Docket No. SA-534

Exhibit No. 2-ED

NATIONAL TRANSPORTATION SAFETY BOARD

Washington, D.C.

San Bruno Gas Transmission Line
Rupture Investigation CPUC Data Request 069

(60 Pages)

Nicholson Matthew

From: Chhatre Ravindra **Sent:** Wednesday, February 23, 2011 12:02 PM **To:** Nicholson Matthew **Subject:** FW: **Attachments:** SanBrunoGT-LineRuptureInvestigation_DR_CPUC_069-Q01.pdf; SanBrunoGT

LineRuptureInvestigation_DR_CPUC_069-Q01Atch01.pdf; SanBrunoGT-LineRuptureInvestigation_DR_CPUC_069-Q01Atch02.pdf; SanBrunoGT-LineRuptureInvestigation_DR_CPUC_069-Q01Atch03.pdf

-----Original Message----From: Shori, Sunil _Sent: Wednesday, February 16, 2011 2:52 PM To: Chhatre Ravindra Cc: Stepanian, Raffy; Robertson, Michael; Berdge, Patrick S.; Lee, Dennis M.; Cauguiran, Aimee Subject:

Ravi:

The attachments to this e-mail were received in response to Question 1 of CPUC Data Request 069. I believe NTSB may have already received Attachments 1 and 2; however, I don't believe earlier NTSB responses included the response provided by Attachment 3.

In addition, I wanted to suggest you to review, if you haven't already had a chance to do so, NTSB_021-001, pages 33-35. These show a leak on a girth weld due to a possible girth weld failure. This should be an item to follow-up on during the hearing.

I would like to discuss these, and the hearing process, with you further. We have not yet provided these attachments to other party members, so please let me know how we should proceed. Please call me after you have had a chance to review the attachments.

Thanks, Ravi.

Sunil Shori

PACIFIC GAS AND ELECTRIC COMPANY
San Bruno GT Line Rupture Investigation
Data Response

PG&E Data Request No.:	CPUC_069-01		
PG&E File Name:	SanBrunoGT-LineRuptureInvestigation_DR_CPUC_069-Q01		
Request Date:	January 10, 2011	Requester DR No.:	
Date Sent:	January 26, 2011	Requesting Party:	CPUC (CPSD)
		Requester:	George Carter

QUESTION 1

Request procurement documents/purchase specifications for 31 inch nominal steel/iron seam welded pipe/tubing purchased by PG&E from the beginning of 1945 to the end of 1959.

On January 11, 2011, PG&E clarified with Mr. Carter that the request is for procurement documents/purchase specifications for 30 inch nominal pipe, not 31 inch nominal pipe.

ANSWER 1

Please see the following attachments:

- **CPUC_069-Q01Atch01**: *September 16, 1948, Appendix A: Specification for 30" O.D., Gas Line Pipe for Pacific Gas and Electric Company.*

  This attachment contains information related to the specifications, chemical properties and tests, physical properties and tests, dimensions and tolerances, workmanship and finish, and inspection and marking requirements for 30" steel pipe.

- **CPUC_069-Q01Atch02**: *July 19, 1949, Final Report of the inspection of 30 inch pipe by Moody-Engineering Company at Consolidated Western Steel Co's. plant in Maywood, on Order No. 7R 66858.*

  This attachment contains the final report by Moody Engineering Company, covering the supervision of manufacture and their inspection, in accordance with Inspection Order No. 7R-81743, of pipe shipped during the interval from March 11 to April 22, 1949. PG&E's order placed with the manufacturing company, Consolidated Western Steel Corporation, covered 100,000 feet of Black Electric Welded Steel Pipe, 30" O.D. x .375" wall x 31' 2" length. The report covers details about the pipe manufacture, chemical and physical properties of steel, internal hydraulic expansion operation, hydrostatic pressure test, end finish of pipe, inspection, length range, rejections, shipment, and the following conclusion: the pipe was inspected, was in accordance with PG&E's order and specifications, and was accepted for shipment subject to PG&E's shipping instructions.

- **CPUC_069-Q01Atch03**: *December 12, 1962, PG&E internal memo to Division Gas Superintendents regarding the history of pipe purchases.*

  This attachment contains guidance on identifying unknown pipe, as required by General Order 112. Tabulation and notes regarding pipe purchased in the early 1920's, late 1920's, 1930's, between 1940-1947, and between 1948 and the date of the memo (1962), was provided for the Division Gas Superintendents use. Superintendents were instructed to resolve any doubt of the identity of any unknown pipe materials in favor of lower strength materials or contact the Gas System Design office for more positive identification.

SanBrunoGT-LineRuptureInvestigation_DR_CPUC_069-Q01Atch01.pdf

September 16, 1948
PGE-6

APPENDIX A
SPECIFICATION FOR 30" O. D. GAS LINE PIPE
FOR PACIFIC GAS & ELECTRIC COMPANY

SECTION I

GENERAL

This specification applies to 30" O. D. pipe to be used for the purpose of conveying gas.

The pipe shall be fabricated from steel made by the Open Hearth process.

Longitudinal seams shall be joined by electric fusion welding.

SECTION II

CHEMICAL PROPERTIES AND TESTS

1. Ladle Analysis:

A ladle analysis of each heat of steel shall be reported to the purchaser. Only those heats conforming to the following chemical composition shall be used in the manufacture of pipe under this specification.

Carbon	.30% max.
Manganese	1.25% max.
Phosphorus	.045% max.
Sulphur	.05% max.

2. Check Analysis:

A check analysis of one plate from each heat of steel shall be reported to the purchaser. Samples for check analysis shall be taken in accordance with standard mill practice.

If the check analysis varies from the requirements for Ladle Analysis by more than the permissible limits set forth below, additional analysis from the heat may be made. The composition, based on the average of all the separate determinations made, may vary from that specified for Ladle Analysis to the following extent:

	Over max. limit, percent
Carbon	.04
Manganese	.04
Phosphorus	.01
Sulphur	.01

SECTION III

PHYSICAL PROPERTIES AND TESTS

1. Physical Properties:

The finished pipe shall conform to the following physical properties:

In pipe of 1/2" nominal wall thickness, Tranverse yield strength of plate material, min.,p.s.i.	46000
Transverse ultimate strength, min. p.s.i.	65000
Transverse elongation in 2" of plate material, min., per cent	22
In pipe of 7/16" nominal wall thickness, Transverse yield strength of plate material, min.,p.s.i.	48000
Transverse ultimate strength, min.,p.s.i.	65000
Transverse elongation in 2" of plate material, min., per cent	22
In pipe of 3/8" nominal wall thickness, Transverse yield strength of plate material, min.,p.s.i.	52000
Transverse ultimate strength, min., p.s.i.	72000
Transverse elongation in 2" of plate material, min., per cent	22

The yield strength is defined as the stress required to produce a total elongation under load of 0.5 per cent of the gauge length on the test specimen as determined by multiplying dividers or extensometer.

2. Hydrostatic Pressure Tests:

Each length of pipe approximately 31'-1" long (Maywood) or 31'-7" long (South San Francisco) including jointers, shall be tested to a hydrostatic pressure which will produce a stress of 90% of the specified minimum transverse yield strength, which pressure shall be maintained for not less than ten seconds. This pressure shall be determined by the formula:

$$P = \frac{2\,ft}{D}$$

where

P = hydrostatic test pressure, p.s.i.
t = thickness of wall, inches
D = outside diameter, inches
f = allowable fiber stress, p.s.i.

For the following diameters and thicknesses, this test pressure is as follows:

O.D.	Wall Thickness	Test Pressure, p.s.i.
30"	1/2"	1380
30"	7/16"	1260
30"	3/8"	1170

While under pressure, the pipe length shall be struck a blow with a two-pound hammer, or its equivalent, near both ends of the weld.

After the hammer test, the pressure shall be reduced to not less than 450 p.s.i. and the longitudinal welded seam inspected for sweats or leaks.

All hydrostatic tests may be conducted with 2" rubber seals inside the pipe ends.

3. Tensile Tests:

All tensile tests shall be made at room temperature.

All tensile test specimens shall be 1" wide within a 2" gauge length and may be pressed flat prior to machining and testing.

Tensile tests shall be made on one length of pipe of each thickness from each heat of steel, as follows:

One transverse tensile test across the weld, with the weld in the center of the specimen (weld reinforcement not removed), for determination of ultimate strength.

One transverse tensile test 90 degrees from the weld, for determination of yield strength, ultimate strength, and elongation.

The results of these tests shall at least equal the applicable physical properties specified in Section III, Paragraph 1, and shall be reported to the purchaser.

4. Retests:

If the results of any tensile test of a length of pipe representing any thickness from any heat of steel do not conform with the requirements of Section III, Paragraph 1, two retests of that test shall be made on the same length of pipe. If both of these retests meet the requirements, the material of that thickness and heat shall be considered acceptable. If either retest fails, additional tests shall be made of lengths of pipe, selected at random from that thickness and heat, until the required results have been obtained from tests of three successive lengths of pipe, whereupon the tested thickness and heat, except those lengths which previously have failed, shall be considered acceptable.

Individual pipe lengths which have failed in the above tests may be further retested and shall be acceptable if the required results are obtained from two successive tests.

If the elongation of any tensile test specimen is less than that specified and any part of the fracture is outside of the middle third of the gauge length, a retest shall be allowed.

If any specimen fails because of flaws resulting from preparation of the specimen, it may be discarded and another specimen substituted.

SECTION IV

DIMENSIONS AND TOLERANCES

1. Dimensions:

The finished pipe sections shall have the following dimensions, within the tolerances specified below:

		Length	
O.D.	Wall Thickness	Maywood	So. San Francisco
30"	1/2"	31'-1"	31'-7"
30"	7/16"	31'-1"	31'-7"
30"	3/8"	31'-1"	31'-7"

2. Circumference Tolerance:

The outside circumference of the pipe, for a distance of 8" from each end, shall not vary from the circumference calculated from the specified outside diameter by more than minus 3/32" or plus 9/32".

3. Wall Thickness Tolerance: 3/16' 11/32

The wall thickness at any point shall not be less than ninety per cent of the specified thickness for the 3/8" wall pipe and 95% of the specified thickness for the 7/16" and 1/2" wall pipe.

4. Length Tolerance:

Ninety-five per cent of the pipe sections shipped shall be between 30'-6" and 31'-10" in length, and no section will be acceptable which is less than 27'-0" in length. Jointers (two or more pieces joined by welding) shall be acceptable to a maximum of five per cent of the order. No jointer shall contain pipe lengths measuring less than 5'-0".

SECTION V

WORKMANSHIP AND FINISH

1. Defects:

The finished pipe shall be free from injurious defects, both in plate and in weld. When the depth of defect reduces the wall thickness to less than 90 per cent of the specified wall thickness, such defect shall be considered injurious.

Repair of injurious defects by welding shall be permitted, provided the depth of the defect does not exceed 33-1/3 per cent of the specified wall thickness (except in the case of sweats or leaks in the weld), and provided the length of the defect is not greater than a length equivalent to one diameter of the pipe.

The repairing of sweats or leaks in the welds shall be permitted to the full thickness of the pipe.

Repairs shall be made by chipping and welding. The workmanship involved in the repair is subject to approval of the purchaser's inspector.

Hydrostatic retest of pipe which has been repaired in this manner may be required by the purchaser's inspector.

2. End Finish:

The ends of the sections of pipe shall be beveled to an angle of 30 degrees, plus 5 degrees, minus zero and with a width of flat at the end of the pipe of 1/16", plus or minus 1/32". It shall be understood that the angle is to be measured from a line drawn perpendicular to the axis of the pipe.

The bevels shall be reasonably free from burrs.

The plane of the ends of the pipe shall be within .060" of perpendicular to the axis of the pipe at the ends, as measured across the pipe, by means of a square.

3. Surface Treatment:

All surfaces of the pipe shall be free from loose mill scale; but no surface treatment, such as blasting or pickling, shall be required.

The inside and outside weld reinforcement need not be removed.

SECTION VI

INSPECTION AND MARKING

1. Inspection:

While work on this contract is in progress, the purchaser's inspector, as designated by or under the contract, shall have free entry at all times to all parts of the manufacturer's plant engaged in the manufacture of pipe under this contract. The manufacturer shall afford the inspector, free of charge, all reasonable facilities for inspection of the pipe and shall permit him to witness all tests. The manufacturer of the pipe shall not be obligated, however, to delay any of its operations because of the absence of the inspector.

2. Marking:

Each section of the pipe to be shipped shall be marked by painting on the inside surface near both ends the measured length and the specified thickness of the section.

SanBrunoGT-LineRuptureInvestigation_DR_CPUC_069-Q01Atch02.pdf

62-6224

PACIFIC GAS AND ELECTRIC COMPANY **COPY**

Bureau of Tests and Inspection

August 3, 1949

MR. R. S. FULLER:

Attention: Mr. R. D. Smith

I am enclosing herewith a final report of the inspection of 30 inch pipe by Moody-Engineering Company at Consolidated Western Steel Co's. plant in Maywood, on our Order No. 7R 66858.

I am sure you, and possibly Mr. J. A. Love, would like to look this over before returning it for our file.

W. N. LINDBLAD

WNL:MLM
Enclosure
CC: JAL

MOODY ENGINEERING COMPANY
HIGHLAND BUILDING PITTSBURGH 6, PA.

JUL 20 1949

July 19, 1949

Pacific Gas & Electric Co.
4245 Hollis Street
Emeryville 8, California

Attention: Mr. W. N. Lindblad
Chief of Bureau of Tests & Inspection

Inspection Order 7R-81743
Purchase Order 7R-66858
Consolidated Western Steel Corp.
30" O.D. x 3/8" Wall Line Pipe

Gentlemen:

We wish to submit herewith our report, covering the supervision of manufacture and our inspection, in accordance with your Inspection Order No. 7R-81743, of:

3,222 pieces - 100,001.63 feet - 18.939 miles of 30" O.D. x 3/8" wall "Unionmelt" Electric Fusion Weld Steel Line Pipe;

supplied on your Purchase Order 7R-66858, placed with the Consolidated Western Steel Corporation, and shipped via auto truck to your coating and wrapping plant in Montebello, California, as designated in your shipping instructions issued to the manufacturer. Shipment of this pipe was made during the interval from March 11 to April 22, 1949.

Your order as placed with the manufacturer covered:

100,000 feet of Black Electric Welded Steel Pipe, 30" O.D. x .375" wall x 31' 2" length, to be fabricated in accordance with the P.G. & E. Specifications for pipe dated June 21, 1948.

The pipe supplied for this order was fabricated at the Maywood, California plant of the Consolidated Western Steel Corporation, at which plant our inspection of the pipe was conducted during its manufacture. This order was scheduled for production in conjunction with several other orders for the same size and quality of pipe, and therefore, the plates used in the manufacture of this pipe involved a greater number of heats of steel than would normally be required for an order for this quantity. The required results of the ladle analyses, check chemical analyses, and tension tests of all of the heats of steel for the 3/8" wall pipe are included in this report.

The major portion of the steel plates from which the pipe was made were supplied through the Columbia Steel Company, Los Angeles, California by the Geneva Steel Company, and rolled at their plant in Geneva, Utah. The balance of the plates were supplied by the Kaiser Company, Inc., and rolled at their plant in Fontana, California.

DETAILS OF PIPE MANUFACTURE:

The flat plates for fabrication into pipe enter the production line on a flat charge table. They pass under end squaring shears where the ends of the plates are cut square with the longitudinal edges.

As the plates leave the end shearing operation, they are passed between two planers, set parallel and back-to-back, where the longitudinal edges of each plate are simultaneously planed parallel to each other, and with a slight bevel of about five degrees. This bevel is just sufficient to insure definite closure contact of the inner edges when formed into a cylinder, which will tend to prevent "burn-through" as the outside longitudinal weld is made. The longitudinal edges of the plate are also chamfered at the outer corner to form a guide groove for the flexible weld head attachment of the Berkley Welding Units. This flexible weld head has been arranged to prevent off seam welds, and to centralize the weld properly over the long seam of each cylinder. The plates are finished planed to a width of 91-5/8", plus or minus 1/32", for this 30" O.D. x .375" wall pipe.

Following the planer operation, the plates pass through a set of edge break, or crimping rolls, and then to the pyramid rolls where they are formed into cylinders with the longitudinal edges aligned for the outside welding operation. The cylinders are then progressed through the Berkley Welding Units, where the longitudinal seam is automatically welded on the outside by the "Unionmelt" Electric Fusion method. A similar "Unionmelt" weld is also made along this seam on the inside by the Inside Welding Units. Each of these welds is regulated to penetrate to a minimum of 2/3 of the plate thickness from each side, thereby resulting in an overlap, or tie, of these two welds in the middle third of the wall thickness of the cylinder.

As now arranged, the Berkley Welding Units will not complete a sound solid weld to the very end of each longitudinal seam of each cylinder. It is characteristic of these units to allow the weld to crack about two to three inches at the leading end of the cylinder, and about four to eight inches at the trailing end of the weld. This condition is no doubt a result of the "spring-back" of the plate as the ends of the cylinders leave the retaining guides of the cage at the welding zone, and before the weld metal has had time to congeal sufficiently to restrain the uncontrolled stresses caused by the "spring-back" of the plate. The manufacturer does not cut any crop from the ends of the cylinders, therefore, it is necessary to repair, and complete each end of the longitudinal automatic weld before the cylinders pass to the inside long seam welders.

Lincoln Semi-Automatic squirt welders, which make a submerged arc weld, were used to complete the longitudinal weld at each end of the cylinder. Each end of each outside automatic weld was carefully cleaned by chipping before the Lincoln squirt weld was made to complete the outside long weld. These end welds were made against an inside flux back-up arrangement held in position in the pipe by an air pressure jack, or ram, which permitted the end welds to be regulated to give complete wall penetration.

Each outside end weld was back chipped on the inside of the seam to remove any chance of flux entrapment or pockets before this section of the inside was covered with a similar Lincoln Semi-Automatic weld at each end of the inside seam. Each of these end welds was started on a square steel tab placed at the end of the seam, and this tab was left attached to the cylinder for a starting area for the inside automatic weld.

The cylinders, with the end tabs attached, are progressed to the inside welding operation. The welding heads of the Inside Welding Units are suspended at the free end of a box girder arm of sufficient length to allow the head to extend through the a cylinder as it is conveyed endwise on a carriage for this welding operation. The cylinder supports of the carriage are adjustable, so that the operator may vary the position of the inside weld to cover, or follow, the inner side of the previously made outside weld, which is used as a guide for locating the inside "Unionmelt" weld. At the completion of the inside weld, the travel of the supporting carriage is reversed to free the weld unit arm from the inside of the cylinder.

The welded cylinders then pass over a series of inspection and repair skids, where at this stage of manufacture, a shop inspection is made of the inside and outside of the cylinders with especial attention being given to the condition of each of the welds. All defects discovered during this inspection are required to be eliminated by chipping before repairs are permitted. If not excessive, repairs are made by hand welding, otherwise the repair weld is made with a "Unionmelt" unit. Every effort is made to have all repairs completed before the cylinders are subjected to the expanding operation. It is standard practice to pre-heat all areas to be repaired to about 450 degrees before repair welds are made.

Each cylinder as formed and welded was smaller in diameter than the specified O.D. of the finished pipe; therefore, all cylinders passed by the shop inspection for further processing are conveyed to the End Belling Unit, and each end expanded mechanically to approximately the finished O.D. of the pipe. Each piece is then subjected to an internal hydrostatic pressure sufficient to stress the steel beyond its yield point, and increase the diameter until the outer surface of the cylinder is in direct contact with the inner surface of the retaining die of the expander unit, which is cylindrical, and bored to the proper diameter to produce pipe of the specified O.D.

The wall thickness of the pipe is not materially reduced by the expanding operation, since the length of the cylinders is shortened to compensate for the increase in diameter. The O.D. of the cylinders as formed and welded range from 29-37/64" to 29-39/64" for the finished 30" O.D. pipe.

Comparative tensile tests have been made on numerous heats of steel from which pipe has been manufactured by this process, and it has been determined that the yield strength of the steel has been increased by about 12,000 to 20,000 lbs per square inch by the internal expanding, or cold working operation. It is also established that this increase in yield strength is accomplished without the steel being transformed into a serious brittle condition if the chemistry of the plate as rolled is suitable for fabrication under this method of pipe manufacture.

The specified hydrostatic pressure test and hammer test are applied to each length of pipe directly following the expanding operation, and with the same equipment, but with the retaining dies released and open so that the pipe is not supported or restricted in any manner by the die section.

The balance of operations required in finishing the pipe as adapted by this manufacturer are similar to the conventional methods followed by other pipe manufacturers.

CHEMICAL AND PHYSICAL PROPERTIES OF STEEL:

Ladle and Check Chemical Analyses have been made on each heat of steel involved in the supply of pipe for this order.

Tension tests were also conducted on specimens cut from one length of finished pipe made from a plate selected from each heat of steel. One transverse tensile test was made on a specimen cut from the finished pipe across the weld, with the weld in the center of the specimen, to determine the ultimate strength of the steel. The weld re-inforcement metal was not removed for this test. Another transverse tensile test was made on a specimen cut from the same pipe, but 90 degrees from the weld, to determine the yield strength, ultimate strength, and percentage of elongation of the steel of the finished pipe after expansion.

The results of ladle and check chemical analyses made on the heats of steel from which the plates have been rolled for the manufacture of this pipe are as follows:

HEAT SYMBOL	HEAT NUMBER	ANALYSIS	PERCENTAGE C	Mn	P	S	Si
AGK	21490	Ladle	.26	.91	.018	.033	.07
		Check	.26	.94	.017	.021	-
AGL	21491	Ladle	.26	.97	.013	.035	.07
		Check	.27	1.03	.015	.018	-
AGT	61713	Ladle	.25	.91	.012	.031	.04
		Check	.27	.87	.017	.022	-
AGV	71733	Ladle	.25	1.04	.018	.023	.04
		Check	.29	1.04	.013	.037	-
AHO	41549	Ladle	.27	1.09	.020	.032	.07
		Check	.28	.93	.014	.035	-
AHP	41550	Ladle	.26	1.00	.015	.036	.08
		Check	.27	.91	.013	.037	-
AHQ	61734	Ladle	.24	.93	.013	.025	.06
		Check	.27	1.21	.013	.023	-
AHX	91068	Ladle	.27	1.06	.015	.036	.08
		Check	.26	1.06	.020	.028	-
AHY	11085	Ladle	.26	.97	.012	.034	.07
		Check	.27	.96	.015	.037	-
AHZ	11097	Ladle	.25	1.03	.014	.030	.10
		Check	.27	1.01	.017	.023	-
AIK	91038	Ladle	.29	1.03	.013	.029	.08
		Check	.32	1.04	.016	.026	-
AIL	51572	Ladle	.26	1.05	.017	.033	.08
		Check	.24	1.00	.016	.032	-

HEAT SYMBOL	HEAT NUMBER	ANALYSIS	C	Mn	P	S	Si
			PERCENTAGE				
AIP	21511	Ladle	.26	.96	.016	.035	.08
		Check	.24	.90	.017	.023	-
AJA	81456	Ladle	.24	.91	.014	.028	.04
		Check	.22	.94	.015	.026	-
AJB	81458	Ladle	.26	1.07	.012	.027	.08
		Check	.26	1.16	.016	.023	-
AJC	21510	Ladle	.24	.99	.010	.039	.10
		Check	.26	1.01	.014	.032	-
AJD	41566	Ladle	.27	.99	.010	.030	.06
		Check	.27	1.04	.016	.040	-
AJE	41567	Ladle	.26	.91	.022	.042	.08
		Check	.22	.85	.015	.023	-
AJH	61746	Ladle	.24	.95	.012	.023	.06
		Check	.23	1.00	.017	.023	-
AJI	81457	Ladle	.26	1.02	.022	.027	.05
		Check	.27	1.06	.018	.029	-
AJJ	31494	Ladle	.26	1.01	.032	.043	.09
		Check	.24	1.04	.017	.031	-
AJK	81472	Ladle	.24	.91	.016	.030	.09
		Check	.22	1.00	.015	.023	-
AJL	31493	Ladle	.26	.99	.016	.032	.10
		Check	.25	1.04	.014	.037	-
AJM	61747	Ladle	.26	.94	.010	.030	.05
		Check	.26	1.00	.016	.027	-
AJN	21500	Ladle	.24	.87	.012	.036	.07
		Check	.25	.92	.018	.025	-
AJO	31495	Ladle	.26	.93	.017	.038	.10
		Check	.23	1.05	.017	.030	-
AJP	81475	Ladle	.25	.88	.013	.041	.08
		Check	.20	.87	.014	.043	-
AJQ	21509	Ladle	.25	.95	.032	.029	.07
		Check	.25	.87	.021	.026	-
AJS	61749	Ladle	.26	.92	.011	.032	.07
		Check	.28	1.00	.018	.028	-
AJT	11339	Ladle	.26	1.13	.035	.025	.07
		Check	.26	1.19	.018	.032	-

HEAT SYMBOL	HEAT NUMBER	ANALYSIS	PERCENTAGE C	Mn	P	S	Si
AJU	21573	Ladle	.26	1.01	.019	.045	.05
		Check	.27	1.00	.015	.035	-
AJV	31553	Ladle	.26	1.00	.019	.030	.07
		Check	.28	1.01	.014	.037	-
AJW	11350	Ladle	.27	1.17	.010	.034	.06
		Check	.29	1.12	.013	.037	-
AJX	91301	Ladle	.28	1.12	.025	.037	.09
		Check	.32	1.14	.013	.049	-
AJY	1556	Ladle	.28	1.00	.013	.024	-
		Check	.29	1.05	.014	.023	-
AJZ	91308	Ladle	.25	1.13	.024	.035	.09
		Check	.30	1.17	.015	.040	-
AKF	61776	Ladle	.27	1.08	.017	.035	.08
		Check	.25	1.01	.011	.035	-
AKM	21549	Ladle	.25	.99	.016	.031	.06
		Check	.25	.95	.012	.032	-
AKP	61785	Ladle	.24	.91	.023	.032	.07
		Check	.22	.92	.016	.032	-
ALM	41615	Ladle	.25	1.09	.013	.037	.09
		Check	.25	1.05	.014	.040	-
ALO	91309	Ladle	.25	1.09	.024	.026	.10
		Check	.29	1.12	.016	.032	-
ALV	71875	Ladle	.27	1.09	.010	.022	.06
		Check	.27	1.15	.012	.026	-
ALY	31509	Ladle	.26	.99	.043	.036	.10
		Check	.24	1.08	.018	.026	-
ALZ	91316	Ladle	.27	1.07	.022	.026	.08
		Check	.27	1.06	.012	.032	-
AMA	11370	Ladle	.25	1.06	.016	.027	.07
		Check	.27	.92	.015	.026	-
AMB	91310	Ladle	.25	1.03	.033	.028	.04
		Check	.29	.98	.015	.029	-
AMC	81537	Ladle	.26	.97	.034	.028	.06
		Check	.26	.95	.013	.029	-

HEAT SYMBOL	HEAT NUMBER	ANALYSIS	C	Mn	P	S	Si
			PERCENTAGE				
AMD	41619	Ladle	.25	1.09	.021	.035	.07
		Check	.24	.92	.015	.029	-
AME	41618	Ladle	.25	.88	.010	.025	.06
		Check	.25	.88	.015	.026	-
AMG	81534	Ladle	.26	1.05	.025	.035	.10
		Check	.29	1.04	.014	.035	-
AMI	81535	Ladle	.27	1.08	.015	.032	.04
		Check	.28	1.05	.012	.023	-
AMJ	31557	Ladle	.27	1.01	.016	.029	.04
		Check	.28	.98	.015	.032	-
AMR	31559	Ladle	.28	.91	.015	.028	.09
		Check	.23	.95	.013	.032	-
AMS	21577	Ladle	.25	.99	.017	.036	.05
		Check	.23	1.08	.014	.032	-
AMT	51646	Ladle	.25	1.03	.022	.045	.10
		Check	.25	.98	.014	.035	-
AMU	41617	Ladle	.24	.94	.022	.038	.10
		Check	.24	.93	.014	.029	-
AMV	11373	Ladle	.25	1.04	.030	.024	.09
		Check	.25	1.06	.017	.026	-
AMW	11372	Ladle	.28	1.04	.010	.022	.06
		Check	.29	1.08	.017	.026	-
AMX	81533	Ladle	.25	1.02	.019	.030	.05
		Check	.27	1.09	.015	.029	-
AMY	11376	Ladle	.27	1.06	.015	.022	.10
		Check	.28	1.07	.015	.029	-
AMZ	91314	Ladle	.30	1.09	.039	.030	.06
		Check	.29	1.23	.017	.023	-
ANL	51660	Ladle	.25	.97	.017	.040	.04
		Check	.29	1.00	.014	.040	-
ANO	71904	Ladle	.28	.93	.017	.028	.07
		Check	.29	1.00	.013	.029	-

HEAT SYMBOL	HEAT NUMBER	ANALYSIS	C	Mn	P	S	Si
ANX	91344	Ladle	.26	1.03	.010	.024	.07
		Check	.24	.99	.012	.032	-
ANY	51678	Ladle	.24	.98	.020	.036	.05
		Check	.26	.96	.012	.032	-
AOB	21579	Ladle	.26	1.00	.018	.022	.08
		Check	.27	1.12	.017	.023	-
AOC	31556	Ladle	.27	1.13	.019	.030	.07
		Check	.28	1.28	.018	.026	-
AOD	71877	Ladle	.25	1.01	.010	.023	.07
		Check	.24	1.07	.015	.029	-
AOE	81538	Ladle	.25	1.07	.013	.027	.05
		Check	.25	1.00	.017	.026	-
AOH	31558	Ladle	.24	.88	.039	.032	.06
		Check	.23	.99	.018	.026	-
AOI	41576	Ladle	.27	1.08	.039	.030	.06
		Check	.28	1.19	.018	.026	-
AOJ	51649	Ladle	.26	.93	.025	.032	.05
		Check	.27	.97	.016	.032	-
AOP	61797	Ladle	.27	.97	.023	.035	.07
		Check	.27	1.04	.017	.026	-
AOV	41616	Ladle	.27	.97	.023	.035	.07
		Check	.26	.96	.017	.037	-
AOW	11374	Ladle	.26	1.07	.017	.028	.05
		Check	.31	1.05	.018	.032	-
AOX	21527	Ladle	.25	1.09	.024	.030	.09
		Check	.24	1.17	.013	.029	-
AOY	41633	Ladle	.25	1.05	.010	.034	.10
		Check	.27	.87	.015	.029	-
APE	21594	Ladle	.26	.95	.018	.029	.06
		Check	.23	.99	.015	.024	-
APK	51668	Ladle	.26	1.03	.017	.035	.09
		Check	.28	1.07	.014	.032	-
APP	31582	Ladle	.26	1.01	.015	.033	.07
		Check	.25	1.10	.014	.026	-

HEAT SYMBOL	HEAT NUMBER	ANALYSIS	C	Mn	P	S	Si
APR	91351	Ladle	.27	1.08	.010	.029	.08
		Check	.25	1.02	.016	.023	-
APS	11369	Ladle	.24	1.01	.013	.029	.07
		Check	.24	.99	.017	.029	-
APT	91349	Ladle	.25	1.02	.013	.026	.04
		Check	.22	1.00	.020	.023	-
APU	81577	Ladle	.26	1.04	.018	.025	.06
		Check	.27	.99	.016	.032	-
APV	91362	Ladle	.25	.93	.010	.031	.04
		Check	.30	1.07	.017	.037	-
APW	81568	Ladle	.25	1.09	.011	.032	.08
		Check	.29	1.10	.014	.037	-
APX	71909	Ladle	.28	.98	.019	.032	.07
		Check	.28	.99	.014	.026	-
APY	91372	Ladle	.25	.93	.014	.026	.07
		Check	.25	.93	.015	.023	-
APZ	91371	Ladle	.27	1.04	.015	.028	.06
		Check	.25	1.03	.015	.026	-
AQB	11386	Ladle	.26	1.00	.014	.019	.05
		Check	.27	.98	.016	.026	-
AQF	91335	Ladle	.27	1.04	.014	.025	.08
		Check	.26	1.04	.012	.029	-
AQG	81555	Ladle	.26	.97	.015	.034	.06
		Check	.24	.98	.013	.026	-
AQM	81513	Ladle	.25	1.09	.022	.031	.06
		Check	.24	1.01	.013	.032	-
AQP	11416	Ladle	.26	1.03	.023	.025	.07
		Check	.29	.95	.015	.026	-
AQU	81586	Ladle	.26	.99	.016	.031	.04
		Check	.26	.92	.012	.029	-
AQX	31614	Ladle	.26	.97	.010	.028	.06
		Check	.23	.87	.013	.032	-
ARA	31609	Ladle	.26	1.07	.011	.027	.07
		Check	.25	1.08	.014	.026	-

HEAT SYMBOL	HEAT NUMBER	ANALYSIS	PERCENTAGE C	Mn	P	S	Si
ARB	91365	Ladle	.24	.92	.014	.034	.05
		Check	.24	.94	.014	.029	-
ARC	91363	Ladle	.27	1.07	.013	.034	.08
		Check	.27	1.12	.013	.020	-
ARD	21620	Ladle	.27	.97	.015	.030	.07
		Check	.25	.95	.014	.026	-
ARE	51677	Ladle	.28	.96	.013	.036	.06
		Check	.27	.96	.012	.029	-
ARF	11400	Ladle	.25	1.02	.018	.022	.08
		Check	.27	.99	.013	.032	-
ARK	11397	Ladle	.26	.87	.021	.026	.06
		Check	.27	.85	.013	.023	-
ARL	81594	Ladle	.25	1.03	.016	.028	.09
		Check	.25	1.06	.014	.029	-
ARN	71922	Ladle	.25	.91	.011	.029	.05
		Check	.26	.87	.014	.029	-
ARO	91376	Ladle	.25	.91	.012	.029	.06
		Check	.23	.92	.013	.026	-
ARP	31618	Ladle	.26	.96	.010	.033	.08
		Check	.26	.90	.016	.029	-
ARQ	11428	Ladle	.25	1.02	.027	.028	.07
		Check	.25	.96	.015	.023	-
ARR	71934	Ladle	.27	.91	.020	.025	.04
		Check	.28	.93	.012	.026	-
ARS	91375	Ladle	.25	.93	.021	.025	.08
		Check	.26	1.06	.017	.032	-
ART	31635	Ladle	.24	.99	.018	.034	.08
		Check	.26	.96	.017	.035	-
ARU	61836	Ladle	.25	1.00	.017	.034	.04
		Check	.26	.96	.017	.035	-
ARV	11440	Ladle	.27	1.07	.010	.030	.08
		Check	.24	1.00	.015	.026	-
ARW	41648	Ladle	.25	.91	.012	.035	.09
		Check	.26	.89	.018	.035	-

HEAT SYMBOL	HEAT NUMBER	ANALYSIS	C	Mn	P	S	Si
			PERCENTAGE				
ARX	41651	Ladle	.24	.92	.017	.029	.10
		Check	.26	.90	.016	.043	-
ARY	61851	Ladle	.24	.97	.023	.037	.05
		Check	.26	.94	.016	.032	-
ARZ	51711	Ladle	.24	1.03	.020	.034	.04
		Check	.25	1.08	.015	.029	-
ASA	71920	Ladle	.26	.95	.012	.029	.05
		Check	.26	.95	.012	.026	-
ASC	21644	Ladle	.26	1.06	.018	.033	.08
		Check	.26	1.04	.015	.035	-
ASD	71948	Ladle	.25	1.07	.019	.043	.10
		Check	.26	1.09	.016	.037	-
ASE	21652	Ladle	.26	.85	.018	.028	.07
		Check	.25	.89	.018	.029	-
ASF	71949	Ladle	.25	.94	.010	.029	.07
		Check	.27	1.07	.018	.035	-
ASH	31631	Ladle	.25	1.02	.022	.041	.10
		Check	.23	.94	.018	.032	-
ASN	61858	Ladle	.26	1.05	.010	.034	.08
		Check	.30	1.07	.017	.037	-
ASO	21659	Ladle	.26	1.00	.025	.031	.09
		Check	.25	1.02	.015	.035	-
ASQ	11442	Ladle	.26	1.04	.019	.027	.07
		Check	.26	1.03	.013	.029	-
ASV	71953	Ladle	.27	.97	.019	.024	.05
		Check	.28	.93	.017	.032	-
ASY	31627	Ladle	.27	1.01	.019	.036	.09
		Check	.30	1.22	.012	.032	-
ATA	21648	Ladle	.28	1.09	.018	.023	.10
		Check	.31	1.13	.018	.026	-
ATB	31625	Ladle	.25	.98	.020	.024	.08
		Check	.24	.98	.017	.026	-
ATC	41654	Ladle	.26	.95	.024	.034	.09
		Check	.25	.93	.018	.026	-

HEAT SYMBOL	HEAT NUMBER	ANALYSIS	C	Mn	P	S	Si
			PERCENTAGE				
ATD	41647	Ladle	.24	1.06	.014	.033	.09
		Check	.26	1.04	.019	.029	-
ATE	61838	Ladle	.27	1.08	.010	.036	.05
		Check	.25	1.06	.017	.026	-
ATF	91399	Ladle	.25	.96	.028	.030	.10
		Check	.24	.95	.016	.046	-
ATG	41646	Ladle	.27	.91	.022	.034	.10
		Check	.20	.92	.014	.032	-
ATH	21639	Ladle	.24	1.01	.010	.029	.07
		Check	.21	1.02	.017	.029	-
ATI	31629	Ladle	.27	1.01	.021	.036	.07
		Check	.26	1.00	.017	.026	-
ATJ	31634	Ladle	.26	.80	.012	.037	.05
		Check	.25	.85	.013	.029	-
ATL	31654	Ladle	.26	.95	.011	.031	.10
		Check	.25	.95	.015	.023	-
ATP	91361	Ladle	.27	1.04	.020	.027	.08
		Check	.29	1.03	.014	.026	-
ATQ	91401	Ladle	.25	.98	.018	.029	.10
		Check	.25	.95	.016	.026	-
ATT	41693	Ladle	.24	1.04	.017	.043	.10
		Check	.25	1.07	.013	.035	-
ATX	21695	Ladle	.25	1.05	.022	.034	.04
		Check	.26	1.08	.013	.029	-
ATY	21631	Ladle	.26	.99	.029	.030	.06
		Check	.23	.93	.015	.036	-
ATZ	91382	Ladle	.27	.98	.020	.025	.07
		Check	.29	.98	.013	.033	-
AUE	61859	Ladle	.24	.94	.020	.033	.08
		Check	.26	.97	.016	.029	-
AUG	31617	Ladle	.28	.97	.018	.032	.05
		Check	.29	1.00	.020	.035	-
AUO	21662	Ladle	.25	.92	.025	.032	.05
		Check	.23	.90	.018	.023	-
AUR	61830	Ladle	.26	1.04	.017	.029	.08
		Check	.23	1.01	.017	.035	-

HEAT SYMBOL	HEAT NUMBER	ANALYSIS	C	Mn	P	S	Si
			PERCENTAGE				
AVE	31684	Ladle	.25	.94	.018	.033	.09
		Check	.27	.98	.016	.032	-
AVF	51737	Ladle	.24	.87	.019	.039	.07
		Check	.26	.90	.017	.037	-
AVH	81608	Ladle	.27	1.06	.020	.031	.10
		Check	.28	1.11	.012	.035	-
AVJ	11496	Ladle	.27	1.02	.020	.025	.09
		Check	.30	1.03	.018	.029	-
AVN	21710	Ladle	.24	.92	.023	.029	.04
		Check	.25	.99	.015	.032	-
AVO	31695	Ladle	.26	.99	.013	.038	.08
		Check	.27	1.05	.012	.037	-
AVP	91449	Ladle	.26	1.07	.025	.035	.10
		Check	.26	1.06	.015	.029	-
AVS	41716	Ladle	.24	.94	.022	.038	.10
		Check	.27	.98	.014	.039	-
AWA	21682	Ladle	.25	.95	.022	.030	.08
		Check	.28	1.00	.015	.036	-
AWB	61879	Ladle	.27	1.04	.037	.042	.10
		Check	.28	1.00	.013	.039	-
AWC	71988	Ladle	.26	1.04	.045	.039	.06
		Check	.28	1.01	.017	.033	-
AWS	41721	Ladle	.25	.95	.016	.038	.07
		Check	.26	1.08	.015	.035	-
AWW	61917	Ladle	.26	1.03	.021	.036	.09
		Check	.25	1.02	.017	.029	-
AWX	31702	Ladle	.25	1.04	.019	.038	.10
		Check	.29	1.07	.015	.036	-
AWZ	11479	Ladle	.25	.95	.015	.026	.04
		Check	.25	.91	.016	.029	-
AXE	61919	Ladle	.27	1.12	.019	.040	.07
		Check	.27	1.14	.017	.039	-
AXQ	61939	Ladle	.22	1.09	.027	.040	.09
		Check	.22	1.12	.014	.046	-

HEAT SYMBOL	HEAT NUMBER	ANALYSIS	C	Mn	P	S	Si
			PERCENTAGE				
AXR	21740	Ladle	.24	.95	.018	.035	.04
		Check	.26	.94	.014	.030	-
AYA	61922	Ladle	.25	1.05	.035	.040	.08
		Check	.26	1.03	.016	.035	-
AYB	72035	Ladle	.25	1.07	.013	.032	.10
		Check	.25	.97	.015	.035	-
AYC	41738	Ladle	.25	.97	.017	.039	.08
		Check	.27	1.01	.012	.042	-
AYD	61918	Ladle	.27	1.06	.026	.042	.08
		Check	.25	1.01	.015	.035	-
AYK	21742	Ladle	.25	.93	.022	.033	.09
		Check	.29	.91	.012	.039	-
AYS	11541	Ladle	.25	.96	.015	.033	.08
		Check	.25	.95	.015	.027	-
AYT	72059	Ladle	.25	1.08	.018	.040	.07
		Check	.25	1.08	.015	.035	-
AYU	31736	Ladle	.26	1.07	.012	.039	.07
		Check	.30	1.10	.015	.036	-
AYZ	41758	Ladle	.25	1.05	.024	.040	.09
		Check	.30	1.07	.016	.026	-
AZA	81678	Ladle	.26	1.08	.015	.039	.09
		Check	.27	1.01	.014	.029	-
AZC	81660	Ladle	.24	1.05	.017	.038	.08
		Check	.27	1.04	.016	.033	-
AZD	41756	Ladle	.27	1.08	.017	.035	.10
		Check	.28	1.11	.016	.035	-
AZE	91486	Ladle	.26	1.03	.021	.035	.10
		Check	.30	1.01	.014	.036	-
AZF	72060	Ladle	.24	.95	.014	.038	.05
		Check	.26	.97	.012	.029	-
AZG	21743	Ladle	.25	.95	.014	.035	.07
		Check	.29	1.02	.014	.033	-
AZH	41774	Ladle	.26	1.02	.016	.033	.13
		Check	.28	1.02	.015	.029	-

HEAT SYMBOL	HEAT NUMBER	ANALYSIS	PERCENTAGE C	Mn	P	S	Si
AZI	11553	Ladle Check	.24 .27	.85 .92	.015 .015	.030 .033	.04 -
AZJ	72086	Ladle Check	.24 .29	1.03 .98	.011 .016	.040 .036	.13 -
AZX	72071	Ladle Check	.26 .27	.94 .96	.018 .017	.033 .030	.04 -
BAA	70095	Ladle Check	.25 .27	1.01 1.08	.012 .012	.034 .036	.06 -
BAB	52948	Ladle Check	.22 .26	.94 .98	.014 .017	.032 .023	- -
BAC	70093	Ladle Check	.25 .26	.89 .98	.017 .014	.031 .029	- -
BAD	52947	Ladle Check	.24 .26	.91 .96	.010 .014	.029 .039	.03 -
BAP	31765	Ladle Check	.26 .27	1.03 1.09	.010 .015	.040 .039	.07 -
BAS	21760	Ladle Check	.22 .28	.96 1.07	.010 .013	.038 .046	.08 -
BAY	11569	Ladle Check	.26 .29	1.03 1.13	.022 .017	.037 .036	.09 -
BBC	61965	Ladle Check	.27 .25	1.04 .97	.012 .013	.030 .026	.07 -
BBH	41801	Ladle Check	.26 .27	1.14 1.17	.025 .014	.041 .039	.10 -
BBJ	91535	Ladle Check	.25 .26	1.03 1.03	.023 .019	.033 .030	.06 -
BBM	71882	Ladle Check	.24 .28	.98 1.00	.013 .016	.030 .039	.10 -
BBN	91536	Ladle Check	.24 .25	.98 1.04	.022 .015	.030 .029	.07 -
BBO	41802	Ladle Check	.24 .29	1.02 1.11	.020 .015	.039 .035	.07 -
BBP	71991	Ladle Check	.25 .28	.98 .99	.012 .015	.032 .033	.06 -

HEAT SYMBOL	HEAT NUMBER	ANALYSIS	PERCENTAGE C	Mn	P	S	Si
BBQ	31783	Ladle	.27	.91	.018	.028	.06
		Check	.28	.99	.014	.039	-
BBU	41827	Ladle	.25	1.00	.017	.038	.07
		Check	.25	1.04	.014	.038	-
BBY	81701	Ladle	.26	.85	.017	.036	.06
		Check	.28	.91	.015	.033	-
BBZ	91532	Ladle	.25	1.01	.018	.040	.10
		Check	.25	1.05	.017	.036	-
BCA	11576	Ladle	.26	1.02	.018	.035	.08
		Check	.26	1.09	.015	.033	-
BCB	31775	Ladle	.24	1.01	.022	.037	.07
		Check	.28	.95	.016	.035	-
BCC	81699	Ladle	.25	1.00	.010	.039	.06
		Check	.26	1.05	.014	.039	-
BCD	81592	Ladle	.26	.92	.012	.030	.09
		Check	.25	.96	.015	.033	-
BCE	31774	Ladle	.28	1.00	.012	.037	.07
		Check	.26	.99	.014	.039	-
BCF	21786	Ladle	.26	1.06	.013	.036	.09
		Check	.32	.98	.015	.039	-
BDD	21758	Ladle	.24	1.03	.016	.038	.08
		Check	.24	1.00	.015	.033	-
KME	70188	Ladle	.25	1.04	.019	.027	-
		Check	.29	.97	.015	.033	-
KMF	23311	Ladle	.26	.95	.019	.025	-
		Check	.29	1.04	.012	.029	-
KMK	43174	Ladle	.22	.89	.020	.028	-
		Check	.23	1.03	.013	.033	-
KML	62613	Ladle	.25	.92	.015	.024	-
		Check	.26	1.00	.016	.036	-
KMN	23312	Ladle	.24	.91	.013	.025	-
		Check	.22	1.03	.014	.033	-
KMO	70192	Ladle	.24	.95	.023	.023	-
		Check	.24	1.09	.015	.036	-

HEAT SYMBOL	HEAT NUMBER	ANALYSIS	C	Mn	P	S	Si
			PERCENTAGE				
KMP	70191	Ladle	.25	.96	.020	.026	-
		Check	.24	1.05	.013	.029	-
KMQ	53017	Ladle	.26	1.01	.020	.030	-
		Check	.30	1.14	.015	.030	-
KMR	23303	Ladle	.25	.95	.018	.026	-
		Check	.27	1.01	.013	.029	-
KMS	43166	Ladle	.24	.92	.020	.030	-
		Check	.25	.98	.015	.029	-
KNF	13192	Ladle	.25	.85	.013	.028	-
		Check	.27	1.05	.014	.036	-
KNG	70218	Ladle	.25	.98	.020	.031	-
		Check	.30	1.13	.014	.027	-
KNH	53044	Ladle	.25	.97	.021	.045	-
		Check	.28	1.07	.015	.036	-
KNI	70217	Ladle	.25	.94	.027	.035	-
		Check	.28	1.02	.013	.027	-
KNJ	62653	Ladle	.26	.88	.015	.030	-
		Check	.30	1.00	.014	.036	-
KNK	62636	Ladle	.27	.94	.015	.027	-
		Check	.30	1.11	.015	.024	-
KNO	70207	Ladle	.24	.85	.016	.024	-
		Check	.27	1.07	.015	.033	-
KNR	23327	Ladle	.25	.93	.019	.022	-
		Check	.27	.95	.015	.030	-
KNT	13191	Ladle	.25	.87	.018	.025	-
		Check	.26	.92	.016	.033	-
KNU	52948	Ladle	.22	.94	.014	.032	-
		Check	.27	1.06	.014	.039	-
KNV	70093	Ladle	.25	.89	.017	.031	-
		Check	.27	1.05	.016	.033	-
KNW	13200	Ladle	.25	.85	.022	.030	-
		Check	.26	.97	.016	.024	-
KNX	62637	Ladle	.25	.93	.018	.034	.05
		Check	.28	1.00	.016	.027	-

The results of tensile tests made on specimens cut from the finished pipe, selected from each heat of steel used in the manufacture of this pipe are as follows:

HEAT SYMBOL	HEAT NUMBER	TYPE TEST	YIELD POINT lbs/sq/in	TENSILE STR. lbs/sq/in	ELONG. % in 2"	LOCATION OF FRACTURE
AGK	21490	TW*	--	79,892	-	Plate
		TT	66,666	74,722	31.0	-
AGL	21491	TW	--	84,636	-	Plate
		TT	73,854	84,366	28.0	-
AGT	61713	TW	--	82,133	-	Plate
		TT	75,000	80,851	28.0	-
AGV	61733	TW	--	84,324	-	Plate
		TT	69,918	78,320	32.0	-
AHO	41549	TW	--	87,671	-	Plate
		TT	72,928	82,872	28.0	-
AHP	41550	TW	--	80,706	-	Weld
		TT	67,671	79,452	30.0	-
AHQ	61734	TW	--	81,370	-	Plate
		TT	67,302	76,294	31.0	-
AHX	91068	TW	--	84,800	-	Plate
		TT	71,657	82,085	30.0	-
AHY	11085	TW	--	83,333	-	Plate
		TT	72,826	80,978	30.0	-
AHZ	11097	TW	--	85,474	-	Plate
		TT	73,224	82,513	28.0	-
AIK	91038	TW	--	89,189	-	Plate
		TT	72,237	84,097	30.0	-
AIL	51572	TW	--	87,061	-	Plate
		TT	70,509	80,965	30.0	-
AIP	21511	TW	--	82,972	-	Plate
		TT	74,456	78,260	28.0	-
AJA	81456	TW	--	79,365	-	Plate
		TT	62,864	72,148	30.0	-
AJB	81458	TW	--	80,540	-	Plate
		TT	69,189	75,945	33.0	-
AJC	21510	TW	--	85,714	-	Weld
		TT	72,752	83,651	28.0	-

Note: (*) TW - Transverse test across weld.
TT - Transverse test 90 degrees from weld

HEAT SYMBOL	HEAT NUMBER	TYPE TEST	YIELD POINT lbs/sq/in	TENSILE STR. lbs/sq/in	ELONG. % in 2"	LOCATION OF FRACTURE
AJD	41566	TW	--	84,122	-	Plate
		TT	75,766	83,286	27.0	-
AJE	41567	TW	--	83,561	-	Plate
		TT	69,589	80,547	25.0	-
AJH	61746	TW	--	79,729	-	Plate
		TT	67,663	77,808	31.0	-
AJI	81457	TW	--	86,486	-	Plate
		TT	74,659	83,923	30.0	-
AJJ	31494	TW	--	83,333	-	Weld
		TT	74,520	83,013	27.0	-
AJK	81472	TW	--	83,466	-	Plate
		TT	61,968	76,861	30.0	-
AJL	31493	TW	--	81,989	-	Plate
		TT	66,576	76,550	30.0	-
AJM	61747	TW	--	86,225	-	Plate
		TT	75,956	85,792	26.0	-
AJN	21500	TW	--	82,210	-	Plate
		TT	68,918	78,378	28.0	-
AJO	31495	TW	--	80,540	-	Plate
		TT	66,756	74,262	30.0	-
AJP	81475	TW	--	84,964	-	Plate
		TT	68,817	76,881	30.0	-
AJQ	21509	TW	--	81,147	-	Plate
		TT	70,194	77,994	28.0	-
AJS	61749	TW	--	85,597	-	Plate
		TT	71,273	83,468	31.0	-
AJT	11339	TW	--	89,518	-	Plate
		TT	76,756	88,648	28.0	-
AJU	21573	TW	--	86,522	-	Plate
		TT	72,654	84,986	28.0	-
AJV	31553	TW	--	84,239	-	Plate
		TT	73,770	80,054	31.0	-

HEAT SYMBOL	HEAT NUMBER	TYPE TEST	YIELD POINT lbs/sq/in	TENSILE STR. lbs/sq/in	ELONG. % in 2"	LOCATION OF FRACTURE
AJW	11350	TW	--	77,866	-	Weld
		TT	73,614	86,015	28.0	-
AJX	91301	TW	--	90,961	-	Weld
		TT	80,310	91,450	27.0	-
AJY	1556	TW	--	88,115	-	Weld
		TT	61,428	88,571	28.0	-
AJZ	91308	TW	--	87,466	-	Plate
		TT	70,588	84,224	30.0	-
AKF	61776	TW	--	84,450	-	Plate
		TT	67,741	76,075	30.0	-
AKM	21549	TW	--	84,010	-	Plate
		TT	72,628	83,197	30.0	-
AKP	61785	TW	--	83,733	-	Plate
		TT	68,170	73,740	30.0	-
ALM	41615	TW	--	88,980	-	Plate
		TT	75,338	82,655	28.0	-
ALO	91309	TW	--	85,522	-	Plate
		TT	71,390	78,074	31.0	-
ALV	71875	TW	--	86,065	-	Plate
		TT	73,829	85,675	30.0	-
ALY	31509	TW	--	87,601	-	Plate
		TT	74,796	83,468	30.0	-
ALZ	91316	TW	--	87,602	-	Plate
		TT	77,358	87,602	28.0	-
AMA	11370	TW	--	84,718	-	Plate
		TT	59,681	80,371	30.0	-
AMB	91310	TW	--	87,061	-	Weld
		TT	64,705	84,760	28.0	-
AMC	81537	TW	--	83,914	-	Weld
		TT	74,462	84,408	28.0	-
AMD	41619	TW	--	84,880	-	Plate
		TT	67,904	77,718	32.0	-
AME	41618	TW	--	78,706	-	Plate
		TT	64,498	74,796	32.0	-
AMG	81534	TW	--	86,648	-	Plate
		TT	68,206	82,880	30.0	-

HEAT SYMBOL	HEAT NUMBER	TYPE TEST	YIELD POINT lbs/sq/in	TENSILE STR. lbs/sq/in	ELONG. % in 2"	LOCATION OF FRACTURE
AMI	81535	TW	--	85,792	-	Plate
		TT	79,508	86,885	28.0	-
AMJ	31557	TW	--	84,782	-	Plate
		TT	67,671	78,082	32.0	-
AMR	31559	TW	--	84,283	-	Plate
		TT	73,297	82,561	30.0	-
AMS	21577	TW	--	81,940	-	Plate
		TT	63,492	84,126	27.0	-
AMT	51646	TW	--	84,224	-	Plate
		TT	74,603	81,216	28.0	-
AMU	41617	TW	--	79,947	-	Weld
		TT	68,253	76,985	30.0	-
AMV	11373	TW	--	85,215	-	Weld
		TT	72,580	80,107	30.0	-
AMW	11372	TW	--	85,135	-	Plate
		TT	65,053	83,870	26.0	-
AMX	81533	TW	--	82,446	-	Weld
		TT	75,200	84,533	30.0	-
AMY	11376	TW	--	87,062	-	Plate
		TT	75,405	85,135	30.0	-
AMZ	91314	TW	--	95,121	-	Plate
		TT	76,566	86,920	30.0	-
ANL	51660	TW	--	86,178	-	Weld
		TT	59,568	80,323	32.0	-
ANO	71904	TW	--	84,533	-	Plate
		TT	61,273	80,371	30.0	-
ANX	91344	TW	--	85,365	-	Weld
		TT	63,926	83,023	30.0	-
ANY	51678	TW	--	80,697	-	Plate
		TT	60,638	77,925	30.0	-
AOB	21579	TW	--	86,253	-	Weld
		TT	74,005	84,084	30.0	-
AOC	31556	TW	--	90,348	-	Plate
		TT	73,458	87,400	30.0	-

HEAT SYMBOL	HEAT NUMBER	TYPE TEST	YIELD POINT lbs/sq/in	TENSILE STR. lbs/sq/in	ELONG. % in 2"	LOCATION OF FRACTURE
AOD	71877	TW	--	84,905	-	Plate
		TT	70,731	78,590	30.0	-
AOE	81538	TW	--	85,638	-	Plate
		TT	72,460	81,283	30.0	-
AOH	31558	TW	--	88,891	-	Plate
		TT	69,272	77,358	32.0	-
AOI	41576	TW	--	92,432	-	Plate
		TT	80,810	91,891	25.0	-
AOJ	51649	TW	--	82,446	-	Plate
		TT	70,026	79,840	28.0	-
AOP	61797	TW	--	87,052	-	Weld
		TT	66,481	85,041	25.0	-
AOV	41616	TW	--	85,520	-	Plate
		TT	70,410	78,904	30.0	-
AOW	11374	TW	--	86,178	-	Plate
		TT	77,628	86,522	28.0	-
AOX	21527	TW	--	87,608	-	Plate
		TT	66,402	83,862	29.0	-
AOY	41633	TW	--	80,965	-	Plate
		TT	67,925	78,975	29.0	-
APE	21594	TW	--	87,643	-	Plate
		TT	72,432	79,459	30.0	-
APK	51668	TW	--	86,827	-	Plate
		TT	61,185	79,515	32.0	-
APP	31582	TW	--	82,198	-	Plate
		TT	62.077	77,922	32.0	-
APR	91351	TW	--	83,110	-	Weld
		TT	59,733	79,200	32.0	-
APS	11369	TW	--	83,733	-	Plate
		TT	63,925	77,188	31.0	-
APT	91349	TW	--	80,428	-	Weld
		TT	61,866	75,733	32.0	-
APU	81577	TW	--	85,066	-	Weld
		TT	66,843	84,085	31.0	-

HEAT SYMBOL	HEAT NUMBER	TYPE TEST	YIELD POINT lbs/sq/in	TENSILE STR. lbs/sq/in	ELONG. % in 2"	LOCATION OF FRACTURE
APV	91362	TW	--	83,606	-	Plate
		TT	57,908	79,088	30.0	-
APW	81568	TW	--	87,052	-	Weld
		TT	62,880	78,947	32.0	-
APX	71909	TW	--	83,957	-	Plate
		TT	58,666	82,133	32.0	-
APY	91372	TW	--	83,018	-	Plate
		TT	62,972	80,270	32.0	-
APZ	91371	TW	--	85,752	-	Weld
		TT	66,310	84,491	31.0	-
AQB	11386	TW	--	86,956	-	Plate
		TT	60,962	79,145	30.0	-
AQF	91335	TW	--	87,704	-	Plate
		TT	63,934	83,333	31.0	-
AQG	81555	TW	--	86,807	-	Plate
		TT	67,540	79,842	27.0	-
AQM	81513	TW	--	84,700	-	Plate
		TT	64,595	81,621	33.0	-
AQP	11416	TW	--	80,547	-	Plate
		TT	60,752	77,150	31.0	-
AQU	81586	TW	--	83,606	-	Weld
		TT	64,960	81,401	30.0	-
AQX	31614	TW	--	82,384	-	Weld
		TT	62,735	82,841	30.0	-
ARA	31609	TW	--	85,597	-	Plate
		TT	66,133	80,533	30.0	-
ARB	91365	TW	--	80,913	-	Plate
		TT	61,765	72,995	32.0	-
ARC	91363	TW	--	88,978	-	Plate
		TT	66,219	85,790	25.0	-
ARD	21620	TW	--	80,053	-	Weld
		TT	61,702	76,861	32.0	-
ARE	51677	TW	--	85,444	-	Plate
		TT	66,666	79,570	32.0	-

HEAT SYMBOL	HEAT NUMBER	TYPE TEST	YIELD POINT lbs/sq/in	TENSILE STR. lbs/sq/in	ELONG. % in 2"	LOCATION OF FRACTURE
ARF	11400	TW	--	88,705	-	Plate
		TT	66,295	85,236	30.0	-
ARK	11397	TW	--	80,592	-	Plate
		TT	61,021	81,182	30.0	-
ARL	81594	TW	--	84,800	-	Plate
		TT	63,492	82,540	32.0	-
ARN	71922	TW	--	83,018	-	Plate
		TT	63,538	80,160	30.0	-
ARO	91376	TW	--	82,352	-	Plate
		TT	60,790	77,105	30.0	-
ARP	31618	TW	--	81,300	-	Plate
		TT	61,968	78,723	32.0	-
ARQ	11428	TW	--	79,076	-	Weld
		TT	63,636	78,610	31.0	-
ARR	71934	TW	--	83,246	-	Plate
		TT	62,303	81,152	31.0	-
ARS	91375	TW	--	83,155	-	Plate
		TT	63,517	78,215	31.0	-
ART	31635	TW	--	83,287	-	Plate
		TT	64,462	80,165	25.0	-
ARU	61836	TW	--	82,825	-	Plate
		TT	61,064	76,190	26.0	-
ARV	11440	TW	--	85,792	-	Plate
		TT	63,114	81,420	27.0	-
ARW	41648	TW	--	83,380	-	Plate
		TT	58,953	78,237	30.0	-
ARX	41651	TW	--	85,277	-	Plate
		TT	58,402	77,961	30.0	-
ARY	61851	TW	--	83,783	-	Plate
		TT	61,021	79,838	31.0	-
ARZ	51711	TW	--	85,753	-	Plate
		TT	63,487	82,288	30.0	-
ASA	71920	TW	--	84,468	-	Plate
		TT	59,510	76,358	32.0	-

HEAT SYMBOL	HEAT NUMBER	TYPE TEST	YIELD POINT lbs/sq/in	TENSILE STR. lbs/sq/in	ELONG. % in 2"	LOCATION OF FRACTURE
ASC	21644	TW	--	83,516	-	Plate
		TT	66,578	78,779	29.0	-
ASD	71948	TW	--	81,720	-	Plate
		TT	63,588	77,045	32.0	-
ASE	21652	TW	--	83,197	-	Plate
		TT	60,326	76,630	27.0	-
ASF	71949	TW	--	82,894	-	Plate
		TT	56,806	74,345	33.0	-
ASH	31631	TW	--	82,320	-	Plate
		TT	66,486	79,730	30.0	-
ASN	61858	TW	--	83,277	-	Plate
		TT	56,335	77,088	31.0	-
ASO	21659	TW	--	77,348	-	Weld
		TT	61,232	83,957	28.0	-
ASQ	11442	TW	--	86,216	-	Plate
		TT	65,517	80,371	28.0	-
ASV	71953	TW	--	86,792	-	Plate
		TT	66,666	85,937	31.0	-
ASY	31627	TW	--	92,432	-	Weld
		TT	67,904	92,307	26.0	-
ATA	21648	TW	--	89,893	-	Plate
		TT	68,450	87,027	28.0	-
ATB	31625	TW	--	85,135	-	Plate
		TT	63,760	79,019	26.0	-
ATC	41654	TW	--	87,131	-	Plate
		TT	67,374	85,411	25.0	-
ATD	41647	TW	--	87,533	-	Plate
		TT	62,972	87,027	30.0	-
ATE	61838	TW	--	89,066	-	Plate
		TT	63,517	84,514	29.0	-
ATF	91399	TW	--	87,637	-	Plate
		TT	62,601	81,842	31.0	-
ATG	41646	TW	--	85,215	-	Plate
		TT	60,857	80,160	30.0	-

HEAT SYMBOL	HEAT NUMBER	TYPE TEST	YIELD POINT lbs/sq/in	TENSILE STR. lbs/sq/in	ELONG. % in 2"	LOCATION OF FRACTURE
ATH	21639	TW	--	83,520	-	Plate
		TT	65,425	78,723	30.0	-
ATI	31629	TW	--	83,513	-	Plate
		TT	59,836	78,688	34.0	-
ATJ	31634	TW	--	82,887	-	plate
		TT	61,600	78,667	31.0	-
ATL	31654	TW	--	80,601	-	Plate
		TT	62.021	77,049	32.0	-
ATP	91361	TW	--	83,888	-	Weld
		TT	58,445	78,552	34.0	-
ATQ	91401	TW	--	88,251	-	Weld
		TT	69,633	87,958	29.0	-
ATT	41693	TW	--	88,767	-	Weld
		TT	59,730	81,621	29.0	-
ATX	21695	TW	--	84,426	-	Weld
		TT	60,870	82,336	30.0	-
ATY	21631	TW	--	83,611	-	Plate
		TT	56,486	76,216	31.0	-
ATZ	91382	TW	--	86,178	-	Weld
		TT	60,158	83,377	31.0	-
AUE	61859	TW	--	85,638	-	Plate
		TT	59,259	78,511	32.0	-
AUG	31617	TW	--	85,676	-	Weld
		TT	60,317	83,068	28.0	-
AUO	21662	TW	--	85,751	-	Plate
		TT	58,225	80,156	30.0	-
AUR	61830	TW	--	83,554	-	Weld
		TT	62,765	82,978	29.0	-
AVE	31684	TW	--	89,256	-	Weld
		TT	62,903	86,560	26.0	-
AVF	51737	TW	--	77,030	-	Plate
		TT	53,278	73,497	34.0	-
AVH	81608	TW	--	89,890	-	Weld
		TT	61,096	84,073	31.0	-

HEAT SYMBOL	HEAT NUMBER	TYPE TEST	YIELD POINT lbs/sq/in	TENSILE STR. lbs/sq/in	ELONG. % in 2"	LOCATION OF FRACTURE
AVJ	11496	TW	--	90,217	-	Plate
		TT	62,235	82,978	28.0	-
AVN	21710	TW	--	79,670	-	Plate
		TT	56,720	76,344	33.0	-
AVO	31695	TW	--	84,595	-	Weld
		TT	59,140	79,838	32.0	-
AVP	91449	TW	--	91,712	-	Plate
		TT	60,107	81,401	30.0	-
AVS	41716	TW	--	83,520	-	Plate
		TT	62,942	79,019	28.0	-
AWA	21682	TW	--	83,740	-	Weld
		TT	59,466	81,866	30.0	-
AWB	61879	TW	--	85,145	-	Plate
		TT	59,630	78,627	30.0	-
AWC	71988	TW	--	86,885	-	Weld
		TT	63,115	81,693	29.0	-
AWS	41721	TW	--	86,850	-	Weld
		TT	58,870	80,913	30.0	-
AWW	61917	TW	--	79,255	-	Weld
		TT	63,440	86,290	28.0	-
AWX	31702	TW	--	89,645	-	Weld
		TT	60,270	81,891	30.0	-
AWZ	11479	TW	--	83,689	-	Plate
		TT	63,779	82,939	29.0	-
AXE	61919	TW	--	87,500	-	Weld
		TT	58,839	79,947	32.0	-
AXQ	61939	TW	--	81,671	-	Weld
		TT	57,142	76,190	34.0	-
AXR	21740	TW	--	82,596	-	Plate
		TT	60,000	81,095	28.0	-
AYA	61922	TW	--	86,968	-	Plate
		TT	61,942	82,415	30.0	-
AYB	72035	TW	--	86,660	-	Plate
		TT	60,547	81,917	30.0	-

HEAT SYMBOL	HEAT NUMBER	WALL SIZE	YIELD POINT lbs/sq/in	TENSILE STR. lbs/sq/in	ELONG. % in 2"	LOCATION OF FRACTURE
AYC	41738	TW	--	81,697	-	Weld
		TT	55,790	80,000	30.0	-
AYD	61918	TW	--	75,561	-	Weld
		TT	62,534	84,848	28.0	-
AYK	21742	TW	--	87,362	-	Plate
		TT	57,452	80,758	32.0	-
AYS	11541	TW	--	82,336	-	Plate
		TT	54,768	75,476	33.0	-
AYT	72059	TW	--	81,671	-	Weld
		TT	56,951	77,807	31.0	-
AYU	31736	TW	--	87,297	-	Plate
		TT	63,611	90,835	28.0	-
AYZ	41758	TW	--	84,210	-	Weld
		TT	64,750	86,422	31.0	-
AZA	81670	TW	--	87,967	-	Plate
		TT	59,416	82,758	25.0	-
AZC	81660	TW	--	86,898	-	Plate
		TT	55,497	77,225	32.0	-
AZD	41756	TW	--	85,405	-	Weld
		TT	58,445	83,914	28.0	-
AZE	91486	TW	--	87,710	-	Plate
		TT	60,762	82,288	30.0	-
AZF	72060	TW	--	84,254	-	Plate
		TT	55,795	74,932	32.0	-
AZG	21743	TW	--	81,216	-	Weld
		TT	62,041	82,198	30.0	-
AZH	41774	TW	--	90,476	-	Plate
		TT	63,215	83,106	30.0	-
AZI	11553	TW	--	85,175	-	Weld
		TT	59,250	79,892	31.0	-
AZJ	72086	TW	--	88,980	-	Weld
		TT	64,041	84,073	29.0	-
AZX	72071	TW	--	87,123	-	Plate
		TT	59,890	81,593	24.0	-
BAA	70095	TW	--	86,178	-	Plate
		TT	60,215	80,376	29.0	-

HEAT SYMBOL	HEAT NUMBER	TYPE TEST	YIELD POINT lbs/sq/in	TENSILE STR. lbs/sq/in	ELONG. % in 2"	LOCATION OF FRACTURE
BAB	52948	TW	--	84,905	-	Weld
		TT	64,921	83,769	26.0	-
BAC	70093	TW	--	88,533	-	Weld
		TT	60,309	82,216	28.0	-
BAD	52947	TW	--	91,364	-	Plate
		TT	58,157	81,052	29.0	-
BAP	31765	TW	--	82,479	-	Plate
		TT	54,301	73,655	33.0	-
BAS	21760	TW	--	83,471	-	Weld
		TT	59,668	77,624	26.0	-
BAY	11569	TW	--	84,759	-	Plate
		TT	61,702	86,170	28.0	-
BBC	61965	TW	--	84,594	-	Weld
		TT	58,713	82,841	29.0	-
BBH	41801	TW	--	88,739	-	Plate
		TT	61,066	83,466	28.0	-
BBJ	91535	TW	--	84,718	-	Plate
		TT	61,333	82,400	29.0	-
BBM	71882	TW	--	83,557	-	Weld
		TT	64,032	80,653	32.0	-
BBN	91536	TW	--	82,841	-	Weld
		TT	61,578	81,052	31.0	-
BBO	41802	TW	--	85,286	-	Plate
		TT	61,141	82,250	30.0	-
BBP	71991	TW	--	81,550	-	Plate
		TT	55,764	75,871	30.0	-
BBQ	31783	TW	--	85,294	-	Plate
		TT	55,882	81,016	30.0	-
BBU	41827	TW	--	86,991	-	Plate
		TT	63,072	80,323	25.0	-
BBY	81701	TW	--	80,494	-	Weld
		TT	57,692	78,571	30.0	-
BBZ	91532	TW	--	83,333	-	Plate
		TT	59,065	81,083	30.0	-

HEAT SYMBOL	HEAT NUMBER	TYPE TEST	YIELD POINT lbs/sq/in	TENSILE STR. lbs/sq/in	ELONG. % in 2"	LOCATION OF FRACTURE
BCA	11576	TW	--	86,956	-	Plate
		TT	66,666	81,029	30.0	-
BCB	31775	TW	--	82,933	-	Plate
		TT	64,379	82,321	30.0	-
BCC	81699	TW	--	84,196	-	Plate
		TT	56,873	78,975	30.0	-
BCD	81592	TW	--	87,771	-	Plate
		TT	65,405	85,135	27.0	-
BCE	31774	TW	--	86,027	-	Plate
		TT	60,055	81,542	30.0	-
BCF	21786	TW	--	84,972	-	Plate
		TT	58,904	84,657	27.0	-
BDD	21758	TW	--	85,215	-	Weld
		TT	60,589	80,965	26.0	-
KME	70188	TW	--	89,545	-	Plate
		TT	61,038	83,806	30.0	-
KMF	23311	TW	--	92,572	-	Plate
		TT	72,797	88,082	24.0	-
KMF	23311	TW	--	90,245	-	Plate
		TT	60,677	89,843	30.0	-
KMK	43174	TW	--	86,216	-	Plate
		TT	59,466	80,000	30.0	-
KML	62613	TW	--	86,702	-	Weld
		TT	60,668	84,061	31.0	-
KMN	23312	TW	--	85,945	-	Weld
		TT	61,111	81,481	30.0	-
KMO	70192	TW	--	90,190	-	Plate
		TT	65,425	86,170	29.0	-
KMP	70191	TW	--	86,807	-	Weld
		TT	60,206	80,878	31.0	-
KMQ	53017	TW	--	80,687	-	Plate
		TT	56,417	78,342	30.0	-
KMR	23303	TW	--	88,767	-	Plate
		TT	60,800	82,133	30.0	-

HEAT SYMBOL	HEAT NUMBER	TYPE TEST	YIELD POINT lbs/sq/in	TENSILE STR. lbs/sq/in	ELONG. % in 2"	LOCATION OF FRACTURE
KMS	43166	TW TT	-- 66,321	89,572 83,678	- 23.0*	Plate (*Broke near gage mark.)
KNF	13192	TW TT	-- 55,216	81,770 80,152	- 29.0	Weld -
KNG	70218	TW TT	-- 55,801	87,988 86,740	- 29.0	Plate -
KNH	53044	TW TT	-- 61,325	86,376 87,016	- 29.0	Plate -
KNI	70217	TW TT	-- 59,139	82,655 83,064	- 30.0	Weld -
KNJ	62653	TW TT	-- 64,190	95,238 93,103	- 30.0	Plate -
KNK	62636	TW TT	-- 61,455	91,644 92,183	- 27.0	Weld -
KNO	70207	TW TT	-- 57,534	98,439 80,821	- 30.0	Plate -
KNR	23327	TW TT	-- 56,315	85,378 81,578	- 33.0	Weld -
KNT	13191	TW TT	-- 58,981	86,898 83,378	- 30.0	Plate -
KNU	52948	TW TT	-- 57,600	87,837 80,000	- 30.0	Plate -
KNV	70093	TW TT	-- 56,010	85,479 82,513	- 32.0	Plate -
KNW	13200	TW TT	-- 59,836	85,635 82,513	- 28.0	Plate -
KNX	62637	TW TT	-- 58,485	84,840 80,939	- 31.0	Weld -

The results of the chemical analyses and tensile tests meet with the requirements of your specifications, dated June 21, 1948, issued to cover the manufacture of this pipe.

With regard to the transverse tensile tests made on the pipe with the weld in the middle of the specimen, in some cases the location of the fracture is recorded as being in the weld. The weld re-inforcement metal is not removed from the specimen for this test; therefore, these breaks recorded as in the weld are in reality in the weld zone at the edge of the weld metal. The most critical areas of this pipe appears to be in the plate metal about 1/2" to 3/4" either side of the longitudinal weld. If it were practical to stress relieve the metal at these locations after inside welding, and before expanding the pipe, the physical properties of the metal might be considerably improved.

INTERNAL HYDRAULIC EXPANSION OPERATION:

The expansion of this pipe from the as-rolled and welded diameter to the specified finished pipe diameter is a very critical operation. This is especially true relative to the metal in and adjacent to the weld zone. The most critical areas appear to be in the repaired places in the longitudinal weld, and usually at the end repairs. In some instances, these critical areas are not sufficiently strong or ductile to withstand the strain of the expanding stress, and they rupture under the internal expanding pressure or test pressure conditions. In most cases, the rupture indicates a defect, or weak structure in the weld section, which appears to be the starting point of the break.

It is very seldom that a break starts in the plate, and in such cases there have been nicks or scratches in the plate to reduce its effective thickness, thereby reducing its strength.

The ratio of failures to the total number of lengths of pipe expanded in the production of pipe for this order is as follows:

Total Number Expanded - - - - - - - - -	3259 pieces
Number of Failures - - - - - - - - - -	29 pieces
Percentage of Failures - - - - - - - -	0.88 percent

The ruptured portion of the pipe is in most cases cut off, and the balance of the section is used to make up jointers, All jointers are subjected to the expanding and test conditions after the girth weld has been completed and chipped flush on the outside.

HYDROSTATIC PRESSURE TEST:

Each length of pipe was subjected to an internal hydrostatic pressure test in the equipment utilized for expanding the pipe to the finished diameter. At the completion of the expanding operation, the pressure inside the pipe was lowered to the specified test pressure of 1,170 lbs per square inch, and maintained for at least ten seconds while the retaining dies were open. At this time, the hammer test was applied to each length of pipe at each end near the weld while the pipe was subjected to the full test pressure.

If the pipe withstood the expanding and test pressures satisfactorily, the pressure was further reduced to about 400 to 500 lbs per square inch, and an inspector walked along the pipe to examine the weld for pinhole or sweat leaks. All lengths considered to be satisfactory under test conditions were passed for end finishing and final inspection.

END FINISH OF PIPE:

Each end of each length of pipe was beveled to an angle of 30 degrees to the vertical axis of the pipe, and finished with a 1/16" vertical face, plus or minus 1/32".

The inside weld re-inforcement metal was chipped flush with the inside surface of the pipe for a distance of approximately 6 inches from each end.

INSPECTION:

A careful supervision of all shop inspection and hydrostatic pressure testing was maintained during the operation of the plant. A general observance of all plant proceedings and operations was also maintained while the pipe was being produced for this order. Particular attention was given the weld procedure, & any changes or developments made by the shop to improve their methods of satisfactorily completing this vitally important part of the fabrication of the pipe.

Each length of finished pipe was carefully inspected for manufacturing, steel or surface defects. Inspectors passed through the inside of each piece of pipe for its entire length in making their final inspection. Especial attention was given to the examination of the longitudinal welds, both inside and outside for defects characteristic of the "Unionmelt" type of fusion weld. The inside and outside surfaces of each length was thoroughly examined to insure freedom from seams, scabs, pits, or other steel defects which might have been present in the steel at the time the plate was rolled.

The ends of the pipe were carefully examined for satisfactory bevel and finish. The thickness of the wall of the pipe was checked with "No-go" gauges to be certain that all sections were in excess of the minimum tolerance permitted by the specifications. The ends of the pipe were also examined for evidence of of laminations in the plate which would cause trouble in the field, and impair the strength or service of the pipe.

The squareness of the ends was checked at frequent intervals to be certain that the ends of the pipe were finished at 90 degrees to the longitudinal axis of the pipe, and to insure true alignment of the sections in the field for welding.

The O.D. of the pipe was checked by measurement with an O.D. tape at very frequent intervals to be certain that the size of the pipe was maintained within satisfactory limits for mating and field assembly. The O.D. of the pipe covered by this report was held within the limits of the specifications of:

30-3/32" Maximum O.D.
29-31/32" Minimum O.D.

The use of a ring gauge in checking the size and roundness of the ends has proven impractical, since the ends of the pipe are about 1/4" to 3/8" out of round. Pipe of this wall thickness does not retain the shape of the bore of the retaining die of the expander unit. The ovate condition of the ends is not excessive, and the use of an internal line-up clamp facilitates the ease and speed of assembly, as it rounds out the matching ends of the pipe for tacking or stringer bead welding in field alignment.

LENGTH RANGE:

The length range of the pipe supplied on this order varies as follows:

Maximum Length - - - - - - - - - - - - - - 31.28 feet
Minimum Length - - - - - - - - - - - - - - 28.06 feet
Average Length - - - - - - - - - - - - - - 31.037 feet

REJECTIONS:

As a result of our inspection, a number of serious defects were discovered in some lengths of pipe offered for application to your order. These defective pieces were permanently rejected, and not permitted to be repaired for shipment. A list of these lengths, showing the cause for rejection, follows:

No. Pieces	Cause of Rejection
3	Excessive repairs to longitudinal weld.
5	Unsatisfactory repairs.
3	Numerous deep pits and scabs.
2	Poor repairs to inside weld.
3	Offset longitudinal seam.
2	Damaged and scratched, outside surface.
1	Large O.D.
19	Total

In addition to the above permanent rejections, a number of lengths of pipe were found with minor defects, which were temporarily rejected. These defects were repaired to our satisfaction, the lengths re-tested as required, and accepted for application to this order on subsequent inspection. A list of these temporary rejections, and the method of repair, follows:

Number	Cause of Rejection and Method of Repair
2	Dented - balled or pressed out.
5	Scabs, inside surface - ground out.
7	Scabs, inside surface - chipped and welded.
11	Scabs, outside surface - ground out.
4	Scabs, outside surface - chipped and welded.
3	Pits, inside surface - chipped and welded.
6	Pits, outside surface - chipped and welded.
9	Undercut welds, inside weld - chipped and welded.
12	Undercut welds, outside weld - chipped and welded.
21	Pinholes in weld - chipped and welded.
17	Crack in weld, inside weld - chipped and welded.
9	Cracks in weld, inside weld - ends cut off.
7	Cracks in weld, outside weld - chipped and welded.
16	Damaged ends - ends cut off.
47	Unsatisfactory bevel - re-beveled.
22	Offset longitudinal seam at ends - cut off.
19	Unsatisfactory repairs to weld - end cut off.
4	Off seam welds - chipped flush and re-welded.
21	Thin wall from grinding - ends cut off.
2	Small O.D. - re-expanded.
244	Total

SHIPMENT:

Each length of pipe accepted for application to this order was stamped with our acceptance mark "ME" near the longitudinal weld on the outside surface at one end. A shipment serial number was assigned to each piece, and painted on the inner surface of each end, together with the length, the O.D., and the wall thickness. The wall thickness was indicated by the number 12 (12/32"). The pipe was shipped free of coating of any kind, and the beveled ends were not covered.

Shipment of the pipe was made by motor truck from the Maywood, California plant of the manufacturer to your coating and wrapping plant in Montebello, California, as follows:

SUMMARY OF SHIPMENTS
Purchase Order 7R-66858
Consolidated Western Steel Corporation

Date of Shipment	Shipment Number	Trucks	Pieces	Footage
March 11	1- 19	19	114	3,544.67
March 12	20- 33	14	84	2,609.00
March 14	34- 65	32	192	5,962.40
March 15	66- 83	18	108	3,347.21
March 16	84-153	70	420	13,045.46
March 18	154-218	65	390	12,066.83
March 21	219-231	13	78	2,409.78
March 22	232-237	6	36	1,121.27
March 23	238-242	5	30	927.87
March 24	243	1	6	185.04
March 25	244	1	6	186.77
March 30	245	1	6	185.93
March 31	246	1	4	120.35
April 7	247-258	12	72	2,236.84
April 8	259-295	37	222	6,905.29
April 11	296-299	4	24	746.33
April 12	300-306	7	42	1,302.93
April 13	307-375	69	414	12,879.69
April 14	376-394	19	114	3,543.24
April 15	395-403	9	54	1,681.71
April 18	404-408	5	20	621.02
April 19	409-469	61	363	11,253.69
April 20	470-539	70	420	13,024.87
April 21	540	1	2	62.29
April 22	541	1	1	31.15
	Totals	541	3222	100,001.63

CONCLUSION:

The 30" O.D. x 3/8" wall "Unionmelt" Electric Welded Steel Line Pipe covered by this report has been carefully inspected by us, and having found it to be in accordance with your order, and your specifications (6-21-48), as noted herein, it was accepted for shipment subject to your shipping instructions.

Yours very truly,

MOODY ENGINEERING CO.

W. H. Webb

jcv

SanBrunoGT-LineRuptureInvestigation_DR_CPUC_069-Q01Atch03.pdf

Gas System Design
028.6 x 522 x 463.1

History of Pipe Purchases

December 12, 1962

DIVISION GAS SUPERINTENDENTS:

In following the requirements of General Order 112, it sometimes becomes necessary to identify unknown pipe material.

In order to give some guidance, the attached tabulation and notes are prepared for your use. Any doubt as to the identity of unknown pipe materials should be resolved in favor of lower strength materials or should be referred to this office for more positive identification.

R. D. SMITH

WERoss:ha
Attach.
cc:EFSibley
KBAnderson
MHChandler

Early 1920's

All pipe purchased during this period was either lap weld or butt weld pipe. The Longitudinal Joint Factor equals .80 in lap weld and .60 in butt weld pipe. The yield strength of this pipe may be taken as 28,000 psi.

Means of identifying this pipe are difficult. They both resemble seamless pipe. However, close examination of lap weld pipe should show continuous tool markings along the longitudinal seam weld. This marking was made by a wheel pressing against the pipe in order to join the skelp together when forming.

Butt weld pipe shows no characteristic markings. The pipe is formed by drawing the heated skelp through a "welding bell" in a continuous motion. The edges of the skelp are fused together as it passes through the welding bell. The only positive way to identify butt welded pipe from seamless is to bend the pipe to expose any longitudinal joint.

In exposed pipe, it is sometimes possible to identify butt welded pipe by a thin line of corrosion which will usually appear along the longitudinal butt joint first before appearing elsewhere on the pipe. The butt weld pipe was purchased in sizes 3/4" through 4" and the lap weld in sizes of 6" and larger.

Late 1920's

In the late 1920's, say 1927 to 1929, single submerged arc welded pipe was manufactured and was bought extensively for the system. It was especially bought for large transmission lines and facilitated the transport of natural gas into metropolitan areas.

Transmission mains such as Mains 100, 101, 105, 107, Stanpac, 109, 132 contain single submerged arc welded pipe. If no seam weld can be found, the pipe is seamless. The 30" section of Main 132 is double submerged arc welded. The single submerged arc welded pipe has a longitudinal joint factor of .80 and a minimum specified yield of 33,000 psi.

Smaller diameter pipe was still purchased as lap or butt welded pipe.

The point to remember is that any pipe purchased during the 20's and 30's, up to 1940, that has a weld on the longitudinal seam is to be considered as single submerged arc welded pipe.

1930's

Beginning about 1930, seamless pipe was purchased in various sizes. However, some butt welded 3/4" through 4" pipe was also purchased during this period. Seamless was mainly purchased in sizes of 3/4" up to 16". Most of the pipe purchased during this period was seamless. Single submerged arc welded and seamless pipe was purchased in the larger sizes. The seamless pipe has a joint factor of 1.0 and minimum yields of 30,000 for grade "A" and 35,000 for grade "B". Any pipe having a weld on it purchased during this period is single submerged arc welded pipe and could have yield strengths from 33,000 up to 39,000 psi.

1940 - 1947

About 1947, double submerged expanded arc welded pipe over 18" in diameter was developed and we started to use it in limited quantities. This pipe is readily identified with a weld on the inside as well as on the outside. This pipe has a joint factor of 1 and yields up to 52,000 psi.

Resistance welded pipe with a joint efficiency of 1 was also used largely in 12", 16" and 18" diameter.

In any of the sizes, if a weld is apparent (adding weld metal), we should assume it is single submerged arc weld pipe since substantial quantities were purchased during this period. Any questions as to proper identity should be referred to this office.

Except for 1940-41 period, most of the pipe purchased in the smaller sizes is likely to be butt welded, as seamless became unobtainable during the war years.

Other pipe purchased was as before, butt weld, single submerged arc weld and seamless. Generally in sizes where it was available, seamless pipe was purchased over lap or butt weld.

In about 1941, we started to purchase electric resistance weld pipe (where no metal is added to make the longitudinal joint as opposed to submerged arc welded pipe where metal is added). This pipe was available in 4" sizes up to 18" and had joint efficiencies of 1 and yields up to 39,000 psi. However, extensive use was not made of the larger sizes until after 1945.

<u>1948 to Date</u>

1948 is the date which ended the purchase of single submerged arc welded pipe. All pipe purchased from this period is about as follows:

3/4" through 4" - butt weld pipe. Yield at 28,000 psi; longitudinal joint factor equals .60. (Relatively small quantities of butt weld were purchased in 4" size as compared to the quantities of electric resistance weld pipe.)

4" on up to and including 18" can be either electric resistance weld or seamless with joint efficiencies of 1.0 and yields from 35,000 psi up to 52,000 psi.

20" on up to 36" - double submerged arc weld, expanded type pipe or seamless up to 24" all with joint factors of 1.0 and yields of up to 52,000 psi.

WERoss:ha

NTSB_021-001, pages 33-35

Pacific Gas and Electric Company

62-4060(Rev 3/08)
Gas T&D
Utility Standard
S4110

Leak Survey, Repair, Inspection and Gas Quarterly Incident Report (Form "A")

INITIAL LEAK DATA

Leak Number (YR - Series - SFX): 09 - 30255 - 1
USA Ticket #:
Valid Date:
Date Reported: 11 - 16 - 2009
Time Reported: 14:30 (24 hr Time)
PCC Number: 11778
Response Date: 11 - 16 - 2009
Response Time: 15:50 (24 hr Time)
Paved Wall To Wall: ○ Yes ● No
Moratorium Expire Date:
SAP Recheck Order #:
SAP Repair Order #: 41228227
Address: 1236 Mission Rd
City: *South San Francisc*
Description of Reading Location: *Over main between 1236 & 1230 Mission Rd*

REPORTED BY: ● Call In ○ Mobile Survey ○ Foot Survey ○ Other Employee [b]

SURFACE OVER LEAK: ○ Concrete ○ Unsurfaced ● Asphalt ○ Other

READINGS

PPM	%LEL	%GAS	Inst (a)	Grade (b)	2% or Less (c) or Suspect Copper (s)	Down Grade Via Vent (Yes/No)	DATE	TIME (24 hr Time)	OPERATOR LAN ID	UNIT SERIAL NUMBER (Last 4 Digits)	LOCATION REMARKS (Not needed, if the same as previous)
0	0	0	V	2+	H		11 - 16 - 2009	14:30	J1CA		
0	0	2.5	C	2+			11 - 16 - 2009	16:45	TAGN	1122	Waiting for sample

PRIORITY 2 (2+) REQUESTED REPAIR DATE (Only needed if less than 90 days) 02 - 14 - 2010 (Repair required within 90 calendar days)

a Instrument Type: Enter H for Hydrogen Flame Ionization, C for Combustible Gas Indicator, or V for Visual.

b Enter Grade or enter 2+ for Priority Grade 2. Enter 0 (zero) if no leak is found. **If a competent first responder from other than M&C determines that the leak is non-hazardous, enter as a Grade 2+. The % Gas will be zero, the instrument will be "V" and the 2% reason code will be "H". Use the next line below to upgrade or downgrade the leak.**

c 2% or less reason code is required if leak is graded as 1, 2+, or 2:
A - Wall to wall and traveling, B - Next to, at or under building, C - Odor and next to public gathering location, D - In foreign structure, E - Audible and/or visible,
F - On facility in extremely poor condition, G - At least second customer call out, H - Leak is reported as 0% Gas Visual,
J - Leak within scope of work by others, N - Grade 3 downgrade is not allowed, S - Leak is suspected to be on a copper service.

MAPPING DATA

Leak Location Map Wall Map: 7 Plat: A14
Federal Land ○ Yes ● No
Recorded Location Map Wall Map: 7 Plat: A14 Block: 026

SYSTEM PRESSURE (MAOP)
R'qrd for Grade 1, 2 ,2+ Downgrades to Grade 0
○ LP (<=10.5"wc) ○ SHP (<=25psig) ○ HP (<=60psig) ● TP (>60psig)

Normally Cathodically Protected ● Yes ○ No
CPA: 2706
MOP (TP only): 400
NOP (All systems): 375
Year Inst: 1948
TP Line #: 132
Mile Post: 42 99
Original Job # (TP only): *GM98015*

For Leaks On Services: Main Connected to Service ○ Cast Iron ○ Plastic ● Steel
Installation Year of Main: 1948

PIPE DATA

LEAK SOURCE

- ○ Bell Joint
- ○ Body of Pipe
- ○ Clamp
- ○ Drip
- ○ Encapsulation
- ○ Fitting
- ○ Fusion Joint
- ● Girth Weld
- ○ Logitudinal Weld
- ○ Mechanical Joint
- ○ Plastic Tee Cap
- ○ Other Welds
- ○ Regulator
- ○ Riser
- ○ Tap Connection
- ○ SS Fitting in Plastic System
- ○ Valve
- ○ Unknown
- ○ Other________

LEAK CAUSE

- ○ Atmospheric Corrosion
- ○ Cast Iron Fracture
- ○ Construction Defect
- ○ Damage by Electrical Facility
- ○ Damage by Heavy Rains/Flood
- ○ Damage by Earth Movement
- ○ Damage by 3rd Party
- ○ External Corrosion
- ○ Internal Corrosion
- ○ Stress Corrosion Cracking
- ○ Material Failure
- ○ Plastic Crack Failure
- ○ Plastic Embrittlement
- ○ Vandalism
- ○ Structure Fire
- ○ Vehicle
- ○ Incorrect Operation
- ○ Equipment Malfunction
- ○ Previously Damaged
- ○ Lightening
- ● Weld Failure
- ○ Unknown
- ○ Other________

LINE MATERIAL

- ○ Copper
- ● Steel/Wrought Iron
- ○ Cast/Ductile Iron
- ○ Aldyl A (Tan or Gray)
- ○ PE2406 (Yellow or Orange)
- ○ PE2406/2708 (Yellow)
- ○ PE3408 (Black)
- ○ PE4710 (Black)
- ○ Other Plastic________
- ○ Other________

LINE USE:

- ○ Distribution Main
- ○ Gathering
- ○ Single Service
- ○ Branch Service
- ● Transmission
- ○ Service

Line Size: 30

Line Above Ground ○ Yes ● No
Internal Liner ○ Yes ● No
Line Inserted ○ Yes ● No
High Consequence Area (Transmission Only) ● Yes ○ No
EFV Installed ○ Yes ○ No
EFV Operated ○ Yes ○ No

Incident Report # ________ **Material Problem Report #** ________

Previously Printed: 01 February 2010

Date Printed: 30 September 2010

REPAIR DATA (1)

Repair Location **Main**

● Yes ○ No Pipeline Engineer Consulted Repair Remarks **Ins'd 30 in sleeve, 625 wt x60**

Repaired By: ***Archer, Vern*** Repair Date **02 - 02 - 2010** Repair Time **06:00** Pipe-to-Soil (mV) **1300** (External Corrosion Only)

Repair Code:

○ Bell Joint Seal ○ Mechanical Repair Fitting ○ Replace Valve < 2 inch ○ Soap and/or Tape ○ Type A Sleeve
○ Bell Joint Clamp ○ Replace Dist Main < 100 ft ○ Replace Valve > or = 2 inch ○ Tee Fused over Defect ● Type B Sleeve
○ CI Repair Sleeve ○ Replace Dist Main > or = 100 ○ Replace Plastic Tee Cap ○ Fill Weld ○ Grinding
○ BJ Permabond ○ Deactivated Entire Service ○ Tighten Cap/Bolt ○ Patch Weld ○ Clockspring
○ Deactivate TP Main ○ Deactivated Partial Service ○ Aldyl Electrofusion Overcap ○ Direct Deposition Weld ○ Aquawrap
○ Replace TP Main ○ Replace Entire Service ○ Skinner Clamp ○ Welded Sleeve/Can ○ Other ______
○ Deactivate Dist Main (1 foot or more) ○ Replace Partial Service ○ SS Clamp w/Anode ○ Welded Save-A-Valve

SIZED INSTALLED: [.] REPLACED WITH: ○ STEEL ○ PE2406/2708 (Yellow) ○ PE100 ☐ **Copper Entirely Replaced**
○ PE4710 (Black) ○ TR418

Field Reviewed By *McCorkle, Dennis* **Date** 02 - 03 - 2010 **Post Repair Check** ○ Yes ● No **Date** ______
Mapping Reviewed By *Armas, Fernando* **Date** 02 - 04 - 2010 **Posting Required** ○ Yes ● No

GENERAL INSPECTION DATA

DATE: 02 - 02 - 2010 Inspected by LAN ID: **(JKL5) Lusk, Joe** Line Use: ○ Distribution Main ○ Service ○ Single Service ○ Gathering ● Transmission ○ Branch Service

LINE MATERIAL
● Steel/Wrought Iron
○ Cast/Ductile Iron
○ Copper
○ Aldyl-A (Tan or Grey)
○ PE2406 (Yellow or Orannge)
○ PE2406/2708 (Yellow)
○ PE3408 (Black)
○ PE4710 (Black)

SOIL TYPE
● Clay
○ Rock
○ Sand
○ Loam
○ Wet
○ Exposed Facility
○ Other ______

For TP Only SOIL RESIST (Ohm-cm)
○ 0 - 1,000
○ 1,000 - 2,000
○ 2,000 - 5,000
● 5,000 - 10,000
○ > 10,000

SURFACE OVER PIPE
○ Concrete
● Asphalt
○ Soil (Previously Unsurfaced)
○ Exposed
○ Other ______

FEET EXPOSED 8
COVER ON PIPE (Inches) 39
INTERNAL LINER ○ Yes ● No
PAVED WALL TO WALL ○ Yes ● No
NEAR PUBLIC ASSEMBLY ○ Yes ● No
Line Size 30.00

METALLIC PIPE CONDITION

COATING TYPE ○ Bare/None ○ Paint ○ Single Wrap ○ Somastic ● Tar ○ Epoxy ○ Tape ○ Double Wrap ○ Plastic Coated ○ Other ______

COATING CONDITION ○ Excellent ○ Fair ● Good ○ Poor

CIRCUMFERENTIAL WELD CONDITION (Visual) (See Numbered Document D-20 or D-22)

LONG SEAM ● DSAW ○ ERW ○ AO Smith ○ Spiral ○ SSAW ○ SMLS ○ LAP ○ Flash

EXTERNAL INSPECTION

RUST ● None ○ Light ○ Heavy WALL THICKNESS (Req for TP) (Inches) 0.375 WALL THICKNESS MEASURED ● Yes ○ No
PITTING ● None ○ Light ○ Heavy MAX. PIT DEPTH (Req for TP) (Inches) 0 GRAPHITIZED (Cast Iron) ○ Yes ○ No
GOUGING ● None ○ Light ○ Heavy MAX GOUGE DEPTH (Req for TP) (Inches) 0

INTERNAL INSPECTION

RUST ○ None ○ Light ○ Heavy
PITTING ○ None ○ Light ○ Heavy MAX. PIT DEPTH (Req. for TP) (Inches) 0

PLASTIC PIPE CONDITION

PRINTLINE VISIBLE ○ Yes ○ No MANUFACTURE DATE ______
PIPE MANUFACTURER (LOCATED ON PIPE) ______ LOCATING WIRE ○ Good ○ Bad ○ None
GOUGING ○ Yes ○ No UNDER STRESS/BENT ○ Yes ○ No DISCOLORING TO GRAY ○ Yes ○ No CRACKING ○ Yes ○ No IN CONTACT WITH HARD OBJECTS ○ Yes ○ No
ESTIMATE GOUGE DEPTH ○ <10% ○ 10-50% ○ >50% VISUAL BEAD APPEARANCE (SEE NUMBERED DOCUMENT D-21) ○ Acceptable ○ Unacceptable TEE CAP CRACKING ○ Yes ○ No

GAS QUARTERLY INCIDENT REPORT

DAMAGING PARTY ______ ADDRESS ______ CITY ______
Damaging Party Working for PG&E ○ Yes ○ No Phone ( ) - Zip Code ______
INJURED Employees *0* Others *0* Damage $ ______ # Cust. Interrupted *0* # Cust. Hours 0 FIRE ○ Yes ○ No EXPLOSION ○ Yes ○ No
FATAL Employees *0* Others *0* Media ○ Yes ○ No Media Type ☐ TV ☐ Radio ☐ Newspaper Name/Channel: ______
DOT REPORTABLE (Fatality, In-patient Hospitalization, >= $50K Property Damage) ○ Yes ○ No CPUC REPORTABLE (Major News Media) ○ Yes ○ No

LOCATION SKETCH

REQUIRED for new or returned to service segments of main and/or service: ☐ ***On-Site Test*** ☐ ***Pre-Test*** TESTED AT ____ PSIG for ____ ◯ Hours ◯ Minutes **TEST in accordance with A-34** BY ____________ DATE ________ TEST QUALIFIES PIPE FOR _____ PSIG MAOP	(if any fittings are used, then text and/or sketch must show location) TYPE OF PLASTIC MATERIAL INSTALLED Manufacturer Name (Polypipe, US Poly, Performance, or KWH) ____________	MFG. DATE (mm/dd/yy) See Numbered Document A-93	WELDED BY *Archer, Vern* Date: 02-01-2010 WELDING INSPECTED PER PG&E NUMBERED DOCUMENT D-40 BY *Archer, Vern* Date: 02-01-2010 INSPECTOR

COMMENTS ____

Sketch is required for all repairs (or directions as to where to find the sketch is required, if sketch is located on another record).

Please Note: EMS Markers are to be installed for Deactivated Facilities and where plastic is found without wire. All EMS markers shall be clearly dimensioned.