# Analysis of Current Field Data
Technical Topical Report

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## DISCLAIMER



## ABSTRACT

This report provides a concise summary of the information collected and analyzed regarding the leak characteristics which define them as applicable candidates for pressure activated sealant technology. This information covers Office of Pipeline Safety reported incidents from 1985 to 1997 and was collected from existing data sources as well as operator and service company input.

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## EXECUTIVE SUMMARY

The purpose of this collection and analysis of existing data regarding the cause, type and severity of leaks most commonly experienced in natural gas transmission systems is twofold: first, to develop a database on information gathered and provide a summary of leak characteristics which define them as applicable candidates for pressure activated sealant technology; and secondly, utilize this database as a basis in constructing applicable sealant test modeling.

The period from 1985-1997 was chosen because this was the time frame with the most complete data. Starting with “Analysis of DOT Reportable Incidents for Gas Transmission and Gathering System Pipelines, 1985 through 1997” and adding additional data from Office of Pipeline Safety reports as well as operator and service company input, we were able to identify 205 incidents from a possible 1,084 that would have been candidates for pressure activated sealant technology.

## EXPERIMENTAL

This report contains no experimental methods.

RESULTS AND DISCUSSION

## Collection of Data

Our collection of existing data started with the "Analysis of DOT Reportable Incidents for Gas Transmission and Gathering System Pipelines, 1985 through 1997"[1]. This report covers 1,084 incidents on 523,000 kilometers (325,000 miles) of natural gas transmission and gathering pipelines that were reported to the DOT's Office of Pipeline Safety. In this report the authors classified the incidents into 22 distinct causes (Table 1).

**Table 1. PRCI Report, All Reportable Incidents, 1985 - 1997**

| | | Number | % |
|---|---|---|---|
| Cold Weather | CW | 9 | 0.8% |
| Defective Fabrication Weld | DFW | 20 | 1.8% |
| Defective Girth Weld | DGW | 23 | 2.1% |
| Defective Pipe | DP | 15 | 1.4% |
| Defective Pipe Seam | DPS | 24 | 2.2% |
| External Corrosion Related Failure | EC | 109 | 10.1% |
| Earth Movement | EM | 24 | 2.2% |
| Gasket or O-Ring Failure | GF | 15 | 1.4% |
| Heavy Rains or Flood | HRF | 58 | 5.4% |
| Internal Corrosion Related Failure | IC | 130 | 12.0% |
| Incorrect Operation by Carrier Personnel | IO | 79 | 7.3% |
| Lightning | LIGHT | 14 | 1.3% |
| Malfunction of Control or Relief Equipment | MCRE | 27 | 2.5% |
| Miscellaneous | MISC | 73 | 6.7% |
| Previously Damaged Pipe | PDP | 40 | 3.7% |
| Stress Corrosion Cracking | SCC | 11 | 1.0% |
| Seal or Pump packing Failure | SPPF | 4 | 0.4% |
| Third Party Inflicted Damage | TP | 308 | 28.4% |
| Threads Stripped, Broken Pipe, or Coupling Failure | TSBPC | 34 | 3.1% |
| Unknown | UNK | 54 | 5.0% |
| Vandalism | V | 6 | 0.6% |
| Wrinkle Bend or Buckle | WBB | 7 | 0.6% |
| | | 1,084 | 100.0% |

In focusing on leak characteristics that define incidents as applicable candidates for sealant technology we first chose to examine leak severity. Data for actual leak size and rate being unavailable we filtered the incidents based on the data in the Rupture/Leak column (R/L)[2], as shown in Table 2.

**Table 2. Rupture/Leak**

| Input | Number | Percentage |
|---|---|---|
| “Blank” | 6 | 0.6% |
| Leaks | 354 | 32.7% |
| None | 10 | 0.9% |
| Other | 206 | 19.0% |
| Puncture | 160 | 14.8% |
| Rupture | 293 | 27.0% |
| Tear | 55 | 5.1% |
| | 1,084 | 100.0% |

For the purpose of this analysis we eliminated all incidents that were not classified as Leaks (…an unintentional escape of gas from the pipeline). The inputs of “Blank”, None and Other were too vague to make a determination of their candidacy. The inputs of Rupture (…a complete failure of any portion of the pipeline), Puncture (…damage from an externally applied force) and Tear (…an extension of the original opening in the pipeline resulting from an externally applied force) indicated conditions that may be too severe for pressure activated sealant technology. This analysis resulted in 354 incidents remaining in our database.

At present, for pressure activated sealant technology to be successful, a working pressure of plus or minus 1.38 MPa (200 psi) or greater is required. After eliminating incidents that were in environments less than 1.38 MPa (200 psi) MAOP, 328 incidents remained. At this stage, without having leak rate or size data available, the assumption could be made that “a leak is a leak” and thus all 328 remaining incidents were applicable candidates for pressure activated sealant technology. That being said, we also looked at the data from the viewpoint where a pressure activated sealant repair would have an economic advantage over traditional repair methods.

To achieve this we took a broad view of the causes that were associated with the remaining incidents, and then eliminated causes that, as a group, did not appear to have a distinct economic advantage for utilizing sealant repair technology. These causes are listed below in Table 3[3].

**Table 3. Causes Eliminated**

| Cause Eliminated | Reason for Elimination |
|---|---|
| Cold Weather | All incidents occurred onshore, on surface components and facilities that could easily be accessed for repair. |
| Gasket or O-Ring Failure | These types of leaks have historically been successfully cured by utilizing pressure activated sealant technology. Often, there are alternate methods of repair that possess an economic advantage. |
| Incorrect Operation by Carrier Personnel | All but one occurred onshore, mainly above ground, and usually resulted in damages that were too severe for sealant technology. |
| Lightning | All onshore and easily accessible. |
| Malfunction of Control or Relief Equipment | Either easily accessible, sealant technology not suitable for system or damage too severe. |

| | |
|---|---|
| Miscellaneous | Assorted failures on tees, ball valves and flanges, mainly at surface. |
| Stress Corrosion Cracking | All incidents resulted in ruptures. |
| Seal or Pump Packing Failure | Both incidents were compressor related. |
| Third Party Inflicted Damage | Mostly onshore, on exposed pipelines and damage too severe for sealant technology. |
| Threads Stripped, Broken Pipe or Coupling Failure | Mostly onshore and easily accessible. |
| Vandalism | All incidents were classified as ruptures. |

We then examined the "OPS Natural Gas Transmission Incident Data – mid 1984 to 2001", eliminating data prior to 1985 and after 1997, and merged the two databases, matching incident per incident. A final filtering was done through closer examination of each individual incident, with a focus on damage severity, accessibility, incomplete and conflicting information.

The remaining base of 205 incidents and their causes are reflected in Table 4.

**Table 4. Incident Base - Sealant Candidates**

| | | Number of Leaks by Cause | % of Incident Base | % of all 354 Leaks | % of all 1,084 Incidents |
|---|---|---|---|---|---|
| Defective Fabrication Weld | DFW | 9 | 4.4% | 2.5% | 0.8% |
| Defective Girth Weld | DGW | 16 | 7.8% | 4.5% | 1.5% |
| Defective Pipe | DP | 5 | 2.4% | 1.4% | 0.5% |
| Defective Pipe Seam | DPS | 12 | 5.9% | 3.4% | 1.1% |
| External Corrosion | EC | 41 | 20.0% | 11.6% | 3.8% |
| Earth Movement | EM | 7 | 3.4% | 2.0% | 0.6% |
| Heavy Rains or Flood | HRF | 13 | 6.3% | 3.7% | 1.2% |
| Internal Corrosion | IC | 77 | 37.6% | 21.8% | 7.1% |
| Previously Damaged Pipe | PDP | 6 | 2.9% | 1.7% | 0.6% |
| Unknown | UNK | 17 | 8.3% | 4.8% | 1.6% |
| Wrinkle Bend or Buckle | WBB | 2 | 1.0% | 0.6% | 0.2% |
| | | 205 | 100.0% | 57.9% | 18.9% |

The remainder of this report will focus on our analysis of this remaining incident base and how these incidents will be represented in our test modeling.

**Analysis of Data**

<u>Leak Cause Analysis</u>

An analysis of the incident base by cause (Table 5) shows that weld and corrosion causes account for 75.6% of the 205 incidents.

**Table 5.**

| | Number of Leaks by Cause | % of Incident Base |
|---|---|---|
| DFW | 9 | 4.4% |
| DGW | 16 | 7.8% |
| DPS | 12 | 5.9% |
| EC | 41 | 20.0% |
| IC | 77 | 37.6% |
| | 155 | 75.6% |

We also looked at causes by "Operator Judgment" versus "Damage Greater Than $50K", since by definition, the incidents that were classified under "Operator Judgment" are considered more of a minor, or lesser leak.

Table 6 shows that weld and corrosion leaks account for 81.7% of the incidents classified as Operator Judgment and 70.5% of the incidents classified under Damage Greater Than $50K.

**Table 6.**

| | Operator Judgment | | | Damage > $50K | |
|---|---|---|---|---|---|
| | Number of Leaks by Cause | % of Op Judg | | Number of Leaks by Cause | % of Dam > $50K |
| DFW | 5 | 5.4% | DFW | 4 | 3.6% |
| DGW | 10 | 10.8% | DGW | 6 | 5.4% |
| DPS | 3 | 3.2% | DPS | 9 | 8.0% |
| EC | 27 | 29.0% | EC | 14 | 12.5% |
| IC | 31 | 33.3% | IC | 46 | 41.1% |
| | 76 | 81.7% | | 79 | 70.5% |

For our testing, we will focus on simulating and sealing leaks that are caused by Defective Fabrication Welds, Defective Girth Welds, Defective Pipe Seams, External Corrosion and Internal Corrosion.

## Area of Incident

Table 7 illustrates the breakdown of offshore and onshore incidents.

**Table 7. Area of Incidents**

| | Onshore | Offshore | Total | % |
|---|---|---|---|---|
| Above Ground | 1 | 0 | 1 | 0.5% |
| Under Ground | 92 | 1 | 93 | 45.4% |
| Under Pavement | 8 | 0 | 8 | 3.9% |
| Above Water | 0 | 5 | 5 | 2.4% |
| Under Water | 14 | 83 | 97 | 47.3% |
| Other | 1 | 0 | 1 | 0.5% |
| | 116 | 89 | 205 | 100% |

For the onshore incidents the 1 "Above Ground" is actually in a marsh area; the 1 "Other" is along the edge of a creek; and the 14 "Under Water" were under rivers and streams; all together making accessibility challenging.

The offshore incidents were represented by 1 "Under Ground" which was under water and then under a 4' burial layer. The 5 incidents classified "Above Water" were riser related. Obviously the vast majority were "Under Water". What we can conclude from this data is that based on accessibility, for all 205 incidents, internal sealant repair could have an economic advantage over traditional methods of repair which average $75,000 and $150,000 respectively for onshore and shallow offshore external repairs, with the costs soaring as water depths are increased.

## Area of Failure

Referring to Table 8, 81.0% of the incidents occurred on transmission lines, 16.6% on gathering lines and 2.4% on transmission lines of distribution system.

Even though all of the 205 incidents were candidates for sealant technology, for testing purposes we will focus on simulating pipe body and weld leaks, which together account for 88.3%, of the total incidents.

**Table 8. Area of Failure**

| | Branch | Fitting | Gasket | Mech Jt. | Pipe Body | Unk | Valve | Weld | WB | |
|---|---|---|---|---|---|---|---|---|---|---|
| Gathering Line | | 2 | | | 31 | | | 1 | | 34 |
| Transmission Line | 1 | 6 | 1 | 3 | 103 | 8 | 1 | 42 | 1 | 166 |
| Trans. Line of Distr. | | 1 | | | 2 | | | 2 | | 5 |
| | 1 | 9 | 1 | 3 | 136 | 8 | 1 | 45 | 1 | 205 |

## Pipe Size

Table 9 shows that 168.28 mm (6-5/8"), 323.85 mm (12-3/4"), 406.40 mm (16") and 508.00 mm (20") pipe accounted for 56.1% of the incidents. Since pipe size has no relevance for the success or failure of a sealant repair we will utilize 168.28 mm (6-5/8") pipe for our test modeling in order to reduce cost and facilitate ease of handling.

**Table 9. Pipe Sizes - by System of Failure**

| Pipe Size mm | Pipe Size inches | Gathering | Transmission | Trans. Line of Distribution | Totals | % |
|---|---|---|---|---|---|---|
| 12.70 | 0.500 | | 3 | | 3 | 1.5% |
| 60.33 | 2.375 | | 2 | | 2 | 1.0% |
| 76.20 | 3.000 | 2 | 2 | | 4 | 2.0% |
| 101.60 | 4.000 | | 1 | | 1 | 0.5% |
| 114.30 | 4.500 | 2 | 6 | | 8 | 3.9% |
| 128.02 | 5.040 | | 1 | | 1 | 0.5% |
| 139.70 | 5.500 | | 1 | | 1 | 0.5% |
| **168.28** | **6.625** | **7** | **20** | | **27** | **13.2%** |
| 219.08 | 8.625 | 4 | 8 | | 12 | 5.9% |
| 273.05 | 10.750 | 1 | 12 | | 13 | 6.3% |
| **323.85** | **12.750** | **7** | **30** | **2** | **39** | **19.0%** |
| 355.60 | 14.000 | | 3 | | 3 | 1.5% |
| **406.40** | **16.000** | **4** | **22** | **1** | **27** | **13.2%** |
| 450.85 | 17.750 | | 1 | | 1 | 0.5% |
| 457.20 | 18.000 | | 4 | 1 | 5 | 2.4% |
| **508.00** | **20.000** | **3** | **18** | **1** | **22** | **10.7%** |
| 558.80 | 22.000 | 2 | 1 | | 3 | 1.5% |
| 609.60 | 24.000 | 2 | 11 | | 13 | 6.3% |
| 660.40 | 26.000 | | 4 | | 4 | 2.0% |
| 762.00 | 30.000 | | 10 | | 10 | 4.9% |
| 863.60 | 34.000 | | 1 | | 1 | 0.5% |
| 914.40 | 36.000 | | 4 | | 4 | 2.0% |
| 1066.80 | 42.000 | | 1 | | 1 | 0.5% |
| | | 34 | 166 | 5 | 205 | 100.0% |

## Pipe Material

Since incidents that occurred on systems rated less than 200 psi MAOP were already removed from our study, it comes at no surprise that the vast majority (204) of the incidents occurred on steel material. The one other incident was classified as weld material. We will utilize schedule 80 steel material for our test modeling, with 0.432" wall thickness and 12.36 MPa (1,793 psi) MAOP.

Pipe Pressures

Table 10 shows the number of incidents at reported pressure ranges for estimated incident pressure, maximum leak differential and maximum allowable operating pressure.

The leak differential pressure is calculated as MAOP less atmospheric (or hydrostatic) pressure. With pressure activated sealants there are two primary criteria: a minimum of around 1.38 MPa (200 psi) differential pressure and leak severity.

The one Leak Differential incident in the 0.69 – 1.37 MPa (100 – 199 psi) range is at 1.28 MPa (185 psi). The thirty-nine MAOP incidents in the 9.65 – 10.34 MPa (1400 – 1499 psi) range were all 9.93 MPa (1440 psi). In our testing we will achieve a low pressure seal at 1.28 MPa (185 psi) and increase pressure in various stages until obtaining a maximum pressure seal at 9.93 MPa (1440 psi).

**Table 10. Number of Incidents at Each Pressure Range**

| Pressure, MPa | Pressure, psi | Est. Incident Pressure | Max. Leak Differential | MAOP |
|---|---|---|---|---|
| 0 - 0.68 | 0 - 99 | 5 | 0 | 0 |
| 0.69 - 1.37 | 100 - 199 | 4 | 1 | 0 |
| 1.38 - 2.06 | 200 - 299 | 12 | 8 | 9 |
| 2.07 - 2.75 | 300 - 399 | 19 | 7 | 6 |
| 2.76 - 3.44 | 400 - 499 | 21 | 11 | 6 |
| 3.45 - 4.13 | 500 - 599 | 18 | 5 | 11 |
| 4.14 - 4.82 | 600 - 699 | 18 | 8 | 4 |
| 4.83 - 5.51 | 700 - 799 | 17 | 17 | 16 |
| 5.52 - 6.20 | 800 - 899 | 28 | 22 | 22 |
| 6.21 - 6.89 | 900 - 999 | 17 | 21 | 17 |
| 6.89 - 7.58 | 1000 - 1099 | 22 | 13 | 17 |
| 7.58 - 8.27 | 1100 - 1199 | 16 | 31 | 13 |
| 8.27 - 8.96 | 1200 - 1299 | 1 | 11 | 30 |
| 8.96 - 9.65 | 1300 - 1399 | 0 | 22 | 11 |
| 9.65 - 10.34 | 1400 - 1499 | 0 | 17 | 39 |
| 10.34 - 11.02 | 1500 - 1599 | 1 | 0 | 0 |
| 11.03 - 11.71 | 1600 - 1699 | 0 | 0 | 0 |
| 11.72 - 12.40 | 1700 - 1799 | 0 | 1 | 0 |
| 12.41 - 13.09 | 1800 - 1899 | 0 | 0 | 1 |
| 13.10 - 13.78 | 1900 - 1999 | 0 | 0 | 0 |
| 13.79 - + | 2000 - + | 0 | 3 | 3 |
| | | 199 | 198 | 205 |

Pipe Corrosion States

It can be seen by the data in Table 11 that 68.3% of the externally corroded pipe and 64.1% of the internally corroded pipe is described as either "localized pitting", "pinhole" or "pinhole with localized pitting". This number for internally corroded pipe may actually be closer to the 80% range if not for the lack of data for 19 incidents under "Corrosion Description". We will simulate pinhole leaks with localized pitting in our test model when attempting to seal external and internal corrosion leaks.

**Table 11. Pipe Corrosion States**

| Leak Cause | Corrosion Location | Corrosion Description | Corrosion Cause |
|---|---|---|---|
| | | | |
| 1 – DP | 1 – Internal | 1 – Localized Pitting | 1 – Bacteria |
| | | | |
| 41 – EC | 40 – External | 8 – General Corrosion | 1 – Coating Failure<br>4 – Galvanic<br>3 – "Blank" |
| | | 26 – Localized Pitting | 1 – Atmosphere<br>1 – Coating Failure<br>18 – Galvanic<br>6 – "Blank" |
| | | 1 – Pinhole | 1 – "Blank" |
| | | 1 – Pinhole, Localized Pitting | 1 - Galvanic |
| | | 4 – "Blank" | 4 – "Blank" |
| | 1 – Internal* | 1 – Localized Pitting | 1 – Bacteria |
| | | | |
| 77 – IC | 76 – Internal | 1 – ¼" Circular Hole | 1 – "Blank" |
| | | 9 – General Corrosion | 2- Bacteria<br>1 – Chemical<br>1 – Galvanic<br>1 – Microbiological<br>4 – "Blank" |
| | | 38 – Localized Pitting | 2 – Liquid Accumulation<br>2 – Bacteria<br>2 – Chemical<br>9 – Galvanic<br>1 – H2S<br>22 – "Blank" |
| | | 7 – Pinhole | 7 – "Blank" |
| | | 3 – Pinhole, Localized Pitting | 1 – Galvanic<br>2 - Blank |
| | | 18 – "Blank" | 1 – Liquid Accumulation<br>1 – Galvanic |

| | | | |
|---|---|---|---|
| | 1 – “Blank” | 1 – “Blank” | 16 – “Blank”<br><br>1 – “Blank” |
| | | | |
| 1 – PDP** | 1 – External | 1 – External Cracks | 1 – Stray Current |
| *Leak was classified as External Corrosion, but leak location was designated as internal. May have been typographical error, but data remained unchanged to ensure accuracy of analysis.<br><br>**Operator classified cause as Stress Corrosion Cracking and not Previously Damaged Pipe. | | | |

Pipeline Piggability

Two operators and a service provider were queried about the ability to pig their pipelines. The service provider, through customer surveys, proclaimed that 40% of the onshore pipelines and 70% of the offshore pipelines were piggable. One operator generalized that only 20% of their onshore pipelines were piggable. Operator B examined 32 incidents that were part of our incident database and the results are outlined in Table 12.

**Table 12.**

| | Piggable | | |
|---|---|---|---|
| | Yes | No | Unknown |
| Offshore | 6 | 6 | 16 |
| Onshore | 2 | 0 | 2 |
| | 8 | 6 | 18 |

Since the data is limited, these numbers are rendered inconclusive, and testing procedures will be developed for both non-piggable and piggable applications.

## Conclusion

Candidates for pressure activated sealant technology were identified on the basis of several criteria: Accessibility/Economic Advantage, Leak Severity, Leak Geometry, Minimum Operating Pressure, and Leak Cause.

Starting with 354 leaks out of 1,084 incidents in a 13 year period we identified 205 leaks that were candidates for our sealant technology. This number affirms that pressure activated sealant technology is a viable option to traditional external leak repairs.

Accessibility/Economic Advantage: The more inaccessible the leak site, the greater the economic advantage. Our database focuses on leaks where accessibility is difficult, time-consuming and costly. 198 incidents (96.6% of our 205 incident base) were either underground, under pavement or underwater.

Leak Severity and Geometry: While no actual leak rates were collected, we know through previous field experience and testing that we can cure leaks in the range of 2.83 – 8.50 cubic meters per minute (100 – 300 scf per minute). Our incident base focused on cracks & pinholes, not ruptures, punctures or tears, which may be out of the range for sealant technology. Narrow leaks, which have more surface area to open area, are easier to seal and have longer seal longevity than circular leaks.

Minimum Operating Pressure: MAOP less hydrostatic (or atmosphere) needs to be near or greater than 200 psi for pressure activated sealant technology to be successful. Our testing will focus on curing leaks with differentials from 1.28 MPa (185 psi) to 9.93 MPa (1440 psi).

Leak Cause: Weld and corrosion leaks accounted for 75.6% of our incident base and 43.8% of all 384 leaks. By focusing our testing on weld and corrosion leaks we will be testing a representative sampling of the majority of leaks that are applicable candidates for pressure activated sealant technology.

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[1 - 3] Report No. PR-218-9801 Published 2001 by Kiefner and Associates, Inc., J. F. Kiefner, R. E. Mesloh, and B. A. Kiefner

# Pressure Activated Sealant Candidates, 1985-1997



| Leak No. | OPS Rpt ID | Op Judgement | Offshore Onshore | Area of Incident | Water Depth (ft) | Estimated Incident Pressure, psi | Max. Leak Differential Pressure, psi | MAOP, psi | Leak Cause | Leak Cause Detail | Corrosion Cause | Corrosion Location | Corrosion Description | Coated | CP | Incident Occurred on | Part of System Involved | Pipeline Piggable Yes/No | Failure Occurred on | Material Involved | Diameter (inch) | Wall Thickness (inch) | SMYS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 19850003 | Op Judge | Onshore | Under Ground | | 250 | 485 | 500 | DGW | Leak in a Girth Weld | | | | | | Tr of Dis | Pipeline | | Weld | Steel | 12.750 | 0.219 | 42,000 |
| 2 | 19850027 | Op Judge | Onshore | Under Ground | | 500 | 492 | 507 | PDP | Unknown Date of Damage | | | | | | Trans | Pipeline | | Pipe Body | Steel | 10.750 | 0.250 | 24,000 |
| 3 | 19850029 | Op Judge | Onshore | Under Ground | | 540 | 705 | 720 | IC | | Accumulation of Liquids | Internal | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 2.375 | 0.250 | 60,000 |
| 4 | 19850043 | Dam>$50K | Offshore | Under Water | 187 | 969 | 1,116 | 1,200 | IC | | Galvanic | Internal | Pinhole Leak, Localized Pitting | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 8.625 | 0.250 | 52,000 |
| 5 | 19850045 | Op Judge | Onshore | Under Ground | | 550 | 1,140 | 1,155 | IC | | Chemical | Internal | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 6.625 | 0.156 | 42,000 |
| 6 | 19850050 | Op Judge | Onshore | Under Ground | | 80 | 235 | 250 | EM | Subsidence/extreme Weather Caused Fillet Weld Failure | | | | | | Trans | Pipeline | | Weld | Steel | 6.625 | 0.250 | 24,000 |
| 7 | 19850052 | Op Judge | Onshore | Under Ground | | 240 | 285 | 300 | EC | | Galvanic | External | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 12.750 | 0.250 | 35,000 |
| 8 | 19850068 | Dam>$50K | Onshore | Under Ground | | 660 | 765 | 780 | DFW | Hot Tap Connection, Fillet Weld Leaked in Haz | | | | | | Trans | Pipeline | | Pipe Body | Steel | 30.000 | 0.312 | 52,000 |
| 9 | 19850080 | Op Judge | Onshore | Under Ground | | 90 | 223 | 238 | DFW | Branch Connection, Crack in Fillet Weld on Saddle | | | | | | Trans | Pipeline | | Weld | Steel | 20.000 | 0.250 | |
| 10 | 19850089 | Dam>$50K | Onshore | Under Ground | | 655 | 945 | 960 | EM | Nipple (1/2") Failure Caused by Subsidence | | | | | | Trans | Pipeline | | Fitting | Steel | 0.500 | 0.109 | 35,000 |
| 11 | 19850099 | Op Judge | Onshore | Under Ground | | 410 | 612 | 627 | EC | Cathodic Protection Breakdown | Galvanic | External | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 3.000 | 0.312 | 60,000 |
| 12 | 19850104 | Op Judge | Onshore | Under Ground | | 790 | 1,165 | 1,180 | EC | | Galvanic | External | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 12.750 | 0.312 | 35,000 |
| 13 | 19850129 | Op Judge | Onshore | Under Ground | | 240 | 705 | 720 | DGW | Leak in a Girth Weld | | | | | | Trans | Pipeline | | Weld | Steel | 6.625 | 0.188 | |
| 14 | 19850200 | Op Judge | Onshore | Under Ground | | 550 | 1,140 | 1,155 | IC | | | Internal | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 6.625 | 0.188 | 42,000 |
| 15 | 19850204 | Op Judge | Onshore | Under Ground | | 465 | 773 | 788 | IC | Leak Was 250' from Well | | Internal | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 2.375 | 0.154 | 35,000 |
| 16 | 19850207 | Dam>$50K | Offshore | Under Water | | 635 | | 1,218 | IC | | Galvanic | Internal | General Corrosion | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 16.000 | 0.500 | 52,000 |
| 17 | 19850214 | Op Judge | Onshore | Under Ground | | 685 | 848 | 863 | IC | Suspected Cause | | | | | | Trans | Pipeline | | Pipe Body | Steel | 10.750 | 0.203 | 46,000 |
| 18 | 19850218 | Op Judge | Onshore | Under Ground | | 400 | 545 | 560 | DGW | Leak in a Girth Weld | | | | | | Trans | Pipeline | | Weld | Steel | 6.625 | 0.219 | 35,000 |
| 19 | 19850228 | Dam>$50K | Offshore | Under Water | 185 | 1,000 | 1,357 | 1,440 | EC | Occurred on Cad Weld of Anode to Pipeline Offshore | | External | Pinhole Leak | Y | Y | Trans | Pipeline | Unk | Pipe Body | Steel | 10.750 | 0.365 | 52,000 |
| 20 | 19850273 | Op Judge | Onshore | Under Ground | | 200 | 1,185 | 1,200 | IC | | Chemical | Internal | General Corrosion | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 10.750 | 0.203 | 35,000 |
| 21 | 19850306 | Dam>$50K | Offshore | Under Water | 215 | 996 | 1,344 | 1,440 | UNK | | | | | | | Trans | Pipeline | | Pipe Body | Steel | 16.000 | 0.375 | 52,000 |
| 22 | 19860039 | Dam>$50K | Offshore | Under Water | 212 | 1,100 | 1,345 | 1,440 | UNK | Power Gas Piping | | | | | | Trans | Power Gas Piping | | Fitting | Steel | 0.500 | 0.147 | |
| 23 | 19860042 | Op Judge | Onshore | Under Ground | | 950 | 960 | 975 | DGW | Crack in a Girth Weld, Leak | | | | | | Trans | Pipeline | | Weld | Steel | 30.000 | 0.344 | 60,000 |
| 24 | 19860067 | Dam>$50K | Onshore | Under Ground | | 498 | 485 | 500 | PDP | Contractor Damaged Pipe During Grading | | | | | | Trans | Pipeline | | Pipe Body | Steel | 8.625 | 0.188 | 42,000 |
| 25 | 19860078 | Dam>$50K | Onshore | Under Water | | 620 | 785 | 800 | HRF | Heavy Water Run-off | | | | | | Trans | Pipeline | | Unknown | Steel | 10.750 | 0.365 | 35,000 |
| 26 | 19860099 | Op Judge | Onshore | Under Ground | | 1,000 | 2,537 | 2,552 | IC | H2s In-line | | Internal | Localized Pitting | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 3.000 | 0.300 | 35,000 |
| 27 | 19860115 | Op Judge | Offshore | Under Water | | 1,150 | | 1,440 | DFW | Flange Failed | | | | | | Trans | Pipeline | | Fitting | Steel | 6.625 | 0.432 | 52,000 |
| 28 | 19860123 | Dam>$50K | Offshore | Under Water | 11 | 750 | 1,295 | 1,300 | DPS | DSAW Leak, Construction Defect | | | | | | Trans | Pipeline | Yes | Weld | Steel | 20.000 | 0.406 | 52,000 |
| 29 | 19860126 | Op Judge | Onshore | Under Ground | | 600 | 794 | 809 | EM | Landslide Due to Soaked Ground; GW Failure | | | | | | Trans | Pipeline | | Weld | Steel | 26.000 | 0.281 | 52,000 |
| 30 | 19860128 | Dam>$50K | Onshore | Under Ground | | 418 | 485 | 500 | DP | Leak in Pipe Wall | | | | | | Trans | Pipeline | | Pipe Body | Steel | 6.625 | 0.188 | 35,000 |
| 31 | 19860143 | Op Judge | Onshore | Under Ground | | 720 | 485 | 500 | DPS | Lap Weld Leaked During MAOP Upgrade Test-fire | | | | | | Trans | Pipeline | | Weld | Steel | 8.625 | 0.250 | 24,000 |
| 32 | 19860174 | Dam>$50K | Offshore | Under Water | 232 | 1,000 | 1,336 | 1,440 | IC | Elbow, 90 Degree | | Internal | | Y | Y | Trans | Pipeline | Unk | Fitting | Steel | 12.750 | 0.500 | 42,000 |
| 33 | 19860175 | Dam>$50K | Onshore | Under Water | | 1,060 | 1,085 | 1,100 | PDP | Dent and Gouge | | | | | | Trans | Pipeline | | Pipe Body | Steel | 30.000 | 0.360 | 65,000 |
| 34 | 19860211 | Dam>$50K | Onshore | Under Ground | | | 885 | 900 | DPS | EW (AOS) Leak, Incomplete Fusion | | | | | | Trans | Pipeline | | Weld | Steel | 30.000 | 0.344 | 52,000 |
| 35 | 19870008 | Dam>$50K | Offshore | Under Water | 227 | 1,020 | 1,148 | 1,250 | IC | | | Internal | | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 24.000 | 0.500 | 60,000 |
| 36 | 19870041 | Op Judge | Onshore | Under Ground | | 940 | 1,330 | 1,345 | IC | Release Occurred During Repair | Chemical | Internal | Localized Pitting | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 6.625 | 0.188 | 42,000 |
| 37 | 19870089 | Dam>$50K | Onshore | Under Water | | 582 | 1,295 | 1,310 | EC | Poor Drainage Contributed to Excessive Standing Water | | External | General Corrosion | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 6.625 | 0.156 | 35,000 |
| 38 | 19870047 | Dam>$50K | Offshore | Under Water | 167 | 850 | 1,225 | 1,300 | DGW | Leak in a Girth Weld, Construction Defect | | | | | | Trans | Pipeline | No | Weld | Steel | 12.750 | 0.375 | 46,000 |
| 39 | 19870050 | Dam>$50K | Offshore | Under Water | 227 | 930 | 1,148 | 1,250 | IC | | | Internal | | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 24.000 | 0.500 | 60,000 |
| 40 | 19870072 | Dam>$50K | Onshore | Under Ground | | 250 | 385 | 400 | EM | Subsidence of Abandoned Coal Mine Caused Leak in Gas Storage Well Casing | | | | | | Trans | Gas Storage Well | | Pipe Body | Steel | 5.500 | 0.244 | |
| 41 | 19870078 | Dam>$50K | Offshore | Under Water | 236 | | 1,334 | 1,440 | IC | | | Internal | | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 12.750 | 0.375 | 52,000 |
| 42 | 19870091 | Dam>$50K | Onshore | Under Pavement | | 350 | 400 | 415 | EC | | | External | | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 18.000 | 0.250 | 33,000 |
| 43 | 19870093 | Op Judge | Onshore | Under Ground | | 700 | 1,048 | 1,063 | EC | | Galvanic | External | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 16.000 | 0.281 | 42,000 |
| 44 | 19870094 | Op Judge | Offshore | Under Water | | 125 | | 200 | EM | Erosion | | | | | | Gath | Pipeline | | Pipe Body | Steel | 3.000 | 0.216 | 35,000 |
| 45 | 19870105 | Op Judge | Onshore | Under Ground | | 320 | 549 | 564 | IC | | | Internal | | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 6.625 | 0.188 | |
| 46 | 19870113 | Op Judge | Onshore | Under Ground | | 510 | 794 | 809 | DPS | DSAW Leak | | | | | | Trans | Pipeline | | Weld | Steel | 26.000 | 0.281 | 52,000 |
| 47 | 19870124 | Op Judge | Onshore | Under Ground | | 605 | 1,076 | 1,091 | IC | | | Internal | General Corrosion | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 6.625 | 0.156 | 42,000 |

| Leak No. | OPS Rpt ID | Op Judgement | Offshore Onshore | Area of Incident | Water Depth (ft) | Estimated Incident Pressure, psi | Max. Leak Differential Pressure, psi | MAOP, psi | Leak Cause | Leak Cause Detail | Corrosion Cause | Corrosion Location | Corrosion Description | Coated | CP | Incident Occurred on | Part of System Involved | Pipeline Piggable Yes/No | Failure Occurred on | Material Involved | Diameter (inch) | Wall Thickness (inch) | SMYS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 48 | 19870128 | Op Judge | Onshore | Under Ground | | 520 | 787 | 802 | EC | Accumulation of Liquid under Coating | Galvanic | External | General Corrosion | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 12.750 | 0.164 | 52,000 |
| 49 | 19870135 | Op Judge | Onshore | Under Ground | | 370 | 575 | 590 | PDP | Multiple Dents Found at Leak, Tension Failure of Girth Weld and Bending | | | | | | Trans | Pipeline | | Weld | Steel | 3.000 | 0.156 | 42,000 |
| 50 | 19870142 | Dam>$50K | Offshore | Under Water | | 850 | | 955 | IC | | | Internal | Localized Pitting | Y | N | Trans | Pipeline | | Pipe Body | Steel | 10.750 | 0.250 | 42,000 |
| 51 | 19870157 | Dam>$50K | Offshore | Under Water | 70 | 1,000 | 1,409 | 1,440 | IC | | | Internal | | Y | Y | Gath | Pipeline | Unk | Pipe Body | Steel | 12.750 | 0.375 | 52,000 |
| 52 | 19870172 | Op Judge | Onshore | Under Ground | | 82 | 185 | 200 | DFW | Miter Weld (48 Degree) Broke | | | | | | Trans | Compr Station | | Pipe Body | Steel | 16.000 | 0.250 | |
| 53 | 19870186 | Dam>$50K | Onshore | Under Ground | | 850 | 885 | 900 | EC | | | External | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 36.000 | 0.375 | 60,000 |
| 54 | 19870225 | Op Judge | Onshore | Under Pavement | | 600 | 697 | 712 | EC | Cased Carrier Pipe, Coating Failure | Galvanic | External | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 16.000 | 0.219 | 52,000 |
| 55 | 19880011 | Op Judge | Onshore | Under Ground | | 800 | 895 | 910 | IC | Sulfate Reducing Bacteria (Srb) | Bacteria | Internal | Localized Pitting | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 12.750 | 0.250 | |
| 56 | 19880033 | Dam>$50K | Onshore | Under Ground | | 805 | 843 | 858 | DFW | Branch Connection Reinforcement Sleeve Weld Failure | | | | | | Trans | Pipeline | | Branch | Steel | 30.000 | 0.344 | 52,000 |
| 57 | 19880068 | Dam>$50K | Onshore | Above Ground | | 760 | 1,125 | 1,140 | DPS | DSAW Leak, Construction Defect | | | | | | Trans | Pipeline | Yes | Weld | Steel | 20.000 | 0.375 | 52,000 |
| 58 | 19880079 | Op Judge | Onshore | Under Water | | 450 | 845 | 860 | HRF | Suspected - High Waters in Ms River Crossing | | | | | | Trans | Pipeline | | Unknown | Steel | 18.000 | 0.725 | 35,000 |
| 59 | 19880080 | Dam>$50K | Onshore | Under Ground | | 720 | 794 | 809 | EM | Landslide Caused Buckle | | | | | | Trans | Pipeline | | Weld | Steel | 26.000 | 0.344 | 52,000 |
| 60 | 19880112 | Dam>$50K | Onshore | Under Ground | | 725 | 1,070 | 1,085 | DPS | DSAW Leak, Construction Defect | | | | | | Trans | Pipeline | Yes | Weld | Steel | 20.000 | 0.375 | 52,000 |
| 61 | 19880124 | Dam>$50K | Offshore | Under Water | 191 | 1,066 | 1,355 | 1,440 | IC | | | Internal | Pinhole Leak | Y | Y | Trans | Pipeline | Unk | Pipe Body | Steel | 16.000 | 0.438 | 42,000 |
| 62 | 19880129 | Op Judge | Onshore | Under Ground | | 650 | 785 | 800 | HRF | Floodwater in Creek Caused Mech. Coupling Failure | | | | | | Trans | Pipeline | | Mech Jnt | Steel | 24.000 | 0.281 | 48,000 |
| 63 | 19880143 | Dam>$50K | Onshore | Under Ground | | 525 | 843 | 858 | DP | Lamination 5-feet Long, Material Defect | | | | | | Trans | Pipeline | | Pipe Body | Steel | 30.000 | 0.344 | 52,000 |
| 64 | 19880157 | Op Judge | Offshore | Under Water | 68 | 400 | 1,410 | 1,440 | IC | Corrosion on Girth Weld | Galvanic | Internal | Localized Pitting | Y | Y | Trans | Pipeline | | Weld | Steel | 20.000 | 0.500 | 52,000 |
| 65 | 19880159 | Dam>$50K | Offshore | Under Water | 189 | | 1,355 | 1,440 | EM | Landslide Offshore, GW Failure | | | | | | Trans | Pipeline | | Weld | Steel | 12.750 | 0.500 | 42,000 |
| 66 | 19880211 | Dam>$50K | Offshore | Under Water | 220 | 1,100 | 1,342 | 1,440 | IC | | Galvanic | Internal | | Y | Y | Trans | Pipeline | Unk | Pipe Body | Steel | 10.750 | 0.365 | 42,000 |
| 67 | 19880219 | Op Judge | Onshore | Under Ground | | 800 | 1,425 | 1,440 | EC | Stray Current | Galvanic | External | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 6.625 | 0.250 | 35,000 |
| 68 | 19880225 | Dam>$50K | Offshore | Under Water | | 1,180 | | 1,440 | DFW | Saddle Pad at (6") Side Valve, Weld Cracked | | | | | | Trans | Pipeline | Yes | Valve | Steel | 24.000 | 0.500 | 60,000 |
| 69 | 19880229 | Op Judge | Onshore | Under Ground | | 450 | 685 | 700 | EC | Cased Carrier Pipe | Galvanic | External | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 12.750 | 0.219 | 52,000 |
| 70 | 19880269 | Dam>$50K | Offshore | Above Water | | 1,000 | 1,425 | 1,440 | EC | Platform Riser-water Beneath Concrete Coating in Splash Zone | Galvanic | External | Localized Pitting | Y | N | Gath | Pipeline | | Pipe Body | Steel | 20.000 | 0.625 | 52,000 |
| 71 | 19890022 | Op Judge | Offshore | Under Water | 197 | 1,014 | 1,112 | 1,200 | UNK | | | | | | | Gath | Pipeline | | Pipe Body | Steel | 8.625 | 0.250 | 52,000 |
| 72 | 19890025 | Op Judge | Onshore | Under Ground | | 610 | 1,090 | 1,105 | EC | Improperly Installed Tape Coating | Galvanic | External | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 12.750 | 0.203 | |
| 73 | 19890039 | Dam>$50K | Offshore | Above Water | | 835 | 1,258 | 1,273 | EC | Platform Riser Clamp | Galvanic | External | Localized Pitting | Y | N | Gath | Pipeline | No | Pipe Body | Steel | 20.000 | 0.500 | 60,000 |
| 74 | 19890061 | Op Judge | Offshore | Under Water | 68 | 350 | 970 | 1,000 | IC | Corrosion on Girth Weld | Galvanic | Internal | Localized Pitting | Y | Y | Trans | Pipeline | | Weld | Steel | 20.000 | 0.500 | |
| 75 | 19890063 | Dam>$50K | Onshore | Under Ground | | 550 | 765 | 780 | DPS | SAW Manufacturing Defect, Material Defect | | | | | | Trans | Pipeline | Unk | Weld | Steel | 30.000 | 0.312 | 52,000 |
| 76 | 19890066 | Op Judge | Onshore | Under Ground | | 620 | 815 | 830 | DFW | Stopple Fitting, Fillet Weld Crack | | | | | | Tr of Dis | Pipeline | | Fitting | Steel | 16.000 | 0.375 | 52,000 |
| 77 | 19890107 | Op Judge | Onshore | Under Pavement | | 240 | 809 | 824 | IC | Sulfate Reducing Bacteria | H2S | Internal | Localized Pitting | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 12.750 | 0.250 | 42,000 |
| 78 | 19890108 | Op Judge | Onshore | Under Ground | | 410 | 973 | 988 | EC | Shorted Casing | Galvanic | External | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 12.750 | 0.250 | 42,000 |
| 79 | 19890111 | Dam>$50K | Onshore | Under Water | | 300 | 973 | 988 | HRF | Suspected - High Waters in Bayou | | | | | | Trans | Pipeline | | Unknown | Steel | 12.750 | 0.375 | 42,000 |
| 80 | 19890114 | Dam>$50K | Offshore | Under Water | 215 | 990 | 1,344 | 1,440 | UNK | | | | | | | Trans | Pipeline | | Mech Jnt | Steel | 6.625 | | |
| 81 | 19890119 | Op Judge | Onshore | Under Ground | | 420 | 973 | 988 | EC | | | External | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 12.750 | 0.250 | 42,000 |
| 82 | 19890120 | Op Judge | Onshore | Under Pavement | | 426 | 485 | 500 | DFW | Weld-o-let Fillet Weld From Construction Leaked | | | | | | Trans | Pipeline | | Weld | Steel | 18.000 | 0.312 | 42,000 |
| 83 | 19890123 | Op Judge | Onshore | Under Ground | | 470 | 985 | 1,000 | EC | | Galvanic | External | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 6.625 | 0.156 | 42,000 |
| 84 | 19890154 | Op Judge | Onshore | Under Ground | | 830 | 1,020 | 1,035 | EC | | Galvanic | External | General Corrosion | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 16.000 | 0.250 | 52,000 |
| 85 | 19890155 | Op Judge | Onshore | Under Ground | | 590 | 809 | 824 | EC | | Galvanic | External | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 14.000 | 0.281 | 35,000 |
| 86 | 19890156 | Op Judge | Onshore | Under Ground | | 350 | 814 | 829 | EC | | Galvanic | External | General Corrosion | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 6.625 | 0.250 | |
| 87 | 19890164 | Dam>$50K | Onshore | Under Ground | | 625 | 809 | 824 | EC | | Galvanic | External | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 14.000 | 0.281 | 35,000 |
| 88 | 19890165 | Dam>$50K | Onshore | Under Ground | | 740 | 945 | 960 | EC | | Galvanic | External | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 24.000 | 0.312 | 52,000 |
| 89 | 19890173 | Op Judge | Onshore | Under Ground | | 266 | 310 | 325 | EC | | | External | General Corrosion | N | Y | Trans | Pipeline | | Pipe Body | Steel | 4.500 | | 24,000 |
| 90 | 19890177 | Op Judge | Onshore | Under Water | | 660 | 716 | 731 | IC | River Crossing | | Internal | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 24.000 | 0.312 | 52,000 |
| 91 | 19890181 | Op Judge | Offshore | Under Water | 68 | 350 | 970 | 1,000 | EC | Concrete Coating Missing at Location | Galvanic | External | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 20.000 | 0.500 | 52,000 |
| 92 | 19890188 | Op Judge | Onshore | Under Ground | | 350 | 1,137 | 1,152 | PDP | Dent Found near Leak | | | | | | Trans | Pipeline | | Pipe Body | Steel | 4.500 | 0.237 | 35,000 |

| Leak No. | OPS Rpt ID | Op Judgement | Offshore Onshore | Area of Incident | Water Depth (ft) | Estimated Incident Pressure, psi | Max. Leak Differential Pressure, psi | MAOP, psi | Leak Cause | Leak Cause Detail | Corrosion Cause | Corrosion Location | Corrosion Description | Coated | CP | Incident Occurred on | Part of System Involved | Pipeline Piggable Yes/No | Failure Occurred on | Material Involved | Diameter (inch) | Wall Thickness (inch) | SMYS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 93 | 19890203 | Dam>$50K | Offshore | Under Water | 193 | 1,100 | 1,354 | 1,440 | IC | | | Internal | Localized Pitting | Y | Y | Trans | Pipeline | Unk | Pipe Body | Steel | 20.000 | 0.500 | 60,000 |
| 94 | 19890243 | Dam>$50K | Offshore | Under Water | 193 | 1,100 | 1,354 | 1,440 | IC | | | Internal | Localized Pitting | Y | Y | Trans | Pipeline | Unk | Pipe Body | Steel | 20.000 | 0.500 | 60,000 |
| 95 | 19890250 | Dam>$50K | Offshore | Under Water | 228 | 920 | 1,338 | 1,440 | IC | | | Internal | General Corrosion | Y | Y | Trans | Pipeline | Unk | Pipe Body | Steel | 10.750 | 0.365 | 42,000 |
| 96 | 19890253 | Op Judge | Onshore | Under Ground | | 300 | 382 | 397 | EC | | | External | | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 4.500 | 0.156 | 24,000 |
| 97 | 19890257 | Op Judge | Onshore | Under Water | | 420 | 1,121 | 1,136 | IC | Low Point in Creek Crossing | | Internal | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 6.625 | 0.188 | 35,000 |
| 98 | 19890270 | Dam>$50K | Offshore | Under Water | 197 | 1,000 | 1,112 | 1,200 | IC | | | Internal | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 8.625 | 0.250 | 52,000 |
| 99 | 19890274 | Dam>$50K | Onshore | Under Ground | | 860 | 1,085 | 1,100 | DP | Lamination in Pipe Wall Produced a Leak | | | | | | Trans | Pipeline | | Pipe Body | Steel | 30.000 | 0.360 | 65,000 |
| 100 | 19900015 | Dam>$50K | Onshore | Under Ground | | 310 | 455 | 470 | WBB | Construct., Wrinkle Bend Started a Crack | | | | | | Trans | Pipeline | | Pipe Body | Steel | 12.750 | 0.250 | |
| 101 | 19900056 | Op Judge | Offshore | Under Water | 67 | 585 | 1,410 | 1,440 | IC | | Accumulation of Liquids | Internal | | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 8.625 | 0.322 | 42,000 |
| 102 | 19900059 | Op Judge | Onshore | Under Ground | | 511 | 602 | 617 | HRF | Rains Caused Subsidence, in Area of Recent Adjacent Leak Repair | | | | | | Trans | Pipeline | | Pipe Body | Steel | 14.000 | 0.250 | 30,000 |
| 103 | 19900035 | Op Judge | Offshore | Under Water | 65 | 350 | 971 | 1,000 | IC | | Galvanic | Internal | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 20.000 | 0.500 | 52,000 |
| 104 | 19900046 | Op Judge | Onshore | Under Ground | | 350 | 385 | 400 | DGW | Possible Contribution by Axial Tension in Pipe | | | | | | Trans | Pipeline | | Weld | Steel | 5.040 | 0.209 | |
| 105 | 19900057 | Op Judge | Onshore | Under Ground | | 235 | 453 | 468 | IC | | | Internal | General Corrosion | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 8.625 | 0.322 | 35,000 |
| 106 | 19900068 | Op Judge | Offshore | Under Water | 65 | 335 | 971 | 1,000 | IC | | | Internal | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 20.000 | 0.500 | 52,000 |
| 107 | 19900088 | Dam>$50K | Offshore | Under Water | 175 | 880 | 1,172 | 1,250 | IC | Small Leak | | Internal | Localized Pitting | Y | Y | Trans | Pipeline | No | Pipe Body | Steel | 12.750 | 0.375 | 46,000 |
| 108 | 19900100 | Op Judge | Offshore | Under Water | 40 | 460 | 1,422 | 1,440 | IC | Pipeline Had Been Shut-in 2 Years | | Internal | | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 12.750 | 0.344 | 52,000 |
| 109 | 19900109 | Dam>$50K | Onshore | Under Water | | 800 | 1,118 | 1,133 | HRF | Floodwater (Ms River) Caused Failure | | | | | | Trans | Pipeline | | Pipe Body | Steel | 10.750 | 0.365 | 42,000 |
| 110 | 19900110 | Dam>$50K | Onshore | Under Ground | | 750 | 960 | 975 | WBB | Pigging Operation (Ili) Caused Failure of Wrinkle Bend | | | | | | Trans | Pipeline | | Wrinkle Bend | Steel | 24.000 | 0.312 | 52,000 |
| 111 | 19900117 | Op Judge | Onshore | Under Ground | | 900 | 896 | 911 | DPS | ERW Seam Leaks Found During Survey | | | | | | Trans | Pipeline | | Weld | Steel | 4.500 | 0.125 | 35,000 |
| 112 | 19900123 | Dam>$50K | Offshore | Under Water | 193 | 1,100 | 1,354 | 1,440 | IC | | | Internal | Localized Pitting | Y | Y | Trans | Pipeline | Unk | Pipe Body | Steel | 20.000 | 0.500 | 60,000 |
| 113 | 19900140 | Dam>$50K | Offshore | Under Water | 185 | 1,060 | 1,117 | 1,200 | IC | | | Internal | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 8.625 | 0.250 | 52,000 |
| 114 | 19900190 | Dam>$50K | Offshore | Under Water | 200 | 1,050 | 1,351 | 1,440 | IC | | | Internal | Pinhole Leak | Y | Y | Trans | Pipeline | Unk | Pipe Body | Steel | 16.000 | 0.438 | 42,000 |
| 115 | 19900210 | Dam>$50K | Offshore | Under Water | 60 | 1,030 | 1,173 | 1,200 | IC | | | Internal | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 12.750 | 0.375 | 52,000 |
| 116 | 19920125 | Dam>$50K | Onshore | Under Water | | 325 | 370 | 385 | HRF | Floodwater Washed out Crossing, Girth Weld | | | | | | Trans | Pipeline | | Weld | Steel | 8.625 | 0.250 | |
| 117 | 19910052 | Op Judge | Onshore | Under Ground | | 60 | 809 | 824 | EC | | Galvanic | External | Pinhole Leak, Localized Pitting | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 6.625 | 0.156 | 35,000 |
| 118 | 19910056 | Dam>$50K | Offshore | Under Water | 187 | 970 | 1,116 | 1,200 | IC | | | Internal | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 8.625 | 0.250 | 52,000 |
| 119 | 19910058 | Dam>$50K | Onshore | Under Water | | 650 | 843 | 858 | DPS | Leak Caused by Penetrater in the Flash Weld | | | | | | Trans | Pipeline | | Weld | Steel | 30.000 | 0.344 | 52,000 |
| 120 | 19910062 | Dam>$50K | Onshore | Under Pavement | | 250 | 985 | 1,000 | IC | Corrosion on Girth Weld | | Internal | Localized Pitting | Y | Y | Trans | Pipeline | | Weld | Steel | 4.500 | 0.337 | 35,000 |
| 121 | 19910089 | Op Judge | Offshore | Under Ground | 68 | 500 | 970 | 1,000 | IC | | Galvanic | Internal | Localized Pitting | N | Y | Trans | Pipeline | | Pipe Body | Steel | 20.000 | 0.500 | 52,000 |
| 122 | 19910095 | Dam>$50K | Onshore | Under Ground | | 750 | 843 | 858 | IC | Pipeline Drip | Microbiological | Internal | General Corrosion | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 24.000 | 0.375 | 42,000 |
| 123 | 19910133 | Dam>$50K | Offshore | Under Water | 167 | 830 | 1,175 | 1,250 | IC | | | Internal | Pinhole Leak at 6 o'clock | Y | Y | Trans | Pipeline | Unk | Pipe Body | Steel | 12.750 | 0.375 | 46,000 |
| 124 | 19910170 | Dam>$50K | Offshore | Under Water | 232 | 1,140 | 1,336 | 1,440 | EC | Crack in Concrete Coating Possible Damaged Pipe | Coating Failure | External | Localized Pitting | Y | Y | Trans | Pipeline | Unk | Pipe Body | Steel | 12.750 | 0.375 | 52,000 |
| 125 | 19910173 | Op Judge | Onshore | Under Ground | | 210 | 277 | 292 | EC | Cased Carrier Pipe | | External | | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 12.750 | 0.250 | 24,000 |
| 126 | 19920073 | Dam>$50K | Onshore | Under Ground | | 550 | 697 | 712 | EC | Cased RR Crossing | Atmosphere | External | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 26.000 | 0.250 | 52,000 |
| 127 | 19920082 | Dam>$50K | Offshore | Under Water | 230 | 850 | 1,097 | 1,200 | IC | | | Internal | Pinhole Leak, Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 6.625 | 0.344 | 52,000 |
| 128 | 19920109 | Dam>$50K | Onshore | Under Water | | 870 | 985 | 1,000 | UNK | Material Defect | | | | | | Trans | Pipeline | | Gaskets | Steel | 36.000 | 0.625 | 60,000 |
| 129 | 19920114 | Dam>$50K | Offshore | Under Water | 167 | 830 | 1,175 | 1,250 | IC | | | Internal | Localized Pitting | Y | Y | Trans | Pipeline | Unk | Pipe Body | Steel | 12.750 | 0.375 | 46,000 |
| 130 | 19920120 | Dam>$50K | Offshore | Under Water | 25 | 740 | 1,157 | 1,168 | DGW | Leak in a Girth Weld | | | | | | Trans | Pipeline | | Weld | Steel | 16.000 | 0.312 | 52,000 |
| 131 | 19920136 | Dam>$50K | Offshore | Under Water | 48 | 1,100 | 1,179 | 1,200 | IC | Two Isolated Pits | | Internal | | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 16.000 | 0.375 | 52,000 |
| 132 | 19920141 | Op Judge | Onshore | Under Ground | | 334 | 410 | 425 | DGW | Leak in a 30 Degrees Miter Girth Weld | | | | | | Trans | Pipeline | | Weld | Steel | 20.000 | 0.281 | 35,000 |
| 133 | 19920149 | Op Judge | Onshore | Under Ground | | 166 | 235 | 250 | HRF | River Flooded (Hurricane Andrew) and Tree Hit 45 deg Elbow | | | | | | Trans | Pipeline | | Fitting | Steel | 10.750 | 0.365 | 35,000 |
| 134 | 19920156 | Op Judge | Onshore | Under Ground | | 90 | 985 | 1,000 | IC | | Accumulation of Liquids | Internal | Localized Pitting | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 8.625 | 0.322 | 35,000 |
| 135 | 19920181 | Dam>$50K | Onshore | Under Pavement | | 440 | 672 | 687 | UNK | Leak in Cased Road Crossing | | | | | | Trans | Pipeline | | Pipe Body | Steel | 34.000 | 0.375 | 52,000 |
| 136 | 19930042 | Dam>$50K | Offshore | Under Water | 70 | 1,000 | 1,409 | 1,440 | IC | | | Internal | | Y | Y | Gath | Pipeline | Unk | Pipe Body | Steel | 12.750 | 0.375 | 52,000 |
| 137 | 19930029 | Op Judge | Offshore | Above Water | | 1,000 | 1,425 | 1,440 | EC | Platform Riser Coating Wore off | Coating Failure | External | General Corrosion | Y | N | Gath | Pipeline | | Pipe Body | Steel | 6.625 | 0.432 | 40,800 |

| Leak No. | OPS Rpt ID | Op Judgement | Offshore Onshore | Area of Incident | Water Depth (ft) | Estimated Incident Pressure, psi | Max. Leak Differential Pressure, psi | MAOP, psi | Leak Cause | Leak Cause Detail | Corrosion Cause | Corrosion Location | Corrosion Description | Coated | CP | Incident Occurred on | Part of System Involved | Pipeline Piggable Yes/No | Failure Occurred on | Material Involved | Diameter (inch) | Wall Thickness (inch) | SMYS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 138 | 19930089 | Dam>$50K | Onshore | Under Water | | 341 | 685 | 700 | HRF | River near Flood Stage, Exact Cause Unknown | | | | | | Trans | Pipeline | | Unknown | Steel | 24.000 | 0.344 | 60,000 |
| 139 | 19930093 | Dam>$50K | Onshore | Under Ground | | 705 | 958 | 973 | EC | Disbonded Coating | | External | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 24.000 | 0.312 | 52,000 |
| 140 | 19930102 | Dam>$50K | Offshore | Under Water | 195 | 1,100 | 1,219 | 1,306 | UNK | Evidence Available Did Not Allow Determination of Cause | | | | | | Trans | Pipeline | | Pipe Body | Steel | 20.000 | 0.438 | 60,000 |
| 141 | 19930105 | Op Judge | Offshore | Under Water | 160 | 1,050 | 1,178 | 1,250 | IC | | | Internal | Pinhole Leak, Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 24.000 | 0.438 | 60,000 |
| 142 | 19930109 | Dam>$50K | Onshore | Under Water | | 162 | 235 | 250 | HRF | Strong (Ms River) Current Caused GW Haz Failure | | | | | | Trans | Pipeline | | Weld | Steel | 10.750 | 0.500 | 35,000 |
| 143 | 19930169 | Dam>$50K | Onshore | Under Ground | | 1,550 | 1,785 | 1,800 | EC | Located on 65% Grade Rock - Ineff. Cp | Galvanic | External | General Corrosion | N | Y | Trans | Pipeline | | Pipe Body | Steel | 4.500 | 0.337 | 24,000 |
| 144 | 19930180 | Dam>$50K | Offshore | Under Water | 197 | 1,150 | 1,162 | 1,250 | IC | | | Internal | Pinhole Leak | | | Trans | Pipeline | | Pipe Body | Steel | 12.750 | 0.406 | 52,000 |
| 145 | 19930197 | Dam>$50K | Offshore | Under Water | 51 | | 1,224 | 1,247 | UNK | Offshore Leak | | | | | | Trans | Pipeline | | Pipe Body | Steel | 16.000 | 0.406 | 42,000 |
| 146 | 19940024 | Op Judge | Onshore | Under Ground | | 368 | 580 | 595 | DGW | Acetylene Girth Weld Failed | | | | | | Trans | Pipeline | | Weld | Steel | 20.000 | 0.344 | 42,000 |
| 147 | 19940023 | Dam>$50K | Offshore | Under Water | 51 | 530 | 1,224 | 1,247 | UNK | Suspected Int/ext Corrosion | | | | | | Trans | Pipeline | | Pipe Body | Steel | 16.000 | 0.406 | 42,000 |
| 148 | 19940033 | Dam>$50K | Offshore | Under Water | 42 | 910 | 1,421 | 1,440 | IC | | Galvanic | Internal | Localized Pitting | Y | | Trans | Pipeline | Yes | Pipe Body | Steel | 16.000 | 0.375 | 52,000 |
| 149 | 19940057 | Op Judge | Onshore | Under Ground | | 270 | 255 | 270 | DGW | Leak in End Cap, Blew off | | | | | | Tr of Dis | Pipeline | | Weld | Steel | 18.000 | 0.312 | 42,000 |
| 150 | 19940061 | Op Judge | Onshore | Under Ground | | 270 | 335 | 350 | EC | Leak on Dresser Coupling | Galvanic | External | Localized Pitting | N | Y | Trans | Pipeline | | Mech Jnt | Steel | 4.000 | 0.198 | 30,000 |
| 151 | 19940062 | Op Judge | Offshore | Under Water | 68 | 475 | 570 | 600 | IC | | Galvanic | Internal | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 20.000 | 0.500 | 52,000 |
| 152 | 19940082 | Dam>$50K | Offshore | Under Water | 25 | 820 | 1,157 | 1,168 | IC | | | Internal | | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 16.000 | 0.312 | 52,000 |
| 153 | 19940089 | Dam>$50K | Onshore | Under Ground | | 775 | 975 | 990 | DPS | ERW Lack of Fusion | | | | | | Trans | Pipeline | | Weld | Steel | 20.000 | 0.312 | 52,000 |
| 154 | 19940102 | Op Judge | Onshore | Under Ground | | 705 | 765 | 780 | DGW | Leak in a Girth Weld, Construction Defect | | | | | | Trans | Pipeline | Unk | Weld | Steel | 24.000 | 0.250 | 52,000 |
| 155 | 19940111 | Op Judge | Offshore | Under Water | 63 | 410 | 1,412 | 1,440 | UNK | Suspected Int/ext Corrosion | | | | | | Trans | Pipeline | | Pipe Body | Steel | 16.000 | 0.375 | 52,000 |
| 156 | 19940115 | Dam>$50K | Offshore | Under Water | 230 | 815 | 1,097 | 1,200 | IC | | Bacteria | Internal | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 6.625 | 0.344 | 52,000 |
| 157 | 19940118 | Dam>$50K | Onshore | Under Water | | 159 | 235 | 250 | HRF | Strong (Ms River) Current Caused GW Haz Failure | | | | | | Trans | Pipeline | | Weld | Steel | 10.750 | 0.500 | 35,000 |
| 158 | 19940121 | Dam>$50K | Onshore | Under Ground | | 620 | 896 | 911 | DGW | Leak in GW Between X65 and X70 Pipe | | | | | | Trans | Pipeline | | Weld | Steel | 42.000 | 0.456 | 70,000 |
| 159 | 19940129 | Dam>$50K | Offshore | Under Water | 225 | 900 | 1,099 | 1,200 | IC | | | Internal | Localized Pitting | | | Tr of Dis | Pipeline | | Pipe Body | Steel | 12.750 | 0.375 | 52,000 |
| 160 | 19940145 | Dam>$50K | Offshore | Under Water | 42 | 863 | 1,421 | 1,440 | IC | | Galvanic | Internal | Localized Pitting | Y | | Trans | Pipeline | Yes | Pipe Body | Steel | 16.000 | 0.375 | 52,000 |
| 161 | 19940146 | Dam>$50K | Offshore | Under Water | 200 | 1,108 | 1,161 | 1,250 | IC | | | Internal | | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 12.750 | 0.406 | 52,000 |
| 162 | 19940153 | Dam>$50K | Onshore | Under Pavement | | 608 | 697 | 712 | UNK | | | | | | | Trans | Pipeline | | Pipe Body | Steel | 18.000 | 0.375 | 30,000 |
| 163 | 19940154 | Dam>$50K | Offshore | Under Water | 48 | 890 | 1,179 | 1,200 | IC | Line Abandoned | | Internal | | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 16.000 | 0.375 | 52,000 |
| 164 | 19940158 | Dam>$50K | Offshore | Under Water | 150 | 580 | 713 | 780 | IC | | Bacteria | Internal | General Corrosion | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 22.000 | 0.500 | 52,000 |
| 165 | 19940176 | Dam>$50K | Offshore | Under Water | 150 | 580 | 713 | 780 | IC | | Bacteria | Internal | General Corrosion | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 22.000 | 0.500 | 52,000 |
| 166 | 19940180 | Dam>$50K | Offshore | Under Water | 62 | 956 | 1,272 | 1,300 | DP | Identified as Material Defect | Bacteria | Internal | Localized Pitting | | | Gath | Pipeline | | Pipe Body | Steel | 12.750 | 0.312 | 52,000 |
| 167 | 19940184 | Dam>$50K | Offshore | Under Water | 200 | 1,108 | 1,161 | 1,250 | IC | | | Internal | | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 12.750 | 0.406 | 52,000 |
| 168 | 19940192 | Op Judge | Onshore | Under Ground | | 400 | 735 | 750 | EC | | | External | Localized Pitting | N | N | Trans | Pipeline | | Pipe Body | Steel | 6.625 | 0.280 | |
| 169 | 19940193 | Op Judge | Onshore | Under Ground | | 390 | 735 | 750 | EC | | | External | | N | Y | Trans | Pipeline | | Pipe Body | Steel | 6.625 | 0.280 | |
| 170 | 19940203 | Dam>$50K | Offshore | Under Water | 42 | 910 | 1,421 | 1,440 | IC | | Galvanic | Internal | Localized Pitting | Y | Y | Trans | Pipeline | Yes | Pipe Body | Steel | 16.000 | 0.375 | 52,000 |
| 171 | 19940216 | Op Judge | Offshore | Above Water | | 850 | 1,300 | 1,315 | EC | Platform Riser (3) Leaked | | External | Localized Pitting | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 16.000 | 0.281 | 52,000 |
| 172 | 19940229 | Dam>$50K | Offshore | Under Water | 140 | 1,100 | 1,377 | 1,440 | UNK | | | | | | | Trans | Pipeline | | Unknown | Steel | 6.625 | 0.432 | 35,000 |
| 173 | 19950004 | Dam>$50K | Onshore | Under Pavement | | 780 | 843 | 858 | UNK | | | | | | | Trans | Pipeline | | Unknown | Steel | 30.000 | 0.340 | 52,000 |
| 174 | 19950021 | Dam>$50K | Onshore | Under Ground | | 640 | 985 | 1,000 | EC | Coating Damage During Construction | | External | Localized Pitting | Y | Y | Trans | Pipeline | | Pipe Body | Steel | 12.750 | 0.250 | 46,000 |
| 175 | 19950042 | Op Judge | Offshore | Under Water | 468 | 800 | 1,171 | 1,380 | DP | Small Split | | | | | | Gath | Pipeline | | Pipe Body | Steel | 10.750 | 0.280 | 42,000 |
| 176 | 19950048 | Op Judge | Offshore | Above Water | | 360 | 1,425 | 1,440 | EC | Elbow (90-degree) next to Weld | | External | General Corrosion | Y | N | Gath | Pipeline | | Fitting | Steel | 4.500 | 0.240 | |
| 177 | 19950060 | Op Judge | Onshore | Under Ground | | 980 | 1,425 | 1,440 | IC | | | Internal | Localized Pitting | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 16.000 | 0.500 | 52,000 |
| 178 | 19950074 | Dam>$50K | Onshore | Under Ground | | 890 | 896 | 911 | DPS | Seam Split (3/4-inch) | | | | | | Trans | Pipeline | | Weld | Steel | 16.000 | 0.230 | 46,000 |
| 179 | 19950106 | Dam>$50K | Offshore | Under Water | 164 | 1,073 | 1,367 | 1,440 | IC | | | Internal | Pinhole Leak | Y | Y | Trans | Pipeline | Yes | Pipe Body | Steel | 16.000 | 0.380 | 52,000 |
| 180 | 19950114 | Dam>$50K | Offshore | Under Water | 60 | 850 | 1,413 | 1,440 | DFW | Fillet Weld on 6-inch Hot Tap Tie-in Weld | | | | | | Trans | Pipeline | | Weld | Steel | 6.625 | 0.430 | 35,000 |
| 181 | 19950134 | Dam>$50K | Offshore | Under Water | 225 | 822 | 1,099 | 1,200 | UNK | 1/2" NPT Nipple | | | | | | Trans | Pipeline | | Fitting | Steel | 0.500 | 0.280 | 25,000 |
| 182 | 19950136 | Op Judge | Onshore | Under Ground | | 1,200 | 2,183 | 2,198 | IC | | Galvanic | Internal | Localized Pitting | Y | Y | Gath | Pipeline | | Pipe Body | Steel | 6.625 | 0.280 | 52,000 |
| 183 | 19950153 | Op Judge | Onshore | Under Ground | | 569 | 1,048 | 1,063 | DGW | Small Crack in Girth Weld | | | | | | Trans | Pipeline | | Weld | Steel | 17.750 | 0.310 | 42,000 |
| 184 | 19960021 | Op Judge | Onshore | Under Ground | | | 335 | 350 | UNK | Damage by Outside Force | | | | | | Trans | Pipeline | | Weld | Steel | 12.750 | 0.219 | 35000 |
| 185 | 19960077 | Dam>$50K | Offshore | Under Water | 14 | 905 | 1,294 | 1,300 | DGW | Construction Defect | | | | | | Trans | Pipeline | No | Weld | Steel | 6.625 | 0.312 | 35,000 |
| 186 | 19960092 | Dam>$50K | Offshore | Under Water | 36 | 980 | 1,184 | 1,200 | DGW | | | | | | | Trans | Pipeline | | Weld | Steel | 16.000 | 0.312 | 52,000 |
| 187 | 19960094 | Dam>$50K | Onshore | Under Ground | | 488 | 1,035 | 1,050 | HRF | Buckle | | | | | | Tr of Dis | Pipeline | | Pipe Body | Steel | 20.000 | 0.281 | |
| 188 | 19960101 | Op Judge | Onshore | Under Ground | | 440 | 485 | 500 | PDP | Stress Corrosion in Old Dent | Stray Current | External | External Cracks | N | Y | Trans | Pipeline | | Pipe Body | Steel | 24.000 | 0.250 | 52,000 |
| 189 | 19960129 | Dam>$50K | Offshore | Under Water | 175 | 1,065 | 1,362 | 1,440 | IC | | | Internal | Pinhole Leak at 6 o'clock | N | Y | Trans | Pipeline | No | Pipe Body | Steel | 16.000 | 0.381 | 52,000 |

# Pressure Activated Sealant Candidates, 1985-1997

| Leak No. | OPS Rpt ID | Op Judgement | Offshore Onshore | Area of Incident | Water Depth (ft) | Estimated Incident Pressure, psi | Max. Leak Differential Pressure, psi | MAOP, psi | Leak Cause | Leak Cause Detail | Corrosion Cause | Corrosion Location | Corrosion Description | Coated | CP | Incident Occurred on | Part of System Involved | Pipeline Piggable Yes/No | Failure Occurred on | Material Involved | Diameter (inch) | Wall Thickness (inch) | SMYS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 190 | 19960146 | Dam>$50K | Offshore | Under Water | 220 | 856 | 1,102 | 1,200 | IC | | | Internal | 1/4" Circular Hole at 6 o'clock | N | Y | Trans | Pipeline | | Pipe Body | Steel | 12.750 | 0.381 | 52,000 |
| 191 | 19960169 | Op Judge | Offshore | Under Water | 130 | | 3,622 | 3,680 | HRF | Break-Away Joint | | | | | | Gath | Pipeline | | Fitting | Steel | 4.500 | 0.438 | 35,000 |
| 192 | 19960174 | Op Judge | Offshore | Under Water | 200 | 890 | 1,351 | 1,440 | UNK | Unknown Pipe Leak | | | | | | Trans | Pipeline | | Unknown | Steel | 16.000 | 0.438 | 42,000 |
| 193 | 19960185 | Dam>$50K | Offshore | Under Water | 35 | 1,082 | 1,424 | 1,440 | UNK | Unknown | | | | | | Trans | Pipeline | | Unknown | Steel | 6.625 | 0.375 | 35,000 |
| 194 | 19970078 | Dam>$50K | Onshore | Under Ground | | 765 | 835 | 850 | DPS | | | | | | | Trans | Pipeline | | Weld | Steel | 22.000 | 0.250 | 52,000 |
| 195 | 19970083 | Op Judge | Offshore | Under Water | 64 | 1,100 | 1,199 | 1,228 | IC | | | Internal | General Corrosion | N | Y | Gath | Pipeline | | Weld | Steel | 20.000 | 0.406 | 42,000 |
| 196 | 19970094 | Dam>$50K | Onshore | Other | | 720 | 985 | 1,000 | EC | | Galvanic | External | Localized Pitting | N | Y | Trans | Pipeline | | Pipe Body | Steel | 8.625 | 0.281 | 24,000 |
| 197 | 19970095 | Dam>$50K | Offshore | Under Water | | 848 | | 1,100 | IC | | | Internal | | N | Y | Trans | Pipeline | No | Pipe Body | Steel | 12.750 | 0.250 | 42,000 |
| 198 | 19970122 | Op Judge | Offshore | Under Water | 48 | 1,000 | 1,279 | 1,300 | IC | | | Internal | | | | Trans | Pipeline | | Pipe Body | Steel | 12.750 | 0.381 | 52,000 |
| 199 | 19970132 | Op Judge | Offshore | Under Water | 48 | 960 | 1,279 | 1,300 | IC | | | Internal | | | | Trans | Pipeline | | Pipe Body | Steel | 12.750 | 0.381 | 52,000 |
| 200 | 19970135 | Op Judge | Onshore | Under Ground | | 650 | 843 | 858 | IC | | | Internal | Pinhole Leak | | | Trans | Pipeline | | Weld | Steel | 36.000 | 0.438 | 60,000 |
| 201 | 19970140 | Dam>$50K | Offshore | Under Water | 74 | 1,170 | 1,407 | 1,440 | IC | | | Internal | Localized Pitting | N | Y | Gath | Pipeline | Unk | Pipe Body | Steel | 12.750 | 0.500 | 42,000 |
| 202 | 19970170 | Op Judge | Onshore | Under Ground | | 450 | 830 | 845 | EC | | Bacteria | Internal | Localized Pitting | N | Y | Trans | Pipeline | | Pipe Body | Steel | 12.750 | 0.250 | 42,000 |
| 203 | 19970171 | Dam>$50K | Onshore | Under Ground | | 850 | 959 | 974 | DGW | | | | | | | Trans | Pipeline | | Weld | Weld Mtl | 36.000 | 0.381 | 65,000 |
| 204 | 19980022 | Dam>$50K | Offshore | Under Water | | 1,050 | | 1,250 | IC | | | Internal | Localized Pitting | N | Y | Trans | Pipeline | | Pipe Body | Steel | 12.750 | 0.406 | 52,000 |
| 205 | 19980025 | Dam>$50K | Offshore | Under Water | 250 | 1,000 | 1,328 | 1,440 | IC | | | Internal | Localized Pitting | N | Y | Trans | Pipeline | Unk | Pipe Body | Steel | 16.000 | 0.438 | 52,000 |

Blue Text Represents Additional Operator Input

Red Text Designates Possible Error in Input