--sulfur dioxide

T.--Township

T--Tosco

THC--total hydrocarbons

tpsd--tons per stream day

TSP--total suspended particulates

UBS--Uintah Basin Synfuels

UDWR--Utah Division of Wildlife Resources

ug/m^3--micrograms per cubic meter

USFWS--U.S. Fish and Wildlife Service, U.S. Department of the Interior

VMS--Visual Management System

VRM--Visual Resource Management

VQO--Visual Quality Objective

WSA--Wilderness Study Area

yr--year

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NAME	EIS RESPONSIBILITY
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Dennis Dalley, Assistant Director Utah Division of Environmental Health	Review
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Lloyd Ferguson, District Manager BLM Vernal District	Co-chairman and Review
Don Gillespie, Assistant to the Regional Director U.S. National Park Service	Review
Dennis Montgomery, Acting Lands Operations Officer U.S. Bureau of Indian Affairs, Uintah Ouray Agency	Review
Robert Jacobson, Assistant Area Manager U.S. Fish and Wildlife Service, Salt Lake City Area Office	Review
Barbara Korzendorfer, Geologist U.S. Minerals Management Service	Review
Jim Reidhead, County Commissioner Duchesne County Commission	Review
Gary Tomsic, Deputy Director Utah Department of Community and Economic Development	Review
Gary Voerman, Environmental Protection Specialist U.S. Environmental Protection Agency, Region VIII	Review

MAPS

Appendix R-A (Maps R-A-1 through R-A-3 and T-1-2) is a separate map volume distributed with the Draft EIS. A limited number of additional copies are available upon request from Mr. Lloyd Ferguson, District Manager, Bureau of Land Management, Vernal District, 170 South 500 East, Vernal, Utah 84078. Copies are also available for review at selected Uintah Basin libraries, and the Salt Lake City and Denver main public libraries.

During preparation of the Final EIS, Mono Power had a joint participation agreement with Enercor for the P.R. Springs Project. However, recently (October 1982), that arrangement has been dissolved. Each of the two companies may develop their leases as separate or possibly, in the future, joint projects. However, there should not be any significant changes to the project as described here and analyzed in the EIS.

The proposed P. R. Springs tar sand processing plant would have a daily production between 15,000 and 50,000 barrels per stream day (bpsd) and an associated surface mine in the P.R. Springs area (Cedar Camp site). Construction of this facility may be scheduled to start in 1985, with full production achieved in approximately five years. Road improvement, utility connections, and site development work would occur prior to actual plant construction.

The present reserves held by Enercor-Mono Power and its partners have been conjectured to contain sufficient resource to sustain operation at this location for at least 20 years at the 50,000 bpsd level. At present, Enercor-Mono Power are in the midst of an exploration program designed to delineate the resource base, which in turn will ultimately determine the maximum capacity of the envisioned tar sand processing plant.

Copies of the Enercor-Mono Power technical report, Project Description for the Uintah Basin Regional EIS, can be obtained from Mr. Richard Kodani, Southern California Edison Company, 2244 Walnut Grove Avenue, Rosemead, CA 91770.

LOCATION

Enercor-Mono Power holds extensive leases in the southern portion of P.R. Springs, in Township 15, 15 1/2 and 16 South, Range 22 and 23 East (Map R-A-1, located in Appendix R-A). The majority of these leases are held by the production of gas from active federal oil and gas leases. It is anticipated that these federal oil and gas leases will be converted to combined hydrocarbon leases in accordance with the recently enacted federal legislation (Public Law 97-78).

MINE AND PROCESS DESCRIPTION

The mine would be a conventional strip mine using draglines, front-end loaders, and dump trucks. During the life of the project, the mine would disturb 5,290 acres.

A haul back system using dump trucks to return the damp plant sands to the mine pit would be used for all mining areas. Mine spoil would be placed in the mined out areas along with the waste sands from the pl nt.

Reclamation of the spoil piles would follow the mining operation in accordance with regulatory requirements.

The plant site would occupy 200 acres which would be rehabilitated after project abandonment.

The plant would utilize a modified hot water extraction technique to recover crude bitumen material from the ore. This process was developed by the University of Utah, under the direction of Dr. Alex Oblad, based on a tar sand recovery process used in Canada. Water used in the process would be recycled. After processing, the clean sand would be returned to the mine area for disposal.

The crude bitumen would be upgraded to a synthetic crude oil using a conventional delayed coking process. Coke product would be burned in boilers to supply plant heating and hot process water requirements. It is anticipated that the synthetic crude oil, gas, and coke would contain less than 0.5 percent sulfur; therefore no special sulfur removal facilities are planned.

PRODUCT TRANSPORTATION

From the Cedar Camp plant, synthetic crude oil would be piped south to the Denver and Rio Grande Railroad adjacent to Interstate 70 and shipped via tank car unit trains to customers or to existing crude oil transmission lines. Any gas produced at the plant would be used to supplement in-plant heating requirements.

WATER SUPPLY

Presently the project proponents are studying potential sources of water supply. It appears as though large quantities of water could be available from private and agency sources. It is anticipated the water would be taken from the Green, White or Colorado rivers and piped to the proposed project site.

In the maximum production case approximately 12,000 acre-feet per year would be required.

ELECTRICAL SUPPLY

A new 20-mile, 138-kV power line would be installed from the proposed Enercor Rainbow Project to the Cedar Camp site. An estimated 720 kW of power would be required to operate the plant.

EMISSIONS

The following air pollutants would be emitted:

TOTAL CONTROLLED AIR EMISSIONS

Pollutant	Emission Rate (kilograms per hour)
Sulfur Oxides	101
Nitrogen Oxides	112
Hydrocarbons	unknown
Total Suspended Particulates	220
Carbon Monoxide	unknown

The Air Quality Technical Report (Systems Applications Inc. 1983) discusses the control technology assumptions used to determine these emission rates.

OTHER FACILITIES

In addition to the major components, a town would be built on one of several alternative sites in the vicinity of the old town of Westwater, about 35 miles south of the plant site.

CONSTRUCTION SCHEDULE AND WORK FORCE

Construction is scheduled to start in 1985 and finish as early as 1990. If the above schedule is maintained, a peak construction work force of 2,215 would occur in 1985.

OPERATION SCHEDULE AND WORK FORCE

Operation is scheduled to start in 1987 with full production anticipated in 1990. The full production work force would be approximately 1,500 people.

GEOKINETICS LOFRECO AND AGENCY DRAW PROJECTS

Geokinetics, Inc. proposes to develop two oil shale projects in the Uintah Basin region. The Lofreco Project would be an in-situ retort facility and the Agency Draw Project would be a surface retort facility.

LOFRECO PROJECT

Geokinetics has leases on 13 non-contiguous units, two of which are located within the Geokinetics Agency Draw block. Each unit is approximately one square mile in size and is located on state lands which have near-surface beds of oil shale to which the Lofreco true in-situ retorting process is applicable. The present concept is to successively bring each unit into commercial operation producing 5,000 bpsd of shale oil. This eventually would involve the simultaneous operation of 15 to 20 retorts which measure at minimum 220 feet on a side. After the start-up of a commercial operation in the fourth quarter of 1984, ten of the non-continguous units would be in commercial production by 1994.

LOCATION

Each section would be brought into commercial status annually commencing in the fourth quarter of 1984 with Wolf Den 1 (Map R-A-1, located in Appendix R-A).

Name	Location
Wolf Den 1	T12S R22E, Section 36
Seep Ridge	T14S R22E, Section 2
Wolf Den 2	T13S R24E, Section 2
Agency Draw 1	T12S R20 - 21E
Agency Draw 2	T13S R20 - 21E
Buck Canyon	T12S R21E, Section 36
Sunday School Canyon	T13S R22E, Section 16
Woods Canyon	T13S R22E, Section 32
McCook Ridge	T13S R23E, Section 36
Brewer Canyon	T13S R24E, Section 16
Deep 1	T11S R23E, Section 16
Deep 2	T11S R23E, Section 2
Deep 3	T11S R24E, Section 16

Enercor and Geokinetics have mineral leases for Section 36--Enercor, for tar sand and Geokinetics, for oil shale. Geokinetics would develop the oil shale resource first, because in this area the oil shale bed is above the tar sand deposit. Enercor would then develop the tar sand.

MINE AND PROCESS DESCRIPTION

In the construction of a true in-situ retort, a pattern of blast holes would be drilled from the surface through the overburden into the oil shale bed. The holes would be loaded with explosives and fired using a carefully planned blast system. The blast results in a fragmented mass of oil shale with a high permeability. The void space in the fragmented zone would come from lifting the overburden and producing a small uplift of the surface.

The fragmented zone constitutes a true in-situ retort. The bottom of the retort would be sloped to provide drainage for the oil to a sump where it would be lifted by a number of oil production wells. Air injection holes would be drilled at one side of the retort and off-gas and oil production holes drilled at the opposite side.

The oil shale would be ignited at the air injection holes and air injected to establish and maintain a burning front that occupies the full thickness of the fragmented zone. The front is moved in a horizontal direction through the fractured shale towards the off-gas wells at the far side of the retort. As the burn front moves from the air-in to the gas-out wells, it would burn the residual coke in the retorted shale as fuel. The burning front would heat the oil shale ahead of the front, producing gas and driving out the shale oil which drains to the bottom of the retort, where it would then flow along the sloping bottom to the oil production wells. The gas would be combustible and would be used for power generation. Progress of the burn front would be monitored by thermocouples set in thermocouple wells.

FEEDSTOCKS

There are no feedstocks contemplated for use at the plant site.

PRODUCTS/BY-PRODUCTS

The primary product for the proposed retorting operations would be 5,000 barrels per stream day (bpsd) of shale oil per section of land. When all 10 sections are in production in 1994 the maximum output would be 50,000 bpsd. The by-products from the operation of the proposed project would be the product gas which could be used for on-site energy production and water, part of which could be used as a viable resource (quantity of water equivalent to oil production). A pipeline to transport the shale oil to a refinery may be necessary.

UTILITIES AND OFF-SITE CORRIDORS

Each unit would use existing access roads. These existing access roads would be used to the extent possible, however Geokinetics may need to develop additional access to the sites. Utility and product pipeline corridors may be needed, but the needs have not been defined.

WATER SUPPLY

Although water is a by-product of the process there would be a minor need for potable water. It is presently planned that this water would be acquired through a well drilled on each of the commercially producing units.

ELECTRICAL SUPPLY AND DISTRIBUTION

For each commercial facility, the produced gas would be used to generate electrical power to meet all electrical needs. There would be sufficient excess power to warrant construction of 130 kV electrical power lines to each site to export surplus power to the local distribution system.

COMMUNICATION FACILITIES

It is anticipated that communication lines would be brought into each commercially operating unit; however, a private microwave system may be a viable alternative.

CONSTRUCTION PROGRAMS

Construction activities at each unit would include, site clearing, construction of access roads, water supply system, electrical power generating facility, development of rubblized retorts, and installation of necessary manifolding and product recovery equipment (oil, gas and water separation, treatment, and handling systems).

Operation would involve igniting and burning about 25 retorts per section per year. During full operation, each section of land would produce 5,000 bpsd for about 13 years.

MANPOWER REQUIREMENTS

It is estimated that 100 people would be required to construct and operate each unit. Therefore the total number of personnel required would increase by 100 each year until all 10 units are in operation. At peak operation (1994) 1,000 people would be employed on a continuous basis.

A small construction camp would be used during first year staging activities. For the most part workers would be transported from Vernal and Roosevelt by bus to the site.

CONSTRUCTION/OPERATIONS SCHEDULE

Initial construction programs would focus on the development of power lines, the upgrading of existing roads, and site preparation. Later, power generating facilities, retorts, product recovery systems, and on-site construction camp facilities would be constructed.

Construction is scheduled to begin on the first unit during the first quarter of 1984 and would last one year, at which point operation would begin on that unit. A new unit would be constructed each subsequent year. Thus production on the first unit could begin in the fourth quarter of 1984, and one unit would be added each year until 1994 when all units would be in production.

EMISSIONS

The following air pollutants would be emitted:

TOTAL CONTROLLED AIR EMISSIONS[a]

Pollutant	Emission Rate (kilograms per hour)
Total Suspended Particulates	113
Sulfur Oxides	1,529
Nitrogen Oxides	522
Carbon Monoxide	0
Hydrocarbons	31

[a]All ten sections operating simultaneously. Best available control technology has not been determined for in-situ operations.

The Air Quality Technical Report (Systems Applications Inc. 1982) discusses the control technology assumptions used to determine these emission rates.

LIQUID EFFLUENT

At the present time it is anticipated that each unit would produce 2,000 to 5,000 bpsd of process water, some of which would meet the water requirements for operation (i.e., dust, cooling, ammonia wash, etc.). Any excess water would be disposed of through approved wastewater disposal methods (e.g., surface cleanup methods, deep well injection, etc.).

SOLID AND HAZARDOUS WASTES

No solid waste would be produced on the surface. Spent shale would remain underground in the retort. Any hazardous wastes generated from the process would be disposed of in an approved off-site facility.

AGENCY DRAW PROJECT

Geokinetics also holds oil shale leases on 22,000 contiguous acres located in southern Uintah County, Utah. Over one billion barrels of shale oil are contained in this area.

The proposal is to mine and surface retort 22,000 tons per stream day (tpsd) of oil shale from a 13-foot thickness containing between 28 and 33 gallons of oil per ton. Room and pillar mining would be used and the mine would probably be developed from an adit entrance. It is further proposed that the mine would facilitate subsequent secondary recovery of the remaining resource by means of controlled blasting and in-situ retorting of the pillars and of the lower grade oil shale located below the high-grade, mined-out bed.

LOCATION

The site is located in Uintah County, in the northeastern portion of Utah (about 70 miles south of Vernal (Map R-A-1, located in Appendix R-A). Approximately 19,200 acres of this area was leased in April 1977 to Geokinetics by the Utah Shale Lands and Minerals Company; the remainder was leased in July 1978 from the State of Utah. This area is located in T. 12 and 13 S., R. 20 and 21 E. in the Agency Draw vicinity.

MINE AND PROCESS DESCRIPTION

The following processes would be used in this project:

1) Room and pillar mining
2) Mined shale transportation and crushing
3) Surface retorting
4) Spent shale disposal
5) Waste gas treatment and disposal
6) Secondary recovery by horizontal in-situ retorting

The transportation and crushing of the mined oil shale would be done with conventional belt conveyors and jaw and gyratory crushers, respectively.

Retorting would be performed by the TOSCO II process.

Additional development would involve the blasting of mine support pillars and shale underlying the mined zone in preparation for modified in-situ retorting.

FEEDSTOCKS

There are presently no plans to construct or use feedstocks.

PRODUCTS/BY-PRODUCTS

The primary product from the proposed mining and surface retorting operations would be approximately 20,000 barrels per stream day (bpsd) of shale oil. This would result in the production of an estimated 133 million barrels of shale oil during a commercial operating period of approximately 20 years. In addition, secondary in-situ recovery is anticipated to produce up to 10,000 bpsd. The by-products from the operation of the proposed project would be the product gas which would be used to produce electrical energy. Water, sulfur, and ammonia also would be produced in undetermined quantities.

UTILITIES AND OFF-SITE CORRIDORS

There are existing roads between the proposed site and the towns of Vernal and Roosevelt, Utah (each approximately 70 miles from the site). About 40 miles of county roads would need upgrading for heavy traffic access from Utah State Highway 88. About 3 miles of road would be built for access to and within the project site. Utility and/or product pipeline corridors may be needed.

WATER SUPPLY

Water supply for the project could be developed from deep wells or by the purchase of water rights from Willow Creek or Green River. The water consumption for the overall facility is estimated at 1,350 ac-ft/yr.

Water would be supplied to an on-site treatment system and then stored in tanks. A booster pump would provide water at the plant site for fire protection, sanitary purposes, boiler feed water, dust control, cooling, and other uses.

ELECTRICAL SUPPLY AND DISTRIBUTION

Electric power for construction and start-up would initially be supplied by portable generators. Later electric supply would be determined when final process selection is complete.

After the facility is operational, auxiliary power would not be needed. The product gas would be used to generate electrical power. It is estimated that the gas represents more than sufficient energy to supply all the electrical power for the needs of the entire facility and that surplus power could be sold to the local distribution system.

COMMUNICATION FACILITIES

Telephone and/or radio telephone communications systems would be required. It is anticipated that communication lines would be brought into the site; however, a private microwave system may be a viable alternative.

CONSTRUCTION PROGRAMS

Initially, construction activities would focus on access roads, power supply, site preparation, water supply, and construction camp facilities; later major mining, shale handling, retorting, product recovery, and retorted shale disposal facilities would be constructed.

The facilities would disturb approximately 800 acres in the northern portion of the Agency Draw property. Access roads and other off-site corridors are undefined at this time but would increase acreage disturbed.

MANPOWER REQUIREMENTS

Personnel requirements are estimated as follows (based on six-month averages):

Year	Construction Mine	Construction Plant	Operation Mine	Operation Plant	Total
1983	50	100			150
	100	200			300
1984	150	500			650
		800	200		1,000
1985		800	200		1,000
		500	200		700
1986			200	200	400
			200	200	400
1987			200	200	400
			200	200	400
1988			200	200	400
	100*	100	200	200	600
1989	50	50	200	250	550
	50		200	250	500

*Modified in-situ development begins.

Peak construction is expected to require 1,000 persons from 1984 to 1985. Approximately 500 persons would be required during peak operation of the facility.

CONSTRUCTION/OPERATIONS SCHEDULE

The general project schedule which is subject to change based on completion of additional environmental assessment and right-of-way grants would be as follows:

Begin construction	April 1983
Begin surface retorting operations	January 1986
Begin modified in situ operation	1988 through 1989

EMISSIONS

The following air pollutants would be emitted:

TOTAL CONTROLLED AIR EMISSIONS[a]

Pollutant	Emission Rate (kilograms per hour)
Total Suspended Particulates	46
Sulfur Oxides	270
Nitrogen Oxides	222
Carbon Monoxide	22
Hydrocarbons	9

[a]Combined emissions from surface and in-situ retorting operations

The Air Quality Technical Report (Systems Applications Inc. 1982) discusses the control technology assumptions used to determine these emission rates.

LIQUID EFFLUENTS

Major sources of wastewater from the proposed facility would include:

- Retort operations (including power generation);
- Effluent from line drainage, mine dewatering, and dust scrubbing operation;
- Raw water treatment plant effluent;
- Sanitary and sewage treatment system effluent;
- Leachate from spent shale or raw shale piles;
- Site runoff water.

All waste water would be treated as necessary for reuse in dust control and shale disposal and other process water requirements. There would be no discharge of waste water from the site.

If retort waters produced during the in-situ process exceed the amount that can be reused and/or evaporated, the waters would be reinjected underground.

SOILD AND HAZARDOUS WASTES

Retorted shale generated by the facility would amount to 6.6 million tons per year or 5.5 million cubic yards per year of compacted material. A disposal pile would be constructed near the plant site and is expected to cover 600 acres for the life of the project. Retorted shale would be conveyed to the disposal area where the retorted shale would be formed into a stable, impervious, and erosion-resistant land mass.

A retention dam of compacted spent shale would be constructed down-gradient of the disposal pile to prevent any runoff or leachate from reaching surface waters.

Non-hazardous wastes and refuse would be collected and disposed in an on-site landfill. The wastes may include non-saleable sulfur, Stretford chemical wastes, sludges from water treatment and shale oil tank bottoms.

Any hazardous wastes generated from the process would be disposed in an approved off-site facility.

APPENDIX A-3

SOHIO ASPHALT RIDGE TAR SAND PROJECT

Sohio Shale Oil Company (Sohio) Asphalt Ridge Project is a proposed two-phase tar sand development involving a pilot plant and a commercial plant. The pilot tar sand processing plant would be constructed to demonstrate a solvent-assisted extraction process and to prove design information for a larger commercial plant to be constructed later.

LOCATION

The site is located on Asphalt Ridge in Uintah County, southwest of the community of Vernal, Utah (Map R-A-1, located in Appendix R-A).

MINE

The mining plan would include three open pits: one at the north end of the property, one near the middle, and one at the south end. The distance from the northern end to the southern end is 14 miles.

The mines would provide enough tar sand to produce 20,000 barrels per stream day (bpsd) of crude tar sand oil (bitumen) for a project life of 20 years.

PILOT PLANT FACILITY

The pilot plant would be located in the northwest quarter of the southwest quarter of Section 31, Township 5 South, Range 22 East.

Ore in small lots (totalling less than 5,000 tons) would be stockpiled at the pilot plant site. These tar sands would be transported from the stockpile to a feed bin by a front-end loader. Lean ore requiring crushing would pass through a portable crusher before delivery to the feed bin.

The extraction process is a solvent-assisted counter-current process. The tar sand would be conditioned with water at 150° to 190° F and diluted to 60 to 70 percent solids. Conditioning would be followed by an addition of solvent at 150° to 190° F in an extraction column. This extraction column is a Sohio development covered by U.S. Patent Number 4,067,796 entitled "Tar Sands Recovery System." The solvent-bitumen mixture would proceed to a solvent stripping column, and the solvent would be condensed for reuse in the extraction column. The condenser would be cooled by a closed loop cooling system.

COMMERCIAL EXTRACTION PLANT

The commercial extraction facility is under study at this time. Factors which would influence the type and location of this facility would depend on information obtained from the pilot plant testing and from a mining study. The plant would probably be located near the pilot plant with the process being very similar.

UPGRADING PLANT

Upgrading facilities for the commercial plant have not been finalized but would probably utilize upgrading processes to produce a high quality synthetic crude from 20,000 bpsd of extracted bitumen. This crude could be refined in existing nearby refineries. Processing facilities envisioned for the commercial plant include diluent recovery, coking or hydrocracking, hyrotreating, sulfur and nitrogen removal, sulfur recovery, and process water treating. Off-site facilities including a utility plant and waste water treating facility would also be required for this plant.

TAILING DISPOSAL

The present concept of tailing disposal is to provide tailing disposal areas of sufficient size to allow the open pit mining to expand to a point where future tailings can be disposed of in the mined-out pit areas.

PRODUCT TRANSPORTATION

Sohio's upgraded crude line would connect or parallel existing lines as much as possible. The upgraded crude could then go to market by either joining Chevron's 10-inch diameter line which terminates in Salt Lake City or pipelining to Rangely, Colorado, for distribution to the midwest region of the United States.

WATER SUPPLY

Water for the facilities can be pumped from the Green River. Sohio Shale Oil Company owns an approved water right application for 5 cubic feet per second of Green River flow; application No 29105 (49-219). The water line routing from Sohio's Green River pump stations to the extraction and upgrading facilities would be confined to the lands controlled by Sohio. On an annual basis, 3,620 acre-feet of water would be used.

ELECTRICAL SUPPLY

An existing power line with a 500 Kilovolt amps (KVA) substation used for previous pilot plants is already in place at the pilot plant site.

For the full scale commercial plant electricity would likely be supplied from the Utah Power and Light Ashley Valley substation approximately six miles away.

EMISSIONS

Air emission sources include the fired heaters, storage tanks, and fugitive emissions. The following pollutants would be emitted:

MAXIMUM TOTAL CONTROLLED AIR EMISSIONS
(Commercial Facility)

Pollutant	Emission Rate (kilograms per hour)
Total Suspended Particulates	644
Sulfur Oxides	373
Nitrogen Oxides	327
Carbon Monoxide	29
Hydrocarbons	88

The Air Quality Technical Report (Systems Applications Inc. 1982) discusses the control technology assumptions used to determine these emissions rates.

LIQUID EFFLUENT

Wastewater would be reused or would evaporate, resulting in a zero discharge.

SOLID AND HAZARDOUS WASTES

Any solid or hazardous wastes that would be produced during the process would be disposed in an approved manner.

OTHER FACILITIES

Sanitary facilities would be designed and constructed to local and state codes. Water would treated on site to provide potable water during commercial operations. Ancillary facilities such as offices, laboratory, sample preparation facilities, shop, warehouse, and steam generator would be housed in a single building and trailers would be used as required.

CONSTRUCTION SCHEDULE AND WORK FORCE

Construction of the commercial plant would start in 1986 and finish in 1988. A peak work force of 1,525 would occur in 1987.

OPERATION SCHEDULE AND WORK FORCE

Operation of the commercial plant would start in 1988 with full production anticipated in 1989. Full production work force would be 820 people.

SOCIOECONOMICS

This appendix includes an explanation of the interrelated projects considered in the socioeconomic cumulative impact analysis and a discussion of the Utah Process Economic and Demographic Impact Simulation Model.

INTERRELATED PROJECTS

The projects planned for development in the Uintah Basin that were not included in the socioeconomic baseline projections, but that were determined to have impacts that would interrelate with those of the applicants' proposed projects are identified in Table A-4-1. The direct employment assumptions used for these projects are identified in this table.

UTAH PROCESS ECONOMIC AND DEMOGRAPHIC MODEL

The Utah Process Economic and Demographic Impact Simulation (UPED) Model is the official model used by the Utah State Planning Coordinator's Office to project population and employment growth in the state. The UPED model is a hybrid of two standard population and economic projection methodologies: (1) the cohort survival model and (2) the economic base model. In the three-component, cohort survival population model, future population levels are projected from base year figures by adding births, subtracting deaths, and adding net in-migration or subtracting net out-migration. The values of each of the three components of population change (births, deaths, and migration) are projected as a function of the initial year values and the resultant increments are added or subtracted to generate the first projection year's values. The process is then repeated to generate the second projection year's values and so on to the last projection year. The population is disaggregated into appropriate subgroups, called cohorts, whose values are projected over time. In UPED, sex and single year of age cohorts are used. Through the projection years, of course, each cohort ages and its behavior with respect to demand for goods and services, labor force participation, fertility, mortality, and geographic mobility varies with the aging process.

According to the economic base concept, for all but the largest (national-continental regions), the primary determinant of the level of economic activity, and consequently of population size, is the amount of goods and services produced for export to other areas. Increases or decreases in basic (export) employment produce corresponding changes in the number of households deriving their income from these sectors. These changes, in turn, produce changes in the demand for goods and services produced locally for the local consumption. (These local production/local consumption activities are referred to variously as non-basic, service, residentiary, or population dependent sectors.) Initial changes in population dependent sectors, in turn, produce changes in population and in household incomes, which generate further

TABLE A-4-1

DIRECT EMPLOYMENT ASSUMPTIONS FOR INTERRELATED PROJECTS
(Not Included In Baseline)

Project	Barrels of Oil	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
White River Shale	100,000															
Const-camp[a]		0	90	915	515	175	515	1,195	2,020	1,900	1,470	1,440	810	140	0	0
Const-noncamp[b]		0	85	915	515	170	515	1,195	2,015	1,895	1,470	1,440	810	140	0	0
Operations		0	0	10	70	370	840	885	990	1,285	1,865	2,215	2,490	3,040	3,355	3,355
C and A Tar Sand	20,000															
Const-camp		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Const-noncamp		0	45	0	125	200	225	0	0	0	0	0	0	0	0	0
Operations		0	0	0	65	145	320	320	320	320	320	320	320	320	320	320
Bonanza Power Plant (Unit 2)	NA															
Const-camp		0	0	0	0	0	0	0	100	100	100	100	100	0	0	0
Const-noncamp		0	0	0	0	0	0	0	280	406	681	592	200	0	0	0
Operations		0	0	0	0	0	0	0	0	20	20	66	80	80	80	80
Deserado Mine	NA															
Const-camp		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Const-noncamp		0	0	0	0	0	0	0	5	100	38	0	0	0	0	0
Operations		0	0	0	0	0	0	0	9	94	218	240	240	240	240	240
Water Development Projects	NA															
Const-camp		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Const-noncamp		0	0	0	10	20	40	50	80	130	170	110	30	3	0	0
Operations		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White River Dam	NA															
Const-camp		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Const-noncamp		0	94	94	36	36	0	0	0	0	0	0	0	0	0	0
Operations		0	0	0	0	5	5	5	5	5	5	5	5	5	5	5
Western Tar Sand	5,000															
Const-camp		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Const-noncamp		0	25	0	0	50	50	0	0	0	0	0	0	0	0	0
Operations		0	4	4	4	0	0	7	7	7	7	7	7	7	7	7
Ramex	NA															
Const-camp		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Const-noncamp		0	50	50	0	0	0	0	0	0	0	0	0	0	0	0
Operations		0	0	0	50	50	50	50	50	50	50	50	50	50	50	50
GRAND TOTAL	125,000															
Const-camp		0	90	915	515	175	515	1,195	2,120	2,000	1,570	1,540	910	140	0	0
Const-noncamp		0	299	1,059	686	476	830	1,245	2,380	2,531	2,359	2,142	1,040	143	0	0
Operations		0	4	14	189	570	1,215	1,267	1,381	1,781	2,485	2,903	3,192	3,742	4,057	4,057

NOTE: NA = not applicable.

[a]Refers to construction workers who would live in a construction camp.

[b]Refers to construction workers who would not live in a construction camp.

changes until, finally, a given projected initial change in basic sector employment will produce a "multipliered" change in population dependent and local employment as well as in population.

In UPED, the economic base methodology is adapted to affect population projection through the migration component. Population projections, in turn, generate residentiary employment for each level of basic employment. Thus, the cohort survival and economic base methodologies are combined in UPED to form a complex systems model. The workings of the UPED Model and of its key data requirements are presented in Figure A-4-1. The top three boxes represent the natural increase (births and deaths), again, and the non-employment related part of the migration components of UPED's population project methodology.

The initial (year t) population, consisting of a census-type count or estimate of all people residing in the area by age and sex is adjusted to reflect the temporary absence of some individuals who are permanent residents (an increase) and/or the temporary presence of individuals who are not permanent residents (a decrease). Relevant categories here include college students, military, and LDS missionaries. The resultant estimate of the permanent resident population is then survived by applying cohort specific survival rates. The result is the subset of the initial resident population expected to still be alive the next year. Members of each cohort have aged one year. The aged-survived population is adjusted to reflect projected levels of temporary absence (a decrease) or presence (an increase) and permanent non-employment related in-(increase) and out-(decrease) migration. Total births are projected by applying a vector of age specific birth rates to the female component of this adjusted aged-survived population. Infants' sex composition and infant mortality are also projected at this stage. The result of these calculations, as shown in Box 3, is the Adjusted Natural Increase Population at Year t+1, which becomes the initial estimate of population in that year (Box 4).

The first approximation population projection is the source of two elements of Labor Market Analysis: (1) the initial (pre-employment related migration) Labor Force and (2) initial Population Dependent Job Opportunities at Year t+1 (Boxes 5 and 6, respectively). The Labor Force is derived by applying projected age and sex specific labor force participation rates to the projected population. The projected participation rates are dependent upon both extrapolations of their secular trends and year-to-year changes in area economic opportunity.

Population dependent job opportunities are projected as dependent upon (1) the size and age composition of the population, (2) projected sector specific ratios of area per capita residentiary employment to national employment per capita, and (3) projections of national residentiary employment by sector and/or national popultion by cohort. Thus, changes in the size and/or demographic composition of the population, in the capability of the area to produce goods and services for its own consumption, and/or national economic and demographic conditions can all influence the projection of each sectors population dependent job opportunities. The most critical operational assumptions here are the local-national per capita residentiary employment

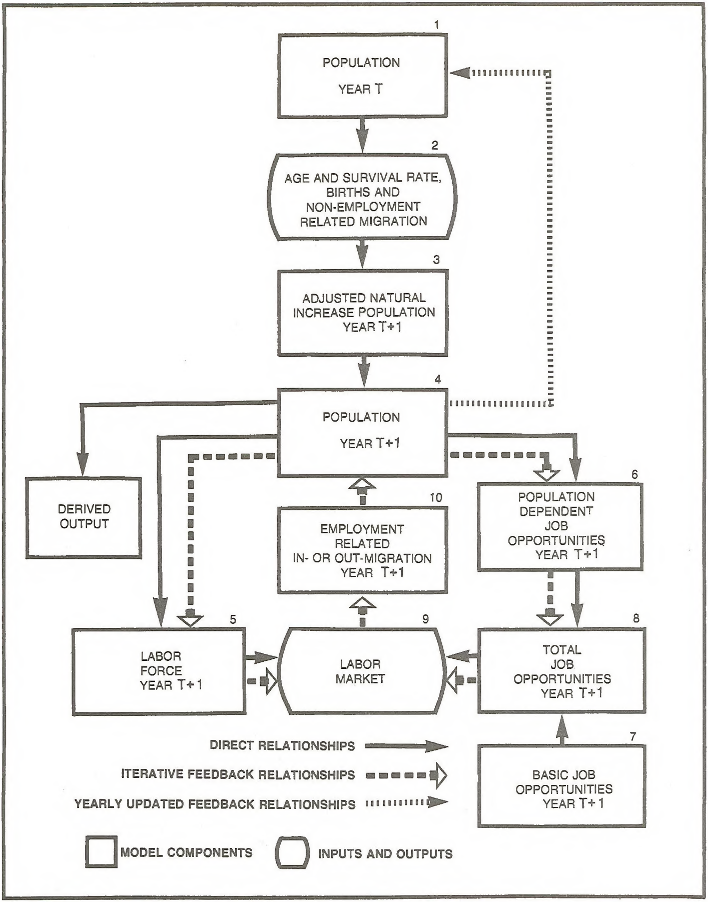

FIGURE A-4-1. UTAH PROCESS AND DEMOGRAPHIC IMPACT SIMULATION MODEL GENERAL FLOW CHART

relatives. Of special importance is the ability to adjust these assumptions to reflect structural changes as market expansion leads to import substitution possibilities.

As Box 7 indicates, basic employment demand is exogenously projected by sector and treated parametrically in UPED. These projections of basic employment are varied to reflect the different economic developments to be analyzed. For example, to project the impacts of a particular power plant, the direct basic employment by industrial sector involved in constructing and operating the plant would be added to a baseline basic employment projections and the sum would serve as the basic job opportunities input for that power plant's UPED run.

Basic and population dependent job opportunities are summed to produce Total Job Opportunities at Year t+1 (Box 8). This, initial value for both the supply of and demand for labor are introduced into the Labor Market component of UPED, where they are used to calculate the projected unemployment rate as an index of the area's economic opportunities. This rate is compared against a parametrically established "normal" range of unemployment rates. If it is higher than the upper bound of the range--the out-migration triggering rate--this is taken to indicate inadequate opportunities for the natural increase population and Employment related Out-Migration at t+1 is projected. Alternatively, if it is below the lower bound--the in-migration triggering prosperity is indicated and Employment Related In-Migration at Year t+1 is projected.

The amount of migration projected is sufficient to provide the labor force required to adjust the unemployment rate to the relevant triggering rate, assuming no change in population dependent job opportunities. The demographic detail of this migration reflects cohort difference in (1) labor force participation rates, (2) migration propensities, and (3) the composition of the source population (local population for out-migration, national population for in-migration).

Of course, the assumption stressed in the previous paragraph, that job opportunities do not change as a result of migration, is invalid. The migration of workers and their families increases or decreases population dependent job opportunities. This first short dash arrows in Figure 7 indicate the interactive nature of the UPED solution to this inter-dependence problem. The iterative process continues until the calculated unemployment rate is satisfactorily close to the relevant triggering rate, at which time solution is achieved and no further migration or employment changes are calculated. Final population, migration, and employment outputs are presented with the former being used to derive projections of households, labor force, and school age population. The solution value for projected population is then fed back into the Model (long dash arrow in Figure A-4-1 to serve as the initial population vector for the next projection year.

AIR QUALITY ANALYSIS METHODOLOGY

This appendix provides a more thorough discussion of the methodology used to develop the air quality analysis that was presented in Chapter R-4.A.2. It is intended to provide interested readers a fairly detailed description of the rationale for model selection, including the advantages and limitations of each model used, the conditions assumed when applying the model, and the interpretation of model results. Also presented is information on wind data used, emissions inventory data and methodology, and the site-specific projects and regional visibility analysis. If additional information is desired beyond what appears in this appendix, refer to the Air Quality Technical Report (Systems Applications Inc. 1983).

WIND DIRECTION PATTERNS IN THE STUDY REGION

Figure A-5-1 compares the annual morning wind-direction frequency distribution at the 150-meter, 300-meter, 500-meter, and 1,000-meter levels at tracts U-a and U-b, C-b, and at Craig and Grand Junction. In the mornings, at all sites, there is a large variation in wind speed and direction between levels. The shape of each site's wind-direction distribution curves (shown in Figure A-5-1) is unique at the lower levels, but each merges towards the west-southwesterly upper-air flow. This demonstrates the significant effect complex terrain has on lower-level wind directions.

The distribution profiles of wind direction for each level (shown in Figure A-5-2) indicate differences in morning and afternoon wind patterns. In general, the variation in wind direction with height above the ground, is much less at all sites in the afternoon and the winds at the lower levels tend to be more westerly, as are the 1,000-meter winds (which change little from the morning). This phenomenon occurs because the atmosphere is well-mixed in the afternoon, and the surface winds become coupled with the steady, persistent upper-level winds.

In the afternoon at U-a/U-b, northwesterly up-slope flow (penetrating up to 500 meters) tends to occur more frequently over a deeper layer than does the morning drainage flow. Low-level wind speeds increase in the afternoon, but they still do not approach the wind speeds at C-b.

EFFECT OF TERRAIN ON WIND FIELDS

The descriptions in this section of the effect of the complex terrain (hills, mountains, and valleys) in the study region are substantiated by the wind field modeling work performed as part of this analysis. The Air Quality Technical Report (Systems Applications Inc. 1983) displays the computed wind fields for the lowest of the three atmospheric layers modeled, which is about 2,500 feet (780 meters) thick and extends from the terrain or 4,300 feet above mean sea level (MSL), whichever is highest, to 6,800 feet MSL. Winds are

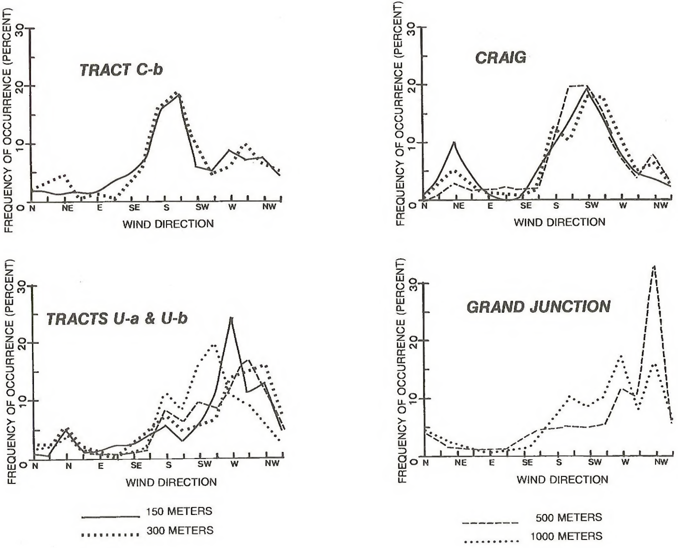

FIGURE A-5-1 WIND DIRECTION FREQUENCY DISTRIBUTIONS FOR ALL MORNING SOUNDINGS

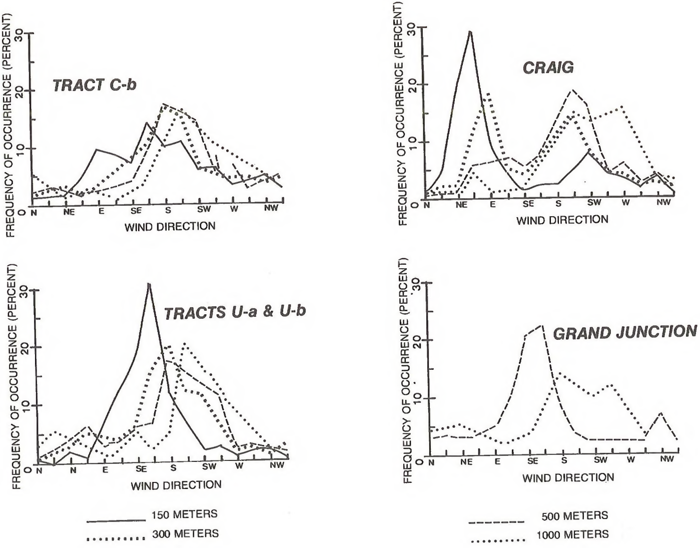

FIGURE A-5-2 VERTICAL WIND DIRECTION DISTRIBUTION PROFILES FOR ALL AFTERNOON SOUNDINGS channeled through valleys (the White, Green, and Colorado river basins), and winds are accelerated and decelerated by the effects of complex terrain.

EMISSION INVENTORY DEVELOPMENT

Information was submitted by all project applicants for use in estimating the direct emissions from each facility. The materials submitted by the applicants were reviewed to ensure that the estimates were reasonable, thorough, and accurate; in some cases, additional information was requested. The review focused primarily on the following emission-related areas:

- Process description
- Emission factors
- Activity data
- Anticipated control technology
- Stack parameters

The data for each applicant formed the initial basis of each project's emission estimates. Inventories for each project were constructed for both high and low levels of production. In certain instances, engineering judgment was used to complete the inventories for the synfuel projects. In addition, because of the large number of emission points at some projects, the smaller emission rates were consolidated into fewer emission points for the regional modeling cases in which this activity was technically justified; this effort reduced the complexity and cost of the regional modeling activities. In the case of near-source modeling, each emission point at a project was located by means of UTM coordinates, and stack data were developed for each point.

Tables A-5-1 and A-5-2 provide the production rates and direct emission totals for each of the Utah synfuel projects at the high and low levels of oil shale and tar sands production. Available emission estimates for selected non-criteria pollutants for the proposed projects are shown on Table A-5-3. As shown in these two tables, emission rates vary considerably from one project to another. This variation is due to several aspects of the proposed projects including process design, production rate, and emission control technology design. For example, Geokinetics proposes to employ an in-situ oil shale extraction process, unlike the other Utah projects which are aboveground processes. Geokinetics is in an early stage of design; future designs may alter emission rates considerably from those presented in the tables. Similarly, emission levels for Sohio are quite different between the high- and low-oil-production scenarios. This variation results from different assumed fuels and levels of control for steam generation at the Sohio tar sands facility.

Utah population data and projections were used to generate secondary area source emission files for the portion of Utah in the study region for the 1980 baseline and for future low- and high-oil-production scenarios. Information concerning Colorado point and area source emissions and Utah population projections were obtained from a study performed for the National Park Service by PEDCo (1981).

TABLE A-5-1

PRODUCTION AND EMISSION RATES FOR APPLICANTS' SYNFUEL PROJECTS
High-level Scenario

		Emission (kilograms per hour)[a]				
Project	Production (Barrels/day)	Sulfur Dioxide	Particulate Matter	Nitrogen Oxides[b]	Total Hydrocarbon	Carbon Monoxide
Enercor/Mono Power	55,000	111	233	123	38	33
Geokinetics	70,000	1,799	159	744	40	22
Magic Circle	31,500	147	107	823	4	53
Paraho	42,000	182	97	482	14	72
Sohio	20,000	373	644	327	88	29
Syntana-Utah	57,000	128	129	746	81	64
Tosco	45,000	94	127	786	183	9
TOTAL	320,500	2,834	1,496	4,031	448	282

Note: This table contains the emission rates used in the air quality modeling analysis. Some of the production numbers vary slightly from production numbers in the description of each proposed action. However, these numbers were used for analysis purposes.

[a]1 kilogram per hour = 9.66 tons per year.

[b]Nitrogen oxides emissions expressed as NO_2.

TABLE A-5-2

PRODUCTION AND EMISSION RATES FOR APPLICANTS' SYNFUEL PROJECTS
Low-level Scenario

Project	Production (Barrels/day)	Emission (kilograms per hour)[a]				
		Sulfur Dioxide	Particulate Matter	Nitrogen Oxides[b]	Total Hydrocarbon	Carbon Monoxide
Enercor/Mono Power	20,000	40	79	45	13	12
Geokinetics	31,000	764	71	331	18	12
Magic Circle	16,400	73	51	420	2	33
Paraho	10,500	45	54	105	3	21
Sohio	5,000	1	136	25	22	16
Syntana-Utah	16,500	40	38	230	18	19
Tosco	22,000	46	62	385	90	4
TOTAL	121,400	1,009	491	1,541	166	117

[a]1 kilogram per hour = 9.66 tons per year.

[b]Nitrogen oxides emissions expressed as NO_2.

TABLE A-5-3

EMISSION ESTIMATES FOR SELECTEO NONCRITERIA POLLUTANTS[a]
(tons per year)

Project	Lead	Fluorides	Asbestos	Beryllium	Mercury	Vinyl Chloride	Hydrogen Sulfide	Reduced Sulfur	Total Reduced Sulfur	Sulfuric Acid Mist
Magic Circle	0.023	0.93	nil	0.001	0.05	nil	nil	nil	nil	16.1
Paraho	?	2.9	nil	nil	nil	less than 1.0	less than 10.0	less than 1.0	less than 1.0	17.7
Syntana-Utah	0.22	0.86	nil	nil	nil	0.08	0.05	0.07	0.10	14
Tosco	0.04	0.965	?	0.00071	0.0018	?	less than 9.8	?	?	?
EPA de minimis values	0.6	3.0	0.007	0.0004	0.1	1.0	10	10	10	7

[a]From PSO permit application submittals. No data is available from Enercor/Rainbow.

Future point sources other than the seven applicants' synfuel facilities were included in the emission estimates for Uintah and Grand counties in Utah. Eight other planned projects had significant emission rates; of these, three were estimated to account for the majority of total emissions from other planned projects in Utah:

Bonanza Power Plant, Unit 2
Plateau refinery expansion
White River Oil Shale Project

Emission and stack parameters for the eight other planned projects were developed from information regarding each facility's source type, operating process, activity data, and proposed controls. In some cases, the conceptual nature of a particular project requires considerable judgment to estimate the emission rates. Emission totals for the large facilities and for the other planned projects are listed in Table A-5-4.

Full production conditions--100 percent design capacity--were used to estimate all the components in the inventories. Unlike the variable effects of a malfunction, full capacity can be quantified and thus was used to derive the inventories. The effects of nonaverage conditions such as startups and malfunctions are covered during the permit review process by air pollution control agencies.

Average operating conditions were assumed for developing the emission inventories. This means that variations in normal operations from hour to hour, day to day, and month to month were averaged in arriving at emission rates. This is a typical procedure commonly employed in deriving emission inventories.

UTAH BASELINE POINT SOURCES

Emissions for existing point sources with significant emission rates were developed from available data. First, the State of Utah emission files for Utah counties within the grid region (primarily Uintah and Grand counties) were reviewed. As a result of these reviews, two point sources were identified for the Utah baseline point source file:

Bonanza Power Plant, Unit 1
Plateau refinery

The first power plant unit for the Bonanza facility was placed in the existing point source file, because construction of this facility has begun. The existing Plateau refinery located in Duchesne County was also included because of its relatively significant emissions. Emission and stack data for the Bonanza Power Plant were taken from the EPA Prevention of Significant Deterioration (PSD) permit, whereas, comparable data for the existing Plateau facility were derived from the State of Utah 1980 emission data. Table A-5-5 lists the emission data for these two facilities.

TABLE A-5-4

EMISSION TOTALS FOR OTHER PLANNED PROJECTS IN UTAH
(kilograms per hour)[a]

Project	Sulfur Dioxide	Particulate Matter	Nitrogen Oxides[b]	Total Hydrocarbon	Carbon Monoxide
Bonanza Unit 2	95	55	1,012	0	0
Plateau Expansion	29	44	58	245	67
White River	136	197	827	165	381
Additional Projects (5)	195	80	99	93	6
TOTAL	455	376	1,996	503	454

[a]1 Kilogram per hour = 9.66 tons per year.

[b]Nitrogen oxides emissions expressed as NO_2.

TABLE A-5-5

EMISSION TOTALS FOR BASELINE POINT SOURCES IN UTAH
(kilograms per hour)[a]

Project	Sulfur Dioxide	Particulate Matter	Nitrogen Oxides[b]	Total Hydrocarbon	Carbon Monoxide
Bonanza Unit 1	95	55	1,012	0	0
Plateau Refinery	4	6	432	291	62
TOTAL	99	61	1,444	291	62

[a]1 Kilogram per hour = 9.66 tons per year.

[b]Nitrogen oxide emissions expressed as NO_2.

The Colorado emission estimates were used in the modeling portion of the Systems Applications Inc. study.

UTAH BASELINE AREA SOURCES

Available emission inventory data for existing area sources in eastern Utah were very limited. Consequently, it was necessary to develop this information from the available data concerning area source activities. Appropriate activity data such as fuel use by sector, agricultural operations, gasoline sales, and traffic counts were then obtained from several information sources. These data were combined with the same emission factors used by PEDCo for Colorado area sources. The result was a set of emission inventories by source category for each of the two primary Utah counties in the study region--Uintah and Grand. The inventories are generally representative of 1980 conditions. Allocation factors were used to assign emissions from each category to specific 10-kilometer-square grid cells. The emission totals for baseline area sources in Utah are shown in Table A-5-6.

COLORADO EMISSION SOURCES

Emission rates for Colorado sources in the study region appear in the Air Quality Technical Report (Systems Applications Inc. 1983). The Colorado emission rates used by Systems Applications Inc. were taken from the PEDCo (1981) report.

A more detailed description of the determination of emission source terms is found in the technical report (Systems Applications Inc. 1983).

DESCRIPTION OF MODELING APPROACHES

In this section, the approach adopted for the analysis of regional-scale air quality and visibility impacts resulting from oil shale development in the Uintah Basin and in Colorado, and from other existing and anticipated emission sources is described.

More detailed description of the determination of emission source terms is provided in the technical report (Systems Applications, Inc. 1983).

MODELING METHODOLOGY

The complex dispersion processes that occur in the rugged terrain of the study region, the large size of the modeling region, and diverse temporal scales (3-hour, 24-hour, and annual averages) strain the capabilities of almost all routinely applied air quality models. The simple models (e.g., VALLEY, CRSTER, and COMPLEX), which have been previously applied to some of the proposed facilities studied here, are recognized as having serious shortcomings on a regional scale in this setting; among the most serious are:

TABLE A-5-6

EMISSION TOTALS FOR BASELINE AREA SOURCES IN UTAH
(kilograms per hour)

County	Sulfur Dioxide	Particulate Matter	Nitrogen Oxides	Total Hydrocarbon	Carbon Monoxide
Uintah	36	5,310	219	274	2,636
Grand	36	1,495	219	190	1,538

- Inability to treat spatially and temporally varying wind fields.

- Inability to treat spatially and temporally varying dispersion rates.

- Inability to properly treat the effects of topography, slope winds, and other physical processes in complex terrain (assuming instantaneous and straight-line plume transport).

- Limited ability to treat chemical transformations and removal mechanisms.

Furthermore, the model applications carried out thus far have not been extensive (i.e., allowing the assessment of cumulative impacts from all proposed developments) or consistent enough to contribute to a comprehensive impact assessment.

To achieve the study objectives, a modeling methodology was selected to assess cumulative impacts of future oil shale and other associated and nonassociated development on a regional scale, resolved to averaging periods of 3 hours, 24 hours, and 1 year, within the states of Colorado and Utah. The methodology selected is based on the utilization of several sophisticated component models: the Systems Applications Inc. Complex-Terrain Wind Model, the Systems Applications Inc. Gaussian Puff Model, the Systems Applications Inc. Regional Transport Model, the EKMA model, and the Systems Applications Inc./EPA PLUVUE model. In addition, EPA's COMPLEX-I model was applied for calculations of concentrations very near emission sources. Each model component was intended to serve a purpose that is specific to the strengths of its particular formulation and that complements the strengths of the other components.

The following models were used:

- Gaussian Puff Model (GPM) applied for every 3-hour period in the modeled year (1978).

- COMPLEX-I applied for every 3-hour period in the modeled year for receptors near sources for which individual emission points were aggregated in GPM calculations.

- Regional Transport Model (RTM) applied for every hour in four 48-hour episodes of interest with respect to long-range transport and regional impacts at sensitive receptors (Flat Tops Wilderness and Dinosaur National Monument).

Each of these models has distinct strengths and limitations. Because of source aggregation, GPM is not well-suited to the calculation of near-source impacts, especially for sources with multiple ground-level release points. It is suspected that assumptions regarding puff diffusion used in GPM are not appropriate, particularly at large distances downwind from a source. Thus, it appears appropriate to supplement the estimates of near-source and long-range ground-level air quality impacts calculated using GPM with additional estimates on the basis of COMPLEX-I and RTM calculations, respectively.

Descriptions of the rationale behind the use of each model and the way each is used are given below.

Use of COMPLEX-I

- It is a model developed by EPA, and is currently being evaluated by that agency.
- It is relatively inexpensive and simple to apply.
- A meteorological data base was available for its application.
- Near the source, its formulation is nearly equivalent to those of more sophisticated and expensive models.

Further, from the source (beyond 5 to 10 km), some well-known deficiencies of COMPLEX-I and other Gaussian plume models become limiting, especially in rugged terrain such as the terrain in the study area. Among the more serious of these deficiencies are:

- Assumptions of spatially constant winds and dispersion.
- Assumption of instantaneous transport.

More sophisticated models are required to overcome those deficiencies at moderate to long transport distances.

For Utah sources, COMPLEX-I was applied using 1978 U-a/U-b 10-meter tower wind and delta data. The seasonal and diurnal variations in mixing depths suggested by Holzworth (1972) were used to construct an hourly mixing depth input for Utah and Colorado sources. For Colorado sources, the 1975 C-b or 1975 C-b 10-meter tower data (wind and delta T) were used, depending on the location of each emitting facility in relation to the measurement sites.

Use of the Complex-Terrain Wind Model (CTWM)

CTWM utilizes surface and upper air wind data, as well as, information on stability, terrain, surface roughness, and temperature distribution to generate three-dimensional wind flow fields, taking into account physical processes which occur in complex terrain. Upper air data from Salt Lake City, Denver, Lander, and Grand Junction and surface wind data from four U-a/U-b sites were used.

Surface winds measured at several sites in the modeling region during 25 randomly selected hours during 1978 were compared with the corresponding winds predicted by the model. The comparison showed that the predicted surface wind directions were within 45^{o} of the measured wind directions on all but two occasions. Predicted wind speeds were within 30 percent of the measured wind speeds in all but four instances where they were within 60 percent of the measured speeds.

Use of the Gaussian Puff Model

The Gaussian Puff Model (GPM) was used with CTWM-generated wind fields to overcome some of the major shortcomings of COMPLEX I for medium to long transport distances. GPM was used because of its capability to accommodate spatially and temporally varying wind fields and dispersion rates and CTWM's capability to provide a better definition of winds in complex terrain. GPM was run on a regional scale (268 x 180 km) and a subregional scale (110 x 110 km) using CTWM modeled winds for every 3-hour period in 1978. The regional scale model runs used a 12 km grid spacing, 3-hour time steps, and Pasquill D stability class. The subregional model runs used a 5 km grid spacing for better resolution close to the emission sources, 1-hour time steps, and time varying stability.

Use of the Regional Transport Model (RTM)

RTM was used for calculation of worst-case, short-term, regional scale concentration averages because it is better suited than GPM for treating the dispersion of pollutants from many sources over long transport distances and times. It is Systems Applications Inc. opinion that RTM is more physically appropriate than GPM, because RTM allows for variations in wind and diffusivity across a puff, whereas GPM cannot. RTM was too costly to run for an entire year, so its purpose was to provide estimates of short-term (3-hour and 24-hour) concentration averages for the worst-case episode identified by GPM when run for an entire year. RTM was run in 1-hour time steps for a 268 x 180 km region with 4-km grid spacing for four 48-hour worst-case episodes identified by GPM. CTWM was run in an hourly mode to generate the wind data for the 48-hour period.

Use of the Empirical Kinetic Modeling Approach (EKMA)

The two-dimensional photochemical model (OZIPM or Level II-EKMA) was used to study photochemical pollutants (ozone) impacts due to secondary development associated with the synfuels development. The modified version of EKMA was used to account for chemical reactions in rural areas which involve largely methane, carbon monoxide, and trace organics, such as naturally occurring terpenes.

Estimation of Baseline TSP Levels

For most of the monitoring locations in the study area, TSP ambient air quality standards are exceeded. The primary cause of these exceedances is most likely windblown dust and dust from unpaved and gravel roads.

Utilizing the TSP emission inventory developed for the study region, Systems Applications Inc. looked at the emissions in locations for which they had TSP ambient data. A high correlation between local TSP emissions and ambient concentrations was found. On the basis of these correlations, Systems Applications Inc. developed empirical models to calculate the existing baseline ambient TSP concentrations for the study region. The 24-hour and annual average isopleth maps are shown in the technical report. Ambient-annual average TSP concentrations in excess of the air quality standards are predicted to exist in the Colorado River basin (near Grand Junction and Rifle) in the southeastern portion of the study region, and near Craig, Colorado, and Vernal, Utah. Systems Applications Inc. estimated that annual-average TSP concentrations in most other sites in the study area are currently within the range of 20 to 40 ug/m^3. Maximum 24-hour average concentrations were predicted to be higher than the NAAQS for much of the study region.

Concentration Estimation Approach

A variety of modeling approaches were used in the analysis of regional air quality impacts. For ground-level concentration estimates, the Gaussian Puff Model (GPM) was exercised for every 3-hour period in an entire year based on regional meteorological conditions in the region. The GPM results were used to identify, for each gridded receptor in the region, the maximum 3-hour and 24-hour concentrations (occurring at different times, at different receptors) and the annual average concentrations. The maximum concentrations thus identified are expected to be upper-bounds estimates of the future maximum concentrations in the region for a number of reasons.

The expected conservatism of the Gaussian Puff Model is due to several factors:

Puffs are diffused assuming Pasquill D dispersion coefficients; this is conservative at long range (greater than 25-50 km). Considerable dispersion results from the effects of complex terrain on turbulence. Complex terrain considerably enhances plume dilution. Also, additional dilution is expected to result from daytime heating and resultant convective mixing throughout the mixed layer. These processes rapidly result in uniform vertical mixing throughout the mixed layer (the convective boundary layer) which is typically 1,000 meters to over 4,000 meters thick. By comparison, the vertical dispersion coefficient for Pasquill D stability at 50 km is 320 meters. Dispersion conditions during the daytime are typically Pasquill A, B, or C. The difference of just one stability class (from Pasquill D to C) is a reduction in short-term concentrations by a factor of more than 5 and in annual averages by a factor of more than 2.

Puffs are assumed to be transported by the portions of the wind field that are at the centroid of puff mass. This assumption is conservative at long distances where puffs are large because a complex wind field will tend to transport different portions of the puffs in different directions. This effect is much larger than the dilution resulting from the small-scale turbulence that is accounted for in the Pasquill scheme.

The GPM model results are also conservative for near-source impacts (less than 25 km) where there are multiple, ground-level releases of emissions at a given facility (e.g., TSP). In this analysis, because of cost considerations, multiple emissions (there are as many as 30 TSP emission sources at oil shale facilities) are treated as emissions from a single point in the center of the emission source. To more rigorously model the near-source impacts of multiple ground-level emissions, COMPLEX-I was used.

Furthermore, wind field definition in GPM is based upon upper level wind characterization, which is appropriate for long-range transport. For short-range, near-source calculations, lower-level or surface winds are more appropriate, and these exhibit a larger amount of temporal variability than upper level wind and, hence, would result in lower concentration averages. An even greater degree of conservatism is added to GPM by allowing puff centroids to approach high terrain features to within one-half their effective release heights, even under the assumed neutral stability conditions. One would expect this to occur in reality only under stable conditions, while in neutral and unstable conditions, puffs should remain near their effective release heights.

Another way to evaluate the potential conservatism of GPM is to compare GPM results with other regional models that are expected to be more appropriate at longer distances, such as RTM.

Comparisons between GPM and RTM calculations of regional 24-hour average SO_2 concentrations were performed on four days of particular interest, assuming a high-oil-production scenario. These days are as follows:

- July 27, 1978, a day for which GPM calculated highest concentrations several kilometers west of Flat Tops Wilderness.

- October 20, 1978, a day for which GPM calculated highest concentrations within Flat Tops.

- July 15, 1978, a day for which GPM calculated the second highest 24-hour average concentrations in Dinosaur. (On the day with the highest concentrations modeled by GPM in Dinosaur, May 1, 1978, significant precipitation occurred, which would have scavenged SO_2 in the atmosphere.)

- December 16, 1978, a day during a high-pressure stagnation episode when surface winds were light and decoupled from rather strong upper-air winds. (GPM calculations indicated relatively low regional SO_2 concentrations on this day because GPM was driven by the strong, upper-air winds, not the light, decoupled lower-level winds.)

July 27, 1978, Worst-Case Impacts

The first comparison between GPM and RTM was performed for a day (July 27, 1978) in the year modeled with GPM that resulted in the highest 24-hour average SO_2 concentration in the vicinity of the Flat Tops Wilderness. This 24-hour SO_2 concentration was predicted by GPM to be 19 ug/m^3 and to occur to the west of Flat Tops. (The highest modeled 24-hour concentration within Flat Tops occurred on October 20, 1978 and was 12 ug/m^3.) The RTM was exercised for the meteorological conditions on this July 27, 1978 day.

It should be noted that RTM was exercised and initiated with a background SO_2 concentration of 1.5 ug/m^3. Although some of this background SO_2 is transformed to sulfate and/or deposited during the RTM simulation, it is possible that up to 1.5 ug/m^3 of the RTM-calculated SO_2 concentration is the assumed background. Subtracting anywhere from 0 to 1.5 ug/m^3 would give an indication of the incremental impact of sources in the region. There is uncertainty in the amount of 24-hour average background SO_2 at any receptor point in the region, because it is not known how much of the 1.5 ug/m^3 is deposited or converted. Thus, RTM results are stated with a 1.5 ug/m^3 uncertainty range.

GPM calculated a maximum concentration in Flat Tops greater than 6 ug/m^3 on this day, while RTM calculated an impact of about 0 to 1 ug/m^3. For the receptor in the vicinity of Flat Tops for which a 19 ug/m^3 impact was calculated by GPM, RTM calculated an impact between 0 and 2 ug/m^3. The maximum, near-source concentration in the entire region calculated by GPM was 51 ug/m^3, which occurred near the White River Shale Project (U-a, U-b) in Utah. RTM calculated a maximum concentration at this location and 20 km to the north of 41 ug/m^3. (These calculated impacts near the White River Shale Project may be unrealistically high because in both the GPM and RTM models, multiple ground-level SO_2 emission sources throughout the facility were combined in a single point source.) Maximum near-source concentrations calculated by both models in the Piceance Basin are near Cathedral Bluffs; GPM calculated a maximum concentration of 20 ug/m^3, and RTM calculated 16 ug/m^3.

October 20, 1978, Worst-Case Impacts in Flat Tops Wilderness

GPM calculated a maximum concentration in Flat Tops of 12 ug/m^3; RTM calculated 3.3 ug/m^3. Subtracting the 0 to 1.5 ug/m^3 background from the RTM calculations, the incremental impact in Flat Tops due to sources in the region was calculated by RTM to be 1.8 ug/m^3 to 3.3 ug/m^3. On this day a relatively high concentration was calculated by both GPM and RTM just to the west of Dinosaur National Monument. GPM calculated an impact of 7 ug/m^3 to the northwest of Dinosaur, while RTM calculated an impact of 8 ug/m^3 to the southwest of Dinosaur National Monument. Taking into account the 1.5 ug/m^3 background, concentrations within Dinosaur were calculated by RTM to be 3.1 ug/m^3 to 4.6 ug/m^3. Most of this impact is due to emissions from Sohio's conceptual tar sand project.

July 15, 1978, Worst-Case Impacts in Dinosaur National Monument

GPM calculated a maximum concentration in Dinosaur of 9.8 ug/m^3 and in Flat Tops of 5.7 ug/m^3. On this day, RTM calculated much lower concentrations; again, taking the assumed background SO_2 concentration into account, RTM calculated an impact of 2.7 ug/m^3 to 4.2 ug/m^3 in Dinosaur and 0.4 ug/m^3 to 1.9 ug/m^3 in Flat Tops. However, a high concentration of 27 ug/m^3 was calculated by RTM in ghe grid square just outside the southwest corner of Dinosaur. If one interpolates between the two grid squares, one inside and one just outside Dinosaur, it is possible that the boundary at the southwest corner of Dinosaur would receive a concentration of 6.5 ug/m^3 to 8.0 ug/m^3. Again most of the impact in Dinosaur is due to Sohio, located only 20 km southwest from the monument's boundary.

December 16, 1978, Stagnation Episode

This day was modeled to investigate a period of stagnation during a persistent, high-pressure episode. RTM calculated highest concentrations in the Uintah Basin near the White River and Paraho facilities. Maximum incremental concentrations in Flat Tops Wilderness, Dinosaur National Mounument, and the Uintah and Ouray Indian Reservation were each about 2.5 ug/m^3 to 4.0 ug/m^3 (taking into consideration the 1.5 ug/m^3 background).

Estimates of Uncertainty in Model Calculations

The following table summarizes the differences between GPM and RTM calculations at the receptors in Flat Tops Wilderness and Dinosaur National Monument with calculated maximum concentrations:

	Maximum 24-hour SO_2 Concentration (ug/m^3)			
	Flat Tops		Dinosaur	
Day	GPM	RTM*	GPM	RTM*
July 27, 1978	6	1	7	3
October 20, 1978	12	3	7	5
July 15, 1978	6	2	10	8
December 16, 1978	<1	4	<1	4

	Maximum 3-hour SO_2 Concentration (ug/m^3)			
	Flat Tops		Dinosaur	
Day	GPM	RTM*	GPM	RTM*
July 27, 1978	34	3	46	8
October 20, 1978	76	6	54	16
July 15, 1978	10	3	30	16
December 16, 1978	1	8	<1	8

* These concentrations may be conservatively high because they include an assumed background SO_2 concentration of between 0 and 1.5 ug/m^3.

Except for the stagnation day (December 16), RTM calculated concentrations lower than GPM, with the most significant difference between RTM and GPM calculations occurring at Flat Tops. RTM results were similar to GPM results in Dinosaur because impacts were dominated by emissions from Sohio, only 20 km distant. Near-source impacts are modeled in a similar manner (using Gaussian puffs) in RTM and GPM, so it is not surprising that calculated impacts in

Dinosaur are similar, using the two models. The average ratio of GPM to RTM 24-hour average impacts in Flat Tops is 4 to 6, depending on whether or not the assumed background SO_2 concentration is subtracted. Ratios of GPM to RTM 3-hour average impacts are 6 to 10. RTM calculations of 24-hour average impacts in Flat Tops are in the range 1 ug/m^3 to 4 ug/m^3, less than the 5 ug/m^3 PSD Class I increment; GPM results are in the range, 6 ug/m^3 to 12 ug/m^3, in excess of the increment. Impacts on the stagnation day (December 16) calculated by RTM were larger than those calculated by GPM, because it was found that lower-level winds on this day were decoupled from upper-level winds used to drive GPM.

By comparing the GPM and RTM isopleths on these four episode days, for Class II receptors, in some cases RTM calculated higher concentrations than GPM. These differences, in general, resulted from somewhat different wind field specifications in the GPM and RTM applications. A comparison of the maximum 24-hour SO_2 isopleths calculated using GPM shows that RTM concentrations on the four episode days are less than maxima calculated by GPM in the entire modeled year.

Air quality impacts have been projected by using ranges of concentrations, with the GPM predictions being the high end of that range. The size of this range is estimated to be an order of magnitude (a factor of 10) for the maximum 3-hour and 24-hour concentrations. This range is based on professional judgment as to the uncertainty of concentration estimates and the belief that GPM calculations of maximum concentrations are probably conservative (i.e., that concentration estimates predicted on the basis of GPM will be greater than actual concentrations). The GPM model is expected to be less conservative for annual averages than for short-term averages, because underestimates of horizontal dispersion are cancelled out in the process of averaging concentrations over an entire year. GPM is still expected, however, to be somewhate conservative, because it underestimates vertical dispersion. The empirical model used to calculate TSP concentrations from area source emission densities is expected to be unbiased, since it is a least-squares fit; but it could underestimate or overestimate actual concentrations by an estimated factor of 2, or perhaps more if the estimates of fugitive dust emissions are inaccurate.

Any conclusions about the magnitude and significance of air quality impacts should be made, recognizing that model estimates of regional impact are uncertain to this degree, at this time.

Visibility Analysis Methodology for Site Specific Projects

An EPA Level-1 visibility screening test was done for each site specific project to determine the potential for significant visibility impairment at Dinosaur and Colorado National Monuments, the proposed High Uintas Wilderness Area, the Uintah and Ouray Indian Reservation, and Flat Tops Wilderness Area. EPA Level-1 tests were also performed for the regional analysis. The Level analysis allows one to determine the likelihood that visiblity impairment will be considered to be adverse. This analysis functions as a screening test, in that it overestimates (by design) impacts to the extent that, if the test is passed, there is little possibility that significant visibility impairment will take place.

Level-1 screening contrast parameters (C_1, C_2, C_3) were calculated to indicate potential problems for three scenarios: a dark (NO_2) plume visible against the sky, a light (particulate) plume visible against terrain, and regional reductions in terrain/sky contrast and visual range. The Air Quality Technical Report (Systems Applications Inc. 1983) summarizes the results. If any of these contrast parameters is greater or less than -0.1, a potentially adverse problem cannot be ruled out.

A more detailed assessment considering possible atmospheric discoloration at Dinosaur National Monument and the Uintah-Ouray Indian Reservation was also performed for each site-specific project, conceptual projects, and baseline and interrelated sources. Values of delta E, an indicator of the perceptibility of atmospheric discoloration resulting from nitrogen oxide emissions, were calculated for the Dinosaur National Monument Visitors Center and the Uintah and Ouray Indian Reservation. Delta E was estimated for three meteorological conditions most likely to cause impacts; F (very stable), E (stable), and D (neutral) stabilities with light wind speeds of 2.5 meters/second and a wind direction that would transport the plume directly toward the area of interest. Next, the frequency of occurence of each meteorological condition was estimated. This was done using joint frequency distribution of wind speed, wind direction, and stability developed at plume height for the Moon Lake (Deseret) power plant (Burns and McDonnell 1980). The joint frequency analysis was developed using pilot balloon and temperature sonde data collected at the U-a/U-b tracts. The pilot balloons with temperature sondes attached were released every other day at 1/2 hour after sunrise and at 2 p.m. local standard time from October 1976 to January 1978.

The cumulative frequencies of occurrence of delta E values are shown in Tables A-5-7 and A-5-8. It is estimated that the threshold of perceptibility of atmospheric discoloration ranges from about a delta E of 1 to a delta E of 4, depending upon the sensitivity of the observer. The frequency of occurrence of delta E's greater than 4 and the frequency of delta E's greater than 1 was estimated. The range of number of days per year of perceptible discoloration given in Chapter 4 of each site specific was the difference between the number of mornings or afternoons per year with delta E's between 1 and 4. For example, if it were estimated that a delta E of 4 or greater would occur 5 mornings per year and a delta E of 1 or greater would occur 15 mornings per year, the frequency of perceptible discoloration would be given as 5 to 15 mornings per year.

Regional Haze Analysis Methodology

Worst-case impacts of regional emissions on visual range would be seen with the simultaneous occurrence of:

TABLE A-5-7

MAGNITUDE (DE) AND CUMULATIVE FREQUENCY (cf)*
OF PLUME DISCOLORATION FOR AN OBSERVER
LOCATED IN DINOSAUR NATIONAL MONUMENT

Emission Source	F Stability			E Stability			D Stability		
		cf			cf			cf	
	DE,	mornings	afternoons	DE,	mornings	afernoons	DE,	mornings	afternoons
Enercor	0.6	6	0	0.3	18	3	0.2	19	6
Geokinetics									
Agency Draw	1.1	4	0	0.6	10	2	0.3	12	7
Lofreco	0.3	8	0	0.2	20	3	0.1	21	6
Magic Circle	4.2	4	0	3.1	10	2	1.7	12	7
Moon Lake 1 and 2	10.5	8	0	8.3	20	3	4.9	21	6
Paraho	2.4	4	0	1.8	16	3	1.0	17	6
Sohio	1.6	1	1	1.4	6	2	1.1	8	7
Syntana-Utah	3.9	4	0	3.1	16	3	1.8	17	6
Tosco	4.0	4	0	2.9	10	2	1.6	12	7
White River	4.2	6	0	3.1	18	3	1.7	19	6

* Days per year.

TABLE A-5-8

MAGNITUDE (DE) AND CUMULATIVE FREQUENCY (cf)*
OF PLUME DISCOLORATION FOR AN OBSERVER
LOCATED IN THE UINTAH AND OURAY INDIAN RESERVATION

Emission Source	F Stability			E Stability			D Stability		
		cf			cf			cf	
	DE,	mornings	afternoons	DE,	mornings	afernoons	DE,	mornings	afternoons
Enercor	0.6	0	0	0.5	6	2	0.3	7	3
Geokinetics									
Agency Draw	1.1	4	0	0.9	10	2	0.5	12	7
Lofreco	0.3	0	0	0.2	7	2	0.1	7	3
Magic Circle	4.2	3	1	3.3	8	2	2.7	10	7
Moon Lake 1 and 2	8.9	1	0	8.0	3	1	6.7	3	1
Paraho	2.5	0	0	2.1	7	2	1.4	7	3
Sohio	1.7	0	1	1.4	2	2	0.9	2	2
Syntana-Utah	3.9	0	0	3.3	3	2	2.1	4	7
Tosco	3.1	4	0	2.8	10	1	2.5	12	1
White River	4.3	0	0	3.6	2	1	2.4	3	2

* Days per year.

- Low wind speeds (stagnant conditions).

- Low mixing heights

- High insolation (to maximize sulfate aerosol formation rates).

- Wind directions that permit an air parcel to pick up emissions from many sources.

- Lack of significant precipitation (which would wash out aerosols).

It is difficult to find periods in the study during which all these conditions occur simultaneously. For example, stagnation events, with low wind speeds, low mixing heights, and no significant precipitation are most common in winter when solar insolation and fugitive dust emissions are at their minimum annual values. Holzworth (1972) found that in Grand Junction, on average, there are six episodes of two days or more each (a total of 26 days) with no significant precipitation, mixing heights less than 1,000 m, and wind speeds less than 4 m/s. These episodes occur primarily in winter. In summer, when insolation is at a maximum, mean afternoon mixed layers are 3,900 meters thick, and wind speeds are about 6 m/s.

Although it must be noted that it is possible that significant regional visual range reduction would occur in the winter in populated areas due to fireplace and stove emissions trapped in stagnant layers, the magnitude of such impacts is difficult to quantify at this time.

A summertime worst-case meteorological scenario for evaluation of regional visual range reduction was selected. A conservatively low summertime mixing height of 1,000 meters and a low wind speed of 3 meters per second were chased. It was assumed that an air parcel was transported over the population centers and synfuel development areas of the Uintah and Piceance basins picking up emissions as it progressed eastward. Unlike plume discoloration effects, regional visual range reduction increases with transport time and the rate of plume mixing with reactive background species (primarily the hydroxyl radical). A C stability for plumes (trapped within the 1,000-m mixed layer) and a long transport time of about 10 hours for Uintah Basin emissions were selected. Impacts were evaluated for a line of sight northwest from Flat Tops. It is possible that somewhat larger reductions in visual range than those calculated here could occur further downwind in Mount Zirkel and Rocky Mountain National Park because of longer transport and reaction times. However, it is unlikely that impacts in these areas would be much larger, because, at these more significant distances, the mixed layer is likely to be deeper and much of the plume aerosol and its precursors would be deposited in a dry mode or in a wet mode during afternoon thunderstorms that are common at higher elevations.

Although regional visibility impacts deserved more detailed study than what is possible to present here, it is believed that a reasonable worst-case scenario has been identified.

PLUVUE model calculations were used to calculate percentage reductions in visual range. These percentage reductions are independent of the baseline visual range assumed. A background ozone concentration of 43 ppb was assumed. The model runs were not performed separately for each point source. All the oil shale source emissions for the Uintah Basin were summed and modeled using one plume, and the width of the initial plume was set at 10 km. (It should be noted that a sensitivity study of PLUVUE has shown that specification of horizontal plume dispersion is not critical to visibility predictions.) As noted above, the stability class within the 1,000-m mixed layer was set to Pasquill-Gifford C stability. Separate model runs were performed for synfuel facilities in the Uintah Basin and in Colorado, for other point sources in the Uintah Basin and in Colorado, and for fugitive particulate emissions in the Uintah Basin, and Rio Blanco and Moffat counties in western Colorado.

Specification of the size distribution of the aerosol is very important in obtaining accurate estimates of visibility impacts due to scattering by particulate matter or secondary aerosol. Size distribution specified by EPA (1981) were used. The only area source emissions considered were emissions of fugitive dust (TSP) from unpaved roads, which amount to more than 90 percent of the total area source TSP emissions

A PLUVUE model simulation was performed for each source type, level of emissions, and location. For each simulation, the reduction in visual range from the background value was determined for an observer at the Flat Tops Wilderness Area looking toward the northwest horizon sky. The total visual-range reduction was obtained by adding the fractional visual-range reductions for all the different sources. The visual-range reductions are 2.86 percent, 7.25 percent, and 9.48 percent for the 1980 baseline year, and for the low- and high-oil-shale-production scenarios, respectively.

Most of the visual-range reduction in the worst-case scenario results from sulfate aerosol formed from SO_2 emissions from oil shale facilities and other point sources. Little of the visual-range reduction is due to secondary emissions associated with population growth.

Acid Deposition

Acid deposition has been of growing concern since the 1970s, but assessment of environmental effects is still in relatively early stages. Concerns for effects of acid deposition are presently confined primarily to the eastern United States and Canada. It is evident that much of that area is receiving acid precipitation at pH levels less than 4.7. Demonstrated effects to date appear to be primarily those in aquatic systems (Gibson and Linhurst 1982). Research on potential effects to plants and soils have demonstrated inconclusive results with respect to current levels of acid deposition.

Much less information is available for western environments where ecosystems are much different relative to soil pH's, buffering capacity, precipitation amounts and distribution, and plant types. Acid deposition levels are presently low in the western areas due to both higher pH levels and less precipitation, than in eastern North America. Large areas of the West are also protected, to some degree, by extensive areas with calcareous soils. These soils not only provide high acid-neutralizing capacity (buffering) but also high levels of calcium and magnesium in wind-suspended dusts in the atmosphere. These alkaline materials are at levels sufficient to neutralize over 100 percent of the acidity in sulfuric and nitric acids in the more arid regions of the United States (Gibson and Linhurst 1982).

Based on the experience in the eastern United States, aquatic systems are assumed to be the most sensitive component of the environment within the area of influence and would, therefore, be the first component of the environment to express a response to increases in acidic deposition. This sensitivity is, in turn, largely a function of the drainage basin bedrock (or soils derived from bedrock) acid-neutralizing capacity during chemical weathering (Norton et al. 1982). Norton (1980) classified all terrain into the following:

Class 1 - Low to no acid-neutralizing-capacity - (Widespread effects on aquatic ecosystems expected from acidic precipitation.)
Characteristic bedrock types:
- Granitic gneiss
- Quartz sandstones or metamorphic equivalents

Class 2 - Medium to low acid-neutralizing-capacity - (Effects from acidic precipitation restricted to first and second order streams and small lakes. Complete loss of alkalinity unlikely in large lakes.)
Characteristic bedrock types:
- Sandstones, shales, conglomerates, or their metamorphic equivalents (no free carbonate phases present).
- High-grade metamorphic felsic to intermediate volcanic rocks
- Intermediate igneous rocks
- Calc-silicate gneisses with no free carbonate phases

Class 3 - High to medium acid-neutralizing-capacity - (Effects from acidic precipitation improbable except for overland run-off effects in areas of frozen ground.)
Characteristic bedrock types:
- Slightly calcareous rocks
- Low-grade intermediate to mafic volcanic rocks
- Ultramafic rocks
- Glassy volcanic rocks

Class 4 - "Infinite" acid-neutralizing-capacity - (No effect on aquatic ecosystem.)
Characteristic bedrock types:
Highly fossiliferous sediments or metamorphic equivalents
Limestone or dolostones

Class 5 - Covered by glacial debris or Quaternary alluvial material which obscures the bedrock. Loess is common in the high plains.

Class X - Surficial material of unspecified composition, shown only in NJ.

Based on the data presented in the atlas of Norton et al. (1982), the terrain within the area of influence varies from Class 2 to Class 4. There are no Class 1 areas. Large portions of the elevated areas, particularly in the Uinta Mountain range north of the Uintah Basin, are Class 2. Lower elevation areas within the Uintah Basin are also largely Class 2. Between the higher elevation (Uinta Mountain) Class 2 and the Class 2 in the basin itself lies a band of Class 4 areas. This band would be expected to act as a protective influence on the outflow of streams to the lower elevation areas. According to Norton et al. (1982), even small amounts of limestone in a drainage exert an overwhelming (neutralizing) influence on terrains that otherwise would be vulnerable to acidification.

Higher elevation areas typically have higher precipitation rates with annual averages ranging from 30 to 60 inches above 7,500 feet compared with 8 to 15 inches below 5,500 feet. Much of the precipitation is in the form of snow or drizzles, which are efficient atmospheric scrubbers. Much of the biomass is made up of lower plant forms (rock and soil lichens, algae, and mosses), which are efficient accumulators; in many areas the soil mantle is thin, and soils in many areas may be acidic. The higher elevation systems make up a good portion of the watershed in many areas.

According to Turk and Adams (1982) in their study of lakes in the Flat Tops Wilderness Area, approximately 370 lakes having a total surface area of about 157 hectares or approximately 388,000 acres would be susceptible to potentially harmful levels of acidification if precipitation attains the average pH that is currently experienced in the northeastern United States.

Because the oil shale developments would be an additional source of sulfur dioxide and nitrogen oxides, an analysis of potential acid deposition that might result from the facilities and associated activities was performed, recognizing the uncertainties involved but attempting to take a conservative first approximation approach.

For the high-level scenario, dry deposition in the area of influence was estimated from annual average concentration isopleth maps from the Gaussian Puff Modeling (GPM). The annual dry deposition was determined through multiplication of the annual concentration by the deposition velocity, which for sulfur dioxide and nitrogen oxides was estimated to be on the order of 1 cm/sec. (Figures R-4-2 and R-4-3 (included in Section R-4.A.2, Air Quality, in the main body of this EIS) summarize these calculations.)

Wet deposition was estimated from precipitation statistics for Grand Junction and the surrounding region. Grand Junction has an average of 69 days per year during which precipitation is greater than 0.01 inch, and has a total annual precipitation of 8.4 inches. However, higher elevations receive greater amounts of precipitation. For example, annual precipitation in the Flat Tops Wilderness Area is estimated to be as high as 40 to 50 inches. Assuming conservatively that virtually all SO_2 and NO_x is scavenged in significant rainfall events, it was estimated that annual wet deposition rates would be on the same order as dry deposition rates, although short-term wet deposition rates would be higher. These estimates are considered to be conservative--extremely conservative in the low-elevation areas that receive less precipitation than the high-elevation areas.

Wet deposition rate was estimated by calculating an annual effective deposition velocity assuming that all emissions in the mixed layer throughout the region are deposited during one-hour precipitation events on the 69 days per year with measured precipitation in Grand Junction of 0.01 inch and greater. This is expected to be conservative since it is unlikely that significant fractions of the atmospheric loading would be removed during light precipitation events.

Assuming an annual average mixing depth of 2,600 m (Holzworth 1972) and the complete atmospheric cleansing during the one-hour precipitation event on each of 69 days per year, the following effective, annual-average wet deposition velocity was calculated:

$$V_d = \frac{(2{,}600\ \text{m})\ (100\ \text{cm/m})}{(69\ \text{hrs})\ (3{,}600\ \text{s/hr})} = 1.05\ \text{cm/s}$$

This deposition rate is about equal to that for dry deposition. Over the course of a year, the pattern of wet deposition would be similar to that for dry deposition. It should be noted again, that at lower elevations, wet deposition is unlikely to be as great as that calculated here.

A pH of 4.7, which is a proposed protective acid deposition limit in an area of approximately 40 inches annual precipitation, is equivalent to a sulfate deposition rate of approximately 1 gram per square meter (1 g/m^2) (Gibson and Linhurst 1982). Based on studies in Europe (Swedish Ministry of Agriculture 1982) and eastern North America (U.S./Canada Working Group on

Impact Assessment 1981), values greater than 0.5 gm sulfate/m^2/yr are accompanied by acidification of surface waters over a period of one to three decades, while lower values may lead to acidification over a longer time period or may not lead to any significant acidification.

Based on the results shown in Figures R-4-2 and R-4-3, in Section R-4.A.2 of the main body of the EIS, in the Flat Tops Wilderness it is estimated that wet and dry sulfur deposition would be approximately 0.2 g/m^2/yr, which is less than one-half of the criterion of 0.5 g/m^2/yr mentioned above.

It is BLM's opinion that the analysis, although only a first approximation, is conservative (that it tends to overpredict rather than underpredict potential impacts). The analysis has also not considered the influence of wind-suspended calcium and magnesium dusts from calcareous soils or ammonia concentrations which would be expected to have a significant neutralizing effect on airborne sulfuric and nitric acid precipitation.

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VISUAL RESOURCE MANAGEMENT METHODOLOGIES

The BLM's Visual Resource Management (VRM) system and the FS's Visual Management System (VMS) were used to analyze the landscape which the proposed actions and alternatives would traverse.

To compare the visual impacts of the proposed projects and their alternatives, the VRM system was applied to lands managed by the BLM, as well as other federal lands (other than national forest lands for which the VMS procedure was applied), and state, local, Indian, and private lands.

The following three sections describe the VRM system, the VMS, and the BLM contrast rating procedure. A further explanation of each process may be found by referring to the sources used as a basis for the discussion.

THE BLM VISUAL RESOURCE MANAGEMENT SYSTEM

The VRM system is an analytical process that identifies, sets, and meets the objectives for maintaining scenic values and visual quality (BLM 1978, 1980).

The system is based on research that has produced ways of assessing aesthetic qualities of the landscape in objective terms. Aesthetic judgments considered extremely subjective were found to have identifiable, consistent qualities that can be described and measured. Whatever the terrain and whoever the observer, perception of visual quality in a landscape seems to be based on three common principles:

- Landscape character
- Influence of form, line, color, and texture
- Visual variety

Landscape character is primarily determined by the four basic visual elements of form, line, color, and texture. Although all four elements are present in every landscape, they exert varying degrees of influence. The stronger the influence exerted by these elements, the more interesting the landscape. The more visual variety in a landscape, the more aesthetically pleasing the landscape. Variety without harmony, however, is unattractive, particularly if alterations (cultural modifications) are made carelessly.

The VRM system (see Figure A-6-1, for flow diagram) involves a four-step process: 1) determining the scenic quality of a landscape, 2) measuring the visual sensitivity of an area, 3) determining distance zones, and 4) compiling all the information into management classes for guidance in assessing environmental impact (Figure A-6-1).

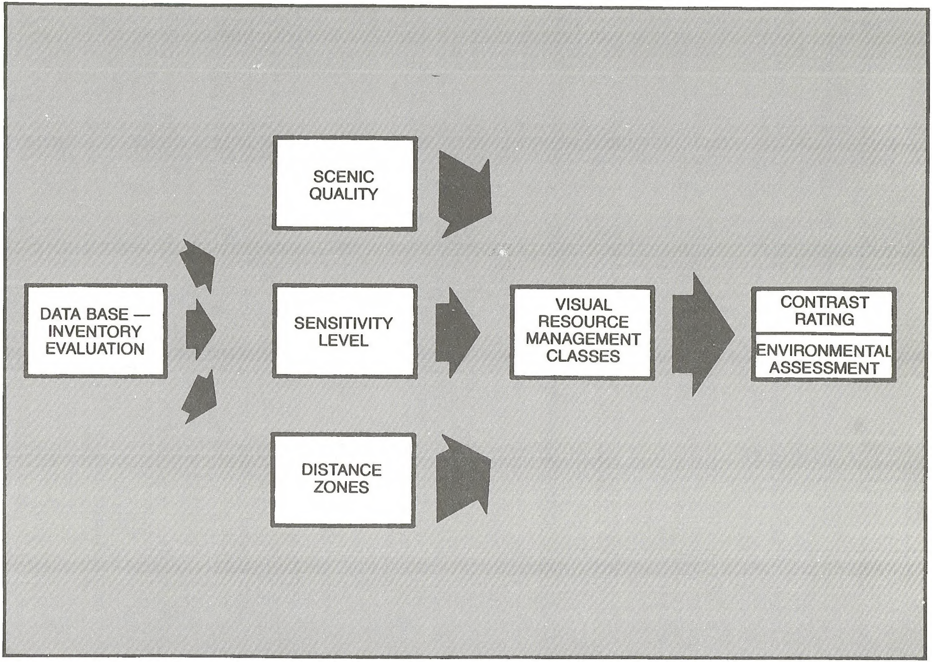

FIGURE A-6-1 THE VISUAL RESOURCE MANAGEMENT SYSTEM PROCESS

SCENIC QUALITY

Scenic quality is perhaps best described as the overall impression retained after driving through, walking through, or flying over an area of land. In the VRM process, rating scenic quality requires a brief description of the existing scenic values in a landscape.

When inventoried, an area is first divided into subunits that appear homogeneous, generally in terms of landform and vegetation. Each area is then rated by seven key factors: landform, vegetation, water, color, influence of adjacent scenery, scarcity, and cultural modification. A standardized point system assigns great, some, or little importance to each factor. The values for each category are calculated and, according to total points, three scenic quality classes are determined and mapped:

Class A--Areas that combine the most outstanding characteristics of each rating factor.

Class B--Areas which combine some outstanding features and some that are fairly common to the physiographic region.

Class C--Areas where the features are fairly common to the physiographic region.

SENSITIVITY LEVELS

Although landscapes have common elements that can be measured, there is still a subjective dimension to landscape aesthetics. Each viewer brings perceptions formed by individual influences, culture, visual training, familiarity with local geography, and personal values.

To measure regional and individual attitudes in evaluating a landscape, visual sensitivity is determined in two ways:

Use Volume

Frequency of travel through an area (by road, trail, and river) and use of (for recreation, camping, and events) of are tabulated. The area is then assigned a high, medium, or low rating according to predetermined classifications.

User or Public Reaction

Public groups are familiarized with the area (if necessary) and asked to respond to activities that will modify that landscape. The concern they express about proposed changes in scenic quality is also rated high, medium, or low.

The various combinations of use volume and user reaction for each are converted by a matrix to an overall sensitivity rating of high, medium, or low. A map is then developed that illustrates these sensitivity levels.

DISTANCE ZONES

The visual quality of a landscape (and user reaction) may be magnified or diminished by the visibility of the landscape from major viewing routes and key observation points.

A landscape scene or 'seen area' can be divided into three basic distance zones: 1) foreground/middleground, 2) background, and 3) seldom-seen. Because areas that are closer have a greater effect on the observer, such areas require more attention than do areas that are farther away. Distance zones allow consideration of the proximity of the observer to the landscape.

Selection of the key viewing points and accurate assessment of distance zones require some judgment. Where several viewing routes exist, what is foreground from one route may be background from another. In that case, the more restrictive designation is used. Atmospheric conditions may also modify the perception of distance.

The process culminates in a final distance zone map.

MANAGEMENT CLASSES

Management classes describe the different degrees of modification allowed to the basic elements of the landscape. Class designations are derived from an overlay technique that combine the maps of scenic quality, sensitivity levels, and distance zones. The overlays are used to identify areas with similar combinations of factors. These areas are assigned to one of five management classes according to predetermined criteria. The resulting map of contiguous areas sharing the same VRM class is used to assess the visual impact of proposed development.

The five classes are:

Class I

This class provides primarily for natural ecological changes; management activities are to be restricted and are not to attract attention.

Class II

Changes in basic elements by management activities should not be evident in the characteristic landscape.

Class III

Contrasts to the basic elements may be evident and begin to attract attention, but they should remain subordinate to the existing characteristic landscape.

Class IV

Alterations may attract attention but should repeat the form, line, color, and texture characteristics of the landscape.

Class V

Rehabilitation is needed to restore the landscape to the character of the surrounding landscape.

THE FS VISUAL MANAGEMENT SYSTEM

The VMS establishes criteria for identifying and classifying scenic qualities and aesthetic concern for those qualities on national forest lands (FS 1974). The process establishes quality objectives for altering the visual resource by recognizing the great variation in visual strength of the various types of natural landscape and their inherent capabilities to accept change.

In this process, a particular landscape is placed within a framework for analysis. (See Figure A-6-2 for diagram.) The framework is the character type or common distinguishing visual characteristic of landform, water forms, and vegetative patterns based upon physiographic regions as defined by Nevin M. Fenneman (1981). The characteristic landscape is the naturally established landscape being viewed; it serves as the final basis for analyzing and comparing the appropriateness of a management activity against the prescribed VQO (Figure A-6-2).

The VQO incorporates the extreme variability of the land's scenic quality, the visual sensitivity of the land, and the ability of various forest landscape to undergo alteration.

VARIETY CLASSES

Variety classes are obtained by classifying landscapes into those where the scenic quality is most important and those where it is of lesser value. The classification is based on the premise that all landscapes have some value, but those with the most variety or diversity have the greatest potential for high scenic value. There are three variety classes which identify the scenic quality of the natural landscape:

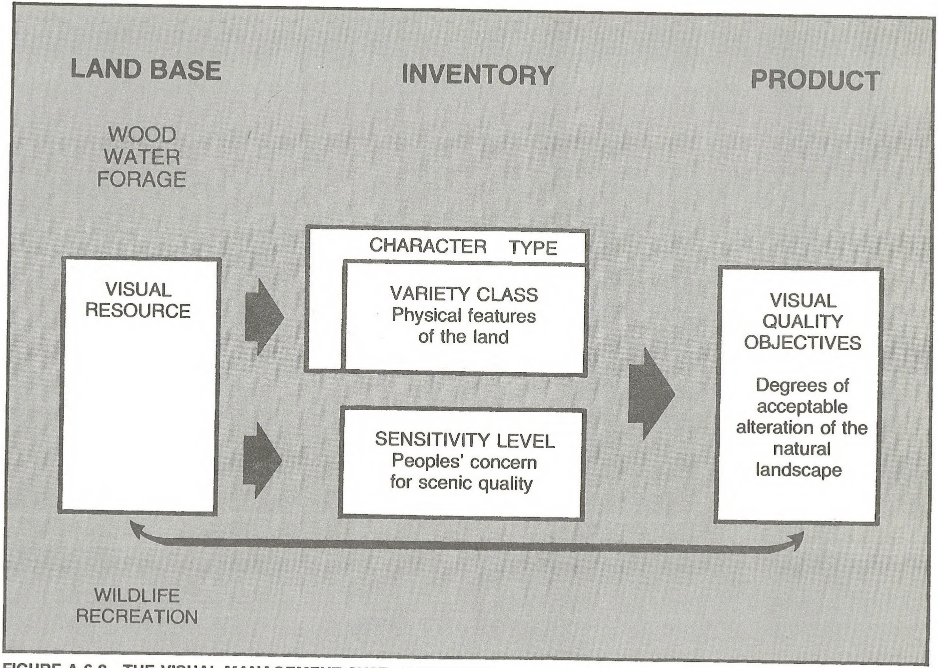

FIGURE A-6-2 THE VISUAL MANAGEMENT SYSTEM PROCESS

Class A, Distinctive

Areas where features of landform, vegetative patterns, water forms, and rock formations are of unusual or outstanding visual quality. They are usually not common in the character type.

Class B, Common

Areas where features contain variety in form, line, color, and texture or combinations thereof, but which tend to be common throughout the character type and are not outstanding in visual quality.

Class C, Minimal

Areas where features have little change in form, line, color, or texture. Includes all areas not included in Classes A and B.

SENSITIVITY LEVELS

Sensitivity levels are a measure of people's concern for the scenic quality of the national forests. These levels are determined for land areas viewed by those who are traveling through the forest on developed roads and trails, are using areas such as campgrounds and visitor centers, or are recreating at lakes, streams, and other water bodies. All national forest land is seen at least by aircraft users; therefore, some degree of visitor sensitivity exists for the entire land base.

Three sensitivity levels, each identifying a different level of user concern for the visual environment, are employed:

Level 1, Highest Sensitivity

Includes all areas seen from PRIMARY travel routes, use areas, and water bodies where, at a minimum, at least one fourth of the forest visitors have a MAJOR concern for the scenic qualities. Also includes all areas seen from SECONDARY travel routes, use areas, and water bodies where at least three-fourths of the forest visitors have a MAJOR concern for the scenic qualities.

Level 2, Average Sensitivity

Includes all areas seen from PRIMARY travel routes, use are and water bodies where fewer than one-fourth of the forest visitors have a MAJOR concern for scenic qualities. Also includes all areas seen from SECONDARY travel routes, use areas, and water bodies where at least one-fourth and not more than three-fourths of the forest visitors have a MAJOR concern for scenic qualities.

Level 3, Lowest Sensitivity

Includes all areas seen from SECONDARY travel routes, use areas, and water bodies where less than one-fourth of the forest visitors have a MAJOR concern for scenic qualities and all national forest land not seen from any travel route, use area, or water body. It does not include any area seen from PRIMARY routes or areas.

Sensitivity levels are correlated with distance zones of foreground, middleground, and background for seen areas established in the sensitivity level determination. This step correctly emphasizes the viewers' concern for scenic quality within the system.

VISUAL QUALITY OBJECTIVES

The VQO's are designed to develop measurable standards or objectives for the visual management of all national forest lands. The objectives are based upon the previously determined variety classes and sensitivity levels. They are represented by five terms which can be defined as visual resource management goals.

Preservation (P)

Preservation allows for ecological changes only. Management activities, except for very low visual impact recreation facilities, are prohibited.

Retention (R)

Activities may only repeat form, line, color, and texture which are frequently found in the characteristic landscape.

Partial Retention (PR)

Management activities must remain visually subordinate to the characteristic landscape. Activities may repeat or introduce form, line, color or texture common to the characteristic landscape, but changes in their size, amount, intensity, direction, pattern, etc., must remain visually subordinate to the characteristic landscape.

Modification (M)

Modification activities may visually dominate the original characteristic landscape. However, vegetation and landform alteration must borrow from naturally established form, line, color, or texture so completely and at such a scale that the visual characteristics are those of natural occurrences within the surrounding area or character type. Additional elements must remain visually subordinate to the proposed composition.

Maximum Modification (MM)

Vegetation and landform alterations may dominate the characteristic landscape. However, when viewed as background, the visual characteristics must be those of natural occurrences within the surrounding area or character type. When viewed as foreground or middleground, they may not appear to borrow completely from naturally established form, line, color, or texture.

Unacceptable Modification (UM)

Management activities demonstrate excessive modification in the landscape regardless of the distance from which the management activity is observed. Usually the size of the activity is not to scale or is so excessive as to contrast with the characteristic landscape.

THE BLM VISUAL RESOURCE CONTRAST RATING SYSTEM

The objective of the visual resource contrast rating system is to provide a measure of whether the proposed action will meet the requirements of the assigned VRM classes (FS 1974, BLM 1978 and 1980). The degree to which a management activity adversely affects the visual quality of a landscape depends on the extent of visual contrast that is created between the activity and the existing landscape character. Contrast is measured by separating the landscape into land and water surfaces, vegetation, and structures and then predicting the magnitude, and structures and then predicting the magnitude of contrast with the basic elements (form, line, color, and texture) for each of these major features. Assessing the degree of contrast will indicate the severity of impact and will guide the plans for mitigating the contrasts to meet the requirements of the VRM classes. Contrasts are considered from the most critical viewpoints for distance, angle of observation, length of time, relative size of the project, season of the year, light, and the effects of time on the healing process.

The following parameters have been applied to determine if the proposed action will meet the requirements of the assigned VRM classes.

Class I: The degree of contrast for any one element may not exceed a weak degree of contrast (1x), and the total contrast rating for any one feature may not exceed 10.

Class II: The degree of contrast for any one element may not exceed a moderate value (2x), and the total contrast rating for any feature may not exceed 12.

Class III: The degree of contrast for any one element should not exceed a moderate value (2x), and the total contrast rating for any feature may not exceed 16.

Class IV: The total contrast rating for any feature should not exceed 20.

DURATION OF VISUAL IMPACT

Preservation (P)

Only ecological change is permitted.

Retention (R)

Immediate reduction in form, line, color, and texture contrast should be accomplished during or immediately after construction.

Partial Retention (PR)

Reduction in form, line, color, and texture contrast should be accomplished as soon after project completion as possible or, at a minimum, within the first year.

Modification (M)

Reduction in form, line, color, and texture contrast should be accomplished in the first year or, at a minimun, should meet existing regional guidelines.

Maximum Modification (MM)

Reduction of contrast should be accomplished within 5 years.

DEGREE OF CONTRAST

For purposes of this project, the contrasts for each VQO should not exceed the parameters established for the following comparable VRM Classes:

FS VQO's	BLM VRM CLASSES
Preservation (P)	Class I
Retention (R)	Class II
Partial Retention (PR)	Class III
Modification (M) and Maximum Modification (MM)	Class IV
Unacceptable Modification (UM)	Class V

Specific contrasts in form, line, color, and texture indicate problems that could require design mitigation. Applying design procedures to the proposed action could eliminate or reduce visual contrasts to meet the visual planning objectives stipulated in the VRM class designations. If this were done, the project would be reassessed to determine if it could meet the area's visual goals and if not, to what degree the landscape's visual resource would be affected.

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UNCOMMITTED MITIGATION MEASURES

The following mitigation measures were identified during the process of impact analysis to further alleviate or minimize potential environmental effects from the proposed developments. However, these measures are not committed to by the federal agencies or the applicants. These additional mitigation measures are presented as additional information and for use by the applicants as voluntary implementation or by authorizing officials in eventual permit stipulation. These uncommitted mitigation measures are presented below by resource topic.

SOCIOECONOMICS

1. Single family, trailer sites, and mobile homes could be provided for sale or lease to employees at an affordable costs in order to mitigate expected housing shortage.

2. The sale of housing units that would be constructed by local developers could be formally guaranteed in order to provide an incentive for increased housing.

3. Rental commitments of units that would be constructed by local developers also could be formally guaranteed in order to provide an increased supply of housing.

4. Funds for local planning positions could be provided in order to allow careful planning and mitigation of community impacts.

5. Funding for certain service positions such as policemen or social workers could be provided in order to encourage an adequate supply.

6. Low interest loans with delayed payments could be provided until revenue increase. This would eliminate the problem of lag time between when community expenditures are needed and when the increased revenues begin.

7. Establish a housing office to help place workers in available housing units.

8. For the proposed synfuels projects the federal government could support synfuel legislation to provide direct special impact assistance to the Ute Indian Tribe.

9. The proposed synfuels projects could create a planning and assistance mechanism for the Ute Indian Tribe that closely parallels the proposed community impact assistance program for the state and local government.

10. A special referral assistance program could be established which would consist of those federal agencies who are presently responding to the Ute Indian Tribe's infrastructure impacts.

11. The proposed synfuels projects establish proceedures that could include creation of a job training program. The training programs for the Ute Indian Tribe would be implemented by divert aid to local educational institutions or to a Native American organization. Such aid would be used to support relevant vocational skills training, and 2) adoption of an affirmative action hiring plan.

12. Monitoring of work camp populations and policies to ensure that assumed occupancy occurs could be incorporated into the mitigation planning required by Utah law (S.B. 170).

AIR QUALITY

1. It is predicted that the National Ambient Air Quality Standards will be exceeded for particulates due to vehicular travel on dirt roads. Paving all roads that have significant amounts of vehicular travel, especially in populated areas, would greatly reduce this problem. Chemical stabilization of dirt roads, although less effective than paving, would also reduce particulate levels. Paving or chemical treatment could be carried out by the applicant or governmental agency having the responsibility for each particular road.

2. Nitrogen oxide emissions are predicted to cause atmospheric discoloration and contribute to acidic deposition in various ecosystems. Use of selected catalytic reduction (SCR) of nitrogen oxides by ammonia to nitrogen can reduce flue gas concentrations of nitrogen oxides by 80 to 90 percent. Using SCR in combination with combustion process modifications (which reduces the nitrogen oxides formations during combustion processes up to 50 percent) would minimize nitrogen oxides emissions from applicable sources. The applicability and efficiencies of SCR to commercial-scale synfuel processes are unknown at the present time.

3. Sulfur dioxide emissions may potentially contribute to PSD Class I increments and Colorado Category I increments being exceeded and also contribute to acidic deposition in ecosystems. Additional controls beyond those proposed by the applicants may be possible in commercial-scale development. Some applicants propose to use flue gas desulfurization units to control 90 percent of sulfur dioxide emissions. Control of 95 percent or more may be technologically feasible and would reduce sulfur dioxide emissions to the atmosphere.

4. EPA has recommended that, as a result of substantial uncertainties surrounding the air quality impacts associated with the synfuels industry, a comprehensive monitoring program (including worker health monitoring) be established in order to detect and eliminate adverse impacts to workers and the surrounding population.

WATER RESOURCES

1. During periods of drought, pumping water from the White River could be suspended by the applicants. This measure would maintain minimum flows in the White River during droughts. This measure also matches trends in the White River Dam EIS, Appendix 3, Minimum Flow Releases (BLM 1982b).

2. A cooperative desalting program between the applicants could be implemented. By treating water in various portions of the Colorado River Basin, the applicants could offset salinity increases due to consumptively using relatively high quality water. Depending on the program, it could reduce the salinity at various measuring points.

VEGETATION, SOILS, AND RECLAMATION

1. Due to the need of implementation and compliance with an intensive erosion control and reclamation program to ensure successful erosion control and reclamation, an on site reclamation specialist could be employed by the applicants to provide: (1) liaison with private land owners, federal agency officals and local governments; (2) expertise to direct proper implementation of applicable restoration procedures and assure compliance; and (3) favorable public relations. This mesure would: (1) help ensure proper implementation and compliance with applicable and effective erosion control, reclamation and revegetation measures, and (2) provide expertise on site during construction to direct applicable reclamation procedures when special conditions are encountered without causing construction and operation delays.

WILDLIFE

Certain wildlife species would be adversely affected if pipeline construction took place in their habitats during critical periods in their life cycles. The proposed construction schedule would avoid many of these critical periods, therefore, adverse impacts are not expected. Other critical periods for wildlife coincide with the construction schedule. All identified critical habitats and use periods are listed in Tables A-7-1 and A-7-2.

1. Realignment of the pipeline could eliminate some adverse impacts, but could also add other critical areas to the list. The critical wildlife habitats and periods listed in Table A-7-1, could be avoided during construction, unless otherwise authorized.

2. There are at least 20 stream or river crossings along the proposed pipeline route. Critical crossing times and milepost locations are listed in Table A-7-2. To reduce the likelihood of impacts to aquatic species, construction could be restricted to the periods identified.

TABLE A-7-1

CRUCIAL WILDLIFE USE AREAS AND PERIODS TO BE AVOIDED ALONG THE SALT LAKE CITY ALTERNATIVE PRODUCT PIPELINE

Nearest Mileposts	Dates When Construction Should be Avoided	Reason
White River Crossing (6.7)	March 15 thru July 15	Waterfowl nesting
10 - 17	May 10 thru June 20	Antelope fawning
18 - 22	March 15 thru July 15	Waterfowl nesting (National Wildlife Refuge)
25 - 27	March 15 thru July 15	Raptors-waterfowl nests
47 - 51	March 15 thru July 15	Waterfowl area
94 - 103	May 16 to July 1	Elk and deer fawning/calving
121 - 125	March 15 to July 15	Raptor habitat
140 - 142	May 16 to July	Deer fawning
139 - 157	October 31 to April 30	Big game winter range

TABLE A-7-2

STREAM AND RIVER CROSSINGS AND SUGGESTED CONSTRUCTION PERIODS

Nearest Milepost	Dates When Construction Should Occur	Reason
WHITE RIVER 6.7	August 15 to October 15	Lowest flows - Coordinate with release schedules
Green River 21	August 15 to October 15	Lowest flows - Coordinate with release schedules
Duchesne River 49	August 1 to October 15	Low flows - Coordinate with Bureau of Reclamation
Rock Creek 68	August 1 to October 1	Low flows - Indian lands Brown trout fishery
Duchesne River 71	Late fall and winter	Low water; no flow controls
Duchesne River 74	February	Low water; no flow controls
Duchesne River 87	August 15 to October 1	Private land
Duchesne River 90	August 15 to October 1	Low water - Late fall
West Fork Duchesne River 91 - 93	August 1 to October 1	Multiple Crossings - Low water - Fall construction
Spring Creek 92	August 1 to October 1	Low water
Wolf Creek 94	August 1 to October 1	Low water
Wolf Creek 100	August 1 to October 1	Low water
South Fork Provo River 105 and 107	July 15 to September 15	Reproduction area
Provo River 110, 111, and 115	July 15 to September 15	Rearing water

TABLE A-7-2 (Concluded)

STREAM AND RIVER CROSSINGS AND SUGGESTED CONSTRUCTION PERIODS

Nearest Milepost	Dates When Construction Should Occur	Reason
Silver Creek 134	July 15 to September 15	- - - -
Kimball Creek 132	July 15 to September 15	- - - -
Mountain Dell Creek 143	August 15 to October 1	Brown trout
Emigration Creek 144 and 148	July 15 to September 15	Cutthroat - Private
Red Butte Creek 150	July 15 to October 1	Brown trout
City Creek 154	August 15 to October 1	Brown trout

3. In order to reduce harassement to wildlife, particularly big game animals on their winter ranges, all pipeline construction roads could be decomissioned to eliminate public access. If access roads are necessary for operation and maintenance, they must be approved by the authorized officer and clearly marked "No Access Except Authorized Vehicles." In high-use areas, the contractor may be directed to install and maintain gates to limit access.

4. Camping or parking could be prohibited at or near any livestock watering source, artificial water source, or spring, so that use by wildlife and domestic livestock would not be hampered. The restricted area should be determined by the authorized officer.

5. At stream crossings, care could be taken to create a minimum disturbance to vegetation in this important wildlife habitat type. In addition, all larger line trees and dead snags could be left standing, wherever possible, to benefit raptors and other species that require these types of trees. All management practices as defined in Title 33 CFR, 1980, ed., part 323 could be followed to lessen impacts to stream crossings.

6. In areas of crucial wildlife habitat, initiate range improvement practices to increase carrying capacities in adjacent areas prior to habitat disturbance by oil shale project construction.

7. Initiate training and educational programs to acquaint company personnel with wildlife programs and the need for firearms control in order to create a greater respect for wildlife and reduce poaching.

8. Increase the forage productivity of lands adjacent to areas committed to irreversible commitment of resources to make up for acres lost.

AGRICULTURE

1. All road rights-of-way could be fenced to exclude animals. This measure would reduce or prevent losses of livestock due to collisions with construction traffic.

2. New water sources could be developed in areas presently not utilized for grazing due to lack of water. This measure would mitigate losses of forage and grazing areas due to project activities by opening up other areas for grazing.

TRANSPORTATION

1. Truck and heavy equipment traffic routes could avoid residential areas to reduce safety hazards and noise disturbance.

2. Nighttime truck and heavy equipment traffic could be avoided in municipal areas to eliminate nighttime noise disturbance.

3. To reduce traffic volume impacts, an alternative transportation system, including carpools, vanpools, buspools, or public transit system, could be established.

4. Earmark to certain percent of the revenues (taxes) paid to the State from energy development companies to go for roadway improvements (state and county).

5. Require that energy development companies contribute to an escrow account for roadway improvements on a percentage basis, according to their size (impact) and as they come on line.

6. Set up a special funding program at the federal level to pay for improvements resulting to roadways which are affected by the various federal leasing/subsidy programs.

RECREATION

1. For purposes of minimizing boredom, the potential for deviant behavior, minimizing poaching and wanton killing of wildlife, and generally reducint the turnover rate, the on-site construction camp could include the following recreational facilities and activities: baseketball, racketball, pool, table tennis, weight training room, and locker and shower facilities.

2. Due to the predicted population growth caused by synfuels development for the low-level and high-level regional scenarios, new developed camping facilities would be needed to meet the anticipated public demand. Federal, state, county, local, private, and the Ute Indian Tribe could provide diverse camping opportunities.

3. Due to the predicted population growth in Vernal and Roosevelt, Utah, the new town at Westwater, Utah, and Rangely, Colorado, new municipal recreation facilities and local park areas would be needed to meet the leisure time needs of an expanding urban population. For example, Roosevelt would need a new year-round swimming pool and recreation community center (Eschler 1982); Vernal would need an additional recretaion community center, additional tennis, baseketball, and racketball courts; Rangely would need additional park acreage and day use areas (Bartlett 1982); and the new town of Westwater (predicted to have a population of 12,000 to 15,000 by 1995) would need all the local recreation facilities and park acreage to meet resident demands.

WILDERNESS

1. Due to a predicted increase in visitation to designated Wilderness Areas by the mid and late 1980's and early and mid 1990's within the region, federal land management agencies would likely have to institute a permit

quota system to preserve naturalness and solitude wilderness resource characteristics for maintaining high quality user experiences and protection of resource values.

2. Due to the predicted increase in visitation to the Uintah and Ouray Indian Reservation by the public, more enforcement personnel would likely be needed to maintain wilderness-related values in the undeveloped Wilderness Areas of the Hill Creek Extension on reservation lands.

3. Due to the predicted incrase in visitation to the State roadless area in the P.R. Springs area, more enforcement personnel would likely be needed to maintain the natural characteristics, especially wildlife values, in this undeveloped area.

VISUAL RESOURCES

ROADS

1. Oil or water all non-land surfaced roads during the primary recreation season of May through September to keep visibility impacts from dust to a minimum.

2. Utilize existing raods as much as possible to maintain the existing quality of the visual resources and lessen other environmental impacts.

3. When constructing new roads or rebuilding existing roads, minimize the width of roads, keeping safety in mind, to lessen the imapct on the visual resource and other resoruce values.

4. Keep road cuts and fills to minimum when constructing new roads or upgrading existing areas to minimize the contrast in landform modification and contrast for the visual resource.

5. Double cut ends of culverts to match the road cut slopes, or use preformed end section, when installing culverts for roads in visually high or medium sensitive areas to reduce the visual contrast when adding a structure to the landscape.

6. Use self-weathering steel for guardrails in areas of high or medium visual sensitivity to reduce the visual contrast when adding such structures to the landscape.

TRANSMISSION LINES

1. Avoid locating transmission line towers so that they would "skyline" or silouette against the sky in areas of high or medium visual sensitivity so that increased contrasts in form and line would be reduced.

2. Use non-specular conductors, insulators, and towers in areas of visually high or medium sensitvie areas to reduce visual contasts created by reflection and added visibility of such structures which would be in contrast to the existing landscape.

3. Preplan transmission line corridors to lessen introduced visual contrasts of the structures with the existing visual landscape by screening or blending the transmission line characteristics where possible.

4. Minimize river and road crossings by transmission lines where possible in high or medium visually sensitive areas and where unavoidable cross at right angles with long span lengths to minimize the visual contrasts in form, line, and color of the added structures.

5. Avoid placing transmission line tower which would be in direct-ahead line of sight from high or medium sensitive travel routes or rivers to lessen the contrast of such added landscape structures.

6. Do not clear vegetation for transmission line construction unless the existing vegetation would directly interfere with construction or operation ofthe structures in high or medium visually sensitive areas. Lessened clearing would reduce the vegetative contrasts in form, line, color, and texture with the natural landscape.

7. Where possible, connect vegetative clearings for transmission line construction and operation with existing natural clearings, even if extra clearing would be reasonably necessary, to reduce the form, line, color, and texture or the contrast with the natural landscape vegetation.

8. When locating transmission lines through valley floors, align the structures along the break in landform or vegetation of the valley floor and side slopes to reduce contrasts of the induced structures with the natural landscape features.

RIVER CROSSINGS

1. Bridges should be constructed of colored concrete, self-weathering steel, pressure treated wood, or other materials which would blend with the surroundings to place as little impact on the visual resources in high and medium sensitivity areas.

2. Place pumps and other such equipment in underground vaults or where they would be screened by vegetation in areas of high or medium sensitivity where seen from the river to lessen visual contrasts.

3. Pipelines should cross rivers at right angles where possible to be less in a person's line of vision from the river and lessen visual impacts as seen by the river user.

FACILITIES

1. Choose building materials, colors, and overall designs for facilities in high or medium visual sensitivity areas to closely help the facility blend with the surrounding landscape.

2. Locate facilities when possible to minimize visual contrast by taking advantage of landforms, vegetative pattern, etc.

3. Where feasible, remove and save topsoil for redistribution when constructing facilities so that the site may more easily revegetate when construction is complete.

4. Minimize vegetation removal when constructing facilities, or in a few cases, clear additional and vegetation to blend clearings with existing landscape conditions and help reduce visual contrast.

PRODUCT LINES

1. When constructing surface pipelines, colors of the pipeline should blend with the surronding landscape where feasible, or as a minimum should be painted black, rather than galvanized or silver, to reduce visual contrasts.

2. Pipeline clearings should be natural in appearance, blending with natural vegetative cleraings and patterns, or where possible place pipeline along side existing roads, to minimize visual contrast with the natural landscape.

3. In areas where subsoil colors are different than surface soil colors and the visual sensitivity is high or medium, use proper traveling and backfill techniques to replace soils so color contrasts do not result in lessening the visual quality of an area.

MISCELLANEOUS

1. Where feasible, revegetate with indigenous plants, using on-site transplants, as an example, to help avoiding long-term visual contrasts with the natural landscape.

2. Plan uniformity in signing (highways, recreational, informational) to reduce visual contrasts by establishing harmony in signing.

PALEONTOLOGY

1. During excavation whenever fossils are encountered, the applicants should contact a qualified paleontologist. The qualified paleontologist should determine the value of the fossils and collect them and record their

occurrence, if necessary. The relative value of paleontologic resources would be maintained and irretrievable losses of these resources minimized.

HEALTH AND SAFETY

1. Some of the oil shale's health and safety hazards can be reduced by:

   - the design and maintenance of safe working environments; and

   - health monitoring programs, including examinations and record keeping.

Initial training programs and refresher courses are required by Occupational Safety and Health Administration (OSHA) and Mine Safety and Health Administration (MSHA). These agencies also promulgate standards for working environments. Health inspections are sometimes included in OSHA/MSHA routine inspections, and special health inspections can be made if the agencies determine that a serious health hazard exists. At present, exchange of worker-health information among companies is not required, although some companies, especially in the coal mining industry, have organized such programs to provide data regarding occurrences of black lung among miners who change jobs within the industry.

APPENDIX A-8
REVIEW AND EVALUATION OF APPLICANTS' EROSION CONTROL AND RECLAMATION PROGRAMS

Achieving successful reclamation and erosion control on lands disturbed by project development and operation in the Uintah Basin would require an intensive reclamation program. Important variables that strongly affect reclamation success in the region are: (1) severe climatic conditions (low, erratic precipitation and high winds); (2) soil properties, such as shallow depths, thin surface layers, low inherent fertility, moderate to strong salinity and alkalinity and the volumes of rock fragments; (3) strongly sloping to steeply sloping terrain; (4) preconstruction variations in vegetation types and their low densities; (5) livestock grazing control on newly seeded areas; and (6) off-road vehicle traffic control on access roads to minimize off-road land surface disturbance.

RECLAMATION SUCCESS AND RECLAMATION GOALS

The lack of successful reclamation in the past has been due, in part, to inadequate reclamation practices and/or a lack of compliance to applicable reclamation practices and continuing follow-up measures. Reclamation efforts have been improving in recent years due to: (1) stronger emphasis on achieving successful reclamation to meet regulatory requirements and a more dedicated stewardship commitment; (2) improved methods, procedures, and plant varieties; (3) improved kinds of machinery to implement practices; and (4) stronger emphasis on compliance and monitoring programs.

TYPES OF LAND DISTURBANCE

Different kinds of land disturbance caused by project activities would require tailored reclamation programs. These include: (1) reclamation and revegetation of land disturbed by surface facilities and installation of right-of-way facilities, such as pipelines, roads, and electric transmission lines; (2) reclamation and revegetation of spent shale disposal areas; (3) reclamation and revegetation of surface mined areas, and land disturbance caused by "in-situ" retorting process; and (4) protection and reclamation of right-of-way areas subject to periodic construction disturbances due to common corridor use. Table A-8-1 identifies the types of land disturbance that would be caused by each applicants' project.

ASSUMPTIONS

The determinations made concerning erosion control and reclamation success on lands disturbed by project construction and operation activities are based on the following assumptions:

(1) Applicants operating on lands in the State of Utah lawfully subject to its police power would prepare and follow appropriate

TABLE A-8-1

TYPES OF LAND DISTURBANCE BY PROJECT

Project	Right-of-way Facility Construction	Spent Shale Disposal	Surface Mining	In-situ Retorting Process
Enercor (Rainbow)	X		X	
Enercor-Mono (P.R. Springs)	X		X	
Geokinetics	X	X	X	X
Magic Circle	X	X		
Paraho	X	X		
Sohio	X		X	
Syntana-Utah	X	X		
Tosco	X	X		

plans, including applicable measures and procedures, to accomplish and ensure successful reclamation of state land affected by project action, as required by the Utah State Department of Natural Resources, Division of Oil, Gas and Mining (State of Utah 1953). The erosion control and reclamation plans would fulfil requirements outlined by Form MR-1 (Revised May 1982) entitled "Notice of Intention to Commence Mining Operations and Mining and Reclamation Plan," (State of Utah 1982). This 12-page form outlines the preparation of a detailed reclamation plan, including: (1) maps identifying project location, drainage patterns, locations of stockpile and disposal areas; (2) maps identifying acreage to be disturbed by each project component; (3) geologic and overburden analysis; (4) construction and maintenance techniques for access roads; (5) dominant preconstruction vegetation; (6) vegetation removal methods; (7) soil types (surficial plant supportive material), overburden properties and revegetation potential; (8) method of removing and stockpiling soil material and overburden; (9) use of impoundments; (10 backfilling, grading, contouring and soil redistribution and stabilization techniques; (11) revegetation plan, including species, rate of seeding, season of planting, seedbed techniques, mulching, fertilizing and irrigation; (12) reclamation schedule, and (13) monitoring and follow-up program.

Performance and compliance of the applicant as required by the State of Utah Mined Land Reclamation Act would be examined by members of the Utah State Division Staff (State of Utah 1953).

(2) Applicants would comply with the proposed erosion control and reclamation programs they have developed and/or would follow through on their commitment to "comply with appropriate regulations and required plans and stipulations to protect and restore the land disturbed by project construction and operation to a stable, productive and aesthetically acceptable condition."

The applicants' proposed erosion control and reclamation programs have been reviewed, evaluated and a determination made as to their adequacy, effectiveness and additional mitigation identified if necessary (refer to Specific Project Applicants Reclamation Program Evaluations section of this appendix).

(3) Results of special studies and field trials accurately assessed local conditions and potential for reclamation success. (Several applicants have conducted detailed soil and vegetation inventories and special on-site field studies to provide for adequate resource inventories, to identify revegetation and reclamation potential, to determine applicable reclamation measures and their effectiveness, and to identify source areas for favorable soil materials.)

(4) The following "Erosion Control, Revegetation, and Restoration Guidelines for use on Federal Lands" would be included as stipulations in the right-of-way grants issued to the applicants by the Bureau of Land Management and U.S. Forest Service, and would also be implemented for all other lands including state lands, Indian-owned and controlled lands, and private lands, as agreed on by the applicant and landowner.

EROSION CONTROL, REVEGETATION, AND RESTORATION GUIDELINES FOR USE ON FEDERAL LANDS

The following guidelines would be included as stipulations in the right-of-way grants issued to the applicants.

Standard procedures for the applicants would include implementation of erosion control and revegetation measures to assure that lands disturbed by construction and operation activities would be restored to a stable, productive, and aesthetically acceptable condition.

A detailed, site-specific reclamation plan would be developed and become part of the Operating Plan. Because the proposed rights-of-way are composed of many types of terrain, soils, vegetation, land uses, and climatic conditions, the detailed plan would include sets of techniques and measures tailored to each condition encountered. Local expertise and locally effective reclamation methods would be followed when the site-specific procedures for the detailed reclamation plan are developed. The erosion control, revegetation, and restoration guidelines and Operating Plan would be implemented under the direction of the appropriate agency official.

Detailed information regarding applicable techniques and technical assistance to private landowners concerning erosion control measures and reclamation procedures would be obtained from the Soil Conservation Service through local Soil Conservation Districts. Technical assistance and approval of written plans for federal lands would be obtained from the Bureau of Land Management and the U.S. Forest Service prior to any construction.

During construction of the applicants' projects, an on-site reclamation specialist would be employed by the applicants to provide: (1) liaison with private landowners, federal agency officials, and local governments; (2) expertise to direct applicable restoration procedures when special conditions are encountered, without causing construction delays; and (3) favorable public relations.

General erosion control and restoration measures have been developed for the following areas and will be included as part of the Operating Plan:

- Right-of-way and Site Clearing
- Trenching and Preservation of Topsoil
- Backfilling and Grading
- Land Preparation and Cultivation
- Revegetation

- Maintenance and Monitoring
- Use of Biochemicals

Right-of-way and Site Clearing

Emphasis would be placed on protecting existing vegetation and minimizing disturbance of the existing environment.

- Land grading would be done only on the area required for construction.

- Sidehill cuts would be kept to a minimum to ensure resource protection and a safe and stable plane for efficient equipment use. The authorizing agency would provide assistance and would approve sidehill cuts prior to construction.

- Existing ground cover such as grasses, leaves, roots, brush, and trees trimmings would be cleared and piled only to the extent necessary. Slash would be piled and later shredded and chipped for use in restoration operations or disposed of at the discretion of the authorized agency official.

- Trees and shrubs on the right-of-way that are not cleared would be protected from damage during construction.

- Where the right-of-way crosses streams and other water bodies, the banks would be stabilized to prevent erosion. Construction techniques would minimize damage to shorelines, recreational areas, and fish and wildlife habitat.

- Care would be taken to avoid oil spills and other types of pollution in all areas including streams and other water bodies and in their immediate drainage areas. All spills would be immediately cleaned up.

- Design and construction of all temporary roads would be based on an approved transportation plan and would ensure proper drainage, minimize soil erosion, and preserve topsoil. After abandonment, these roads would be closed and areas restored without undue delay or maintained at the discretion of the landowners. Restoration, including redistribution of topsoil, would be to the satisfaction of the landowner and/or regulatory officials.

- During adverse weather conditions, as determined by the on-site reclamation specialist, the authorizing agency would issue stop and start orders to prevent rutting or excessive tracking of soil and deterioration of vegetation in the right-of-way area.

- During construction activities near streams or lakes, sedimentation (detention) basins and/or straw bale filters would be constructed to prevent suspended sediments from reaching downstream watercourses or lakes, as required by the authorizing officer.

- Actual construction activities would immediately follow clearing operations, especially in areas of soil that are highly susceptible to wind or water erosion and other special areas.

Trenching and Preservation of Topsoil

Trenching methods and techniques would ensure that:

- Topsoil is removed from the trench area by double-ditching (i.e., windrowed separately, protected, and replaced last during backfilling). This procedure would be followed as specified by the authorizing officer.

- Remaining unearthed materials are removed and stored in a manner that facilitates backfilling procedures, uses a minimum amount of right-of-way area, and protects the excavated material from vehicular and equipment traffic.

- Cofferdams or other diversionary techniques would be use where necessary to permit flow in one part of a stream while pipelaying construction occurs in another part.

- A specific trenching and excavated material stockpiling procedure would be used on steep-sloping and rough, broken terrain to ensure minimum disturbance as outlined in the Operating Plan. This procedure would be developed by both the authorizing officer and applicant.

Backfilling and Grading

The following backfilling and grading techniques would be used:

- Backfill would be replaced in a sequence and density similar to the preconstruction soil condition.

- Backfilling operations would be conducted in a manner that would minimize further disturbance of vegetation.

- The contour of the ground would be restored to permit normal surface drainage.

- In strongly sloping and steep terrain, erosion control structures such as water bars, diversion channels, and terraces would be constructed to divert water away from the pipeline trench and reduce soil erosion along the right-of-way and other adjoining areas disturbed during construction.

- All structures such as terraces, levees, underground drainage systems, irrigation pipelines and canals would be restored to preconstruction conditions so that they would function as orginally intended.

- The surface would be graded to conform to the existing surface of the adjoining areas except for a slight crown over the trench to compensate for natural subsidence. In cropland areas, especially border and furrow irrigated cropland, the soils would be compacted and the crown would be smoothed to match the bordering area to allow surface irrigation.

- Topsoil would be uniformly replaced over the trench fill and other disturbed areas to restore productivity to its preconstruction condition.

- Materials unsuitable for backfilling or excess backfill material would be disposed of as arranged by the authorizing officials.

- Temporary work space areas used at stream and highway crossings and other special sites would be restored to approximate preconstruction conditions and to the satisfaction of the authorizing officials.

- The right-of-way at stream crossings would be restored to a preconstruction state. The upland areas and banks would be revegetated to preconstruction conditions. Where this is not possible, they would be mulched with rock. The size of the rock mulch would be larger in diameter then materials excavated from the trench. The streambed would be returned to its original contours with sediments like those that were excavated.

<u>Land Preparation for Seeding and Cultivation</u>

Construction, backfilling and grading activities commonly cause compaction and alter soil conditions that affect soil productivity and/or seeding success in the right-of-way area. The following practices and techniques would be used to improve these soil conditions, protect soil from erosion and provide a favorable seedbed:

- In cropland areas, as required by the authorizing agency or landowner, subsoiling or chiseling would be used to ensure that soil compaction is reduced and preconstruction soil permeability is restored.

- Chiseling would be used, unless objected to by the landowner or authorizing agency, in range land areas to reduce compaction and improve soil permeability. Pitting and contour furrowing as directed by the authorizing agency or landowner would be done on steeper slopes of disturbed areas to increase infiltration and to reduce runoff and erosion.

- Suitable mulches and other soil stabilizing practices would be used on all regraded and topsoiled areas to protect unvegetated soil from wind and water erosion and to improve water absorption.

- Special mulching practices or matting would be necessary in critical areas where wind and water are serious erosion hazards to protect seeding, seedlings after germination, and plantings.

- Commercial fertilizers would be applied to soil areas with low inherent fertility to maintain crop yields and establish grass seedings. Application rates would be commensurate with annual precipitation and available irrigation water.

- Seedbeds for areas seeded to grass would be prepared to provide a firm and friable condition suitable for the establishment of grass stands.

- Rock mulches would be used in steep-sloping rock outcrop areas and low precipitation areas to reduce erosion and promote vegetal growth.

- Cultivation and land preparation operations on steeply sloping areas would be done on the contour to minimize erosion.

- Soil area with rock fragments, such as very coarse gravel, cobble, or stone scattered on the surface, would be restored to the original preconstruction surface condition to blend with the adjoining area, to avoid a smooth surface right-of-way area and to control accelerated erosion.

Revegetation (Reseeding and Planting)

The loss of vegetation from lands disturbed by pipeline construction can be mitigated only by satisfactory revegetation. To ensure a successful revegetation program, methods and procedures would be consistent with local climate and soil conditions and would follow recommendations and directions of local experts. Revegetation efforts would be continued until a satisfactory vegetative cover is established. The following practices and techniques would be used in areas where reseeding is suitable as determined by the authorizing agency:

- A firm seedbed would be prepared prior to seeding. This would include a mulch of plant residues or other suitable materials. A cover crop may be needed in larger disturbed areas.

- Seed would be planted by drilling, broadcasting or hydroseeding. Drilling is the preferred method because it is usually most successful. Drill seeding with a grass drill equipped with depth bands would be used where topography and soil conditions allow operation of equipment to meet the seeding requirements of the species being planted. Broadcast seeding would be used for inaccessible or small areas. Seed would be covered by raking or harrowing. Hydroseeding would be done in critical areas determined by the reclamation specialist or authorizing officer.

- Only species adaptable to local soil and climatic conditions would be used. Generally, these would be native species. However, introduced species may be considered for specific conditions when approved by the landowner and regulatory authority. Seeding rates in critical area plantings and generally throughout the right-of-way would be increased 100 percent over regular seeding rates to allow for seed mortality due to adverse growing conditions.

- Seed testing would be conducted to meet state, federal, and agency seed requirements.

- Seeding would be done when seasonal or weather conditions are most favorable, and as determined by the landowner or authorizing officer.

- Grazing or mowing would be delayed at least one season after seeding to provide time for vegetation to become established, especially in highly erodible areas, unless objected to by the landowner or lessee. Protective fencing may be necessary in special areas and will be constructed, maintained, and removed according to authorizing agency specifications.

- In areas of low annual precipitation (generally less than 8 to 10 inches), where reseeding is not suitable or as successful, erosion control structures and measures would be applied on sloping areas to reduce accelerated erosion, to allow reestablishment of preconstruction surface soil conditions, and to allow natural revegetation.

- Trees and shrubs would be reestablished in areas as specified in the revegetation plan. Fifty temporary and/or permanent structures would be installed by the company at specific locations along the right-of-way and other disturbed sites to prevent off-road vehicle access.

Maintenance and Monitoring

Joint inspection of the right-of-way by the applicant and authorizing agency would be conducted to monitor the success and maintenance of erosion control measures and revegetation programs on native grazing land for two growing seasons, or for a period determined by the landowner on private land, or the authorized agency official on state or federal land. The monitoring program would identify problem areas and corrective measures to ensure vegetation cover and erosion control. Certification of successful revegetation and erosion control would be determined by the landowner or authorized agency official.

Use of Biochemicals

The use of biochemicals such as herbicides, fungicides, and fertilizers would comply with state and federal laws, regulations, and policies regarding the use of poisonous, hazardous, or persistent substances. State and federal wildlife agencies would be contacted if application of any of these substances would be on or near sensitive wildlife areas. Application of these substances would be by ground methods. Prior to the use of such substances on or near the permit or grant area, the applicant would obtain approval of a written plan for such use from the authorizing officer, landowner, and appropriate wildlife agency. The plan would outline the kind of chemical, method of application, purpose of application, and other information as required, and would be considered as the authorized procedure for all applications until revoked by the authorizing officer, landowner, or appropriate wildlife agency. This plan would become part of the Operating and Construction Plan.

Construction Timing

Pipeline construction activities on irrigated cropland would be timed, as possible, to avoid disruption of irrigation delivery systems during the major irrigation season, to reduce effects on crop production in areas of construction as well as adjoining irrigated cropland areas served by the systems.

REVIEW AND ASSESSMENT OF APPLICANTS' PROPOSED RECLAMATION PROGRAMS

The applicants' erosion control, reclamation, and revegetation procedures were reviewed using information collected for the vegetation, soils, agriculture and climatic review of the project. The reclamation procedures were evaluated in separate phases according to the type of land disturbance based on the potential problem areas and conditions identified in the vegetation, soils, and climatic inventories. The measures and procedures outlined by the applicants were then evaluated to determine whether they were applicable and effective for the range of soils, vegetation types, terrain, land use, and climatic conditions encountered in the project area.

Table A-8-2 is the checklist that was used as a guideline for the review and evaluation of erosion control, reclamation, and revegetation programs. The checklist is of a summarized list of effective and realiable measures and procedures essential for successful erosion control and reclamation. (The sources of these measures and procedures are identified on the table.) A summary of review comments for each applicant's proposed erosion control and reclamation program is presented in the following individual project discussions. Additional mitigation measures are also identified.

ENERCOR RAINBOW PROJECT

The erosion control and reclamation program outlined by Enercor identified the following (refer to Table A-8-2):

TABLE A-8-2

EROSION CONTROL, RECLAMATION AND REVEGETATION PROGRAM CHECKLIST

RECLAMATION METHODS AND PROCEDURES[2]	REVIEW COMMENTS REGARDING APPLICANT'S PROGRAM[3]

GENERAL MEASURES

A. Avoidance of Critical Areas by Preplanning Construction Alignment (Where Possible).

B. Construction Timing to Minimize Impacts (e.g., Cropland Areas).

C. Construction Precautions During Adverse Weather Conditions (e.g., Prevent Tracking and Compaction During Wet Soil Conditions).

D. Minimized Off-road Vehicle Travel to Reduce Land Surface Disturbance.

E. Preparation and Implementation of an Erosion Control, Reclamation and Revegetation Plan Tailored to Conditions, Within Project Area.

F. Reclamation Accomplished in all Disturbed Areas as soon as Practical.

G. Compliance with Regulations (Local, State and Federal) and Implementation of Applicable Measures and Procedure.

LAND SURFACE AREA DISTURBANCE, EROSION CONTROL AND RECLAMATION

A. Right-of-Way and Site Clearing and Preparation.

1. Minimize area disturbance
2. Vegetation and growth cover clearing, storage or disposal
3. Protection of existing vegetation
4. Protection of natural drainage
5. Land grading technique-steep slopes
6. Techniques used at stream crossings and streams
7. Erosion control (wind and water) measures
8. Sedimentation (retention) basins, dikes and diversions
9. Design, construction and restoration of temporary roads and construction sites.

B. Site Grading, Trenching and Preservation of Topsoil and Excavated Material Handling.

1. Topsoil (or suitable plant growth material) removal, storage and protection
2. Excavated material stockpiling procedures
3. Trenching techniques (steep sloping areas)
4. Grading techniques for surface facilities
5. Fill areas (compaction and erosion control)
6. Stream crossing techniques (trenching)

C. Backfilling, Shaping, and Cleanup.

1. Backfilling procedures (compaction)
2. Topsoil replacement
3. Restoring contour of land surface to permit drainage
4. Restoring soil physical conditions (subsoiling, etc.)
5. Restoring structures (roads, irrigation systems, etc.)
6. Match surrounding landscape (rock outcroppings, coarse fragments on surface, etc.)
7. Erosion control measures (contouring, terraces, diversions)
8. Excess or unsuitable excavated material disposal

D. Land Preparation for Seeding and Cultivation.

1. Measures to improve soil physical conditions
2. Seed bed preparation
3. Surface, roughness condition
4. Fertilizers and other soil admendments (if applicable)
5. Suitable mulches and mulching practices
6. Land preparation methods on "critical areas"

E. Revegetation (Reseeding and Planting).

1. Selection of adapted species
2. Seeding and planting methods and techniques
3. Supplemental irrigation (when applicable)
4. Protection of seedlings
5. Continuing revegetation efforts to ensure satisfactory cover (when necessary)

F. Maintenance and Monitoring.

1. Identifying maintenance, monitoring and corrective measures to ensure erosion control and successful revegetation

G. Use of Biochemicals.

1. Identify procedures regarding use of herbicides, pesticides, and fertilizers (when needed)

TABLE A-8-2 (Cont'd)

EROSION CONTROL, RECLAMATION AND REVEGETATION PROGRAM CHECKLIST

RECLAMATION METHODS AND PROCEDURES[2]	REVIEW COMMENTS REGARDING APPLICANT'S PROGRAM[3]
PROCESSED SHALE DISPOSAL AREA RECLAMATION	
A. Topsoil and Suitable Plant Growth Material Removal and Storage.	
B. Design of Disposal Area (Geomorphic Relationships, Blending with Surrounding Terrain).	
C. Ground Water Contamination Control.	
D. Suitable Surface Water Runoff Control Structures, and Retention Ponds (Surface Water Contamination Control).	
E. Placement and Compaction of Spent Shale.	
F. Shaping and Contouring Disposal Embankments.	
G. Leaching Soluble Salts from Root Zone.	
H. Topsoil or Suitable Plant Growth Material Replacement (Blending Color of Disposal Pile with Surrounding Area).	
I. Application of Organic Matter, Fertilizers and Soil Admendments.	
J. Erosion Control Measures (Contouring, Diversions, Benching, etc.).	
K. Seeded Preparation.	
L. Suitable Mulches and Mulching Practices.	
M. Selection of Adapted Species for Revegetation.	
N. Applicable Seeding and Planting Methods.	
O. Transplanting Native Shrubs and Trees to Blend Visually with Surrounding Area (If Applicable).	
P. Supplemental Irrigation (If Applicable).	
Q. Protection of New Seedlings and Plantings from Livestock and Wildlife.	
R. Continuing Revegetation Effects (Where Necessary).	
S. Maintenance, Monitoring and Corrective Measures.	
T. Use of Surface Water Runoff for Revegetation and Other Project Use.	
SURFACE MINING RECLAMATION	
A. Surface Mining Sequence and Design (Compatible with Terrain and Overburden).	
B. Overburden Analysis (Physical and Chemical).	
C. Topsoil and/or Suitable Plant Growth Material Removal and Storage.	
D. Materials Handling (Soils and Overburden).	
E. Ground Water Contamination Control Measures.	
F. Suitable Surface Water Runoff Control Structures and Retention Ponds (Surface Water Contamination Control).	
G. Covering Undesirable Spoil Material.	
H. Placement and Compaction of Spoil Material.	
I. Grading, Shaping and Restoration of Natural Surface Drainages.	
J. Topsoil and/or Suitable Plant Growth Material Replacement on Mine Overburden.	
K. Erosion Control Measures (Contouring, Diversion, Benching, etc.).	
L. Application of Organic Matter, Soil Admendments and Fertilizers.	

TABLE A-8-2 (Concluded)

EROSION CONTROL, RECLAMATION AND REVEGETATION PROGRAM CHECKLIST

RECLAMATION METHODS AND PROCEDURES[2]	REVIEW COMMENTS REGARDING APPLICANT'S PROGRAM[3]
M. Maintaining Soil Physical Conditions (Subsoiling etc.).	
N. Seed Bed Preparation.	
O. Suitable Mulches and Mulching Practices.	
P. Selection of Adapted Species for Revegetation.	
Q. Applicable Seeding and Planting Methods.	
R. Transplanting Native Shrubs (Nursery Stock) to Blend Visually with Surrounding Area (If Applicable).	
S. Supplemental Irrigation (If Applicable).	
T. Protection of New Seedlings and Plantings from Livestock and Wildlife.	
W. Maintenance, Monitoring and Corrective Measures (Including Revegetation Efforts, Where Necessary).	
V. Use of Surface Water Runoff for Revegetation.	

[1]This checklist was developed by the Bureau of Land Management, Division of EIS Services (EISS) to provide a guideline to review and evaluate the adequacy and effectiveness of applicant's proposed erosion control, reclamation and revegetation programs. The checklist consists of a summarized list of measures, practices and procedures essential to ensure successful reclamation, revegetation and erosion control for land disturbance.

[2]The measures and procedures listed have been used in meeting objectives associated with soil and water conservation, water management, pollution abatement, waste disposal, improved fish and wildlife habitat and improved quality of the environment. The effectiveness and reliability of these measures and procedures are based on research, field trials and experiences of many years. Specific measures associated with surface mining activities and processed shale disposal areas are based on recent research and field trials. All practices and procedures identified are well documented and have been demonstrated to be reliable in making assumptions regarding effectiveness when properly implemented. (References (30) available upon request from Bureau of Land Management, EISS, 555 Zang Street, First Floor East, Denver, Colorado 80228.)

[3]Review comments should reflect the adequacy of the applicant's proposed program by: (1) identifying the essential measures and procedures recognized; (2) identifying essential measures omitted; (3) making note of overall intent and compliance to ensure successful reclamation, revegetation and erosion control; and (4) whether program is tailored to the needs and conditions (soils, vegetation and climate) of the project area. Additional migitation measures needed by applicant should also be identified.

General Measures:

The Enercor program very adequately recognizes items A through G. The reclamation efforts proposed will be directed toward returning the disturbed and mined lands to approved premining conditions. The program also states all reclamation efforts will be conducted in accordance with all regulations.

Land Surface Disturbance, Erosion Control and Reclamation:

The Enercor program very adequately identifies all the essential measures listed in Items A through G for rights-of-way facilities.

Item F: A monitoring and maintenance program has been identified. Certification of successful revegetation and erosion control would be based on compliance with agreement.

Item G: The program does not specifically identify procedure regarding the use of biochemicals. However, Enercor indicates compliance to all regulations, so it is assumed Item G will be adequately recognized.

Surface Mining Reclamation:

The Enercor program indicates all reclamation operations will be conducted in accordance with regulatory guidelines. The program identifies the essential measures listed in Items A through V. However, some of the items (Items H, K, L and T) are very generally recognized.

Item B needs additional detail concerning identification of physical and chemical properties of the overburden.

It is determined that: (1) Enercor's reclamation program identifies applicable measures and procedures to ensure successful restoration of land disturbance associated with construction of right-of-way facilities; (2) Enercor's program indicates compliance with regulatory guidelines for reclamation of surface mine areas. However, in order for Enercor to accomplish this compliance the following additional items (that will be part of the final plan as required by State of Utah) should be carried out: (1) conduct a detailed soil survey for the surface mine area to provide an inventory of soil types and terrain to identify areas most strongly susceptible an impacts, to identify revegetation and reclamation potential, to identify source areas for top soil and favorable plant growth material, and (2) provide a detailed overburden inventory and analysis to provide information necessary to reclaim the surface mine area.

MAGIC CIRCLE COTTONWOOD WASH PROJECT

The erosion control and reclamation program outined by Magic Circle (Magic Circle 1982) identifies the following (refer to Table A-8-2):

General Measures:

The Magic Circle program very adequately recognizes Items A through G. It identifies compliance with local, state and federal regulations and procedures.

Land Surface Disturbance, Erosion Control and Reclamation:

The Magic Circle program identifies the essential measures and procedures listed in Items A, B, C, D and E.

Item F: Program of erosion protection and revegetation will continue throughout the project until such time as the reclamation effort is deemed successful. Vegetation assessment and data collection will continue on site with the purpose of establishing reference areas that are in accordance with planned post-development land use.

Item G: Fertilizers will be used. If the use of other biochemicals is warranted, their use will be in accordance with applicable state and federal regulations.

Spent Shale Disposal Area Reclamation:

The Magic Circle program very adequately identifies all the essential measures and procedures listed in Items A through T. The program indicates the final reclamation plan will be validated in principle by results of studies, laboratory data, field trials, and current reclamation literature.

It is determined that: (1) The applicants' reclamation program identifies adequate, applicable measures and procedures to ensure successful restoration of land disturbance and reclamation of the spent shale disposal area and land disturbance caused by construction and operation of project right-of-way facilities.

In addition to the reclamation program outlined, Magic Circle has conducted the following: (1) a detailed soil survey that will be available later for the project area to provide an inventory of soil types and terrain to identify areas most susceptible to impacts caused by construction and operation activities, to identify revegetation and restoration potential, and to determine applicable reclamation measures; (2) a detailed vegetation survey to provide information concerning vegetation type, density, and revegetation potential.

The reclamation program outlined by Magic Circle, assuming intensive implementation, provides the necessary measures to ensure successful revegetation of all disturbed areas to a condition supporting the preconstruction (mainly sheep grazing and wildlife habitat). The reclamation program indicates the final plan will be based on applicable, proven measures and procedures, including specific techniques developed through recent and on-going field studies and research. The revegetation program is designed to minimize the aesthetic impact of disturbed areas and provide a self-sustaining vegetative cover that will withstand the arid climatic and soil conditions typical of the area.

PARAHO-UTE PROJECT

The erosion control and reclamation program outlined by Paraho in their application (Paraho 1981a, Paraho 1981b, Paraho 1982) identifies the following (refer to Table A-8-2):

General Measures:

The Paraho program as outlined generally recognizes Items A through G. However, their program states, "The objective of the reclamation efforts will be to return the area to as near its original use and appearance as practical."

Land Surface Disturbance, Erosion Control and Reclamation:

The Paraho program is general and does not specifically recognize Items A through G. As stated above, only a general intent has been indicated.

The following statements are made: "Techniques used will emphasize the use of natural vegetation type and minimal use of supplemental irrigation water. Disturbed areas will be graded to approximate natural contours. Planting and seeding will be done in full. Site will be protected from grazing during the early growing seasons."

Spent Shale Disposal Area Reclamation:

The reclamation program outlined for establishing vegetative cover over the spent shale disposal area is very adequate. It is based on "Conceptual Design Criteria for a Retorted Shale Disposal Facility, Paraho Module, Phase I" (Woodward-Clyde 1980). The program development has involved the review of: (1) literature on retorted shale (especially Paraho properties as they relate to a plant growth medium; (2) Uintah Basin climate; and (3) results of research concerning establishment of vegetation on retorted shale.

The program also considers the availability and amount of suitable soil materials needed to cover the spent shale disposal area.

The reclamation program as outlined by Paraho presently will require additional measures for land surface disturbance associated with right-of-way facility construction. However, these additional measures are contained in the "Erosion Control, Reclamation, and Revegetation Guidelines for use federal Lands" and will be included as a part of the stipulation in the right-of-way grant; therefore, these measures will be required on federal lands.

The reclamation program outlined for the spent shale disposal area (Paraho 1982) is very adequate and is based on applicable measures and procedures including specific techniques developed through recent and on-going field studies and research.

It is determined that the applicant's reclamation program including the additional mitigation measures outlined would provide for a successful restoration of land disturbance.

In addition to the reclamation program outlined, Paraho has conducted the following:

(1) A detailed soil survey for the lease area to provide an inventory of soil types and terrain to identify areas most susceptible to impacts caused by construction and operation activities, to identify revegetation and restoration potential, to determine applicable reclamation measures, and to identify areas most suitable for sources of topsoil and favorable plant growth materials for use in covering the processed shale disposal areas.

(2) Demonstration plot studies and research consisting of processed shale reclamation, revegetation methods and types of plant material for the project area. Results from these continuing studies would aid in selecting effective reclamation methods, seeding methods, and adapted species (Paraho 1978).

SYNTANA-UTAH PROJECT

The erosion control and reclamation program outlined by Syntana-Utah in their technical report (Syntana-Utah 1982) identifies the following (refer to Table A-8-2):

General Measures:

The Syntana-Utah program adequately recognizes Items A through G. The program also emphasizes that in all cases the Syntana-Utah project will: (1) Be performed in such a manner as to minimize erosion and to ensure establishment of vegetation; and (2) meet permit requirements and stipulations as mandated in the regulatory process.

Land Surface Disturbance, Erosion Control and Reclamation:

The Syntana-Utah program identifies the essential measures and procedures listed in Items A, B, C, D and E.

Item F: Monitoring and maintenance will continue until reclamation success is determined to be adequate by agency personnel and landowners.

Item G: The use of biochemicals will comply with state and federal laws, regulations, or policies. The use of fertilizers is anticipated, other substances may be used only if the need arises.

Processed Shale Disposal Area Reclamation:

The Syntana-Utah program adequately recognizes the essential measure listed. Note the exception regarding Item H.

To ensure the success of reclamation efforts, methods will be consistent with the results of past and current research.

Item H: The spent shale should be covered with more than 6 inches of topsoil and/or suitable soil material. Recent studies indicate a thickness of 12 inches or more is needed to provide an effective medium for plant growth (refer to list of source for Table A-8-2).

In addition to the reclamation program outlined, Syntana-Utah is also conducting a detailed soil survey to provide an inventory of soil types and terrain to identify revegetation and reclamation potential and to determine applicable reclamation measures.

The reclamation program outlined by Syntana-Utah, assuming intensive implementation, provides the necessary measures to ensure successful revegetation of all disturbed areas to a condition supporting the preconstruction use consisting mainly of sheep grazing and wildlife habitat. The reclamation program is based on applicable and proven measures and procedures, including specific techniques developed through recent ongoing field studies and research.

TOSCO SAND WASH PROJECT

The erosion control and reclamation program outlined by Tosco in their project technical report (Tosco 1982) identifies the following (refer to Table A-8-2).

General Measures:

The Tosco program very adequately acknowledges Items A through G. Emphasis is placed on compliance with regulations (local, state, and federal) and with procedures outlined by landowner or authorized agency and state officials.

Land Surface Disturbance, Erosion Control and Reclamation:

The Tosco program identifies the essential measures and procedures listed in Items A, B, C, D, and E.

Item F: The monitoring and maintenance program is identified.

Item G: The program indicates that the use of biochemicals, where needed, would comply with local, state, and federal regulations and policies.

Spent Shale Disposal Area Reclamation:

The Tosco program incorporates all the essential measures listed. Tosco has conducted extensive field studies and research regarding processed shale reclamation and revegetation in the Colony and Sand Wash Project Areas. Their program is based on information gained from these studies. Selected references in the list of sources for Table A-8-2 identifies specific studies and their results.

In addition to the reclamation program outlined, Tosco has conducted the following:

(1) A detailed soil survey (Tosco 1981) for the project area to provide an inventory of soil types and terrain to identify areas most susceptible to impacts caused by construction and operation activities, to identify revegetation and restoration potential, to determine applicable reclamation measures, and to identify areas most suitable for sources of top soil and favorable plant growth materials for use in covering the processed shale disposal areas.

(2) Demonstration plant and research consisting of processed shale reclamation, revegetation methods, procedures and types of plant materials at the Sand Wash Site and Colony Site. Results from continuing studies will aid in selecting effective reclamation methods, seeding methods, and selection of adapted species (Tosco 1980, Cook 1974, Berg 1973, Merkel 1973, Harbert and Berg 1974).

The reclamation program as outlined by Tosco, assuming intensive implementation, provides the necessary measures to ensure successful revegetation of all disturbed areas to a condition supporting the preconstruction use (mainly sheep grazing and wildlife habitat). The reclamation program for the spent shale disposal area is based on applicable proven measures and techniques, including specific techniques developed through recent and on-going field studies and research.

ENERCOR-MONO POWER (P.R. SPRINGS PROJECT)

For this conceptual project, the applicant has proposed an adequate erosion control and reclamation program for disturbance caused by construction of right-of-way facilities, similar to the Enercor (Rainbow Project) program.

Since the major type of land disturbance associated with this project is surface mining, additional inventories concerning overburden analysis and more detailed soil surveys will be needed when the final reclamation plan is prepared.

It is assumed that an adequate erosion control and reclamation program will be implemented due to the compliance required by state and Federal agencies for their lands.

GEOKINETICS AGENCY DRAW AND LOFRECO PROJECTS

For these conceptual projects, the applicant has outlined an adequate and effective erosion control and reclamation program. Land disturbance associated with these projects will consist of surface disturbance caused for right-of-way facility installation, spent shale area disposal, underground blasting for a portion of the area where the in-situ retorting process will be used.

The applicant has also conducted on-site studies and field trials. The reclamation program is based on results and experience gained from these studies (Geokinetics 1981).

SOHIO ASPHALT RIDGE PROJECT

For this conceptual project, the applicant to date has presented a very general reclamation program, but has indicated that disturbed land would be reclaimed according to regulatory authority. It is assumed that an adequate reclamation program will be implemented because of the intent identified and because of the necessary compliance with the State of Utah Oil and Gas Conservation Act and with the erosion control and reclamation guidelines for federal lands.

SOIL EROSION AND EROSION CONTROL ANALYSIS

The Erosion Control, Revegetation, and Restoration Guidelines (refer to Assumption section of this Appendix) and the checklist (Table A-8-2) were developed and evaluated using information collected in the soils and vegetation review of the projects. The result of the evaluation was the determination that if the guidelines are followed and the appropriate monitoring occurs, the disturbed areas would be successfully revegetated upon completion of the construction phase of the projects. The methodology used to complete the evaluation is discussed below.

Soils, vegetation and climatic information was collected for the surface areas potentially disturbed by the proposed action and alternatives. Soil surveys were inventoried to identify soil types and terrain strongly affecting construction procedures, revegetation and restoration potential.

The soils data was analyzed and evaluated to identify the following:

- soil areas with soil properties that strongly affect restoration of cropland and revegetation of native rangeland.

- areas that are susceptible to high wind and water erosion hazards.

- effective measures to minimize the effect of soil disturbances caused by construction activities and control accelerated erosion.

- areas where erosion and resultant sediment yield affect water quality.

Soil erosion losses were estimated by the use of the universal soil loss equation (USLE) and the wind erosion equation as applied to construction sites for selected soil areas representing various conditions occurring throughout the proposed project areas.

Recent developments in the soil loss equation make it a potentially valuable tool for selecting and evaluating conservation practices on disturbed areas resulting from construction activities. The information gained by application of the USLE to selected soil sites was used as a basis for determining appropriate erosion control and revegetation measures and to evaluate the effectiveness of those measures to ensure successful erosion control, revegetation, and restoration.

Selected soils representing significant conditions in the project areas were analyzed. The soils and conditions presented in Table A-8-3 represent some of the conditions that would be expected to occur. The table also identifies the effectiveness of several erosion control measures or combinations that could be implemented to control soil loss.

Additional information, consisting of major rangeland management concerns and recommended conservation practices, was obtained from published detailed soil survey reports and the unpublished Uintah County Soil Survey.

The Erosion Control, Revegetation, and Restoration Guidelines and accompanying checklist were developed to cover the range of soil and vegetation types, terrain, land uses and climatic conditions by the procedures outlined above. A detailed site-specific construction and erosion control plan would be developed including locally recommended techniques and measures tailored to the conditions encountered. Proper implementation of the erosion control and revegetation measures outlined in the guidelines would assure successful restoration of land disturbed by project construction activities.

The outlined maintenance and monitoring program would identify problem areas caused by adverse weather conditions during restoration periods or small localized areas with adverse soil properties and provide corrective measures to ensure erosion control.

REVEGETATION

The five broad vegetation types in the Uintah Basin are a composite of several plant communities that occur within that particular climatic or physiograhic setting.

TABLE A-8-3

WATER EROSION RATES ASSOCIATEO WITH SEVERAL SOIL EROSION TREATMENT AND REVEGETATION SCENERIOS

Soil Setting and Vegetation Condition	Condition, Erosion Treatment and Revegetation Scenario	Erosion Rates (Tons/Acres/Year)[a]
Walknolls Soil - (shallow, very channery, loamy Soils underlain by sandstone at 6 to 20 inches. Annual Precipitation - 5 to 8 inches. Slope - 15 percent, 150 feet long. Vegetation Cover - 15 percent.	Current Condition	3.6
	Exposed Soil[b]	12.6
	Erosion Control Measures:	
	- 100 feet interval water bars	10.0
	- 1 ton mulch	2.3
	- 1/2 ton mulch	4.4
Part of Map Unit UNE Walknolls - Gilston Association 2 to 25 percent slope.	- 100 feet interval water bars plus 1/2 ton mulch plus	3.5
	- 100 feet interval water bars plus 1/2 ton mulch plus contouring[c]	
	Reseeding (10 percent cover)[d]	
	- No Erosion Control Measures	5.7
	- 100 feet water bars	4.5
	- 100 feet water bars plus 1 ton mulch	3.5
	- 100 feet water bars plus 1 ton mulch plus contouring[c]	2.8
Motto Soil - Shallow, very flaggy, coarse loamy soils underlain by sandstone at 8 to 20 inches. Annual Precipitation - 5 to 8 inches. Slope - 8 percent, 300 feet long. Vegetation Cover - 15 percent.	Current Condition	1.9
	Exposed Soil[b]	6.5
	Erosion Control Measures:	
	- 200 feet interval water bars	5.0
	- 1 ton mulch	1.2
	- 1/2 ton mulch	2.3
Part of Map Unit - AOC Motto very flaggy loam, 2 to 8 percent slope.	- 200 feet water bars plus 1/2 ton mulch	1.8
	- 200 feet water bars plus 1/2 ton mulch plus contouring[c]	1.1
	Reseeding (10 percent cover)[d]	
	- No Erosion Control Measures	2.9
	- 200 feet water bars	2.3
	- 200 feet water bars plus 1/2 ton mulch	1.8
	- 200 feet water bars plus 1/2 ton mulch plus contouring[c]	1.1
Castner Soil - Shallow very channergy, loamy soils over shale at depths of 6 to 20 inches. Annual Precipitation 14 to 16 inches. Slope 25 percent, 200 feet long. Vegetation Cover - 30 percent.	Current Condition	3.8
	Exposed Soil[b]	27.0
	Erosion Control Measures:	
	- 100 feet interval water bars	18.0
	- 60 feet interval water bars	13.5
	- 1 ton mulch	4.9
	- 1/2 ton mulch	9.5
	- 60 feet water bars plus 1/2 mulch	4.7
	- 60 feet water bars plus 1/2 mulch pluc contouring[c]	4.3
	Reseeding (10 percent cover)[d]	
	- No Erosion Control Measures	12.2
	- 100 feet water bars plus 1 ton mulch	8.1
	- 100 feet water bars plus 1 ton mulch plus contouring[c]	2.9
	- 60 feet water bars plus 1 ton mulch	2.4
	- 60 feet water bars plus 1 ton mulch plus contouring[c]	2.2
Lanver Soils - Moderately deep, loamy soils with 35 to 70 percent rock fragments on the surface with sandstone at depths of 20 to 40 inches. Annual Precipitation - 8 inches. Slop - 8 percent, 300 feet long. Vegetation Cover - 25 percent. (This Soil represents moderately deep soils associated with shallow units).	Current Condition	1.0
	Exposed Soil[b]	6.5
	Erosion Control Measures:	
	- 200 feet interval water bars	5.0
	- 1 ton mulch	1.2
	- 1/2 ton mulch	2.3
	- 200 feet water bars plus 1/2 ton mulch	0.9
	- 200 feet water bars plus 1/2 ton mulch plus contouring[c]	0.5
Part of Map Units: APE2 Lanver - Buckan very channery sandy loams 2 to 25 percent slope.	Reseeding (10 percent cover)[d]	
	- No Erosion Control Measures	2.6
	- 200 feet water bars	2.0
	- 200 feet water bars plus 1 ton mulch	0.9
	- 200 feet water bars plus 1 ton mulch plus contouring[c]	0.5

NOTE: Soil and Vegetation Condition Selection based on tentative soil information from the unpublished Soil Survey for Uintah County, Utah.

[a]Based on Universal Soil Loss Equation (USLE) calculations using factors outlined in "Preliminary Guidance for Mining Activities in the Interior Wester United States."

[b]Represents completely base soil in a loose condition during construction activities. Soil loss estimates are speculative for slopes exceeding 24 percent as these value are beyond the range of research dta. Soil losses are identified as "Worst Case" and would require extremely adverse weather and construction conditions.

[c]Topsoil spreading, tillage and surface roughness done on the contour.

[d]Based on the establishment of 10 percent vegetative cover.

The mixed-desert shrub type, located at lower elevations near the White River, is composed of salt-tolerant, drought-resistant plants. The plant densities are low, with various locations ranging from barren to 20 percent ground cover in this 4- to 6-inch precipitation zone.

Revegetation is difficult in this low precipitation range; however, with timing of seeding and the addition of a mulch, a grass and forb cover can be successfully established within 2 to 10 years. Without a mulch, direct seeding is not recommended. The area disturbed would be shaped, surface rock or debris replaced, and the area allowed to revegetate naturally. This process could require up to 10 years for understory growth and from 20 to 40 years for shrubs and woody species to achieve preconstruction size and dimensions.

The pinyon-juniper type, upland-brush grass, Bookcliffs, and riparian vegetation types occupy different climatic zones but are basically composed of three classes of vegetation--tree species, brush and shrub species, and grass and forb species. Tree species would reseed naturally, but planting seedlings would ensure a greater degree of success. A period of 20 years for willows and up to 300 years for Englemann spruce trees would be required to reach full dimensions. Brush and shrub species would reseed naturally, sprouting from roots, or could be container planted. Approximately 10 to 40 years would be required for full regrowth. Grass and forb species could be reseeded with successful establishment anticipated within 2 to 5 years following reseeding.

Revegetation can be achieved in the region utilizing various techniques. However, the time element will vary from 2 to 10 years for establishment of seedlings.

The degree of success would be determined by the application of techniques and the degree of compliance exercised by the authorizing agency or landowner.

SUMMARY

It is predicted that successful erosion control, reclamation, and revegetation generally would be achieved throughout the project areas provided the applicants implement effective measures and procedures tailored to the kind of land disturbance and to the conditions encountered. It is emphasized, however, that to ensure reclamation success, a strong compliance program accompanied by an effective monitoring and maintenance program is necessary to ensure that applicable measures are applied effectively, and that follow-up measures are carried out. The compliance program would be conducted by the authorizing agencies and landowners for their lands. However, it should be noted that impacts to soils and its potential to produce preconstruction vegetation would be significant if applicable erosion control measures are not implemented due to lack of compliance with approved plans and if adverse weather conditions, mainly heavy rainstorms, would occur during construction before any erosion control measures could be installed.

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APPENDIX A-9
ENDANGERED SPECIES ACT COMPLIANCE

The Endangered Species Act of 1973 requires, under Section 7, that any federal agency carrying out any action that might affect an endangered species must consult with the Fish and Wildlife Service concerning the effects of the project on threatened or endangered species.

This appendix includes pertinent correspondence related to the Endangered Species Act and Section 7 consultation.

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Memorandum

To: Area Manager, U.S. Fish & Wildlife Service, Endangered Species Section, Federal Bldg., Room 1311, 125 South State St., Salt Lake City, UT 84138

From: Team Manager, Special Projects Environmental Impact Team

Subject: Uintah Basin Synfuels Projects - Request for List of all Threatened, Endangered, and Proposed Species, both Plant and Animal

Our office is presently in the preliminary stages of preparing an environmental impact statement for the Uintah Basin Synfuels Projects. The bulk of the projects are located in Uintah County, Utah, with a few developments in Grand County, Utah (see attached map). The EIS effort will consist of five site-specific projects and a regional assessment.

The site-specific projects include: a tar sand recovery proposal by Enercor - Mono Power and oil shale development projects by Magic Circle, Paraho, Syntana-Utah, and Tosco. There will be two additional "conceptual" projects proposed by Geokinetics and Sohio Shale Oil that will be analyzed only in the regional assessment.

Included with this letter is a summary of all the projects noted above and a large-scale map of the regional area and the various project sites.

In accordance with this endeavor, we are officially requesting a Section 7 listing as noted below:

1. A list of all listed and proposed endangered or threatened species of any plant or animal within the regional boundary.

2. A list of all designated or proposed critical habitats within the regional boundary.

3. The name, address, and telephone number of any endangered species recovery team chairman of any species involved in the regional area.

We would appreciate any distribution maps, seasonal ranges, etc., to be included if you have them. Our preliminary examination of the area indicates that T&E species that might be encountered include, at least, black-footed ferret, bald eagle, humpback chub, Colorado River squawfish, bonytail chub and Uintah hookless cactus. Any questions should be referred to Jack Edwards, Project Leader, or Ray Boyd, Wildlife Biologist, at FTS-234-6737.

Thank you for your attention in this matter.

Enclosure

cc: Thom Slater (w/o encl.)

/s/ Charles R. Tullos

United States Department of the Interior
FISH AND WILDLIFE SERVICE
AREA OFFICE COLORADO—UTAH
1311 FEDERAL BUILDING
125 SOUTH STATE STREET
SALT LAKE CITY, UTAH 84138

IN REPLY REFER TO:

23 October 1981

MEMORANDUM

TO: Team Manager
Special Projects Environmental Impact Team
Bureau of Land Management
Denver, Colorado

FROM: Acting Area Manager
Area 5
Fish and Wildlife Service
Salt Lake City, Utah

SUBJECT: Uintah Basin Synfuels Projects

We have reviewed your 23 September 1981 memorandum requesting a list of Federally listed and proposed plant and animal species in the potential impact area of Enercor-Mono Power, Magic Circle, Paraho, Syntana-Utah, Tosco, Geokinetics, and Sohio Shale Oil, tar sands and oil shale development projects in northeast Utah. The following are the Federally listed threatened and endangered species in the project area with the name of the recovery team chairman as you requested.

Species	Recovery Team Leader
1. black-footed ferret (Mustela nigripes)	Dr. Raymond L. Linder South Dakota Cooperative Wildlife Research Unit Department of Wildlife and Fisheries Sciences South Dakota State University Brookings, South Dakota 57006 [605] 688-6121
2. bald eagle (Haliaeetus leucocephalus)	Dr. James Grier North Dakota State University Fargo, North Dakota 58102 [201] 237-8444
3. American peregrine falcon (Falco peregrinus anatum)	Mr. Gerald Craig Colorado Division of Wildlife P. O. Box 2287 Fort Collins, Colorado 80522 [303] 482-6575

4. humpback chub (Gila cypha)	Vacant
5. bonytail chub (Gila elegans)	Contact: John Gill
6. Colorado squawfish (Ptychocheilus lucius)	Endangered Species Office U.S. Fish and Wildlife Service
7. Uinta Basin hookless cactus (Sclerocactus glaucus)	Room 1311, Federal Building 125 South State Street Salt Lake City, Utah 84138 [801] 524-4430

In addition to the above official Federally listed species we would bring to your attention the following species identified in the Federal Register of 15 December 1980. These plant species are candidates for official listing by the Fish and Wildlife Service. While they are not at present protected under the Endangered Species Act, they should be considered in environmental planning so as to avoid further degradation to their limited populations and possible extinction. These species include:

Glaucocarpum suffrutescens
Cryptantha barnebyi
Aquilegia barnebyi
Arabis sp. (underscribed species from the Gray Knolls)
Astragalus hamiltonii
Astragalus lutosus
Festuca dasyclada
Penstemon goodrichii
Penstemon grahamii
Penstemon sp. (underscribed species from the White River)
Thelypodiopsis argillaceae

The District Office of the Bureau of Land Management in Vernal, Utah has in its files much of the best information available on the distribution of these plant species. The Fish and Wildlife Service requests the opportunity to photo copy this information for our own records. Mr. Larry England of our Endangered Species Office is preparing listing packages for Glaucocarpum suffrutescens, Festuca dasyclada, and the White River Penstemon, he has also prepared a draft recovery plan for Sclerocactus glaucus. Dr. James Miller of our Regional Office in Denver is preparing a listing package for Cryptantha barnebyi.

Section 7(c) also requires the Federal agency proposing a major Federal action significantly affecting the quality of the human environment to conduct and submit to the FWS a biological assessment to determine the effects of the proposal on listed and proposed species. The biological assessment shall be completed within 180 days after the date on which initiated or a time mutually agreed upon between the agency and the FWS. Before any contracts for construction are entered into, and before construction is begun the assessment must be completed. If the biological assessment is not begun within 90 days, you should verify this list with us prior to initiation of your assessment. We do not feel that we can adequately assess the effects of the proposed action on listed and proposed species or critical habitat and proposed critical habitat without a complete assessment. When conducting a biological assessment, you shall, at a minimum:

1. conduct a scientifically sound on-site inspection of the area affected by the action, which must, unless otherwise directed by the FWS, include a detailed survey of the area to determine if listed or proposed species are present or occur seasonally and whether suitable habitat exists within the area for either expanding the existing population or potential reintroduction of populations;

2. interview recognized experts on the species at issue, including those within the Fish and Wildlife Service, the National Marine Fisheries Service, state conservation agencies, universities, and others who may have data not yet found in scientific literature;

3. review literature and other scientific data to determine the species' distribution, habitat needs, and other biological requirements;

4. review any other relevant information.

The FWS representative who will provide you with technical assistance is J. Larry England of our Endangered Species Team in Salt Lake City, Utah ([801] 524-4430; FTS 588-4430).

After your agency has completed and reviewed the assessment, it is your responsibility to determine if the proposed action "may affect" any of the listed species or critical habitats. You should also determine if the action is likely to jeopardize the continued existence of proposed species or result in the destruction or an adverse modification of any critical habitat proposed for such species. If the determination is "may affect" for listed species you must request in writing formal consultation from the Area Manager, U. S. Fish and Wildlife Service at the address given above. In addition, if you determine that the proposed action is likely to jeopardize the continued existence of proposed species or result in the destruction or adverse modification of proposed critical habitat, you must confer with the FWS. At this time you should provide this office a copy of the biological assessment and any other relevant information that assisted you in reaching your conclusion.

Your attention is also directed to Section 7(d) of the Endangered Species Act, as amended, which underscores the requirement that the Federal agency or the applicant shall not make any irreversible or irretrievable commitment of resources during the consultation period which, in effect, would deny the formulation or implementation of reasonable and prudent alternatives regarding their actions on any endangered or threatened species.

The FWS can only enter into formal Section 7 consultation with another Federal agency or its designee. State, county or any other governmental or private organizations can participate in the consultation process, help prepare information such as the biological assessment, participate in meetings, etc. We are prepared to assist you whenever you have questions which we may be able to answer. If we can be of further assistance, please advise us.

William C. White

United States Department of the Interior
FISH AND WILDLIFE SERVICE
AREA OFFICE COLORADO—UTAH
1311 FEDERAL BUILDING
125 SOUTH STATE STREET
SALT LAKE CITY, UTAH 84138

SPECIAL PROJECTS STAFF

DEC 29 1981

RECEIVED

IN REPLY REFER TO:

18 December 1981

MEMORANDUM

TO: Chief
Environmental Impact Statement Office
Bureau of Land Management
Denver, Colorado

FROM: Acting Area Manager
Area 5
Fish and Wildlife Service
Salt Lake City, Utah

SUBJECT: Uinta Basin Synfuels Project - Supplemental List

We have received your memorandum of 20 November 1981 concerning the Rangely, Colorado to Salt Lake City, Utah pipeline feature of the Uintah Basin Synfuels Project. Our 23 October 1981 response to your 23 September 1981 request of a list of threatened and endangered species in the vicinity of the project remains adequate. Threatened and endangered species in the area traversed by the proposed pipeline include the following:

black-footed ferret	Mustela nigripes
bald eagle	Haliaeetus leucocephalus
American peregrine falcon	Falco peregrinus anatum
humpback chub	Gila cypha
bonytail chub	Gila elegans
Colorado squawfish	Ptychocheilus lucius
Uinta Basin hookless cactus	Sclerocactus glaucus

If we can be of any further assistance, please advise us.

Robert D. Jacobsen

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Endangered Species Office
1406 Federal Building
125 South State Street
Salt Lake City, Utah 84138-1197

IN REPLY REFER TO:

SE/SLC:6-5-82-018

19 November 1982

Memorandum

To: District Manager, Vernal District
U. S. Bureau of Land Management, Vernal, Utah

From: Field Supervisor, Endangered Species
U. S. Fish and Wildlife Service, Salt Lake City, Utah

Subject: Biological Opinion - Uintah Basin Synfuels Development

In response to your memorandum of 17 August 1982 requesting interagency consultation under Section 7 of the Endangered Species Act of 1973 as amended (ESA) we are providing you with this biological opinion for the following four site specific synthetic fuels energy projects as described by your agency's Uintah Basin Synfuels Development Draft Environmental Impact Statement: 1. Enercor-Rainbow tar sand project. 2. Magic Circle - Cottonwood Wash oil shale project. 3. Syntana - Utah oil shale project and, 4. Tosco - Sand Wash oil shale project. (hereafter collectivly called proposed synfuels projects) The Parahoe-Ute oil shale project is being considered in a separate Section 7 formal consultation between the Fish and Wildlife Service (FWS) and the Corps of Engineers. The nonsite specific projects described in DEIS will not be considered in formal consultation until more specific information is available concerning these projects.

This biological opinion is relevant only to the proposed actions as described by the Uintah Basin Synfuel DEIS for each of the site specific projects with the exception of the Magic Circle - Cottonwood Wash oil shale project where the Bureau of Land Management (BLM) prefered alternative is the only alternative for which this opinion is appropriate. Any substantial change in these projects which might affect endangered species will necessitate BLM reinitiating Interagency Section 7 Consultation under the ESA. This biological opinion has been prepared as prescribed by the Section 7 Interagency Cooperation Regulations (50 C.F.R. 402) and the Endangered Species Act. 16 U.S.C. 1531 et seq.

Biological Opinion

The proposed synfuels projects are not expected to jeopardize the continued existence of the black-footed ferret (Mustela nigripes), bald eagle, (Haliaeetus leucocephalus), peregrine falcon (Falco peregrinus), whooping crane (Grus americana), humpback chub (Gila cypha), bonytail chub (Gila elegans), Colorado squawfish (Ptychocheilus lucius), and Uinta Basin hookless cactus (Sclerocactus glaucus) if the conservation measures discussed later in this biological opinion and in the Uintah Basin Synfuels Development DEIS are followed.

The biological opinion assumes that all water used in these projects will either be purchased from the White River Dam project or come from wells which will not affect the instream flow or water quality of the Colorado River and its tributaries.

Project Description

1. Enercor - Rainbow Project would involve the mining of tar sand, processing it to remove the bitumen, upgrading the bitumen, transporting it to a refinery, and disposing the remaining spent sand after processing. The proposed project would consist of the following major components.

   a. 1,200-acre open pit tar sand strip mine located on sections 32 and 36, T. 12S., R. 25E., in Southern Uintah County, Utah.

   b. 25 acre hot water extraction and delayed coking processing plant.

   c. Wastewater treatment and recycling system.

   d. Spent sand disposal system.

   e. Product transportation system.

   f. Ancillary facilites including; access road, mine haul road, water pipeline (from the proposed White Rive Dam Reservoir), power transmission line and communication facilities.

   This project is expected to use 5,000 acre ft of water per year which is to be purchased from the White River Dam Project.

2. Magic Circle - Cottonwood Wash Project would involve the mining of 70,000 tons per day of oil shale, processing it to remove the crude oil, processing the oil to form the crude shale oil product, transporting the oil by pipeline, and disposing the spent shale after processing. The proposed product would consist of the following major components:

   a. Underground room and pillar mine.

   b. Processing plant on a 200 acre plant site, both mine and plant are to be located on section 19, T. 10S., R. 21E., in Southern Uintah County, Utah.

   c. 40 mile product pipeline to the Plateau Refinery in Roosevelt, Utah and 25 mile product pipeline to an existing pipeline at Bonanza, Utah.

   d. A spent shale disposal system, including a 1,880 acre disposal area located in sections 19, 29, 30, 31 and 32 T. 10S., R. 21E. and sections 24, 25 and 36 in T. 10S., R. 20E.

e. A wastewater treatment system.

f. Solid and hazardous waste disposal systems.

g. Ancillary facilities including: access road, water pipeline (following the BLM preferred alternative of purchasing White River Dam Project Water and diverting the water from the White River near its confluence with the Green River), power transmission line and communication facilities.

This project is expected to use 540 acre feet per year at full production. It is assumed in this biological opinion that the water will be purchased from the White River Dam Project and released for diversion further downstream. This water is to be in addition to releases required by White River Dam Project Biological Opinion. The project will make every effort to avoid the one individual Uintah Basin hookless cactus plant identified as occuring on site. If this is impossible the plant will be salvaged by the BLM for scientific purposes under the supervision of the FWS.

3. Syntana - Utah Project would involve the mining and processing of 84,500 tons of oil shale per day at maximum capacity, the disposal of waste products, and the transportation of synthetic, upgraded shale oil to market areas. The proposed project would consist of the following major components:

   a. Underground room-and-pillar mine and associated facilities occupying 380 surface acres located on sections 1,2,9,10,11, 12,13,14,15,16,17,20,21,22,23 and 29 T. 9S, R. 25E. in Southern Uintah County, Utah

   b. Processing plant and upgrading facilities.

   c. 16.5 mile pipeline to Rangely, Colorado.

   d. Spent shale disposal system including a 3,440 acre disposal area.

   e. Ancillary facilities including; access road, two water pipelines within the same right-of-way (from the proposed White River Dam Reservoir), two natural gas pipelines within the same right-of-way, power supply system, solid and hazardous waste disposal systems, steam and power generation facilities and a communication system.

This project is expected to use 7,000 acre feet of water per year which is to be purchased from the White River Dam Project.

4. Tosco - Sand Wash project would involve the mining of 66,000 tons of oil shale per day, processing it to recover crude shale oil, upgrading the crude to produce a premium quality shale oil product, transporting the oil by pipeline to Rangely, Colorado, and disposing the spent shale after processing. The proposed project would consist of the following major components:

a. Three underground room-and-pillar mines and associated facilities totaling 16.452 surface acres located in townships 9 and 10 South and ranges 21 and 22 East in Southern Uintah County, Utah.

b. 1,086 acre processing plant.

c. 42 mile product pipeline to Rangely, Colorado.

d. 2,000 acre spent shale disposal area.

e. Wastewater treatment system.

f. Solid and hazardous waste treatment system.

g. Ancillary facilities including; access roads, water pipeline to the White River (diverting water from the White River in either section 28, T. 9S., R. 22E. The proposed action or section 17, T. 9S., R. 22E. The BLM prefered alternative), power supply system and interblock roads and conveyors.

The project is expected to use 9,000 acre feet of water per year which is to be purchased from the White River Dam Project actually released for diversion further downstream. This water is to be in addition to releases required by White River Dam Project Biological Opinion and diverted from the White River downstream from the reservoir.

Basis for Opinion

Humpback chub, Bonytail Chub and Colorado Squawfish.

The Synfuels Projects are not expected to adversly impact the humpback chub, bonytail chub and Colorado Squawfish, if the conservation measures discussed later in this biological opinion are followed.

This biological opinion is being issued under the assumption that the four proposed synfuels projects will purchase water from the White River Dam Project. As stated in the Uintah Basin Synfuels Development DEIS, projects that purchase water from the White River Dam Project would not adversly affect the endangered fish species in the Green and White Rivers because of agreed upon conservation measures in the biological opinion issued to the BLM from the FWS (FWS, 1982). Diversion structures downstream from the White River Dam for the Magic Circle - Cottonwood Wash Project and the Tosco - Sand Wash project will have to be constructed so as to avoid impact to the resident endangered Colorado Squawfish in the lower White River. The FWS must aprove the specific design, location and construction proceedures for these water diversion structures and any other project features which could affect the White or Green Rivers (ie: pipeline crossings etc.).

Peregine falcon and whooping crane

The FWS concurs with the BLM in the statement in the Uintah Basin synfuels DEIS that impacts to the peregine falcon and whooping crane are not anticipated. Both these species are so transient in the area of influence of the synfuels project that even indirect impacts are not projected to be significant.

Bald Eagle

The proposed Synfuels Projects are not expected to adversly impact the bald eagle providing the conservation measures discussed later in the biological opinion are implemented. Large concentrations of wintering bald eagles are concentrated along the Green and White River and at Pelican Lake which are near the proposed projects. The various utility and transportation features of the project shall be constructed to avoid these wintering concentrations and the distruction of any eagle roost. The BLM will insure the various project sponsors design and construct the various features of the respective projects to provide for the maximum protection of the bald eagle and its wintering habitat. Power lines will be contructed to avoid raptor electrocution.

Black-footed Ferret

The proposed Synfuels Projects are not expected to adversly impact the black-footed ferret providing the conservation measures discussed later in this biological opinion are implemented. The black-footed ferret is not definitely known to occur in the Uintah Basin. New information, however, concerning the behavior of the black-footed ferret indicates that previous inventory procedures may have been inadequate in determining the presence of the black-footed ferrets in prairie dog towns. The FWS therefore considers it imperative that all features of the proposed Synfuels Projects which affect a prairie dog town be inventoried for black-footed ferrets using inventory techniques now being developed. If black-footed ferrets are found in any of the project areas it will be imperative that the BLM reinitiate Section 7 Interagency Consultation.

Uinta Basin Hookless Cactus

The proposed Synfuels Projects are not expected to adversly impact the Uintah Basin hookless cactus providing the conservation measures discussed later in this biological opinion are implemented. The Uintah Basin hookless cactus is found primarily along the lower reaches of the Green, Duchesne and White River in the Uintah Basin growing primarily on Pliestocene alluvial terrace deposits above the current flood plain of those rivers, though not absolutely restricted to that habitat. Any project feature that crosses the habitat of the Uintah Basin hookless cactus will have to have a botanical inventory and the project feature placed so as to avoid populations of the cactus.

Conservation Measures

The BLM will insure that the various Synfuels Projects will comply with the following conservation measures in order to protect endangered and threatened species.

Colorado squawfish and humpback chub - Water diversion structures will be designed so as to maximize protection for the endangered Colorado River fishes. Construction activities affecting the White and Green River will be conducted and timed so as to minimize impact to the endangered Colorado River fishes.

Bald eagle - Construction activities near the White, Duchesne and Green Rivers and Pelican Lake Will be timed to avoid concentrations of wintering bald eagles, all eagle roosts will be preserved. Electrical transmission lines will be constructed in accordance with the guidelines found in R.E.A. Bulletin 6110.

Black-footed ferret - All prairie dog towns which will be affected by features of the Synfuels Projects will be inventoried for black-footed ferrets using the latest inventory procedures which are now being developed by the FWS. If black-footed ferrets are discovered it will be necessary for the BLM to reinitiate interagency Section 7 Consultation.

Uinta Basin hookless cactus - All potential Uinta Basin hookless cactus habitat near the Green, White and Duchesne Rivers which will be impacted by Synfuels Project features will be inventoried for the cactus. Project features will be sited so as to avoid populations of the Uinta Basin hookless cactus.

If substansive changes are made in the synfuels projects as described in the Uintah Basin Synfuels DEIS, particularly if the source of water for these projects is to come from sources other than the proposed White River Dam Project, it will be necessary to reinitiate Interagency Section 7 Consultation.

We sincerely appreciate your concern and efforts made towards the conservation of endangered species.

Fred L. Bolwahnn

Fred L. Bolwahnn
Field Supervisor

References

Bureau of Land Management. 1982. White River Dam final environmental impact statement. Vernal District Office. Vernal, Utah.

________________________. 1982. Uintah Basin Synfuels Development draft environmental impact statement. Vernal District Office. Vernal, Utah.

Fish and Wildlife Service. 1982. Biological Opinion White River Dam Project. Salt Lake Area Office, Salt Lake City, Utah.

ENERGY EFFICIENCY

Energy efficiency is concerned with the energy cost of producing energy. It is defined as the net energy output divided by the net energy input times 100. Direct energy output consists of the useable energy contained in the output product(s). Direct energy input consists of the fuels consumed in producing the energy, both the fuel contained within the material being converted and that brought in from other sources to assist in the conversion process. The transportation of the raw materials to the processing plant and the transportation of the products and waste products away from the plant are part of direct energy inputs.

Indirect energy includes that energy needed to produce the fuels and equipment to do the job. Every material has an energy input associated with it. This includes all the incremental energies needed through all the steps from locating the ore to manufacturing the item needed, including shipping, handling, and supporting the employees doing the work. Any manufactured product contains one or many different materials, each contributing its incremental energy input.

Logically, a part of the direct energy associated with a project is that consumed in the infrastructure needed to support the project, in the energy used by the employees of the project, their families, and the secondary industries (including social services) supported by the employees and their families. Infrastructure is usually kept separate from other indirect energy.

Every new employee hired at a project uses energy to feed, clothe, house, and entertain himself, his wife, and his children. The increased numbers of families in a community add secondary employment in the community, as in additional school teachers, policemen, grocery clerks, appliance servicemen, and so on. The presence of a new project increases business for the community and may result in new service establishments. The growth of the infrastructure tends to lag behind the increase in employment, but new employment from the five major synfuels projects is expected eventually to result in 7.33 persons per employee. Because of the lag factor over 20 years, the net energy analysis is predicated on per-capita use of energy at a rate of 5.23 persons per new employee at the five projects. As shown on Table A-10-1, it is expected that the energy used directly and indirect energy sequestered in materials produced or imported for the primary and secondary employees and their families would average nearly 78 trillion Btu's per year over the 20 year period between 1981 and 2000.

A major difficulty in comparing energy efficiencies in the past has been in defining the boundaries within which the energy analyses have been performed. The conversion of energy from one form to another will result in a net loss of available energy. The losses can be small; typically, an alternating current transformer will deliver more than 98 percent of the electricity coming to it. Losses can also be very large; it is not unusual for the energy delivered to

TABLE A-10-1

INFRASTRUCTURE-INDIRECT ENERGY CONSUMED BY PRIMARY AND SECONDARY EMPLOYMENT AND FAMILIES

Project	Employment	Population Increase	Petroleum (Btu/yr)	Natural Gas (Btu/yr)	Coal (Btu/yr)	Hydropower (Btu/yr)	Nuclear (Btu/yr)	Totals (Btu/yr)
Enercor	256	1,339	5.207 E11	2.562 E11	2.631 E11	1.667 E11	3.761 E10	1.245 E12
Magic Circle	1,741	9,105	3.541 E12	1.742 E12	1.789 E12	1.134 E12	2.558 E11	0.854 E13
Paraho	1,523	7,965	3.098 E12	1.524 E12	1.565 E12	9.916 E11	2.237 E11	0.7406 E13
Syntana-Utah	1,631	8,529	3,317 E12	1.632 E12	1.676 E12	1.062 E12	2.396 E11	0.7922 E13
Tosco	2,103	10,998	4.277 E12	2.104 E12	2.161 E12	1.369 E12	3.089 E11	1.0219 E13
TOTAL	7,255	37,940	1.475 E13	7.257 E12	7.454 E12	4.723 E12	1.066 E12	3.5253 E13

NOTE: Numbers are given to base 10, the digits after the "E" being the exponent.

Sources: Population - UPEO model (State of Utah 1983).
Employment - Project figures.
Energy equivalents - BLM 1982a.

the customer's electric meter to be as little as 15 percent of the energy contained in the coal in the ground, including the coal which is not recoverable due to mining the rest.

The same is true for oil production, natural gas, oil shales, tar sands, and other forms of fossil energy. Any energy conversion process results in a net loss of available energy; instead, it provides a larger amount of useable energy.

A more rigorous rationale is presented in Energy Analysis Handbook for Preparation of Oil Shale Development Environmental Impact Statements, (BLM 1982a). The publication, in pre-publication form, was used as the primary source for energy conversion factors contained in the net energy analyses in this EIS.

APPENDIX A-11

GENERAL MEASURES FOR GRANTS AND PERMITS

As a condition of granting the various rights-of-ways and permits the various agencies would require that certain terms and conditions are met. Some of these general measures are presented in this appendix. As project plans are finalized and before specific authorizations are given, additional specific requirements would be added by the various authorizing agencies.

A Construction Operation (CO) plan or similar document would be prepared covering the construction of all project facilities on federal land. This plan would be submitted for approval by the authorizing agency prior to commencement of work on the ground. The CO plan would contain the following sections on site-specific stipulations: (Because the various rights-of-way would be composed of many types of terrain, soils, vegetation, land uses, and climatic conditions, the sections within the CO plan would include sets of techniques and measures tailored to each condition encountered).

- Fire Protection
- Clearing - Visual Resources
- Erosion Control, Revegetation, and Restoration. Specific guidelines for the Erosion Control, Revegetation, and Restoration Section of the CO plan are included in this report as Appendix R-J.
- Transportation
- Communications
- Cultural Resources
- Threatened and Endangered Studies and Mitigation (including a wildlife mitigation plan developed jointly by Utah Division of Wildlife Resources (UDWR), Bureau of Land Management (BLM), U.S. Forest Service (FS), and the applicant).
- Blasting
- Pesticide and Herbicide Use
- Health and Safety
  a. Solid Waste
  b. Emergency Response
  c. Air Quality
  d. Transportation
- Site Prescription
- Right-of-way Maintenance and Monitoring

Technical assistance and approval of written plans for Federal lands would be obtained from BLM and the FS prior to any construction.

Under authority of Section 504 of the Federal Land Policy and Management Act (FLPMA), the applicant would be required to provide funding to the appropriate federal agencies for the purpose of financing one or more specialists for administration of construction activities.

The Uintah and Ouray Tribe intends that all applicable federal and state measures, as well as those requirements of the Ute Indian Tribe and the Bureau of Indian Affairs, Uintah-Ouray Agency, will be applicable to authorizations that may be issued for Tribal land use.

General measures applicable to Tosco's Salt Lake City Alternative Pipeline that are site-specific and developed as a result of impact analysis, can be found in the Salt Lake City Alternative, Tosco's Oil Shale Product Pipeline Technical Report, Section 2 Part A, Mitigation Measures.

BUREAU OF LAND MANAGEMENT AND U.S. FOREST SERVICE

GENERAL

1. All state and federal regulations and laws will be complied with.

2. All activities associated with the projects will be conducted in a manner that will avoid or minimize degradation of air, land, and water quality. In the construction, operation, maintenance, and abandonment of the projects, activities will be performed in accordance with applicable air and water quality standards, and related plans of implementation, including but not limited to, the Clean Air Act, as amended (42 USC 1321) and the Clean Water Act (USCA 1251).

3. Permittees and other regular users of public lands affected by construction of the projects will be notified in advance of any construction activity that may affect their businesses or operations. This will include, but not be limited to, signing of temporary road closures, and notification of proposed removal and/or cutting of fences, and disturbances to range improvements or other use-related structures.

TRANSPORTATION

1. A transportation plan will be submitted as part of the CO plan. This plan will cover approval of temporary, reconstructed, and newly constructed roads and will include clearing work, signing, rehabilitation, and uses associated with transportation needs. Overland access could be specified in lieu of road construction or reconstruction.

2. Access roads necessary for operation and maintenance of the projects will be clearly identified. Some of these access roads may be designated by the authorizing agency as open for public use, including but not limited to, off-road vehicular (ORV) travel.

3. Helicopters would be used to string pipe and deliver equipment in areas where access to the terrain or management constraints preclude standard construction.

4. The rights-of-way will be used as an access road only when necessary and only during the construction period. The temporary access roads within the rights-of-way will be closed and vegetative cover reestablished after construction is completed. No maintenance roads along the pipelines will be permitted.

5. The applicants will control ORV use on the rights-of-way. Such specified control could include use of physical barriers, replanting trees, or other reasonable means of ORV control.

6. Gates or cattle guards on established roads on public land will not be locked or closed by the applicants.

LAND USE

1. Disturbance of improvements such as fences, roads, and watering facilities during the construction and maintenance of the rights-of-way must be kept to an absolute minimum. Immediate restoration to any damage of improvements to at least their former state will be required. Functional use of these improvements must be maintained at all times. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting of the fence. A gate acceptable to the authorizing agency official shall be installed in the gate opening and kept closed when not in actual use. Where a permanent road is to be constructed or maintained, cattleguards shall be placed at all fence crossings.

2. The right-of-way would coincide with the existing Chevron oil pipeline right-of-way, except where terrain conditions require additional width for both construction and permanent right-of-way needs. The authorized officer would establish right-of-way widths.

3. If a natural barrier used for livestock control is broken during construction, the applicants will adequately fence the area to prevent drift of livestock. In pronghorn ranges, the fence may have to be constructed to allow for animal passage. Fence specifications will be determined on a case-by-case basis.

WATER

1. All river, stream, and wash crossings required for access to project facilities would be at existing roads or bridges, except at locations designated by the authorizing agency official. Culverts or bridges, will be installed at points where new permanent access roads cross live streams to allow unobstructed fish passage. Where temporary roads cross drainages or dirt fills, culverts will be installed and removed upon completion of the project. Any construction activity in a perennial stream is prohibited unless specifically allowed by the authorizing agency official. All stream channels and washes will be returned to their natural state.

2. Construction plans for stream crossings by boring, driving, or trenching would be approved by the authorized officer.

3. A buffer strip of terrestrial vegetation above the high water line would be left between work areas adjacent to the stream and the stream itself.

4. In steams, construction would be planned to coincide with low water flows.

5. The applicant would complete the work and return the stream to its natural state as soon as possible.

6. Stream banks would be returned, as nearly as possible, to their original condition.

7. Backfill material for the pipe in the streambed would be of predominantly course material.

8. Construction equipment would be refueled and maintained outside of stream channels in areas designated by the authorizing agency official.

WASTE

1. Construction equipment must be refueled and maintained outside of stream channels in areas designated by the authorizing agency official.

2. Garbage and other refuge will be disposed in an authorized disposal site or landfill. Engine oil changed on federal lands will be contained in suitable containers and disposed as refuse; no fuel, oil, or other hydrocarbon spills are permitted. If such a spill accidentally occurs, the authorized officer would be notified immediately and corrective measures undertaken as directed.

3. Within 30 days after conclusion of construction and operation, all construction materials and related litter and debris shall be disposed in accordance with instruction of the authorized officer.

VEGETATION

1. Vegetation cleared during construction or other activity will be disposed of as directed.

2. Commerical tree species cut would be measured and paid for.

3. Disturbed areas, which in the opinion of the authorizing agency are unsuitable for successful revegetation, shall be protected under the reclamation, erosion control, and revegetation provisions of the CO plan. This plan shall state the method of protection to be used and the provisions for prevention of site deterioration and introdution of noxious weeds. At a minimum, the CO plan will include the reclamation, erosion control, and revegetation items described in Appendix A-8 for all federal land rights-of-way.

4. Preclearing of mountain brush and tree-covered areas prior to dozer and maintenance blade work would be required. Preclearing will involve handwork in cutting of brush and trees and removal to designated areas.

SOILS

1. Existing soils and geological data will be gathered and used to achieve maximum revegetation and soil erosion mitigation responses.

2. Areas subject to mudflows, landslides, mudslides, avalanches, rock falls, and other types of mass movement will be avoided where practical in locating linear facilities. Where such avoidance is not practical, the design, based upon detailed field investigations and analysis, will provide measures to prevent the occurrence of mass movements.

3. All topsoil and suitable plant growth material on federal lands will be conserved for reclamation requirements; excess topsoil will be stockpiled at designated locations.

4. All disturbed areas shall be landscaped and revegetated as nearly as possible to their original condition or to a condition agreed upon by both the applicant and the authorizing agency official. This reclamation shall be accomplished as soon as possible after the disturbance occurs.

5. The reestablishment of vegetative cover and establishment of watershed stabilization measures will be completed during the ongoing working season and prior to the next winter season.

6. Trees and brush (indigenous species) will be established according to the revegetation, erosion control, and rehabilitation plan contained within the CO plan.

7. In areas where soil surface had been modified or natural vegetation had been removed, noxious weeds will be controlled.

8. Clearing in timber areas to reduce fire hazard will be limited to the right-of-way.

9. Stumps will not be higher than six (6) inches. The trees will be limbed and stacked adjacent to the right-of-way. Slash will be spread over the right-of-way during cleanup.

10. Fire control provisions will be included in the CO plan. The applicant shall do everything reasonably possible, both independently and upon request of the authorized officer, to prevent and suppress fires on or in the immediate vicinity of the right-of-way or permit area. This includes making available such construction and maintenance force as may be reasonably obtained for the suppression of fires.

VISUAL

1. A plan to minimize visual impacts from structures will be required as a part of the CO plan. The applicants will design and locate the pipeline routes and ancillary structures to blend into the existing environment so as to meet the minimum degree of contract acceptable for the Visual Resources Management class and Visual Quality Objectives in which the structures would be located. The authorizing agency will evaluate and approve measures before construction began.

2. Edges of right-of-way vegetative clearing would be feathered to avoid straight lines.

CULTURAL RESOURCES

1. All significant cultural resources identified on the project area will be avoided wherever possible. For significant cultural resources that cannot be avoided, a Memorandum of Agreement with the Advisory Council of Historic Preservation and the Utah State Historic Preservation Office will be developed that details specific mitigation measures in accordance with 36 CFR 800. All cultural resources discovered during construction that were not previously identified will be left undisturbed until they can be evaluated for significance.

PALEONTOLOGY

1. The applicant will provide a qualified paleontologist who is approved by the authorizing officer. The paleontologist will conduct an intensive survey of all areas to be disturbed according to the significance and mitigation needs specified by the applicant. The paleontologist will be available, as needed, during surface disturbance. If in the opinion of the paleontologist, paleontolgical values specified by the applicant would be disturbed, construction will be halted until appropriate action could be taken.

WILDLIFE

1. The applicants will be required to conduct surveys to determine if listed threatened or endangered species or their critical habitats may be present on areas to be disturbed. If it is determined that listed species or their habitats may be present and could be affected by the proposals, appropriate consultation with the U.S. Fish and Wildlife Service (FWS) will be conducted by the federal authorizing agency. No activities will be authorized until consultation is complete as specified by Section 7(c) of the Act. The Biological Opinion issued by FWS as a result of the consultation process specifies the specific mitigation measures to be carried out by the applicant.

2. Any active golden eagle nest found within 1-mile of project activities would have to be protected from harassment during the critical nesting period in accordance with provisions established by the Bald Eagle Protection Act.

PESTICIDES

1. Applicable federal and state laws and regulations concerning the use of pesticides (i.e. insecticides, herbicides, fungicides, rodenticides, and other similar substances) will be complied with in all activities and operations. The applicants will obtain program approval from the authorizing agency prior to the use of such substance. The program request will provide the type and quantity of material to be used; the pest, insect, fungus, etc., to be controlled; the method of application; the location of storage and disposals of containers; and other information that may be required. The request will be submitted no later than December 1 of the calendar year prior to the start of the fiscal year that the activities are proposed (i.e., December 1, 1982, deadline for a fiscal year 1983 action). Emergency use of pesticides will be approved by the authorizing agency. A pesticide will not be used if the Secretary of the Interior or Agriculture has prohibited its use. A pesticide will only be used in accordance with its registered uses and with other Secretarial limitations. Pesticides will not be permanently stored on federal lands.

U.S. FISH AND WILDLIFE SERVICE

For protection of the habitat of the Colorado squawfish, humpback chub, bony-tail chub, and razorback sucker, the applicant would be required to implement the following measures at the White and Green river pipeline crossings and Lower Duchesne River pipeline crossing south of U.S. Highway 40 for the Tosco Salt Lake City Alternative Product Pipeline:

1. Install automatic shut-off valves on the pipeline. Tosco's alternative product pipeline would be required to have a shut-off valve at the eastern edge of the Wyasket Basin (proposed for a floodplain) and on the western bank of the Green River.

2. Locate emergency oil spill cleanup equipment (booms and skimmers) adjacent to the river pipeline crossings.

3. Instream construction would be planned to coincide with low water flow with no construction permitted between August 1 and November 15.

4. No construction disturbance would be allowed in backwater areas.

5. Backfilling practices and reseeding with native grasses and native forbs would be required of all disturbed land on the Ouray National Wildlife Refuge.

UINTAH AND OURAY TRIBAL REQUIREMENTS

The Ute Indian Tribe is a local sovereign government with specific land use requirements. Final mitigation measures and stipulations would require approval of the Uintah and Ouray Agency, Bureau of Indian Affairs (BIA). Decisions of action would be made through the Ute Tribal Business Committee on a case-by-case basis.

The Ute Indian Tribe intends that these measures listed for lands and/or resources administered by federal agencies be applicable to authorizations they may issue for tribal land use.

The following are some of the provisions (general measures) that would be included in a Surface Use and Operating Plan for rights-of-way construction, operation, and maintenance on reservation lands. (The Ute Tribe is considering the development of a Tribal Review Process for on-reservation development, which may include additional environmental requirements.)

1. FIRE ARMS - A procedure would be implemented to prevent company employees, including subcontractors, from carrying fire arms or other weapons that may be used to kill game animals on reservation land.

2. OFF ROAD TRAFFIC - A procedure would be implemented to confine company employees, including subcontractors, to established roads and authorized sites. The purpose for this would be to prevent soil erosion and the harassment of game or livestock due to off-road traffic such as snowmobiles, motorcyles, 4-wheel drive vehicles, etc.

3. FIREWOOD - A procedure would be implemented to prevent employees, including subcontractors and other unauthorized people, from gathering firewood. It is the policy of the Ute Indian Tribe and the BIA to require wood permits from the Forestry Section of BIA for both Indians and non-Indians harvesting wood from the Uintah and Ouray Indian Reservation.

4. RESTORATION - A procedure would be carried out to restore abandoned roads, or other disturbed areas to or near their original condition after completion of construction. This procedure would include: (a) stockpiling topsoil; (b) establishing original ground contour; (c) re-establishing irrigation systems where applicable; (d) re-distributing topsoil to the ground surface on disturbed areas; (e) on irrigated fields reestablishing soil conditions in such a way as to ensure cultivation and harvesting of crops; (f) a procedure to ensure revegetation of the disturbed areas to the specifications of the Ute Indian Tribe or the BIA at the time of completion of construction.

5. SIGNS - All roads constructed by the applicants on the Uintah and Ouray Indian Reservation would have appropriate signs. Signs would be neat and of sound construction . They would state: (a) the land is owned by the Ute Indian Tribe; (b) the name of the applicant; (c) prohibition of firearms to all non-Ute Tribal members; (d) permits are required from the BIA; and (e) only authorized personnel permitted.

6. RIGHTS-OF-WAY - The BIA and the Ute Indian Tribe would make rights-of-way available without cost to oil shale companies when both mineral rights and surface rights are owned by the Ute Indian Tribe when the right-of-way is for direct Tribal development. It is the policy that the right-of-way be approved and a charge be assessed for damages prior to the time the oil shale company begins any construction activities; and when the surface is owned by another entity and the mineral rights are owned by the Ute Indian Tribe, rights-of-way must be cleared with the other entity.

7. PERMIT FOR WATER OR EARTH FILL - If water or fill materials are needed in constructing roads, or other authorized uses, proper permits would be needed. Included in the plan would be: (a) the approximate amount of water or material needed; (b) who owns the rights to the water or materials which are planned to be used; (c) the location where water and materials would be obtained; and (d) the approximate time period in which water or materials would be used.

8. WEEDS - A plan would be developed and carried out for controlling noxious weeds along rights-of-way for roads, pipelines, or other applicable facilities. (A list of noxious weeds can be obtained from the appropriate county.)

9. LITTER - A plan would be developed and carried out to keep the applicable sites free from litter and groomed in a neat and professional condition.

10. BENCH MARKS - A bench mark would be established near each authorized use in a location where it would not be destroyed. The bench mark would be set in concrete with a brass cap. The brass cap would show the use number and elevation to the nearest one-tenth of a foot. The engineering drawing showing the cuts/fills for the use would be required to show elevations in relation to the bench marks.

CORPS OF ENGINEERS

The Corps of Engineers has prescribed management practices that would be followed to the maximum extent practical, for discharges covered by the Nationwide Permit (items 1 through 8 below). Additionally, certain conditions (33 CFR 323.4-3(b)) must be met under the Nationwide Permit authority (items 9 through 17 below). For further detail, please refer to the COE Permit Program, "A Guide for Applicants," November 1, 1977.

1. Discharges of dredged or fill material into United States water would be avoided or minimized through the use of other practical alternatives.

2. Discharges in spawning areas during spawning seasons would be avoided.

3. Discharges would not be allowed to restrict or impede the movement of aquatic species indigenous to the waters, impede the passage of normal or expected high flows, or cause the relocation of the waters (unless the primary purpose of the fill is to impound waters).

4. If the discharge creates an impoundment water, adverse impacts on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow would have to be minimized.

5. Discharges in wetland areas would be avoided.

6. Heavy equipment working in wetlands would be placed on mats.

7. Discharges into breeding and nesting areas for migratory waterfowl would be avoided.

8. All temporary fills would be removed in their entirety.

9. There cannot be any change in preconstruction bottom contours. (Excess material would be removed to an upland disposal area.)

10. The discharge cannot occur in the proximity of a public water supply intake.

11. The discharge cannot occur in areas of concentrated shellfish production.

12. The discharge cannot destroy a threatened or endangered species as identified under the Endangered Species Act or endanger the critical habitat of such species.

13. The discharge cannot disrupt the movement of those species of aquatic life indigenous to the waterbody.

14. The discharge would consist of suitable material free from toxic pollutants in other than trace quantities.

15. The fill created by a discharge would be properly maintained to prevent erosion and other nonpoint sources of pollution.

16. The discharge would not occur in a component of the National Wild and Scenic River System or in a component of a State Wild and Scenic River System.

17. No access roads, fills, dikes, or other structures would be constructed below the ordinary high water level of the streams under the Nationwide Permit. These structures would require separate "Section 404" permits.

ENVIRONMENTAL PROTECTION AGENCY

Spent shale is a mine process waste and, as such, is exempt from regulation under the Resource Conservation and Recovery Act (RCRA), pending the outcome of an EPA study, which will result in agency recommendations to Congress in October of 1983. It is not possible to determine what those recommendations would be or precisely how spent shale would be dealt with by EPA in the future. At present EPA only can recommend that industry approach this problem prudently and undertake a monitoring and mitigation program which allows maximum reasonable protection for the environment.

A spent shale monitoring/mitigation plan would need to contain several basic elements including; surface runoff control including either a pile underdrain or over-the-top drainage with erosion control, retention dams (for surface runoff), inplace soil moisture monitoring either by cup lysimeters, moisture cells and/or dry wells for continuous neutron logging and deep ground water monitoring wells of all nearby aquifers including various depth monitoring by either packers or nested wells.

Drains above and below the impermeable lines under spent shale disposal piles would be recommended. Such drains would prevent any accumulation of moisture (due to water moving down through the piles or groundwater invading the pile from below the lines), which would aversely affect pile stability.

Another potential problem with spent and new shale concerns auto-oxidation. Oxidation of raw and spent shale would raise pile temperatures and could threaten a fire. The likelihood for auto-oxidation depends upon several factors; the amount and type of carbon in the shale, the size of the spent shale, the temperature at which the spent shale is laid down and the air flow through the pile. EPA would recommend the following procedures to avoid excessive auto-oxidation:

1. Spent shale be allowed to reach ambient temperature before it is laid down and compacted.

2. Raw (especially fines) and spent shale not be mixed.

3. The entire spent shale pile be compacted to the maximum extent (with optimum moisture) to eliminate air.

4. No carbonacious material such as trees or shrubs (or material containing sulfur) be mixed with the spent shale.

5. An impermeable cap be placed over the spent shale pile to prevent moisture and air from entering.

6. Temperature monitors (thermocouples) be installed in the shale pile.

The EPA hazardous waste regulations are found at 40 CFR 260-265 and recommends that these regulations be consulted by the companies for minimum monitoring requirements. 40 CFR Part 265.91 describes the requirements for a ground water monitoring system: As recommended by EPA, a ground water monitoring system would be capable of yielding ground water samples for analysis and consist of:

1. Monitoring wells (at least one) installed hydraulically upgradient (i.e., in the direction of increasing static head) from the limit of the waste management area. Their number, locations, and depths would be sufficient to yield ground water samples that are:

   i) Representative of background ground water quality in the uppermost aquifer near the facility; and

   ii) Not affected by the facility; and

2. Monitoring wells (at least three) installed hydraulically downgradient (i.e., in the direction of decreasing static head) at the limit of the waste management area. Their number, locations, and depths would be to ensure that they immediately detect any statistically significant amounts of hazardous waste or hazardous waste constituents that migrate from the waste management area to the uppermost aquifer."

In order to review this plan at a minimum the following site-specific information would need to be submitted:

1. The uppermost aquifer would be identified;

2. The hydraulic properties of formations would be determined (horizontal and vertical hydraulic conductivities);

3. Data on seasonal fluctuations in the ground water surface elevation would be given;

4. Hydraulic gradients would be identified;

5. Horizontal velocity of ground water would be determined; and

6. Detailed information on well installation would be available.

STATE OF UTAH

1. Each applicant is required by Utah Code Ann. Section 63-51-10 (Supp. 1981) to submit a financial impact statement and plan to alleviate socioeconomic impacts. Approval of each applicant's plan would be required before issuance of any state permits required to start construction.

UNIVERSITY OF UTAH

In order to avoid conflicts with the University of Utah Master Plan for facility planning and construction, the University would stipulate the following construction and right-of-way measurements for Tosco's Salt Lake City Alternative Product Pipeline:

a. Applicant would stay within existing Chevron Oil and Mountain Fuel gas pipeline rights-of-way from Red Butte Creek to Dry Creek Canyon drainage.

b. Applicant would stay within or east of the existing Chevron Oil and Mountain Fuel gas pipeline rights-of-way from the vicinity of Emigration Canyon to Red Butte Creek.

c. Applicant would coordinate actual pipeline location with the future location of Salt Lake City's 11th Avenue road prism (i.e. place pipeline under proposed road surface). This future road location is proposed to parallel or occupy the existing pipeline rights-of-way across University land.

NOTICE OF INTENTION TO COMMENCE MINING OPERATIONS APPROVAL (Noncoal minerals excluding sand and gravel)

Introduction

The Utah Division of Oil, Gas, and Mining (UDGOM), within the Department of Natural Resources and Energy, has responsibility for issuance of permits or approval letters for intention to commence mining operations for noncoal minerals excluding sand and gravel operations, under the authority of the Utah Mined Land Reclamation Act, 1975. The purpose of this permit is to ensure protection of the environment prior, during, and following mining activities.

Operations Requirements

1. Mine development and reclamation must proceed in accorance with the approved plan.

2. An annual report (Form MR-3) must be filed every year.

RIGHT OF WAY/RIGHT OF ENTRY PERMIT

Introduction

The Utah Division of State Lands and Forestry (UDSLF), within the Department of Natural Resources and Energy, has responsibility for issuance of Right-of-Way/Right-of-Entry permits, under the authority of Utah Code Annotated, 1953, Title 65. The purpose of this permit is to protect the environment and prevent illegal entry to state lands.

Operations Requirements

1. Following approval, permittee must fully comply with all stipulations.

2. Federal specifications shall apply to the state lands where federal lands are also involved and a federal permit for a right-of-way has been granted.

APPROVAL OF AIR POLLUTION SOURCES

Introduction

The Utah Division of Environmental Health (UDEH), Bureau of Air Quality, within the Department of Health, has responsibility for approval of air pollution sources, under the authority of the Utah Air Conservation Act. The purpose of this permit is to prevent air pollution by any air pollution source except comfort heating.

Operations Requirements

1. No operating permit is required.

2. Periodic inspection must be completed to ensure compliance with permit requirements.

3. Periodic source testing at the sources expense.

PLAN APPROVAL FOR HAZARDOUS WASTE MANAGEMENT, TREATMENT, STORAGE AND/OR DISPOSAL FACILITY

Introduction

The Utah Division of Environmental Health (UDEH), Bureau of Hazardous Wastes and Radiation, within the Department of Health, has responsibility for approval of plans for hazardous waste management, treatment, storage and/or disposal facilities, under the authority of the Utah Solid and Hazardous Waste Act. The purpose of the permit is to prevent faulty construction of these facilities which may constitute hazardous conditions.

Operations Requirements

1. Following approval, the owner or operator of a facility complies with the conditions of the plan approval and the requirements of the Utah Hazardous Waste Management Regulations.

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