CPUC Meeting Materials

Weekly Non-Destructive Examination Program Updates

December 13, 2013

Discussion Topics

- PG&E/SEI Alignment
  - L-114
  - Extent of Conditions for TCI Inspections
  - NDE Program Enhancements
  - NDE Program Validation Protocols/Extent of Conditions (LLNL)

- Completed Activities To Date

- Next Steps
  - Schedule
  - Immediate Needs

L-114 Update

- L-114 Final Report complete (See "Noncompliant Weld Inspection Techniques, L-114 Non Destructive Examination Final Report, December 5, 2013")
- L-114 Findings:
  - Pipeline currently in service
  - PG&E Found NO Weld Integrity issues present on L-114
  - PG&E found on-site vendor performing noncompliant Non-Destructive Examinations

[1]Activity progress/completion is discussed in the Completed Activities To Date section
[2]Dates are contingent on weather, permit, and/or construction schedules

TCI Validation

- See presentation dated 12/6/13 for past items
- Re-Inspection site status:
  - WV-06A (L-108/L-401) (12/9/2013)[2]
    - 12 welds "finger-printed" and spot inspection per API 1104
  - WV-03A/B (L-108/DFM-0613-06) (12/11/2013)[2]
    - 2 welds "finger-printed" and spot inspection per API 1104
  - WV-05D/E (L-108) (12/13/2013)[2]
    - 4 Welds to be removed as part of pipe replacement project
    - Welds will be radiographed in place then sent to ATS for further testing
- Leak Survey details
  - Leak Survey began on 600 miles of identified Gas Transmission pipeline (12/2/2013)
  - To date 360 Miles have been assessed (as of 12/10/13)
    - 1 Leak indication has been found on segment within Los Medanos Station
      - Further validation required as it may just be vent gas (power gas)
    - 2 indications pending further investigation (thought to be non-PG&E)
    - 3 indications determined to be non-PG&E

[1]Activity progress/completion is discussed in the Completed Activities To Date section
[2]Dates are contingent on weather, permit, and/or construction schedules

NDE Program Enhancements

- Increased job observation frequency from quarterly to weekly (Q1 2013)
- Expanded job observations outside of new construction (Q1 2013)
  - Station Projects
  - Integrity Management Inspection Projects
- Issuance of Gas Welding Control Manual (TD-4160M) (Q2 2013)
  - Sets minimum Requirements for qualifications, procedures, and materials for NDE
- Development of Gas NDE Control Manual (TD-4190M) (Started Q2 2013)
  - Establishes procedures for all NDE inspections
- Comprehensive review of all NDE Contractor procedures and qualifications (Q2 2013)
- Engagement of 3rd Party experts for the review and execution of new contracts with NDE service providers (Q2 2013)
- Integrity Management NDE vendor's procedures were reviewed and personnel proficiency tested for the performance of inspections (Q3 2013)
- Facility and NDE program audits were conducted for existing and prospective NDE service providers (Q3 2013)
- Online OQ Training modules (Veriforce) developed for contractor NDE personnel (Q3 2013)

NDE Program Validation Protocols

- Engaged 3rd Party experts (LLNL) to develop scope and provide historical understanding (11/21/2013)
- Working to establish contracts with Lawrence Livermore National Labs
  - Working to meet contract requirements, and fee structure requirements
- LLNL will work to provide the following:
  - Validation of statistical approach to TCI Extent of Conditions/Remediation
    - PG&E will work to incorporate LLNL improvements if any
  - Development of Extent of Condition for Post-'61 Transmission Pipe
  - Development of Validation Protocol for Post-'61 Transmission Pipe
    - Inspection methods
    - Girth weld integrity
- Leak Analysis Results
  - Total of 2182 Leaks on the Gas Transmission System (data covers 1939-2013)
  - Total of 47 Girth Weld Leaks on the Gas Transmission System (data covers 1939-2013)
    - Only 7 Girth Weld Leaks on the 600 miles in question (1.3%). This indicates the welds are generally of higher quality than those that pre-date 1961 installations
  - 2% of GT Leaks are on the Girth Weld (data covers 1939-2013)

Completed Activities to Date

- See 11/22/13 presentation for items prior to 11/22/13
- Validation of 5 welds on L-132 (11/15/2013)
  - All 5 Welds passed radiographic inspection per API 1104
- Engaged Lawrence Livermore National Labs (LLNL)
  - Developed Scope of Work
  - Initiated contract/agreement
- Excavated/Tested/Passed 19 welds as of 12/12/13:
  - 5 welds on L-132
  - 12 welds at Vernalis Station
  - 2 welds at 8 Mile Rd Pressure Limiting Station (PLS)
- Completed L-114 Final Report
- Created Maps of pipeline segments to be Leak Surveyed as a result of L-114 Findings
  - Pipeline segments
  - Hydrotested sections
  - ILI Sections
- Began monthly Leak Survey of 600 miles of pipeline

[1]This population contained some 2010 and 2011 welds

Follow-Up Questions from 11/22/13

- SED: How many contractors does PG&E have doing Radiographic Testing?
  - PG&E: PG&E Gas Operations currently has three vendors performing Radiography (WIX, JANX and Edge/ATS). We have also used two additional vendors (Team Industrial and Mistras) on the Whisky Slough project.
- SED: Has PG&E been looking at the ability to have all X-Ray images made electronic?
  - PG&E: Yes. PG&E is evaluating various technologies to allow for the digitial imaging and storage of RT examinations.
- SED: As contractors are doing Radiography, how does the film get handed off?
  - PG&E: Film is handed off daily, along with reader sheets to the lead inspector or General Construction Foreman. Film/Reader Sheets are kept on-site until the end of the project.
- SED: How is film stored at the end of each job?
  - PG&E: Film is turned over to our records processing area in Walnut Creek (Redacted) There it is checked, re-packaged and labeled. It is then shipped to our permanent storage facility located in Brisbane, CA (Redacted) where it is kept for the life of the asset.
- SED: When you need to look for X-Ray Films, where do you go to get the film?
  - PG&E: Any film needed to be retrieved is requested from the Redacted Facility as detailed above.

Follow-Up Questions from 11/22/13 (con't)

- SED: What are the film requirements for PG&E/Contractors?
  - PG&E: Please see below excerpt from the attached PG&E Technical Specification regarding the use of class I film only.

> "5.2.8 For film radiography, radiographs shall be made using ASTM Standard E 1815 Class I film of high contrast and relatively fine grain structure that will produce the results required. Example film may be such as AGFA D4 or D5 film. (Or equivalent)
>
> 5.2.10 Class II film equivalent to AGFA D7 shall not be used except upon specific approval by PG&E NDT Level III and only where very long exposure times would be necessary (e.g., for extreme large diameter (>48" dia using DWSE method) and extremely heavy wall sections)."

Next Steps

- High Level activities within the next 6 Weeks
  - See 11/22/13 presentation for prior items:
  - Issue L-114 Final Report [12/6/13] Submitted (12/6/2013)
  - Finalize LLNL contract (12/13/2013)
  - Inspection of first 20 TCI Welds [12/31/13] (5 completed as of 11/15/2013)
  - Inspection of all 43 TCI Welds [3/31/14]
  - LLNL to validate TCI Dig plan and issue recommendations if necessary (43 digs) (1/15/2013)

Appendix I

Inspection Summary for WV-6 & WV-3 Welds:

Technical Services, Inc.
P. O. Box 721139, Houston, Texas 77272-1139

Cell: (281) 389-4304
Ph: (281) 341-0469
Email: david.culbertson@ndttechservices.com
www.ndttechnicalservices.com

SUMMARY AND ASSESSMENT OF EOC – RE-INSPECTION PERFORMED ON GIRTH WELDS

In accordance with the approved PG&E Inspection Test Plan (ITP), on December 11, 2013 a re-inspection utilizing radiographic examination with AGFA D5 film was performed on two (2) girth welds on the WV-3 project at Redacted Pressure Limiting Station in Stockton, CA. Once each of the welds were re-radiographed they were "fingerprinted" (weld features compared against original images) to verify that the original radiographic film images of the weld matched the images of the re-inspected girth weld.

The following weld numbers were re-inspected:

Original Weld Id Number	Re-inspection Weld Id Number
W-75	W-75-RI
W-76	W-76-RI

The following were the results of these-inspections:

Weld Number: W-75-RI Comments: Weld matched fingerprint and weld was determined to be acceptable to API 1104, 20th edition.

Weld Number: W-76-RI Comments: Weld matched fingerprint and weld was determined to be acceptable to API 1104, 20th edition.

PG&E had initially identified three (3) welds (Location: WV-3A - Weld #41, & Location: WV-3B – Welds #75 & #76) to be inspected at this location. However, after reviewing the as-built drawing it indicated that Weld #41 to be a weld on 12" OD pipe, yet the original radiographic film and reader sheet for Weld #41 indicated that it had been taken on 8" OD pipe. After further investigation and review, PG&E determined that Weld #41 had actually been found to be located at a different site location. To support this conclusion, Western Industrial X-Ray (WIX) took field measurements of the pipe diameter for Welds #41, #75 and #76 to determine that they were in fact 12" OD, 16" OD, and 16" OD, respectively. The results of the measurements were confirmed and were recorded on the attached WIX inspection

report. A copy of WIX's Radiographic Testing Inspection report indicating the results of their evaluation of welds examined are attached.

This summary completes the evaluation and documentation of the re-inspections performed on the two (2) identified girth welds on the WV-3A & 3B project in Stockton, CA.

Let me know should you require any additional information concerning these reviews and approvals.

Respectfully,

David L. Culbertson
President
ASNT Level III – 2820
ACCP Professional Level III

DLC/Letter Concerning Results of PGE Reinspection & Findings at WV-3 – Stockton CA 12-11-2013

Western Industrial X-Ray, Inc.
P.O. Box 238 Fairfield, CA
(707) 425-4673
(888) For X-Ray
info@wixinc.net
www.wixinc.net

Date 12/11/2013 Page 1 Of 1
Radiographic Report or Control # RIG-D
Customer PGE
Address
Customer's P.O. Number 2500927507
Job Location STOCTON, CA
Job Number 41985295
Item Description 16" GIRTH WELDS
100% Insp. ✓ Spot Insp. Percent

Nondestructive Inspection Report

Piece or Joint #s	Weld Number	Film No.	Acc	Rej	Defect Code	Comments
16"X.375	W-75-RI	3	✓			
16"X.375	W-76-RI	3	✓			
LOC-A VERIFIED						
PIPE IS 12.750 O.D.						
LOC-B VERIFIED						
PIPE IS 16" O.D.						

Work Summary

Amount	Description
2 Travel Hours	3 # Persons
0800 In Time	1630 Out Time
2.5 Work Hours	
6 Standby Hours	
10.5 Total Hours	
NO Per Diem	# Persons
100 Mileage	One Way ___ Round Trip ✓
2 Weld 16" in. dia.	Weld in. dia.
Weld in. dia.	Weld in. dia.
Weld in. dia.	Weld in. dia.
Film x	Type
Film x	Type

Technique Date/Procedure Qualification

Inspection Specification API-1104
Acceptance Standard 20TH
RT Procedure No. RT-7 Shooting Sketch (RSSS) D
View: DWF SWV Source Ir192 Curies 67
Physical Source Size: .106X.126 Effective Focal Spot: .165
Pb Screens: Front .005 Center N/A Back .005

Dia. 16" Material Type: C/S Thickness: .375 Reinf.: .125
SFD: 16" Source To Obj.: 15.625 IQI Essential Wire: 013
Exp. Time: 3 min. 0 sec. Dev. Time: 5 @ 68 deg.
Film Manufacturer: Agfa Speed: D-5 No. of Exp. 3 Film 3
Geometric Unsharpness (Ug): 008 Avg. Density: 2.5

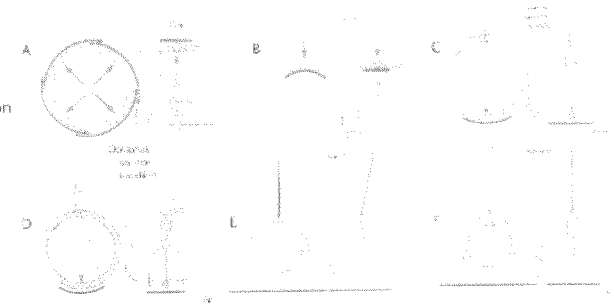
Dia. ___ Material Type: ___ Thickness: ___ Reinf.: ___
SFD: ___ Source To Obj.: ___ IQI Essential Wire: ___
Exp. Time: ___ min. ___ sec. Dev. Time: ___ @ ___ deg.
Film Manufacturer: ___ Speed: ___ No. of Exp. ___ Film ___
Geometric Unsharpness (Ug): ___ Avg. Density: ___

Dia. ___ Material Type: ___ Thickness: ___ Reinf.: ___
SFD: ___ Source To Obj.: ___ IQI Essential Wire: ___
Exp. Time: ___ min. ___ sec. Dev. Time: ___ @ ___ deg.
Film Manufacturer: ___ Speed: ___ No. of Exp. ___ Film ___
Geometric Unsharpness (Ug): ___ Avg. Density: ___

Defect Code

BT – Burn Through
C – Crack
CV – Root Concavity
CX – Root Convexity
DT – Drop Through
ICP – Inadequate Cross Penetration
IF – Incomplete Fusion
IP – Incomplete Penetration
PD – Inadequate Penetration Due to High-Low
Ox – Oxidation
P – Porosity
SL – Slag Lines
SI – Slag Inclusions
UC – Undercut
TI – Tungsten Inclusion

1. _____ Level II/II
Radiographer E.FINKENBINDER/S.CARPENTER
2. _____ Level I
Radiographer's Assistant GERRIT VANSICKLE



The person signing this document represents that they have the authority to sign on the behalf of the customer. This report does not guaranty or warranty the condition of the materials tested. Western Industrial X-Ray, Inc. is not liable for any interpretation of results or losses attributable to any testing performed. There is no warranty for these services. Any liability is limited to the amount paid for the services in question. Final film interpretation is the responsibility of the customer.

David L. Carbaton Date 12/11/13
Customer's Signature

Report Form WIX-101

Technical Services, Inc.
P. O. Box 721139, Houston, Texas 77272-1139

Cell: (281) 389-4304
Ph: (281) 341-0469
Email: david.culbertson@ndttechservices.com
www.ndttechnicalservices.com

SUMMARY AND ASSESSMENT OF EOC – RE-INSPECTION PERFORMED ON GIRTH WELDS

In accordance with the approved PG&E Inspection Test Plan (ITP), on December 9, 2013 a re-inspection utilizing radiographic examination was performed on twelve (12) girth welds on the WV-6A project in Vernails, CA. Once each of the welds were re-radiographed they were "fingerprinted" (weld features compared against original images to verify that the original radiographic film images of the weld matched the images of the re-inspected girth weld.

The following weld numbers were re-inspected:

Original Weld Id Number	Re-inspection Weld Id Number
W-8	W-8-RI
W-9	W-9-RI
W-10	W-10-RI
W-11	W-11-RI
W-12	W-12-RI
W-13	W-13-RI
W-14	W-14-RI
W-15	W-15-RI
W-17	W-17-RI
W-18	W-18-RI
W-21	W-21-RI
W-22	W-22-RI

The following were the results of these-inspections:

Weld Number: W-8-RI Comments: Weld matched fingerprint and weld was determined to be acceptable to API 1104, 20th edition.

Weld Number: W-9-RI Comments: Weld matched fingerprint and weld was determined to be acceptable to API 1104, 20th edition.

Weld Number: W-10-RI Comments: Weld matched fingerprint and weld was determined to be acceptable to API 1104, 20th edition.

Weld Number: W-11-RI Comments: Weld matched fingerprint and weld was determined to be acceptable to API 1104, 20th edition.

Weld Number: W-12-RI Comments: Weld matched fingerprint and weld was determined to be acceptable to API 1104, 20th edition.

Weld Number: W-13-RI Comments: Weld matched fingerprint and weld was determined to be acceptable to API 1104, 20th edition.

Weld Number: W-14-RI Comments: Weld matched fingerprint and weld was determined to be acceptable to API 1104, 20th edition.

Weld Number: W-15-RI Comments: Weld matched fingerprint and weld was determined to be acceptable to API 1104, 20th edition.

Weld Number: W-17-RI Comments: Weld matched fingerprint and weld was determined to be acceptable to API 1104, 20th edition.

Weld Number: W-18-RI Comments: Weld matched fingerprint and weld was determined to be acceptable to API 1104, 20th edition.

Weld Number: W-21-RI Comments: Weld matched fingerprint and weld was determined to be acceptable to API 1104, 20th edition.

Weld Number: W-22-RI Comments: Weld matched fingerprint and weld was determined to be acceptable to API 1104, 20th edition.

PG&E's Inspection Test Plan (ITP) states that PG&E shall utilize AGFA D7 (or equivalent) Class II film. It was reasoned that the original radiographs by TC Inspection (TCI) were taken with D7 film, and PG&E wanted to ensure the best comparator to the original Class II film images of the welds possible for the re-inspection. The inspection plan (ITP) also states in instance where a closer look at a weld may be deemed necessary to evaluate the weld then a Class I film may be used such as AFGA D4 or

D5 (or equivalent). During the initial inspection at site WV-6A, the first weld examined was performed utilizing both AGFA D7 & D5 and the weld images were compared to the original radiographs taken by TIC. The results of this examination determined that the D5 film greatly enhance the fingerprinting process and provide the best overall film images for evaluation of weld quality. After having a discussion with PG&E Director, Brian Daubin, the decision was made to use the high quality Class I film such as AGFA D5 (or equivalent) moving forward for all remaining welds identified by the re-inspection plan. As a result of this decision, all twelve (12) welds at this site were inspected utilizing AGFA D5 film.

A copy of WIX's Radiographic Testing Inspection report indicating the results of their evaluation of welds examined are attached.

This summary completes the evaluation and documentation of the re-inspections performed on the twelve (12) identified girth welds on the WV-6A project in Vernails, CA.

Let me know should you require any additional information concerning these reviews and approvals.

Respectfully,

David L. Culbertson
President
ASNT Level III – 2820
ACCP Professional Level III

DLC/Letter Concerning Results of PGE Reinspection & Findings at WV-6A – Vernails CA 12-92013

Western Industrial X-Ray, Inc.
P.O. Box 238 Fairfield, CA
(707) 425-4673
(888) For X-Ray
info@wixinc.net
www.wixinc.net

Date 12/09/2013 Page 1 Of 1
Radiographic Report or Control # RIG-D
Customer PGE
Address TRACY,CA
Customer's P.O. Number
Job Location Redacted
Job Number 41960098
Item Description 16" GIRTH WELDS
100% Insp. ✓ Spot Insp. Percent

Nondestructive Inspection Report

Piece or Joint #s	Weld Number	Film No.	Acc	Rej	Defect Code	Comments
16"X.500	W-8-RI	3	✓			
16"X.500	W-9-RI	3	✓			
16"X.500	W-10-RI	3	✓			
16"X.500	W-11-RI	3	✓			
16"X.500	W-12-RI	3	✓			
16"X.500	W-13-RI	3	✓			
16"X.500	W-14-RI	3	✓			
16"X.500	W-15-RI	3	✓			
16"X.500	W-17-RI	3	✓			P@11.5"<.12
16"X.500	W-18-RI	3	✓			
16"X.500	W-21-RI	3	✓			
16"X.500	W-22-RI	3	✓			

Work Summary

Amount	Description
4	Travel Hours
2	# Persons
0700	In Time
1800	Out Time
11	Work Hours
0	Standby Hours
15	Total Hours
NO	Per Diem
	# Persons
175	Mileage One Way ___ Round Trip ✓
12	Weld 16" in. dia.
	Weld in. dia.
	Weld in. dia.
	Weld in. dia.
	Weld in. dia.
	Weld in. dia.
	Film x Type
	Film x Type

Technique Date/Procedure Qualification

Inspection Specification API-1104
Acceptance Standard 20TH
RT Procedure No. RT-7 Shooting Sketch (RSSS) D
View: DWF SWV Source Ir192 Curies 67
Physical Source Size: .106X.126 Effective Focal Spot: .165
Pb Screens: Front .005 Center N/A Back .005

Dia. 16" Material Type: GR-B Thickness: .500 Reinf.: .125
SFD: 16" Source To Obj.: 15.5 IQI Essential Wire: .016
Exp. Time: 4 min. 0 sec. Dev. Time: 5 @ 68 deg.
Film Manufacturer: Agfa Speed: D-5 No. of Exp. 3 Film 3
Geometric Unsharpness (Ug): .008 Avg. Density: 2.56

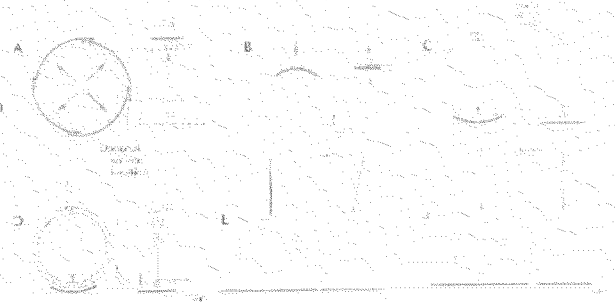
Dia. ___ Material Type: ___ Thickness: ___ Reinf.: ___
SFD: ___ Source To Obj.: ___ IQI Essential Wire: ___
Exp. Time: ___ min. ___ sec. Dev. Time: ___ @ ___ deg.
Film Manufacturer: ___ Speed: ___ No. of Exp. ___ Film ___
Geometric Unsharpness (Ug): ___ Avg. Density: ___

Dia. ___ Material Type: ___ Thickness: ___ Reinf.: ___
SFD: ___ Source To Obj.: ___ IQI Essential Wire: ___
Exp. Time: ___ min. ___ sec. Dev. Time: ___ @ ___ deg.
Film Manufacturer: ___ Speed: ___ No. of Exp. ___ Film ___
Geometric Unsharpness (Ug): ___ Avg. Density: ___

Defect Code

BT – Burn Through
C – Crack
CV – Root Concavity
CX – Root Convexity
DT – Drop Through
ICP – Inadequate Cross Penetration
IF – Incomplete Fusion
IP – Incomplete Penetration
PD – Inadequate Penetration Due to High-Low
Ox – Oxidation
P – Porosity
SL – Slag Lines
SI – Slag Inclusions
UC – Undercut
TI – Tungsten Inclusion

1. Radiographer E.FINKENBINDER/S.CARPENTER Level II/II
2. Radiographer's Assistant G.EAGLES Level I



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Customer's Signature Date 12/9/13

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