McCHORD PIPELINE

A Subsidiary of U.S. Oil & Refining Co.

January 8, 2010

David D. Lykken
Pipeline Safety Director
Washington Utilities and Transportation Commission
1300 S. Evergreen Park Drive SW
PO Box 47250
Olympia, WA 98504-7250

Subject: Response to Integrity Management Field Inspection at 72nd/Waller Road

Dear Mr. Lykken,

This letter is in response to the integrity management field inspection at 72nd/Waller road (Docket PL-091410). These responses are a result of a WUTC letter dated December 11, 2009.

Item #1: Response to probable violation of not preparing a company qualified welding procedure
Statement: "Provide the commission a copy of the destructive testing results used to qualify the procedure used for performing field welds on August 5-11, 2009."

Response: Please see Attachment #1 for destructive test results used to qualify welding procedure 4900.1300.
To avoid future concerns regarding contractor supplied welding procedures, McChord Pipeline has generated an in-house procedure for future repair work. (A spare piece of 6" API 5L-X42 pipe from the field repair was used as a test coupon.) Please see Attachment #2 for the McChord Pipeline welding procedure specification, procedure qualification record, and welder performance specification.

Item #3: 49 CFR 195.250 Clearance between pipe and underground structures
Question: "Was the in-line inspection tool rescheduled to complete the inspection and establish a baseline for future monitoring the adequacy of your CP system including the new section of pipe placed over the water main?"

Response: The in-line inspection tool run was completed on August 19, 2009. After analyzing the data, there were no wall loss anomalies in the vicinity of 72nd/Waller.
A detailed close interval survey was conducted over the two pipelines in November 2009. (This was accomplished by drilling small holes in the pavement directly over the McChord pipeline and the Tacoma water main.) No stray current exists between the two systems, and McChord pipeline shows adequate cathodic protection. During initial backfilling operations in August, the MPL was covered in 12" of sand; the high resistivity of sand assists in reducing the chances of any stray current between the two systems. See Attachment #3 for the detailed report. Since there is no evidence of a cathodic protection problem, this area will be monitored using a close interval survey at the standard five year frequency.

Question: "Was there any indication of internal or external corrosion found on the pipe section removed?"

Response: There was no indication of internal or external corrosion on the removed pipe section or in the intersection area. Tie-in areas were ultrasonically examined for laminations and wall loss. The minimum wall thickness was 0.185" and the average wall thickness was 0.188"; this is acceptable for a nominal 0.188" wall pipe. There have been no indications of internal corrosion during the pipeline's life time. Jet fuel is often used in refineries to prevent corrosion in out-of-service equipment. The old pipe section was sandblasted and visually examined for external wall loss. No areas were noted. See Attachment #4 for supporting documentation.

Question: "At what frequency in the future will your pipeline be inspected with a smart pig tool?"

Response: Given that the pipeline has adequate cathodic protection and there is no evidence of internal corrosion, the smart pigging inspection interval will be set at five years per CFR 195.452 (j)(3). The next smart pigging inspection will be prior to December 2014.

McChord Pipeline takes pride in our Maintenance, and Integrity Management Planning and we take these potential violations and concerns very seriously. McChord Pipeline strives to keep an open relationship with the WUTC to improve pipeline safety and regulatory compliance. Please advise myself or Corey Herrick, Chief Engineer, if any further action is required on this item.

Sincerely,

Alan J. Cabodi
President – McChord Pipeline Company

CC (w/o att): RWS, JPW
CC: CGH
Attachment #1 = Procedure Qualification Record SMA-1-B-II-2G/5G (Destructive test results included)
Welding Procedure 4900.1310

Attachment #2 = Welding Procedure Specification – MPL-001
Procedure Qualification Record – SMAW-1 with lab results
Welder Performance Qualification – Jake Zourkos

Attachment #3 = CP Testing Report NW Corrosion Engineering

Attachment #4 = UT report for tie-in areas
Field Investigation Report for 72nd/Waller Road

ATTACHMENT #1

Pipe Welding Procedure

SMA-1-B-II-2G/5G

1.	Welding Process:	Manual Shielded Metal Arc
2.	Pipe Grades Qualified:	API 5L Grade X42 and Below
3.	Pipe Dia,/W.T. Qualified:	2 3/8" thru 12 3/4" O.D. ; 3/16" - 3/4" W.T.
4.	Weld Joint Design and Weld Pass Requirements:	Refer to Page 2
5.	Weld Parameters and Electrical Characteristics:	Refer to Page 3
6.	Filler Material:	AWS E6010-All Passes
7.	Welding Current & Polarity:	Direct Current/Reverse Polarity
8.	Production Weld Position:	Weld in Vertical-Fixed Position Weld in Horizontal-Fixed Position
9.	Direction of Welding:	Vertical Downhill for Horizontal Pipe-Fixed Position Horizontal for Vertical Pipe-Fixed Position
10.	Welding Technique:	Stringer or Weave
11.	Number of Welders:	1 Minimum
12.	Time Lapse Between Passes:	5 Min. Max. Between Root/Hot Pass; Remaining Passes Within 72 Hrs.
13.	Type of Line-Up Clamp:	External / Internal Except when clamp is impractical due to dimensional differences such as flange to pipe, etc.
14.	Removal of Line-Up Clamp:	After 50% of Root Pass Completed with External; after 100% with Internal Clamp
15.	Method of Weld Cleaning:	Power Brushing and Power Grinding
16.	Preheat Method:	Fuel Gas - Propane or Oxy-Acetylene
17.	Preheat Temp. Control:	Tempil Sticks or Contact Pyrometer
18.	Preheat Temperature:	Above 40° F. — None Required* 40° F. and Below — 150° F. Min. - 250° F. Max. *Pipe shall be preheated as necessary to assure all traces of moisture are removed prior to welding
19.	Interpass Temperature:	Above 40°F. — 40° F. Min. - 250° F. Max. 40°F. and Below — 100° F. Min. - 250° F. Max. When welding is interrupted, preheat pipe as above prior to finishing the weld. Note: it is recommended that when welding fitting to pipe or fitting to fitting, a preheat of 150° F. min.-250° F. max. be used.
20.	Postheat Treatment:	None Required
21.	Destructive Test Results:	Refer to Page 4

This procedure was prepared in accordance with and meets the requirements of API 1104, Eighteenth Edition, and DOT Part 192.

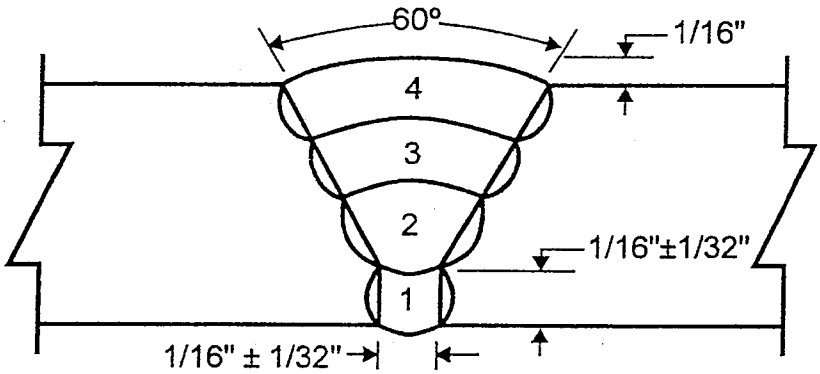
Rich Hahn — WNG Representative

2-28-97 — Date

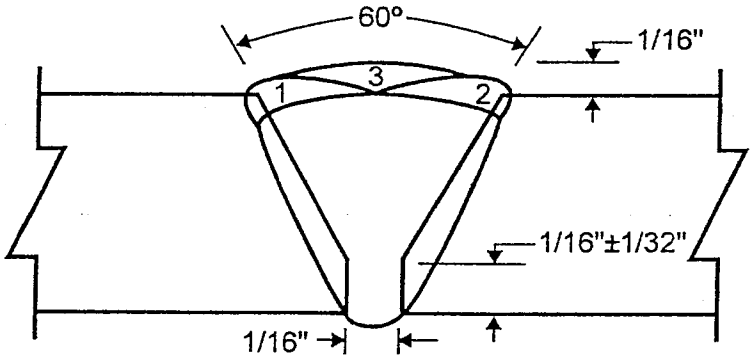
Pipe Welding Procedure

SMA-1-B-II-2G/5G

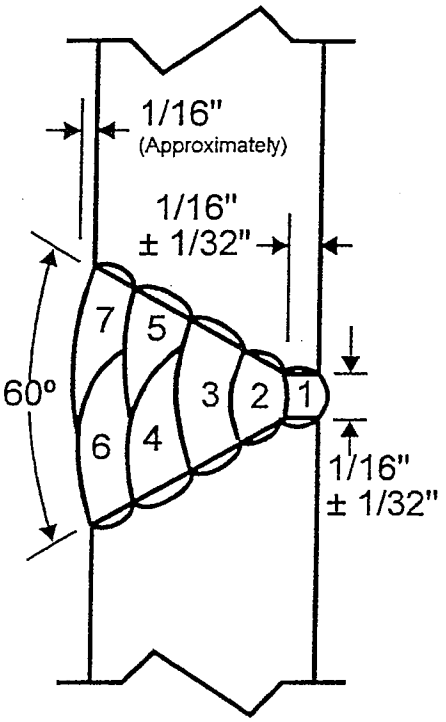
Weld Joint Designs



5G Position
Typical Weld Pass Sequence
(Minimum weld passes specified below; Additional passes as required for wall thickness variations.)



Optional three-beaded cap for wall thickness over 0.500" with WNG Welding Inspector approval.



2G Position
Typical Weld Pass Sequence
(Minimum weld passes specified below; Additional passes as required for wall thickness variations.)

Minimum Weld Pass Requirements for Pipe Wall Thicknesses - 3/16" thru 3/4"

Pipe Wall Thickness	Horizontal-Fixed Position	Vertical-Fixed Position
3/16"	3	3
1/4"	4	5
3/8"	5	7
1/2"	6	9
5/8"	7	11
3/4"	8	13

Pipe Welding Procedure

SMA-1-B-II-2G/5G

Welding Parameters and Electrical Characteristics

Horizontal- Fixed Position

Pass No.	Process	Filler Material		Welding Parameters (Electrical Characterisitics)		Travel Speed (Ipm)
		Size	Classification	Amperage Preferred Range* [Acceptable Measured Range]	Voltage Preferred Range* [Acceptable Measured Range]	
1	SMAW	5/32"	E6010	130-160* [90-200]	20-23* [16-30]	9-15
2	SMAW	5/32"	E6010	130-160* [90-200]	25-30* [16-30]	10-16
3	SMAW	3/16"	E6010	160-190* [110-225]	25-30* [18-30]	10-16
4	SMAW	3/16"	E6010	160-190* [110-225]	25-30* [18-30]	9-14
5 - Rem.	SMAW	3/16"	E6010	160-190* [110-225]	25-30* [18-30]	5-10

Vertical - Fixed Position

Pass No.	Process	Filler Material		Welding Parameters (Electrical Characterisitics)		Travel Speed (Ipm)
		Size	Classification	Amperage Preferred Range* [Acceptable Measured Range]	Voltage Preferred Range* [Acceptable Measured Range]	
1	SMAW	5/32"	E6010	130-160* [90-200]	22-23* [16-30]	9-15
2	SMAW	5/32"	E6010	130-160* [90-200]	25-30* [16-30]	10-16
3	SMAW	5/32"	E6010	130-160* [90-200]	25-30* [16-30]	10-16
4 - Rem.	SMAW	5/32"	E6010	130-160* [90-200]	25-30* [16-30]	9-14

NOTE: If necessary due to wall thickness changes or variations of the joint space, within the tolerance limits, a change from the above electrode size to <u>one</u> nominal size smaller or larger for each of the above passes is permissible. The approved welding parameters for optional electrode diameters (within the nominal size limits of the procedure) are shown below.

Electrode Diameter	Amperage Range	Voltage Range	Travel Speed (IPM)
3/32"	50-80* [30-100]	20-25* [16-30]	4-14
1/8"	90-120* [40-180]	20-25* [16-30]	5-15
5/32"	130-160* [90-200]	22-28* [18-35]	5-18
3/16"	160-200* [110-225]	25-30* [18-35]	5-18

Voltage is measured across the arc during procedure development. Add 1-3 volts to the above voltage depending on the length of welding cables if voltage is measured across the terminals of the welding machine.

[Acceptable Measured Ranges] may be determined with either a digital or analog ammeter or voltmeter.

WASHINGTON NATURAL GAS COMPANY

Pipe Welding Procedure

SMA-1-B-II-2G/5G

Test Pipe/Fitting Material and Test Conditions for Procedure Qualification

Ambient Test Temp.: 50° Weather Conditions: Cloudy Type of Machine: Power-Con

Test Pipe Material Grade: API 5L Grade X42

Test Pipe Dia. / W.T.: 8" .250 To:

Position of Test Weld Sample: 5G

Destructive Test Results per API 1104

Tensile Tests

Specimen No.	Width (Inches)	Thickness (Inches)	Area (Sq. In.)	Max. Load (Lbs.)	U.T.S. (P.S.I.)	Fracture Location
T-1	1.018	.2465	.250737	19,630	78226	Pipe
T-2	1.09	.2410	.26269	19630	74726	Pipe
T-3						
T-4						

Face Bend Tests

Specimen	Results
FB-1	No Defects Passed
FB-2	No Defects Passed
FB-3	
FB-4	

Root Bend Tests

Specimen	Results
RB-1	No Defects Passed
RB-2	No Defects Passed
RB-3	
RB-4	

Nick-Break Tests

Specimen	Results
NB-1	No Defects Passed
NB-2	No Defects Passed
NB-3	
NB-4	

Side Bend Tests

Specimen	Results	Specimen	Results
SB-1		SB-5	
SB-2		SB-6	
SB-3		SB-7	
SB-4		SB-8	

All of the above tests were conducted in accordance with the requirements of API 1104, Eighteenth Edition. The test results met the acceptance criteria of API 1104 and DOT Part 192.

Richard A. Hahe
WNG Representative

2-28-97
Date

Shielded Metal Arc Butt W. .ding
Pipe Diameters 2″ thru 12″/Pipe Grades X42 and Lower
Wall Thickness 3/16″ (0.188″) thru 3/4″ (0.750″)

4900.1310

OK Corey Herrick 8-3-09

Description

This pipe welding procedure is for butt welding Grade X42 and below pipe that is 2-3/8″ thru 12-3/4″ in diameter, and has a wall thickness of 3/16″ (0.188″) thru 3/4″ (0.750″).

Essential Variables

Welding Process:	**Manual Shielded Metal Arc**
Pipe Material:	**API 5L Grade X42 and below**
Wall Thickness[a]:	**3/16″ (0.188″) thru 3/4″ (0.750″) W.T.**
Weld Joint Design:	**V-bevel Butt**
Filler Metal:	**Group 1 (E6010 Preferred) – Root pass** **Group 1 (E6010 Preferred) – All other passes**
Weld Position:	**All orientations (vert. to horiz.), fixed positions only**
Direction of Welding:	**Vertical downhill for horizontal pipe-fixed position** **Horizontal for vertical pipe-fixed position**
Speed of Travel:	**See "Welding Parameters and Electrical Characteristics" (page 3 of procedure)**
Time Lapse Between Passes:	**5 minutes max. between root/hot pass;** **remaining passes within 72 hours.**
Preheat Temperature:	Above 40°F: **None Required*** 40°F and below: **150°F min. to 250°F max.** * Pipe shall be preheated as necessary to assure all traces of moisture are removed prior to welding.
Postheat Treatment:	**None Required**

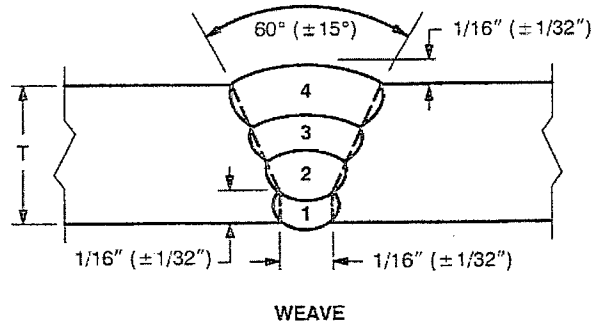
Other Variables

Pipe Diameter[a]:	**2-3/8″ thru 12-3/4″ O.D.**
Welding Technique:	**Stringer or Weave**
Weld Pass Requirements:	**See page 3 of procedure**
Welding Current & Polarity:	**Direct Current/Reverse Polarity**
Electrical Characteristics:	**See page 3 of procedure**
Number of Welders:	**1 minimum**

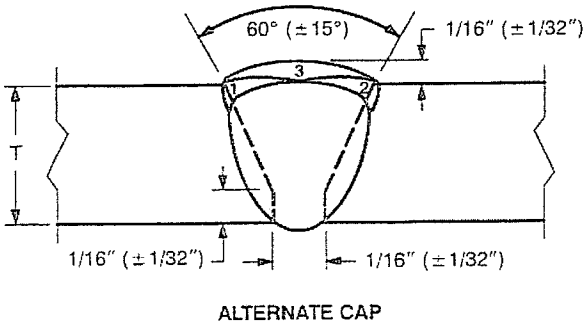
[a] *Note: Pipe diameter is not an essential variable for procedure, but is important for single procedure qualifications of a welder.*

Type of Lineup Clamp:	**External/Internal** Except when clamp is impractical due to dimensional differences such as flange to pipe, etc.
Removal of Lineup Clamp:	**After 50% of root pass completed with external clamp; after 100% with internal clamp.**
Method of Weld Cleaning:	**Power Brushing and Power Grinding**
Preheat Method:	**Fuel Gas – Propane or Oxyacetylene**
Preheat Temp. Control:	**Tempil Sticks or Contact Pyrometer**
Interpass Temperature:	**Above 40°F** / **40°F and below** **40°F min. to 250°F max.** / **100°F min. to 250°F max.** When welding is interrupted, preheat pipe as specified in the Essential Variables section of this procedure prior to finishing the weld. ***NOTE:*** It is recommended that when welding fitting to pipe or fitting to fitting, a preheat of 150°F min. to 250°F max. may be used.
Destructive Test Results:	**Available from the Standards Department upon request.**

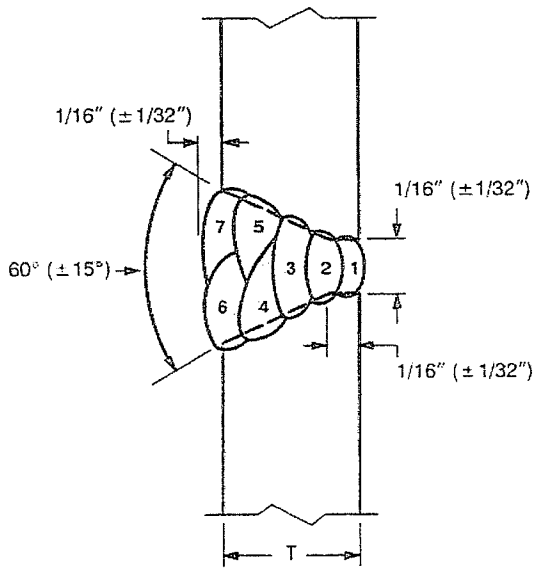
Weld Joint Designs



WEAVE



ALTERNATE CAP



STRINGER

NOTE: Dimensions are for example only.

Preferred Weld Pass Requirements for Pipe Wall Thickness 3/16″ (0.188″) thru 3/4″ (0.750″)

Pipe Wall Thickness	Horizontal–Fixed Position	Vertical–Fixed Position
3/16″	3	3
1/4″	4	5
3/8″	5	7
1/2″	6	9
3/16″	7	11
3/4″	8	13

Welding Parameters and Electrical Characteristics

Horizontal – Fixed Position

Pass No.	Process	Filler Material		Welding Parameters (Electrical Characteristics)		Travel Speed (IPM)
		Size	Classification	Amperage Preferred Range* [Acceptable Range]	Voltage Preferred Range* [Acceptable Range]	
1	SMAW	5/32″	E6010	130–160* [90–200]	22–28* [18–35]	5–18
2	SMAW	5/32″	E6010	130–160* [90–200]	22–28* [18–35]	5–18
3	SMAW	3/16″	E6010	160–200* [110–225]	25–30* [18–35]	5–18
4	SMAW	3/16″	E6010	160–200* [110–225]	25–30* [18–35]	5–18
5–Rem	SMAW	3/16″	E6010	160–200* [110–225]	25–30* [18–35]	5–18

Vertical – Fixed Position

Pass No.	Process	Filler Material		Welding Parameters (Electrical Characteristics)		Travel Speed (IPM)
		Size	Classification	Amperage Preferred Range* [Acceptable Range]	Voltage Preferred Range* [Acceptable Range]	
1	SMAW	5/32″	E6010	130–160* [90–200]	22–28* [18–35]	5–18
2	SMAW	5/32″	E6010	130–160* [90–200]	22–28* [18–35]	5–18
3	SMAW	5/32″	E6010	130–160* [90–200]	22–28* [18–35]	5–18
4–Rem	SMAW	5/32″	E6010	130–160* [90–200]	22–28* [18–35]	5–18

Approved Parameters for Optional Electrode Diameters
(Within the Nominal Size Limits of the Procedure)

NOTE: If necessary due to wall thickness changes or variations of the joint space, within the tolerance limits, a change from the above electrode size to one nominal size smaller or larger for each of the above passes is permissible. The approved welding parameters for optional electrode diameters (within the nominal size limits of the procedure) are shown below.

Electrode Diameter	Amperage Preferred Range* [Acceptable Range]	Voltage Preferred Range* [Acceptable Range]	Travel Speed (IPM)
3/32″	50–80* [30–100]	20–25* [16–30]	4–14
1/8″	90–120* [40–180]	22–28* [18–35]	5–15
5/32″	130–160* [90–200]	22–28* [16–30]	5–18
3/16″	160–200* [110–225]	25–30* [18–35]	5–18

Voltage is measured across the arc during procedure development. Add 1 to 3 volts to the above voltage depending on the length of welding cables if voltage is measured across the terminals of the welding machine.

Measured ranges may be determined with either a digital or analog ammeter or voltmeter.

This procedure was prepared in accordance with and meets the requirements of API 1104, Nineteenth Edition, and DOT Part 192.

ATTACHMENT #2

MPL - WELDING PROCEDURE SPECIFICATION - MPL-001

Reference PQR: SMAW-1

Process: SMAW

Material: Carbon steel piping with SMYS of 42,000 psi and lower

Range of pipe diameter: 2.375" to 12.75" OD | Wall thickness range: 0.188"-0.500"

Joint design: Single vee grove

Filler metal: E6010 (Lincoln Fleetweld 5P+ is preferable)

Electrical or flame characteristics: DC Reverse Polarity (DC+)

Position: All

Direction of welding: Downhill

No. of welders: 1 per weld joint

Time lapse between passes: Hot pass shall be completed within 5 minutes of root pass completion. Weld shall be completely capped prior to the end of a shift. Maximum IPT shall be 300°F.

Cleaning and/or grinding: Power wire brush and grinder as required.

Preheat/stress relief: 50°F preheat / No stress relief required. If temperature is below 50°F, pre-heat so that base material is warm to the hand (approximately 100°F).

Shielding gas and flow rate: N/A

Shielding flux: N/A

Speed of travel: See chart below

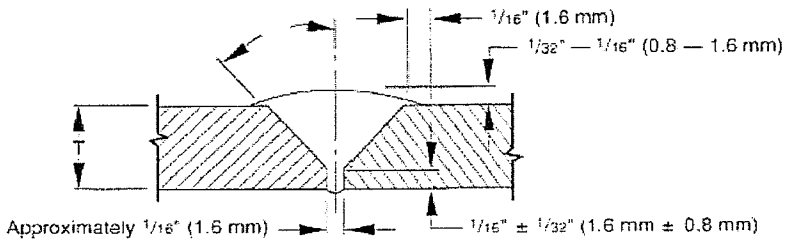
Line-up clamp usage: Internal and external clamps are acceptable.
50% of the root bead shall be completed prior to clamp removal.

Comments: See sketches below for typical pass sequence.

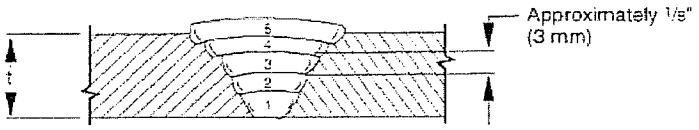
WPS Approved by: Corey Herrick

Applicable Code: API 1104

Applicable Regulation: CFR 195 and WAC 480-75



Standard V-Bevel Butt Joint



Sequence of Beads

Typical joint design. See field drawings for exact joint detail.

ELECTRODE SIZE AND NUMBER OF BEADS – ROD SIZE FOR ROOT AND HOT PASSES MAY VARY BETWEEN 1/8"Ø AND 5/32"Ø DEPENDING ON WALL THICKNESS AND FIT-UP

Bead Number	Electrode Size And Type	Voltage	Amperage And Polarity	Travel Speed
1	1/8" E6010	22-30 volts	80-100A DC+	4-11 ipm
2	5/32" E6010	24-32 volts	90-150A DC+	4-16 ipm
3	3/16" E6010	25-32 volts	120-190A DC+	5-18 ipm
4 and remaining fill passes	3/16" E6010	25-32 volts	120-190A DC+	5-18 ipm

MPL - PROCEDURE QUALIFICATION RECORD – SMAW-1

Date: 17-DEC-2009	PQR No.: SMAW-1
Welding Test Location: Pilchuck Shop, Lakewood, WA	
Mechanical Test Location: Anvil Lab, Bellingham, WA	Weld Position: Roll ☐ Fixed ☒ 6G Downhill
Welder: Jake Zourkos	Preheat: Ambient temperature
Welding time: 1 hour	Time of day: 9:20 am
Mean temperature: 50°F	Wind break used: Shop roof
Weather conditions: Cloudy and 80% humidity	
Voltage: 1/8" = 23-28V 5/32" = 24-30 V (Measured with Fluke Meter 79621016)	Amperage: 1/8" = 80-100A 5/32" = 90-120A (Measured with Fluke Meter 79621016)
Welding machine type: Miller Pipe Pro 304 (Portable)	Travel Speed: 1/8" = 7 ipm 5-32" = 4-10 ipm (measured with arc timer)
Filler metal: Lincoln Fleetweld 5P+ (E6010) Lot# 1/8" = 11919106	Lot# 5/32" = 11638605
Description of Pass Sequence: (1)Root Pass = 1/8"Ø E6010 (2) Hot Pass = 5/32"Ø E6010 (3) Cap Pass = 5/32"Ø E6010	
Pipe type and grade: API 5L X42 Heat # JN1879 (California Steel Industries)	
Wall thickness: 0.188" wall	Outside diameter: 6.625"

	1	2	3	4	5	6	7
Coupon stenciled	TENSILE-1	TENSILE-2					
Original specimen dimensions	1.001" X 0.188"	0.995" X 0.188"					
Original specimen area	0.1882 sq inches	0.1871 sq inches					
Maximum load	14600 lbs	14750 lbs					
Tensile strength	77577 psi	78835 psi					
Fracture location	BM	BM					

☒ Procedure ☒ Qualifying test ☒ Qualified

☐ Welder ☐ Line test ☐ Disqualified

Maximum tensile: 78835 psi Minimum tensile: 77577 psi Average tensile: 78206 psi

Remarks on tensile-strength tests:
1. Acceptable per API 1104
2. Acceptable per API 1104

Remarks on bend tests:
1. FB-1 = acceptable per API 1104
2. FB-2 = acceptable per API 1104
3. RB-1 = acceptable per API 1104
4. RB-2 = acceptable per API 1104

Remarks on nick-break tests:
1. NB-1 = acceptable per API 1104
2. NB-2 = acceptable per API 1104

Test made at: Anvil Laboratory Date: 24-DEC-2009

Test Results Reviewed by: Corey Herrick | Applicable Code: API 1104

Signed for Acceptance by: Corey Herrick Date: 24-DEC-2009

ANVIL
Innovative Engineering & Technical Services
1675 West Bakerview Road • Bellingham • WA • 98226
Phone: 360-671-1450 • Toll Free: 877-412-6845
Fax: 360-671-1697 • www.anvilcorp.com

TENSILE AND BEND TESTS

REPORT TO: **Corey Herrick**
P.O. NO.: **133986**
CONTRACTOR: **McChord Pipeline Company**
CONTRACTOR'S PQR:
TEST REQUIREMENTS: **2 Face Bends, 2 Root Bends, 2 Tensiles**
MATERIAL: **X42 / X52 Dual Cert. 6" Pipe**
APPLICABLE CODE: **API 1104**

DATE: **12/24/09**
ANVIL JOB NO.: **104503**
ANVIL LAB NO.: **A171**
INSPECTOR: **R. Sullivan**

TENSILE TESTS

	TENSILE 1	TENSILE 2	TENSILE 3	TENSILE 4
MEASUREMENTS (INCHES)	1.001 X .188	0.995 X .188		
AREA (SQUARE INCHES)	0.1882	0.1871		
YIELD STRENGTH, (ACTUAL TEST LBS.)	----------	----------		
YIELD STRENGTH, (ACTUAL PSI)	----------	----------		
ULTIMATE LOAD, (ACTUAL TEST LBS.)	14,600	14,750		
TENSILE STRENGTH, (ACTUAL PSI)	77,577	78,835		
ELONGATION IN 2 INCHES	----------	----------		
ELONGATION, PERCENT	----------	----------		
FRACTURE TYPE/LOCATION	Ductile / BM	Ductile / BM		

BEND TESTS

LOCATION OF BEND/WELD POSITION	RESULTS
Face 1	Acceptable, No Flaws
Face 2	Acceptable, No Flaws
Root 1	Acceptable, No Flaws
Root 2	Acceptable, No Flaws

Remarks:

Haley Lowry
Robert C. Sullivan, CWI
ANVIL CORPORATION

Unless otherwise requested, all material submitted for testing will be discarded after thirty days.

NICK BREAK TESTS

REPORT TO: **Corey Herrick**
PO ORDER NO.: **133986**
CONTRACTOR: **McChord Pipeline Company**
CONTRACTOR'S WPS NO.:
APPLICABLE CODE: **API 1104**
TEST REQUIREMENTS: **2 Nick Breaks**
MATERIAL: **X42 / X52 Dual Cert. 6" Pipe**
WELDING ELECTRODE: **E6010**

DATE: **12/24/09**
ANVIL JOB NO.: **104503**
ANVIL LAB NO.: **A172**
INSPECTOR: **R. Sullivan**

MATERIAL THICKNESS: **.188**
WELDING POSITION: **6G**

NICK BREAKS

LOCATION:	RESULTS
Nick Break 1	**Acceptable**
Nick Break 2	**Acceptable**

Haley Lowry

Robert C. Sullivan, CWI
ANVIL CORPORATION

Unless otherwise requested, all material submitted for testing will be discarded after thirty days.

MPL – WELDER PERFORMANCE QUALIFICATION – JAKE ZOURKOS

Date: 17-DEC-2009	WPQ No.: Jake Zourkos
Welding Test Location: Pilchuck Shop, Lakewood, WA	Weld Position for test: 6G Downhill
Mechanical Test Location: Anvil Lab, Bellingham, WA	Qualified for welding: all position vertical down only
Welder: Jake Zourkos	Preheat: per WPS (50°F)
Welding time: 1 hour	Line up clamp used: No
Voltage: 1/8" = 23-28V 5/32" = 24-30 V	Joint Design for test: Single vee groove
Amperage: 1/8" = 80-100A 5/32" = 90-120A	Joint Design Limitations: Butt welds and lap fillets
Travel Speed: 1/8" = 7 ipm 5-32" = 4-10 ipm	Welding machine type: Miller Pipe Pro 304 (Portable)
Filler metal used on test: Lincoln Fleetweld 5P+ (E6010)	Qualified to use: E6010 and E7010
Description of Pass Sequence: (1)Root Pass = 1/8"Ø E6010 (2) Hot Pass = 5/32"Ø E6010 (3) Cap Pass = 5/32"Ø E6010	
Pipe type and grade: API 5L X42	
Wall thickness for test: 0.188" wall	Outside diameter for test: 6.625"
Qualified thickness range: 0.188"-0.500"	Qualified diameter range: 2.375" – 12.750" OD

	1	2	3	4	5	6	7
Coupon stenciled	TENSILE-1	TENSILE-2					
Original specimen dimensions	1.001" X 0.188"	0.995" X 0.188"					
Original specimen area	0.1882 sq inches	0.1871 sq inches					
Maximum load	14600 lbs	14750 lbs					
Tensile strength	77577 psi	78835 psi					
Fracture location	BM	BM					

☐ Procedure ☒ Qualifying test ☒ Qualified

☒ Welder Performance ☐ Line test ☐ Disqualified

Maximum tensile: 78835 psi Minimum tensile: 77577 psi Average tensile: 78206 psi

Remarks on tensile-strength tests:
1. Acceptable per API 1104
2. Acceptable per API 1104

Remarks on bend tests:
1. FB-1 = acceptable per API 1104
2. FB-2 = acceptable per API 1104
3. RB-1 = acceptable per API 1104
4. RB-2 = acceptable per API 1104

Remarks on nick-break tests:
1. NB-1 = acceptable per API 1104
2. NB-2 = acceptable per API 1104

Test made at: Anvil Laboratory Date: 24-DEC-2009

Test Results Reviewed by: Corey Herrick | Applicable Code: API 1104

Signed for Acceptance by: Corey Herrick Date: 24-DEC-2009

ATTACHMENT #3

November 30, 2009

Northwest Corrosion Engineering

10995 Warfield Road, Sedro-Woolley, WA 98284
Phone: (360) 826-4570 Fax: (360) 826-6321

Corey Herrick, Chief Engineer – McChord Pipeline
McChord Pipeline Co.
3001 Marshall Avenue
Tacoma, WA 98421

SUBJ: McChord Pipeline / Tacoma Water Corrosion Interference Testing

Mr. Herrick,

Northwest Corrosion Engineering completed detailed interference testing on the 6-inch diameter McChord jet fuel transmission pipeline and Tacoma Water transmission pipeline at the intersection of Waller Road East and 72nd Street East. The purpose of the testing was to determine if the corrosion control system utilized by the McChord Pipeline is having a detrimental effect on the Tacoma Water pipeline.

Recently, the McChord pipeline was exposed at the Waller Road / 72nd Street intersection to remove a pipeline in-line inspection tool. Retrieval of the tool required that a portion of the McChord pipeline be replaced. The replacement pipe section was installed such that it was in close proximity to the Tacoma Water pipeline. To maintain electrical isolation, a dielectric FRP shield was placed between the two pipelines in order to avoid inadvertent contact.

It was reported that the Tacoma water pipeline is a 52-inch diameter reinforced concrete cylinder pipeline. It was reported that, similar to the McChord pipeline, the Tacoma water pipeline utilizes an impressed current cathodic protection system for protection against external corrosion control. Because the two lines are in close proximity, it is important to ensure that the pipelines are not electrically continuous with each other and that stray current interference is not occurring. Stray current is defined as current flow in unintended paths. If stray current is picked up by a structure it must be returned back to its source, resulting in accelerated corrosion at the point of current discharge.

The testing sequenced involved the following steps:

1. Locating and marking the two pipelines at their intersection location.
2. Gaining access to the soil by drilling a 5/8-inch diameter hole through the asphalt at the point of pipeline intersection. In addition, access holes were drilled over each pipeline at five foot intervals for a distance of 20 feet on each side of the crossing. A total of 17 holes were drilled to allow for proper testing (see drawing).
3. Cycling of the McChord pipeline rectifier unit (located approximately 1 mile to the southeast of the crossing) was completed using a long on and short off timing

sequence. Measurement of the rectifier output was recorded at 15 volts and 2.4 amperes.

4. Electrical contact was made to the Tacoma Water pipeline at an aboveground portion of steel piping located approximately 1,500 feet to the northwest. Wire spools were used to extend the connection to the testing site.
5. Measuring the electrical potential of the Tacoma Water pipeline was completed by inserting a copper-copper sulfate (Cu-Cu SO_4) reference electrode into each drilled hole at the crossing. Both ON and Instant Off electrical potentials were measured.
6. Once the Tacoma Pipeline potential data was collected, an electrical connection was made to the McChord pipeline and ON and Instant Off potentials were recorded at the same soil access holes.

Results of the testing are included on the attached drawings. The data show that only a slight negative change (2 – 6 millivolts) was measured on the Tacoma Water pipeline as the McChord pipeline rectifier was cycled off. These small shifts do not suggest that stray current interference is occurring on the Tacoma Water pipeline as a result of the operation of the McChord pipeline impressed current cathodic protection system.

Additional testing of the McChord Pipeline indicates that the structure is receiving acceptable levels of cathodic protection current at the tested locations. The relatively low (more positive) readings on the Tacoma Water pipeline are an indication that the impressed current cathodic protection systems associated with water pipeline are not adversely affecting the McChord pipeline. In addition, the electrical potential measurements recorded at established McChord Pipeline test stations located approximately 300 feet on each side of the crossing are within 10% of annual survey readings recorded at each site dating back to 2001.

Northwest Corrosion Engineering recommends that McChord Pipeline continue to monitor the pipeline potentials at established test stations on an annual basis, record rectifier output bi-monthly (at a minimum), and perform a close interval survey over the top of the pipeline every five years.

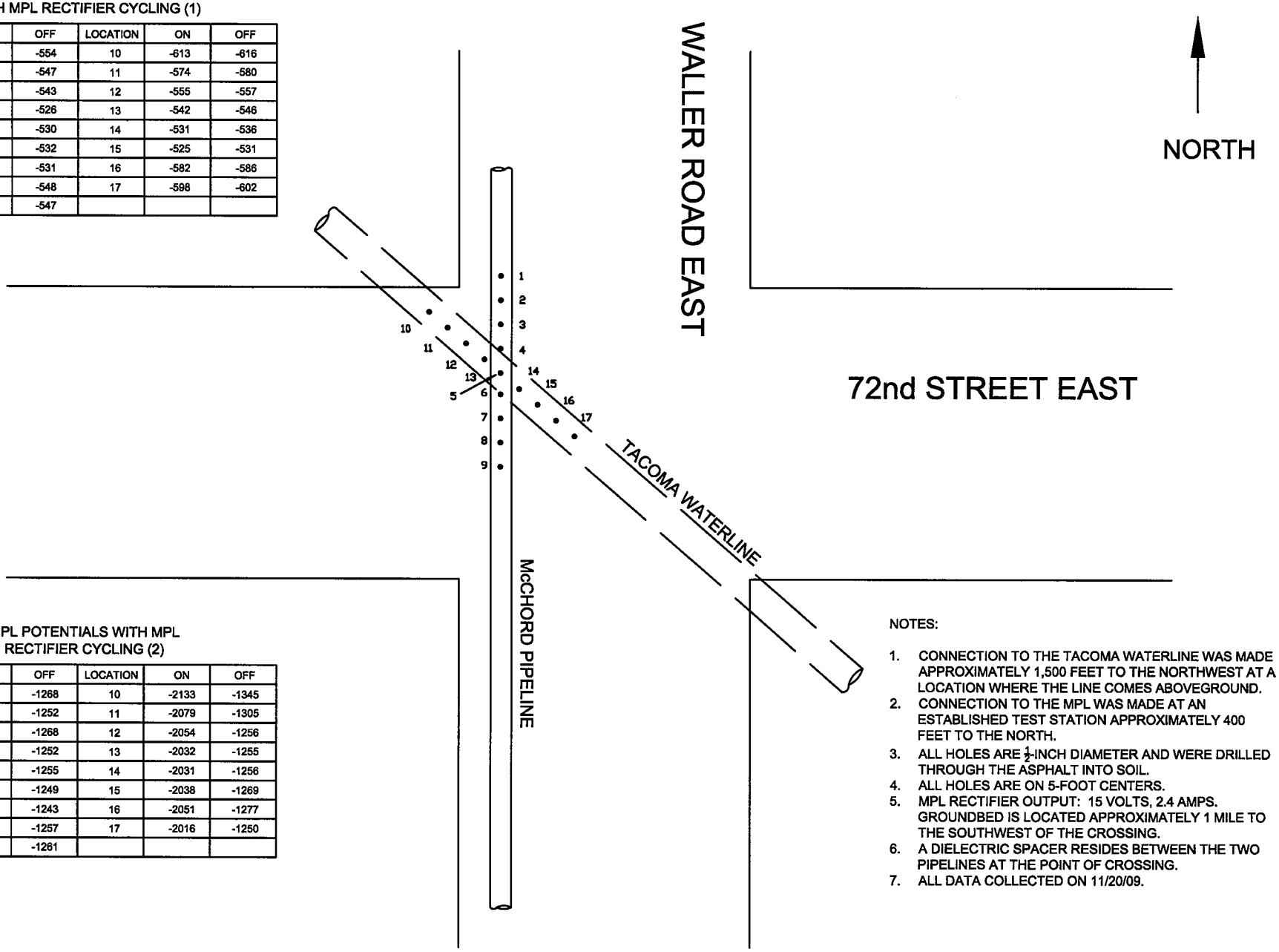
We appreciate the opportunity to assist you with this important project. If you have any questions or require additional information, please do hesitate to contact our office.

Sincerely,
Northwest Corrosion Engineering

Jeremy A. Hailey, P.E.

TACOMA WATER POTENTIALS
WITH MPL RECTIFIER CYCLING (1)

LOCATION	ON	OFF	LOCATION	ON	OFF
1	-541	-554	10	-613	-616
2	-543	-547	11	-574	-580
3	-539	-543	12	-555	-557
4	-522	-526	13	-542	-546
5	-525	-530	14	-531	-536
6	-528	-532	15	-525	-531
7	-525	-531	16	-582	-586
8	-544	-548	17	-598	-602
9	-544	-547			



MPL POTENTIALS WITH MPL
RECTIFIER CYCLING (2)

LOCATION	ON	OFF	LOCATION	ON	OFF
1	-2024	-1268	10	-2133	-1345
2	-2016	-1252	11	-2079	-1305
3	-2026	-1268	12	-2054	-1256
4	-2017	-1252	13	-2032	-1255
5	-2031	-1255	14	-2031	-1256
6	-2019	-1249	15	-2038	-1269
7	-1996	-1243	16	-2051	-1277
8	-2014	-1257	17	-2016	-1250
9	-2001	-1261			

NOTES:

1. CONNECTION TO THE TACOMA WATERLINE WAS MADE APPROXIMATELY 1,500 FEET TO THE NORTHWEST AT A LOCATION WHERE THE LINE COMES ABOVEGROUND.
2. CONNECTION TO THE MPL WAS MADE AT AN ESTABLISHED TEST STATION APPROXIMATELY 400 FEET TO THE NORTH.
3. ALL HOLES ARE $\frac{1}{2}$-INCH DIAMETER AND WERE DRILLED THROUGH THE ASPHALT INTO SOIL.
4. ALL HOLES ARE ON 5-FOOT CENTERS.
5. MPL RECTIFIER OUTPUT: 15 VOLTS, 2.4 AMPS. GROUNDBED IS LOCATED APPROXIMATELY 1 MILE TO THE SOUTHWEST OF THE CROSSING.
6. A DIELECTRIC SPACER RESIDES BETWEEN THE TWO PIPELINES AT THE POINT OF CROSSING.
7. ALL DATA COLLECTED ON 11/20/09.

NORTHWEST CORROSION ENGINEERING
PHONE: (360) 826-4570
FAX: (360) 826-6321
EMAIL: info@nwcorrosion.com

McCHORD PIPELINE / TACOMA WATER INTERFERENCE TESTING

INTERFERENCE TESTING DATA

DWG NO: 1	SCALE: NONE
30-NOV-09	REV. 0

ATTACHMENT #4

REPORT NO. UT 1110

ANVIL CORPORATION
REPORT OF ULTRASONIC INSPECTION

CLIENT: U.S. OIL

DATE: 11, August 2009 SHEET 1 OF 1

P.O. NO. B122110

CONTRACT NO. —

PART NAME: McCHord Pipeline

DEFECT PLOT CHART

PART NO. —

SERIAL NO. —

HEAT NO. —

SPECIFICATION Thickness Only

ACCEPTANCE STANDARD Information for Welding

PROCEDURE Anvil C-1003

COVERAGE REQUIRED 3 Bands of Readings on 2 sides

EXAMINATION METHOD A-Scan

ULTRASONIC UNIT MFG Panametrics

ULTRASONIC UNIT S/N 93042501

ULTRASONIC UNIT MODEL 36 DL Plus

TRANSDUCER TYPE Dual

TRANSDUCER MATERIAL —

TRANSDUCER FREQUENCY 5 MHz

SCANNING FREQUENCY —

SCANNING SENSITIVITY —

COUPLANT G-2

See Attached for Results

Location at 72nd + Waller Tacoma, WA

ACCEPTED ✓ REJECTED

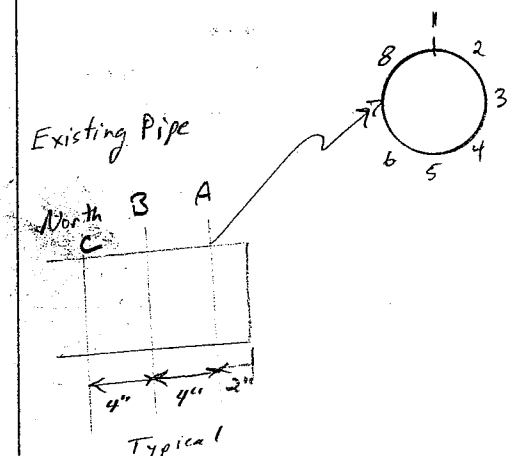
INSPECTED BY:

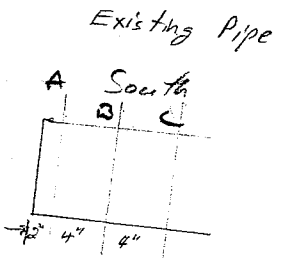
Jared Sims

LEVEL II

8-11-2009 | NDE Request

UT Existing Pipe
Verify wall thickness





View from 72nd Looking East

Demagnatize pipe w/ AC mag yolk

Be on-site @ 0800 Aug 11, 2009

	1	2	3	4	5	6	7	8
A	186	186	185	189	188	187	185	186
North B	187	185	185	187	189	186	185	185
C	185	186	191	191	191	188	185	185
A	185	184	190	185	193	190	184	186
South B	188	187	185	188	188	189	194	192
C	185	187	186	188	186	185	190	186

McCHORD PIPELINE COMPANY — FIELD INVESTIGATION REPORT

INVESTIGATION

PREPARED BY:	DATE	REVIEWING SUPERVISOR	DATE	FIR NUMBER
STEVE CALTON	10/1/2009	Corey Herrick	10/1/09	MPL 2009-3A

RESPONSIBILITY	LOG-UN-LOG	CODING: (CHECK ALL THAT APPLY) E	V	C	S	R	R/W NUMBER	ATLAS PAGE	~~MILE~~ POST NUMBER STAKE
McPIPE								6A	347+34

INVESTIGATION BECAUSE OF: (circle one) ONE CALL SYSTEM LINE PATROL AIR PATROL REPORT BY A OR B BELOW (OTHER)

TICKET OF FLIGHT REFERENCE NUMBER	DATE	WORK ORDER REQUEST #
9184628	7/31/09	X

INVESTIGATION

	(A) CONTRACTOR/DEVELOPER	(B) ON PROPERTY OWNED BY:	(C) PROPERTY LOCATION (if different than (B))
NAME	PILCHUCK	PIERCE COUNTY	
ADDRESS		72nd & WALLER	
CITY/TWP/ COUNTY/STATE			
PHONE #			
COMMENTS:			

PROPERTY TYPE (circle one): (STREET) SIDEWALK LAWN CROP WOODS WETLANDS OTHER: _____

(D) PERSON CONTACTED (A OR B OR C)	ACTIVITY WAS: (circle one) (APPROVED) DISAPPROVED BPL NOT INVOLVED	WRITTEN NOTICE (exhibit B) WAS GIVEN TO (A B C) ABOVE
(A)	(APPROVED)	(A) B C)

ENCROACHMENT

ACTIVITY (check)	COMP-LETED	UNDER WAY	PRO-POSED	EFFECT	TEMP.	PERM.
FILL				REDUCED ACCESS		
CUT				REDUCED COVER		
BORE OR PILE DRIVE				INCREASED COVER		
CONSTRUCT				REDUCED SUPPORT		
MOVE EQUIP.				OTHER (comment below)		
STOCKPILE				ENCROACHMENT NOTICE (exhibit C) WAS GIVEN TO (A B C) ABOVE		
OTHER (comment below)						

PIPE VISUAL ISPECTION

COATING TYPE (circle one): NONE (COAR TAR) EPOXY SOMASTIC OTHER TAPE WRAP

CONDITION OF COATING: (circle) GOOD (DAMAGED) DISBONDED

EXTERIOR CONDITION OF PIPE: (circle one) GOOD PIT CORROSION GENERAL CORROSION (DENT) STRESS CONCENTRATOR DENT W/ STRESS CONC.

INTERIOR CONDITION OF PIPE: (circle one) (GOOD) PIT CORROSION GENERAL CORROSION OTHER _____

PIPELINE CROSSING

TYPE OF CROSSING:	UTILITY:	OTHER:	SIZE:	FACILITY DAMAGE: (circle one or more)	NON-DESTRUCTIVE TESTING REQUIRED:
(STEEL) COOPER NON-METALIC CABLE	ELECT. SEWER GAS TELE/TV (WATER) PETROLEUM		52"	(NONE) COATING PIPE	(YES) NO

CROSSING WAS: 0 FEET <2 INCHES OVER (UNDER) ~~BPL~~ MPL AT STAKE NO. 347+34

TEST WIRES INSTALLED BY:	TEST STATION TYPE(S):	AT STAKE NUMBER(S):	ANODES INSTALLED BY:	AT STAKE NUMBER(S)
COMPANY ~~FOREIGN~~		COMPANY ~~FOREIGN~~		

RELEASE

CAUSE

LOCATION: _____ FEET N W E S OF

STAKE NUMBER

PRODUCT TYPE	AMOUNT OUT	RECLAIMED	~~LOST~~	SOIL TYPE	~~AREA AFFECTED~~	AREA EXCAVATED	CLEANUP COMPLETED
							~~YES~~ ~~NO~~

DISPOSITION OF CONTAMINATED MATERIAL:

REPAIR

REPAIRS (circle one) COATING REPAIR ONLY DEFECT REMOVEL SLEEVE INSTALLATION (PIPE REPLACEMENT)

SIZE:	GRADE/ SERIES	WALL THICKNESS	TYPE OF PIPE:	LENGTH	STAKE NUMBERS:
6"	API X42	0.188	SMLS	17 FEET	FROM 347+44
				0 INCHES	TO: 347+27

DRAWING ATTACHED YES NO — (ERW)

COMMENTS

INVESTIGATION PERFORMED BY COMPANY EMPLOYEE NUMBER	DATE	WORK HOURS
STEVE CALTON	8-11-2009	

FOLLOW UP REQUIRED BY REGIONAL RAW AGENT (circle one) YES NO NOT SURE

REMARKS OR LOG: SEE REVERSE SIDE of This REPORT.

- WORK STARTED AUG. 4 2009
- WORK COMPLETE AUG 14 2009
- CLOCKSPRING WAS INSTALLED IN 2005 OVER DENTED AREA.
- REPAIR IN AUG 2009 WAS NECCESSARY DUE TO "SMART PIG" BECOMING STUCK IN PIPELINE AT THIS LOCATION.
- CAUSE AND TIME FRAME of PIPE DAMAGE UNKNOWN.
- PIPELINE SECTION WAS ENCASED IN CONCRETE AT UNKNOWN TIME AT 72ND AND WALLER INTERSECTION. NO RE-BAR WAS PRESENT.
- DAMAGED PIPE COATING DISCOVERED UNDER CONCRETE. NO METAL LOSS ON PIPE.
- PIPE ID WAS VISUALLY INSPECTED AFTER REMOVAL AND NO INTERNAL CORROSSION WAS PRESENT.
- NEW PIPE SECTION INSTALLED WITH FBE COATING. FIELD WELD AREAS WERE TAPE WRAPPED
- FRP SHIELD WAS INSTALLED BETWEEN MPL AND TACOMA WATER MAIN.
- HOLE WAS BACKFILLED PER MPL REQUIREMENTS (12" of SAND SURROUNDING PIPE) REMAING BACKfill WAS PER PIERCE COUNTY REQUIREMENTS (5/8 - WITH SAND).
- SEE MPL PIGGING RECORDS FOR MORE DETAILED DATA.

Steve Colton
MPL INSPECTORS
10-1-2009

STATE OF WASHINGTON
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION
1300 S. Evergreen Park Dr. S.W., P.O. Box 47250 • Olympia, Washington 98504-7250
(360) 664-1160 • TTY (360) 586-8203

Ref. No. Docket PL-091410

CERTIFIED MAIL

December 11, 2009

Alan J. Cabodi, President
McChord Pipeline Company
3001 Marshall Avenue
Tacoma, Washington 98421

Dear Mr. Cabodi:

RE: Integrity Management Field Inspection

We are in receipt of the McChord Pipeline (McChord) response dated 9/28/2009 to a field inspection conducted on August 5-11, 2009. During the inspection, two probable violations and one area of concern were identified. The following is staff's follow-up response to your reply:

Item #1 49 CFR §195.402 Procedural manual for operations, maintenance and emergencies.

Your response informed the commission that McChord is in full compliance with ASME B31.4, WAC 480-75-430 and 49 CFR §195.402 requirements while performing maintenance activity on your pipeline using a natural gas company's welding procedure.

49 CFR §195.402 requires McChord to have a manual for conducting maintenance activities including welding procedures (49 CFR §195.214) that are qualified under Section 5 of API 1104 or Section IX of the ASME Boiler and Pressure Vessel Code. The quality of the test welds used to qualify the welding procedure shall be determined by destructive testing. A record of the qualifying tests shall be retained by the operator.

Please provide to the commission a copy of the destructive testing results used to qualify the procedure used for performing field welds on August 5-11, 2009.

In addition, the welding procedure in question was used by the contractor without the expressed written authorization of Puget Sound Energy (PSE). McChord will need to keep on file for future inspections, all correspondence from third parties approving the use of their welding procedures on the McChord pipeline system.

Item #2 49 CFR §195.505 Qualification Program

McChord must verify that covered task employees and contractors have current qualifications prior to performing maintenance activities. We are in receipt of the updated NDT certificate from the QA Manager for the radiography technician in question.

Item #3 49 CFR §195.250 Clearance between pipe and underground structures

Your response was to assure the commission that the McChord cathodic protection (CP) system is adequate in protecting your pipeline where it crosses over a concrete coated 52-inch steel water main with 2-inches of clearance. The response identified the concrete coating and a fiberglass reinforced plastic sheet placed between the two pipelines as insulators and noted close interval surveys to monitor adequacy of CP. We are concerned that:

- The water main is a larger metallic mass shielding your 6-inch diameter pipeline from CP current.
- The concrete coating found on your pipeline and on the water main is not an insulator. CP is used to protect rebar in concrete piers in a salt water environment.
- It may not be practical to perform a satisfactory close interval survey over pavement at the intersection of 72nd and Waller Road.

Was the in-line-inspection tool rescheduled to complete the inspection and establish a baseline for future monitoring the adequacy of your CP system including the new section of pipe placed over the water main? At what frequency in the future will your pipeline be inspected with a smart pig tool? Was there any indication of internal or external corrosion found on the pipe section removed?

Your response needed
Please respond in writing by January 12, 2010 to Items #1 and #3, above. Refer to this docket number PL-091410 in your correspondence.

If you have any questions, or if we may be of any assistance, please contact Al Jones at (360) 664-1321.

Sincerely,

David D. Lykken
Acting Pipeline Safety Director

cc: Corey Herrick, McChord Pipeline