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**Research and
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Annual Report on Pipeline Safety

Calendar Year 1983

Materials Transportation Bureau

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PREFACE

This report on the administration of the Department of Transportation's (DOT) Pipeline Safety Program is prepared as prescribed by Sections 16 of the Natural Gas Pipeline Safety Act of 1968, (49 USC § 1683) and 213 of the Hazardous Liquid Pipeline Safety Act of 1979, (49 USC § 2012). The Pipeline Safety Act of 1979, P.L. 96-129 besides amending the Natural Gas Pipeline Safety Act of 1968, Title I, included a Title II which created the Hazardous Liquid Pipeline Safety Act of 1979. This report, therefore, describes the Department's activities during calendar year 1983 to promote and influence the safe transportation of both natural gas and hazardous liquids through the Nation's network of pipelines.

Natural Gas Pipeline Safety

The Natural Gas Pipeline Safety Act (NGPSA) of 1968, as amended (49 USC 1671 et seq.), provides for regulation of those facilities used in the transportation by pipeline of natural and other gases in, or affecting, interstate or foreign commerce. It created exclusive Federal authority over interstate gas pipeline systems and granted the Department overall responsibility for regulation of intrastate gas systems, with provisions allowing for state assumption of regulatory jurisdiction over intrastate systems. DOT's responsibility for safety regulation of natural gas pipelines involves more than 2,300 operators of a gas pipeline network of more than 1.5 million miles. This total includes almost 37,000 miles of gathering lines, 307,000 miles of transmission lines, 812,000 miles of distribution mains, and 406,000 miles of service lines. DOT is also responsible for regulating approximately 81,000 master meter operators.

As an incentive for states to assume regulatory jurisdiction over intrastate pipeline systems, the NGPSA authorized establishment of a grant-in-aid program that allows states to apply to the Department for up to 50 percent of their costs to operate a gas pipeline safety program. Under a system of "Certifications" or "Agreements", states elect either to adopt and enforce Federal safety regulations, or to undertake on behalf of the Department certain inspection activities, referring instances of non-compliance to the Department for Federal enforcement action. The success of this Federal/state partnership, measured in terms of the total resources devoted to pipeline safety, clearly demonstrates the cost benefit advantages of subsidizing the development of state regulatory and inspection expertise. Furthermore, state adoption and enforcement of the Federal Pipeline Safety Regulations influenced by the financial incentives provided by the grant

program, results in very effective national enforcement of pipeline safety standards.

Liquid Pipeline Safety

The Hazardous Liquid Pipeline Safety Act of 1979 (HLPESA) (49 USC 2001 et seq.) granted the Department substantial regulatory and enforcement authority over interstate and intrastate transportation of hazardous liquids by pipeline and pipeline facilities which mirrors that granted by the NGPSA. Specific provisions allow for establishment of minimum pipeline safety standards governing the transportation of hazardous liquids by pipeline; a Federal/State partnership in regulating intrastate hazardous liquid pipelines with financial assistance to state agencies participating in the program; and establishment of enforcement remedies for violations of the safety standards.

Since enactment of this legislation, the Department has exercised its authority to regulate the interstate movement of hazardous liquids but reserved for future rulemaking any application to intrastate operators. Based upon experience with the natural gas pipeline program, the Department delayed implementation of the intrastate program to allow states time to adopt authorizing statutes to qualify them for certification to carry out the requirements of Section 205 of the HLPESA. Section 205 invites states, under a system of "Certifications" similar to that in effect for natural gas pipelines, to assume enforcement of the pipeline safety standards as they apply to intrastate pipeline facilities. With most interested states having acquired enabling legislation, the Department plans to implement this certification program in the near future.

Departmental Responsibilities

The Department's pipeline safety program is administered by the Materials Transportation Bureau (MTB) of the Research and Special Programs Administration (RSPA). Pipeline safety functions assigned to MTB include developing, issuing, and enforcing regulations for the safe transportation of natural gas, liquefied natural gas, and other hazardous liquids by pipeline. MTB's regulatory programs are designed to assure safety in the design, construction, testing, operation, and maintenance of these pipeline facilities, and in the siting of new liquefied natural gas facilities. In support of these regulatory responsibilities, MTB manages grants to aid states in conducting intrastate gas pipeline safety programs; monitors performance of those state agencies participating in

the program; collects, compiles, and analyzes pipeline safety and operating data; and conducts training programs for government and industry personnel in the application of the pipeline safety regulations.

MTB also conducts a pipeline safety technology program with primary emphasis on applied research. This program delivers solid analytical methodologies and state-of-the-art technology that support regulatory decision making, ensure the integrity of inspection and enforcement activities, and provide the technical and analytical foundation necessary for planning, evaluation and implementation of the natural gas and hazardous liquid pipeline safety program.

Also assigned to MTB is the function of the Department's Agency Authorized Officer (AAO) for the Alaska Natural Gas Transportation System project. Under the organizational structure established by Executive Order 12142, the AAO represents the Department within the Office of the Federal Inspector, and is responsible for monitoring and expediting all the project related activities that fall within the purview of the Department.

REGULATORY PROGRAM

The Federal safety regulations applicable to interstate and intrastate transportation of natural and other gas by pipeline are published in 49 CFR Parts 191, 192, and 193 and those regulations governing hazardous liquid pipelines are contained in Part 195. Four amendments to these regulations were issued in 1983:

- o Amendment Nos. 192-45 and 195-28 - Qualification of Metallic Components - establishes criteria for qualifying pipeline components manufactured according to industry voluntary standards not yet incorporated by reference into the Department of Transportation safety regulations. The existing regulations precluded the use of millions of dollars of metallic pipeline components manufactured according to unreferenced editions of voluntary standards. This amendment will permit the use of these components contingent upon their safety being assured under criteria set out in this amendment.

- o Amendment Nos. 192-44 and 195-27 - Line Marking at Navigable Waterways - revokes the regulations requiring pipeline operators to maintain line markers at locations where pipelines cross navigable waterways. The previous regulations were considered to be costly and no empirical evidence existed to demonstrate the effectiveness of the

markers in reducing the potential for accidents. It was also apparent that the benefits of the markers would not be available at night or in fog.

- o Amendment 195-26 - Retention of Radiographic Film -deletes the requirement to retain radiographic film for three years after a line is placed in service and to map the location of the radiographed welds. The requirement was found to be redundant in that other conditions of the regulations require that records be kept for the life of the facility showing the total number of girth welds, the number tested, rejected, and the disposition of those rejected.

- o Amendments 192-46 and 195-29 - Repair or Removal of Girth Weld Defects - changes the pipeline construction requirements of Parts 192 and 195 by modifying the present regulations on the repair or removal of defective girth welds utilizing performance standards for weld repair. The revised requirements permit the more cost effective repair of a weld crack, as well as the repair of any weld defect in a previously repaired area, provided that qualified weld repair procedures are followed. The procedures must assure that the soundness and mechanical properties of a repaired weld will be equal to an acceptable original weld.

Among the proposals for regulatory change issued in 1983 were those that would:

- o evaluate the feasibility of the requirement for monitoring external corrosion control on natural gas pipelines under cathodic protection where the pipe is located under continuous paving or in areas where electrical stray currents interfere with cathodic protection measurements;
- o eliminate the specification criteria now in use for control of isolated corrosion pitting and, instead, adopt a performance standard that would permit the industry to take advantage of technological advances in evaluating the strength of corroded pipe; and,
- o revise the reporting requirements for incident and annual reporting of gas leaks and failures to clarify definitions and instructions, remove redundancies, and redesign the reporting forms to lessen the amount of information requested without compromising safety.

Two proposals for rulemaking, one on odorant level controls and the other on the frequency of leakage surveys, were withdrawn after review of comments and further evaluation concluded that the minimal benefits to be gained by the proposed standards did not justify the substantial cost of compliance to the industry.

Waivers Granted

In unusual circumstances where strict compliance with a pipeline safety regulation would not be appropriate and where sufficient safeguards to the public safety are set in place, MTB, at its discretion, may grant an operator's petition for a waiver from that regulation. MTB granted two such petitions in 1983:

- o The Florida Gas Transmission Company was granted a waiver that would permit temporary continued service of a segment of gas pipeline that under the regulations should be replaced or have its pressure reduced as a result of increased population near the pipeline's location. In view of the fact that the line was scheduled for conversion to liquid petroleum product service in three years and that reconstruction, costing over \$500,000, and pressure reductions would not be required in liquid pipeline service, MTB granted a waiver from the replacement requirement provided the pipeline is hydrostatically tested.
- o The Tennessee Gas Pipeline Company sought a waiver from the requirement to bury plastic pipe installed above ground while the regular service tap was temporarily out of service. Because the purpose of burying plastic pipe is to avoid long term degradation of the plastic due to ultraviolet exposure and this temporary situation would be of short duration, MTB granted the waiver.

A summary of all 1983 regulatory issuances appears in Appendix A.

Safety Standards Committees

As required by the Natural Gas Pipeline Safety Act of 1968, and the Hazardous Liquid Pipeline Safety Act of 1979, all proposed amendments to the pipeline safety standards issued in 1983 were reviewed by the Technical Pipeline Safety Standards Committee (TPSSC) and the Technical Hazardous Liquid Pipeline Safety Standards Committee (THLPSSC). These Committees function as advisory bodies to the Materials Transportation Bureau with responsibility for evaluating proposed pipeline safety standards and reporting on their technical feasibility, reasonableness, and practicability. Each Committee is comprised of 15 members, five from Federal, State or local governments (including two state commissioners), four representatives from the pipeline industry, and six representatives from the general public. All are appointed for three-year terms. Charters for both committees were renewed for an additional two years during 1983 and both committees met once in 1983.

The TPSSC reviewed and voted favorably on five natural gas regulatory proposals that resulted in substantive improvements to the weld repair and line marking regulations in addition to regulatory actions being finalized in gas incident reporting and corrosion control improvements. The THLPSSC considered and concurred in principle with the following regulatory proposals: extension of interstate pipeline regulation to intrastate; pipeline facilities used in the transportation of petroleum; petroleum products or anhydrous ammonia; new criteria for isolated corrosion pitting; and, qualification of pipeline welders.

FEDERAL/STATE COOPERATIVE PROGRAM

Natural Gas Pipeline Program

With the exception of Alaska and South Dakota, all states, along with the District of Columbia and Puerto Rico, participated in the gas pipeline safety program in 1983. Under this program, authorized by the Natural Gas Pipeline Safety Act (NGPSA), states agree to assume regulatory and enforcement authority over certain gas pipeline operations within their borders. These responsibilities are carried out by designated agencies within each state operating under either of two authorities: 5(a) certifications or 5(b) agreements.

State agencies certified under section 5(a) of the NGPSA assume regulatory and enforcement authority over intrastate gas facilities. To qualify, a state agency must, among other things, have adopted the Federal Gas Pipeline Safety Standards and must enforce those standards through injunctive and monetary sanctions substantially the same as those provided by Sections 11 and 12 of the NGPSA.

State agencies that do not meet the criteria for 5(a) certification may enter into a 5(b) agreement to undertake certain

aspects of the gas pipeline safety regulatory program for intrastate facilities on behalf of the Department. Under a section 5(b) agreement state agencies conduct inspections to ascertain compliance with the pipeline safety regulations. Probable violations are reported to the Department of Transportation for federal enforcement actions.

States may also elect to conduct inspections of interstate transmission line facilities within the State as Interstate Agents on behalf of the Department. State responsibility in this instance parallels responsibility assumed under section 5(b) agreements, in that detection of probable violations of the regulations are reported to the Department for enforcement action.

The financial incentive offered by the grant program, which provides for reimbursement to state agencies of up to 50% of their expenses incurred in discharging these regulatory responsibilities, has served to encourage states' continued involvement in this program. In 1983, 48 state agencies held 5(a) certifications, three operated under 5(b) agreements, and twelve acted as Interstate Agents on behalf of the Department. A total of \$3.5 million in grant funds was allocated to the 49 state agencies applying for financial assistance. South Carolina has never participated in the grant program and Florida's Public Service Commission withdrew from the program in 1983 after a single year's participation, citing burdensome paperwork associated with the small grant allocation, as its reason for withdrawal. (State certification and fund allocation data are displayed in Tables 1 and 2.) Over the years, grant

allocations have closely approximated the maximum allowable reimbursement to states to cover their operating costs. Only in recent years has the reimbursement level dropped below 50% with the 1983 level at 34% up 9 % from 1982. How this compares historically with previous years' reimbursements can best be seen in the following graph:

Federal/State Expenditures Pipeline Safety Program

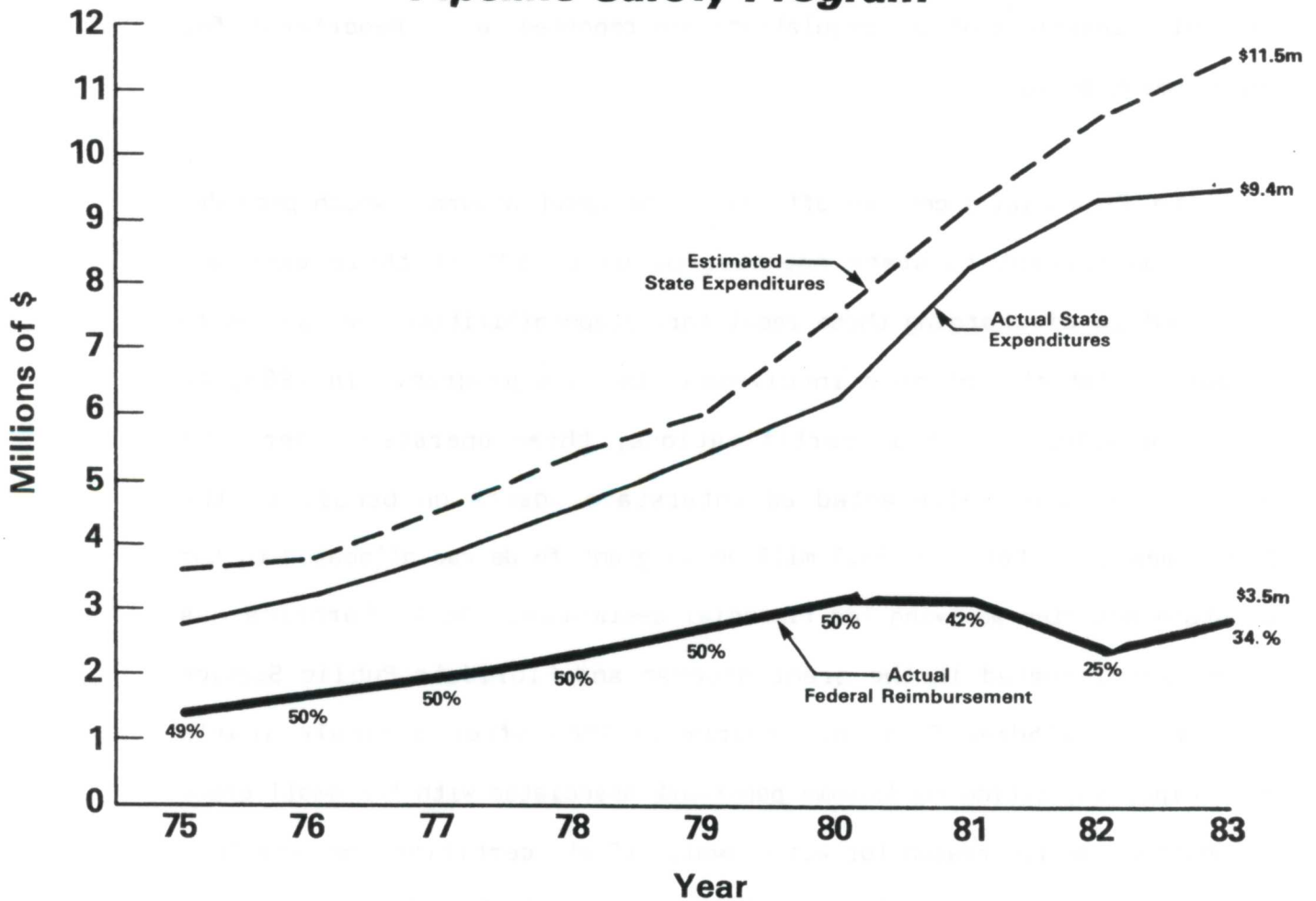


Table 1

**STATES PARTICIPATING IN THE FEDERAL/STATE COOPERATIVE
GAS PIPELINE SAFETY PROGRAM IN 1983 UNDER
SECTIONS 5(a) AND 5(b) OF THE
NATURAL GAS PIPELINE SAFETY ACT OF 1968 AS AMENDED**

States under 5(a) Certification

Alabama	Montana
Arizona	Nebraska
Arkansas	Nevada
California	New Hampshire
Colorado	New Mexico
Connecticut	New York
District of Columbia	North Carolina
Florida PSC	North Dakota
Florida (State Treasurer—LP Gas Div.)	Ohio
Georgia	Oklahoma
Hawaii	Oregon
Idaho	Pennsylvania
Illinois	Puerto Rico
Indiana	Rhode Island
Iowa	South Carolina
Kansas	Tennessee
Kentucky	Texas
Louisiana	Utah
Maine	Vermont
Maryland	Virginia
Michigan	Washington
Minnesota	West Virginia
Mississippi	Wisconsin
Missouri	Wyoming

States under 5(b) Agreements

Delaware	Massachusetts	New Jersey
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States Acting as Interstate Agents

Connecticut	Ohio
Iowa	Rhode Island
Kentucky	Utah
Michigan	Washington
Montana	West Virginia
Nevada	Wyoming

Table 2

1983 NATURAL GAS PIPELINE SAFETY GRANT ALLOCATIONS

State	Allocation
Alabama	102,655
Arizona	58,805
Arkansas	66,083
California	104,754
Colorado	58,227
Connecticut	39,670
Delaware	9,947
Florida PSC	-----
Florida ST	44,358
Georgia	76,570
Hawaii	12,078
Idaho	19,380
Illinois	101,325
Indiana	58,163
Iowa	36,271
Kansas	66,826
Kentucky	105,895
Louisiana	206,432
Maine	14,407
Maryland	36,308
Massachusetts	63,272
Michigan	94,643
Minnesota	26,174
Mississippi	84,144
Missouri	73,965
Montana	18,145
Nebraska	52,827
Nevada	31,982
New Hampshire	30,154
New Jersey	98,743
New Mexico	57,287
New York	280,988
North Carolina	75,011
North Dakota	9,565
Ohio	79,530
Oklahoma	82,692
Oregon	39,090
Pennsylvania	108,511
Rhode Island	49,877
Tennessee	102,680
Texas	321,808
Utah	32,243
Vermont	24,890
Virginia	74,389
Washington	50,055
West Virginia	86,075
Wisconsin	85,105
Wyoming	86,436
District of Columbia	41,983
Puerto Rico	19,582
TOTAL	\$3,500,000

The benefits derived from this cooperative approach to pipeline safety are enormous. A decade of states' participation has proven to be extremely effective in extending the Federal regulatory influence in intrastate gas pipeline operations without a comparable increase in Federal resources. Frequent communication between the Department and state agencies contributes to a clearer understanding of enforcement issues and problems, thus enabling state programs to be as efficient and effective as possible. Experience has also shown that where an aggressive state compliance and enforcement program is in effect operator efforts at system safety are significantly increased.

Hazardous Liquid Pipeline Program

The Hazardous Liquid Pipeline Safety Act of 1979 (HLPsA) vests the Secretary of Transportation with authority to regulate both interstate and intrastate pipeline transportation of hazardous liquids. In a Final Rule entitled "Transportation of Liquids by Pipeline" (46 FR 38357 July 28, 1981), MTB applied this authority to interstate hazardous liquid pipelines but reserved application to intrastate operators for future rulemaking.

Section 205 of the HLPsA further provides for states to assume regulatory responsibility for intrastate pipeline facilities under a system of annual certifications similar to that employed under the intrastate natural gas Federal/State program. But, before states can become full partners under the state

certification program and exercise regulatory authority over intrastate liquid pipeline operations, existing interstate Federal Regulations must be extended by legislation to cover intrastate hazardous liquid pipeline operations as well. This action is necessary to establish minimum Federal safety standards that would serve as the foundation for, and provide consistency to, state-run regulatory programs. Based upon experience with the natural gas certification program, at least two years is required for states to adopt authorizing statutes to qualify them for certification to carry out their regulatory responsibilities. States with preexisting programs need time to make necessary adjustments and those without programs need time to consider establishing one.

Nationwide, the 239 identified intrastate liquid pipeline operators are located within 39 states. In an MTB survey of these states, less than half (41%) expressed some degree of interest in assuming this new regulatory responsibility--some, however, with the caveat that financial assistance is made available to them. On the other hand, a few states are already moving toward implementing their programs. California, for example, has enacted state law and promulgated state regulations, expects to hire 12 inspectors, and will fund its program by a fee assessment process. Arizona is close behind having hired two inspectors preparatory to establishing its program.

The rulemaking that MTB introduced in 1983 to extend the applicability of the interstate safety standards to intrastate operations is expected to be completed by the first quarter of 1985.

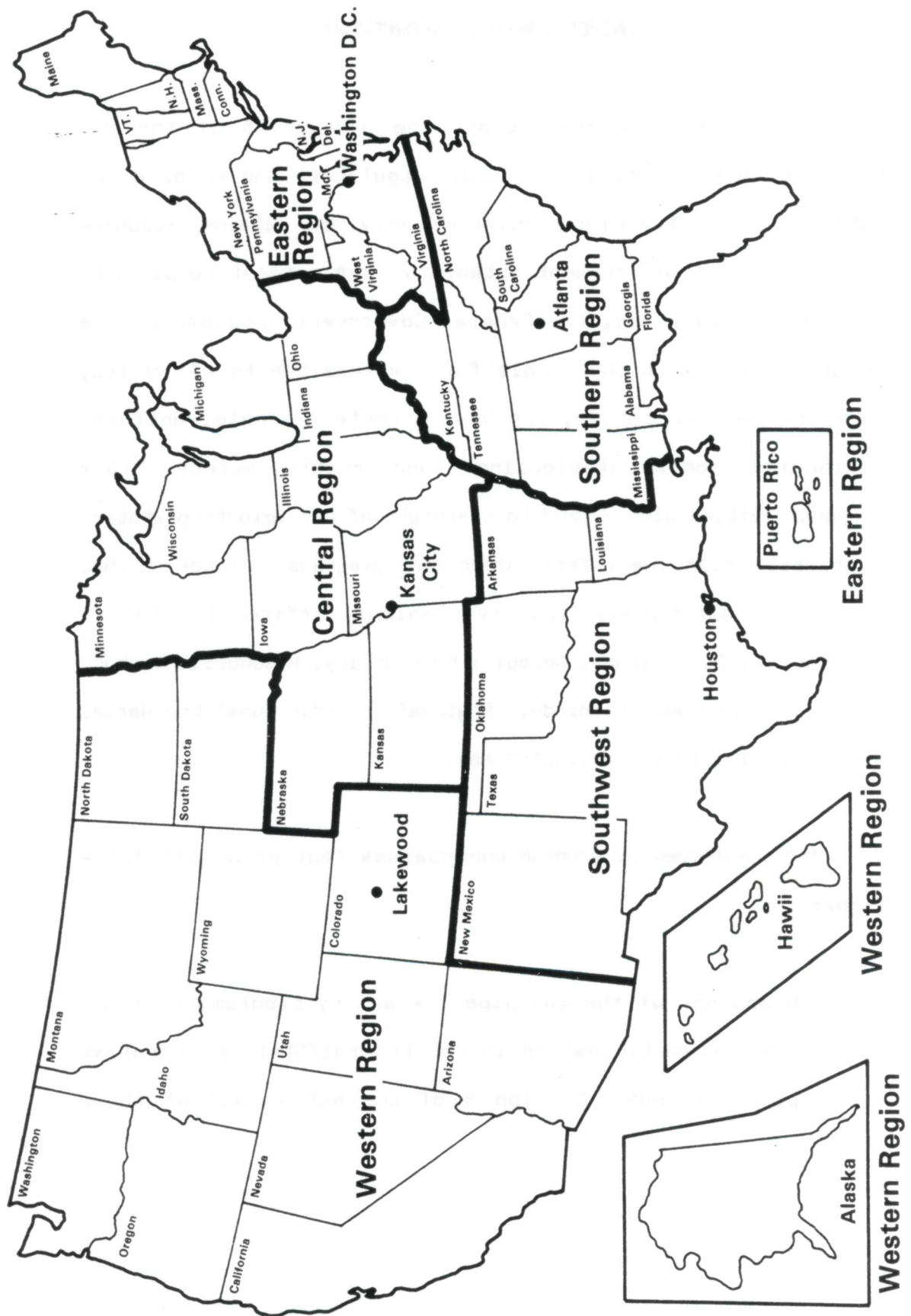
INSPECTION AND ENFORCEMENT

While state agencies, under the provisions of the gas pipeline safety program, exercise regulatory and enforcement authority over intrastate pipeline activity, MTB retains exclusive regulatory and enforcement authority over interstate pipeline activity. In this way, the Federal Government, because of its unique position as the single forum accessible to all states, industry, and the public, can best promote a single, uniform, nationwide program of pipeline transportation safety. MTB's responsibilities also extend to oversight of participating states' intrastate pipeline safety enforcement programs--a function that is carried out through its five regional offices located in Washington, DC; Atlanta, Georgia; Kansas City, Missouri; Houston, Texas; and Lakewood, Colorado. Regional jurisdictional boundaries are identified in the following map.

MTB's enforcement program encompasses four principal functions:

- o Oversight of the gas pipeline safety programs of state agencies participating in the Federal/State cooperative programs under Section 5 of the NGPSA, and of those

Materials Transportation Bureau Regional Boundaries



agencies acting for MTB with regard to inspection of interstate gas operators to ensure adequate program performance;

- o Inspection of intrastate gas pipeline systems under direct MTB jurisdiction (such as certain municipal and master meter gas systems that by state law are not subject to regulation by a cooperating state agency) to assure that such systems comply with federal gas pipeline safety regulations;

- o Inspection of interstate gas transmission facilities and hazardous liquid pipeline systems to ensure that such facilities and systems comply with the federal pipeline safety regulations;

- o Investigation of pipeline failure incidents to determine whether or not violations of federal standards occurred or if revisions or additions to the regulations are needed.

Oversight of State Programs

Each regional office monitors the gas pipeline safety programs operated by state agencies in its region to ensure that each program is being conducted in consonance with the agency's

certification or agreement. The Bureau evaluates the effectiveness and quality of program performance as well as the level of state agency expertise, initiative, and drive in operating an aggressive and productive inspection and enforcement program. Where appropriate, MTB makes suggestions and recommendations for revising or strengthening the program to bring it back on target--that of maintaining within their jurisdictions the highest possible level of pipeline safety. Forty-six of the forty-eight jurisdictions certified under section 5(a) of the NGPSA and the three jurisdictions having agreements under section 5(b) were evaluated by MTB field personnel in 1983.

Inspection Activity

Regional offices also perform inspections of interstate hazardous liquid and gas pipeline systems as well as intrastate gas pipeline systems under direct federal jurisdiction to determine the degree of compliance with the Federal Safety Regulations. The majority of these systems are interstate gas transmission facilities and municipally-owned gas distribution systems that are not under a cooperating state agency's regulatory authority. The remainder include master meter systems or petroleum gas systems and intrastate gas transmission operations. There is no existing state operated inspection program for intrastate hazardous liquid systems.

During 1983, MTB's staff expended a total of 653 person-days inspecting 254 intrastate gas systems, 67 interstate gas systems,

and 95 hazardous liquid pipeline systems. With an estimated universe of 450 gas pipeline operators under direct federal jurisdiction and an additional 29,000 master meter operators, MTB has determined that the best strategy for allocating its limited inspection resources is to prioritize the inspection workload by a set of criteria that includes potential risk, incident, and compliance experience and time between inspections. This is also the approach MTB recommends to state agencies for determining their own inspection priorities. In the most recent data available, these agencies reported that they expended 24,346 person days performing 5,996 inspections of gas pipeline operators under their direct jurisdiction.

Enforcement

There are a variety of enforcement actions available to the Materials Transportation Bureau upon determination that a probable violation of the provisions of the Federal Pipeline Safety Regulations has occurred. These actions, depending upon the gravity of the violation, fall anywhere between issuance of a warning letter and issuance of a hazardous facility order requiring immediate suspension of operations or restricted use of a facility.

During 1983, federal enforcement actions were initiated against 92 gas and 19 liquid pipeline operators who were found to be in probable violation of the pipeline safety regulations. Final disposition of these actions resulted in the assessment of four civil penalties amounting to \$26,000 and the issuance of two formal compliance orders and 68 warning letters. A total of 32 enforcement cases were closed without penalty where either corrective action was taken by the operator or further

investigation concluded that no violation existed. An enforcement profile appears in Table 3. Detailed state statistics are shown in Tables 4 through 6.

Table 3
**INSPECTION AND ENFORCEMENT PROFILE
1983**

System	Person Days Spent on Inspections	Enforcement Actions Initiated	Penalties Assessed		Penalties Collected	
			No.	Amt.	No.	Amt.
Hazardous Liquid MTB	207	19	0	\$ 0	2	\$ 4,500
Natural Gas MTB	446	92	3	21,000	3	15,000
State Agencies	24,346	2,001	15	3,336,800	15	112,100

Detail of State Penalty Data

State	Penalties Assessed		Penalties Collected	
	No.	Amt.	No.	Amt.
California	1	\$ 90,000	1	\$ 90,000
Florida ST	1	3,000	1	3,000
Missouri	—	—	3	11,000
New Hampshire	1	4,000	1	4,000
New Mexico	10	34,000	9	4,100
New York	1	3,200,000	—	—
West Virginia	1	5,000	—	—
TOTAL	15	\$3,336,800	15	\$112,100

New York Public Service Commission operating under a 5(a) certification levied a preliminary assessment of \$3.2 million against the Long Island Lighting Company for violations of the New York State Safety Code that requires that out-of-service lines be disconnected from the main within a specific time frame. The violations were discovered when Long Island Lighting Company employees were injured in the process of responding to a gas leak. Detailed investigation of the company by NY Public Service inspectors uncovered numerous such violations and within the framework of that State's penalty provisions, a preliminary assessment of a \$3.2 million fine was made against the company — \$50,000 for the injury related incident and \$10,000 per day per violation at sites other than the original incident. Resolution of this action, however, is pending final disposition of a challenge to New York's authority to levy a similar fine in an earlier action involving Con Edison.

Table 4

**1983 GRANT-IN-AID ALLOCATIONS
AND
STATE AGENCY INSPECTION DATA**

State	Grant-in Aid Allocation	No. of Inspectors	No. of Gas Operators Inspected	Inspections Made (In Person-days)	Noncompliances Found	Enforcement Actions Taken
Alabama	\$ 102,655	7	249	862	269	140
Arizona	58,805	5	17	270	72	2
Arkansas	66,083	4	128	306	131	2
California	104,754	5	6	354	152	1
Colorado	58,227	2	75	186	108	31
Connecticut	39,670	3	9	140	25	25
Delaware	9,947	2	35	91	0	0
Florida PSC	—	5	65	546	82	29
Florida ST	44,358	5	125	415	395	107
Georgia	76,570	4	111	465	107	81
Hawaii	12,078	1	1	173	0	0
Idaho	19,380	1	17	123	16	16
Illinois	101,325	8	138	507	47	47
Indiana	58,163	3	105	255	46	15
Iowa	36,271	5	37	287	62	12
Kansas	66,826	4	103	400	58	58
Kentucky	105,895	4	52	281	188	52
Louisiana	206,432	8	276	1,850	1,020	0
Maine	14,407	2	2	15	0	0
Maryland	36,308	2	11	81	18	0
Massachusetts	63,272	7	11	190	2	0
Michigan	94,643	3	49	372	36	0
Minnesota	26,174	1	13	74	89	5
Mississippi	84,144	4	149	584	407	27
Missouri	73,965	6	26	259	232	232
Montana	18,145	2	15	69	7	0
Nebraska	52,827	3	625	268	17	0
Nevada	31,982	1	8	44	6	8
New Hampshire	30,154	1	7	55	13	13
New Jersey	98,743	5	4	326	0	0
New Mexico	57,287	3	209	254	459	159
New York	280,988	24	24	3,380	4,725	24
North Carolina	75,011	3	59	384	104	39
North Dakota	59,565	2	9	30	37	0
Ohio	79,530	7	44	487	5	0
Oklahoma	82,692	4	115	384	309	85
Oregon	39,090	1	12	77	49	23
Pennsylvania	108,511	5	41	973	40	40
Rhode Island	49,877	3	12	392	26	0
South Carolina	—	3	40	481	154	106
Tennessee	102,680	4	183	847	73	69
Texas	321,808	27	2,319	4,930	6,426	351
Utah	32,243	2	88	191	91	123
Vermont	24,890	1	18	101	34	0
Virginia	74,389	4	14	174	39	8
Washington	50,055	2	23	162	76	50
West Virginia	86,075	5	82	438	24	21
Wisconsin	85,105	4	16	163	166	0
Wyoming	86,436	4	217	258	72	0
Dist. of Columbia	41,983	1	1	80	0	0
Puerto Rico	19,582	6	1	312	0	0
TOTAL	\$3,500,000	228	5,996	24,346	16,514	2,001

* Florida (PSC) and South Carolina are non-participants in the grant program.

Table 5

STATE JURISDICTION AS OF DECEMBER 31, 1983

+ = has jurisdiction N = none in state 0 = does not have jurisdiction S = seeking jurisdiction P = partial jurisdiction

STATE	Gathering Lines in Non-rural areas	Transmission	Privately owned Distribution Public Utilities	Privately owned Facilities not Public Utilities Under State Law	Municipally Owned Distribution Systems	Other Publicly Owned Distribution Systems	Petroleum Gas	Master Meter	Offshore Facilities
Alabama	+	+	+	+	+	N	+	+	N
Arizona	N	+	+	+	+ P	0	+	+	0
Arkansas	+	+	+	+	+	+	+	+	N
California	+	+	+	0 S	0 S	0 N	0 S	0 S	+ N
Colorado	+	+	+	+	+	+	+	+	0
Connecticut	+ N	+	+	+	+	+	+	+	+ N
Delaware	+ N	+	+	0	0	0	+	+	0 N
Florida PSC	0	+	+	+	+	+	0	0	0 N
Florida ST	0	0	0	0	0	0	+	+	0
Georgia	N	+	+	+	+ P	0	0	+	N
Hawaii	N	+	+	N	N	N	+	0 S	N
Idaho	N	+	+	N	0	0	+	+	N
Illinois	+	+	+	+	+	+ N	+	+	+ N
Indiana	+	+	+	+	+	+	+	+	N
Iowa	N	+	+	+	+	N	+	+	N
Kansas	+	+	+	0 S	+	0 S	+	0 S	N
Kentucky	+	+	+	+	0	+	0	0	N
Louisiana	+ P	+ P	+	+	+ P	+ P	0	+	0
Maine	+ N	+	+	0 N	+	+	0 S	+	+ N
Maryland	0 N	+	+	0	+	+	+	0	0 N
Massachusetts ...	N	+	+	0	+	0 N	0	0	N
Michigan	+	+	+	+	+	0 N	+	+	0 N
Minnesota	+	+ P	+	+	+	+	+ P	+	N
Mississippi	+	+	+	+	+	+	+	+	+
Missouri	N	+	+	0	+	N	+ PN	0	N
Montana	0 N	+	+	+ P	+	0 N	+	0	0 N
Nebraska	0	+	+	+	+	0	+	+	+
Nevada	0 N	+	+	+	0 N	0	+ P	0	0 N
New Hampshire ..	N	+	+	0 N	0 N	+	+	+	+
New Jersey	0 N	+	+	0	0 N	0 N	+ P	0	0 N
New Mexico	+	+	+	+	+	+	+	+	0
New York	+	+	+	+	+	+	+	0	+
North Carolina ..	N	+	+	+	+	0	+ PS	+	N
North Dakota ...	+	+	+	+	+	N	+	+	N
Ohio	+	+	+	+ P	+	0 N	+ P	+	N
Oklahoma	+	+	+	+	+	0	+	0	0
Oregon	+ N	+	+	+ P	+	0 N	+	+	+ N
Pennsylvania	+ P	+ P	+	0	0 S	0	+ P	0	0 N
Rhode Island	N	+	+	+	N	N	+	+	N
South Carolina ...	N	+	+	+	+	+	0	+	N
Tennessee	+	+	+	+	+	+	+	+	N
Texas	+	+	+	+	+	+	+	+	+
Utah	+	+	+	+	+	+	+	+	N
Vermont	N	+	+	+	N	N	+	N	N
Virginia	N	+	+	0	0	N	+	0	N
Washington	0 N	+	+	+	+ P	0 N	+	+	+ N
West Virginia	+	+	+	+	+	+	+ N	+	N
Wisconsin	0 N	+	+	+	+	+ N	P	P	0 N
Wyoming	+	+	+	+	N	N	+	+ P	N
Dist. of Columbia	N	+	+	N	N	0	N	?	N
Puerto Rico	N	+	+	N	N	N	+	N	N

Number of
States having
jurisdiction

27

50

50

35

35

21

41

32

11

Table 6

QUALIFICATIONS OF STATE PERSONNEL (TECHNICAL) 1983

STATE	No. Cat. A	No. Cat. B	No. Cat. C	No. Cat. D	No. Cat. E	Total No. Inspectors
Alabama	0	1	4	1	1	7
Arizona	0	1	1	3	0	5
Arkansas	0	0	2	1	1	4
California	5	0	0	0	0	5
Colorado	2	0	0	0	0	2
Connecticut	2	1	0	0	0	3
Delaware	1	1	0	0	0	2
Florida PSC	3	2	0	0	0	5
Florida ST	0	0	5	0	0	5
Georgia	0	1	1	2	0	4
Hawaii	0	0	1	0	0	1
Idaho	0	1	0	0	0	1
Illinois	0	3	3	1	1	8
Indiana	1	0	2	0	0	3
Iowa	0	3	2	0	0	5
Kansas	0	0	3	1	0	4
Kentucky	0	3	1	0	0	4
Louisiana	0	7	1	0	0	8
Maine	0	2	0	0	0	2
Maryland	0	1	0	1	0	2
Massachusetts	0	3	3	1	0	7
Michigan	3	0	0	0	0	3
Minnesota	0	1	0	0	0	1
Mississippi	0	1	1	1	1	4
Missouri	0	3	3	0	0	6
Montana	1	1	0	0	0	2
Nebraska	0	0	2	1	0	3
Nevada	0	1	0	0	0	1
New Hampshire	0	1	0	0	0	1
New Jersey	0	4	0	1	0	5
New Mexico	2	1	0	0	0	3
New York	1	20	1	0	2	24
North Carolina	0	2	1	0	0	3
North Dakota	1	0	1	0	0	2
Ohio	0	2	2	1	2	7
Oklahoma	0	3	1	0	0	4
Oregon	1	0	0	0	0	1
Pennsylvania	2	2	1	0	0	5
Rhode Island	0	0	2	1	0	3
South Carolina	0	1	2	0	0	3
Tennessee	0	4	0	0	0	4
Texas	6	5	6	8	2	27
Utah	0	2	0	0	0	2
Vermont	1	0	0	0	0	1
Virginia	0	4	0	0	0	4
Washington	1	1	0	0	0	2
West Virginia	0	5	0	0	0	5
Wisconsin	0	4	0	0	0	4
Wyoming	4	0	0	0	0	4
Dist. of Columbia	0	0	0	0	1	1
Puerto Rico	0	0	4	0	2	6
TOTAL.....	37	98	56	24	13	228

STATE INSPECTOR QUALIFICATION CATEGORIES

- A. Has an engineering degree from an accredited engineering school or is a registered professional engineer, with a minimum of three years of experience in gas or liquid transmission and/or distribution pipelines.**
- B. Has an engineering degree from an accredited engineering school, or is a registered professional engineer, or has over ten years of gas or liquid transmission and/or distribution experience which demonstrates in-depth knowledge of pipeline engineering technology, particularly as related to pipeline safety.**
- C. Has a college degree or over five years of experience as a State pipeline inspector monitoring gas or liquid operators in regard to their compliance with State and Federal pipeline safety regulations.**
- D. Has less than five years of experience as a State pipeline inspector monitoring gas or liquid operators in regard to their compliance with State and Federal pipeline safety regulations.**
- E. Has less than one year of experience as a State pipeline inspector monitoring gas or liquid operators in regard to their compliance with State and Federal pipeline safety regulations.**

Note: The experience listed in categories A and B refers to actual on-the-job experience working for a pipeline company involved with gas or liquid distribution, transmission, or both. Individuals with no actual pipeline experience still qualify for category B as long as they have an engineering degree from an accredited college or university or are registered by the respective State as a registered professional engineer.

PIPELINE FAILURES AND INVESTIGATIONS

The requirements and criteria for reporting gas pipeline leaks and system failures are contained in Part 191 of Title 49 of the Code of Federal Regulations. Part 195 contains the requirements for reporting hazardous liquid system failures. These include damage thresholds, exclusions, time requirements, and methods of reporting. In addition to the obvious regulatory implications of this incident reporting requirement, the data collected serve yet another purpose. Incorporated into an incident data base, this information becomes part of MTB's comprehensive Hazardous Materials Information System that provides the operational and statistical information necessary to perform accident and cost benefit analyses and various studies that support rulemaking and enforcement programs.

In 1983, MTB undertook a major revision of the requirements for gas pipeline system incident and annual reporting. The proposed revisions have the immediate benefit of lessening the paperwork burden such reporting imposes on the industry while maintaining the same level and quality of data collection considered necessary for the identification, analysis, and evaluation of pipeline safety problems.

Specifically, the proposed revisions would simplify and streamline reporting instructions and forms, and delete information deemed unnecessary after ten years of data collection experience, thereby encouraging a greater degree of compliance with the reporting requirements.

Natural Gas Pipeline Accident Data

The 1,580 system failures reported in 1983 represent a 7% decline since 1982 and resulted in 12 fatalities and 245 injuries. Damage by outside forces remains the leading cause of system failures--61% of all 1983 failures--and resulted in 56% of all casualties. It was to address this continuing problem that MTB, pursuant to section 3(a)(2) of the NGPSA, instituted rulemaking requiring operators of gas pipelines in populated areas to establish or participate in excavation damage prevention programs. This requirement which became effective in April 1983, offers operators the latitude of participating in existing public service "one call" or similar systems provided the system essentially meets the performance criteria for operator-run programs which must:

- o publicize and educate the public to the existence of the damage prevention program;

- o provide a means of receiving notification of excavation intent;
- o provide excavation companies with the marked location of buried pipe in the vicinity of the excavation; and,
- o provide for inspection during and after excavation activity, of pipelines that could be in jeopardy of being damaged.

A majority of states fully support the concept of excavation damage prevention and, in many instances, have instituted their own programs in some form. In the southern tier of the country, all states covered by MTB's Southern Region have active "One Call" Systems that excavation companies may use to determine location of buried pipes prior to excavation.

Table 7

**SUMMARY OF GAS PIPELINE ACCIDENTS AND CASUALTIES REPORTED FROM 1973-1983
AS REQUIRED BY 49 CFR PART 191**

Report Year	Distribution			Transmission and Gathering			Total		
	Failures	Fatalities	Injuries	Failures	Fatalities	Injuries	Failures	Fatalities	Injuries
1973	893	33	333	471	2	19	1,364	35	352
1974	1,017	20	314	460	4	20	1,477	24	334
1975	979	8	220	394	6	17	1,373	14	237
1976	1,036	53	319	543	10	47	1,579	63	366
1977	1,530	29	420	466	7	30	1,996	36	450
1978	1,555	20	320	533	11	86	2,088	31	406
1979	1,520	33	313	450	12	93	1,970	45	406
1980	1,467	9	269	529	2	41	1,996	11	310
1981	1,128	10	73	495	6	6	1,623	16	79
1982	1,191	20	225	520	11	41	1,711	31	266
1983	1,127	10	220	453	2	25	1,580	12	245

Table 8
**FAILURES AND CASUALTIES REPORTED BY
 GAS SYSTEM OPERATORS DURING CY 1983**

Distribution Systems

<i>Cause</i>	<i>No. of Failures</i>	<i>Fatalities</i>	<i>Injuries</i>
Corrosion	85	0	19
Damage by Outside Forces	790	2	129
Construction Defect or Material Failure	86	4	38
Other Causes	166	4	34
TOTAL	1,127	10	220

TRANSMISSION AND GATHERING SYSTEMS

<i>Cause</i>	<i>No. of Failures</i>	<i>Fatalities</i>	<i>Injuries</i>
Corrosion	69	0	5
Damage by Outside Forces	184	1	7
Construction Defect or Material Failure	162	0	1
Other Causes	38	1	12
TOTAL	453	2	25
GAS INDUSTRY TOTALS	1,580	12	245

Hazardous Liquid Pipeline Incident Data

In 1983, the overall safety performance of hazardous liquid pipelines continued to improve. The 161 reported failures which resulted in nine injuries and six fatalities was the lowest recorded number of incidents in ten years. As it is with natural gas pipelines, outside force damage is the single leading cause of

hazardous liquid pipeline failures--31% of all incidents--and the six recorded fatalities were the result of one such unfortunate incident. During excavation for planting trees in a residential area of West Odessa, Texas, the plow struck a pipeline carrying volatile liquefied petroleum gas 16 inches below the surface and the resulting explosion and fire claimed six lives.

External corrosion follows as the second leading causal factor--20.5%--resulting in a loss of over 107 thousand barrels of commodity. Imprecise and interpretive differences in reporting contribute to the large percentage in the causal category "other" appearing in the accompanying table summarizing 1983 incident data. It is known, however, that 46% of that category, or 15% of all incidents, is attributable to leaks in system components other than pipe.

SUMMARY OF LIQUID PIPELINE ACCIDENTS AND CASUALTIES FROM 1973 to 1983

Report Year	Failures	Fatalities	Injuries	Total Commodity Loss (bbl)
1973	273	7	10	377,672
1974	256	10	6	292,001
1975	254	7	17	318,278
1976	212	5	4	249,690
1977	237	3	15	224,794
1978	256	3	10	280,794
1979	251	4	13	548,669
1980	219	3	12	289,445
1981	239	5	32	214,384
1982	200	1	6	221,411
1983	161	6	9	384,670

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			% of Total	Deaths	Injuries
				Carrier	Other	Total			
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			% of Total	Deaths	Injuries
				Carrier	Other	Total			
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

Accident Investigation

Under the provisions of Section 304 of the Independent Safety Board Act of 1974, investigation of pipeline accidents in which there is at least one fatality and/or substantial property damage is primarily the responsibility of the National Transportation Safety Board. State agencies which also investigate accidents under the terms and rights of their legislated authority reported conducting 472 investigations of gas pipeline accidents in 1983 (See Table 9.) Rather than duplicate these efforts MTB plays a supportive role in these investigations, assisting as needed, but focusing on the degree of compliance with the federal safety standards to determine whether existing standards have been violated and enforcement action should be initiated, or whether existing standards are adequate, clear, and appropriate for the particular circumstances or if regulatory changes are indicated.

Of the 1,580 gas and 161 hazardous liquid pipeline incidents that claimed 18 lives last year only two resulted in multiple fatalities. The National Transportation Safety Board investigated both incidents and determined that the accident that claimed six lives in West Odessa, Texas, was the result of a ruptured pipeline caused by the failure of the operator of an auger being used to plant trees to realize there was a pipeline 16 inches below the surface

of the mobile home lot. The Board further concluded that contributing to the extent of injuries was the development of a residential community over and adjacent to the pipeline easement without appropriate safeguards for the residents. Consequently, it recommended that the Department extend to hazardous liquid pipeline transportation the same high density population regulatory safeguards now required for natural gas pipelines. The Department will examine this issue to determine future action. The Board further recommended that the Transportation Research Board of the National Academy of Sciences assess the adequacy of existing public policy in preventing development of new residential lots over or near pipelines that carry hazardous materials.

In the other instance, the Board determined that the probable cause of an explosion and fire that destroyed a house in Pryor, Oklahoma, claiming two lives and injuring three persons, was corrosion of the natural gas service line located within the residential property lines. A leak occurred, gas migrated into the house, and was ignited by one of several appliance pilot lights. Federal requirements on corrosion control do not extend to non-company owned piping and the City of Pryor, which owns the gas company servicing the area, disclaims responsibility for residential service lines. Consequently, periodic leak surveys to

determine the condition of customer piping are not performed. The NTSB recommends that the American Gas Association and the American Public Gas Association urge their member companies to: (1) encourage their customers to arrange for periodic inspection of their service lines, and (2) encourage local governments to institute requirements for such periodic inspections.

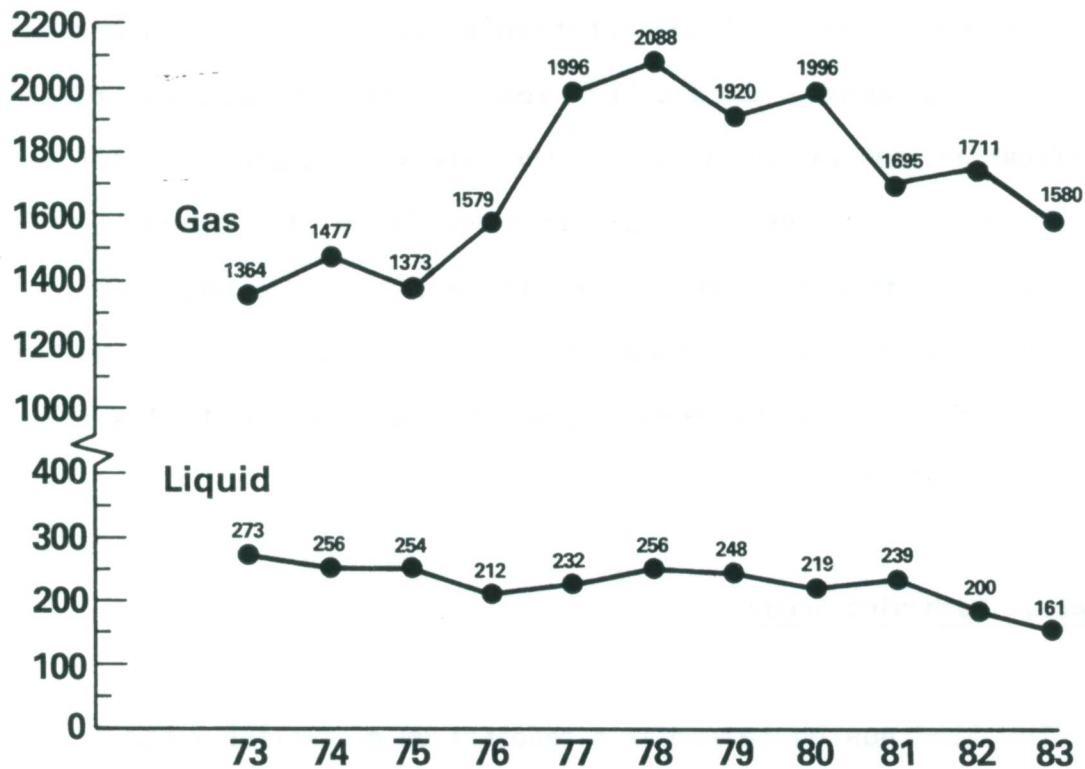
In yet another incident investigated by the NTSB, the Board concluded that the severity of injury and damage occurring in the EL Paso Natural Gas Company's Blanco Field Plant accident in New Mexico, was the result of inadequate training of plant personnel in emergency procedures. Two employees of the plant were severely burned by ignited gas while attempting to shut down the gas supply to a compressor that had malfunctioned. Upon investigation, the Safety Board determined that the probable cause of the accident was the improper tightening of compressor head bolts--a problem attributable to inadequate maintenance.

Table 10

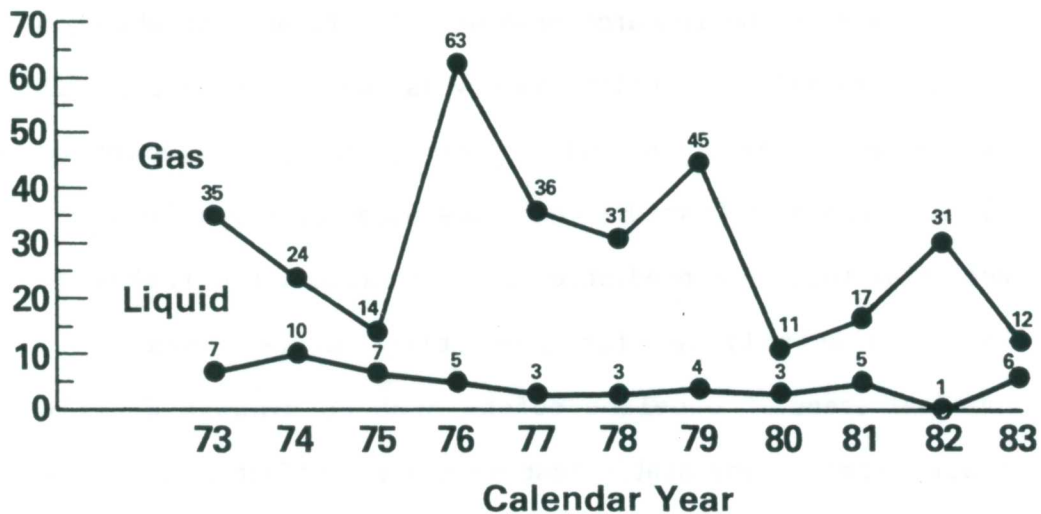
GAS PIPELINE ACCIDENTS INVESTIGATED BY STATE AGENCIES IN 1983

STATE	Total No.	Caused by			
		Corrosion	Damage by Outside Forces	Construction Defect or Material Failure	Other
Alabama	10	0	5	1	4
Arizona	73	1	62	8	2
Arkansas	3	0	0	0	3
California	37	2	24	4	7
Colorado	3	0	2	0	1
Connecticut	4	0	3	0	1
Delaware	0	0	0	0	0
Florida PSC	20	2	15	0	3
Florida S. Treas.	1	0	0	0	1
Georgia	3	1	2	0	0
Hawaii	0	0	0	0	0
Idaho	3	0	3	0	0
Illinois	14	1	9	2	2
Indiana	3	0	3	0	0
Iowa	30	0	8	3	19
Kansas	1	1	0	0	0
Kentucky	14	0	3	0	11
Louisiana	1	0	0	0	1
Maine	0	0	0	0	0
Maryland	1	0	0	0	1
Massachusetts	8	0	4	1	3
Michigan	11	0	4	2	5
Minnesota	35	2	25	4	4
Mississippi	3	0	3	0	0
Missouri	5	1	1	3	0
Montana	1	0	1	0	0
Nebraska	11	0	5	1	5
Nevada	2	0	0	0	2
New Hampshire	0	0	0	0	0
New Jersey	7	1	2	0	4
New Mexico	1	0	0	1	0
New York	7	1	2	1	3
North Carolina	5	0	2	0	3
North Dakota	5	0	4	0	1
Ohio	6	0	3	1	2
Oklahoma	3	0	2	0	1
Oregon	2	0	2	0	0
Pennsylvania	32	4	21	1	6
Rhode Island	2	0	0	0	2
South Carolina	0	0	0	0	0
Tennessee	4	0	3	1	0
Texas	64	14	24	19	7
Utah	2	0	2	0	0
Vermont	0	0	0	0	0
Virginia	10	0	6	0	4
Washington	0	0	0	0	0
West Virginia	9	0	8	1	0
Wisconsin	10	0	2	0	8
Wyoming	6	1	3	1	1
Dist. of Columbia	0	0	0	0	0
Puerto Rico	0	0	0	0	0
TOTAL	472	32	268	55	117

Liquid and Gas Pipeline Leaks/Failures, 1973 - 1983



Liquid and Gas Pipeline Fatalities, 1973 - 1983



RESEARCH AND TECHNOLOGY

The Department of Transportation's pipeline research and technology program provides technical support for development, modification, and interpretation of the safety regulations and for enforcement activities. Research is conducted to find answers to special problems and to keep pace with emerging technological developments and safety trends including the exploration of new areas. Three significant research projects conducted in 1983 are summarized below:

Fracture Mechanics Study

The findings contained in a report from an earlier National Bureau of Standards study "Fitness for Service Criteria for Pipeline Girth Weld Quality", have led to several new initiatives in the research program. The first initiative, a project entitled "Pipeline Safety Assessment Support", will synthesize the existing body of knowledge with respect to elastic plastic fracture mechanics-based criteria for girth weld flaw tolerance predictions. In addition, the framework has been established for supporting future research in critical areas of pipeline safety such as dynamic ductile crack arrest, hydrostatic testing and its effect on pipeline life, and environmentally assisted crack growth.

The second project entitled "Stresses Induced in Pipeline Lowering Operations", was initiated with the goal of developing guidelines for the design of the trench profile to minimize the danger of pipe rupture during lowering operations. It is anticipated that these findings will support rulemaking activities and provide valuable data for estimating flaw or defect tolerance of pipelines when subjected to lateral displacements during soil instability conditions.

Bacterial Corrosion

An exploratory project to develop procedures and equipment capable of detecting bacterial corrosion and establish criteria for mitigation of that problem was begun in 1983. The project output will be evaluated in 1984 to determine the next step to be taken.

LNG Test Program

The safety of Liquefied Natural Gas (LNG) plants is governed by Part 193 standards. One safety provision requires establishment of a zone of low population density around new LNG facilities for protection from the plume of combustible vapor that forms if LNG spills. Because current plant designs and the most acceptable method of calculating

gas dispersion distances produce large zones, compliance with this provision may be very costly--even for new plants. For many existing plants, planned expansion could be prohibitively costly, or even impossible, since often they are located next to gas distribution areas which characteristically have a high density of population and buildings. Thus, full utilization of LNG for meeting peak demand for energy could be stymied by the present standards.

In 1983, MTB, together with the Coast Guard and an international consortium, sponsored research to learn the effect of obstacles on dispersion of a heavy gas similar to vapor from LNG and other highly volatile liquids. Initial trials in this research were completed in November, 1983. Additionally, MTB proposed and separately sponsored a further set of field trials, wind tunnel simulation tests, and development of a predictive technique for vapor dispersion. The final objective is promulgation of an alternate vapor dispersion standard to that presently specified in § 193.2059. If successful, this could permit a reduction in the size of LNG facility vapor exclusion zones. A new standard would significantly reduce costs for LNG facilities and thereby economically benefit consumers.

TRAINING AND INFORMATION DISSEMINATION

Training and information dissemination is an integral part of the Department's regulatory program. To promote compliance with the Pipeline Safety Regulations, the Department sponsors a number of training and information dissemination activities designed to familiarize industry personnel with the requirements of the regulations and to educate inspectors (federal, state, and local) in compliance requirements and enforcement procedures. The primary provider of this training, the Department's Transportation Safety Institute (TSI), is located in Oklahoma City and receives administrative, technical, and financial support from MTB to conduct Pipeline Safety instruction.

Training

In an effort to make pipeline safety training more available to regional entities which, as a rule, have limited funds available for out-of-state training, MTB expanded its highly successful outreach program of offering pipeline safety training at state-selected sites. In this way, for the nominal expenditure of travel funds for fewer persons, states are saved the financial burden of out-of-state training costs, while increasing the numbers of persons knowledgeable in compliance and enforcement responsibilities.

States are encouraged to co-sponsor training seminars at state-selected sites--one advantage to the state being MTB's ability to modify the curriculum to meet the specific and/or special needs of its pipeline enforcement community. The curriculum is continually revised to keep current with regulatory changes as well as to meet the specific needs that often surface during interaction with the pipeline industry. The success of this on-site training--training external to the Oklahoma City facility--is reflected in a 61% increase in the number of persons trained in 1983 compared to 1982 and in the increase in the number of states co-sponsoring training from 15 in 1982 to 21 in 1983.

The demographics and dispersal of the 184 attendees at the ten pipeline safety related courses offered by TSI in 1983 are displayed in Table 11. An additional 1,796 persons attended the 25 seminars held in 21 states across the country.

Information Dissemination

In addition to sponsoring classroom training and seminars, the Department offers a variety of training aids, newsletters, booklets, and other handout materials for use by those involved in pipeline safety compliance and enforcement. The Department is

firmly committed to the concept of promoting safety in the transportation of hazardous materials by pipeline through education and regulation. This commitment is reflected in the continuing revision, update, and issuance of publications that keep the regulated community informed of changes in a very fluid industry, while addressing the emerging needs of various segments of that community. These materials, designed to acquaint and sensitize the industry and the public to the issues of pipeline safety and federal regulatory requirements, are provided upon request to interested organizations, industry groups, and the general public. They include: frequently updated revisions of the Federal Pipeline Safety Regulations; notices of proposed rulemaking; a quarterly Pipeline Safety Newsletter with a distribution of over 4,000; and a slide/tape/booklet training package.

The increasing number of inquiries for information, clarification, or interpretation of various aspects of the federal regulations attest to the public's interest in pipeline safety. Enthusiastic response continues for the "Guidance Manual for Operators of Small Gas Systems" and its companion training package with over 20,000 copies of the book having been distributed. There is no way to accurately assess the number reproduced and distributed by the gas industry for in-house training (required by the regulations) since

the DOT-developed materials are non-copyrighted and reproduction and distribution by industry are encouraged. Under development are a number of pamphlets and training aids to assist communities and non-pipeline personnel in pipeline emergency response planning. These should be completed in 1984.

Table 11
Pipeline Safety Courses Conducted by TSI 1983

	<i>No. of Classes</i>	<i>Students Trained</i>		
		<i>Other</i>	<i>State & Federal</i>	<i>Total</i>
Failure and Noncompliance Investigative Techniques	1	21	2	23
Joining of Gas Pipelines Materials	1	22	0	22
Gas Pressure Regulation and Overpressure Protection	2	25	3	28
Safety Evaluation of Gas Pipeline Systems	1	25	2	27
Safety Evaluation of Gas Pipeline Corrosion Systems	3	49	0	49
Liquefied Natural Gas Safety Technology & Inspection	1	9	0	9
Safety Regulations Requirements for Gas Pipeline Operators	1	26	0	26
TOTAL	10	177	7	184

Table 12
Summary for 1983 Training Conducted by TSI

<i>No. of Resident Classes</i>	<i>No. of Resident Students</i>	<i>No. of Seminars</i>	<i>No. of Seminar Students</i>	<i>Total No. Trained</i>
10	184	21	1,796	1,980

[illegible]

ALASKA NATURAL GAS TRANSPORTATION SYSTEM

The Alaska Natural Gas Transportation System (ANGTS) is the largest privately-financed pipeline construction project ever undertaken and was conceived as a means of tapping the large reserves of natural gas in the State of Alaska to alleviate the critical shortage of natural gas in the contiguous United States. Designed under the provisions of the Alaska Natural Gas Transportation Act of 1976, as the transportation system for delivery of Alaska natural gas, the ANGTS is being developed as four major pipeline segments. The Alaskan segment will be constructed and operated by Northwest Alaskan Pipeline Company, the Canadian segment by four Canadian companies, an Eastern leg (from Montana to Chicago) by Northern Border Pipeline Company, and a Western leg (from Idaho to San Francisco) by Pacific Gas Transmission Company and Pacific Gas and Electric Company. The 4,753-mile system will have a nominal capacity of 2.6 billion cubic feet of gas per day.

Parts of the Canadian segment and the Eastern and Western legs were completed as a first priority in order to transport gas from Alberta, Canada to the U.S. prior to completion of the Alaskan segment. Gas is now being transported through both sections. The construction on the Alaskan segment has been

delayed due to current uncertainties in world financial markets, natural gas prices, and the current excess in world energy supplies. The new anticipated completion date is now 1989.

MTB's Responsibilities and Involvement

Executive Order 12142 requires each Federal agency having statutory responsibilities over any aspect of the ANGTS to appoint an Agency Authorized Officer (AAO) to represent that agency before the Federal Inspector appointed by the President to carry out oversight responsibilities. The Department of Transportation's Agency Authorized Officer (AAO) is organizationally located within MTB and represents the interest of all administrations within DOT having statutory responsibility in this project.

In 1983, MTB concentrated on seeking solutions to two engineering problems unique to the design, construction, and operation of a pipeline subject to extreme arctic weather conditions. One such problem involved frost heave. An MTB evaluation of a proposed design criteria and methodology developed by the Northwest Alaskan Pipeline Company concluded that Northwest's pioneering efforts in this area, did produce a credible plan for control of this problem that further testing could very well validate.

The other problem, girth weld flaws, was the subject of an MTB sponsored study that was completed in 1983. The study confirmed the utility of fracture mechanics analysis in judging the acceptance of girth weld flaws. As a result, the Alaskan Pipeline Company is considering using this procedure as an alternate girth weld acceptance criterion.

PROGRAM DIRECTION AND ISSUES

The Federal Pipeline Safety program has been in place since the passage of the Natural Gas Pipeline Safety Act of 1968 and while the overall safety performance of the system continues to improve, there are emerging issues which the Department must address in order to ensure that this high level of safety performance is sustained.

Federal/State Roles

The Pipeline Safety Act assigns the Federal government responsibility for ensuring pipeline safety in both interstate and intrastate transportation. However, the legislative history clearly envisioned state participation in the enforcement of standards governing intrastate operations. In the early years of implementation, DOT felt obligated to assume safety responsibilities over the intrastate operations of those states which were still preparing to assume jurisdiction. The evolution of the Federal/State program has witnessed the phenomenon of some states selectively assuming jurisdiction over some of their intrastate operators such as the larger distribution operators and not others such as municipal systems and master meter operators. The result is that MTB is seemingly left with the overall responsibility of a disparate mix of pipeline operations: interstate operators,

intrastate operators of these states which have not assumed jurisdiction and a class of relatively small gas systems which might be viewed as purely local in nature. The problem is exacerbated by the imminent implementation of the intrastate liquid pipeline regulatory program and the less than enthusiastic state response received to date. Of the 39 states having intrastate liquid pipeline operations, less than half have evinced any degree of interest in participating in the hazardous liquid regulatory program.

A review of the Federal regulatory program may well be needed to clarify the roles of the various levels of government. The findings of such a review may well lead to modifications or a revalidation of the Federal role.

Steel Pipe Standards

The standards in the CFR, Part 192 governing the selection and use of material for steel pipe incorporate by reference specifications prepared by voluntary standards-setting organizations. New materials, based on advances in material technology, may not be used by the gas pipeline industry until the materials are first included in later editions of the referenced specifications, and the later editions are added to the Federal standards. This process retards the ability of industry to use new materials for steel pipe. To resolve this problem of costly delays, but

still maintain safety, MTB intends to adopt performance standards that pipeline companies may follow in lieu of the referenced specifications. MTB is encouraging the American Society of Mechanical Engineers (ASME) to develop the standards as part of its B31.8 pipeline code. If such standards are satisfactory for regulatory purposes, they will be considered for inclusion in Part 192 as an alternative to the referenced specifications.

Outside Force Damage

Damage to buried pipelines from outside force persists as the major cause of pipeline accidents. Excavators and others engaged in earth moving activities have been urged through state and local laws and "one call" notification systems to have buried lines located and marked before digging. Since 1972, the Department has encouraged states in these efforts. To further advance such safety programs, MTB amended Part 192, effective April 1, 1983, to require gas pipeline operators to establish or participate in damage prevention programs. The new standards specify certain performance criteria for these programs. Now, MTB believes that a method for monitoring the effectiveness of a damage prevention program is necessary. Through a research program at the Department's Transportation Systems Center, MTB initiated a modest effort in 1983 to develop a reliable method for monitoring the safety performance of damage prevention programs. This will be continued through 1984.

APPENDIX A

Transportation of Natural and Other Gas or Hazardous Liquids by Pipeline Rulemakings Published in 1983

Docket No.	Date Issued	Title	Summary
OPS-49 Notice 5 NPRM Correction	March 25, 1983 April 14, 1983	Annual Reports and Incident Reports	Miscellaneous revisions of the reporting requirements that reduce the regulatory burden on the industry and at the same time capture new and comprehensive data that are essential to the protection of life and property.
PS-57 Notice 2 Withdrawal of Proposed Rulemaking	October 24, 1983	Monitoring of Gas Odor Level	Withdrawal of proposed rulemaking that would have instituted more rigid standards for the control of natural gas odorization. The proposal was found to be impractical and would not increase the level of safety sufficiently to justify the high estimated cost of implementation.
PS-62 Notice 2 Withdrawal of Proposed Rulemaking	March 8, 1983	Leakage Surveys	Withdrawal of proposed rulemaking that would have instituted more rigid standards for the frequency or location of leakage surveys. The consensus of the comments received was that, because of the almost instantaneous occurrence of a leak and an ensuing accident, the proposal for more frequent surveys would not be cost effective in reducing risk.
PS-64 Final Rule	June 28, 1983	Qualification of Metallic Compounds	Establishes criteria to qualify for use, components manufactured according to voluntary standards which have not been incorporated by reference.
PS-69 Notice 2 NPRM Final Rule	January 18, 1983 May 27, 1983	Line Marking at Navigable Waterways	Proposes to revoke regulations requiring pipeline operators to place and maintain live markers at locations where pipelines

PS-72 Final Rule	February 24, 1983	Retention of Radio-graphic Film	Deletes the requirement to retain radiographic film for 3 years after a line has been placed in service and to map the location of radiographic welds. The existing rule does not enhance safety but does impose a significant cost burden.	cross navigable waterways. The current regulations are considered costly and unnecessary for safety in light of requirements and practices of the U.S. Army Corp of Engineers.
PS-74 Notice 1 NPRM Final Rule	January 19, 1983 October 14, 1983	Repair or Removal of Girth Weld Defects	Proposes to modify pipeline construction requirements by substituting performance standards for weld repair for the existing regulations governing repair and removal of defective girth welds.	
PS-76-1 Notice 1 ANPRM	March 2, 1983	Monitoring of External Corrosion Control	Explores the feasibility of requiring electrical tests of cathodic protection systems.	
PS-77-1 Notice 1 NPRM	October 6, 1983	Isolated Corrosion Pitting	Proposes to modify existing criteria for replacement or repair of hazardous liquid pipe found to have isolated corrosion pitting.	
PS-78 Notice 1 NPRM	October 31, 1983	Design of Pipeline Components-General Requirements	Proposes to revise the general requirements for design of pipeline components to recognize that limiting stresses to "unit stresses equivalent to those allowed for comparable material in pipe in the same location and kind of service" is not an appropriate criterion from a safety standpoint for many pipeline components.	
Interpretation 83-6	May 19, 1983	Service Line Valve Requirements	Interprets the term "anticipated heat" as it appears in paragraph (b) of § 192.363 to mean any possible source of heat to which a valve may be exposed including fire, that would make the valve inoperable.	

Interpretation 83-7	June 27, 1983	Installation of Plastic Pipe	Interprets the phrase "vault or any other below grade enclosure" as it appears in paragraph (b) of § 192.231 to mean those spaces that are subject to human occupancy in which case plastic pipe installed in that area is subject to corrosion protection requirements.
Interpretation 83-1 and 83-2	March 25, 1983	Corrosion Control Monitoring	Interprets the requirements of 49 CFR § 192.465 to mean that pipelines with voluntarily installed cathodic protection are subject to the 3 year reevaluation requirements instead of annual monitoring and electrical surveys are not required for pipelines in remote areas if it can reasonably be concluded that corrosion-caused leaks would not be detrimental to public safety.
Interpretation 83-8	August 1, 1983	Valve Spacing	Interprets the section analyzing block valve requirements of § 192.179(a)(4) to mean that spacing of not more than 20 miles of pipeline between valves will result in each point on the pipeline between valves being within 10 miles of a valve.
Interpretation 83-9	August 5, 1983	Use of Plastic Pipe to Transport Carbon Monoxide or Hydrogen	Clarifies the phrase "resistant to chemicals with which contact may be anticipated" as it is used in § 192.59 para (a)(2) to apply to PVC and PE pipe manufactured in accordance with ASTM D2513-81 specifications.
83-1 Notice 1 Waiver	August 1, 1983	Petition for Waiver	Waiver granted to Florida Gas Transmission Company from compliance with § 192.611(e)(2) to permit temporary continued operation of a segment of pipe with a design factor of 0.72 until such time as the line is taken out of service.
Notice 2	October 13, 1983		

83-4W Notice 1
Waiver

June 20, 1983

Waiver of Requirements
to Bury Plastic Pipe

Waiver granted to Tennessee Gas Pipeline Company from compliance with §192.321 to permit the temporary installation of above ground pipe while the permanent line is temporarily taken out of service.

APPENDIX B

ENFORCEMENT ACTIONS TAKEN IN 1983

WARNING LETTERS ISSUED

Natural Gas Operators

Operator

ARDLA GAS CO.
 AMERICUS UTILITY COMMISSION
 COMMONWEALTH SERVICE CORP.
 CARNEGIE NATURAL GAS TRANSMISSION CORP.
 EQUITABLE GAS CO.
 GAS SERVICE CO.
 GREAT LAKES GAS TRANSMISSION CO.
 GREAT PLAINS NATURAL GAS CO.
 IBERVILLE PARISH NATURAL GAS SYSTEM
 MICHIGAN-WISCONSIN PIPE LINE CO
 MISSISSIPPI RIVER TRANSMISSION CORP.
 NATIONAL FUEL GAS SUPPLY CORP.
 NORTHWEST PIPE LINE CO.
 PANHANDLE EASTERN PIPE LINE CO.
 TEXAS EASTERN GAS PIPE LINE CO.
 TRANSCONTINENTAL GAS PIPE LINE CORP.
 TRANSCONTINENTAL GAS PIPE LINE CORP.
 TRUNKLINE GAS CO.

Location

SHREVEPORT, LA
 AMERICUS, GA
 WICKLIFFE, KY
 CHARLESTON, WV
 PITTSBURGH, PA
 KANSAS CITY, MO
 DULUTH, N.M.
 FERFUS FALLS, MN
 PLAQUEMINE, LA
 DETROIT, MI
 ST. LOUIS, MO
 HAMBURG, NY
 SALT LAKE CITY, UT
 KANSAS CITY, MO
 HOUSTON, TX
 HOUSTON, TX
 CARLSTADT, NJ
 KANSAS CITY, MO

Location of systems operated by Towns and Municipalities

ANDERSONVILLE, GA
 ARNAUDVILLE, LA
 BAKER, LA
 CLINTON, LA
 COLUMBIA, LA
 COALINGA, CA
 COCHRAN, GA
 CRAWFORDVILLE, GA
 CRAWFORDVILLE, GA
 CUTHBERT, GA
 DANVILLE, VA
 EATONTON, GA
 ELIZABETHTOWN, KY
 GREENBORO, GA
 HAZEL, KY

HOUMA, LA
 HICKMAN, KY
 KENTWOOD, LA
 KINDER, LA
 LIVONIA, LA
 MELVILLE, LA
 PERRY, GA
 RICHMOND, VA
 SOCIAL CIRCLE, GA
 THOMSON, GA
 THIBODAUX, LA
 VIENNA, GA
 WESTLAKE, LA
 WHITE CASTLE, LA
 ZACHARY, LA

Hazardous Liquid Pipeline Companies

Operator

Location

AMOCO PIPELINE CO.	DUPONT, CO
AMOCO PIPELINE CO.	INDEPENDENCE, KS
CENEX PIPELINE CO.	LAUREL, MT
DOMO PETROLEUM LIMITED	SARNIA, ON
GETTY TRADING AND TRANSPORTATION CO.	DENVER, CO
GULF-CENTRAL PIPELINE CO.	TULSA, OK
HYDROCARBON TRANSPORTATION, INC.	OMAHA, NE
JAYHAWK PIPELINE CORP.	WICHITA, KS
LAURELHILL PIPELINE CO.	CAMP HILL, PA
MARATHON PIPELINE CO.	FINDLAY, OH
PORTAL PIPELINE CO.	MINOT, ND
SINCLAIR PIPELINE CO.	SINCLAIR, WY
TEXOMA PIPELINE CO.	TULSA, OK
WILLIAMS PIPELINE CO.	TULSA, OK

ENFORCEMENT CASES OPENED

Natural Gas Companies

Operator

Location

CLINTON, LA G.U.D.#2	CLINTON, LA
CONSOLIDATED GAS SUPPLY CO.	CLARKSBURG, WV
COLUMBIA GAS TRANSMISSION CORP.	CHARLTON, WV
GRANT PARISH, LA, G.U.D. #3	GEORGETOWN, LA
GRANT PARISH, LA, G.U.D. #5	HOPE, AR
MOREHEAD STATE UNIVERSITY	MOREHEAD, KY
NATIONAL FUEL GAS SUPPLY CORP.	BUFFALO, NY
NORTHWEST CENTRAL PIPELINE CORP.	OKLAHOMA CITY, OK
TERRBONNE PARISH, POLICE JURY	HOUMA, LA
TRUNKLINE GAS CO.	KANSAS CITY, MO
UNION GAS SYSTEM INC.	JUDEPENDENCE, KS
WEST BATON ROUGE PARISH NATURAL GAS SYS.	PORT ALLEN, LA
ZEBULON GAS ASSOCIATION, INC.	PIKEVILLE, KY

Location of Systems Operated by Cities and Municipalities

BERWICK, LA	MONTGOMERY, LA
CAIRO, GA	MOREAUVILLE, LA
CAMILLA, GA	OBERLIN, LA
COLQUITT, GA	PORT ALLEN, LA
DENHAM SPRINGS, LA	PORTBARRE, LA
DONALSONVILLE, GA	SPARTA, GA
ESTERWOOD, LA	SUGAR HILL, GA
GRAND ISLE, LA	TALLAPOOSA, GA
JACKSON, LA	VILLE PLATTE, LA
MADISONVILLE, LA	WALKER, LA
MARINGOUIN, LA	WASHINGTON, LA

Hazardous Liquid Pipeline Companies

OPERATOR

LOCATION

BADGER PIPELINE CO.
CALNEV PIPELINE CO.
WEST SHORE PIPELINE CO.
WILLIAMS PIPELINE CO.

TULSA, OK
SAN BERNARDINO, CA
LOMBARD, IL
TULSA, OK

ENFORCEMENT CASES CLOSED

Natural Gas Companies

OPERATOR

DISPOSITION

Consolidated Gas Supply Corp. Clarksburg, WV	Civil Penalty Collected: \$5,000
Commercial Pipeline Co., Inc. Witchita, KS	Closed after Compliance Order Review
East Feliciana Parish, G.U.D. #2 Ethel, LA	Closed after Compliance Order Review
National Fuel Gas Supply Corp. Buffalo, NY	Civil Penalty Collected: \$5,000
Natural Gas Pipeline Co. of America Chicago, IL	Closed after Compliance Order Review.
Northwest Central Pipeline Corp. Oklahoma City, OK	Civil Penalty Collected: \$5,000
Trunkline Gas Co. Kansas City, MO	Notice Withdrawn

Location of Systems Operated by Towns and Municipalities
Disposition: Closed after Compliance Order Review

Georgia:

Dawson
Meigs
Pelham
Talbotton
Waynesboro
Winder
Woodland

Kentucky:

Grayson
Harden
Liberty
North Middletown
Providence

Louisiana:

Baldwin
Breaux Bridge
Colfax
Donaldsonville
Jena
Hentwood
Palmetto
Scott
Summersport
Thibodaux

Disposition: Notices Withdrawn/Deficiencies Corrected

Gueydon, LA
Moreauville, LA
Waterproof, LA

Hazardous Liquid Pipeline Companies

OPERATOR

DISPOSITION

Colonial Pipeline Co. Atlanta, GA	Closed after Compliance Order Review.
Badger Pipeline Co. Tulsa, OK	Closed after Compliance Order Review.
Mid-American Pipe Line System Tulsa, OK	Closed without penalty. Final Order: No violation.
West Shore Pipe Line Co. Lombard, IL	Civil Penalty Collected: \$2,000

