\183

COLONIAL PIPELINE RUPTURE

(103–20)

HEARING

BEFORE THE

SUBCOMMITTEE ON
INVESTIGATIONS AND OVERSIGHT

OF THE

COMMITTEE ON
PUBLIC WORKS AND TRANSPORTATION
HOUSE OF REPRESENTATIVES

ONE HUNDRED THIRD CONGRESS

FIRST SESSION

MAY 18, 1993

Printed for the use of the
Committee on Public Works and Transportation

COLONIAL PIPELINE RUPTURE

(103–20)

HEARING

BEFORE THE

SUBCOMMITTEE ON
INVESTIGATIONS AND OVERSIGHT

OF THE

COMMITTEE ON
PUBLIC WORKS AND TRANSPORTATION
HOUSE OF REPRESENTATIVES

ONE HUNDRED THIRD CONGRESS

FIRST SESSION

MAY 18, 1993

Printed for the use of the
Committee on Public Works and Transportation

U.S. GOVERNMENT PRINTING OFFICE
71–703 WASHINGTON : 1993

For sale by the U.S. Government Printing Office
Superintendent of Documents, Congressional Sales Office, Washington, DC 20402
ISBN 0-16-041564-0

COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION

NORMAN Y. MINETA, California, *Chair*

JAMES L. OBERSTAR, Minnesota
NICK JOE RAHALL II, West Virginia
DOUGLAS APPLEGATE, Ohio
RON DE LUGO, Virgin Islands
ROBERT A. BORSKI, Pennsylvania
TIM VALENTINE, North Carolina
WILLIAM O. LIPINSKI, Illinois
ROBERT E. WISE, JR., West Virginia
JAMES A. TRAFICANT, JR., Ohio
PETER A. DEFAZIO, Oregon
JIMMY HAYES, Louisiana
BOB CLEMENT, Tennessee
JERRY F. COSTELLO, Illinois
MIKE PARKER, Mississippi
GREG LAUGHLIN, Texas
PETE GEREN, Texas
GEORGE E. SANGMEISTER, Illinois
GLENN POSHARD, Illinois
DICK SWETT, New Hampshire
BUD CRAMER, Alabama
BARBARA-ROSE COLLINS, Michigan
ELEANOR HOLMES NORTON, District of Columbia
LUCIEN E. BLACKWELL, Pennsylvania
JERROLD NADLER, New York
SAM COPPERSMITH, Arizona
LESLIE L. BYRNE, Virginia
MARIA CANTWELL, Washington
PAT (PATSY ANN) DANNER, Missouri
KAREN SHEPHARD, Utah
ROBERT MENENDEZ, New Jersey
JAMES E. CLYBURN, South Carolina
CORRINE BROWN, Florida
NATHAN DEAL, Georgia
JAMES A. BARCIA, Michigan
DAN HAMBURG, California
BOB FILNER, California
WALTER R. TUCKER, California
EDDIE BERNICE JOHNSON, Texas

BUD SHUSTER, Pennsylvania
WILLIAM F. CLINGER JR., Pennsylvania
THOMAS E. PETRI, Wisconsin
SHERWOOD BOEHLERT, New York
JAMES M. INHOFE, Oklahoma
BILL EMERSON, Missouri
JOHN J. DUNCAN, JR., Tennessee
SUSAN MOLINARI, New York
WILLIAM H. ZELIFF, JR., New Hampshire
THOMAS W. EWING, Illinois
WAYNE T. GILCHREST, Maryland
JENNIFER B. DUNN, Washington
TIM HUTCHINSON, Arkansas
WILLIAM P. BAKER, California
MICHAEL A. "MAC" COLLINS, Georgia
JAY KIM, California
DAVID A. LEVY, New York
STEPHEN HORN, California
BOB FRANKS, New Jersey
PETER I. BLUTE, Massachusetts
HOWARD P. "BUCK" MCKEON, California
JOHN L. MICA, Florida
PETER HOEKSTRA, Michigan
JACK QUINN, New York

SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT

ROBERT A. BORSKI, Pennsylvania, *Chair*

BARBARA-ROSE COLLINS, Michigan *Vice Chair*
ROBERT E. WISE, JR., West Virginia
LUCIEN E. BLACKWELL, Pennsylvania
LESLIE L. BYRNE, Virginia
JAMES A. BARCIA, Michigan
BOB FILNER, California
EDDIE BERNICE JOHNSON, Texas
(Vacancy)
(Vacancy)
NORMAN Y. MINETA, California (Ex Officio)

JAMES M. INHOFE, Oklahoma
JOHN J. DUNCAN, JR., Tennessee
SUSAN MOLINARI, New York
WILLIAM H. ZELIFF, JR., New Hampshire
WAYNE T. GILCHREST, Maryland
WILLIAM P. BAKER, California
BUD SHUSTR, Pennsylvania (Ex Officio)

CONTENTS

SUBMISSIONS FOR THE RECORD

ADDITIONS TO THE RECORD

U.S. House of Representatives

COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION

SUITE 2165 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225–4472

May 17, 1993

TO: Members of the Subcommittee on Investigations and Oversight

FROM: Committee's Investigations and Oversight Staff

RE: SUMMARY OF SUBJECT MATTER for Investigations and Oversight hearing on the Colonial Pipeline Rupture of March 28, 1993, and an assessment of the adequacy of existing pipeline safety regulations, especially current pipeline inspection practices. The hearing will be held on Tuesday, May 18, 1993, at 1:00 p.m., in Room 2253, Rayburn House Office Building.

Background of the Spill

On Sunday, March 28, 1993, at 8:48 a.m., a pressurized thirty-six inch diameter petroleum product pipeline owned and operated by Colonial Pipeline Company ruptured near Herndon, Virginia. The rupture created a geyser which sprayed diesel fuel over seventy-five feet into the air, coating overhead powerlines and adjacent trees, and misting the adjacent Virginia Electric Power Company buildings. The diesel fuel spewed out of the ruptured line into an adjacent storm water management pond and flowed overland and through a network of storm sewer pipes before reaching Sugarland Run Creek, a tributary of the Potomac River. From this point, Sugarland Run flows north for approximately seven miles before emptying into the Potomac River. See attachment 1.

The pipeline rupture occurred in a section of the pipeline that runs underneath the rear parking lot of Reston Hospital Center. The depth to the pipe is approximately ten feet below grade. The western edge of the parking lot is constructed over the top of four parallel utility easements of varying widths. The utility easements contain two liquid petroleum product lines—a thirty-two inch as well as the ruptured thirty-six inch line, which are owned and operated by Colonial Pipeline Company; one twenty-inch diameter liquid gas line owned and operated by the Columbia Pipeline Company; and a forty-eight inch Fairfax County Water Authority water main. In addition, a Virginia Electric Power Company easement with overhead electrical lines runs parallel to the underground lines just beyond the parking lot. The fact that these utility lines are located so close together may be significant, because the fact that damage has occurred to one of these lines increases the possibility that damage may have been also sustained by the other lines. See attachment 2.

The pipeline stretches from Texas to New Jersey, alternately transporting diesel fuel, jet fuel, and gasoline. The thirty-six inch diameter pipeline transports over thirty-two million gallons of diesel fuel each day, supplying up to twelve percent of the nation's daily diesel fuel consumption. The pipeline was laid in 1980 and is considered a relatively young pipeline in the pipeline industry.

According to Colonial Pipeline officials, the rupture caused a dramatic drop in pipeline pressure, which in turn set off an automatic hydraulic alarm located in the manned Dorsey Junction, Maryland, station approximately 35 miles from the rupture site. Within minutes, Colonial personnel in the Atlanta, Georgia, control center began the process of shutting off the flow of fuel by closing the remote valves along the pipeline. By 8:55 a.m. the entire line from Greensboro Junction, North Carolina through Dorsey Junction, Maryland, was shut down.

The rupture occurred approximately ten miles downstream from the remote valve located at the Chantilly pumping station and 35 miles upstream from the remote valve located at the Dorsey Junction pumping station. A manually operated block valve located approximately five miles downstream from the site of the rupture, near the Potomac River, was closed approximately ninety minutes following the rupture.

The Fairfax County Fire and Rescue Team arrived at the rupture site around 9:00 a.m., confirmed the location of the discharge, and immediately attempted containment efforts. These efforts were hampered by high, swift waters and four to twelve mile per hour winds, causing Fairfax County to request State and Federal assistance. Initial estimates of the amount of the spill varied widely, hampering early assessments of the magnitude of the accident and the emergency response effort.

At approximately 10:04 a.m., the National Response Center was notified. The National Response Center is the primary federal point of contact for reporting all oil, chemical, biological, and etiological (disease causing) discharges into the environment anywhere in the U.S. and its territories. By 10:10 a.m. the Regional Response Center had been notified and by 2:00 p.m. the EPA On-Scene Coordinator and the EPA Technical Assistance Team had arrived at the site and assumed control of the emergency response effort from the Fairfax County Fire and Rescue Team. The U.S. Coast Guard Atlantic Strike Team, downstream jurisdictions, and authorities whose water intake facilities are located along the Potomac River were also notified.

Spill mitigation measures included the use of vacuum trucks and tankers, the construction of an underflow dam, and the deployment of oil skimmers and entrapment and sorbent booms; however, due to high water levels caused by seasonal rains, much of the oil escaped the booms and continued to flow quickly downstream. A special pump was lowered by a Marine Corps helicopter to the marshy site where Sugarland Run joins the Potomac. At approximately 8:00 p.m. on Sunday night, the leading edge of the oil sheen was reported to have reached the Potomac River.

As the fuel oil spill neared the Potomac River, the Fairfax County Water Authority was forced to shut down the Corbalis water intake facility which is located on the Potomac River, approximately 200 yards downstream from Sugarland Run. The facility remained closed for twelve days, was opened briefly, and then quickly reclosed after a storm flushed lingering traces of oil from Sugarland Run into the Potomac River. The Corbalis plant was reopened the following day and is being continuously monitored at this time. The Fairfax County Water Authority provides water for over 900,000 people.

The Washington Suburban Sanitary Commission, which supplies water to both

Prince George's and Montgomery counties, draws water from the Potomac River at a site located about four miles downstream from the Corbalis facility. The District of Columbia and Arlington County water supply is drawn from a facility located on the Potomac River near Great Falls, downstream from Sugarland Run. Fortunately, these facilities were not affected and remained open with continuous monitoring following the spill.

The Fairfax County Health Department issued a recommendation to the public to avoid the Sugarland Run area due to the noxious fumes associated with the oil. Strong fumes were reported as far south as Alexandria, Virginia, several days after the rupture. Forty-one residents of Loudoun County voluntarily fled their homes, and nearby County, State, and National parkland was restricted from public use.

Throughout the episode, the residents of Reston, Herndon, and Fairfax were actively involved in the response and cleanup effort. Residents of the Sugarland Run Creek area were very vocal in expressing their concerns over the health hazards created by the spill, including noxious fumes, polluted soils and water, and the effect on the area's wildlife. Concerns were also raised over the potential for contamination of ground water and private well systems. Property owners with homes located adjacent to Sugarland Run were particularly concerned with the spill's effect on reducing property values. A legal effort mounted by several local citizens, to prevent Colonial from reopening the pipeline until after the cause of the rupture was determined, failed when a federal court judge ruled in favor of the pipeline company.

<u>Investigation and Remediation</u>

On March 29, 1993, the National Transportation Safety Board (NTSB) examined the ruptured pipe. The NTSB is responsible for investigating, determining the probable cause of, making safety recommendations on, and reporting the facts and circumstances of all pipeline accidents which result in a fatality or in substantial property damage. The initial examination at the site indicated that the rupture was located near the top of the pipe, and was longitudinal, extending approximately forty-two inches. NTSB ordered that an additional 700-foot section of the pipe be excavated and the outside cleaned and inspected. The inspection revealed several longitudinal gouges, probably caused by mechanical damage, as well as a six-inch fatigue crack and two dents.

On March 31, 1993, an eighteen-foot section of the pipe containing the rupture and associated damage marks was saw cut removed and transported to the NTSB lab for metallurgical testing. On April 1, 1993, an additional eighteen-inch long section of the pipe was removed and sent to NTSB. The section contained a large depression which was originally located on the bottom of the pipe, approximately thirty feet north of the pipeline rupture. Further evaluation by NTSB of the removed sections of pipeline may reveal additional information useful in determining the source of the damage to the ruptured pipeline.

Repairs to the pipeline were made and the pipeline was allowed to resume operation on April 4, 1993, under a Hazardous Facility Order issued by the Department of Transportation Office of Pipeline Safety. The Office of Pipeline Safety, which is under the Research and Special Programs Administration of the Department of Transportation, is responsible for the implementation of the national program of pipeline regulation, enforcement, training, and research. The Hazardous Facility Order was issued for the segment of pipe between Chantilly, Virginia, and Dorsey Junction, Maryland. The Office of Pipeline Safety had inspected both the thirty-two inch and the thirty-six inch pipelines on March 1, 1993, just four weeks before the rupture occurred; no violations were issued.

The Hazardous Facility Order allows Colonial to continue to operate the pipeline at fifty percent of the maximum operating pressure. Additionally, the company was required to submit a plan by midnight, Monday, April 12, 1993, for an inspection of the line from Chantilly, Virginia, to Dorsey Junction, Maryland, using an instrumented internal inspection device, otherwise known as a "smart pig".

On April 2, 1993, the EPA issued Colonial Pipeline Company a Unilateral

Administrative Order to protect "Public Health and Welfare and the Environment." In issuing this order, the EPA directed Colonial Pipeline Company "to study, abate, mitigate, and eliminate such threats from oil and hazardous substances that may exist to the public health, welfare, and/or the environment at and around the site." Under this order the EPA assumed responsibility to direct Colonial's response effort and required Colonial to submit a Response Action Plan specifying a long-term monitoring and cleanup plan for restoration of the damaged areas. The plan requires a public hearing and weekly reports to the EPA outlining the cleanup and restoration effort progress.

On Monday, April 5, 1993, Colonial Pipeline Company excavated an area surrounding their thirty-two inch diameter pipeline to inspect two small dents in the line, also suspected to have been caused by mechanical damage. The thirty-two inch line runs parallel to the ruptured line, approximately fifty feet away. The company knew about the existence of the dents after inspecting the pipeline several years earlier with a smart pig. After discovering the dents and evaluating the data generated by the smart pig inspection, the company decided that the dents did not affect the overall structural integrity of the pipeline.

At the time of this writing, all containment booms have been removed, and the spill remediation effort continues as Colonial Pipeline Company employees, environmental cleanup personnel contracted by Colonial, EPA representatives, and State and local officials remain on site to oversee the cleanup effort. EPA officials are in the process of evaluating soil decontamination methods; including bioremediation, for use on the contaminated banks of Sugarland Run, the area where the oil flowed overland, and the stockpiled soil removed from around the rupture site. Bioremediation is an innovative technology in which microorganisms are introduced into contaminated soil. The microorganisms use the contaminants for food, breaking them down typically into carbon dioxide and water.

According to NTSB officials, the current estimate (as of May 4, 1993) of the total amount of diesel fuel spilled is 412,000 gallons, with 355,446 gallons of fuel recovered. In addition, 4,073 gallons of contaminated water were collected.

<u>Colonial Pipeline Company</u>

Colonial Pipeline Company was incorporated in 1962 with representatives from nine major oil companies. The name Colonial was chosen because the proposed pipeline was to pass through nine of the original thirteen colonies between Texas and New York. According to company records, Colonial's original 2,853 mile system from Houston, Texas, to the New Jersey/New York Harbor, was at the time the largest privately financed American construction project ever attempted. The entire system now includes over 5,315 miles, and has become the world's largest-volume refined petroleum products pipeline system. According to Colonial, the company transports more barrels of refined petroleum products more miles than any other pipeline in the world, including the Trans-Alaska Pipeline System. The company transports on the average 77,811,712 gallons of petroleum products per day.

Colonial Pipeline Company began construction of their system during the 1960's. During this period it was common practice to transport pipe using flatbed rail cars. The vibration caused by the motion of the train created stress in the pipe which over time became fractures, and eventually caused sections of the pipeline to fail. This type of pipeline failure has become known as railroad fatigue. Colonial has had three failures on the thirty-two inch pipeline in Virginia which were the result of railroad fatigue.

According to spill reporting records kept by RSPA, Colonial Pipeline Company reported fifty-one spills between October, 1985, and February, 1993. The spills ranged in size from one to 13,100 barrels. Of the fifty-one spills reported, seven occurred in the state of Virginia. Of those seven spills, four were the result of mechanical damage caused by a third party, one resulted from a rock under a pipe, one was due to a failed pipe, and one was due to a valve stem leak. Including the March 28, 1993 spill, four of the eight largest spills reported nationwide occurred in Virginia.

Fairfax County, State of Virginia, and Federal agencies have described Colonial's response to the incident as aggressive and fully cooperative.

Statutory Authority

Pipelines are a major means of transporting petroleum products. According to the Annual Report on Pipeline Safety published by DOT for calendar year 1991, there are approximately 1.7 million miles of natural gas pipelines and 152,300 miles of hazardous liquid pipelines under Federal regulatory authority.

The pipeline safety program is administered by the Research and Special Programs Administration (RSPA) of the Department of Transportation. The Natural Gas Pipeline Safety Act of 1968, as amended (49 U.S.C. app. 1671 et seq.), regulates gas pipelines, and the Hazardous Liquid Safety Act of 1979, as amended (49 U.S.C. app. 2001 et seq.), regulates hazardous liquid pipelines. The most common hazardous liquid transported is oil. Both Acts regulate interstate and intrastate pipeline transportation; however, states may impose more stringent regulations over intrastate pipelines.

The federal government is primarily responsible for developing, issuing, and enforcing minimum safety standards for interstate and intrastate pipelines. Pursuant to an agreement with RSPA, a state agency may participate in all or part of the enforcement of safety regulations for intrastate pipelines. The DOT may also permit a state to act as its agent and inspect interstate pipelines traversing the state. The Department is then responsible for taking appropriate enforcement action. Participating states are reimbursed by the Federal Government for up to fifty percent of the costs of implementing the pipeline safety program. The state of Virginia does not participate in the Hazardous Liquid Program; however, it does participate in the intrastate Natural Gas Program.

Under Section 7005 of the Consolidated Omnibus Budget Reconciliation Act of 1985

(Pub. L. 99-272, 49 U.S.C. App. Sec. 1682a), the Secretary of Transportation assesses and collects annual fees from the pipeline industry to fund the cost of the pipeline safety program. The fees are based on pipeline mileage.

The Federal Water Pollution Control Act of 1972 (also known as the Clean Water Act, 33 U.S.C. 1321 et seq) mandated the development of the National Oil and Hazardous Substances Pollution Contingency Plan. This plan was established for the purpose of creating a federal spill response mechanism to help meet the challenge of responding to spills into U.S. waters and the adjacent shorelines. The National Response Plan establishes three organizational levels--the National Response Team, Regional Response Teams, and Federal On-Scene Coordinators--and four special force components.

This multi-level response plan combines federal, regional, state, and local resources and establishes an organizational framework in which these resources are readily accessible in the event of a spill. Over forty federal, state, and local agencies were involved in various aspects of the emergency response and clean-up effort associated with the Colonial pipeline rupture of March 28, 1993.

The Oil Pollution Act (OPA) of 1990 (P.L. 101-380) amended section 311 of the Federal Water Pollution Control Act to clarify federal response authority and to expand oil spill prevention, preparedness, and response capabilities of the federal government and industry. The Colonial oil spill of March 28, 1993, was the first oil spill during which EPA used the new authority granted to it under the OPA to direct an emergency response effort.

The OPA also required that operators of pipelines and other facilities capable of causing oil pollution submit spill contingency plans for federal approval by the Office of Pipeline Safety. The statutory deadline for submission of these plans was February 18, 1993. According to the Office of Pipeline Safety, Colonial Pipeline Company filed a spill contingency plan by the deadline.

The Pipeline Safety Reauthorization Act of 1988 (P.L. 100-561) included several significant requirements to improve pipeline safety. Included was a requirement that the Secretary of Transportation establish minimum Federal standards requiring operators of both natural gas and hazardous liquid pipeline facilities to provide information relating to the operation of the pipeline, such as emergency telephone numbers, maps showing the location of the pipelines, descriptions of all transported products, operations and maintenance manuals, an emergency response plan, and a pipeline inventory describing the type of pipe used and the material and leak history. The Office of Pipeline Safety intends to issue a rulemaking on this provision in the fall of 1993.

The Pipeline Safety Reauthorization Act of 1988 also directed DOT to prepare a feasibility study on requiring the use of internal inspection devices to inspect natural gas and hazardous liquid transmission lines and to establish regulations requiring that new and replacement pipelines be designed and constructed, to the extent practicable, so as to accommodate internal inspection devices. In November 1992, DOT issued the feasibility study which among its conclusions stated that:

- It is not feasible to require the inspection of gas transmission and hazardous liquid pipelines with an internal inspection device if the pipelines are not constructed so as to accommodate the device.

- It may be feasible to conduct periodic inspections of hazardous liquid pipelines with an internal inspection device in highly populated areas, if the pipeline can accommodate the device and has launching traps.

The Pipeline Safety Act of 1992 (P.L. 102-508) is significant in that, for the first time, consideration was given to regulating pipelines so as to protect the environment, and increased attention was paid to pipelines running through high-density population areas. The Act required that all pipeline operators identify all pipeline facilities in high-density areas and hazardous liquid pipelines that cross a navigable waterway or that are in areas deemed environmentally sensitive. The Act also revised the property damage threshold reporting requirements from $5,000 to "an amount established by the Secretary."

The additional regulations required by the Pipeline Safety Act of 1992 will be promulgated by the Department of Transportation's Office of Pipeline Safety. The Act requires that forty-eight regulations be issued, four reports be made to Congress, and that three surveys and two studies be conducted. (See attachment 3.)

Pipeline Inspection

Pipeline corrosion is second only to third party mechanical damage in causing pipeline incidents. Regular pipeline inspection is essential to maintaining the structural integrity and safety of natural gas and hazardous liquid pipeline facilities and requires the use of several technologies. These technologies include visual inspection, X-raying pipe welds, hydrostatic pressure, and the use of instrumented internal inspection devices, often referred to as "smart pigs".

Visual inspection methods include excavating sections of pipeline suspected of corrosion and inspecting the condition of the external coatings. When external corrosion is observed then internal corrosion can be tested for by using a hand-held ultrasonic instrument. This inspection technique is used most commonly on short segments of pipeline. Pipeline companies also routinely survey their pipelines both by air (using light planes and helicopters) and by land. These inspections can reveal dying vegetation, ground cavities and water bubbles, often indicative of a pipeline leak. Illegal construction activities occurring within the pipeline easement are also detected during aerial inspections.

Hydrostatic testing provides information on the pressure integrity of the pipeline by forcing water through the pipeline at a pressure equal to 125 percent or more of the pipeline's maximum operating pressure. Significant pipeline defects cause the pipeline to rupture during hydrostatic testing.

Hydrostatic testing has several limitations. It does not provide information on the nature or extent of remaining corrosion damage, and some experts believe that hydrostatic testing can weaken the pipeline. In addition, the pipeline must be removed from service during hydrostatic testing, and must be cleaned before and after the test with cleaning pigs. Also of some concern in some areas of the country is the cost and availability of the quantities of water required to conduct the test–and the proper disposal of the contaminated test water.

Current regulations require pipeline operators to conduct hydrostatic testing of their lines prior to initial operation, following replacement of pipe, and when a company wishes to increase the volume of the transported fuel.

The use of internal inspection devices (smart pigs) is the only pipeline inspection technique that can detect internal and external corrosion without actual excavation of the pipe. Smart pigs are also able to detect certain irregularities or anomalies in the pipeline wall, such as dents. The pig is inserted into the line and is propelled by the movement of the fluid inside. The device carries recording equipment enabling it to record the existence, location, and relative severity of the anomaly. Currently there are no federal regulations on the use and frequency of smart pig inspections.

There are several different types of smart pigs in common use, including the magnetic-flux pig, caliper or geometry pig, and ultrasonic pig. The magnetic-flux pig is the most commonly used instrumented device. It is used primarily to detect loss of material in the inside or outside surface of the pipe and is useful in the detection of anomalies in the pipe wall, such as gouges, local corrosion leading to corrosion pits, and general corrosion.

Caliper or geometry pigs are the second most commonly used devices and are useful in detecting dents, buckles, and wrinkles. They are primarily used following construction of the pipeline to detect construction damage and are also used to determine whether the pipeline will accept a magnetic-flux or ultrasonic pig. The caliper pig has been available since 1971, and can be used in both natural gas and hazardous liquid lines. Many experts recommend that a baseline pig run be conducted prior to starting service in new lines.

Ultrasonic pigs are capable of being used only in liquid pipelines although technology is underway to design an ultrasonic device that can be used in gas pipelines as well. Ultrasonic pigs have been useful in detecting losses in pipeline material and cracks.

The current state of instrumented internal inspection device technology is not without limitations. Currently available smart pigs can not detect longitudinal cracks, locate potential pipe seam failure in electric-resistance-welded pipes, or detect metal loss in circumferential welds. They are also not readily available in sizes to fit all pipelines and are often unable to negotiate a pipe with sharp bends, which are common in older pipelines. Additionally, some pipelines have valves which do not permit the passage of the pig.

Instrumented internal inspection device technology is rapidly advancing. As the use of this technology increases and attracts more vendors, it is expected that devices will be available which will be able to overcome many of the current limitations. At the present time, however, hydrostatic testing combined with the use of smart pigs and traditional visual inspection techniques provides the highest level of safety.

In September of 1992, the General Accounting Office issued a report entitled Natural Gas Pipelines: Greater Use of Instrumented Inspection Technology Can Improve Safety (GAO/RCED-92-237). According to GAO, smart pigs have been used by pipeline companies since the 1960's, and cleaning pigs were used as early as 1890. In this report GAO provided an indepth analysis of the benefits and limitations of using smart pigs in pipeline inspections. Much of the information in the report is applicable to both natural gas and hazardous liquid pipelines.

<u>Issues</u>

The Colonial Pipeline rupture of March 28, 1993, focuses attention on the issue of pipeline safety and raises a number of questions regarding whether the existing regulations are sufficient to ensure safe pipeline operation. The following list includes several of these issues:

1. There are no federal requirements regulating the distance between or the type of shut-off valves used. In the March 28, 1993, spill, even though the flow of fuel was shut off within minutes of the rupture, over 412,000 gallons of fuel were spilled, because the rupture point was 10 miles downstream from the closest shut-off valve.

2. A current regulation requires that shut-off valves be used on pipelines on both sides of watercrossings where the body of water is more than 100 feet wide. In most cases, these valves are manual shut-off valves which are often not quickly accessible. Since pipelines often cross streams and rivers less than 100 feet wide that are tributaries of larger waterbodies, it is not clear, given the new emphasis on protection of the environment, that this regulation provides sufficient protection.

3. Statistics indicate that third party damage is the leading cause of pipeline failure, yet there is no federal regulation requiring states to participate in "One-Call" systems.

4. Pipeline inspection using internal inspection devices is the only way (without excavation) to detect internal and external pipeline corrosion; the second leading cause of pipeline failure. There is currently no regulation requiring

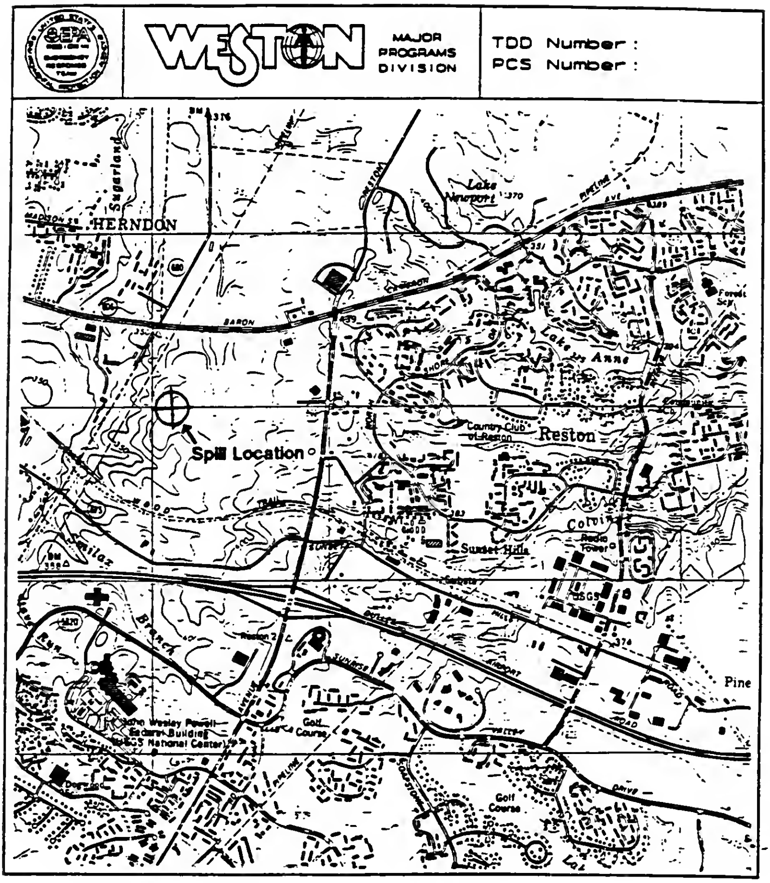
these inspections.

5. There are no standards available on which pipeline operators can base decisions on what action to take as a result of detecting, through smart pig runs, pipeline deficiencies and anomalies of any given degree of severity. Data interpretation is instead conducted by individual companies, based on individual experience. The lack of industry-wide standards can lead to the misinterpretation of internal inspection data and result in otherwise avoidable pipeline accidents.

6. In passing the Pipeline Safety Acts of 1988 and 1992, Congress has continued to strengthen federal statutes in an effort to improve pipeline safety. The Office of Pipeline Safety faces a tremendous backlog of regulations required to fulfill the pipeline safety goals of Congress. It is not clear as to whether the federal resources dedicated to pipeline safety are adequate to cover the additional work required.

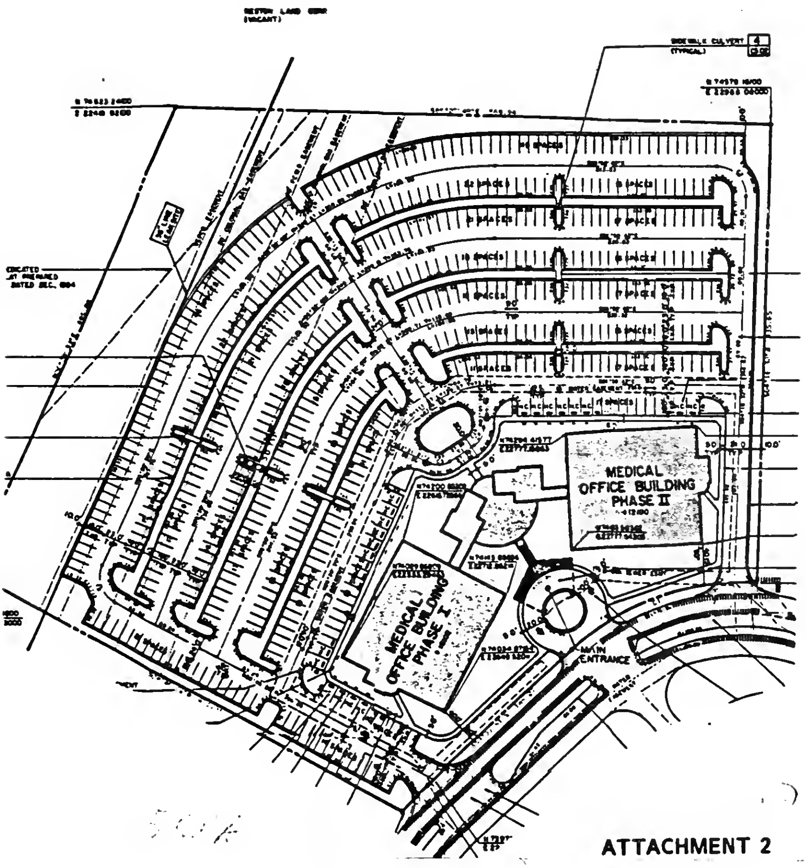
7. Colonial Pipeline has had four serious pipeline spills in Virginia since 1985. At question is to what extent Colonial's construction techniques, maintenance practices and inspection methods are contributing factors.

8. The Colonial Pipeline spill was the first oil spill during which EPA exercised its authority under the 1990 Oil Pollution Act. An examination of the overall response effort may provide useful insight in determining the adequacy of the legislation in addressing future emergency response efforts.



Initial Spill Location

ATTACHMENT 1



ATTACHMENT 2

FACT SHEET

"THE PIPELINE SAFETY ACT OF 1992"

The major provisions of the Pipeline Safety Act of 1992 are summarized as follows:

o Adds environmental protection, in addition to need for pipeline safety, as a goal of Federal safety standards;

o Requires all pipeline operators to identify pipeline facilities in high-density population areas, and in the case of hazardous liquid lines, areas deemed environmentally sensitive or those that cross a navigable waterway;

o Requires periodic inspection of all pipelines and directs D.O.T. to prescribe the circumstances, if any, under which such inspections should be conducted with the use of a smart pig; If smart pigs are not required, an inspection method that is at least as effective, is required to be used; Also provides that D.O.T. can require an existing transmission facility to be modified (i.e. remove valves) to accommodate a smart pig, as long as its current basic construction would accommodate such a device;

o Requires D.O.T. to issue regulations to prescribe circumstances, if any, where operators of natural gas distribution systems must install excess flow valves in new and renewed service lines; D.O.T. must issue a report to Congress on the reasons for any determination that EFV's would not be required in any circumstance; D.O.T. must issue regulations prescribing performance standards for EFV's; Operators of natural gas distribution systems must notify customers on new and renewed lines where an EFV could be installed in accordance with the performance standards, of the availability of an EFV and install the device where the customer pays all costs associated with the installation;

o Requires the appointment of two individuals with backgrounds in environmental protection to each Pipeline Safety Standards Committee and requires at least one member of each Committee to have no financial interest in pipeline, petroleum or natural gas industries;

o Requires D.O.T. to issue minimum operator training requirements for all pipeline operators and authorizes the Secretary to provide for self-certification by operators;

o Requires D.O.T. to publish a notice as to the availability of the industry guidelines for the replacement of cast iron pipelines;

o Expands inspection requirement for Gulf offshore pipeline facilities to all offshore pipelines and those in navigable waterways;

ATTACHMENT 3

o Directs D.O.T. to define by regulation the term "gathering line" and "regulated gathering line"; Exempts crude oil gathering lines of nominal diameter of six inches or less, operating at low pressure, and located in rural areas that are not unusually sensitive to environmental damage from definition of regulated gathering line;

o Clarifies the Secretary's authority to regulate intrastate pipeline transportation to the extent that the certifying state is not adequately doing its job;

o Raises the minimum civil penalty for a violation of the Acts from $10,000 to $25,000;

o Gives state officials responsible for pipeline safety, notice and opportunity to comment on any agreement proposed to be entered into by the Secretary to resolve a proceeding; Comments of local officials may be incorporated;

o Requires operators of natural gas distribution systems that do not maintain customer-owned service lines up to the building walls to advise their customers of the requirements for maintenance of those lines; Directs D.O.T. to conduct a comprehensive safety review to evaluate existing policies, procedures and rules with respect to customer-owned service lines, the extent that lack of maintenance of customer-owned service lines raises safety concerns, and make recommendations regarding maintenance of those lines, including any legislative and regulatory action; Requires D.O.T. to conduct a survey of owners of customer-owned service lines to determine the views as to whether distribution companies should assume responsibility for the operation and maintenance of customer-owned lines; After completion of the study and report to Congress, D.O.T., in cooperation with State and local authorities, shall take action, as appropriate, to promote adoption of measures that would improve the safety of customer-owned lines;

o Ensures that only states which have certified pipeline programs can adopt different safety standards from the federal program;

o Makes abandoned pipelines subject to the safety oversight of D.O.T.; D.O.T. must define what constitutes a hazard to navigation with respect to underwater abandoned pipeline facilities; Operators must report abandonments to D.O.T.; State officials must report to D.O.T. information on collisions between vessels and abandoned pipeline facilities;

o Prohibits any exception from hazardous liquid pipeline safety regulations based solely on the fact that facility operates at low internal stress;

o Requires D.O.T. to survey and assess the effectiveness of emergency flow restricting devices and issue rules prescribing circumstances under which operators of hazardous liquid pipeline facilities must install emergency flow restricting devices;

o Requires NTSB to investigate and report on pipeline accidents that involve significant injury to the environment, in addition to the current requirement to investigate pipeline accidents involving loss of life or substantial property damage;

o Makes it a criminal violation of the Acts for an excavator to fail to call a one-call system or heed marking information and subsequently damages the facility causing death, serious bodily harm, actual damage to property over $50,000, or release of more than 50 barrels of product; Makes civil and criminal penalties apply to pipeline operators who fail to accurately mark facilities or fail to participate in a one-call system; Requires D.O.T. to notify OSHA of any pipeline accident in which an excavator may have violated OSHA regulations;

o To the extent funds are provided in advance in appropriations acts, authorizes D.O.T. to hire twelve new additional pipeline safety inspectors;

o Authorizes $500,000 for D.O.T. to carry out a research and development program on underground utility location technologies;

o Authorizes D.O.T. to conduct a study of the abandonment of underwater pipeline facilities;

o Authorizes appropriations for the pipeline safety programs for fiscal years 1992-1995;

o Establishes the Research and Special Programs Administration as an agency within D.O.T. by statute (RSPA has existed by delegation of authority within D.O.T.);

o Makes various technical amendments to the Hazardous Materials Transportation Act;

o Provides for an exemption for certain rail-motor carrier mergers.

COLONIAL PIPELINE RUPTURE

TUESDAY, MAY 18, 1993

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT,
COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION,
Washington, DC.

The subcommittee met, pursuant to call, at 1:20 p.m., in room 2167, Rayburn House Office Building, Hon. Robert A. Borski (chairman of the subcommittee) presiding.

Mr. BORSKI. The subcommittee will come to order. The subcommittee today will be examining the rupture of the Colonial Oil Pipeline which spilled 412,000 gallons of diesel into Sugarland Run and the Potomac River in Northern Virginia on March 28th.

This unfortunate incident has caused considerable and justifiable concern and distress in Northern Virginia and I want to express my appreciation to the gentlewoman from Virginia, Ms. Byrne, for bringing this matter to the attention of the subcommittee as quickly as she did.

The issue before us is whether something could have been done to reduce the likelihood of this spill in an area that is both highly populated and environmentally sensitive. Was this spill inevitable or could it have been prevented through more frequent and more rigorous inspections and other precautions?

Oil spills and environmental damage are the all too frequent price we pay for the conveniences and advances of modern society. We must reduce that environmental damage to the bare minimum through the concentrated use of the most advanced technology available to us and through constant vigilance.

The question this subcommittee will attempt to answer today is whether the maximum precautions were taken in the case of the March 28th spill. It is important for us and for the people of Northern Virginia to find out what the Colonial Pipeline Company has done in the past to prevent this type of rupture and spill and what precautions are being taken to prevent it from happening again.

It is also our job to look closely at the actions of the Federal regulators. The Office of Pipeline Safety has a big job, overseeing natural gas pipelines which extend 1.7 million miles and hazardous liquid pipelines which cover 152,000 miles.

Throughout its system, Colonial transports 77 million gallons of petroleum products each day. The vast majority is moved safely and without incident but when confronted with the significant and serious damage that can be caused by these hazardous substances, even a minor spill can be intolerable.

It was because of the extensive system of pipelines that Congress moved in 1988 and in 1992 to upgrade the safety requirements. At the same time, however, the resources available to the Office of Pipeline Safety for its regulatory activities and the National Transportation Safety Board for its investigation of accidents have not been increased.

The most troubling question of all is why with the attention that has been paid to pipeline safety and regulation during the last five years was no one able to detect the impending rupture of the Colonial Pipeline in Northern Virginia?

With hundreds of millions of gallons of hazardous liquids and billions of cubic feet of natural gas moving through pipelines each day, it is essential to find out if this is a case of faulty laws and regulations or faulty implementation.

The Northern Virginia spill was the first use of the Unified Command to direct the emergency response to oil spills that was enacted in law after the *Exxon Valdez* spill. This hearing gives us an early opportunity to evaluate the workings of the unified command but our focus should be on preventing spills with the widespread damage that even small amounts of petroleum can cause.

Before we continue, I will place in the record statements received from Hon. Norman Y. Mineta, Chair of the Committee on Public Works and Transportation, and Hon. Lucien E. Blackwell.

[Statements referred to follow:]

CHAIRMAN NORMAN Y. MINETA

SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT
COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION

HEARING ON THE COLONIAL PIPELINE RUPTURE

MAY 18, 1993

I WANT TO THANK OUR NEW COLLEAGUE FROM THE 11TH DISTRICT OF VIRGINIA, LESLIE BYRNE, FOR ENCOURAGING THIS COMMITTEE TO LOOK INTO THE CIRCUMSTANCES OF THE RUPTURE OF THE COLONIAL PIPELINE THAT TOOK PLACE IN HER DISTRICT ON MARCH 28, 1993. I SAY THAT BECAUSE THIS SPILL BRINGS INTO SHARP RELIEF THE ISSUES OF SAFETY AND ENVIRONMENTAL RISK THAT SHOULD BE THE FOCUS OF OUR PIPELINE REGULATORY SYSTEM.

NO LIVES WERE LOST AS A RESULT OF THIS SPILL, AND NO INJURIES OCCURRED, BUT THE ENVIRONMENTAL DAMAGE WAS MAJOR. OVER 50,000 GALLONS OF DIESEL OIL HAVE BEEN LOST INTO THE ENVIRONMENT, AND REMEDIATION OF DAMAGED SOILS WILL TAKE YEARS.

THIS SPILL REMINDS US OF THE IMPORTANCE OF THE AMENDMENTS WE MADE LAST YEAR TO THE PIPELINE SAFETY PROGRAM TO MAKE ENVIRONMENTAL DAMAGE A MAJOR FOCUS OF THE PROGRAM. I LOOK FORWARD TO HEARING FROM THE DEPARTMENT OF TRANSPORTATION HOW THEY PLAN TO IMPLEMENT THIS NEW FOCUS OF THE PROGRAM.

CLEARLY, NOT ALL THE ANSWERS ARE IN ON THE CAUSES OF THIS SPILL. BUT SOME POTENTIAL CAUSES ARE CLEARLY APPARENT. THE NTSB METALLURGICAL REPORT POINTS CLEARLY TO MECHANICAL DAMAGE AS THE CAUSE OF THE RUPTURE. THE ONLY QUESTION IS, DID IT TAKE PLACE WHEN THE PIPELINE WAS LAID, OR DID IT OCCUR LATER?

IF IT TOOK PLACE WHEN THE PIPELINE WAS LAID, WE CLEARLY NEED EITHER MORE STRINGENT CONSTRUCTION STANDARDS OR MORE STRINGENT ENFORCEMENT OF EXISTING STANDARDS. IF IT TOOK PLACE LATER, THEN WE NEED TO FOCUS MORE ON THE PROBLEM OF THIRD-PARTY DAMAGE THAT HAS ALREADY BEEN IMPLICATED AS THE CAUSE OF OTHER PIPELINE SPILLS. IN EITHER CASE, WE NEED TO LOOK AGAIN AT THE ADEQUACY OF OUR INSPECTION REQUIREMENTS, SINCE AN INTERNAL "SMART PIG" INSPECTION PROBABLY COULD HAVE DETECTED THE FLAW THAT CAUSED THIS PIPE TO BREAK.

I LOOK FORWARD TO THE RESULTS OF THIS HEARING, AND I AM CONFIDENT THAT IT WILL BE ONE MORE STEP IN THE PROCESS OF IMPROVING THE SAFETY OF OUR PIPELINE SYSTEM AND REDUCING ITS ADVERSE ENVIRONMENTAL IMPACT.

STATEMENT OF CONGRESSMAN LUCIEN E. BLACKWELL
SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT
COLONIAL PIPELINE INCIDENT HEARING
MAY 19, 1993

Mr. Chairman, First, I wish to commend you and the gentlewoman from Virginia for bringing this crucial issue to the forefront of the Subcommittee agenda.

An oil spill is perhaps one of the most environmentally tragic consequences of our everyday reliance on petroleum products. Nobody wants an oil spill, and when one occurs, we would all like to think that we have done everything in our power to prevent such a catastrophe.

But the sad truth is Mr. Chairman, that oil spills do occur.

Sometimes, as we all know, these spills are massively devastating.

Our recent memory of the 1989 grounding of the Exxon Valdez which resulted in a 35,000 ton oil spill in one of our nation's most environmentally fragile areas, or Saddam Hussein's deliberate dumping of nearly 1.5 million tons of crude oil into the Persian gulf, makes the topic of oil spills one of the hottest environmental issues today.

But what about the smaller spills, that happen literally, right in our back yards?

On March 28th when 400,000 gallons of diesel fuel spewed from a Colonial Pipeline into Sugarland Run, and eventually a 50 mile stretch of the Potomac, we realized just how vulnerable every community in this nation is to the hazards of a potential oil spill.

Residents were forced to flee their homes. Plants and wildlife were instantly killed. Water supplies were threatened. The spill drew the anger of residents throughout the community, many of whom had no idea that millions of gallons of oil flowed beneath their homes each and every day.

We have assembled here today, not to point fingers, or place blame. That would clearly be counter-productive to what this vital hearing is attempting to accomplish.

What we must concentrate on is the issue of pipeline safety, and the multitude of questions surrounding the complex operation of these vital energy lines.

We need to examine current regulations pertaining to shut off valves in the event of similar disasters.

We must consider the need to enact universal standards for pipeline inspections.

The technology of "smart-pigging" carries great promise for detecting defects, but unless we can make good use of this data, it will be sacrificed in vain.

With four serious pipeline spills in Virginia since 1985, the time has also come for the Colonial Pipeline Company to take a look at some of their own individual practices, particularly in regards to inspection.

I am confident that the results of this hearing will prove most fruitful as this Subcommittee seeks to determine how we can avoid these environmental tragedies in the future.

I welcome all of our witnesses here today, and once again Mr. Chairman, commend you for all of your hard work. Thank you.

Mr. BORSKI. Let me recognize our distinguished Ranking Member, the gentleman from Oklahoma, Mr. Inhofe.

Mr. INHOFE. Thank you very much, Mr. Chairman and I want to also thank and commend Congresswoman Byrne and Congressman Frank Wolf for calling our attention to this and bringing this issue to the attention of the subcommittee.

As a representative of the oil capital of the world, pipeline safety has always been of interest to me. Unfortunately several years ago my district was the site of a pipeline accident. In our case, it was an explosion which was due in part to the introduction of foreign matter into the pipeline.

Not only did the explosion damage the pipeline, it released hazardous fumes into the air and threatened the safety of pipeline employees.

The most important lesson learned from the explosion is that the key to minimizing public health risks and environmental damage is to have a workable emergency response plan.

It is my understanding that all involved in the emergency response to the March 28th spill in Reston are to be commended. Due to the immediate efforts of the Fairfax Fire Department and Colonial Pipeline Company emergency response teams, the extent of damage was not as extensive as it could have been given the volume that was spilled. Once the degree of the spill was known, additional help was asked for and received from various Federal and State agencies.

While there is never a good time for a spill, it appeared that in this incident all the relevant governmental and private entities were able to come together and respond to the emergency in a comprehensive and effective manner.

In retrospect, we must now answer the question how safe is safe enough or what more needs to be done to prevent future spills?

While it is relatively simple to require periodic pigging and increase the frequency of emergency or remote shut-off valves, the difficulty is balancing these requirements with economic realities. Unfortunately we can never make a system completely fail proof, even if it were technically feasible, it would be economically impossible.

Equally impossible is placing an economic value on spill prevention. Thus we must balance the value of increased regulation against the cost of compliance.

Also we must recognize that pipeline owners and operators are not the only entities that require oversight. Equally important is the need to address issues involving sharing of easements and possible third-party violators.

It is my hope that our efforts here today will result in a well thought out viable comprehensive response to future pipeline requirements and not just a reaction to one incident.

Mr. Chairman, given the large number of witnesses, I will stop here and I look forward to hearing these witnesses.

Mr. BORSKI. The Chairman would now like to recognize the distinguished gentlewoman from Virginia, a valuable Member of this subcommittee.

Ms. BYRNE. Thank you, Mr. Chairman. I would also like to thank you for providing us the forum. By the turn out today, you see it has gathered a lot of interest and we are here to discuss the Colonial Pipeline rupture on March 28th, in the 11th congressional district. And to see what measures to prevent such disasters in the future we can address.

First of all I, too, would like to thank and congratulate Colonial Pipeline, the EPA, Fairfax County Fire and Rescue, and the many other agencies that played an integral role in the cleanup effort. The emergency phase product recovery rate was impressive. And I hope that the long-term efforts proceed in the same manner.

With more than 400,000 gallons of number two diesel fuel spilled, they had a difficult job on their hands and all of these that I mentioned rose to the occasion. And I commend them for that. There is no question that pipeline transportation of petroleum products and natural gas is a fact of life. It is more affordable and safer than many other modes of fuel transport.

However, since these intricate systems of transport are honeycombed underneath our homes, our businesses, our roads, and our hospitals, in this case, we must insure the safety of our institutions and the individuals who live and work on top of them.

This is the second major incident involving oil in my district. Between the tank farm on Pickett Road and the pipeline, Fairfax County is starting to look like the Exxon Valdez.

My constituents and I have grave concerns about the health and environmental effects of these spills. We are curious about why they continue to happen and wonder why the industry seems adverse to making changes that would make some catastrophes less likely.

We have all called this hearing today to determine if there are ways to prevent the latest occurrence and three major spills by Colonial in the Commonwealth of Virginia in the past and many more throughout the United States by this pipeline company and others.

Our goal today is to ascertain what the pipeline industry can do, what the agencies involved can do, and what we in Congress can do to insure the health, safety and welfare of our citizens.

Thank you, Mr. Chairman.

TESTIMONY OF HON. FRANK R. WOLF, A REPRESENTATIVE IN CONGRESS FROM VIRGINIA

Mr. BORSKI. The Chair thanks the gentlewoman.

First I would like to welcome our first witness, the distinguished gentleman from the State of Virginia, the Ranking Member of the Appropriations Subcommittee on Transportation, Congressman Frank Wolf.

Mr. WOLF. Thank you, Mr. Chairman. I would like to submit my full statement if I may for the record and summarize.

Mr. Chairman, thank you for holding the hearings on the recent Colonial pipeline break in Northern Virginia. In addition, I want to publicly commend the Fairfax Hazmat Team and the other Federal and State and local agencies for their response to this unfortunate spill, and also pay a tribute to local officials in Loudoun County and supervisor Bob Dix, whose district this is, and chairman Tom Davis. Both of them provided day-to-day, hour-to-hour leadership on this issue. In interests of brevity I will summarize.

As the Chairman and Members of this committee know, the Potomac River tributary, Sugarland Run, into which most of the 400,000 gallons of diesel spilled, traverses Virginia's 10th congressional district, which I represent.

I appreciate, Mr. Chairman, the opportunity to share with the committee my concerns and thoughts about some possible steps to avoid these disasters, or at least mitigate their impact. My testimony will stress proactive ideas to supplement or replace what seems to be reactive policy.

It has been suggested that the Office of Pipeline Safety, OPS, does not belong in the Department of Transportation and would more appropriately fit into the portfolio of another Federal agency such as the Department of Energy. True, pipelines are a mode of transportation but only in the sense that utility lines are also, and pipelines transport energy.

In addition to a more natural fit in terms of subject matter, the Department of Energy seems to be a more compatible home for pipeline safety for two other reasons. First the Department of Energy has expertise with costs and market circumstances affecting the energy industry which is important since any regulatory activity needs cost benefit analysis.

And second, the DOE also has extensive emergency response capability with respect to energy catastrophes.

Currently OPS is within the Research and Special Programs Administration, RSPA, of the Department of Transportation. RSPA is one of the most enthusiastic and hard working groups in the department, and let me just say, my statement today is not meant, and I want to stress this, is not meant as any criticism. They have done a very good job.

While this group is one of the most enthusiastic and hard working, they simply do not have the staff or the resources to carry out the duties assigned to them. The result is that the Nation's pipeline network is not receiving adequate oversight.

Mr. Chairman, I would emphasize again, I am not being critical of RSPA, which cheerfully performs admirably on a shoestring budget. The people are hard working and dedicated.

I will give you a graphic example of just how overwhelmed RSPA is. In a recent hearing of the transportation appropriations subcommittee on which I serve as the ranking Republican Member, we were discussing their fiscal year 1994 budget request for $2.6 million to contract out the review of detailed emergency response plans submitted by private pipeline operators as required by the Oil Pollution Act of 1990. Mr. Chairman, there is a room at RSPA literally stacked with hundreds of plans awaiting review. No one has actually looked at them because they don't have the staff. It is not a criticism, they just don't have the manpower.

I don't know, whether prior to the spill, Colonial's pipeline plan had been read or was gathering dust like all the others in the RSPA holding tank. Nor am I claiming prior review of this plan would have prevented the spill we are discussing today. However, it is important to remember that a major factor in the high-volume release of product into the environment during Colonial's spill was the delay of up to one and one half hours in getting to the manual valves. This underscores the importance of an emergency response plan as well as the obvious assumption that these plans need prompt review so that emergency strategies can be amended as necessary before disaster strikes.

Why is the Office of Pipeline Safety in RSPA? I go into great detail in my full statement. RSPA does an outstanding job. They have the Volpe Center which is on the cutting edge of research such as IVHS technology. OPS has been placed in RSPA because there isn't any other place in the Department of Transportation where they would fit.

Mr. Chairman, I thoroughly believe there are immediate steps that can be taken to make pipelines' safety more proactive. First, is the use of internal inspection devices, "smart pigs," which Jim Inhofe mentioned.

Last year the GAO concluded that widespread use of smart pigs could save lives and protect property by improving the safety and reliability of natural gas and hazardous liquids transmission lines.

In 1988, Congress required RSPA to establish minimum federal safety standards so that all new and replacement pipelines could accommodate smart pigs. Prior to this 1988 congressional mandate, the National Transportation Safety Board had recommended in 1987 that RSPA required natural gas and hazardous liquid pipeline transmission operators to make modified and repaired pipelines piggable.

RSPA has not issued either of the required regulations or feasibility study which was due in May. I hope this committee will push for a speedy final rule making in this area.

Second, Mr. Chairman, there is another issue pending on the long delayed rule making docket at RSPA. For many years the National Transportation Safety Board, NTSB, has requested that RSPA issue regulations requiring excess flow valves.

In addition, the 1992 Pipeline Safety Act requires RSPA to issue regulations in this area and indeed RSPA has issued an advanced notice of proposed rule making. However, the next step in the regulatory process, issuing a notice of rule making, has not yet followed.

I would hope this is an area where the committee will do what it can to speed up action as well as urging frequent spacing for these valves which will maximize protection, especially in heavily populated areas and areas with fragile ecosystems.

Finally, Mr. Chairman, there is the issue of third party damage. I think that has to be dealt with. This committee should look into that. It is very, very important.

In the area where there is an ongoing rule making, I would urge the committee to explore options that would speed up the process. I am specifically referring to the rule making concerning the one-call systems such as Miss Utility. All owners of underground utilities should be required to belong to a one-call system so that prior to an evacuation, a call would be made which would result in the location of all underground utilities. An emerging technology, subsurface utility engineering, can further help pinpoint the location of utilities. I was told that some utilities are not members of Miss Utility. I was also told that about a number of localities around the country.

Someone told me, and it may not be accurate, the other day that Arlington County, which used to be in my congressional district, does not participate in Miss Utility. That may be wrong. I think from a liability point of view, any utility would want to be part of it.

I just think it is so important to—almost as a protection for the utility—that it would want to be involved and certainly any local government or county or a unit of government would want to be involved.

So there are the three major points upon which we elaborate in detail in my testimony because I don't want to take the committee's time and I again thank the Chairman for holding the hearings, I appreciate it very much.

Mr. BORSKI. I thank the gentleman.

Questions for this gentleman?

If not, let me thank you for your testimony. As always, it is very thoughtful.

Mr. WOLF. Thank you, Bob.

Mr. BORSKI. Thank you, sir. We would like to welcome our second witness, Stephen Luftig, Acting Deputy Director, Office of Emergency and Remedial Response.

He is accompanied by Mr. Alfred Lindsey, Director, Office of Environmental Engineering and Technology; and Mr. Dennis Carney, Chief, Region III Superfund Removal Branch.

Would you please stand.

[Witnesses sworn.]

Mr. BORSKI. Let me first thank all of our witnesses for appearing before the subcommittee today. We have an extraordinarily full agenda this afternoon. So that we might be able to hear from all of our witnesses, we would ask that each of you summarize your statements. Of course, your entire statements will become part of the record.

Mr. Luftig?

TESTIMONY OF STEPHEN LUFTIG, ACTING DEPUTY DIRECTOR, OFFICE OF EMERGENCY AND REMEDIAL RESPONSE, ENVIRONMENTAL PROTECTION AGENCY, ACCOMPANIED BY ALFRED LINDSEY, DIRECTOR, OFFICE OF ENVIRONMENTAL ENGINEERING AND TECHNOLOGY DEMONSTRATION; AND DENNIS CARNEY, CHIEF, REGION III SUPERFUND REMOVAL BRANCH

Mr. LUFTIG. Thank you, Mr. Chairman.

My name is Stephen Luftig, Acting Deputy Office Director for the EPA's Office of Emergency and Remedial Response within EPA's Office of Solid Waste and Emergency Response. And I am pleased to represent EPA here today.

I am pleased to have the opportunity to address your subcommittee on the subject of the recent Colonial Pipeline Company oil spill in Fairfax County, Virginia.

With me today are two other EPA representatives, Mr. Alfred Lindsey, Director of the Office of Environmental Engineering and Technology Demonstration, which is within EPA's Office of Research and Development; and Mr. Dennis Carney of EPA's Region III, Superfund Removal Branch.

With your permission, I would like to submit written testimony for the record.

Mr. BORSKI. So ordered.

Mr. LUFTIG. EPA is one part of a large emergency response network that includes many Federal, State, and local participants throughout the country. EPA's role is described in the National Contingency Plan which is our regulatory blueprint for emergency planning and response.

In addition to the national plan, each EPA regional office has a regional contingency plan in place covering various parts of the country. In general, we differentiate between planning for oil spills and responding to spills once they occur. It is our goal, of course, to prevent oil spills from occurring. However, when spills do occur, EPA assumes a lead role in responding to oil spills in the inland areas of the United States, while the Coast Guard has the lead response role for spills in the coastal areas, Great Lakes, and some large rivers.

On Sunday morning, March 28th, the National Response Center telephoned the EPA Region III duty officer who is on call 24 hours a day to report a major pipeline oil spill. The spill was initially estimated at several hundred thousand gallons and impacted the Sugarland Run, a tributary of the Potomac River.

Upon his arrival at the spill that afternoon, EPA's on-scene coordinator met with county emergency personnel who had already promptly initiated response measures that morning by deploying booms to begin containing the spilled oil. In cooperation with State, county, and local officials, EPA employed a unified command system in accordance with the Region III Regional Contingency Planning.

This pre-set arrangement allowed EPA to direct spill response efforts as required by the Oil Pollution Act of 1990 and forced the productive use of all available response resources.

This coordination is vital because there are several competing priorities to consider in such a response. To protect public health, drinking water facilities must be immediately notified. As a result, some water intakes were temporarily closed and others were monitored frequently for any contamination. To prevent spilled oil from entering the Potomac River, and to protect the areas environment, booms and other spill mitigating devices were employed at the most accessible areas of Sugarland Run. To keep the public informed, a telephone public information hotline was quickly established and staffed by Fairfax County. Response personnel were on the scene round the clock for several days. It is estimated that about 407,000 gallons of No. 2 fuel oil, a heating oil, were discharged from the pipeline.

Our assessment of the Sugarland Run identified a considerable amount of shoreline contamination as well as wildlife injury. From the beginning of the incident, Colonial Pipeline had participated in the response activities; and on April 2nd, EPA issued a unilateral administrative order to Colonial Pipeline.

In response, Colonial Pipeline provided a draft response action plan detailing their future activities including long-term monitoring along Sugarland Run and the Potomac River and cleanup of oil contaminated areas.

Now, several weeks after the spill, a considerable amount of work remains to be completed. Activities are under way to remove excavated soil and to more fully assess the extent of contamination and any environmental damage.

I would like to put this particular spill into perspective with other spills. About 19,000 oil spills were reported last year to the Federal Government. About 9 percent of these are attributed to pipelines. The Colonial Pipeline spill was a very large spill. It was the second largest pipeline spill reported to the National Response Center during the past 12 months.

Thank you for the opportunity to appear before your subcommittee. My EPA colleagues and I will be pleased to answer any questions you or the other subcommittee Members might have.

Mr. BORSKI. Thank you very much, Mr. Luftig.

Generally speaking, the emergency response to the Colonial spill seems to have gone pretty well, with the staff from EPA, local fire and rescue companies, and Colonial working well together.

But suppose the spill had been worse, suppose the spill had occurred closer to the Potomac so that it was not contained within the Sugarland Run, and suppose more oil had escaped, how adequate would our resources have been? What margins of safety do we have in our preparedness?

Mr. LUFTIG. As you say, the coordination went well and there was sufficient equipment and on-time response to trap a lot of oil in Sugarland Run before it hit the Potomac. And it would be difficult to judge what would happen if more oil spilled closer to the larger Potomac River and difficult to evaluate the weather conditions and situations under those circumstances.

We were able to bring a lot of spill response equipment to the site quickly. The Coast Guard helped us through a couple of their response centers, shipping equipment quickly to the site. We borrowed a helicopter from the United States Army, and a lot of equipment was deployed very quickly.

If the site had been more inaccessible and closer to the Potomac, likely more oil would have reached the Potomac River.

During this high flow time, I think less oil impacted the drinking water intakes than might have impacted the intakes during lower flow times or if more oil had been discharged. But a larger spill, closer to the Potomac, would have had a greater impact on the Potomac River.

Mr. BORSKI. So our preparedness really wouldn't change had that occurred again?

Mr. LUFTIG. Depending on the volume of oil present. I think we were able to deploy a lot of equipment very quickly, though, to trap most of this oil.

Mr. BORSKI. The gentleman from Oklahoma?

Mr. INHOFE. Thank you, Mr. Chairman.

Mr. Luftig, would you just characterize in one or two sentences the level of cooperation that received from Colonial during this incident?

Mr. LUFTIG. I would say that they were cooperative. They were there early during the response with the county responders, and they have been fulfilling the requirements that we have asked them to undertake thus far within our administrative order.

Mr. INHOFE. I always look at these things as hoping to make them learning experiences.

Do you think, as a result of this accident, along with the work you have been doing, that we have better prepared ourselves for something like this in the future?

Mr. LUFTIG. I think that the groups that got to work together, unfortunately, because of this spill are now better prepared even than before. They know each other better and are more aware of others' available resources to do things, like notify the public, keep a hotline open; but the groups were already familiar in that they did have the regional contingency plan in place. And I think we were fortunate in that regard.

Mr. INHOFE. I think Representative Wolf made it pretty clear when he said that everybody was cooperative, everyone worked hard, but perhaps we are just lacking some resources. There are never enough resources.

In one of the written testimony that was submitted, one of the witnesses suggested that the leading source of oil pollution in the United States is pipelines.

Do you agree with that statement?

Mr. LUFTIG. It is difficult to say. We go by data that is reported to the National Response Center. And as I mentioned, there were about 19,000 oil spills reported last year, and approximately 9 percent of those were pipeline oil spills.

About 13.2 percent of the quantity of oil spilled was reported last year. In 1991, about 13.2 percent of the quantity of oil spilled was reported to have come from pipelines.

Mr. INHOFE. That answers the question. Thank you very much.

Mr. BORSKI. The gentlewoman from Virginia.

Ms. BYRNE. It is my understanding that the EPA monitored the product recovery as the cleanup was going on; and in the initial stages of this, it was reported that we had 200,000 gallons; and then, incrementally, it kept going up as more product, I guess, was discovered. And it struck me then, how do we verify the numbers that we get from Colonial?

Is that your job? Do you verify those numbers?

Mr. LUFTIG. Ms. Byrne, it was very hard to estimate the amount of oil that was being recovered. And the way it was done and continues to be done is that as oil is pulled out with water, it is then separated, and the oil is usually recovered.

And based on the first batches of oil that were removed and separated, the Colonial Pipeline people gave us an estimate of how much oil was being removed with each batch. And that was then projected to the future as far as future oil removals.

So it was a guess based on separating oil in the first few batches, and it certainly did vary over time. I think our closest estimate now is about 350,000 gallons. We rely on their estimates, the folks that EPA had on scene. And at one point we had four or five people there. Response people, around the clock, were really involved with deploying the equipment and managing—helping to manage the site. And we were relying on the pipeline company's estimate of the amount of oil recovered.

The other part, too, if I may, is that the numbers reported as volume recovered are interesting but don't direct our response, necessarily. That is mostly a visual kind of response. Where we see the oil and think we can get it, we go after it.

Ms. BYRNE. So do you feel that the recovery rates on these figures that were given by Colonial are fairly high?

I mean, I think it is estimated that we recovered all but 50,000 gallons or something like that.

Is that a fairly high figure for recovery rate on this kind of spill?

Mr. LUFTIG. It is very high, yes.

Ms. BYRNE. Let's get into what we are going to do now, a little bit about long-term mitigation.

What kinds of mitigation, long-term—now that we have got the dirt separated and everything pulled out of there that we saw today, what do you think is going to happen to it?

And how long will it take to make the decision about what is going to happen to that contaminated soil?

And when can we expect the affected areas to regain their status prior to the spill?

Mr. LUFTIG. I will pass that to Mr. Carney who is managing the site cleanup.

Mr. CARNEY. First of all, with regard to when we will be making some decision with regard to disposal of soil and things, under the administrative order that we issued to Colonial, they are required to provide us with some plans on options on how to handle that soil and, presuming they want to do off-site treatment on some locations, where they would want to take it.

Upon our review, then, we would give them the authority to go ahead and implement that. We have not received those plans, but we expect them soon. In terms of when the area itself may be restored to its original conditions—which is, I guess, the question as I understood it—that is very difficult to judge.

This area was significantly, as you know, and seriously impacted environmentally by the oil spill. The stream itself served almost like an open culvert, if you will, for people to be able to boom across and work along while we recovered the oil. And because it was like that, that is why there were such high volumes of oil recovery, why there was such an ability to—a good ability to retain it in the stream before it got to the Potomac.

It is very difficult to judge. We will continue to work with the State and local governments and the local town of Herndon and others to give them opportunities to review plans that we receive from Colonial so we can get local input into the assessment and remediation process so that we can try and make sure it gets done as quickly as possible.

Ms. BYRNE. I just have one last question, Mr. Chairman.

Last Monday, I think it was, in The Washington Post, there was an article regarding long-term effects of diesel oil. Did any of you happen to see that and the experiment that was done that diesel oil as it breaks down in the environment becomes more toxic and not less; and one of the remediation efforts that have been talked about is letting it degrade in the environment, biodegradability I guess it is.

Could you comment? Have you any knowledge that diesel becomes more toxic rather than less toxic as it is exposed to the environment?

Mr. LUFTIG. Mr. Lindsey will answer that.

Mr. LINDSEY. I, unfortunately, did not see that article, and I will have to find it and take a look at it.

What happens in the environment, typically, is that, over time, the oil bioremediates naturally. Microorganisms break it down and use it as foodstuffs, if you will. In the Valdez situation in Alaska, we did rather large-scale controlled tests and then treated a lot of the coastline via this method by trying to augment, if you will, natural bioremediation by using nutrients.

We did, in that case, spend quite a bit of resources looking at that issue. And we were not able to find any increase in toxicity in the breakdown products. Of course that was crude oil and not No. 2, so I can't vouch for what specifically might happen there.

But we will have to get that information and take a look at it.

Ms. BYRNE. It was a study done by the Portel Marine Science Laboratory in Sequim, Washington, that showed the differences between diesel oil, crude, and other types of petroleum products. And I would recommend that to you before we decide on the remediation on the site.

Thank you, Mr. Chairman.

Mr. BORSKI. The Chair thanks the gentlewoman.

Mr. Lindsey, let me follow up. Is EPA considering using bioremediation in this Sugarland Run area?

Mr. LINDSEY. That is one of the options on the shoreline-some of the contaminated shorelines which is a possibility.

I think I would defer to you, Dennis, on that.

Mr. CARNEY. Again, the administrative order which we have issued to Colonial basically gives them the opportunity to provide us a plan with various options or alternatives on how to best handle the remediation of not only the soils and piles where excavation occurred, but along the shoreline as well.

Bioremediation is certainly an alternative that they may consider as well as enhanced bioremediation where you actually try to do something to stimulate the naturally occurring organisms locally, or there may be some other options that seem appropriate.

We have not received that plan yet. We expect it soon.

Mr. BORSKI. If the plan came in did not include bioremediation, would that be something you could encourage them to do?

Mr. CARNEY. I think we need to take a look at what their proposal was first.

Mr. BORSKI. Any other questions?

If not, thank you very much.

Mr. BORSKI. We would like to welcome our third witness, Mr. Christopher A. Hart with the National Transportation Safety Board. Mr. Hart is accompanied by Mr. Larry Jackson, Acting Chief, Pipeline Division, National Transportation Safety Board.

Gentlemen, would you please rise?

[Witnesses sworn.]

Mr. BORSKI. Mr. Hart, you may proceed.

TESTIMONY OF CHRISTOPHER A. HART, NATIONAL TRANSPORTATION SAFETY BOARD, ACCOMPANIED BY LARRY JACKSON, ACTING CHIEF, PIPELINE DIVISION, NATIONAL TRANSPORTATION SAFETY BOARD

Mr. HART. Thank you.

Good afternoon, Mr. Chairman and Members of the subcommittee. I appreciate the opportunity to appear on behalf of the National Transportation Safety Board to discuss our ongoing investigation into the recent Colonial Pipeline Company accident in Northern Virginia.

With me today to help with questions is Larry Jackson, the Acting Chief of our Pipeline Division.

In the limited time available, I would like to give a synopsis of my written testimony that you now have before you. But I would ask that the written testimony be included in the record.

Mr. BORSKI. Without objection, it is so ordered.

Mr. HART. Thank you.

As this panel knows, the National Transportation Safety Board is an independent agency that is charged with investigating transportation accidents, determining their probable cause, and proposing safety recommendations to help prevent their recurrence.

The Safety Board also conducts safety studies and evaluates the effectiveness of the programs of other government agencies and companies in the transportation industries for preventing transportation accidents.

Liquid pipelines transport about 54 percent of our Nation's petroleum products. When released during accidents involving such pipelines, these products can cause millions of dollars in environmental damage and other disruptions.

These losses were not considered in developing pipeline safety standards until recently when the Pipeline Safety Act of 1992 added environmental protection as an objective for pipeline safety standards.

The accident we are discussing today is the March 28th, 1993, rupture of the 36-inch Colonial Pipeline Company pipeline in Herndon, Virginia, that runs behind the Reston Hospital Physicians Office Building.

This rupture occurred in a section of pipeline between a pump station in Chantilly, Virginia, and another station 45 miles from there in Dorsey, Maryland. At the point of the rupture, the top of the pipeline was approximately eight feet below the surface.

The company's controller in Atlanta received an alarm from the Dorsey station, and within minutes, remotely closed certain valves. In addition, two pumps at the Dorsey station automatically stopped, and the Dorsey station operator remotely closed another Dorsey station valve.

Between these remote control valves were several manually operated valves, and local Colonial employees drove to some of the valves downstream of the rupture on both sides of the Potomac River and closed them to further isolate the line.

The 45 miles of pipeline between the remotely operated valves are estimated to have a capacity of about 12.4 million gallons, or about 295,000 barrels. The company, Colonial, estimates that about 407,000 gallons, or about 9,700 barrels of No. 2 fuel oil, escaped. And they estimate that they recovered about 87 percent of that.

Near the rupture site was a run-off pond for the hospital parking lot, and the escaping fuel oil from the rupture quickly filled that pond and entered into a storm drain that entered into Sugarland Run Creek, from which it flowed into the Potomac River and threatened the nearby water intake for Fairfax County. The water intake was subsequently closed, and citizens in the immediate area were evacuated.

When the pipeline was excavated after the accident, there were large boulders and rocks on and around the pipeline that could be seen. The boulders and rocks were removed during excavation. When the excavation reached the pipe, the 42-inch rupture on the top of pipeline was exposed.

An 18-foot section of the pipeline was taken to the Safety Board Material Laboratory for further examination. Microscopic inspection of that section in our lab preliminarily suggests a metal scraping on the top of the pipe, although no determination has yet been made as to the source of this scrape. There were also some dents on the pipe.

Several days after the accident, the Office of Pipeline Safety of the Research and Special Programs Administration within DOT required Colonial to expose and examine an additional 700 feet of the pipeline to search for additional damage along the medical office parking lot.

This pipe segment rested on a protruding bedrock, and during the lifting of the pipeline, a dimple was discovered in the bottom of the pipe. The Board requested Colonial to also remove this dented pipe section located 28 feet downstream from the rupture. It was also taken to our laboratory where the dent was observed to be about three-quarters of an inch deep and about 10 inches across.

The on-scene phases of the Safety Board's investigation are now finished, and we are now reviewing Colonial's design and construction records as well as its previous pipeline accidents and operating and maintenance history.

The issues we are now examining include the adequacy of internal electromagnetic, ultrasonic, and other pipeline inspections, their utilization by Colonial, and existing requirements for their use.

We are also looking at the adequacy of inspections during pipeline installation and during construction and maintenance that occurs near a pipeline; remotely operated and automatic shut-off valves; early leak detection procedures and their performance in conjunction with supervisory control and data acquisition systems, such as the one that was in use by Colonial; the structure and integrity of the pipeline; and Federal oversight of the Colonial Pipeline activities.

As this subcommittee knows, these are not new issues for the Safety Board because we have recommended for some time the use of appropriate pipeline internal inspection equipment at least since 1987.

We have also recommended appropriately spaced remotely operated valves to enable the prompt isolation of sections that pass through populated areas.

Again, the Safety Board thanks the subcommittee for the opportunity to testify, and I would be very pleased to answer any questions that the panel may have.

Mr. BORSKI. Thank you very much, Mr. Hart.

Mr. Hart, in your testimony, you stated that the remote control valves on the ruptured 36 inch pipeline were located 45 miles apart and that the 45-mile segment of the pipeline had the capacity to hold 12.4 million gallons. Based on your experience with pipelines, is 45 miles an unusually long distance between valves or is it fairly typical in the pipeline industry?

Mr. HART. Mr. Jackson will take that question.

Mr. JACKSON. The spacing of valves, there are no regulations with respect to that. For liquid valves, there are some in the natural gas regulations. But with respect to this, in this area, there are none. The spacing typically has been used depending on what they thought was needed on the length and pumping of the stations.

In this case, the valves were at the pump stations, 45 miles apart, and you needed additional force to get the material through the pipeline.

Mr. BORSKI. The safety board issued recommendations in the past on pipelines which pass through highly populated areas. Does the safety board have any specific recommendations regarding the spacing of these valves either in highly populated or sensitive areas, and what recommendations do you have outstanding that might affect the length of the spacing?

Mr. JACKSON. I think the safety board's history started about 1971 when we said, remote valves should be placed throughout the system. Numerous studies were done in the early 1970s which said they were not cost beneficial. As we entered the late 1980 era and issued recommendations again in this area.

The strategy we used to, hopefully, get some adoption of regulations in this area is they are cost beneficial in the populated areas and where there is possible environmental impact damage. We made those recommendations in 1987. I think RSPA has since done a study which shows that it is feasible in those areas. Of course, Public Law 100–561 indicated that RSPA should go forward in that rule-making process.

Mr. BORSKI. The gentleman from Oklahoma.

Mr. INHOFE. Mr. Hart, your testimony indicated that there are a number of NTSB recommendations that have been made concerning pipeline internal inspection equipment and insulation of remotely operated valves. Could you enlighten the subcommittee as to what the status is of those recommendations, if they have been acted upon, or if there are any outstanding?

Mr. HART. There are some outstanding, but we have deemed the response to be unacceptable. Mr. Jackson can supply the details.

Mr. JACKSON. As a result of the Beaumont, Kentucky Act, we issued 87–6 and 87–6 to RSPA. They replied that they were related to what they were doing. There was no action taken in this area until the 1988 Public Law 100–561. They began a study on the feasibility of requiring operators to use the devices.

That study was completed and submitted to Congress in 1990. Meanwhile, we had additional accidents involving the Southern Pacific in San Bernardino, California. That was the train accident when the pipeline was scraped and it ruptured several days later. We reiterate the recommendation.

Currently there is a MPRM that RSPA has out on internal inspections. We are very concerned with that. It says you should be able to run inspection devices through their lines. There is no requirement that you have to have the ability to get that device into the line and receive it. That is one of the problems we saw in the California accident where they are going to have to run two or 300 miles. And the speed of two or 300 miles per hour, it would take a very long time to get that pipeline opened again.

In 1990, GAO did a study pertinent to natural gas, but much of that occurred to the liquid pipelines. In 1993, they responded to the recommendations of 86 and 87, and the board voted to change that to unacceptable response. We were glad to see the public laws and we were hoping RSPA will see action in this area very soon.

Mr. INHOFE. Let me ask the same question I asked the previous witness. As a responding organization, how would you characterize the efforts and performance of Colonial, of EPA, the State and local entities.

Mr. HART. If I might again, I would like to defer to Mr. Jackson. Thank you.

Mr. JACKSON. At this point, I think it is premature for us to make any statement to that effect. We are still collecting a tremendous amount of data. Typically, the safety board will look at something from two or three different angles or aspects. Until we analyze it different ways, I think it is premature to say how Colonial performed or Fairfax or the water authorities or EPA.

Specifically, we have not even gotten the EPA reports and not gotten into the aspect of litigation, so I think it is premature.

Mr. INHOFE. Then how would you characterize their cooperation?

Mr. JACKSON. We have had tremendous cooperation from them with the material and information we have requested from them. From that standpoint, there has been a good working relationship with all the organizations.

Mr. BORSKI. The gentlewoman from Virginia, Ms. Byrne.

Ms. BYRNE. Are you saying the pipeline rupture was due to mechanical damage but you are not willing to assess when, where or who damaged the pipe?

Mr. HART. No, I think what we have discovered preliminarily is that there are some metal signatures on the pipe that indicate a scraping of metal. It is not that we are not willing, but we are in the process of conducting that examination as we speak, and we are yet not able to determine. If Mr. Jackson has additional details, I would defer to him.

Mr. JACKSON. Before we get to the bottom of that question, we plan to do metallurgy analysis looking at how many fatigue schedules it went through. About 30 percent went through those fatigue signs. We want to try to get an idea for perhaps when the initial mechanical damage occurred. We also want to combine that with all Colonial's flights, where they observed information along the line, somewhat going on. We also want to combine that by looking at this utility data we are still seeking and getting slowly.

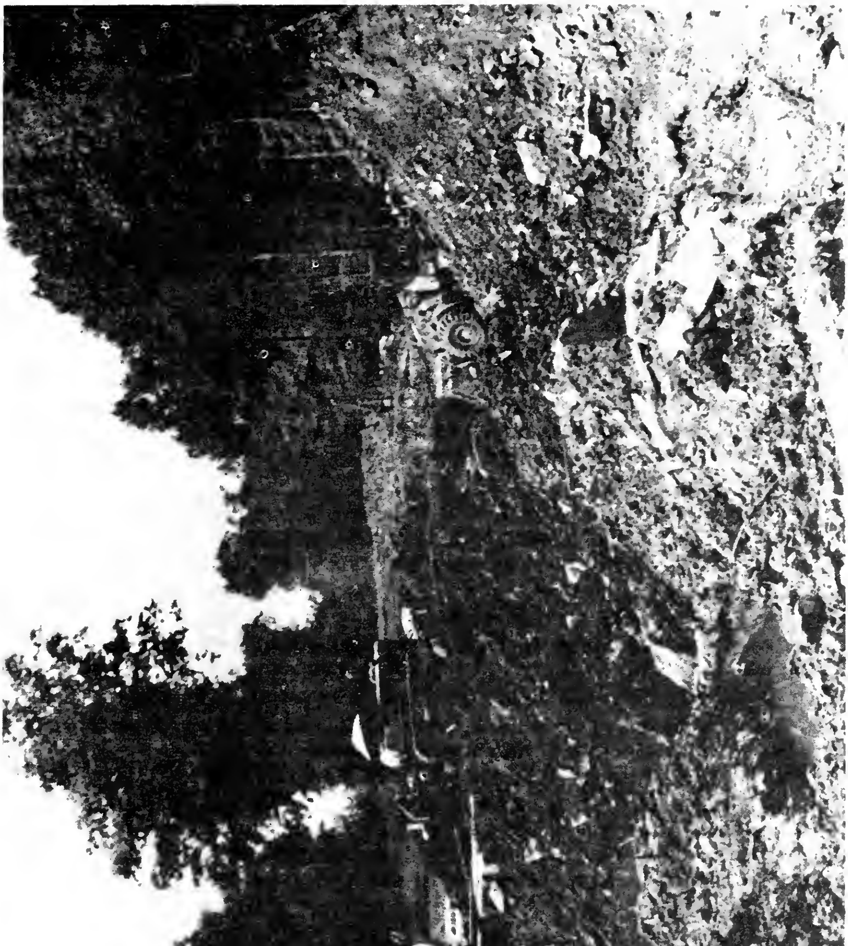
We will also look at Fairfax County permits and we may go into the individual logs for various construction projects along the right of way in that area. That is going to be an intensive effort that will take time.

Mr. HART. That right of way is quite crowded. There are some other Colonial pipelines and other lines overhead.

Ms. BYRNE. I think we should talk about some other right of ways that are there later on this afternoon, too.

The Water Authority of Fairfax County was out at the site during the time this pipe was made and had brought us photos that I am going to share with you and make part of the record and give you a set of them. But it was at the time and the site of the laying of Colonial.

[The photographs follows:]



Ms. BYRNE. The first one, Mr. Chairman, shows an unusual gouge, an indentation at least as this pipe was being laid. I wanted you to have a copy of this and try to determine if you recognize these types of gouges in this pipe as the type of longitudinal gouges that you talked about, because I think it is indicative of something other than a third-party damage. So we will pass these on to you for you to take a look at.

In your other testimony, you also stated that when they dug the pipe up, there were a large number of boulders?

Mr. HART. Yes, rocks and boulders.

Ms. BYRNE. As product oil goes through these pipelines, they vibrate and that is the reason why we really don't want a lot of backfill that has large boulders. There is a standard, I believe, about how big backfill can be in terms of you have to be able to hold it in your hand. Can you help me on that?

Mr. JACKSON. We are not aware of any Federal regulations to that. What we will look at the contract specifications for that. The backfill issue is definitely an area that we will look into in the investigation and determine if that was a role in this accident or if it was a good practice.

We are concerned about this because we looked at the research and data there. We found 51 Colonial accidents in the case and they did talk about them being due to rocks and boulders. So we are interested in that area and we will explore it. With regard to Fairfax, they have provided us with some pictures during initial construction and showed some large rocks and boulders in the area.

Ms. BYRNE. Mr. Chairman, I have two photographs, as I mentioned before, where these pipelines are being laid at the time on the site. It shows the backhoe putting rather large boulders back in the hole around this pipeline.

I will also submit these to the safety board and the committee so they can make them part of the record. We are really not at the point where we can assign what happened in this particular rupture, are we?

When we hear people say there had to be third-party damage during the construction, we are not at that point?

Mr. HART. Given our resources, it will probably be at least a year from the accident until we come up with a completed report and a probable cause determination. In that report, we may also look at other Colonial accidents.

Ms. BYRNE. One last follow-up question, Mr. Chairman. Mr. Chairman, you asked about the 45 miles between the shut-off valves. Is that an average? We talked about no regulations applying. But is there an average? Can you determine what the average is between shut-off valves?

Mr. HART. I will defer on that to Mr. Jackson.

Mr. JACKSON. If we wanted to get some type of feel for that information, we would have to do it on Colonial's basis or perhaps do some kind of inventory and ask a number of companies to provide us information on that. But we ourselves right now do not have that information.

Ms. BYRNE. Thank you. That is all I have, Mr. Chairman.

Mr. BORSKI. Are there any other questions? If not, thank you both for your testimony.

[Subsequent to the hearing, additional question were submitted to Mr. Hart (NTSB). The questions and responses follow:]

QUESTIONS FOR THE RECORD SUBMITTED BY CHAIRMAN BORSKI (NTSB)

1. When the ruptured pipe was excavated, were soil samples taken from below the pipe to determine if product other than diesel fuel was leaking prior to the main rupture?

Response. Soil samples were not taken from below the pipe, since the initial review and field examination of the failure, conducted by a Safety Board metallurgist, suggested that the rupture was catastrophic with no opportunity for a small leak. Later, this field assessment was confirmed by the in-depth metallurgical analysis that was conducted in our laboratory.

2. Were the anomalies discovered in the excavated Colonial pipeline greater than the industry standard of less than 6% of the thickness of the pipeline wall?

Response. Anomalies observed on the pipe included dents, scrapes and a fatigue crack. ASME standard B31.4 (1992 edition), section 451.6.2 defines the limits for removal of pipe. Gouges and grooves having a depth greater than 12.5% of the nominal wall thickness and dents exceeding 6% of the nominal pipe diameter are to be removed or repaired. Since the pipe was 36-inches in diameter and 0.344 inches thick, the dents had to be 2.16 inches deep and gouges and grooves had to be 0.043 inches deep to require removal. The dents, gouges and grooves did not approach these depths and would not have required replacement. The scrape progressed to a fatigue crack that extended to a depth of a third of the wall thickness. If this crack had been detected prior to rupture it would have been removed or repaired based on the ASME standard.

3. One of the central responsibilities of NTSB, as it relates to pipeline safety, is to investigate pipeline accidents in an effort to determine the cause of the accident and to propose safety recommendations to prevent further accidents from occurring. According to your records, of over 2,000 pipeline accidents reported annually, only 25–30 accidents are investigated by NTSB's two pipeline investigators. Does NTSB have the necessary personnel to effectively fulfill its mandated pipeline safety responsibilities?

Response. Currently, there are about 400 pipeline accidents annually that are required to be reported to RSPA by the companies. When the severity of an accident exceeds $500,000, results in a fatality, or an extensive release of highly volatile liquids, the Safety Board investigates the accident. The Safety Board's pipeline investigators conduct 10 to 20 accident investigations annually. In addition, the States or RSPA are requested by the Safety Board to investigate an additional 10 to 20 accidents. Because of changes in the 1992 Pipeline Safety Act, the Safety Board also investigates accidents that result in significant injury to the environment.

The Safety Board does not have sufficient resources to investigate all pipeline accidents. The accidents are screened carefully to determine the severity of the accidents and the possible issues. This screening process allows the Board's limited pipeline investigation resources to be applied to those accidents that have a significant impact on pipeline safety on a national scale. To assist in future investigations that involve significant injury to the environment, as mandated, the Safety Board is seeking an additional position in the fiscal year 1995 budget.

Mr. BORSKI. We would like to welcome our next witness Mrs. Rose A. McMurray, Acting Administrator, Research and Special Programs Administration, Department of Transportation accompanied by Mr. George W. Tenley, Associate Administrator Office of Pipeline Safety.

[Witness sworn.]

TESTIMONY OF ROSE A. McMURRAY, ACTING ADMINISTRATOR, RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION, DEPARTMENT OF TRANSPORTATION, ACCOMPANIED BY GEORGE W. TENLEY, ASSOCIATE ADMINISTRATOR, OFFICE OF PIPELINE SAFETY, DEPARTMENT OF TRANSPORTATION

Ms. MCMURRAY. Good afternoon, Mr. Chairman and members of the committee. I am pleased to appear on behalf of the Secretary of Transportation concerning important issues arising out of the

Colonial Pipeline Company spill of diesel fuel on March 28, 1993, into Sugarland Run in Fairfax County, Virginia. Appearing with me is George W. Tenley, Jr., Associate Administrator for Pipeline Safety.

My testimony follows the format presented in the Subcommittee's letter requesting the Department's appearance. I have provided for the record testimony which outlines the Subcommittee's request. In that written testimony, I discuss our mission, areas of oversight, goals and challenges.

Simply put, our goal is to assure the highest level of public safety and environmental protection at a cost commensurate with real risk. Among the many challenges we face, we believe we must have a comprehensive risk management system. We have plans to use the system to consider the relative risks of all potential causes of accidents and the probability of fluorocarbons.

The pipeline program is in transition as we work toward managing the program on the basis of comprehensive risk assessment. We have basically six areas of operational focus: Data analysis and information systems, research and development, regulatory programs, compliance, training and information dissemination, and emergency response.

The most important element of our risk assessment process, and the one which we acknowledge needs much more attention, is reliable data.

The 36-inch pipeline that ruptured in Reston, Virginia is currently in service at a pressure of 50 percent of its maximum operating pressure.

In accordance with RSPA's hazardous facility order, Colonial submitted a plan for the internal inspection of the pipeline using an instrumented diagnostic device. This is commonly referred to as a "smart pig." Based on negotiations with Colonial, our agency will determine the most appropriate pig to run in this pipeline. We expect to conclude these negotiations no later than next week.

The Colonial incident demonstrates the value of new construction inspections. If we had been able to be on the scene when the 36-inch line was constructed, we would be in a better position today to assure you our construction standards were properly followed.

However, with only two inspectors in 1980 for the entire eastern region, we could inspect very few new construction projects.

Concerned about the environmental impact of the Colonial spill, Secretary Pena, in one of his earliest acts as Secretary of Transportation, directed we review the adequacy of the Federal pipeline program in providing environmental protection. This will quickly result in an action plan ensuring that additional environmental protection measures are put on a priority timetable.

As the Secretary has made clear, the actions we take to meet his strong commitment to environmental protection must be weighed against actions necessary to meet our public safety mission.

The environmental mandate is relatively new to RSPA. An important first step is the identification and rank of those areas of geographical risk of pollution from hazardous liquid pipelines. We are particularly interested in rivers that are sources of drinking water.

Once these areas are known, we will apply our primary regulatory strategy, putting emphasis on prevention of accidents and spills and the maintenance of pipeline integrity. This means keeping the product in the pipe. While spills from pipelines are undesirable, the unfortunate reality is that probably more spills will occur.

To limit the numbers and consequences of these spills, we are looking at putting added emphasis on monitoring and emergency response procedures. In our compliance program, we are assessing means to reduce environmental risk through a redirection of inspection time related to liquid operators, new construction, and field time inspections of pipelines and related facilities.

With respect to the important State programs, we are evaluating the extent of State participation in the hazardous liquid program. We are determining how to enhance our field compliance presence and the number of pipelines inspected by States.

In implementing the Oil Pollution Act, or OPA, we believe we need to reach out to industry and the States to collaborate in a national effort to map pipelines. Also, we want to better support the area of contingent planning efforts for setting environmental priorities.

Historically, accidents like the recent Colonial spill in Virginia have provided valuable lessons. The Federal pipeline program that we have today has been derived from lessons learned from similar accidents which became mandates through past and current pipeline legislation.

We are concerned that lessons learned be viewed in terms of their relative merits. All risks associated with pipeline transportation are not equal.

As we implement the 14 rule-makings, studies, reports and other mandates of the Pipeline Safety Act of 1992, RSPA will prioritize those initiatives based on risk assessment.

As we go through the Oil Pollution Act, we go through areas such as pipeline reauthorization mandates as interrelated to OPA work. Our analysis of OPA response zones involve areas of environmental importance and the means to provide adequate protection whether through protection or response.

With the data provided from OPA response plans, we are beginning work to map geographic information systems to benefit the base program. Since low stress lines are regulated under OPA, we have information on those lines which help us with those mandatory initiatives under the Pipeline Safety Act.

We have advocated a comprehensive approach to management of the program. This requires an effort in which all involved with pipeline safety and EPA join with resources and data to address the causes of pipeline accidents. This requires States availing themselves of the opportunity to assume the broadest possible jurisdiction for overseeing intrastate pipeline regulations.

Government, academia and States must all work together to understand the emerging trend, solve safety and environmental programs, and accept program priorities within available resources.

To achieve the best possible record, we must end the historical and adversarial paradigm of regulator versus the regulated. We stand ready to work with this committee and others to meet their goal.

Thank you, Mr. Chairman. Mr. Tenley and I are prepared to answer any questions that you have.

Mr. BORSKI. RSPA has received numerous recommendations from NTSB, GAO, and others, many of which have not been implemented. Would the Colonial spill or others have been avoided if those recommendations had been implemented? I'm talking about the use of the smart pigs, criteria for hydrostatic tests and installation of remote operated valves?

Ms. MCMURRAY. In each case, there has been some effort that has been undertaken in the Office of Pipeline Safety to study the NTSB studies. Not all of them have proceeded into an actual rule. We have right now a study of the smart pig program as part of our mandates of the 1992 Act.

We have been working collegially, I believe, with the NTSB in making progress in each and every one of those areas. While we wish we could report more closed and acceptable actions from the NTSB, we still would assert we have been working with them to proceed to the goal of mitigating the pipeline problems we have in this country.

George may want to add to that.

Mr. TENLEY. If all those means were in place, then I would have to say, yes, you would reduce the number and consequences of spills. To the extent they emanate from NTSB recommendations, to determine the probable cause of an accident, we have to look at these issues and others. Sometimes that slows us down.

Mr. BORSKI. What is the status on the emergency slow flow restriction devices required by the Pipeline Safety Act of 1992? Would these have made a difference in Northern Virginia?

Ms. MCMURRAY. We had a report issued in 1991 on that subject, I believe. We are currently considering how we might proceed with the recommendations in that study.

Mr. BORSKI. Would you care to comment if they would have made a difference in this particular incident?

Mr. TENLEY. I don't believe it would have. Clearly, again, you can say that 45 miles is too broad a distance in that area for remotely controlled valves and they should have been closer, but in determining where to put them, you have to consider topography of the land and other things. You still would have had a drainage if they were closer. You have to consider these issues in how to place your valves.

Mr. BORSKI. What is your opinion of the unified command response to the March 29 spill?

Ms. MCMURRAY. Being someone in an acting capacity, I had my first experience with responding to a major oil spill. It seemed to me there was a great deal of cooperation, collegiality and communication.

Our office dispatched to the scene right away, an inspector from the eastern region. He reported back to us on the response by the county and the Coast Guard. And other jurisdictions were nothing short of a case study in regional cooperation.

Mr. BORSKI. The gentleman from Oklahoma?

Mr. INHOFE. I have no questions.

Mr. BORSKI. The gentlewoman from Virginia.

Ms. BYRNE. It is my understanding that for an anomaly in a pipe to be required to be fixed by your office, it has to be 6 percent of the thickness of the pipe.

Is that correct?

Ms. MCMURRAY. I believe that is the engineering standard that we adhere to and implement.

Ms. BYRNE. In the safety board's testimony, they talked about the pipe having dents and scratches that exceed this threshold. I assume you didn't know they had dents and scratches that exceeded 6 percent?

Mr. TENLEY. We are aware from our examination conducted with NTSB and Colonial that any of the dents in the pipeline in that range were repaired. It is news to me that there was a large number of impairments. I will look into that information.

Ms. BYRNE. How large does a spill have to be before it is reported to you?

Mr. TENLEY. Irrespective of injuries or cost damage, it is 50 barrels.

Ms. BYRNE. Ms. McMurray, you stated in 1980 you only had two inspectors for the whole eastern region?

Ms. MCMURRAY. That is right.

Ms. BYRNE. So this pipe, as it was laid, was not inspected by you. There is no evidence of that in your office or in your files?

Ms. MCMURRAY. I understand that we did not have an inspector on-site.

Ms. BYRNE. In researching what happened here, do you know if anybody did an inspection as this pipe was put down?

Ms. MCMURRAY. I have to believe that the Colonial Pipeline Company had their staff of experts during construction of the pipe to assure that the pipeline was installed properly. But no, I have no definite reason to know that they in fact had someone on site.

Ms. BYRNE. When we hydrostatically test these pipes after they have been welded and before they go into operation, that is a requirement that we hydrostatically test them; right?

Mr. TENLEY. That is right.

Ms. BYRNE. Who certifies these tests; do you?

Mr. TENLEY. We don't certify them. The operator self-certifies they were performed and we check the records to be sure they were performed. When they do new construction inspections, we can be there during the hydrostatic testing.

Ms. BYRNE. But you were not in that instance?

Mr. TENLEY. No.

Ms. BYRNE. It was reported that that line was inspected weeks before the rupture. Do you have any knowledge of what kind of inspection was done? Do you think that something could have been detected if a full inspection had been done?

Do you remember Colonial said they inspected this pipe a few weeks before the rupture?

Mr. TENLEY. On the 29th, they ran a caliper pig through it. Our inspection in March of 1993 was a standard inspection. We also go out and do field inspections of certain facilities. In this case, we checked the valve on the Virginia side of the Potomac River and it did pass inspection and in fact properly operated at the time of the accident.

Ms. BYRNE. Was this a normal inspection? Did you have a reason to inspect this?

Mr. TENLEY. It was a scheduled routine standard inspection.

Ms. BYRNE. So the valve was okay?

Mr. TENLEY. We looked at the pump station, the records and the valve.

Ms. BYRNE. But no one looked at the pipe?

Mr. TENLEY. No, we would not typically look at the buried pipe.

Ms. BYRNE. Thank you.

Mr. BORSKI. The gentleman from Tennessee, Mr. Duncan.

Mr. DUNCAN. Thank you. I have not been here for the whole hearing and I know very little about pipelines and things of that measure, but I understand the pipeline transportation is, in fact, the safest method of transporting petroleum products; is that true?

Ms. MCMURRAY. Yes. Liquid pipelines carry 50 to 55 percent of the yearly consumption of petroleum products. It is the safest form of transport of those products.

Mr. DUNCAN. I also read in the material here that the Colonial Company—and I certainly have no connection with them—but they transport over 80 million gallons of product a day and they have one of the best records on safety.

Is that true or false?

Mr. TENLEY. It is about 28 percent of the product delivered to the New York area and Northeast. Their record is standard and representative of the industry as a whole.

Mr. DUNCAN. In your testimony, you say, "If we had been able to be on the scene in 1980 at the time the Colonial 36-inch line was constructed, we could have assured that our standards were followed and would have had a better understanding today as to the cause of the accident."

But you are not saying anybody did anything wrong at that time or there was improper construction; is that right?

Ms. MCMURRAY. No, sir. There is no way for us to ascertain that.

Mr. DUNCAN. It is not only possible, but it is highly probable that if an inspector had been there, it would have done no good at all. I mean, the construction would have been the same and you would have found that everything was being done properly.

Ms. MCMURRAY. It is certainly hard to speculate whether all standards would have been met. One would think that, at a minimum, a deterrent factor would be in play. If there had been an inspector physically and visibly inspecting construction practices that there might be, one might surmise that there would be a tendency to protect and comply with construction standards that we have issued.

Mr. DUNCAN. Thank you very much.

Mr. BORSKI. Mr. Tenley, the rules of pipeline safety require that shut-off valves be located on each side of a water crossing that is more than 100 feet wide from high water mark to high water mark unless the Secretary finds the valves are not justified. In the recent Colonial spill, a manual shut-off value was located one and a half miles from the Potomac River on the downstream side of the rupture?

Are there no regulations about how close the valve can be to the river? Is this adequate to protect environmentally sensitive areas and the water supply?

Mr. TENLEY. I think we will look at the valve spacing to see if it is reasonable. A mile and a half from a water source that supplies the water supply that this river provides, we might have to tighten up on that. We don't prescribe in the regulations a definitive standard as to where the valve is placed.

Mr. BORSKI. Are there further questions? If not, thank you very much for your testimony.

[Subsequent to the hearing additional questions were submitted to Ms. McMurray. The questions and responses follow:]

U.S. Department
of Transportation

Research and
Special Programs
Administration

The Administrator

400 Seventh Street, S.W.
Washington, D.C. 20590

AUG 11 1993

The Honorable Robert A. Borski
Chairman, Subcommittee on Investigations
and Oversight
Committee on Public Works and Transportation
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

The Research and Special Programs Administration (RSPA) appreciated the opportunity to appear before the Subcommittee on Investigations and Oversight on May 18, 1993, to testify on the Department of Transportation's actions following the March 28, 1993, Colonial Pipeline Company spill of 400,000 gallons of diesel fuel into the Sugarland Run.

RSPA has completed an environmental examination of the hazardous liquid pipeline safety program directed by Secretary Peña following the Colonial spill. A plan of action is currently undergoing review within the Department. Please be assured that RSPA intends to proceed proactively in implementing measures to prevent environmental damage caused by pipeline spills.

Our answers to additional questions are enclosed for inclusion in the hearing record. If we can be of further assistance in this matter, please contact me or Ms. Patricia Klinger, who handles our congressional inquiries, at (202) 366-4831.

Sincerely,

Rose A. McMurray

Rose A. McMurray
Acting Administrator

Enclosure

OFFICE OF PIPELINE SAFETY ANSWERS TO QUESTIONS FOR INCLUSION IN THE COLONIAL PIPELINE PUBLIC HEARING RECORD

QUESTION:

Section 202(j) of the Pipeline Safety Reauthorization Act of 1988 stipulated that the Secretary establish minimum standards requiring operators of pipelines to submit an inventory of all pipes in the operator's system, along with additional information such as the pipe material history and the leak history. The inventories were required to be submitted to the Department of Transportation's Office of Pipeline Safety no later than October 31, 1988. What is the status of this mandate by Congress?

ANSWER: A Notice of Proposed Rulemaking (NPRM) that would establish the inventory requirement has been approved by the Office of the Secretary of Transportation. The notice is now being considered by the Office of Management and Budget (OMB) under Executive Order 12291. We will publish the notice for public comment as soon as OMB grants approval under the Executive Order.

QUESTION:

Without the benefit of information regarding pipeline age, material, leak history, and inspection and operation data, what criteria does OPS use for assessing risk in implementing its risk based pipeline inspection program?

ANSWER: As of August 1, 1990, the Office of Pipeline Safety (OPS) transitioned from a resource based inspection plan to a risk based inspection plan. This risk based plan was sent to the Chairman of the House Appropriations Subcommittee on Transportation on May 30, 1990. The risk based plan currently used by OPS does incorporate limited leak history as well as accident data, OPS inspection history, and operator compliance history by utilizing, as a management tool, our Pipeline Inspection Priority Programs (PIPP 1 and 2) computer programs. OPS recognizes that PIPP has limitations caused by the absence of certain information. As noted in the answer to the previous question, OPS has developed an NPRM which proposes that operators be required to submit definitive information on pipeline age and material, along with additional leak history. The NPRM also proposes that hazardous liquid pipeline operators would be required to provide OPS annual reports for the first time on the characteristics of their pipelines. (Gas distribution, transmission, and gathering system operators have been providing annual reports since 1970.) OPS will incorporate the additional data into its risk based plan after the rule becomes effective.

QUESTION:

What criteria does OPS use in issuing Hazardous Facility Orders? What type of follow-up is there to ensure that the companies have complied with the order?

ANSWER: Hazardous Facility Orders are issued where a likelihood of serious harm to life or property may exist. OPS employs site inspections and documentation reviews to ensure compliance with Hazardous Facility Orders.

QUESTION:

In 1987, the National Transportation Safety Board recommended that OPS develop criteria for determining safe intervals between hydrostatic pressure testings. What is the status of OPS's response to this recommendation and when does OPS plan to develop and issue such criteria?

ANSWER: OPS does not believe a blanket requirement is warranted to include criteria for determining safe service intervals between hydrostatic tests. Available data do not support a positive cost-benefit ratio, limiting the chances for a viable rulemaking to implement the National Transportation Safety Board's (NTSB) recommendation. In an attempt to resolve the difference of opinion with NTSB, a representative of OPS met with a representative of NTSB on February 18, 1993, to discuss the disposition of the recommendation (Recommendation P-87-23). The two representatives were in general agreement that there is not a need for hydrostatic retesting of all pipelines. They also agreed that risk assessment of pipelines or pipeline segments based on such factors as type of and age of pipe, leak history, fluid transported, personnel training, control systems, population density, and environmental conditions should be used on a case-by-case basis to determine when and if a pipeline should be hydrostatically retested and the period between retests. As a result, we do not intend to develop criteria for determining safe intervals between tests.

Currently, OPS is developing a process for prioritizing risk and a plan of action for using this information to develop an agenda for the OPS regulatory and compliance program. This process is expected to be completed by the end of 1993, and we will then assess the priority of developing safe intervals between hydrostatic pressure testings.

QUESTION:

Hydrostatic pressure testing is the only method which tests pressure integrity and can detect defects caused by railroad fatigue and by fluctuating pressures which are common in hazardous liquid pipelines. Opponents of hydrostatic pressure testing argue that the tests can cause damage to the pipeline which can later cause the pipeline to fail. In the opinion of OPS, is this a valid argument against the use of hydrostatic pressure testing, or should regular hydrostatic testing be required of pipelines which are located in high density population and environmentally sensitive areas?

ANSWER: OPS agrees that hydrostatic testing is the only method which tests the pressure integrity of a pipeline and can detect longitudinally oriented cracks, such as those defects initiated by railroad fatigue and grown by fluctuating pressures which are common in hazardous liquid pipelines. Currently, instrumented inspection devices (smart pigs) are not capable of reliably detecting longitudinally oriented cracks in pipelines. Opponents of hydrostatic testing technically are correct that such tests can damage the pipeline and later cause the pipeline to fail. However this damage and subsequent failure, commonly called "pressure reversal," is infrequent. The damage may occur at defects nearly large enough to fail during testing and depends on the pressure level and the length of time at pressure during the test.

In the opinion of OPS, the benefit of removing defects large enough to fail during hydrostatic testing far outweighs the minimal risk of a failure attributed to pressure reversal. Hydrostatic testing is the preferred action, especially for pipelines that have a history of a sequence of failures at similar cracks that have grown by fatigue.

QUESTION:

Is there any type of leak detection system that has a reasonable chance of detecting the leakage from a crack before the crack reaches the "critical crack stage" and the line grossly ruptures?

ANSWER: At this time, there is no leak detection system that can detect the small amount of leakage which occurs from a crack. Industry has extensively compared pipeline failures resulting from leaks versus failure resulting from ruptures. The conditions that exist in a pipeline may lead to either a leak or a rupture, but in almost all cases, a leak is not followed by a rupture. Therefore, it is incorrect to conclude that the detection of a leak will prevent a rupture. Typically, ruptures occur without a prior leak at the rupture site. Engineering calculations in the field of fracture mechanics are available to estimate the likelihood that a defect will leak versus rupture if sufficient data are known regarding the pipeline materials and operation.

QUESTION:

When the ruptured pipe was excavated, were soil samples taken from below the pipe to determine if product other than diesel fuel was leaking prior to the main rupture?

ANSWER: No, soil samples were not taken. However, OPS believes that the pipeline was not leaking at this location prior to the incident based on a review of Colonial's operating pressures and the factual report issued by NTSB's metallurgist.

QUESTION:

Please describe what Supervisory Control and Data Acquisition Systems (SCADA) are and how their use might affect pipeline operation. Also, please provide information as to the extent that SCADA is currently employed by the pipeline industry.

ANSWER: SCADA systems are installed on many pipelines utilizing computer technology to analyze data, such as pressure, temperature, and delivery flow rates, as the data are continuously gathered from remote locations on the pipeline. Computer analysis of these data is utilized in day-to-day operating decisions on the pipeline and to provide input for real-time models of the pipeline operation which can identify, size, and locate leaks.

The American Petroleum Institute conducted a survey of hazardous liquid pipeline companies regarding the use of SCADA systems with a leak detection system (Analysis of a Software-Based Pipeline Leak Detection Systems Survey; February 20, 1991). One hundred fifty-five companies, representing most of the hazardous liquid volume transported by pipeline, reported that about 50 percent of those companies had SCADA with a leak detection system.

QUESTION:

Virginia is part of the Office of Pipeline Safety's Eastern Region which includes 13 other states. How do three inspectors effectively cover 14 states? What is the percentage of inspections in which serious violations are observed by the inspectors?

ANSWER: The Eastern Region annually prioritizes its inspections according to the risk based inspection plan referenced above. Accident investigations and follow-up inspections to assure that the operator takes adequate remedial measures after an accident always have highest priority. It is estimated that the Eastern Region can inspect all current jurisdictional inspection pipeline units on the average of a 2.5 to 3 year interval. Operators identified as highest risk will be inspected at least annually. The average inspection interval will increase when OPS begins to regulate hazardous liquid pipelines operating below 20 percent of specified minimum yield strength. It is estimated that with this new jurisdiction the average interval of inspection will be approximately 4 years. On approximately 33 percent of our inspections, probable violations of the safety code are found.

QUESTION:

Does a pipeline that extends through several regions over numerous states, such as the Colonial pipeline, cause any special inspection and enforcement difficulties given the limited number of inspectors available?

ANSWER: No, Colonial extends through three of our regions and each region is responsible for inspection of Colonial pipeline facilities in its territory. Regions share information about operators, including those operating in more than one region, by utilizing our computer system and by requiring all regions to send copies of accident reports and enforcement actions to all other regions.

QUESTION:

There is great concern among the residents of the Sugarland Run area who claim there is insufficient care in the planning, siting, construction, and operation of pipelines. How would you reassure these people?

ANSWER: The Hazardous Liquid Pipeline Safety Act does not provide the Department of Transportation with the authority to approve the routing of pipeline. The Act also does not provide the Department with the authority to regulate land use along pipeline rights-of-way. These activities are generally the responsibility of state or local government authorities.

OPS does regulate the design, construction, operation, and maintenance of pipelines. OPS has issued a Hazardous Facility Order to Colonial for its 36-inch pipeline which restricted the operating pressure to 50 percent of the maximum operating pressure between Chantilly, Virginia, and Dorsey Junction, Maryland. The Order also required Colonial to develop an internal inspection plan for this section of pipeline. On June 4, 1993, OPS accepted the internal inspection plan. Two separate internal inspection tools (pigs) have been run. The first pig (magnetic flux leakage tool) was run on June 26, 1993. The second pig (slope/deformation tool) was run on July 16, 1993. The results of these pig runs will be graded by the third party vendor in Houston, Texas. The final graded logs will not be available until after mid-August. OPS has observed all phases of these pig runs, reviewed the raw data collected, and will review the data from the pig-run graded logs. OPS will be present to inspect the pipe at all excavations of pipe resulting from the graded logs. OPS will not allow the operating pressure in the pipeline to be increased until all required repairs have been made to the pipeline, based on data from pig runs. OPS has determined that no further remedial actions are necessary.

QUESTION:

The Oil Pollution Act of 1990 required pipeline operators to submit emergency response plans by February 18, 1993. Facing an overwhelming backlog of rulemakings and studies, how does OPS plan to ensure that these plans receive the necessary review and evaluation.

ANSWER: When we were delegated the Oil Pollution Act (OPA) responsibilities, we formed an interdisciplinary team from within our base program resources. This team has worked closely with other federal agencies having OPA responsibilities to deal most effectively with regulatory and implementation issues. The Coast Guard, in particular, has provided significant assistance.

We have requested $2.5 million in Fiscal Year 1994 for contract support to undertake analytical tasks which will greatly assist our internal approval process. These tasks will include analyzing plans to determine minimal adequacy and areas of suggested improvement, performing a quality control check on operator-provided data and assumptions, analyzing impacts and consequences of spill scenarios, and identifying the location of pipelines in relation to environmentally sensitive areas and drinking water intakes.

Further, the results from analysis of these response plans required by OPA will provide data useful in completing other studies and rulemakings that are part of our base program activities.

QUESTION:

Could stiffer requirements for self-policing and more frequent inspections by the pipeline operators substitute for a lack of federal inspection resources? Are adequate resources devoted to pipeline safety?

ANSWER: As part of the growing emphasis on performance measurement and reinventing government, OPS will be exploring the possibility of using a pipeline operator's existing internal audit program, or lack of such a program, as an additional input to PIPP with the intent of improving our inspection prioritization process.

In the meantime, OPS has developed changes in its compliance program that will result in more effective inspections. OPS intends to include coordinated inspections (involving more than one OPS region) of an interstate pipeline operator's Operation and Maintenance (O&M) plans at the operator's headquarters. OPS believes this change will result in improved safety and environmental protection because of the time spent observing actual field conditions instead of repetitive O&M plan review which often results in only "paperwork" violations. OPS is planning to implement this new procedure in Fiscal Year 1994.

The pipeline safety regulations are written as performance standards. They set a minimum level of safety to be attained, allowing the pipeline operator discretion as to the method and frequency of inspection and testing to assure the safety of the operator's pipelines. We expect an operator to exceed the minimum level, where appropriate, based on the operator's determination of the condition of its pipelines. During our standard inspections, we ascertain whether an operator's O&M procedures, including its inspection and testing programs, are adequate to assure the safety of its pipelines.

In addition, OPS may require an operator subject to compliance action to conduct an Operational Reliability Assessment (ORA) of its pipeline. The ORA determines the need for and frequency of additional inspections to be conducted by the pipeline operator to assure the safety of its pipeline.

The combined resources of federal and state pipeline safety operations are believed to be adequate for pipeline safety. Federal inspection resources are allocated using a risk-based inspection plan. Increasingly, states are also using a risk-based plan to establish inspection intervals and priorities.

QUESTION:

Section 7005 of the Consolidated Omnibus Budget Reconciliation Act of 1985 allows the Secretary to assess and collect annual fees from the pipeline industry to fund the cost of the pipeline safety program. Have the fees been increased since the enactment of the 1988 Act to cover the cost of achieving the pipeline safety goals of Congress?

ANSWER: Yes, the fees have increased. The dollar/per mile assessment for both gas and liquid pipelines for the last 3 years follows:

Year	Gas	Liquid
1990	$29.22	$ 9.28
1991	30.57	13.53
1992	43.64	17.88

QUESTION:

What criteria does OPS use in determining whether and how much to fine pipeline operators whose pipelines have ruptured?

ANSWER: If a violation of the pipeline safety regulations has occurred as a result of a pipeline accident, the pipeline operator is subject to compliance action. The nature and circumstances of the violation would determine the type of compliance action appropriate to assure the safe operation of the pipeline system. Civil penalties are limited by statute to a maximum of $25,000 a day for each violation and a total of $500,000 for any related series of violations.

In assessing a civil penalty, the following must be considered: (a) the nature, circumstances, and gravity of the violation; (b) the degree of culpability; (c) the history of prior violations; (d) the ability to continue in business; (e) any good faith in attempting to achieve compliance; (f) the ability to pay the penalty; and (g) such other matters as justice may require.

QUESTION:

Please explain how the membership of the Technical Pipeline Safety Standards Committee is determined. Are members prohibited from having a vested financial interest in the pipeline industry while serving on the board?

ANSWER: As directed by Congress, the Research and Special Programs Administration (RSPA) consults with representatives of the National Association of Regulatory Utility Commissioners and National Association of Pipeline Safety Representatives in filling government vacancies on the Committee and with industry representatives (e.g., American Petroleum Institute, American Gas Association) in filling industry vacancies. RSPA consults with other associations, such as the National Association of Corrosion Engineers, Wilderness Society, and National Fire Protection Association, in filling public vacancies.

Committee members are generally not prohibited from having a vested financial interest in the pipeline industry since by definition members must be experienced in the safety regulation of pipeline transportation or technically qualified by training, experience, or knowledge in one or more fields of engineering applied in pipeline transportation. The Pipeline Safety Act of 1992, however, now requires that at least one of the public members should have no financial interest in the pipeline, petroleum, or natural gas industries.

QUESTION:

What is the reason behind proposing to relax the threshold reporting requirements for hazardous liquid pipeline accidents by raising the threshold from $5,000 to $50,000? Is damage to the environment calculated in this figure?

ANSWER: President Bush's moratorium to review and revise existing regulations to eliminate unnecessary and overly burdensome requirements encompassed a review of the telephonic reporting requirements for hazardous liquid pipeline accidents. Because the $5,000 reporting requirement requires the reporting of minor accidents, RSPA proposed to increase the reporting threshold to $50,000, the same level as required for natural gas pipelines. Other reporting criteria will remain the same, assuring the reporting of significant accidents. These criteria require accidents to be reported that involve death of any person; personal injury requirng hospitalization; fire or explosion; or pollution of any stream, river, or similar body of water. Environmental clean-up and recovery of lost product are included in the threshold amount calculation.

QUESTION:

How do you respond to Mr. Robert Rackleff's assertion that "The zeal of pipeline companies to prevent state regulation of pipelines has ensured that the OPS program with state regulators will not expand in coming years?" Has OPS encountered substantial lobbying by pipeline companies opposed to self-regulation by states?

ANSWER: RSPA disagrees with Mr. Rackleff's assertion. Over the last several years, OPS has very actively promoted expanded state safety jurisdiction to cover all intrastate gas and hazardous liquid pipelines as part of the phase-in of a performance-based formula for allocating grant funds to state pipeline safety programs. RSPA is not aware of any industry lobbying efforts to reduce or dilute state regulation of pipeline safety.

QUESTION:

Are states allowed to create and enforce environmental and safety standards that are more restrictive than those of the federal government in order to protect sensitive and unique environmental and cultural resources from damage from pipeline accidents.

ANSWER: The pipeline safety statutes provide that an agency of a state that certifies it has adopted and enforces the federal standards, and has assumed jurisdiction over intrastate facilities, may adopt additional or more stringent safety standards for intrastate pipeline transportation, if such standards are compatible with the federal minimum standards. However, no state agency may adopt or continue in force any such standards applicable to interstate transmission facilities.

Further, the Federal Water Pollution Control Act and amendments to that statute by OPA, do not preempt states or political subdivisions from imposing requirements or liability with respect to the discharge of oil or hazardous substances into any waters within a state, or with respect to related removal activities. In fact, many states have enacted more stringent requirements for response planning and exercises and have unlimited liability for costs or damages associated with spills affecting environmentally sensitive areas.

QUESTION:

According to Department of Transportation data contained in the Annual Report on Pipeline Safety, incidents reported to the Office of Pipeline Safety involving natural gas pipelines appear to be on the decline, while incidents involving hazardous liquid pipelines appear to be on the rise. To what do you attribute these differences in trends? Do you agree with Mr. Donald Brinkley of Colonial Pipeline Company who testified that internal corrosion is not a problem in hazardous liquid pipelines?

ANSWER: In 1984, the property damage threshold for reporting natural gas incidents was increased from $5,000 to $50,000 (at present, the threshold for hazardous liquid accidents is still $5,000). That change resulted in a dramatic decrease in the number of reportable gas incidents reported in the 1984-1986 time frame. Since then, there appears to be a continuing decline in the number of reportable gas incidents and an increase in liquid accidents. However, we would be remiss in declaring this a statistically significant trend, since there has been some fluctuation over the years (for example, in 1990, there were 199 reportable gas incidents, but in 1991, 233 gas incidents were reported).

A number of safety initiatives have been implemented over the last several years that may be contributing to the apparent reduction in natural gas accidents--increased use of one-call notification systems to prevent accidents caused by outside force damage, the leading cause of pipeline accidents; enhanced training of federal and state safety inspectors; better education of pipeline operators; and improved safety practices. With respect to liquid pipelines, there is greater recognition of pipeline safety and particularly environmental protection requirements due to new mandates imposed by OPA. The resulting increase in operator awareness of reporting requirements may be contributing to more liquid accidents being reported than would otherwise have been reported.

In 1992, 5 percent of all reportable liquid accidents were attributed to internal corrosion. RSPA will be assessing the relative risk of internal corrosion in its risk assessment prioritization process.

QUESTION:

In your testimony you state that pipelines are the safest form of transportation of petroleum products. Yet Mr. Rackleff states that OPS data on pipeline spills support his assertion that pipelines spill more product than water carriers. How do you respond to this conflicting testimony? Has DOT or OPS conducted a safety analysis comparing different modes of petroleum transportation to support its position? Please provide the data for the record.

ANSWER: Over the years, RSPA has made statements based on data collected by the Department to the effect that pipelines are one of the safest modes of transportation, taking into account the numbers of fatalities, injuries, and property damage. With the increasing focus on the environment, we have become concerned about the lack of data on environmental damage from hazardous liquid pipeline spills. In the past, we have not collected data on gathering lines and lines operating at 20 percent or less of specified minimum yield strength. We are moving toward improving our data collection in these areas. We have been in contact with Mr. Rackleff and are trying to reconcile data differences.

QUESTION:

The ruptured pipeline was under approximately nine feet of fill, which is substantially more than what is required by 49 CFR Part 195 Section 195.248 of the Pipeline Safety Regulations. Section 195.210(b) requires that pipelines be located a minimum of 50 feet from dwellings and buildings where people congregate unless an additional twelve inches of cover is provided. What effect does twelve inches of extra cover have in ensuring public safety when an additional six feet of cover resulted in an accident such as the Colonial spill? Does twelve inches of additional cover justify the construction of a pipeline less than fifty feet to a dwelling? What would the results of the Colonial spill have been if the pipe had ruptured fifty feet or less from the facade of a residential building?

ANSWER: The purpose of adding extra cover over a buried pipeline above the 3-foot requirement is to further protect the pipeline against physical damage from excavation activities, the leading cause of pipeline accidents. Although excavation can damage a pipeline regardless of its burial depth, NTSB has not determined whether the damage to Colonial's pipeline occurred during or after the additional 6 feet of cover was installed. The damage may have occurred during construction of the pipeline, before it was initially covered. Or an excavator at a later date may have damaged the pipeline during other construction activities, including regrading of the overlying terrain, thus adding to the initial cover.

Twelve inches of extra cover does not justify the construction of a pipeline less than 50 feet from a dwelling. Operators avoid locating a pipeline within 50 feet of a building.

Although we can only speculate, if a residential building had been within 50 feet of the Colonial pipeline spill, the results may not have differed significantly from the actual event. The spilled liquid fortunately did not vaporize rapidly. So it did not ignite, which is the main danger presented by spills of flammable liquids near residential buildings.

Mr. BORSKI. We would like to welcome our next witness, Allen Li, Associate Director, General Accounting Office. He is accompanied by Mr. Ron Wood, Assistant Director, General Accounting Office.

[Witness sworn.]

TESTIMONY OF ALLEN LI, ASSOCIATE DIRECTOR, GENERAL ACCOUNTING OFFICE, ACCOMPANIED BY RON WOOD, ASSISTANT DIRECTOR, GENERAL ACCOUNTING OFFICE, BARRY KIME, SENIOR EVALUATOR, AND DR. MANOHAR SINGH, CONSULTANT ENGINEER

Mr. LI. We have a few graphics today that may take us a few seconds to set up.

Mr. Chairman, it is good to see you again. Allow me to introduce my colleagues. On my right is Ron Wood. Barry Kime will be helping us with our graphics. Also with us today is Dr. Manohar Singh, our consultant engineer.

Today we will discuss our September 1992 report which was referred to earlier today on the role that instrumented internal inspection devices can play in improving pipeline safety. While our report focused on pipelines, our reference to smart pigs has bearing on liquid pipelines as well. We will also speak today about the pipeline accident in Reston, Virginia.

A smart pig is the only pipeline inspection technique that can detect internal and external corrosion without excavating the pipe. In front of me is a photograph of a smart pig. This device is propelled through the pipeline to detect flaws like gouges and dents.

Our other photograph shows the capability of this technology. At the top is a photograph showing the corroded section of pipeline. At the bottom is a strip chart that shows the results of the smart pig identifying the location of corrosion.

Pipeline corrosion is the second leading cause of natural gas pipeline incidents. Damage caused by accidental excavation is the number one cause. However, smart pigs do have their limitations. They cannot detect defects such as longitudinal cracks and metal loss in pipe welds.

Furthermore, while many pipelines can accommodate smart pigs, others cannot because of sharp bends in the pipeline. Those responding to our survey reported that in 1991, the per mile cost of using smart pigs ranged from $650 to $2,400.

As you heard today there are currently no Federal regulations governing the use of smart pigs or the frequency of smart pig inspections. In addition, there are no Federal regulations setting forth, frequency criteria for when pipelines must be hydrostatically retested or requiring installation of remotely controlled operating valves. The absence of Federal regulations cannot be attributed to the lack of recommendations.

As you just heard, NTSB has investigated numerous pipeline incidents and has made several recommendations aimed at enhancing pipeline safety. They recommended that new or replacement pipelines be capable of accommodating smart pigs. They recommended that RSPA require installation of remotely-operated valves on pipelines that transport hazardous liquids.

In response to our report recommendations, RSPA issued the feasibility study on smart pigs. Also, they have initiated a rule-making to develop the regulations mandated by the 1988 act. This requires pipelines to accommodate smart pigs.

My final point: The Colonial Pipeline Company plans to use smart pigs as part of their agreement with RSPA. In response to the hazardous facility order it received after the Reston spill, Colonial submitted a plan stating that it would inspect the pipeline segment between Chantilly, Virginia, and Dorsey Junction, Maryland with a caliper pig. The caliper pig may identify dents, wrinkles, and flat spots. After using the caliper pig, Colonial plans to run a magnetic pig.

RSPA told us the Colonial Pipeline Company has made heavy use of smart pigs in the past. They used a caliper pig on this segment in 1989. However, they have never inspected it with a magnetic-flux pig.

Some other matters of interest to the subcommittee: RSPA told us Colonial has not hydrostatically tested this segment since 1980. It does not have remotely-controlled operating valves in the transmission line between the Chantilly and Dorsey pumping stations. Such valves located closer together could have reduced the amount of spill. However, there are no federal regulations requiring the use of smart pigs, periodic hydrostatic testing, or the installation of remotely-controlled valves.

In conclusion, aging pipelines are of concern because there is a higher risk that they will result in incidents. The Reston incident points out that even relatively newer pipelines are subject to failure. The true cause of the failure is yet to be determined. However that incident points to the necessity for pipeline companies to periodically inspect their pipelines to identify defects and flaws and take the necessary corrective action.

We believe our approach incorporating smart pigs can strengthen the federal strategy to ensure pipeline safety and minimize incident damage.

This concludes my statement.

Mr. BORSKI. While natural gas pipelines show a reassuring picture of declining incidents and most incidents are caused by outside forces, hazardous liquid pipes show an alarming pattern of steady increases in incidents during the past three years because of corrosion, defective construction and incorrect operations. What do you think accounts for these different patterns in hazardous gas and liquid lines?

Mr. LI. We did not look into the causes of why hazardous liquid pipelines are having these problems in our report. However, in our prepared statement today, we included a chart that shows the number of incidents in the hazardous liquid pipeline area has been steadily going up.

I speculate that this has something to do with not only increasing housing development near the lines, but also the corrosive nature of the liquids going through the pipelines. It has taken some time for that corrosion to take place and, unfortunately, it may be showing up now.

Mr. BORSKI. In your testimony you say Congressionally mandated regulations have been delayed because DOT is devoting resources to other work? Can you describe what that other work has been and can you give an opinion on the safety benefits of the other work compared with the regulations mandate by the Congress?

Mr. LI. We did not look at the totality of RSPA's work and priorities. When we asked them why there was a delay in conducting the study, they said other priorities were impacting their work. My belief is that RSPA does indeed have, as was indicated earlier, much on their plate. Unfortunately, this is a safety concern that needs to be addressed.

I believe, Mr. Chairman, that the pace at which some of these rule-makings are taking place is much too slow and I believe the subcommittee can help expedite that.

Mr. BORSKI. According to your testimony, Colonial used a caliper pig on this segment of the pipeline in 1989, but the pipeline cannot easily accommodate a magnetic flax or ultrasonic smart pig. Are the launching requirements different for these devices?

Mr. WOOD. My understanding is that caliper pigs have arms on them that can open up to various sizes depending on the pipeline. A magnetic-flux pig can only go thru one size pipeline such as a 32-inch pipeline.

Mr. BORSKI. Mr. Inhofe?

Mr. INHOFE. Thank you, Mr. Chairman.

Mr. Li, in your testimony you stated that the overall safety records of pipelines is relatively good in comparison with other transportation modes of hazardous materials. I assume you have statistical data that backs that up. And when you are comparing to other modes, you are talking about water carriers, per gallon spills, and this kind of statistic to show that this is true?

Mr. LI. Yes, sir. The information actually came from a report written by the Transportation Resources Board. What they did, Mr. Inhofe, is that they compared other modes of transportation that would transport hazardous liquids. We are talking here in terms of a product ton-mile unit. As a result of transportation distances, the pipelines did turn out to be a safer mode of transportation than for example rail cars.

Just to add, the other aspects of safety referred to in that report were on fatalities. The number of fatalities using pipelines was lower than other means of transportation.

Mr. INHOFE. If the Chairman will allow me, it is not directly related, but you might remember. How long have you been in your position?

Mr. LI. I have been at GAO for 14 years, sir.

Mr. INHOFE. You can recall four years ago we had the problem of injecting hazardous waste materials into oil pipelines. Do you remember that incident?

Mr. LI. No, sir, I don't.

Mr. INHOFE. According to your survey, you reported that the cost of using smart pigs with between $650 and $2,000 a mile in 1991?

Mr. LI. That is right.

Mr. INHOFE. Do these cost estimates apply not only to natural gas pipelines, but also hazardous liquids?

Mr. LI. No, they don't. However, hazardous liquid and gas pipelines can both use the magnetic-flux pig. The ultrasound pig needs a liquid medium. So if you are inspecting a natural gas pipeline with an ultrasonic pig, you would have to inject some liquid in it. But it is true, you can use pigs for both liquid and natural gas.

Mr. INHOFE. The range of the $650 to $2,000 is quite a range. Which is more expensive, the use of that device with natural gas or liquid?

Mr. LI. Our report and those numbers you referenced, $650 to $2,400, only dealt with natural gas so I cannot answer from that perspective. However, we do know that the cost is variable. And the reason why it is variable is that the diameter of the pipeline that you are testing has a bearing on the cost. The other variables would be the bends in the pipe, and how much time it would take for you to do the analysis.

These people analyzing the inspection data are paid by the hour. So the longer you run the inspection, the more money it would cost. The level of smart pig competition also has a bearing on the overall cost per mile. If you have many vendors at that point in time who are willing to do the job, then that price will in essence go down.

Mr. INHOFE. Thank you.

Mr. LI. You are welcome.

Mr. BORSKI. The gentlewoman from Virginia.

Ms. BYRNE. Have you done any studies about the cost of periodic pigging of these lines as opposed to the cleanup of the spills?

Mr. LI. No, we have not.

Ms. BYRNE. When we talk about the size necessary for this type of smart pig that you have in front of you there, the reason I understand that it was not used or could not be used on this particular section is that pipe, while it was 36 inches in diameter, had a thirty-two-inch valve on it.

Mr. LI. That is our understanding. We have asked OPS to provide that information and that is correct. There are some changes in pipeline diameter that make pigging very difficult. However, we understand that Colonial has told RSPA that they intend to make the line pig-able.

Ms. BYRNE. Do you know why you would put a smaller valve on a bigger pipe?

Mr. LI. No, ma'am, I don't know the reason.

Ms. BYRNE. When we look at the pipeline regulations, we tend to lump natural gas pipelines in with liquid pipelines. Is there any indication that liquid pipelines of the type that we are talking about are more corrosive, for example, on the interior of the pipe than natural gas?

Mr. LI. Liquid pipelines are more corrosive. The type of material being transported, because of some of the chemicals being transported, will in essence create more corrosion. Water is present in many of these products.

Ms. BYRNE. Would that suggest to you that maybe in terms of standards that we should set separate standards for liquid as opposed to natural gas?

Mr. LI. There are already separate Acts, and the regulations deal separately with liquid and natural gas pipelines.

Ms. BYRNE. Thank you.

Mr. BORSKI. There being no further questions, Mr. Li, thank you for your testimony. It was very helpful as always.

[Subsequent to the hearing, additional questions were submitted to Mr. Li. The questions and responses follow:]

GAO

United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

July 9, 1993

Mr. Jack Wells
Staff Director
Subcommittee on Investigations
and Oversight
Committee on Public Works and
Transportation
House of Representatives

Dear Jack:

Enclosed are our answers to the three questions contained in Chairman Borski's June 18, 1993, letter relating to our testimony on the use of instrumented internal inspection devices in pipelines and on the rupture of the Colonial Pipeline Company's hazardous liquid pipeline in Reston, Virginia. We appreciated the opportunity to testify and hope that the hearings will have a positive impact on pipeline safety.

Sincerely,

Allen

Allen Li
Associate Director,
Transportation Issues

Enclosure

1. <u>Question.</u> Based on GAO's knowledge of the capabilities of instrumented internal inspection devices, and after seeing the anomalies present in the section of the excavated pipeline, could these anomalies in your opinion have been detected by an instrumented internal inspection device prior to the rupture?

<u>GAO Reply.</u> Instrumented inspection devices, such as magnetic-flux smart pigs, are designed to detect pipe flaws such as corrosion, mechanical damage, gouges, and dents. Mechanical damage and dents were evident on the ruptured pipeline. Therefore, we believé an instrumented inspection device could have detected these anomalies. Our view is further supported by a RSPA official. He recently informed us that an official of Vetco Pipeline Services, a manufacturer of instrumented internal inspection devices, examined the ruptured pipeline and stated that an instrumented internal inspection device would have detected the anomalies prior to the rupture.

2. <u>Question.</u> In your testimony you state that a possible reason for an increase in the number of incidents relating to hazardous liquid pipelines is internal corrosion. Mr. Donald Brinkley of the Colonial Pipeline Company testified that internal corrosion has never to his knowledge been a problem with Colonial's pipelines or in the hazardous liquid pipeline industry. How do you respond to this?

<u>GAO Reply.</u> In response to a question at the hearing, I stated that we had not looked into the causes of the increases in hazardous liquid pipeline incidents. I speculated, however, that one possible reason for this increase was internal corrosion. My response was based on incident information reported by pipeline companies to RSPA/OPS which is included in RSPA's annual reports on pipeline safety and the fact that the nation's pipelines are quite old. The RSPA annual reports for 1989 to 1992 show that the percent of hazardous liquid pipeline incidents caused by internal corrosion increased more than any other cause from 1989 to 1991 before decreasing in 1992. Incidents are reported to RSPA when they meet RSPA's reporting criteria and include incidents on any part of the pipeline system, including equipment on tank farms and pump stations.

Our review of incident reports submitted by Colonial Pipeline Company to RSPA from October 1985 to February 1993 showed that Colonial reported seven incidents on their pipeline system caused by internal corrosion. The reports show that the incidents occurred on equipment at tank farms and pump stations as opposed to being on the pipelines themselves. Mr. Brinkley's comment apparently is referring only to the actual pipeline and not the total pipeline system.

3. Question. Mr. Robert Rackleff stated in his testimony that transportation of petroleum products through pipelines is not as safe a means of transport as by water carriers. In your written testimony you state that "the overall safety record of pipelines is relatively good in comparison with that of other modes that carry hazardous materials." What do your data show in terms of comparing pipelines with water carriers?

GAO Reply. My statement was a general comment on the overall safety record of pipelines and not a detailed comparison of the different transportation modes as in Mr. Rackleff's testimony. Also my statement was based on fatalities and injuries incurred by the various modes that transport hazardous materials, whereas Mr. Rackleff's testimony was based on the number and amount of hazardous material spills by the various modes and the resulting damage to the environment. Nevertheless, as discussed below, even though we used different data bases, our supporting data shows that transporting hazardous materials by water carriers was safer than transporting hazardous materials by pipelines, which is in line with Mr. Rackleff's testimony.

My statement was based on a Transportation Research Board report[1] which showed that between 1982 and 1985 hazardous liquid pipeline accidents resulted in fewer annual fatalities and injuries on average than any of the alternative modes transporting hazardous materials except by water. The report goes on to say that when fatalities and injuries (casualties) are adjusted for ton miles of hazardous material product carried, average annual rail tank car and tank truck casualty rates were 100 and 40 times greater, respectively, than casualty rates for liquid pipelines; and that the only safer mode was water tanker. Data in recent National Transportation Safety Board annual reports compare transportation fatalities for all modes and show that the number of pipeline fatalities is small in comparison with other transportation modes.

---

[1] Pipelines and Public Safety, Special Report 219. Transportation Research Board, National Research Council.

Mr. BORSKI. We would like to welcome Mr. Donald R. Brinkley, President and CEO, Colonial Pipeline Company; accompanied by Victor A. Yarborough, Director of Engineering; and Harold R. Melendy, Senior Manager of the Eastern Division.

[Witness sworn.]

TESTIMONY OF DONALD R. BRINKLEY, PRESIDENT AND CEO, COLONIAL PIPELINE COMPANY, ACCOMPANIED BY VICTOR A. YARBOROUGH, DIRECTOR OF ENGINEERING, COLONIAL PIPELINE COMPANY; AND HAROLD R. MELENDY, SENIOR MANAGER OF THE EASTERN DIVISION, COLONIAL PIPELINE COMPANY

Mr. BRINKLEY. Thank you, Mr. Chairman. My name is Donald R. Brinkley. I am the President and Chief Executive Officer of Colonial Pipeline Company.

Colonial is a Delaware and Virginia corporation that operates pipeline facilities through 14 states in the southeastern and eastern United States. Our pipeline system transports nearly 80 million gallons of petroleum products per day to serve the needs of the citizens of these and surrounding states; this amount represents roughly 12 percent of the United States' daily consumption of petroleum products.

In the State of Virginia, the petroleum products delivered by Colonial accounted for approximately 80 percent of the gasoline, fuel oil, and kerosene consumed during 1989, the last year for which consumption data is generally available.

First, Colonial deeply regrets the fact that this incident occurred. We apologize for the inconvenience and concern that this accident inflicted on the community despite our best efforts to mitigate its effects.

At 0848 on Sunday, March 28, our Line 3 suffered a catastrophic failure between Chantilly Station and Dorsey Junction, Maryland. This failure immediately activated alarms in our control center in Atlanta, and the Line 3 controller initiated shutdown of the line from Greensboro, North Carolina.

Chantilly Station was shut down and blocked in at 0850 and Dorsey Station, the downstream station, was run until it went down on low suction pressure at 0855.

At 0905, Colonial received a call from the Fairfax County Fire Department advising us of the leak location. Local response teams were dispatched to the site, the corporate emergency response team was activated, and maintenance and spill contractors were called in, all in accordance with Colonial's Contingency Plan.

At peak activity, we had 110 Colonial employees and 300 contractor employees on scene, along with sufficient equipment to properly mount containment and recovery operations.

I would like to take this opportunity to commend the EPA, the USCG, the Fairfax County Safety Forces, and the other nearly 40 Federal, State, and local agencies who play a role in this response.

Through all of our efforts, I believe that we were able to produce a timely, effective recovery operation that served to mitigate the immediate impact of the spill. Within five days, recovery was essentially complete, with recovery of over 355,000 gallons from a total release of 407,000 gallons. That is a recovery rate of about 87 percent and incidentally it is one that we have experienced in other similar situations before.

Although the product recovery phase has been completed, environmental remediation has just begun and Colonial and its contractors will continue these efforts until the environment has been fully restored.

I presume that the reason for this hearing being convened is to address the questions of what happened and what can we do to prevent another happening. What occurred is painfully obvious to us at Colonial. We have seen this type of damage at Simpsonville, South Carolina; at Orange County, Virginia; at Craney Island, Virginia; at Linden, New Jersey; at Lost Mountain, Georgia, and of course in its most egregious form at Centreville, Virginia.

The cause was third-party damage through improperly operated excavating equipment. In this instance, the culprit looks like a backhoe, judging from the long longitudinal scrapes and the National Transportation Safety Board metallurgical report indicating traces of foreign, high-chrome steel in the origin area. At this point in time, we have no idea as to who might be responsible for these misdeeds, so let's turn to the second question: What can we do to minimize the chances of a recurrence?

We have four suggestions. First, strengthen the one-call systems. Since the advent of these systems in the late 1970s, a lot of third-party accidents have been avoided. But as I recounted in my written testimony, many contractors violate the one-call laws.

The HLPSA amendments of 1992 provide for criminal sanctions that result in serious harm, but these are properly cumbersome. We suggest that DOT be given authority to levy substantial civil penalties for an excavator's failure to use one-call systems, regardless of the damage caused by that failure.

Second, the Oil Pollution Act provides for civil penalties of up to $100 a barrel against the owner or operator of a facility that has an oil spill. The statute should embody the flexibility to impose that penalty upon a responsible party, even if it is different from the owner/operator.

Third, as illustrated by our experience at Centreville, Simpsonville, Lost Mountain, and many other instances, most contractors have no pollution liability insurance and they have assets insufficient to cover damages they are likely to incur in an encroachment incident. The contractor working in or near pipeline easements or the person hiring the contractor should be required to demonstrate proper financial responsibility, including proof of insurance coverage for pollution or environmental damage.

Pipeline operators should be given authority to seek injunctive relief in Federal court to prevent excavation in its easements if third parties cannot provide evidence of financial responsibility.

And fourth, local governments can also play an important role in pipeline safety by using their land use regulatory authority to restrict unnecessary construction in pipeline easements. Pipeline companies such as Colonial have no authority to restrict or bar construction in their easements unless the construction actually interferes with the operation of the pipeline.

If local governments were to consider as part of the approval process for site plans and building permits the need to reduce the number of encroachments into utility easements, pipeline safety would be promoted by reducing the opportunity for third-party damage.

In closing, I would like to stress that when leaks occur, the pipeline operator is in the final analysis one of the most severely damaged parties. Certainly incidents such as the one we are discussing today cost millions of dollars of Colonial's money to correct, but more importantly, they immeasurably damage our corporate reputation. We try very hard to prevent them.

Colonial believes that the lessons of these incidents will likely be that Federal, State, and local governments can do much more to aid pipeline companies in their efforts to prevent third-party damage to interstate pipeline facilities. The efforts of pipeline operators to regularly patrol their lines and to have ground personnel deal directly with third parties who wish to encroach on pipeline rights of way are, of course, our first lines of defense.

However, policies that provide swift and certain penalties against violators of one-call statutes that ensure that only financially secure, reputable contractors work near their utility lines and that promote sensible land use policies near such lines will aid us in the prevention of these accidents.

One last point, Mr. Chairman. You will be hearing later from the Interstate Commission on the Potomac River Basin, which is an entity created by Congress to coordinate multi-State efforts to reduce pollution and the potential for pollution in the Potomac.

For the record, let me state that Colonial was not asked by the commission to provide detailed information regarding its operations in Maryland, Virginia, and Pennsylvania. Since it is a public entity, one would expect that the broad, sweeping, and in some cases erroneous conclusions contained in its testimony were based on sound technical data buttressed by scientific studies or extensive fact finding by the staff.

Colonial stands ready to meet with the commission or any other competent State or Federal authority to discuss our operations. However, we strongly object to some of the conclusions drawn by the commission and question their basis in fact.

We will stand ready to answer any questions that you may have, Mr. Chairman.

Mr. BORSKI. Thank you very much, Mr. Brinkley.

Mr. Brinkley, when you built your 36-inch pipeline in 1980, you were familiar with the Trans-Alaska pipeline which had recently been completed; is that correct?

Mr. BRINKLEY. Yes.

Mr. BORSKI. Were you aware that the Trans-Alaskan pipeline had been designed to be inspected by smart pigs?

Mr. BRINKLEY. Yes, we were.

Mr. BORSKI. Could you tell us why you didn't design your 36-inch line to allow it to be inspected by smart pigs?

Mr. BRINKLEY. Colonial Pipeline Company has probably had as much experience as anyone in the industry in using smart pigs. We began using smart pigs on an extensive basis in 1985 starting with those lines that were the oldest lines in our system.

And we are still continuing a program of running smart pigs in all of our systems and it is now very close to being complete.

We prioritized the lines by a number of criteria, including what lines appeared to have the most corrosion-potential for corrosion damage, which ones were the oldest and hence the coatings were perhaps not quite as good as those newer lines.

The last line in our priority list was line three from Greensboro, North Carolina, to Dorsey Junction, Maryland and the reason for that is that it was our newest line. It is still by pipeline standards quite a new line. It was constructed in 1980 so it is only 13 years old. During that ensuing time as a result of a lot of construction in and around Northern Virginia, we have had ample opportunity to inspect that line visually and we find that the cathodic protection is in very good shape. The coating is in excellent condition and all of those observations gave us every opportunity to believe that we had the lines correctly prioritized.

All of Colonial's system is piggable. Even that line is piggable, but it is not piggable by a magnetic flux pig. We have run caliper pigs, which are just another kind of smart pig. They tell you a few different things.

The reason was that during the time that that line was constructed in 1980, there was a single line. The original 32-inch line that was being used to move products from the Gulf Coast into this part—Northern Virginia and on into New York Harbor, was over subscribed and was being operated at its absolute capacity.

Those pump stations were in use on that 32-inch line until the 36-inch line was completed and then it was cut into alternate pump stations. So it is not a case of having a valve that is 32 inches. It is the case of having pump station piping on this particular segment of the line that is 32 inch rather than 36 inch.

In 1989, Colonial's management devised a plan for the 1990s, a long-range plan that enumerated a number of things that we were going to do to increase the integrity of the pipeline system and to address what we felt were upcoming environmental issues. One of those projects which was in that plan and is still in that plan and was to be completed on an unspecified time frame within that period of time was to modify the line from Greensboro to Dorsey Junction so that we could run a magnetic flux pig in it.

That still is a part of our plan and there is probably some reason to believe that that plan might be somewhat accelerated now.

Mr. BORSKI. Let me ask you, sir, NTSB found a three-quarter inch deep dent on the under side of the pipe 28 feet north of where the rupture occurred. The pipe at that point was resting even though your specifications require one foot of padding on the bottom of the pipe between the pipe and any rock. Can you explain that?

Mr. BRINKLEY. While we attempt to make certain that the pipeline is properly padded when it is being laid in a rocky area, none of those specifications are ever 100 percent successful in keeping pipe, particularly large diameter pipe off a rock.

That particular dent would not have required immediate repair by the standards under which we repair and maintain pipelines. We have—we have had a number of instances, obviously when you have 5,300 miles of pipe, you are going to occasionally find it sitting on a rock.

We have never had an instance where that kind of problem has ever caused a catastrophic failure such as the kind that occurred at Reston. On the other hand, we have had many, many instances where pipe has been damaged either immediately or perhaps as much as 10 years before on the top of the pipe and that is the kind of failure that we have had in this instance.

Mr. BORSKI. Let me ask you if I may in light of the recent accident, does Colonial have any plans to install additional remotely operated valves?

Mr. BRINKLEY. At the moment we don't. Let me speak to that. Remotely operated valves are, at first glance seem to be—and closer valve space, let me take the two things together.

Mr. BORSKI. Please.

Mr. BRINKLEY. Seems to be the panacea for a great number of things. However, the line fill of a 36-inch pipeline is 5,300 barrels a mile so if you had valves a mile apart, it would still be able to spill 5,300 barrels and that is a very big spill.

In liquid pipelines, the valve spacing is not quite as simple as just adding up the volume of product between one valve and the next one because the amount that is released in an accident such as this is composed of two things: The amount of liquid that is released from the pipe in order to reduce the pressure to atmospheric pressure and in this particular instance, at the pressures that this pipeline was operating, that is something like 2,300 barrels.

So even if you had the valves right beside one another and a leak in between, you would still have 2,300 barrels of loss. The rest of this spill is a fact of geography: How much product will drain down from both sides of the place where the leak occurred in order to equalize the pressure?

In this particular case, if there had been a remotely operated valve at Potomac River and if it had been closed immediately at the same time that the rest of the remotely operated valves were closed, it would have made no difference whatsoever in the amount released.

In fact, if we had had a valve three miles downstream and three miles upstream of the leak site, it would have made no difference no matter how fast those valves could have been closed.

So it is—when we are talking about very large pipelines, a breach of a pipeline is going to cause a very large spill, no matter how close the valves are for any practical purposes. Vic, do you have anything?

Mr. YARBOROUGH. I agree with Mr. Brinkley. It all depends on the topography of the pipeline as it goes over hills and in the valleys. Obviously a product will come off the hills and go to the low spots and every accident site is different and every scenario is different. What you can say generally about large pipelines, when you have a catastrophic failure, you are going to have a large amount of product out.

And the ability of this valve to reduce that amount of product out, depends on the specific site and the profile on either side.

Mr. BORSKI. I yield this point to the gentleman from Oklahoma.

Mr. INHOFE. Thank you, Mr. Chairman. Mr. Brinkley, one of the questions that the Chairman asked I thought he might have been alluding to the article that was in the Washington Post today wherein they talk about the Reston spill and this is a quote, "Points up the need to require the same kind of tough pipeline safety precautions along the Potomac River as are in effect on the Alaskan pipeline."

Do you agree with that statement?

Mr. BRINKLEY. No, I don't. And before coming to Colonial Pipeline, I spent nearly 10 years on the owners' committee of the Trans-Alaska pipeline and indeed was chairman of the owners' committee for some period of time.

I don't know where that particular—I don't know where that particular piece of information or misinformation may have come from. I presume it speaks to what we call leading edge flow meters which are installed one at each pump station on the Trans-Alaska pipeline. They are not very accurate flow meters. They certainly don't do anything remotely resembling what the newspaper article purported them to do.

Incidentally, I might, since you have asked the question, let me just make an observation. The only pipeline that I know of that has ever been constructed that had mandated valve spacing was the Trans-Alaska pipeline. And that pipeline has more valves than any pipeline that I have ever seen and they are designed to prevent any spill from being larger than 50,000 barrels.

That is over 2 million gallons so that is what we are talking about.

Mr. INHOFE. Well, I suspected that was the case and I had heard, Mr. Brinkley, that you had a position at one time when the Alaskan pipeline went through. So I appreciate you giving that to us for the record.

You have heard the various regulators who are testifying. Have you been here during the whole hearing this afternoon?

Mr. BRINKLEY. Yes, sir, I have.

Mr. INHOFE. You probably heard that they have almost unanimously said that the pipeline method of transportation is the safest in the industry and I think that certainly is what I have heard and I come from a State where pipelines are very, very prevalent.

The third-party issue that was brought up is kind of interesting to me and I was a little confused because you were not referring, then, to a third party who was hired by your company to do the excavating and the laying of the pipeline but instead some company that disturbed the environment after your pipeline was already in; is that correct?

Mr. BRINKLEY. That is right.

Mr. INHOFE. Could we see the pictures once more that the gentlelady from Virginia was kind enough to share with us? It is very difficult for me not being in the business, not being more familiar with it to identify what was characterized as a gouge as being that, a gouge. Can you look at that from your experience and tell us what that is?

Mr. BRINKLEY. Yes, sir. This is the longitudinal weld in this pipeline.

[Photographs referred to, previously entered into the record, appear beginning on page 33.]

Mr. INHOFE. There is an obvious weld there. We want to make sure that we are looking at the one that is perpendicular.

Mr. BRINKLEY. Yes. This is a girth weld. This is where the joints of the pipe are joined together in the field. This is a longitudinal weld which is the way that the flat plate is bent around and then welded to form a tube in the pipe mill.

Mr. INHOFE. All right.

Mr. BRINKLEY. We don't know where these pictures came from. Obviously they did not come from a site anywhere close to the spill site in Reston, Virginia, because this is a piece of concrete coated half-inch heavy wall river pipe. And I guess the closest place that we can think of that these might have come from would be the Potomac River crossing.

Mr. INHOFE. Well, perhaps the location of where those were taken would be shared with us in just a moment. On the picture that would be the second picture, you have what appears to be a backhoe and was that taken during the laying of the pipeline?

Mr. YARBOROUGH. We are short one picture.

Mr. BRINKLEY. Well, here is a backhoe over there.

Mr. YARBOROUGH. There is another picture that shows the line.

Mr. INHOFE. I was looking at the one that actually has the backhoe in there.

Mr. BRINKLEY. You are probably more familiar with that and the location. Go ahead.

Mr. YARBOROUGH. If I may, this is not a backhoe it is what is known as a drag line. It is a piece of equipment that you may have seen working in and around rivers before. It has a big bucket that is suspended from the boom by cables and generally the—it has another cable that comes toward the cab and the operator can swing the bucket out and let it down on say a river bottom or ditch bottom and then use a cable to pull the bucket towards him and then it fills up with whatever he is excavating, and he picks it up and lays it over to one side.

It is an excavating machine but it is not a backhoe that is typically used in and around water crossings.

Mr. INHOFE. I am referring you to the one that is over here. That is not a backhoe; is that correct?

Mr. YARBOROUGH. This is a backhoe here.

Mr. INHOFE. Yes I thought so. At least in Oklahoma we call those backhoes.

Mr. YARBOROUGH. We call them that in Virginia, too.

Mr. INHOFE. Okay. But the question I have about that is when I looked at the picture, it appeared to me that the excavation had taken place and that there is adequate room in that picture for padding to go back in, the mere proximity of the material that was taken out, shouldn't be a basis to pass any judgment as to whether or not that was used for padding or put back in.

Where in that picture would the padding be located? Somewhere else, trucked in and put in as a normal procedure?

Mr. YARBOROUGH. Our specifications say if it is not available near the right of way, then it has to be trucked in. What we require is where you have rocks in the bottom of the ditch that you put as in this particular construction project, urethane pads approximately every 10 feet and then fill in between the pads with the pad material and in addition, someplaces, we will put another material around the pipe, which is this white stuff, I believe is what we call rock shield, it protects the coating during backfill if there is any, not supposed to have any large rocks adjacent to the pipe but there could be some small rocks in there.

Mr. INHOFE. I thought that was the case and let me just lastly compliment you because in your testimony I wish more of our witnesses would be as specific as to recommendations.

You outline four recommendations and this committee certainly will look at those to prevent things like this from happening in the future.

Thank you, very much.

Mr. BRINKLEY. Thank you, sir.

Mr. BORSKI. I have one question if I could before I go to the gentlewoman. In that picture with the—there is a rock in the ditch and obviously more rock in kind of a fill material. Could you explain to me what would happen? You would fill that area around the pipe first with what?

Mr. YARBOROUGH. Padding material, typically sand or any soft nonabrasive material without any large rocks in it.

Mr. BORSKI. And would that material be used to complete the fill?

Mr. YARBOROUGH. No.

Mr. BORSKI. You wouldn't use any of that at all?

Mr. YARBOROUGH. Wait, this material?

Mr. BORSKI. Yes, whatever came out.

Mr. YARBOROUGH. Once you have a foot of this padding material around the pipe, specifications allow the contractor to complete the backfill with rocks—that is not a very scientific statement, but it says no bigger than one man can carry, okay.

Mr. BORSKI. The gentlewoman from Virginia.

Ms. BYRNE. Well, since you have got the pictures, let's stick with them for a minute. That weld that you spoke of, it is usual to have a weld that is indented from the surface rather than like the weld that connects the two pipes together that is raised?

Mr. BRINKLEY. These are both raised.

Ms. BYRNE. If you look at the shadow, sir, Mr. Brinkley, I think you will see that it is indented, not raised.

Mr. YARBOROUGH. I have to agree with Mr. Brinkley, it looks like it is raised and a typical longitudinal weld. It may be the way the light falls on it when the picture was taken.

Ms. BYRNE. Right. Do you paint over those welds? When you paint the pipe, do you paint over the welds?

Mr. YARBOROUGH. Yes, but that is not paint. That is the coating. The coating was applied in the pipe mill.

Ms. BYRNE. Mr. Brinkley, in your testimony, you have already stated that you were here when Mr. Jackson and Mr. Hart gave their testimony and I asked them specifically who, when, where did the mechanical damage happen?

And they were unable to state with a degree of certainty that you stated in your testimony that was third party and yet you rely on their findings as part of your statement. Were you here when they testified that they could not with any certainty say that it was third-party damage?

Mr. BRINKLEY. Yes, I was.

Ms. BYRNE. Let's talk a little bit about the inspectors. When you put this pipeline down in 1980, did you have an inspector on the site?

Mr. BRINKLEY. Yes, we did.

Mr. BORSKI. What kind of training do these inspectors have?

Mr. BRINKLEY. Basically these are people who have worked for Colonial for a number of years and who have training ranging from being engineers just to years and years of pipeline experience.

Ms. BYRNE. Do we know who the inspector was on this pipeline?

Mr. BRINKLEY. I don't know at the moment, no.

Ms. BYRNE. Do you keep any records of who inspects what pipe?

Mr. BRINKLEY. If we—those kinds of records are not part of the construction records that are required under HLPSA 195, which is the Hazardous Liquid Pipeline Safety Act that governs construction, operation, and maintenance of pipelines.

However, I do believe that we know who the inspectors were. There are a number of inspectors on a pipeline job. There is a ditching inspector. There is a coating inspector. There is a stringing inspector. There is a welding inspector. There is a lowering in inspector. There is a backfill inspector and over them all is the chief inspector.

So there are a lot of inspectors on any given job.

Ms. BYRNE. Well, if you have with some certainty the knowledge of who these inspectors were for the backfill inspector and the ditch inspector, could you give me any idea what kind of training they had for their jobs?

Mr. BRINKLEY. Offhand, I can't, no.

Ms. BYRNE. Okay. Could you get back to us with that information?

Mr. BRINKLEY. Yes.

[The following was received from Mr. Brinkley:]

The following information is submitted in response to Congresswoman Byrne's May 18 question regarding the training of Colonial Pipeline Company's ditch and backfill inspectors.

Colonial used freelance inspectors for its construction projects, as was commonplace in the pipeline industry, until the mid 1970's. These inspectors were typically retired pipeline company or contractor employees with experience in construction. This philosophy changed at the time of Colonial's last major expansion program. It was felt that regular employees, with a direct and long lasting interest in the company, might be more effective inspectors. Dedicated employees with good employment records, who expressed interest in serving as construction inspectors, were chosen for these positions. This policy has served us well, and it remains in effect today.

The ditch inspector on Colonial's 1980 36-inch pipeline construction project was Gary A. Shoemake. Prior to being hired by Colonial Pipeline Company, Shoemake served in the U.S. Army. He attended the army's Aviation School and became foreman of a helicopter repair shop. After receiving an honorable discharge, he worked and became experienced in all phases of home construction. He received an Associate Degree in Business Administration from Kennesaw College in 1976.

Shoemake was hired by Colonial February 28, 1977. He completed the company's Pipeline Operator Training Program in August of the same year. This extensive formal program comprises a combination of written material and practical factors. It familiarizes the employee with pipeline equipment and all facets of operations. Having demonstrated diligent performance in pipeline operations for approximately two years, Shoemake was assigned as ditching inspector on a 40-inch pipeline construction project in Texas from April to September 1979. He completed this assignment in an exemplary manner before returning to his operating position in Atlanta.

Colonial's backfill inspector on its 36-inch pipeline project was Thomas E. Blackstone. Prior to being employed by Colonial, Blackstone was an electrician in the U. S. Navy. He was honorably discharged in May 1969 and entered private industry. He worked as a journeyman electrician and then for a year as a construction foreman.

Blackstone was hired by Colonial March 12, 1979. He, too, completed the Pipeline Operator Training Program. Thereafter, while serving as a pipeline operator, Blackstone completed a Technical Training Program through Cleveland Institute of Electronics. He was promoted to pipeline technician in September 1979 in recognition of his aptitude and achievements.

Both these employees were assigned to the 1980 construction project in March, about two weeks prior to its commencement. This time was used to thoroughly familiarize the inspectors with all aspects of the project under the direct supervision of a highly seasoned Chief Inspector and included a refresher training session for these inspectors with the company's engineering staff. They studied the Construction Specifications, especially the sections that applied to their respective areas of responsibility; ensured their familiarity with the various reports and other paperwork that they would be required to complete on a daily basis; familiarized themselves with the route of the pipeline, both on maps and on the ground; met with contractor representatives; and performed other duties as assigned by the Chief Inspector.

Throughout their construction assignments these men continued to learn from their daily experiences. They were subject to the continuous scrutiny of the Chief Inspector, a Spread Engineer, a Project Engineer, and a Project Manager. Both performed admirably without incident and returned to their normal duties at the conclusion of the project.

Attached are copies of the specifications which governed the activities of these inspectors in the performance of their duties.

SECTION 10

BENDING, LAYING, AND LOWERING-IN

Field Bending

Contractor shall make all necessary pipe bends required in the construction of the line; but, Company may at its option furnish factory bends for installation at points where, in its judgment, the use of such bends is preferable.

Each field bend must comply with the following:

1. The bend must be smooth and uniform.

2. After bending, the pipe must be free from buckling, cracks, or any other mechanical damage and must conform to the profile of the completed ditch.

3. There must be no wrinkle bends or miter bends.

4. Bending through a girth weld is permissible provided:

   a. The longitudinal weld is kept as near as practicable to the neutral axis of the bend, i.e., when placed in the bending shoe the longitudinal weld shall be as close as practical to the three o'clock or nine o'clock position, and

   b. Each girth weld located within the radius of a bend is 100% x-rayed before or after bending. It shall be the Contractor's responsibility to clearly mark this weld to call attention to the need for x-ray.

5. The difference between the maximum and minimum diameter at a bend must not be more than 2-1/2 per cent of the nominal diameter.

6. The wall thickness of the pipe after bending shall not be less than the minimum permitted by the pipe specification.

All bending shall be done by a cold stretch bending method, and due care shall be exercised to avoid buckling the pipe or weakening welds. Any bend that is buckled, or does not fit the ditch to the satisfaction of Company Representative, shall be cut out and replaced at Contractor's expense, and pipe thus removed will be charged to Contractor as damaged material at the delivered cost. In general, the curvature of all bends shall be distributed throughout as great a length as possible. All equipment used to make bends shall be approved by Company Representative. Padded bending dies for the bending machine shall be required at no additional cost if, in the Company Representative's opinion, it is necessary to protect the coating.

Normal tangents of 6 feet shall be left on the ends of all bent joints. No pipe shall be bent in excess of 0.6° per linear foot nor more than 17° per 40 foot pipe joint. Extreme caution shall be exercised in the use of internally expanded mandrel type bending machines so that the diameter of the pipe is not increased. In bending, the difference between the maximum and minimum diameter shall be as stated in (5) above.

Lowering-In

The Contractor may employ any acceptable means of lowering provided that such means secures the necessary amount of pipe centered in the bottom of the ditch and does not injure the pipe or protective coatings.

Whenever possible, pipe shall be lowered into the ditch before the atmospheric temperature exceeds 80° F. Any excess pipe shall be removed by the Contractor by cutting out the excess pipe as directed by Company's Representative and rewelding the resulting two ends of the line together. All pipe installed in the ditch must be installed in a manner that minimizes the introduction of secondary stresses and the possibility of damage to the pipe.

A non-abrasive canvas padded sling or other Company approved device shall be used in lowering all coated pipe sections without injury to the protective coating. Any coating injured in handling or lowering the pipe shall be repaired by the Contractor and left in a condition equal to that of the undamaged coating. Protection shields of plywood (or equivalent material) shall be placed alongside walls of trench containing rock or other hard object. These shields are to be taken out when pipe is not subject to further movement.

All sag-bends and side-bends shall fit the trench neatly, and the inside of all side-bends or over-bends shall clear the side or bottom of the ditch by a minimum of 12 inches. In blasted rock ditch the pipe shall clear both side walls by three feet.

No line shall be lowered into the ditch until Company's Representative has been notified and his approval has been given and the line has been subjected to electrical holiday testing in accordance with Section 9 of these Specifications.

Submerging Pipe

At locations along the pipeline route where concrete jacket is not specified and water in the ditch prevents lowering the pipe, Contractor shall pump the water from the ditch to permit lowering. In lieu of this method, Contractor may, with Company's approval, submerge the pipe by filling it with filtered fresh water. If water is utilized for submerging the pipe, it shall not be removed until after the ditch has been backfilled.

Where factory benda are specified by the Company, Contractor, at no additional charge, shall cut required degree segments from Company supplied standard 3R 30°, 45° and 90° elbows. No segment of a factory bend may be employed where the arc distance measured along the crotch is less than 2 inches. If the internal diameter of auch fittings differs by more than 3/16" from that of the adjoining pipe, the Contractor, at no additional expense, shall prepare and make the transition as shown on Attachment 38 and as specified in Section 8 of these Specifications.

Laying

Each joint of pipe shall be swabbed with an internal line-up clamp or with a leather or canvas belt disc of the proper diameter, to the satisfaction of the Company's Representative, to remove dirt, mill scale and other foreign material before placing pipe in an alignment for welding.

Longitudinal seams shall be on the upper surface of the line and within 30° from top center. Successive joints shall be rotated to right or left to avoid aligning the seams in adjoining joints.

The open end of the line shall be securely closed at the end of each dav's work to prevent the entrance of water, small animals, trash or any other obstructions and shall not be opened until work is resumed. Where the line is left apart at intervals for any reason, both ends shall likewise be securely closed.

Contractor shall pick up, haul and insert in the line short pieces of pipe which have been cut off when tying sections of the line together. These short pieces of pipe shall not be allowed to accumulate but shall be moved ahead and welded in the line intermittently with pipe of the same wall thickness and grade. The shortest pipe pup permissible under these conditions shall be 10 feet in length. With specific Company Representative approval, shorter lengths may be employed when necessary to facilitate tie-ins, etc., but in no case shall pipe less than one pipe diameter in length be installed anywhere in the line.

CAUTION Company may elect to impose additional special conditions, restrictions or limitations on the quantity and length of pup joints permitted, their use in the line, final disposition, Contractor responsibility, etc. Such additional special conditions, restrictions, and limitations shall be set forth in Section 17 of these Speficications.

Pipe Transitions

Company may elect to utilize pipe transition pieces on this project. Welding transition pieces in the line shall be the Contractor's responsibility and shall not be a basis for extra payment. All mainline valves are weld-end and will be supplied with ends to match, or approximately match, adjoining pipe wall thickness. At any location where the pipe wall thickness changes and the difference in thickness exceeds 3/32", and transition nipples are not specified, the Contractor, at no additional expense, shall prepare and make the transition as shown on Attachment 38 and as specified in Section 8 of these Specifications.

SECTION 11

BACKFILLING, RETARDS, CLEANUP

Backfilling - General

No ditch shall be backfilled unless the pipe has proper depth and fit. Absolutely no rocks, hard clods, or other hard objects shall be allowed to remain on or against the coated pipe. No timber, roots, wood, excess coating material, containers, packaging material, metal, or other such items shall be permitted in the backfill. Approval of Company Representative shall be obtained prior to backfilling any section of ditch.

Backfilling - Normal Terrain

Backfilling shall be done in such a manner as to insure filling the space below and up the sides of the pipe to a point at least 12 inches above the pipe with soft, loose earth. The backfill material 12 inches and higher above the pipe shall meet the general conditions above or the specific conditions stated below. Use of auger type backfill equipment is approved and preferred.

Contractor shall employ any acceptable method approved by Company Representative which will insure adequate compaction of the backfill and at the same time not deform the pipe from its normal roundness. Upon completion of the compaction, the remaining backfill shall be spread over the pipeline ditch as shown in Attachment 62, and the earth on both sides of the ditch, which has been disturbed during construction, shall be graded to the satisfaction of the Company Representative, the landowner, or his tenant, and fertilized and seeded when so directed by Company (see "Cleanup of Right of Way" below).

Contractor shall open all natural water courses disturbed by construction. When directed by Company Representative, Contractor shall construct furrows and terraces across the pipeline ditch to divert the flow of water away from the backfilled ditch and into natural drainage courses.

Backfilling - Rock Ditch

All coated pipe, other than concrete coated pipe, installed in a blasted or rock ditch line must be placed on Company approved supports 10 feet on center with 1 foot minimum clearance above bottom of ditch and at a sufficient depth to provide the required cover over the installed line. (See section on "Retards" and Attachment 37 herein.)

Following placement of supports, the ditch shall be filled with soft earth padding to the top of the supports. The pipe shall then be placed on the supports and additional soft earth shall be added in 6" lifts until there is 12" of padding above the pipe. Contractor shall provide adequate compaction on each side of the pipe to prevent "egging" when the ditch is completely backfilled.

In anv area where there is insufficient loose, clean dirt on the right of way for this padding, Contractor shall furnish, haul and place such dirt padding as required at no additional charge to the Company. Backfilling shall then proceed as defined above under "Normal Terrain" with the exception, and at the discretion of the Company Representative, some rock, no larger than one man can carry, may be placed in the backfill after the above mentioned padding is in place. In cultivated areas, no rock shall be placed in the top of the backfill which would interfere with plowing or cultivating. All surplus rock shall be disposed of by Contractor to the satisfaction of Company, landowner, or tenant at no additional compensation.

In a blasted or rock ditch line that cannot be drained, such as small stream crossings, Company may elect to furnish and utilize a "pipe shield" material on the underside of the line pipe. This material will generally be made of polyester, resin, fiber glass, and silicon. It will be supplied by the Company in 1/2" to 3/4" thicknesses, 120°-180° segments, and in random 5' to 10' lengths (see Attachment 69). Contractor shall supply labor to install and necessary banding. Payment for installation shall be on a Unit Price Basis, Exhibit "C".

Backfilling of Public and Private Road Crossings

Where a ditch has been opened across a public or private road or highway, Contractor shall, immediately after lowering in the pipe, backfill that part of the ditch line crossing the roadway. Contractor is cautioned backfill requirements may vary to meet the requirements of County Road Commissioners or the equivalent City, County, State, or Federal officials or private road owners.

In lieu of such special requirements, backfilling of all road crossings not bored shall be performed in the following manner: The backfill under, around, and to a point 6 inches above the top of the pipe or casing shall be of loose earth, free of clods or rocks, and shall be placed in tamped layers not to exceed 6 inches in thickness. Each succeeding layer, to a point 12 inches below the normal road surface, shall be placed in 6" layers, each layer being thoroughly tamped and watered if necessary, but need not be free of rock or clods provided that any rock placed in the backfill shall not exceed 6 inches in diameter and shall be placed in layers with soil or fine rock placed between to fill all voids. On graded dirt roads, the top 12 inches of backfill shall be well graded crushed rock or gravel mixed with clay and placed in the backfill in 4" layers. Each layer shall be thoroughly tamped, using water if necessary, before placing the next layer. On all surfaced roads, which are not bored, the top 12 inches of backfill and the surface shall be replaced in a manner satisfactory to the Company Representative and to the authorities having jurisdiction thereof. Contractor is cautioned that most road authorities will require 90% to 100% compaction which, when required, is the Contractor's responsibility and shall not be a basis for extra payment.

Contractor shall arrange whenever possible to complete all road crossings before the end of the work day to avoid hazards to night travel.

Backfilling - Terraces, Crossings, Drain Tile, Etc.

In backfilling across farm or other terraces or in small stream crossings, Contractor shall backfill as required above and shall restore the terraces and/or banks and, if necessary, shall reinforce the backfill with earth filled bags, sprayed urethane, rock, rip-rap, or concrete headwalls as directed by Company Representative.

Contractor shall repair all drain tile removed or damaged by the method shown in Attachment 70 or by a method approved by Company Representative.

Backfilling - Designated River Crossing

Contractor shall backfill designated river crossings in accordance with the special drawings and/or restriction list provided with same.

Distance Between Rough Backfill and Lowering-In

Contractor shall keep the rough backfill as close as possible to the lowering-in operation and at no time shall the distance between exceed one mile unless specifically approved by Company Representative.

Maintenance of Backfill

Contractor shall at his own expense repair damage to levees, roadways, lands, private driveways, and farm terraces caused by settling or washing along right of way up to and including date of acceptance by Company of work included herein.

Retards

It is the intent of the Company to have the Contractor erect on hillsides or slopes "retards" to prevent the loss of material from the bottom of the ditch line by "washing". Contractor shall provide retards consisting of sand bags or sprayed urethane foam as requested by Company Representative. When Company requests use of sand bag retards, Contractor shall supply the sand bags and erect the retards. In such instances, sand bags two or more high shall be placed completely across the ditch before the pipe is lowered into position. Additional sand bags shall then be placed around, over, and above the pipe. Each retard shall be built completely across the ditch and to the height designated by the Company Representative (see Attachment 64). Company Representative will designate the number and location for all retards. Payment for sand bag retards shall be on a Unit Price Basis in accordance with Exhibit "C".

When Company requests use of urethane foam retards, Contractor shall spray liquid urethane furnished by Company across the ditch line generally as shown on Attachment 63. Pipe shall then be placed on the retard, and Contractor shall spray urethane around the pipe and completely across the ditch and to the height requested by the Company Representative. Any forming material required to attain the height requested shall be the responsibility of the Contractor. Payment for urethane form retards shall be in accordance with Exhibit "C".

<u>Cleanup of Right of Way</u>

As soon as backfill is completed, Contractor shall immediately clean up the right of way, removing to places designated by Company all surplus and defective materials, and disposing of all refuse such as brush, sheet iron, broken skids, enamel, glass fiber, etc., to the satisfaction of Company's Representative. All rock, which has been scattered along the right of way or on property adjacent to the right of way by Contractor's operations, shall be gathered up by Contractor and disposed of by Contractor so as not to cause damage to property of others.

Insofar as possible, the earth on both sides of the pipeline ditch, which has been disturbed during the construction of the pipeline, shall be smoothed up. On all land subject to cultivation, a chisel plow of type acceptable to Company shall be used and the entire right of way plowed to a depth of 10 inches unless the right of way easement specifically omits this requirement. On pasture land, the entire right of way shall be disked and left in a condition satisfactory to the Company Representative. Contractor is to fertilize and seed all distrubed right of way except right of way normally inundated with water or under cultivation. Company will furnish required seed and fertilizer. All temporary fills and bridges shall be removed and cleaned up to the satisfaction of both the landowner and Company Representative.

To control and prevent soil erosion and/or sedimentation at water crossings, Contractor shall erect berms across the right of way near the water's edge on each side of each water crossing. These berms shall be of sufficient height and width to turn water washing down the right of way to right and left, well away from the point where the ditch line enters the water crossing. In certain areas, to further control erosion, washing, and/or sedimentation, Contractor may be required to place straw mulch, baled filter straw, or other Company approved material on the right of way. Payment for mulch and bale placement shall be on a Unit Price Basis in accordance with Exhibit "C".

Company will not prevent Contractor from attempting to clean up on account of weather or ground conditions. If Contractor proceeds with cleanup during adverse weather or when adverse ground conditions prevail, Contractor will assume full risk of acceptance and may be required by Company to again do such cleanup at the Contractor's expense to meet the Company's normal dry weather cleanup specifications.

Repairs to Fences

Upon completion of all backfilling and the cleaning up of the right of way, permanent repairs shall be made to all fences by using new and like kind of fencing materials. Contractor shall furnish and install good pressure creosoted or cedar post of 3" minimum top diameter in all fences except where steel, concrete, or specially constructed posts are encountered, in which case Contractor shall furnish and install such posts. All fence repairs shall be satisfactory to Company, landowner, and his tenant.

It is not the intention of the Company to install permanent gates along the route of the line; however, at some locations landowners may require such gates, and wherever they are necessary, Company's Representative will so advise Contractor. In such cases, Company will furnish gate and gate posts, and Contractor will install and furnish any other material that may be required at no extra expense to the Company.

Distance Between Final Cleanup and Backfill

The distance between final cleanup and backfilling, which shall include all tie-ins, shall not exceed five miles unless approved by Company Representative.

Ms. BYRNE. You had mentioned in your testimony and I agree that the one-call system needs to be tightened up and we mentioned about what local and State and Federal Government can do to prevent these kind of oil spills in the future.

Do you have any things that you want to do within the company to prevent these kind of spills in the future? You have told us what you thought government should do. What should Colonial do?

Mr. BRINKLEY. I think what Colonial has been doing has been quite successful. Unfortunately we were not able to get to this pipeline yet and I have explained how we prioritized the system and why this was put down on our priority list.

But Colonial will continue their program which is not required to inspect these pipelines with magnetic pigs, to repair any anomalies that show up on these magnetic pig runs.

And while I am on that subject, let me set the record straight. There is no problem with internal corrosion in product pipelines such as ours. We have never had a problem with internal corrosion insofar as I know, neither has anyone else in the business.

So the only corrosion—and that is what magnetic pigs are really designed to do is to detect corrosion both internal and external, but in our case internal is not an issue. External corrosion is of course an issue. We have found through this program many places where we needed to repair the pipe and we have repaired the pipe before we had a failure so we have averted many spills through our pipeline pigging program and will continue to do that.

We have spent probably $40 or $50 million over the past five or six years in smart pig inspections, excavations and repair of pipelines.

Ms. BYRNE. How much have you spent on this cleanup so far?

Mr. BRINKLEY. As of March the 5th, we had spent $3.5 million. It will certainly cost between $5 and $10 million before we finish.

Ms. BYRNE. You spent $50 million on pigging and you spent $5 million, was it, on cleanup?

Mr. BRINKLEY. We have spent $3.5 million so far. We have not yet received the expected request for money from the EPA, from the Coast Guard and other Federal agencies and of course we haven't—we haven't begun, really, substantial expenditures for the remediation efforts yet.

Ms. BYRNE. But you haven't spent as much on cleanup as you spent on inspection?

Mr. BRINKLEY. No, we haven't.

Ms. BYRNE. I presume, I am just thinking out loud here, I presume that you get to deduct the cost of cleanup from your cost of doing business; is that correct?

Mr. BRINKLEY. That is right.

Ms. BYRNE. So really those losses are being felt by taxpayers, too, because that is income that would have been there that is not there.

Mr. BRINKLEY. I guess that is true. On the other hand, when we make money, we pay some of it to the Federal Government, so——

Ms. BYRNE. I understand. I understand. You talk in your testimony about the third-party damage and the only construction that took place in this area was seven years ago. I presume that you in those seven years since that construction happened, you did some kind of inspection.

Did you discover anything that would indicate that you had a problem here? Is there anything you could have fixed prior to the rupture?

Mr. BRINKLEY. Certainly if we had known there was a gouge in the pipe, we would have fixed it. We know that gouges in the pipeline make it subject to failure by cyclic fatigue after a long enough period of time.

We did run a caliper pig in this line in 1989. This particular gouge did not show up on the caliber pig chart, although going back and expanding the chart and looking at it very carefully, you can actually see it but you would have to know where to start.

Ms. BYRNE. So you—there was something there you just didn't deal with it at that time.

Mr. BRINKLEY. No, it wasn't—we could not have found it unless we knew where it was.

Ms. BYRNE. Okay. You also state that the damage resulted from third party because of similar scrapes and marks that were found on the adjacent 32-inch pipe. Was this section of pipe replaced when you found these anomalies?

Mr. BRINKLEY. I am sorry the 32 inch?

Ms. BYRNE. One of your reasons for saying it was third-party damage is you found similar marks in the adjacent 32-inch pipe as the marks you found on the 36-inch pipe.

Mr. BRINKLEY. That is right.

Ms. BYRNE. I am asking was that pipe taken out and replaced?

Mr. BRINKLEY. We repaired it with a full encirclement sleeve which is an approved way to repair such a piece of damage.

Ms. BYRNE. You didn't want to take that section of pipe out. I mean if you had one pipe—you had a 36-inch pipe that you just didn't want to put a new section in.

Mr. BRINKLEY. No, the sleeve is as good a repair as taking out the section of pipe.

Ms. BYRNE. Again, we had talked about this pigging and you had mentioned in your testimony before the Chairman that you had maybe some plans about making this pipe piggable.

Mr. BRINKLEY. Making it piggable by magnetic flux tools, yes.

Ms. BYRNE. Do you have any idea what the time frame might be for that?

Mr. BRINKLEY. I don't have—we haven't addressed that at this moment. It could be as early as next year. It depends perhaps on exactly what kinds of materials are required.

We are talking about an expenditure of probably well over $20 million and 36-inch valves are long delivery items, so that would probably be one of the major factors in exactly when we could make this pipeline a single diameter all the way through or make it so we can run a magnetic flux pig in it.

One of the other things that kind of colored our thinking was that during the period of time when we were struggling with the question of are we going to modify this line or how are we going to modify this line, some of the suppliers of smart pigs kept telling us that they were on the verge of being able to develop a pig that would indeed inspect the 36-inch line and go through the 32-inch station piping.

However, they haven't come up with one yet and we are beginning to lose hope that they will. So we will probably have to modify the pipeline to take the large diameter pig.

Ms. BYRNE. Why wasn't that done in the first place since the technology was available? You had the 32-inch station piping and you had a 36-inch pipe and was it just a matter of cost savings, cost cuttings, convenience, what?

Mr. BRINKLEY. No, as I explained earlier and in 1980 when that pipeline was built, this was not proven technology. In fact, it was very unproven technology and the pigs that were available at those times didn't do a very good job, probably gave you more misinformation than information, so it wasn't nearly as important.

We wanted to make sure that we could get cleaning pigs through it. Which we regularly do. We run a cleaning pig through about once a quarter but it was not nearly as important in those days because the technology was not developed to be able to run a magnetic flux pig.

And the reason that they ended up with 32-inch station piping, as I tried to explain, was that this was a parallel line, what we call a loop to an existing line that was being operated at maximum capacity in order to supply the demands for petroleum products in this area and on further into New York Harbor and just didn't have that opportunity to build these stations and modify them, they were just—these stations were cut off at the 32-inch line and tied into the 36.

Ms. BYRNE. Thank you, Mr. Brinkley.

Mr. BORSKI. I thank the gentlewoman. Any other questions? Mr. Brinkley, we have a time problem here. I am going to submit questions to you in writing if I may and appreciate your rapid response if we could.

Mr. BRINKLEY. Certainly we welcome that, Mr. Chairman.

Mr. BORSKI. Thank you very much for your testimony today.

[Subsequent to the hearing additional questions were submitted to Mr. Brinkley. The questions and responses follow:]

Colonial Pipeline Company

QUESTIONS FOR COLONIAL PIPELINE COMPANY AS FOLLOW-UP

TO THE COLONIAL PIPELINE HEARING OF MAY 18, 1993

Q. 1. When do you anticipate completion of the necessary modifications to the 36-inch diameter pipeline so that it can accept a magnetic-flux inspection device?

A. Colonial is pursuing the possibility of having a vendor build a magnetic inspection pig that will traverse this line in its present configuration. If an appropriate pig cannot be built in a timely fashion, Colonial will include the modifications in its capital budget for 1994. Engineering, drawing, and material acquisition will take place in the first half of 1994 with construction in the last half. Modifications should be complete by year end.

Q. 2. Are pipeline companies insured against pipeline accidents such as that which occurred on March 28, 1993? If so, to what extent does the insurance industry provide incentives or requirements regarding preventative spill maintenance of pipelines?

A. Pipelines generally carry insurance to indemnify against accidents similar to the March 28, 1993 event. Specifically, the level of self-insured retention and upper limits of liability coverage vary from company to company.

There are no formal incentives or requirements other than the desire of any businesses to reduce the financial risk associated with an extradordinary catastrophic event. Pipeline companies perceived by insurance markets to be proactive in preventive maintenance, employee training for damage control and spill response, and discovery and remediation of environmental hazards are more likely to find coverage to be more readily available at more stable rates than those who are not as careful.

Q. 3. Does Colonial Pipeline Company have internal guidelines on hydrostatic pressure testing?

A. Colonial hydrostatically tests all new pipe installations in accordance with DOT regulations.

Q. 4. Hydrostatic testing is the only testing method available that can test the pressure integrity of a pipeline and detect defects caused by railroad fatigue and by fluctuating pressures which are common in hazardous liquid pipelines. Does Colonial regularly use hydrostatic testing to test the pressure integrity of its hazardous liquid pipelines? If not, why?

A. As a point of clarification, while it is true that fluctuating pressures are common in hazardous liquid pipelines, those fluctuations are not a cause of pipeline defects. Furthermore, the

Colonial Pipeline Company

existence of defects caused by railroad fatigue is not "common" in hazardous liquid pipelines, although Colonial has experienced this problem with one vintage (1962) of large diameter pipe from a certain manufacturer.

Colonial hydrostatically tests new pipelines in accordance with DOT regulations. Colonial does not regularly use hydrostatic testing to pressure test the pressure integrity of its pipelines because a hydrostatic test does not reveal all defects - only those that are severe enough at the time of the test to fail at or below the test pressure. Colonial feels that because of the cost, the difficulties in acquiring and disposing of water, and the disruption in the supply of refined products to the area served by the pipeline, hydrostatic tests are not warranted unless it is perceived that there exists a number of harmful defects that cannot be detected by some other means.

Q. 5. When Colonial hydrostatically tested the 32-inch line from Mitchell Junction to Dorsey in August and September 1990, the section between Lousia, Virginia, and Remington, Virginia, had a blow out. What was the basis for the decision to test that line? Has the entire length of the 32-inch diameter pipeline been hydrostatically tested since the time of its construction in the 1960's?

A. The basis for the decision to test that line was the occurrence of a pipeline rupture downstream of Louisa in December of 1989. The cause of the failure was attributed to railroad fatigue and was near a similar failure that had occurred in 1980 (both failures involved the previously mentioned 1962 vintage pipe). It was Colonial's contention that, despite the two failures, the railroad fatigue problem was not widespread because pipe loading specifications in effect at the time would have prevented the problem if all rail cars had been loaded per the specifications. Apparently some small number of joints was loaded improperly. Of the 144 miles of pipe tested, the only failure was in the remaining portion of the joint of pipe that had failed in 1980 (at the time of the 1980 failure only the affected portion of the pipe joint had been removed and replaced - the remainder of the joint was examined radiographically but that failed to show small cracks that were present). In summary the hydrotest revealed no additional defective joints of pipe beyond those that had failed in 1980 and 1990.

The remaining length of the 32-inch line was hydrotested when first constructed but not since that time. The pipe in this section is from different manufacturers and has experienced no failures due to railroad fatigue in over 30 years of service.

Q. 6. Colonial provided the Office of Pipeline Safety (OPS) with information that 4,636 miles of pipeline are piggable with a smart pig and that 3,848 miles have been pigged. What internal criteria, factors, or guidelines were considered in deciding to pig the 3,848 miles of pipeline? What is the frequency of inspecting your line with smart pigs?

Colonial Pipeline Company

A. The criteria was simply to start by pigging the older lines first as smart pigs became available. Some lines had to be modified to run the pigs. Inspection of some of the smaller lines had to be delayed until pigs were developed that could negotiate small radius bends. Colonial is still conducting the first round of smart pig inspections. Criteria for future inspections will depend on several factors including leak history, results of the first round of inspections, etc. Colonial expects to be doing some amount of internal inspection every year.

Q. 7. Why was the 36-inch line not caliper-pigged in 1980 when the line was commissioned, as is the practice in the industry, to ensure that the line was free of dents and defects?

A. This line was proven to be free of what would be considered significant dents or buckles by running what is known as a "gauging pig" through the line. This is a pig with an aluminum gauge plate attached to the front. If any significant dents or other reductions in pipe diameter were present the gauge plate would be deformed. It was neither Colonial's practice nor general industry practice in 1980 to run a caliper pig.

Q. 8. Why did Colonial run a caliper pig rather than the more advanced geometry pig (which is fitted with a gyroscope and can detect horizontal and vertical changes in alignment) in the 36-inch line between Chantilly and Dorsey Junction, given that both types of pigs were readily available in 1989?

A. Line 3 from Greensboro Junction, North Carolina, to Dorsey Junction, Maryland, is a 36-inch line with five pump stations. Because these stations were originally constructed to serve an earlier vintage 32-inch pipeline, all of these pump stations are equipped with 32-inch station piping. Both the cleaning pigs that we normally run and caliper pigs such as that run in 1989, can pass through the restricted station piping, whereas more advanced geometry pigs cannot. Furthermore, the only advantage to a geometry pig is that it can detect horizontal and vertical changes in alignment. A pipeline such as Colonial's pipeline in this area, which is buried in stable ground, would not be subject to such changes and we would not consider this data to be of any advantage to the objective of maintaining the pipeline.

Q. 9. Did the pig run identify any of the dents which were subsequently discovered when the pipe was excavated such as the dent which was found on the underside of the pipe?

A. Colonial's requirement to the pig vendor was to identify all dents that were 3 percent of the pipe diameter or greater (1.08" in diameter or greater). Piping codes require that all dents greater that 6 percent be repaired. The report did not identify the dent on the underside of the pipe.

Colonial Pipeline Company

After the Reston accident, Colonial asked the vendor to re-examine the charts and magnify the graphical data in the area of the accident. Once this was done, one could see a small indication that appears to match the location of the dent on the underside of the pipe.

Q. 10. Please describe the specific actions which Colonial plans to take to ensure pipeline safety in high population and environmentally sensitive areas?

A. Those areas which Colonial considers to be densely populated or environmentally sensitive are given extra surveillance and higher maintenance priorities than other areas.

Within the Department of Transportation, the Office of Pipeline Safety is obligated under the provisions of the 1992 Amendments to the Hazardous Liquid Pipeline Safety Act to define those areas and establish further procedures for protecting them if necessary. When those procedures are developed, Colonial will comply.

Q. 11. Mr. Brinkley stated in his testimony: "There is no problem with internal corrosion in product pipelines such as ours. We have never had a problem with internal corrosion insofar as I know, and neither has anyone else in the business." How then do you explain that on page 49 of the Annual Report on Pipeline Safety for calendar year 1991, published by the Department of Transportation, 19 accidents were directly attributed to internal corrosion in hazardous liquid pipelines discharging almost 39,000 barrels of petroleum?

A. Mr. Brinkley's accurately described the situation with respect to internal corrosion in product pipelines. His comment was made in the context of the GAO testimony on using smart pigs to detect internal corrosion. While it is certainly true that internal corrosion is a problem with certain crude oils which may contain fairly substantial amounts of sulphur and water, Mr. Brinkley was reacting to the testimony of the gentleman from the GAO who stated that petroleum products such as those that Colonial pumps are very corrosive. This is simply not the case, as corrosion inhibitors are added to the products before they are shipped on the pipeline. These are the same products that are stored in an automobile's gas tank or home heating oil tank.

Of the 19 accidents attributable to internal corrosion only four involved refined products and only 248 of the 39,320 barrels released were refined products. The remaining 15 accidents and the vast majority of the volume released involved crude oil pipelines.

Of the four accidents involving refined products, three were attributed to water and/or trash in auxiliary lines, which usually are within pipeline facilities such as pump stations and tank farms and involve small fittings susceptible to trapping such water and trash. One was in a tank line and was caused by urea ammonia nitrate solution which had been stored in the tank in times past. None of the four were located in line pipe accessible by smart pigs.

Colonial Pipeline Company

Q. 12. According to data supplied by the Department of Transportation's Office of Pipeline Safety, the number of incidents involving natural gas pipelines appears to be declining, while the number of incidents reported involving hazardous liquid pipelines is steadily increasing. To what do you attribute this increase?

A. This question is probably best answered by the Office of Pipeline Safety. However, from Colonial's perspective we offer the following comments:

The criteria for reporting accidents for liquid pipelines is significantly different from the criteria for natural gas pipelines. Though both types of pipelines have to report any accident involving a death or injury, natural gas lines have to report accidents with property damage over $50,000, while liquid pipelinea have to report any accident with property damage over $5,000. Often in the past, leaks were not reported unless they met the 50-barrel minimum release criteria provided in the regulations. However, the Office of Pipeline Safety has advised Colonial that property damage includes the cost of environmental remediation. As a result, Colonial has been reporting (including making telephonic notice to the National Response Center) small leaks such as one or two barrels because the cost of responding to the leak almost always exceeds $5,000, if one includes environmental costs, even if this involves only testing to prove that contamination was prevented or limited. Other than the environmental concerns, inflation has increased the cost of pipeline repairs but the $5,000 trigger level has been in effect for a number of years and has not been adjusted for inflation. As a result, the statistics for pipeline releases reported to DOT for recent years will be skewed when compared to past years.

Mr. BORSKI. On our next panel we would like to welcome Keith Buttleman, Deputy Director, Public and Intergovernmental Affairs, Virginia Department of Environmental Quality; Dr. John M. DeNoyer, Councilman, Town of Herndon and Chairman, Fairfax County, Environmental Quality Advisory Council; Thomas M. Davis, III, Chairman, Fairfax County Board of Supervisors; and Jerry Garegnani, Chairman, Friends of Sugarland Run.

[Witnesses sworn.]

TESTIMONY OF KEITH BUTTLEMAN, DEPUTY DIRECTOR, PUBLIC AND INTERGOVERNMENTAL AFFAIRS, VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY; DR. JOHN DeNOYER, COUNCILMAN, TOWN OF HERNDON AND CHAIRMAN, FAIRFAX COUNTY ENVIRONMENTAL ADVISORY COUNCIL; THOMAS M. DAVIS, III, CHAIRMAN, FAIRFAX COUNTY BOARD OF SUPERVISORS; AND JERRY GAREGNANI, CHAIRMAN, FRIENDS OF SUGARLAND RUN

Mr. BORSKI. Mr. Buttleman.

Mr. BUTTLEMAN. Thank you. My name is Keith Buttleman, Deputy Director for Public and Intergovernmental Affairs of the Virginia Department of Environmental Quality.

The Commonwealth of the Virginia is vitally interested in the regulation of petroleum pipelines because of our experiences in Virginia with spills. I am here today to briefly discuss the Colonial Pipeline spill near Herndon and a couple of other recent incidents. On the morning of March 28th, 1993 a section of the Colonial Pipeline near Herndon, Fairfax County, Virginia, ruptured, releasing diesel petroleum into the environmental. The spill contaminated about nine miles of Sugarland Run which empties into the Potomac River.

The Fairfax County Fire Department responded immediately and did an excellent job of initial damage control. The Virginia Department of Environmental Quality and the Virginia Department of Emergency Services along with the Environmental Protection Agency and the U.S. Coast Guard Atlantic Strike Force responded immediately as did the pipeline company with their own personnel and several cleanup contractors.

As described under the Oil Pollution Act of 1990, a Unified Command Structure was established between Fairfax County and the Department of Environmental Quality and EPA to oversee emergency response.

Initial activity focused on collecting the diesel fuel behind containment booms in Sugarland Run to prevent it from migrating downstream, and on recovering the product into tanker trucks. Protection of human health was an immediate priority and air quality monitoring of adjacent neighborhoods was conducted to assure there was no immediate health risks. Residential wells were also monitored to assure that ground water was not affected.

Initial recovery efforts were successful, but were quickly hampered by a shortage of tanker trucks and locations to store recovered oil. High flow conditions in Sugarland Run and the Potomac and difficult access at the mouth of the Sugarland Run also complicated the recovery efforts.

The public drinking water intake on the Potomac River which serves half of Fairfax County was closed because of oil sheen at the intake. Within 24 hours, animal recovery efforts were organized by the Fairfax Animal Control Department to collect and rehabilitate affected beaver and waterfowl.

The Unified Command Post was required to maintain 24 hour operations for the first week after the spill to oversee emergency cleanup. Ultimately, it appears that more than 400,000 gallons were released and the cause of spill remains uncertain.

The extent of the environmental damage has yet to be fully determined. Potentially sensitive wetland areas have been affected. The Fairfax County Water Authority was forced to keep its Potomac facility closed for 11 days and had intermittent shutdowns following that. Preliminary indications are that the fish populations in Sugarland Run were completely eliminated and most other aquatic communities were severely damaged. Damage assessment is continuing at this time.

Colonial Pipeline is currently developing a plan for remediation of Sugarland Run under the direction of county, State and Federal authorities. At this time it is uncertain what will be required or how long the cleanup will take. It appears that there is no longer an immediate threat to residents and that the emergency phase has ended.

This spill is one of a series of pipeline releases which the Commonwealth of Virginia has experienced in recent years. Since 1985 at least four other major spills have released over 400,000 gallons into State waters.

In November of 1985, over 120,000 gallons of heating oil was released due to a pipeline break in Chesterfield County. About 93,000 gallons of product was actually lost into the James River, but extremely high flood conditions mitigated an adverse environmental effects.

A pipeline rupture near Locust Grove in Orange County, Virginia resulted in over 200,000 gallons of kerosene being released into Mine Run and ultimately the Rapidan River and then the Rappahannock River. This spill in December of 1989 resulted in the city of Fredericksburg's water intake being shut down for nine days and the city had suffered a similar effect from a Colonial Pipeline break in March of 1980 near the same sight.

In June of 1990 a line break caused damage to—a line break caused by damage to the pipeline by a backhoe spilled over 80,000 gallons of number 2 fuel oil into a farm pond in Chesterfield County. Almost all of that product was contained in the pond and was recovered.

And also in August of 1990, a pipeline ruptured in the city of Chesapeake, Virginia, spilled over 60,000 gallons of marine diesel into Drum Creek, a tributary of the Elizabeth River and affected a considerable area of tidal wetlands.

The history of repeated spills by petroleum pipelines has caused the Commonwealth to be gravely concerned over the adequacy of pipeline regulations. On April 1st, 1993, after personally touring the area affected by the recent spill in Fairfax County, Governor Wilder instructed the State to actively pursue all avenues to strengthen pollution prevention requirements for petroleum pipelines. We believe that States must have a substantive role in these regulations in order to protect our public interest.

Mr. BORSKI. We will hear from all panelists first and hold all questions to the end.

Mr. DENOYER. Mr. Chairman, Members of the subcommittee, I am a town councilman in Herndon and also the chairman of the Fairfax County Environmental Quality Advisory Council. My boss is sitting to my right, Tom Davis. I would like to summarize my statement and submit the total copy for the record.

Mr. BORSKI. Without objection it is so ordered.

Mr. DENOYER. Mr. Chairman, I would like to cover a few topics that have not been covered by other people because many of the things I have written have been covered by others. First of all, we were very, very lucky in this oil spill. It could have been a lot worse and I think we have to think in terms of much worse scenarios that could have happened.

First, the material that was spilled was not gasoline—it was a fuel oil not gasoline. If this had been gasoline, we could have a terrible situation, probably fire and much more toxicity. Second, the ground was saturated with water which minimized the amount of penetration of oil into the water. Third, the water table was high. That tends to mitigate the contamination of groundwater because the flow is generally from the high water table into the stream at this time, although there is reverse flow going on. Fourth, the stream was in full bank. This prevented the floating oil from severely contaminating the stream bottom and since the stream was not at flood stage the oil did not spread out over the flood plain except in localized low areas or where impoundment structures such as beaver dams were present. Fifth, the cleanup and recovery operations were able to recover a significant part of the oil that spilled, reducing the amount that remained in the environment. I think we all have to commend everybody involved in their excellent response and ability to recover as much as possible.

Sixth, we had several heavy rains following the oil spill that helped flush out the oil from the stream. And seventh, the warmer weather has helped evaporate the volatile portions of the oil.

Regardless of these good things, the environmental impact was significant and while some life can be found in the stream, it is certainly not a completely recovered ecological system at this time. In order for that to happen, the residual oil must be removed in one way or another and the food chain for the entire water dependent life in the stream must be redeveloped. This is something that will take a number of years in all probability.

Also damage to vegetation, especially trees is something that is hard to assess initially because trees can be stressed and not show the signs for several years. The point I want to emphasize is the next step in this recovery operation is one that I find very frustrating.

The techniques of bioremediation are quite well known. In terms of contingency planning it seems nothing has been done in the past to plan for the remediation and final recovery of an area of this type.

And I think that this is something that needs to be added into the overall in terms of pipeline safety and other hazardous materials safety. The technique of bioremediation either augmented or natural is that microbes eat—use the oil as a food source. They use it as a carbon source and they consume it and break it down into simpler materials.

I did not see the article in The Washington Post, Ms. Byrne, the intermediate harmful products from diesel fuel, I am unfamiliar with that. However, in general the hydrocarbons are broken down into carbon dioxide and water which are basically harmless.

The technique can be to leave it alone or to augment it slightly with fertilizer to augment the bioremediation with the bugs that have been accustomed to eating the oil and they do work best under damp conditions when oxygen is present and during warm weather.

Since the spill, we have lost over a month now in terms of time when rapid implementation of bioremediation could have been successful. Hopefully, this will change in the near future. The Treatment Technologies Working Group, of which I am a member, did give some guidance to EPA and Colonial at the last meeting on May 12th and we plan to meet again I believe it is on May 26th or 27th to continue to review the response of Colonial.

So hopefully this bioremediation program will get started in early June and the sooner the better because we are losing valuable summertime.

Mr. Chairman, I have done some research on pipeline safety and also some investigation of smart pigs. And I summarize some of this information in my statement. The comments so far have been largely directed at magnetic flux pigs. Magnetic flux pigs are good, but I feel that the ultrasonic pig is something that is still a very important instrument in terms of measuring actual wall thickness of pipelines. Also from the best information I have gotten there are not satisfactory ultrasonic pigs for this 36-inch diameter pipe and larger diameters. I feel this is an area that needs attention and that these ultrasonic pigs should be developed as soon as practical and used in these types of pipelines.

I have attached several recommendations to my statement. I think the most important is the first one and that is that Public Law 102–508, Pipeline Safety Act of 1992 should be implemented as fast as possible to provide for the safety of all of us.

Thank you.

Mr. BORSKI. Thank you.

Mr. DAVIS. Mr. Chairman and Members of the subcommittee, my name is Thomas Davis, Chairman of the Fairfax County Board of Supervisors, and I thank you for this opportunity to discuss issues and facts related to the recent rupture of the Colonial Pipeline in northwestern Fairfax County. I wish to especially thank Representative Leslie Byrne for her initiative in bringing this matter before you.

On Sunday, March 28th, at approximately 9:00 a.m., Fairfax County, Virginia Fire and Rescue Department units responded to the report of a petroleum release near the rear of the Reston Hospital Medical Center in the Hunter Mill District. The release was thought to have originated from one of Colonial Pipeline Company's petroleum transmission lines along Fairfax County's western end. The source of the release was later confirmed to be Colonial's 36-

inch pipeline, which at the time of failure was carrying number 2 fuel oil, a product commonly used for home heating.

At the site, our emergency units found petroleum product pooling in a nearby storm retention pond, covering portions of adjacent parking lots, and extending through a combination of storm drainage pipes and wetlands into and down Sugarland Run leading north towards the Potomac River. Emergency units quickly moved to: Contain as much of the product as possible at the origination site; determine the extent of the release; request assistance from responsible agencies; and attempt to contain and control the product migrating via Sugarland Run to the Potomac River.

Within an hour, first responders were joined by officials from Colonial Pipeline, and subsequently by Colonial contractors, local officials from the Town of Herndon and Loudoun County, as well as Federal and State representatives. Over 40 local, State, Federal and private agencies were notified and were operating on the scene within the first six hours of the incident.

By managing the incident through clearly defined objectives and a unified command, resources were effectively employed over the next eight days to control and recover a large portion of the estimated 407,000 gallons of fuel oil that were released. We believe this is a model example of local, State, Federal, and private cooperation that allowed us to respond well in very difficult and sudden circumstances.

Although the emergency phase of this incident has ended, we are left with unsettling questions about its cause as well as the lessons to be taken from our experience. The incident on March 28 is the third time in the last 13 years that a petroleum pipeline has released a significant amount of product in Fairfax County creating public health, safety, and environmental concerns. In each incident lives have been disrupted, hundreds of thousands of dollars have been spent on clean-up, and extensive investigations of cause and effect have been performed. Our experience with these incidents leads us to conclude that more effort needs to be focused on: Prevention through improved, regular, periodic inspections; detection of leaks while they are still small; and reducing the volume of product that can be released following a failure, particularly in areas where water supplies are involved.

No one of these three efforts alone will prevent reoccurrence of the failure we experienced. Each of these action areas must be upgraded and used in combination to improve leak detection.

The regulation of interstate pipelines is clearly a Federal responsibility. I understand that Federal officials are investigating this incident, and I strongly urge that they use information learned from this and other pipeline failures to strengthen pipeline regulations and improve inspection and monitoring of pipeline installations and operations.

We specifically suggest that the Department of Transportation Office of Pipeline Safety intensify the types, intervals, and methods of pipeline inspections. This should include authorizing local governments to inspect and monitor pipeline construction and repair using Federal standards.

"Smart pigs" and "caliper pigs" that detect abnormalities in pipeline wall thickness should be mandated at regular intervals for all sizes of main and lateral lines. Improved calibration standards should be established regarding what size of defect in a pipe can be detected by inspection pigs. For example, there were reportedly scars on the outside of the pipe that contributed to the final pipe rupture in Fairfax County. Whey weren't these defects detected by the inspection pig? We should know what level of confidence, or put another way, what size of defects, we can really expect to detect from inspection by these pigs. It would appear the sensitivity and calibration control of these pigs need great improvement to help prevent problems such as we have experienced.

In some cases it may be appropriate to require that the damaged line be uncovered. Additional inspection by means of internal or external devices should be required for any repaired or adjacent section of pipeline to assure pipe and weld integrity before the pipeline is returned to service.

More precise technologies that monitor product flow should be mandated to detect small losses of product from initial pipeline cracks before they become catastrophic. I understand that highly precise flow measurement technology to detect very small leaks has been used on the Trans-Alaskan Pipeline. I also am told that the nuclear industry uses varied means to achieve leak detection before rupture. Since improved technologies exist, they should be used in the pipeline industry.

Particularly in densely populated areas such as Fairfax County and where water supplies are involved, pipelines should also be required to have additional isolation valves. For example, an additional estimated 100,000 gallons of product was discharged on March 28 after the pipeline was shut down.

The pipeline industry has demonstrated an admirable safety record relative to other forms of petroleum transportation. However, that record is far from perfect. As painfully demonstrated by the March 28 Colonial release, an incident of this kind poses serious consequences. We believe the cost of prevention is less and a better investment than the cost of clean-up.

As bad as this incident was, can we imagine, for example, the result had the released product been gasoline rather than fuel oil? The consequences could have been far more grave and in addition to all that happened, we might be talking today about massive evacuations, potential explosions, and acute dangers to life and property. We do not want that to occur in Fairfax County or anywhere else. We, therefore, strongly recommend that the Federal Government improve its oversight of this very critical aspect of interstate commerce by upgrading the pipeline system in the three basic areas I have discussed at a minimum.

In closing, I wish to express my deep appreciation to our Fairfax County agencies and employees for their prompt and professional response to this urgent problem. I also want to thank my colleague, Supervisor Bob Dix, who represents the Hunter Mill District, for his outstanding leadership in helping bring the resources together to handle this emergency. I believe the consequences of this massive rupture would have been far worse in most other local communities that are simply not as well equipped or prepared to handle such a crisis.

Thank you again, Mr. Chairman and Representative Byrne, for your concern by holding this hearing. I would be pleased to answer questions or furnish additional information for the record.

Mr. GAREGNANI. Good afternoon. I am chair of the Friends of Sugarland Run. I appreciate this opportunity to share my group's view on the Colonial pipeline spill of fuel oil into the environmentally sensitive area of Sugarland Run in March 1993.

Just some background on the Friends of Sugarland Run. We are a group of citizens and business people who have come together to protect one of the last natural areas in the heavily urbanized region of northern Fairfax and eastern Loudoun Counties. Our goal is to establish a continuous greenway along the 10 mile Sugarland Run stream valley to support a diversity of wildlife and allow their migration from the Potomac River deep into Fairfax County. As part of a national greenway movement in this country, the FOSR intends to accomplish this with minimal public funds using volunteers to raise funds, perform monitoring, and provide necessary labor. In fact the FOSR had just, prior to the spill, received from the Conservation Fund a grant from the DuPont Greenways Award.

As part of the effort to establish a greenway, we have spent time identifying threats to the habitats along Sugarland Run. We were lulled into thinking that the most significant threats were primarily from the heavy development in the watershed causing severe sedimentation and erosion problems degrading the ability of the stream to support the aquatic life which starts the food chain for a healthy habitat. Suddenly a threat we weren't even aware of destroyed the existing Sugarland Run ecosystem in a matter of hours by dumping over 400,000 gallons of number 2 fuel oil into the stream.

There are several aspects of this disaster that are now apparent and which we find disturbing due to the lack of adequate controls and potential reoccurrence of a spill.

Lack of regular internal inspection of the pipeline to measure wall thickness using "smart pigs". The technology for this exists but is not being applied. Lack of post-construction inspections. Colonial was aware of the construction at the Reston Hospital site and even excavated the pipe to aid in its protection, but they did not visually inspect the pipe before it was re-buried.

Lack of adequate shut off valves leaving vast distances between valves. Even though the pipeline was shut down almost immediately after the burst occurred, over 400,000 gallons were dumped into the stream. The pipeline which burst in March usually carries gasoline. If the spill would have been of 400,000 gallons of gasoline with its explosive potential and high levels of carcinogens, the disaster would have been terribly worse.

These weaknesses reflect decisions made by Colonial for which no Federal guidance, regulations or negative incentives exist to adequately protect environmentally sensitive areas. The decisions made by Colonial were based upon their economic feasibility with regard to profitability. This is to be expected from a free enterprise system and I will be the first to say it is the best system in the world. However, it depends upon some level of control to make up for the gap between the good of the corporation and the overall public good. This disaster clearly points out that the gap between corporate and public good is not being adequately addressed by interstate pipeline safety controls or negative incentives.

The hundreds of us who live along Sugarland Run place a very high value on the recreation and aesthetic quality of the stream valley in our back yards. Unfortunately, that value does not have associated with it a dollar price tag. On the other hand, it is very easy for a pipeline company to calculate the cost associated with a spill in lost product and fines, to apply a risk factor, and decide not to address known weaknesses in their system. This decision causes the citizens near the pipeline to carry the burden of risk and, if an accident occurs, the value lost by the citizens essentially goes to subsidize the pipeline company. It is true that if pipeline companies were forced to respond to more government control, the price for their products would go up; however, instead of the citizens who live near the pipeline subsidizing the real cost of dependence on these products, the cost would be evenly spread among all the users of the product. There is also a long term benefit to this, as members of the committee probably know, higher energy costs drive technology for cleaner and cheaper energy.

A significant amount of money is now being spent to clean up Sugarland Run. Had that money been spent in prevention instead of post-accident clean up, we citizens would still be enjoying our stream valley instead of trying to keep our kids away from the stream, assessing the effects on property values, and worrying about when the pipeline may dump gasoline into the stream.

In summary, from those of us who have lost something of great value, we ask this committee to consider more stringent regulations and fines to prevent continued destruction of our diminishing natural areas.

Thank you for this opportunity to express our views.

Mr. BORSKI. Thank you gentlemen. The gentlewoman from Virginia.

Ms. BYRNE. Mr. Chairman, I am going to submit questions to all of the panel, but I would like to ask Mr. Buttleman from Virginia we have heard testimony that talks about the one-call laws today and they come into question.

How do you perceive Virginia's one-call laws and what kind of enforcement do we have for those in Virginia?

Mr. BUTTLEMAN. Representative Byrne, that is a question that I will have to get back to you on. Our analysis of this situation is continuing at this time. We are not prepared to make any conclusions quite yet on that.

Ms. BYRNE. Okay.

Chairman Davis, does the county have a map that shows where Colonial Pipeline is? Do you actually physically have a map?

Mr. DAVIS. Yes, we do.

Ms. BYRNE. When the construction permits were obtained for excavation in the area, when Reston Hospital was built, how many were obtained and when and by whom?

Mr. DAVIS. I don't know if I have it here. We will supply that to you within a week.

Ms. BYRNE. My understanding, Mr. Chairman, is that current law says that these pipelines have to be at least 50 feet from inhabitable buildings and I was wondering if Fairfax County has any regulations itself prohibiting the building within 50 feet of such a pipeline.

Mr. DAVIS. We don't have one as we speak, but we are in the process of looking at it now as a result of this incident.

Ms. BYRNE. When we were out at the site today, Chairman Davis, someone mentioned that right along this area where the pipeline is currently sited, there is a Virginia Department of Highway somebody's right of way for a road.

Can you tell us what road is going next to this pipeline?

Mr. DAVIS. There are numerous roads that go across the pipeline throughout the county. The project is paid for by the county, but designed and approved by the State. We can try to get you a cross-section of every road that runs across.

Ms. BYRNE. I understand it is a proposed roadway or right of way. It may be Dominion or the right of way, but it looked to be fairly close to the pipeline.

Mr. DAVIS. If it were the Fairfax Parkway, that would have been designed by the State. We will look at that. There have been numerous design hearings, but the State Transportation Board controls that. I will get that information to you in more particulars.

[The following was received from Mr. Davis:]

COMMONWEALTH OF VIRGINIA

COUNTY OF FAIRFAX

BOARD OF SUPERVISORS
OFFICE OF THE CHAIRMAN

THOMAS M. DAVIS, III
CHAIRMAN

SUITE 530
12000 GOVERNMENT CENTER PARKWAY
FAIRFAX, VIRGINIA 22035-0071
TELEPHONE (703) 324-2321
FAX (703) 324-3955

The information requested for the record (as clarified by Ms. Jennifer Beens of Representative Byrne's staff) is as follows:

1. Does Fairfax County have any regulations affecting or limiting land use, particularly such as locating inhabitable buildings, within any proximity of a pipeline?

   The Fairfax County Zoning Ordinance contains provisions requiring approval of a special exception for pipelines, however, there are no provisions that provide for any minimum yard requirements or other setback requirements for structures located within any proximity of a pipeline.

2. Is any new construction, particularly related to highways, expected to go on near the pipeline in the affected area?

   Future highway plans in the area include continued construction of the Fairfax County Parkway which will parallel the pipeline easement within 100 feet from the WO&D trail overpass to approximately one quarter mile north of Baron Cameron Avenue where it then bears north and away from the pipeline easement. Also, a bike path will parallel the easement within 75 feet of the pipeline. A ramp off the Fairfax County Parkway is planned to cross the pipeline easement at the Baron Cameron Avenue intersection. Also, New Dominion Parkway is planned to cross the easement approximately 1,800 feet south of the rupture area.

   A thorough review of our records and documents indicates that plans for a townhouse/condominium project near the area have been submitted to Fairfax County. The nearest building in the project will be approximately 80 feet from the nearest pipeline. This project is in the vicinity of Baron Cameron Avenue where it crosses the pipeline. As you are aware, there is currently a construction project underway, the Reston Hospital Extension parking lot, which is within the pipeline easement directly over the pipeline in the vicinity of the rupture.

Ms. BYRNE. Thank you. That is all I have, Mr. Chairman.

Mr. BORSKI. The Chair thanks the gentlewoman. The Chair also would have some questions to submit.

[Subsequent to the hearing additional questions were submitted to Mr. Buttleman. The questions and responses follow:]

COMMONWEALTH of VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
Public & Intergovernmental Affairs
202 North Ninth St., Suite 900, Richmond, VA 23219 (804) 786-4500

July 22, 1993

The Honorable Robert A. Borski
U.S. House of Representatives
Committee on Public Works and Transportation
Chairman, Subcommittee on Investigations and Oversight
Suite 2165, Rayburn House Office Building
Washington, DC 20515

RE: Colonial Pipeline Rupture of March 28, 1993 and Other Pipeline Accidents
Questions of the Subcommittee

Dear Congressman Borski:

As requested, we have responded to the additional questions posed by the Subcommittee. The questions posed are listed for reference and followed by our response.

1. *Since 1985, the State of Virginia has sustained damage from seven Colonial Pipeline Company oil spills. In your opinion, has Colonial's response been fully cooperative and did they respond aggressively to remediate all damage caused by these spills?*

Our experience is that Colonial Pipeline has responded promptly to their oil spill incidents. Although there were occasional temporary shortfalls, they quickly mobilized their internal response resources and brought in sufficient contractor resources. They always cooperated with the State officials in the containment and removal activities and responded to our recommendations and concerns. In no case have we found it necessary to initiate enforcement actions for a failure, on Colonial's part, to contain and clean-up spills as required by State law.

2. *In your testimony, you discuss several pipeline spills that have occurred in Virginia in recent years. One spill that you did not discuss is the spill that took place in Centreville, Virginia in 1987. Colonial discusses this spill in some detail in their testimony, and they allege that the building contractor who caused the spill was not adequately punished for violating Virginia's "one-call" statute. Would you comment on whether you think Virginia's enforcement of its one-call statute is adequate?*

The Virginia Underground Utility Damage Prevention Act, Virginia's one-call statute, does not provide state enforcement authority of its provisions. The State Corporation Commission, with the concurrence of the Virginia General Assembly, has created a task force that is currently studying the Act and one of the issues under review is the adequacy of enforcement. The Commission has indicated that there is a possibility that proposed amendments relating to state enforcement of the Act will be brought before the 1994 session of the General Assembly.

3. *In your testimony, you stated that as a result of the Colonial pipeline rupture, the fish population in Sugarland Run had been completely eliminated, and potentially sensitive wetland areas had been affected. Based on your past experience with similar pipeline spills, how permanent is the damage to the Sugarland Run area, and how long do you expect it will take to fully restore this ecosystem?*

Virginia is conducting a Natural Resources Damage Assessment (NRDA) for the Sugarland Run area. The NRDA process mandated in the federal Oil Protection Act of 1990 is designed to provide a mechanism for determining the environmental damage resulting from oil spill events and the measures to be implemented to assure the restoration of the ecosystem. Until the study has been completed, I am unable to offer a conclusive answer to this question. Our experience with petroleum spills is that the damage to flowing freshwater aquatic ecosystems is very severe in the short term. After the initial clean-up, most systems are resilient and there are few long term effects which can be observed after several years.

4. *Did representatives from the Commonwealth of Virginia take any soil samples of the soil located under the ruptured pipeline? If so, what petroleum products other than diesel fuel were present?*

Samples of Sugarland Run stream sediment were collected by DEQ staff immediately following the spill. The stream sediment station closest to the spill site contained polynuclear hydrocarbons (PAH) at the concentration of 0.7 ppm and total petroleum hydrocarbons (TPH) at 130 ppm. The sediment sample from Sugarland Run at the Algonkian Park access road (located downstream) contained 1320 ppm TPH and 86 ppm PAH. The classes of compounds found during DEQ sampling were consistent with the constituents expected to be found in No.2 fuel oil.

Thank you for the opportunity to respond to the questions of the Subcommittee. Please contact me if you have further questions.

Sincerely,

Keith J. Buttleman
Deputy Director for Public and
Intergovernmental Affairs

cc: The Honorable Elizabeth H. Haskell, Secretary of Natural Resources
Richard Burton, Director of DEQ
William Woodfin, Deputy Director of DEQ Operations

Mr. BORSKI. On our final panel, we would welcome Mr. Robert Rackleff, President, Friends of Lloyd, Lloyd, Florida; Mr. Stuart Schwartz, Director, Interstate Commission for the Potomac River Basin, Section for Cooperative Water Supply Operations; accompanied by John Corless, Washington Suburban Sanitary Commission, Perry Costas, Chief, Washington Aqueduct Division, U.S. Army Corps of Engineers, and Jim Warfield, Fairfax County Water Authority.

Mr. Rackleff.

[Witnesses sworn.]

TESTIMONY OF ROBERT RACKLEFF, PRESIDENT, FRIENDS OF LLOYD, LLOYD, FLORIDA; STUART SCHWARTZ, DIRECTOR, INTERSTATE COMMISSION FOR THE POTOMAC RIVER BASIN, SECTION FOR COOPERATIVE WATER SUPPLY OPERATIONS, ACCOMPANIED BY JOHN CORLESS, WASHINGTON SUBURBAN SANITARY COMMISSION, PERRY COSTAS, CHIEF, WASHINGTON AQUEDUCT DIVISION, U.S. ARMY CORPS OF ENGINEERS, AND JIM WARFIELD, FAIRFAX COUNTY WATER AUTHORITY

Mr. RACKLEFF. Thank you, Mr. Chairman. I have submitted written testimony for the record. I will summarize very briefly.

I am Bob Rackleff, President of the Friends of Lloyd, a citizens group in North Florida which has been opposing a proposed gas line and pipeline tank mine project in our community.

Lloyd is a small village 15 miles east of Tallahassee. For over 15 years, if there is one lesson we have learned and one we would like to leave with you today, it is this, the Colonial Pipeline spill on March 25 was not an isolated situation. Pollution from pipelines is a serious national problem that needs the attention of Congress.

Consider these facts: In the past 23 years, pipelines have spilled or leaked three times more than tankers and barges in a comparable 20-year period.

Pipelines have spilled an annual average of 11.8 million gallons while water carriers have spilled 11.6 million on average. According to a report released yesterday about pollution by the oil industry, it estimates that pipelines spill 25 to 30 million gallons a year. I have no way of verifying that.

What you heard earlier this afternoon are far different figures. Both EPA and AEO have told you pipelines have a very good record for preventing injuries and fatalities, but when it comes to preventing pollution, it is a far different story.

The figures that they use come from the Coast Guard which seriously undercounts pipeline spills. The figures that I have used come from annual reports of pipeline safety reported every year by the Office of Pipeline Safety.

To give you an idea of how the Coast Guard figures undercount the problem, in the 1980s, the Coast Guard reported about 20 million gallons of spills from pipelines under water. During the same 10 years, 1980 to 1989, the Office of Pipeline Safety counted about 109 million gallons of pipeline spills.

About Colonial Pipeline, in the past four years, Colonial spilled about 1.5 million gallons as reported to the Coast Guard and the Office of Pipeline Safety. In the past two years, all pipelines have spilled 15.5 million while tankers and barges have spilled 529,893 gallons. In the last two years, they have spilled 30 times more volume than tankers and barges.

And, in fact, Colonial, in those two years, spilled 37,000 more gallons of oil than did all the tankers and barges in the United States in 1991 and 1992. And in case you think I am talking about ancient history, since the March 28 spill until May 10th, the Office of Pipeline Safety received 280 telephone reports of pipeline spills. One of them was in the Los Angeles area where an Arco pipeline spilled 260,400 gallons on April the 6th.

These statistics tell us something important. Our system of moving oil by pipeline without polluting our ground and water is broken and it needs to be fixed. And at the heart of the problem is an industry that has grown complacent with its own primitive operating and technical standards and a Federal regulatory agency which is doing little to solve the problem.

A year ago when I wrote to the Office of Pipeline Safety to verify some of Colonial's claimed environmental record, I received this reply, and I quote, "We cannot at this time categorically verify or deny them. We would have to undertake a significant amount of validation, analysis and interpretation to arrive at any responsible conclusion."

In other words, the Office of Pipeline Safety had never bothered to study the environmental impact of daily spills by oil pipelines. So we did our own study using data from the Office of Pipeline Safety, Coast Guard, and the Association of Oil Pipelines.

We adjusted the spill data that I just told you about for ton-miles of oil transported by each competing mode and we found that pipelines spill an average of 21,000 gallons of oil per billion ton-miles, while tankers and barges spill about 10,000 gallons per billion ton-miles. If pipelines are safer than tankers and barges, then that claim certainly does not hold up with the data that are available.

Now, this comparison is important because Congress and the public recognize that tanker barges and spills are a serious problem, but not pipelines.

Another interesting comparison is that from 1979 to 1991, the Office of Pipeline Safety collected $427,300 in civil penalties from pipeline companies, which during that same period had spilled 126 million gallons. This works out to penalties of 3.4 cents per gallon spilled, which is one of the great regulatory bargains of our time.

My written testimony details many specific problems with both the industry and the Office of Pipeline Safety, but they boil down to the reality that there is little compulsion or incentive for pipeline companies to prevent and detect leaks.

We have heard repeated the industry claim that, well, we lose money when we spill so it is just good business to do everything we can to prevent and detect leaks. That simply isn't true. It is far cheaper for the industry to let the pipelines leak than it is to invest in effective means like double-wall pipes and hydrostatic testing.

In fact, their main objection to advances like this is it would cost too much. And when the inevitable spills happen, they blame outside damage. Yet in three out of four pipeline spills, by volume and by number of incidents in the last half dozen years, outside damage accounts for only one-quarter of all the pipeline spills. Three-quarters of it come from things that the company does, either sloppy operation or equipment failures.

We need to change the economics by requiring tougher standards and imposing heavier costs on companies when they spill. You have just heard from Colonial Pipeline that they don't really intend to do very much to correct the problems that they have. So it will take congressional action.

Another part of this equation is that the Pipeline Safety Act could be more properly called the pipeline company protection act. It protects pipeline companies from State and local governments by preempting their regulations that exceed Federal standards and by excluding them from negotiations when a pipeline spill happens.

It protects pipeline companies from lawsuits by owners of property damaged by spills, by barring suits until administrative proceedings are finished which could be years. And by its lax standards and enforcement, it protects companies from paying the true cost of the widespread pollution that they cause.

Let me briefly summarize some of the suggested changes to the law which can help. First and foremost, encourage States to regulate pipelines by removing the preemption clause that prevents them from meaningful participation.

Second, allow individuals and other interested parties to sue for damages and penalties when spills affect them and to allow them to participate in what are now essentially secret negotiations between the Office of Pipeline Safety and the companies.

I find it ironic that Colonial Pipeline just asked you to allow them to sue for injunctive relief from parties which may cause outside damage when they themselves are insulated from that very same remedy by the Pipeline Safety Act.

Third, I would require pipeline companies to report spills over a gallon or which produce a sheen on water. Verify and strictly enforce accurate reporting so we can get an accurate picture of the problem. The pipeline figures that I have given you from the annual reports include spills that do not include spills that are under 2,100 gallons or from pipelines that aren't regulated, like gathering lines. We simply don't have an accurate picture of the problem at this point.

Fourth, because the Office of Pipeline Safety has dragged its feet over the past decade to the neglect of stricter standards, Congress should study methods to reduce spills by at least half to achieve a record that should be at least as good as water carriers.

Included in these standards would be such technologies as double-wall pipes, hydrostatic testing, monitoring wells and improved cathodic protection. We should explore other ideas such as building pipelines in critical areas above ground where we can see leaks after they are properly sealed against vandalism and other sorts of outside damage.

While this is under way, we should have a moratorium on new construction, otherwise we will allow the construction of substandard pipelines destined to leak or spill and continue the sorry record of pipelines.

Finally, we should increase penalties to the levels applied to other forms of the oil industry. And let me make one final point. It is something that I started thinking about just this morning, which was, it seems to me, that part of the problem is that we lump together the regulation of two kinds of pipelines for which the problems are very different. We have an agency that regulates both natural gas and oil pipelines.

The problem with natural gas pipelines is a safety problem. They blow up and hurt people. They don't pollute, however. The problem with oil pipelines is pollution. Whenever they leak, they cause a great deal of pollution. They sometimes explode and hurt people, but that is a much smaller problem with them than it is with natural gas pipelines.

It seems to me that we ought to consider dividing the regulatory responsibilities so that we regulate oil pipelines for what the problem really is, which is pollution, regulate natural gas pipelines for the public safety aspect.

I would like to close on that note. Thank you very much for having me here, sir.

Mr. BORSKI. Okay, Mr. Rackleff, thank you.

Mr. Schwartz.

Mr. SCHWARTZ. Thank you, Mr. Chairman, members of the committee. We appreciate the opportunity to appear here this afternoon. I would ask, if I may, that my prepared statement be included in the report.

I am Stuart Schwartz from the Interstate Commission on the Potomac River Basin where I am the director of the Section for Cooperative Water Supply Operations and I am here with representatives of the three major water suppliers in the Washington area: Mr. John Corless, the manager of water supply operations for the Washington Suburban Sanitary Commission; Mr. Jim Warfield, Director of the Administration Division with the Fairfax County Water Authority; and to my far left, Perry Costas, Chief of the Aqueduct Division of the U.S. Army Corps of Engineers. And we are here to share with you our concerns regarding safety of the region's water supply.

What I would briefly like to do is describe ICPRB's role and the role of the Section for Cooperative Water Supply Operations in the regional management of water supply and spill response and notification and share with you four observations we have drawn from the events surrounding the break on March 28th.

Very briefly, the Interstate Commission on the Potomac River Basin is a nonregulatory interstate compact commission created in 1940 with members from the States of Virginia, West Virginia, Maryland, Pennsylvania, District of Columbia and the Federal Government.

The Commission acts to support and enhance the management of water and associated lands resources of the basin, and as a result of the spill in Sugarland Run on March 28th, we have received clear direction from our Commission to undertake a comprehensive assessment of the risk of spill in the Potomac River Basin, both from pipelines and from multi-modal transport and stationary sources, as well as a review of opportunities for pollution prevention in the Potomac.

Again, briefly, the Section for Cooperative Water Supply Operations was created to provide regional coordination for the cooperative water supply for the Washington, D.C. Metropolitan area. And the co-op section is designated as the agency that monitors demands, allocates flows, schedules reservoir releases in times of drought and emergency in order to maximize the reliability of the region's water supply.

The Commission also maintains a transport model that is used in the event of spills to the Potomac and we work cooperatively with the basin states to provide travel time information, warning and notification to municipal water suppliers using the Potomac.

From that regional perspective, I would like to briefly share with you four concerns we have growing out of the spill on March 28th.

First and foremost, as I said, we are here to share with you our concerns regarding the safety of the region's water supply. We feel the bottom line is that as serious as this spill was, shutting down the Fairfax County Water Authority for 11 consecutive days, from a regional perspective, we dodged the bullet with respect to this particular accident.

If the accident had occurred under slightly different conditions, low summer flows, if the spill had been closer to the Potomac or occurred in the Potomac where the pipelines cross into Maryland, the consequences could have been severe. Under low flow conditions, contamination could have been expected to linger in the river for weeks.

In the case of the Washington aqueduct division, which has no other source of treatable water but the Potomac, they would quickly run out of treatable water. Within no more than 48 hours, there would be a severe shortage of potable water and some difficult decisions would have to be made.

Aside from the economic impacts to the region from the massive disruption of municipal and commercial activities, the consequences to public health and public safety from shortages of potable water, water for sanitation purposes, fire protection, would be severe.

We think the consequences would be severe and that these risks are real, and in view of the photographs that you have seen in some of the earlier testimony, I think you can understand why we continue to have ongoing concerns regarding the physical integrity of this pipeline, concerns that we think might be most expeditiously resolved with an independent review of the physical integrity of this pipeline.

Beyond these regional concerns, we see some opportunities arising out of this accident to reassess the ways in which we manage the risks associated with pipelines. And two suggestions I briefly offer that might fall in the category of application of appropriate technology would be a need that we see for a mechanism to institutionalize the review of both the technologies that are available and the risks that are posed in these transportation corridors to assure that the appropriate technology continues to be matched to the risks posed from the transport activities as they continue to change.

In respect to the Potomac corridor, we see a need to find a mechanism that would expedite the designation of a high hazard corridor, the corridor within which the consequences of an accident are recognized as being severe enough that they require the most stringent technology.

In the case of the Potomac water supply, there are pipeline crossings not only in the Potomac, but also in the watersheds of the Occoquan and Patuxent Reservoirs which provide the only alternate sources of supply. So all three sources of supply for the Washington D.C. area potentially could be exposed to these accidents and we think that this region in particular, this corridor, is a good example of one that would warrant this high hazard designation.

With that, Mr. Chairman, let me conclude in thanking the committee for the opportunity to appear here. Happy to answer any questions you may have.

Mr. BORSKI. Thank you very much, Mr. Schwartz. The gentleman from Oklahoma.

Mr. INHOFE. Thank you, Mr. Chairman.

Mr. Rackleff, I must say that after having served in this body and sat through these various hearings like this for some six and a half years, I think this is the first time this has happened.

Those who testify prior to you either in person or vicariously testified that the pipeline system of transportation is the safest system that we have. We heard from the EPA, from the Coast Guard, from the GAO, from the National Transportation Safety, and from the Department of Transportation, and having dealt with all these organizations for a long period—in fact, I am on the Coast Guard Committee and I deal with them quite frequently—I would say that in the area of pipeline expertise, we are talking about maybe a thousand top ranked technicians all who have come to the same conclusion that the pipeline system is the safest system.

You come in here and contradict them. Why should we believe you?

Mr. RACKLEFF. Well, I suggest that they read the annual reports of pipeline safety, which is what I did.

Mr. INHOFE. You don't think that these organizations read those reports?

Mr. RACKLEFF. Well as I told you before, they were looking at a different database. They are looking at the—what is called the ERNS, Emergency Response Notification System. It is a databank. It originates from Coast Guard data and it does not accurately reflect the extent of pipeline spills in America.

For example, I received a copy of the report—the Coast Guard report on the pipeline spill in—near Herndon on March 28th and its entry for the column that says amount spilled says zero, so——

Mr. INHOFE. Although there isn't time now, I would advise the chairman that I will be asking the questions of those individuals who have—and entities who have already testified if they have made themselves or this data available to them for their conclusions.

In the opening of your written testimony, you state that your primary concern over four years has been the Friends of Lloyd.

Mr. RACKLEFF. Yes.

Mr. INHOFE. Among other things, to stop construction of the Texaco gas line tank farm and Colonial pipeline project, et cetera, et cetera. Who is Friends of Lloyd?

Mr. RACKLEFF. The Friends of Lloyd is a citizens group. It is made up of—that has had the active participation of roughly 1,500 people in the last four years who have gone to hearings, who have contributed to our treasury, who have come to rallies that we have had, they have written letters on our behalf. It has been——

Mr. INHOFE. You are the President?

Mr. RACKLEFF. And I am the President of it.

Mr. INHOFE. Who are the other officers?

Mr. RACKLEFF. My wife and my sister-in-law. We are incorporated. It is a nonprofit organization, and as I said, we have had the active participation of roughly 1,500 people.

Mr. INHOFE. It would take a lot of money to do the work that you do. And could you tell me your funding source? And specifically, is the Florida Alliance actively involved in supporting you in your efforts?

Mr. RACKLEFF. The Florida Alliance has been actively involved and they have contributed roughly $300,000 for our legal expenses. We have raised another $100,000 or more from individuals and other organizations. It is a—it is a very expensive proposition to go up against a major oil company and a company like Colonial Pipeline.

Mr. INHOFE. It may be expensive—I was looking at the receipts of the Florida Alliance and find that in one of their year-to-date statements dated May 31st of 1990 they talk about raising during that period of time in contributions $153,000. Half came from the Port Everglades Authority, and the Port Everglades Authority—in fact, all of these individuals who made—or entities that made contributions are movers or transporters, all except the pipeline industry.

So wouldn't it appear that those individuals or entities there would have a prejudiced perspective?

Mr. RACKLEFF. Perhaps they do. What we have is what is called a coalition. It is—we all have a common interest in stopping the Colonial pipeline project because it is environmentally hazardous, and they are—the Florida Alliance has its reasons and I have my reasons.

Mr. INHOFE. For clarification, Mr. Rackleff, on three different documents I noticed the figures that your Friends of Lloyd received from the Florida Alliance. At one time, it is $190,000, one time it is $300,000, then again I saw a figure of $600,000. What is the amount that you have received from the Florida Alliance?

Mr. RACKLEFF. We have received about $300,000 for our legal expenses. Not everything that the Florida Alliance spends comes to the Friends of Lloyd.

Mr. INHOFE. Because I know we are out of time, and I want to give the gentlelady from Virginia the last five minutes, I would like to read the first three paragraphs of an editorial from the Miami Herald dated August 22, 1991.

Keep in mind that the Port Everglades Authority is the largest contributor to the Florida Alliance. I will read this and then submit the rest for the record, Mr. Chairman.

"Snuffle, snuffle, once again here comes the Florida Alliance waddling towards the public trough. This little piggy is already fat on more than $600,000 in public funds.

The Florida Alliance pretends to be a coalition of maritime businesses interested in staving off environmental disaster or, in its words, in leveling the regulatory playing field between oil tankers and pipelines.

"In reality, the Alliance survives because of politicians who dip into the Port Everglades public till for their patrons. In shipping, leveling the playing field means using the regulatory process to strangle competition. For this, the public has paid more than $1.5 million."

I ask unanimous consent to submit the entire text of that Miami Herald editorial for the record.

Mr. BORSKI. So ordered.

Mr. INHOFE. I have no other questions.

Mr. BORSKI. Mr. Rackleff.

Mr. RACKLEFF. I would like the opportunity to submit other news articles as well that directly contradict the claims that Colonial Pipeline has made to you.

Mr. BORSKI. The record will remain open.

[The articles submitted by Mr. Rackleff follow:]

4 / Thursday, June 10, 1993 Florida Flambeau

Florida Flambeau

Out of hand

The Saturday arson of an historic country store in Lloyd owned by tenacious environmental activist Bob Rackleff was no doubt a retaliation against Rackleff's actions as the vanguard of the fight against the Colonial Pipeline company.

Rackleff, who has fought for more than four years to prevent the company from running a gas pipeline from Bainbridge, Ga. to a storage facility in the small Jefferson County town because of potential environmental damage, has been the victim of a smear campaign by Colonial officials.

As most readers know, the *Flambeau* has taken a position against Colonial's efforts. Like Rackleff, many Jefferson County residents, several local government officials in Tallahassee and Leon County, and many others, we are concerned that damage to a gas pipeline could spell environmental disaster.

A pipeline catastrophe could easily affect Leon County residents. The Floridan aquifer, an underground reservoir from which all of North Florida and much of Central Florida gets its drinking water, could potentially be tainted as a result of a spill. One need only look at the recent massive Colonial pipeline spill in Virginia to see the danger involved.

This basic fact is the impetus for the propaganda the company has disseminated in its effort to destroy Rackleff's reputation. Colonial's message is clearly designed to rally community support in favor of the pipeline project, which Colonial officials also say will bring jobs to the community.

While we would never imply that Colonial officials are directly responsible for the destruction of Rackleff's country store, which was built in 1910 and was listed in the National Registry of Historic Sites, the pipeline company's anti-Rackleff rhetoric no doubt inflamed the emotions of some crazy, spurring him or her to torch the store in an ill-conceived effort to further deter Rackleff from his fight.

Interestingly, in one of several Colonial booklets sent to all Jefferson County property owners earlier this year, Colonial had these seemingly prophetic words about Rackleff and the store:

"... The 'historic' Lloyd store he owns and repeatedly says he intends to restore is a burned-out eyesore in the middle of town.

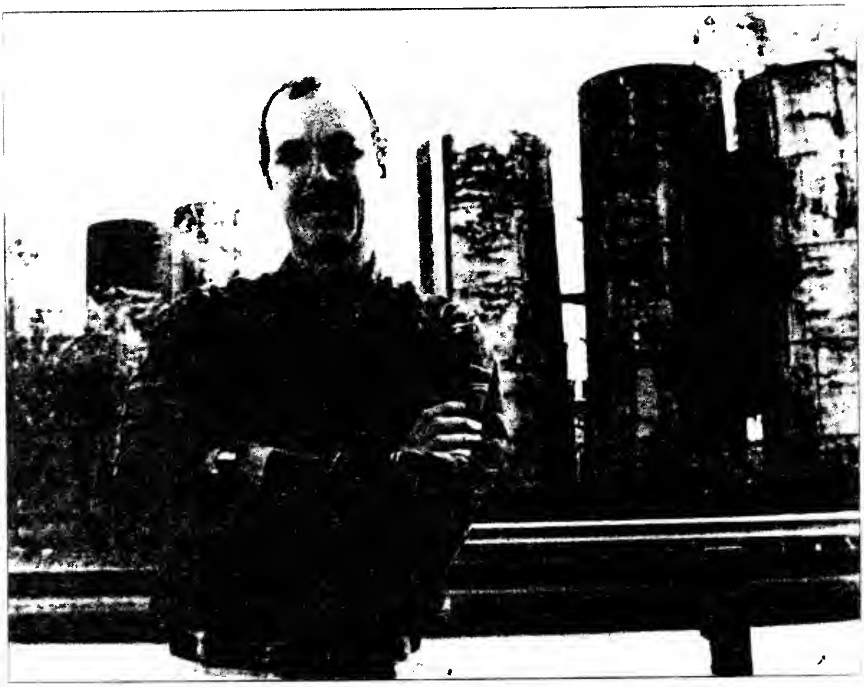
"One benefit from the pipeline and terminal Mr. Rackleff might welcome is Texaco's promise of a fire truck and training for Lloyd's volunteer fire department. With that truck at the ready, Lloyd residents could respond more effectively if Mr. Rackleff's store catches fire again while he drives over from his home in Tallahassee."

We hope the state fire marshal will be able to determine who torched Rackleff's country store. More importantly, we hope those who have sided with pipeline advocates in the past, will recognize the divisive—and now destructive—seeds Colonial has sewn in the little town of Lloyd.

There will be a fundraising benefit concert for Rackleff's efforts to defeat the Colonial pipeline project Friday the 18th at the Warehouse. Several musical acts, including Bill Wharton, will be on hand starting at 8 p.m. There will be a $7 cover charge.

The Free Lance-Star
FREDERICKSBURG, VIRGINIA
THURSDAY, SEPTEMBER 10, 1992

ENVIRONMENT



MONA LISA ABBOTT

To dramatize the environmental ugliness of a tank farm, Rackleff poses next to a set of rusting tanks in Tallahassee, Fla.

FIGHTING BIG OIL

> Bob Rackleff says his small Florida town is threatened by the same pipeline company that's responsible for two major spills near Fredericksburg. To some, Rackleff is standing in the way of economic progress; to others he's sounding an important environmental warning.

By MARIE JOYCE
Staff Reporter

When Robert Rackleff started to restore his Florida dream house, he thought of Fredericksburg.

He had passed through the city only twice, about 13 years ago, on a trip from Washington to Norfolk and back again

He recalled the beauty of the Rappahannock River, the charm of the 19th century architecture downtown He envisioned similar restorations on the 19th century homes in his tiny panhandle town of Lloyd

Now, Rackleff looks to Fredericksburg for an example of a different kind He looks at the time in 1989 when the Virginia city shut off its water supply because a petroleum spill had polluted the Rappahannock

He looks at the environmental problems that linger, the cost of the cleanup, the frustration of Fredericksburg officials

And he says Colonial Pipeline, the culprit in Fredericksburg, will do the same thing to Lloyd

* * *

Rackleff has always been interested in the environment Twenty years ago, he wrote a book, "Close to Crisis—Environmental Problems in Florida" At the time, he didn't even think to include oil pipelines as one of those problems

Now, he can't stop thinking about them

The object of Rackleff's dread is a petroleum tank farm in Lloyd, a town about 15 miles east of Tallahassee, in Jefferson County

The story is long and complicated, but this is the crux of it

Right now the tank farm only exists on paper, but three oil companies—Texaco Amoco, and Citgo—have permission from Jefferson County to build in Lloyd.

Now it's all up to Atlanta-based Colonial Pipeline which is trying to get approval to build a line that would supply the tank farm

The most direct route from Colonial Pipeline's Georgia facilities to Lloyd is through adjoining Leon County, the county that includes Tallahassee But Leon officials have said no, and a court upheld their decision

So Colonial Pipeline is trying to secure a route through Jefferson County, and Rackleff and his supporters are trying to stop them

"They can't say, 'If we come here, we will not pollute.' Up until now, these facilities have always polluted," Rackleff says.

The project, he says, would ruin Lloyd

* * *

What is so special about Lloyd? That depends on whom you talk to

"There's just a sign there, crossroads, and a few homes," says Richard Calupca, the senior manager of Colonial's western region

Rackleff looks at it a little differently

"Lloyd is kind of a state of mind," he says, with a laugh. About 300 people live in the central village area. About 2,000 more live within a 5-mile radius

The town sprang up in the mid-1800s around a railroad station. The trains still go through there, but prosperity has passed it by The main street is unpaved, and most downtown businesses closed years ago

The Rackleffs' house was built in the 1850s It had belonged to a friend of the couple, and Bob and his

Please see Pipeline, page D[illegible]

Pipeline

from page D1

wife, JoEllyn, were married under a big, old oak tree in the back yard.

Bob is a free-lance speechwriter who once worked for President Carter. JoEllyn is an artist. They have three school-age children.

When they bought their house in 1985, they also bought into a vision of Lloyd.

More than a sleepy crossroads, they saw Lloyd as a newly bustling town, a place of lovely restored homes and good stores and businesses.

Already, growth from Tallahassee was creeping toward Lloyd to the east. With Lloyd's location on Interstate 10, it could become prime real estate.

The Rackleffs made plans to restore their house. They persuaded several friends to buy and restore other old homes in Lloyd.

Then they heard about the tank farm, and the pipeline.

The pipeline, which would come from a Colonial operation in Bainbridge, Ga., would pump in about 630,000 gallons a day of various types of refined petroleum products like gasoline, heating oil, diesel fuel and aviation kerosene.

At the tank farm, the fuel would be stored before being transferred to trucks, which would deliver it to gas stations and businesses in the Tallahassee area.

The Lloyd operation would represent only a small fraction of Colonial's business. Last year the company's network of pipes across the South and up the East Coast shipped 1.8 million barrels per day.

It's important, however, because it would make Colonial the first company to stretch an interstate oil pipeline to serve Florida, according to company spokesman Noel Griese. Florida is the third-largest gasoline market in the United States, he says, and right now trucks and barges have a lock on it.

Rackleff would like to see the oil stay on the barges. A pipeline, he says, is an environmental catastrophe waiting to happen.

"Tank farms pollute, pipelines pollute," he says.

He's worried about the groundwater in the area. An an oil leak would sink into the aquifer under the town, he says, contaminating the local drinking water.

Colonial officials say they have safeguards built into their system to prevent this kind of thing. "We monitor our pipelines. We know what goes in and what goes out. We know (when) there are leaks," Calupca says.

Company spokesman Griese says the amount of petroleum spilled in a year by pipeline companies is less than half of that spilled by domestic ships transporting the stuff.

And in the rare case of a pipeline accident, Calupca says, they clean it up.

Bull, says Rackleff. And he points to accidents like Fredericksburg's.

In December 1989, a section of a Colonial line through Orange County ruptured, spilling 212,000 gallons of kerosene into tributaries of the Rappahannock.

Fredericksburg declared a water emergency and shut off the water supply for several days.

A similar spill involving a Colonial line occurred in 1980. In both cases, the ruptures were blamed on "railroad fatigue," which occurred before the pipelines opened, as sections of metal pipe were transported to construction sites by rail.

"It really validates what we've been saying all along: that these things are dangerous and that you can't trust an oil company," Rackleff says.

Beyond his environmental concerns, Rackleff opposes the project because he believes it will ruin the character and the future of Lloyd.

"Why would anybody choose to live next to a tank farm? Why would anybody want to build a restaurant or a nice store? Then Exxon will come, and BP will come, and build tank farms."

That scenario doesn't sound so bad to some people. Jefferson County, after all, is a poor place.

"They're a very poor and rural county. They want some development . . . they're receptive to this kind of development," Calupca says.

Some local residents have spoken out in favor of the tank farm. Rackleff, who currently lives in Tallahassee, has received threatening phone calls.

He says the tank farm isn't the answer to Jefferson's problems. It will bring only a handful of jobs, he says.

He has his supporters, too. At a recent county public meeting, a direct mail campaign by his group, Friends of Lloyd, brought out about 300 people to oppose the pipeline, he says.

* * *

Rackleff's fight has gone beyond Jefferson County, Fla.

The pipeline business "is basically a self-regulated industry, and the payoff is 12 million gallons a year being spilled," he says. "The . . . standards they operate by are primitive."

One person who shares that opinion wholeheartedly is James M. Pates, Fredericksburg's city attorney.

Since the Orange County spill, Pates has become an advocate for stricter regulation of the oil pipeline industry. He and Rackleff regularly exchange information.

"He's a voice crying in the wilderness," says Pates. "He's one of the few people who is really trying to draw public attention to a serious environmental hazard."

Rackleff says he is tired of fighting. The cost has been tremendous, he says.

"Sometimes I feel like one of the crash dummies of the environmental movement—I've taken a lot of hits."

The financial costs led Friends of Lloyd to accept funding from a group not known for its environmental advocacy—the oil shipping industry. The Florida Alliance, the shipping concern, has a clear interest in keeping the pipeline out of Florida.

Colonial officials say this contradicts Rackleff's professed concern for the environment, especially since at least one company in the alliance has been responsible for a major spill off Florida in recent years.

But Rackleff says his group had no choice. He and his wife have spent at least $20,000 of their own money on the fight. They haven't had the money to start the restorations to their house in Lloyd.

"I just got my American Express bill, and it's got $600 of printing costs on it," he says. And the legal fees from a variety of related court cases are piling up.

All told, he says, anti-pipeline advocates have accepted about $150,000 from the Florida Alliance. Rackleff's lobbying groups also have raised about $25,000 in individual donations. They haven't had to turn to the shipping industry for about a year now, he says.

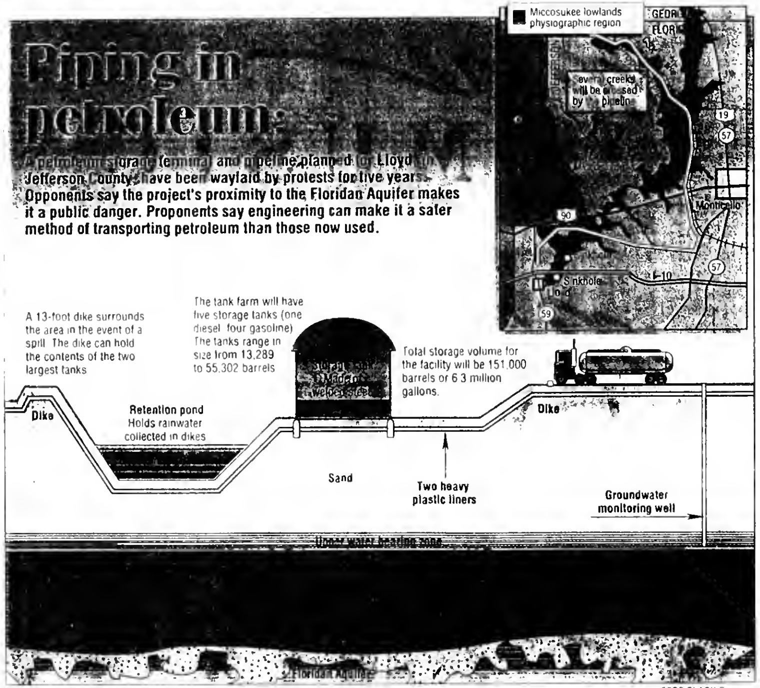
Whatever the outcome of the Lloyd controversy, Rackleff says, he plans to continue lobbying for more government regulation of oil pipelines.

He plans to write a book on the subject. He hopes it will spur Congress to implement more regulation.

He also wants to write a second book, a personal memoir of his fight with Colonial.

"I've felt strongly from the beginning that something creative will come out of this."

Proposed pipeline fuels only a raging debate



FRED CLARK Democrat

Five years and 11 lawsuits later, Colonial's pipeline-tank farm project is still the subject of hot disagreement.

By Christina Binkley
DEMOCRAT STAFF WRITER

It seemed so simple.

A routine petroleum project at a Jefferson County crossroads called Lloyd — 60 miles of pipeline from Bainbridge, Ga., to a small tank farm, bringing gas products to 10 North Florida and Georgia counties.

Well.

Eleven lawsuits, more than $2.3 million and nearly five years after Texaco and Colonial Pipeline Co. proposed the project, the companies have yet to break the sandy ground.

They have met resistance beyond their wildest dreams. The project's location over the Floridan Aquifer — the area's water supply — has given the opposition the perfect peg on which to hang its hat.

Mixing the petroleum project with North Florida's environment, they say, would be tantamount to mixing oil and water.

There is logic to their argument. Since the project was conceived, Colonial has reported spilling 1.5 million gallons of gas, diesel, and other fuel oils into rivers, fields, and yards across the country.

But, at the same time, the St. Marks River terminal, where barges unload their products, is sometimes hazy with fumes of spilled petroleum. Thousands of gallons have spilled from overturned tanker trucks. And at least one person has died in Florida while transporting petroleum this year.

Put simply, petroleum pollutes no matter how it's transported.

So the battle boils down to this question: If a pipeline will benefit

Please see PIPELINE, 7B

Pipeline battle takes long and winding road

The regulations governing pipelines are weak and don't protect the environment, says one side. Not so, says the other side. They'll see each other in court.

By Christina Binkley
DEMOCRAT STAFF WRITER

Although the oil industry disagrees, the government and environmentalists say petroleum-pipeline regulations are woefully inadequate and don't protect the environment.

"DOT (the federal Department of Transportation) has no program with the goal of preventing water pollution from pipelines," said a 1991 report by the U.S. General Accounting Office, the investigative arm of Congress.

"No responsible federal agency knows the locations and operators of all petroleum pipelines," the report continued.

DOT does not even require that the proximity of waterways be considered when pipelines are planned, the federal investigation found.

For 10 of the years between 1979 and 1990, the total of fines levied by the federal Office of Pipeline Safety against oil companies for millions of gallons spilled amounted to $354,700.

That figure does not include 1986, which OPS was unable to locate.

Please see REGULATIONS, 6B

PIPELINE:
Indisputable statistics are unavailable

the area by moving petroleum more safely, does it belong above the precious Floridan Aquifer?

Aquifer's the source of water — and controversy

The Floridan Aquifer floats like a huge, water-soaked limestone sponge under all of Florida and parts of Alabama, Georgia and South Carolina.

There's about a 90-percent chance that the water you draw from your kitchen tap is Floridan water.

The aquifer is also the source for recreational waters — Wakulla Springs and the St. Marks and Wakulla rivers.

The aquifer is replenished as water flows through the ground and sinkholes scattered through the limestone-anchored region.

Stabbing his finger at a map of the proposed pipeline route, Leon County Commissioner Gary Yordon works himself into a lather because the pipeline would lie entirely within one of these replenishment areas of "high recharge."

"There's only one way to assure that it won't affect your water supply and that's if it's not over it," Yordon says.

Fighting the pipeline has become a *raison d'etre* for Yordon, who counts the issue as a main reason for his plans to run for a third term in 1994.

Scores of speakers at Jefferson County public hearings have pleaded the same case — that any risk to the aquifer is too great to take.

One gallon of gasoline will contaminate 1 million gallons of water to the extent that fish will die, says opponent Bob Rackleff.

But Colonial and Texaco officials say thousands of dollars worth of scientific studies prove the aquifer will be adequately protected by the project's engineering.

Tom Kwader, a hydrogeologist hired by the oil interests to study the risks, then paid by Jefferson County to present them at a public hearing, downplays concerns.

Kwader says petroleum that leaked into a sinkhole would float and never enter the aquifer.

But Tom Pratt, chief of the groundwater bureau for the Northwest Florida Water Management District, says petroleum products regularly dissolve and sink in water.

Statistics abound for making each case

Underground oil spills are hard to visualize. No oily beaches. No sorry birds.

But visualize this: Each year, more petroleum spills from pipelines than the 11 million gallons that leaked into the Alaskan wilderness from the Exxon Valdez in 1989.

Of the 100 worst spills that took place in the 12 months following the Valdez disaster, pipelines accounted for 46 spills, tank farms for 16, releasing 8.5 million gallons for 79 percent of the total spilled, Rackleff wrote in an article published by *The Washington Post*.

Colonial spokesman John Ballentine has campaigned in person, by phone and through advertising to shift the spotlight to barge, tanker and truck traffic, saying the pipeline will be cleaner and safer.

Most spills have occurred to pipelines built with old technology, some of which date back to Colonial's first in 1962, Ballentine says.

And Colonial's record of spills is seven times better than the pipeline industry's average, he says.

Both sides have statistics to bolster their sides — that the other mode of transportation is dirtier and more dangerous.

Unassailable statistics are unavailable. No federal or state agency collects them.

Federal law does not require the reporting of most pipeline spills of fewer than 2,100 gallons.

But the petroleum industry agrees there is a problem. Ray Karnes, of the Petroleum Marketing Association of Wisconsin, says 100 percent of his organization's members' above-ground tanks have contaminated the ground around them.

Cleaning the groundwater contaminated by above-ground storage tanks cost the petroleum industry $790 million a year, according to the U.S. Environmental Protection Agency.

That does not include reimbursing residents for medical needs, property loss or the cost of the lost product.

Ballentine says cost is an incentive not to spill.

But spills happen.

And once they happen, it's cheaper to ignore them than to clean them up, says Lois Epstein, an engineer with the Environmental Defense Fund.

Colonial to public: Trust our safeguards

Colonial's pipeline will span 60 miles in length and 12 inches in diameter, made of steel seven-thirty-secondsth- to nine-thirty-secondsth-of-an-inch thick.

Its walls and welds will have been tested to a pressure of 1,900 pounds per square inch. Its products will move at pressures between 60 and 100 psi, although at other spots along the line to the north, pressures rise to 1,400, says Colonial project coordinator Joel Boisvert.

That is as specific as the pipeline plans get right now, says company spokesman Ballentine.

But Ballentine says the public can trust that shut-off valves will be close enough together, that leak-checking machines called "smart pigs" will be used frequently enough, and that the pipeline will be padded and protected enough to avoid spills.

And Colonial has other means of detecting leaks once they happen. Pilots fly in search of dead vegetation, dogs sniff for fumes, and computers measure pressure changes within the pipes, to name a few.

All of these protections did not prevent a March 28 spill in Virginia from leaking 407,000 gallons of Colonial petroleum into a tributary of the Potomac River.

The Virginia pipeline's technology was basically the same as is planned here, but the line was significantly larger — 36 inches in diameter.

Colonial has been fined $2.5 million for that spill, which has led to congressional hearings and pledges by Secretary of Transportation Federico Pena that tougher pipeline regulations are on the way.

Led by Rackleff, public outcry during the tank farm's two-year approval process in Jefferson County caused plans for the 23-acre terminal to exceed legal requirements. It's final cost will be twice the original estimates, Texaco representatives say.

Two plastic liners and an 18-inch layer of clay would protect the groundwater from a possible spill. There would be a built-in fire-protection system. And piping within the terminal would be above ground for easy inspection.

Colonial officials expect the same for the pipeline.

"If and when we get this project going, it will probably be the safest pipeline in the world when (Rackleff) is through with us," says Ballentine.

"This situation here is very unique for us. Nowhere, ever, have we had opposition like this."

— Joel Boisvert, Colonial project coordinator

The companies cite other advantages to the pipeline.

Although 100 trucks a day would deliver petroleum to Tallahassee and regional gas stations, fewer trucks would make the drive from St. Marks, says Texaco attorney Guyte McCord.

Gas prices could fall a nickel a gallon, Colonial officials say, due to added competition. As business dropped at the St. Marks terminal, so would the amount of spillage there. And property-tax revenue would go to cash-starved Jefferson County.

The companies would like to be more trusted.

"Our opponents are always asking, 'What if this were to happen, what if that were to happen?' We'll have contingency plans in place to clean up," says Boisvert. He predicts the odds of an accident as "so infinitesimal that it's probably not even worth considering."

Huge profits at stake; future plans unclear

Texaco officials swear they have no plans to expand the tank farm beyond the five tanks, storing 6.3 million gallons, now planned.

But Amoco and Citgo have expressed interest in the project, Boisvert says. And the big oil markets of Jacksonville and Central and South Florida are a temptation.

"We can't rule that out — that Colonial someday will end up going there," Boisvert says.

His statement is at odds with earlier promises to the contrary made by Ballentine and McCord.

Colonial serves nine oil companies other than Texaco, including Amoco and Citgo.

Tallahassee, with population growth projected at 20 percent by the turn of the century, is a ripe market. Florida is the largest single state market not yet served by an interstate petroleum pipeline.

So there are big profits at stake.

Colonial estimates it would grab 555,000 gallons a day in business from the St. Marks barge interests, represented by the Florida Alliance.

That represents $10-20 million a year in wholesale profits to Texaco, according to two industry analysts, in addition to about $6 million to Colonial.

And it represents such a loss to the St. Marks barge interests, represented by the Florida Alliance, that they have contributed $300,000 to the pipeline's environmental opposition movement.

And there's more money coming, says Rackleff, who has a many-pronged strategic plan to continue the fight.

So much for the routine project.

"This situation here is very unique for us," says Boisvert. "Nowhere, ever, have we had opposition like this."

REGULATIONS: *Eminent domain is a serious issue in the pipeline struggle*

Colonial Pipeline officials disagree with the GAO. They applaud the government's system of regulation.

"With more than 200,000 miles of oil pipelines in the United States, the federal government has the experts, the staff and the expertise to regulate pipelines," said one of three Colonial brochures published to state the company's viewpoint on the pipeline.

But the federal Office of Pipeline Safety — which is responsible for regulating hazardous-liquid pipelines — has only three inspectors to cover seven states in the southeastern United States.

Only one agency, and not 'a very big program'

The agency acknowledged in 1989 that it routinely inspects records in offices rather than pipes in the ground.

"We don't have a very big program," says Cesar de Leon, OPS regulatory program director in Washington.

But OPS has the only federal program.

De Leon says states do more inspecting than OPS. This isn't so in Florida, he says, because Florida is not among the 10 states that regulate hazardous-liquid pipelines.

The petroleum industry is exempted from Superfund regulation, due at least in part to heavy lobbying by oil interests when Superfund was created.

Spills of petroleum must be reported under Clean Water Act regulations, but no federal reporting requirements exist for underground releases or leaks, according to Lois Epstein, an engineer with the Environmental Defense Fund in Washington.

Landowners worry about pipeline route

Many property owners in South Georgia and Jefferson County fear their lands will be marred by the clear-cuts required to keep a pipeline's path visible. They worry that land values will fall and that their lands' uses will be limited because construction cannot take place on the pipeline's right-of-way.

Since 1957, oil pipelines have wielded the power of eminent domain in Florida.

That means they can condemn and purchase the property they want and landowners' only recourse is to sue.

That process has begun in Jefferson County, where owners of property along Colonial's preferred route have received forms that grant, for $25, consent for a survey. The forms carefully state that the fee is a "courtesy" and that permission is granted not by the owner but by the law.

More litigation may be ahead

The opposition is meeting Colonial and Texaco every inch of the way. Eminent domain may be the source of a 12th lawsuit against the project, and a 13th lawsuit has been threatened as well.

Opponents' attorneys are preparing a constitutional challenge of the state's eminent-domain law.

Leon County has threatened to sue Jefferson County, saying the plans violate the Comprehensive Plan.

What seemed so simple five years ago has been anything but.

EDITORIALS

Safe, but not safe enough

The Colonial Pipeline Co. and Texaco may have thought they had an ideal plan when they proposed to extend a pipeline from Bainbridge, Ga., and build a petroleum products tank farm at the small north Florida community of Lloyd. The site was adjacent to an interchange on Interstate 10, only 16 miles east of the fast-growing Tallahassee market. Tiny Jefferson County would be grateful for the additional property taxes. And with only 300 people living at Lloyd, there wasn't much risk of significant opposition.

But one of those residents happened to be Robert Rackleff, a free-lance writer and public relations consultant whose resume includes speech-writing for President Jimmy Carter, two Cabinet members and a U.S. senator. When Rackleff, a Tallahassee native, came home years ago, it was just after working in the corporate headquarters of Time Inc.

Rackleff knew how to fight even big corporations like Colonial and Texaco. A year and a half later, their project is stalled by a lawsuit alleging zoning and sunshine law violations, and state policymakers are faced with a controversy that won't go away regardless of how the litigation concludes.

Among other things, the dispute has highlighted serious loopholes in Florida's environmental laws. For example, Jefferson County has only five full-time firefighters. Tampa needed 50 to control the fire that raged at a Hooker's Point tank farm April 15 after a fatal explosion involving vapor recovery equipment like that the Lloyd facility would use. Should a similar disaster strike at Lloyd, Jefferson County would need help from neighboring Tallahassee — but it is Jefferson County, not Tallahassee, that will be receiving Texaco's taxes.

The shortcomings in fire protection almost certainly would disqualify the Texaco tank farm if it were presented as a development of regional impact (DRI) under the state's growth management laws. But the tank farm is projected at 157,000 barrels, just 3,000 fewer than the minimum level at which the Department of Community Affairs could assert jurisdiction and classify it as a DRI. *Any* petroleum storage facility should require DRI approval.

Though pipeline companies have the right of eminent domain, which allows them to condemn land and lay pipe almost anywhere they please, there are insufficient environmental and public safety safeguards under either state or federal law. This is a critical issue, because the federal Office of Pipeline Safety (OPS) customarily delegates responsibility wholesale to state fire marshals. Though the OPS has oversight of 1.7-million miles of pipe carrying hazardous materials, it employs only 15 inspectors. Hearings by Congress and the National Transportation Safety Board have explored the weakness. With more petroleum pipelines coming to Florida, including a major line from Port Tampa to Fort Myers, Florida plainly needs to assure itself that the state fire marshal's office is staffed for the challenge.

Florida also needs a law imposing strict environmental standards on the pipeline routes and requiring carriers and terminal operators to post bonds or proof of insurance against spills, fires and explosions. Florida's dependence on ground water leaves little margin for error.

But the Lloyd experience should not become a pretext for barring pipelines, as some of the project's opponents are trying to do. The Florida Alliance, a lobby supported by the Port Everglades Authority and several maritime shippers and maritime unions, has been trying to persuade county commissions in north Florida to pass prohibitive local pipeline ordinances. It has asked the Legislature to repeal eminent domain for pipeline companies, which for all practical purposes would stop them in their tracks. (The alliance has also helped to pay for the Friends of Lloyd lawsuit, even though a pipeline from Bainbridge to Lloyd poses no conceivable competition to barge and tanker traffic at Port Everglades.)

The fact is that pipelines are a relatively safe means of transporting hazardous liquids. A 1988 report of the Transportation Research Board of the National Research Council said that liquid pipeline casualty rates, adjusted for volume and distance, are "significantly lower" than those for rail and truck transport and "only slightly higher than for transportation by water."

They are not, however, safe enough. Some 10,000 failures in the years 1971 through 1986 spilled nearly 5-million barrels of petroleum products, causing 178 deaths and 770 injuries. It's small consolation to say losses would have been greater had all that fuel been carried by rail and truck, or to rationalize that outside forces such as train derailments and careless backhoe operators were most frequently the cause.

This is why Florida should pass a responsible pipeline siting law — one that would both allow the state to overrule unreasonable local restrictions and also keep pipelines and tank farms away from encroaching development and out of places like Lloyd, where they shouldn't be.

■ PROTECTING FLORIDA'S PRECIOUS WATER

Jefferson County's big decision

By ED JOHNSON

TALLAHASSEE — Jefferson County would seem like a good place to put a tank farm. It's nicely situated for the terminus of a 12-inch petroleum products' pipeline from southwestern Georgia. And who'd notice?

Like most of the small counties sprinkled across North Florida, it's sparsely populated and agricultural, a somewhat pleasant place stuck with a hardscrabble economy and not much promise of the good times associated with growth and development.

But as it turns out, Texaco and the Colonial Pipeline Company have underestimated the importance of Jefferson County's geography. The proposed petroleum products tank farm has attracted intense public scrutiny because it's too near Tallahassee and it's too near the Floridan Aquifer.

The timing's not so good either. A series of disturbing environmental incidents in recent years has awakened those Floridians who label themselves environmentalists — and three out of four do so, including the governor. The resulting concern has assured water management a top spot on the public agenda for the 1990s.

About a year ago, Texaco-Colonial applied for a permit to store 6.5 million gallons of fuel near the small community of Lloyd, 13 miles and a county line from the Capitol building. It didn't take long for a neighborhood group called the Friends of Lloyd to illuminate the risks for both the county officials considering the request and their constituency who would live with the decision.

The telling argument, which has generated appeals and lawsuits, turned out not to be the possibility of a spectacular accident changing night into day, but the threat of spills into the water supply. It is the threat of a system of petroleum shipping and storage outmoded by growing public expectations for environmental safety and health.

Jefferson County's proposed tank farm, sited as it would be in a high recharge area for the 82,000-square-mile Florida Aquifer, has become one of a series of symbols of the interdependence of the state's population in preserving a vital resource.

Water's not scarce in Florida, of course, but drinking water is increasingly threatened by pollutants and, in coastal areas, saltwater intrusion. There's ample rain, averaging more than four feet a year, and billions of gallons of water annually flow into Florida from Alabama and Georgia.

Under most of the state there are six aquifers, great storage areas charged by the water above. Five drift above the Floridan Aquifer, which lies under the lowland areas of Georgia, Alabama and South Carolina as well as most of Florida. The quality of its content, drawn upon for man's needs, depends largely on what seeps into it from above.

Now, with the effect of rocketing demands for fresh water, hydrologists are warning that pure water no longer is a limitless resource, even in Florida.

In dealing with the craving for petroleum products, there's been a somewhat muted awakening to that warning. Since the mid-1980s, state and federal laws have tightened controls on underground storage tanks, waste disposal and some forms of transport. Pipeline operators, who introduced the tank farm controversy to Jefferson County, still do business under the old rules.

But the state Cabinet, the legislature and the Florida congressional delegation have been petitioned to do something about it.

State legislation has been introduced to limit the right of pipeline companies to take private land by eminent domain, and to tighten tank farm and pipeline fire safety standards. And the Cabinet has been asked to designate pipeline projects as Developments of Regional Impact, which would introduce operators to the regulation and scrutiny of several state agencies charged with protecting the environment.

Because of a series of plant explosions, the U.S. Occupational Health and Safety Administration is conducting a special investigation of safety standards in refineries and pipeline operations. Whether that, or any state government initiative, will swiftly alter the relationship between the providers of Florida's petroleum products and Florida's water supply remains to be seen.

Short of a diesel fuel cocktail from the kitchen faucet, or a flaming lawn sprinkler, nothing helps to focus attention on the potential ruin of a vital resource like community confrontations over how to handle necessary commodities safely and thoughtfully.

It's places like Lloyd where those debates are finely drawn. The issue of locating and operating a tank farm is theirs to resolve. But the consequences belong to far more than the 12,000 residents of Jefferson County.

Ed Johnson is a senior editor for the New York Times Regional Newspapers.

Tallahassee Democrat/Tue., May 15, 1990

OPINION

OUR VIEW

Oil pipelines

Why we can't 'leave it to the feds'

Pipelines. Federal responsibility. Right?

Best answer: Well, er, yes, maybe.

The Office of Pipeline Safety, in the U.S. Department of Transportation, is charged with oversight of the 1.7 millions miles of pipelines that traverse the nation carrying hazardous liquids, which includes petroleum products, and natural gas.

That office has 15 inspectors. In a congressional hearing in 1989, one inspector said:

"Essentially our inspections consist primarily of reviewing their operating records and their operation and maintenance manuals, and spot checking pipelines in the field..."

With limited staffing and resources, the Office Pipeline Safety is limited in how well it can do its job.

Pipeline accidents have the potential to harm water supplies as well as cause fires. A state oversight role is needed.

A bill in the Florida Legislature that cleared the Senate Natural Resources Committee in early May would give that job to the state Department of Environmental Regulation. Sen. Tom McPherson's bill would allow DER to set rules for the construction and operation of pipelines. Currently the DER has oversight of fuel storage tanks, and pipelines that go across wetlands.

And the Public Service Commission and state Treasurer participate in a federal program for natural gas inspection. A state role is needed in the inspection of intrastate pipelines carrying hazardous liquids.

Russell Rockwell, consultant to the administrator, Research and Special Programs Administration, Department of Transportation, says when states participate in inspection of intrastate pipelines, "the federal government will reimburse ...up to 50 percent of the cost of their operations."

Pipelines transport an awesome amount of petroleum products annually — approximately 500 billion ton miles of crude oil and petroleum products, according to a federal report, plus an additional 15 trillion cubic feet of natural gas.

A special report, "Pipelines and Public Safety," by the Transportation Research Board of the National Research Council states, "The safety performance of transmission pipelines is good in comparison with that of other transportation modes that carry hazardous material."

To evaluate that sentence, a few definitions are in order. In 1984, federal regulations changed reporting requirements. Before then, spills of 210 or more gallons had to be reported. In 1984, the limit was upped to 2,100 gallons (50 barrels). Subsequently, the number of incidents reported dropped That puts assertions about "safety performance" in a different light.

A report put out by the Wilderness Society in March looks at a year's worth of spills. In "100 Spills, 1,000 Excuses," the Wilderness Society writes:

"No one has final figures, but experts estimate that there have been roughly 10,000 spills since the Exxon Valdez tore open, polluting American's land and water with 15 to 20 million gallons of oil.

"The explanations for the spills, most of which involve pipelines, are almost as numerous as the spills themselves. Pipelines corrode, their valves break, their welds fail, and during the past year, one pipeline was ruptured by a pile driver."

State regulation is even more crucial as Florida continues to be developed. In the forward to "Pipelines and Public Safety," the Transportation Research Board of the National Research Council states:

"The development of residences, work places and shopping areas near once-isolated transmission pipelines, which carry gas and liquids at high pressures from producing areas to refineries or distribution networks, threatens to increase the risk of pipeline failure caused by inadvertent excavation damage."

With the federal government taking a minimalist approach, Florida needs to step in to the pipeline oversight business to protect the public's interests.

McPherson's bill should go the distance this legislative session.

Find out more

The Transportation Research Board of the National Research Council authored "Pipelines and Public Safety." Copies may be obtained for $14 by writing the board at 2101 Constitution Ave. N.W., Washington D.C. 20418. The Wilderness Society report, "100 Spills, 1,000 Excuses," may be obtained for $2 by writing the society at 1400 Eye St. N.W., Washington D.C. 20005.

18A Sun-Sentinel, Wednesday, April 11, 1990 N

Sun-Sentinel

Dedicated to being the most important information provider in Broward and Palm Beach counties, Florida

Thomas P. O'Donnell, *President & Publisher*

Gene Cryer, *Editor*

Earl Maucker, *Managing Editor*

Kingsley Guy, *Editorial Page Editor*

EDITORIALS

State must regulate oil pipelines to reduce threat of water pollution

Everyone should know by now just how vulnerable Florida's fragile wetlands and underground water supplies are to pollution.

That's why it's hard to understand why Florida has no state laws at all regulating a major threat to those wetlands and water supplies — oil pipelines.

That failure risks an environmental catastrophe. Pipelines routinely span swamps, lakes, canals and streams and run atop underground aquifers supplying drinking water to millions of people. One gallon of refined petroleum can pollute 1 million gallons of water.

A crude oil pipeline running across Alligator Alley to Port Everglades has suffered 81 spills since 1972. The state already has hundreds of miles of pipelines, including some crossing South Florida's vital water storage area, the Biscayne Aquifer. Petroleum companies are actively pursuing efforts to build additional pipelines into North Florida and then throughout the state.

Although Broward, Palm Beach and Dade counties have adopted tough pipeline ordinances, Florida needs its own law. Fortunately, it could have that law if lawmakers adopt a bill by Senate Natural Resources Committee Chairman Tom McPherson, D-Cooper City.

The bill makes three simple, sensible and long-overdue changes in the law:

- It requires a pipeline company to get development orders from local governments prior to exercising its power to buy private property for the project.
- It gives the state Department of Environmental Regulation authority to regulate pipelines and requires it to adopt rules to carry out that authority by March 1991. The rules must cover design, installation, maintenance, inspection and handling of emergencies.
- And it says a pipeline over five miles long that crosses a county line must comply with strict requirements as a development of regional impact.

The main reason lawmakers should vote for this bill is to fulfill their legal obligation to protect public safety. Without adequate state regulation, a pipeline could in theory be constructed in unsafe areas or ways that would allow leaks to threaten plant and animal life and poison drinking water supplies.

Another reason is to provide a reasonably level playing field for the two competing kinds of companies that transport petroleum products. Shipping companies must spend a lot of money to comply with strict Coast Guard regulations. Pipeline firms don't have to meet any state regulations in Florida.

The federal government has sharply cut back its commitment to pipeline safety; federal regulations are minimal, and the National Transportation Safety Board has only two pipeline inspectors for the entire country.

Florida must step in now; it cannot afford to continue to duck its responsibility to regulate oil pipelines.

January 22, 1990

Sarasota Herald-Tribune

A non-partisan newspaper
Published every morning of the year at 801 South Tamiami Trail.
Sarasota, Florida 34237

Elven Grubbs, Publisher

News:
William F. McIlwain, Executive Editor
Kerry Slagle, Managing Editor

Editorial:
Waldo Proffitt Jr., Editor
C. Herbert Harrigan, Editorial Page Editor

A NEW YORK TIMES COMPANY

Editorials

Is a LONG Pipeline Better?

Plans announced recently to build a petroleum products pipeline from the Port of Tampa to Fort Myers trigger mixed feelings in many if not most observers.

While apparently not as hazardous as ship or truck tankers, a pipeline buried beneath several feet of soil prompts reservations precisely because leaks, seeps and outright breaks cannot be readily seen.

And while we share Manatee County Commissioner Ed Chance's elation that a proposed petroleum pipeline traversing several miles of the Lake Manatee watershed will now be displaced, we note the threat of pollution, if any, has been extended across a broader region.

Regardless of whether a public reservoir watershed lies in its path, any such pipeline poses a potential risk because petroleum products leaking from it could penetrate water table and aquifer formations tapped by private and public wells. Adulteration by petroleum products of such wells would be expensive to remedy and difficult, if not impossible, to reverse.

Presumably, high technology devices are available to detect any problems, and we are certain promoters of the pipeline – the GATX Corp. of Chicago – will so reassure us, but we aren't likely to take much comfort from guarantees made so far.

A spokesman for the project, who stated the company had no plans to traverse any watersheds, obviously needs a lesson in Southwest Florida geography as we count no fewer than six major watercourses – from the Alafia to the Caloosahatchee rivers – to be crossed by this conduit.

That is not to say we categorically oppose the construction of what could prove to be a safe and vital method of moving petroleum fuels from the port to various recipients – including the Tampa Electric Co. which had proposed the Lake Manatee watershed transection.

But, we plan to keep a close watch on the progress of this project and rest assured others, too, will be paying attention.

Tallahassee Democrat/Tue., March 20, 1990

10A OPINION

OUR VIEW

State review

Needed for tank farm

The consultants hired by the Jefferson County Commission — Darabi and Associates Inc. — turned in their report two weeks ago on the proposed 6.6-million gallon tank farm for Lloyd. The commission is scheduled to take up the proposal March 29.

Considering the past performance of tanks farms across Florida and in other states, the threat of contamination to the Floridan Aquifer, which runs under the site and on into Leon and Wakulla counties — must be taken seriously.

Currently the only review is what Jefferson County deems necessary as it considers a rezoning application (from agricultural to commercial).

It is time — as the Tallahassee City and Leon County commissions have requested — for Gov. Martinez to intercede. The governor has done well fighting oil-drilling efforts in sensitive offshore waters. And he successfully pushed for ocean-going vessels near the Keys to further skirt the Florida coast. This problem closer to home needs his attention, too.

Sited as it would be on a hill in Lloyd, the tank farm would be well positioned to threaten a multi-county water supply. Writes the consultant about the flow of stormwater from the 23.14 acre site:

"It is obvious, due to the natural slope of the property, that it currently drains into the low area located adjacent to the southeastern corner of the site. From here, drainage flow meanders through the woods until it crosses under Jefferson Road, into the system of ditches along I-10, west into Still Creek, and then either north into Bird Sink or south into tributaries that eventually discharge into the St. Marks River."

The purity of the Floridan Aquifer should not rest on a Jefferson County zoning decision — one that has been heavily lobbied by a billion-dollar corporation. Clean-up of contaminants in water supplies is extremely expensive. All precautions should be taken to prevent that eventuality. Yet the consultant found the proposed liner inadequate.

"Texaco and Colonial have proposed utilizing high density polyethylene (HDPE) as the liner material. This will not be acceptable in that HDPE is not compatible with gasoline as indicated in the tables shown in Appendix F. . ."

Already the Texaco plan is challenged by one outside engineer. What would a state review find?

The purity of the Floridan Aquifer should not rest on a Jefferson County zoning decision — one that has been heavily lobbied by a billion-dollar corporation. Clean-up of contaminants in water supplies is extremely expensive. All precautions should be taken to prevent that eventuality. Yet the consultant found the proposed liner inadequate.

Last year local government officials in Leon County asked the Department of Community Affairs to consider the tank farm — and the Colonial pipeline that would connect it with points north — a Development of Regional Impact. That designation would bring a broad-based state review. The department declined, on the grounds that the amount of gas to be stored at the proposed site would fall below the state-review threshold.

But state review is needed. Other tanks from other companies could easily be added after rezoning — without any review being required. And the gas continuously stored in the feeding pipeline would push the number of gallons above the state-review limit.

Tank farms are a fact of life in our highly mobile society. Those served by pipelines, as this farm would be may well offer less threat to the environment than those served by tankers. But they should be situated in areas where the risk to the public can be minimized.

The consultant's executive summary gives further reason why state review is necessary:

"While detailed engineering and design calculations and plans have not been prepared by Texaco, it is believed the site soil and hydrogeological limitations can *be potentially* overcome with the application of engineering principles. . ."

What if they are not potentially overcome?

Who will be watching that they are? Who will force corrective action if they are not?

Because many residents outside Jefferson County could be affected by a series of continuous spills, or one large one, the watching needs to be done beforehand.

Just ask the residents of Prince Williams Sound — Alaska.

NEIGHBORHOODS

Woodgate and Lightsey are tops in eyes of neighborhood council

The awards recognize those who act on behalf of neighborhoods and perform outstanding public service.

By Gary Fineout
DEMOCRAT STAFF WRITER

Woodgate, the large neighborhood off Thomasville Road, and City Commissioner Debbie Lightsey took top honors in the annual awards banquet held this week by neighborhood leaders.

Bob Rackleff, a vigorous Colonial Pipeline opponent, was named "David Krause Neighbor of the Year."

The Council of Neighborhood Associations (CONA), the 14-year-old conglomerate of more than 50 Tallahassee neighborhoods, handed out five awards Thursday night.

The awards recognize those who act on behalf of neighborhoods and perform outstanding public service.

"Since neighborhoods are the most vital part of any community, CONA feels it's important to recognize the outstanding neighbor and outstanding neighborhood as it relates to decisions affecting the community," said Bev DeMello, one of CONA's vice presidents.

The award winners were.

■ Neighborhood of the Year Award: Woodgate Neighborhood Association.

■ Carol Bellamy Official of the Year Award: City Commissioner Debbie Lightsey The late Bellamy was a CONA leader and city commissioner.

■ David Krause Neighbor of the Year Award: Bob Rackleff David Krause was one of the organizers of CONA.

Rackleff has led the opposition against a plan to build a 60-mile petroleum pipeline from Bainbridge, Ga., to Lloyd in Jefferson County, a project that opponents say will threaten the Floridan Aquifer, the area's major source of drinking water.

■ Youth Recognition Award: Students Against Violent Environments (Godby High School).

■ Citizen's Service Award: Delta Kappa Omega Chapter of Alpha Kappa Alpha sorority

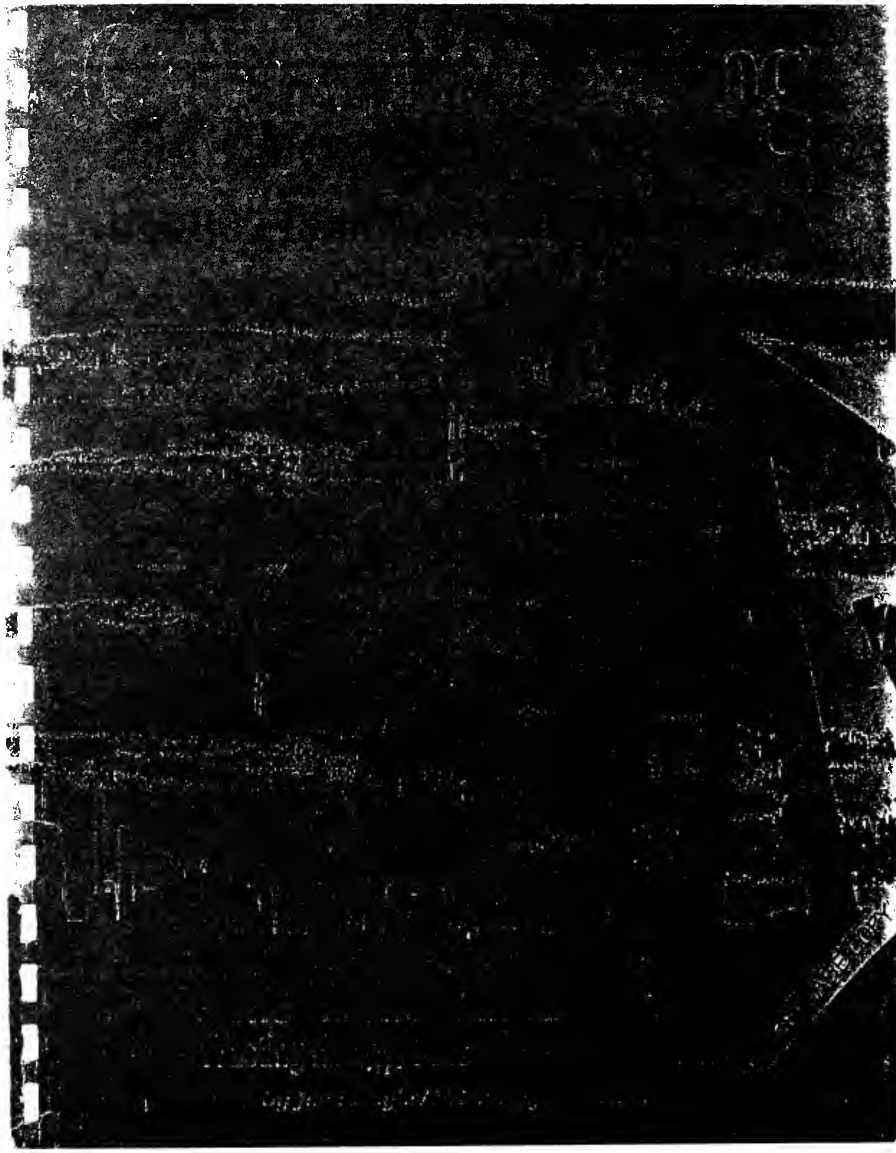
CONA board of directors member Wally Senter said Woodgate took top honors this year for its long-standing habit of doing neighborhood projects, including bicycle rallies and beautification efforts, as well as being well-organized.

Lightsey, CONA officials said, was tapped as the top elected official for her support of the Comprehensive Plan and her defense of neighborhoods.

"As I told CONA, accolades are few and far between in this business, and when one comes from a group like this it is even dearer," Lightsey said Friday.

Godby High's SAVE group was recognized for its campaign to stop school violence.

The sorority group was awarded for its community involvement on a reading and mathematics enrichment program.



6
A CRACK IN THE PIPE

Bob Rackleff used to write speeches for President Jimmy Carter. Today he finds leaks in pipelines and probably knows more about the petroleum pipeline business than many industrial experts.

Rackleff came to this avocation not in pursuit of a second career as a petroleum engineer, but rather as an ordinary citizen. In 1988, he and his family retired from the Washington D.C. fast-track and moved to what they thought would be a more comfortable existence in the rural community of Lloyd, Florida.

Not long after they arrived, however, Rackleff and his wife JoEllyn learned that a petroleum pipeline and a 6.5 million gallon gasoline tank farm were coming to their neighborhood.

Texaco, Amoco, Citgo, and the Colonial Pipeline Company, which the oil companies own in part, planned to extend an existing pipeline from Georgia into Lloyd, where it would connect to the proposed gasoline tank farm. Marketing officials, with an eye on booming Florida growth and the growing gasoline market of Tallahassee, less than 20 miles away, thought the location was ideal for a terminal.[3]

But Bob Rackleff and his neighbors had another view. They started asking questions, digging up statistics, and filing lawsuits. Rackleff soon became a leader in raising questions about the proposal. What he learned about petroleum pipelines in the United States of America astounded him.

He discovered, among other things, that:

- neither the federal government nor most state governments have accurate maps of where pipelines are located;
- 41 states do not regulate pollution from pipelines;
- there are no federal requirements for oil companies to monitor pipelines;
- the Office of Pipeline Safety (OPS) in the U.S. Department of Transportation (DOT), an agency charged with regulating some aspects of pipeline safety, had too few inspectors to cover the nation's pipeline system — for example, 4 federal inspectors cover all the interstate pipelines in 13 Midwestern states;
- there can be wide discrepancies in the number of pipeline spills reported at the federal level and those reported at the state level;
- from 1987 through 1989 — when pipeline companies spilled almost 33 million gallons in 580 separate instances — OPS fined the companies a total of $188,000; and
- the U.S. Environmental Protection Agency (EPA) has no role in regulating or preventing pollution from pipelines, but can be called in to clean up spills.[4]

"Petroleum pipelines have operated for decades fooling people that 'out of sight, out of mind' means a good pollution record."

— Norma Turner, Citizen Activist, Port Angeles, Washington

There are more than 200,000 miles of interstate and intrastate petroleum pipelines in the United States. They are found in all 50 states, and they carry every conceivable oil product, from crude oil to gasoline to jet fuel. The pipelines range in size from several inches to more than four feet in diameter.

Most were built between 1947 and the mid-1960s — laid segment by segment and joined seam by seam into one of the largest transportation systems ever built. The system is underground for the most part. So when something goes wrong, most people never see or hear about it.

But something has gone wrong, and even the people that should know don't really have a handle on it.

A Million Gallons A Month

America's petroleum pipelines are leaking — leaking badly. Friends of the Earth estimates that petroleum pipelines leak at least 12 million gallons a year. But that's a conservative estimate, for several reasons:

- First, as of 1985, spills of 2,100 gallons or less do not have to be reported.
- Second, some pipelines — such as low-pressure gathering lines, which account for 15 percent of all petroleum pipelines — have been exempt from federal leak-reporting requirements.
- Third, according to U.S. General Accounting Office (GAO), most companies do not comply with the reporting requirements that do exist.
- Fourth, no single federal agency has an accurate list of the number, age, and location of all the nation's pipelines.[5]

TABLE 6-1
U.S. INTERSTATE & INTRASTATE PETROLEUM PIPELINES

Crude Oil Trunk Lines	65,000
Gathering Lines	56,000
Product Lines	91,000
TOTAL	212,000

One study of pipeline leakage, based on leaks reported to the DOT's Office of Pipeline Safety, indicates that more than 256 million gallons of petroluem leaked from pipelines between 1970 and 1990 — an average of 12.2 million gallons per year. But Bob Rackleff and other observers believe that, because of undetected leaks and unreported spills, total pipeline leakage may be as high as 20 to 30 million gallons per year.

Pipeline Pollution

Pipeline leakage — like storage tank leakage *(see Chapter 3)* — can cause environmental harm, such as polluted drinking water.

According to DOT, almost all petroleum pipelines travel through or near bodies of water.[6] Yet, as the GAO discovered in its 1991 investigation, "there is no federal program with the goal of preventing water pollution from pipelines."[7]

Although DOT is responsible for preventing water pollution from petroleum pipelines under the Clean Water Act, "it has not established a program to prevent water pollution caused by pipeline spills," according to GAO.[8]

In fact, until 1992, DOT's Office of Pipeline Safety allowed low-pressure petroleum pipelines to be completely exempt from regulation, regardless of their potential for causing water pollution. Nor did OPS require that nearby waterways be considered in the routing and building of new pipelines.[9]

It's no wonder then that pipelines have been polluting the nation's water resources on a regular basis.

"Pipelines have experienced, on average, more than one water-polluting spill per day between 1980 and 1989," reported GAO. "These spills range in size from less than 1 gallon to 3.5 million gallons, averaging 5,000 gallons each..."[10]

Now, under new regulations mandated by the Pipeline Safety Act of 1992, OPS in consultation with EPA must issue regulations to define environmentally sensitive areas and identify all pipelines that cross navigable waterways. The regulations, however, are not expected to be final until November 1994.

Who's Responsible?

Most of the pipelines that operate in the U.S. today are owned and operated by the major oil companies — either through their subsidiaries or through joint ventures. Oil-company owned pipelines account for one-third of all oil transported in pipelines, while joint ventures account for 45 percent.[11] Oil companies, in other words, have at least some equity in about 80 percent of the petroleum pipeline network.

Table 6-4 and Appendix X illustrate that these oil-company controlled pipeline companies have been responsible for numerous spills and leaks.

But oil companies often give pipeline companies full title to the oil while in transport, a practice which can relieve the oil company of legal responsibility should a spill occur. In Florida, for example, Exxon uses the Sunniland Pipeline Company of Fort Lauderdale to move oil across the Everglades. Exxon claims it isn't responsible for what happens to the oil in Sunniland's pipeline.[14] So Exxon bore no responsibility when Sunniland spilled 21,000 gallons of crude oil in March 1989 in south Florida.

A CRACK IN THE PIPE

Oil Company Record

Government records indicate that many pipeline leaks could have been prevented.

"The spills could have been prevented, either by management or by the persons that caused the spills," wrote Langley Adair, a Florida Department of Environmental Resources (DER) official, after an unsuccessfull attempt to fine Sunniland $15,000 for a series of oil spills that occurred between November 1983 and February 1985.[15]

A review pipeline-related court action suggests that Adair's sentiments are shared by government officials across the nation:

New York — In February 1990, New York City took Exxon to court, charging that the company had submitted false pipeline safety reports since 1984, a practice that contributed to a January 1, 1990 spill of 567,000 gallons of heating oil into the Arthur Kill waterway.[23]

Prior to the lawsuit, Exxon publicly admitted that its leak detection system had not worked properly for 12 years, and that it frequently gave false signals. It was common practice to ignore leak signals and override a system that automatically shut down the pipeline when a leak was detected.

That became a fateful practice on the evening of January 1, 1990, when workers twice overrode a leak signal they thought was false. The mistake allowed oil from a broken underwater pipeline to flow into the Arthur Kill for five hours.[24]

In March 1991, Exxon settled out of court with the city, agreeing to spend $10 to $15 million on environmental improvements to avoid litigation. Some of this money was used to buy wildlife habitat and undertake ecological studies. Exxon never formally faced the fraud charges.[25]

Alaska — The state fined ARCO $200,000 after it under-reported the size of an August 1989 pipeline spill in its Kuparuk field. An estimated 312 to 603 barrels spilled onto the tundra when a valve failed. ARCO initially reported a spill of only one barrel. Two weeks later it raised the estimate to the full amount.

ARCO says it did not intentionally under-report the size of the spill. Nevertheless, the state ordered ARCO to improve its spill reporting procedures, clean up the site, and accelerate pipeline maintenance. In September 1991, the site was still being cleaned up.[26]

Washington — The state fined U.S. Oil & Refining Co. $45,000 for a 600,000 gallon spill from a broken 16-inch underground pipeline. The January 1991 break apparently resulted from heavy equipment operating over the pipeline. U.S. Oil was found negligent for not adequately protecting and marking the pipeline right-of-way.

"Only one foot of soil covered the pipeline where the rupture occurred and there were no warning signs over any portion of the 5,000-foot pipeline," noted the state Department of Ecology.[51]

Montana — In April 1992, a pipeline gasket failed at the Yellowstone Pipeline terminal in Missoula, Montana, allowing 5,000 gallons of gasoline to spray from the pipe. It was the fifth spill at the terminal — run by Conoco, Du Pont's energy unit — since November 1990.[52] City health officials, concerned that the spills might pollute the city's drinking water, ordered Conoco to protect the Missoula aquifer below the site.

"We are, as a community, just coming to terms with the fact that we live above our drinking water," said Ellen Leahy, director of the Missoula City County Health Department in issuing the order. "The protective measures you've taken to date don't measure up to what is required."[53]

Conoco had no alarm system at the terminal, and nearly all of the leaks had been reported by passers-by. An investigation of the 1992 spill also revealed that the terminal lacked an automatic shut-off system; it took a

TABLE 6-2
REPORTED PIPELINE SPILLS

YEAR	GALLONS
1970	22,097,418
1971	9,805,362
1972	14,462,700
1973	15,727,404
1974	12,127,962
1975	13,312,614
1976	10,060,722
1977	9,403,338
1978	11,779,530
1979	22,900,248
1980	12,005,238
1981	8,588,622
1982	9,214,926
1983	16,020,942
1984	12,008,010
1985	7,065,702 *
1986	11,756,850
1987	15,341,634
1988	9,089,640
1989	8,452,076
1990	5,206,656
TOTAL	256,427,594
Average	12,210,838

Source: Annual Report of Pipeline Safety (1978-1990), Office of Pipeline Safety, U.S. Department of Transportation. (*) Pipeline spills from 1985 to present reported if they exceed 2,100 gallons; prior to 1985 all spills larger than 210 gallons were supposed to be reported.

TABLE 6-4
The Top 30 Pipeline Spills, 1985-1993

COMPANY	DATE	LOCATION	GALLONS	PRODUCT	DAMAGE /POLLUTION/OTHER
Lakehead Pipeline	3 Mar 91	Grand Rapids, MN	1,700,000	crude	Prairie River & wetlands[27]
Amoco	29 Jun 91	Denver City, TX	1,450,000	crude	ground spill[2]
Texaco	23 Jan 89	Winkler Co.,TX	900,000	crude	spilled on ranchland
Shell/Texaco	Dec 88	Vienna, MO	840,000	crude	Shoal Creek, Gasconade, Miss. & Mo. Rivers[29]
Shell	19 Feb 90	Roxana, IL	672,000	crude	refinery spill[30]
U.S Oil	6 Jan 91	Tacoma, WA	600,000	crude	Blair Waterway (Puget Sound) & soil[31]
Exxon	2 Jan 90	Arthur Kill, NY	567,000	#2 heating oil	pollution of Arthur Kill;400 dead birds[32]
Colonial Pipeline	19 Dec 91	Greenville, SC	546,000	fuel oil	pollution of Durbin Crk. & Enoree River[33]
Exxon	13 Jan 89	Eugene Island, LA	588,000	crude	corrosion, most recovered[34]
Coastal Derby	25 Dec 90	Sedgwick Co., KS	447,720	naphtha	ground spill
Marathon Pipeline	27 Apr 85	Newton, IL	452,550	crude	pipe rupture; pollution of Newton Lake[35]
GATX	3 Aug 90	Carteret, NJ	420,000	jet fuel	contained; 300 yards from Arthur Kill[36]
Texaco	28 Mar 89	San Joaquin Valley, CA	420,000	crude	line rupture; into dry bed of Salt Creek[37]
Colonial Pipeline	29 Mar 93	Fairfax Co., VA	400,000	diesel oil	Sugarland Crk.& Potomac River
Amoco	5 Jun 90	Alberta, Canada	360,000	lt crude	seam failure; most cleaned up[38]
Shell	28 Nov 92	McCamey/Houston, TX	357,000	oil & water	line rupture[39]
Amoco	6 Nov 90	Salisbury, MO	300,000	crude	pipe rupture; wat. pollution & fish kill[40]
Chevron	20 Dec 89	Beaumont, TX	231,000	crude	pollution of Hildebrandt Bayou[41]
Amoco Pipeline	17 Jan 92	Bowring, OK	210,000	crude	corrosion; $75,000 prop. damage
Petrofina	22 Oct 89	Crane Co., TX	207,300	crude	ground spill[42]
Williams Pipeline	13 Jan 92	Renner, SD	200,000	gas & diesel	leaked onto farmland[43]
Fina Oil	22 Sep 91	Port Arthur, TX	189,000	crude	ground spill[44]
Platte Pipeline	9 Jan 92	Salisbury, MO	172,000	crude	seam failure; farmland spill
Scr Permian(Amoco)	5 Feb 92	Johnson Co., WY	168,000	crude	ground spill
Texaco	8 Jan 91	Augusta, KS	160,000	lt. crude	some oil in local creek[45]
Conoco	14 Sept 89	Judith Basin, MT	160,000	lt. crude	land spill; half recovered[46]
Sun	11 Jun 89	Liberty, TX	147,000	crude	pollution of Trinity R.[47]
Amoco Oil Co.	16 Mar 92	Delta Co., MI	126,000	#2 fuel	ground spill[48]
Mobil	26 Apr 90	Gorman, TX	110,000-210,000	crude	pollution of Sabana River; 6,000 fish dead
BP	29 Nov 90	Oregon, OH	105,000	decanted fuel[49]	

Source Friends of the Earth, Washington, D C Compiled from published sources and news sources See also Appendix ___ includes an additional company-by-company listing of pipeline spills, by date, location and amount spilled

worker 20 minutes to manually crank a valve 120 times to close the pipeline. An automatic system would have taken two minutes.[54]

Conoco says it will install motorized block valves at points leading into and out of the Missoula terminal. The new valves will be controlled by pipeline managers in Houston, who oversee the operations of the entire line, which runs from Billings, Montana to Moses Lake, Washington.

New Mexico — Twenty-five miles northwest of Carlsbad, New Mexico, in country known mostly for its rattlesnakes and desert, the Marathon Oil company has operated the Indian Basin gas processing plant since 1966. The plant, which produces petroleum condensate, has four incoming gathering lines.

Through 1989 and most of 1990, production at the plant was about 11,000 barrels per day. Then, in November 1990, production suddenly dropped to 4,600 barrels. Something was wrong.[55]

Four months later, on April 12, 1991, workers found the problem. They discovered a colorless, salty mixture of oil and water bubbling out of Gathering Line #4 about 800 feet south of the plant. According to Marathon, corrosion caused the line to break.

Company officials estimated that the break had occurred the previous fall and calculated losses of 1.5 million gallons of oil and 840,000 gallons of produced water. It was the largest leak ever recorded in New Mexico.

At the state's request, Marathon dug monitoring wells that revealed as much as a foot of oil floating on groundwater. The plume was moving at the rate of six inches to a foot each day, and by August 1991 had moved about a mile east of the pipeline break.

New Mexico officials believe it will be some time before the plume threatens drinking water supplies — the nearest wells are about three miles away — but they don't know if heavy rains will speed the plume's movement.

Chris Shuey, Director of the Community Water Quality Program at the Southwest Research and Information Center in Albuquerque, believes Marathon was negligent in dealing with the leak. He maintains that the company could have prevented the leak with better pipeline installation and monitoring practices. For example, he says the gathering lines should have been equipped with flow meters, which would allow workers to detect and address any loss in volume quickly. The pipelines should have also included a corrosion prevention systems.

Shuey believes the state should have sought fines and penalties in the incident, given the magnitude of the leak and the toxicity of the pollutants. "These leaked fluids can be acutely and chronically toxic to both humans and animals," he said. "The damage that these long-term discharges may bring to the regional ground water system may not be known for years."[56]

Kansas — Mary and Ray Simmons of Wichita, Kansas were just about to break ground for a new home when they learned of the contamination. The groundwater beneath their land — their sole source of drinking water — contained 17,000 parts per billion benzene, a chemical which can cause cancer. Where did the benzene come from? The Simmons believe it came from a nearby Conoco pipeline. In February 1990, a weld gave way, allowing 42,000 gallons of jet fuel to spill from the pipeline. Unaware of the spill, the Simmons purchased their property a year later. Today, their construction plans are on hold and they are in court seeking relief from Conoco.[61]

Conoco pipelines, which are also implicated in spills in Valley Center and east of

TEXACO SPILL ON TEXAS RANCH

Rex Pigmon had seen oil spills on his West Texas ranch before. But the one on January 24, 1989, was different. The 62-year old Winkler County cattleman sat in his pickup for a long minute, watching the stream of smelly crude flow across his land toward the road. He thought about getting out for a closer look, but the danger of poisonous gases and explosion made him stay put...

...Within a few hours, three bulldozers, a herd of trucks, and two dozen men were at the site, scrambling to contain the thousands of gallons of crude draining out of the 20-inch diameter Texaco pipeline. The bulldozers built levees to contain the gushing oil. As the dozers worked to wall in the spill, two vacuum trucks sucked up the heavy-smelling crude. As soon as one truck was full, it turned around and headed for the row of huge gray oil tanks at the pump station. But there just weren't enough trucks to keep up with the rising oil. Soon the levees gave way and the sulfurous oil crept over the arid terrain. Before the oil stopped flowing, six acres of Pigmon's land — an are the size of four and a half football fields — was covered with oil.

Twenty-four hours after Pigmon found the leak, the pipeline was still draining. The welders and pipe fitters waited and watched as the oil occupying the twenty miles worth of pipe oozed out onto Pigmon's property. Finally, around noon, the damaged pipe was empty. Backhoes dug out the buried pipe, and the ruptured section was cut out. Seventy-four feet of new pipe were laid in place, and by six o'clock that evening, the welders were gone. The dozers leveled the dikes. The oil that couldn't be vacuumed up was covered over with dirt. That done, the remaining crew loaded the equipment and drove away — leaving a chunk of Pigmon's land oil-soaked and sterile. ...When [Pigmon] learned two months later that nearly one million gallons of crude had leaked onto his land and was beginning to contaminate his groundwater, he got mad. And when Texaco offered him $1,2000 for damages, he got a lawyer...

(Excerpted from Robert Bryce "More Precious Than Oil," *Texas Monthly*, February 1991.)

WYOMING SPILL WIPES OUT TROUT; TAINTS WATER

It was April 1987. Mike Sullivan, then governor of Wyoming, was surveying the damage to the North Platte River from a circling helicopter. A Conoco pipeline near Casper had ruptured, spilling gasoline into the river. Dead fish were washing up on river banks — some were calling it the worst disaster in Wyoming history for a prime trout fishery.[67]

Bill Wichers, a Wyoming fisheries supervisor, reported that about 1,250 trout per mile of stream had been killed, about 14,000 fish in total. More fish were expected to succumb to the spill. Wichers estimated it would take three to four years for the fishery to recover.[68]

Joe White, chief of fisheries for Wyoming Game and Fish, was optimistic about the long term. He said the spill would not have a long-lasting environmental impact on the river. The spring runoff from upstream reservoirs would flush the river of fuel, he said.

Conoco promised to restock the river. But dead trout weren't the only problem. Near Casper, residents were told not to drink or cook with their tap water. At one water treatment location, officials reported contamination levels of .9 ppm gasoline at the top of a water storage tank and .14 ppm at a treatment plant.[69]

"The purpose of the ban is to make sure that someone is not going to drink gasoline or any water with gas in it," explained Dan Coughlin, Manager of the Brooks Water and Sewer District.

At the time, however, Wyoming's DEQ did not plan any enforcement action against Conoco.

Wichita, aren't the only ones leaking in Kansas. Coastal, for instance, has a number of leaking pipelines in the state. In Conway Springs, residents discovered oil pollution beneath their land and new homes, the result of a leak in the Coastal Derby Pipeline, a crude oil gathering line that is exempt from federal regulation. Another Coastal pipeline leaked refined petroleum at Park City.

A Coastal line near Kechi spilled naphtha in December 1989. The naptha line leaked again on Christmas Eve, 1990 near Benton, spilling 420,000 gallons and forcing four families to leave their homes.[63] According to John Stoner, spokesman for DOT's regional pipeline safety office, the agency didn't even know the Coastal naptha pipeline existed until the second incident was reported. Coastal now has a computerized leak monitoring system on the line.[64]

Other Kansas pipeline leakers include: Kaneb Pipeline (spilled gasoline at Arkansas City and Augusta); Amoco (spilled crude near Valley Center); Koch (leaked gasoline at Maize); and Phillips (might have a gasoline leak from a pipeline near its Wichita terminal).[65]

"From our standpoint, [the pipelines] are unregulated," says Kyle Parker, a geologist with the Kansas Department of Health and Environment. "That is the biggest problem. As far as preventive regulations, our department has none. As far as specific cleanup regs, our department has none. It is pretty difficult to deal with."[66]

Mobil's "Chronic Leaker"

Mobil called the 28,980 gallon crude oil leak from its pipeline into Bull Creek at Granada Hills, California "an isolated incident." That's the term company officials used in an April 1986 a letter to the state Fire Marshall's office.

But the leaks continued over the next few years. The line, which carried heavy "tarry" crude oil from Mobil's oil fields in Kern County to its refinery at Torrance, had seven leaks greater than 2,100 gallons between 1985 and 1991. This is an accident rate about 10 times higher than that for similar crude pipelines.

The leaks — of crude heated to 180 degrees to keep it flowing — included:

- 2,520 gallons in Van Nuys, November 1985;
- 28,980 gallons in Granada Hills, April 1986;
- 6,300 gallons in Torrance, June 1986;
- 105,000 gallons in Lebec, June 1987;
- 132,000 gallons in Encino, September 1988;
- 120,000 gallons of oil & water in Sherman Oaks, September 1988;
- 1,040 gallons in Valencia, May 1990; and
- 74,634 gallons again near Valencia in January 1991 (some of the oil made its way to the Santa Clara River).[71]

"The line's a chronic leaker," said Jim Wait, chief of the Los Angeles Fire Marshal's pipeline safety division. And Ken Cude, division engineer for the L.A. Department of Transportation, cited the line's "inordinate" number of spills.[72]

What was causing the problem?

Some theorized it was age — parts of the Mobil pipeline were 50 years old. But many of the leaks occurred in portions of the line that were less than 20 years old, so age wasn't the only factor.

"There's something else that's going on, no question about it..." said Richard Beam, deputy associate administrator of DOT's Office of Pipeline Safety. "It's a question of how the line was designed, constructed, and what its maintenance record is."[73]

And, Beam could have added, it also may be a question of what kind of protective coatings Mobil was putting on the inside of its pipelines to prevent corrosion.

Mobil's April 1986 "isolated" leak, for example, was blamed on an ineffective coating called "T-1," which had been installed in 1964. After the spill, Mobil told the Fire Marshall's office that it was replacing line segments that were coated with T-1.[74]

The incident illustrates that the science of pipeline coatings isn't as far along as some might expect. James Nunn, corrosion manager for Mobil's pipeline subsidiary, wrote about the uncertain business coatings in the May 1987 *Oil & Gas Journal*.

Nunn wrote that Mobil expected each new coating it tried "to be superior to its predecessor." But some coatings — including several designed to prevent corrosion at high temperatures — "failed to reach full expectations."[75]

Nonetheless, Mobil keeps experimenting with its new coatings — and public safety — in the field. Recently, for example, it introduced a new, "state-of-the-art" coating developed by Du Pont Canada and Valspar Inc. But even this state-of-the-art coating carries no assurances. "We do not know, it is true, that in 50 years (it) will not spring any leaks," says Valspar technical consultant Toni Pfaff. "But the new hybrid coating is the very best that the industry has been able to come up with."[76]

Mobil Pays The Piper

The promise of better pipeline coatings in the future, however, was not enough to prevent the Los Angeles officials from filing twelve misdemeanor criminal charges against Mobil for negligent upkeep of its pipelines after the company's September 1988 spills.[77]

"We believe the evidence shows that the rupture and spill could have been avoided if Mobil had detected the corrosion problem through proper monitoring of the pipeline," said Los Angeles City Attorney Jim Hahn.

After the second Mobil spill, oil had bubbled out of the ground and flowed into storm drains that dump into the Los Angeles River. Oil also went into the city sewer system, and

PIPELINES LEAK OFFSHORE, TOO

Offshore oil development has been booming around the globe in recent years and so has the construction of offshore pipelines, which connect drilling platforms to onshore facilities. This underwater pipeline network is vast. Exxon alone, for example, has 3,000 miles of offshore oil and gas pipelines worldwide.[58]

The offshore pipeline system is even more dimly understood than the onshore system. But it too is leaking.

In the Gulf of Mexico, for example, 690 offshore pipeline failures were reported to the U.S. Minerals Management Service between 1967 and 1987. Of these, 290 resulted in "measurable pollution," summarized in the October 1990 *Oil & Gas Journal* as follows.[59]

- 274 spills — less than 4,200 gallons
- 9 spills — between 4,200 and 42,000 gallons.
- 5 spills — between 42,000 and 420,000 gallons.
- 2 spills — more than 420,000 gallons.

Gulf of Mexico pipeline failures appear to be increasing. Between 1967 and 1977, companies reported more than 40 pipeline failures in only one year. But between 1978 and 1987, there were five years in which companies reported 50 or more spills.

"The significant increase in failures since 1975," *Oil & Gas Journal* concluded, "can be attributed to the increase in the pipeline population, aging of the pipelines installed earlier, and the increased offshore construction activity."[60]

vacuum trucks had to pump more than 60,000 gallons out of collection tanks at the Hyperion sewage treatment facility.[78]

The maximum punishment could have been six months in jail. Mobil received a better deal, however. Fearing additional lawsuits, the company "pled to the most anomalous" counts, according to city attorney Vince Sato. In an off-the-record agreement, Mobil paid a $2,000 fine plus emergency response and clean-up costs of about $100,000.[79]

But that wasn't the end of Mobil's travail. The Los Angeles District Attorney for the State of California filed a felony complaint against the company for fouling the Santa Clarita River and violating the state's hazardous waste disposal law.[80] That case is still pending.

Spills Expedite New Line

Mobil did not go away empty-handed from its Los Angeles ordeal. In fact, the spills along the Kern County-to-Torrance line — especially those occurring after 1988 — actual-

Table 6-3
Oil Company Pipelines

Amoco
Operates a 17,193-mile pipeline system in North America, including 2,781 miles of gathering lines & 14,412 miles of trunk lines. Shipped 373 million bbls of crude oil & 366 million bbls of refined product & feedstock in 1991; holds minority interests in 10 other lines, including: 14.3 percent in Colonial Pipeline and 10.5 percent in Endicott Pipeline, which feeds into the Trans Alaska Pipeline.[18]

Ashland
Capline System (LA), Rancho Pipe Line System (TX), Tecumesh Pipe Line Co. (IN & OH), Minnesota Pipeline Co. (MN)

Mobil
Owns or partly owns 18,479 miles of crude oil natural gas liquids, natural gas, and carbon dioxide trunk & gathering lines, and 8,071 miles of product lines; owns Mobil Alaska Pipeline Co., Mobil Pipe Line Co., and holds a 9.085 percent interest in the Trans Alaskan Pipeline System (U.S.).[19]

Occidental
Owns MidCon Corp., a pipeline transportation subsidiary & the Natural Gas Pipeline Co. of America.

Shell (U.S.)
Owns or partly owns more than 17,800 miles of petroleum pipelines in U.S.; owns Shell Pipe Line Corporation.[20]

Sun
Owns & operates crude oil gathering lines & crude oil and petroleum product pipelines in 9 states; holds equity interests in other crude oil and refined product pipelines, including the Mid-Valley, West Texas-Gulf, Explorer, and Inland systems.[21]

Texaco
Owns or has interests in some 30,000 miles of pipelines worldwide; owns Texaco Pipeline, Inc.

Unocal
Owns, partly owns, or leases 9,500 miles of raw material pipelines; holds 20.75 percent interest in Colonial Pipeline Co; holds 1.36 percent interest in Trans-Alaskan Pipeline System; the Unocal California Pipeline Co. owns & operates crude oil gathering lines & trunk lines in California.[22]

ly worked to Mobil's advantage, because they helped the company secure approval for building a new replacement line. Mobil announced plans for the new line in August 1989.[81]

In April 1991, Los Angeles Transportation Commission member Marion C. Fay cast her vote in favor of the new line, saying "The current pipeline is dangerous to the point of certain rupture."[82]

Some observers, however, say the safety issue was simply part of Mobil's strategy for getting permission to bring more crude into the region for refining, which would mean more air pollution in the already smog-choked L.A. area. Others also saw the new pipe's increased capacity — up to 126,000 barrels per day, or twice that of the existing line — as a back door route to an additional pipeline in the region.

To address these concerns, Mobil was restricted to 75 percent of the pipe's design capacity, or 95,000 barrels a day. That was still about one-third more oil than the old line carried. But Mobil said its refining level would remain the same, since it would be cutting back on deliveries from other sources.

The new line — now being built over the objections of some citizen groups — will be much improved, according to Mobil. It will include the latest state-of-the-art coating and have a uniform 16-inch diameter — unlike the existing line. This will allow the company to use a "smart pig" — a robot that crawls along the line — to scan periodically for corrosion.[83]

Williams: A Careless Pipeline Company

In January 1992, a visitor noticed discolored soil on Vernon Berg's farm near Renner, South Dakota. The dark stain signaled a larger problem below the surface — a pipeline leak of more than 200,000 gallons of gasoline, diesel and jet fuel. A hairline crack in the pipeline, owned by the Williams Pipeline Company, had allowed the fuels to seep out.[84]

This was not the first time that Williams' pipelines were found leaking. Indeed, throughout the company's 10-state operating region, pipeline leaks and explosions had occurred on numerous occasions:

- In Mounds View, Minnesota in July 1986, a Williams gasoline pipeline exploded into a raging fireball, shooting flames 50-feet into the air, killing a mother and daughter running from their home.[85]
- In Iowa, explosions in Milford and Pleasant Hill in 1986 killed four Williams workers.
- In Kansas, Williams' pipelines spilled 192,000 of crude oil in 1979.[86]

Williams' pipelines, in fact, have been spilling oil for nearly 30 years *(see Table 6-5)*. Between 1982 and 1992, company lines lost more than two million gallons of petroleum products and fertilizers.[88]

Investigations following the 1986 Mounds

FARMER RECALLS COMPANY ARROGANCE IN SPILL OF '47

"...The pipeline spill near Corson is similar to one that occurred on our farm ...in April 1947. No official gallonage was given because at that time there was no legal recourse for something like this.

"I discovered this spill when I found four or five inches of diesel fuel on top of the water in a pasture creek, eighty rods from the spill. The company (not Williams) said they were short 50 to 100 barrels of fuel, but they didn't know if this was the only leak. The only clean up at that time was to set fire to the fuel on the surface and burn it off.

"The only means of communication between the repair crew and the company office was the phone at our house. When the office called the crew, they asked my wife (eight months pregnant) to walk sixty rods out to the crew and have them come to the house for the call. This was almost a daily occurrence, sometimes more than one a day. Even after the baby was born, the calls kept coming until the work was completed in September.

"I asked the company official what we could expect for my wife's cooperations and damage to the land.

"He replied, 'If you want anything, you can take it to court. That's what we keep our lawyers for.' We never received one cent or even a letter of thanks from the company.

"This spill turned up in our 600-foot Dakota Sandstone well about 10 years later..." — Kerwin Ulrickson, Canton, S.D.[92]

View explosion found that Williams had inadequately maintained and protected the pipeline against corrosion. The company, which knew that the pipe was inadequately protected for five years before the accident, was fined $115,000 by DOT's Office of Pipeline Safety, the largest fine ever collected by the agency at the time.

The Mounds View incident also touched off a Minnesota probe into Williams' record, which turned up 64 spills in the state between 1967 and 1986. Thirty-one spills were caused by corroded equipment. Minnesota levied some $190,000 in fines on the company for spills during that period.[89]

In South Dakota, politicians and the public are still seething over a 1987 spate of Williams pipeline and tank farm spills in Sioux Falls and Watertown (*see Chapter 3*). "Williams Pipe Line Co. reminds us of a politician with good instincts and no conscience," said the editors of the Sioux Falls *Argus Leader* in a February 1992 editorial. "Company officials talk with great sorrow and concern every time one of their aging pipelines leaks, polluting the environment and endangering public health. They seem to do whatever needs to be done at the moment, but nothing more. As soon as public attention turns away, it's back to business as usual."[90]

That view appeared to be shared by Illinois officials who had worked with Williams. "When they're pushed into a corner, they're responsible," said Jim O'Brien of the Illinois Environmental Protection Agency. "Otherwise, it's....just see what they can get away with."

A Big Company

The Williams Companies of Tulsa, Oklahoma is no small outfit. It is the fourth largest petroleum products pipeline company in the nation, right behind Amoco, Mobil and Exxon. The company operates more than 8,500 miles of pipelines that transport crude oil, petroleum products and liquid fertilizer to some 45 terminals in North and South Dakota, Nebraska, Kansas, Iowa, Missouri, Minnesota, Illinois and Wisconsin.

Some of Williams' oldest lines were built in the 1930s without any corrosion protection. And although the company decommissioned about 2,100 miles of its oldest lines, it left hundreds of miles of deteriorating lines in operation.

In early 1992, U.S. Senator Tom Daschle (D-SD) wanted to know why the company's aging lines weren't being monitored more closely, or better still, replaced. "It's unfortunate we've had to just wait for another spill," he said. "If Williams were a good corporate citizen, you'd expect them to be monitoring these aging lines closely."[91]

What was particularly troubling to Daschle and other South Dakota officials was the fact that a leaky Williams pipeline passed over the Big Sioux Aquifer, which supplies half of Sioux Falls' drinking water. To protect the aquifer, South Dakota's Attorney General had filed a civil action against Williams and, at one point, Sioux Falls city commissioners discussed rerouting the pipeline.[93]

By April 1992, a Sioux Falls Pipeline Safety Committee had issued a seven-point plan for dealing with the Williams lines. They called for vapor and corrosion testing along the line; lowering the operating pressure; installing remote-controlled valves with electronic sensing devises; and requiring Williams to complete a spill response and clean up plan for the Big Sioux Aquifer area.[94]

Earlier, in February, the South Dakota Senate unanimously passed a resolution urged Williams to install monitoring and sensing devices in sections of the pipeline that threatened groundwater. But in the House, a measure aimed at regulating pipelines was watered down to request a year-long study of pipeline safety.

A Deteriorating System

South Dakota isn't alone in grappling with pipeline safety. Other state and federal officials are also taking a closer look at the nation's petroleum pipeline system. They are finding an aging, corroding network in need of extensive repair and replacement.

"A major challenge ahead is the general aging of the pipeline infrastructure," says Travis Dungan of DOT's Office of Pipeline Safety.[95]

In New Mexico, the director of the state's Oil Conservation Division (OCD), William J. LeMay, reported that in the first four months of 1991, "60 percent of production line leaks reported to OCD and 86 percent of injection line leaks were attributed to corrosion — totalling approximately 3,400 barrels of oil and 3,900 barrels of [produced] water..."[96]

In the Great Lakes states, "a potential spill from storage tanks and pipelines is particularly acute because of the aging pipeline and storage tank infrastructure," concluded a September 1991 report to the region's governors.[97]

In the Gulf of Mexico, "corrosion is the leading cause of failures of subsea pipelines," an industry investigator reported in *Oil & Gas Journal*.[98]

The Alaskan Pipline

Pipeline corrosion is not always the handiwork of time and nature. Indeed, sometimes those who designed and built the pipeline must carry the blame for the speed and extent of corrosion.

The Trans-Alaskan Pipeline System (TAPS), for example, was supposed to be the engineering marvel of its time. The oil industry boasted that it would last 30 to 40 years. Some even called it "rustproof."

But in 1990, only 13 years after the line opened, Alyeska — the oil company consortium that owns and operates the pipeline — found hundreds of corroded spots in the pipe's steel walls, some as large as quarters.

"What's surprising to us is the degree of corrosion," said DOT's pipeline safety director, George W. Tenley, when the corrosion reports first arrived. "I don't think anybody expected to see this much rust this soon."[99]

It turns out that some of the premature rusting was due to sloppy work, perhaps the result of market pressure to speed construction. "They were in a real hurry to turn the sucker on and start getting a cash flow when they misapplied the pipe's protective coating," explained Robert LaResche, an investigator for the State of Alaska.[100]

Given the hostile environment it would traverse — 800 miles, 3 mountain ranges, hundreds of rivers, temperatures that range between 90 degrees in the summer and 75 below in the winter — the TAPS had to be more than just a run-of-the-mill pipeline. It had to be a pipe four feet in diameter that would carry about 80 million gallons of warm oil every day south from Prudhoe Bay to the port of Valdez. Half the pipeline would be buried — often in frozen soil — while half would be built on above-ground trestles.

The Alyeska Pipeline Service Company

TABLE 6-5
The Williams Record: A Slew Of Spills, 1964-1992

DATE	LOCATION	GALLONS	FUEL	CAUSE
Dec 64	Roseville, MN	44,100	gasoline	tank overfill
Feb 66	Albert Lea, MN	67,620	gasoline	seam failure
Oct 67	Steele Co., MN	109,914	gasoline	seam split
Feb 68	Freeborn Co., MN	67,200	gasoline	seam split
Dec 68	Anoka Co., MN	46,200	#2 fuel	pipe rupture
Dec 76	Clarks Grove, MN	41,370	X-9 oil	seam split
Apr 77	Clarks Grove, MN	47,796	gasoline	seam split
Feb 78	Latimer, IA	140,070	liquid propane	spill
Mar 79	Lyon County, KS	192,276	crude oil	spill
Apr 80	Roseville, MN	92,400	gasoline	fire/pump
Jul 81	Maplewood, MN	100,000	gasoline	corrosion
Oct 81	Superior, MN	114,000	-	valve failure
Jan 82	Circle Pines, MN	42,000	-	girth weld failure
Mar 82	Rosemount, MN	250,000	#2 oil	tank failure
Feb 83	Owatonna, MN	280,000	-	weld failure
Dec 83	Sturgeon Lake, MN	68,000	gasoline	pipe rupture
Jun 84	Roseville, MN	17,934	fuel oil	line break
Nov 86	Watertown, SD	14,000	-	hole in terminal tank
Feb 90	Watertown, SD	13,900	-	gasket failure
Jan 92	Renner, SD	200,000	-	crack in pipeline

Sources State records & news reports[87] directed the design and construction of the pipeline; today, it is responsible for its operation and maintenance. Alyeska was created — and is owned — by seven oil companies: Amerada Hess, ARCO, BP, Exxon, Mobil, Phillips and Unocal.

When Congress approved the TAPS, Alyeska promised to install a special package of corrosion-resistance and early-warning technologies. First, the company would coat the steel pipe with epoxy and a protective tape to keep water away. Second, it would install a cathodic protection system, which used an electric current to thwart corrosion. Third, it would develop automated "smart pigs" — robots that crawl through the pipe — to detect corrosion before it became a problem.

During construction, Alyeska even convinced U.S. Interior Department officials to allow *improperly* coated and taped sections of the pipeline to be buried on assurances that the cathodic protection system and corrosion-detecting pigs provided adequate safety.

But government officials never required Alyeska to assess whether the cathodic protection system could in fact protect the pipeline.[102] And years later, after the pipeline was built, the officials would learn that much of the promised system was untested and experimental. "Neither the cathodic protection system nor the corrosion-detecting pigs had been used on a pipeline the size of TAPS or under harsh conditions," concluded the U.S. General Accounting Office (GAO).[101]

What about the smart pigs? By 1984, Alyeska had discovered they weren't so smart after all — the best pig could only detect spots where 50 percent of the metal had already corroded. After a worldwide search for new technology, the company began using more sophisticated pigs in 1988. The new devices could detect spots where as little as 10 percent of the metal had corroded.[103]

In October 1989, the new pigs helped Alyeska identify 827 spots with potential external corrosion. Two years earlier, the company had found only 14 such spots. Further — in direct contradiction to what Alyeska had told government officials during construction — the company admitted that no cathodic protection system could protect buried pipe where the coating and protective tape had not bonded properly.[104]

Alyeska has begun patching the pipeline's weak spots, using steel sleeves in some spots and installing new pipe in other locations. Over the next five years, the company will be working on at least three weak segments.

"State-of-the-Art" Leak Detection

The problem of detecting pipeline leaks, however, still remains. In theory, detecting and pinpointing leaks in a modern pipeline system shouldn't be difficult. Loss of pumping pressure and declines in volume are obvious indicators of a problem. But even the most modern technologies — such as computerized leak-detection systems — have deficiencies.

According to GAO, "although Alyeska has a computerized leak detection system, none of the spills that occurred along the pipeline since operations began in 1977 were initially detected by the system."

Alyeska's system was originally designed to trigger an alarm if a leak was bigger than 31,500 gallons per day.[105] But after the company experienced an "unacceptable" number of false alarms, it asked to recalibrate the system so that it would only trigger an alarm for bigger spills.

In July 1989, Alyeska reported that the system was accurately warning them of leaks of 126,000 gallons per day. When the pipeline was at extremely stable operation, they reported it could also detect smaller leaks, down to 25,200 gallons per day.

But GAO investigators found that the alarm system wasn't working as well as the company claimed. In 1988 and 1989, company documents show, the system sometimes would allow potentially large leaks — over 500,000 gallons per day — to occur without triggering the alarm.[106]

Another weakness in the system, GAO found, was that it did not identify a leak's location. "In most cases," GAO reported, "the exact location must be determined by visual surveillance," which is not always easy in the dark Alaskan winters.[107]

Once a large spill is found, GAO is also unsure of Alyeska's capability to respond. "Alyeska's ability to respond to a large-scale spill along the pipeline or at the terminal is not known," the agency concludes.[108]

Noting that the TAPS transports nearly 25 percent of the nation's domestically produced crude oil, GAO warns that "A major break in the pipeline could spill tens of thousands of barrels of oil on Alaska's fragile environment, and an extended shutdown for repairs from such an accident could affect the nation's domestic oil supply." [109]

Meanwhile, Alyeska says it is reviewing ways to improve its computerized leak detection system.

Too Cozy With Industry?

A major obstacle to properly regulating the Alaskan pipeline — and for regulating petroleum pipelines generally — has been the cozy relationship between industry and government regulators.

For example, GAO found that the five federal and state agencies that had primary responsibility for overseeing TAPS did not have the "systematic, disciplined and coordinated approach needed." Instead, "these agencies relied on Alyeska to police itself..."[110]

The Wilderness Society charges that "For the past 13 years, both [Bureau of Land Management and DOT] oversight consisted largely of accepting whatever Alyeska told them about the pipeline and corrosion."[111]

Florida pipeline activist Bob Rackleff has noticed a similar problem at DOT's Office of Pipeline Safety. It has, he says, consistently deferred to industry on safety issues. "The industry has far too much influence...for OPS to carry out impartial studies that will lead to significant improvements," he told a U.S. Congressional committee in 1991.[112] In some cases, even in the aftermath of spills, the "orders" that OPS issues to pipeline owners area weak substitutes for real enforcement.

Take what happened in Fredericksburg, Virginia, for example. Colonial Pipeline Company spilled 212,000 gallons of kerosene into the Rappahannock River, forcing the city to close its municipal water supply.

After an OPS investigation, Colonial and the agency entered into an operating agreement in August 1990. This agreement, used in place of a more formal enforcement action or consent order, is typical of how the pipeline industry is "regulated" by the federal government and how OPS has often neglected state and local authorities.

Colonial and OPS agreed that the pipeline would operate at a lower pressure until an ORA — Operational Reliability Assessment — could be completed. The agreement also required Colonial to subject the line to hydrostatic, or water-pressure, testing. All testing was to be complete by the end of 1991. The agreement was billed by OPS more as a "testing agreement" than the basis for an enforcement action. It also fell short on other fronts.[113]

- First, the agreement never included consultation with the State of Virginia or the City of Fredericksburg.
- Second, the agreement allowed Colonial to hire and supervise a consultant to analyze the incident and predict the likelihood of future spills. "To allow a known violator such as Colonial to hire and supervise the consultant whose work would form the basis for an OPS enforcement decision creates ... a situation which at least gives the appearance of a conflict of interest," said Fredericksburg City Attorney Jim Pates.[114]
- Third, the agreement allowed Colonial to resume normal operating pressure and to terminate the OPS agreement upon notice to OPS. Says Fredenckburg's Jim Pates, "The City would have strongly urged OPS to prohibit Colonial from increasing the operating pressure or terminating the Agreement until the ORA had been completed and made available for public comment. The City was prepared to present proof that the pipeline, it its defective condition, presented serious and continuing threat to thousands of citizens in the Fredericksburg area."[115]

Where's The Regulation?

Ten years ago, an EPA contractor writing about a new agency report on the hazards of petroleum pipelines wrote the following:

"...Petroleum accidents and leakage cause many pollution incidents that are detrimental to both the national interest and the oil industry. These accidents result in the loss of large quantities of petroleum, cause significant environmental problems, and subject segments of the population to potential hazards. Even small losses from a pipeline system cannot be tolerated, and it is the responsibility of government and operating companies to protect the community from possible damages resulting from a leak."[116]

Today, with more than 12 million gallons of oil and petroleum products leaking each year from pipelines, and countless communities across America still threatened by corroding pipelines, it is clear that the federal government and operating companies have not met their responsibilities.

Although the Pipeline Safety Act of 1992 is now law, the changes in the statute may not amount to much given the long-standing relationship between industry and government.

The new law calls for DOT's Office of Pipeline Safety to issue regulations on safety, standards, and reporting "to take into account" protection of the environment. And there are also new requirements for identifying and mapping pipelines located in environmentally sensitive areas and those which cross navigable waterways.[117]

Pipelines in these two latter categories are supposed to receive "periodic inspection" according to the 1992 amendments, the regulations for which are not due until October 1995. But OPS has already missed the May 1990 deadline for an inspection report that was to be delivered to Congress.[118]

OPS, in fact, was supposed to begin inspecting pipelines at two-year intervals beginning in 1989, subject to appropriations. Today, the agency says it focuses on high risk pipelines. Yet, in reality, its inspection force doesn't even allow that.

"We're very under-resourced," said John Stoner, spokesman for OPS in February 1992. "We regulate 2,200 operators of pipelines and a network of 1.7 million miles...It's a daunting task." According to Stoner, the agency has 60 inspectors, or one inspector for every 28,300 miles of pipe.[119]

In 1990, according to Bill Shrenk of the Natural Resources Defense Council, OPS assessed civil penalties in 46 cases averaging about $6,500 per case, or roughly $300,000 overall.[120]

Timid Steps

The new federal law takes a few steps toward including environmental protection

PIPELINE LEAKAGE ABROAD

Leaking pipelines and lack of regulation aren't problems only in the U.S. Overseas, the situation is even worse.

Consider the Trans-Ecuadorian Pipeline in the Amazon. A consortium lead by Texaco spent $150 million to build the 300-mile pipeline in 1972. Known the Ecuadorian acronym SOTE, the line runs from the oil fields of the Oreinte, across the 13,000-foot Andes, and down to the Pacific oil port of Esmeraldas. The line has a capacity of 300,000 barrels per day. There are also some 240 miles of secondary lines.[124]

According to Judith Kimerling, writing in *Amazon Crude* for the Natural Resources Defense Council, the Ecuadorian government has recorded approximately 30 major spills from the SOTE, with an estimated loss of 16.8 million gallons of crude oil. However, these are only the reported spills. With the system aging and corroding, more spills are expected.

Spill control and clean-up are typically late or non-existent. "In the Oriente," Kimerling explains, "no equipment is available to mitigate or clean up oil spills. Spill response is limited to locating the source of the drop in pressure in the pipeline, turning off the flow of oil into the damaged portion of the line, waiting for the oil to spill out, and repairing the pipeline. Because valves along pipelines are designed for pumping purposes only, not for safety shut-offs, the nearest valve to a spill can be tens of kilometers away. Oil can spill for days before the breached line is evacuated."[125]

In Russia, leaking oil pipelines are also a major environmental problem. To speed construction of one pipeline, officials allowed builders to install cut off valves every 30 miles instead of every three, meaning that a rupture could release the oil in 30 miles of pipe. In Siberia, one spill formed a small lake: 4 miles wide, 7 miles long, and 6 feet deep.[126]

in DOT's regulations, but it gives the agency wide discretion in making changes. But the new law is not really aimed at preventing pipeline spills.

Lacking, for example, are provisions for regularly spaced shut-off valves, regular hydrostatic testing of pipelines, use of double-walled pipes in new construction, or computerized leak detection systems — all of which are proven ways to prevent pollution. Nor do the new provisions allow citizens to intervene in administrative proceedings or to bring their own lawsuits when serious violations persist and federal enforcers fail to act.

There is a provision that allows states to take responsibility for pipeline regulation — with the federal government paying 35 percent of the costs. But the law bars states from enacting laws that are tougher than federal standards — a rule that provides states with little incentive to aggressively address pipeline pollution.

"Why should we take over regulations that don't have teeth in them?," asks Bill Markley, an inspector with South Dakota's Department of Environment and Natural Resources.[121]

If this provision were changed, states and localities — which are often closer to pipeline problems — might take strong action. "Local and state officials are often more aware of the real-life effects of pipeline accidents than OPS is," says Fredericksburg city attorney Jim Pates. "They are certainly more aware of the potential health and environmental risks of pipeline accidents to their particular localities than federal officials are."[122]

Meanwhile, Back In Florida...

By early 1993, Bob Rackleff and his wife JoEllyn had logged many hours with their neighbors and the Friends of Lloyd in fighting Texaco and the Colonial Pipeline Company over the proposed pipeline/tank farm complex.

In their research, they learned that Colonial Pipeline Company was owned by nine oil companies — Amoco, Texaco, Citgo, Mobil, Du Pont, Phillips, BP, ARCO, and Union Oil. They also learned that Colonial had reported at least 25 spills and leak between 1982 and April 1990, amounting to more than 1.1 million gallons.[12] They also discovered that DOT had fined Colonial $10,500 in August 1989 for failing to correct seven problem spots in two pipelines near Richmond, Virginia.[13]

They presented this and other information at countless meetings — organizing citizen testimony for no less than seven public hearings. They also filed civil lawsuits against county commissioners for holding private meetings. They raised concerns about groundwater contamination. They convinced state legislators to introduce bills that would limit pipeline eminent domain powers and tighten pipeline and tank farm standards. They proposed local pipeline safety ordinances. They brought a nuisance suit against Colonial. They insisted on competitive bidding procedures in the county reviews of Texaco's plans. They made TV ads to get their message out. And they formed key alliances.

One very important alliance was with a group of South Florida shipping and union interests called the Florida Alliance. The Alliance — made up of marine shippers of petroleum and gasoline who feared that the pipeline would damage their business — provided over $135,000 to Rackleff and his organization. Most of the money was used to cover litigation and advertising costs.[123]

Texaco and Colonial Pipeline, of course, did not stand still.

Texaco's Full-Court Press

Texaco, after having its first pipeline proposal rejected on technical grounds by Jefferson County in May 1989, released a "new and improved" plan two months later. The company defended the new proposal with full-court press — undertaking a determined public relations effort, meeting with public officials to assuage their concerns, and releasing a public opinion poll showing that a majority of county residents supported the new plan.

They also spent big bucks on a local media campaign.

"They began a three-month media blitz that cost what I estimate was $300,000 for saturation local TV ads and print ads in the two newspapers," recalls Rackleff. "They also printed a newsletter and distributed it to every household in the county. Their ads were strongly negative against us. One radio ad compared us with Chicken Little — with a punch line of: 'Makes you wonder how

America ever put a man of the moon, doesn't it?"[127]

One of Texaco's TV ads — run on all the local stations during prime time — attacked Rackleff personally. It included a clip of him speaking at a public meeting as a Texaco narrator asked "Who's side is Bob Rackleff really on?"[128]

By the summer of 1991, however, the Texaco star was loosing its luster in Florida and elsewhere. A huge tank farm leak in Fairfax, Virginia — just across the Potomac River from Washington — put Texaco in an unflattering light and raised the national visibility of leaking pipelines and tank farms *(see Case Study #23).*

Colonial Pipeline, meanwhile, had troubles of its own. In December 1991, a company pipeline ruptured near Greenville, South Carolina, spilling more than 400,000 gallons of fuel oil and gasoline into a nearby waterway, threatening the drinking water of two towns.129

Then, in April 1993, a Colonial pipeline spilled 400,000 gallons into Sugarland Run, a small tributary of the Potomac near Washington, D.C. Those visiting the city's famed Cherry Blossom Festival were greeted by fumes and sheens of oil on the Potomac.

Colonial had also been stymied in Florida. In August 1991, the company brought a federal lawsuit challenging a land use determination by Leon County (the county adjacent to the proposed Texaco tank farm). The County was requiring Colonial to abide by the county comprehensive plan — which did not include the pipeline route. Colonial's suit charged that federal pipeline regulations preempted state and local regulations.[130]

That argument brought the Florida Attorney General into the fray, as Florida asserted the right of state and local governments to regulate land use via the state's Growth Management Act. Colonial lost its challenge. For a time, the company flirted with an appeal but withdrew its notice in April 1992.

Colonial and Texaco haven't left town, however. They are still attempting to win public approval for their pipeline/tank farm project and are still negotiating with local authorities in Jefferson and Leon Counties to amend local plans and zoning. But the project is, for the moment, blocked by a stalemate.

Bob Rackleff, meanwhile, is writing speeches for himself these days. He has become a hot property on the speakers' circuit, sharing his experiences with other citizens who have discovered the environmental dangers and operational shortcomings of petroleum pipelines.

CRUDE AWAKENING: References

88. Matt Cecil, "Pipeline Safety: A Leaky History," *Argus Leader*, Sunday, February 9, 1992, p. 4-A.
89. See, for example, Minnesota Pollution Control Agency, Water Quality Stipulation Agreements with the Williams Pipeline Company – March 15, 1984, 12 pp; August 23, 1983, pp. 2-5; and November 28, 1979, pp. 2-7; See also, Minnesota Pollution Control Agency compilation, "Williams Pipeline Incidents," 1951-1986, 14 pp; and, Todd Murphy, "Williams Leaving Trial of Leaks, Spills," *Argus-Leader*, May 3, 1987, p. 1-A
90. Editorial, "Put More Pressure On Pipeline Firm," *Argus Leader*, February 11, 1992, p. 8-A.
91. Matt Cecil, "Seam Failures A Long-Standing Problem," in Special Section, "Pipeline Safety: A Leaky History," *Argus Leader*, Sunday, February 9, 1992, p. 4-A.
92. Letter to the Editor, "Effect of Pipeline Spill Can Last Forever," *Argus Leader*, Sunday, March 1, 1992.
93. Lisa Gaumnitz, "City Wants Firm To Move Fuel Pipeline," *Argus Leader*, February 19, 1992, p. 3-C.
94. "Committee's 7-Point Plan," *Argus Leader*, April 16, 1992.
95. Robert Rackleff, "Out of Line," *Environmental Action*, November/December 1991, p. 18.
96. William J. LeMay, Director, Oil Conservation Division, New Mexico Department of Energy, Minerals and Natural Resources, Letter to Mr. W.J. Mueller, Phillips Petroleum Company, Odessa, TX, September 3, 1991.
97. Council of Great Lakes Governors, "A White Paper on Protecting the Great Lakes from Spills," September 1991, p. 7.
98. J.S. Mandke, "Corrosion Causes Most Pipeline Failures in Gulf of Mexico," *Oil & Gas Journal*, October 29, 1990, pp.40-44
99. Timothy Egan, "Alaska Pipeline Faces Costly Work to Stop Rust," *The New York Times*, March 11, 1990, p. 22.
100. Timothy Egan, "Alaska Pipeline Faces Costly Work to Stop Rust," *The New York Times*, March 11, 1990, p. 22
101. U.S. General Accounting Office, *Trans-Alaska Pipeline*, "Regulators Have not Ensured That Government Requirements Are Being Met," GAO/RCED-91-89, July 1991, p. 23.
102. U.S. General Accounting Office, *Trans-Alaska Pipeline*, "Regulators Have not Ensured That Government Requirements Are Being Met," GAO/RCED-91-89, July 1991, p. 23.
103. U.S. General Accounting Office, *Trans-Alaska Pipeline*, "Regulators Have not Ensured That Government Requirements Are Being Met," GAO/RCED-91-89, July 1991, p. 23.
104. U.S. General Accounting Office, *Trans-Alaska Pipeline*, "Regulators Have not Ensured That Government Requirements Are Being Met," GAO/RCED-91-89, July 1991, p. 23.
105. U.S. General Accounting Office, *Trans-Alaska Pipeline*, "Regulators Have not Ensured That Government Requirements Are Being Met," GAO/RCED-91-89, July 1991, p. 27
106. U.S. General Accounting Office, *Trans-Alaska Pipeline*, "Regulators Have not Ensured That Government Requirements Are Being Met," GAO/RCED-91-89, July 1991, p. 27.
107. U.S. General Accounting Office, *Trans-Alaska Pipeline*, "Regulators Have not Ensured That Government Requirements Are Being Met," GAO/RCED-91-89, July 1991, p. 27
108. U.S. General Accounting Office, *Trans-Alaska Pipeline*, p. 39.
109. U.S. General Accounting Office, *Trans-Alaska Pipeline*, "Regulators Have not Ensured That Government Requirements Are Being Met," GAO/RCED-91-89, July 1991, p. 2
110. U.S. General Accounting Office, *Trans-Alaska Pipeline*, "Regulators Have not Ensured That Government Requirements Are Being Met," GAO/RCED-91-89, July 1991, p. 3.
111. *Daily News* (Anchorage, AK) story cited by the Wilderness Society, *A Hundred Spills, A Thousand Excuses*, March 1990, p.3
112. Testimony of Robert B. Rackleff, President, Friends of Lloyd, Before the House Subcommittee on Surface Transportation, Committee on Public Works and Transportation, Hearing on Pipeline Safety Act of 1991, U.S. Congress, Washington, D.C., September 25, 1991, p. 11.
113. Letter of Jim Pates, City Attorney, City of Fredericksburg, Virginia, to Hon. Norman Y. Mineta, Chairman, Subcommittee on Surface Transportation, Committee on Public Works & Transportation, U.S. House of Representatives, RE: H.R. 1489, Pipeline Safety Act of 1991, April 6, 1992, p. 2.
114. Ibid
115. Ibid
116. John R. Mastandrea, Project Summary, "Petroleum Pipeline Leak Detection Study," U.S. Environmental Protection Agency, Research and Development, Municipal Environmental Research Laboratory, Cincinnati, OH, EPA-600/S2-82-040 April 1983, p. 1
117. Bill Shrenk, "Hazardous Liquid Pipeline Safety Act – Regulations and Reports Under the Act But Not Completed and Other Questions," Natural Resources Defense Council, New York, December 17, 1992, p. 3.
118. Bill Shrenk, "Hazardous Liquid Pipeline Safety Act – Regulations and Reports Under the Act But Not Completed and Other Questions," Natural Resources Defense Council, New York, December 17, 1992, p. 3
119. Matt Cecil, "Safety Official: Agency Lacks Funding, Staff," *Argus Leader*, Sunday, February 9, 1992, p. 4-A
120. Bill Shrenk, "Hazardous Liquid Pipeline Safety Act – Regulations and Reports Under the Act But Not Completed and Other Questions," Natural Resources Defense Council, New York, December 17, 1992, p. 3.
121. Matt Cecil, "Safety Official: Agency Lacks Funding, Staff," *Argus Leader*, Sunday, February 9, 1992, p. 4-A.
122. Letter of Jim Pates, City Attorney, City of Fredericksburg, Virginia, to Hon. Norman Y. Mineta, Chairman, Subcommittee on Surface Transportation, Committee on Public Works & Transportation, U.S. House of Representatives, RE: H.R. 1489, Pipeline Safety Act of 1991, April 6, 1992, p. 3
123. George Thurston, "Tank Fight Grew From Experience," *Tallahassee Democrat*, March 26, 1990, p. 1-A.
124. Judith Kimerling, et. al., *Amazon Crude*, Natural Resources Defense Council, New York, 1991, p. 43.
125. Judith Kimerling, et. al., *Amazon Crude*, Natural Resources Defense Council, New York, 1991, pp. 69-70.
126. "Toxic Wasteland," *U.S. News & World Report*, April 13, 1992, p. 42.
127. Remarks of Bob Rackleff, President, Friends of Lloyd, Before the Florida Defenders of the Environment, 1991 Statewide Environmental Grassroots Networks Forum, Gainesville, FL, November 2, 1991, p. 5.
128. Remarks of Bob Rackleff, President, Friends of Lloyd, Before the Florida Defenders of the Environment, 1991 Statewide Environmental Grassroots Networks Forum, Gainesville, FL, November 2, 1991, p. 5
129. Associated Press, "Pipe Spills Fuel in South Carolina," *The New York Times*, December 22, 1991, p. A-30.
130. Julie Hauserman, "Colonial Pipeline Sues Leon County," *Tallahassee Democrat*, August 17, 1991, p. 1-A.

CRUDE AWAKENING: References

Supply Looks Safe," *Argus Leader*, February 4, 1992, p 2-A, and Steve Young, "Size of Williams Leak Revised," *Argus Leader*, March 3, 1992
44 "International Spill Statistics, 1991," *Oil Spill Intelligence Report*, March 26, 1992, p. 18
45 "International Spill Statistics, 1991," *Oil Spill Intelligence Report*, March 26, 1992, p. 5.
46 Wilderness Society, *100 Spills, 1,000 Excuses*, March 1990, p 4; and Cutter Information Corp., "International Spill Statistics, 1989-1990," *Oil Spill Intelligence Report*, March 28, 1991, p 11.
47 Cutter Information Corp., "International Spill Statistics, 1989-1990," *Oil Spill Intelligence Report*, March 28, 1991, p. 8
48 National Response Center, U.S Coast Guard, U.S. Department of Transportation, Washington, D.C., Freedom of Information Act request, Summary of Reports received by Jack Doyle from 1992 database, Report # 111037, p. 103.
49 Cutter Information Corp., "International Spill Statistics, 1989-1990," *Oil Spill Intelligence Report*, March 28, 1991, p. 26.
50 "International Spill Statistics, 1991," *Oil Spill Intelligence Report*, March 26, 1992, p. 10.
51 Washington State Department of Ecology, News Release, "U.S. Oil And Texaco Fined For Pipeline Spills," December 4, 1991, p. 1.
52 Associated Press, "Gas Contaminated Soil Dug Up," *Billings Gazette*, April 22, 1992, and, Associated Press, "Missoula Raps Conoco - County Demands Oil Company Protect Groundwater," *Billings Gazette*, April 25, 1992
53 Associated Press, "Missoula Raps Conoco - County Demands Oil Company Protect Groundwater," *Billings Gazette*, April 25, 1992
54 Ibid
55 This account is based on Chuck McCutcheon, "Carlsbad Oil Leak Spreading Concern," *Albuquerque Journal*, August 18, 1991, p. F-1, and Chris Shuey, Director, Community Water Quality Program, Southwest Research and Information Center, Albuquerque, NM, "Marathon Indian Basin Gas Plant Gathering Line Leak – Incident Summary and Recommendations for Enforcement Action," July 16, 1991, 5 pp. (information and data based on documents provided by Marathon to the New Mexico Oil Conservation Division through July 8, 1991 and on interviews with state and federal officials)

56. Chris Shuey, Director, Community Water Quality Program, Southwest Research and Information Center, Albuquerque, NM, "Marathon Indian Basin Gas Plant Gathering Line Leak – Incident Summary and Recommendations for Enforcement Action," July 16, 1991, p. 5
57. Chuck McCutcheon, "Carlsbad Oil Leak Spreading Concern," *Albuquerque Journal*, August 18, 1991, p. F-2
58 Denise Allen Zwicker, "Unseen But Essential The Role of Offshore Pipelines," *The Lamp* (Exxon Corporation), Winter 1991, pp 14-19
59 Denise Allen Zwicker, "Unseen But Essential: The Role of Offshore Pipelines," *The Lamp* (Exxon Corporation), Winter 1991, pp 14-19
60 Denise Allen Zwicker, "Unseen But Essential: The Role of Offshore Pipelines," *The Lamp* (Exxon Corporation), Winter 1991, pp. 14-19
61 Jean Hayes, "Hidden Hazards: Spill Victims Question Pipeline Regulations," *The Wichita Eagle*, Sunday, June 7, 1992, p. 1-C
62 Ibid
63 Ibid
64 Ibid
65 Ibid
66 Ibid
67 Associated Press, "Gas Spill Disastrous to Prime Trout Fishery," *Rapid City Journal* (Rapid City, SD), April 12, 1987
68 Associated Press, "Gas Spill Disastrous to Prime Trout Fishery," *Rapid City Journal* (Rapid City, SD), April 12, 1987
69 Associated Press, "Gas Spill Disastrous to Prime Trout Fishery," *Rapid City Journal* (Rapid City, SD), April 12, 1987.
70 Myron Levin and Tracey Kaplan, "Mobil Hopes To Stem Flow of Pipeline's Problems," *Los Angeles Times* (Valley Edition), Sunday, July 14, 1991, and Myron Levin and Tracey Kaplan, "Pipeline Flawed, But Will New One Be Better?", *Los Angeles Times*, July 18, 1991, p. B-5.
71 Myron Levin and Tracey Kaplan, "Pipeline Flawed, But Will New One Be Better?", *Los Angeles Times*, July 18, 1991, p. B-5; and George Stein, "Mobil Decides to Replace 75 Miles of Leaky Pipeline," *Los Angeles Times*, August 29, 1989, p. 1
72 Myron Levin and Tracey Kaplan, "Pipeline Flawed, But Will New One Be Better?", *Los Angeles Times*, July 18, 1991, p B-5.
73 Myron Levin and Tracey Kaplan, "Pipeline Flawed, But Will New One Be Better?", *Los Angeles Times*, July 18, 1991, p. B-5
74 Myron Levin and Tracey Kaplan, "Mobil Hopes To Stem Flow of Pipeline's Problems," *Los Angeles Times* (Valley Edition), Sunday, July 14, 1991
75 Myron Levin and Tracey Kaplan, "Pipeline Flawed, But Will New One Be Better?", *Los Angeles Times*, July 18, 1991, p. B-5
76 Myron Levin and Tracey Kaplan, "Pipeline Flawed, But Will New One Be Better?", *Los Angeles Times*, July 18, 1991, p. B-5
77 Amy Pyle, "Criminal Case Filed Against Mobil Over Pipeline Ruptures," *The Los Angeles Times*, September 9, 1989, p B-1
78 Office of Los Angeles City Attorney James K. Hahn, "Hahn Charges Mobil Over Oil Spill Into L.A. River," News Release, September 8, 1989, pp 2-3
79 Telephone conversation with Vincent B Sato, Deputy City Attorney, Office of the City Attorney, Los Angeles, CA, July 12, 1991, and Sentencing Documents, Case No. 89R38169, *People vs. Mobil Oil Corporation, et al*, Judge Kwong, January 1, 1989, p. 1.
80 *California v. Mobil Oil Corporation*, In The Municipal Court of the Los Angeles Judicial District, Country of Los Angeles, State of California, Complaint Felony, No. BA051493.
81 George Stein, "Mobil Decides To Replace 75 Miles Of Leaky Pipeline," *Los Angeles Times*, August 29, 1989, p. B-1
82 Tracey Kaplan, "City OKs First Stage In Replacing Oil Pipeline," *Los Angeles Times*, April 12, 1991, p. B-1.
83 Myron Levin and Tracey Kaplan, "Pipeline Flawed, But Will New One Be Better?", *Los Angeles Times*, July 18, 1991, p B-5
84 Steve Young, "Williams Blaming Spill on Hairline Crack in Pipe," *Argus Leader*, January 15, 1992, p 1-C
85 See, for example: Charles Laszewski, "Tests Confirm Flaw in Pipeline," and "Perpich Appoints Panel To Study Pipeline Safety," *St. Paul Pioneer Press and Dispatch*, July 16, 1986, p 1-A, Jacqui Banaszynksi, "Dad And Daughter Struggle to Keep Faith in Tomorrow," *St. Paul Pioneer Press and Dispatch*, July 20, 1986, p 1-A, Paul Gustafson and Bruce Benidt, "Williams Dispatcher Knew of Leak 20 Minutes Before Blast," *Minneapolis Star and Tribune*, October 23, 1986, p. 1-A, and, Minnesota Department of Energy and Economic Development, Policy Analysis Division, *Minnesota Commission on Pipeline Safety Findings and Recommendations*, December 1986, 55 pp
86 Todd Murphy, "Williams Leaving Trail of Leaks, Spills," *Argus Leader* (Sioux Falls, SD), Sunday, May 3, 1987, p 1-A
87 Minnesota Pollution Control Agency, see Water Quality Stipulation Agreements with the Williams Pipeline Company – March 15, 1984, 12 pp, August 23, 1983, pp. 2-5; and November 28, 1979, pp 2-7, See also, Minnesota Pollution Control Agency compilation, "Williams Pipeline Incidents," 1951-1986, 14 pp; South Dakota Department of Water and Natural Resources, "Williams Pipeline Company Sioux Falls Spills," a table listing 10 spills thru April 1987, 1 pp.; Todd Murphy, "Williams Leaving Trial of Leaks, Spills," *Argus-Leader* (Sioux Falls, SD), May 3, 1987, p 1-A

CRUDE AWAKENING: References

3A Cutter Information Group, International Oil Spill Statistics, 1992," Oil Spill Intelligence Report, March 18, 1993, p. 25)

Chapter 6: A CRACK IN THE PIPES

1 U.S. Congress, Statement Before the Subcommittee on Energy & Power, House Energy and Commerce Committee, May 22, 1991
2 Robert Rackleff, "Out of Line," *Environmental Action*, November/December 1991, p. 16.
3. Author conversations with Bob Rackleff and other sources, including: Matt Bokor, "Fuel Plan Ignites PR Exec, Tiny Town," *The Miami Herald*, November 12, 1989, p. 6-B; George Thurston, "Tank Fight Grew From Experience," *Tallahassee Democrat*, March 26, 1990, p. 1-A, Bob Rackleff, "Fighting A Florida Pipeline," *Environmental Action*, November/December 1991, pp 16-17, and Marie Joyce, "Fighting Big Oil," *The Free Lance-Star* (Fredericksburg, VA), September 10, 1992, p. D-1
4. See, for example, Remarks of Bob Rackleff, President, Friends of Lloyd, Florida Defenders of the Environment, 1991 Statewide Environmental Grassroots Networks Forum, Gainesville, FL, November 2, 1991, 16 pp.; Remarks of Bob Rackleff, Friends of Lloyd, "The Hidden Dangers of Oil Pipelines," Environmental Defense Fund Conference on Pollution Prevention to Protect Groundwater, Chicago, IL, November 17, 1991, 11 pp.; Bob Rackleff, "The Oozing of America," *The Washington Post*, September 15, 1991, p. C-5; and Bob Rackleff, "Out of Line," *Environmental Action*, November/December, 1991, pp. 15-18.
5 U.S. General Accounting Office, *Pollution From Pipelines*, DOT Lacks Prevention Program and Information for Timely Response, GAO/ RCED-91-60, January 1991.
6 U.S. General Accounting Office, *Pollution From Pipelines*, GAO/RCED-91-60, January 1991, p. 1.
7 U.S. General Accounting Office, *Pollution From Pipelines*, "DOT Lacks Prevention Program and Information for Timely Response," GAO/RCED-91-60, January 1991, p. 2.
8 U.S. General Accounting Office, *Pollution From Pipelines*, "DOT Lacks Prevention Program and Information for Timely Response," GAO/RCED-91-60, January 1991, p 2
9 Ibid., GAO, January 1991, p 5
10 U.S. General Accounting Office, *Pollution From Pipelines*, GAO/RCED-91-60, January 1991, p.3
11 Association of Oil Pipelines, *Oil Pipelines of the United States: Progress and Outlook*, Washington, D.C., August 1991, p. 7
12 Friends of Lloyd, "The Real Colonial Pipeline Record," September 9, 1990, 1 page (based on reports from the U.S. Department of Transportation, Research & Special Programs Administration, Colonial Pipeline Accident Reports, and Office of Pipeline Safety reports).
13 Daryl Lease, "Pipeline Company Disciplined 3 Times," *The Free Press* (Fredericksburg, VA), January 6, 1990, p 1
14 Robert McClure, "Oil Spills Endanger Delicate Everglades," *Sun Sentinel*, March 6, 1990, pp 1-A & 9-A
15 Robert McClure, "Oil Spills Endanger Delicate Everglades," *Sun Sentinel*, March 6, 1990, pp. 1-A & 9-A
16. Robert McClure, "Oil Spills Endanger Delicate Everglades," *Sun Sentinel*, March 6, 1990, pp. 1-A & 9-A
17 Robert McClure, "Oil Spills Endanger Delicate Everglades," *Sun Sentinel*, March 6, 1990, pp 1-A & 9-A
18 Amoco Corporation, Form 10-K (1991), U.S. Securities and Exchange Commission, January 31, 1992, p 6
19 U.S. Securities and Exchange Commission, Form 10-K, Mobil Corporation, 1991, pp 1, 13, & 38
20 U.S. Securities and Exchange Commission, Form 10-K, Shell Oil Company, 1991, p 13
21. U.S. Securities & Exchange Commission, Form 10-K, Sun Company, Inc., 1990, p. 8
22 Unocal Corporation, Form 10-K, U.S. Securities and Exchange Commission, 1991, p 9
23. Leonard Buder, "New York City Accuses Exxon of Fraud in Spill," *The New York Times*, February 8, 1990, p. B-2, and "New York City Sues Exxon Over Oil Spill in January," *The Wall Street Journal*, February 8, 1990, p. A-8
24 Leonard Buder, "New York City Accuses Exxon of Fraud in Spill," *The New York Times*, February 8, 1990, p B-2.
25 Allan R. Gold, "Exxon To Pay Up To $15 Million for Spill," *The New York Times*, March 15, 1991, p. B-1.
26. Patrick Lee, "Alaska's Oil: New Fuel for Old Debate," *The Los Angeles Times*, September 15, 1991, p. A-10.
27 "International Spill Statistics, 1991," *Oil Spill Intelligence Report*, March 26, 1992, p. 8.
28 "International Spill Statistics, 1991," *Oil Spill Intelligence Report*, March 26, 1992, p 15.
29 Caleb Solomon, "Shell, A Fallen Champ of Oil Industry, Tries to Regain Its Footing," *The Wall Street Journal*, August 30, 1991, p 1
30. Wilderness Society, **100 Spills, 1,000 Excuses**, March 1990, p. 8
31. Linda Shaw & Thomas Guillen, "Major Oil Spill Corralled," *Seattle Times*, January 7, 1991, p A-1; Kathy George, "Oil Spill 60,000 Larger Than Suspected," *Seattle Post-Intelligencer*, January 8, 1991; Joni Balter & Thomas Guillen, "Incident In Tacoma Not First For U.S. Oil," *Seattle Times*, January 8, 1991, p. 1; John Balter, "Firm Mops Spill, But Dirt Goes Unclaimed," *Seattle Times*, January 9, 1991, p B-4, and Associated Press, "Spill Estimate Now 600,000 Gallons," *Seattle Times*, January 16, 1991
32 Cutter Information Corp., "International Spill Statistics, 1989-1990," *Oil Spill Intelligence Report*, March 28, 1991, p 16
33 Daniel Dighton, "Upstate Pipeline Spews Oil," *The State* (Columbia, SC), December 21, 1991, p 1; and Associated Press, "Fuel Leaking to Creeks in Upstate S.C.," *The Times-News* (Hender-sonville, N.C.) December 21, 1991, p. 5
34 Cutter Information Corp., "International Spill Statistics, 1989-1990," *Oil Spill Intelligence Report*, March 28, 1991, p. 3
35 Illinois Environmental Protection Agency, Office of Chemical Safety, "Newton Lake Oil Spill," File, DS:syg/sp/1753j/8, 19 pp
36. Cutter Information Corp., "International Spill Statistics, 1989-1990," *Oil Spill Intelligence Report*, March 28, 1991, p. 23
37. "Oil Transport Line Bursts," *Los Angeles Times*, April 5, 1989.
38 Cutter Information Corp., "International Spill Statistics, 1989-1990," *Oil Spill Intelligence Report*, March 28, 1991, p. 21.
39 Bloomberg Business News, "Shell Pipeline Finishes Repairs on Ruptured Line," *The New York Times*, December 1, 1992, p. D-5.
40 Cutter Information Corp., "International Spill Statistics, 1989-1990," *Oil Spill Intelligence Report*, March 28, 1991, p. 26.
41 Wilderness Society, **100 Spills, 1,000 Excuses**, March 1990, p. 7.
42 Wilderness Society, **100 Spills, 1,000 Excuses**, March 1990, p 6.
43. See, for example, Associated Press, "Fuel Leak Linked to Hairline Crack in Buried Pipe," *Rapid City Journal* (Rapid City, SD), January 17, 1992; Carson Walker, "Pipeline Leak Would Endanger City Water," *Argus Leader* (Sioux Falls, SD), January 31, 1992; Carson Walker, "EPA To Evaluate Spill; Water

Mr. BORSKI. The gentlewoman from Virginia.

Ms. BYRNE. Mr. Rackleff, I just want to thank you for being here to show that these concerns are not just Fairfax County or Northern Virginia or the Washington metropolitan area. They are truly national in scope. And as the Congresswoman that represents both the Texaco Tank Farm and Colonial Pipeline, I can tell you that your concerns are well founded and I thank you for being here.

Mr. BORSKI. No further questions?

Thank you very much. We appreciate your testimony and we thank you for coming to Washington to help us out. This subcommittee hearing is adjourned.

[Whereupon, at 4:27 p.m., the subcommittee was adjourned.]

[Subsequent to the hearing, additional questions were submitted to Mr. Rackleff. The questions and responses follow:]

Robert B. Rackleff
816 Cherry Street
Tallahassee, Florida 32303
(904) 222-9789
fax (904) 222-5026

June 29, 1993

Honorable Robert A. Borski, Chairman
Subcommittee on Investigations and Oversight
Committee on Public Works and Transportation
U.S. House of Representatives
Suite 2165 Rayburn House Office Building
Washington, D.C. 20515

Dear Mr. Chairman:

I am delighted to respond to the questions in your letter of June 21, 1993 and welcome the interest of the subcommittee in the serious problem of pollution from oil pipelines. Let me also thank you for the opportunity to share my information with the subcommittee at the May 18 hearing. Besides my written response in this letter, I request that you also include in the hearing record the materials I enclose about my sources of data.

Question #1: The Department of Transportation Office of Pipeline Safety, the National Tranportation Safety Board, the Environmental Protection Agency, and the General Accounting Office have all testified that pipelines have the best overall safety record in terms of transporting petroleum products. You've asserted that pipelines spill more product than water carriers, and have stated for the record that your assumption is based on data which are provided by the Office of Pipeline Safety. How do you explain this discrepancy?

I assume that when you wrote "safety," you meant the volumes of leaks and spills rather than public safety as measured in fatalities and injuries. I stated in my written testimony that the claims of oil pipelines' superior record were based on flawed data that seriously undercount the volumes which pipelines spill. In several telephone conversations later in the week of the May 18 hearing, I confirmed that, indeed, they used these data.

The agencies you mentioned all used pipeline spill data in the Emergency Response Notification System (ERNS), which compiles raw data from reports to the U.S. Coast Guard National Response Center. For a variety of reasons, pipeline operators do not report most oil pipeline spills to the Coast Guard, which is primarily concerned with spills in U.S. waters, and not inland pipeline spills.

Although ERNS data show about twice the number of spills as OPS data, they seriously undercount the volume of these spills. As the GAO noted in its 1991 report, "Pollution from Pipelines: DOT Lacks Prevention Program and Information for Timely Response," ERNS data show that oil pipelines spill "nearly 20 million gallons" for the years 1980 to 1989. Yet the OPS's Annual Report on Pipeline Safety for the same years reported spills of 109,543,640 gallons.

I invite you to check my methodology, in which I obtained all of OPS's annual reports and added up the volume of crude oil and petroleum products spilled each year. I enclose copies of the relevant tables showing spills from 1970 to 1992. I obtained data about spills from tankships and barges from 1973 to 1992 from the Marine Environmental Protection Division, U.S. Coast Guard, and enclose copies of those tables. To adjust for ton-miles transported, for a fair comparison, I obtained that data from the Association of Oil Pipe Lines.

These data show that pipelines spilled 272,015,306 gallons of crude oil and petroleum products from 1970 to 1992, and that marine carriers spilled a total of 92,340,884 gallons of crude oil and petroleum products from 1973 to 1992. Adjusted for ton-miles transported, pipelines spilled 20,928 gallons per billion ton-miles and water carriers spilled 9,947 per billion ton-miles. Thus, pipelines are not the most environmentally compatible mode of transporting oil.

In the 1988 report, Pipelines and Public Safety, the Transportation Research Board, National Research Council, used the same OPS data as I did. It reported on page 2, which I enclose:

> Despite this good [public] safety record, pipeline operators reported more than 10,000 failures to liquids and gas transmission and gathering lines between 1971, the first full year of federal required reporting, and 1986, the latest year for which data are available. *These failures resulted in* total estimated property loss of approximately $300 million in 1986 dollars, and *commodity loss of nearly 5 million barrels of crude oil and petroleum products* plus an unquantified amount of natural gas. [emphasis mine]

Five million barrels are, of course, 210 million gallons.

The Houston Post recently published three articles about leaking oil pipelines and tank farms which also used the same data I did. It reported on May 23, 1993 that oil pipelines "spilled more than twice the 4.6 million gallons tankers and barges spill annually." I enclose a copy of the three articles, which I request that you reprint in the hearing record.

In the data I have submitted, you may be able to note a fact which I find astonishing: In 1991 and 1992, one company alone, Colonial Pipeline, spilled more than did all tankships and barges throughout the United States in those two years. Colonial spilled 566,496 gallons, according to OPS incident reports, and all water carriers spilled 529,693 gallons, according to the Coast Guard's Marine Environmental Protection Division, in those two years.

I was also astonished to hear OPS officials at the May 18 hearing claim that pipelines are more environmentally compatible than other modes of transporting oil, because they have previously stated that they have not studied the data and have never drawn such conclusions. In a letter to me on March 16, 1992, Travis Dungan, Admnistrator, Research and Special Programs Administration, stated,

> In Congressional hearings and various publications, we have characterized pipelines as "one of the safest modes of transportation" and have referred to the "excellent safety record of pipeline transportation." These assertions have been made in relation to safety (e.g., number of fatalities and injuries) and not environmental protection (e.g., number of barrels lost). *To my knowledge, no one from RSPA has ever made a claim that pipelines offer the most environmentally compatible method for transportation of petroleum.* [emphasis mine]

On April 17, 1992, George W. Tenley Jr., Associate Adminstrator for Pipeline Safety, wrote to me that the Florida Energy Pipeline Association had falsely cited the U.S. Department of Transportation as the source of data which the FEPA stated showed the superior spill record of oil pipelines. Tenley wrote:

> We did not recognize the statistics in the article and called the FEPA Executive Director to determine the source. He, in turn, referred us to the contributing author who, upon checking, acknowledged the statistics were not from DOT but from a brochure published by the Association of Oil Pipelines. . . .
>
> To avoid any further confusion, we are requesting the FEPA Executive Director to issue a retraction in the next issue of the newsletter. . . .
>
> *With respect to the assertions in the article, we cannot at this time categorically confirm or deny them.*

Since the statistics are not from DOT data bases, we would have to undertake a significant amount of validation, analysis, and interpretation to arrive at any responsible conclusions. [emphasis mine]

I enclose copies of the letters quoted above and request that you reprint them in the hearing record. If the Office of Pipeline Safety has carried out the "significant amount of validation, analysis, and interpretation" necessary to justify its claim at the May 18 hearing, I would appreciate reoeiving such documents to review and comment on.

Having stated that OPS data about oil pipeline spills are more accurate than the ERNS data, let me hasten to add that the OPS data also undercount these spills, albeit less than the ERNS data. As a result, the data are deeply flawed as a basis for policy development or public information. For example, there is no way of knowing whether a pipeline operator's good record at OPS is genuine or a result of underreporting the volume of spills or not reporting them at all.

This is partly because the OPS in 1984 inexplicably relaxed its reporting requirements so that it now requires hazardous liquids pipeline operators to report spills or leaks of more than 2,100 gallons (50 barrels), or that involve $5,000 or more in property damage or injury or death; the previous requirement was to report all spills over 210 gallons (five barrels).

As a result, the average number of liquids pipeline spills reported to OPS was fewer than half the 391 annual average spills compiled by the GAO. Note also that the GAO reported on spills in U.S. waters only, while the OPS data are supposed to reflect all spills, inland or in U.S. waters.

Moreover, the GAO reported in 1987 that few pipeline companies complied fully with even the relaxed OPS reporting requirements and that the OPS was unable to monitor compliance with reporting requirements. The GAO was unable to determine the full extent of this underreporting. Other problems, as noted in 1990 by an OPS official in conversation with me, are pipeline companies which underreport the size of spills, and failure to revise reported spill volumes upward after their initial report.

As one test of OPS data accuracy, we compared the number of reported spills at OPS with known data about a crude oil pipeline which traverses the Florida Everglades. The Florida Department of Natural Resources has on file approximately 40 spills by Sunniland Pipeline; the OPS has two on file.

There are even more glaring omissions, such as a leak in a Marathon Oil pipeline near Carlsbad, New Mexico. It leaked 1.47

million gallons of unrefined natural gas condensate and 840,000 gallons of contaminated waste water between November, 1990, and April, 1991, according to the New Mexico Oil Conservation Division. The pipeline was so poorly operated that Marathon had not even *installed* flow meters at both ends, which would have detected such a massive leak. And because this was a gathering line deregulated by OPS in 1984, it was *never* included in the OPS spill data; it never happened, according to the OPS. I enclose a copy of a report about this leak and request that you reprint it.

I also enclose a letter from the New Mexico Oil Conservation Division expressing its concern about the growing problem of oil pipeline leaks because of corrosion. "Also," the letter states, we have reason to believe that the reported spills represent only 10 to 50% of actual leaks. I request that you reprint it.

Another recent, but unreported, leak occurred in Winkler County, Texas, in which a Texaco gathering line leaked almost 750,000 gallons of crude oil on a remote ranch on January 24, 1989. Because the pipeline was deregulated by OPS in 1984, this spill never happened, according to OPS data. I enclose a copy of a Texas Monthly article about this spill and request that you reprint it.

In short, the inadequate data on pipeline spills are a serious shortcoming which distort the safety and environmental record of petroleum pipelines and thereby impair objective analyses of risks and the development of policies to reduce those risks. An important step forward would be to require pipeline operators to report all spills of one gallon or more, and to require these reports from all oil pipelines, including those, such as gathering lines, which have been unregulated.

As for the federal agencies you list in the question, I hope that you require them to submit documents which support their assertion that pipelines are the most environmentally compatible mode of transporting fuel. I would like to obtain those documents and comment on them.

Question #2: In your testimony you state that the Coast Guard severely underestimates the amount of oil spilled by pipelines. On whose data do you base your figures for the amount of oil spilled by water carriers?

As I wrote in answer to question #1, the ERNS data report that oil pipelines spilled "nearly 20 million gallons," as noted by the 1991 GAO report. Yet the OPS's Annual Report on Pipeline Safety for the same years reported spills of 109,543,640 gallons.

The data for oil spilled by water carriers come from tables compiled by the Marine Environmental Protection Division, U.S. Coast Guard. The reports are enclosed.

The materials I submitted in answer to question #1 are the primary sources from which I obtained these data.

Question #3: How do the product recovery amounts compare for pipeline and water carrier spills?

I have no data about this, but would be delighted to review and comment on any you may have.

However, you question raises an important consideration, which is that where pipelines spill and leak can be more important than how much they spill and leak. Pollution from pipelines and water carriers both are serious problems, but we must remember that pollution from pipelines primarily contaminates fresh water while water carriers primarily contaminates salt water.

Pipelines primarily leak and spill underground, on land, and on inland waters, immensely complicating cleanup efforts and jeopardizing vital water supplies for municipal, industrial, and agricultural users. At a time, when our nation must turn increasingly to groundwater sources for our water, it is growing more important than ever to protect groundwater from pollution.

This concludes my response to your questions.

To the three you asked, I would add a fourth question, Is there a safe way to transport oil? The answer is no, that all modes of transporting oil cause pollution, and Congress must help prevent this pollution at every opportunity. This is one of those opportunities.

Again, I appreciate the opportunity to share my information and hope that the subcommittee takes decisive action to remedy this serious problem.

Sincerely yours,

Robert B. Rackleff

Robert B. Rackleff

COMPARATIVE SPILLS AND LEAKS BY PIPELINE AND WATER CARRIERS OF OIL AND PETROLEUM PRODUCTS IN THE UNITED STATES, 1970-92 BY VOLUME AND TON-MILES TRANSPORTED

Year	Pipeline 1/ Spills (gals)	Pipeline Ton-Miles 2/ (billions)	Water Carrier 3/ Spills (gals)	Water Carrier Ton-Miles (billions)
1970	22,097,418	n/a	n/a	n/a
1971	9,805,362	n/a	n/a	n/a
1972	14,462,700	475.8	n/a	330.0
1973	15,727,404	507.0	4,404,390	296.8
1974	12,127,962	506.0	3,535,385	297.0
1975	13,312,614	507.0	11,296,669	298.0
1976	10,060,722	515.0	11,018,486	306.9
1977	9,403,338	546.0	1,769,202	333.3
1978	11,779,530	585.0	3,569,813	530.6
1979	22,900,248	608.3	3,352,052	522.9
1980	12,005,238	588.2	3,335,011	617.8
1981	8,588,622	563.7	5,369,100	617.2
1982	9,214,926	565.7	3,366,433	616.9
1983	16,020,942	556.1	1,953,673	630.5
1984	12,008,010	568.1	7,152,367	570.7
1985	7,065,702 4/	564.3	4,417,032	590.4
1986	11,756,850	577.9	3,031,437	568.1
1987	15,341,634	586.8	2,222,546	566.5
1988	9,089,640	601.1	4,034,490	543.7
1989	8,452,076	584.2	12,126,258	466.2
1990	5,206,656	583.8	5,857,070	454.5
1991	9,196,530	n/a	n/a	n/a
1992	6,391,182	n/a	n/a	n/a
Total	272,015,306	10,590.0	91,811,414	9.158.0
Average	11,827,242	557.4	5,100,634	482.0
Avg Gals Spilled per Billion Ton-Miles	21,207		10,355	

1/ Source: Annual Report of Pipeline Safety (for years 1978-90), Office of Pipeline Safety, U.S. Department of Transportation; 1991 data from OPS letter of March 16, 1992.

2/ A ton-mile is movement of a ton of cargo one mile. Source: Annual Reports on Shifts in Petroleum Transportation, Association of Oil Pipe Lines.

3/ Water Carriers are tankships and tank barges. Spills were in U.S. waters. Source: Oil Pollution Incidents, Marine Environmental Protection Division, U.S. Coast Guard.

4/ Annual pipeline spill totals from 1985 to present reflect OPS change to require reports for spills of more than 2,100 gallons. Until 1985, reports were required for spills of more than 210 gallons.

Prepared by the Friends of the Aquifer, Tallahassee FL, May 13, 1993

1992 SUMMARY OF LIQUID PIPELINE
ACCIDENT REPORTS (DOT Form 7000-1)

INCIDENT SUMMARY BY CAUSE

CAUSE	# OF INCIDENTS	% OF TOTAL	BARRELS LOST	ESTIMATED PROPERTY DAMAGES	% OF TOTAL	FATALITIES	INJURIES
Internal Corrosion	11	4.91	2,925	$1,628,198	2.57	0	0
External Corrosion	34	15.19	29,416	$15,722,580	24.85	0	0
Defective Weld	15	6.70	31,897	$2,876,408	4.55	0	0
Incorrect Operation	16	7.14	5,271	$1,523,566	2.41	0	2
Defective Pipe	11	4.91	7,480	$1,358,166	2.15	0	0
Outside Damage	41	18.30	40,054	$8,113,373	12.82	0	8
Malf. of Equipment	10	4.46	8,258	$2,353,250	3.72	0	0
Other	86	38.39	27,280	$29,698,689	46.93	5	28
TOTAL	224	100.00	152,581	$63,274,230	100.00	5	38

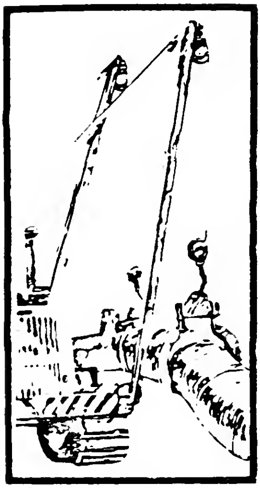
INCIDENT SUMMARY BY COMMODITY

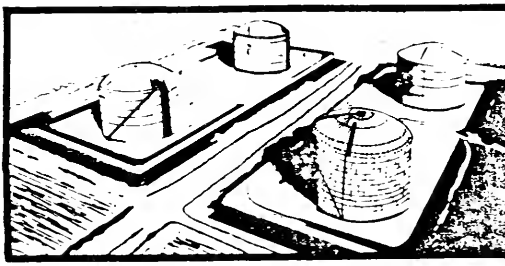
COMMODITY	# OF INCIDENTS	% OF TOTAL	BARRELS LOST	ESTIMATED PROPERTY DAMAGES	% OF TOTAL	FATALITIES	INJURIES
Anhydrous Ammonia	5	2.23	410	$5,955	0.01	1	2
Condensate	1	0.44	0	$0	0.00	0	0
Crude Oil	81	36.16	67,618	$49,100,232	77.60	1	1
Diesel Fuel	11	4.91	2,220	$433,300	0.69	0	2
Fert., Ammon. Nitr.	0	0.00	0	$0	0.00	0	0
Fuel Oil	17	7.59	4,522	$2,811,898	4.44	0	0
Gasoline	49	21.88	36,752	$5,755,817	9.10	0	0
Jet Fuel	12	5.36	4,317	$900,000	1.42	0	0
Kerosene	4	1.79	348	$26,000	0.04	0	0
L.P.G.	11	4.91	11,132	$881,750	1.39	3	31
Natural Gas Liquid	11	4.91	14,936	$2,414,578	3.82	0	2
Oil and Gasoline	5	2.23	395	$90,000	0.14	0	0
Toluene	1	0.44	400	$225,000	0.36	0	0
Turbine Fuel	7	3.13	2,465	$217,600	0.34	0	0
Various Petrol Proc	7	3.13	6,775	$312,100	0.49	0	0
Xylene	2	0.89	291	$100,000	0.16	0	0
TOTAL	224	100.00	152,581	$63,274,230	100.00	5	38

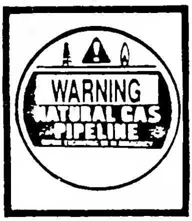
U.S. Department of Transportation

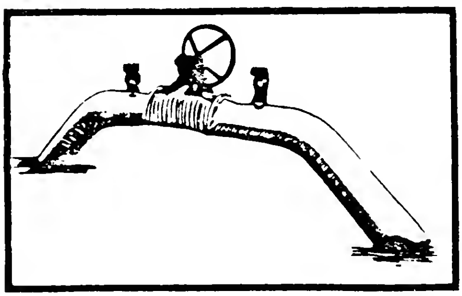
Research and Special Programs Administration

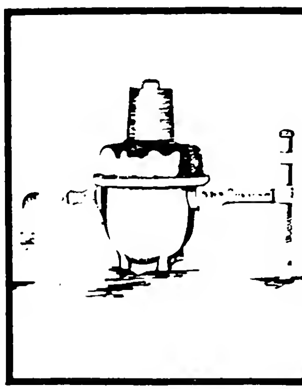
ANNUAL REPORT ON PIPELINE SAFETY
Calendar Year 1991









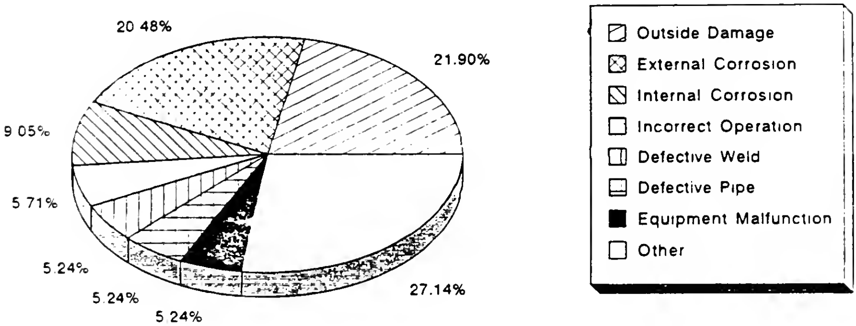


Prepared by

U.S. Department of Transportation
Research and Special Programs Administration
Office of Pipeline Safety
Washington, D.C. 20590

Table 13

Hazardous Liquid Pipeline Accidents Reported in 1991 by Cause



Cause	Accidents	Barrels Lost	Property Damage	Deaths	Injuries
Outside Damage	46	48,305	$8,555,831	0	0
External Corrosion	43	10,334	$1,427,659	0	0
Internal Corrosion	19	38,966	$494,100	0	0
Incorrect Operation	12	5,375	$127,973	0	5
Defective Weld	11	4,809	$7,927,500	0	0
Defective Pipe	11	30,576	$2,177,433	0	0
Equipment Malfunction	11	11,072	$56,478	0	0
Other	57	69,796	$4,187,105	0	3
Total	**210**	**219,233**	**$24,954,079**	**0**	**8**

Table 15

Summary of Liquid Pipeline Accident Reports (DOT Form 7000-1) Received in 1991

Commodity	# of Incidents	% of Total	Barrels Lost	Property Damages	# of Total	Deaths	Injuries
Alkylate	0	0.00	0	$0	0 00	0	0
Anhydrous Ammonia	9	4.29	268	$30,209	0 12	0	1
Condensate	2	0 95	77	$225,000	0 90	0	0
Crude Oil	90	42 86	146382	$17,707,932	70 96	0	0
Diesel Fuel	13	6 19	9477	$1,877,048	7 52	0	0
Fert Ammon Nitr	0	0 00	0	$0	0 00	0	0
Fuel Oil	23	10.95	28836	$1,144,853	4.59	0	0
Gasoline	28	13 34	6177	$2,724,267	10 92	0	0
Jet Fuel	2	0 95	168	$34,350	0 14	0	0
Kerosene	2	0 95	1702	$40,500	0 16	0	0
L P G	13	6 19	14082	$283,900	1 14	0	0
Natural Gas Liquid	20	9 52	7704	$329,020	1.32	0	4
[illegible] Gasoline	0	0.00	0	$0	0 00	0	3
Toluene	0	0 00	0	$0	0 00	0	0
Turbine Fuel	2	0 95	2411	$329,000	1 32	0	0
Various Petrol Prod	3	1 43	28	$16,000	0 06	0	0
Xylene	3	1 43	1901	$212,000	0 85	0	0
Total	210	100.00	219233	$24,954,079	100.00	0	8

Table 14

Summary of Hazardous Liquid Pipeline Incident Reports Received in 1990

Summary by Commodity

COMMODITY	# OF INCIDENTS	% OF TOTAL	BARRELS LOST	PROPERTY DAMAGES	% OF TOTAL	DEATHS	INJURIES
Alkyate	0	0.00	0	$ 0	0.00	0	0
Anhydrous Ammonia	1	0.56	2,622	100,000	0.64	0	0
Butane	2	1.13	2,600	66,000	0.42	0	0
Condensate	1	0.56	140	0	0.00	0	0
Crude Oil	91	51.41	66,894	8,256,629	52.88	0	0
Diesel Fuel	9	5.08	5,697	1,661,450	10.64	0	0
Fert., Ammon. Nitr.	0	0.00	0	0	0.00	0	0
Fuel Oil	15	8.47	5,922	319,000	2.04	0	0
Gasoline	27	15.25	16,986	1,979,327	12.68	0	0
Jet Fuel	4	2.26	2,790	1,689,000	10.82	0	0
Kerosene	0	0.00	0	0	0.00	0	0
L.P.G.	18	10.17	8,329	1,169,039	7.49	3	7
Natural Gas Liquid	5	2.82	9,400	211,492	1.35	0	0
Oil and Gasoline	1	0.56	2	50,000	0.32	0	0
Toulene	0	0.00	0	0	0.00	0	0
Transmix	2	1.13	2,506	12,500	0.08	0	0
Turbine Fuel	1	0.56	20	100,000	0.64	0	0
Xylene	0	0.00	0	0	0.00	0	0
TOTAL	177	99.96	123,908	$15,614,437	100.00	3	7

TABLE 14

SUMMARY OF HAZARDOUS LIQUID PIPELINE
INCIDENT REPORTS RECEIVED IN 1989

SUMMARY BY COMMODITY

COMMODITY	# OF INCIDENTS	% OF TOTAL	BARRELS LOST	PROPERTY DAMAGES	% OF TOTAL	DEATHS	INJURIES
Alkyate	0	0.00	0	$0	0.00	0	0
Anhydrous Ammonia	1	0.62	1	$0	0.00	0	1
Condensate	1	0.62	40	$26,000	0.36	0	0
Crude Oil	68	42.24	117,082	$3,352,568	46.27	0	2
Diesel Fuel	7	4.35	3,511	$253,740	3.50	0	0
Fert., Ammon. Nitr.	0	0.00	0	$0	0.00	0	0
Fuel Oil	11	6.83	3,550	$536,196	7.40	0	0
Gasoline	40	24.84	18,113	$1,029,220	14.21	2	32
Jet Fuel	2	1.24	2,037	$56,920	0.79	0	0
Kerosene	2	1.24	5,110	$79,600	1.10	0	0
L.P.G.	15	9.32	19,239	$1,450,678	20.02	1	0
Natural Gas Liquid	11	6.83	27,432	$451,743	6.24	0	3
Oil and Gasoline	1	0.62	75	$3,500	0.05	0	0
Toulene	1	0.62	211	$5,000	0.07	0	0
Turbine Fuel	1	0.62	4,843	$0	0.00	0	0
Xylene	0	0.00	0	$0	0.00	0	0
TOTAL	161	100.00	201,244	$7,245,165	100.00	3	38

Petroleum incidents

160 '89
196 '88
234 '87
590

201,243
× 42
8,452,206

8,452,076 '89
9,089,640 '88
15,341,634 '87

3 / 32,883,350
10,961,117

TABLE 12

SUMMARY OF LIQUID PIPELINE ACCIDENT REPORTS RECEIVED FOR 1988
(DOT Form 7000-1)

ACCIDENT SUMMARY BY COMMODITY

COMMODITY	NUMBER OF ACCIDENTS	PERCENT OF TOTAL	BARRELS LOST	DEATHS	INJURIES
Alkyate	0	0.00	0	0	0
Anhydrous Ammonia	0	0.00	0	0	0
Condensate	1	0.51	1,045	0	0
Crude Oil	84	42.86	136,290	0	0
Diesel Fuel	9	4.59	7,910	0	0
Fert., Ammon. Nitr.	0	0.00	0	0	0
Fuel Oil	19	9.69	11,061	0	0
Gasoline	37	18.88	28,369	0	3
Jet Fuel	4	2.04	981	0	0
Kerosene	0	0.00	0	0	0
L.P.G.	16	8.16	14,527	1	3
Natural Gas Liquid	17	8.67	8,185	1	5
Oil and Gasoline	4	2.04	2,989	0	0
Toulene	3	1.53	4,192	0	8
Turbine Fuel	1	0.51	131	0	0
Xylene	1	0.51	740	0	0
TOTAL	196	100.00	216,420	2	19

x42
9,089,640

TABLE 12
SUMMARY OF LIQUID PIPELINE
INCIDENT REPORTS (DOT FORM 7000-1)
RECEIVED FOR 1987

INCIDENT SUMMARY BY COMMODITY
(BASED ON AUDIT COMPLETED 4/22/88)

CAUSE	# OF INCIDENTS	% OF TOTAL	BARRELS LOST	DEATHS	INJURIES
Alkyate	0	0.00	0	0	0
Anhydrous Ammonia	0	0.43	2	0	1
Condensate	1	0.43	1,500	0	0
Crude Oil	114	48.51	118,299	0	8
Diesel Fuel	12	5.11	8,081	0	0
Fert., Ammon. Nitr.	1	0.43	110	0	0
Fuel Oil	17	7.23	5,421	0	0
Gasoline	51	21.70	34,933	0	2
Jet Fuel	3	1.28	3,602	0	2
Kerosene	0	0.00	0	0	0
L.P.G.	15	6.38	148,483	0	1
Natural Gas Liquid	14	5.96	43,132	0	3
Oil and Gasoline	2	0.85	250	0	0
Toluene	0	0.00	0	0	0
Turbine Fuel	4	1.70	1,576	0	0
TOTAL	235	100.00	365,389	0*	17

* There were 3 fatalities as a result of an incident involving an intrastate operator for which a written report, as required by Section 195.54, was not filed.

Petroleum 234 57 365,277
x42
15,341,634

Table 8

SUMMARY OF LIQUID PIPELINE INCIDENT REPORTS RECEIVED IN 1986

ACCIDENT SUMMARY BY CAUSE

Cause	No. of Incidents	% of Total	Barrels Lost	Property Damages	% of Total	Deaths	Injuries
Internal Corrosion	11	5.42	6,885	$ 20,935	.14	0	0
External Corrosion	39	19.21	24,154	$ 1,974,918	13.08	0	2
Defective Weld	8	3.94	3,874	$ 1,724,962	11.43	2	1
Incorrect Operation	12	5.91	27,075	$ 34,261	.23	0	0
Defective Pipe	16	7.88	23,813	$ 645,283	4.27	0	0
Outside Damage	66	32.51	92,886	$ 4,073,929	26.98	1	0
Malf. of Equipment	4	1.97	494	$ 700,000	4.64	0	0
Other	47	23.15	100,744	$ 5,923,073	39.23	0	29
TOTAL	203	100.00	279,925	$15,097,361	100.00	3	32

INCIDENT SUMMARY BY COMMODITY

Commodity	No. of Incidents	% of Total	Barrels Lost	Property Damages	% of Total	Deaths	Injuries
Alkyate	0	.00		$	.00	0	0
Crude Oil	108	53.20	113,724	$ 8,232,614	54.53	0	3
Gasoline	38	18.72	98,377	$ 2,924,300	19.37	2	27
Natural Gas Liquid	17	8.37	15,705	$ 1,226,218	8.12	1	2
Fuel Oil	9	4.43	5,042	$ 731,625	4.85	0	0
L.P.G.	7	3.45	19,619	$ 84,533	.56	0	0
Jet Fuel	2	.99	552	$ 50,000	.33	0	0
Diesel Fuel	14	6.90	20,284	$ 1,636,721	10.84	0	0
Anhydrous Ammonia	0	.00		$	.00	0	0
Kerosene	1	.49	320	$ 150	.00	0	0
Turbine Fuel	3	1.48	806	$ 151,000	1.00	0	0
Oil and Gasoline	1	.49	1,800	$ 14,000	.09	0	0
Condensate	2	.99	3,693	$ 33,200	.22	0	0
Fert., Ammon. Nitr.	0	.00		$	.00	0	0
TOTAL	203	100.00	279,925	$15,097,361	100.00	3	32

Table 7

SUMMARY OF LIQUID PIPELINE INCIDENT REPORTS RECEIVED IN 1985

INCIDENT SUMMARY BY CAUSE

Cause	*No. of Incidents*	*% of Total*	*Loss (Barrels)*	*Total Damages ($)*	*% of Total*	*Deaths*	*Injuries*
Internal Corrosion	16	8.74	4,202	83,670	1.63	0	1
External Corrosion	38	20.76	26,808	1,089,399	21.22	0	0
Defective Weld	0	.00	0	0	.00	0	0
Incorrect Operation	15	8.20	19,805	1,619,500	31.55	0	1
Defective Pipe	8	4.37	25,032	316,000	6.16	0	0
Outside Damage	52	28.42	55,622	817,573	15.93	1	3
Malf. of Equipment	2	1.09	956	29,250	.57	0	0
Other	52	28.42	39,032	1,177,255	22.94	4	13
TOTAL	**183**	**100.00**	**168,457**	**5,132,647**	**100.00**	**5**	**18**

INCIDENT SUMMARY BY COMMODITY

Commodity	*No. of Incidents*	*% of Total*	*Loss (Barrels)*	*Total Damage ($)*	*% of Total*	*Deaths*	*Injuries*
Alkylate	0	.00	0	0	.00	0	0
Crude Oil	93	50.81	76,132	2,389,915	46.56	1	1
Gasoline	46	25.14	23,336	665,638	12.97	3	6
Natural Gas Liquid	11	6.01	26,704	50,799	.99	0	0
Fuel Oil	9	4.92	5,286	547,405	10.66	0	1
L P G	9	4.92	29,027	285,930	5.57	0	2
Jet Fuel	4	2.19	2,218	1,153,150	22.46	1	7
Diesel Fuel	5	2.73	2,712	10,100	.20	0	0
Anhydrous Ammonia	2	1.09	226	500	.01	0	1
Kerosene	2	1.09	1,299	29,010	.57	0	0
Turbine Fuel	1	.55	100	200	.01	0	0
Oil and Gasoline	0	.00	0	0	.00	0	0
Condensate	0	.00	0	0	.00	0	0
Fert. Amma. Nitr.	1	.55	1,417	0	.00	0	0
TOTAL	**183**	**100.00**	**168,457**	**5,132,647**	**100.00**	**5**	**18**

Table 7

SUMMARY OF LIQUID PIPELINE INCIDENT REPORTS RECEIVED IN 1984

ACCIDENT SUMMARY BY CAUSE

Cause	No. of Accidents	% of Total	Loss (Barrels)	Damages: Carrier	Damages: Other	Damages: Total	Deaths	Injuries
Internal Corrosion	11	5.42	6,126	48,040	2,700	50,740	0	0
External Corrosion	38	18.72	33,403	11,977	8,200	20,177	0	0
Defective Weld	5	2.46	1,826	1,510	550	2,060	0	0
Incorrect Operation	12	5.91	11,001	3,000	9,000	12,000	0	0
Defective Pipe	7	3.45	5,810	11,115	2,800	13,915	0	0
Equip. Rupt. Line	53	26.11	53,235	79,621	677,020	756,641	0	18
Other	77	37.93	180,725	4,025,732	552,570	4,578,302	0	1
TOTAL	203	100.00	292,126	$4,180,995	$1,252,840	$5,433,835	0	19

ACCIDENT SUMMARY BY COMMODITY

Commodity	No. of Accidents	% of Total	Loss (Barrels)	Damage: Carrier	Damage: Other	Damage: Total	Deaths	Injuries
Alkyate	1	.49	3,900	600	8,000	8,600	0	0
Crude Oil	102	50.25	178,847	3,967,498	367,770	4,335,442	0	2
Gasoline	35	17.24	33,951	99,197	400,450	499,882	0	12
Natural Gas Liquid	17	8.37	37,763	27,791	180,600	208,391	0	5
Fuel Oil	18	8.87	10,124	14,459	6,250	21,269	0	0
L.P.G.	5	2.46	8,703	35,666	275,700	311,366	0	0
Jet Fuel	5	2.46	2,926	2,423	1,520	3,943	0	0
Diesel Fuel	11	5.42	7,339	2,411	9,550	11,961	0	0
Anhydrous Ammonia	3	1.48	6,221	25,100	1,500	27,287	0	0
Kerosene	2	.98	416	0	0	0	0	0
Turbine Fuel	1	.49	55	1,500	0	1,500	0	0
Oil and Gasoline	1	.49	1,543	0	0	0	0	0
Condensate	2	.98	338	4,350	1,500	5,850	0	0
TOTAL	203	100.00	292,126	$4,180,995	$1,252,840	$5,435,835	0	19

Table 9

Summary of Liquid Pipeline Incident Reports Received in 1983

ACCIDENT SUMMARY BY CAUSE:

Cause or Commodity	No. of Accidents	% of Total	Loss (Barrels)	Damages: Carrier	Damages: Other	Damages: Total	% of Total	Deaths	Injuries
Internal Corrosion	11	6.83	6,986	48,690	5,700	54,390	.77	0	0
External Corrosion	33	20.50	107,202	13,621	46,955	60,576	.86	0	0
Defective Weld	1	.62	6,700	800	5,000	5,800	.08	0	0
Incorrect Operation	9	5.59	7,058	3,320	4,800	8,120	.12	0	0
Defective Pipe	5	3.11	6,602	8,633	10,100	18,733	.27	0	0
Equip. Rupt. Line	50	31.06	71,555	57,906	1,903,926	1,988,832	28.28	6	4
Other	52	32.30	178,567	4,630,133	265,450	4,895,583	69.62	0	5
TOTAL	161	100.00	384,670	4,763,103	2,268,931	7,032,034	100.00	6	9

ACCIDENT SUMMARY BY COMMODITY:

Cause or Commodity	No. of Accidents	% of Total	Loss (Barrels)	Damages: Carrier	Damages: Other	Damages: Total	% of Total	Deaths	Injuries
Alkyate	0	.00	0	0	0	0	.00	0	0
Crude Oil	73	45.34	188,542	4,248,675	287,355	4,536,030	64.51	0	0
Gasoline	30	18.63	16,761	277,662	54,370	332,032	4.72	0	0
Natural Gas Liquid	11	6.83	93,555	1,503	1,733,504	1,734,504	24.67	0	0
Fuel Oil	7	4.35	5,701	7,700	7,100	14,800	.21	0	0
L.P.G	16	9.94	49,826	26,306	175,505	201,811	2.87	6	6
Jet Fuel	5	3.11	695	6,409	2,100	8,509	.12	0	0
Diesel Fuel	9	5.59	16,910	105,198	600	105,798	1.50	0	0
Anhydrous Ammonia	2	1.24	3,219	700	2,400	3,100	.04	0	3
Kerosene	3	1.86	555	83,000	0	83,000	1.18	0	0
Turbine Fuel	2	1.24	8,700	5,800	5,000	10,800	.15	0	0
Oil and Gasoline	1	.62	95	0	0	0	.00	0	0
Condensate	2	1.24	111	150	1,500	1,650	.02	0	0
TOTAL	161	100.00	384,670	4,763,103	2,268,931	7,032,034	100.00	6	9

* Percentages Rounded

TABLE 11

SUMMARY OF LIQUID PIPELINE ACCIDENT REPORTS RECEIVED IN 1982

ACCIDENT SUMMARY BY CAUSE:

Cause or Commodity	No. of Accidents	% of* Total	Loss (Barrels)	% of* Total	Damages Carrier	Damages Other	Damages Total	% of* Total	Deaths** Empl	Deaths** Nonempl	Injuries** Empl	Injuries** Nonempl
INTERNAL CORROSION	12	6.56	11,495	5.19	29,271	12,600	41,871	2.83	0	0	0	0
EXTERNAL CORROSION	43	21.50	32,746	14.79	14,202	12,100	26,302	1.78	0	0	0	4
DEFECTIVE WELD	6	3.00	10,850	4.90	13,378	1,600	14,978	1.01	0	0	0	0
INCORRECT OPERATION	8	4.00	9,647	4.36	256,400	5,500	261,900	17.69	0	0	0	0
DEFECTIVE PIPE	7	3.50	7,455	3.37	4,190	1,500	5,690	.38	0	0	0	0
EQUIP. RUPT. LINE	65	34.00	94,539	42.23	211,398	261,270	472,668	31.93	0	1	0	[illegible]
OTHER	52	26.00	54,379	[illegible]	392,921	264,200	657,121	44.38	0	0	0	0
TOTAL	200	100.00	221,411	100.00	921,760	558,770	1,480,530	100.00	0	1	0	[illegible]

ACCIDENT SUMMARY BY COMMODITY:

Cause or Commodity	No. of Accidents	% of* Total	Loss (Barrels)	% of* Total	Damages Carrier	Damages Other	Damages Total	% of* Total	Deaths** Empl	Deaths** Nonempl	Injuries** Empl	Injuries** Nonempl
[illegible]	[illegible]	[illegible]	[illegible]	.0[illegible]	0	0	0	.00	0	0	0	0
CRUDE OIL	[illegible]	51.00	128,0[illegible]	57.[illegible]	324,015	206,050	530,065	35.80	0	0	0	0
GASOLINE	35	17.50	[illegible]	[illegible]	[illegible]	8,070	35,287	2.38	0	0	0	0
NATURAL GAS LIQUID	4	2.00	3,343	1.51	250,003	0	250,003	16.89	0	0	0	4
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	19,400	44,395	3.00	0	[illegible]	0	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	145,650	101,450	247,10[illegible]	16.69	0	0	0	1
JET FUEL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	1,213	.08	0	0	0	0
DIESEL FUEL	4	[illegible]	[illegible]	1.01	2,665	500	3,165	.21	0	0	0	0
ANHYDROUS AMMONIA	4	2.00	[illegible]	.91	700	1,300	2,000	.14	0	0	0	0
KEROSENE	3	1.50	1,58[illegible]	.71	123,800	216,000	339,800	22.95	0	0	0	0
TURBINE FUEL	0	.00	0	.00	0	0	0	.00	0	0	0	0
OIL AND GASOLINE	4	2.00	10,474	4.73	21,500	6,000	27,500	1.86	0	0	0	0
CONDENSATE	0	.00	0	.00	0	0	0	.00	0	0	0	0
TOTAL	200	100.00	221,411	100.00	921,760	558,770	1,480,530	100.00	0		0	6

*Percentages Rounded **Empl = Carrier Employee Nonempl = Non-employee

Table 14

Liquid Pipeline Accident Summary by Cause—1981

					Damages				Deaths		Injuries	
Cause	No of Accidents	% of Total	Loss (Barrels)	% of Total	Carrier	Other	Total	% of Total	Carrier Employees	Non Employees	Carrier Employees	Non Employees
Internal Corrosion	14	4.86	7,116	3.32	193,600	4,000	197,600	3 77	0	0	0	0
External Corrosion	38	15.90	20,970	9 78	106,076	127,450	233,526	4 46	0	0	4	0
Defective Weld	4	1.67	6,301	2.94	282	50,000	50,282	.96	0	0	0	4
Incorrect Operation	16	6 69	11,569	5 40	600,850	61,000	661,850	12 64	1	0	1	0
Defective Pipe	11	4.60	6,900	3.22	10,888	2,275	13,163	.25	0	0	0	0
Equip Rupt Line	99	41 42	111,888	52 19	1,903,672	1,777,250	3,680,922	70.28	0	4	0	22
Other	57	23 85	49,640	23 15	372,710	27,575	400,285	7 64	0	0	0	1
TOTAL	**239**	**100.00**	**214,384**	**100.00**	**3,188,078**	**2,049,550**	**5,237,628**	**100.00**	**1**	**4**	**5**	**27**

Table 15

Liquid Pipeline Accident Summary by Commodity—1981

					Property Damage ($)				Deaths		Injuries	
Commodity	No of Accidents	% of Total	Loss (Barrels)	% of Total	Carrier	Other	Total	% of Total	Carrier Employees	Non Employees	Carrier Employees	Non Employees
Crude Oil	115	48 12	76,259	35 57	1,974,996	971,125	2,946,121	56 25	0	0	0	1
Gasoline	46	19.25	30,603	14.27	139,132	740,950	880,082	16 80	0	0	0	2
Natural Gas Liquid	12	5 02	31,946	14 90	396 440	160,600	557,240	10 64	0	4	0	2
Fuel Oil	11	4 60	7,985	3 72	7,656	7,000	14,656	.28	0	0	0	0
[illegible]	35	14 64	46,974	21.91	637,538	54,375	691,913	13.21	1	0	5	14
Fuel	3	1.26	2,799	1.31	250	0	250	00	0	0	0	0
Diesel Fuel	6	2 51	1,241	.58	5,846	300	6 146	12	0	0	0	0
Anhydrous Ammonia	3	1.26	9,893	4 61	471	10,500	10,971	.21	0	0	0	8
Kerosene	1	42	120	06	200	0	200	00	0	0	0	0
Turbine Fuel	4	1 67	5,212	2 43	3,850	44,000	47,850	.91	0	0	0	0
Oil and Gasoline	1	42	0	.00	0	60,000	60,000	1 15	0	0	0	0
Condensate	2	.84	1,352	.63	21,699	500	22,199	.42	0	0	0	0
TOTAL	**239**	**100.00**	**214,384**	**100.00**	**3,188,078**	**2,049,550**	**5,237,628**	**100.00**	**1**	**4**	**5**	**27**

Table 16

Liquid Pipeline Accident Summary by Commodities Involved For the Year 1980

Cause of Accident Operation Accidents	No. of Accidents	% of Total	Loss (Barrels)	% of Total	Property Damage ($) Carrier	Property Damage ($) Other	Property Damage ($) Total	% of Total	Deaths Carrier Employees	Deaths Non Employees	Injuries Carrier Employees	Injuries Non Employees
Crude Oil	[illegible]	48.3	147,777	51.1	482,126	488,924	971,050	17.9	0	1	0	0
Alkylate	0	.0	0	0	0	0	0.0	.0	0	0	0	
Anhydrous Ammonia	1	.5	3,606	1.2	100	1,800	1,900	0.0	0	0	0	0
Jet Fuel	5	2.3	3,214	1.1	73	100	173	0.0	0	0	0	0
Gasoline	42	19.2	30,277	10.5	3,175,567	397,670	3,573,237	65.9	1	1	3	1
Oil and Gasoline	2	.9	9,794	3.4	602	0	602	0.0	0	0	0	0
Turbine Fuel	3	1.4	2,382	1	67	45,500	46,170	.9	0	0	0	0
Kerosene	1	.5	8,000	2.8	934	0	934	0.0	0	0	0	0
Diesel Fuel	6	2.7	2,841	1.0	5,131	4,550	9,681	.2	0	0	0	0
Fuel Oil	13	5.9	8,783	3.0	65,988	2,625	68,613	1.3	0	0	0	0
Condensate	1	.5	75	0.0	0	0	0	0.0	0	0	0	0
LPG	24	10.9	50,881	17.6	172,236	277,780	450,016	8.3	0	0	2	8
NGL	11	5.0	20,798	7.2	153,531	125,556	279,087	5.1	0	0	0	1
Unknown	2	.9	1,017	.4	19,400	500	19,900	.4	0	0	0	0
Totals	219	100.0	[illegible]	100.0	4,078,358	1,346,006	5,421,363	100.0	1	2	5	10

Table 8

Liquid Pipeline Accident Summary by Commodities Involved For the Year 1979

Cause of Accident Operation Accidents	No. of Accidents	% of Total	Loss (Barrels)	% of Total	Property Damage ($) Carrier	Property Damage ($) Other	Property Damage ($) Total	Property Damage ($) % of Total	Deaths Carrier Employees	Deaths Non Employees	Injuries Carrier Employees	Injuries Non Employees
Crude Oil	131	52 2	136 163	25 2	4 253 413	1.527,077	5 777.490	4 8	0	0	1	0
Alkyate	0	0	0	0	0	0	0	0	0	0	0	0
Anhydrous Ammonia	1	4	3 425	6	200	2 000	2.200	0	0	0	0	0
Jet Fuel	5	2 0	3.333	6	9 150	0	9 150	0	0	0	0	0
Gasoline	38	15 1	25 411	4 6	101.508 142	303.411	101 811.553	84 7	0	0	0	2
Oil and Gasoline	6	2 4	1.922	4	15 960	402.000	417 960	3	0	0	0	0
Turbine Fuel	1	4	150	0	0	0	0	0	0	0	0	0
Kerosene	0	0	0	0	0	0	0	0	0	0	0	0
Diesel Fuel	6	2 4	5 397	1 0	19.571	7.200	26.771	0	0	0	0	0
Fuel Oil	22	8 6	34 237	6 2	44 321	552 700	597.021	5	1	0	0	0
Condensate	1	4	584	1	2 000	750	2.750	0	0	0	0	0
LPG	34	13 5	321.446	58 6	10 444 608	978 000	11 422 608	9 5	0	3	3	6
NGL	5	2 0	14 601	2 7	47.963	40 000	87 963	1	0	0	0	[illegible]
Unknown	0	0	0	0	0	4.000	4 000	0	0	0	0	0
Totals	251	99 6	548 669	100 0	116.342.328	3.817.138	120 159 466	100 0	1	3	4	9

through a longitudinal weld, one of several small cracks on or near a wrinkle in the pipe. The June 15 leak occurred north of pump station no. 12 through a 3-inch crack near a wrinkle in the pipe. Alyeska estimated a total commodity loss of 1,800 barrels from both leaks.

NTSB Report Issuance

In 1979 NTSB issued a report on its investigation of a liquid petroleum gas pipeline rupture and fire which occurred near Donnellson, Iowa on August 4, 1978. Propane that had vaporized and spread widely from a ruptured 8-inch pipeline was ignited by an unknown source. The intense fire killed three people, critically burned two others, and destroyed a farmhouse and six outbuildings. Before the fire burned out, 3,750 barrels of propane had burned and 75 acres of cornfields and woods were damaged.

NTSB determined that the failure resulted from stresses exerted on the pipeline when it was lowered three months before the accident and to a dent and gouge which had weakened the pipe.

Enforcement Activity

MTB regional engineers conducted 66 inspections of liquid pipeline facilities under the Bureau's direct safety jurisdiction, expending 166 person-days. Enforcement actions were initiated against 13 liquid carriers believed to be in violation of the Federal regulations. Five investigations were closed without penalty as safety issues were resolved. Regional Chiefs sent six warning letters to carriers found to be in violation of the Federal liquid pipeline safety regulations. Sixteen cases remained active at the end of 1979. (See Appendix E.)

The United States District Court for the Southern District of Iowa levied a criminal penalty of $4,000 on the Mid-America Pipeline Company of Tulsa, Oklahoma for violations of the Federal regulations.

ESTIMATED COMMODITY LOSS DUE TO ACCIDENT

	78	77	76	75	74	73	72	71	70
CRUDE OIL	118832	104367	90709	107755	167991	212356	238500	108220	380289
ALKYATE	0	0	0	0	0	0	0	0	[illegible]
ANHYROUS AMMONIA	5	1093	10149	1311	3240	3210	0	9850	1005
JET FUEL	854	1192	394	4456	1645	2810	5744	2236	2678
GASOLINE	26367	32540	25870	30770	32122	36382	42004	36526	49318
OIL AND GASOLINE	160	0	13549	1000	4507	433	295	3376	1750
TURBINE FUEL	4373	1595	1394	73	4927	10101	0	0	4591
KEROSENE	0	200	906	25030	217	1527	10200	700	4142
DIESEL FUEL	9861	2744	16545	3916	1148	5668	10179	6445	12462
FUEL OIL	8090	8427	34790	9368	9743	51202	16098	14113	23473
CONDENSATE	0	0	0	600	0	0	0	0	0
LPG	95116	64582	31173	111907	54655	37832	21110	51592	47426
NGL	16812	8242	24211	21892	9806	16181	200	10253	0
TOTALS	280470	224982	249690	318278	292001	377672	344350	243311	527134

U.S. OIL POLLUTION IN GALLONS

Year	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Tankships													
0-10,000	181,178	186,091	127,127	126,075	99,010	139,590	139,083	118,043	79,993	64,521	41,890	50,048	25,722
10,001-100,000	303,800	66,200	381,328	84,000	103,600	191,000	325,440	135,000	154,600	103,600	103,908	176,620	32,676
100,001+	2,868,092	946,626	8,216,000	9,105,670	0	0	1,725,000	1,344,000	840,000	1,051,764	0	4,437,258	673,980
Tank Barges													
0-10,000	149,576	165,676	155,536	141,841	182,746	162,104	165,680	133,968	178,207	91,037	172,451	108,983	72,754
10,001-100,000	318,054	497,292	408,102	215,074	795,846	506,466	519,849	309,400	378,300	327,455	237,380	239,118	44,000
100,001+	783,690	1,673,500	2,008,578	1,345,826	588,000	2,570,653	477,000	1,294,600	3,738,000	1,728,056	1,398,044	2,140,340	3,567,900
Other Vessels													
0-10,000	182,123	163,062	153,117	185,923	167,120	214,493	174,295	180,395	196,377	167,449	177,823	204,772	196,010
10,001-100,000	123,400	216,115	105,000	95,000	107,980	263,900	225,500	110,566	15,000	244,830	200,662	132,600	302,000
100,001+	745,200	0	1,164,058	0	0	0	0	0	130,000	0	0	1,535,867	0
Non-Vessel													
0-10,000	1,663,970	2,514,129	2,027,485	1,940,228	1,685,524	1,772,844	1,674,226	1,300,879	1,070,715	1,448,384	1,176,414	1,261,192	1,095,132
10,001-100,000	2,221,781	3,494,298	2,080,115	1,809,516	1,905,172	1,713,310	2,208,440	2,035,797	1,650,011	1,315,922	1,167,387	1,256,540	917,681
100,001+	5,948,324	5,816,805	4,702,000	3,468,230	2,553,400	3,501,523	2,416,758	5,676,200	488,586	3,861,628	3,702,780	7,463,994	1,537,200
Totals	15,289,188	15,739,792	21,528,444	18,517,383	8,188,398	11,035,883	10,051,271	12,638,848	8,919,789	10,404,646	8,378,718	10,007,332	8,465,055

U.S. Department of Transportation
United States Coast Guard

Commandant
U.S. Coast Guard

2100 Second Street S.W.
Washington, DC 20593-0001
Staff Symbol: G-MEP
Phone: (202) 267-6670

5720
92-0236

Mr. Robert B. Rackleff
816 Cherry Street
Tallahassee, Florida 32303

MAR 2 1992

Dear Mr. Rackleff:

This is in response to your letter dated February 14, 1992, requesting a table of annual totals of oil spills in U.S. Waters from tankships and tank barges. Please be advised that any pollution data provided may be ongoing and could change or be deleted at anytime.

Enclosure (1) is the number of oil spills by calendar year and source. Enclosure (2) is the number of gallons of oil spilled by calendar year and source.

Should you have any questions concerning this information, please contact me at the above number.

Sincerely,

Mary Robey

Mary Robey
Management Information Systems Analyst
By direction of the Commandant

Encl: (1) Number of Incidents
(2) Amount spilled

U.S. OIL POLLUTION IN GALLONS

YEAR	1986	1987	1988	1989	1990	1991	1992
TANKSHIPS							
0-10,000	64,487	32,319	62,562	54,862	47,737	36,794	19,174
10,001-100,000	125,000	73,560	145,000	118,272	66,057	55,000	98,725
100,001 +	975,306	1,437,564	644,700	11,099,000	4,863,916		
TANK BARGES							
0-10,000	111,843	97,572	82,702	101,443	115,386	67,941	46,559
10,001-100,000	450,496	174,680	261,990	399,008	544,356	54,600	27,000
100,001 +	1,081,814	301,770	2,836,134	252,000	342,000	123,900	
OTHER VESSELS							
0-10,000	212,193	170,074	184,739	200,172	228,545	248,138	195,986
10,001-100,000	118,000	154,722	222,400	274,500	255,444	253,936	59,710
100,001 +		684,360		237,340			144,600
NON-VESSEL							
0-10,000	255,289	268,826	320,651	320,006	313,087	307,730	229,514
10,001-100,000	332,116	237,570	135,100	198,040	483,048	304,064	560,794
100,001 +	701,000	126,966	1,721,300	252,000	4,116,000		121,800
TOTALS							
0-10,000	643,812	568,791	650,654	676,483	704,755	660,603	491,233
10,001-100,000	1,025,612	640,532	764,490	989,820	1,348,905	667,500	746,229
100,001 +	2,758,120	2,550,660	5,202,134	11,840,340	9,321,916	123,900	266,400
GRAND TOTAL	4,427,544	3,759,983	6,617,278	13,506,643	11,375,576	1,452,103	1,503,862

UNITED STATES COAST GUARD

MARINE ENVIRONMENTAL PROTECTION DIVISION

TELECOPIER COVER SHEET

TIME: 1515

DATE: 5-11-93

NUMBER OF PAGES INCLUDING THIS PAGE: 02

TO: Bob Backleff

FROM: Mary Robey

PHONE:

PHONE: 202-267-0518

SUBJ:

COMMENTS REQUESTED BY:

THE NUMBER FOR THIS FACSIMILE MACHINE IS (202) 267-4085

Transportation Research Board (TRB) of the National Research Council examine ways that such accidents could be averted by more effective land use policies. In response to this request the TRB formed a study committee to examine land use measures for controlling development near pipelines. The committee broadened its inquiry to include other approaches to reducing intrusion on pipelines, such as damage prevention programs, and methods of mitigating the consequences of pipeline failures from all causes, such as more responsive emergency preparedness programs.

SAFETY RECORD OF THE PIPELINE INDUSTRY

The safety performance of transmission pipelines is good in comparison with that of other transportation modes that carry hazardous materials. When total fatalities and injuries from accidents are combined, and adjusted for the volume of product carried and the distance over which it is moved, casualty rates for transportation of hazardous liquids by transmission pipeline are significantly lower than rates for transport of similar hazardous materials by rail or truck, and only slightly higher than for transport by water. (Similar comparisons cannot be made for natural gas because this product is transported almost exclusively by pipeline.)

Despite this good safety record, pipeline operators reported more than 10,000 failures to liquids and gas transmission and gathering lines between 1971, the first full year of federally required reporting, and 1986, the latest year for which data are available. These failures resulted in total estimated property loss of approximately $300 million in 1986 dollars, and commodity loss of nearly 5 million barrels of crude oil and petroleum products plus an unquantified amount of natural gas. Approximately 3 percent of the 10,000 failures resulted in 178 fatalities and 770 injuries.

5 mill bbl
x 42
210 mill gals.
or
13.1 mill gals. per year

The single largest cause of pipeline failure is damage from outside forces, which represents 40 percent of all reported failures. Two-thirds of these reported outside force failures are caused by excavation damage by a party other than the pipeline operator. Natural causes, such as land subsidence, account for most other reported outside force failures.

Since 1980 outside force failures have declined. Over the same period, industry-sponsored "one-call systems," which provide a centralized number for contractors to use to notify pipeline companies and other utilities of intended excavation, have expanded. However, recent changes in pipeline accident reporting criteria and slowdowns in construction during the early 1980s may account for part of the decline; several more years of accident data will be needed to determine if the downward trend in outside force failures will persist. Moreover, the committee was unable to document conclusively that the establishment and extension of one-call systems has had a causal effect on reducing excavation incidents.

Corrosion, the second major cause of pipeline failure, accounted for 2[illegible] percent of all reported transmission and gathering line incidents between 197[illegible] and 1986. The number of failures attributable to corrosion has stabilized sinc[illegible] the mid-1970s, in part because of improvements in corrosion control methods Construction and material defects, equipment failures, incorrect operation and unidentified causes accounted for the remaining 40 percent of reporte[illegible] failures and showed no discernible trend during this period.

REGULATING PIPELINE SAFETY

Because of the dangers posed by pipeline accidents, the federal governme[illegible] and state and local governments regulate various aspects of pipeline activit[illegible] Federal safety regulations, first required by legislation passed in 1968, focu[illegible] on the pipeline operator and cover such broad areas as pipeline desig[illegible] construction, testing, and operation. Although the regulations do not contr[illegible] the use of land near pipelines, they are concerned with the safety of peopl[illegible] living and working near pipelines. For example, the natural gas regulatior[illegible] require higher pipeline design and operating standards in areas of hig[illegible] building density, and the liquids regulations mandate additional depth of cov[illegible] for pipelines constructed within 50 feet of private dwellings, industrial buil[illegible] ings, and places of assembly. Because excavation damage is a major cause [illegible] pipeline accidents, federal regulations also require operators of natural g[illegible] lines that are located in areas of high-density development to initiate dama[illegible] prevention programs. A major limitation of all of these federal regulations that the design and construction provisions are not retroactive.

The federal government has preempted state regulation of pipeline oper[illegible] tors, but states play a major role in implementing federal safety regulation Thirty-eight states and the District of Columbia have enacted their ow[illegible] damage prevention statutes, which require contractors to give advance no[illegible] fication of intent to excavate so that pipeline operators and other affect[illegible] utilities can identify and mark their lines.

Local governments are the primary governmental units that have the a[illegible] thority to regulate land use. Through comprehensive plans and zoning, loc[illegible] governments may designate appropriate land uses for parcels located ne[illegible] pipelines and specify the configuration of lots and setbacks from pipeli[illegible] rights-of-way.

RECOMMENDATIONS FOR ENHANCING PIPELINE SAFETY

The study identified a wealth of policies and practices that could be employ[illegible] to enhance public safety near pipelines but found that these measures a[illegible]

SPECIAL REPORT 219

Pipelines and Public Safety

Damage Prevention, Land Use, and Emergency Preparedness

Transportation Research Board
National Research Council
Washington, D.C. 1988

U.S. Department of Transportation
Research and Special Programs Administration

The Administrator

400 Seventh Street S W
Washington, D C 20590

MAR 16 1992

Mr. Robert B. Rackleff
816 Cherry Street
Tallahassee, FL 32303

Dear Mr. Rackleff:

Thank you for your January 25, 1992, letter regarding the pollution record of oil pipelines. You indicated in your letter that Research and Special Programs Administration (RSPA) officials have made statements to the effect that pipelines offer the most environmentally compatible method for transporting petroleum.

In Congressional hearings and various publications, we have characterized pipelines as "one of the safest modes of transportation" and have referred to the "excellent safety record of pipeline transportation." These assertions have been made in relation to safety (e.g., number of fatalities and injuries) and not environmental protection (e.g., number of barrels lost). To my knowledge, no one from RSPA has ever made a claim that pipelines offer the most environmentally compatible method for transportation of petroleum.

Historically, the primary focus of the Department of Transportation's pipeline safety program has been public safety. Since the March 24, 1989 Exxon Valdez incident (which did not involve a pipeline) and the January 1, 1990 Arthur Kill Waterway spill, public concern has heightened over the potential environmental impacts of hazardous liquid pipeline accidents. The Administration's proposed legislation and other bills to reauthorize the pipeline safety program would, in fact, recognize that "protection of the environment" is a basis for regulation of hazardous liquid pipelines. Such legislation would effectively elevate environmental protection alongside public safety as a major program objective.

In line with the new emphasis on environmental protection, we have initiated a number of activities to prevent potential pollution problems associated with hazardous liquid pipelines:

1. We will conduct a multi-year study in which we will define, identify, and investigate various types of "environmentally sensitive areas" traversed by hazardous liquid pipelines, such as wetlands, navigable waters, and aquifers, and determine if it is reasonable to rank the areas in order of potential harm from pollution by liquids transported.

2. We will undertake another multi-year study in which we will investigate and analyze the various computer-based supervisory control and data acquisition (SCADA) systems used to detect leaks in hazardous liquid pipelines to determine if any of them are suitable for general application in the pipeline industry. The study will also pinpoint areas where further research is needed to minimize leak detection time.

3. We have issued a final rule requiring pipeline operators to conduct underwater inspection of pipelines in the Gulf of Mexico and its inlets located in water less than 15 feet deep; report to the U.S. Coast Guard pipelines exposed or otherwise a hazard to navigation and mark with a buoy; and bury those identified pipelines.

4. We have begun other prevention-focused regulatory projects related to hydrostatic testing of older pipelines, hazardous liquid pipelines operated at 20 percent or less of specified minimum yield strength, and use of internal inspection devices.

5. We have increased the use of hazardous facility orders following hazardous liquid accidents to assure that the future operation of the pipeline is safe and environmentally sound.

In response to your request for spill and leak data, we are enclosing a table showing the number of hazardous liquid accidents reported to RSPA over the last seven years, along with an indication of barrels lost, property damage, deaths, and injuries.

I hope this letter clarifies our past statements related to the "pipeline safety record." Please be assured that we are grappling with the pollution implications of hazardous liquid pipeline accidents.

Sincerely,

Travis P. Dungan

Travis P. Dungan

Enclosure

U.S. Department of Transportation

Research and Special Programs Administration

400 Seventh Street, S.W.
Washington, D.C. 2059?

APR 17 1992

Mr. Robert B. Rackleff
816 Cherry Street
Tallahassee, FL 32303

Dear Mr. Rackleff:

This letter is in response to your March 22, 1992, correspondence to Travis P. Dungan, regarding the environmental soundness of liquid pipelines. We were surprised to see the article in the Florida Energy Pipeline Association (FEPA) newsletter entitled "Pipelines: Safe and Environmentally Sound" attributed to the Department of Transportation (DOT).

We did not recognize the statistics in the article and called the FEPA Executive Director to determine the source. He, in turn, referred us to the contributing author who, upon checking, acknowledged the statistics were not from DOT but from a brochure published by the Association of Oil Pipe Lines (AOPL). (The author further admitted the article had been inadvertently attributed to DOT.)

We subsequently verified that the AOPL brochure, "Oil Pipelines of the United States: Progress and Outlook," was the source of both the statistics and narrative used in the article. We have enclosed a comparison of the article and the AOPL brochure. Indeed, in most cases, the statistics and narrative have been lifted almost verbatim. To avoid any further confusion, we are requesting the FEPA Executive Director to issue a retraction in the next issue of the newsletter.

With respect to the assertions in the article, we cannot at this time categorically confirm or deny them. Since the statistics are not from DOT data bases, we would have to undertake a significant amount of validation, analysis, and interpretation to arrive at any responsible conclusions.

Sincerely,

Richard L. Beam

for George W. Tenley, Jr.
Associate Administrator for
Pipeline Safety

Enclosure

Texas Monthly

ILLUSTRATION BY BRAD HOLLAND

MORE PRECIOUS THAN OIL

Out in West Texas the fight over water is an old story. But years of searching for oil and transporting it have fouled the fresh aquifers, and now ranchers are scrambling to save what's left.

REX PIGMON HAD SEEN OIL SPILLS on his West Texas ranch before. But the one on January 24, 1989, was different. The 62-year-old Winkler County cattleman sat in his pickup for a long minute, watching the stream of smelly crude flow across his land toward the road. He thought about getting out for

by Robert Bryce

a closer look, but the danger of poisonous gases and explosion made him stay put. He watched the spill for a few more seconds, then in a torrent of dust and flying sand, he wheeled his truck around and sped toward the pipeline pump station, about a mile away.

Butch Higdon, Texaco's pump station supervisor, was hurrying out the door when Pigmon pulled up. "I don't have time to visit," Higdon said impatiently, heading for his truck. "I'm looking for a pipeline leak."

"You just follow me," said the rancher. "I'll take you right to it."

Five minutes later, the two men were surveying the rapidly growing black river. "Looks like I better get busy," Higdon said. With that, he jumped back in his truck and sped down the bumpy caliche road toward the town of Wink, five miles away. Within a few hours, three bulldozers, a herd of trucks, and two dozen men were at the site, scrambling to contain the thousands of gallons of crude draining out of the 20-inch-diameter Texaco pipeline. The bulldozers built levees to contain the gushing oil. As the dozers worked to wall in the spill, two vacuum trucks sucked up the heavy-smelling crude. As soon as one truck was full, it turned around and headed for the row of huge gray oil tanks at the pump station. But there just weren't enough trucks to keep up with the rising oil. Soon the levees gave way and the sulfurous oil crept over the arid terrain. Before the oil stopped flowing, six acres of Pigmon's land—an area the size of four and a half football fields—was covered with oil.

When water is polluted by oil-field activity, the case is assigned to the Texas Railroad Commission, an agency with a reputation for being more concerned about production of oil than protection of water.

Twenty-four hours after Pigmon found the leak, the pipeline was still draining. The welders and pipe fitters waited and watched as the oil occupying twenty miles worth of pipe oozed out onto Pigmon's property. Finally, around noon, the damaged pipe was empty. Backhoes dug out the buried pipe, and the ruptured section was cut out. Seventy-four feet of new pipe were laid in place, and by six o'clock that evening, the welders were gone. The dozers leveled the dikes. The oil that couldn't be vacuumed up was covered over with dirt. That done, the remaining crew loaded the equipment and drove away—leaving a chunk of Pigmon's land oil-soaked and sterile. But the rancher didn't know how much oil had spilled. No one from Texaco called him. So he waited. And when he learned two months later that nearly one million gallons of crude had leaked onto his land and was beginning to contaminate his groundwater, he got mad. And when Texaco offered him $1,200 for damages, he got a lawyer.

HAVING POLLUTED WATER, A GOOD lawyer, and a pending lawsuit against a major oil company has become a tradition in West Texas; Pigmon is just one of dozens of landowners fighting oil companies, which seem impervious to lawsuits and regulations. But this is only a modern extension of an ancient fight between ranchers and oilmen, one that was immortalized in Edna Ferber's novel *Giant*. Bick Benedict was the noble rancher who loved the land; Jett Rink was the low-life wildcatter who plundered the surface to get to what lay underneath. Ranchers still see themselves as caretakers of the land, and they still believe—with good cause—that oil operators regard the land only as something that stands in the way of their objective. Much of the work of finding oil in Texas has been performed by high-living, free-spirited roughnecks who were not the sort to worry about a little brine here or a little oil leak there. Huge patches of West Texas have become oil-field deserts, because for years the salt water that is a result of oil production was released to flow across the land, leaving it bare.

Eventually oil-field carelessness shows up in the groundwater. The upper reaches of the Colorado River are being polluted with salt water from abandoned oil wells. Groundwater near the Odessa Petrochemical Complex is contaminated with cancer-causing benzene. Texas Water Commission investigators believe a refinery in the complex is responsible for a six-foot layer of benzene that lies on top of the local groundwater supply. Children in the El Ranchito subdivision, a few hundreds yards east of the refinery, can't bathe in the water because it causes skin rashes.

PHOTOGRAPHS BY ROBERT BRYCE

Chemicals used during the oil-well drilling process often contain highly toxic elements, such as barium, chromium, cadmium, and arsenic. Drilling muds, corrosion inhibitors, workover fluids, and other oil-field materials are often dumped into unlined earth pits, spread over large areas, or used on oil-field roads for "dust control." These toxic chemicals, which would be highly regulated if they were produced by any other industry, are exempt from scrutiny in the oil patch. In 1988 the staff of the Environmental Protection Agency recommended that oil-field waste products be regulated as hazardous waste. However, the staff was overruled by two appointees of Ronald Reagan: administrator Lee Thomas and assistant administrator J. Winston Porter. EPA officials have said that it was Porter who made the decision on the oil-field waste designation. At the time the decision was made, Porter owned an interest in two oil and gas wells in New Mexico.

The EPA estimates that about one million tons of hazardous waste are generated in American oil fields every year. The EPA has put seven Texas sites that are directly related to the production and refining of oil and gas on the federal superfund list. (The Texas Water Commission has put eight other sites that are contaminated with oil and gas wastes on the state superfund list.)

The watchdog for the oil industry in Texas is the Texas Railroad Commission, an agency frequently scorned by ranchers such as Pigmon for its laissez-faire attitude toward the problem of groundwater contamination. After the discovery of oil in East Texas at Spindletop in 1901, pipelines were deemed a mode of interstate transportation just like the railroads; thus began the Railroad Commission's entry into the business of regulating the oil industry. Over the years, the commission has developed a reputation for being more concerned about production of oil than protection of water. For decades it has looked the other way while oil companies have disposed of salt water and dangerous chemicals on roads, in waste pits, and in creeks that flow into the Gulf of Mexico. Recently the U.S. Fish and Wildlife Service started prosecuting oil producers because the pits that many of them use to dispose of waste oil attract—and kill—hundreds of thousands of migratory birds every year. During the course of their crackdown, agents have found hundreds of pits that are being used to store and dispose of waste oil. This [CONTINUED ON PAGE 141]

Robert Bryce is an Austin freelance writer who specializes in environmental issues.

Oil from a broken pipeline saturated six acres of Rex Pigmon's ranch, killing the soil and grass and contaminating the water. Texaco offered $1,200 for the damage—but a cleanup would cost $9 million.

More Precious Than Oil

[CONTINUED FROM PAGE 109] use of open pits was legal until 1969, when the Railroad Commission finally adopted the "no pit rule."

Despite numerous complaints about the Railroad Commission's lack of environmental concern, the agency remains the sole arbiter in cases in which water has been contaminated by oil-field activity. Numerous landowners have appealed to the Texas Water Commission for help, but if its tests determine the pollution is coming from oil-field activity, the Water Commission can only turn the case back to the Railroad Commission. And even if the Railroad Commission wanted to pursue each contamination case, it doesn't have the resources to do it. In 1989, $11.5 million was allotted for enforcement of state laws that govern Texas' second-largest industry—not just pollution laws but everything from drilling permits to oil-field trucking. The City of Austin spends more money each year on parks and recreation—about $16 million—than the Oil and Gas Division of the Railroad Commission spends regulating the oil industry in Texas. About 5 percent—$1.02 billion—of the $21 billion 1989 state budget came from taxes the state collects on oil and gas. However, the state spends only .0005 percent of its annual budget to police the oil industry—an industry that sold more than $17 billion worth of oil and gas in 1988. In effect, oil-field pollution is virtually unregulated.

WATER HAS LONG BEEN MORE valuable in West Texas than oil. During the thirties after a boom in the small town of McCamey, a barrel of water cost a dollar. A barrel of oil brought five cents. Last summer in Midland, before Iraq invaded Kuwait, water was still more expensive than oil. The price of 42 gallons of crude oil—one barrel—hovered around $17. The price of 42 gallons of groundwater, based on the prevailing cost of 50 cents a gallon, was $21.

Half of all Texans rely on groundwater. In West Texas the percentage is much higher. In Winkler County, where Rex Pigmon lives, over 90 percent of all residents use well water. But in dozens of groundwater contamination cases, Railroad Commission investigators from the Midland office have blamed improperly cased water wells, fertilizer runoff, and septic tank leaks for water pollution problems. They have seldom blamed oil production.

In 1988 T. G. Herring, a rancher in Andrews County, had a water well on his ranch go salty. Tests on his water performed by the Water Commission indicated high levels of chloride, sulfate, and sodium—compounds commonly found in oil-field brine. Chloride and sodium levels in the water were nearly 12,000 parts per million—48 times greater than federal drinking water standards. The Water Commission deemed the contamination to be oil-field related and turned it over to the Railroad Commission. Despite the Water Commission's findings, the Railroad Commission determined the water was contaminated by "natural causes." In the report, the investigator blamed the high sulfate levels in the water on sulfur mining. The closest sulfur mine to Herring's ranch was sixty miles away. The closest oil well was just six hundred feet north.

The methods used by Railroad Commission investigators are as suspect as their findings. While testing Glenda Kiker's water in West Odessa, an investigator from the Midland office tied a string to a dirty coffee cup to sample the contaminated well for bacteria—despite the fact that sterile bailers and containers are essential for proper results. When she saw her well being tested with a coffee cup, Kiker became furious. "I could see the coffee grounds in the bottom of the cup. What were they going to find—that my water's high in caffeine?"

How many cases of oil-field pollution has the Railroad Commission uncovered in the Permian Basin? Mark Ehrlich, the complaint coordinator from the Midland office, says, "I haven't found one case where groundwater has been contaminated by oil and gas activity in this region." As for his use of the coffee cup, Ehrlich says, "There is no difference between testing with a sterile bailer and testing with a coffee cup"—a claim that Water Commission investigators greeted with a chorus of derisive laughter.

AFTER ABOUT FOUR YEARS AS A professional rodeo cowboy in the forties, Rex Pigmon returned to the ranch that was homesteaded a century ago by his grandfather Bill Vest. Decades of working long hours on horseback in the hot sun have left Pigmon's arms and face a deep reddish-brown. A heavy-set, quiet man, Pigmon doesn't waste words. He doesn't like discussing the spill or dealing with the lawyers and engineers who are investigating the mess. If he had his druthers, he would just go quietly about his business, tending the eight hundred cattle that roam the sparse grassland. But Pigmon has seen the asphaltlike scars left by leaking tanks and pipelines. These leaks kill the soil and the grass. [CONTINUED ON PAGE 157]

(CONTINUED FROM PAGE 141) And in a dry region where each cow needs fifty or more acres of browse just to survive, every little bit counts.

Lying in the middle of the oil field that caused a boom in the town of Wink during the twenties, the 38-square-mile Vest Ranch has been explored for oil for six decades. Some four hundred active wells produce oil and gas on the ranch, and it bears the scars. Abandoned wells, barren drilling sites contaminated with toxic heavy metals, and rusting equipment litter the landscape. How much royalty income does Pigmon get from the oil pumped from beneath his land? Pigmon chuckles. "None," he says. "My granddad sold all the minerals in 1918. We only get money for surface damage."

Though he has worked around the oil industry all his life, none of his experiences prepared him for the trouble that began the day he discovered the Texaco pipeline break. Two months after the spill, when he hadn't heard anything from Texaco Pipeline or the Railroad Commission, Pigmon decided to find out for himself what had happened. He looked up commission records, which indicated that on January 25, 1989—the day after the spill—Texaco Pipeline notified the Railroad Commission office in Midland that 3,200 barrels of oil had leaked from the pipeline and that 2,700 barrels had been recovered. Accepting Texaco's version, the initial Railroad Commission report filed Monday, February 6, reads, "Operator cleaned up spill and replaced line. Oil spill affected about ¼ mile of land by 100 yards wide." The following day, however, Wayne McClung, a field supervisor from the Midland office, went to the Vest Ranch. He surveyed the spill site and wrote, "Three feet of sand in low area oil soaked. Loss—23,534 barrels, Recovered—5,849, Net loss—17,685." Neither report was even close to accurate. The leak Texaco had originally described as only 500 unrecovered barrels of oil turned out to be far worse. Nearly 20,000 barrels—about 750,000 gallons—of crude oil had soaked into the soil on Pigmon's ranch and no one knew about it. None of the local papers carried the story. This was not like an oil slick at sea—no dead sea lions or oil-coated birds to be rescued—it was just a big greasy spot in the sandy West Texas soil. For six months after the spill, Railroad Commission investigators monitored how much oil had saturated the soil. They dug holes to see how much oil was flowing beneath the surface. When oil stopped flowing into the holes, they determined that the investigation was finished, filled in the holes, and closed the case.

The final field report on the spill was filed July 6 by Mark Ehrlich from the Midland office. Ehrlich's report reads, "Mr. Pigmon stated that Texaco offered $100 an acre for the six acres damaged, and that for being such a cooperative guy they would pay him total of $1,200 for damage. Rex refused the offer to him, because he doesn't know the long-term effect of the spill and that to him his land damage is about $250,000. . . . Texaco has not been very cooperative in contacting him about what is occurring on status of spill or the settlement. Rex would appreciate all the help we could offer to help him."

Ehrlich was right. Pigmon needed help. But the Railroad Commission wasn't going to give him any, and neither was Texaco. By July, Pigmon had found another commission report on the spill investigation. Dated June 28, it said, "On June 1, 1989, no more oil was seen within the monitor holes and it was decided that these holes should now be closed. Mr. Pigmon expressed satisfaction since there was no evidence of oil in the monitoring holes. The spill in question is underlaid by a very hard caliche layer and is not believed to be a threat to groundwater supplies. . . . As Mr. Pigmon appeared satisfied with the efforts, we believe no further action is necessary as this time." Pigmon laughs when he reads the report. "I never expressed any satisfaction to these people," he says. "They are just trying to weasel out of this thing."

Contrary to the commission's findings, the spill hadn't gone away, and it was beginning to cause groundwater problems. A monitor well dug by Petro-Global Consultants, a Midland engineering firm, showed that two dangerous constituents of crude oil—benzene and toluene—were showing up in the shallow water table sixty feet below the surface. Petro-Global also gave Pigmon a rude shock when its consultants estimated that the cost of a complete cleanup on the site would be $9 million. The $1,200 offered by Texaco wouldn't be enough to buy fuel for all the trucks and heavy equipment needed to remove the thousands of cubic yards of contaminated soil.

TWO DAYS AFTER THE SPILL, UNknown to Pigmon, Chevron had hired Martin Water Labs in Midland to test a sample of fresh water drawn from one of Pigmon's wells. The test wasn't being done out of concern for Pigmon's water resources; it was being done to determine if Chevron could use Pigmon's fresh water for waterflooding an oil well on the Vest Ranch.

As oil wells get older and their productivity decreases, oil producers inject water under pressure to force more oil to the surface—an activity called secondary recovery. And though some companies use the salt water that is produced during oil production for waterflooding, many prefer to use fresh water. Unlike salt water, which is high in dissolved solids, fresh water doesn't clog pipes and pumping equipment.

Nothing makes West Texas ranchers and farmers madder than the use of fresh water for waterflooding an oil well, and it doesn't take them long to tell you why. Even if a farmer irrigates his crops on the hottest day of the year at high noon, the water stays in the weather system. If it evaporates, it later forms clouds and comes back in the form of rain. But if that same fresh water is injected into the ground for secondary recovery, it's gone forever. Permanently polluted, it will stay in the oil cavity for eons, never to be useful again. In Texas in 1974, almost a billion barrels of fresh water were used for secondary recovery. In 1981, the last year for which accurate records are available, 600 million barrels of fresh water—enough to supply the city of San Angelo for nearly three and a half years—were flushed down oil wells. And while the Railroad Commission says it discourages the practice, ranchers like Pigmon are finding that oil producers are still using copious amounts of fresh water for secondary recovery.

Walter Bertsch has worked for the Soil Conservation Service in West Texas for 31 years and is now based in the small Gaines County oil-and-cotton town of Seminole, eighty miles southwest of Lubbock. He has seen hundreds of water wells drilled to provide fresh water for secondary recovery. In Gaines County alone, about 13 million barrels of fresh water a year are used for secondary recovery. More than 1,400 wells in eight West Texas counties—Winkler, Ward, Andrews, Gaines, Crane, Ector, Midland, and Martin—are currently using fresh water for secondary recovery. Three of the eight counties—Midland, Ward, and Winkler—have been designated critical water zones by the Texas Water Commission because of declines in the water table and subsequent shortages. Four more counties—Ector, Gaines, Andrews, and Crane—may soon be added to the critical water zone list. Despite declining freshwater resources, an antiquated law called right of capture governs groundwater usage in Texas. Based on English common law, it allows landowners to pump as much water as they want from under their land. Up until the twenties, the law also applied to oil underground. In those early days, oil wells were crowded close together and well owners competed to pump as much oil, as fast as they could, from the same pool. Since this depleted the reservoir needlessly, producers decided to apportion the production from a single oil field to the various owners. Unfortunately, this idea doesn't apply to groundwater. Companies can buy land or water rights and pump as much as they like—regardless of the needs of neighboring ranchers and farmers who share the aquifer.

Bertsch thinks the use of fresh water for secondary recovery could be the death of agriculture in West Texas. "There will still be people wanting to live here after the oil is gone. And if there's no fresh water, this area will dry up."

Pigmon still fumes when he thinks about Chevron's attempt to use fresh water for secondary recovery. The application Chevron filed with the Railroad Commission shows that the company planned to use 600 barrels of water a day to recover 37 barrels of oil. In other words, for each barrel of oil produced, 16 barrels of water would be permanently lost. Although Pigmon talked to Chevron representatives and was able to persuade them not to use the water, he is infuriated about the attempt—particularly because it happened so soon after Texaco's pipeline spill.

"My uncle Earl Vest fought the oil companies all his life," says Pigmon, "and I have fought them for most of my life too. These oil companies think us ranching people are kind of stupid country hicks that don't know anything. But we put a stop to them using fresh water on that project damn quick. I wasn't about to let them waste my fresh water."

Pigmon figures more than a thousand oil and gas wells have been drilled on his ranch over the years. Some of them came in; most did not. Those operators who lost, Pigmon says, packed up their tools, threw their garbage down the deep, narrow hole that they thought would make them rich, and moved on.

Little did the old wildcatters know that the holes they were leaving across the state would cause so much concern today. Reaching thousands of feet into the earth, oil wells are essentially long vertical pipelines that allow oil to flow or be pumped to the surface. Very often, oil-bearing zones also have large saltwater formations in the vicinity. To prevent the deep salt water from traveling upward into freshwater aquifers near the surface, a well must be plugged with cement after it is shut down or if it contains no oil.

But of the 1.5 million oil wells drilled in Texas, approximately one million are left unplugged. Unplugged wells are particularly dangerous in the region around San Angelo because of the Coleman Junction, a highly pressurized saltwater formation that underlies the area. When oil wells are drilled through the Coleman Junction, the highly corrosive salt water begins to eat away at the steel pipe that lines the well. If the well isn't properly plugged, the salt water eventually eats through the pipe and flows to the surface. One unplugged well, near the town of Rowena, northeast of San Angelo, spewed millions of gallons of salt water into the Colorado River for decades until it was plugged in the mid-sixties by the Railroad Commission.

A FEW MILES EAST OF ROWENA, Runnels County farmer Ralph Hoelscher looks at the salt crystals lying atop the powdery soil that used to grow cotton and says, "My father-in-law worked this piece of land his whole life. And his father before him. This old soil is so salty now it won't even grow grass." Pointing to a nearby rise, the soft-spoken farmer explains, "There has to be an unplugged well right around here."

Few people know more about unplugged oil wells in West Texas than Ralph Hoelscher. A self-educated expert on the problem, Hoelscher has been on a one-man crusade for ten years. He even ran for railroad commissioner a few years ago, losing narrowly to another Republican candidate, Jim Nugent, in the primary. When he is not tending his crops of milo and grain sorghum, Hoelscher is talking to other farmers and to anyone else who will listen about the danger of unplugged wells. In Runnels County alone, Hoelscher has found about one hundred unplugged wells. In neighboring Tom Green County, he has been working with Wayne Farrell, the director of the Tom Green County Health Department, to locate unplugged wells around San Angelo that are fouling the drinking-water supply. One was underneath the main street through town; two more were below O. C. Fisher Lake, which flows into the Colorado River.

Two reasons why so many wells in the state haven't been plugged are the lack of enforcement by the Railroad Commission and carelessness on the part of the oil operators. Almost a century ago, the state Legislature mandated that abandoned wells be plugged. The Texas House of Representatives approved a rule in 1899 requiring operators abandoning a well to "securely fill such well with rock, sediment or with mortar composed of two parts sand and one part cement or other suitable material to the depth of two hundred feet above the top of the first oil and gas bearing rock." In 1919 another law was passed that gave the Railroad Commission authority to enforce well-plugging. Despite these and other laws, thousands of operators simply left well holes open. Operators drilling on shoestring budgets had little incentive to spend more money on dry holes, especially when they knew that the Railroad Commission was unlikely to catch them. The penalties for not plugging wells were not severe and many operators declared bankruptcy to avoid liability. Compounding the problem of unplugged wells are inaccurate Railroad Commission records. Hoelscher and Tom Green County health inspector David Hale took me to numerous oil wells that had never been plugged—despite commission records that said they had been.

IN LATE 1990 THINGS BEGAN CHANGing at the Texas Railroad Commission. New commissioner Bob Krueger ran television spots during the November election that emphasized the environment. Lena Guerrero, an Austin legislator appointed to the commission by Governor Ann Richards, has a history of environmental activism. The staff of the Oil and Gas Division has also been shaken up. Jim Morrow, the former head of the division, and Willis Steed, the former head of regulatory enforcement, have been replaced. After numerous complaints from the Martin County Underground Water Conservation District about an extensive saltwater leak that was ignored by the Railroad Commission, Ronald Strong, the director of the commission's district office in Midland, was fired. Strong's second in command, Hank Krusekopf, was demoted. Citing documents received under the Texas Open Records Act, Hank Murphy of the *Lubbock Avalanche-Journal* reported last summer that some of the workers in the Midland field office were accepting gratuities in the form of turkeys and hams from oil companies.

The new head of the Oil and Gas Division, David Garlick, told me that a new era of cooperation and vigilance has begun at the Railroad Commission. Even if Garlick can overhaul his division, the 101 field investigators spread among ten district offices face an industry of overwhelming size; 360,000 oil and gas wells are currently operating in the state—not to mention pipelines and abandoned wells—that should be checked periodically by commission investigators. The Midland office of the Railroad Commission may be the worst in terms of manpower. With more than 40,000 wells in the district, the office has only 9 full-time field inspectors.

The field offices are also responsible for regulating 364 natural-gas processing plants, thousands of miles of pipeline, and thousands of waste pits. Insiders at the Railroad Commission acknowledge that they are understaffed; one who requested anonymity said, "We could use five times as many field technicians as we have. And they would be busy all the time." Garlick himself believes an increase of $5 to $10 million is needed to properly regulate the industry.

Former railroad commissioner Kent Hance agrees that the division needs more employees, but he believes a 10 percent increase in the budget will be enough. "I think we do a great job," Hance said. "We could improve, but it becomes a question of money and whether the Legislature would give us that kind of money." Fining operators that violate Railroad Commission rules could add money to the coffers, but the commissioners have shown extreme reluctance to levy large fines to get compliance from the industry. One of the highest fines ever levied by the Railroad Commission was $70,000 against Clinton Manges and the Duval County Ranch Corporation in 1984 for not plugging several abandoned wells. Compared to those of the Texas Water Commission, the Railroad Commission's fines are minuscule. When the City of Houston violated wastewater regulations a few years ago, the Water Commission slapped the city with a fine of $500,000. Last spring the Water Commission levied a $244,000 fine against Formosa Plastics for wastewater violations at the company's Point Comfort facility.

DESPITE PERSONNEL CHANGES AT the Railroad Commission, landowners—including Pigmon and Hoelscher—are still skeptical. And farmers and ranchers share a common sentiment: Having the commission watch over the oil industry is like having the fox guard the henhouse; landowners simply don't trust the commission to do anything that will harm the most powerful industry in the state. While the oil industry has enriched the state treasury, the University of Texas, and many individual Texans, a legacy of the oil business—contaminated groundwater—will last long after the oil and the money have run out.

Pigmon's white-faced Hereford cattle still drink the water brought up by windmills near the pipeline spill site. It is already too salty for humans to drink, and Pigmon figures even the cattle will soon quit. Wells that yielded fresh, clear water when he was a boy are now fouled with salt water and other oil by-products. To stay in the cattle business, Pigmon will have to drill a dozen new water wells, all of them at least 350 feet deep. At a cost of $10 a foot, the rancher figures he'll have to spend $35,000 to reach the last remaining pocket of uncontaminated fresh water under his ranch. As for the lawsuit, Pigmon shrugs and says, "The lawyer told me he was going to take care of it, so I'm going to let him."

Pigmon doesn't have much to offer when asked how he would change the Railroad Commission or the oil industry. Taking off his hat, he wipes the sweat from his face. "You know, I don't know. But something has got to change—that's for damn sure. 'Cause without good water, I'm out of business."

lose 20 House votes for the criminal justice package. Hightower said as many as 50 House members will vote to kill the penal code unless it prohibits sodomy.

Conferees tentatively agreed to put the hate crimes measure in the new criminal code — even though the move will require a separate vote by House and Senate since it was not included in the original rewrite. But they deadlocked on the sodomy issue.

Sen. John Whitmire, D-Houston, said no one ever has been prosecuted under the sodomy

Please see LEGISLATURE, A-12

Associated Press

A dejected Robert Horry looks on after the Seattle SuperSonics defeated the Rockets in the second round of the NBA playoffs. Seattle will face the Phoenix Suns.

A WRAP ON THE ROCKETS

■ It was deja vu all over again as the Rockets suffered yet another painful overtime playoff loss to the Seattle SuperSonics, 103-100/B-1.

■ Ray Buck blames the referees for the heartbreaker and Mickey Herskowitz asks how you can measure a heartbreak./B-1, B-8

some important ... ing the conflict to Bosnia so it doesn't spread into Macedonia, Ksovo and other places."

He described the pact as "a step toward ending the ethnic cleansing and slaughter by staking out safe havens.

"We're still pushing for a political settlement that has some reasonable land for the Bosnian Muslims," he added.

Clinton had proposed lifting the arms embargo against Bosnia's Muslim-led government that is heavily outgunned by

Please see BOSNIAN, A-14

... about 7 mph. Today, ... of rush hour commuters ... just as slow.

The solution to this mo... day congestion — trans... tion experts hope — lies ... collection of technolo... known as "Intelligent Ve... Highway Systems," or IV... The idea is to make dr... vehicles and roads "sma... by improving communic... among the three throug... use of satellites, in-car ... puters and remote traffi...

Good morning

100th Year, No. 40 — 14 Sections

INDEX

LUCKY LOTTO WINNER? . . .

See if the six numbers on your ticketmatch the six winners. A-2

RECYCLABLE

Classified ads 940-0000

Pipeline leaks posing untold human, environmental perils

SPILLS AND CHILLS

PART 1

This is the first of three reports examining pipeline and storage tank leaks and their regulation. Today: An overview.

BY DAN CARNEY
POST WASHINGTON BUREAU

WASHINGTON — Four years ago the sky exploded over San Bernardino, Calif.

Fire engulfed 10 houses, taking the lives of a woman and the baby daughter she was holding. Thirty-one others in the neighborhood were burned or suffered from smoke inhalation before they realized what was happening.

"(There were) women running down the streets in housecoats, screaming for their children, children screaming and crying for their parents, men and women running around aimlessly, screaming and crying in fear of being totally annihilated," neighborhood resident Paul Allen told federal authorities. The explosion May 25, 1989, was caused by the rupture of a pipeline carrying gasoline from Southern California to Las Vegas.

As spills go, it was more tragic and dramatic than most, but in other ways it was not particularly unusual.

Had it not ignited, the leak at San Bernardino would have added but a few thousand gallons to the vast ocean of oil, gasoline, heating oil, jet fuel and other

Please see PIPELINES, A-22

■ A total 2.34 million gallons of various petroleum products were spilled in 42 incidents in Texas last year /A-20

First ... HL...

BY MIC... OF THE H...

A two-... Co.'s rate ... years the ... standing ...

Althou... Utility C... the com... filing. T... the comp... about $1...

Consu... Light C... but for d...

They ... should b... $313 mil... costs as...

PIPELINES: Leaks posing untold environmental perils

From A-1

petroleum products that sometimes spew in torrents and sometimes seep imperceptibly from the nation's vast and aging infrastructure of pipelines and storage tanks.

A six-month examination of state, federal and industry records by The Houston Post shows liquid pipelines and petroleum storage tanks leak the equivalent of several Exxon Valdezes each year, causing billions of dollars in damage.

As a rule, pipelines and storage tank spills do not often result in human tragedies such as the San Bernardino fire or the explosion of a liquid petroleum gas facility in Brenham last year that killed three people. From this perspective, the nation's 225,000 miles of pipelines that account for a staggering 578 billion ton-miles, and the 2,400 major tank facilities storing virtually the entire petroleum needs of the country, are safe.

But out of this record has come a misconception that industry and even government officials have done little to correct, that pipelines and storage tanks are efficient and environmentally benign.

In fact, pipelines spill much more than the other principal bulk petroleum transportation method — tankers and barges. And storage tanks account for most of the largest spills in U.S. history.

Among the facts that bear this out:

■ Pipelines report spilling 224,254,544 million gallons of oil, gasoline, kerosene and other products over the last two decades. At an annual rate of about 11.3 million gallons, they spill more than an Exxon Valdez — the oil tanker that dumped 10.8 million gallons of crude oil into Alaska's Prince William Sound in 1989 — each year. They spill more than twice the 4.6 million gallons tankers and barges spill annually.

■ As a result of the lifting of liability caps on marine spills after the Exxon Valdez, tanker and barge operators have considerably improved their record, while pipeline operators — who cannot

not as an environmental one.

In fact, neither gather nor disseminate any data on environmental damage by spills. Many property owners and local governments around the country consider the OPS to be an impediment in recovering damages.

But more than the absence of much federal oversight, it is the lack of sensationalism behind pipeline and storage tank spills that prevents them from garnering attention, say a variety of sources. Compared to a tanker breaking up on the coast of Scotland, or even a barge run aground on the Mississippi River, they are not compelling to those not directly affected.

"When a pipeline or tank farm leaks, about the best you can see is a grease spot on the ground, and it just isn't good television," says Bob Rackleff, a Florida activist fighting the addition of a pipeline and tank farm in his community.

The power of pictures in the Exxon Valdez spill helped create a flurry of major actions in Congress — the enactment of double-hulled tanker legislation, the creation of a 16-ship rapid response unit, the lifting of liability caps on damages caused by spills, and the indefinite postponement of oil and gas exploration in Alaska's Arctic National Wildlife Refuge.

In contrast, the few people hoping to make a cause out of pipeline and storage tank spills have not gotten their message on television and have been largely ignored in Washington. Even environmental groups — never shy of a good fight with big oil companies — have not been particularly responsive.

"It just seems they're not interested in these things," says Michele Grumet, a pipeline activist in California. "It's not really dramatic, its not like save the whales, or a tanker."

Tracing its history

A good bit of what passes through San Bernardino starts at a refinery in El Segundo, an industrial community on the Pacific Ocean in the shadow of the Los Angeles International Airport.

If there were any doubt about the size and scope of pipeline and storage tank farm pollution it

HOW MUCH WE LOSE

Here are the losses (in gallons) from pipeline and tanker/barge spills reported in the United States from 1973 through 1992

YEAR	PIPELINE SPILLS	TANKER/ BARGE SPILLS
1973	15,727,404	4,404,390
1974	12,127,962	3,535,385
1975	13,312,614	11,296,669
1976	10,060,722	11,018,486
1977	9,403,338	1,769,202
1978	11,779,530	3,569,819
1979	22,900,248	3,352,052
1980	12,005,238	3,335,011
1981	8,586,622	5,369,100
1982	9,214,926	3,366,433
1983	16,020,942	1,953,673
1984	12,008,010	7,152,367
1985	7,065,702	4,417,032
1986	11,756,850	3,301,437
1987	15,341,634	2,222,546
1988	9,089,640	4,034,490
1989	8,452,076	12,126,258
1990	5,206,656	5,857,070
1991	9,196,530	338,235
1992	4,997,990	191,458
TOTAL	224,254,544	92,611,113

Source: Office of Pipeline Safety, U.S. Coast Guard

The Houston Post

the very cutting edge of this kind of technology," says Spackman.

But even with the aid of high technology and lots of money, for the foreseeable future the goal is not to clean up the spill, but merely to contain it. At a minimum, experts say, it will take 10 to 15 years before any significant percentage of pollution is actually removed from the groundwater.

Even then there is considerable doubt as to how successful Chevron can be in permanently cleaning up the site. Groundwater never has been totally cleaned up on any significant scale and even the most optimistic forecasts have the company successfully removing 70 percent of the contamination.

"Most people realize they don't expect to remove all the contamination," says Tom Kelly, an environmental engineer with the EPA's California office. "That's not a realistic goal."

To make matters worse, the soil under the El Segundo refinery is "smeared" with oil as the changes in tides raise and lower

HL&P: Says

From A-1

overturned and remanded commission

"We don't have any power plants under constr for the first time since War II — it is really a situation," said Graham P HL&P spokesman. "That is driving our present st not because the regulator overly generous during o rate hike hearing."

The two-year freeze wa of a negotiated settl among HL&P, the city of ton and 42 cities that pav way for approval of th 1991 hike.

The settlement was lenged, however, by the Of Public Utility Counsel, ar pendent state-funded offic represents small busines residential ratepayers on of the state. The settleme upheld at the district cour and is pending before the of Appeals for the 3rd Dis Austin.

OPUC appealed the ra on grounds the PUC "is ratepayers to pay excessi just and unreasonable ra HL&P's service."

HL&P officials, includi Hogan, group vice presid external affairs, recentl that the outcome of th school financing issue with a possible energy ta on British thermal unit will be determining fact whether the company de seek a rate hike soon.

But Painter said, "No o here is feverishly prep rate hike filing." Such typically takes a few m prepare and is based o year that must begin and a quarterly basis.

Luis Wilmont, public for OPUC, said the ene issue is "all smoke," bec tax will likely be added top of electric bills and increase HL&P's operatin

Painter said if the tax ied, HL&P would favor "simple and clear," for ers to see on each mont how much they are payin eral energy taxes.

If inflation, Houston's ic growth rate, federal bly improved their record, while pipeline operators — who cannot even be sued while the federal government is involved — have not. As a result, in 1991 and 1992 pipelines reported spilling 29 times more than did tanker and barges.

■ The actual number and size of pipeline spills are likely to be considerably larger than reported because pipelines classified as rural gathering lines or pipelines operating at or below 20 percent capacity are unregulated and do not show up on yearly spill totals compiled by the federal Office of Pipeline Safety. Some of the largest spills in the last five years fall into these two categories.

■ In a recent survey by the American Petroleum Institute, 70 percent of refineries and 39 percent of local distribution tank farms reported cleaning up from one or more spills from above ground petroleum storage tanks.

■ Many leaks, particularly those from storage tanks at major refineries, have been going on for decades and are estimated in the tens of millions of gallons. At least one slow leak in California is estimated in the *hundreds* of millions of gallons.

Spills from pipelines and storage tanks have polluted ground and surface water, sometimes shutting down water systems temporarily or permanently. They have polluted major waterways, such as the Arthur Kill waterway running between New Jersey and New York's Staten Island, as well as creeks and wetlands.

They have devalued property by 50 percent and more. And in some cases have forced people to abandon their homes, businesses and even schools as toxic and flammable fumes have seeped into basements.

Despite all this, pipelines and storage tanks go largely unnoticed while even minor tanker and barge spills often garner national attention.

In part, this may stem from relatively little oversight from the federal and state government. The Environmental Protection Agency regulates aboveground storage tanks only in as much as they might cause "catastrophic" leaks. Pipelines are policed by 24 federal agents that have 1.8 million miles to cover.

Both the OPS and the Texas Railroad Commission have historically monitored pipelines

the size and scope of pipeline and storage tank farm pollution it ends here. Under the complex of more than 200 tanks and hundreds of miles of pipeline is a plume of various refined products that Chevron estimates at somewhere between eight and 23 times the size of the Exxon Valdez spill.

Based on the types of fuels found in the ground — high sulfur diesels and gasolines, heating oil and kerosene grades that have not been sold in America since early in this century — Chevron has concluded the spill could go back as far as the plant's 82-year history.

"It's not stuff we were making yesterday by any stretch," says Chevron spokesman Rod Spackman. "This problem has been with us for a very, very long time."

The problem first appeared in the late 1970s, when petroleum products started showing up in tidal pools in the Pacific Ocean. In the mid-1980s, the community around the refinery started smelling fumes from the ground.

Fortunately there are two factors working to keep what is probably the largest spill in U.S. history from causing major near-term environmental devastation.

First, the three aquifers under the site are not used for local drinking water and do not feed water to the surface. And second, Chevron has mounted an enormous containment and cleanup effort.

Already the company has spent between $200 million and $300 million and may spend that again in years to come. Engineers have put new bottoms on 130 above-ground tanks and have uncovered all of the refinery's piping and have retrofitted much of it.

They have developed a sophisticated computer model to study the earth's topography and have dug hundreds of wells for a variety of purposes.

There are wells that extract vapors. There are wells that do nothing but monitor the outward extent of the plume.

There are wells that pump out pollution. There are wells that pump out water, in an attempt to make the pollution flow toward the pollution pumps. And finally there are wells lined up along the beach that pump *in* water to keep the pollution from going into the Pacific and other unwanted directions.

ery is "smeared" with oil as the changes in tides raise and lower the water table and all of its pollutants. Talks between Chevron and local environmental authorities on what to do with the soil are beginning.

Fear of disaster

Back in San Bernardino, the problem is not long-term pollution but a lingering fear that disaster might strike again.

As it turns out, the pipeline explosion was not caused by some freak occurrence, or some long-standing problem with the pipeline, but by a tragic accident that happened 10 days before the explosion.

Behind the story of the San Bernardino pipeline is what may be the best example of the shortcomings of the Office of Pipeline Safety.

OPS officials were on site and watched as rescue workers dragged the scrap metal that was once a freight train from the side of a track under which lay the submerged pipeline.

The derailment itself caused the death of three people and injured another 11 as the train careened out of control on a sharp curve at the bottom of a hill.

As the accident was cleaned up, heavy equipment rumbled over the pipeline picking up pieces of metal, in some cases digging them up. When the work was done, the OPS went home and ordered the resumption of service in the line over the objection of local officials. The pipeline had been inspected in a few select points only, and no effort was made to see if the excavating equipment could have damaged the line.

"Their attitude seemed cavalier to say the least," said city attorney James Penman. "I would hope they learned something from the experience."

The city certainly learned something. If Penman could do it over he says he would declare the area a crime scene, close it off and press negligent homicide charges.

Monday: Regulation, or a cozy relationship?

Texas was marred by 42 spills over 10,000 gallons last year

By Dan Carney
POST WASHINGTON BUREAU

WASHINGTON — Last year, there were 42 liquid pipeline and storage tank spills of at least 10,000 gallons in the state of Texas.

From Beaumont to El Paso, from the Rio Grande Valley to the Panhandle, a total of 2.34 million gallons of various petroleum products were spilled, according to documents from two sources.

The Texas Railroad Commission, which monitors only intrastate pipelines that begin and end within the state, recorded 1.25 million gallons spilled. Oil Spill Intelligence Report, an Arlington, Mass.-based company that collates documents from several federal sources, found another 1.1 million gallons from storage tanks and pipelines that did not show up on the Railroad Commission's list.

The worst spills were in San Patricio County, across the Nueces Bay from Corpus Christi. Pipelines operated by Coastal States Crude Gathering Co. spilled three times between September and December, dumping 561,792 gallons of jet fuel, butane and diesel fuel. (One of the lines was leaking again last week when The Houston Post interviewed local officials by telephone.)

Big pipeline spills also were recorded in Bee County, immediately to the north of San Patricio County, in Hutchins County in the Panhandle and in Wichita Falls.

The biggest tragedy of the year occurred in Brenham, where an explosion of a salt dome operating as a storage facility for liquid petroleum caused the death of three people.

Being the energy capital of the United States, Texas has clearly had more than its share of pipeline and storage tank leaks. But for all the spills in the state, the Houston area has done remarkable well, at least on paper.

TEXAS SPILLS '92

By month, here are the number of both intrastate and interstate pipeline-related spills in Texas for 1992.

MONTH	NUMBER	SPILLAGE (gallons)
January	5	402,430
February	6	348,362
March	7	398,550
April	2	70,000
May	3	52,000
June	6	134,000
July	6	237,000
August	3	36,000
September	2	84,000
October	1	273,000
November	0	0
December	1	246,000
TOTAL	42	2,281,384

Here are the number of pipeline-related spills for the past five years for facilities that begin and end in Texas.

YEAR	NUMBER	SPILLAGE (gallons)
1988	14	778,000
1989	5	552,000
1990	23	361,000
1991	13	1,030,000
1992	21	1,300,000
TOTAL	76	4,021,000

Source: Texas Railroad Commission

The Houston Post

Despite having a vast web of interstate and intrastate pipelines carrying a variety of liquid products through the area, the area has fared relatively well on paper.

In 1992, a Panhandle Eastern Pipeline spilled 16,000 gallons into Buffalo Bayou, a Texas Eastern pipeline spilled 63,000 gallons in Deer Park and a Coastal States pipeline spilled 30,000 gallons of butane, which caught fire.

In 1991, a year in which a single pipeline in the Panhandle leaked 1.4 million gallons, the Houston area saw only one 10,000-gallon leak, in Baytown.

Some experts believe the Houston area might benefit from its cadre of trained inspectors and other energy industry personnel, and from the fact that operators of heavy equipment that can puncture lines are more careful, given all the underground pipelines in the area.

"I would say, given the concentration of pipelines in the Houston area, the companies are probably more attuned to pipeline location and maintenance than in other areas," says Brian Schaible, a spokesman for the Railroad Commission.

Another theory held by some is that Houston-area industry and local municipalities have some of the best emergency response units in the country.

William Zagorski, the San Patricio emergency coordinator, says the reason his county, and neighboring Corpus Christi, have reported so many spills is not because companies operating there are unusually sloppy. Rather, he says, the area has one of the most aggressive and "proactive" policies of ferreting out environmental and public safety disasters before they happen.

To that end, the many refineries and pipeline companies in the area are constantly being visited by local emergency officials.

"It's not that we have a whole lot more than anybody else, but it's reported," Zagorski says.

Houston Post May 24, 1993

Do firms have pipeline to regulators?

Critics say agency lax in stopping accidents

This is the second of three reports examining pipeline and storage tank leaks and their regulation. Today: Regulation, or a cozy relationship?

BY DAN CARNEY
POST WASHINGTON BUREAU

WASHINGTON — Not far from Fredericksburg, Va., two mighty rivers converge. From the west, the Rappahannock descends from the Shenandoah Mountains on its way to the Chesapeake Bay. From the south, one of Colonial Pipeline Co.'s trunk lines brings refined petroleum products from Houston to the Northeastern United States.

Normally, the pipeline passes under the river unnoticed. But on a frigid night at the end of 1989, it ruptured, sending 210,000 gallons of kerosene into an open field.

Fighting freezing temperatures, crews hired by Colonial constructed earthen berms and assured the city they would contain the spill. For 14 days they were right.

"We had been lulled into a false sense of security by their assurances," says City Attorney Jim Pates. "When in fact we didn't realize the danger that awaited us."

The danger manifested itself on New Year's Eve when the kerosene broke through and poured into a tributary of the Rappahannock. From there it flowed into the big river and right up to the intake point for the

Please see SPILL, A-8

SPILL: Critics say industry has pipeline to regulators, control lax

From A-1

city's water systems.

For the first week of the new year Fredericksburg was without water and the the governor declared the county a disaster area.

Had this been a one-time occurrence, the city would have shrugged it off. But the same pipeline had ruptured in the same place nine years before, for the same reason, and with the same consequences.

Of all the 160,000 miles of interstate liquid-carrying pipelines within the United States that spill an average of more than 11.3 million gallons a year, and almost a quarter of a *billion* gallons over two decades, the Colonial line is perhaps the most notorious.

Colonial knew of a potential problem in its thin-walled high-ductile steel pipeline when it was laid in the early 1960s. It even hired a company to study ways of preventing the problem, which is known as "railroad fatigue," and is caused by tiny cracks that develop when the pipeline is shipped to site by train.

Despite careful shipping, in 1970 the company had its first railroad fatigue rupture near Tuscaloosa, Ala. The same thing happened again in Mercer County, N.J., in 1975 and twice in Greenville, S.C. — in May and June 1979.

Spills in Beaumont in 1971, and Houston in 1976, appeared to have the same cause, a federal report concluded. But no definitive conclusions were reached since metallurgical studies had not been conducted before the pipelines were reburied.

Easy to identify

With this much of a history of railroad fatigue spills, the National Transportation Safety Board had no problem after the first Fredericksburg spill in 1980 identifying the cause.

The board — which issues findings and makes recommendations, but has no enforcement authority — blamed the spill on railroad fatigue. It urged the Office of Pipeline Safety, which regulates all interstate, and many intrastate, pipelines to order a replacement of certain portions of the line.

The OPS *ignored* the advice, and history repeated itself in a field outside Fredericksburg.

To this day, the city does not believe the problem has been corrected, and like many other communities around the country, has developed an adversarial relationship with the OPS.

The city filed a petition under the Freedom of Information Act to find out what the agency knew about the condition of Colonial pipeline. The petition was denied.

A similar petition by The Houston Post for OPS data indicating which pipelines the agency considers the biggest risk was also denied.

"I've never seen a regulatory agency so much in bed with industry," says Pates. "Pipeline accident victims have absolutely no standing over at OPS. We can't participate in their hearings. They won't provide documents filed as part of enforcement proceedings. We have nothing."

Other critics of the agency argue that even if it decided to crack down on pipeline companies, it is ill-equipped to do so. With only 24 inspectors and an equal number of office workers, it is expected to monitor 160,000 miles of liquid pipelines and 1.7 million miles of gas lines.

"OPS is only about 50 people," says Charles Batten, of the National Transportation Safety Board. "If you look at what it's charged with, and say 'Fifty people are going to do that?' There's no way."

OPS Director George Tenley says that much of the criticism his agency comes under is unfair, often driven by politicians who legitimately stand up for local interests but aren't sensitive to the disruptions to interstate commerce they can cause.

Not political decisions

"State and local people say, 'I was elected to look out for the people's interest and you aren't letting me do this,'" Tenley says. "But these are decisions that have to be made outside of a political arena."

Regarding the number of federal inspectors, he says no number will be sufficient if companies don't adequately oversee themselves and if users of backhoes and other heavy equipment that can rupture pipelines operate oblivious of what is underfoot.

"If I had a thousand inspectors, most of the spills in the last five years probably would have occurred anyway," Tenley says.

According to Tenley's agency, pipelines carrying crude oil, gasoline, heating oil, kerosene and other products spilled 226 million gallons in the 20 years ending in 1992 — or a little over 11.3 million gallons a year.

The numbers do not reflect spills companies say are below a threshold amount — 2,100 gallons before 1985 and 210 gallons since then. Nor do they reflect pipelines that are exempt from regulation, including low-pressure lines and rural gathering lines such as a Marathon Oil Co. pipeline in Carlsbad, N.M., that leaked 1.4 million gallons.

Despite these exceptions the rate of pipeline spills is more than twice the rate of tanker and barge spills recorded by the U.S. Coast Guard, both in absolute numbers and as a percentage of ton-miles of shipped product.

Tankers and barges spill about 4.6 million gallons per year, which translates to 8,947 gallons per billion ton-miles. The 11.3 million gallons a year pipelines spilled translates to 20,928 gallons per billion ton-miles.

The numbers are even more striking in 1991 and 1992, after the tanker industry dealt with the Exxon Valdez spill of 10.8 million gallons of crude oil into Alaska's Prince William Sound in 1989. During those two years pipelines spilled 15.58 million gallons to 530,000 spilled by tankers and barges.

This huge disparity comes despite the fact that tankers and barges face a number of adverse conditions that do not effect pipelines, including storms, tides, currents, winds, fogs and captains who are not always at the helm.

Just beginning to realize the extent of the problem, Congress in 1991 proposed pipeline legislation. The act specified a number of procedural changes but perhaps its most radical feature is that it adds the phrase "and the protection of the environment" to existing legislation governing the Office of Pipeline Safety.

As odd as it may seem, the OPS had never considered protecting the environment part of its mission, and it had never considered environmental costs of spills when deciding what kind of requirements to place on pipeline companies.

It was actually the National Transportation Safety Board that insisted on the change, seeing safety and pollution as going hand-in-hand.

The NTSB realized the OPS wasn't requiring enough remotely controlled shutoff valves and other devices to prevent spills because its studies showed they were not worth the cost.

Bookkeeping awry

But the OPS's cost-benefit studies did take into account environmental costs, which are often the single largest part of a spill.

For example, when an Exxon pipeline under the Arthur Kill Waterway linking New Jersey and New York's Staten Island ruptured in 1989, the company spent millions on its own on cleanup efforts and then paid out $15 million in a court settlement.

But on the OPS books, the spill would go down as a relatively minor one since no one was killed or injured and no property was affected. With a database of these kinds of incidents, the OPS could see no reason for increasing the number of shutoff valves.

In addition to more shutoff valves, there are a number of proposals often made for decreasing the number and amount of pipeline spills.

One method is known as hydrostatic testing, where companies shut down a pipeline, fill it with water and increase the pressure well beyond where it would otherwise be. Inspectors then look for pools of water.

It is arguably the single most effective leak prevention method, but pipeline companies don't like it. It causes them to lose revenue and they argue it can cause ruptures under the high water pressure that wouldn't otherwise happen.

Another technology in use is a device known as a "smart pig," which moves through the pipeline with its normal flow, surveying the inside of its walls. It can be effective in some cases, but much of the pipeline infrastructure was not built with the most sophisticated kinds of pigs in mind and contains turns that are too sharp, changing pipeline apertures and other impediments.

Vapors can sometimes be sniffed by machines known as chromatographs, or even as Esso Chemical Canada found out, by more conventiontional sniffers — dogs.

Fredericksburg has not had another spill since 1989, but Colonial has had three other spills in the area, culminating on March 28 of this year when 275,000 gallons spewed out of one of its lines into a creek in Reston, Va.

Perhaps because of its proximity to Washington — some of the heating oil flowed through the nation's capital on the Potomac and could be smelled as far away as Mount Vernon — this spill has caught the attention of government officials.

Touring the site afterward, federal officials ordered a full investigation and declared that when it comes to pipeline regulation "environmental protection is as important as public safety."

Tuesday: Living with fear.

PIPELINE SPILLS '92

By month, here are the number of pipeline-related spills in the United States for 1992. Causes listed include corrosion, equipment malfunction, line breaks and unknown.

MONTH	NUMBER	SPILLAGE (gallons)
January	18	1,023,000
February	19	986,500
March	12	776,500
April	8	176,000
May	8	300,000
June	13	259,000
July	13	604,600
August	13	525,100
September	5	220,000
October	3	36,200
November	3	43,000
December	2	48,000
TOTAL	118	4,997,900

Source: Oil Spill Intelligence Report, Arlington, Mass.

The Houston Post

The Houston Post Tuesday, May 23, 1995

NATION & WORLD

Long ignored, tank farms an environmental mess

This is the last of three reports examining pipeline and storage tank leaks and their regulation. Today: Living with fear.

BY DAN CARNEY
POST WASHINGTON BUREAU

SPILLS AND CHILLS
PART 3

WASHINGTON — There is something scary in Vicki McGonegal's basement.

It lurks by the drain. At any moment, day or night, it could start screaming, sending the Fairfax, Va., resident and her husband fleeing from their home fearing for their lives.

No, it's not a creature from the deep, nor a psychotic ax murderer in a hockey mask. It's an explosive-vapors monitor installed at the insistence of the local fire department after an underground leak of at least 100,000 gallons was discovered at a nearby complex of storage tanks housing gasoline, diesel fuel and kerosene.

"It's very unsettling," McGonegal says. "You should feel secure — no matter how bad your day was — when you drive home. I'm deprived of that. I worry about what toxics are in the air. Will the meter go off? Will I be evacuated?"

Actually, McGonegal and her husband *are* being evacuated in a sense. They are one of a group of households in the neighborhood that has been bought out by Texaco, one of five companies owning tanks at the local complex, known as a tank farm.

"I'm angry, and I'm upset," McGonegal says. "I've been forced to leave a community that I never would have left."

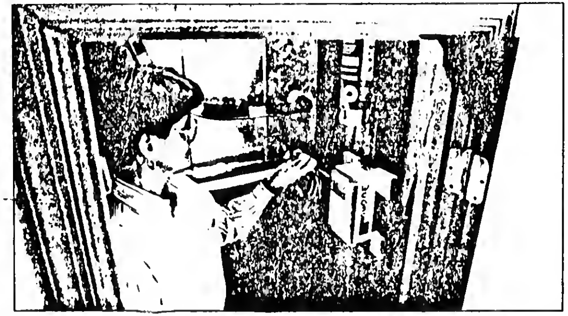
Other residents who have not been bought out by Texaco have seen their property values plummet. The neighborhood is one of the priciest in Virginia, with homes that went for as much as $400,000 before the leak was discovered.

"I don't think I could sell my house if I had to," says Kathleen MacBride. "Maybe for $200,000 less than what it's worth."

Texaco spokesman Joe Kelly says the company is doing all it can to make amends with local residents. While it is not going to buy all 2,000 or so homes in the area, the company has bought 200 homes and has offered to guarantee the value of an undisclosed number of other houses.

"We have a responsibility to make sure any neighbor that is affected adversely is assisted and made whole," Kelly says, "and that's a position that we have repeated many times."

Tank farms like the one in Fairfax are just now emerging as a major environmental problem after being ignored for decades.



Photopress/Special to The Houston Post

Vicki McGonegal inspects her explosive-vapors monitor, installed in her Fairfax, Va., basement at the insistence of the local fire department. The machine sets off an alarm when fumes reach dangerous levels. The vapors originate from an underground leak of 100,000 gallons of petroleum fuels at a nearby tank farm.

Last year the American Petroleum Institute — the lobbying and research arm of major oil companies — conducted a survey of tank farms.

Of the type found in Fairfax — which take gasoline and other products off a pipeline and store them for local distribution — 39 percent of those that responded said they were cleaning up one or more spills.

At the much larger tank farms found at refineries, 70 percent said they were cleaning up something.

In 1984 Congress passed legislation regulating what are the most common and often the smallest tank farms — the underground tanks that are often at gas stations, dry cleaners and other small businesses.

But the above-ground tanks have been left largely unregulated and in many cases unnoticed by state and federal agencies. The Environmental Protection Agency inspects tank farms looking only for conditions that could cause a "catastrophic" spill. It does not look for the much more common slow leaks that can go on for decades.

In a largely Hispanic neighborhood in East Austin, residents found out just how little oversight there is at the state level as well. For years, people had complained of odors from a nearby tank farm. For just as long, the Texas Air Control Board had said there was nothing it could do.

When contaminants started showing up in nearby wells, and complaints grew almost deafening, state regulators including the TACB, the Texas Water Commission and the Texas Railroad Commission came in to find just what residents had been complaining about — a longstanding leak at a nearby tank farm run by Texaco, Exxon and four other companies.

Tests by the water commission found not only gasoline and other refined products, but benzene, a known carcinogen, at levels as high as 240 times more than the maximum set by federal standards.

Unlike Fairfax, property values in East Austin were not in the six-digit range, but the presence of a leaking tank farm sent prices into an equally stunning decline. An estimated 1,400 homes have dropped by at least 50 percent in value.

Local resident Johnny Limon, who has lived in the area for 30 years, is one of the 1,400. He estimates the value of his home has dropped to about $8,000 from about $39,000.

"I guess I'm staying here for a while," he says, when asked of his plans. "It's real hard to sell because of the contamination."

What East Austin lacks in terms of wealth and sophistication it makes up in other ways. Unlike Fairfax, it has a feisty elected county attorney and a sympathetic local media that have taken on the tank farm companies.

Travis County Attorney Ken Oden, after declaring a vacuum in state and federal authority over tank farms, started his own investigation of the site.

With the evidence of his investigation — which has been sealed as part of the settlement — he took the companies to court, and, one by one, convinced all six it would be in their best interest to pack up and leave town.

The EPA estimates there are 2,400 tank farms in the country that hold at least a million gallons each.

Estimating the size the leaks at many of these facilities is far from an exact science. With pipeline and tanker spills, companies can figure out how much is missing and calculate the spill that way. But many tank farms have been leaking imperceptibly for years and even decades. They have to be gauged by digging wells and taking samples.

But even taking the uncertainties into consideration, tank farm spills constitute the largest ones in the United States. The biggest of them all is under a refinery in El Segundo, Calif. At somewhere between 84 and 252 *million* gallons it is somewhere between eight and 23 times the 10.8 million gallons of crude oil dumped in 1989 into Alaska's Prince William Sound by the tanker Exxon Valdez, as estimated by its owner, Chevron.

A Mobil Oil tank farm has leaked more than the Exxon Valdez within the city limits of New York, in a neighborhood along the East River. Others spills estimated in the 10-20 million gallon range are to be found in Martinez, Calif.; Hammond, Ind.; Tulsa, Okla.; and Sparks, Nev.

Across America, communities have become unwitting laboratories for the newly emerging science of underground spill cleanup. Not much is known about the subject since most efforts have only begun in the last few years and ballpark estimates of cleanup times are often in the 20-year range.

The most common method used is the pump-and-treat method where a mixture of water and oil is pumped out the ground. The two are then separated and the water is dumped into a storm drain or creek, and the oil is either burned or recycled.

In some cases, pipes are inserted into the ground to recover fumes, and in some very rare cases companies are experimenting with introducing fertilizers to the soil that aid the growth of bacteria that can break down the oil.

Many of these methods have proven effective in stopping the growth of underground oil spills, but none have yet shown they can clean the spills up in any substantial way.

It will take years before the efficacy of some of these methods is determined and it may take new technologies before the problem is squarely addressed.

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

September 3, 1991

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

Mr. W. J. Mueller
Phillips Petroleum Company
4001 Pennbrook
Odessa, TX 79762

Re: AGING INFRASTRUCTURE INDUSTRY COMMITTEE

Dear ~~Mr. Mueller:~~ Bill

Thank you for agreeing to serve on the *Aging Infrastructure* Committee. I believe that this committee will address some of the most critical and complex issues facing the oil and gas industry today and in the future. In the first four months of this year, 60% of production line leaks reported to OCD and 86% of injection line leaks were attributed to corrosion — totaling approximately 3,400 barrels of oil and 3,900 barrels of water. These losses are exclusive of the 35,000 barrel condensate loss reported by an operator in the Indian Basin field. Also, we have reason to believe that the reported *spills* represent only 10 to 50% of actual leaks.

Bill Mueller with Phillips Petroleum in Midland, Texas has agreed to chair this committee. Following is a list of issues for your consideration and deliberation. Please do not feel limited by this list or feel that all items on the list need addressing or are of equal importance.

1. Equipment corrosion — valves, tanks, but especially flow lines and gathering systems.

   a. Investigate the frequency of mechanical failures and the conditions affecting failure. How does pressure, temperature, fluid properties, and composition and age of the pipe effect the mechanical integrity of pipe and equipment and what remedies can be employed to prevent failure.

   b. Recommendations for additional regulations or industry guidelines.

2. Procedures for increasing product inventory control — report unaccounted product loss or gain even when spills are not evidenced.

   a. Recommendations for additional regulations or industry guidelines.

3. General review of the current status of well bores and maintenance and testing procedures which could ensure mechanical integrity of casing and cement jobs over periods of 20 to 50 years. What can/should industry do to extend the mechanical life of producing wells?

    a. With our current efforts to extend the useful life of producing wells and to encourage additional tertiary technology and application, there may be procedures and/or techniques which will allow longer service life for our existing wellbores.

I have enclosed a list of committee members, their addresses, and telephone numbers. By copy of this letter, I am requesting a committee representative from B.L.M. and the State Land Office. A member of OCD's Environmental Bureau will also be attending meetings and can provide the committee with reported spill occurrence and frequency information. The next contact you will receive will be from Chairman Mueller who will set the agenda and time and place for your first meeting. Let me know if I or any member of the OCD staff can be of help in supplying information or pursuing the goals of this committee. I appreciate your willingness to serve and look forward to receiving the results of your study.

Very truly yours,

WILLIAM J. LeMAY,
Director

WJL/dp

Enclosure

SOUTHWEST RESEARCH AND INFORMATION CENTER
P.O. Box 4524 Albuquerque, NM 87106 505-262-1862

MARATHON INDIAN BASIN GAS PLANT GATHERING LINE LEAK — INCIDENT SUMMARY AND RECOMMENDATIONS FOR ENFORCEMENT ACTION

prepared by

Chris Shuey
Director, Community Water Quality Program
Southwest Research and Information Center

July 16, 1991

For 20 years a continuing tradition of effective citizen action

MARATHON INDIAN BASIN GAS PLANT GATHERING LINE LEAK — INCIDENT SUMMARY AND RECOMMENDATIONS FOR ENFORCEMENT ACTION

prepared by
Chris Shuey, Director, Community Water Quality Program
Southwest Research and Information Center

July 16, 1991

This paper summarizes the available information on the leak of petroleum condensate and produced water at the Marathon Oil Company Indian Basin gas-processing plant near Carlsbad, N.M. The information and data herein are based on SRIC's review of documents provided by Marathon to the New Mexico Oil Conservation Division (NMOCD) through Monday July 8, 1991, and on interviews with officials of relevant state and federal agencies.[1] Much of the most recent information was taken from documents provided by NMOCD to the Water Quality Control Commission (WQCC) on July 9 and in SRIC's telephone interviews with NMOCD officials on July 10 and July 12 and with U.S. Bureau of Land Management (BLM) officials on July 15 and 16. SRIC's concerns about the leak and its recommendations for enforcement action to deter future leaks are discussed.

SOURCE AND LOCATION OF THE LEAK — The leak occurred in Gathering Line #4 a point about 800 feet south of the Marathon Indian Basin plant in section 23, T.21.S., R.23.E., Eddy County, New Mexico, about 25 miles northwest of Carlsbad.

VOLUME AND CHEMISTRY OF LEAKED FLUIDS — According to NMOCD, 1.47 million gallons (35,000 barrels) of unrefined natural gas condensate and 840,000 gallons (20,000 barrels) of produced water leaked from the gathering line between November 1990 and April 12, 1991, when the leak was discovered by Marathon personnel. David Boyer, NMOCD environmental bureau chief, told the WQCC on July 9 that he assumes that the produced water is at least as salty as sea water, that is, that it has a total dissolved solids concentration of at least 35,000 parts per million. He also said that the natural gas condensate itself is a complex mixture of aromatic and aliphatic hydrocarbons in extremely high concentrations.

CAUSE OF THE LEAK — Marathon stated in a June 11 report to the Environmental Protection Agency (EPA) that the gathering line failure was "the result of [illegible] H_2S [hydrogen sulfide] corrosion in the bottom, water carrying portion of th[illegible]

GEOLOGY OF THE SITE — The leak site is underlain by 12 feet to 16 feet of gravelly alluvium in Rocky Arroyo. The alluvium rests on alternating beds of dolomite (or "magnesium limestone") and sandstone. Fractures and joints persist throughout these strata and are acknowledged by NMOCD to be a principal path for migration of

---

[1]SRIC has not reviewed Marathon's latest report, which was submitted to NMOCD on Tuesday July 9, 1991.

fluids to the Lower Queen aquifer, which supplies potable water to wells in the region and which begins about 175 feet below the land surface at the plant site.

EXTENT OF CONTAMINATION — As of June 25, condensate and produced water were detected in several boreholes in the alluvium and in the top few inches of the dolomite at a maximum distance of 3,800 feet from the leak site. Two boreholes drilled into the dolomitic bedrock to 76 feet and 65 feet (boreholes #80 and #81 on attached Map I) had hydrocarbon odors; a third bedrock borehole, #82, encountered liquid condensate at 41.5 feet below the land surface. These three boreholes are located at distances of 2,800 feet, 3,300 feet, and 3,700 feet from the leak site. A trace of benzene, a petroleum constituent, was detected in ground water in the Lower Queen aquifer at 175 feet below the land surface in a borehole (#83) located at the southeastern edge of the contaminant plume about 3,200 feet from the leak site. During the first week of July, condensate was detected floating on the water table of the Lower Queen in two ground water monitoring wells. Borehole #84, which is located 4,200 feet northeast of the leak point, contained one-quarter inch of condensate; borehole #85, which is located about 5,000 feet due east of the leak site, contained one foot of condensate. (See Map I.) The depth to ground water in those two wells is about 207 feet. Detection of condensate on the water table of the Lower Queen suggests leakage through the dolomite via fractures and joints.

Mr. Boyer told SRIC on July 12 that a new monitoring well drilled 1,500 feet east (or downgradient) of borehole #85 did not show condensate contamination. As of July 16, BLM officials said Marathon is still trying to determine the areal extent of the contaminant plume while recovering as much petroleum product as possible.

SOURCE OF THE CONDENSATE — According to NMOCD, Marathon officials said last week that the condensate in boreholes #84 and #85 is "weathered" and does not chemically match that of the leaked fluids. As of late on July 12, NMOCD officials had not verified Marathon's claim. However, Mr Boyer told WQCC members on July 9 and SRIC staff in telephone conversations on July 10 and 12 that the agency holds Marathon responsible for the contamination since there are no other sources of petroleum pollutants in the area. NMOCD Director William LeMay confirmed the agency's position in a telephone conversation with SRIC staff on July 11.[2]

REGULATORY ORDERS TO DATE — Upon notification that a spill had occurred on April 12, Marathon was ordered by both NMOCD and BLM to begin an investigation of the cause and extent of the leak. Soil organic vapor analyses were submitted by Marathon to NMOCD during the last week of April and first week of May; those data depicted a plume of contaminants grading eastward from the spill site along the

---

[2]An inspection of a map contained in Marathon's June 11 report to EPA shows that a condensate and produced water gathering line (Line #3) traverses Section 24 in the approximate area of borehole #85. (See attached Map II.) If the chemistry of the condensate in that monitoring well is confirmed to be different than that of the leaked fluids, the possibility of previous leaks from Line #3 should be investigated.

axis of Rocky Arroyo. (See Map I.) A NMOCD letter of May 15 directed Marathon to conduct further investigations and to recover condensate and produced water. By mid-June, Marathon had received permission from NMOCD to drill monitoring wells through the dolomite and into the Lower Queen aquifer. The detection of condensate in the Lower Queen wells (boreholes #83, #84, and #85) at distances of up to nearly one mile from the leak site prompted NMOCD on July 4 to order Marathon to drill and complete additional monitoring wells 1,500 feet east of boreholes #84 and #85, or approximately 1.2 miles from the point of the pipeline leak. Marathon also is required to submit a comprehensive remediation plan to NMOCD and BLM once the full extent of the contamination is determined.

DAMAGE TO PROPERTY — NMOCD officials said that the closest water wells and springs used for drinking purposes are located about 3 miles east of the plant site along *Rocky Arroyo*. Marathon's weekly sampling and analyses of water from those sources have not detected petroleum-related contamination, NMOCD and BLM officials said. The Pecos River is about 13 miles east of the nearest domestic well.

MARATHON COMPLIANCE — As of the first of July, the company had drilled 85 boreholes, of which 50 are completed as recovery wells. Of those, 20 to 30 are recovering fluids from atop the dolomite at its interface with the alluvium. Mr. Boyer said that as of July 1, the company had recovered nearly 3,400 barrels of condensate (about 9.7 percent of the volume leaked) and more than 8,000 barrels of produced water (about 40 percent of the volume leaked).

HISTORY OF THE LEAK — Mr. Boyer told the WQCC that the leak probably began sometime in November 1990. During that month, Marathon reported a more than 50-percent reduction in condensate production. Until the time the leak was detected in April, the company told state and federal officials that it could not determine the reason for the discrepancy between actual production and theoretical production. The discrepancy persisted, however, through March 1991 when condensate production was only about a quarter of normal, as shown in Table 1 below.

At the time of the leak, the condensate and produced water gathering lines were not equipped with meters to measure flow; the total combined flow from the four gathering lines was (and continues to be) measured inside the plant. BLM officials said that condensate and produced water are separated at the production wells before being recombined for transport to the plant through the gathering lines.[3]

Visual inspections of the gathering lines by company personnel did not detect leakage until plant workers observed a "sinkhole" at the leak point on April 12. The leak occurred in a section of steel pipe that was installed five years ago after a flash flood in Rocky Arroyo broke an existing PVC gathering line, resulting in a much

[3]Saltwater and condensate are produced from about 40 natural gas wells located within a 7-mile radius of the plant, Marathon documents show.

Table 1. Condensate Production at Marathon Indian Basin Plant
(selected data from 1989, 1990, and 1991, in barrels; data from NMOCD)

Month/Year	Production
April 1989	12,000
November 1989	10,600
December 1989	12,000
April 1990	11,000
October 1990	11,600
November 1990	4,600
December 1990	4,400
January 1991	5,600
February 1991	3,800
March 1991	2,800
April 1991	7,700

smaller leak. (All gathering lines coming into the plant are made of PVC.) The new steel section was not equipped with cathodic protection to prevent external or internal corrosion. Since the April 12 leak, the failed section of gathering line has been replaced with a section of PVC inserted into a larger-diameter steel pipe

FUTURE REGULATORY RESPONSES — NMOCD officials say that are concerned that the advancing age of oil-field infrastructure (gathering lines, product pipelines, storage tanks, production well casings, etc.) is causing increased environmental damage in the southeast oil fields. Mr. Boyer reported that NMOCD has observed a significant increase in leaks and spills in the last two to three years and that much of that increase is attributable to corrosion of gathering lines and injection lines. NMOCD statistics for the first four months of 1991 reveal the extent of the problem of aging infrastructure and the apparent widespread lack of compliance by operators with the spill reporting requirements of the WQCC and NMOCD regulations:

- Corrosion caused 61 percent of all production-line leaks and 86 percent of all injection-line leaks.

- About 3,400 barrels of petroleum condensate were lost from corrosion-caused leaks in lines and tanks; that number represents 55 percent of all oil losses reported by operators to NMOCD in the first third of 1991.

- Corrosion was responsible for 88 percent of the 3,900 barrels of produced water lost from leaks in production and injection lines.

- Only 10 percent to 50 percent of all leaks are actually reported to NMOCD.

The Marathon leak points to the need to require operators to demonstrate the

...ity of their pipes, casings, tanks and other facilities on a regular basis, Mr. Boy... told the WQCC, adding that NMOCD will move aggressively by next spring to propose and adopt new regulations to ensure integrity of pipelines in order to prevent leaks. Mr. LeMay told SRIC that NMOCD intends to convene a task force to study the issue and make recommendations for regulatory actions.

SRIC'S CONCERNS.— SRIC is concerned that the state is not contemplating additional enforcement action against Marathon. There are several reasons why court-imposed fines and penalties should be sought, including —

- <u>The magnitude of the leak</u>. At 2.3 million gallons, the Marathon leak is one of the largest unrefined petroleum spills in the state's history, possibly second only to the more than 500,000 barrels of crude oil that has leaked into the Ogallala Aquifer in Lea County from hundreds of corroded oil well casings whose construction dates to the 1920s and 1930s.

- <u>The toxicity of the fluids</u>. The leaked fluids can be acutely and chronically toxic to both humans and animals. The condensate and produced water are likely to contain very high levels of aromatic hydrocarbons such as benzene (a known human carcinogen), toluene, ethylbenzene, and xylenes. The produced water is corrosive because it is a concentrated brine. The produced water may also contain elevated concentrations of naturally occurring radioactive materials including radium-226, another carcinogen.

- <u>The extent and duration of environmental damage</u>. Although the extent to which ground water has been polluted remains uncertain, a large area of soils and rock has been contaminated and will remain so for years, if not decades. The fractures in the dolomite have been shown to be effective conduits for contaminant migration. The fact that condensate from some source has been found on top of the water table of the Lower Queen aquifer is indicative of the potential for long-term, continuing discharges of toxic pollutants to the ground water. The damage that these long-term discharges may bring to the regional ground water system may not be known for several years.

- <u>Company negligence</u>. Marathon could have prevented this leak if it had equipped the 200-foot steel section of Line #4 with cathodic protection or installed flow meters on each of the four gathering lines coming into the plant or at the individual wellheads. The company apparently did not search diligently for the cause of the discrepancy in its condensate production volumes when the 50-percent-plus loss was noted in November because that discrepancy grew even larger over the following four months.[4]

---

[4]The law enforcement unit of BLM's state office in Santa Fe is conducting a "routine" investigation into the cause of the leak and whether any federal environmental, mineral, or fraud laws were violated, BLM officials confirmed. BLM law enforcement personnel have visited the plant site and interviewed Marathon employees about the cause and history of the leak.

- Possible violation of WQCC Regulations. NMOCD officials said they "take as a given" that the numerical standards of the Commission's regulations have been, or will be, violated once the fluids reach ground water, if they have not already as a result of migration of pollutants to the Lower Queen aquifer.

SRIC'S RECOMMENDATIONS — SRIC believes that state must take additional enforcement action against Marathon in order to send a clear message that the people of New Mexico expect industry to take proactive steps to prevent leaks and spills of toxic substances. Two legal avenues are available to the state in this regard:

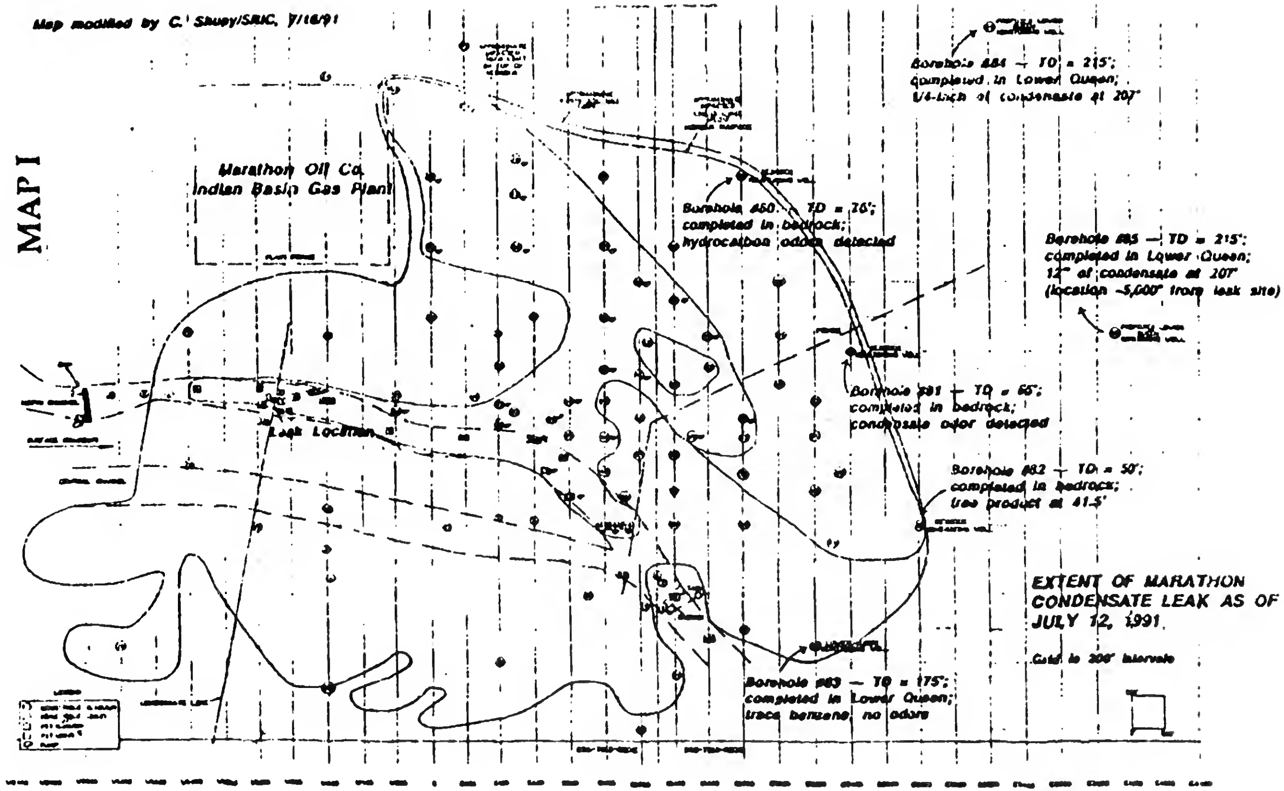
- Court-imposed penalties and fines. Should ground water be confirmed to have been contaminated as a result of the leak. NMOCD, on behalf of the Water Quality Control Commission, should initiate a civil action in state district court for Eddy County against Marathon for violation of the Commission's regulations Such action is authorized by the state Water Quality Act (WQA, §74-6-10.B.). The action should seek fines commensurate with the damage caused by the leak and recovery of expenses incurred in investigating the leak and prosecuting the claims.

- Assurance of Discontinuance. Either independent of a court action or as a result of it, the Commission should require Marathon to enter into an Assurance of Discontinuance (authorized by WQA §74-6-10.D.) that will guide cleanup of the leak and serve to regulate (and mitigate) ongoing leakage of pollutants through the bedrock into the aquifer below.

To ensure that leaks and spills are prevented and to facilitate state legal action whe pollution occurs, at least two regulatory and statutory changes are needed.

- New regulations for aging infrastructure. As soon as is reasonably feasible. NMOCD should propose and adopt, after notice and opportunity for public comment and hearings, regulations that require demonstration of the integrity of all lines and equipment that have the potential to leak contaminants into the waters of the state.

- Administrative penalties and citizens suits. The Water Quality Act (§74-6-1 through 13, N.M.S.A. 1978, as amended) and the Oil and Gas Act (§70-2-1 through 36, N.M.S.A. 1978, as amended) should be amended to grant the WQCC and its constituent agencies and the Oil Conservation Commission the authority to impose administrative penalties and fines for violations of the acts and their implementing regulations These statutes also should be amended to allow for private causes of action by citizens against state agencies that fail to carry out nondiscretionary duties and against operators that violate state laws and regulations.

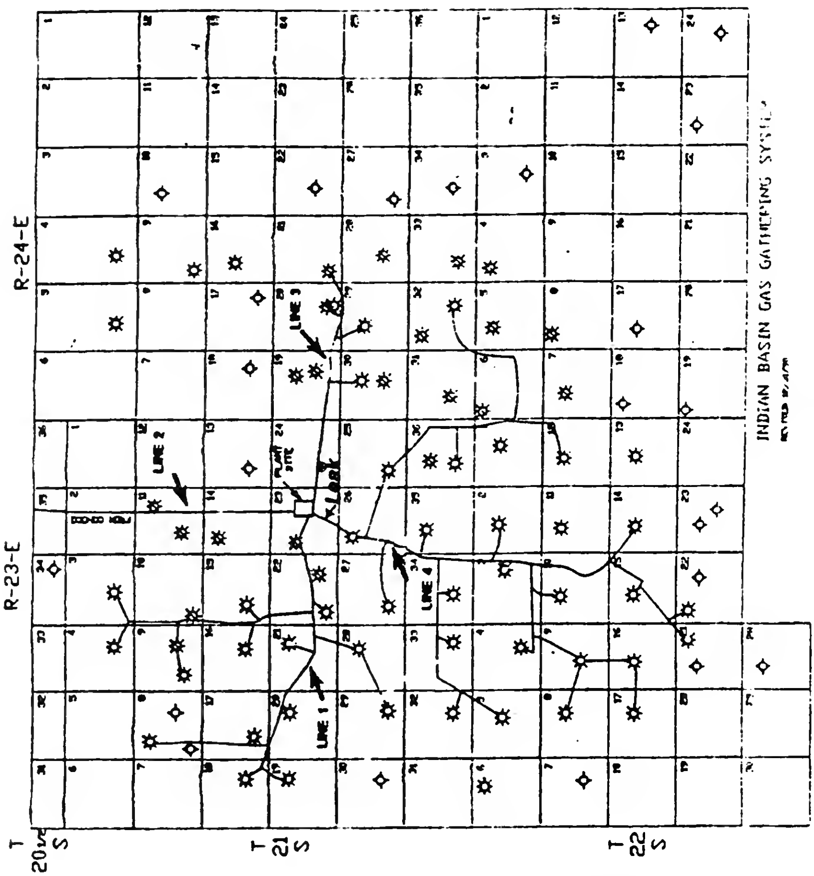


Map modified by C. Shuey/SRIC, 7/16/91
Marathon Oil Co.
Indian Basin Gas Plant
Leak Location
Borehole #84 — TD = 215'; completed in Lower Queen; 1/4-inch of condensate at 207'
Borehole #60 — TD = 76'; completed in bedrock; hydrocarbon odors detected
Borehole #85 — TD = 215'; completed in Lower Queen; 12" of condensate at 207' (location ~5,000' from leak site)
Borehole #81 — TD = 65'; completed in bedrock; condensate odor detected
Borehole #82 — TD = 50'; completed in bedrock; free product at 41.5'
Borehole #83 — TD = 175'; completed in Lower Queen; trace benzene, no odors
EXTENT OF MARATHON CONDENSATE LEAK AS OF JULY 12, 1991
Grid in 200' intervals

MAP I

MAP II

EXHIBIT 3



RECEIVED

JUN 17 1991

OIL CONSERVATION DIV.
SANTA FE

PREPARED STATEMENTS SUBMITTED BY WITNESSES

Testimony for the Subcommittee on Investigations and Oversight of the House Public Works and Transportation Committee

I am Donald R. Brinkley, Chief Executive Officer of Colonial Pipeline Company. Colonial is a Delaware and Virginia corporation that operates pipeline facilities through 14 states in the Southeastern and Eastern United States. Colonial's pipeline system transports nearly 80 million gallons of petroleum products per day to serve the needs of the citizens of these and surrounding states; this amount represents roughly 12 percent of United States' daily consumption of petroleum products. In the State of Virginia, the petroleum products delivered by Colonial accounted for approximately 80 percent of the gasoline, fuel oil, and kerosene consumed during 1989, the last year for which consumption data is generally available.

Colonial appreciates the opportunity to address this committee concerning the March 28, 1993 leak near Reston, Virginia, and the implications that incident has for pipeline safety. Colonial always welcomes the opportunity to discuss issues concerning pipeline safety, and I am prepared to answer any questions you may have regarding the Reston incident, the clean-up effort and the many actions Colonial has undertaken in connection with this incident.

Data show that pipelines are the safest mode of transportation for petroleum and petroleum products, and I must emphasize that

Colonial's record is significantly better than that of the oil pipeline industry in general. In 1991, for example, releases from the Colonial system were less than one-third that of the overall industry average on a ton-mile transported basis. Our recent experience in Virginia should also be viewed from the perspective that, while our Virginia leaks since 1968 have comprised 11.4 percent of overall DOT reportable leaks, pipeline mileage in Virginia comprises 14 percent of the mileage of the entire system. In our experience, there is a single thread running through the series of leaks in Virginia and that is the prevalence of third-party damage as the cause. Of the 10 reportable leaks in Virginia since 1980, fully one-half were due to third-party damage.

Based on the currently available physical evidence, it is clear that the cause of this leak is mechanical damage from a so-called outside force. The NTSB metallurgical report, issued on May 11, 1993, indicates that the damage was caused by some sort of excavating equipment.[1] As witnesses have testified or will testify to this committee, much investigation remains to be done on who may have damaged this pipeline. Nonetheless, the evidence so far indicates that the excavation equipment was operated by a third

[1] The NTSB Metallurgist's Factual Report is consistant with Colonial Pipeline's originel opinion that the 36-inch line ruptured because of outside mechanical force damage. The discovery of traces of foreign metal in the origin area of the groove during the NTSB analysis supports the theory that the mechanical damage resulted from excavating equipment.

party.[2] Since all the facts regarding the damage to Colonial's pipeline in Reston, Virginia are as yet unknown, insight into the risks posed by third-party contractors can be gained by considering another incident that occurred on the Colonial system in Fairfax County. The particular incident to be discussed is the 1987 gasoline leak at Singleton's Grove subdivision near Centreville, Virginia.

The Singleton's Grove Incident

The Singleton's Grove subdivision in Centreville, Virginia was developed by the U.S. Home Corporation ("U.S. Home"). U.S. Home designed the subdivision such that it is literally bisected by the pipeline easement, containing both a 32-inch and a 36-inch pipeline. Half of the subdivision was built on one side of the pipelines and half on the other side. The subdivision is connected by a street over the pipelines known as "Singleton's Way." In addition, storm sewers, sanitary sewers, water, electrical and telephone lines cross through the pipeline easement to connect both halves of the subdivision.

[2] For several reasons, Colonial could not have been the source of the damage which caused the rupture. First, the gouge on the pipeline which led to the failure was longitudinal in nature; that it followed the line of the pipe indicates that the equipment which damaged the line was operating directly over the pipeline, a condition that would not exist in original construction. Second, after the rupture, Colonial removed the cover above its adjacent 32-inch pipeline to inspect its condition in the area where the 36-inch pipeline ruptured. Colonial discovered gouges on the 32-inch pipeline similar to the gouges on the 36-inch pipeline. It is exceedingly unlikely that the 32-inch pipeline, which was installed 20 years prior to the 36-inch pipeline, would have similar gouges in the same area if the damage occurred during initial installation of the pipeline. Finally, and most importantly to Colonial, we regard the possibility of damage during original construction to have been low because of our exacting construction standards and the high degree of specialized professionalism of our contractors.

As discussed below, Colonial had no input into the design of the Singleton's Grove subdivision or the desirability of repeatedly crossing its easement. Once the developer obtained site plan approval for the subdivision from local officials, Colonial had no authority to bar construction over its easement unless the proposed encroachment actually threatened pipeline operations.

U.S. Home retained a subcontractor, F.E. Gregory & Sons, Inc. ("Gregory"), to make a number of the utility crossings through the pipeline easement. Gregory was also hired by U.S. Home to build Singleton's Way over the pipeline easement.

At the time it was hired by U.S. Home, Gregory was in financial difficulty and under Chapter 11 bankruptcy reorganization. Further, while U.S. Home required Gregory to submit proof of insurance, the bulk of Gregory's insurance did not cover environmental or pollution damage that might occur if Gregory struck one of the pipelines. In short, U.S. Home retained a contractor to work in the pipeline easement who had no financial ability to respond to any damage to the pipeline and no insurance to cover any environmental or pollution damage if it struck the pipelines.

Shortly after Gregory was hired, it began construction on an 8-inch sanitary sewer that was designed to cross under Colonial's pipelines. Colonial reviewed the drawings and procedures for installation of the sewer submitted by U.S. Home. Colonial requested that certain safeguards be implemented to protect the pipelines, including restrictions on use of mechanized equipment and prior notification to Colonial of any excavation of the pipelines. The purpose of the notification requirement was to permit a Colonial representative to be present when the pipelines were exposed. Colonial's safety procedures were reduced to writing in the form of a letter agreement between U.S. Home and Colonial.

On October 28, 1986, a Colonial representative went to the Singleton's Grove subdivision responding to a call that had been placed by Gregory to Miss Utility, the Virginia one-call service. One-call services are central clearinghouses which contractors notify prior to excavation so that companies with buried facilities in the area can be notified and given an opportunity to respond. Colonial's representative discovered that Gregory's employees were in the process of exposing Colonial's pipelines with a backhoe. This action was in violation of the written agreement Colonial had with U.S. Home requiring notification and the presence of a Colonial representative prior to excavation near the pipelines. Gregory's excavation within the easement also violated the Virginia one-call statute and Fairfax County ordinances, which required that Gregory's employees make the Miss Utility call 48 hours before excavating in the easement.

The Colonial representative halted Gregory's work and called a Colonial supervisor. The Colonial supervisor lectured Gregory's on-site foreman, Keith Carpenter, about Gregory's unauthorized conduct. Colonial had no authority, however, to penalize Gregory or to bar Gregory from working in the pipeline easement.

Approximately seven months later, Gregory began construction on Singleton's Way, the street that crossed over the pipeline easement. Colonial had reviewed the construction drawings for the street submitted by U.S. Home and had requested a number of safeguards to protect the pipelines. These safeguards included: installation of protective concrete slabs over the pipelines where the street crossed them, restrictions on the use of mechanized digging equipment in the easement, and notification to Colonial so that a Colonial representative could be present whenever work was to be performed near the pipelines. Once again, these safeguards were reduced to writing in a letter agreement between Colonial and U.S. Home.

On June 11, 1987, Keith Carpenter, the same Gregory employee whom Colonial had previously caught exposing the pipelines, struck Colonial's 32-inch pipeline while excavating in the easement with a 48-inch ripper blade attached to a bulldozer, this time without any notice to Colonial or Miss Utility of the intended work. The tip of the ripper blade punched a 4-inch by 4-inch hole in the 32-

inch pipeline that resulted in the release of approximately 15,000 gallons of premium grade gasoline into the Singleton's Grove subdivision. The leak required extensive remediation efforts by Colonial, U.S. Home and Fairfax County.

ACTIONS NEEDED TO PREVENT THIRD-PARTY DAMAGE

What lessons can be drawn from Colonial's experience at Centreville, Virginia and, to the extent facts are known, from the recent leak near Reston, Virginia? One clear lesson of the Centreville incident is that the one-call systems available in this country need strengthening. As noted above, no U.S. Home or Gregory employee ever notified Colonial of the proposed use of the ripper blade over the pipelines on June 11, 1987, either by calling Colonial's office directly or by calling Miss Utility. This was a breach of Colonial's letter agreement with U.S. Home and a violation of the Virginia one-call statute and Fairfax County ordinances. Despite the seriousness of this conduct, however, the employee who struck the pipeline was never prosecuted. Charges were brought against Gregory under the Fairfax County ordinances at the initiative of Fairfax County's Department of Environmental Management. This prosecution in the Fairfax County General District Court ended with a fine of $1,000, $500 of which was suspended. This nominal penalty is not an appropriate deterrent for actions that potentially threatened the lives of construction workers at the site and residents of the subdivision, and caused substantially more than $2,000,000 in property damage.

A good initial step to strengthen one-call systems was taken by the Congress in enacting § 304 of the Pipeline Safety Act of 1992, which provided for criminal sanctions for one-call violations that result in death, serious bodily injury or property damage, or the release of more than 2100 gallons of petroleum. On the other hand, these criminal sanctions can be a cumbersome method of dealing with infractions of one-call rules and can only be invoked after a sloppy excavator has caused serious damage. For example, § 304 of the Pipeline Safety Act would not have permitted criminal sanctions against Gregory the first time it was detected violating the one-call rules at Singleton's Grove. Criminal sanctions for serious accidents should hence be supplemented. One additional measure that would strengthen one-call provisions would be to grant authority to the Department of Transportation to levy substantial civil penalties for an excavator's failure to utilize available one-call notification systems regardless of the damage caused by that failure. Granting the Department this authority will provide additional incentive to those parties to comply with one-call rules, and such incentive may, in fact, be greater than that provided by rarely-invoked criminal sanctions.

The minor penalty assessed against Gregory Construction Company after the Centreville incident also points out a related deficiency of the penalty provisions of the Federal Oil Pollution Act. Under that statute, a penalty of up to $1,000 per barrel can be assessed against the <u>owner or operator</u> of a facility while no penalty of a corresponding magnitude can be assessed against the person who causes the spill, if different from the owner or operator. In this respect, OPA contrasts unfavorably with the provisions of the Virginia oil spill statute under which the Virginia Department of Environmental Quality has ample authority to seek penalties against the person who ultimately is responsible for causing the spill.

Another lesson of the Singleton's Grove incident is that greater controls are needed over contractors who are authorized to work in pipeline easements. Colonial presently has <u>no authority</u> to regulate the qualifications of contractors working in its easements. Obviously, it is not desirable to have financially troubled contractors working in pipeline easements because such contractors present special risks. Generally speaking, they have less qualified employees and a higher rate of employee turnover. Inexperienced and improperly supervised employees operating mechanized equipment near a pipeline increase the potential risk to the pipeline.

Economic pressures may also force bankrupt contractors to take short cuts that compromise safety. At Singleton's Grove, for instance, Gregory was many months behind its construction schedule. In part to induce Gregory to work faster in constructing Singleton's Way, U.S. Home renegotiated Gregory's contract such that Gregory stood to lose more than $60,000 if it did not complete the street on an expedited time table. The pressure on a financially troubled contractor to cut corners to speed its work under these circumstances compromises safety.

Fortunately for the public, Colonial possesses the financial resources to address leaks such as Singleton's Grove and the recent Reston incident, but it is sensible policy to require contractors working near interstate pipelines to demonstrate that they have the financial wherewithal to properly address the risks of their operations. As Singleton's Grove indicates, many, if not most, contractors (perhaps unknown to them), have pollution exclusions in their general liability policies. This exposes the public to an additional degree of risk that the party causing an oil spill incident will be financially unable to respond to. Accordingly, Colonial believes that the following measures should be taken to assure contractor solvency: (1) contractors working in or near interstate hazardous liquid pipelines should be required to demonstrate an appropriate degree of financial responsibility, including maintenance of insurance that does not exclude coverage for pollution or environmental damage; (2) if the contractor cannot demonstrate financial stability and adequate insurance, the property owner or other person hiring the contractor should be required to provide adequate insurance to cover damage resulting from the contractor's negligence; and (3) pipelines should be given the authority to seek injunctive relief in federal court to prevent excavation in its easement if a contractor, landowner or other person cannot provide evidence of adequate insurance. The current system is unfair to pipeline companies because it penalizes them for the negligence of third-party contractors they did not hire and over whom they have little or no control.

Local governments can also play an important role in pipeline safety by using their land use regulatory authority to restrict unnecessary construction in pipeline easements. Pipeline companies such as Colonial have no authority to restrict or bar construction in their easements unless the construction actually interferes with the operation of the pipeline. If local governments were to consider as part of the approval process for site plans and building permits the need to reduce the number of encroachments into utility easements, pipeline safety would be promoted by reducing the opportunity for third-party damage.

Singleton's Grove presents a good example of how local governments could have reduced the risk of third-party damage to the pipelines by incorporating into the site plan approval process a requirement that encroachments in utility easements be minimized. The design of the Singleton's Grove subdivision substantially and unnecessarily increased the number of encroachments in the pipeline easement for installation of storm sewers, sanitary sewers, water and electrical lines, and streets and sidewalks. The subdivision did not have to be designed in a manner that required such extensive crossings of the easement. By reconfiguring the streets leading into the subdivision, the developer could have constructed two entrances to the subdivision, thereby eliminating the necessity for building a road across the easement. Similarly, it would have been possible for the developer to reconfigure the utilities located in the subdivision to avoid or reduce the number of pipeline crossings. Thus, by conditioning approval of the site plans and building permits on reducing the number of encroachments in the easement, the existing subdivision could have been built without exposing the pipelines to so many potential third-party incidents.

Local government actions restricting unnecessary construction in easements are also appropriate in light of federal law and state laws that require, to the extent practicable, construction of new utility lines in existing rights-of-way.[3] The requirement that utilities share easements means there is often a concentration of lines in the same utility corridor. The greater the number of utilities in a corridor, the greater the chance that one of those utilities will be struck whenever construction occurs in the easement. Local governments could aid the objectives of the federal legislation by controlling unnecessary encroachment in these corridors.

---

[3] See Federal Power Commission Order No. 414, Doc. No. R-368, November 27, 1970, adopting Guidelines for the Protection of Natural, Historic, Scenic and Recreational Values in the Design and Location of Rights-of-Way and Transmission Facilities; see also Virginia Code § 56-259 (1986), requiring public service corporations such as Colonial to consider the feasibility of locating new facilities on, over, or under existing easements and rights-of-way.

In closing, I'd like to stress that when leaks occur, the pipeline operator is, in the final analysis, one of the most severely damaged parties. Certainly incidents such as the one we are discussing today cost millions of dollars of Colonial's money to correct, but, more importantly, they immeasurably damage our corporate reputation. We try hard to prevent them. Colonial believes that the lessons of these incidents will likely be that federal, state and local governments can do much more to aid pipeline companies in their efforts to prevent third-party damage to interstate pipeline facilities. The efforts of pipeline operators to regularly patrol their lines and to have ground personnel deal directly with third parties who wish to encroach on pipeline rights of way are, of course, the first lines of defense. However, policies that provide swift and certain penalties against violators of one-call statutes, that ensure that only financially secure, reputable contractors work near utility lines and that promote sensible land use policies near such lines, will aid in the prevention of these accidents.

TESTIMONY BEFORE PUBLIC WORKS AND TRANSPORTATION COMMITTEE
Keith J. Buttleman
Deputy Director for Public and Intergovernmental Affairs
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
May 18, 1993

The Commonwealth of Virginia is vitally interested in the regulation of petroleum pipelines because of our experiences in Virginia with spills. I am here today to briefly discuss four recent incidents.

On the morning of March 28, 1993 a section of the Colonial Pipeline near Herndon, Fairfax County, Virginia, ruptured, releasing diesel petroleum into the environment. The spill contaminated approximately 9 miles of Sugarland Run which empties into the Potomac.

The Fairfax County Fire Department responded immediately and did an excellent job of initial damage control. The Virginia Department of Environmental Quality, the Virginia Department of Emergency Services, the U.S. Environmental Protection Agency, and the Coast Guard Atlantic Strike Force responded immediately, as did the pipeline company with their own personnel and several cleanup contractors.

As described under the Oil Pollution Act of 1990, a Unified Command Structure was established between Fairfax County, the Department of Environmental Quality, and EPA to oversee emergency response.

Initial activity focused on collecting the diesel fuel behind containment booms in Sugarland Run to prevent it from migrating downstream, and on recovering the product into tanker trucks. Protection of human health was an immediate priority and air quality monitoring of adjacent neighborhoods was conducted to assure there where no immediate health risks. Residential wells were monitored to assure that ground water was not affected.

Initial recovery efforts were successful, but were quickly hampered by a shortage of tanker trucks and locations to store recovered oil. High flow conditions in Sugarland Run and the Potomac and difficult access at the mouth of Sugarland Run also complicated recovery efforts.

The public drinking water intake on the Potomac River which serves half of Fairfax Co. was closed because of oil sheen at the intake. Within 24 hours, animal recovery efforts were organized by the Fairfax Animal Control Department to collect and rehabilitate affected beaver and waterfowl.

The Unified Command Post was required to maintain 24-hour operations for the first week after the spill to oversee emergency cleanup. Ultimately, it appears that more than 400,000 gallons were released and the cause of the spill remains uncertain.

The extent of environmental damage has yet to be fully determined. Potentially sensitive wetlands have been affected. The Fairfax Water Authority was forced to keep its Potomac facility closed for 11 days and had intermittent shutdowns following that. Preliminary indications are that the fish population in Sugarland Run was completely eliminated and most other aquatic communities were severely damaged. Damage assessment is continuing at this time.

Colonial Pipeline is currently developing a plan for full remediation of Sugarland Run under the direction of County, State, and Federal Authorities. At this time it is uncertain what will be required or how long the cleanup will take. It appears that there is no longer an immediate threat to residents and the emergency phase has ended.

This spill is one of a series of pipeline releases which the Commonwealth of Virginia has experienced in recent years. Since 1985, at least four other major spills have released over 400,000 gallons into state waters.

On November 8, 1985, 120,750 gallons of heating oil was released due to a pipeline break in Chesterfield County. Approximately 93,000 gallons of product were actually lost into the James River, but extremely high flood conditions mitigated any adverse environmental effects.

A pipeline rupture near Locust Grove, Orange County, resulted in 212,000 gallons of kerosene being released into Mine Run and ultimately the Rapidan River and the Rappahannock River. This spill on December 18, 1989 resulted in the City of Fredericksburg's water intake being shut down for nine days (the City had been similarly affected during a Colonial Pipeline break in March, 1980).

In June, 1990, a line break caused by damage to the pipeline by a backhoe spilled 84,000 gallons of #2 fuel oil into a farm pond in Chesterfield County. Almost all of the product was contained in the pond and was eventually recovered.

Finally, in August, 1990, a pipeline rupture in City of Chesapeake spilled 67,200 gallons of marine diesel into Drum Creek (a tributary of the Elizabeth River) and affected a considerable area of tidal wetlands.

This history of repeated spills by petroleum pipelines has caused the Commonwealth to be gravely concerned over the adequacy of pipeline regulations. On April 1, 1993, after personally touring the area affected by the recent spill in Fairfax County, Governor Wilder directed the State to actively pursue all possible avenues to strengthen pollution prevention requirements for petroleum pipelines. States must have a substantive role in these regulations in order to protect our public interests.

The following information is provided concerning three significant Colonial Pipeline spills in Virginia that have occurred in recent years:

1. On November 8, 1985 at about 7:30 a.m., a rupture in Colonial Pipeline's 16 inch pipeline at the Exxon Bulk Storage Facility in Chesterfield County resulted in 2,875 barrels (120,750 gallons) of fuel oil being released. State personnel were informed of the incident by the Chesterfield Fire Department at 1:00 p. m. and responded to the site. Colonial Pipeline personnel and a cleanup contractor were on site when State Water Control Board staff arrived. Most of the product lost was spilled into the James River at the time of the initial release; no instream cleanup was undertaken and no adverse effects were noted because the river was at extremely high flood stage at this time. Cleanup actions on shore were conducted by the responsible party at the direction of the State. In the end, 685 barrels (27,636 gallons) were recovered, and an estimated 2190 barrels (93,114 gallons) were lost into the James River. On-site recovery from contaminated ground water was undertaken, and these efforts continued until late 1988. Colonial Pipeline concluded that the rupture was the result of damage to the pipe by other parties.

2. A rupture in the 32 inch pipeline operated by Colonial Pipeline near Locust Grove, Orange County on December 18, 1989, caused 5,043 barrels (212,000 gallons) of kerosene to be released into Mine Run. The break occurred at 10:27 a.m., and the actual location of the problem was determined by Colonial Pipeline at 1:00 p.m.; the State Water Control Board was notified by Colonial at 3:30 p.m. and responded immediately. Colonial had initiated containment measures with their own personnel and had mobilized a cleanup contractor. Cleanup and removal was generally overseen by the State Water Control Board, but the Environmental Protection Agency did inspect the site periodically. Weather greatly complicated the cleanup activities when a severe storm flushed an estimated 84,000 gallons out of Mine Run into the Rapidan River and ultimately the Rappahannock River. The presence of petroleum in the Rappahannock River necessitated the closing of the City of Fredericksburg water supply intake for nine days. A Corrective Action Plan was developed to address ground water contamination at the spill site; these remediation efforts are now nearly completed. The cause of this rupture was determined to be a structural failure of the pipe as a result of stresses experienced during shipping.

3. On August 30, 1990, a Colonial Pipeline delivery line in the City of Chesapeake ruptured and 67,200 gallons of marine diesel fuel was spilled into Drum Point Creek. The event probably occurred before midnight, April 29, but was not

confirmed by field inspection until 1:00 a.m., April 30. Product flowed in a ditch paralleling an abandoned railroad right-of-way into a marsh area that constitutes the headwaters of Drum Point Creek. Colonial personnel and cleanup contractors were on-scene soon after the release was discovered. U. S. Coast Guard and the State Water Control Board were involved in directing the cleanup activities. Approximately 47,000 gallons of product were recovered. Wetland areas were considerably impacted by this spill. A final Corrective Action Plan to address soil and ground water contamination at the spill site has not been developed. Colonial Pipeline claims that this rupture was the result of third party damage to the line.

STATEMENT OF THOMAS M. DAVIS, III, CHAIRMAN, FAIRFAX COUNTY BOARD OF SUPERVISORS, TO THE SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT OF THE HOUSE COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION, MAY 18, 1993

Mr. Chairman and Members of the Subcommittee, my name is Tom Davis, Chairman of the Fairfax County Board of Supervisors, and I thank you for this opportunity to discuss issues and facts related to the recent rupture of the Colonial Pipeline in northwestern Fairfax County. I wish to especially thank Congresswoman Leslie Byrne for her initiative in bringing this matter before you.

On Sunday, March 28, 1993, at approximately 9:10 a.m., Fairfax County, Virginia Fire and Rescue Department units responded to the report of a petroleum release near the rear of the Reston Hospital Medical Center in the Hunter Mill District. The release was thought to have originated from one of Colonial Pipeline Company's petroleum transmission lines along Fairfax County's western end. The source of the release was later confirmed to be Colonial's 36" pipeline, which at the time of failure was carrying #2 fuel oil, a product commonly used for home heating.

At the site, our emergency units found petroleum product pooling in a nearby storm retention pond, covering portions of adjacent parking lots, and extending through a combination of storm drainage pipes and wetlands into and down Sugarland Run leading north towards the Potomac River.

Emergency units quickly moved to:

1) contain as much of the product as possible at the origination site,
2) determine the extent of the release,
3) request assistance from responsible agencies, and
4) attempt to contain and control the product migrating via Sugarland Run to the Potomac River.

Within an hour, first responders were joined by officials from Colonial Pipeline, and subsequently by Colonial contractors, local officials from the Town of Herndon and Loudoun County, as well as Federal and state representatives. Over 40 local, state, Federal and private agencies were notified and were operating on the scene within the first six hours of the incident.

By managing the incident through clearly defined objectives and a unified command, resources were effectively employed over the next eight days to control and recover a large portion of the estimated 407,000 gallons of fuel oil that were released. We believe this is a model example of local, state, Federal, and private cooperation that allowed us to respond well in very difficult and sudden circumstances.

Although the emergency phase of this incident has ended, we are left with unsettling questions about its cause as well as the lessons to be taken from our experience. The incident on March 28 is the third time in the last 13 years that a petroleum pipeline has released a significant amount of product in Fairfax County creating public health, safety, and environmental concerns. In each incident lives have been disrupted, hundreds of thousands of dollars have been spent on clean-up, and extensive investigations of cause and effect have been performed. Our experience with these incidents leads us to conclude that more effort needs to be focused on:

1) prevention
2) detection of leaks while they are still small, and
3) reducing the volume of product that can be released following a failure.

The regulation of interstate pipelines is clearly a Federal responsibility. I understand that Federal officials are investigating this incident, and I strongly urge that they use the information learned from this and other pipeline failures to greatly strengthen pipeline regulations and improve inspection and monitoring of pipeline installations and operations.

We specifically suggest that the Department of Transportation Office of Pipeline Safety beef up the types, intervals, and methods of pipeline inspections. This should include giving authority to local governments to inspect and monitor construction and repair of pipelines following Federal standards. "Smart pigs" and "caliper pigs" that detect abnormalities in the thickness of a pipeline wall should be mandated at regular intervals for all sizes of main and lateral lines. Minimum standards should be set for abnormalities discovered through "pigging" to assure closer inspection and/or repair. In some cases it may be appropriate to require that the damaged line be uncovered. Additional inspection by means of internal or external devices should be required for any repaired or adjacent section of pipeline to assure pipe and weld integrity before the pipeline is returned to service.

More precise technologies to monitor product flow should be mandated. Emphasis should be placed on detecting small cracks or other breaches before they become catastrophic. I understand these technologies have been employed along the Alyeska pipeline and in the nuclear industry.

Particularly in densely populated areas such as Fairfax County pipelines should also be required to have additional control valves. For example, an additional estimated 100,000 gallons of product were discharged on March 28 <u>after</u> the pipeline was shut down.

The pipeline industry has demonstrated an admirable safety record relative to other forms of petroleum transportation. However, that record is far from perfect. As painfully demonstrated by the March 28 Colonial release, an incident of this kind poses serious consequences. We believe the cost of prevention is less and a better investment than the cost of clean-up.

As bad as this incident was, can we imagine, for example, the result had the released product been gasoline rather than fuel oil? The consequences could have been far more grave and in addition to all that happened, we might be talking today about massive evacuations, potential explosions, and acute dangers to life and property. We do not want that to occur in Fairfax County or anywhere else, and we hope that the Federal Government can improve its oversight of this very critical aspect of interstate commerce.

In closing, I wish to express my deep appreciation to our Fairfax County agencies and employees for their prompt and professional response to this urgent problem. I also want to thank my colleague, Supervisor Bob Dix, who represents the Hunter Mill District, for his outstanding leadership in helping bring the resources together to handle this emergency. I believe the consequences of this massive rupture would have been far worse in most other local communities that are simply not as well equipped or prepared to handle such a crisis.

Thank you again for your concern by holding this hearing. I would be pleased to answer questions or furnish additional information for the record.

Testimony of John M. De Noyer, Ph.D.

To the Subcommittee on Investigations and Oversight

of the

U. S. House of Representatives

Committee on Public Works and Transportation

May 18, 1993

Mr. Chairman and Members of the Subcommittee:

I am Dr. John M. De Noyer. I live at 600 Austin Lane in the Town of Herndon, Virginia. I am a retired earth scientist with nearly 40 years of experience in a wide variety of roles in the Federal Government, academia, and the private sector. At the present time I am an elected member of the Herndon Town Council and am serving in an appointed position as Chairman of the Fairfax County Environmental Quality Advisory Council (EQAC). My background as a scientific observer, elected official of an impacted local jurisdiction, and advisor to the Board of Supervisors on the environmental quality of Fairfax County, Virginia, forms the basis for the comments contained in this statement.

ENVIRONMENTAL IMPACT:

The March 28, 1993, oil spill from the Colonial pipeline just outside the Herndon Town limits dumped about 407,000 gallons of #2 fuel oil onto commercial properties near the spill site and through a storm drain into Sugarland Run. Sugarland Run flows along the eastern edge of Herndon into stream valley parkland in Fairfax County, into Loudoun County, and into the Potomac River upstream from the water intake for the Corbalis water treatment plant. The distance from the rupture location to the confluence with the Potomac River is about nine miles.

A number of conditions reduced the environmental impact of this spill. <u>First</u>, the material spilled was No. 2 fuel oil. If gasoline had been being transported at the time, the danger from fire and the toxicity of the fumes would have been much greater. <u>Second</u>, the ground was saturated with water. This saturated condition minimized the absorption and adsorption capability of soils in the stream valley. <u>Third</u>, the water table was high. Under these conditions, the majority of the groundwater flow was from the watertable into the stream. This direction of

groundwater flow was important because it minimized groundwater contamination. Fourth, the stream was at "full bank" stage. This prevented the floating oil from severely contaminating the stream bottom and since the stream was not at flood stage the oil did not spread out over the flood plain except in localized low areas or where impoundment structures such as beaver dams were present. Fifth, cleanup and recovery operations were able to recover a significant part of the oil that spilled, reducing the amount that remained in the environment. Sixth, several heavy rains helped to flush residual oil from the stream valley. Seventh, the warmer weather has helped evaporate the volatile fractions of oil.

At the present time, the upper reaches of Sugarland Run do not show signs of life. Crayfish that are usually abundant are absent. Minnows are only present where tributaries are contributing fresh water to the stream. The macro-invertebrates that are essential to the food chain are absent. Minnows are present farther downstream where Sugarland Run flows under Route 7. It is, however, not clear that the aquatic food chain is adequately reestablished to support them.

Others are better qualified to comment on the environmental impacts on the Potomac River. The conditions that helped minimize the impact on Sugarland Run probably made it more difficult to protect the Potomac River. The short time between the spill and entry of oil into the river made it difficult to contain and recover the product before water supplies and ecological systems were threatened.

There is little comfort to be gained from the natural conditions that reduced the environmental and societal impact of this spill. The spill might have happened at the end of the summer and the material spilled could have been gasoline. If this had happened we would have had a major catastrophe with probable fire, loss of human life, long-term health problems, and much more serious environmental impacts from both the spilled product and the essential cleanup methods.

ECOLOGICAL RECOVERY:

The first steps are to remove as much of the free product as possible. This has been done during the emergency phase of cleanup. The remaining oil is in the soil, vegetable matter along the stream, and possibly in the groundwater.

The long-term effects are difficult to predict. The effect of the oil on tree roots exposed along the stream and the effects of residual oil in the soils near trees may take months to years to become apparent. These trees are important for bank stabilization and as habitat in Herndon's Runnymede Park and in the county stream valley parks along Sugarland Run. There are several places where the stream did flow out of bank or oil was impounded. These areas remain contaminated. Highly contaminated soils near the spill site are being removed. No remedial action has been taken for the less contaminated soils along the stream. Removal of these soils or treatment with chemicals or steam cleaning would only add to the environmental insult. Oil remaining in the soil will continue to seep out to the surface and constitute a continuing source of contamination until it is reduced to an insignificant level. This could take many months or even several years.

Fortunately, the method for treating these less contaminated soils is well known. It is called bioremediation. The technique uses naturally occurring microbes that have adapted to using petroleum products as a food source. The microbes break the petroleum products down into harmless products. The method of application is to spray a slurry containing microbes and nutrients (fertilizer) on the affected areas. The microbes multiply rapidly and consume the petroleum products. This method works best during warm weather and under moist conditions. The conditions along Sugarland Run are ideal for bioremediation during the summer months. Bioremediation can be expected to accelerate the removal of hydrocarbons by a factor of three to twenty. When the oil is gone the microbes die. They do not harm anyone while alive or dead.

I recommended bioremediation as the preferred approach at a meeting on remediation planning soon after the spill and again at a preliminary meeting of the Sugarland Run Task Force on April 8, 1993. At the first regular meeting of the Sugarland Run Task Force on May 3, 1993, Colonial reported that their environmental consultant was studying the method and other alternatives. The EPA coordinator stated that they may try a pilot project. The summer will be over by the time a pilot project is planned, implemented, and evaluated. No one denies that the method works. The excuse seems to be that the fertilizer applied with the microbes might cause algae blooms in the Potomac. This is nonsense! The amount of fertilizer applied is small and the areas where application are needed are limited. Water quality monitoring in the stream can be used to measure any significant increases in nitrogen or phosphorous. If increases are observed, the amount of fertilizer can be reduced before any harmful affects occur. The amount of fertilizer runoff from improper spring lawn fertilization will greatly exceed any additional runoff from bioremediation. In the meantime, we have lost at least a month of valuable time for effective removal of hydrocarbons from Sugarland Run. It should have been possible to have most of the oil removed by the end of the summer, but this may no longer be possible because of procrastination.

The Treatment Technologies Work Group met on May 12, 1993, to discuss bioremediation methods. Colonial's environmental consultant recommended an approach to bioremediation that would add nutrients to the soil by applying mulch, tilling the soil, and using hydroseeding or other methods to stabilize the soil. The proposal was to apply this technique to three locations as pilot projects. The proposed locations were an upland area near the spill site (wooded but future highway right-of-way), a wooded wetlands area where the spill flowed into Sugarland Run, and a partially wooded location in Algonkian Park where Sugarland Run flows into the Potomac. Open field methods and equipment are not realistic in wooded, rocky terraine and ecologically sensitive areas. The prospect of increasing the erosion potential by tilling the soil in the stream valley and introducing alien species into natural park woodlands met with strong objections. In addition, a contaminated area in Runnymede Park where the stream flowed out of bank because of a beaver dam obstruction was not included in the recommendation. The EPA Coordinator instructed Colonial and their environmental consultant the revise the plan to use low-impact topical application of commercial microbes and fertilizer in the wooded stream valley and to add the location that had been identified in Runnymede Park. There was also general agreement that the term "pilot project" should be replaced with "initial implementation" and that other localities will be added as they are identified. Hopefully, a bioremediation program can get started in early June.

It is ironic that an effective remediation program takes so long to develop and implement in contrast to the efficient and effective containment and recovery effort of the emergency phase following this oil spill. Future contingency planning needs to consider follow-on requirements and organizational structure for remediation and recovery as well as initial cleanup activities.

Once the oil is removed as a source of continuing contamination the stream can start its true recovery as an ecological system. The food chain will have to be reestablished for all of the life forms that were present before the spill. The presence of a few species does not signal recovery. It only indicates that the process is progressing. Full recovery of the ecological system may take three or more years if bioremediation is used. Longer if bioremediation is postponed or not used.

Runnymede Park in Herndon has been designated as a nature park. Our intention has been to use the park as a nature education resource. We will continue to pursue this objective. The lessons, however, will be different. Now we will be emphasizing how the human race can destroy the environment and how ecological systems respond and recover if we act responsibly. The most important lesson may be learning that attention to prevention is critical and that our actions cause serious problems for both the natural environment and ourselves (*i.e.* protecting our water supply and air quality).

PIPELINE FAILURES:

Our society has become dependent on the use of large quantities of hydrocarbon products. This will continue until this finite supply diminishes to the point that supply can no longer meet demand. There is no doubt that pipelines are much safer than most forms of surface transportation for transporting large amounts of petroleum products. It is also true that when a pipeline ruptures the potential exists for a major disaster. This is analogous to aircraft travel. Statistically, it is a lot safer to fly than to ride in an automobile, but when a large passenger plane crashes the loss of life is usually great.

There are many possible causes for pipeline failure. These included faulty materials, improper installation, damage during installation, damage after installation, deterioration of the metal in the pipe due to abrasion and electrolytic action, and earth movements such as earthquakes and landslides. All of these causes should be preventable except for earth movements if adequate inspections, quality control, and monitoring are carried out. The hazards of earth movements can be minimized by careful attention to the geologic conditions where the pipeline is placed and use of cutoff valves to minimize the amount of potential spills where hazardous geologic conditions can not be avoided. Why then do so many pipeline accidents occur? The answer seems to be that insufficient care is exercised in the planning, siting, construction, and operation of the pipelines.

Public Law 102-508, the Pipeline Safety Act of 1992, amended several previous pipeline safety acts for gas and oil pipelines. This act recognizes high-density population areas, environmentally sensitive areas, and the need for using internal inspection devices. The Secretary of Transportation is to provide regulations not later than three years after the date of enactment. I hope that the Secretary will provide these regulations in less than the three years specified in the act. No regulations had been provided four years after another pipeline safety act in 1988. The pipelines are getting older and will be increasingly susceptible to failure. More high-density population areas are being built in locations that are close to pipelines. Environmentally sensitive areas are already subject to many pressures -- they don't need oil spills on top of everything else.

INTERNAL INSPECTION -- SMART PIGS:

The GAO report "Natural Gas Pipelines, Greater Use of Instrumented Technology Can Improve Safety" (GAO/RCED-92-237) discusses the use of smart pigs for both gas and liquid pipelines. The two types of smart pigs that are available are magnetic flux and ultrasonic. The magnetic flux pigs provide qualitative information about the condition of the pipe. The ultrasonic pigs have the capability to measure the wall thickness and provide quantitative information. Both types of pigs probably have their uses, but the ultrasonic pig should provide the most relevant and needed information concerning the condition of the pipe. Colonial has informed me that the ultrasonic pigs that are available for larger pipe diameters (32 inch and larger) do not provide reliable results. I have verified this through other sources. I have had the opportunity to examine proprietary reports of results from two major oil companies that have had excellent results from using ultrasonic pigs for smaller diameter pipelines. There is no reason that an ultrasonic pig can not be developed for larger diameter pipes. The deficiency in one of the existing large diameter smart pigs appears to be in the signal processing technology that is used. A concerted effort needs to be made to develop a reliable and functional ultrasonic pig for the larger diameter pipelines.

RECOMMENDATIONS:

1. The Secretary of Transportation should provide regulations in response to Public Law 102-508 ahead of the three year mandated period.

2. The spacing of shut-off valves in environmentally sensitive and high-density population areas needs to be examined closely. Cutoff valves should be spaced close enough so that emergency response teams can effectively respond and control the volume of oil that may be spilled. A spill of 407,000 + gallons in a high-density population and environmentally sensitive area is inexcusable.

3. Internal inspection of pipelines of all diameters needs to be conducted on a regular schedule. Oversight of these inspections needs to be provided by parties that do not have a vested interest in the results and the results of the testing need to be reported.

4. Ultrasonic smart pigs for large diameter pipelines need to be developed that are of equal reliability to the ultrasonic pigs for smaller diameter pipelines.

5. All major pipelines, especially those that pass through high-density population areas and environmentally sensitive areas should be constructed or modified with launching and recovery ports to accommodate smart pigs.

6. Inspections during construction, modification, or repair of pipelines should be conducted by qualified inspectors who are not affiliated with the pipeline companies or their contractors.

7. Site specific contingency plans should be developed by the pipeline companies for high-density population areas and environmentally sensitive areas. These contingency plans should include weather and stream conditions, rate of transport, type of material, access to points where effective collection and recovery are possible, organizations that will be involved, and public information networks. These contingency plans need to include options for remediation and recovery operations.

8. Local jurisdictions need to organize and practice for hazardous materials incidents. Fairfax County was fortunate in having an excellent HAZMAT team. The rapid response of this team and its ability to establish an initial command system were essential in reducing the impact of this oil spill.

9. Local jurisdictions need to exercise greater supervision and control when third party land disturbing or construction activities occur near existing pipelines. Unbiased inspectors should be present throughout any such construction and should be required to report any incident that might cause an immediate or delayed threat to pipeline integrity.

TESTIMONY OF JERRY J. GAREGNANI, CHAIRMAN
FRIENDS OF SUGARLAND RUN
U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION
SUB-COMMITTEE ON INVESTIGATIONS AND OVERSIGHT
TUESDAY, MAY 18, 1993

Good Afternoon, I am Jerry Garegnani Chairman of the Friends of Sugarland Run (FOSR). I appreciate this opportunity to share my group's view on the Colonial pipeline spill of fuel oil into the environmentally sensitive area of Sugarland Run In March,1993.

The Friends of Sugarland Run ,a sub-committee of the Audubon Naturalist Society, is a group of citizens and area business people who came together a year ago to protect one of the last natural areas in the heavily urbanized region of northern Fairfax and eastern Loudoun Counties. Our goal is to establish a continuous greenway along the ten mile Sugarland Run stream valley to support a diversity of wildlife and allow their migration from the Potomac River deep into Fairfax County. As part of a national greenway movement in this country, the FOSR intends to accomplish this with minimal public funds using volunteers to raise funds, perform monitoring, and provide necessary labor. In fact the FOSR had just, prior to the spill, received from the Conservation Fund a grant from the DuPont Greenways Award.

As part of the effort to establish a greenway, we have spent time identifying threats to the habitats along Sugarland Run. We were lulled into thinking that the most significant threats were primarily from the heavy development in the watershed causing severe sedimentation and erosion problems degrading the ability of the stream to support the aquatic life which starts the food chain for a healthy habitat. Suddenly a threat we weren't even aware of destroyed the existing Sugarland Run ecosystem in a matter of hours by dumping over 400,000 gallons of No. 2 Fuel Oil into the stream.

There are several aspects of this disaster that are now apparent and which we find disturbing due to the lack of adequate controls and potential for re-occurrence of a spill.

- Lack of regular internal inspection of the pipeline to measure wall thickness using "smart Pigs". The technology for this exists but is not being applied.

- Lack of post construction inspections. Colonial was aware of the construction at the Reston Hospital site and even excavated the pipe to aid in its protection but, they did not visually inspect the pipe before it was re-buried.

- Lack of adequate shut off valves leaving vast distances between valves. Even though the pipeline was shut down almost immediately after the burst occurred, over 400,000 gallons were dumped into the stream.

- The pipeline which burst in March usually carries gasoline. If the spill would have been of 400,000 gallons of gasoline with its explosive potential and high levels of carcinogens, the disaster would have been terribly worse.

These weaknesses reflect decisions made by Colonial for which no Federal guidance, regulations, or negative incentives exist to adequately protect environmentally sensitive areas. The decisions made by Colonial were based upon their economic feasibility with regard to profitability. This is to be expected from a free enterprise system and I'll be the first to say its the best system in the world. However, it depends upon some level of control to make up for the gap between the good of the corporation and the overall public good. This disaster clearly points out that the gap between corporate and public good is not being adequately addressed by interstate pipeline safety controls or negative incentives.

The hundreds of us who live along Sugarland Run place a very high value on the recreation and aesthetic quality of the stream valley in our back yards. Unfortunately, that value does not have associated with it a dollar price tag. On the other hand, it is very easy for a pipeline company to calculate the cost associated with a spill in lost product and fines, to apply a risk factor, and decide not to address known weaknesses in their system. This decision causes the citizens near the pipeline to carry the burden of risk and, if an accident occurs, the value lost by the citizens essentially goes to subsidize the pipeline company. It is true that if pipeline companies were forced to respond to more government control, the price for their products would go up; however, instead of the citizens who live near the pipeline subsidizing the real cost of dependence on these products, the cost would be evenly spread among all the users of the product. There is also a long term benefit to this, as members of the committee probably know, higher energy costs drive technology for cleaner and cheaper energy.

A significant amount of money is now being spent to clean up Sugarland Run. Had that money been spent in prevention instead of post-accident clean up, we citizens would still be enjoying our stream valley instead of trying to keep our kids away from the stream, assessing the affects on property values, and worrying about when the pipeline may dump gasoline into the stream.

In Summary, from those of us who have lost something of great value, we ask this committee to consider more stringent regulations and fines to prevent continued destruction of our diminishing natural areas. Thank you for this opportunity to express our views.

Safety Information

National Transportation Safety Board

Washington, D.C. 20594

Testimony of

Christopher A. Hart, Member

National Transportation Safety Board

before the

Subcommittee on Investigations and Oversight

Committee on Public Works and Transportation

House of Representatives

regarding the

March 28, 1993, Colonial Pipeline Rupture

May 18, 1993

Good afternoon Mr. Chairman and Members of the Subcommittee. I appreciate the opportunity to appear on behalf of the National Transportation Safety Board to discuss our ongoing investigation into the March 28, 1993, Colonial Pipeline Company accident in Northern Virginia.

As this panel knows, the National Transportation Safety Board is an independent agency charged with investigating transportation accidents, determining their probable cause(s), and proposing safety recommendations to prevent their recurrence. The Safety Board also conducts safety studies and evaluates the effectiveness of the programs of other government agencies and companies in the transportation industries for preventing transportation accidents.

Liquid pipelines transport about 54 percent of our Nation's petroleum products, and when released during accidents they may cause a significant impact to our safety and the environment, wildlife, other transportation activities, and community water supplies. Recent liquid pipeline accidents have emphasized that while they do not cause large numbers of human casualties (five in 1992, according to preliminary figures), they result in millions of dollars in environmental damages, disruptions to communities, and other losses.

Historically such losses were not considered in developing safety standards for detecting abnormal pipeline operations or for developing systems for minimizing the quantity of products released from pipeline failures. This changed with the enactment of the Pipeline Safety Act of 1992, which added environmental protection as an objective when establishing minimum Federal safety standards for pipeline transportation. This Act also authorizes the Safety Board to investigate and report on pipeline accidents that involve significant environmental damage.

Consequently, Safety Board investigations are being targeted to better define and document safety improvements needed to identify pipe failure occurrences earlier, and to control petroleum product pipeline spills more quickly in order to reduce societal losses.

The recent Colonial Pipeline Company pipeline rupture accident and the resultant oil spill in Virginia offer a unique opportunity to study and assess these very issues.

At 8:48 a.m., on March 28, 1993, a 36-inch outside diameter pipeline owned and operated by Colonial Pipeline Company ruptured in Herndon, Virginia, adjacent to and immediately behind the Reston Hospital Physicians Office Building. At the point of rupture, the top of the pipeline was about 8 feet below the surface. At 8:49 a.m. the company's controller in its Atlanta control center received an alarm on the supervisory control and data acquisition (SCADA) system indicating low suction pressure on Colonial's Line 3. The alarm was received from the company's Dorsey Junction, Maryland pump station (Dorsey Station). The pipeline ran from a station in Chantilly, Virginia to Dorsey, Maryland.

At 8:50 a.m., the controller in Atlanta transmitted commands to close remotely operated valves and shut down pump units 1 and 3 at Chantilly. Due to low suction, two pump units at the Dorsey Station automatically shut down at 8:51 a.m. At 8:52 a.m., the Chantilly discharge valves were shut off and the Chantilly block valve was closed at 8:54 a.m, both by the controller in Atlanta, Georgia. The Dorsey Station operator remotely closed the Dorsey Station suction valve at 8:53 a.m.

Colonial Pipeline's remote control valves on Line 3, the segment of pipeline that ruptured, were spaced 45 miles apart at the Chantilly and Dorsey stations. There are also manually operated block valves between the remote control valves located on the Virginia side and the Maryland side of the Potomac River. Local Colonial employees drove to the manually operated block valves in Virginia and Maryland located downstream of the pipeline rupture and closed them to further isolate Line 3.

The 45 miles of pipeline are estimated to have a capacity of 12.4 million gallons (295,000 barrels). The Colonial Pipeline Company has provided an estimate to the Safety Board that 407,000 gallons (9,700 barrels) of No.2 fuel oil escaped from the ruptured pipeline, of which 87 percent of the fuel oil has been recovered.

The pipeline rupture area was located in a north-south oriented utility right-of-way that parallels the edge of the parking lot behind the medical office building. Within this right-of-way are overhead power lines, a 48-inch water line, a 20-inch gas line, Colonial's Lines 3 and 4, and a run-off pond for the parking lot. The escaping fuel oil from the pipeline rupture quickly filled the run-off pond and entered a storm drain that emptied into Sugarland Run Creek, ultimately flowing into the Potomac River. The spill that flowed into the Potomac River threatened the nearby water in-take for Fairfax County and the in-take was subsequently closed. Citizens in the immediate spill area were also evacuated.

When the pipeline was excavated after the accident, large boulders and rocks on and around the pipeline could be seen. The boulders and rocks were removed during excavation. When the excavation reached the pipe, the 42-inch rupture on the top of pipeline was exposed. The damaged pipe section was photographically documented and an 18 1/3 foot section of the damaged pipeline was removed under Safety Board supervision and taken to our materials laboratory in Washington D.C. for further examination.

The Safety Board's metallurgist's factual report was recently completed and a copy of the report has been provided to the Subcommittee. The metallurgical examination of the 18 1/3 foot section of the pipeline found:

- Mechanical damage (similar to a scrape) along the top of the pipeline in a longitudinal direction with a trace of metal deposits different in chemical properties from that of the pipe (the pipe surface was deformed from north to south);

- Two dents 1/2 and 1/4 inch deep on the pipe section -- one close to the rupture and the other away from the origin of the rupture; and

- An overstress fracture near the outside wall., which was followed by fatigue progressing over time to an overall depth of one-third of the pipe wall thickness and a longitudinal length of 5 1/4 inches.

In summary, microscopic viewing of the damage is indicative of an object sliding longitudinally against the pipe in the southerly direction. No determination has been made as to the source of the longitudinal scrape.

Several days after the accident, the Department of Transportation's Research and Special Programs Administration's (RSPA) Office of Pipeline Safety required Colonial Pipeline to expose and examine an additional 700 feet of Line 3 to search for additional damage along the medical office parking lot. During this examination, which was also observed by Safety Board staff, a dent on the bottom of the pipe was observed during the lifting of the pipeline. This pipe segment rested on protruding bedrock.

The Board requested that Colonial remove this dented pipe section (a 16-inch segment of the pipe), which was located 28 feet downstream (north) of the accident rupture. This second piece of pipe was taken to the Safety Board's laboratory for further examination. The dent observed was about 3/4-inch deep and 10 inches across.

The on-scene phase of the Safety Board's investigation has ended and we are now beginning to review the company's design and construction records. An assessment of the firm's previous pipeline accidents, as well as its operating and maintenance history, is also underway. The issues the Safety Board is examining as part of our ongoing investigation are the adequacy of:

- Internal electromagnetic, ultrasonic, and other pipeline inspections, their utilization by the Colonial Pipeline Company, and existing requirements for their use;

- Inspections during pipeline installation and when subsequent construction and maintenance is being performed adjacent to a pipeline;

- Remotely operated and automatic shut off valves and their spacing;

- Early leak detection procedures and their performance in conjunction with supervisory control and data acquisition systems;

- Structural integrity of the pipeline for designated service; and

- Federal oversight of Colonial Pipeline Company activities in federal safety standards enforcement.

As the Subcommittee knows, these are not new issues of concern to the Safety Board. Safety recommendations have called for the correct and timely use of appropriate in-line pipeline internal inspection equipment since 1987. The Safety Board has also issued recommendations concerning the installation of remotely operated valves on pipelines to enable the prompt isolation of those sections that pass through highly populated areas.

The Safety Board again thanks the Subcommittee for the opportunity to testify, and I would be pleased to answer any questions the panel may have.

STATEMENT OF ROSE A. MCMURRAY
ACTING ADMINISTRATOR
RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION

BEFORE THE
SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT
HOUSE COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION

May 18, 1993

Good afternoon Mr. Chairman, and members of the Subcommittee. I am pleased to appear before you today to testify on behalf of Secretary Peña and the Department of Transportation concerning important issues arising out of the Colonial Pipeline Company spill of diesel fuel on March 28, 1993, into Sugarland Run in Fairfax County, Virginia. Appearing with me is George W. Tenley, Jr., Associate Administrator for Pipeline Safety.

My testimony follows the format presented in the Subcommittee's letter requesting the Department's appearance.

I. Overview

The mission of the pipeline safety program of the Research and Special Programs Administration (RSPA), administered by RSPA's Office of Pipeline Safety (OPS), is "To protect the people and the environment of the United States through a comprehensive pipeline safety program that includes effective risk management, thorough pipeline operator compliance, high quality training and a strong, balanced federal state partnership."
Our oversight responsibility covers transportation by pipeline of

natural gas to 55 million residential and commercial customers, and transportation of 25 percent of the nation's intercity freight, consisting of over 605 billion ton miles annually of petroleum and other materials.

Our goal continues to be assuring the highest level of public safety and environmental protection at a cost commensurate with real risk. Our primary strategy is emphasizing prevention of accidents and spills by stringent design and construction standards, operational practices which maintain pipeline integrity, adequate monitoring and leak detection systems, and emergency response procedures that mitigate consequences to the maximum degree practicable. The Colonial incident demonstrates the value of new construction inspections. If we had been able to be on scene in 1980 at the time the Colonial 36 inch line was constructed, we could have assured that our construction standards had been properly followed and we would have a better understanding today as to the cause of the accident. However, with only two inspectors in 1980 for the entire Eastern Region, we could inspect only a very small number of new construction projects.

We face a number of challenges as the stewards of the pipeline program, including increased public, state, and Congressional demands for more safeguards; increased importance of environmental protection; an aging infrastructure; increasing population development encroaching on pipeline rights-of-way; and financial pressures on the industry to control costs.

Historically, accidents like the recent Colonial spill in Fairfax County, Virginia, have given rise to increased pipeline safety legislation, as well as recommendations from the National Transportation Safety Board and the General Accounting Office. While these accidents have provided valuable lessons and led to improved standards and practices, RSPA believes that we must now focus our attention on the relative risks of all potential causes attributed to pipeline accidents and their probability of occurrence. RSPA believes strongly that more reliable data are needed to form the basis for credible decision making and risk management.

II. Program Operation

This is a time of transition for the pipeline safety program, as we work toward managing the program on the basis of comprehensive risk assessment and allocating resources to implement program priorities accordingly. The program has six areas of operational focus which are each increasingly risk-based in approach:

1) Through Data Analysis and Information Systems, we are attempting to make full use of available information systems technology to analyze and predict risk and set safety and

environmental priorities. We are redesigning outdated organizational structures and work processes, including decentralizing operations, reassessing inspection priorities, streamlining accident investigations and upgrading information systems.

2) Pipeline Research and Development primarily supports the development of regulations, compliance, and training. We are identifying new technologies which have a high potential for risk reduction and a positive cost benefit ratio; striving to identify high population density and environmentally sensitive geographic areas that require more stringent prevention measures; and finalizing development of a risk assessment model.

3) Through our Regulatory Program, we evaluate safety and environmental problems and develop regulations or alternatives to regulations that assure safety in the design, construction, operation, and maintenance of pipelines. We are prioritizing rulemakings and studies to assure prompt action on those with the potential for preventing the greatest risks with the least impact practicable on industry. Our criteria for prioritizing our work include accident statistics, trends, and system-wide problems that show up in more than one operator's facilities. Some alternatives to rulemaking include alert notices, advisory bulletins, technical assistance, and public education.

4) The foundation of the Compliance Program has been risk-based for several years, allowing RSPA to direct its inspection resources to those problem areas for which an accident would likely have significant consequences on public safety or the environment. We inspect all pipelines under Federal jurisdiction within a three to five year cycle and higher-risk pipelines more frequently. Once new regulations mandated by law become effective (e.g., low- stress hazardous liquid pipelines), the inventory of pipelines subject to Federal jurisdiction will increase about 50 percent.

Existing Federal resources alone will not adequately ensure the safe operation of pipeline facilities, given the size of the regulated community and the complexity of operations. State adoption and enforcement of Federal pipeline regulations under an annual certification program result in a uniform nationwide program. While the gas and hazardous liquid pipeline safety laws authorize grant funds to reimburse states up to 50 percent of the actual cost of state programs, appropriations for the last several years have permitted funding of approximately 35 percent for state gas programs, and 26 percent for state hazardous liquid programs. The allocation formula emphasizes state program performance. Our regional staff monitors and supports states in striving to improve their programs.

5) Training and Information Dissemination are critical to ensure

that state regulatory and compliance personnel better understand and apply pipeline regulations. RSPA provides comprehensive information, guidance, and direction through formal training and technical assistance provided by the Department's Transportation Safety Institute in Oklahoma City.

6) Emergency Response is an area where we are placing increased attention in the pipeline program. We are implementing new authority for the oversight of response planning by hazardous liquid operators mandated under the Oil Pollution Act of 1990 (OPA), and working to determine what information on pipeline locations and operations would facilitate the work of emergency and environmental planners at the Federal, state, and local levels of government. We are evaluating how to provide this information in a user-friendly form through geographic information systems. We promote and support the National Response System, mandated by the Comprehensive Environmental Response, Compensation, and Liability Act and the Clean Water Act, and the U. S. Coast Guard's National Response Center, which receives reports and initiates actions for the immediate response to incidents.

III. Report on the Status of the Colonial Spill Investigation and Monitoring of Other Pipelines in the Area

Last week, the NTSB released its metallurgical report covering its analysis of the failed pipe involved in the Colonial spill. Our review of the Board's report leads us to conclude that the cause of the failure is mechanical damage. Neither OPS nor the Board is prepared at this time to conclude when the damage occurred.

At the present time, the 36-inch pipeline that ruptured is in service at a pressure of 50 percent of its maximum operating pressure (a service pressure of approximately 325 psi). This limitation was imposed on Colonial in an April 5, 1993 amendment to the Hazardous Facility Order RSPA issued to Colonial on March 30, 1993. In accordance with the Amended Order, Colonial submitted a plan for the internal inspection of the pipeline using an instrumented device, commonly referred to as a "smart pig." After an initial review of that plan, OPS requested additional information in order to evaluate the plan fully. Following a meeting between Colonial representatives and OPS engineers, the Company provided answers to all questions posed by OPS.

Since that time, OPS has met with companies that offer smart pig services to the pipeline industry to determine the proper device to run in the pipeline to find the type of conditions that existed on the failed pipeline (i.e., dents and gouges associated with mechanical damage). We will meet with Colonial representatives next week to finalize the plan. As provided in the Amended Order, Colonial will not be allowed to operate above the 50 percent pressure limitation until the pig data indicate it is safe to do so, and any anomalies are repaired appropriately.

There are two other pipelines in the right-of-way through which the Colonial 36-inch line runs: a Colonial 32-inch petroleum products pipeline, and a Columbia Gas Transmission Company 20-inch natural gas pipeline. The 32-inch Colonial pipeline was excavated in the area of the failed 36-inch line, and, based on data from a pig run in 1987, one of two dents found was repaired with a full encirclement sleeve. The other dent was very shallow, had no gouges in it, and presented no concern as to the integrity of the line.

The Columbia Gas line is approximately 150 feet away from the Colonial 36-inch line and would not have been subject to damage from the rupture of the Colonial line. However, because of the third-party excavation that occurred in the area, Columbia is reviewing its records of inspections it conducted at the time of that excavation to determine if the line could have been damaged. OPS will monitor the results of Columbia's review.

IV. Secretarial Program Review

In the wake of the Colonial spill, Secretary Peña directed a review of the adequacy of the pipeline program in providing environmental protection. This review will provide a basis for assessing and prioritizing proposed actions to deal with the risk to the environment posed by hazardous liquid pipelines. As we take actions to meet the RSPA environmental mission, these actions must be weighed in balance with actions necessary to meet our public safety mission. Determining the proper balance will be critical to assuring the delivery of a comprehensive pipeline safety and environmental program within available resources.

In accordance with the Secretary's direction, we are assessing programs which have the greatest potential to reduce risk, including regulatory actions, compliance initiatives, state programs, and implementation of OPA.

- In the regulatory area, we are looking at the integrity of pipeline systems and the prevention or limitation of product loss. Specifically, in pending rulemakings we are considering hydrostatic testing, modification of pipelines to accept internal inspection devices, requirements for liquid operators to have damage prevention programs, and regulating low stress lines. In addition, the Pipeline Safety Act of 1992 contains a provision on the use of emergency flow restricting devices and leak detection systems, subjects having a potential and direct relevance to the Colonial spill.

- In the compliance program, we are assessing means to reduce environmental risk through new areas of program emphasis. We are considering whether there is a need to redirect resources for more inspection time focused on liquid operators, new construction, and inspections in the field as opposed to headquarters facilities.

- In state programs, we are evaluating the extent of state participation in the liquid program and assessing the potential for benefits from increased state involvement. Our focus is on determining how realistic it is to expect to enhance our field compliance presence and the number of pipelines inspected by leveraging state resources.

- In the OPA program, we believe that there may be opportunities for risk reduction by reaching out to industry to collaborate in a national effort to map pipelines. We are also determining if there are ways to better support the area contingency planning efforts to set environmental priorities. In addition, attention can be placed on low-stress pipelines, which have previously been unregulated, in the early phases of review of response plans.

V. Addressing Mandates of the Pipeline Safety Act of 1992

In approaching implementation of the 14 rulemakings, several studies, reports, and other actions mandated by the Pipeline Safety Act of 1992, RSPA has prioritized those initiatives that address the greatest risk or the shortest mandated timeline. Our FY 1994 budget reflects an increase of $225,000 for studies to support regulatory development or possible alternatives to rulemaking and $275,000 for research and development initiatives. Highest priority studies to support regulatory activity would address:

- Installation by gas distribution operators of excess flow valves to mitigate the risk of explosion due to rupture of a gas service line;
- Qualification and training of pipeline personnel to assure their ability to recognize and react to abnormal operating conditions;
- Definition of "gathering lines" and "regulated gathering lines" for the purpose of bringing these previously unregulated gas and hazardous liquid pipelines under RSPA's regulations;
- Identification of pipeline facilities located in environmentally sensitive areas and high-density population areas, and maintenance of related maps;

- o Inspection of underwater pipelines in shallow water outside the Gulf of Mexico, reporting on the proper abandonment of offshore pipelines, and the periodic inspection of all offshore pipelines that pose a threat; and

- o Prescription of circumstances under which emergency flow restricting devices and leak detection systems should be used on hazardous liquid pipelines.

Research and development studies to address reauthorization priorities would include a survey of the extent of replacement of cast iron pipelines and a study of local government codes and standards where customer-owned service lines are located. Federal regulations do not cover customer-owned lines downstream of the customer meter, although such lines are covered in some states.

VI. Conclusion

Based on decisions the Secretary will make in reviewing our environmental program, our priorities under the 1992 reauthorization may, in consultation with Congress, be revised and are contingent on the availability of funding requested in the FY 1994 budget.

To reduce the risk to public safety and the environment from pipelines, we must maximize the expertise available in government, industry, the environmental community, and academia. We must work together to understand emerging trends, solve safety and environmental problems, and set program priorities, based on real rather than perceived risk, within available resources.

Because the problems are large and complex, and the mitigating resources limited, we must, to the degree possible, end the historical, and adversarial, paradigm of the regulator versus the regulated. RSPA, the states, and the industry must strive to pursue the same goals. This approach does not negate, but appropriately directs, the need for a strong Federal and state presence stimulating industry performance and providing oversight of industry regulatory compliance.

Like the other witnesses testifying today, the Department of Transportation is very concerned about the Colonial spill and the issues it raises. We are prepared to take whatever practicable steps are necessary to lessen the risks posed by this indispensable mode of transportation, and to do so in concert with the Congress, the states, environmental groups, and the industry.

Thank you.

United States General Accounting Office

GAO

Testimony

Before the Subcommittee on Investigations and Oversight, Committee on Public Works
House of Representatives

For Release on Delivery
Expected at
1:00 p.m. EDT
Tuesday
May 18, 1993

PIPELINE SAFETY

Use of Instrumented Technology to Inspect Pipelines

Statement of Allen Li,
Associate Director, Transportation Issues,
Resources, Community, and Economic
Development Division

GAO/T-RCED-93-41

Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to be part of the Subcommittee's review of the March 28, 1993, pipeline incident in Reston, Virginia, as it seeks to improve pipeline safety. Today we will discuss our report on the role that instrumented internal inspection devices--called smart pigs--can play in improving pipeline safety.[1] Also, we will comment on the recent Reston incident.

Pipelines provide a vital transportation service. Approximately one-half of the nation's supplies of crude oil and petroleum products, and virtually all natural gas supplies, are transported through a network of over 1.7 million miles of pipelines. The overall safety record of pipelines is relatively good in comparison with that of other modes that carry hazardous materials. However, the Reston incident serves as a reminder that increasingly effective inspection technologies should be continually sought.

Our September 1992 report addressed the capabilities, limitations, costs, and regulations associated with the use of smart pigs in natural gas pipelines. While our report focused on natural gas pipelines, our findings on smart pig inspection capabilities have bearing on liquid pipelines as well. Our testimony also discusses various actions relating to pipeline safety that were taken after our report was issued. In addition, at your request, we will comment on ways pipeline safety can be enhanced to minimize the risk of incidents such as the Reston spill.

---

[1]Natural Gas Pipelines: Greater Use of Instrumented Inspection Technology Can Improve Safety (GAO/RCED-92-237, Sept. 28, 1992)

In summary, our work shows the following:

-- A smart pig is the only pipeline inspection technique that can detect internal and external corrosion without excavating the pipe.[2] Pipeline corrosion is the second leading cause of natural gas pipeline incidents after damage caused by accidental excavation. While smart pigs can detect other pipe flaws such as gouges and dents, they cannot detect defects such as longitudinal cracks and metal loss in pipe welds. Furthermore, while many pipelines can accommodate smart pigs, others cannot because of operational limitations such as sharp bends in the pipeline. Companies responding to our survey reported the cost of using smart pigs per mile of on-stream pipeline ranged from $650 to $2,400 in 1991.

-- Currently, there are no federal regulations governing the use of smart pigs or the frequency of smart pig inspections. Our September 1992 report recommended that the Department of Transportation's (DOT) Research and Special Programs Administration (RSPA) complete the feasibility study on smart pigs mandated by the Pipeline Safety Reauthorization Act of 1988 (P.L. 100-561). Also, we recommended that RSPA issue the regulations mandated by the act, which required new or replacement pipelines--gas and liquid--to accommodate smart pigs.

---

[2]Two types of smart pig technologies--magnetic-flux leakage measuring and ultrasonic--are used to detect corrosion. Magnetic-flux pigs are used for inspecting hazardous liquid and natural gas pipelines. Ultrasonic pigs are used for inspecting liquid pipelines, because they require a liquid medium such as methanol, glycol, or water to operate. Ultrasonic pigs can be used, however, for inspecting a natural gas pipeline, provided it is emptied first and refilled with a liquid medium. A magnetic-flux smart pig is illustrated in app. I.

-- In response to our recommendations, RSPA issued the feasibility study in November 1992 and took actions to issue the regulations mandated by the 1988 act that could enhance the use of smart pigs. RSPA is now evaluating the comments received as a result of its proposed rulemaking.

-- Over the years, the National Transportation Safety Board (NTSB) has investigated numerous pipeline incidents and has made several recommendations for enhancing pipeline safety. For example, NTSB recommended that new or replacement pipelines be capable of accommodating smart pigs.

-- Aging pipelines are of concern because there is a higher risk that they will result in pipeline incidents. The Reston pipeline incident points out that even relatively newer pipelines are subject to failure. While the true cause of the failure is unknown at this time, that incident points out the need for pipeline companies to periodically inspect their pipelines to identify defects and flaws and take needed corrective action. We believe that smart pigs, in conjunction with other inspection techniques, and the NTSB recommended improvements can strengthen the federal strategy to ensure pipeline integrity and safety and minimize incident damage.

BACKGROUND

RSPA's Office of Pipeline Safety is responsible for developing, issuing, and enforcing safety regulations for more than 1.7 million miles of natural gas and hazardous liquid pipelines in the United States. RSPA has five Regional Pipeline Safety Offices with a total of 22 inspectors. RSPA's Eastern Region, which covers Virginia and 13 other states, has three inspectors. The Colonial Pipeline Company has a pipeline that transports refined petroleum products from Pasadena, Texas, to Linden, New Jersey. This pipeline runs through three RSPA regions having a total of 12 inspectors.

Most of the nation's natural gas pipelines were constructed in the 1950s and 1960s; 10 percent of the lines were constructed before 1950 and 9 percent before 1940. Comparable data on the age of hazardous liquid pipelines are not readily available. However, the majority of liquid lines were built after 1950. Although the pipeline industry has a reasonably good safety record, each year several hundred pipeline incidents occur. The safety of aging pipelines is of increasing concern. Older pipelines may exhibit a greater potential for leakage or rupture than newer lines because of pipe corrosion. Pipeline leakage can cause severe damage to human health, property, and the environment.

From 1985 through 1992, 1,906 natural gas pipeline incidents involving 146 fatalities and 721 injuries were reported to RSPA. By far, the leading cause of natural gas pipeline failure is accidental damage caused by excavation by third parties; the second leading cause is corrosion. Appendix II shows natural gas pipeline incidents for 1985 through 1992, and appendix III shows the causes of these incidents for 1992. For the same period, 1985 to 1992, 1,591 hazardous liquid pipeline incidents involving 24 fatalities and 180 injuries were reported to RSPA. The leading causes of hazardous liquid pipeline failure are corrosion and damage caused by outside forces, such as third parties. Appendix IV shows hazardous liquid pipeline incidents for 1985 through 1992, and appendix V shows the causes of these incidents in 1992.

Pipelines must be protected while being transported and installed. During operations, pipelines must be protected from damage and degradation from other causes such as corrosion, mechanical damage, fatigue, and stress-corrosion cracking.[3] Determining and maintaining the structural integrity and safety of natural gas pipelines and improving the baseline knowledge of their condition requires a combination of external corrosion controls and inspection techniques.

We reported that pipeline inspection techniques include (1) visual inspection techniques, such as line walking and the use of light aircraft or helicopters to check for evidence of leaking; (2) x-raying pipe welds; (3) hydrostatic pressure testing;[4] and (4) placing a smart pig inside the pipe to record flaws as it is propelled by the product being transported.

FACTORS ASSOCIATED WITH USING SMART PIGS

Our work showed that smart pigs can improve pipeline integrity and safety. However, they have certain capabilities and limitations associated with their use. Furthermore, companies we surveyed reported varying costs.

Capabilities and Limitations of Smart Pigs

Smart pig technology is the only pipeline inspection technique available to detect internal and external corrosion without excavating the pipeline. Corroded areas and other pipeline flaws identified by smart pigs can be repaired or replaced before they rupture. Smart pig use also produces data on the metal integrity[5]

---

[3]Such cracking is characterized by multiple longitudinally oriented tight cracks--usually accompanied by poor or distorted coating in a coated pipeline.

[4]Hydrostatic testing--forcing water through a pipeline at high pressure--provides data on the pipeline's operating pressure integrity and identifies significant pipeline defects by exposing the pipeline to pressure above its maximum operating pressure.

[5]Soundness of the pipe's metal.

and condition of the pipeline. Without such data, it is not possible to evaluate the total integrity and safety of the pipeline. On the other hand, hydrostatic testing provides information on the pressure integrity of the pipeline. Hydrostatic testing identifies significant defects by causing the pipe segment to fail during testing. However, hydrostatic testing provides confidence in the pipeline's integrity and safety only at the time of the test. No information can be obtained about the extent or severity of any remaining corrosion damage or other existing pipeline flaws. Therefore, neither technique can be substituted for the other because each produces information unique within its own scope. An advantage of the smart pig technology is that it does not require emptying the pipeline of the product being transported, as hydrostatic testing does. Such emptying results in revenue loss to pipeline operators because operations are interrupted. Also, the water used in hydrostatic testing must be properly treated and disposed of.

During the course of our work on smart pig technology, we received survey responses from 15 U.S. and 3 Canadian natural gas pipeline companies. Nine of the U.S. and all three Canadian companies reported success in using smart pig technology. Companies that had used smart pigs told us that the pigs identified corrosion pitting, mechanical damage, gouges, dents, and manufacturing defects, as well as the location of girth welds, valves, and bends in pipelines. Some companies also noted that smart pigs enabled them to rank repair work on the basis of the location and severity of problems identified, minimize pipeline downtime, and plan effective maintenance. Other benefits cited were that smart pig usage minimizes costly loss of natural gas, ensures that the pipeline is being operated and maintained in a safe manner, and enables prospective sellers and buyers to evaluate the value of pipelines before sale or purchase of pipeline systems.

Companies also told us of limitations. They said that smart pigs could not identify metal loss in circumferential welds (where two ends of pipes are welded together) and longitudinal cracks (cracks that run the length of pipes). They also stated that smart pigs could not establish the integrity of external coatings, including the location of coatings that have separated from the pipe. We also found that neither the magnetic-flux nor the ultrasonic pig technologies had been sufficiently developed to locate potential pipe seam failure of electric-resistance-welded pipes.[6] We also found that smart pigs cannot be used to inspect all pipelines for several reasons: Some pipelines are not able to accommodate pigs due to sharp bends; valves that cannot be fully opened obstruct pig passage; and pipe walls are too thin.

We found specific instances in which smart pig inspections of natural gas pipelines could improve pipeline integrity and safety. For example, in one case a smart pig inspection detected the presence of corrosion in a gas pipeline company's transmission line. However, no follow-up action was taken. This line subsequently ruptured, causing five deaths and property damage. According to the state gas pipeline safety office that conducted the investigation, the incident could have been prevented had the company interpreted the data from the smart pig inspection as an impetus for corrective action. Another company found the use of smart pigs so successful that its current 20-year plan includes pig inspection of all of its lines. A third pipeline company voluntarily invested $100 million to make 9,000 miles of its pipelines "piggable" and has reported many advantages to the use of smart pigs.

In terms of improvements they would like to see, companies responding to our survey specified data analysis and interpretation

---

[6]A low frequency electric resistance welding method prevalent in the United States before the 1970s.

of inspection logs, particularly for magnetic-flux pig technology. These companies told us that smart pigs should be improved to enhance their ability to more accurately measure the depth and length of corrosion. The companies also desired improvements in data interpretation, such as more readable inspection logs, computerized analysis of the data on personal computers at the field level, and correlation of pig inspection logs with actual measurement of pipe anomalies obtained after excavation of the line. Several smart pig manufacturers told us that, over time, market demand would bring about such technology improvements.

Cost of Using Smart Pigs

Companies responding to our survey told us that the cost of using smart pigs depends on a number of variables, such as the type of smart pig used--first-generation or second-generation. In general, second-generation smart pigs have state-of-the-art technology and more advanced capabilities for detecting pipeline flaws. Some companies said they used first-generation smart pigs because of their availability and lower cost. Other companies used second-generation smart pigs because they are capable of providing more detailed data on pipe flaws. Other variables affecting cost cited by these companies include the diameter of the pipeline, cleanliness of the pipeline, length of pipeline for which the smart pig is used, level of competition among smart pig vendors, and the amount of data analysis and interpretation needed for the corrosion reported. Pipeline operators may incur other costs to excavate, inspect, and repair any pipe segments where a smart pig has indicated significant anomalies.

These variables help to explain the broad range of costs reported by nine of the companies responding to our survey. The companies reported that the costs of using smart pigs per mile of on-stream pipeline ranged from $650 to $2,400 in 1991. The only company that provided detailed cost information on the use of smart pigs had used a second-generation pig. This company reported that the inspection cost of a first-generation smart pig is typically one-third to one-half of the inspection cost for a high-resolution, or second-generation, smart pig.

REGULATIONS RELATED TO THE USE OF SMART PIGS

To improve the safety of natural gas and hazardous liquid transmission pipelines, the Congress passed the Pipeline Safety Reauthorization Act of 1988 (P.L. 100-561, Oct. 31, 1988), directing DOT to (1) prepare a feasibility study on requiring the use of a smart pig to inspect transmission pipelines and (2) establish regulations requiring that new or replacement pipeline facilities, to the extent practicable, be capable of accommodating smart pigs. As we will discuss later, the Congress more recently passed the Pipeline Safety Act of 1992 (P.L. 102-508), which mandates regulations on the use of instrumented inspection technology for inspecting pipelines.

Despite congressional mandates and the benefits identified by several pipeline operators, there are no federal regulations on smart pig use or on the frequency of smart pig inspections. When we issued our report in September 1992, RSPA had not completed the feasibility study on smart pigs that the 1988 act mandated be issued by May 1990. Also, RSPA had not issued the mandated regulations requiring new or replacement pipelines, to the extent practicable, to accommodate smart pigs. We found that the delays resulted from RSPA's resource shortages and the agency's decision to devote resources to other work.

In our report we recommended that the Secretary of Transportation act to expeditiously (1) provide the Congress with the final report from the smart pig feasibility study mandated by the 1988 act or notify the Congress when the study would be available and (2) issue the regulations mandated by the 1988 act.

In carrying out these actions, we pointed out that DOT should (1) determine how smart pig technology can effectively be used in natural gas transmission pipelines, especially those in densely populated areas, and (2) consider the capabilities, limitations, and costs of smart pigs in determining the role that these inspections should play in an overall strategy for ensuring pipeline integrity and safety.

RSPA, however, had recognized the capabilities of smart pig inspection. Over the previous 6 years, RSPA had served hazardous facility and consent orders to natural gas and hazardous liquid pipeline companies following incidents in their lines. In those cases, RSPA required the companies to use smart pig inspections to verify pipeline integrity.

RECENT ACTIONS TO ENHANCE SMART PIGS' USE

In November 1992, RSPA issued the feasibility study mandated by the 1988 act.[7] The report assessed the feasibility of requiring the inspection of transmission facilities with smart pigs at periodic intervals. It concluded that, under certain circumstances, it may be feasible to require periodic inspections of natural gas transmission and hazardous liquid pipelines with a smart pig if the pipelines are constructed to accommodate the pigs.

RSPA also took actions to issue the regulations mandated by the 1988 act. In November 1992, DOT published in the Federal Register a Notice of Proposed Rulemaking requiring that new or replacement natural gas transmission pipelines, new and replacement hazardous liquid pipelines, and certain carbon dioxide pipelines be designed to accommodate smart pigs. The proposed rules do not apply to

[7]Instrumented Internal Inspection Devices (A Study Mandated By P. L. 100-561), Research and Special Programs Administration, U.S. Department of Transportation, Nov. 1992.

specific installations for which such design and construction would be impracticable. DOT invited interested parties to submit comments. RSPA is currently evaluating the comments received and plans to issue final regulations by the end of this year.

Subsequent to our report, the Pipeline Safety Act of 1992 was enacted on October 24, 1992. It contains provisions that could increase the use of smart pig inspections in pipelines. The act directs the Secretary of Transportation to issue regulations, within 3 years of enactment, requiring pipeline operators to periodically inspect natural gas pipelines in high-density population areas and hazardous liquid pipelines in environmentally sensitive and high-density population areas. The regulations are to prescribe the circumstances, if any, under which such inspections should be conducted with an instrumented internal inspection device. The act provides that, when an instrumented internal inspection device is not required, the Secretary shall require the use of an inspection method that is at least as effective as the use of a such a device in providing for the safety of the pipeline.

NTSB PIPELINE SAFETY RECOMMENDATIONS

NTSB has made several recommendations to RSPA regarding pipeline safety that are relevant to the Reston incident. For example, in 1987, NTSB recommended that RSPA require operators of natural gas and liquid transmission pipelines to construct new pipelines to facilitate the use of smart pigs and to require operators to incorporate smart pig facilities when repairing or modifying existing systems. These recommendations were subsequently incorporated into the Pipeline Safety Reauthorization Act of 1988, which, as we pointed out earlier, required RSPA to issue regulations addressing these requirements. RSPA, however, did not issue a Proposed Notice of Rulemaking on this requirement until November 1992.

In 1987, NTSB also recommended that RSPA develop operational criteria for determining safe intervals between hydrostatic tests of pipelines. RSPA has not adopted this recommendation. We noted that federal regulations require hydrostatic testing of new pipelines but do not require retesting unless the pipeline is relocated, replaced, or otherwise changed. However, in the course of pipeline operations, the pipeline may be displaced, deformed, and damaged because of movement of the earth, and/or third-party construction damage. This damage--dents and gouges--may weaken the pipe and remain unknown to the operator. In addition, hazardous liquid lines are subject to fluctuating pressure changes that, in a weakened pipe, can result in fatigue cracking of the pipe's metal. Fatigue cracking propagates over time. These cracks can result in leaks or ruptures. Hydrostatic testing could detect such flaws by causing the pipeline to fail during the test.

NTSB also recommended in 1987 that RSPA require the installation of remote-operated valves on pipelines that transport hazardous liquids and determine the spacing of the valves on the basis of the population at risk. In response to the 1988 act, a 1991 RSPA study found the following:

-- Remotely controlled valves and check valves are the only effective emergency flow-restricting devices.

-- From a cost standpoint, it is reasonable to retrofit all manually operated valves to be remotely controlled on hazardous liquid pipelines located in urban areas.

-- There are other locations where remotely controlled valves should be installed to protect environmentally sensitive areas.

The Pipeline Safety Act of 1992 requires that RSPA assess the effectiveness of emergency flow-restricting devices--including remotely controlled valves--and issue regulations prescribing the circumstances under which operators of hazardous liquid pipelines must use such emergency flow restricting devices. To date, RSPA has not begun to develop these regulations.

Despite the 1987 NTSB recommendations, it is worth noting that there are still no federal regulations (1) requiring inspections with an instrumented inspection device, (2) setting forth frequency criteria for hydrostatically retesting pipelines, and (3) requiring installation of remotely controlled operating valves. Furthermore, there are no federal criteria that specify the size of dents, gouges, and groves on pipelines that would require a section of pipe to be repaired or replaced once they are detected.

RESTON, VIRGINIA, PIPELINE INCIDENT

We have not conducted a detailed review of the March 28, 1993, spill in Reston, Virginia. However, as requested by the Subcommittee, we are providing comments on these matters as they relate to the issue of pipeline safety.

The Colonial Pipeline Company hazardous liquid pipeline which ruptured in Reston, Virginia, spilled an estimated 336,000 gallons of fuel oil. About 236,000 gallons of the spill entered the Sugarland Run Creek, a tributary of the Potomac River. The pipeline segment that ruptured is part of Colonial's 36-inch pipeline between pump stations at Chantilly, Virginia, and Dorsey Junction, Maryland. This pipeline was commissioned in 1980 and is part of Colonial's overall system, which runs from Pasadena, Texas, to Linden, New Jersey. RSPA and NTSB are currently investigating the causes of the Reston incident.

Following the incident, RSPA, on March 30, 1993, issued a Hazardous Facility Order to the Colonial Pipeline Company. The order required Colonial to reduce the operating pressure at the

Chantilly pump station to 20 percent below the pressure prior to the pipeline failure. It also mandated certain analysis of the failed pipeline segment and of the failure site. Following further investigation into the cause of the incident, RSPA amended its order to restrict the operating pressure for the pipeline segment to 50 percent of the maximum operating pressure. The order also required Colonial to submit a plan by April 12, 1993, for the internal instrumented inspection of the pipeline between Chantilly, Virginia, and Dorsey Junction, Maryland, and to prescribe the actions to be taken to correct the problems found.

In its April 12, 1993, plan, Colonial stated that it would inspect the pipeline segment with a caliper pig and subsequently with a magnetic-flux pig. The caliper pig will identify the location of anomalies such as dents, wrinkles, buckles, ovalities, and flat spots by measuring the reduction of a pipe's diameter resulting from these anomalies. The use of the caliper pig also ensures that a smart pig will then be able to traverse the line.

RSPA told us that the Colonial Pipeline Company has made considerable use of smart pigs. However, while it used a caliper pig in 1989 on this segment of pipeline, it has never inspected this segment with a magnetic-flux pig. RSPA also told us that Colonial had not hydrostatically tested this segment since its 1980 construction. In addition, this 35-mile pipeline segment does not have remotely controlled operating valves in the transmission line between the Chantilly and Dorsey Junction pumping stations. Remotely controlled operating valves located closer together could have reduced the amount of fuel oil spilled. However, as discussed earlier, there are no federal regulations requiring the use of smart pigs, periodic hydrostatic testing, or the installation of remotely controlled valves.

RSPA officials also told us that the Colonial pipeline segment that ruptured is not designed to easily accommodate magnetic-flux or ultrasonic smart pigs. This is because the pipeline changes in diameter from 36 inches to 32 inches around pumping stations. Colonial plans to modify the pipeline to accommodate smart pigs.

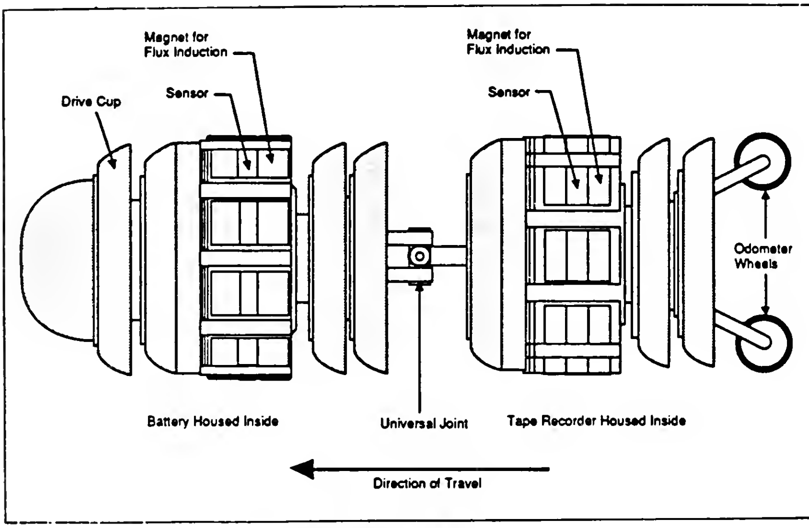
CONCLUSIONS

Smart pigs, in conjunction with other inspection techniques, and the improvements recommended by NTSB, can strengthen the federal strategy to ensure pipeline integrity and safety and minimize incidents and damage. Although aging pipelines are of concern because they have a higher risk of resulting in pipeline incidents, the Reston spill points out that even relatively newer pipelines are subject to failure. Accordingly, there is good reason for pipeline companies to use all available technologies to better ensure the integrity and safety of their pipelines.

- - - -

Mr. Chairman, this concludes our testimony. We would be very happy to respond to any questions you or other Subcommittee members might have.

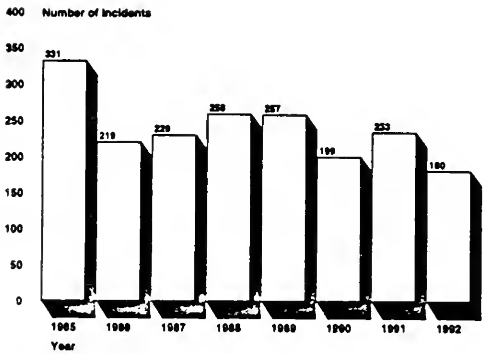
MAGNETIC-FLUX SMART PIG



Source: Vetco Pipeline Services.

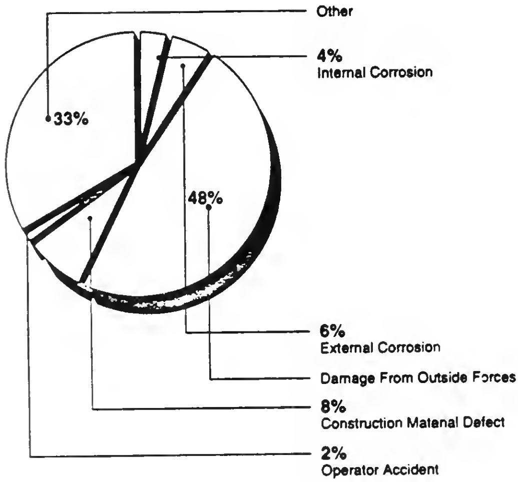
APPENDIX II

NATURAL GAS PIPELINE INCIDENTS (1985-92)



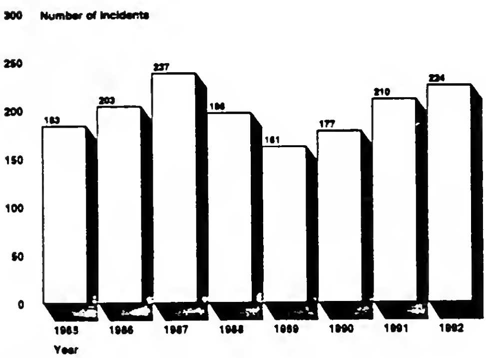
Source: RSPA

NATURAL GAS PIPELINE INCIDENTS BY CAUSE (1992)



Source RSPA

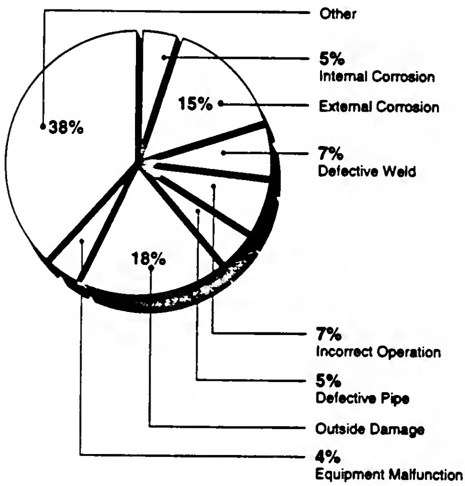
HAZARDOUS LIQUID PIPELINE INCIDENTS (1985-92)



Source: RSPA

APPENDIX V

HAZARDOUS LIQUID PIPELINE INCIDENTS BY CAUSE (1992)



Source: RSPA

(342875)

STATEMENT OF
STEPHEN LUFTIG
ACTING DEPUTY OFFICE DIRECTOR
OFFICE OF EMERGENCY AND REMEDIAL RESPONSE
OF THE
OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT
OF THE
COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION
U.S. HOUSE OF REPRESENTATIVES

May 18, 1993

Good afternoon, Mr. Chairman, and distinguished members of the Subcommittee. I am Stephen Luftig, Acting Deputy Office Director for the Environmental Protection Agency (EPA) Office of Emergency and Remedial Response, within the Office of Solid Waste and Emergency Response. I am pleased to have the opportunity to address your Subcommittee on the subject of the recent Colonial Pipeline Company ("Colonial Pipeline") oil spill in Fairfax County, Virginia. With me today are Mr. Alfred Lindsey, Director of the Office of Environmental Engineering and Technology Demonstration, which is within EPA's Office of Research and Development, and Mr. Dennis Carney, Chief of EPA's Region III Superfund Removal Branch.

I will begin by briefly explaining our Nation's system for responding to oil spills, focusing on EPA's role in that system. I will then discuss EPA's response to the Colonial Pipeline spill and the extent of environmental damage caused by the spill. In addition, I would like to provide the Subcommittee with recent data on the types and number of oil pipeline spills, and discuss EPA's oil spill response research and development efforts.

The National Response System

The National Oil and Hazardous Substances Pollution Contingency Plan, also known as the NCP (40 CFR Part 300), provides the organizational structure and procedures for the Federal Government's planning for and response to oil and hazardous substance spills. Generally speaking, EPA responds to oil spills in the Inland Area of the U.S., while the U.S. Coast Guard (Coast Guard) responds to spills in the Coastal Area. In appropriate circumstances, State and local governments may respond to Inland spills that are within their response capability.

The NCP establishes the National Response Center (NRC), which is staffed 24 hours a day by the Coast Guard. The NRC receives all reports of oil and hazardous substance releases anywhere in the U.S. and its territories. The NRC, in turn, notifies appropriate EPA Regional Offices and Coast Guard District Offices of the spill. EPA and the Coast Guard determine whether Federal response or oversight is necessary.

Our National planning and preparedness structure involves many organizations, including EPA and other Federal agencies, State and local governments, local planning committees, and other interested parties. This network, which is detailed in the NCP, is a key component of the oil spill preparedness and response system. Our experience has shown that a pre-established communications and planning network involving all parties to a response effort, including the private sector, is critical to successful response actions.

On-Scene Coordinators (OSCs) are the lead Federal officials at the scene of a discharge. OSCs are responsible for managing on-site Federal efforts and resources in responding to an incident and are authorized to take all necessary actions, consistent with Federal law, to remove an oil discharge or mitigate or prevent a substantial threat of a discharge into navigable waters.

While OSCs respond to emergencies, it is the responsibility of the National Response Team (NRT) and Regional Response Teams (RRTs) to prepare and plan for emergencies. The NRT, which is chaired by EPA, consists of representatives from 15 Federal agencies who have responsibilities for environmental emergencies. The NRT addresses issues of general applicability across agencies, sites, and programs. One of the NRT's major responsibilities is to maintain national preparedness to respond to an oil discharge that exceeds local and State response capabilities. The NRT also develops recommendations for response training, accident prevention, and revising the NCP; coordinates information about research and development; and shares experiences of regional responses. In some situations, particularly those that cross regional boundaries, the NRT may be activated as an incident-specific team to support the OSC's emergency response efforts. In that capacity, the NRT's role generally consists of bringing the widest possible range of resources to bear and providing expertise consistent with its position as the senior-level support organization in the national response system.

While the NRT provides national planning and preparedness support, the thirteen RRTs, under the direction of the NRT, are generally responsible for regional planning and coordination of preparedness and response actions. RRTs consist of State and local government representatives and regional representatives of EPA and other NRT agencies. The RRTs have many specific functions, including evaluating regional and local responses, encouraging the State and local response community to improve its preparedness, reviewing local response plans prepared under SARA Title III, and conducting preparedness training exercises. The standing RRT serves as a planning and coordination body, while incident-specific RRTs are formed from appropriate RRT member agencies in a limited number of situations, such as when an oil discharge crosses State boundaries or poses a substantial threat to the public health or welfare or the environment. Key responsibilities of the incident-specific RRT are monitoring the response, providing communications support, making recommendations to the OSC consistent with the RRT's expertise, and mobilizing resources available in the region, as requested by the OSC in specific response situations.

EPA's Environmental Response Team (ERT), located in Edison, NJ, is composed of National experts in environmental response activities, including oil spill response. ERT provides technical advice and support to EPA Regions and other Federal agencies. During significant international incidents, ERT has also provided technical assistance to foreign governments.

All ten EPA Regions and the Emergency Response Division in EPA Headquarters maintain 24 hour a day Duty Officers. The NRC notifies the appropriate Regional Duty Officer in the event of a spill and the Duty Officer determines the need for dispatching an OSC to the scene of the spill. The NRC also notifies EPA's Headquarters Duty Officer of significant incidents anywhere in the U.S. or the world that have resulted or may result in major effects to public health and welfare or the environment, evacuations, loss of life, major property damage, and local (DC) or National media attention. The Headquarters Duty Officer will, as appropriate, notify the EPA chair of the NRT and EPA's Administrator. Reports of significant events will be passed to the White House as required or requested.

EPA's National Incident Coordination Team (NICT) coordinates EPA response actions during extraordinary emergency situations of National or international significance. The NICT is comprised of senior-level representatives from each EPA Region and Headquarters. Over the past several years, EPA has been involved in several such situations (for example, the Persian Gulf War and the Exxon Valdez oil spill response).

Colonial Pipeline Spill Response, Damage Assessment, and Restoration Plans

Initial Response

The response to the Colonial Pipeline spill was a coordinated effort by many agencies of Federal, State, and local governments, as well as Colonial Pipeline itself. The spill resulted from a pipeline break at about 8:48 a.m. on March 28, 1993. The rupture discharged approximately 407,000 gallons of #2 fuel oil, of which it is estimated approximately 350,000 gallons have been recovered.

The oil entered Sugarland Run creek via a storm sewer approximately one-half mile from the pipeline rupture site. The oil travelled approximately nine miles through Fairfax and Loudoun Counties, VA, before reaching the Potomac River at Algonkian Park in Loudoun County. EPA dispatched an On-Scene Coordinator (OSC) to the spill site on Sunday, March 28, 1993, within 3 hours of receiving the NRC's initial report. Along with the OSC, contractors from the Technical Assistance Team (TAT) arrived to assist the OSC in evaluating the situation and to provide technical support. Prior to his departure, the OSC alerted the Coast Guard Atlantic Strike Team (based at Fort Dix, New Jersey). Based upon his initial assessment of the spill's severity, the OSC requested that the Strike Team dispatch an oil recovery unit to the site.

The Fairfax County Fire Department began organizing the response and initial boom placement operations before EPA's OSC arrived on site. Because the Federal OSC is required under the Oil Pollution Act of 1990 to direct all response efforts to oil spills that pose a substantial threat to public health or welfare of the United States, EPA organized a Unified Command System, led by the EPA OSC.

The Unified Command consisted of decision-makers from the Coast Guard, Virginia, Maryland, Colonial Pipeline, and Fairfax and Loudoun Counties. The Unified Command participated in decisions regarding resources, field recovery operations, and response logistics and support. The EPA OSC retained ultimate authority to direct the response efforts. The Unified Command structure greatly aided decision-making and was instrumental in response coordination, and obtaining advice from all response organizations.

EPA's OSC requested additional equipment and personnel from the Coast Guard's Gulf Strike Team, a helicopter (provided by the U.S. Marine Corps at Quantico), and Coast Guard personnel, who were dispatched from their Marine Safety Office (MSO) in Baltimore. A senior USCG officer dispatched with the Atlantic Strike Team unit served as an advisor to the EPA OSC.

EPA held morning and evening briefings at which all participants engaged in the response were given the opportunity to brief the Unified Command with regard to their organizations' activities, concerns, and problems.

Early during the Emergency Response phase, the OSC solicited and received input from all involved governmental agencies and citizen groups regarding long-term cleanup issues. These issues were subsequently addressed in a Unilateral Administrative Order that EPA Region III issued on April 2, 1993. This Order directed Colonial Pipeline to study, abate, mitigate, and eliminate any threats to the public health, welfare, and the environment resulting from the spill. The transition from the emergency response phase to longer-term cleanup phase took place on April 9, 1993.

Environmental Assessment

EPA has coordinated two complete assessments of Sugarland Run. The first of these assessments was performed on March 31 and April 1, 1993. During this assessment, crews assembled from local, State, and Federal agencies under the direction of the Unified Command were assigned to sectors of Sugarland Run and the Potomac River. These crews walked the waterway banks and noted environmental damage. They found most of the bank areas to be damaged. Many animals, including birds, beavers, and ducks, were rescued and treated at the Tri-State Animal Rescue Association. The U.S. Fish & Wildlife Service coordinated all dead wildlife counts and rescue efforts.

From April 28 through April 30, EPA coordinated a second assessment of Sugarland Run. Much of the oil along the banks had disappeared. The OSC and representatives from State and local agencies believe this happened for several reasons.

First, when the spill occurred the water table was exceptionally high. This prevented the oil from settling on and saturating the banks. Because oil is lighter than water, most of the oil remained on the surface of the stream. Some was flushed downstream during the first several days of the spill. Secondly, much of the fuel oil degraded and evaporated due to weather conditions and exposure to sunlight. As this type of oil tends to remain on the surface, natural biodegradation occurs rather rapidly.

In the past several weeks, crews walking the stream have noted evidence of sheen on the water surface. Although oil sheen still remains in some areas, sheening from decaying organic matter is also evident in the soils. This type of sheen is common during this time of year when plants are growing and organic matter naturally degrades onto the surrounding soil.

While site conditions are significantly improved, some areas are still affected by the spill. The soils and sediments leading to Sugarland Run Creek are still grossly contaminated in some areas. Areas of Lowe's Island (the area where Sugarland Run enters the Potomac River) and Runnymeade Park in Herndon still show signs of contamination.

The Department of Interior, one of the involved Natural Resource Trustees, has assumed the role of Lead Administrative Trustee in conducting preassessment activities in considering whether a Natural Resource Damage Assessment is warranted under provisions of the Oil Pollution Act of 1990 and related statutes. Other Natural Resource Trustees involved include the National Oceanic and Atmospheric Administration in the Department of

Commerce, the States of Virginia and Maryland, and the District of Columbia. These preassessment activities include consideration of short and long-term effects on natural resources exposed to the oil, including plant and animal life in the area, State and Federal landholdings, and services provided by the resources.

EPA issued a Unilateral Administrative Order to Colonial Pipeline on Friday, April 2, 1993, outlining specific response and restoration measures they must take. Colonial Pipeline orally notified EPA that they intended to comply with this Order on April 3, 1993. On Friday, April 9, 1993, Colonial Pipeline provided a draft Response Action Plan (RAP) to EPA to comply with the terms of this Order. Some of the significant actions that Colonial Pipeline must perform include:

- Long-term monitoring and sampling of the water and sediments located along Sugarland Run and the Potomac River,
- Cleanup of oil-contaminated areas,
- A public education program,
- A groundwater monitoring program,
- Restoration of all areas damaged by Colonial Pipeline during the response effort.

To assure that all local and State concerns would be properly addressed, a copy of the RAP was delivered to each of the agencies involved in the Unified Command for comment. The EPA OSC reviewed these comments and decided that Colonial Pipeline should further develop the RAP.

A comprehensive sampling plan under the RAP is now near completion. This plan will incorporate the assessment information to target primary areas of concern. The focus of sampling performed under the Order will be to determine extent of contamination and areas from which oil needs to be removed.

Data on Pipeline Oil Spills

We have drawn data on pipeline spills from the Emergency Response Notification System (ERNS), a national computer database that stores information on releases of oil and hazardous substances. ERNS is a cooperative effort among EPA, the Department of Transportation, and the NRC. The data in ERNS generally consist only of information provided at the time of the release.

- Data over the past six years show consistently that oil pipeline spills are reported as being approximately 9% of the 15 to 20 thousand annual oil spills.

- This 9% is reported as accounting for approximately 11% to 21% of the total annual volume of oil spilled.

- Approximately 70% of the oil pipeline spill notifications over the past six years do not list the cause of the spill. Of the approximately 30% that do, most are attributed to equipment failure (approximately 72%) and operator error (approximately 11%).

- The vast majority (approximately 80%) of oil pipeline spill notifications over the last six years have reported spills of fewer than 1500 gallons..

- Initial notifications over the last six years show that a few large pipeline spills (approximately 4%) account for most of the oil spilled from pipelines (approximately 73%).

- EPA conducts approximately 30 oil spill cleanups per year and monitors approximately 200 additional oil spill cleanups per year.

EPA's Oil Spill Research and Development Efforts

EPA is participating in the Interagency Research and Development Coordinating Committee, which was established by the Oil Pollution Act of 1990 and chaired by the U.S. Coast Guard. This Committee prepared a coordinated research plan and submitted it to Congress in April, 1992. The plan identifies research that will be conducted over the next five years.

Under the agreement of the Committee, EPA is focusing its oil spill research in four areas: 1) bioremediation, 2) dispersants, 3) mechanical cleanup of Inland spills, and 4) debris disposal. The plan submitted to Congress proposed that bioremediation and dispersant technology would be EPA's two top research and development priorities.

Bioremediation

EPA established the Bioremediation Action Committee (BAC) to speed the development of bioremediation as a tool for addressing both oil and hazardous waste spills. The BAC recommended the development of a set of standardized protocols for determining the effectiveness and toxicity of bioremediation products, including both microbial products and nutrients. A panel of experts from industry, academia, and government is currently developing the protocols.

Under Subpart J of the NCP, any approved bioremediation products are listed on the NCP Product Schedule. Currently, EPA requires bioremediation manufacturers to submit specific laboratory data about the product (e.g., effectiveness, composition) before being added to the Schedule. If the manufacturer submits all required data, EPA lists the product on the Schedule. During a spill response, the OSC may choose to use any product listed on the Schedule, and other products may be selected on a case-by-case basis. The NCP is currently under revision, and information developed from the protocol development research will be used to improve the current Product Schedule.

Under the auspices of the BAC, EPA has prepared a bioremediation spill response plan for use at a future spill in Region VI. The Region VI Spill Response Plan is a document intended to expedite the decision of whether to use bioremediation agents to mitigate an oil spill. Although some of the information in the plan is specific to Region VI, other EPA Regions have used it as a prototype.

Dispersants

During the Exxon Valdez oil spill in Alaska, considerable controversy arose over the use of dispersants as a response tool. EPA has made significant progress in evaluating a test methodology to determine the effectiveness and toxicity of dispersants. This is intended to provide decision-making officials with reliable data that could be used in responding to a spill. The decision to use dispersants should be made quickly after an oil spill occurs. The protocol improvements are intended to expedite this decisionmaking process.

Mechanical Cleanup

Mechanical oil spill containment devices used on the high seas or in Coastal environments often fail when used on fast flowing rivers and streams. EPA is investigating the use of an innovative diversionary system based on vertical, plunging water jets. This system could be used to divert an oil spill to a quiescent zone for removal, and can be used effectively in currents up to six knots. EPA has sponsored research for this system in small stream feasibility tests, and in 1984 published a field manual for the use of a small-sized water jet system. The Agency is now focusing on evaluating the effectiveness of larger diameter nozzles and high flow rates when used in a large, higher current river system.

Debris Disposal

Some States and local authorities regulate oil wastes as hazardous materials. Therefore, oil-laden debris associated with the cleanup of spilled oil is often managed as a regulated hazardous material. This complicates waste management and often results in long-distance shipment of large volumes of oil spill waste to regulated hazardous waste facilities. So far, acceptable shipboard or transportable land-based waste management options have not materialized. EPA plans further research into 1) developing state-of-the-art disposal techniques, 2) evaluating emissions from waste debris incineration, 3) evaluating several reclamation alternatives, and 4) evaluating bioremediation technology as a means to allow future land disposal of the waste.

Thank you again for the opportunity to appear before your Subcommittee. My colleagues and I would be pleased to answer any questions you or the other Subcommittee members might have.

****

TESTIMONY OF ROBERT B. RACKLEFF
PRESIDENT, FRIENDS OF LLOYD
BEFORE THE
SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT
U.S. HOUSE COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION
HEARING ON COLONIAL PIPELINE SPILL OF MARCH 28, 1993
WASHINGTON, D.C.
MAY 18, 1993

I am Robert B. Rackleff, President of the Friends of Lloyd, a group of North Florida citizens organized to protect the environmental quality of our community and surrounding area. Lloyd is an unincorporated village in Jefferson County, 16 miles east of Tallahassee. Our mailing address is 816 Cherry Street, Tallahassee, Florida 32303, phone 904-222-9789.

Our primary concern for over four years has been to stop construction of a Texaco gasoline tank farm and Colonial Pipeline project in the county's only high-recharge area for the Floridan Aquifer. But a more general concern has become inadequate federal and state regulation of petroleum pipelines. There can be no doubt that much stronger federal and state regulation is necessary, and that is why we are submitting this testimony.

By way of introduction, I work as a self-employed writer and consultant for such clients as the Polaroid Corporation, American Bar Association, Time Warner Inc., and Ford Foundation. Before that, I was a speechwriter for U.S. Senator Edmund Muskie, President Jimmy Carter, and Time Inc. Chairman J. Richard Munro. My involvement in environmental issues began in the late 1960s and includes authorship of Close to Crisis: Florida's Environmental Problems (New Issues Press, 1972). As President of the Friends of Lloyd, I receive no compensation of any sort; my involvement is voluntary and unpaid.

INTRODUCTION

I appear today to describe the extent of the problem of pollution from harzardous liquid, or oil, pipelines in America, as exemplified by the Colonial Pipeline spill on March 28 near Reston, Virginia. The estimated 406,000 gallons of fuel which spilled into Sugarland Run and the Potomac River were only part of the more than 1.5 million gallons Colonial has spilled or leaked in the last four years. In fact, in 1991 and 1992, Colonial Pipeline alone spilled more than did all tankships and barges throughout the United States in those two years. Colonial spilled 566,496 gallons, and all water carriers spilled 529,693, in those two years.

And Colonial Pipeline's record is only a small part of the total spilled or leaked by an industry which is so lightlyregulated that it is, for all practical purposes, that it is self-regulated. Oil pipelines spill or leak the equivalent of an Exxon Valdez spill every year in America, on average, year after year. From 1970 to 1992, oil pipelines spilled a total of 272,036,562 gallons of crude oil and petroleum products, or an annual average of 11,827,242 gallons, according to the Annual Reports of Pipeline Safety of the U.S. Office of Pipeline Safety. In the six weeks after the Sugarland Run spill, from March 28 to May 10, the OPS has received telephone reports of 280 pipeline spills. One of them, by ARCO Four Corners Pipeline Company, spilled 260,400 gallons in the Los Angeles area.

Pipelines are the leading point source of oil pollution in the United States. The annual average of nearly 12 million gallons spilled are only those reported to the OPS. The actual volume of oil spilled each year by pipelines is undoubtedly far higher and "may be as much as 20 million to 30 million gallons each year," according to a report issued yesterday by the Friends of the Earth. I mention "point source," because urban runoff, or "nonpoint source" pollution, is the leading overall cause of oil pollution.

Spills from oil tankships and barges are far less serious a source of oil pollution than pipelines. In the years 1973 to 1992, tankships and barges spilled a total of 92,340,884 gallons of crude oil and petroleum products, according to the U.S. Coast Guard. We have no authoritative data on the annual volume of leaks and spills from aboveground and underground storage tanks.

Moreover, as a means of transporting oil, pipelines are twice as likely as tankers and barges to spill or leak. Factoring in statistics on ton-miles compiled by the Association of Oil Pipelines, pipelines have spilled 20,928 gallons of oil per ton-mile transported, and tankships and barges have spilled 9,947 gallons per ton-mile transported. That is an important comparison because public concern and our regulatory effort in recent years has centered on preventing oil spills by tankships and barges.

(See page 21 for a table showing yearly spill totals for oil pipelines and water carriers in the United States.)

As only one indication of regulatory neglect, in contrast with the massive volumes spilled by pipelines, consider that the total amount of civil penalties collected from pipeline companies by OPS was $429,300 from 1979 to 1991. It does not include penalties collected in 1986; they were not available to me. During those 12 years (excluding 1986), there were 2,437 reported pipeline incidents which spilled 126,000,584 gallons of oil, yet the OPS collected only $429,300 in civil penalties. That amounts to penalties paid of 3.4 cents per gallon spilled -- surely one of the great regulatory bargains of our time.

Pipeline pollution is an environmental crisis that persists because we have simply not taken it seriously as an environmental threat. Until passage of amendments to the Hazardous Liquid Pipeline Safety Act by Congress last year, federal regulations were concerned only with safety problems and not the environmental disasters they are. "The U.S. pipeline industry has an excellent public safety record," a National Transportation Safety Board (NTSB) official stated at a Congressional hearing two years ago. It was as if DOT officials in 1989 had claimed that the Exxon Valdez disaster was a triumph of public safety regulation because, after all, nobody was killed or injured -- then done nothing to prevent similar tanker spills.

The pollution of Sugarland Run and the Potomac River by Colonial Pipeline on March 28, despite its tragic impact, may at least have the effect of focusing Congressional attention on this long-neglected problem. I hope that a momentum will come out of this hearing for a thorough aseessment of how poorly we regulate oil pipelines and a significant strengthening of these regulations.

I submitted written testimony in 1991 and closely followed Congressional action on the reauthorization of the Pipeline Safety Act enacted last October. The amendments in that reauthorization made only marginal improvements in federal regulation of oil pipelines. It was one more opportunity lost for a significant advance in environmental protection and public safety.

Today, however, Congress again has an opportunity to develop stricter standards for location, construction, operation and regulation of hazardous liquid pipelines, as well as a stronger role for state governments and citizen access to the courts. I hope that Congress makes the most of that opportunity.

LESSONS LEARNED ABOUT PIPELINE SAFETY AND POLLUTION

I want now to share some lessons the Friends of Lloyd have learned in the last four years of research about and direct experience with oil pipelines.

Our experience in opposing an ill-conceived gasoline pipeline proposal by Colonial Pipeline Company is a case study of how government pipeline regulations are not protecting the environment and public safety at the local level. It has also given us an opportunity to learn about the problem nationwide. In a sense, we have learned at the retail level what results from your work at the wholesale level, and we believe the lessons learned here are worth considering while you consider further actions after this hearing concludes. The most basic lesson we have learned is that government regulation is not working.

Colonial has proposed extending a 12-inch pipeline which now terminates in Bainbridge, Georgia, 55 miles to Lloyd, Florida, to serve a proposed gasoline tank farm in Lloyd, Florida, to be built by a partnership of Texaco, Citgo and Amoco. It would traverse high-recharge areas of the Floridan Aquifer, including a lake, wetlands and sinkhole-prone areas, jeopardizing groundwater supplies of three counties in Georgia and two in North Florida. The projects are still unbuilt because of the opposition of the Friends of Lloyd and the Leon County government.

We endeavored throughout to base our opposition on documented evidence of the safety and environmental records of petroleum pipelines and related facilities. We have carried out extensive research of public records, research literature, and pretrial discovery, as well as consulting with numerous scientific and engineering experts.

We also approached the widest possible range of federal, state and local agencies to seek relocation of the pipeline and tank farm. We found that these public agencies were neither willing nor able to help. We have had to rely primarily on privately-financed lawsuits to challenge the project. While we have been able to bear these expenses, they are far out of the financial range of most community groups. Nobody should have to go through the strenuous efforts we have undertaken, yet this will happen again repeatedly unless regulators exercise more responsibility.

Here are some lessons we want to share with this subcommittee.

LESSON #1 - FEDERAL REGULATORY AGENCIES ARE NOT PROTECTING THE PUBLIC OR THE ENVIRONMENT.

Results should count, and the results demonstrate that the Office of Pipeline Safety is not serious about regulating pipelines. A record of 272 million gallons spilled in the last 23 years speaks for itself: The current regulatory structure is broken, and it needs fixing.

General Accounting Office reports in 1984, 1989 and 1991 and Congressional hearings in 1987 and 1989 have detailed the shortcomings of the Department of Transportation agencies regulating petroleum pipelines.

Among our many concerns about the numerous shortcomings is the inadequate staffing of the OPS and the National Transportation Safety Board. The OPS now has three field inspectors for the eight states, including mine, in its Southeastern Region -- and only 24 for a national pipeline system of 1.75 million miles (including 225,000 miles of hazardous liquids pipelines). We understand that the 1992 amendments will increase this number, but even that would be inadequate.

Inadequate staffing affects the full range of OPS activities, from data collection, verification and compilation to inspections. As an OPS official said in the 1989 hearing,

> Essentially, our inspections consist primarily of reviewing their operating records and their operation and maintenance manuals, and spot checking pipelines in the field. . . . As you know, we have a very small program. . . . It is a constant balancing act as far as how you deploy very limited resources.

Inadequate staffing also affects DOT's ability to investigate pipeline accidents, a responsibility of the NTSB. In the 1987 Congressional hearing, a NTSB official reported it had only two pipeline accident investigators. "Of the approximately 2,000 accidents reported to the Department of Transportation, the Safety Board is able to investigate 25 to 30," the official stated.

The result is that the public and environment are inadequately protected. Remember also that, in 40 states, including Florida and Virginia, there is no state regulation of petroleum pipelines. These 40 states rely entirely on the federal program to protect them from pipeline leaks, spills, and explosions.

Also, pipeline companies assert the right to route new petroleum pipelines without meaningful restrictions by federal or state governments. There is no federal routing process for oil pipelines. The result is that pipeline companies routinely ignore environmental or safety considerations in routing new pipelines and in siting related facilities, such as gasoline tanks farms -- even when the dangers are obvious.

LESSON #2 - PIPELINE TECHNOLOGY AND OPERATING PRACTICES DO NOT PROTECT THE ENVIRONMENT

"Liquid petroleum pipelines are the safest mode of transportation in the United States," Joe Swift, president of Sun Pipeline Company, told the Sharp subcommittee on May 22. Yet the pipeline record of 272 million gallons of oil spills alone is a repudiation of claims like this and an indictment of pipeline operations in the United States. Other reports confirm the enormity of the pipeline problem. For example, the General Accounting Office (GAO) in its January 29, 1991, report, "Pollution From Pipelines," documented 3,910 spills in U.S. waters during the 1980s, more than one per day.

The Wilderness Society report, "A Hundred Spills, A Thousand Excuses," released on March 19, 1990 underscored this serious failure and suggests a comparison of pipelines with other sources of oil pollution. From this report of the 100 worst oil spills following the Exxon Valdez disaster, we found this breakdown:

46 spills	- Pipelines
16 spills	- Storage Tanks
13 spills	- Barges
10 spills	- Tanker Trucks
9 spills	- Tanker Ships
3 spills	- Other Ships
2 spills	- Railroad Tankers
1 spill	- Unknown

The Wilderness Society report showed that pipelines accounted for more than half of the total volume of the 100 worst spills. Here they are by category:

5,596,650 gallons	(51.6%)	- Pipelines
2,890,300 gallons	(27.4%)	- Storage Tanks
1,198,800 gallons	(11.0%)	- Tanker Ships
772,800 gallons	(7.1%)	- Barges
260,100 gallons	(2.4%)	- Other Ships
82,500 gallons	(0.8%)	- Tanker Trucks
25,500 gallons	(0.2%)	- Railroad Tankers
25,000 gallons	(0.2%)	- Unknown
10,851,650 gallons		Total

The Friends of the Earth report on oil pollution, "Crude Awakening," released yesterday, compiled from news reports a list of 30 oil pipeline spills of over 100,000 gallons from 1985 until to the March 28 Sugarland Run spill by Colonial Pipeline. A report in Oil & Gas Journal of October 29, 1990, found 690 failures in Gulf of Mexico offshore oil pipelines from 1967 to 1987 and that the rate of failures was getting worse, not getting better. The report concluded, "The significant increase in failures since 1975 can be attributed to the increase in the pipeline population, aging of the pipelines installed earlier, and the increased offshore construction activity."

These and other reports demonstrate that petroleum pipelines are far more dangerous and unreliable than both the industry and regulators claim. Moreover, we should never lose sight of the fact that pipeline spills tend to happen inland, and pollute the ground and waters we depend on for municipal and agricultural water supplies. Unlike coastal waters, where tides and other flushing action can disperse contamination (although the ecological effects can be devastating), inland spills from pipelines can produce groundwater contamination that persists for decades and may never be completed cleaned up.

For example, a leak in an eight-inch pipe in East Setauket, Long Island, dribbled a million gallons of leaded gasoline into the ground for over 10 years. The underground pool of gasoline still floats over the Long Island Aquifer, the island's only source of drinking water. Besides pumping out undissolved gasoline, cleanup efforts include a new wastewater treatment plant, large enough for a city of 35,000 people, to treat the ground water containing dissolved gasoline. Officials there expect the cleanup to take at least a decade.

LESSON #3 - SPILL AND ACCIDENT DATA ABOUT PETROLEUM PIPELINES ARE INCOMPLETE, INACCURATE AND NEEDLESSLY DIFFICULT TO OBTAIN.

Despite reports of 32.9 million gallons of petroleum spilled in 1987-89, the OPS data serious underreport the number and dimension of pipeline spills. As a result, the data are deeply flawed as a basis for policy development or source of public information. For example, there is no way of knowing whether a pipeline operator's good record at OPS is genuine or a result of underreporting the volume of spills or not reporting them at all.

This is partly because the OPS in 1984 inexplicably relaxed its reporting requirements so that it now requires hazardous liquids pipeline operators to report spills or leaks of more than 2,100 gallons (50 barrels), or involve $5,000 or more in property damage or injury or death; the previous requirement was to report all spills over 210 gallons (five barrels).

As a result, the average number of liquids pipeline spills reported to OPS was fewer than half the 391 annual average spills compiled from other sources by the GAO. Note also that the GAO reported on spills in U.S. waters only, while the OPS data were supposed to reflect spills inland as well.

Moreover, the GAO reported in 1987 that few pipeline companies complied fully with even the relaxed OPS reporting requirements and that the OPS was unable to monitor compliance with reporting requirements. The GAO was unable to determine the full extent of this underreporting. Other problems, as noted in 1990 by an OPS official in conversation with me, are pipeline companies which underreport the size of spills, and failure to revise reported spill volumes upward after their initial report.

As one test of OPS data accuracy, we compared the number of reported spills at OPS with known data about a crude oil pipeline which traverses the Florida Everglades. The Florida Department of Natural Resources has on file approximately 40 spills by Sunniland Pipeline; the OPS has two on file.

The only other source of systematic pipeline spill data, the Emergency Response Notification System (ERNS), comes from reports to the U.S. Coast Guard National Response Center on spills in U.S. waters, and does not include inland pipeline spills. Although it shows about twice the number of spills as OPS data, it seriously undercounts the volume of these spills. For the years 1980 to 1989, ERNS reports that oil pipelines spill almost 20 million gallons, while OPS data reported spills of 109,543,640 gallons during the same period. More recently, Coast Guard data on the Sugarland Run spills records the volume spilled as zero.

In short, the inadequate data on pipeline spills are a serious shortcoming which distort the safety and environmental record of petroleum pipelines and thereby impair objective analyses of risks and the development of policies to reduce those risks.

LESSON #4 - PIPELINE COMPANIES ROUTINELY MISREPRESENT THEIR SAFETY RECORDS AND FEDERAL REGULATIONS WHICH GOVERN THEM

Even compared to the undercount of spills and accidents in OPS records, Colonial Pipeline has misrepresented both its company record and the industry record of spills and leaks. It has repeatedly told North Florida residents that pipelines cause less pollution than other means of transporting oil, especially tankers and barges. In a newsletter published last year, Colonial claimed that data from the U.S. Department of Transportation showed that in 1990 pipelines spilled 18,709 gallons per billion ton-mile transported while water carriers spilled 44,458 gallons per billion ton-mile. The same statistics were in a Florida Energy Pipeline Association (FEPA) newsletter. When we asked DOT about these statistics, we heard from George W. Tenley Jr., Associate Adminstrator for Pipeline Safety:

> We did not recognize the statistics in the article and called the FEPA Executive Director to determine the source. He, in turn, referred us to the contributing author who, upon checking, acknowledged the statistics were not from DOT but from a brochure published by the Association of Oil Pipelines. . . .
>
> To avoid any further confusion, we are requesting the FEPA Executive Director to issue a retraction in the next issue of the newsletter. . . .
>
> With respect to the assertions in the article, we cannot at this time categorically confirm or deny them. Since the statistics are not from DOT data bases, we would have to undertake a significant amount of validation, analysis, and interpretation to arrive at any responsible conclusions.

We looked at Colonial's data more closely and determined that they came from the Emergency Response Notification System, which counted less than 20 percent of the volume of oil pipeline spills in the 1980's, as I cited earlier, and ignored the more accurate OPS data.

Moreover, in an application for a dredge-and-fill permit in 1990, the Florida Department of Environmental Regulation asked Colonial Pipeline how many spills it had experienced; its answer was two. Also, Colonial Pipeline has repeatedly stated that its few spills were the result of "outside force," when the actual causes of most were equipment failures or employee error. As OPS data show, outside force typically accounts for about one-fourth of liquid pipeline accidents, while pipeline companies' equipment or operational failures account for three-fourths.

Colonial Pipeline has also misrepresented the nature of federal regulations in a concerted effort to forestall state or local governments from regulating petroleum pipelines here. When the Friends of Lloyd lobbied the Florida Legislature in 1990 to enact a state program to regulate hazardous liquid pipelines, pipeline lobbyists repeatedly claimed that "federal preemption" made such state legislation illegal, despite OPS efforts to encourage state involvement in regulating pipeline safety. As recently as May 16, 1991, a Colonial attorney told the Tallahassee Democrat, "Federal law says no state -- and the county is part of the state -- shall adopt any standards related to the safety of pipelines."

In fact, the federal government encourages states to enact pipeline regulation. As a senior U.S. Department of Transportation official said at a 1989 Congressional hearing,

> The state programs are critical to pipeline safety. Existing Federal resources, and any reasonably likely expansion of those resources, are not sufficient to ensure the safe operation of pipeline facilities given the size of the regulated community, the extent of their facilities, and the complexity of their operations. Moreover, states have a strong interest in protecting their citizens.

One obvious, but overlooked, result of pipeline company misrepresentation is that only 10 of the 50 states are certified to participate in the regulation of pipelines. If our experience during the 1990 Florida legislative session is a guide, the zeal of pipeline companies to prevent state regulation of pipelines has ensured that the OPS program with state regulators will not expand in coming years. The apparent reason for opposing state regulations is that pipeline companies have grown comfortable with federal regulators and do not want this relationship disturbed.

For another example, Colonial Pipeline attempted two years ago to stop a local government in Florida from determining the route of a new pipeline within its jurisdication. It filed a lawsuit in federal court on August 16, 1991 against Leon County, claiming that federal law preempts the county's action, despite federal policy that leaves such determinations to state and local governments. Yet only weeks earlier, DOT's Administrator of the Research and Special Programs Administration, Travis P. Dungan, told a Congressional subcommittee that "such matters as zoning and location of pipelines are entirely a matter of local control." Even the Association of Oil Pipe Lines has endorsed "the power of state and local governments to affect the location of pipelines that cross their jurisdiction," in a written statement on June 20, 1991. A federal judge in February, 1992, ruled against Colonial.

Colonial has also misrepresented federal safety regulations about the clear-cutting of pipeline rights of way. A group of homeowners in the Atlanta, Georgia area have filed a lawsuit in state court to stop Colonial from clear-cutting trees adjacent to their homes. In reply, Colonial and Plantation Pipeline submitted a legal brief on June 28, 1990 that they had no alternative but to clear cut because, "The pipeline companies must clear the right of way and any obscuring side growth to comply with the inspection requirements of Part 195.412(a) [of DOT pipeline regulations]." However, that requirement states simply that operators inspect rights of way at specified intervals and nothing about methods or clear-cutting.

The March 28 spill by Colonial Pipeline is another example of how Colonial misrepresents itself. When the spill took place, Colonial claimed that it lost 336,000 gallons; it had the look of a precise number, but it was exactly 8,000 barrels, and later turned out to be about 406,000 gallons. In a newspaper ad run in the Tallahassee area, Colonial Pipeline claimed, "Almost all of the product spilled in Virginia was recovered -- a phenomenal recovery effort." Yet Congressional staff found that Colonial has wildly exagerrated the volume of fuel it recovered, counting the volume oil-tainted water it recovered as pure oil when it recovered barely half of of the oil spilled. Colonial also claims that outside damage scarred the pipeline and theregy caused the spill, when it is more likely that sloppy construction by Colonial's contractor installing the pipeline was the cause.

In short, if Colonial Pipeline's lack of veracity is any guide, pipeline companies routinely mislead state and local officials, as well as the general public. This will persist as long as federal policy continues to be obscure and data continue to be faulty and inaccessible to the public.

LESSON #5 - THE CURRENT RELATIONSHIP OF THE REGULATED INDUSTRY AND REGULATORS MAKES SIGNIFICANT REFORM IMPOSSIBLE.

As important as inadequate funding and staffing have been as causes of inadequate regulation of pipelines by DOT, these alone cannot explain the history of consistently pro-industry actions by the regulatory agencies involved, primarily the Office of Pipeline Safety.

We do not impugn their integrity or dedication, but we also found unmistakably pro-industry behavior of DOT staffs and leadership during the Presidency of Ronald Reagan and George Bush. The 1984 relaxation of the petroleum pipeline spill reporting requirements is a notable example of a decision that could only benefit pipeline operators, to the detriment of the public and environment.

Less than six months ago, the OPS in the Federal Register of November 27, 1992, proposed relaxing its spill reporting requirements so that pipeline companies would no longer have to to raise the threshhold from $5,000 of property damage to $50,000. The stated reason for this change was that the American Petroleum Institute the $5,000 requirement was "outdated, unnecessarily burdensome and results in unnecessary costs and red tape." The OPS agreed that "the requirement sometimes requires reporting of minor accidents." This would have further reduced the effectiveness of an already-inadequate reporting system and ignored the need for accurate data to understand the pollution problem better.

We also note the pro-industry membership of the OPS's Technical Pipeline Safety Standards Committees, which exert a powerful influence on regulatory decisions. The most recent list of members of the two committees shows a membership comprised of industry, government and public representatives, each in equal number. However, the "public" members consisted of lawyers and consultants whose livelihood depends on pipeline companies. With such a membership, the real public and real public interests are invisible and unrepresented.

There is no better confirmation of this pro-industry bias than the OPS disposition of proposed improvements in hazardous liquid pipeline regulations, as reported in the Federal Register of June 8, 1990, pages 23514-19. The OPS considered 18 proposals, beginning in February, 1987, including proposals by a DOT Safety Task Force and the National Transportation Safety Board, and requirements in the Pipeline Safety Reauthorization Act of 1988.

After three years, the OPS in 1990 had taken final action on only two of the 18 proposals, adoption of the one-call system and the inclusion of carbon dioxide pipelines in its regulatory program. The OPS decided either to study further, to modify severely or to reject outright the 16 other proposals, erring in all cases on a lighter regulatory burden on the pipeline industry. The recommendations of the technical committees determined the OPS outcomes in most of these cases.

The OPS put off for study proposals requiring such technical improvements as automatic shut-off valves, hydrostatic testing, lower maximum operating pressures and computer-based leak detection, and rejected proposals requiring cathodic protection and double-wall pipe. It put off for study such procedural improvements as requiring operators to inventory types of pipelines and systems and to submit reports on pipeline condition every four years, and rejected proposals for operators to provide information to local governments, to inform local residents of pipeline locations, to install more conspicuous line markers, and to develop setback requirements.

However, in most cases where the OPS intends to study these proposals, the results are foreordained to err in favor of pipeline companies' interests. For example, in considering the NTSB recommendation to require automatic shutoff valves, which might have reduced the size of the Sugarland Run spill, the OPS stated, "there does not appear to be sufficient justification to require the installation . . . along the entire length," but it would carry out a study as required by the 1988 Reauthorization Act; the results of the study are predictable. The 1988 Reauthorization Act required the OPS to study hydrostatic testing of pipelines, yet the forthcoming results are also predictable, given the OPS statement that "integrity testing of all pipelines at arbitrary, fixed intervals does not appear justified."

A review of the disposition of each proposal shows a consistent deference to industry claims that both technical and procedural improvements would be unnecessary financial burdens -- and a general satisfaction of OPS with current procedural and technical standards. In considering increased federal oversight in design and construction of new pipelines, the OPS stated, "The available safety data do not indicate that the actions contemplated by this proposal for design and construction functions are needed." However, it did agree to establish competency standards for pipeline company personnel, a position consistent with companies' tendency to blame problems on human error, and not equipment or operating procedure problems.

Of special concern to us is the consistently low regard by OPS for informing the public or local governments. The OPS deferred to pipeline company claims about the high cost of requiring them to provide local governments with information about pipeline locations and descriptions; it decided instead that states should have that responsibility. It deferred to company complaints that informing residents near pipelines about locations would "create undue alarm, that landowners are not necessarily the persons at risk, and that the costs would be extremely high with little expected benefit"; the OPS rejected this proposal. It also rejected more conspicuous pipeline markers at road crossings "without regard for esthetic considerations." In other words, the OPS has little regard for informing the public, despite the public's right to know and the obvious value in a better-informed public and local governments.

The 1987 Congressional hearing on pipeline safety, in the wake of the Mounds View, Minnesota, disaster, provides another example of OPS deference to industry interests. During that hearing, GAO commented on OPS's "study" of the feasibility of regulating pipeline-connected petroleum tank farms, a measure GAO had recommended in 1984. The OPS study found that such regulations were not necessary because, it claimed, unregulated tank farms had safety records comparable to similar regulated ones. However, GAO reviewed crucial data in this study and found that OPS had selected data only from operators with the best safety records, ignoring more representative data, which would have demonstrated an urgent need for regulation. Once again, OPS had acted to the benefit of the pipeline industry, not the public.

In short, it is clear that continued reliance on the Office of Pipeline Safety by Congress to improve technical and procedural standards, short of mandating specific standards, will produce only marginal improvements far short of the urgent need to improve the pipeline safety and environmental record. The industry has far too much influence, especially through the technical advisory committees, for OPS to carry out impartial studies that will lead to the significant improvements.

LESSON #6 - FEDERAL REGULATIONS DO NOT, BUT SHOULD, COVER PIPELINE-CONNECTED PETROLEUM TANK FARMS.

Despite recommendations by GAO in 1984 that the Department of Transportation study the feasibility of regulating pipeline-connected petroleum tank farms, DOT took no action. As a result, a large number of inland tank farms continue to have safety and pollution records which should concern us all. As the GAO found in 1989, federal tank farm regulations "do not contain mandatory, specific design and operating practices to avoid spills."

That lack of federal regulation helped lead to such tragedies as the massive tank farm leaks in Fairfax, Virginia, which was investigated by a commission formed by Governor Doug Wilder. In its report of December 18, 1992, it stated,

> The Commission adheres to the position stated by the Attorney General of Virginia, the Fairfax City Council, the Fairfax County Board of Supervisors, the Council of Civic Associations of the City of Fairfax, the Fairfax County Federation of Citizens Associations, and Citizens for a Healthy Fairfax, that the Pickett Road Tank Farm is inappropriate in its present location, poses an unreasonable risk to the surrounding public health, safety, and welfare, and must be relocated.

The report also noted:

> During the first year of operation [1965], a spill of 2500 gallons was reported by Texaco. Over the next 27 years, at least 20 spills were reported by the various owners and operators, with a total spillage of at least 500,000 gallons of various products.

The Washington Post reported that the Virginia Attorney General was about to file criminal charges against Texaco, which avoided prosecution after agreeing to buy out homeowners in two neighborhoods and otherwise compensate them in a settlement which may cost Texaco as much as $200 million.

Texaco in Travis County, Texas, recently closed down its tank farm in East Austin because it caused massive contamination and health problems. To avoid criminal prosecution -- just like in Virginia -- Texaco and several other oil companies had to close down their tank farms there permanently. The Austin American-Statesman reported on September 19, 1992,

> Facing the threat of criminal subpoenas from a five-month pollution investigation, a third oil company agreed Friday to close its gasoline terminal at East Austin's controversial tank farm.
>
> Officials at Star Enterprise [Texaco], which operates the largest terminal at the tank farm, notified Travis County Attorney Ken Oden that they will halt all operations at their six-acre site as soon as the company finds a temporary alternate fuel supply. . . . Friday's announcement came just days after Oden was to begin issuing grand jury subpoenas to the oil companies that remain a focus of his investigation.

In 1991 the Environmental Protection Agency (EPA) ordered a Santa Fe Pacific Pipeline Co. fuel-tank farm near Reno, Nevada, to begin a cleanup of leaks that total no less than four million gallons and may be as large as 40 million gallons. This is a staggering amount of leaked fuel which may be migrating underground to the nearby Truckee River. If that occurs, it would contaminate irrigation canals and Pyramid Lake downstream.

Other examples include massive contamination at pipeline and storage tank complexes in Greensboro, N.C. and in Spartanburg, S.C. As reported in the Greensboro News & Record, state authorities have required a massive cleanup by Colonial Pipeline, Plantation Pipeline and eight oil companies in Spartanburg because resident complaints and test wells showed widespread contamination of groundwater there. A state official "estimated that only about 5 percent of the cleanup is complete and that it will continue throughout the 1990's," wrote the Greensboro newspaper on December 14, 1989.

In Greensboro, state officials found a massive underground pool of gasoline, five feet deep in one test well, at a tank farm operated by Colonial Pipeline, Plantation Pipeline and 16 oil companies. Discovered in 1988, it went unreported until November, 1989. Reported soon after was the discovery that Colonial Pipeline buried storage tank sludge in trenches on a farmer's field until 1980; the sludge included carcinogenic chemicals and heavy metals.

These illustrate the severe contamination that slow leaks can cause at tank farm sites which have scores of storage tanks and mazes of underground pipelines, any one of which can be the source of major problems. As a report issued in February by the Environmental Defense Fund stated,

> At refineries and other facilities that store large quantities of petroleum in aboveground tanks, it is likely that more than half the facilities have large underground reservoirs of petroleum which can migrate offsite if unaddressed.

Our experience in North Florida is further evidence of this regulatory need. Texaco and Colonial selected a site for the first of what will be several tank farms in a major complex in the only high-recharge area in Jefferson County. The site is bracketed by four sinkholes in an area known to be sinkhole-prone. Cave divers explored one of the sinkholes in November and December, 1990 and discovered that it was part of a major underground water system which surfaces nine miles away to form one of Florida's last unspoiled rivers. We have edited footage of this historic dive into a 12-minute video which we can provide to this subcommittee.

Also, the proposed Texaco and Colonial tank farm in Lloyd is in a community with no effective ability to monitor fire safety at the facility or to extinguish even minor fires. Jefferson County has only five paid firefighters for the entire county and no effective means to enforce fire safety or extinguish a fire. This is at a site less than 300 yards from Interstate Highway 10, surrounded by an area slated for intensive commercial and residential development.

In other words, as a result of this lack of federal (and lax state) regulations on pipeline-connected petroleum tank farms, Texaco and Colonial can site this major new facility in one of the worst possible locations you could imagine. If federal regulations are adequate today, why can oil companies make such irresponsible and dangerous decisions, without review by competent environmental authorities?

LESSON #7 - PETROLEUM PIPELINES CAN BE MUCH SAFER AND CLEANER, AND THE FEDERAL GOVERNMENT SHOULD TAKE THE LEAD, WHILE ALSO FULLY INVOLVING STATE REGULATORS.

Despite the self-satisfaction of the industry and federal regulators, it is painfully obvious that improved technology and operating standards can make petroleum pipelines much safer and cleaner than they are, or will be, if Congress continues to enact only marginal regulatory improvements. We propose later in this testimony several such standards which are far more promising than those this subcommittee is actively considering.

We are especially concerned that the Pipeline Safety Act excludes states at a time when effective regulation of pipelines calls for a federal and state partnership such as those formed in other areas of environmental regulation. It preempts any state safety regulation of interstate pipelines that exceeds federal standards, but leaves open the possibility of state environmental regulations that are stricter than Federal standards which are necessary for protecting unique environmental conditions in that state. States like Florida or Virginia should be able to adopt additional standards to protect their environment, especially groundwater. Legislation should make clear that states can impose additional environmental standards.

We are also concerned that new pipelines incorporate improved technologies and operating procedures before major new pipelines are built. This is a special concern because Florida is on the verge of major expansion of petroleum pipelines in what the industry proclaims is the nation's third-largest gasoline market -- and because of Florida's unique dependence on groundwater supplies which are close to the surface; 90 percent of the water Floridians use comes from underground aquifers.

Only two inter-urban pipelines exist in Florida today, a Sunniland Pipeline carrying crude oil from Collier County to Port Everglades, and a GATX gasoline pipeline from Tampa to Orlando. Plans are underway to change this, however, because of the proposed Colonial project in North Florida and another proposed GATX pipeline from Tampa to Fort Myers. The GATX project would extend 128 miles through some of Southwest Florida's most vulnerable waterways and wetlands.

In such a fragile environment, petroleum pipeline leaks and spills would have a devastating effect on water quality, with untold long-term effects on public health.

Much stricter federal regulations could be the most effective means of protecting the public of Florida and other states, but not the only means. The Friends of Lloyd and other environmental organizations are preparing a petition for rulemaking to the Florida Department of Environmental Regulation, to establish a state program though administrative procedures.

LESSON #8 - A NATIONAL STUDY BY AN UNBIASED AUTHORITY IS NEEDED TO DETERMINE THE PROBLEMS AND SOLUTIONS FOR PIPELINE POLLUTION

It is painfully obvious that pipelines are a far greater source of oil pollution than acknowledged by the industry, regulators, the public or even most environmental organizations. This is because current information and data about leaks and spills are fragmented, incomplete, and anecdotal. The uncoordinated compilation and organization of this information makes it impossible to determine accurately the relative dangers from different means of transporting fuels.

The foremost sources today are industry organizations, such as the American Petroleum Institute, and regulators like the DOT, which have no demonstrated ability to provide impartial information to policymakers. When the DOT commissioned a study of pipeline safety by the Transportation Research Board of National Research Council (Special Report 219, "Pipelines and Public Safety"), its narrow focus on safety ignored the enormous but unexamined problem of pipeline pollution. And as I found out in correspondence last year with the OPS, it had never studied the pollution record of pipelines, with the excuse, "we would have to undertake a significant amount of validation, analysis, and interpretation to arrive at any responsible conclusions."

The problem is so alarming that the Congress should ask for a comprehensive study by an organization with no stake in either existing regulatory policies or economic interests.

LESSON #9 -- THE PIPELINE SAFETY ACT COULD MORE ACCURATELY BE CALLED "THE PIPELINE INDUSTRY PROTECTION ACT"

Much of the Hazardous Liquid Pipeline Safety Act amounts to strong protection of oil pipeline companies from other federal agencies, state and local governments, and citizens. It protects companies from state and local governments by preempting them from regulating the safety of interstate pipelines, except land-use decisions. Section 2002(d) states,

> . . . No state agency may adopt or continue in force any safety standards applicable to interstate pipeline facilities or the transportation of hazardous liquids associated with such facilities.

When a pipeline spill occurs, the Pipeline Safety Act protects companies by preventing state or local governments from taking meaningful actions to prevent further spills. The case of Williams Pipeline Co. v. City of Mounds View, Minnesota, affirmed that the city could not prevent the restarting of the damaged pipeline only days after it had exploded and killed several people. A 1992 amendment to the Act permits state and local governments to comment on settlements between the OPS and pipeline companies, but this is hardly meaningful.

Moreover, the Pipeline Safety Act protects pipeline companies from owners of property destroyed by pipeline spills or leaks. Section 2014(b) states,

> No civil action may be commenced [for injunctive relief] . . . if the [Office of Pipeline Safety] has commenced and is diligently pursuing administrative proceedings . . .

It usually takes at least two years, and often more, for the OPS to complete these proceedings. As a result, virtually all owners of property destroyed by pipeline companies settle for pennies on the dollar, instead of waiting years just to file a claim for damage in court.

SUGGESTIONS FOR FURTHER ACTION

We believe that adoption of the following suggestions can significantly improve the regulation of oil pipelines.

1. Encourage states to adopt pipeline regulatory programs, allowing them to adopt environmental and safety standards which may be stricter than federal standards. If the 40 states without such programs adopted an oil pipeline regulator program, it would vastly increase the resources put to that task. States have shown little interest because of industry lobbying, as in Florida, but also because federal preemption discourages them. There are many states with unique environmental vulnerabilities which should be alowed to protect them from inadequate federal regulation. We suggest the following language:

> Nothing in this act shall affect, or be construed or interpreted as preempting, the authority of any State or political subdivision thereof from imposing any additional liability or requirements with respect to --
>
> (1) the discharge of oil or other pollution by oil within such State; or
>
> (2) any removal activities in connection with such a discharge.

2. Allow individuals to sue pipeline companies for civil penalties and damage to their property or selves as soon as the damage occurs. It makes little sense to insulate pipeline companies from lawsuits by individuals, and, in fact, it would strengthen pipeline safety if companies were exposed to this liability. It would bring the Pipeline Safety Act into consistency with other federal environmental laws, such as the Resource Conservation and Recovery Act. Most important, individuals should be able to recover damages in full, not be forced to settle for only a fraction of the damages, as they do now.

3. Interested parties should have the right to intervene and participate in DOT administrative proceedings regarding violations, including spills and leaks. State and local governments, environmental organizations, and individuals have been frustrated for too long with their inability to participate

in negotiated settlements between DOT and pipeline companies. This and the previous suggestion would help provide citizen enforcement of pipeline regulations, as is the case in other areas of environmental law.

4. Regulations should require pipelines companies to report all spills over one gallon, or produce a visible sheen on waters, or that result in injury or $100 in damage to company, private or public property. This would make petroleum pipeline incident reporting requirements consistent with requirements for other forms of petroleum transportation. This would help overcome the lack of credible incident data which has helped ensure a widespread complacency about pipeline safety and pollution and lax regulatory standards. It hinders the development of meaningful risk analysis. And it hinders the ability of the public to inform themselves about the true extent of pipeline safety and pollution incidents.

5. If DOT continues its weak response to new technical and operation standards, Congress should take up the task. It was only after Congress last year required the use of "smart pigs" that OPS took action. If this inaction continues, Congress must be more specific and forceful about technical standards.

For example, we believe that regulations should require double-wall pipe for hazardous liquid pipelines, with continuous leak detection, in environmentally-sensitive and high-density population areas. Current detection devices cannot find small leaks that, over days and weeks, can contaminate groundwater with thousands of gallons of petroleum. Double-wall pipe can offer enhanced protection much the same as double-hull tankers, double-wall underground storage tanks, and secondary containment of aboveground storage tanks.

We believe the bill should also require enhanced technical standards for cathodic protection design, hydrostatic test facilitation, pipeline valves, acoustic leak detection test points, monitoring wells, and continuous leak monitoring pipeline math modeling systems.

For example, regulations should require hydrostatic testing of new pipelines at least every three years, and new pipelines should have the technical capabilities that make that possible. This is necessary because current leak detection methods cannot find small leaks which, over time, can release large amounts of petroleum into the ground. Visual surveillance can miss leaks which do not produce dead surface vegetation or other telltale signs, pressure gauge calibrations miss slight drops caused by small leaks, flow meters cannot correct for temperature changes which cause changes in volume, and "smart pigs" often miss faulty welds or other defects. Hydrostatic testing can detect leaks caused by smart pigs (which may, as they travel through pipes, dislodge scaling or other deposits which plugged existing leaks) and should be considered complementary to pigs.

We are aware of many of the industry objections to such technical standards, and the negative response in 1990 to similar proposals by the Technical Pipeline Safety Standards Committees and the Office of Pipeline Safety, but it is precisely because of the combined resistance of the regulated industry and current regulators that pipeline pollution is such a serious problem. If the subcommittee staff does not have the expertise to evaluate technical standards, perhaps the Office of Technology Assessment could provide assistance.

6. Require that all members of the Technical Hazardous Liquid Pipeline Safety Standards Committee have no financial interests in the pipeline industry. The current requirement that only one public member have no financial interest is a pathetic mockery of the purpose of having one-third of the members of this committee represent the public interest. It means that the other three "public" members of the committee can continue to be lawyers, consultants and other individuals whose livelihoods depend on the pipeline industry. The four "public" committee members can represent the public only if they have no conflicts of interest, and there is no reason for them not to be conflict-free.

7. Federal regulations should include a process by which pipelines and related tank farms are sited. As we already do with interstate natural gas pipelines, we must recognize the crucial role which siting and routing decisions can have in minizing environmental damage. Given the sorry record of leaks and spills by pipelines, new routes should avoid wetlands, sinkhole-prone, aquifer-recharge areas and other environmentally-sensitive areas. There are no such federal regulations today.

8. Appropriations levels should provide increased staffing for OPS and related agencies to ensure that new levels reflect the urgent need for improved inspection, data collection and dissemination, and development of stringent new technical and operating standards.

* * *

This concludes our comments. Thank you for providing us the opportunity to present testimony to this subcommittee.

# # #

Attachment

COMPARATIVE SPILLS AND LEAKS BY PIPELINE AND WATER CARRIERS OF OIL AND PETROLEUM PRODUCTS IN THE UNITED STATES, 1970-92 BY VOLUME AND TON-MILES TRANSPORTED

Year	Pipeline 1/ Spills (gals)	Pipeline Ton-Miles 2/ (billions)	Water Carrier 3/ Spills (gals)	Water Carrier Ton-Miles (billions)
1970	22,097,418	n/a	n/a	n/a
1971	9,805,362	n/a	n/a	n/a
1972	14,462,700	475.8	n/a	330.0
1973	15,727,404	507.0	4,404,390	296.8
1974	12,127,962	506.0	3,535,385	297.0
1975	13,312,614	507.0	11,296,669	298.0
1976	10,060,722	515.0	11,018,486	306.9
1977	9,403,338	546.0	1,769,202	333.3
1978	11,779,530	585.0	3,569,813	530.6
1979	22,900,248	608.3	3,352,052	522.9
1980	12,005,238	588.2	3,335,011	617.8
1981	8,588,622	563.7	5,369,100	617.2
1982	9,214,926	565.7	3,366,433	616.9
1983	16,020,942	556.1	1,953,673	630.5
1984	12,008,010	568.1	7,152,367	570.7
1985	7,065,702 4/	564.3	4,417,032	590.4
1986	11,756,850	577.9	3,031,437	568.1
1987	15,341,634	586.8	2,222,546	566.5
1988	9,089,640	601.1	4,034,490	543.7
1989	8,452,076	584.2	12,126,258	466.2
1990	5,206,656	583.8	5,857,070	454.5
1991	9,196,530	577.8	338,235	436.4
1992	6,391,182	n/a	191,458	n/a
Total	272,015,306	11,167.8	92,340,884	9,594.4
Average	11,827,242	558.4	4,617,044	479.7
Avg Gals Spilled per Billion Ton-Miles	20,928		9,947	

1/ Source: Annual Report of Pipeline Safety (for years 1978-90), Office of Pipeline Safety, U.S. Department of Transportation; 1991 data from OPS letter of March 16, 1992.

2/ A ton-mile is movement of a ton of cargo one mile. Source: Annual Reports on Shifts in Petroleum Transportation, Association of Oil Pipe Lines, and Transportation in America.

3/ Water Carriers are tankships and tank barges. Spills were in U.S. waters. Source: Oil Pollution Incidents, Marine Environmental Protection Division, U.S. Coast Guard.

4/ Annual pipeline spill totals from 1985 to present reflect OPS change to require reports for spills of more than 2,100 gallons. Until 1985, reports were required for spills of more than 210 gallons.

Prepared by the Friends of the Aquifer, Tallahassee FL, May 14, 1993

STATEMENT BEFORE THE SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT, COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION, U.S. HOUSE OF REPRESENTATIVES

BY

DR. STUART S. SCHWARTZ, DIRECTOR,
SECTION FOR COOPERATIVE WATER SUPPLY OPERATIONS,
INTERSTATE COMMISSION ON THE POTOMAC RIVER BASIN

MAY 18, 1993

GOOD AFTERNOON MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE. I AM DR. STUART SCHWARTZ, DIRECTOR OF THE SECTION FOR COOPERATIVE WATER SUPPLY OPERATIONS AT THE INTERSTATE COMMISSION ON THE POTOMAC RIVER BASIN. I AM HERE REPRESENTING THE SUPPLIERS AND JURISDICTIONS RESPONSIBLE FOR PROVIDING A SAFE AND RELIABLE WATER SUPPLY TO THE NATIONAL CAPITAL REGION, NAMELY THE WASHINGTON SUBURBAN SANITARY COMMISSION, THE FAIRFAX COUNTY WATER AUTHORITY, THE WASHINGTON AQUEDUCT DIVISION OF THE U.S. ARMY CORPS OF ENGINEERS, THE DISTRICT OF COLUMBIA, THE STATE OF MARYLAND, AND THE COMMONWEALTH OF VIRGINIA. I AM JOINED HERE TODAY BY MR. JOHN CORLESS FROM THE WASHINGTON SUBURBAN SANITARY COMMISSION, MR. PERRY COSTAS, THE CHIEF OF THE WASHINGTON AQUEDUCT DIVISION OF THE U.S. ARMY CORPS OF ENGINEERS, AND MR. FRED MORIN, CHAIRMAN OF THE FAIRFAX COUNTY WATER AUTHORITY. THANK YOU FOR THE OPPORTUNITY TO TESTIFY ON THIS IMPORTANT MATTER.

WE ARE HERE TODAY TO EXPRESS OUR GREAT CONCERN ABOUT THE SAFETY OF THE NATIONAL CAPITAL REGION'S WATER SUPPLY, DEMONSTRATED MOST RECENTLY BY THE SPILL FROM THE COLONIAL OIL TRANSMISSION PIPELINE ON SUGARLAND RUN. WE WOULD LIKE TO BRIEFLY DESCRIBE TO YOU THE MAGNITUDE OF THE RISK WE FACE AND SHARE WITH YOU SOME VERY SPECIFIC CONCERNS WE HAVE REGARDING THE PHYSICAL INTEGRITY OF THE COLONIAL PIPELINE AND THE NEED FOR MEASURES TO REDUCE THE RISK TO THE REGION'S WATER SUPPLY.

BEYOND THIS VERY SERIOUS REGIONAL INTEREST, WE BELIEVE THE MOST RECENT SPILL FROM THE COLONIAL PIPELINE AND THE ASSOCIATED THREATS TO THE POTOMAC RIVER AND THE WATER SUPPLY OF THE NATION'S CAPITAL, DEMONSTRATE HAZARDS THAT MAY EFFECT COMMUNITIES THAT ARE SIMILARLY LOCATED ALONG THE CORRIDORS CONTAINING OIL AND GAS TRANSMISSION PIPELINES. THE RECENT SPILL TO THE POTOMAC OFFERS BOTH CLEAR LESSONS, AS WELL AS A TIMELY OPPORTUNITY TO REASSESS PIPELINE SAFETY NEEDS AND THE MANAGEMENT OF RISKS ASSOCIATED WITH PIPELINE SPILLS BEFORE A MORE SERIOUS ACCIDENT OCCURS.

BACKGROUND ON THE ICPRB

THE INTERSTATE COMMISSION ON THE POTOMAC RIVER BASIN (ICPRB) IS A NON-REGULATORY INTERSTATE COMPACT COMMISSION CREATED WITH THE POTOMAC BASIN CONSERVANCY COMPACT OF 1940, APPROVED BY THE U. S. CONGRESS ON JULY 11, 1940. THE 1940 COMPACT WAS DEVELOPED FOR THE PURPOSE OF CONTROLLING POLLUTION IN THE POTOMAC DRAINAGE BASIN, AND RATIFIED BY THE COMMONWEALTHS OF VIRGINIA AND PENNSYLVANIA, THE STATES OF MARYLAND AND WEST VIRGINIA, AND THE DISTRICT OF COLUMBIA. MEMBERS OF THE COMMISSION ARE APPOINTED BY THE CHIEF EXECUTIVE (GOVERNOR, OR MAYOR) OF EACH SIGNATORY BODY ACCORDING TO THE PROVISIONS OF EACH PARTY'S RATIFYING STATUTE, AND BY THE PRESIDENT FOR THE FEDERAL GOVERNMENT. IN 1970, THE COMPACT WAS AMENDED TO BROADEN THE COMMISSION'S COORDINATION, INVESTIGATION, AND EDUCATION RESPONSIBILITIES TO INCLUDE "DEVELOPMENT, UTILIZATION AND CONSERVATION OF THE WATER AND ASSOCIATED LAND RESOURCES OF THE BASIN."

ICPRB'S ACTIVITIES CONTINUE TO EVOLVE IN RESPONSE TO THE CHALLENGES IN THE POTOMAC RIVER BASIN AND THE NEEDS OF OUR MEMBER JURISDICTIONS. OUR PROGRAM INCLUDES MAJOR COMMITMENTS IN SUPPORTING THE CLEANUP AND RESTORATION OF THE WATER RESOURCES AND LIVING RESOURCES OF THE POTOMAC RIVER AND THE CHESAPEAKE BAY,

RANGING FROM THE RESTORATION OF THE ANACOSTIA RIVER IN THE METROPOLITAN AREA TO THE REVITALIZATION OF THE NORTH BRANCH POTOMAC RIVER IN WESTERN MARYLAND AND THE PANHANDLE OF WEST VIRGINIA. ICPRB'S PUBLIC INFORMATION AND EDUCATION PROGRAMS COMPLEMENT INTEGRATED TECHNICAL PROGRAMS THAT SUPPORT THE MANAGEMENT AND ENHANCEMENT OF THE WATER RESOURCES, LIVING RESOURCES, AND THE ASSOCIATED LAND RESOURCES OF THE POTOMAC RIVER BASIN.

IN ORDER TO PROVIDE A CONTEXT FOR OUR CONCERNS REGARDING THE COLONIAL PIPELINE SPILL, I WOULD LIKE TO BRIEFLY SUMMARIZE ICPRB'S ACTIVITIES AND REGIONAL PERSPECTIVE ON THE MANAGEMENT OF WATER SUPPLY AND HAZARDOUS SPILLS.

METROPOLITAN WATER SUPPLY

WATER SUPPLY FOR THE WASHINGTON METROPOLITAN AREA IS PROVIDED ALMOST ENTIRELY BY THREE SEPARATE UTILITIES: THE WASHINGTON AQUEDUCT DIVISION (A UNIT OF THE U.S. ARMY CORPS OF ENGINEERS SERVING THE DISTRICT OF COLUMBIA AND PARTS OF VIRGINIA); THE WASHINGTON SUBURBAN SANITARY COMMISSION (SERVING THE MARYLAND SUBURBS); AND THE FAIRFAX COUNTY WATER AUTHORITY (SERVING THE VIRGINIA SUBURBS). ALL THREE ARE HIGHLY DEPENDENT ON POTOMAC RIVER FLOW AS A PRIMARY

SOURCE OF WATER SUPPLY.

THE WASHINGTON METROPOLITAN AREA HAS LONG UTILIZED THE POTOMAC RIVER FOR MUNICIPAL WATER SUPPLY. DROUGHTS IN 1966 AND 1977 DEMONSTRATED THE FINITE NATURE OF THIS VALUABLE RESOURCE. THE PRESSURE FROM REGIONAL GROWTH AND INCREASING WATER USE HAD THE POTENTIAL TO DEVELOP INTO A WASTEFUL COMPETITIVE STRUGGLE FOR USE OF THE LIMITED SUPPLY OF WATER. INSTEAD, THE STATE OF MARYLAND, THE COMMONWEALTH OF VIRGINIA, THE DISTRICT OF COLUMBIA AND THE FEDERAL GOVERNMENT, ENTERED INTO AN AGREEMENT TO SHARE AVAILABLE RESOURCES DURING TIMES OF SHORTAGE. THE POTOMAC RIVER LOW FLOW ALLOCATION AGREEMENT, SIGNED IN 1978, ESTABLISHED THE FRAMEWORK AND ADMINISTRATIVE MECHANISM FOR EQUITABLY ALLOCATING THE AVAILABLE WATER RESOURCES IN TIME OF DROUGHT OR EMERGENCY.

BACKGROUND ON THE ICPRB CO-OP SECTION

RESPONDING TO THE NEED FOR INTERSTATE, INTER-JURISDICTIONAL COOPERATION, THE MEMBERS OF THE ICPRB COMPACT FORMED THE SECTION FOR COOPERATIVE WATER SUPPLY OPERATIONS (CO-OP SECTION) TO COORDINATE JOINT, COOPERATIVE OPERATION AND MANAGEMENT OF THE METROPOLITAN WATER SUPPLY. ICPRB WORKED WITH THE STATE AND FEDERAL GOVERNMENTS AS WELL AS THE REGION'S WATER SUPPLY UTILITIES

TO DEMONSTRATE THAT THE WASHINGTON METROPOLITAN AREA'S WATER SUPPLY NEEDS COULD BE RELIABLY SATISFIED THROUGH JOINT, COOPERATIVE OPERATION. THIS RESULT ELIMINATED THE NEED TO CONSTRUCT 15 MAJOR RESERVOIRS, RECOMMENDED BY THE U.S. ARMY CORPS OF ENGINEERS (CORPS OF ENGINEERS) IN 1964, SAVING THE FEDERAL GOVERNMENT AND THE REGION SUBSTANTIAL CONSTRUCTION COSTS (INITIALLY ESTIMATED AT $250 MILLION).

COOPERATIVE OPERATING PROCEDURES WERE INSTITUTIONALIZED IN THE WATER SUPPLY COORDINATION AGREEMENT, SIGNED ON JULY 22, 1982 BY THE FAIRFAX COUNTY WATER AUTHORITY, THE WASHINGTON SUBURBAN SANITARY COMMISSION, THE DISTRICT OF COLUMBIA, AND THE ICPRB. THE WATER SUPPLY COORDINATION AGREEMENT ESTABLISHES THE REGIONAL FRAMEWORK TO IMPLEMENT, MAINTAIN, AND REFINE THESE COOPERATIVE OPERATING PROCEDURES WITHIN THE ICPRB CO-OP SECTION. THE AGREEMENT DESIGNATES THE ICPRB CO-OP SECTION AS THE AGENCY RESPONSIBLE FOR: ALLOCATING LOW FLOWS AND SCHEDULING RESERVOIR RELEASES TO ASSURE THE RELIABILITY OF THE REGION'S WATER SUPPLY; MAINTAINING INSTREAM FLOWS FOR LIVING RESOURCES; ESTABLISHING, MAINTAINING AND EXECUTING JOINT AND COORDINATED OPERATING PROCEDURES TO MONITOR SUPPLY AND DEMAND DURING EMERGENCIES AND DROUGHTS; AND PERFORMING DROUGHT-MANAGEMENT ANALYSIS.

DROUGHT PREPAREDNESS

IN EXECUTING THESE RESPONSIBILITIES, THE REGION'S SUSCEPTIBILITY TO DROUGHT IS REGULARLY EVALUATED AND REPORTED IN A SERIES OF WATER SUPPLY OUTLOOKS PREPARED BY THE CO-OP SECTION THROUGHOUT THE SPRING, SUMMER AND FALL. THE CO-OP SECTION MAINTAINS THE REGION'S DROUGHT PREPAREDNESS BY CONDUCTING AN ANNUAL "DROUGHT EXERCISE" TO ENHANCE READINESS AND TEST WATER RESOURCE OPERATING PROCEDURES DEVELOPED AND MAINTAINED BY THE CO-OP SECTION. THE CO-OP SECTION HAS THE FURTHER RESPONSIBILITY OF PROTECTING INSTREAM BIOLOGICAL HABITAT INTEGRITY BY FORECASTING THE NEED FOR LOW FLOW AUGMENTATION RELEASES AND ALLOCATING EXISTING WITHDRAWALS TO ASSURE THAT REGIONALLY DETERMINED TARGET FLOWS REMAIN IN THE RIVER DOWNSTREAM OF WATER SUPPLY INTAKES.

IN ADDITION, THE CO-OP SECTION PREPARES PERIODIC LONG-TERM WATER DEMAND FORECASTS AND ASSESSMENTS OF RESOURCES TO MEET THOSE DEMANDS. THE CO-OP SECTION ALSO WORKS WITH AND ON BEHALF OF THE COMBINED WATER UTILITIES IN THE APPRAISAL OF NEW SOURCES OF WATER, AND SUPPORTS PLANNING FOR THE SIZING OF REPLACEMENT AND EXPANDED WATER TREATMENT WORKS.

BEYOND THE DEVELOPMENT, MAINTENANCE AND IMPROVEMENT OF FORECASTING, PLANNING AND OPERATIONAL RESPONSIBILITIES, ICPRB HAS DEVELOPED AND MAINTAINS A TOXIC SPILL MODEL OF THE POTOMAC RIVER AND ITS MAJOR TRIBUTARIES. THIS MODEL IS USED TO ESTIMATE TIME OF TRAVEL WHEN DANGEROUS MATERIALS ARE SPILLED OR ACCIDENTALLY DISCHARGED INTO THE RIVER. WHEN CONTAMINATION ACCIDENTALLY ENTERS THE POTOMAC RIVER AND ITS TRIBUTARIES, OUR STAFF WORKS IN CLOSE COOPERATION WITH THE BASIN STATES TO PROVIDE TRAVEL TIME INFORMATION AND TIMELY NOTIFICATION TO WATER SUPPLIERS ALONG THE RIVER.

TOXIC SPILL MANAGEMENT IN THE POTOMAC RIVER BASIN

THE ICPRB TOXIC SPILL MODEL SIMULATES THE TRANSPORT OF A DISSOLVED POLLUTANT FROM THE POINT THE POLLUTANT ENTERS THE RIVER TO POINTS OF PARTICULAR CONCERN DOWNSTREAM (E.G. MUNICIPAL WATER INTAKES) AND ESTIMATES THE TIME OF TRAVEL FOR DANGEROUS MATERIALS THAT ARE ACCIDENTALLY DISCHARGED TO THE RIVER. SEVERAL RECENT SPILLS IN RIVERS WITHIN AND OUTSIDE THE BASIN UNDERSCORE THE VALUE OF THIS METHODOLOGY.

THE POTOMAC RIVER PROVIDES AN INCREASING PORTION OF THE WATER SUPPLY FOR THE WASHINGTON METROPOLITAN AREA. THE DRAINAGE AREA

UPSTREAM OF THE INTAKES FOR THE REGION'S WATER SUPPLY UTILITIES IS APPROXIMATELY 11,000 SQ. MILES (28,490 KM^2). OVER THIS LARGE AREA SIGNIFICANT POTENTIAL EXISTS FOR ACCIDENTAL DISCHARGES OF TOXIC OR HAZARDOUS MATERIALS TO THE POTOMAC RIVER AND ITS TRIBUTARIES, THAT COULD TEMPORARILY THREATEN THE POTABILITY OF THE WATER. THE RISK OF AN ACCIDENT IS REAL -- A NUMBER OF POTENTIALLY DANGEROUS SPILLS HAVE REACHED THE POTOMAC RIVER IN RECENT YEARS. DIESEL FUEL, RAW SEWAGE, AND OTHER MATERIALS HAVE SPILLED INTO THE RIVER AND BEEN OF SUFFICIENT CONCERN TO REQUIRE USE OF THE MODEL TO ESTIMATE TIME OF TRAVEL TO WATER SUPPLY INTAKES. ALTHOUGH, IN MOST CASES, THE SMALL QUANTITIES SPILLED OR THE LONG DISTANCES TO INTAKES HAVE MINIMIZED RISKS, THE MARCH 28, 1993 OIL PIPELINE LEAK IN FAIRFAX COUNTY, VIRGINIA CAUSED AN EXCEPTIONALLY SERIOUS THREAT TO THE WMA WATER SUPPLIES. IT IS THIS THREAT, AND THE HAZARDS POSED BY ACCIDENTAL SPILLS OF THIS TYPE THAT BRINGS US BEFORE YOU THIS AFTERNOON.

SAFETY OF THE REGION'S WATER SUPPLY

AS YOU KNOW, THE SPILL OF DIESEL FUEL FROM COLONIAL PIPELINE'S 36-INCH TRANSMISSION LINE ON MARCH 28, 1993, REPRESENTED THE LATEST AND MOST SERIOUS EVENT IN A TROUBLED HISTORY OF CONTAMINANT SPILLS IN THE POTOMAC RIVER BASIN. AT THEIR 15TH ANNUAL MEETING ON APRIL 29, 1993, THE SIGNATORIES OF THE POTOMAC RIVER LOW FLOW ALLOCATION

AGREEMENT UNANIMOUSLY AGREED TO DIRECT THE ICPRB CO-OP SECTION TO REPORT TO YOU THEIR SERIOUS CONCERNS REGARDING THE SAFETY OF THE WATER SUPPLY FOR THE NATIONAL CAPITAL REGION.

THESE CONCERNS ARE WIDELY SHARED AS DEMONSTRATED IN THE VIRGINIA HOUSE OF DELEGATES' JOINT RESOLUTION NUMBER 1005 (ATTACHED), OFFERED TO THE VIRGINIA GENERAL ASSEMBLY AT THE REQUEST OF GOVERNOR DOUGLAS WILDER ON APRIL 7, 1993. THE JOINT RESOLUTION NOTES THAT THE COLONIAL PIPELINE HAS EXPERIENCED NINE SPILLS SINCE 1977, AND PETITIONS THE CONGRESS AND THE PRESIDENT TO STRENGTHEN THE ENFORCEMENT AND INSPECTION PROVISIONS OF THE FEDERAL HAZARDOUS LIQUID PIPELINE SAFETY ACT OF 1977.

THE HISTORY OF EVENTS PRECEDING THE COLONIAL PIPELINE SPILL SUGGESTS THAT A HIGH RISK TO THE REGION'S WATER SUPPLY EXISTS, REQUIRING YOUR ACTION AND ASSISTANCE TO REDUCE THE THREAT FROM EXISTING PIPELINES THROUGH EFFECTIVE LEGISLATIVE, REGULATORY, AND ENFORCEMENT ACTION.

MAGNITUDE OF EXISTING RISK

TO APPRECIATE THE MAGNITUDE OF THE EXISTING RISK, ONE NEED ONLY IMAGINE THE RECENT COLONIAL PIPELINE SPILL OCCURRING UNDER SLIGHTLY DIFFERENT CIRCUMSTANCES. AS DAMAGING AND DISRUPTIVE AS THE SPILL

WAS, FORTUNATE CIRCUMSTANCES ALLOWED THE NATIONAL CAPITAL REGION TO ESCAPE WITH *RELATIVELY* MINOR IMPACT. THE UNUSUALLY HIGH STREAMFLOW IN THE POTOMAC DURING THE SPILL CAUSED MUCH OF THE CONTAMINATION TO BE QUICKLY TRANSPORTED DOWNSTREAM PAST THE MAJOR WATER SUPPLY INTAKES SERVING THE WASHINGTON, D.C., METROPOLITAN AREA. THE LOCATION OF THE PIPELINE BREAK SOME EIGHT MILES FROM THE POTOMAC ALSO ALLOWED PARTIAL CONTAINMENT AND RECOVERY OF THE PRODUCT PRIOR TO REACHING THE MAINSTEM OF THE RIVER. THE CONTAMINATION THAT DID REACH THE RIVER HUGGED THE VIRGINIA SHORELINE, AVOIDING THE INTAKES OF THE WASHINGTON SUBURBAN SANITARY COMMISSION, THE CITY OF ROCKVILLE AND THE WASHINGTON AQUEDUCT DIVISION OF THE U.S. ARMY CORPS OF ENGINEERS.

EVEN SO, DURING THE PERIOD MARCH 28 TO APRIL 23, 1993 THE FAIRFAX COUNTY WATER AUTHORITY'S CORBALIS WATER TREATMENT PLANT WAS CLOSED FOR 11 CONSECUTIVE DAYS. FOR MORE THAN THREE WEEKS THE PLANT OPERATED WITH PERIODS OF TOTAL SHUTDOWN AND INTERMITTENT RE-STARTS, LEAVING THE PRODUCTION RATE FAR BELOW DESIRED CAPACITY. EXTRAORDINARY MONITORING MEASURES CONTINUE, ESPECIALLY DURING RAIN EVENTS WHEN RESIDUAL OIL IS FLUSHED INTO THE RIVER.

AS THE ACCOMPANYING MAP SHOWS, THIS PIPELINE, LIKE SEVERAL OTHERS,

CROSSES UNDER THE POTOMAC RIVER JUST UPSTREAM OF THE WATER SUPPLY INTAKES FOR MOST OF THE REGION'S WATER PURVEYORS. IF THE PIPELINE BREAK HAD OCCURRED DIRECTLY IN THE RIVER DURING SUMMER CONDITIONS OF LOW STREAMFLOW, THE IMPACT ON THE REGION'S WATER SUPPLY WOULD HAVE BEEN DEVASTATING. UNDER LOW FLOW CONDITIONS, A SPILL IN THE RIVER COULD BE EXPECTED TO LINGER FOR WEEKS, IF NOT MONTHS, SPREADING TO BOTH SIDES OF THE RIVER AND AFFECTING EVERY DOWNSTREAM WATER SUPPLY. UNDER THE MOST OPTIMISTIC CIRCUMSTANCES, THE WASHINGTON AQUEDUCT DIVISION OF THE U.S. ARMY CORPS OF ENGINEERS (PROVIDING TREATED WATER TO THE DISTRICT OF COLUMBIA, ARLINGTON COUNTY AND FALLS CHURCH), WITH NO ALTERNATE SOURCE OF SUPPLY, WOULD RUN OUT OF POTABLE WATER IN LESS THAN 36 HOURS. THE UNTREATABLE NATURE OF THIS TYPE OF CONTAMINATION WOULD RESULT IN THE DISRUPTION OR FORCED CLOSURE OF MOST MUNICIPAL AND COMMERCIAL ACTIVITIES THROUGHOUT THE REGION.

IN ADDITION TO THIS ECONOMIC IMPACT, THE DIFFICULT CHOICE QUICKLY WOULD HAVE TO BE MADE WHETHER TO RISK PUBLIC HEALTH BY PUMPING CONTAMINATED WATER INTO THE DISTRIBUTION SYSTEM IN ORDER TO MAINTAIN FIRE PROTECTION. THE PUBLIC HEALTH CONSEQUENCES OF SUCH A DECISION COULD BE SEVERE, REQUIRING A MASSIVE MOBILIZATION OF EMERGENCY DRINKING WATER SUPPLIES AND PUBLIC EDUCATION AND

INFORMATION EFFORTS. BEYOND THE IMMEDIATE CONCERNS WITH PUBLIC HEALTH AND SAFETY, A LONGER-LASTING IMPACT OF SUCH A DECISION WOULD BE THE LENGTHY AND EXPENSIVE CLEANUP OF THE CONTAMINATED WATER SUPPLY INFRASTRUCTURE, INCLUDING THE ENTIRE TREATMENT AND DISTRIBUTION SYSTEM FOR THE DISTRICT OF COLUMBIA.

RECOMMENDED ACTIONS

RECENT SPILLS, INCLUDING THE MARCH SPILL FROM THE COLONIAL PIPELINE, INDICATE THESE RISKS ARE REAL AND CONTINUING, AND REQUIRE POSITIVE ACTION ON THE FOLLOWING ISSUES:

1. WE BELIEVE THE HISTORY OF PROBLEMS WITH THIS PARTICULAR PIPELINE RAISES SERIOUS QUESTIONS REGARDING ITS PHYSICAL INTEGRITY. A THOROUGH INDEPENDENT TECHNICAL REVIEW AND INVESTIGATION OF THE CONSTRUCTION AND INSPECTION RECORDS OF THIS PIPELINE, AS WELL AS A REVIEW OF STATE AND FEDERAL CONSTRUCTION AND INSPECTION REQUIREMENTS, IS AN ESSENTIAL FIRST STEP.

2. IN ADDITION TO THIS INDEPENDENT REVIEW, THE HISTORY OF PROBLEMS WITH THIS AND OTHER PIPELINES, AS WELL AS THE ENORMOUS HAZARD POSED BY ANOTHER FAILURE, CLEARLY DEMONSTRATE THE NEED TO IMPLEMENT STATE-OF-THE-ART

TECHNOLOGY TO REDUCE THE RISKS FROM EXISTING PIPELINES. ADVANCED DETECTION SYSTEMS LINKED TO CLOSELY SPACED AUTOMATED SHUTOFF VALVES ARE ESSENTIAL. FOR EXAMPLE, ALTHOUGH THE COLONIAL PIPELINE SHUTDOWN SOON AFTER A PRESSURE DROP WAS NOTICED, NEARLY A HALF-MILLION GALLONS OF OIL WAS LOST TO THE ENVIRONMENT. AUTOMATED INSPECTION AND CONTROL TECHNOLOGIES ARE AVAILABLE AND USED IN MANY HIGH-HAZARD PIPELINES; PROTECTION OF THE WATER SUPPLY FOR THE NATION'S CAPITAL DEMANDS NO LESS.

3. THE COLONIAL AND OTHER RIGHTS-OF-WAY CROSS NOT ONLY THE POTOMAC RIVER, BUT ALSO THE WATERSHEDS OF THE OCCOQUAN AND PATUXENT RIVERS. THESE WATERSHEDS PROVIDE THE OTHER RAW WATER SUPPLIES THAT HAVE BEEN DEVELOPED TO SERVE THE NEEDS OF THE WASHINGTON, D.C., METROPOLITAN AREA, AND THE ONLY SOURCE OF SUPPLY THAT WOULD BE AVAILABLE IN THE EVENT OF A LARGE SPILL IN THE POTOMAC. WE NOTE THAT THE OCCOQUAN RESERVOIR (WHICH PROVIDED MOST OF THE POTABLE SUPPLY TO NORTHERN VIRGINIA DURING THE RECENT COLONIAL PIPELINE SPILL) WAS THREATENED BY A 336,000 GALLON SPILL FROM A COLONIAL PIPELINE IN 1980. IN VIEW OF THE MAGNITUDE OF THE THREAT TO BOTH THE POTOMAC AND THE ENTIRE REGION'S WATER SUPPLY, LEGISLATIVE AND REGULATORY

ACTION SHOULD BE TAKEN TO ASSURE THE DESIGNATION OF A "UNIQUE HIGH-HAZARD CORRIDOR" WITHIN WHICH THE MOST STRINGENT MONITORING AND CONTROL TECHNOLOGIES WOULD BE REQUIRED. THESE PRECAUTIONS NEED TO BE REQUIRED OF ALL PIPELINES TRANSPORTING CONTAMINANTS IN THE CORRIDOR.

CONCLUSIONS

THE SIGNATORIES OF THE POTOMAC RIVER LOW FLOW ALLOCATION AGREEMENT ARE UNANIMOUS IN URGING DECISIVE ACTION TO REDUCE THE RISK OF PIPELINE SPILLS TO THE POTOMAC RIVER AND ITS TRIBUTARIES. ACCORDINGLY, STATE AND FEDERAL REGULATORY AGENCIES WITH APPROPRIATE JURISDICTION ARE BEING CONTACTED TO EMPHASIZE NEEDED ACTIONS INCLUDING:

(1) INDEPENDENT INVESTIGATION OF THE PHYSICAL INTEGRITY AND OPERATION OF THE COLONIAL PIPELINE AND SIMILAR PIPELINES IN THE POTOMAC RIVER BASIN, INCLUDING THE LOCATION OF VALVE INSTALLATIONS AND DETAILS RELATING TO CONTROL AND SHUT-OFF PROCEDURES;

(2) ADDITIONAL IMPROVEMENTS TO THE EXISTING PIPELINES, INCLUDING RETROFITTING AS NECESSARY WITH STATE-OF-THE-ART MONITORING AND

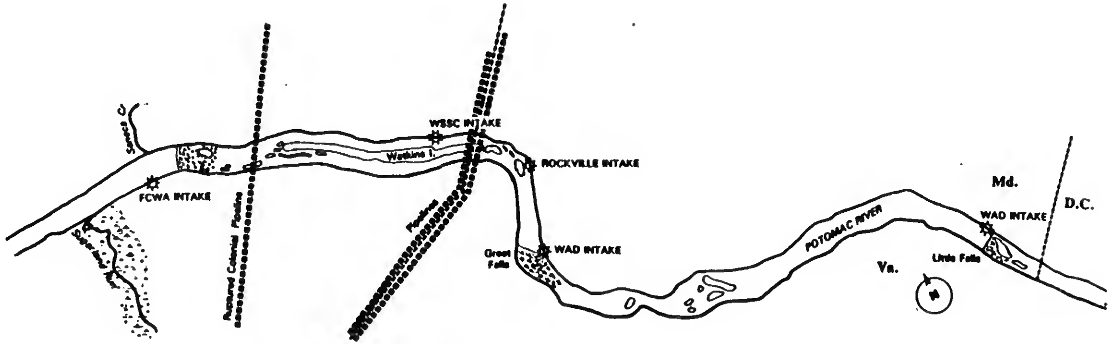
CONTROL TECHNOLOGIES COMMENSURATE WITH THE HAZARD (AS AN EXAMPLE, ULTRASONIC FLOWMETERS ARE UTILIZED ON MANY HIGH RISK PIPELINES);

(3) COMPREHENSIVE MONITORING AND INSPECTION REPORTING PROCEDURES; AND

(4) THE DESIGNATION OF A "HIGH HAZARD CORRIDOR" WITHIN WHICH THE BEST AVAILABLE TECHNOLOGY IS EMPLOYED TO MONITOR, OPERATE AND CONTROL PIPELINE OPERATIONS, AND PREPARE FOR ACCIDENTS.

THE CO-OP UTILITIES AND MEMBERS OF THE ICPRB CO-OP SECTION STRONGLY URGE CONGRESS TO REVIEW APPLICABLE LEGISLATION, REGULATIONS, AND MONITORING AND INSPECTION REQUIREMENTS TO ADDRESS THESE CONCERNS. THE RECENT COLONIAL PIPELINE SPILL TO THE POTOMAC INDICATES THE VULNERABILITY OF THE NATIONAL CAPITAL AREA'S WATER SUPPLY, AND REQUIRES IMMEDIATE ATTENTION TO IMPLEMENT TIMELY AND EFFECTIVE MEASURES THAT WILL REDUCE THESE RISKS.

THANK YOU AGAIN FOR THE OPPORTUNITY TO TESTIFY ON THIS TIMELY MATTER OF GREAT IMPORTANCE. YOUR SUPPORT AND HELP IN THESE MATTERS WOULD BE GREATLY APPRECIATED.



MAINSTEM POTOMAC RIVER FROM SUGARLAND TO THE DISTRICT OF COLUMBIA

FCWA- FAIRFAX COUNTY WATER AUTHORITY
WAD- WASHINGTON AQUEDUCT DIVISION, U.S. ARMY CORPS OF ENGINEERS
WSSC- WASHINGTON SUBURBAN SANITARY COMMISSION

1993 SPECIAL SESSION

LD9469408

HOUSE JOINT RESOLUTION NO. 1005

Offered April 7, 1993

Memorializing Congress and the Clinton Administration to strengthen the Pipeline Safety Act.

Patrons—Plum, Callahan and Mims; Senators: Howell and Waddell

Introduced at the Request of the Governor

Referred to the Committee on Rules

WHEREAS, on March 28, 1993, Colonial Pipeline Company's pipeline experienced a break which resulted in a spill of 330,000 gallons of diesel fuel into Sugarland Run, a tributary of the Potomac River; and

WHEREAS, the spill resulted in extensive damage to a valuable natural resource and near total destruction of the aquatic life in a 10-mile stretch of Sugarland Run; and

WHEREAS, an oil sheen was evident on several miles of the Potomac River, and a Fairfax County drinking water intake on the Potomac was closed for over a week; and

WHEREAS, the Colonial Pipeline has experienced nine spills since 1977 including major spills of 212,000 gallons of kerosene in a tributary of the Rappahannock River in Orange County in 1989, 85,000 gallons of fuel oil in Chesterfield County, 65,000 gallons of marine diesel fuel in Chesapeake and a 336,000 gallon spill into Bull Run that threatened the Occoquan water supply in 1980; and

WHEREAS, the authority for pipeline safety resides with the federal government's Department of Transportation, Office of Pipeline Safety; and

WHEREAS, the federal Hazardous Liquid Pipeline Safety Act of 1979, the regulations promulgated under it, and the enforcement of those regulations are grossly inadequate; now, therefore, be it

RESOLVED by the House of Delegates, the Senate concurring, That the General Assembly of the Commonwealth of Virginia memorialize the Congress of the United States and the Clinton Administration to aggressively pursue a strengthening of the Pipeline Safety Act and the enforcement and inspection provisions of the Act; and, be it

RESOLVED FURTHER, That the Clerk of the House of Delegates transmit copies of this resolution to the President of the United States, the Speaker of the United States House of Representatives, the President of the Senate of the United States, and the members of the Virginia delegation to the United States Congress that they may be apprised of the sense of the General Assembly of Virginia in this matter.

Official Use By Clerks

Agreed to By The House of Delegates		Agreed to By The Senate	
without amendment	☐	without amendment	☐
with amendment	☐	with amendment	☐
substitute	☐	substitute	☐
substitute w/amdt	☐	substitute w/amdt	☐
Date: ______		Date: ______	
Clerk of the House of Delegates		Clerk of the Senate	

TESTIMONY OF CONGRESSMAN FRANK R. WOLF
before the Subcommittee on Investigations and Oversight
Public Works and Transportation Committee
May 18, 1993

I would like to thank you, Mr. Chairman, for holding this hearing on the recent Colonial pipeline break in northern Virginia. As the chairman and members of this committee know, the Potomac River tributary, Sugarland Run, traverses Virginia's 10th Congressional District which I represent. This bucolic area is one of the Commonwealth's most beautiful and I know I don't need to tell this committee what an unwelcome intrusion was the introduction of 400,000 gallons of diesel into its environment.

In addition to raising safety concerns, disasters like this take a tremendous toll on the quality of life for community residents. I would like to take this opportunity to publicly commend the Fairfax County Hazmat Team and 40 other federal, state and local agencies which have responded and are continuing remediation.

Also, Mr. Chairman, I appreciate this opportunity to share with the committee my concerns and my thoughts on possible steps to avoid these disasters, or at least mitigate their impact. I will be brief, as I know the committee has several expert witnesses to hear today, including the National Transportation Safety Board (NTSB) and the General Accounting Office (GAO).

Before focusing on some "preventive medicine" that could possibly alter what seems to be a perpetual response mode, I would like to raise the question of whether the Office of Pipeline Safety (OPS) is misplaced in the federal hierarchy.

**IS THERE A MORE COMPATIBLE "HOME"
FOR PIPELINE SAFETY?**

It has been suggested that OPS does not belong in the Department of Transportation (DOT) and would more appropriately fit into the portfolio of another federal agency such as the Department of Energy (DOE). I believe this suggestion deserves the attention of this committee. The nation's pipeline network is a transportation mode only in the sense that utility line networks also "transport" a product. And it is, after all, energy products that are being transported by pipelines.

In addition to a more natural "fit" in terms of subject matter, the DOE would seem a more compatible home for pipeline safety for two other reasons. (1) This agency has expertise with costs and market circumstances affecting the energy industry, which is important since any regulatory activity needs cost-benefit analysis. (2) DOE also has extensive emergency response capability with respect to energy catastrophes.

The Research and Special Programs Administration (RSPA) has become the "catch-all" office in DOT which acquires all of the tasks that do not really fit elsewhere in the department. One of the responsibilities "housed" by RSPA is, of course, the Office of Pipeline Safety (OPS) which we are discussing today.

RSPA's primary responsibility presumably is research and it ably carries out most of this responsibility at the Volpe National Transportation Systems Center in Cambridge, Massachusetts. And I might add that as far as public notoriety goes, the Volpe Center is one of the nation's best kept secrets. The Volpe Center performs outstanding research in important areas such as Intelligent Vehicle Highway Systems (IVHS), air traffic control system modernization, and human factors engineering. The Center is in great demand from both governmental and private sector "clients."

As you know, aside from its primary research mission, RSPA's other responsibilities in addition to pipeline safety include hazardous materials (hazmat) safety, emergency transportation, airline statistics, automated tariffs, university research, and the Transportation Safety Institute.

Mr. Chairman, I believe that while this group is one of the most enthusiastic and hard-working in the DOT, RSPA simply does not have the staff or the resources to carry out all the duties assigned to it, the nation's pipeline network being one of those areas that is not receiving adequate oversight. And I want to emphasize that I am not being critical of RSPA, which cheerfully performs admirably on a shoestring budget.

I will give you a graphic example of just how overwhelmed this office is. In a recent hearing of the transportation appropriations subcommittee on which I serve as the ranking Republican, we were discussing RSPA's FY 1994 budget request for $2.6 million to contract out the review of detailed emergency response plans submitted by private pipeline operators as required by the Oil Pollution Act (OPA) of 1990. Mr. Chairman, <u>there is a room at RSPA literally stacked with hundreds of plans awaiting review</u>.

RSPA asked for an appropriation to contract out the review of these emergency response plans because it doesn't have sufficient manpower to perform the review in-house. In fact, it was brought to my attention that RSPA had discussed possibly hiring temporary or part-time graduate students to oversee this process.

One, I believe that oversight of emergency response plans has to be higher up the chain of command. And, second, I believe that this review would be a "federal responsibility" rather than a "contractor responsibility" under existing OMB guidelines which differentiate between the two.

I do not know whether, prior to the spill, Colonial Pipeline's plan had been read or was gathering dust like all the others in the RSPA "holding tank." Neither am I claiming that prior review of this plan would have prevented the spill we are discussing today. However, it is important to remember that a major factor in the high-volume release of product into the environment during the Colonial spill was the delay of up to one-and-one-half hours in getting to the manual valves. This would underscore the importance of an emergency response plan, as well as the obvious assumption that these plans need prompt review so that emergency strategies can be altered as necessary, and hopefully <u>before</u> disaster strikes.

CAN SOME IMMEDIATE STEPS MAKE PIPELINE SAFETY MORE PROACTIVE?

Mr. Chairman, there are three items I believe we should "pluck" from a morass of unimplemented safety recommendations. Rulemakings have been legislatively mandated in these areas, but are currently moving with the speed of molasses.

<u>I. Greater use of internal inspection devices ("smart pigs")</u>

Last year, the GAO concluded that the widespread use of sophisticated electronic inspection devices "could save lives and protect property by improving the safety and reliability of natural gas and hazardous liquids transmission pipelines."

In 1988, Congress required RSPA to establish minimum federal safety standards so that all new and replacement pipelines could accommodate "smart pigs." As the committee knows, these instrumented devices are long, so many cannot negotiate a pipeline with sharp bends. Also, the pigs cannot be used in pipelines with valves that do not fully open. Prior to this 1988 Congressional mandate, the NTSB had recommended in 1987 that RSPA require petroleum and natural gas pipeline transmission operators to make modified and repaired pipelines piggable.

RSPA has not issued either the required regulations or a mandated feasibility study due in May 1990 on requiring the inspection of transmission pipelines with smart pigs. The reason for the delay as cited to the GAO: manpower and money shortages and a need to give more attention to other matters.

As I indicated above, Mr. Chairman, it's my sense that RSPA is trying to do too much with too little. And the result may be that this very important safety function, by virtue of simply being misplaced in the government, is getting short shrift.

III. Measures to reduce third party damage.

According to the DOT, third party excavation damage is the single most common cause of pipeline accidents.

In the case of the Colonial spill, the NTSB has issued a preliminary report indicating that "microscopic viewing of the damage disclosed what appeared to be small metal folds in the deeper areas of the mechanical damage that were indicative of an object sliding longitudinally against the pipe." In other words, the Safety Board believes at this time that the pipeline rupture was caused by a scrape. Obviously, definitive conclusions will have to await NTSB's final report.

Again, this is an area where there is an ongoing rulemaking and I would urge the committee to do what it can to speed the process up. I am referring to the rulemaking concerning "one-call" systems such as Miss Utility. I believe that all owners of underground utilities should be required to belong to a one-call system so that prior to any excavation, a call can be made which will result in the location of all underground utilities.

In addition, all owners of underground utilities should be required to provide sufficient inspection when underground utilities are being installed to ensure that the installation conforms to all applicable rules and regulations, such as depth and location requirements. I am told that it is often discovered that underground utilities which are required to be located three feet in the ground are located just under the surface.

Finally, I believe that civil penalties should be assessed when third party negligence is determined in ruptured pipeline incidents. Obviously, the liability of the utility owner should also be addressed in the event of incorrectly located utilies. Also, there would have to be an appeals process and some determination of the logistics of collection. I think the revenue generated from these fines should be dedicated to the costs of oversight and enforcement of the pipeline safety program, with the possible result of providing additional inspectors and other resources for a more efficient program.

Mr. Chairman, that concludes my testimony, and let me say again that I salute your leadership in quickly holding a hearing to look into this matter, and I appreciate the opportunity to voice my concerns and make some suggestions.

I would hope that this committee would push for a speedy final rulemaking in this area, particularly since private operators aren't likely to take these steps in the absence of federal direction.

While certainly not a panacea, smart pig technology appears to be the "only game in town" for the moment.

As the GAO noted in its recommendation, "Smart pig inspections have demonstrated the potential for identifying internal andternal corrosion and other pipeline flaws and for reducing pipeline incidents. **Smart pig use, supplemented by visual inspection through localized excavations is the only reliable technique currently available** (emphasis added) for detecting internal and external pipe corrosion."

II. More frequent spacing for remote shut-off valves.

Mr. Chairman, this is another issue pending on a long-delayed rulemaking docket at RSPA. And I suspect that the reason is, again, too little resources for an agency with such a diverse mission.

For many years, the NTSB has repeatedly requested that RSPA issue regulations requiring excess flow valves. In addition, the 1992 Pipeline Safety Act requires RSPA to issue regulations in this area. And, indeed, two years ago, RSPA issued an advance notice of proposed rulemaking on excess flow valves. However, the next step in regulatory process, issuing a notice of proposed rulemaking (NPRM) has not yet followed, even though the preliminaries were initiated two years ago.

I hope this committee will do what it can to speed up action in this area, as well as urging frequent spacing of these valves which will maximize protection, especially in heavily populated urban areas and areas with fragile ecosystems.

As you may have noted in this morning's Washington Post, major water suppliers recommended closer spacing of pipeline shutoff valves. The automated valves that shut the Colonial pipeline were more than 30 miles apart on either side of the Potomac, leaving considerable oil still in the closed section of the pipeline to leak out. Had this disaster occurred about two months later in the summer when both river levels and water demand are higher, these experts said we could have faced a Washington area without an adequate supply of potable water.

ADDITIONS TO THE RECORD

METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS

Local governments working together for a better metropolitan region

District of Columbia
Bowie
College Park
Frederick County
Gaithersburg
Greenbelt
Montgomery County
Prince George's County
Rockville
Takoma Park
Alexandria
Arlington County
Fairfax
Fairfax County
Falls Church
Loudoun County
Prince William County

Testimony of the Honorable Derick P. Berlage

Chairman, Environmental Policy Committee

Metropolitan Washington Council of Governments

and

Member, Montgomery County, Maryland, Council

to the

United States House of Representatives

Public Works and Transportation Committee

Subcommittee on Investigations and Oversight

May 18, 1993

777 North Capitol Street, N.E. Suite 300 Washington, D.C. 20002-4226 (202) 962-3200 FAX (202) 962-3201

Testimony of the Honorable Derick P. Berlage

Chairman, Environmental Policy Committee

Metropolitan Washington Council of Governments

and

Member, Montgomery County, Maryland, Council

to the

United States House of Representatives

Public Works and Transportation Committee

Subcommittee on Investigations and Oversight

May 18, 1993

RE: Special Congressional Investigation on the March 28, 1993 Sugarland Run Pipeline Oil Spill

Chairman Borski and Members of the Subcommittee:

My name is Derick P. Berlage and I am presently chairman of the Metropolitan Washington Council of Governments Environmental Policy Committee and a member of the Montgomery County, Maryland, Council. I am pleased to have the opportunity to present comments to the Subcommittee on Investigations and Oversight regarding the March 28, 1993, Sugarland Run Pipeline Oil Spill.

Background

The Metropolitan Washington Council of Governments (COG) is a regional organization which over the past thirty-five years has provided a regional forum for the discussion and resolution of a wide array of transportation, environmental, public safety, human services, economic and informational issues. The organization is comprised of

OVER

seventeen member local government jurisdictions throughout the Washington metropolitan area. The Environmental Policy Committee (EPC), of which I am chairman, is the principal policy advisor on environmental issues to COG's Board of Directors. Membership in the EPC includes elected officials from all seventeen local government members of COG.

The incident at Sugarland Run was a significant event highlighting many important environmental questions. As a result of regional concerns about this incident, and concern that current federal funding may not be adequate to fully implement important pipeline preventative measures, on April 14, 1993, the COG Board of Directors held a special briefing on the Sugarland Run oil spill. The Board asked that the incident be reviewed and that recommendations be developed that would prevent and/or minimize the re-occurrence of a similar incident. They also expressed strong concerns regarding the adequacy of preventative regulations and relief that the incident was not far worse in magnitude. The Board then directed my committee to prepare and submit written/oral testimony on this incident on behalf of COG to the Subcommittee on Investigations and Oversight of the House Public Works and Transportation Committee. The information that is presented here reflects a significant expenditure of time and effort by the COG staff and its member jurisdictions in order to obtain and analyze accurate and timely information on the oil spill incident. The findings of that investigation and the ensuing discussions that have taken place since the March 28, 1993, incident are reflected in the following text.

The Sugarland Run incident also alerted regional officials that had there been a more widespread impact to regional water supplies that the region may not have been prepared to smoothly deal with such an incident. There is currently in place a Regional Water Supply Emergency Agreement; however, because of its age, it needs to be modified and updated. Toward that end COG staff had previously reviewed the adequacy of the Agreement to provide for coordinated and orderly response to situations such as Sugarland Run. An earlier internal COG review noted that several modifications to the agreement were necessary. In order to make such changes several meetings with key regional organizations will be necessary. Plans are currently being developed by COG to arrange such meetings.

Major Impacts of the March 28, 1993 Event

The March 28, 1993, Sugarland Run pipeline rupture of diesel fuel affected not only an isolated local area, but the entire metropolitan Washington region as well. It raised concerns about our ability to adequately manage the pipeline transportation of hazardous liquid throughout the region and to ask ourselves if more can be done to improve its management. The 36-inch diameter pipe that ruptured behind the Reston Medical Center in Fairfax County, Virginia, was a point along a 5,200-mile interstate petroleum pipeline that runs from Texas to New York, and which is capable of pumping

22,400 gallons of liquid petroleum product per minute. The pipeline is owned by Colonial, which is the largest pipeline transporter of refined petroleum product in the United States. As a result of this rupture, approximately 400,000+ gallons of diesel product were released. Diesel product entered the nearby waters of the Sugarland Run in Fairfax County and flowed through the northeast portion of Loudoun County, Virginia, where it entered the Potomac River at the Algonkian Regional Park. Once product entered the Potomac it flowed closely along the Virginia shoreline until it reached the turbulent waters of the Little Falls area of the Potomac. From this point and downriver to the Mason Neck area of Virginia, a petroleum sheen was visible on the entire width of the river.

The impact on the local and regional environment is still being tallied and will likely be felt for years to come. The spill affected surface waters and soils and caused damage and destruction to the regional flora and fauna. While the groundwater appears to have been unscathed, monitoring is continuing. The costs for the local, regional, state and federal governments will certainly be significant. The overall response and coordination during this incident was good, but like many incidents of this magnitude, improvements can and should be made. In a number of incidents citizens were forced from their homes and if the response had been less effective, many more would have been displaced. The spill also caused disruption of traffic, the destruction of recreational facilities and other impacts too numerous to mention.

Review of Historical Data

In examining the historical causes, frequency and locations of pipeline incidents, we were able to determine that during the period between 1971 to 1986, the majority of pipeline failures were a result of outside forces (e.g., excavation) and the second leading cause appeared to be from pipeline corrosion. The cause of the Sugarland Run incident however, is still under investigation. Based upon initial physical evidence, Colonial feels that the rupture was caused by outside damage to the pipe. The damaged section of pipe has been sent to a National Transportation Safety Board lab for analysis.

During this same time period (1971-1986) there was actually a decline in the number of pipeline incidents. Further review also revealed that these types of pipeline failures were infrequent and that, statistically, pipeline transport of liquids was still the safest mode of transport, especially when compared to highway and rail. In discussing Colonial's previous pipeline safety record, Virginia state officials noted that there had been four significant incidents in Virginia since 1985. Maryland officials stated that Colonial was, in several areas, exceeding requirements of current federal regulations and that Colonial's safety record is good. It is obvious, at least from an economic point of view, that it is in the best interest of Colonial or any other pipeline operator to maintain a good performance and safety record. Poor performance would make it very difficult for pipeline operators to continue to attract investors and obtain optimal loan rates. In

OVE

addition, poor performance would result in lost revenue as a result of down time and costs associated with environmental and civil damages.

COG's Review of Local, State, and Federal Laws and Regulation

Another important element of our investigation included a review of all local, state and federal laws and regulations which govern or influence pipeline transportation of liquid petroleum products. We were particularly interested in the adequacy of such regulations to prevent and/or minimize the re-occurrence of similar incidents. We found that current federal regulations are centered around 49 CFR, Part 195, which generally addresses safety but not environmental protection. These regulations cover three primary areas: testing and inspection, design and construction and operator reporting.

The current regulations reflect the mandates of the 1968 Transportation of Explosives Act, as well as the 1979 Hazardous Liquids Pipeline Safety Act, but do not cover construction in the vicinity of the pipelines nor their siting. Under the 1992 Pipeline Safety Act, which revised the Act of 1979, a number of new key mandates have been added. Specifically, the 1992 Act recognizes the need to include: the protection of the environment, increased inspections and inspectors, increased civil penalties, review of circumstances under which additional emergency flow restriction devices (remote valves/check valves) would be used and a one call notification system (*e.g.*, Ms. Utility). Many of the new mandates will aide in our ability to prevent and minimize future incidents, **but, apparently, because of the lack of adequate federal resources many of these positive changes may not be implemented.**

State and local authority to manage and regulate pipelines is somewhat limited, although it can be expanded upon and improved. While states are encouraged to seek and obtain special regulatory and management authority for pipeline transportation of hazardous liquids from the Department of Transportation, Office of Pipeline Safety (DOT/OPS), only a few have chosen to do so. In the case of Virginia and Maryland, only Maryland is a full participant in intrastate pipeline transport. Neither state has nor is currently seeking interstate special authority. Local governments, who are the ones most directly impacted by pipeline transport and the incidents which might occur, can exert more authority through land use controls such as zoning and subdivision ordinances and comprehensive plans. They also have police powers to protect and improve public health and safety. Through these tools local governments can better insure that pipeline right-of-ways are protected and that future pipeline failures and associated safety and environmental impacts are minimized through coordinated emergency response.

COG's Recommendations for a Strong Response

Based on our review and assessment I would like to strongly recommend that the following points and actions be taken into consideration and incorporated into any revisions which may result from this special investigation. Please note that there are a number of proposed actions that would have to be carried out in coordination with COG member local governments. Our points are as follows:

Federal Action Required

1. We recommend that the Executive Branch and the Congress must ensure that those mandates found within the 1992 Pipeline Safety act be fully enacted through rulemaking procedures **and where applicable that adequate federal resources are made available to accomplish those requirements.** Specific mandates that need to be addressed include:

   - increased inspection requirements;
   - identification of environmentally sensitive/high density areas; *
   - increased civil penalties;
   - additional emergency flow restriction devices;
   - hiring of additional federal inspectors; (Under the 1992 Pipeline Safety Act additional inspectors are to be hired, but because there has been no additional appropriation, no additional inspectors have been hired; *
   - increased operator training/certification. *

   * (Federal resources and action needed)

2. We urge that incentives be created to encourage states to take a more active role in intra- and interstate pipeline regulation and management.

Federal/State/Regional/Local Coordination and Action Required

3. We recommend that a comprehensive regional and national monitoring program of pipeline systems be developed using geographical information system technology.

OVER

4. We recommend a critical review based on procedures and conditions to be developed be required before repaired pipelines can be reopened and should be a very high priority. This review should include an assessment of the appropriate role of local authorities in this decision.

5. We recommend the review and development of a petroleum spill model to assist impacted jurisdictions in planning and coping with future oil spills.

6. We recommend there be greater public education and awareness among local, state, and federal governments; citizens; and pipeline operators relative to pipeline locations, safety, emergency response and operations.

Local/Regional Coordination and Action Required

7. We recommend the review of regional notification systems, resources and agreements. Such a review should include a meeting of MWCOG, regional water utilities, the Interstate Commission on the Potomac River Basin's Cooperative Water Supply On the Potomac (CO-OP) Committee, and regional emergency response personnel to discuss modifications to the region's Water Supply Emergency Agreement.

8. We recommend that in cooperation with local governments a review and assessment of current local land planning, zoning, building permits and subdivision ordinances be carried out to determine their adequacy to address pipeline safety and operation (*e.g.*, setbacks, pipeline operator review and approval of subdivisions and site plans).

9. We recommend periodic review of contingency clean-up plans to insure that environmental protection be considered as well as safety.

Mr. Chairman, members of the Subcommittee, that concludes my remarks. I would like to take this opportunity to once again thank you again for allowing the Metropolitan Washington Council of Governments Board of Directors to speak on this issue of importance and concern to the metropolitan Washington region. The Metropolitan Washington Council of Governments, its seventeen member local government jurisdictions, and its 3.8 million inhabitants are genuinely concerned about pipeline safety, operations and management. We are committed to the continued improvement of all aspects of pipeline management and operations and seek to minimize impacts to the citizens of our region as well as the nation through increased coordinated local, state and federal efforts. Thank you.

MPR
ASSOCIATES INC.
ENGINEERS

May 24, 1993

Ms. Linda Komes
Subcommittee on Investigations and Oversight
Committee on Public Works and Transportation
H2-586 Ford HOB
Washington, DC 20515-6259

Subject: Colonial Pipeline Hearing of May 18, 1993

Dear Ms. Komes

We would like to submit the attached report and statement for the record to be included in the Committee's report on the hearing of The Colonial Pipeline Rupture which was held on May 18, 1993.

It is our understanding that statements were made at the hearing by the President of Colonial Pipeline, Mr. Donald R. Brinkley, indicating that the ultrasonic flow meter technologies to detect pipeline leaks do not work effectively and are not capable of detecting leaks. This is not a correct picture of the capability of this type of equipment.

Ultrasonic flow measurement systems have been installed on the Trans Alaskan Pipeline and Alyeska has conducted rigorous calibration and performance tests on these meters. Attached is a 1992 ASME paper written by Alyeska on recent tests that they conducted on their leading edge ultrasonic flowmeters. The results from these tests indicate that the absolute accuracy of the meter was .157% for flow rate, and even more important from a leak detection standpoint, was that the standard deviation of the total flow between two ultrasonic meters was .019%. This .019% means that leakage rates greater than 4.18 gallons per minute (gpm) can be detected in a 36" pipe carrying 22,000 gpm of product. The significance of this is that such a metering system can detect low levels of leakage from the initial stages of a crack (i.e., while the crack is small and leakage is still in the 10 to 40 gpm range). Thus, this system has a reasonable chance of detecting that leakage and allowing time for corrective action before the crack reaches the "critical crack size" and the line grossly ruptures where leakage rates are in the thousands of gpm.

I believe the attached Alyeska paper speaks for itself and presents a very different picture from that presented by Colonial Pipeline. Accordingly, I request that this letter and the attached article be made a part of the record of the May 18, 1993 hearing. If

320 KING STREET ALEXANDRIA VA 22314-3238 703-519-0200 FAX 703-519-0224

you have any questions regarding the measurement technology, track record or its ability to detect pipeline leaks prior to the "critical crack size" being reached and the resultant catastrophic failure, please do not hesitate to contact us.

Sincerely,

Noman M. Cole

Noman M. Cole

cc: Honorable Leslie L. Byrne
Honorable Thomas M. Davis, III
Honorable Frank R. Wolf

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
345 E. 47 St., New York, N.Y. 10017

92-GT-426

State of the Art of Ultrasonic Liquid Flow Measurement and it's Impact on Automated Leak Detection in Pipelines

MICHAEL L. SMULSKI
Alyeska Pipeline Service Company
Eagle River, Alaska 99577

Abstract:

The state of the art of ultrasonic liquid flow measurement has improved greatly in the past decade to where this technology exhibits accuracy equivalent to turbine meter systems, while retaining several advantages over turbine meters.

Testing of a four path non-intrusive meter used for leak detection on the Trans-Alaska Pipeline is discussed. Performance is detailed, and future applications for ultrasonic flow measurement technology are reviewed.

Introduction:

The Trans-Alaska Pipeline stretches 800 miles North to South across Alaska, from the Prudhoe Bay oil fields on the Arctic Ocean to the year round port of Valdez on Prince William Sound. For comparison, it is a little over 800 miles from New York to Nashville. There are no direct flights from Prudhoe Bay to Valdez, but if there were it would take over two hours in a 737 to cover the distance. The terrain is some of the most strikingly beautiful in the world, and at the same time some of the most difficult for construction and maintenance.

The Trans-Alaska Pipeline System is operated and maintained by the Alyeska Pipeline Service Company, 1835 South Bragaw Street, Anchorage Alaska, 99512. The author has been employed by Alyeska as an engineer since January of 1983, and has been involved in ultrasonic flow metering as it relates to leak detection for a large portion of that time.

The pipe is primarily X65 grade steel with a thickness of .562 inch and an outside diameter of 48 inches, and is equally divided between above and below ground construction. Both Prudhoe Bay (mile zero) and Valdez (mile 800) are essentially at sea level. Three major mountain ranges are crossed, with a maximum elevation of 4,739 feet at milepost 166.6, Atigun Pass. Ambient temperatures along the route range from +95 degrees Fahrenheit in summer to -80 degrees Fahrenheit in winter.

The Trans-Alaska Pipeline is capable of transporting over two million barrels of oil a day, and accounts for about 25 % of the United State's domestic supply. The Pipeline has been in virtually continuous operation since first oil into Valdez on July 28, 1977, with down time limited to a few maintenance days.

One result of Alaska's severe climatic extremes is a sensitive ecosystem, requiring long periods of time to recover from environmental damage. Alaska's unique combination of climatic extremes, difficult terrain, and lack of a road system makes cleanup of oil spills difficult and expensive. Because of Alyeska's sincere commitment to maintaining the pristine Alaska environment, Alyeska has developed a computer based automatic leak detection system which is among the most sensitive in the world.

There are many methods of automatic leak detection, each having it's own strong points and limitations. Optimum system configuration is dependent upon parameters such as pipeline terrain, length, diameter, wall thickness, insulation, below/above grade, fluid(s), flow rate, direction of flow, pressures, Pump

Presented at the International Gas Turbine and Aeroengine Congress and Exposition
Cologne, Germany June 1-4, 1992

Station locations, ambient conditions, maintenance considerations, sensor locations, available SCADA data links, instrumentation location and accuracy, regulatory requirements, available computing hardware, software, and available software maintenance personnel.

Thus there is no single best leak detection system for all pipelines, despite claims to the contrary from those vendors promoting their particular system. Alyeska utilizes four different methods of computer based leak detection. The most sensitive periodically calculates the apparent gain or loss of oil from the entire 800 miles internal volume of the pipeline since the last calculation. Temperature and pressure effects upon the pipe geometry and the oil specific gravity are taken into account, as is Reynolds number and slack line. Statistical data processing methods are then used on the calculated gain/loss values to determine a predicted leak threshold, and to determine if a leak over this threshold exists. Student's T Distribution for 99 percent certainty is used in the threshold calculations.

Since the most sensitive system depends on the time integral of corrected mass flow, it is critical that the most accurate flow metering and flow totalizing be used. Presently the system depends primarily upon custody transfer turbine meters at Prudhoe Bay which meter inputs from the North Slope producers, and custody transfer meters at Valdez which meter incoming oil at the terminal. As mentioned previously, the volume balance is done on the entire 800 miles of pipe.

Alyeska has 12 pumping stations along the 800 miles route. Ten of the stations pump oil; stations 5 and 11 are flow through only and contain no pumps.

Each pump station has a four path non-intrusive ultrasonic flow meter installed at both the suction and discharge of the station. These meters were purchased from Westinghouse Marine Systems Division in the mid 1970's. This Division produced sonar systems for the United States Navy including towed sonar arrays and both active and passive sonars for USN submarines; thus the technology used was state of the art for that time period. These meters are called Leading Edge Flow Meters, or LEFMs.

In order to improve leak detection, it would be advantageous to perform the volume balance between stations rather than over the entire 800 miles of pipe. This would divide the pipe into 12 segments and reduce inaccuracies due to slack line. (Slack line is a flow phenomena observed on the down hill side of mountain ranges which are steep enough that the pipe is not full.)

Since Alyeska has a comprehensive program of internal inspection using both magnetic and ultrasonic corrosion/deformation pigs, the LEFM has a great advantage over the turbine meter in that it is non-intrusive, permitting the passage of pigs. No expensive piping network or control system is required to pass pigs though the meters. Another advantage of upgrading the existing LEFMs is that the transducers are already in place and in good condition, so that only the electronics portion would require replacement, taking advantage of the modern information processing technology.

In early 1990 upgraded LEFM electronics became available but were unproven in the necessary size. These units combined improved pulse transmit/receive circuitry with an IBM AT clone processor; the old LEFMs used seven boards of wire wrapped TTL logic chips to form the processor.

A repeatability requirement of 0.15 % mass flow over the pressure range 0 to 1500 psi and the (oil) temperature range of 40 to 140 degrees F. was established. Calibration would be allowed once per year, as opposed to turbine meters which are proved daily and calibrated quarterly or whenever accuracy falls below 0.15 %.

Since the required accuracy is pushing the limits of the state of the art, it was decided to test the new LEFMs at a single pump station prior to purchase. This was done at Pump Station 11 which has both suction and discharge flow meters but no pumps or relief (storage) tanks. Thus a direct determination of repeatability could be made by comparing the suction and discharge flow meters over an extensive time period. This paper describes the test and the results.

Ultrasonic Flowmetering Background.

Doppler vs. Transit Time:

There are two primary physical methods of ultrasonic flow metering: Doppler and transit time. Piezoelectric crystals are used as both transmitters and receivers in most cases.

The Doppler concept works by projecting a sonic pulse train into the moving fluid and measuring the frequency shift of the return. This is a familiar effect best exhibited in the change in pitch of a train whistle as the train passes the stationary observer. The fluid must contain some discontinuity such as air bubbles, sand or dirt to reflect the sonic beam. Clean fluid will usually not work with Doppler meters.

Another disadvantage of Doppler meters is uncertainty as to from where within the velocity profile the beam is being reflected. The velocity vector profile is radically different between laminar and turbulent flow, and can be non symmetrical downstream of bends or imperfections. Typical attainable accuracy with these meters is about +/- 5 %, but they are non intrusive and will work in dirty fluid where a transit time meter will not.

The transit time meter works by projecting a sonic pulse at an angle other than perpendicular to the direction of flow, across the largest pipe diameter. The time from transmitting on one side of the pipe to receiving on the other side is called transit time and is proportional to the speed of sound in the fluid and the increase or decrease in velocity due to fluid movement. Typical orders of magnitude are 1400 meters per second speed of sound in crude oil, and 3 meters per second oil flow velocity.

First a pulse is projected upstream, then downstream. The transit time is measured and the difference between the upstream and downstream time determined by subtraction. The result is a time period equal to twice the change in time due to fluid flow.

Since the beam passes through the fluid at an established pipe chord, a velocity profile must be assumed. This limits the typical accuracy of single path flow meters to about +/- 3 %, although better results have been obtained by calibrating at a particular flow rate.

The next step toward greater accuracy is to increase the number of beams in order to somehow determine the velocity profile. The industry has developed two methods for doing this. The first method is to use multiple parallel beams and a method of numerical integration called Gaussian quadrature integration. By determining the flow velocity at several points, the velocity profile can be determined quite accurately. The LEFMs use the multiple beam (four path) system.

The second method is to use two beams at right angles to each other, with each beam reflected back. This has the advantage of eliminating errors due to cross flow, or eddies. This is a newer method and less is known about it. It was not tested because the four path LEFM transducers were already in place, making that concept more attractive financially.

Clamp on vs. Intrusive:

One of the big advantages of ultrasonic flow meters is that most of them are non-intrusive when measuring liquid flow. This permits easy installation, and allows the passage of inspection and cleaning devices.

An ultrasonic meter can be installed to measure liquid flow in a process without shutting the process down; an intrusive meter (orifice plate, turbine meter, elbow tap, etc.) requires a shutdown to install the transducers.

As with most technical equipment, however, there are real world complications. In actual installations the advantages of non-intrusive flow meters become less dramatic when high performance is desired. For example, the four path chordal meter used for this test in indeed non-intrusive, permitting easy pig passage. It is not a clamp on, however, due to the necessity to precisely locate the four beams relative to each other and relative to the pipe geometry. An expensive spool piece is necessary to maintain the precise beam spacing, consistent pipe roundness, and precise inner diameter required. Four path systems can still be installed at a fraction of the cost of turbine meters, however.

The next quantum step for four path flow meters would therefore be clamp on transducers to reduce the cost.

Description of Caldon Four Path Ultrasonic Flowmeter.

Principles of Operation:

The Caldon four path ultrasonic flow meter uses a precision fabricated spool piece with wetted transducers installed in instrument bosses at precise locations. The spool piece is welded into the line. Refer to figures 1 and 2 for photos of the electronics and the spool piece.

To determine corrected mass flow the fluid velocity is measured along each of the four paths using the transit time technique. The velocity profile is determined, and mass flow is calculated. Corrections are then added for temperature and pressure effects upon oil density and spool piece geometry.

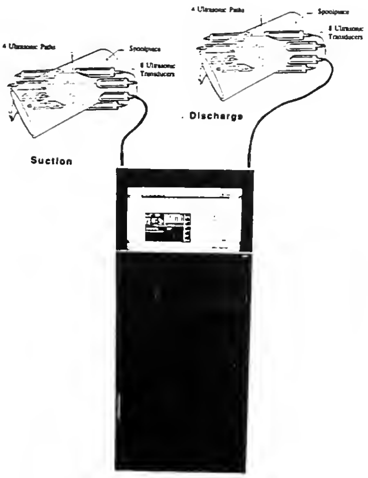


FIGURE 1: LEFM MODEL 8300 AND METERING SECTION

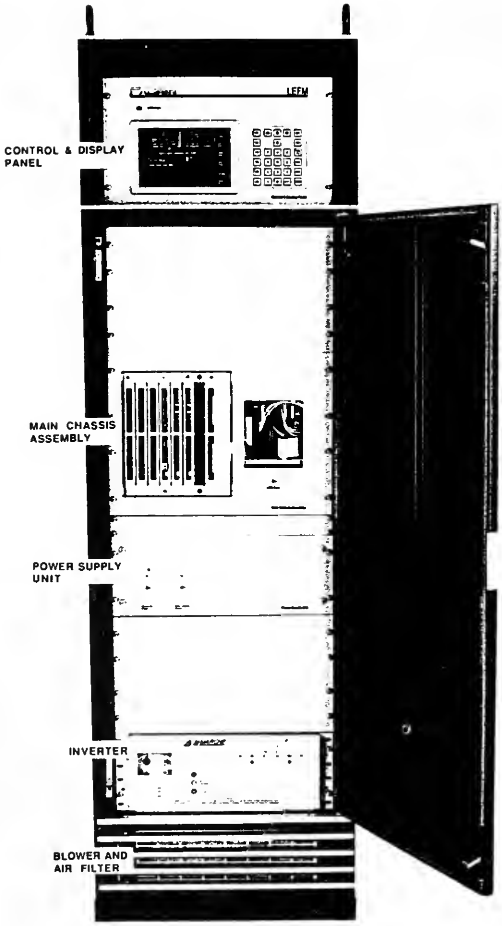


FIGURE 2: LEFM MODEL 8300 ELECTRONICS CABINET, FRONT VIEW

Measuring Transit Time:

A pair of transducers sends ultrasonic (500 khz) pulses to one another along a measurement path at an angle to the flow. The transit time depends on both the speed of sound in the fluid and the flow velocity of the fluid along the path. Transit time is shorter for pulses travelling downstream with the flow:

$$T_d = L_p/(C+V_p)$$

Transit time is longer for pulses travelling upstream against the flow:

$$T_u = L_p/(C-V_p)$$

Where:

T_d = downstream transit time

T_u = upstream transit time

L_p = path length

C = speed of sound in fluid

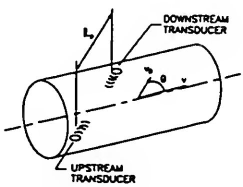
V_p = flow velocity along ultrasonic path

V = flow velocity along pipe axis = $V_p \text{Cos}\emptyset$

When pulses travel upstream and downstream at approximately the same time the above equations may be treated as simultaneous, and solved for two unknowns, C and V_p. Solving for V and taking into account the path angle Ø:

$$V = [L_p(T_u-T_d)]/[2T_dT_u\text{Cos}\emptyset]$$

Using this method, the velocity measurement V is independent of the speed of sound C, which varies as a function of temperature, pressure, density, and other parameters.



Vector Diagram of Transit Time Measurement

Calculating Gross Flow Rate:

The LEFM uses four pairs of transducers to measure flow velocities along four paths. Very specific transducer spacings are required, as shown in figure 3. The transducer assembly is shown in figure 4. The ultrasonic path velocity measurements are combined using the Gaussian Quadrature technique to obtain gross volume measurement:

$$Q = DS[W_1(L_pV_p)_1(\tan\emptyset_1)+W_2(L_pV_p)_2(\tan\emptyset_2)+ +W_3(L_pV_p)_3(\tan\emptyset_3)+W_4(L_pV_p)_4(\tan\emptyset_4)]$$

where:

Q = volume flowrate

D = inside pipe diameter

S = Gaussian correction factor

W_n = Gaussian weighting factors

$L_{p(n)}$ = path lengths

$V_{p(n)}$ = flow velocity along ultrasonic paths

$\emptyset_n$ = path angles

During installation precision measurements of inside diameter, path lengths, and path angles are taken and inserted into the equation for gross volume flow rate. These values and the Gaussian constants are used to calibrate the Caldon LEFM 8300.

Transducer inputs are used to automatically compensate for spool piece expansion and contraction due to changes in temperature and pressure.

Net volume flowrate is then calculated by correcting the gross volume flowrate to standard oil conditions at 60 degrees F. and 0 psig. Temperature and specific gravity correction factors are used from API Standard 2540 table 6a; pressure correction factors from API Standard 11.2.1 are used.

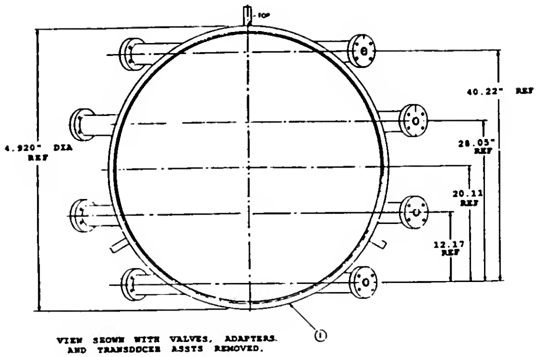


FIGURE 3: LEFM TRANSDUCER SPACING.

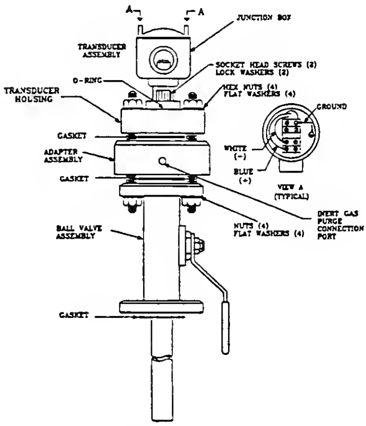


FIGURE 4: LEFM TRANSDUCER ASSEMBLY DETAILS.

Software Description:

The LEFM 8300 software is an example of Object Oriented Programming, allowing for changing and debugging from a single point in the source code. The bulk of the code is written in C++, with assembler code for the high speed low level interfaces between the CPU and APU and also for the high speed DMA Graphics routines.

The object oriented software allows simple implementation of multiple configurations, and allows for for customization for individual application needs. Custom outputs, inputs, and data presentation windows can be configured for other applications.

Functional windows are used to display discrete sets of data such as diagnostic, set-up, or operational parameters. Each of these windows may be selected by the operator by means of "soft-keys" displayed in a definition box on each screen.

Test Description:

The Caldon Model 8300 flow meter electronics was installed at both the suction and discharge sides of Pump Station 11 of the Trans-Alaska Pipeline, using the existing spool pieces. Pump Station 11 is located at Glenallen, Alaska at pipeline milepost 686, about 1500 feet above sea level. The terrain is not mountainous from Pump Station 10 to Pump Station 11; hence, there is no slack line between the two stations at present flow rates. The Valdez Terminal is 114 miles South of Pump Station 11, over Thompson Pass.

Crude oil temperature at Pump Station 11 is about 110 degrees F., and pressure is about 600 psig. Flow rates are slightly over 76,000 barrels per hour. There are no pumps at PS 11.

~ 53,000 gal/min

This test was part of the design verification test (DVT) called out in the purchase specification. The purpose was to determine the repeatability and absolute accuracy of the instrument, and to wring out those problems which inevitably show up when the first prototype is fielded. The DVT specified that data would be taken for 30 days. Three major comparisons were to be made:

a) Comparison of Pump Station 11 suction flow with Pump Station 11 discharge flow: since independent spool pieces and electronics were used for suction and discharge, this would be a good measure of the repeatability of the flow meter. The acceptance criteria was that the standard deviation of the error between suction and discharge flow rates be not greater than +/- 0.167 % over the entire range of oil temperatures and pressures. The temperature and pressure compensation was done by lookup tables using API Standard 2540 table 6a, and API Standard 11.2.1. This section of the computer had been previously tested at the factory and found to introduce essentially no error. Therefore, the entire error margin of +/- 0.167 % was used as the pass/fail criteria for this test, even though the suction and discharge pressures and temperatures were not exercised over their entire range.

b) Comparison of Pump Station 11 LEFM suction totalizer with Pump Station 11 LEFM discharge totalizer; pass/fail criteria was the same as in item a) above. Flow total is the time integral of flow rate, so any offset error between suction and discharge should become evident over the thirty day test period.

c) Comparison of the average flow total passing through Pump Station 11 with the flow received at Valdez over the 30 day period. This gives an approximation of absolute accuracy, since the LEFMs are being compared with the custody transfer turbine meters at Valdez incoming. At 10 miles per hour it takes about 11 hours for the oil to flow from Pump Station 11 to Valdez, which introduces an error in the short term if flow is not steady. Since data was taken for 30 days, this error was ignored. The pass/fail criteria for this test was +/- 0.250 %.

Pump Station 11 data was recorded locally using the on board data logger resident in the Caldon model 8300 flow meter. Data for Pump Station 11, Pump Station 12, and Valdez incoming was recorded at Valdez using the Data General MV10,000 SCADA computer. A comparison could then be made between data recorded at Pump Station 11 and Pump Station 11 data recorded at OCC, to verify the accuracy of the SCADA data link.
Another goal of the test program was to wring out all the "bugs" including the man/machine interface, on board data logger, output update rate, power supply failover characteristics, dc and ac operation, changing of set points and parameters, compatibility of the multiplexed BCD output with the Square D PLC communication device, on board diagnostics, internal timing problems between the processor and the flow meter, software glitches, physical layout of parts and controls, software modification procedures, documentation format and control, security of access to software and set points, and any other deficiencies which may become evident during this test.

Data was recorded every 15 minutes for 30 days at Pump Station 11 using the Caldon on board data logger. There were some software and operational problems which prevented the data from running an unbroken 30 days, but 30 full days of data was collected.

The data was recorded in MS-DOS format by the Caldon 8300. It was then read into a Lotus spread sheet program, translated into Excel, and processed on a Macintosh IIsi. The following parameters were recorded at Pump Station 11. An example page of data is shown as figure 5.

FIGURE 5: SAMPLE DATA PAGE, LEFM TEST AT PUMP STATION 11.

LEFM8300 DATALOG - C 107151650 pm														TEMP	PRESSURE	FLOW RATE	FLOW TOTAL
Year	Month	Day	Hour	Min	Sec	DTemp	STemp	DPres	SPres	DNFR	SNFR	DNFT	SNFT	ERROR	ERROR	ERROR	ERROR
1991	7	15	16	0	0	110.7	110.8	612	607	58816	58180	5851	5888	-0.1	-5	0.4438883	0.25174181
1991	7	15	16	15	0	111	111.8	567	676	58251	58486	20344	20416	0.8	-8	0.42044012	0.36328784
1991	7	15	16	30	0	110	110.2	582	683	58781	58816	34421	34545	0.2	-8	0.10213088	0.35858748
1991	7	15	16	45	0	110.6	110.1	601	687	58017	58364	48713	48878	-0.7	-4	0.47830821	0.33405404
1991	7	15	17	0	0	111.4	110.8	613	610	58232	58308	63380	63586	0.5	-3	0.12465448	0.34022177
1991	7	15	17	15	0	110	110.4	613	688	58860	58077	78123	78388	0.4	-15	0.38788304	0.31211705
1991	7	15	17	30	0	110.7	111.3	605	600	58566	58821	82808	83105	0.5	-5	0.43448037	0.32186828
1991	7	15	17	45	0	108.8	110.2	588	580	58505	58520	107474	107788	0.3	-8	0.02583655	0.30184218
1991	7	15	18	0	0	111.1	110	583	581	57630	58101	121885	122378	-1.1	-2	0.29474882	0.32185282
1991	7	15	18	15	0	110.8	110.2	582	580	57871	58065	136482	136811	-0.8	-2	0.21367183	0.30860724
1991	7	15	18	30	0	110.1	110.7	618	618	60784	60836	161143	161807	0.0	0	0.12335222	0.30852383
1991	7	15	18	45	0	108.8	110.1	626	622	62308	62413	166628	167087	0.2	-8	0.18837881	0.28048861
1991	7	15	19	0	0	110.7	108.8	662	648	68784	68700	182448	182838	-0.8	-4	-0.0824137	0.28876414
1991	7	15	19	15	0	111	111.3	688	678	72072	72064	188788	200188	0.3	-13	-0.0248781	0.24488787
1991	7	15	19	30	0	110.3	111.1	682	687	71101	71046	217841	218883	0.8	-6	-0.0785888	0.20288072
1991	7	15	19	45	0	110.4	111.2	677	683	71888	71713	236436	235884	0.6	-14	-0.2437308	0.18205004
1991	7	15	20	0	0	110.8	110.1	678	671	73180	73110	258475	253872	-0.7	-7	-0.0870288	0.16850038
1991	7	15	20	15	0	110	110.6	676	674	72041	72080	271501	271905	0.6	-6	0.0878537	0.14868177
1991	7	15	20	30	0	110.8	110.1	661	670	72386	70220	288663	288673	-0.7	-11	-0.2420216	0.13113281
1991	7	15	20	45	0	110.1	110.6	676	677	70874	70630	307503	307677	0.4	1	-0.0820138	0.12165001
1991	7	15	21	0	0	110	110	668	666	68333	68182	326046	326375	0	-1	-0.2488463	0.1802423
1991	7	15	21	15	0	108.8	110.8	668	654	68633	68382	342404	342063	1.2	-12	-0.2123801	0.08438782
1991	7	15	21	30	0	110.2	110.7	684	681	72131	71023	360165	360414	0.6	-3	-0.2867808	0.06811108
1991	7	15	21	45	0	108.8	108.6	682	685	73613	73328	378410	378661	-0.3	-7	-0.2618732	0.04782028
1991	7	15	22	0	0	110	110.6	701	682	74113	73682	388881	388661	0.5	-8	-0.3121727	0.0327617
1991	7	15	22	15	0	110.4	110.1	680	680	74812	74788	415848	416613	-0.3	-2	-0.1650868	0.01640013
1991	7	15	22	30	0	110.7	108.3	684	682	75661	75531	434328	434384	-1.4	-6	-0.0132387	0.01408946
1991	7	15	22	45	0	108.7	108.6	678	672	76318	76286	463362	463404	-0.2	-6	-0.0301412	0.01146946
1991	7	15	23	0	0	108.3	110	673	688	76036	76161	472411	472467	0.7	-7	0.16031637	0.00873881
1991	7	15	23	15	0	108.4	110.4	683	687	75465	76311	481344	481307	1	-6	-0.1610245	0.00876112
1991	7	15	23	30	0	110.2	110.6	684	661	74876	76055	610116	610188	0.4	-13	0.10021157	0.00886116
1991	7	15	23	45	0	110.7	110.7	683	661	75447	76425	628818	628878	0	-2	-0.0281838	0.01877612
1991	7	16	0	0	0	108.8	108.7	668	658	76271	75887	647850	647677	-0.1	-6	-0.1373488	0.00482823
1991	7	16	0	15	0	108.8	108.8	670	681	76110	76088	588867	688881	0.3	-6	-0.0581424	0.00246848
1991	7	16	0	30	0	111	110.6	678	6,8	76620	78544	686633	685845	-0.5	-1	-0.08824	0.00204788
1991	7	16	0	45	0	108.8	108.8	674	674	76607	76675	608136	606140	0.2	0	0.11463003	0.00088101
1991	7	16	1	0	0	110.3	110	682	660	76511	76516	624270	624270	-0.3	-13	0.00083476	0.06144187
1991	7	16	1	15	0	110.8	110.7	676	677	76030	76174	643343	643388	-0.2	-2	0.17066613	0.00864873
1991	7	16	1	30	0	110.1	111.6	665	672	76108	76172	662403	662484	1.4	-13	0.08488387	0.01222748
1991	7	16	1	45	0	110.4	111.6	660	686	76324	78488	681430	681561	1.1	-2	0.18676827	0.01804844
1991	7	16	2	0	0	110.4	110.6	682	688	76320	76605	700561	700707	0.2	-7	0.37273173	0.02863827
1991	7	16	2	15	0	111.6	111.6	688	686	76182	76363	718844	718848	0.4	-10	0.27666528	0.02834333
1991	7	16	2	30	0	110.8	110.7	687	688	76008	76116	738700	738834	-0.2	-1	0.14461888	0.03187228
1991	7	16	2	45	0	111.2	110.8	701	685	75886	75865	757871	757842	-0.3	-6	0.11324432	0.03576111
1991	7	16	3	0	0	111.3	112.2	708	706	76661	76041	776886	777006	0.0	-1	0.26017776	0.04080668
1991	7	16	3	15	0	111.4	111.2	711	707	75665	76615	786641	785882	-0.2	-4	0.02434873	0.04418644
1991	7	16	3	30	0	112.8	112.1	722	716	76133	76382	814832	815042	-0.4	-6	0.32452526	0.05031861
1991	7	16	3	45	0	111.6	111.6	721	717	76336	76444	832733	834161	0.4	-4	0.1367888	0.05122221
1991	7	16	4	0	0	111.3	112	720	723	76516	76411	852820	853202	0.7	-6	-0.1373264	0.05533048
1991	7	16	4	15	0	110.6	110.8	724	718	76517	76478	871063	872418	0	-6	-0.0635872	0.05183828
1991	7	16	4	30	0	111	110.4	720	723	76423	76346	881036	881488	-0.6	-3	-0.1008058	0.05127838
1991	7	16	4	45	0	109.8	110	723	718	76461	76378	810182	810612	0.1	-7	-0.167836	0.04723214
1991	7	16	5	0	0	109.8	110	726	723	76460	76415	828286	828880	0.1	-3	-0.0881001	0.04528417
1991	7	16	5	15	0	110.8	111.8	734	726	76354	76278	848247	848773	1	-6	-0.0862746	0.04481018
1991	7	16	5	30	0	109.8	110.6	726	721	76401	76337	867477	867874	0.7	-6	-0.0638036	0.04102815
1991	7	16	5	45	0	110.8	110.6	721	716	76371	76323	888586	888886	0	-3	-0.0828708	0.04053848
1991	7	16	6	0	0	110.2	108.3	718	712	76284	76280	1005883	1008056	-0.8	-2	-0.0327233	0.03706235
1991	7	16	6	15	0	110.4	111	724	708	76227	76282	1024740	1025122	-0.8	-15	0.07212888	0.0372708
1991	7	16	6	30	0	110	109.4	717	707	76358	76206	1043862	1044201	-0.8	-10	-0.1682808	0.03247026
1991	7	16	6	45	0	109.8	108.6	714	714	76505	76484	1082843	1083272	0.4	0	-0.1711758	0.03064701
1991	7	16	7	0	0	109.1	108	716	707	74705	74555	1082054	1082336	0.1	-6	-0.2008618	0.02808816
1991	7	16	7	15	0	109.1	108.8	658	657	68447	68322	1088868	1100118	-0.2	-2	0.16278	0.02300018
1991	7	16	7	30	0	109.1	108.8	685	685	71516	71301	1117205	1117441	-0.6	-6	-0.3038811	0.02112181
1991	7	16	7	45	0	110.4	108.1	722	716	76422	76428	1135808	1138088	0.5	-6	0.00785083	0.01880138
1991	7	16	8	0	0	109.8	108.8	708	708	77083	76865	1155126	1155317	0.7	0	0.1681712	0.01827381

Suction:	Discharge:
Date	Date
Time	Time
Pressure, psig	Pressure, psig
Temperature, deg. F.	Temperature, deg. F.
Flow rate, bbls/hr.	Flow rate, bbls/hr.
(resolution 1 bbl/hr.)	(resolution 1 bbl/hr.)
Flow total, bbls.	Flow total, bbls.
(resolution 1 bbl)	Resolution 1 bbl)

Performance Results:

The standard deviation of the difference between the suction and discharge flow rate taken every fifteen minutes was 0.157 % over the entire 30 day period.

The standard deviation of the difference between the suction and discharge flow total taken every fifteen minutes was 0.019 % over the entire 30 day period.

Meter factors were calculated by the OCC in Valdez for Pump Station 11 over the 30 day test. These factors would normally be programmed into the Pump Station 11 flow meters to make them agree with the turbine meters at Valdez; however, during this test both the suction and discharge meter factors were left at 1.00000 so that the error between Valdez and Pump Station 11 could be quantified. The suction meter factor remained constant within 0.10 % and the discharge meter within 0.06 %.

Conclusions:

The Caldon Model 8300 LEFM met the performance requirements of the DVT under actual field conditions, within Alyeska's ability to measure performance. Although the requirements were specified as a percentage of full scale and the results were presented as a percentage of point, all accuracy requirements were satisfied.

Future Applications of Ultrasonic Flow metering.

Aircraft fuel metering, hydraulics performance:

The Controlotron Co., 155 Plant Avenue, Hauppauge New York, 11788, manufactures a line of ultrasonic flow meters. Although Controlotron was not chosen for the LEFM upgrade program, Alyeska is successfully using single path Controlotron flow meters to control 23 remote check valves.

Controlotron has established a reputation as an industry leader with respect to new and innovative applications, and is the only known vendor working in the aerospace areas of aircraft fuel and hydraulic fluid measurement.

Integrated leak detection system using on-board IBM AT processor:

The fact that the LEFM is an accurate flow meter and contains an IBM AT clone processor makes it an excellent candidate for an integrated leak detection system. Leak detection algorithms could be programmed into the flow meter, just as are programmed into the Data General MV10,000 SCADA computer by Alyeska. An added advantage in doing the computations at the monitored site is that real time, accurate data would be used. This eliminates SCADA errors and delays in data transmission.

There are four or five firms specializing in leak detection and pipeline simulation software. The flow meter vendors also have programmers on their staff due to the nature of their product. It is doubtful that the software firms could develop a flow meter of the required performance, but it is quite likely that the flow meter vendors could develop all but the most sophisticated leak detection software. It therefore appears that the flow meter vendors have the advantage as this technology evolves, with cross technology working agreements or buyouts being possible.

Regulatory Trends: Internal Inspection, Leak Detection.

Federal and State Legislative bodies are currently studying technology with the intent of regulating pipelines. Proposed legislation seems to be falling into two areas; internal inspection requirements and leak detection requirements. Ultrasonic flow meters may offer certain advantages in both areas.

Internal inspection is best accomplished with smart pigs using ultrasonic, magnetic, and inertial technology. These pigs are propelled through the pipeline by the oil flow. Ultrasonic flow meters can pass these devices through directly, eliminating the valves, launchers/ receivers, and control systems needed to pass pigs through intrusive flow meters.

In the field of leak detection ultrasonic flow meters offer accuracy similar to turbine meters at a fraction of the cost, even taking into account the cost of the four path spool piece.

Acknowledgements:

1) "Operating Manual, LEFM Model 8300 Flow Measurement System", printed November 1990 by Caldon Inc., 2857 Banksville Road, Pittsburgh, Pa., 15216.

2) C. Hartman and P. Johnson, "Environmental Atlas of Alaska", Copyright 1984 by the University of Alaska, Fairbanks, Alaska.

3) Purchase Specification No. APSC 70-70, "Four-Path Ultrasonic Flowmeter-- Electronics Only", Alyeska Pipeline Service Company, 1835 South Bragaw Street, Anchorage, Alaska. 99512.

4) LEFM Model 8300 Service Manual IB 102-1190, printed Nov. 1990 by Caldon Inc., 2857 Banksville Road, Pittsburgh, Pa., 15216.

E. A. JONAS, P.E.
CONSULTING METALLURGICAL ENGINEER
P.O. BOX 1428
BETHLEHEM, PA. 18016
PHONE & FAX 215 865-3300

June 4,1993

Mr. J.A. Cox
Colonial Pipeline Co.
Resurgens Plaza
945 East Paces Ferry Rd
Atlanta GA 30326 1125

Dear Mr Cox:

I am in receipt of your letter of June 1,1993 and the accompanying photograph. This photograph shows a girth weld and associated FBE and concrete coating cut back. Although the size, grade and wall thickness of the pipe cannot be determined from the photograph, it is certainly accurate to state that the pipe in question is submerged-arc welded.

The "longitudinal indication" to which you refer in your letter is, in my opinion, the weld reinforcement of the longitudinal seam used to manufacture this pipe, in accordance with API 5L. As such, it is a normal condition, incident to the production of this size, wall and grade of pipe.

Should you require further assistance in this matter please call upon me.

Yours truly,

E.A. Jonas

E.A. Jonas, P.E.

Kiefner & Associates, Inc.

June 7, 1993

Mr. J. A. Cox
Manager, Technical and Regulatory
Colonial Pipeline Company
P.O. Box 18855
Atlanta, Georgia 30326-0855

Dear Jim:

I have reviewed the picture which you sent on June 1, 1993 of Colonial's 36-inch pipeline located in Virginia taken during construction in 1980. The photograph shows a recently made girth weld in the "cut-back" area of both the red, fusion-bonded epoxy anti-corrosion coating and thick, concrete-weight coating of the two lengths of pipe joined by the girth weld. The picture was taken prior to the final coating of the cut-back region.

Your letter requests that I identify, as best I can, the longitudinally oriented feature that appears in the center of the photograph between the concrete-weight coating and the girth weld, ending abruptly at the girth weld. This feature is the crown of the submerged-arc-welded seam of the length of pipe to the left of the girth weld.

Please call me if you have any questions.

Sincerely,

John F. Kiefner
President

JFK:gw

P.O. Box 268
893 High St., Suite L
Worthington, Ohio 43085
Phone (614) 888-8220
FAX (614) 888-7323

FAIRFAX COUNTY WATER AUTHORITY

8560 ARLINGTON BOULEVARD – P.O. BOX 1500
MERRIFIELD, VIRGINIA 22116-0815

May 14, 1993

FLOYD F. EUNPU
ENGINEER-DIRECTOR
TELEPHONE (703) 698-5600 EXT. 400

CHARLIE C. CROWDER, JR.
DEPUTY ENGINEER-DIRECTOR
TELEPHONE (703) 698-5600 EXT. 402

FACSIMILE (703) 698-1759

The Honorable Robert Borski
Chairman, Subcommittee on Investigations & Oversight
U.S. House of Representatives
2161 Rayburn House Office Building
Washington, DC 20515

Dear Congressman Borski:

The Water Authority is the largest supplier of water in Virginia---serving approximately one million northern Virginians. Many of our customers are members of the U.S. Senate and U.S. House of Representatives.

In late March the Potomac River, one of our major sources of water, and a treasured natural resource for the national capital area...was contaminated with heating oil as a result of a ruptured interstate oil pipeline. The pipeline, owned by the Colonial Pipeline Company, passes through thousands of communities from Texas to New Jersey, and is only one of several oil pipelines which traverse our country. The break which occurred in this oil pipeline in March occurred in Fairfax County, Virginia. The oil spilled into a local creek and within hours entered the Potomac River. The oil hugged the Virginia shoreline and forced the closing of the Water Authority's largest water purification plant. For a total of 18 days, 11 consecutive days, we were forced to operate using another source of water, the Occoquan Reservoir, and our customers were requested to curtail water use. Despite the serious threat to our operations we were able to endure this disaster without running out of water, however, our situation is unique.

We are one of the few water suppliers in the nation, and the only one in the national capital area, which has an alternative source of supply of this magnitude. The consequences would have been devastating had this oil pipeline rupture occurred on the Maryland side of the Potomac River. Imagine our Federal City---Washington, D.C.---closed for half a month, along with the Maryland suburbs. Picture this scenario and you will see a severe and damaging economic impact with closed businesses and schools. The consequences would be unthinkable---the capital of the world's greatest nation shutdown by a ruptured oil products pipeline.

On April 29, 1993, the Fairfax County Water Authority hosted the 15th Annual Meeting of the signatories to the Potomac River Low Flow Allocation Agreement. A major topic of discussion was the recent oil spill referred to previously. After numerous questions and discussions it was the unanimous opinion of all of the signatories (Maryland, District of Columbia, Virginia, Corps of Engineers, (Washington Aqueduct), Washington Suburban Sanitary Commission, and the Fairfax County Water Authority that the Interstate Commission on the Potomac River Basin would present our concerns to any regulatory governmental body that might address this issue. In particular, all parties were deeply concerned as to the affect on our Nations Capital should a break of this nature occur on the Maryland side of the Potomac River.

The Water Authority strongly endorses the recommendations proposed to the committee by the Interstate Commission on the Potomac River Basin, namely:

(1) verification of the physical integrity of interstate oil pipelines and the locations of valve installations,

(2) state-of-the-art improvements to reduce the risks from existing pipelines, including retrofitting as necessary, and

(3) comprehensive monitoring control and inspection reporting procedures.

This year's incident has not been the first time the Water Authority's water supply has been threatened by an oil pipeline failure. In 1980 our Occoquan River supply was victimized. We live with the constant threat of having our water sources contaminated by aging and inadequate oil pipeline facilities.

We appreciate the time that you have devoted to this extremely important issue. Our staff is available to answer any questions that you may have on this subject.

Very truly yours,

Fred C. Morin

Fred C. Morin
Chairman

SPILLLTR\FCM:bw

Attachment - Distribution and Copies List

May 14, 1993

Distribution List
Committee on Public Works and Transportation

The Honorable Norman Mineta
The Honorable Robert Borski
The Honorable Barbara Rose Collins
The Honorable Robert Wise
The Honorable Greg Laughlin
The Honorable Lucien Blackwell
The Honorable Leslie Byrne
The Honorable James Barcia
The Honorable Bob Filner
The Honorable Eddie Bernice Johnson
The Honorable James Inhofe
The Honorable John Duncan
The Honorable Susan Molinari
The Honorable Bill Zeliff
The Honorable Wayne Gilchrest
The Honorable William Baker
The Honorable Bud Shuster

cc: Dr. S. Schwartz, Interstate Commission on the Potomac River Basin
Mr. F. Eunpu, Fairfax County Water Authority
Mr. P. Costas, Washington Aqueduct Division, U.S. Army Corps of Engineers
Mr. J. Corless, Washington Suburban Sanitary Commission
Mr. J. Peck, Maryland Department of Natural Resources
Mr. R. Burton, Virginia Department of Environmental Quality
Mr. G. Papadopolous, District of Columbia
Col. J. R. Capka, Baltimore District, U.S. Army Corps, of Engineers

H. Garon Stutzman

May 24,1993

Congressman Robert A. Borski
Chairman
Investigations and Oversight Subcommittee
Rayburn House Office Building
Washington, D.C. 20515

Dear Congressman,

I attended your hearing regarding the ruptured oil pipeline on May 18, 1993.

I appreciate Congressman Wolf including a few words on behalf of the subsurface utility engineering (SUE) profession.

Enclosed, is my statement that I hope you will include in the official hearing documents. The time has come for the SUE profession. *The SUE profession locates and certifies the three-dimensional location of underground structures, such as utility lines, before the design of excavation projects.* Doesn't it make sense that once an excavator has the location of an underground utility he is less likely to damage it? Did you know that traditionally the depths of underground utilities are not available to project engineers or excavators? Unfortunately, this is a story most people do not know and a story that the utility industry will not tell you. The reason has to do with them not wanting to be responsible to provide detailed levels of data. Unfortunately, engineering tradition holds excavators responsible to locate utility lines at the time of excavation. Because of the new SUE profession, requiring excavators to locate during construction is unnecessary, dangerous, expensive and irresponsible. The SUE profession specializes in locating and protecting utility lines before design of a project -- not at time of excavation. *The concept of SUE is simple -- before an engineer designs a project requiring excavation, the engineer should know what structures are beneath the earth and where they are three dimensionally.*

It pleases me to furnish you my statement and I would be please to discuss this issue further with your committee

Sincerely,

Garon Stutzman

HomeOffice: 7726 Wyckland Court, Clifton, Virginia 22024 Phone/Fax (703) 830-0859 (Call Before Faxing)

Statement For The Official Congressional Hearing Into The Ruptured Colonial Oil Pipeline

May 24, 1993

SO-DEEP Inc.

The Subsurface Utility Engineering Company

8397 Euclid Avenue
Manassas Park, Virginia 22111

(703) 361-6005
Metro: 631-6967
FAX (703) 361-7587

We heard sworn witnesses, plus Colonial Pipeline Company, state that "pipelines are the safest mode of transportation for petroleum and petroleum products". I agree and want to tell you about proven new technologies that will make pipeline transportation more safe while costing less money.

We also heard sworn testimonies that "third party damages or diggins to pipelines are the number one cause of pipeline disruptions". I agree and want to tell you how these new technologies not only make pipelines a safer mode of transportation but also manage "third party damages and diggins" while costing less money.

Many of these sworn witnesses, including Colonial Pipeline Company, went on to say that "local government agencies should become more involved in the regulation of development and construction around pipelines". I fully agree that local governmental agencies should become more involved. ***The best way for government agencies to become involved in making pipelines a safer mode of transportation is to protect pipelines from third party damages and diggins by requiring three-dimensional certification of underground utilities before issuing excavation permits.***

Permit issuing agencies can add a simple check-off item to the plan review process ensuring that project owners have obtained certified, three-dimensional (horizontal and vertical) utility data before the issuance of an excavation permit or site plan. This simple step would handily address the issue of "third party damage"[1](the number one cause of pipeline disruptions).

"The common denominator in almost every underground utility damage can be traced to lack of reliable three-dimensional utility data".

---

[1]In 1981 The County of Fairfax, Virginia and in 1984 the Virginia Department Of Transportation entered into a Subsurface Utility Engineering (SUE) program that requires a registered professional to certify the three-dimensional location of all underground utilities on public sector projects. Since the beginning of these programs there has not been a case of a damaged utility line on any FF.Co. or VDOT project. VDOT and Fairfax County are recognized as the first and two of the best public agencies regarding SUE damage prevention procedures. Please note however, neither FF Co. nor VDOT requires this level of engineering quality on private sector projects for which they issue excavation permits. The private sector result during the same time has been thousands of damaged utility lines.

Performing out-of-sight work... *with vision!*™

Until qualified professionals are required, by permit issuing agencies, to provide certified three-dimensional locations of underground utility lines, before excavation, there will continue to be catastrophic utility damages.

Before the development of subsurface utility engineering (SUE) technologies' engineers designed excavation plans using uncertified, uninsured, two-dimensional (horizontal) utility information. This information is available from utility companies at no cost. Utility records however are not three-dimensional nor are they certifiable. The records used are so unreliable that utility companies and engineers add disclaimers to utility records that try to shift responsibility for utility locations to the contractor. As you might expect, the contractor is the least professionally competent person to locate, coordinate, survey and notify the project engineer and utility company if utility conflicts exist. This is the primary reason for third party damages and diggins!

No engineering or utility company anywhere in the nation can or will certify utility records. Shouldn't this tell us something about the prudence of issuing excavation permits for projects when excavation is based on utility records? Since lack of reliable utility data is the primary cause for third party damages and diggins it only stands to reason that providing excavator's quality, three-dimensional, underground utility data, before excavation, will reduce utility damages.

Sincerely,

Garon Stutzman

Garon Stutzman[2]

[2]I am the recognized founder of the SUE profession. I was The 1990 Entrepreneur Of The Year® in the Washington D.C. area and I am a lifetime inductee into the "Entrepreneurial Hall of Fame" in Chapel Hill, N.C. Both of these recognition's was for my work in developing the SUE profession. Additionally, I am Chairman of four companies' two of which specialize in providing SUE services.

○

ISBN 0-16-041564-0

90000

9 780160 415647