

**CENTRAL REGION OFFICE
Construction Inspection Report**

Date: March 23, 2010

Project: Alberta Clipper Superior Station work

Location: Superior WI

MP/Station: Enbridge Terminal

Activity: 124812

Assignment: 80934

OPID: 11169

Unit ID: 1323

Personnel Contacted	Title/Position	Company
Boyd Hougrose	Liaison	Enbridge
Jim Schwartz	Tank Inspector	EMH
Tom Dooley	Chief Inspector	EMH

Activities Observed:

Observed welding on Tanks 36, 37, and 40. Reviewed x-rays of defects and the repairs.

Observed the station piping of the Alberta Clipper. Inspected the welds and reviewed x-rays.

Issues Identified:

1. Matrix has not yet provided a welder qualification trail back to the date of the welders original qualification.
 2. Requested the review of an x-ray on the launcher. The weld should not have passed visual, due to inadequate reinforcement of the cap. Portions of the cap were not as high as the thinner pipe wall.
-
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Inspector: Darren Lemmerman (PHMSA)

**CENTRAL REGION OFFICE
Construction Inspection Report**

Date: March 15, 2010

Project: Alberta Clipper Superior Station work

Location: Superior WI

MP/Station: Enbridge Terminal

Activity: 124812

Assignment: 80933

OPID: 11169

Unit ID: 1323

Personnel Contacted	Title/Position	Company
Boyd Hougrose	Liaison	Enbridge
Jim Schwartz	Tank Inspector	EMH
Tom Dooley	Chief Inspector	EMH

Activities Observed:

Observed welding on Tanks 36, 37, and 40. Reviewed x-rays of defects and the repairs.

Enbridge is building 5 new 180 foot diameter tanks 56' high. Tanks 36 and 37 are full height. Tank 38 has only the ring wall complete. Tank 39 location is currently a spoil storage location. Tank 40 has one ring remaining.

Issues Identified:

1. Matrix has not provided Enbridge with the welder qualification trail back to the date of the welders original qualification.
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Inspector: Darren Lemmerman (PHMSA)

Exit Interview
Enbridge Southern Lights Construction Inspection
February 11, 2010
Manhattan to Streator 20" line
Morris, IL

No issues to discuss.

Exit Interview
Enbridge Southern Lights Construction Inspection
February 09, 2010
Manhattan Terminal
Manhattan, IL

No issues to discuss

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Lights (20")	Date: 02_09_10	
Location: Manhattan, IL Manhattan Station	Station/Survey or Pipeline Marker:	
Personnel Contacted: Dave Stafford Jacob Weertz Kelly Harless	Title/Position: Compliance Mechanical inspector Construction Manager	Company/Affiliation: Enbridge Contractor Enbridge (contract)
Activities Observed/Performed: Manhattan Station 1. Reviewed 150# class piping hydrotest for surge relief piping 2. Reviewed NDE reader sheets for welding done since mid December 2009. 3. Reviewed tank hydrotest plan and strapping plan. Tanks are to be hydrotested and strapped beginning the end of February.	Results/Comments: 1. No issues 2. No issues 3. No issues	
Summary: No issues for followup.		
Inspector(s): Carl Griffis		

CENTRAL REGION OFFICE
Daily Inspection Report

Project: Enbridge Southern Lights (20")	Date: 02_11_10	
Location: Morris, IL Manhattan to Streator 20" line	Station/Survey or Pipeline Marker:	
Personnel Contacted: Carter Saline Matt Bordson Glen Morgan	Title/Position: Construction Manager Project Engineer Corrosion Tech	Company/Affiliation: Enbridge (contract) Enbridge ENEngineering
Activities Observed/Performed: 1. Anomaly #273 appears to be several large gouges to metal on the top and side of the pipe. There are several pitted areas. After blasting, the pits ranged in depth from 0.04 to 0.085 inches. The deeper pits necessitated replacement of the pipe. 2. Anomaly #272 appears to be a scrape on the top of the pipe about 1/2 by 2 inches. Measured wall loss was ~0.025 inches. The scrape will be buffed down and recoated.	Results/Comments: 1. Enbridge will remove the pipe and determine the cause of the deep pits. 2. No issue	
Summary: No issues. Enbridge to provide analysis of pipe damage at anomaly #273.		
Inspector(s): Carl Griffis		

CENTRAL REGION OFFICE
Daily Inspection Report

Project: Enbridge Southern Lights (20")		Date: 02_10_10
Location: Morris, IL Manhattan to Streator 20" line		Station/Survey or Pipeline Marker:
Personnel Contacted: Carter Saline Dave Stafford	Title/Position: Construction Manager Compliance	Company/Affiliation: Enbridge (contract) Enbridge
Activities Observed/Performed: 1. Reviewed the status of the ACVG survey. Examination of anomalies 272 and 273 were delayed to 2/11/10.		Results/Comments: 1. No issues
Summary: No issues. Will observe anomaly digs on 2/11/10.		
Inspector(s): Carl Griffis		

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:		Pass		Type	
Location:		Electrode Dia.		Thickness	
M.P. Station:	MP986	Electrode Type			
Intersection:		Amperage	A		
Weather:	Cloudy, 8F	Voltage	V		
Pipe Information		Travel Rate	in / min		
Pipe Size:	36"	Pre-Heat Temp	475	° F	
Joint Number:		Soil Type:			
Weld Number:					

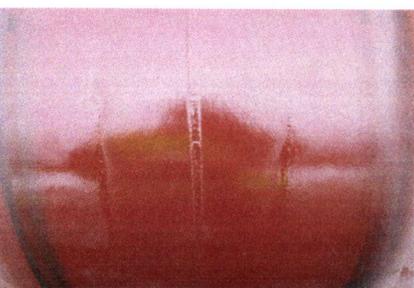
Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Boyd Haugrose	Regulatory Compliance	Enbridge	218.441.2366	boyd.haugrose@enbridge.com
John Rayon	Coating Inspector	Enbridge		
K.D. Lloyd	Coating Inspector	Enbridge		
Don French	Pipe Lowering Inspector	Enbridge		

Notes / Observations:

Boyd Haugrose provided an overall summary of the recent issues on the Enbridge project . He indicated that they continued to phase out the concrete applied to the piping for the wetlands area. He indicated the concrete was much slower to install than bags and potentially could have contributed to cracking at girth welds. Boyd noted that the issues with the cut-out welds were more prevalent on the 36" pipe than the 20" pipe.

Met with K.D. Lloyd and John Rayon (Coating Inspectors) at Mile Post 986. At this location, 36" pipe coating was inspected. Observed one pipe joint that contained a slight amount of weld splatter and a few areas that contained a minor amount of small bumps on the coating. The bumps were located immediately outside of where the heat ring was applied. Boyd indicated that these bumps had been tested to assure they were not hollow and did not contain any excess coating loss. John indicated that two head rings were used for heat management . Jeff Murray observed inspector carrying 475 degree temple stick.

Met with Don French (Pipe Lowering Inspector). Pipe bags were on the ROW in preparation to be used in lieu of concrete pipe. As shown in Photo 4, observed location that the 20" and 36" pipe in the ditch was located no more than 6' apart.



Photograph Description
Photo 1: Coating crews on MP 986.



Photograph Description
Photo 2: Region containing lots of holidays found during jeeping.



Photograph Description
Photo 3: Lowering Crews



Photograph Description
Photo 4: 20" and 36" in ditch

MNOPS Pipeline Construction Inspection Guide

Inspection Date: Date Submitted: Case Number:

Inspector: Inspection Area:

Inspection Details:		Welding:		Coating:	
Inspection Item:		Pass		Type	
Location:		Electrode Dia.		Thickness	
M.P. Station:	MP1033	Electrode Type			
Intersection:		Amperage		A	
Weather:	Cloudy, 20F	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	36"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Boyd Haugrose	Regulatory Compliance	Enbridge	218.441.2366	boyd.haugrose@enbridge.com
Doug Love	Weld Inspector	Enbridge		
Darrel Cradell	Weld Inspector	Enbridge		
Jay Black	Chief Inspector	Enbridge		

Notes / Observations:

Met with Jay Black (Chief Inspector), Doug Love and Darrel Cradell (weld Inspectors) at MP 1033. Observed 36" pipe with concrete overlay that contained two part epoxy near the girth weld on nearly all pipe sections. Jay Black explained that this was required since the width of the ring used to apply FBE was limited due to the concrete on the pipe hence FBE did not extend to parent coating and required the two part epoxy.

Observed heat management during welding. Noted that the crews were staying close to each other assuring that there were no extended time lapses between passes.

No Violations or Non Compliances Observed.



Photograph Description
Epoxy to Parent Coating.



Photograph Description
Photo 2: Region containing lots of holidays found during jeeeping.

Photograph Description

Photograph Description

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Director
Engineering & Construction (US)
Major Projects
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February 12, 2010

To: Jack Olin Paul Eberth
 Tommy Shiflett Avery Schott

Re: PHMSA Audit Issues 68-71 (January 25-29, 2010)

Attached is a summary of PHMSA audit findings and their disposition based on the audit that occurred on January 25-29 on Spread 3/5. Please review these findings/responses and ensure that contractor and inspection staff are informed and take appropriate action.

I appreciate your support in working with PHMSA and MNOPS to ensure we responded to concerns that were raised in a prompt and effective manner. Your effective communications and actions have helped to ensure an exceptional project.

A handwritten signature in black ink, appearing to read 'Jim Crawford', is written in a cursive style.

Jim Crawford

cc: Dan Plume, Tom Hodge, Marc DeVarenes, Shaun Kavajecz, Dave Hoffman

Alberta Clipper

Summary of January 25-29 Spread 3, 4 and 5.

This is the combined observations from Brian Pierzina, Pat Donovan and Darren Lemmerman.

1. Heat management

While observing the pipe gang on spread 3 near Forest RD 2127, it was identified that the heat management requirements were not occurring consistently according to the construction procedures. The procedures require a minimum temperature 250 degrees F shall be maintained while performing welding. It was noted that welders and their helpers who were using the 300 degree tempilsticks were doing significantly better than those using 250 degree tempilsticks. It was stated by the welding inspector that the coating crew had concerns that the welding crews were over heating the coating and damaging it. This was not the first time we heard this comment.

A tie in crew was observed east of Cass Lake performing a 36" tie-in. It appeared that they were performing adequate heat management. They were using 250 degree tempilsticks. The work was being performed in a deep trench and the inspector stated that he was not that limber any more to enter the trench for direct observation of the weld. It was also our understanding that all welders were to use the 300 degree tempilsticks for heat management.

2. Coating/Jeeping

The jeeping crews were observed working on the 36" pipe. About a half mile of pipe was walked and it was noted that several visual defects were missed during the jeeping process. These included two locations consisting of blisters, about 5 locations where the flocking ring damaged the coating by being set down on the transition area while still hot and improperly repaired, an area that was feathered for repair with no coating applied and a repair that did not cover the entire coating defect. The jeeping crew should be commended for finding a defect that existed in the coating and pipe metal surface near weld number 1471. The pipe had a surface anomaly that was inspected for pipe integrity, which could have been just covered up. Jeff W updated me on this location and stated that the defect was fairly shallow. Additional questions on this defect are as follows; How was the depth of the defect measured? Was this defect buffed out? Was the remaining wall thickness measured?

3. Delayed cracking documentation

Brian Pierzina asked for information on cracks found with the delayed x-ray inspections. Jeff W provided a verbal summary of this. We would also like copies of the weld cutout logs for the entire Alberta Clipper project for all spreads.

4. Coating sample for testing

Brian Pierzina asked for a section of pipe containing factory Dupont coating. This was provided last week during the inspection. PHMSA will update you on the findings of any testing performed on the pipe segment.

MNOPS Pipeline Construction Inspection Guide

Inspection Date: Date Submitted: Case Number:

Inspector: Inspection Area: Spread 3

Inspection Details:		Welding:		Coating:	
Inspection Item:		Pass		Type	
Location:	Hwy 2	Electrode Dia.		Thickness	
M.P. Station:	MP 966	Electrode Type			
Intersection:		Amperage		A	
Weather:	cloudy, 20F	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	36"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Jimmy Chance	NDT Office - Bemidji	Enbridge		
John Rayon	Coating Inspector	Enbridge	406-891-0992	
Joe Thornhill	Welding Inspector	Enbridge		

Notes / Observations:
 1/20/10: Met Boyd at the Bemidji Office. Looked at 6 weld reject x-rays and the repairs with Jimmy Chance (ML-1256 "burn thru", ML-1264 "gas pocket", ML-1270 "hollow bead", ML 6753 "weld crack", ML1055 "gas pocket"). Per Jimmy, the weld reject rate for 1/19/10 on spreads 3 & 5 were: 2.70% on 20" pipe, 5.8% on 36" pipe. No issues or concerns noted on repair x-rays. Traveled with Boyd to spread 3 (MP966) where we looked at previously applied FBE coated girth welds (36" pipe), observed no issues or concerns with coating in that area. Observed welding of several joints, 3rd pass amps measured at (188-194). The weld pre-heat was running (290 - 340F). Weld inspector noted that the concrete coated pipe is creating more problems with weld cracks - he believes it is due to the "egg shape" of the pipe ends because of improper support during casting. Boyd mentioned that Enbridge may be phasing out the concrete coated pipe.

Violations / Non-Compliance Issues:
 none



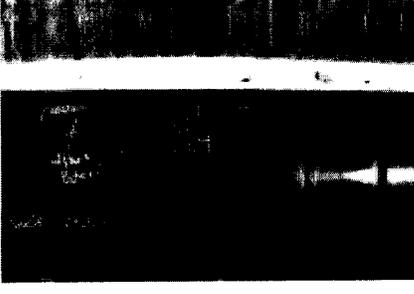
Photograph Description
 Girth welding on 36" pipe, MP 966



Photograph Description
 Pre-heat on 36" pipe, MP 966



Photograph Description
 Pre-heating connecting joint on 36" pipe, MP 966



Photograph Description
 Green two part on 36" pipe, MP 966

MNOPS Pipeline Construction Inspection Guide

Inspection Date: Date Submitted: Case Number:

Inspector: Inspection Area:

Inspection Details:		Welding:		Coating:	
Inspection Item:		Pass		Type	
Location:	Hwy 2	Electrode Dia.		Thickness	
M.P. Station:	MP 966, MP 1041	Electrode Type			
Intersection:		Amperage		A	
Weather:	Cloudy, 15F	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	36"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Jim Miller	Coating Inspector	Enbridge		
Jeff Coleman	Coating Inspector	Enbridge		

Notes / Observations:

1/21/10: Met Boyd and traveled to MP 966. Crew preparing to lower in about a mile long section of concrete coated 36" pipe. Walked the pipe section looking at the coating. Observed 2 girth coated areas that each had 2 spots of undercuts (each spot roughly 1" long). The inspector (Jeff Coleman) was made aware. The undercut areas were to be re-coated with 2 part. Traveled to spread 4 (MP 1041), observed several FBE areas that displayed very fine hair line cracks. Cracks were only seen at the overspray area on top of the parent coating. The photos of the hair line cracks did not turn out.

Noted the FBE process in spread 3 and 4 used two pre-heat induction rings with weed burners ahead of the first ring. Spread 4 was also using a blanket over the coated area after coating was applied. Do not know what the lag time was before the blanket was wrapped around the coated area.

Also noted that spread 4 was using a manual FBE process after the auto process to continue coating at the interface area of parent coating. Did not observe spread 3 using this manual FBE technique.

Violations / Non-Compliance Issues:

None



Photograph Description
FBE coating on spread 4, MP 1041



Photograph Description
FBE coating on spread 3, MP 966



Photograph Description
Applying two part patch on spread 3, MP 966



Photograph Description
Manual FBE at interface area on spread 4, MP 1041

MNOPS Pipeline Construction Inspection Guide

Inspection Date: Date Submitted: Case Number:

Inspector: Inspection Area:

Inspection Details:		Welding:		Coating:	
Inspection Item:		Pass		Type	
Location:	Hwy 2	Electrode Dia.		Thickness	
M.P. Station:	MP 965.6	Electrode Type			
Intersection:		Amperage		A	
Weather:	Cloudy, 25F	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	36"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

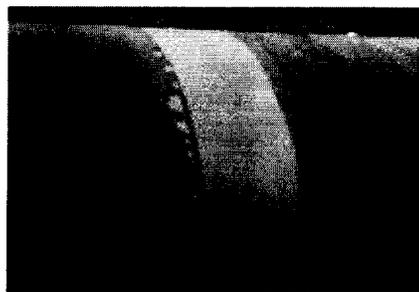
Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Jeff Coleman	Coating Inspector	Enbridge		

Notes / Observations:

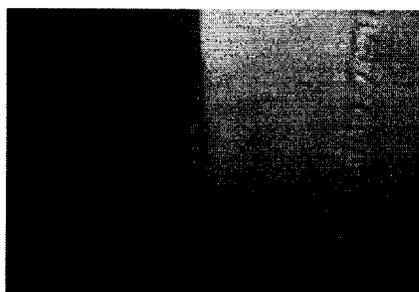
Something to be highlighted: On day 1/22/10 spread 3 (MP 965.6). Observed FBE being applied on 36" pipe. However, the parent coating was not "feathered" properly, meaning that the parent coating was thin with pockets or holes left in it at the interface area to the bare pipe surface (see photos under tab 1.22.10). This was causing fairly severe undercuts at these hole areas. Approximately 8 girth welds had been blasted this way with about 4 coated. There was a small crew following using two part epoxy to patch the areas. Boyd had a discussion with the blasting crew and resolved the issue at site. The blasting crew re-blasted all the uncoated areas.

Violations / Non-Compliance Issues:

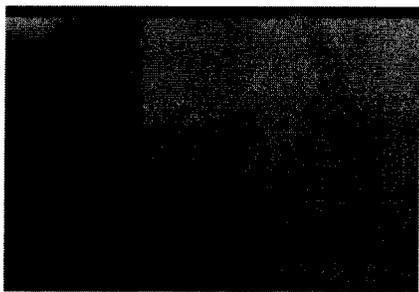
None



Photograph Description
Blasted interface area prior to FBE on spread 3, MP 965.6. Note holes in parent coating at interface.



Photograph Description
Spread 3, MP 965.6



Photograph Description
Spread 3, MP 965.6



Photograph Description
Spread 3, MP 965.6

MNOPS Pipeline Construction Inspection Guide

Inspector: Jonathan C. Wolfgram
Case Number: 109724

AFO: 3

Summary of Inspection Items:

Inspection Date	Inspection Area	Inspection Summary	Page Reference
1/12/2010	Spreads 4 & 6	Coating and Welding Inspection	1
1/13/2010	Spreads 3 & 5	Coating Inspection	2
1/14/2010	Spreads 3 & 5	Coating Inspection	3

Summary of Personnel Observed:

Name	Title / Role	Company	Phone	Email
Boyd Haugrose	Compliance Inspector	Enbridge	218-441-2366	boyd.haugrose@enbridge.com
Bob Jones	Coating Inspector			
David Ladd	Coating Foreman			
Travis Crabtree				
Henry Olson				
Jack Olin	Project Manager	Enbridge	218-269-5504	john.olin@enbridge.com
Jeff Wiklund	Sr. Compliance Specialist	Enbridge		
Darren Lemmerman		PHMSA		
Jeff Coleman				
John Rayon	Coating Inspector			
Avery Schott	Construction Mgr			
Jay Black				
James Miller	Coating Inspector			

Summary of Inspection Observations:

During the week of January 11, 2010 MNOPS conducted pipeline construction observations / inspections near Cloquet and Bemidji, Minnesota. The inspection was mainly focused in the areas of heat management associated with the welding and Fusion Bond Epoxy coating.

During observation of the welding process, MNOPS verified the pre-heat temperature of the pipe. Pre-heat temperatures seemed adequate as the use of an induction heat was introduced to the preheat process. Upon heating the pipe initially with the induction heater, a propane heat was used to maintain preheat temperature during the welding process.

During the coating inspection, areas of fine hairline cracking around the circumference of the pipe was note in the girth weld areas. Enbridge was to perform a further investigation to determine the depth of the cracking in the coating.

The follow inspection reports provide additional details of the inspection.

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:	Welding & Coating	Pass		Type	2-Part Repairs
Location:	Cloquet Area	Electrode Dia.		Thickness	
M.P. Station:	MP 1070 to MP 1073	Electrode Type			
Intersection:		Amperage		A	
Weather:	20 Degrees / Windy	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:		Pre-Heat Temp	250 Min	° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Boyd Haugrose	Compliance Inspector	Enbridge	218-441-2366	boyd.haugrose@enbridge.com
Bob Jones	Coating Inspector			
David Ladd	Coating Foreman			
Travis Crabtree				
Henry Olson				

Notes / Observations:

Coating:
 --Observed coating repairs made to FBE coated girth weld areas between station 15898+68.8 and 15869+32.5. The repairs consisted of pin hole and blister repairs made on the field applied coating with 2-part epoxy.

Welding:
 --Observed heat management of the welding process between station 15380+00 to 15390+00. The welding crew was using an induction ring heat to put an initial heat of 300 degrees prior to welding. The welders are using propane heaters throughout the welding process to ensure the required 250 degree preheat temperature.

Violations / Non-Compliance Issues:
 --No Violations or Non-Compliance Issues Noted



Photograph Description
Coating Repairs



Photograph Description
Coating Repairs



Photograph Description
Coating Repairs



Photograph Description
Coating Repairs

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:	Coating	Pass		Type	FBE
Location:	Bemidji Area	Electrode Dia.		Thickness	38 mils @ Sta 10600
M.P. Station:	MP 964 and MP 973	Electrode Type			
Intersection:		Amperage		A	
Weather:	20 Degrees / Windy	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	36"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Jack Olin	Project Manager	Enbridge	218-269-5504	john.olin@enbridge.com
Jeff Wiklund	Sr. Compliance Specialist	Enbridge		
Darren Lemmerman		PHMSA		
Jeff Coleman				
Boyd Haugrose	Compliance Inspector	Enbridge	218-441-2366	boyd.haugrose@enbridge.com
John Rayon	Coating Inspector			

Notes / Observations:

Coating Inspections:

Station 10110+00 to 10120+00: The 36" line FBE coating was inspected. During the inspection, areas of circumferential cracking was noted in the coating over the girth welds. The coating application procedure was also discussed; including steps to ensure preheat temperatures do not exceed 500 degrees.

Station 10590+00 to 10610+00: The 36" diameter line FBE coating was inspected. During the inspection, areas of circumferential cracking was noted in the coating over the girth welds. The cracking was noted in the overlap of field applied coating over factory applied coating as well as the field applied coating over the girth weld areas. Longitudinal lines in the coating were also noted due to the pipe being jeeped over hot coating.

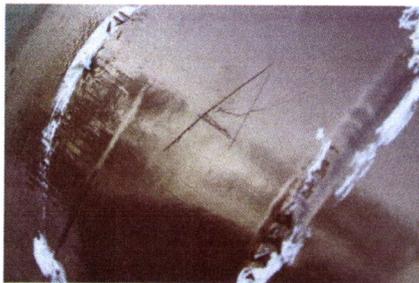
The inspection prompted a knife test to be performed at station 10600+00 (MP973) to see if any disbondment of the coating from the pipe would occur at the areas of cracking. Upon conclusion of the test, no signs of coating disbondment were noted. Enbridge stated that they would investigate the depth of the spider cracking in follow up.



Photograph Description
Weld identification number of joint where knife test was performed.



Photograph Description
Coating Foreman performing knife test.



Photograph Description
Cut in coating after knife test and view of cracks in coating.



Photograph Description
Cut in coating after knife test and view of cracks in coating.

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:	Coating	Pass		Type	
Location:		Electrode Dia.		Thickness	
M.P. Station:	MP 1060	Electrode Type			
Intersection:		Amperage			
Weather:	20 Degrees / Windy	Voltage			
Pipe Information		Travel Rate		in / min	
Pipe Size:		Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Boyd Haugrose	Compliance Inspector	Enbridge	218-441-2366	boyd.haugrose@enbridge.com
Avery Schott	Construction Mgr			
Jay Black				
James Miller	Coating Inspector			

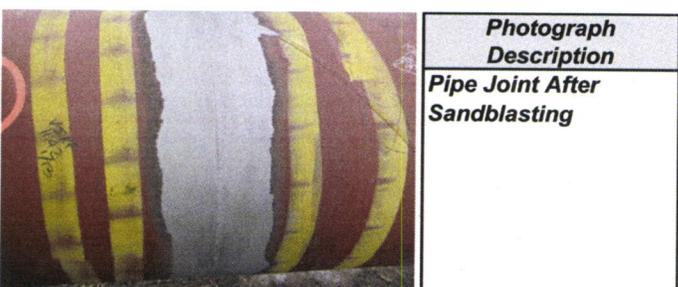
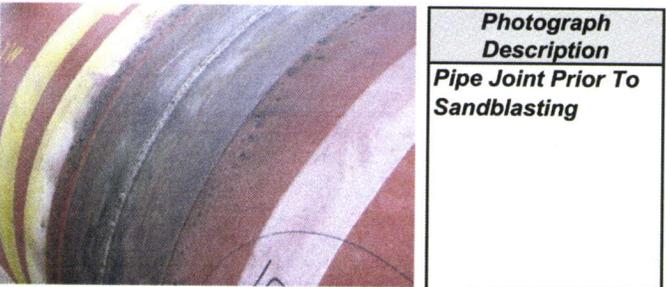
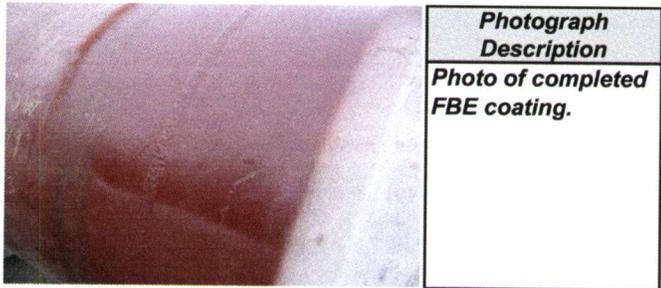
Notes / Observations:

Coating Inspections:

Station 15240+00 to 15260+00: The 36" line FBE coating was inspected. During the inspection, areas of circumferential cracking was noted in the coating over the girth welds that were recently completed (2 to 3 hours). The coating application was also observed. No cracking or other issues were noted on the freshly applied coating.

Violations / Non-Compliance Issues:

--No Violations or Non-Compliance Issues Noted



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January 25, 2010

To: Jack Olin Paul Eberth
 Tommy Shiflett Avery Schott

Re: PHMSA Audit Issues 59-67 (January 4-7, and January 13, 2010)

Attached is a summary of PHMSA audit findings and their disposition based on audits that occurred on January 4-7 on Spread 4/6 and January 13th on Spread 3/5. Please review these findings/responses and ensure that contractor and inspection staff are informed and take appropriate action.

In addition, the following points have come up on the Alberta Clipper/Southern Lights Project. Please take the following actions:

1. As very cold weather moves into the area again, please remind welding crews to be mindful of the preheat process. Both from the perspective of ensuring proper heat and also from the perspective of actively monitoring the preheat process to reduce the chance of burning the coating.
2. Request welding and coating contractor and inspection staff to ensure that end caps are present on the pipe. This will facilitate preheat and help retain heat needed during both welding and coating processes.
3. When jacking crews are grounding to the pipe, they should ensure that when removing coating for the ground, that it be done carefully to ensure no metal is removed and only enough coating for the ground is removed. Areas where coating is removed must be marked immediately to ensure repair is done.
4. Please remind coating crews that sandblasting should remove all insufficiently adhered coating in accordance with specification C-310 6.8 which states "all frayed or loosened coating materials shall be removed. A light abrading or feathering of the plant applied coating for a distance of 1-2 inches from the edge of the coating shall be provided. Feathering shall remove the sharp transition from plant applied coating to girth weld area. Feathering shall remove plant applied coating that has curled up or disbonded from the substrate". The key is to remove all parent pipe coating that is disbonded. I know these crews have worked hard to accomplish this but with the winter conditions and

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impacts due to heating, this job has become more difficult. Enbridge appreciates their diligence and perseverance.

5. Please make sure that the coating inspection staff follows the procedures recently communicated for testing and recording any Hairline Anomalies (HA) found as well as the need to visually inspect for HA and other coating anomalies that may not jeep.

Please positively confirm with me by email when these actions are completed. I appreciate your prompt attention to these matters.

A handwritten signature in black ink, appearing to read "JC", is written above the name "Jim Crawford".

Jim Crawford

cc: Dan Plume, Tom Hodge, Marc DeVarenes, Shaun Kavajecz, Dave Hoffman

MNOPS Pipeline Construction Inspection Guide

Inspector: Jonathan C. Wolfram
Case Number: 109724

AFO: 2

Summary of Inspection Items:

Inspection Date	Inspection Area	Inspection Summary	Page Reference
12/29/2009	36" Line: Station 15600+00 to 15590+00	Fusion Bond Coating Inspection	
12/29/2009	20" Line: Station 8012+22 to 8025+84	Fusion Bond Coating Inspection	
12/30/2009	20" Line: Station 8012+22 to 8025+84	Fusion Bond Coating Inspection	
12/30/2009	36" Line: Station 15285+15 to 15283+71	2-Part Epoxy Coating Inspection	

Summary of Personnel Observed:

Name	Title / Role	Company	Phone	Email
Avery Schott	Construction Mgr		612-759-5994	avery.schott@enbridge.com
David Hokanson	Field Engineer		218-341-1980	dave.hokanson@enbridge.com
Bill Bennett	Ass't Chief Insp		319-850-2150	Bobibe@earthlink.net
Bill Baker	Coating Inspector			
Bob Jones	Coating Inspector			

Summary of Inspection Observations:

On December 29th and 30th 2009, MNOPS inspected the completed girth weld coating in the Cloquet area of the Enbridge Alberta Clipper project (Spreads 4 and 6). During the inspection, MNOPS inspected the following areas and made the following observations:

36" Line: Station 15600+00 to 15590+00 (Northwest of County Road 7):

Hairline cracks were noted in the Fusion Bond Epoxy Coating. The cracks were within 1-1/2" to 2" from the edge of the FBE coating on the downstream side of the working side of the pipe. The cracks were typically noted from 1 o'clock to 4 o'clock. It seems that this is possibly due to some issue with the coil on the induction heater. The cracking was consistent in the area described along the length of pipe.

20" Line: Station 8012+22 to 8025+84 (Brandon Road South of Pine Drive):

Hairline cracks and areas of coating disbonding were noted in the Fusion Bond Epoxy Coating. In certain instances, hairline cracking was evident at the transition / interface of field coating and factory coating. The coating disbonding was typical at the overlap of field applied coating and factory coating. No disbonding of the coating from the steel pipe appeared to be evident.

During the observation of the pipe in the area listed, the section of pipe was being lowered in to the trench. The jeeping crew was performing the final jeep at 1750 volts. The areas of coating disbondment did not seem to cause any audible jeeps during the final inspection. These areas of disbonding were not given any further attention as the pipe was lowered into the trench.

36" Line: Station 15285+15 to 15283+71 (Brandon Road South of Pine Drive):

Hairline cracking and burn marks were noted on the 2-Part Epoxy Coating of the girth weld joints. The cracks seemed to travel along the weld joint around the circumference of the pipe. The coating inspector, Bill Baker noted these issues for attention / repair prior to lowering the section in to the trench.

In conclusion to the inspections noted above, MNOPS talked with the two coating inspectors responsible for oversight of coating in the area. The inspectors shared their process for jeeping and how it would catch if any of the disbonding or cracking had made its way to the bare steel. The coating inspectors told MNOPS that they have not noted any signs of the coating disbonding from the bare steel pipe.

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January 4, 2010

To: Marc DeVarenes Jack Olin Paul Eberth
 Tony Madden Tommy Shiflett Avery Schott

Re: PHMSA Audit Issues 54-58 (December 14-17, 2009)

Attached is a summary of PHMSA and MNOPS audit findings and their disposition based on audits that occurred on the dates above on spreads 4/6. Please review these findings/responses and ensure that contractor and inspection staff are informed and take appropriate action.

In addition, please review the following points and communicate each of these items with the contractor and inspection staff:

1. Over the past three months, I have communicated the need for contractor and inspection staff to maintain/monitor preheat requirements. During a recent PHMSA/MNOPS audit, it was observed that heat management requirements were not occurring consistently. To eliminate any confusion, please make sure all welding crews understand that during the course of each weld, the joint is to be **maintained** between 250 degrees (minimum) and 400 degrees (maximum). Specification 8.7.3 states

“During Completion of the weld, the joint shall be maintained at the temperature between the minimum and maximum interpass temperatures and shall be checked using temperature indicating crayons , or other suitable methods immediately before and *during* the full welding operation. No welding shall take place unless the *minimum* interpass temperature is *maintained*. The heating of local areas (hot spots) above the upper limit of preheating, as indentified on the approved WPS, is not permitted.”

Given our specifications and the fact that temperatures during the next couple months will be cold, each welding crew should follow specifications and use a 250 degree temp crayon to frequently test the minimum temperature and ensure we maintain proper heat in the joint. At any point where the temperature falls below 250 degrees, the joint must be reheated to within specifications prior to resuming welding. Although the welder's helper should ensure heat is maintained by using a temp stick, it is the responsibility of each welder to ensure that they weld in accordance with the specifications. Also, inspection staff should be diligent in inspecting inter-pass temperatures and actively monitoring welding processes to ensure crews are following specifications. Inspection staff should use temp sticks and contact thermometers during the weld process and additionally use pyrometers to monitor the rate of heat loss.

2. Section 8.3.1 coating specifications for FBE (C-310) call for the holiday detector to operate at 1400 to 1700 volts and to be checked and calibrated at the start of each shift. The specification does not state what method should be used for calibration because there are several acceptable methods including the NACE standard and use of a voltage meter. However, coating crews have been provided volt meters. Therefore, calibration of jeeping equipment should be performed using volt meters. Where practical, the voltage should be calibrated based on the grounding method the crew will be using for the jeeping (e.g., jeep tail dragged on ground, ground to pipe, ground to side boom) utilizing the reading of the volt meter to determine the proper setting of each jeep. Inspection staff should verify the calibration using their own volt meter.

3. During a recent PHMSA audit, the inspectors reviewed the pipe for blistering. In all but one location, any blistering that had occurred was repaired. To help ensure that we find and repair all blisters, please review with contractor's coating crews and coating inspection staff the need to identify and repair blistering. Also, re-educate the jeeping staff on what these blisters look like so that if they see any blistering, they identify and make required repairs.

Additionally, hairline cracking with occasional flaking of FBE coating was seen on a number of joints. The hairline cracks and flaking was on the FBE applied coating that overlay the parent pipe coating. It did not extend to the bare metal or the sandblasted area of the joint (see attached photo). Re-emphasis and awareness sessions on this issue should be conducted with both the coating and jeeping contractor and inspection staffs to ensure that these areas are closely reviewed and repaired if necessary.

4. The Specification for Pipeline Construction – Pipeline Welding Specification 8.4.2 requires longitudinal and spiral seam welds on non-factory ends to be removed a distance of 0.500 inch from the edge of the bevel. During a recent PHMSA audit, it was identified that a number of joints were not ground back. This is the second time this issue has been identified by PHMSA. Communicate this requirement to the contractor and inspection staff in writing via AVO and review such in the morning inspectors meeting to ensure adherence to this specification.

Please positively confirm with me by email when these actions are completed. I appreciate your prompt attention to these matters.



Jim Crawford

cc: Dan Plume, Tom Hodge, Shaun Kavajecz, Dave Hoffman,

Regulatory Compliance Audit Report

Alberta Clipper/Southern Lights (Clearbrook, MN to Superior, WI)

Report Number: 9

Date of Report: January 4, 2010

Preparer: Jeff Wiklund

Audit Reference(s): The responses contained in this report reference audit issues found in the PHMSA/MNOPS audit that occurred from December 14-17 on spreads 4 and 6. Audit points were communicated to Jeff Wiklund in an email from Darren Lemmerman (PHMSA) on December 21, 2009.

Please note that audit communications and observations by both PHMSA and MNOPS are also included in this report but are prefaced by (C/O).

Audit Issues (from Tracking Spreadsheet) / Resolution:

54.1214 Heat management -
While observing the pipe gang and firing lines on spreads 4 and 6 it was identified that the heat management requirements were not occurring consistently according to the construction procedures. The procedures require a minimum temperature 250 degrees F shall be maintained while performing welding. On spread 6 it was observed that the preheating was adequate, however the inter-pass temperatures were not maintained by all welders on the firing line. On several instances the temperatures were below 200 degrees F. On spread 4 the pipe gang was measuring the initial preheat while inter-pass temperatures were falling and not measured during interim passes. The firing line preheated the pipe prior to installing the line up clamp, however while completing the root passes the pipe temperatures fell below the minimum with no heat maintenance. The Foreman stated that it would be more detrimental to stop welding and maintain the heat than it would to continue heating below the minimum

The recent communication from the Project Director (attached) directs spread management to discuss with contractor and inspection staff the specifications for pre-heat and interpass heating of pipe and the requirement to *maintain* heat during the welding process at a minimum of 250 degrees. Crews and Inspectors have been asked to test heat more frequently with temp sticks or other approved Enbridge methods such as with contact thermometers. Pyrometers may additionally be used for informational purposes to gage the rate of heat loss. We continue to look at additional ways to ensure adherence to the specifications (e.g., positioning of the star assembly, modifying the star burner to deliver increased heat, reheat after clamping, etc.). With respect to the foreman's comment, spread management has been assured by contractor management that all personnel understand

and will do their utmost to adhere to the specifications regarding preheat, interpass heat and heat maintenance.

55.1214 Jeeping equipment -

Just east of hwy 23 we observed some jeeping. The coating crew stated that they calibrated the jeep to 1750 volts prior to us arriving on site. We asked if they would show us how it was calibrated. The unit's digital readout showed 1750 volts when the volt meter was used it was showing 1100 volts. The jeeping unit was required to be turned up until the digital display read 2700 volts, while the testing meter read 1750 volts. We did not have additional equipment to see where the issue was. It is possible the jeeping voltage was being done significantly lower than required.

The specific jeeping crew referred to in this issue had not started jeeping for the day. Because neither the volt meter nor the jeep could be tested with a second volt meter, we could not determine whether a problem existed in the jeep or the meter. Spread management directed this crew to check their equipment and verify that both the volt meter and jeep are functioning properly. Although practice has been for jeeping crews to calibrate jeeps using a volt meter, we have directed crews to ensure the calibration is done using a volt meter. In addition, we have directed inspectors to double check the calibration with their volt meter.

Last, the result of a check (while on spread 6) in voltage differences using alternative grounding methods (e.g., to pipe, using jeep tail and to side boom) showed only minor differences of less than 100 volts. However, we have also recommended that the calibration be based on the grounding method to be used by the jeeping crew.

56.1214 Coating blisters and cracking-

A newly identified coating issue (by MNOPS or PHMSA) was noted. See picture above. The coating is cracking and chipping from the parent FBE do to some unknown causes. It is believed to be caused by inadequate heat sink into the metal prior to flocking the pipe others have suggested that the lack of an anchor pattern in that area is to blame. I would comment that there has never been an anchor pattern in that region and the chipping has only been observed recently. For the limited observations we made it does not appear that the disbonded FBE or cracks extend beyond the parent FBE surface.

In some locations blisters where identified and repaired. One joint was noted as having the disbonded blistering and was not repaired. There are concerns that disbonded blistered coating is being installed without being repaired.

The issue noted in the first paragraph above was discussed with PHMSA on-site. As stated above, the majority of these are hairline cracks that have occurred to the FBE applied over parent pipe coating. Because they do not extend into the bare metal or sandblasted area, there is no indication that FBE girth weld coatings have been compromised. PHMSA also saw that all pipe continues to be pre-jeeped, areas of concern or anomalies are identified and repairs have been made. In addition, all pipe continues to be jeeped again as lower-in occurs to ensure the integrity of the coating.

As stated in this audit point, what appears to have been blisters on girth welds were all repaired with the exception of one location. The anomaly in this location was about the size of a dime and no determination was made if this blister area was disbanded. To help ensure that all blistering is found and necessary repairs made, the contractor coating crews, coating inspection staff as well as the jeeping crews and inspectors will be re-educated on indentifying and repairing blisters.

57.1214 (C/O) Delayed cracking documentation-

While reviewing x-rays of cracked welds it was noticed that the documentation process for determining if an x-ray is to be considered delayed or not is difficult. When x-rays are taken the following day after weld completion it is not noted that these are delayed shots. In some instances when a weld is cut out for a crack the delayed notation "X" is replaced with a cut-out notation "N". These are only issues when trying to determine the validity and benefit of delayed NDT.

The overwhelming majority of welds that are delayed shots are identifiable on the Weld History Report. These xrays are identified by an "X" in the weld number and each has the date of acceptance. Although it appeared that delayed xrays on these cracked welds were difficult to track, we did not review all the documentation available as the focus was to review film. Enbridge will review this area to see if there is an opportunity to improve documentation. As noted by PHMSA and MNOPS, this is a new process that significantly exceeds what has been done by the industry in the past. Enbridge appreciates suggestions to improve the information/data that could benefit this study and will continue to review our process and determine if there are ways to improve the process.

58.1214 Grinding back of the long seams-

While observing the pipe gang SW of Cloquet it was observed that the engineered cuts were not getting the long seam ground back. The construction procedures require a ½ inch minimum grind back.

This was identified in a prior audit point and communicated to both inspection staff and the contractor that seams require a ½ inch minimum grind back. Spread management

brought this up at the Thursday (12/17/09) morning meeting with contractor and inspection staff. In addition, Project management has asked that this issue be addressed in an AVO with additional review at the morning contractor meeting.

Reviewed/Approved by


(initials)

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:	Welding & Coating	Pass		Type	FBE
Location:	Cloquet	Electrode Dia.		Thickness	
M.P. Station:	As Noted Below	Electrode Type			
Intersection:		Amperage		A	
Weather:	Sunny / 0 Degrees	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:		Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Paul Eberth	Project Manager	Enbridge	218-391-0442	paul.ebert@enbridge.com
Ernest Coleman	Senior Welding Inspector		903-235-9770	
Mark Spann	Surveillance Engineer	Oak Ridge National Lab	865-576-8208	spnma@ornl.gov
Boyd Haugrose	Compliance Inspector	Enbridge	218-441-2366	boyd.haugrose@enbridge.com

Notes / Observations:

MNOPS / PHMSA observed welding and coating operations in the following locations of the Cloquet Spread 6 Area:

- Ditchbank Road: The firing line / pipe gang welding operations were observed. MNOPS / PHMSA observed the pre-heat / heating process of the welding process. (MP1064 to MP1065)
- Moorhead Road: Fusion Bond Epoxy coated girth-welds were inspected for possible coating flaws. (MP1070)
- County Road 3: The tie-weld process / pre-heat process was observed at a road crossing
- MN 210 and Country Road 5: The Fusion Bond Coating process was observed from surface preparation to final coating inspection. MNOPS / PHMSA observed the sandblasting process, surface cleaning, and monitored the pre-heat temperature of the pipe prior and during the coating process. (MP1071 to MP1072)



Photograph Description
Blankets used to retain heat in girth weld area



Photograph Description
FBE Coated girth weld after holiday repair and verification of coating thickness.



Photograph Description
FBE coated girth weld immediately after coating process



Photograph Description
Tie-in welding at county road 3 road crossing

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:	Record Review	Pass		Type	
Location:	Cloquet Field Office	Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:		Amperage		A	
Weather:	Sunny / 0 Degrees	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:		Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
<i>Name</i>	<i>Title / Role</i>	<i>Company</i>	<i>Phone</i>	<i>Email</i>
George Thornton	NDT Inspector			

Notes / Observations:

Performed NDT Film review at Bemidji Field Office. MNOPS / PHMSA reviewed crack / repair films of the following girth welds:

- 801 Gas pocket in weld
- 024 Crack in weld
- 289 Crack in repair weld
- 1043 Missed repair
- 1123 IPD in weld due to High/Low

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
<i>Inspection Item:</i>	Welding & Coating	<i>Pass</i>		<i>Type</i>	
<i>Location:</i>	Cloquet	<i>Electrode Dia.</i>		<i>Thickness</i>	
<i>M.P. Station:</i>	As Noted Below	<i>Electrode Type</i>			
<i>Intersection:</i>		<i>Amperage</i>		A	
<i>Weather:</i>	Sunny / 0 Degrees	<i>Voltage</i>		V	
Pipe Information		<i>Travel Rate</i>		in / min	
<i>Pipe Size:</i>	20" & 36"	<i>Pre-Heat Temp</i>		° F	
<i>Joint Number:</i>		Soil Type:			
<i>Weld Number:</i>		Not Observed			

Personnel Observed:				
<i>Name</i>	<i>Title / Role</i>	<i>Company</i>	<i>Phone</i>	<i>Email</i>
Richard Sandell	Welding Inspector			

Notes / Observations:

Wrenshall Area: MNOPS /PHMSA observed the calibration process for setting the voltage on the jeeping equipment. During the observation, the output voltage of the jeep was not in the same range as the voltage tested used to validate the output. (Near Highway 23)

MNOPS / PHMSA observed fusion bond epoxy coating of the girth weld areas. Disbonding of the FBE coating from the factory applied coating was noted as illustrated below.

MP1064 to MP1065: MNOPS / PHMSA observed mainline welding operations in the Cloquet area. MNOPS/PHMSA noted several occasions where interpass pipe temperatures fell below the specified 250 °F preheat temperature. This issue was presented to the welders and welding inspector in the area.



Photograph Description

Observation of the jeep calibration process



Photograph Description

Voltage meter used to validate output voltage of jeep.



Photograph Description

Disbonding of FBE coating from factory applied coating.

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:	Record Review	Pass		Type	
Location:	Grand Rapids Field Office	Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:		Amperage		A	
Weather:		Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:		Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
<i>Name</i>	<i>Title / Role</i>	<i>Company</i>	<i>Phone</i>	<i>Email</i>
Dan Carol	NDT Inspector			

Notes / Observations:

MNOPS / PHMSA Reviewed NDT Films for the following areas:

11/29/2009: 67-S4-ML-1280-M

12/11/2009: 67-S4-ML-1854-M
67-S4-ML-1887-M

11/04/2009: 13-S4-ML-1329-M-K-RX

10/12/2009: 64-S4-ML-263-M
64-S4-ML-276-M

12/05/2009: 67-S4-ML-1716-M

The following weld defect rates were recorded as noted below:

20" Line: 3771 welds total with a 4.7% defect rate

36" Line: 3364 welds total with a 9.1% defect rate

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
<i>Inspection Item:</i>	Welding & Coating	<i>Pass</i>		<i>Type</i>	
<i>Location:</i>	Floodwood Area	<i>Electrode Dia.</i>		<i>Thickness</i>	
<i>M.P. Station:</i>	As Noted Below	<i>Electrode Type</i>			
<i>Intersection:</i>		<i>Amperage</i>		A	
<i>Weather:</i>		<i>Voltage</i>		V	
Pipe Information		<i>Travel Rate</i>		in / min	
<i>Pipe Size:</i>	36"	<i>Pre-Heat Temp</i>		° F	
<i>Joint Number:</i>		Soil Type:			
<i>Weld Number:</i>					

Personnel Observed:				
<i>Name</i>	<i>Title / Role</i>	<i>Company</i>	<i>Phone</i>	<i>Email</i>
Clayton Carter	Welding Inspector			
Doug Love	Welding Inspector			
James Miller	Coating Inspector			

Notes / Observations:

Floodwood Area:

MNOPS / PHMSA observed mainline welding on the 36" line near Highway 73. During observation of the pre-heat / heating process of the welding process, MNOPS/PHMSA noted several occasions where interpass pipe temperatures fell below the specified 250 ° F preheat temperature. This issue was presented to the welders and welding inspector in the area.

MNOPS / PHMSA observed the Fusion Bond Epoxy coating process near station 14370+00. MNOPS/PHMSA inspected the completed coating for flaws.

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:** **Spread 6**

Inspection Details:		Welding:		Coating:	
Inspection Item:		Pass		Type	
Location:	Carlton area	Electrode Dia.		Thickness	
M.P. Station:	MP1080, 1082	Electrode Type			
Intersection:		Amperage		A	
Weather:	cloudy, 5 deg F	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	36"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email

Notes / Observations:

On 12/7/09: Arrived at spread 6 office , met with Jeff Wiklund and Bill Bennette. Received a brief summary on current activities for spread 6. Traveled to ROW, MP1080 and 1082 where I observed a tie-in of the 36" line. Also observed a coating thickness check and jeeping (coating thickness checked at: 28.9 - 41). Coating being applied was the Denzo Protol 7125 which is their winter type per Mike Duffy. No concerns or issues were observed.

Violations / Non-Compliance Issues:

none



Photograph Description
Checking coating thickness on 36" line.



Photograph Description
Tie-in on 36" line.



Photograph Description
Tie-in on 36" line.



Photograph Description
Girth weld on 36" line.

MNOPS Pipeline Construction Inspection Guide

Inspection Date: Date Submitted: Case Number:

Inspector: Inspection Area: Spread

Inspection Details:		Welding:		Coating:	
Inspection Item:		Pass		Type	
Location:	S of Floodwood, Carlton	Electrode Dia.		Thickness	
M.P. Station:	MP1054, 1075	Electrode Type			
Intersection:		Amperage		A	
Weather:	Cloudy, 0 deg F	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	20 & 36"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email

Notes / Observations:

On 12/8/09: Arrived at spread 6 office, met with Jeff and Bill again. Talked with George Thornton and looked at some weld history data. Had George pull 3 weld reject and repair x-rays. Weld #'s: ML1098FB (burn thru), ML1125 (crack), ML024T1 (crack). Weld repair x-rays looked good for all. George stated they have been having some problems with girth weld cracks on the 36" line. The majority have all been within the last 3 joints of the pipe section (usually around the 6 o'clock position). Traveled to ROW, MP1054, observed the welding crew on the 20" line and observed installation of rock protection wrap. Talked with Henry Olson, weld amps were running (150-160) with volts (27-30). Observed preheat prior to welding and blanket wraps after. Looked at several x-rays (24hr delays) in the Jan-X truck. No concerns or issues were observed.

Violations / Non-Compliance Issues:

None



Photograph Description
Installing rock protection wrap.



Photograph Description
Melting ice/snow from 36" line using propane torch.



Photograph Description
Pre-heating prior to root pass on 20" line.



Photograph Description
Blanket wrap after welding.

CENTRAL REGION OFFICE
Daily Construction Inspection Report

Project: Enbridge Spread 2		Date: 12/03/2009
Location: Thief river Falls, MN		
Personnel Contacted: Jeff Wiklund Marc DeVarenes Tom Hodge Tony Madden Richard Fleming	Title/Position: ROW Escort Project Manager Eng & Const Manager Construction Manager Sr. Welding Inspector	Company/Affiliation: Enbridge Enbridge Enbridge Enbridge
Activities Observed/Performed: Extremely cold (low teens) and windy. Very little work was being performed. Traveled to several tie-in locations. Arrived at one above ground tie-in as the weld was being completed. The welding was being protected from the wind and cold via a tent enclosure. Only found trenching operations being performed at the other locations. Lowering in was moving to a new location and was not expected to perform any work.		
Summary: No issues.		
Inspector: Mark A. Spann P.E., CWI Oak Ridge National Laboratory For the US DOT PHMSA		

CENTRAL REGION OFFICE
Daily Construction Inspection Report

Project: Enbridge Spread 2

Date: 12/02/2009

Location: Thief river Falls, MN

Personnel Contacted:

Title/Position:

Company/Affiliation:

Jeff Wiklund	ROW Escort	Enbridge
Marc DeVarenes	Project Manager	Enbridge
Tom Hodge	Eng & Const Manager	Enbridge
Tony Madden	Construction Manager	Enbridge
Richard Fleming	Sr. Welding Inspector	
Nate Johnson	Coating Inspector	
Lon Dorman	Welding Inspector	
Jeff Sarradet	Welding Inspector	
Douglas Burgess	Welding Inspector	

Activities Observed/Performed:

Observed girth weld coating and pre-jeeping between MP 907 & 908. The coating crew has established a sequence and timing of operations to produce a pipe temperature of 120def F at the time of coating application with an ambient temperature in the mid 30s.

Jeeping is being performed by attaching the jeep ground directly to the pipe. This approach assures the indicated jeep voltage is being applied across the coating. The jeeping crew identified some scrapes in the coating at the 6 o'clock position that were smoothed down, UT'ed and found acceptable.

Traveled to 3 tie-in crews (County Rd 2, County Rd 5, and County Rd 127). Crews were paying good attention to preheat prior to starting all welding passes but all were not checking preheats during passes. Stressed the importance of maintaining the minimum preheat over the entire joint throughout all passes in the welding process.

Summary:

Preheats and heat management are going to become more difficult to maintain as ambient temperatures drop and as wind speeds increase. I stressed this point to the Project Management on several occasions.

Inspector: Mark A. Spann P.E., CWI
Oak Ridge National Laboratory
For the US DOT PHMSA

CENTRAL REGION OFFICE
Daily Construction Inspection Report

Project: Enbridge Spread 2	Date: 12/01/2009	
Location: Thief river Falls, MN		
Personnel Contacted:	Title/Position:	Company/Affiliation:
Jeff Wiklund	ROW Escort	Enbridge
Marc DeVarenes	Project Manager	Enbridge
Tom Hodge	Eng & Const Manager	Enbridge
Tony Madden	Construction Manager	Enbridge
Richard Fleming	Sr. Welding Inspector	
Nate Johnson	Coating Inspector	
Mike Evans	Welding Inspector	
Brian Greenlee	Welding Inspector	
Henry Ainley	Welding Inspector	
Activities Observed/Performed:		
<p>Observed the mainline mechanized welding just prior to its completion (MP 909). Preheat and heat management was good, and with the Serimax making the bead pass and hot pass in the same setup, there was no pipe movement between them. Ambient Temperature was in the mid 30s. Excellent use of thermal wraps to minimize heat loss between welding passes.</p> <p>Observed girth weld coating of a tie-in section near MP 907. No concerns.</p> <p>Observed tie-in welding at CR21. No concerns</p>		
Summary:		
<p>Met with project management to discuss welding heat management and jeeping procedures. Management was very receptive to observations from other projects and applying lessons learned.</p>		
Inspector:	Mark A. Spann P.E., CWI Oak Ridge National Laboratory For the US DOT PHMSA	

CENTRAL REGION OFFICE
Daily Construction Inspection Report

Project: Enbridge Spread 3 & 5

Date: 11/19/2009

Location: Bemidji, MN

Personnel Contacted:

Title/Position:

Company/Affiliation:

Boyd Haugrose	ROW Escort	Enbridge
Jack Olin	Project Manager	Enbridge
Tommy Shiflett	Construction Manager	Enbridge
Van Wyatt	Chief Inspector 5	Enbridge
AV Forbes	Assistant Chief Inspector 5	Enbridge
Steve Browning	Senior Welding Inspector 5	Enbridge
Ronnie Whitaker	Chief Inspector 3	Enbridge
Bobby Gillespie	Assistant Chief Inspector 3	Enbridge
Phil Russell	Senior Welding Inspector 3	Enbridge

Activities Observed/Performed:

Traveled to Clearbrook Station area.

Observed Girth weld coating and jeeping. Crew was doing a good job of cleaning the pipe prior to jeeping. Holiday repairs with patch stick were being done properly. Observed several very small holidays being detected.

Observed Tie-in weld. Arrived on site after initial bead pass was completed. Preheats were being well maintained. RT found a gas pocket defect. Repair was performed correctly. The ground was secured to the pipe with a bungee.

Observed trenching and lowering in. The pipe was covered with a protective blanket while excavated dirt was being moved over it. Lowering in was well planned and there was no excessive movement.

Summary: Jeeping

Enbridge Specification C-310 "Coating of Girth Welds with Fusion Bonded Epoxy" Section 8.3.1 states "the APPLICATOR shall test each girth weld for coating integrity using a holiday detector operating at 1400 to 1700 volts D.C." The operating voltage is not an indication of the actual voltage being applied across the coating unless the grounding tail of the jeep is directly connected to the pipe. In the observed operation, the grounding tail was being dragged on the ground, and the resulting voltage being applied across the coating was being reduced by the resistance of the soil. There are calibration techniques which make allowances for additional resistances in the system.

Inspector: Mark A. Spann P.E., CWI
Oak Ridge National Laboratory
For the US DOT PHMSA

CENTRAL REGION OFFICE
Daily Construction Inspection Report

Project: Enbridge Spread 3 & 5	Date: 11/18/2009																														
Location: Bemidji, MN																															
<table style="width: 100%; border-collapse: collapse;"><thead><tr><th style="width: 33%;">Personnel Contacted:</th><th style="width: 33%;">Title/Position:</th><th style="width: 33%;">Company/Affiliation:</th></tr></thead><tbody><tr><td>Boyd Haugrose</td><td>ROW Escort</td><td>Enbridge</td></tr><tr><td>Jack Olin</td><td>Project Manager</td><td>Enbridge</td></tr><tr><td>Tommy Shiflett</td><td>Construction Manager</td><td>Enbridge</td></tr><tr><td>Van Wyatt</td><td>Chief Inspector 5</td><td>Enbridge</td></tr><tr><td>AV Forbes</td><td>Assistant Chief Inspector 5</td><td>Enbridge</td></tr><tr><td>Steve Browning</td><td>Senior Welding Inspector 5</td><td>Enbridge</td></tr><tr><td>Ronnie Whitaker</td><td>Chief Inspector 3</td><td>Enbridge</td></tr><tr><td>Bobby Gillespie</td><td>Assistant Chief Inspector 3</td><td>Enbridge</td></tr><tr><td>Phil Russell</td><td>Senior Welding Inspector 3</td><td>Enbridge</td></tr></tbody></table>		Personnel Contacted:	Title/Position:	Company/Affiliation:	Boyd Haugrose	ROW Escort	Enbridge	Jack Olin	Project Manager	Enbridge	Tommy Shiflett	Construction Manager	Enbridge	Van Wyatt	Chief Inspector 5	Enbridge	AV Forbes	Assistant Chief Inspector 5	Enbridge	Steve Browning	Senior Welding Inspector 5	Enbridge	Ronnie Whitaker	Chief Inspector 3	Enbridge	Bobby Gillespie	Assistant Chief Inspector 3	Enbridge	Phil Russell	Senior Welding Inspector 3	Enbridge
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Ronnie Whitaker	Chief Inspector 3	Enbridge																													
Bobby Gillespie	Assistant Chief Inspector 3	Enbridge																													
Phil Russell	Senior Welding Inspector 3	Enbridge																													
Activities Observed/Performed: Traveled to Field Office on CR-404. Extensive discussions with Sr Welding Inspector about bead cracking problem. Reviewed radiographs of several cracked welds. Only one joint showed good on first RT then showed cracking in the delayed RT. Observed Tie-in at Cedar Lane near Deer River. Welder's helpers were using 300 deg temp sticks. Observed Main Line Welding at Schoolcraft Rd near Deer River. Preheats were good, and pipe movement after the bead pass was being minimized. The firing line supervisor was sequencing the welders in an effort to minimize cyclic heating and cooling. All joints were being wrapped post welding to slow down the cooling.																															
Summary: Did not observe any ground connectors being bungeed to the pipe. This was not in their specification, but I had seen some email traffic on the subject.																															
Inspector: Mark A. Spann P.E., CWI Oak Ridge National Laboratory For the US DOT PHMSA																															

CENTRAL REGION OFFICE
Daily Construction Inspection Report

Project: Enbridge Spread 3 & 5

Date: 11/17/2009

Location: Bemidji, MN

Personnel Contacted:	Title/Position:	Company/Affiliation:
Boyd Haugrose	ROW Escort	Enbridge
Jack Olin	Project Manager	Enbridge
Tommy Shiflett	Construction Manager	Enbridge
Van Wyatt	Chief Inspector 5	Enbridge
AV Forbes	Assistant Chief Inspector 5	Enbridge
Steve Browning	Senior Welding Inspector 5	Enbridge
Ronnie Whitaker	Chief Inspector 3	Enbridge
Bobby Gillespie	Assistant Chief Inspector 3	Enbridge
Phil Russell	Senior Welding Inspector 3	Enbridge

Activities Observed/Performed:

Discussed project status and weld cracking issue. Project management has done a good job of systematically evaluating the weld cracking problem and bringing Subject Matter Experts in to assist. They have reduced but not eliminated the problem.

Attended safety and environmental training.

Saw a presentation of the GIS system and database that maintains constructions records and traceability. It is a well thought out and tightly integrated system.

Observed mainline welding NW of Bemidji in a wet land. Concrete coated pipe. Very slow going. Line ups and preheats were good. Initial preheater was using a 300 deg temp stick. Welders helpers with the bead crew were checking to ensure the entire joint was still above 250 when welding started.

Summary: No Issues

Inspector: Mark A. Spann P.E., CWI
Oak Ridge National Laboratory
For the US DOT PHMSA

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:	Record Review	Pass		Type	
Location:	Bemidji Field Office	Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:		Amperage		A	
Weather:	45 Degrees / Cloudy	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	20" & 36"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Boyd Haugrose	Compliance Inspector	Enbridge	218-441-2366	boyd.haugrose@enbridge.com

Notes / Observations:

MNOPS performed a record review at the Bemidji Field Office for the Alberta Clipper Project. MNOPS reviewed the following records:

Welder Qualification Record Review

Repair Welding Inspector Report for the day 11/9/2009

- (7) Repairs were made to the 36" Line
- (1) Repair was made to the 20" Line

Reviewed Daily Reports for the 20" and 36" Spreads for the day of 11/4/2009.

- Potholing Reports
- Clearing & Grading Reports
- Coating Reports
- Welding Reports

-- During a daily report record review for the day of 11/4/2009 (36" Alberta Clipper Spread), MNOPS reviewed a Welder Inspection Check Sheet (Report #25). The noted report listed welding voltages that ranged from 21 to 34 volts on the first pass using the 5/32" welding rod. Upon further investigation, it was noted that an alternate welding rod (E8010) was used. It was recommended that the records include the electrode type if an alternate is to be used.

Violations / Non-Compliance Issues:

No violations or non-compliance issues noted during the record review.

MNOPS Pipeline Construction Inspection Guide

Inspection Date: Date Submitted: Case Number:

Inspector: Inspection Area:

Inspection Details:		Welding:		Coating:	
Inspection Item:	Welding	Pass	Tie In Crew		Type
Location:	Bemidji Access Road 49	Electrode Dia.			Thickness
M.P. Station:	MP 957 (STA 9351+29)	Electrode Type			
Intersection:		Amperage		A	
Weather:	45 Degrees / Cloudy	Voltage		V	
Pipe Information		Travel Rate	12	in / min	
Pipe Size:	36"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:		Sand			

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Rick Ary	Welding Inspector	Enbridge		

Notes / Observations:
 Observed welding process by tie-in crew on 36" pipe near access road 49.

Violations / Non-Compliance Issues:
 No violations or non-compliance issues noted.



Photograph Description
 Tie-in Welding Process on 36" Pipe



Photograph Description
 Blankets used to retain heat at joint during and after welding process

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
<i>Inspection Item:</i>	Coating	<i>Pass</i>		<i>Type</i>	FBE
<i>Location:</i>	Bemidji	<i>Electrode Dia.</i>		<i>Thickness</i>	22 mils to 35 mils
<i>M.P. Station:</i>	STA 8640+40 to STA 8717+00	<i>Electrode Type</i>		460 to 480 Degree Preheat	
<i>Intersection:</i>	MP 936.9	<i>Amperage</i>		Temperature for FBE Coating	
<i>Weather:</i>	45 Degrees / Cloudy	<i>Voltage</i>		Process	
Pipe Information		<i>Travel Rate</i>		<i>in / min</i>	
<i>Pipe Size:</i>	36"	<i>Pre-Heat Temp</i>		<i>° F</i>	
<i>Joint Number:</i>		Soil Type:			
<i>Weld Number:</i>					

Personnel Observed:				
<i>Name</i>	<i>Title / Role</i>	<i>Company</i>	<i>Phone</i>	<i>Email</i>
John Rayon	Coating Inspector			
KD Lloyd	Coating Inspector			
Heath Taylor	Coating Foreman			

Notes / Observations:
 Observed the jeeeping, patch stick repair and Fusion Bond Epoxy Coating process of the 36" pipe.

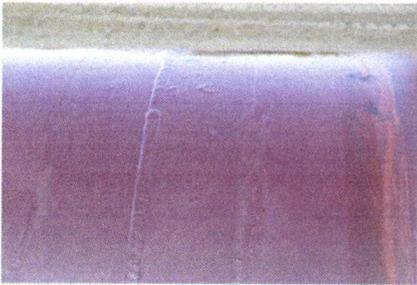
Violations / Non-Compliance Issues:
 No violations or non-compliance issues noted.



Photograph Description
 FBE Coating Process



Photograph Description
 Preheat Stage of FBE Coating Process



Photograph Description
 FBE coated girth weld (Note that the "bumps" in the final coating are a result of excess coating falling on the pipe after the coating ring is removed. These bumps are not blistering in the coating.)

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:	One-Call Process Review	Pass		Type	
Location:	Bemidji 404 Field Office	Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:	CR404	Amperage		A	
Weather:	45 Degrees / Cloudy	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:		Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
<i>Name</i>	<i>Title / Role</i>	<i>Company</i>	<i>Phone</i>	<i>Email</i>
Matt Sandline		USPL		
Ed Bonebreak	Safety Coordinator	USPL		
Brad Davenport	Locate Coordinator			

Notes / Observations:

- MNOPS reviewed the process for obtaining, updating and documenting Gopher State One Call tickets for spreads 3 and 5 of the Alberta Clipper Project. During a conversation with USPL , the process was outlined to included how the tickets are obtained, updated and how locate marks are preserved / refreshed.
- MNOPS reviewed the following tickets during the GSOC process review
 - 90453937
 - 90453959
 - 90453988
 - 90487191
 - 90408719
 - 90487201
 - 90515034
 - 90515048
 - 90515054
 - 90558481
 - 90558484
 - 90558485
 - 90588692
 - 90558870
 - 90588773

The ticket listed noted above includes the original ticket number along with the updates to the original tickets.

Violations / Non-Compliance Issues:

No violations or non-compliance issues noted.

MNOPS Pipeline Construction Inspection Guide

Inspection Date: Date Submitted: Case Number:

Inspector: Inspection Area:

Inspection Details:		Welding:		Coating:	
Inspection Item:	Welding	Pass	First	Type	
Location:	Deer River	Electrode Dia.		Thickness	
M.P. Station:	STA 11605+00	Electrode Type			
Intersection:	Cedar Road	Amperage	A		
Weather:	45 Degrees / Cloudy	Voltage	V		
Pipe Information		Travel Rate	in / min		
Pipe Size:	36"	Pre-Heat Temp	311	° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Dave Williams	Welding Inspector	Enbridge		

Notes / Observations:
 --Observed firing line welding process of the 36" line near Deer River. MNOPS observed the preheat process prior to welding and between each pass.

Violations / Non-Compliance Issues:
 No violations or non-compliance issues noted.



Photograph Description
 Firing Line



Photograph Description
 Alignment of the pipe prior to the welding process.



Photograph Description
 Preheat Process prior to welding.



Photograph Description
 Welding Inspector Monitoring the preheat temperature.

Exit Interview
Enbridge Southern Lights Construction Inspection
November 10, 2009
Manhattan Terminal
Manhattan, IL

Records Review Issues

1. It was noted on review of the pressure test records of the 150# series piping that the pressure dropped 3 psi during the test. ***Enbridge is to provide further documentation and an explanation why this pressure test is valid considering the 3 psi pressure drop.***
2. It was noted on review of the NDE reader sheets that welds W-1300-026 SW and 027 SW did not have an accepted/rejected notation. ***Enbridge is to provide follow up documentation to indicate the disposition of these two welds.***
3. It was noted on review of the NDE reader sheets that two welds on pressure test headers were not acceptable welds, yet the headers were used for pressure testing without repairing the welds. ***Enbridge is to provide follow up documentation on the procedure for verifying the integrity of pressure test header welds and an explanation why these two welds were not repaired.***

Thank you for your prompt attention to the issues listed.

Exit Interview
Enbridge Southern Lights Construction Inspection
November 9-10, 2009
Manhattan to Streator 20" line
Morris, IL

No issues to discuss.

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Lights (20")		Date: 11_10_09
Location: Morris, IL Manhattan to Streator 20" line Manhattan Station		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Carter Saline	Construction Manager	Enbridge (contract)
Dave Stafford	Compliance	Enbridge
Jacob Weertz	Mechanical inspector	Contractor
Kelly Harless	Construction Manager	Enbridge (contract)
Glen Jones	Project Specialist	Enbridge
Jeff Creaney	Design Specialist	ENEngineering
Activities Observed/Performed:		Results/Comments:
<p>Manhattan to Streator 20" line</p> <p>1. Discussed ACVG survey plans with ENEngineering. Approximately one half of the mainline has been surveyed. No indication how many areas will be investigated.</p> <p>Manhattan Station</p> <p>2. Reviewed hydrotest records to date on station piping. Noted a 3 psi pressure drop during the 150 pound series pressure test.</p> <p>3. Reviewed the reader sheets and noted that welds W-1300-026 SW and 027 SW were not marked as accepted or rejected.</p> <p>4. Noted on reader sheets that two welds on a hydrotest header did not pass the radiograph.</p>		<p>1. No issues</p> <p>2. Enbridge to provide followup documentation to explain the three psi pressure drop.</p> <p>3. Enbridge to review these welds with NDE technician.</p> <p>4. Enbridge to provide explanation what their procedure for acceptance of fabricated test headers is and why the radiographed welds were not repaired.</p>
Summary:		
Enbridge to respond to issues 2, 3 and 4		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Lights (20")		Date: 11_09_09
Location: Morris, IL Manhattan to Streator 20" line	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Carter Saline	Construction Manager	Enbridge (contract)
Dave Stafford	Compliance	Enbridge
Josh Schults	Engineer	Enbridge (contract)
Josh Matthews	Coating inspector	contractor
Activities Observed/Performed:		Results/Comments:
<p>Pipeline has been completely welded out, except for hydro test tie in points and the Jordan Creek crossing. West segment is under hydro test 11/9. ENEngineering is doing ACVG of the line, starting on the west segment.</p>		
<ol style="list-style-type: none"> 1. Reviewed weld log history. 2. Reviewed hydro test plan for west segment. Segment got to test pressure at ~ 3:15 pm on 11/9. 3. Observed Jordan Creek crossing site east of Old Chicago Road. This was originally planned as a bore, but the contractor hit substantial rock and it will be open cut. Should be completed the week of 11/9. 4. Observed costing of 3 tie in welds west of Route 53. Extremely wet conditions, blaster hat problems keeping water off the pipe when blasting the bottom. They are currently heating the pipe to ~300 degrees F before blasting, but not applying the two part epoxy until the pipe cooled to 212 degrees F. 		<ol style="list-style-type: none"> 1. No issues 2. No issues 3. No issues 4. No issues. Pipe was blasted properly and coating was applied properly.
Summary:		
No issues.		
Inspector(s): Carl Griffis		

From: Pierzina, Brian (PHMSA)

Sent: Monday, November 16, 2009 10:26 AM

To: Boyd Haugrose; David Hoffman; Jeffrey Wiklund

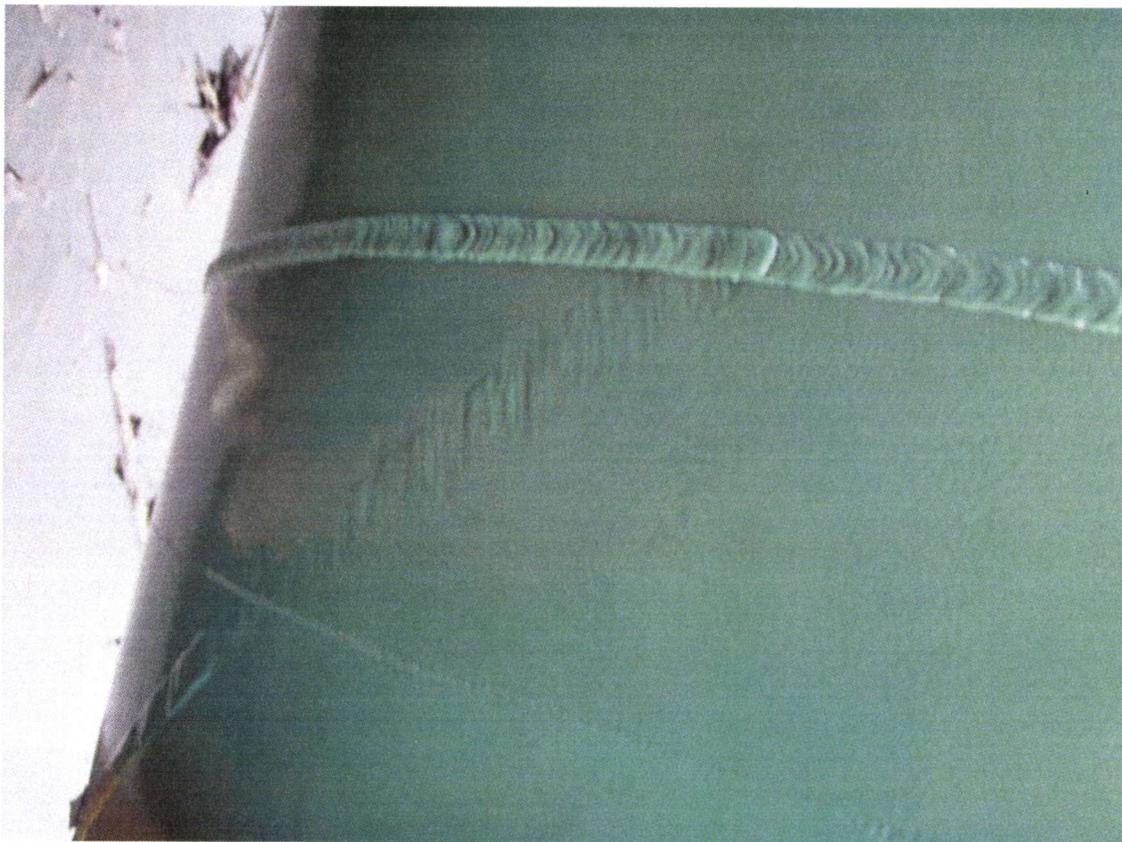
Cc: Lemmerman, Darren (PHMSA); Gulstad, Rick (PHMSA); Skalnek, Elizabeth; Huntoon, Ivan (PHMSA); Bradley.Ardner@state.mn.us

Subject: Exit Interview - Spread 6

The following are issues noted during inspections the week of November 2nd. Let us know if you have any questions.

Thanks,
Brian

1. At some transition pups it was observed that the spiral weld seam had not been ground off adjacent to the girth weld. This was mentioned at the inspector meeting the following morning by Avery Schott, emphasizing that Enbridge's specifications require the seam to be ground off a minimum of 1/2-inch from the girth weld.
2. At weld # ML-251 grinder marks were evident where the spiral weld seam was ground off adjacent to the girth weld. Subsequent review of the x-ray associated with this weld indicated the marks were excess weld metal, and that wall thickness was not compromised.



3. Coating blisters were identified on a number of coated welds, and the coating at these blisters was not adhered to the pipe. Project personnel performed an inspection the next day of 138 welds and identified a total of 29 in which this occurred, and these areas were to be sand blasted and re-coated. Personnel have been informed to watch for this during the coating operation.



**CENTRAL REGION OFFICE
Daily Construction Inspection Report**

Project: Alberta Clipper/Southern Lights Audit		Date: 11/2-6/2009
Location: Superior, WI, Cloquet, MN	Station/Survey or Pipeline Marker:	Spread 6 Office, Multiple sites from Superior Terminal to Carlton, MN
Personnel Contacted:	Title/Position:	Company/Affiliation:
Paul Eberth	Project Manager	Enbridge
Earnest Coleman	Sr. Welding Inspector – Spread 6	EnGlobal
Avery Schott	Construction Manager – Spread 6	Enbridge
Bob Grenfell	Chief Inspector – Spread 6	EnGlobal
George Thornton	NDE Auditor – Spread 6	EnGlobal
Jeff Wiklund	Sr. Compliance Specialist	Enbridge
Dave Hokanson	Field Engineer – Spread 6	Enbridge
Greg Miller	Welding Inspector – Spread 6 Pipe Gang	Mustang
Henry Olson	Welding Inspector – Spread 6 Hot Fill	Mustang
Mike Holloway	Welding Inspector – Spread 6 Firing Line	Mustang
Daryle Smith	Welding Inspector – Spread 6 – Tie-In	Mustang
Mark Newman	Mgr. Facilities Design and Construction	Enbridge
Bill Fotovich	Construction Manager – AC Facilities	Enbridge
Dave Lichtenberg	Project Mgr – Superior Terminal (excl. tanks)	Enbridge
Activities Observed/Performed:		

November 2, 2009 – Travel Day

November 3, 2009 - Brian Pierzina met with Paul Eberth, Avery Schott, Jeff Wiklund, Dave Hokanson, Ernie Coleman and George Thornton at the Spread 6 construction office, near Cloquet. An update on Spread 6 activities was provided. The pipe gang has been shut down due to a lack of swamp mats, and difficult right-of-way conditions due to recent rainfall. There was one recent crack on a 36 inch girth weld. This was at the Nemadji Golf Course, and occurred on a weld which only had the root and hot pass completed before operations were shut down due to rain. The weld was completed the next day, and x-ray indicated a crack at the 6:00 position. As a result of cracks occurring at other spreads, they are going for close to 100% delayed NDT on all welds. They are missing some tie-in welds, and drill strings where it is not practical to wait an additional day for another x-ray. There are currently five tie-in crews working, and the mini-gang is welding up a 36-inch HDD string for the Pokegema River crossing and the wetland HDD (5000 feet). We reviewed the WP-140 PQR (procedure qualification record), and discussed circumstances in which the amperage ranges specified in the welding procedure were not supported by the PQR. This does not appear to be a compliance issue, based on PHMSA staff discussions. X-rays were reviewed with George Thornton, including ML-289, which was the cracked weld, ML-147, which was a 36-inch girth weld which required a visual inspection for a gouge, and ML-195, which was a 36-inch girth weld which had a gouge identified, and tested for thickness by ultra-sonic testing. Following the x-ray review, we met briefly with Jim Crawford, Project Director, and discussed overall thoughts associated with the project.

Right-of-way inspection included 36-inch pipe which had been welded and coated from Bardon Avenue, in Superior to the Nemadji Golf Course. At weld # ML-251 grinder marks were evident where the spiral weld seam was ground off adjacent to the girth weld. Subsequent review of the x-ray associated with this weld indicated the marks were excess weld metal, and that wall thickness was not compromised. At some transition pups it was observed that the spiral weld seam had not been ground off adjacent to the girth weld. This was mentioned at the inspector meeting the following morning by Avery Schott, emphasizing that Enbridge's specifications require the seam to be ground off a minimum of ½-inch from the girth weld. Coating blisters were identified on a number of coated welds, and the coating at these blisters was not adhered to the pipe. An inspection the next day of 138 welds identified a total of 29 in which this occurred, and these areas were to be sand blasted and re-coated. Personnel have been informed to watch for this during the coating operation.

November 4, 2009 – Attended the 6:15 AM daily inspector meeting. Avery Schott covered our observations from the previous day, emphasizing compliance with the specifications. With regard to the coating problems that were identified, Enbridge has been in contact with the coating manufacturer, and they believe the issue stems from pipe that has been stored for extended periods absorbing moisture into the pipe and coating. If the pipe is heated too rapidly when the girth welds are coated the moisture flashes as steam, and blisters the coating. Their solution has been to slowly preheat the area with a propane fired torch, prior to using the heat rings for the coating application. The problem had surfaced early on in the project, and that approach appeared to resolve it. It's unclear whether the re-surfacing of the problem was due to not following the established approach, or some other phenomenon. Reviewed x-rays of welds that were selected from field observations the previous day. No issues were identified.

Field observations in the AM with Paul Eberth included 36-inch pipe east of Wrenshall which had been welded and coated. It was noted that some pipe ends were lacking end caps, and one girth weld (ML-67 FAAR) had coating which was cracked and able to be peeled off over the original pipe coating. This was noted to Paul Eberth and a request was made to have it evaluated to ensure there was an adequate bond prior to reaching the transition to the girth weld. At girth weld ML 26 an area appeared to have been marked for a coating repair, but no repair had been made. The repair area that was marked was near the 9:00 position along the weld cap. We went to the Pokegema River crossing area where the 36-inch HDD string was being welded by the Mini-Gang. Welding Inspectors were Greg Miller – Pipe Gang (root and hot pass), Henry Olson (hot fill), and Mike Holloway (Firing Line). Weld quality has generally been good, although two recent repairs had been identified for elongated slag inclusions (ESI).

November 4, 2009 – PM Observations. Primarily observed tie-in locations with Bob Grenfell, Chief Inspector. At County Road 4 (Station #9268 +22), weld ML-019-TI-BB had recently been completed. Further to the east, the MP 1083D creek crossing was being moved into place. This was an open cut crossing, with water being pumped across. The top soil vegetation had been separated and bagged. Welding would not commence until they had the pipe properly in place. Upstream of County Road 3, tie-in welds 67, 68, and 69 were being completed. Weld #69 had a repair being made for a gas pocket at approximately 1:00. Each of these welds were also designated for delay shots the next day. Observed the repair welder and helper grind out the defect and make the repair. The repair was ground out again after the hot pass due to a problem the welder identified. The fill and cap passes were completed with 7018 electrodes and an uphill welding direction. At the West Chub Lake (MP 1076) location, the crew was still in the process of digging out the drill end. We then proceeded to the Douglas Pit area, where blasting operations were necessary due to excessive rock in a lowland area. No issues were identified.

November 5, 2009 – Met Ernie Coleman at the Spread 6 construction office and discussed welding issues. Met with George Thornton and reviewed x-rays selected from the previous day's observations. No issues were identified. Conducted field observations with Bob Grenfell. We visited a tie-in location east of the Douglas Pit. We proceeded to Little Otter Creek where a blasting operation was to commence, once the hot line pressures were reduced to designated levels. We observed the blasting operations, then went to a tie-in location at Chub Lake Park Road. At that location, the tie in crew were going to be completing their 6th and 7th tie-in welds of the day. There were some difficulties with the ditch encountered, so the pipe was removed, and ditching operations resumed. No issues were identified.

November 6, 2009 – Met at the City Center offices in Superior, WI with Mark Newman – Mgr. Facilities Design and Construction, Bill Fotovich – Facilities Construction Manager (Alberta Clipper), Dave Lichtenberg – Project Manager – Superior Terminal (excluding tanks), and Jeff Wiklund – Sr. Compliance Specialist. The scope and status of Facilities Construction were the primary focus of the meeting. Other individuals involved with the construction, but not present for the meeting are Volmer Anderson – Facilities Construction Manager (Southern Lights) and Bob Lisi – Construction Manager (Tanks).

The 20-inch relief line for Alberta Clipper is constructed and hydrotested. The first phase of the project allows Alberta Clipper to tie into existing tankage, and is scheduled for completion by 3/31/2010. This includes manifold #212, which is a heavies manifold which will tie into 10 existing tanks. Manifold #223 will include 32 valves. Manifold #225 will be located at the five new tanks which are being constructed. Construction of the first three tanks is scheduled for completion at the end of 2010.

The mechanical portion of the Phase 1 construction was estimated as 85% complete by Dave Lichtenberg. Approximately 220 welds have been completed, with two welds requiring repair. The welding procedures are not the same as those being used on main line construction, so electronic copies of the welding procedures and construction specifications were requested.

Summary:

Issue Summary

1. At some transition pups it was observed that the spiral weld seam had not been ground off adjacent to the girth weld. This was mentioned at the inspector meeting the following morning by Avery Schott, emphasizing that Enbridge's specifications require the seam to be ground off a minimum of ½-inch from the girth weld.
2. At weld # ML-251 grinder marks were evident where the spiral weld seam was ground off adjacent to the girth weld. Subsequent review of the x-ray associated with this weld indicated the marks were excess weld metal, and that wall thickness was not compromised.
3. Coating blisters were identified on a number of coated welds, and the coating at these blisters was not adhered to the pipe. Project personnel performed an inspection the next day of 138 welds and identified a total of 29 in which this occurred, and these areas were to be sand blasted and re-coated. Personnel have been informed to watch for this during the coating operation.

Inspector(s): Brian Pierzina

MNOPS Pipeline Construction Inspection Guide

Inspector: Elizabeth Skalneki
Case Number: 109724

AFO: 5

Summary of Inspection Items:

Inspection Date	Inspection Area	Inspection Summary	Page Reference
Cut/Paste From Main	Cut/Past From Main	Cut / Paste From Daily	Enter Page Here
10/27/2009	Spread 3 (Clearbrook to Deer River)		
10/27/2009	Spread 5 (Clearbrook to Deer River)		
10/28/2009	Spread 3 (Clearbrook to Deer River)		
10/28/2009	Spread 5 (Clearbrook to Deer River)		
10/29/2009	Spread 1 (ND to Clearbrook)		
10/29/2009	Spread 2 (ND to Clearbrook)		
10/30/2009	Spread 4 (Deer River to Superior)		
10/30/2009	Spread 6 (Deer River to Superior)		

Summary Personnel Observed:

Name	Title / Role	Company	Phone	Email
Dwight Vaughn	Inspector			
Shannon Jackson	Welder	US Pipeline		
Joe Thornhill	Inspector			
Dave Williams	Welding Inspector			
Troy Post	Welder			
Mark DeWeise	Welding Auditor			
John Werner	X Ray			
Larry Poston	Lower-In Weld	spread 3		
Marc Darennes	Construction Engineering Mgr	spread 1&2		
Dave Hoffman	Supervisor, US Compliance			
Jack Olin	Manager, Pipeline Engr & Const			
Dan Carroll	NDT Level III			
Corey Stovall	Utility Inspector			
John Rayon	Coating - Craft	spread 3		
KD Lloyd	Coating - Craft	spread 3		
Dale Pylard	Sr Welding Inspector			
Dallas Deshan	Sr Welding Inspector			
Paul Eberth	Project Manager			
Avery Schott	Contract Inspection			
David Hokanson	Field Engineer			
George Thornton	NDT Level II			
Bill Bennett	Sr Welding Inspector			
Ernie Coleman	Sr Welding Inspector			

Summary of Inspection Observations:

An inspection of spreads 1,2,3,4,5,6 and 404 was made October 27-30 with a travel day on October 26, 2009.. Welding, coating, bending and records were observed. No violations were noted. Several welders have been discharged for poor welding quality (reject rate high). Arc burn cutout were noted on some spreads but not on other spreads; what is different? One spread is not doing delayed x ray on tie in welds; however, no cracks have yet been detected on the delay xray that were not detected on the initial xray. Recent discussion with KOCH suggests that all of their cracks may have been present but not detected on initial xrays. It is not clear that cracking problems in MN have been the result of delayed hydrogen cracking.

Best practices observed:

- All X-rays and UT scans are read in the field and reviewed in the office by a second NTD. person.
- Repair Weld Parameter Record Sheet used to record all welding parameters for repair welds (not used on all spreads)
- Cut Out Log developed by Dan Carroll, Level III NDT (replaced NDT person who missed the bad weld repair)
- Cut outs are being segregated in a specific area on one spread
- High reject rate tied to welder discharge on most spreads - one spread is not discharging welders with a number of rejects; coincidentally, this spread has a higher overall reject rate?

Special repair blanket for weld repairs with a cutout for the repair area (see photos daily 2)

Summary of Violations & Non-Compliance Issues.

No violations or non-compliances observed; however, there were some inconsistencies between spreads on observed best practices. The previously noted non-compliance of an improperly accepted xray on a repair weld resulted in discharge of the field xray hand and the office xray reviewer; the office reviewer was replaced with an NDT level III. All xrays performed by or reviewed by those responsible for the mistake were reevaluated; no additional repairs were required. The failed weld was cut out (no repair of repair allowed)

MNOPS Pipeline Construction Inspection Guide

Inspector:

ESS

Case Number:

109724

<i>Inspection Date</i>	<i>Inspection Area</i>	<i>Create Daily Report</i>	<i>Date Submitted</i>
10/27/2009	Spread 3 (Clearbrook to Deer River)	●	11/19/2009
10/27/2009	Spread 5 (Clearbrook to Deer River)	●	11/19/2009
10/28/2009	Spread 3 (Clearbrook to Deer River)	●	11/19/2009
10/28/2009	Spread 5 (Clearbrook to Deer River)	●	11/19/2009
10/29/2009	Spread 1 (ND to Clearbrook)	●	11/19/2009
10/29/2009	Spread 2 (ND to Clearbrook)	●	11/19/2009
10/30/2009	Spread 4 (Deer River to Superior)	●	11/19/2009
10/30/2009	Spread 6 (Deer River to Superior)	●	11/19/2009
		●	
		●	

MNOPS Pipeline Construction Inspection Guide

Inspection Date: Date Submitted: Case Number:

Inspector: Inspection Area:

Inspection Details:		Welding:		Coating:	
Inspection Item:	Bending	Pass		Type	
Location:	MP 937	Electrode Dia.		Thickness	
M.P. Station:	8713+92	Electrode Type			
Intersection:		Amperage	A		
Weather:		Voltage	V		
Pipe Information		Travel Rate	in / min		
Pipe Size:	36" .469 WT	Pre-Heat Temp	° F		
Joint Number:		Soil Type:			
Weld Number:		Silt / Sand			

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Dwight Waugh	Inspector			

Notes / Observations:

Jennings
 Bending machine best practices: TruBend automated bend radius detection
 Bending machine pulls pipe ~10" per increment.
 This bend is a 19-3/4 degree right hand bend with a 3/4 degree overbend.

Violations / Non-Compliance Issues:

None



Photograph Description
 Bending machine - distance



Photograph Description
 Bending machine - close up



Photograph Description
 Bending rig mandrel



Photograph Description
 Bend area

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December 4, 2009

To: Marc DeVarenes Jack Olin Paul Eberth
 Tony Madden Tommy Shiflett Avery Schott

Re: MNOPS Audit Issues 48-50 (November 3-5, 2009) and PHMSA Audit Issues
51-53 (November 2-6, 2009)

Attached is a summary of PHMSA and MNOPS audit findings and their
disposition based on audits that occurred on the dates above on spreads 2, 3, 5
and 6. Please review these findings/responses and ensure that contractor and
inspection staff are informed and take appropriate action.

Please positively confirm with me by email when these actions are completed. I
appreciate your prompt attention to these matters.

A handwritten signature in black ink, appearing to read "Jim Crawford", written over a horizontal line.

Jim Crawford

cc: Dan Plume, Tom Hodge, Shaun Kavajecz, Dave Hoffman,
Jerrid Anderson, Randy Rice, Carter Saline

Regulatory Compliance Audit Report

Alberta Clipper/Southern Lights (Clearbrook, MN to Superior, WI)

Report Number: 8

Date of Report: December 4, 2009

Preparer: Jeff Wiklund

Audit Reference(s): The responses contained in this report reference Audit Issues/Comments found in the November 2-6, 2009 PHMSA audit and the November 3-5, 2009 MNOPS audit. Audit points and comments were communicated to Boyd Haugrose and Dave Hoffman in the following emails:

- email received from Brian Pierzina (PHMSA) on November 16, 2009
- audit report received from Brad Ardner on November 11, 2009

Please note that audit communications and observations by PHMSA or MNOPS, when made, are included in this report but are prefaced by (C/O).

Audit Issues (from Tracking Spreadsheet) / Resolution:

48.1103	(C/O) 11/3/09 – Received Project overview briefing from Boyd Haugrose. Went out to Spread 2 ROW to observe the automated welding and NDT (MP 887). Michels is doing the welding, Janx the NDT. Spoke with both crews and everything appeared to be going well. No deficiencies or discrepancies were noted on the ROW. May be welded out by Thanksgiving. This is a comment /no follow-up action is required.
49.1103	(C/O) 11/4/09 – Headed out on the Spread 3&5 ROW. Observed pipe gang and firing line (MP 956), clearing and grading (MP 964), tie-in welding and backfill (MP 951), coating and jeeeping (MP 952). No deficiencies or discrepancies were noted on the ROW. Enbridge has switched to Deso Protal 7125 for a winter coating application. This is a comment /no follow-up action is required.
50.1103	(C/O) 11/05/09 – Conducted an out-briefing with Boyd Haugrose, Jack Olin, and Dan Plume. The discussion centered on the proactive steps Enbridge is taking to address the recent discoveries of cracking in the welds. The samples that have been cut out will/have been sent to a laboratory in Canada. Please also provide the results of metallurgical analyses when they are received. Metallurgical analyses have not been received. Enbridge will continue to update MNOPS and PHMSA on crack issues.
51.1102	(C/O) At some transition pups it was observed that the spiral weld seam had not been ground off adjacent to the girth weld. This was mentioned at the inspector meeting the following morning by Avery Schott, emphasizing that Enbridge's specifications require the

seam to be ground off a minimum of ½-inch from the girth weld.

This issue was resolved on site.

52.1102 (C/O) At weld # ML-251 grinder marks were evident where the spiral weld seam was ground off adjacent to the girth weld. Subsequent review of the x-ray associated with this weld indicated the marks were excess weld metal, and that wall thickness was not compromised. This issue was resolved on site.

53.1102 Coating blisters were identified on a number of coated welds, and the coating at these blisters was not adhered to the pipe. Project personnel performed an inspection the next day of 138 welds and identified a total of 29 in which this occurred, and these areas were to be sand blasted and re-coated. Personnel have been informed to watch for this during the coating operation.
Sandblasting according to coating specifications and employing preheat processes to remove any excess moisture in the factory FBE coating continue to be employed. In addition, crews continue to be made aware of the need to conduct thorough inspections to ensure that coating anomalies, including blistering, are found and repaired. The process to ensure anomalies are found and repaired includes both visual inspections and jeeping .

Reviewed/Approved by


(Initials)

MNOPS Pipeline Construction Inspection Guide

Inspection Date: Date Submitted: Case Number:

Inspector: Inspection Area:

Inspection Details:		Welding:		Coating:	
Inspection Item:	Welding - Repair Porosity	Pass		Type	FBE
Location:	Potlatch Cass Lake	Electrode Dia.	3/32	Thickness	
M.P. Station:	9294+45	Electrode Type	8018 C3 H4R		
Intersection:	Cty 45 & US 2	Amperage		A	
Weather:	Cloudy 42 F	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	36" 0.469 WT	Pre-Heat Temp	400	° F	
Joint Number:		Soil Type:			
Weld Number:	6753ML492W	Silt / Sand			

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Shannon Jackson	Welder	US Pipeline		
Joe Thornhill	Inspector			
Dave Williams	Welding Inspector			

Notes / Observations:

3/32 1st pass then 1/8 fill & cap
 Best practice: repair blanket with cutout for weld repair
 Repair procedure 144: Pass 1 - 1/8 E 6010, Pass 2 - 5/32 E8010-P1, Remaining passes 3/32 E 8018-C3
 Shannon ground out about 3/4 of the steel but did not need to grind out root and bead; therefore, he started with the E 8018-C3 electrode.

Enbridge runs the bead and the hot pass before releasing clamp to avoid cracking in 6:00 position.

Dave checks each welder every day.

Violations / Non-Compliance Issues:

None



Photograph Description
 Location of defect identified on weld



Photograph Description
 Partially ground out weld showing porosity and weld blanket with cut out area for repairs



Photograph Description
 Fully ground out weld



Photograph Description
 Repaired weld showing cutout repair blanket.

MNOPS Pipeline Construction Inspection Guide

Inspection Date: Date Submitted: Case Number:

Inspector: Inspection Area:

Inspection Details:		Welding:		Coating:	
Inspection Item:	Welding	Pass	Cap	Type	FBE
Location:	NW Wilton Station Grant Creek	Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:	1000' west AC 3553 joint II	Amperage	135-160	A	
Weather:	cloudy	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	36"	Pre-Heat Temp	320	° F	
Joint Number:		Soil Type:			
Weld Number:		Silt / Sand			

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Troy Post	Welder			

Notes / Observations:

Jenning s

Review of records: "Coating Application/Progress Matrix" report #67 on 10-26-09 67S3ML31TIG 8484+65 wet film thickness min: 46 max: 83 for brush applied Denso 7200. It appears that Coating specification C-210 has been modified to eliminate the maximum coating thickness requirement (page 4 of 9).

Violations / Non-Compliance Issues:

None

	Photograph Description

	Photograph Description

	Photograph Description

	Photograph Description

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November 10, 2009

To: Marc DeVarenes Jack Olin Paul Eberth
 Tony Madden Tommy Shiflett Avery Schott

Re: PHMSA/MNOPS Audit Issues 42-44 (October 19-23, 2009) and MNOPS
Audit Issues 45-47 (October 13-16, 2009)

Attached is a summary of PHMSA and MNOPS audit findings and their disposition based on audits that occurred on the dates above on spreads 2-6. Please review these findings/responses and ensure that contractor and inspection staff are informed and take appropriate action.

In addition, the following points have come up on the Alberta Clipper/Southern Lights Project or the Streater-Manhattan Project. Please take the following actions:

1. Please ensure that crews are following procedure regarding the removal of tape and prevention of weld spatter. PHMSA has identified instances where weld spatter and melted tape has been found. Pipe should be cleaned in accordance with the Specification for Pipeline Construction – Pipeline Welding Specification 8.8.8 which states “The completed surface of the weld shall be thoroughly power-brushed clean of all spatter and slag and the reinforcement shall blend smoothly with the adjacent pipe surface.”
2. Discuss with inspection staff and contractors the need to follow specifications in the use of patch sticks. The steps to be followed include:
 - a. Patch sticks should only be used on coating anomalies less than ¼ inch in diameter (about the size of a pencil eraser).
 - b. The repair area should be roughened/suitably prepared to ensure adhesion and overlap the surface (parent coating) surrounding the anomaly from ½” to 1”.
 - c. The repair area should be preheated in a manner that avoids burning or charring the parent coating.
 - d. While continuing to heat the surface of the repair area, occasionally draw the patch-stick across the area until it leaves a residue. Then rub the patch stick in a circular motion and utilize the torch to help melt it and maintain the pipe coating temperature. Continue until the patch is smooth and has a thickness of at least 15 mills greater than the parent coating.

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3. Please discuss with inspection staff and contractors the proper use of skids to support pipe from both a construction and safety perspective.

Please positively confirm with me by email when these actions are completed. I appreciate your prompt attention to these matters.

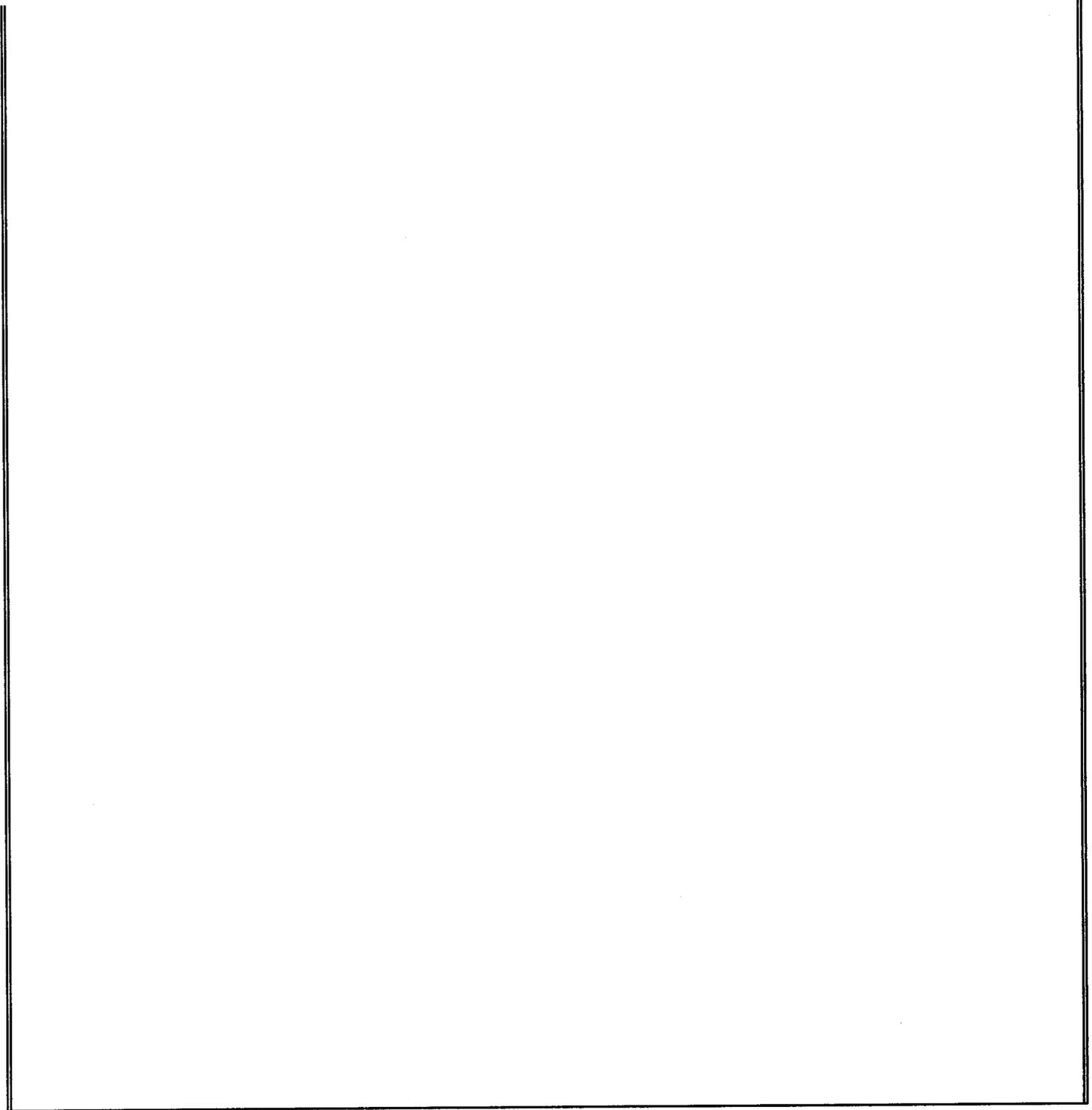
A handwritten signature in black ink, appearing to read "Jim Crawford", written in a cursive style.

Jim Crawford

cc: Dan Plume, Tom Hodge, Shaun Kavajecz, Dave Hoffman,
Jerrid Anderson, Randy Rice, Carter Saline

CENTRAL REGION OFFICE
Daily Construction Inspection Report

Project:	Alberta Clipper/Southern Lights Audit	Date:	10/19-23/2009
Location:	Superior, WI, Grand Rapids, MN, Bemidji, MN, Thief River Falls, MN, Joliette, ND	Station/Survey or Pipeline Marker:	Spread Offices 6, 4, 3, 2 Multiple – As Noted
Personnel Contacted:	Title/Position:	Company/Affiliation:	
Boyd Haugrose	Project Compliance Inspector	Enbridge	
Earnest Coleman	Sr. Welding Inspector – Spread 6	EnGlobal	
Alesia Hybarger	Road Bore Inspector – Spread 6	Mustang	
Jay Black	Chief Inspector – Spread 4	EnGlobal	
John Latham	Sr. Welding Inspector – Spread 4	EnGlobal	
Eddie Jones	Welding Foreman – Spread 4	Precision	
Dan Carroll	NDE Auditor – Spread 4	EnGlobal	
Greg Lindsay	Welding Inspector – Spread 4	Mustang	
Don Robinson	Lowering In Inspector – Spread 4	Mustang	
Rick Swing	Lowering In Foreman – Spread 4	Precision	
Barry Tanhoff	Utility Inspector – Spread 4 - Push	Mustang	
Terry Weier	Welding Inspector – Spread 4	Mustang	
Jack Olin	Project Manager – Spreads 3/5	Enbridge	
Tommy Shifflett	Construction Manager – Spreads 3/5	Enbridge	
Bob Stever	Field Engineer – HDD testing	Enbridge	
Jack Alexander	NDE Auditor – Spreads 3/5	EnGlobal	
Marl Devarens	Project Manager – Spreads 1/2	Enbridge	
David Bennett	NDE Auditor – Spread 2	EnGlobal	
Rick Fleming	Sr. Welding Inspector – Spread 2	EnGlobal	
Lavalle Warren	Chief Inspector – Spread 2	EnGlobal	
Toby Hiner	Welding Inspector – Spread 1	Mustang	
Dale Pyland	Sr. Welding Inspector – Spread 1	EnGlobal	
Darin Standefer	Welding Inspector – Spread 1	Mustang	
Andy Hughes	Lowering In Inspector – Spread 1	Mustang	
Jack Wilcox	Coating Inspector – Spread 1	Mustang	



Activities Observed/Performed:

October 19, 2009 – Brian Pierzina met Boyd Haugrose at the Spread 6 construction office, near Cloquet. We primarily met with Ernie Coleman, Sr. Welding Inspector, to discuss the status of welding on Spread 6. The Pipe Gang recently began welding 36-inch pipe, and initially had some problems with hollow bead defects. They met with the welders, and the problem has been corrected. Their repair rate is still at 7% and they had 3 more repairs over the weekend, but they haven't been welding as much pipe, yet.

We visited a road bore site at Bardon Avenue, adjacent to the Superior Terminal, and met with Alesia Hybarger, road bore inspector. Also present was Duane Lahti, an IEM (Independent Environmental Monitor) who is contracted to represent various agencies. We travelled up the right-of-way and observed an end facing crew that was facing the 36 inch pipe. We also stopped by the HDD site at the Pokegama River, which was just being set up to begin the drill. We ultimately came to the bending crew and observed a number of joints being bent, and the inspections being performed. Gerald Boardman was the Bending Inspector. No issues were identified.

October 20, 2009 – Brian Pierzina and Pat Donovan (MNOPS) met at the Spread 4 construction office in Grand Rapids with Boyd Haugrose, Jay Black – Chief Inspector (replaced Jim Eisenhower), John Latham – Sr. Welding Inspector, and Eddie Jones – Welding Foreman. Spread 4 has had 9 cracks on 36 inch welds, with 7 occurring on Saturday, October 10th. All the cracks were on main line welds, with one of them being a transition weld. The current repair rate on the 36-inch stands at 7.9%, and the repair rate on the 20-inch stands at 4.74%. The overall delay X-ray rate is 21%. A long discussion was held concerning the cracking issue. They believe a large source of the problem was cold and windy weather on October 10th. They are implementing measures to try to control cooling, including end caps and double blankets. They mentioned that the cracking has occurred on welds that are completed with the Lincoln 8010 P+ welding rod, and have implemented a change to an 8010 G rod. Spread 6 has apparently been using the 8010 G rod, and has not experienced the cracking problem that they have on Spread 4. An initial inquiry related to Spreads 3/5 indicated they have seen similar problems in the Bemidji Area (11 cracks since the previous Friday), but further details would have to wait until Wednesday, when we can meet with Jack Olin. We met with Dan Carroll, NDE Auditor, who has replaced Frank Bennett, the previous NDE Auditor. We reviewed x-rays of several of the cracked welds, and they didn't all seem to have the same characteristics. Some appeared to be in the root, while others seemed to be further up in the weld, with more branching (a non-radiographer's interpretation). One crack was on a repair weld 67-S4-ML-263, where there was an external defect. After the weld was repaired, it was x-rayed on October 11th, and it had a large crack in it.

We went to the field, where the cracks were being cut out (approximate MP 997), and met with Greg Lindsay – Welding Inspector. The new welds had recently been completed. Weld 67-S4-ML-285-M-X appeared to have improper patch stick repairs (excessive areas). This was noted also by Boyd Haugrose. We observed lowering-in operations just to the west, and met with Don Robinson – Lowering-In Inspector, and Rick Swing – Lowering-In Foreman. The location was Station # 11854 + 23. Crew members were observed directly applying heat to the patch stick with a torch multiple times. This was mentioned to the Enbridge representatives on site, and the crew corrected their practice. The weather was drizzly, and the pipe jeeped quite a bit, typically small pinholes in the coating.

We went to the Cohasset rupture site (MP 1002) and met with Barry Tanhoff – Utility Inspector. This area is a 1478' push section. Ditching was still taking place for the 20-inch line, and they anticipated beginning the push on the following day. Concrete coated 36-inch pipe was being welded into double joints nearby for the 36-inch push. Terry Weier was the welding inspector on site. One section, with an uncompleted weld, was observed to be improperly supported, such that one end was approximately 6 inches off the skids, with the only skids providing support approximately 5 feet from the girth weld. Due to the weight of the pipe, this creates a large bending moment on the uncompleted girth weld. When this was pointed out, the pipe was re-supported. As the weld was not completed, no x-ray had been performed yet. A request was made for the girth weld # and the status of the x-ray, but that information has not been provided to date. In addition, a review of the specifications for supporting the pipe indicate that the expectations are not clear, so this is an area that should be clarified, to ensure that pipe is properly supported, and not contributing excessive stress to the welds.

October 21, 2009 – Brian Pierzina and Pat Donovan met at the Bemidji construction office with Boyd Haugrose, Jack Olin, and Tommy Shifflett. Jack Olin discussed cracking history on Spreads 3/5, indicating they had 3 cracks on the 20-inch. Two were on delay shots, and one was on an initial shot. The 36-inch had 3 prior cracks, 2 on delay, and one which was a transverse crack. Then they had a rash of cracks occur over the previous weekend (October 17-19), with 5 on Saturday, 3 on Sunday, and 1 on Monday. There was reportedly a mix of initial and delay shots. They had a meeting with welding experts on Hydrogen Assisted Cracking (HAC). As a summary, their go-forward approach is to use the brother in-law approach on the firing line, use tents to protect from weather, tighten up the pipe gang and firing line, continue use of the 2nd crawler rig so that every main line weld has 2 x-rays, and eliminate use of the 8010 P+ welding rod. On Spreads 3/5, there are essentially two separate crews, and all of the cracking has occurred on one crew. The primary difference between the two crews is that one is using the 8010 P+ rod (cracking) and the other is using the 8010 G rod (no cracking). We also met briefly with Bob Stever – Field Engineer, and discussed hydrostatic testing for the HDD's. These tests are being conducted at between 1900 – 2100 psig, for 4 hours and 15 minutes. No efforts are being made to evaluate the pipe for low or variable yield strength.

We reviewed x-rays with Jack Alexander – NDE Auditor. The review was complicated somewhat by difficulties locating initial x-rays, and then the delayed x-rays, as they weren't organized in that fashion. Jimmy Chance will be replacing Mr. Alexander as NDE Auditor in the near future. We reviewed weld #67-S3-ML-137-D and E-X, which had a transverse crack. The initial x-ray was accepted on 10/10/09, and then rejected on the delayed x-ray, on 10/12/09. However, the transverse crack was apparent on both x-rays. When Mr. Alexander was asked about that, he informed us that the x-ray technician (from Rig D) was no longer there. All of the other film reviewed indicated cracks in or near the 6:00 position. The only x-ray we reviewed that showed a crack on a delayed x-ray, but not on the initial x-ray was weld #67-S3-ML-352D and D-E-X. From our untrained observations the initial x-ray, which was shot on 10/17/09 looked OK, but the delayed x-ray, which was shot on 10/18/09 showed a crack from 41 – 47 inches. (The NDT crews are rotating the film so that 6:00 is covered on one film.) We were unable to correlate initial x-rays with the date the weld was completed at the time these observations were made. Jack Olin was going to provide a weld log, which would contain the additional information, but we have not received it as of this date.

October 22, 2009 – Met at the Spread 2 construction office in Thief River Falls with Mark Devarens, Lavelle Warren, Rick Fleming, and David Bennett. We discussed the 10 cracked welds from the previous inspection two weeks earlier. They are now being called centerline indications. David Bennett had files for each with enhanced x-rays. He confirmed that the total number was 10 (not 14), and that the problem appears to have been removed by replacement of the worn internal line-up clamp shoe(s).

Brian Pierzina and Boyd Haugrose went to observe Spread 1 activities. At the main line welding area we observed weld # 67-S1-2124A to have external undercut and Hi-Lo in the 10:00 position. We spoke with Eric Lewis – NDE Technician, who said that the external undercut would not fail due to the ECA (Engineering Critical Assessment) that is performed (as opposed to x-ray). We met with Dale Pyland and Toby Hiner, who came back and evaluated the weld. The Hi-Lo was measured at just under 1/8 inch, with 1/8 being the maximum allowable. A crew was directed to come back and clean up the weld.

We observed a weld being made for a drag section at Sta # 1315+79, where wall thickness transitioned from .562 wall to .469 wall. Darin Standefer was the welding inspector on site. The welders were Josh Jones (LL) and Greg Morris (OO). The transition was back beveled. No issues were identified.

We observed lowering in of two separate sections at Sta #1384+23 (start of 1st section) and appr. 1419 (end of 2nd section). The jeeping crew was observed cleaning the pipe and properly repairing any coating anomalies. No issues were identified.

Summary:

Issue Summary

1. Improper patch stick coating repairs were observed at a lower-in operation at Station # 11854+23. The crew was observed melting the patch stick directly with a torch. Operations improved once the crew was directed. Also, weld # 67-S4-ML-285-M-X appeared to have excessive area repaired using patch stick, and also appeared charred due to excessive heat. Photos taken – but impossible to determine the actual repaired area. This was also noted by Boyd Haugrose.

2. Improper support of 36-inch concrete coated pipe near MP 1002. A section of double jointed pipe, with an uncompleted weld, was observed to be improperly supported, such that one end was approximately 6 inches off the skids, with the only skids providing support approximately 5 feet from the girth weld. Due to the weight of the pipe, this creates a large bending moment on the uncompleted girth weld. When this was pointed out, the pipe was re-supported. As the weld was not completed, no x-ray had been performed yet. A request was made for the girth weld # and the status of the x-ray, but that information has not been provided to date. In addition, a review of the specifications for supporting the pipe indicate that the expectations are not clear, so this is an area that should be clarified, to ensure that pipe is properly supported, and not contributing excessive stress to the welds.

3. 36-inch cracking issues. It appears Spreads 3 and 4 have experienced similar cracking issues, although the majority of cracks on Spread 4 occurred the weekend of October 10th, and the majority of cracks on Spread 3 occurred the weekend of October 17th. A number of steps have been taken to mitigate the problem, including better heat management techniques, and eliminating use of the 8010 P+ welding rod. The vast majority of cracking is occurring at or near the 6:00 position. Provide weld logs for 36-inch welds completed from October 10-12, and October 17-19 for Spreads 3 and 4 (Clearbrook to Superior). Include the date the weld was started, the date the weld was completed, the date of initial NDT, and the date of each subsequent NDT. Please distinguish between welds that were made using the 8010 P+ electrode, and those made using the 8010 G electrode.

Inspector(s): Brian Pierzina

Shieh, Hans (PHMSA)

From: David Hoffman [David.Hoffman@enbridge.com]
Sent: Wednesday, November 11, 2009 4:27 PM
To: Pierzina, Brian (PHMSA); Lemmerman, Darren (PHMSA)
Cc: Elizabeth.Skalnek@state.mn.us; dan.munthe@state.mn.us; Pat.Donovan@state.mn.us; Huntoon, Ivan (PHMSA); Gulstad, Rick (PHMSA); Boyd Haugrose; Jeffrey Wiklund; Shaun Kavajecz; David Stafford
Subject: Construction Field Inspections - October 13-16 & 19-23
Attachments: Jim Crawford Project Directive #7 .pdf, PHMSA_MNOPS Audit communication report#7.pdf

Please find enclosed Enbridge's response to the PHMSA & MNOPS inspections conducted from October 13 – 16 and October 19 - 23. We feel the attached information should address the concerns noted and/or provide additional information for clarification.

Please call if you have any questions or concerns.

Regards,

Dave

Dave Hoffman

Supervisor, US Compliance - | Enbridge Energy Company, Inc.
119 N 25th Street E | Superior, WI 54880
☎ Office: (715) 394-1540 | ☎ Cell: (715) 718-1179

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James Crawford
Director
Engineering & Construction (US)
Major Projects
Tel 715 398 4516
Jim.Crawford@enbridge.com



November 10, 2009

To: Marc DeVarenes Jack Olin Paul Eberth
 Tony Madden Tommy Shiflett Avery Schott

Re: PHMSA/MNOPS Audit Issues 42-44 (October 19-23, 2009) and MNOPS
Audit Issues 45-47 (October 13-16, 2009)

Attached is a summary of PHMSA and MNOPS audit findings and their disposition based on audits that occurred on the dates above on spreads 2-6. Please review these findings/responses and ensure that contractor and inspection staff are informed and take appropriate action.

In addition, the following points have come up on the Alberta Clipper/Southern Lights Project or the Streater-Manhattan Project. Please take the following actions:

1. Please ensure that crews are following procedure regarding the removal of tape and prevention of weld spatter. PHMSA has identified instances where weld spatter and melted tape has been found. Pipe should be cleaned in accordance with the Specification for Pipeline Construction – Pipeline Welding Specification 8.8.8 which states “The completed surface of the weld shall be thoroughly power-brushed clean of all spatter and slag and the reinforcement shall blend smoothly with the adjacent pipe surface.”
2. Discuss with inspection staff and contractors the need to follow specifications in the use of patch sticks. The steps to be followed include:
 - a. Patch sticks should only be used on coating anomalies less than ¼ inch in diameter (about the size of a pencil eraser).
 - b. The repair area should be roughened/suitably prepared to ensure adhesion and overlap the surface (parent coating) surrounding the anomaly from ½” to 1”.
 - c. The repair area should be preheated in a manner that avoids burning or charring the parent coating.
 - d. While continuing to heat the surface of the repair area, occasionally draw the patch-stick across the area until it leaves a residue. Then rub the patch stick in a circular motion and utilize the torch to help melt it and maintain the pipe coating temperature. Continue until the patch is smooth and has a thickness of at least 15 mills greater than the parent coating.

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3. Please discuss with inspection staff and contractors the proper use of skids to support pipe from both a construction and safety perspective.

Please positively confirm with me by email when these actions are completed. I appreciate your prompt attention to these matters.

A handwritten signature in black ink, appearing to read 'Jim Crawford'.

Jim Crawford

cc: Dan Plume, Tom Hodge, Shaun Kavajecz, Dave Hoffman,
Jerrid Anderson, Randy Rice, Carter Saline

Regulatory Compliance Audit Report

Alberta Clipper/Southern Lights (Clearbrook, MN to Superior, WI)

Report Number: 7

Date of Report: November 11, 2009

Preparer: Jeff Wiklund

Audit Reference(s): The responses contained in this report reference Audit Issues found in the October 19-23, 2009 PHMSA audit and the October 13-16, 2009 MNOPS audit. Audit points were communicated to Dave Hoffman in the following emails:

- email received from Brian Pierzina (PHMSA) on October 26, 2009
- email received from Darren Lemmerman (PHMSA) on October 27, 2009

Please note that audit communications and observations by PHMSA or MNOPS, when made, are included in this report but are prefaced by (C/O).

Audit Issues (from Tracking Spreadsheet) / Resolution:

42.1026	Improper patch stick coating repairs were observed at a lower-in operation at Station # 11854+23. The crew was observed melting the patch stick directly with a torch. Operations improved once the crew was directed. Also, weld # 67-S4-ML-285-M-X appeared to have excessive area repaired using patch stick, and also appeared charred due to excessive heat. Photos taken – but impossible to determine the actual repaired area. Jim Crawford's November 10th communication to all spreads directed spread management to discuss this with inspection staff/contractors to emphasize the need to follow specifications in the use of patch sticks. The pipe where this issue was observed was jeeped and there were no coating anomalies found in the areas of question.
43.1026	Improper support of 36-inch concrete coated pipe near MP 1002. A section of double jointed concrete coated pipe, with an uncompleted weld, was observed to be improperly supported, such that one end was approximately 6 inches off the skids, with the only skids providing support approximately 5 feet from the girth weld. Due to the weight of the pipe, this creates a large bending moment on the uncompleted girth weld. When this was pointed out, the pipe was re-supported. As the weld was not completed, no x-ray had been performed yet. A request was made for the girth weld # and the status of the x-ray, but that information has not been provided to date. In addition, a review of the specifications for supporting the pipe indicate that the expectations are not clear, so this is an area that should be clarified, to ensure that pipe is properly supported, and not contributing excessive stress to the welds. The girth weld number (67S4PPML115LX) was provided to PHMSA on 10/27/09. The NDE results x-ray results show that a delayed shot was taken (on 10/22/09) and the weld was good. An applied stress calculation was also done showing that undue stress was not

applied to the weld. However, Jim Crawford's November 10th communication to all spreads directed spread management to discuss with inspection staff and contractors the proper use of skids to support pipe.

- 44.1026 36-inch cracking issues. It appears Spreads 3 and 4 have experienced similar cracking issues, although the majority of cracks on Spread 4 occurred the weekend of October 10th, and the majority of cracks on Spread 3 occurred the weekend of October 17th. A number of steps have been taken to mitigate the problem, including better heat management techniques, and eliminating use of the 8010 P+ welding rod. The vast majority of cracking is occurring at or near the 6:00 position. Please provide (as soon as possible) weld logs for 36-inch welds completed from October 10-12, and October 17-19 for Spreads 3 and 4 (Clearbrook to Superior). Include the date the weld was started, the date the weld was completed, the date of initial NDT, and the date of each subsequent NDT, as well as comments related to the type and location of any defects that were identified. Please distinguish between welds that were made using the 8010 P+ electrode, and those made using the 8010 G electrode. Please also provide the results of metallurgical analyses when they are received.

Enbridge management, inspection staff and contractor staff have been actively analyzing and monitoring the weld process to eliminate/mitigate the cracking issues. Crack sections have been cutout and submitted to Ludwig Associates Ltd. for metallurgical analysis. Additionally, an external expert (R. Huntley) was brought on site in mid-October to review procedures and conduct awareness training for spread management, inspection and contractor staff. A number of procedural changes have been implemented including but not limited to heat management approaches, brother-in-law welding, tenting, tightening pipe-gang/firing line, and stress management at girth welds. Additionally, this project has added crawlers to attain the highest practical level of delayed inspection. As additional information is obtained from both internal and external analysis, it will be communicated to PHMSA.

Please note that a CD titled *Exhibit 1 – Audit Point 44.1026 Weld and NDE Reports* is being sent to PHMSA. This contains weld logs and daily reports from weld and NDE inspection staff for the period of October 10 – 20, 2009.

- 45.1027 There is an apparent problem with cracks appearing in the bottom of the welds on the welding on spread 2.

On October 5, 2009 NDT observed centerline indications on welds on Spread 2. Subsequent investigation lead to the replacement of copper shoes and the backing plate on the internal line up clamp. Increased vigilance has been placed on monitoring the condition of the copper shoes and replacement(s) will be made when necessary.

- 46.1027 We observed weld spatter and an unknown substance (melted) on pipe.

Jim Crawford's November 10th communication to all spreads directed spread management to discuss cleaning of the pipe with inspection staff/contractors to emphasize the need to ensure the pipe is cleaned in accordance with specifications. The Specification for Pipeline

Construction – Pipeline Welding Specification 8.8.8 states “The completed surface of the weld shall be thoroughly power-brushed clean of all spatter and slag and the reinforcement shall blend smoothly with the adjacent pipe surface.

47.1027

During the machine applied coating, aka “flocking”, we observed inconsistently applied coating and what can be best described as dimples. Because of the precipitation, one might deduce that these observations were weather related. Also, the coating crew seemed to be intent on checking the temp and as such we didn’t observe the previous “blistering” problems in the factory applied coating.

All spreads have gone to great lengths to put heating and coating protection procedures/processes (e.g., pre-heat, use of tents, etc.) into place to prevent coating anomalies from occurring. However, this does not ensure that anomalies will not occur. The significant number of variables that can affect coating application are constantly monitored by each crew and considered throughout the day in both the pre-heat and coating process. When an anomaly does occur, each crew follows specifications to repair the problem. As observed, the crews are intent on monitoring the pre-heat process to reduce the potential for blistering (which can occur during the heating process as moisture absorbed by the coating is driven from that coating). Jeeping is done a minimum of two times to ensure the integrity of the coating before it is lowered in.

Reviewed/Approved by


(Initials)

MNOPS Pipeline Construction Inspection Guide

Inspector:

DSM & JTM

Case Number:

109724

<i>Inspection Date</i>	<i>Inspection Area</i>	<i>Create Daily Report</i>	<i>Date Submitted</i>
10/14/2009	Spread 2 (ND to Clearbrook)	●	10/20/2009
10/14/2009	Spread 2 (ND to Clearbrook)	●	10/20/2009
10/14/2009	Spread 2 (ND to Clearbrook)	●	10/20/2009
10/14/2009	Spread 2 (ND to Clearbrook)	●	10/20/2009
10/14/2009	Spread 2 (ND to Clearbrook)	●	10/20/2009
10/14/2009	Spread 2 (ND to Clearbrook)	●	10/20/2009
10/15/2009	Spread 4 (Deer River to Superior)	●	10/20/2009
10/15/2009	Spread 6 (Deer River to Superior)	●	10/20/2009
10/16/2009	Spread 4 (Deer River to Superior)	●	10/20/2009
		●	

MNOPS Pipeline Construction Inspection Guide

Inspection Date: Date Submitted: Case Number:

Inspector: Inspection Area:

Inspection Details:		Welding:		Coating:	
Inspection Item:	Crossing	Pass		Type	
Location:	306th south of CR 33	Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:		Amperage		A	
Weather:	Cloudy, Light Precipitation, ~35 F	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	36"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
N/A				

Notes / Observations:

Looked at pipe intended for crossing Township road 306th.
Berg Pipe & Evraz mills

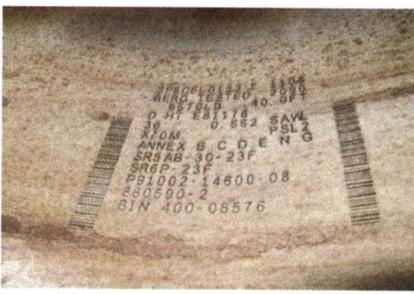
Violations / Non-Compliance Issues:



Photograph Description
Location = 091015-01



Photograph Description
Evraz Pipe Stamp



Photograph Description
Berg Pipe Stamp



Photograph Description
Pipe Strung to east

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:	HDD / Boring	Pass		Type	
Location:	Hwy 59 south of 170th	Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:		Amperage		A	
Weather:	Cloudy, Light Precp., ~35 F	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	36"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Joe Linter				
Dennis Tos				

Notes / Observations:

Intercept Bore. - Set up both sides.
 Pipe at 41' under river.
 75' casing added at west side to alleviate frac out. Verified by return.
 * Jeoped pipe, indications were not all patched. This on pull back pipe.

Violations / Non-Compliance Issues:



Photograph Description
 Location = 091015-02



Photograph Description
 Pull Back pipe



Photograph Description
 East side bore rig



Photograph Description
 missed repair - jeep.

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:	Welding & Coating	Pass		Type	
Location:	N side of cry 26	Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:	1 1/2 mile west hwy 59	Amperage		A	
Weather:	Cloudy, Light Precp., ~35 F	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	36"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Sam Jacks				
Bennie Sparkman				

Notes / Observations:

Automated welding...
 Preheat pipe 122 > 400.
 2" overlap to avoid stack.
 Root and hot pass simultaneous.

Violations / Non-Compliance Issues:



Photograph Description
 Location = 091015-03, 04, & 05



Photograph Description
 Welding by remote control



Photograph Description
 Serimax readout



Photograph Description
 prepping clamp.

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:	NDT	Pass		Type	
Location:	N side of cry 26	Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:	1 1/2 mile west hwy 59	Amperage		A	
Weather:	Cloudy, Light Precipitation., ~35 F	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	36"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
"slim" aka Todd Hammons	UT Tech			

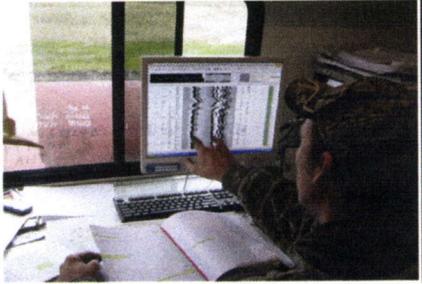
Notes / Observations:

* Cracking showing up at bottom of pipe.
 Because cracks are cut outs, contractor was challenging crack indications. Because of this, crack indications are being verified by X-Ray.
 Enbridge meeting on 10/15/09 PM to summit on the cracking issue.

Violations / Non-Compliance Issues:



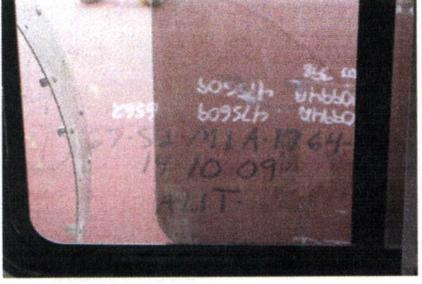
Photograph Description
 Location = 091015-03, 04, & 05



Photograph Description
 Reviewing cracked weld



Photograph Description
 UT sensors



Photograph Description
 joint # being UT'ed

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

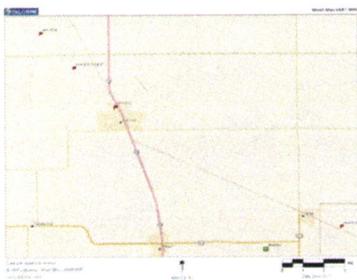
Inspection Details:		Welding:		Coating:	
Inspection Item:	Welding & Coating	Pass		Type	
Location:	N side of cry 26	Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:	1 1/2 mile west hwy 59	Amperage		A	
Weather:	Cloudy, Light Precipitation., ~35 F	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	36"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Brian Greenlee	Repair weld insp.			

Notes / Observations:

Repair Weld...
 UT is used on repair to verify.
 Single chance to repair weld, if still no good it is a cut out.

Violations / Non-Compliance Issues:



Photograph Description
 Location = 091015-03, 04, & 05



Photograph Description
 Welding a repair



Photograph Description
 welding inspector looking at repair



Photograph Description
 Repair weld

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:	Coating	Pass		Type	
Location:	SE CR2 & 165th Ave SE	Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:		Amperage		A	
Weather:	Snowy and Windy, ~35 degrees	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	36"	Pre-Heat Temp		° f	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
John Balzart	Coating Inspector			
Nate Johnson				

Notes / Observations:

Flocking pipe...
 300 F heat with propane and final heat with clamp to 463 F.
 8 passes = 25 to 35 mils
 * unevenly applied coating
 * heat effected mill coating
 * Applied coating defects due to suspected atmospheric conditions.

Violations / Non-Compliance Issues:



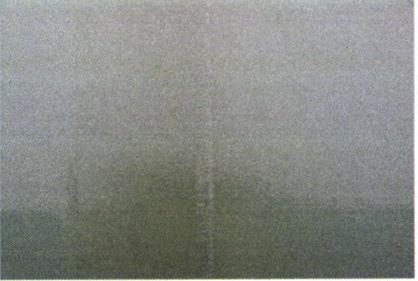
Photograph Description
 Location = 091015-06



Photograph Description
 Heater operational, Flocker in position for application.



Photograph Description
 Dimples in applied coating.



Photograph Description
 Unevenly applied coating.

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:	Welding	Pass		Type	
Location:	East of Hummingbird Road	Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:	South of Hwy 2	Amperage		A	
Weather:	~ 36 and Snowing	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	20"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Doug Love	Weld Inspector			
David Thomas	X-Ray Tech			

Notes / Observations:

Welding on weighted 20".
 Welding Inspector had recorded previous amps and voltage readings from each welder. Within perimeters.
 *stresses on coating caused by camber when pipe is lifted into place?
 *missing 10 minute hot pass interval during crew on break. (was hot pass only half completed by first root bead crew)?
 * heat blanket moisture
 * Welding rods exposed to atmosphere
 * Coating Splatter observed , numerous locations in vicinity.

Also observed X-Ray tech. in same vicinity. Problems with defects.

Violations / Non-Compliance Issues:



Photograph Description
 Welding Rods exposed to elements



Photograph Description
 Weld Inspectors daily log



Photograph Description
 Welding defected recorded by X-Ray



Photograph Description
 Weld Splatter

MNOPS Pipeline Construction Inspection Guide

Inspection Date: Date Submitted: Case Number:

Inspector: Inspection Area:

Inspection Details:		Welding:		Coating:	
Inspection Item:	Welding	Pass		Type	
Location:	Alcohol Road	Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:	W of Bandle Court	Amperage		A	
Weather:	light precipitation. ~40	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	36"	Pre-Heat Temp		° f	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Mark Elliot	Inps			

Notes / Observations:

Push under Alcohol Road. Welding Tie In.
 Deep push to avoid foreign crossing conflicts.
 Short pups to avoid conflicts with newly installed 20".
 * Pipe contacting trailer.

Violations / Non-Compliance Issues:



Photograph Description
 Bore Rig - Set up for last pup push



Photograph Description
 Lining up final tie in Weld



Photograph Description
 X-Ray on north side of road push.



Photograph Description
 Location of Work Map

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:	Bending	Pass		Type	
Location:	West of CR 73, south of Hwy 2	Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:		Amperage		A	
Weather:	40 F overcast, no precipitation.	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	20"	Pre-Heat Temp		° f	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Mike Sanford	Bending Inspector			
Jay Black	Crew Chief			

Notes / Observations:

Enbridge added length to the mandrel after the test bends.
 Seam no more than 30 degrees from neutral axis. ~5 1/4"
 1/2 degree per foot.
 Bends should not be closer than 6' from end of pipe or with in 3' of double joint (factory joint).
 Unlikely to have more than one bend in a single section of pipe(20" long seam).

Violations / Non-Compliance Issues:



Photograph Description
 Marking top of pipe prior to bend



Photograph Description
 Overview



Photograph Description
 Bending Inspector Log book



Photograph Description
 Mandrel - pre bend

MNOPS Pipeline Construction Inspection Guide

Inspector:

DSM & JTM

Case Number:

109724

Inspection Date	Inspection Area	Create Daily Report	Date Submitted
10/13/2009	Spread 3 & 5 (Clearbrook to Deer River)	●	10/20/2009
10/13/2009	Spread 3 & 5 (Clearbrook to Deer River)	●	10/20/2009
10/13/2009	Spread 3 & 5 (Clearbrook to Deer River)	●	10/20/2009
10/13/2009	Spread 3 & 5 (Clearbrook to Deer River)	●	10/20/2009
10/13/2009	Spread 3 & 5 (Clearbrook to Deer River)	●	10/20/2009
		●	
		●	
		●	
		●	
		●	

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
<i>Inspection Item:</i>	Welding	<i>Pass</i>		<i>Type</i>	FBE
<i>Location:</i>	Sta 1682+90, C/Bemidji	<i>Electrode Dia.</i>		<i>Thickness</i>	~14 mils
<i>M.P. Station:</i>	MP 197	<i>Electrode Type</i>			
<i>Intersection:</i>	Immediately west Hwy 197	<i>Amperage</i>		A	
<i>Weather:</i>	26 F, heavy fog	<i>Voltage</i>		V	
Pipe Information		<i>Travel Rate</i>		in / min	
<i>Pipe Size:</i>	20" & 36"	<i>Pre-Heat Temp</i>	320	° F	
<i>Joint Number:</i>		Soil Type:			
<i>Weld Number:</i>		Sand			

Personnel Observed:				
<i>Name</i>	<i>Title / Role</i>	<i>Company</i>	<i>Phone</i>	<i>Email</i>
Roy Burton	Weld Insp			

Notes / Observations:

Quick visit with crew welding up 36" for section west of Hwy 197.
 Observed 20" with AR FBE already installed under 197, but not yet tied in.
 Observed the pipe heating to 320 degrees Fahrenheit.
 Observed heat retention blankets installed after heat - prior to weld, between welds, & after weld completion.
 Roy stated < 3% weld rejection rate.
 Observed welding inspectors on each side of the pipe.

Violations / Non-Compliance Issues:

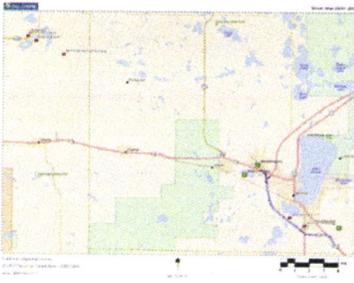
N/A



Photograph Description
Pre Heat



Photograph Description
Welding



Photograph Description
Location of inspection(s) = 091013-01



Photograph Description
Welding Crews

MNOPS Pipeline Construction Inspection Guide

Inspection Date: Date Submitted: Case Number:

Inspector: Inspection Area:

Inspection Details:		Welding:		Coating:	
Inspection Item:	HDD / Boring	Pass		Type	
Location:	Hwy 2 and Mississippi River	Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:		Amperage		A	
Weather:	26F & Fog	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	36"	Pre-Heat Temp		° f	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email

Notes / Observations:

Observed 1/2 mile long HDD project.
 Clean up was progressing on a reported frac. out in a wetland area directly in front of the boring machinery.
 Observed the pull back pipe set up on west side. This pipe had previously been identified as having coating inadequacies. It appeared that re-coating had been completed.

Violations / Non-Compliance Issues:

N/A



Photograph Description
 1/2 mile long HDD Hwy 2 & Mississippi River in Bemidji.



Photograph Description
 frac spill on HDD Hwy 2 & Bemidji



Photograph Description
 Location of inspection(s) = 091013-02



Photograph Description
 AR FBE Coating, prepped for pull through.

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:	Welding Crew	Pass		Type	
Location:	East of Hwy 23	Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:		Amperage	150	A	
Weather:	32 deg.	Voltage	26-27	V	
Pipe Information		Travel Rate	13	in / min	
Pipe Size:	36"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Ronnie Miller	pe Gang Weld Inspect	Embridge	713-201-1103	mojoburns48@yahoo.com

Notes / Observations:

Observed all weld passes. Ronnie indicated the last weld he had taken was 150 Amps, 26-27 Volts. Timed weld passes on the root bead pass and found it to be within acceptable speed range.

* Did not immediately find weld inspector. Did not observe inspector perform a visual inspections of each weld. *Boyd Haugrose later confirmed all weld inspections completed.*

* Weld Splatter on coating and melted substance (tape?) on pipe

Violations / Non-Compliance Issues:



Photograph Description
Root Pass - 4 welders



Photograph Description
Location of inspection(s) = 091013-03



Photograph Description
Filler Pass



Photograph Description
Completed weld - Splatter onto coating. Fi

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:	3108 ft HDD	Pass		Type	
Location:	Hwy223 & CR 2	Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:		Amperage		A	
Weather:	36 deg.	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	20" & 36"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Jim Sevarns	HDD Supervisor	Embridge	906-287-0226	

Notes / Observations:

3108 ft of HDD on 20" pipe located at Hwy 223 & CR2.
 Observed 36" pipe end for AR FBE coating.

Violations / Non-Compliance Issues:



Photograph Description
 Drilling Operation East of West Four Legged Lake



Photograph Description
 Drilling Operation East of West Four Legged Lake



Photograph Description
 Location of inspection(s) = 091013-04



Photograph Description
 Pull back end of 36". Pulled in prior to arrival.

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:	Coating	Pass		Type	2 part epoxy
Location:	Hwy 223 and CR 2	Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:		Amperage			
Weather:	36 deg.	Voltage			
Pipe Information		Travel Rate			
Pipe Size:	36"	Pre-Heat Temp			
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
John Rayon	Coating Inspector			
KD Lloyd	Coating Inspector			

Notes / Observations:

Observed application of two part epoxy coating (Type = SPC SP-2888RG) on 36" pipe.

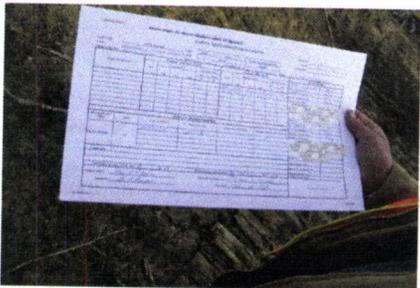
Violations / Non-Compliance Issues:



Photograph Description
Waiting for second application.



Photograph Description
Mixing the 2 part



Photograph Description
Coating Inspection log



Photograph Description
Location of inspection(s) = 091013-05

**Avoid Verbal Order
Internal Memo**

ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Project Title:	Alberta Clipper Pipeline & Southern Lights Clearbrook to Sup	AVO Number:	AVO-AC-9009
-----------------------	---	--------------------	--------------------

Project Number:	N/A	Contractor Ref Num:	none
Contract Number:	Amended Alliance	Date:	10/08/09
Attention:	All E&C Managers	From:	Dan Plume
Subject:	Variance for Specification for Pipeline Construction, United States - 2009 - Appendix E Coating Specification		

The Following Instructions Are Communicated:

Please note the project specific variance to the Specification for Pipeline Construction, United States - 2009 - Appendix E Coating Specification, C-310 Section 9.1.

Delete the current two sentences contained in Section 9.1 and insert the following:

9.1 Repairs to FBE coating shall be repaired as follows:

- Areas 0.25" in diameter (about the size of the tip of a pencil eraser) and smaller may be repaired with a hot-melt stick or two-part epoxy, or equivalent.
- If any holiday is 0.25" in diameter or larger, the coating shall be repaired in accordance with C-210 Section 9.0.

**Avoid Verbal Order
Internal Memo**

ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Project Title:	Alberta Clipper Pipeline & Southern Lights Clearbrook to Sup	AVO Number:	AVO-AC-9008
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Project Number:	N/A	Contractor Ref Num:	none
Contract Number:	Amended Alliance	Date:	10/08/09
Attention:	All E&C Managers	From:	Dan Plume
Subject:	Revision 4 to WP-140 Weld Data Sheet and Revision 3 to WP-140 Welding Procedure Specification		

The Following Instructions Are Communicated:

Please note Revision 4 to WP-140 Weld Data Sheet and Revision 3 to WP-140 Welding Procedure Specification (Attached) and communicate to appropriate contractor and inspection personnel.

This revision provides for a *two or three* beaded cap to be used for W.T. over 0.500".

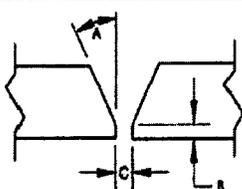


**WP-140
WELD DATA SHEET**

WP-140 Rev3
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Revision: 4
Date: 10/1/09

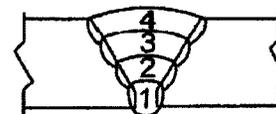
WELDING PROCESS:	Manual Shielded Metal Arc (SMAW)	APPLICATION:	Mainline / Tie In Welding
PIPE AND FILLER MATERIAL REQUIREMENTS			
PIPE GRADES QUALIFIED:	API 5L Grade X70		
PIPE DIAMETER/W.T. RANGE QUALIFIED:	Over 12 3/4" O.D. / 3/16" Through 3/4" W.T.		
FILLER MATERIAL:	AWS E6010 Root Pass; E8010-P1 (G) - Remaining Passes		
PRODUCTION WELDING CONDITIONS			
PRODUCTION PIPE POSITION:	Horizontal - Fixed Position	WELDING DIRECTION:	Vertical Down-All Passes
NUMBER OF WELDERS:	Two Minimum - Root and 2 nd Pass One minimum - All Remaining Passes	WELDING TECHNIQUE:	Stringer / Weave
PREHEAT METHOD:	Propane or Induction	TEMP. MEASUREMENT:	Pyrometer or Tempil Sticks
METHOD OF WELD CLEANING:	Clusters of surface porosity, bead starts and high points shall be removed by power brushing or grinding before depositing weld metal over them to the satisfaction of the company as required.		
WELD CURRENT/ POLARITY:	Direct Current, Reverse Polarity		
TYPE/REMOVAL OF CLAMP:	Internal / External; After 100% of Root Pass Complete with Internal; After 50% of Root Pass complete with External.		
PIPE MOVEMENT:	Lifting of pipe to facilitate set-up of the subsequent joint shall be permitted if the root pass is complete. Welding shall continue without additional pipe movement until a minimum of 3 weld passes, or 2/3 of the weld thickness is filled, whichever is greater.		
TIME BETWEEN PASSES:	10 Minutes between Root and Hot Pass, 1 hour between Hot Pass and Hot Fill, 24 hrs Maximum for remaining passes (unless otherwise authorized by Enbridge assigned designate).		
PREHEAT/INTERPASS TEMP.:	250° F. Minimum - 400° F. Maximum regardless of ambient temperature. Preheat for an area of at least 2" on each side of the weld joint for the entire circumference prior to welding.		

WELD JOINT DESIGN

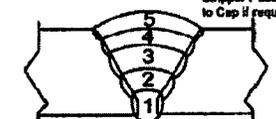


For pipe ends of the same nominal thickness, internal offset larger than 1/8" is permissible provided the offset is caused by variations of the pipe end dimensions within the pipe purchase specification tolerances, and such variations have been distributed essentially uniformly around the circumference of the pipe.

QUALIFIED JOINT DESIGN CONDITIONS	
A	30° + 5°, -0°
B	1/16" ± 1/32"
C	1/16" ± 1/32"
Minimum No. of Passes	
W.T.	Min. Passes
0.250" ≤ 0.400"	4
>0.400" ≤ 0.650"	5
>0.650" ≤ 0.750"	7



TYPICAL WELD PASS SEQUENCE FOR 0.250" W.T.



TYPICAL WELD PASS SEQUENCE FOR 0.438" W.T.

- A two or three beaded cap may be used for W.T. over 0.500".
- Weave width shall be limited to 3x electrode diameter.
- 1/8" max cap reinforcement height.

WELDING PARAMETERS AND ELECTRICAL CHARACTERISTICS

PASS NO.	FILLER MATERIAL		WELDING PARAMETERS		TRAVEL SPEED (IPM)
	SIZE	CLASSIFICATION	AMPERAGE	VOLTAGE	
1	5/32"	E6010	90-175	20-30	6-19
2	5/32"	E8010-P1	100-185	21-34	7-16
3	3/16"	E8010-P1	120-210	22-34	5-17
4	3/16"	E8010-P1	120-210	22-34	5-10
Stripper Pass (as needed)*	3/16"	E8010-P1	120-210	22-34	10-20
5	3/16"	E8010-P1	120-210	22-34	3-11

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 electrodes are shown below. A stripper pass may be made on the sides if needed using the parameters of weld pass shown above. E8010-P1 and E8010-G may be used interchangeably.

OPTIONAL APPROVED WELDING PARAMETERS WITHIN THE ABOVE CLASSIFICATION

ELECTRODE DIAMETER	AMPERAGE RANGE	VOLTAGE RANGE	TRAVEL SPEED(IPM)
1/8" (E6010, E8010)	80-125	21-30	6-19
5/32" (E8010)	100-185	20-34	6-19
3/16" (E8010)	120-210	22-34	5-20

The procedure qualification was conducted in accordance with the requirements of the 20th Edition of API 1104, CFR Part 195 and Enbridge Energy Engineering Specifications.

Enbridge Review & Approval:	<i>Junfang Lu</i>	Date:	<i>Oct. 1, 2009</i>
Enbridge Project Approval:		Date:	
Contractor's Name:		Contractor's Acceptance:	

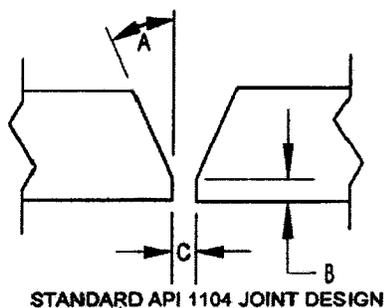


ENBRIDGE ENERGY WELDING PROCEDURE SPECIFICATION

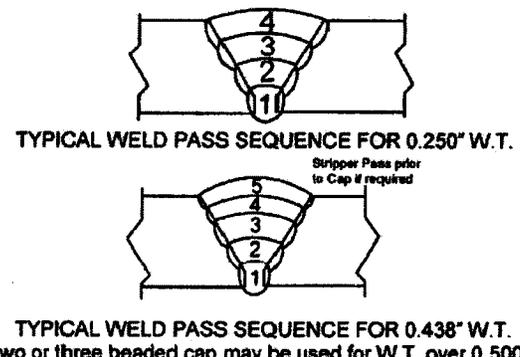
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Date: 10/1/09

WELDING PROCESS:	Manual Shielded Metal Arc (SMAW)	APPLICATION:	Mainline / Tie In Welding
PIPE AND FILLER MATERIAL REQUIREMENTS			
PIPE GRADES QUALIFIED:	API 5L Grade X70		
PIPE DIAMETER/W.T. RANGE QUALIFIED:	Over 12 3/4" O.D. / 3/16" Through 3/4" W.T.		
FILLER MATERIAL:	AWS E6010 Root Pass; E8010-P1 (G) - Remaining Passes		
PRODUCTION WELDING CONDITIONS			
PRODUCTION PIPE POSITION:	Horizontal - Fixed Position	WELDING DIRECTION:	Vertical Down-All Passes
NUMBER OF WELDERS:	Two Minimum - Root and 2 nd Pass One minimum - All Remaining Passes	WELDING TECHNIQUE:	Stringer / Weave
PREHEAT METHOD:	Propane or Induction	TEMP. MEASUREMENT:	Pyrometer or Tempil Sticks
METHOD OF WELD CLEANING:	Clusters of surface porosity, bead starts and high points shall be removed by power brushing or grinding before depositing weld metal over them to the satisfaction of the company as required.		
POSTHEAT TREATMENT:	None Required		
WELD CURRENT/ POLARITY:	Direct Current, Reverse Polarity		
TYPE/REMOVAL OF CLAMP:	Internal / External; After 100% of Root Pass Complete with Internal; After 50% of Root Pass complete with External.		
TIME BETWEEN PASSES:	10 Minutes between Root and Hot Pass, 1 hour between Hot Pass and Hot Fill, 24 hrs Maximum for remaining passes. This procedure also qualified for 6 day delay after Hot Fill Pass.		
PREHEAT/INTERPASS TEMP.:	250° F. Minimum - 400° F. Maximum regardless of ambient temperature.		

WELD JOINT DESIGN



QUALIFIED JOINT DESIGN CONDITIONS	
A	30° + 5°, -0°
B	1/16" ± 1/32"
C	1/16" ± 1/32"
Minimum No. of Passes	
W.T.	Min. Passes
0.250" ≤ 0.400"	4
>0.400" ≤ 0.650"	5
>0.650" ≤ 0.750"	7



WELDING PARAMETERS AND ELECTRICAL CHARACTERISTICS

PASS NO.	PROCESS	FILLER MATERIAL		WELDING PARAMETERS		TRAVEL SPEED (IPM)	Gas Mixture and Flow Rate
		SIZE	CLASSIFICATION	AMPERAGE	VOLTAGE		
1	SMAW	5/32"	E6010	90-175	20-30	6-19	---
2	SMAW	5/32"	E8010-P1	100-185	21-34	7-16	---
3	SMAW	3/16"	E8010-P1	120-210	22-34	5-17	---
4	SMAW	3/16"	E8010-P1	120-210	22-34	5-10	---
(Strip)*	SMAW	3/16"	E8010-P1	120-210	22-34	10-20	---
5	SMAW	3/16"	E8010-P1	120-210	22-34	3-11	---

*Stripper Pass as needed

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 electrodes are shown below. A stripper pass may be made on the sides if needed using the parameters of weld pass shown above. E8010-P1 and E8010-G may be used interchangeably.

OPTIONAL APPROVED WELDING PARAMETERS WITHIN THE ABOVE CLASSIFICATION

ELECTRODE DIAMETER	AMPERAGE RANGE	VOLTAGE RANGE	TRAVEL SPEED RANGE (IPM)
1/8" (E6010, E8010)	80-125	21-30	6-19
5/32" (E8010)	100-185	20-34	6-19
3/16" (E8010)	120-210	22-34	5-20

The procedure qualification was conducted in accordance with the requirements of the 20th Edition of API 1104, CFR Part 195 and Enbridge Energy Engineering Specifications.

Revision details:

- Rev 1: Revised minimum wall thickness requiring 3 beaded cap (from over 0.600" to over 0.500").
- Rev 2: Revised amperage range to reflect minimum values used during procedure qualification.
- Rev 3: Revised the cap bead number for W.T. over 0.500". The method of weld cleaning is modified as well.

ENBRIDGE Integrity: Junfang Lu
ENBRIDGE Pipeline Project Manager (US): _____

Date: Oct. 1, 2009
Date: _____



**ENBRIDGE ENERGY
WELDING PROCEDURE SPECIFICATION**

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Revision: 3
Date: 10/1/09

This page provides the procedure qualification test conditions and a sample of the results for the above Enbridge Energy welding procedure.

TEST PIPE / FILLER MATERIAL AND TEST CONDITIONS FOR PROCEDURE QUALIFICATION					
TEST LOCATION:	United Piping Inc.-Duluth, MN		TEST CONDITIONS:	Inside; 50-60° F.	
PIPE/FITTING GRADE USED FOR TESTING:	API 5L X70	TEST PIPE DIA./W.T.:	20" x 0.250"	PIPE MFG.:	PIPE HEAT NO.:
TEST PIPE POSITION:	Horizontal-Fixed	TO TEST PIPE OR FITTING DIA./W.T.:	20" x 0.250"	EVRAZ	594777
ELECTRODE CLASS.:	E6010/E8010-P1	ELECTRODE MFG.:	Lincoln Electric Co.		
WELDER/S:	Sam Sandbothe, Travis Crabtree, Eddie Jones				
WELDING MACHINE/S:	Lincoln SA-200				
TEST PROC. NO.:	WP-140	LAB REFERENCE NO.:	O903252		

DESTRUCTIVE TEST RESULTS PER API 1104 for 20" - 0.250wt with 5/32" Hot Pass

TENSILE TESTS						
SPECIMEN	WIDTH (INCHES)	THICKNESS (INCHES)	AREA (SQ.IN.)	MAX. LOAD (LBS.)	U.T.S. (PSI)	FRACTURE LOCATION
T-1	1.074	0.268	0.287	27,500	95,818	PIPE
T-2	1.000	0.262	0.262	27,500	104,961	PIPE
T-3	1.063	0.260	0.276	26,250	95,108	PIPE
T-4	1.064	0.260	0.276	25,000	90,579	PIPE

FACE BEND TESTS		ROOT BEND TESTS		NICK BREAK TESTS	
SPECIMEN	RESULTS	SPECIMEN	RESULTS	SPECIMEN	RESULTS
FB-1	Acceptable	RB-1	Acceptable	NB-1	Acceptable
FB-2	Acceptable	RB-2	Acceptable	NB-2	Acceptable
FB-3	Acceptable	RB-3	Acceptable	NB-3	Acceptable
FB-4	Acceptable	RB-4	Acceptable	NB-4	Acceptable

SIDE BEND TESTS			
SPECIMEN	RESULTS	SPECIMEN	RESULTS
SB-1	N/A	SB-5	N/A
SB-2	N/A	SB-6	N/A
SB-3	N/A	SB-7	N/A
SB-4	N/A	SB-8	N/A

VICKERS MICRO-HARDNESS SURVEY - 10 kg load (Optional Test)

(Two rows of readings within 2 mm of each surface across parent metal, weld metal and HAZ on both sides of weld)

TEST NO.	LOCATION	A - A 1	TEST NO.	LOCATION	B - B 1
1	PIPE	215	12	PIPE	225
2	HAZ	213	13	HAZ	191
3	HAZ	220	14	HAZ	201
4	HAZ	221	15	HAZ	207
5	WELD	216	16	WELD	195
6	WELD	211	17	WELD	197
7	WELD	213	18	WELD	200
8	HAZ	220	19	HAZ	207
9	HAZ	220	20	HAZ	198
10	HAZ	209	21	HAZ	189
11	PIPE	213	22	PIPE	216

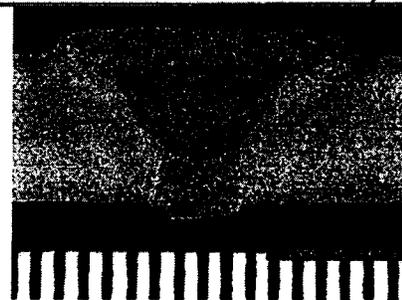


Photo-Macrograph of Weld Cross-section

CHARPY V-NOTCH TEST DATA (Optional Test)

Test Temp.: 23° F.

HAZ @ 3 O'clock (Dimensions: 10 x 5 x 2V)		WELD @ 3 O'clock (Dimensions: 10 x 5 x 2V)	
SPECIMEN	RESULTS (Ft.-Lbs.)	SPECIMEN	RESULTS (Ft.-Lbs.)
1	48	1	30
2	41	2	29
3	50	3	28
AVERAGE	46.3	AVERAGE	29

Test Facility: Bodycote

Test Laboratory Representative: Jim Blevins

Date: 6/01/09



**ENBRIDGE ENERGY
WELDING PROCEDURE SPECIFICATION**

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Revision: 3
Date: 10/1/09

This page provides the procedure qualification test conditions and a sample of the results for the above Enbridge Energy welding procedure.

TEST PIPE / FILLER MATERIAL AND TEST CONDITIONS FOR PROCEDURE QUALIFICATION					
TEST LOCATION:	United Piping Inc.-Duluth, MN		TEST CONDITIONS:	Inside; 50-60° F.	
PIPE/FITTING GRADE USED FOR TESTING:	API 5L X70		TEST PIPE DIA./W.T.:	20" x 0.250"	PIPE MFG. PIPE HEAT NO.
TEST PIPE POSITION:	Horizontal-Fixed		TO TEST PIPE OR FITTING DIA./W.T.:	20" x 0.250"	EVRAZ 594777
ELECTRODE CLASS.:	E6010;E8010-P1		ELECTRODE MFG.:	Lincoln Electric Co.	
WELDER/S:	Travis Crabtree, Eddie Jones, Joe Parrow,				
WELDING MACHINE/S:	Lincoln SA-200				
TEST PROC. NO.:	WP-140		LAB REFERENCE NO.:	O903254	

DESTRUCTIVE TEST RESULTS PER API 1104 for 20" - 0.250wt with 3/16" Hot Pass

TENSILE TESTS						
SPECIMEN	WIDTH (INCHES)	THICKNESS (INCHES)	AREA (SQ.IN.)	MAX. LOAD (LBS.)	U.T.S. (PSI)	FRACTURE LOCATION
T-1	1.056	.254	.268	25,000	93,283	PIPE
T-2	1.058	.254	.268	25,000	93,283	PIPE
T-3	1.080	.256	.276	26,250	95,108	PIPE
T-4	1.054	.252	.265	25,000	94,339	PIPE

FACE BEND TESTS		ROOT BEND TESTS		NICK BREAK TESTS	
SPECIMEN	RESULTS	SPECIMEN	RESULTS	SPECIMEN	RESULTS
FB-1	Acceptable	RB-1	Acceptable	NB-1	Acceptable
FB-2	Acceptable	RB-2	Acceptable	NB-2	Acceptable
FB-3	Acceptable	RB-3	Acceptable	NB-3	Acceptable
FB-4	Acceptable	RB-4	Acceptable	NB-4	Acceptable

SIDE BEND TESTS			
SPECIMEN	RESULTS	SPECIMEN	RESULTS
SB-1	N/A	SB-5	N/A
SB-2	N/A	SB-6	N/A
SB-3	N/A	SB-7	N/A
SB-4	N/A	SB-8	N/A

VICKERS MICRO-HARDNESS SURVEY - 10 kg load (Optional Test)

(Two rows of readings within 2 mm of each surface across parent metal, weld metal and HAZ on both sides of weld)

TEST NO.	LOCATION	A - A 1	TEST NO.	LOCATION	B - B 1
1	PIPE	215	12	PIPE	227
2	HAZ	209	13	HAZ	184
3	HAZ	211	14	HAZ	194
4	HAZ	211	15	HAZ	194
5	WELD	204	16	WELD	187
6	WELD	201	17	WELD	184
7	WELD	196	18	WELD	186
8	HAZ	208	19	HAZ	196
9	HAZ	203	20	HAZ	196
10	HAZ	202	21	HAZ	184
11	PIPE	211	22	PIPE	216

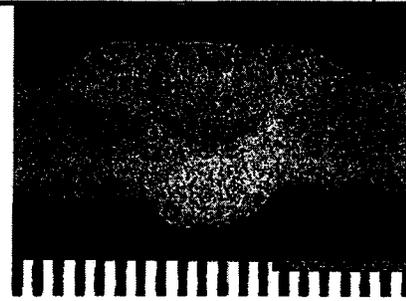


Photo-Macrograph of Weld Cross-section

CHARPY V-NOTCH TEST DATA (Optional Test)

Test Temp.: 23° F.

HAZ @ 3 O'clock (Dimensions: 10 x 5 x 2V)			WELD @ 3 O'clock (Dimensions: 10 x 5 x 2V)		
SPECIMEN	RESULTS (Ft.-Lbs.)		SPECIMEN	RESULTS (Ft.-Lbs.)	
1	43		1	27	
2	42		2	29	
3	37		3	26	
AVERAGE	40.7		AVERAGE	27.3	

Test Facility: Bodycote

Test Laboratory Representative: Jim Blevins

Date: 6/01/09



**ENBRIDGE ENERGY
WELDING PROCEDURE SPECIFICATION**

WP-140
Page No.: 4 of 9
Revision: 3
Date: 10/1/09

This page provides the procedure qualification test conditions and a sample of the results for the above Enbridge Energy welding procedure.

TEST PIPE / FILLER MATERIAL AND TEST CONDITIONS FOR PROCEDURE QUALIFICATION

TEST LOCATION:	United Piping Inc.-Duluth, MN	TEST CONDITIONS:	Inside; 50-60° F.		
PIPE/FITTING GRADE USED FOR TESTING:	API 5L X70	TEST PIPE DIA./W.T.:	20" x 0.250"	PIPE MFG.	PIPE HEAT NO.
TEST PIPE POSITION:	Horizontal-Fixed	TO TEST PIPE OR FITTING DIA./W.T.:	20" x 0.250"	EVRAZ	594777
ELECTRODE CLASS.:	E8010;E8010-P1	ELECTRODE MFG.:	Lincoln Electric Co.		
WELDER/S:	Travis Crabtree, Joe Parrow,				
WELDING MACHINE/S:	Lincoln SA-200				
TEST PROC. NO.:	WP-140	LAB REFERENCE NO.:	O903258		

DESTRUCTIVE TEST RESULTS PER API 1104 for 20" - 0.250wt with External Clamps

TENSILE TESTS

SPECIMEN	WIDTH (INCHES)	THICKNESS (INCHES)	AREA (SQ.IN.)	MAX. LOAD (LBS.)	U.T.S. (PSI)	FRACTURE LOCATION
T-1	1	.264	.264	25,000	94,696	PIPE
T-2	1	.263	.263	25,000	95,057	PIPE
T-3	1	.262	.262	25,000	95,419	PIPE
T-4	1	.263	.263	25,000	95,057	PIPE

FACE BEND TESTS

ROOT BEND TESTS

NICK BREAK TESTS

SPECIMEN	RESULTS	SPECIMEN	RESULTS	SPECIMEN	RESULTS
FB-1	Acceptable	RB-1	Acceptable	NB-1	Acceptable
FB-2	Acceptable	RB-2	Acceptable	NB-2	Acceptable
FB-3	Acceptable	RB-3	Acceptable	NB-3	Acceptable
FB-4	Acceptable	RB-4	Acceptable	NB-4	Acceptable

SIDE BEND TESTS

SPECIMEN	RESULTS	SPECIMEN	RESULTS
SB-1	N/A	SB-5	N/A
SB-2	N/A	SB-6	N/A
SB-3	N/A	SB-7	N/A
SB-4	N/A	SB-8	N/A

VICKERS MICRO-HARDNESS SURVEY - 10 kg load (Optional Test)

(Two rows of readings within 2 mm of each surface across parent metal, weld metal and HAZ on both sides of weld)

TEST NO.	LOCATION	A - A 1	TEST NO.	LOCATION	B - B 1
1	PIPE	202	12	PIPE	203
2	HAZ	207	13	HAZ	178
3	HAZ	205	14	HAZ	186
4	HAZ	204	15	HAZ	195
5	WELD	187	16	WELD	184
6	WELD	189	17	WELD	185
7	WELD	187	18	WELD	184
8	HAZ	205	19	HAZ	201
9	HAZ	198	20	HAZ	196
10	HAZ	186	21	HAZ	193
11	PIPE	213	22	PIPE	219

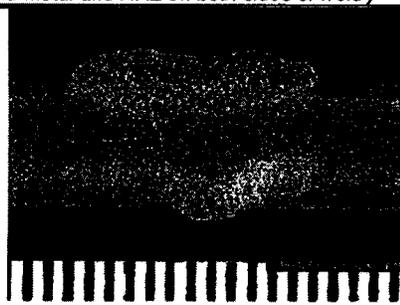


Photo-Macrograph of Weld Cross-section

CHARPY V-NOTCH TEST DATA (Optional Test)

Test Temp.: 23° F.

HAZ @ 3 O'clock (Dimensions: 10 x 5 x 2V)			WELD @ 3 O'clock (Dimensions: 10 x 5 x 2V)		
SPECIMEN	RESULTS (Ft.-Lbs.)		SPECIMEN	RESULTS (Ft.-Lbs.)	
1	27		1	30	
2	32		2	28	
3	35		3	30	
AVERAGE	31.3		AVERAGE	29.3	

Test Facility: Bodycote

Test Laboratory Representative: Jim Blevins

Date: 6/03/09



**ENBRIDGE ENERGY
WELDING PROCEDURE SPECIFICATION**

WP-140
Page No.: 5 of 9
Revision: 3
Date: 10/1/09

This page provides the procedure qualification test conditions and a sample of the results for the above Enbridge Energy welding procedure.

TEST PIPE / FILLER MATERIAL AND TEST CONDITIONS FOR PROCEDURE QUALIFICATION					
TEST LOCATION:	United Piping Inc.-Duluth, MN		TEST CONDITIONS:	Inside; 50-60° F.	
PIPE/FITTING GRADE USED FOR TESTING:	API 5L X70		TEST PIPE DIA./W.T.:	36" x 0.438"	PIPE MFG. PIPE HEAT NO.
TEST PIPE POSITION:	Horizontal-Fixed		TO TEST PIPE OR FITTING DIA./W.T.:	36" x 0.438"	EVRAZ 593024 (36")
ELECTRODE CLASS.:	E6010;E8010-P1		ELECTRODE MFG.:	Lincoln Electric Co.	
WELDER/S:	Sam Sandbothe, Travis Crabtree, Eddie Jones, Joe Parrow, Wade Pilgren, Blake McAnnaley				
WELDING MACHINE/S:	Lincoln SA-200; Miller Pipe Pro 304				
TEST PROC. NO.:	WP-140		LAB REFERENCE NO. : O903254; O903241; O903258; O903257		

DESTRUCTIVE TEST RESULTS PER API 1104 for 36" - 0.438wt with 5/32" Hot Pass

TENSILE TESTS						
SPECIMEN	WIDTH (INCHES)	THICKNESS (INCHES)	AREA (SQ.IN.)	MAX. LOAD (LBS.)	U.T.S. (PSI)	FRACTURE LOCATION
T-1	1.086	0.442	0.480	45,000	93,750	PIPE
T-2	0.931	0.446	0.415	40,000	96,385	PIPE
T-3	1.054	0.439	0.462	45,000	97,402	PIPE
T-4	1.019	0.442	0.450	42,500	94,444	PIPE

FACE BEND TESTS		ROOT BEND TESTS		NICK BREAK TESTS	
SPECIMEN	RESULTS	SPECIMEN	RESULTS	SPECIMEN	RESULTS
FB-1	Acceptable	RB-1	Acceptable	NB-1	Acceptable
FB-2	Acceptable	RB-2	Acceptable	NB-2	Acceptable
FB-3	Acceptable	RB-3	Acceptable	NB-3	Acceptable
FB-4	Acceptable	RB-4	Acceptable	NB-4	Acceptable

SIDE BEND TESTS			
SPECIMEN	RESULTS	SPECIMEN	RESULTS
SB-1	N/A	SB-5	N/A
SB-2	N/A	SB-6	N/A
SB-3	N/A	SB-7	N/A
SB-4	N/A	SB-8	N/A

VICKERS MICRO-HARDNESS SURVEY - 10 kg load (Optional Test)

(Two rows of readings within 2 mm of each surface across parent metal, weld metal and HAZ on both sides of weld)

TEST NO.	LOCATION	A - A1	TEST NO.	LOCATION	B - B 1
1	PIPE	234	12	PIPE	235
2	HAZ	198	13	HAZ	191
3	HAZ	213	14	HAZ	190
4	HAZ	224	15	HAZ	199
5	WELD	218	16	WELD	192
6	WELD	218	17	WELD	185
7	WELD	216	18	WELD	190
8	HAZ	220	19	HAZ	191
9	HAZ	219	20	HAZ	197
10	HAZ	211	21	HAZ	193
11	PIPE	236	22	PIPE	235

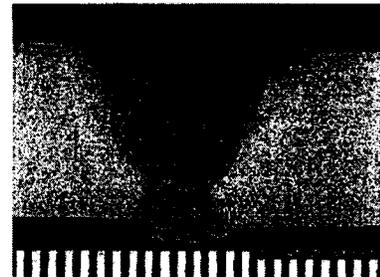


Photo-Macrograph of Weld Cross-section

CHARPY V-NOTCH TEST DATA (Optional Test)

Test Temp.: 23° F.

HAZ @ 3 O'clock (Dimensions: 10 x 10 x 2V)		WELD @ 3 O'clock (Dimensions: 10 x 10 x 2V)	
SPECIMEN	RESULTS (Ft.-Lbs.)	SPECIMEN	RESULTS (Ft.-Lbs.)
1	56	1	52
2	63	2	41
3	65	3	45
AVERAGE	61.3	AVERAGE	46

Test Facility: Bodycote

Test Laboratory Representative: Jim Blevins

Date: 8/01/09



**ENBRIDGE ENERGY
WELDING PROCEDURE SPECIFICATION**

WP-140
Page No.: 6 of 9
Revision: 3
Date: 10/1/09

This page provides the procedure qualification test conditions and a sample of the results for the above Enbridge Energy welding procedure.

TEST PIPE / FILLER MATERIAL AND TEST CONDITIONS FOR PROCEDURE QUALIFICATION					
TEST LOCATION:	United Piping Inc.-Duluth, MN		TEST CONDITIONS:	Inside; 50-60° F.	
PIPE/FITTING GRADE USED FOR TESTING:	API 5L X70		TEST PIPE DIA./W.T.:	36" x 0.438'	PIPE MFG.
TEST PIPE POSITION:	Horizontal-Fixed		TO TEST PIPE OR FITTING DIA./W.T.:	36" x 0.438"	EVRAZ
ELECTRODE CLASS.:	E6010;E8010-P1		ELECTRODE MFG.:	Lincoln Electric Co.	
WELDER/S:	Travis Crabtree, Joe Parrow, Blake McAnnaley				
WELDING MACHINE/S:	Lincoln SA-200				
TEST PROC. NO.:	WP-140		LAB REFERENCE NO. : 0903253		

DESTRUCTIVE TEST RESULTS PER API 1104 for 36" - 0.438wt with 3/16" Hot Pass

TENSILE TESTS						
SPECIMEN	WIDTH (INCHES)	THICKNESS (INCHES)	AREA (SQ.IN.)	MAX. LOAD (LBS.)	U.T.S. (PSI)	FRACTURE LOCATION
T-1	1.129	.450	.508	45,000	98,582	PIPE
T-2	1.117	.448	.500	45,000	90,000	PIPE
T-3	1.041	.449	.467	43,750	93,683	PIPE
T-4	1.011	.451	.455	42,500	93,406	PIPE

FACE BEND TESTS		ROOT BEND TESTS		NICK BREAK TESTS	
SPECIMEN	RESULTS	SPECIMEN	RESULTS	SPECIMEN	RESULTS
FB-1	Acceptable	RB-1	Acceptable	NB-1	Acceptable
FB-2	Acceptable	RB-2	Acceptable	NB-2	Acceptable
FB-3	Acceptable	RB-3	Acceptable	NB-3	Acceptable
FB-4	Acceptable	RB-4	Acceptable	NB-4	Acceptable

SIDE BEND TESTS			
SPECIMEN	RESULTS	SPECIMEN	RESULTS
SB-1	N/A	SB-5	N/A
SB-2	N/A	SB-6	N/A
SB-3	N/A	SB-7	N/A
SB-4	N/A	SB-8	N/A

VICKERS MICRO-HARDNESS SURVEY - 10 kg load (Optional Test)

(Two rows of readings within 2 mm of each surface across parent metal, weld metal and HAZ on both sides of weld)

TEST NO.	LOCATION	A - A 1	TEST NO.	LOCATION	B - B 1
1	PIPE	228	12	PIPE	238
2	HAZ	203	13	HAZ	218
3	HAZ	221	14	HAZ	230
4	HAZ	216	15	HAZ	227
5	WELD	217	16	WELD	218
6	WELD	208	17	WELD	211
7	WELD	216	18	WELD	214
8	HAZ	232	19	HAZ	223
9	HAZ	230	20	HAZ	225
10	HAZ	223	21	HAZ	212
11	PIPE	232	22	PIPE	231

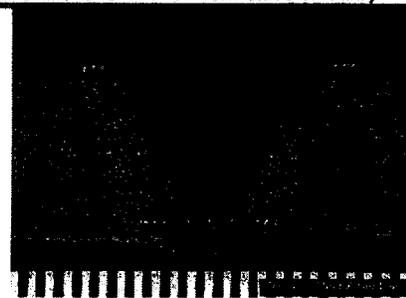


Photo-Micrograph of Weld Cross-section

CHARPY V-NOTCH TEST DATA (Optional Test)

Test Temp.: 23° F.

HAZ @ 3 O'clock (Dimensions: 10 x 7.5 x 2V)		WELD @ 3 O'clock (Dimensions: 10 x 7.5 x 2V)	
SPECIMEN	RESULTS (Ft.-Lbs.)	SPECIMEN	RESULTS (Ft.-Lbs.)
1	48	1	32
2	41	2	30
3	44	3	41
AVERAGE	44.3	AVERAGE	34.3

Test Facility: Bodycote

Test Laboratory Representative: Jim Blevins

Date: 6/01/09



ENBRIDGE ENERGY WELDING PROCEDURE SPECIFICATION

WP-140
Page No.: 7 of 9
Revision: 3
Date: 10/1/09

This page provides the procedure qualification test conditions and a sample of the results for the above Enbridge Energy welding procedure.

TEST PIPE / FILLER MATERIAL AND TEST CONDITIONS FOR PROCEDURE QUALIFICATION						
TEST LOCATION:	United Piping Inc.-Duluth, MN		TEST CONDITIONS:	Inside; 50-60° F.		
PIPE/FITTING GRADE USED FOR TESTING:	API 5L X70		TEST PIPE DIA.W.T.:	36" x 0.438'	PIPE MFG.	PIPE HEAT NO.
TEST PIPE POSITION:	Horizontal-Fixed		TO TEST PIPE OR FITTING DIA.W.T.:	36" x 0.438"	EVRAZ	593024 (36")
ELECTRODE CLASS.:	E6010;E8010-P1		ELECTRODE MFG.:	Lincoln Electric Co.		
WELDER/S:	Wade Pilgren, Blake McAnnaley					
WELDING MACHINE/S:	Lincoln SA-200; Miller Pipe Pro 304					
TEST PROC. NO.:	WP-140			LAB REFERENCE NO. : 0903251		
DESTRUCTIVE TEST RESULTS PER API 1104 for 36" - 0.438wt with External Clamps						
TENSILE TESTS						
SPECIMEN	WIDTH (INCHES)	THICKNESS (INCHES)	AREA (SQ.IN.)	MAX. LOAD (LBS.)	U.T.S. (PSI)	FRACTURE LOCATION
T-1	1.059	.435	.460	45,000	97,826	PIPE
T-2	1.075	.436	.468	47,500	101,495	PIPE
T-3	1.051	.436	.460	45,000	97,826	PIPE
T-4	1.087	.439	.477	46,250	96,960	PIPE
FACE BEND TESTS		ROOT BEND TESTS		NICK BREAK TESTS		
SPECIMEN	RESULTS	SPECIMEN	RESULTS	SPECIMEN	RESULTS	
FB-1	Acceptable	RB-1	Acceptable	NB-1	Acceptable	
FB-2	Acceptable	RB-2	Acceptable	NB-2	Acceptable	
FB-3	Acceptable	RB-3	Acceptable	NB-3	Acceptable	
FB-4	Acceptable	RB-4	Acceptable	NB-4	Acceptable	
SIDE BEND TESTS						
SPECIMEN	RESULTS		SPECIMEN	RESULTS		
SB-1	N/A		SB-5	N/A		
SB-2	N/A		SB-6	N/A		
SB-3	N/A		SB-7	N/A		
SB-4	N/A		SB-8	N/A		
VICKERS MICRO-HARDNESS SURVEY - 10 kg load (Optional Test)						
(Two rows of readings within 2 mm of each surface across parent metal, weld metal and HAZ on both sides of weld)						
TEST NO.	LOCATION	A - A1	TEST NO.	LOCATION	B - B 1	
1	PIPE	227	12	PIPE	225	
2	HAZ	209	13	HAZ	202	
3	HAZ	217	14	HAZ	219	
4	HAZ	227	15	HAZ	222	
5	WELD	216	16	WELD	204	
6	WELD	205	17	WELD	199	
7	WELD	211	18	WELD	206	
8	HAZ	228	19	HAZ	226	
9	HAZ	222	20	HAZ	216	
10	HAZ	209	21	HAZ	202	
11	PIPE	234	22	PIPE	232	
Photo-Macrograph of Weld Cross-section						
CHARPY V-NOTCH TEST DATA (Optional Test)						
Test Temp.: 23° F.						
HAZ @ 3 O'clock (Dimensions: 10 x 10 x 2V)			WELD @ 3 O'clock (Dimensions: 10 x 10 x 2V)			
SPECIMEN	RESULTS (Ft.-Lbs.)		SPECIMEN	RESULTS (Ft.-Lbs.)		
1	62		1	36		
2	50		2	36		
3	79		3	48		
AVERAGE	63.7		AVERAGE	40		

Test Facility: Bodycote

Test Laboratory Representative: Jim Blevins

Date: 6/01/09



**ENBRIDGE ENERGY
WELDING PROCEDURE SPECIFICATION**

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This page provides the procedure qualification test conditions and a sample of the results for the above Enbridge Energy welding procedure.

TEST PIPE / FILLER MATERIAL AND TEST CONDITIONS FOR PROCEDURE QUALIFICATION					
TEST LOCATION:	United Piping Inc.-Duluth, MN		TEST CONDITIONS:	Inside; 50-60° F.	
PIPE/FITTING GRADE USED FOR TESTING:	API 5L X70		TEST PIPE DIA./W.T.:	36" x 0.438"	PIPE MFG.
TEST PIPE POSITION:	Horizontal-Fixed		TO TEST PIPE OR FITTING DIA./W.T.:	36" x 0.438"	PIPE HEAT NO.
ELECTRODE CLASS.:	E6010;E6010-P1		ELECTRODE MFG.:	Lincoln Electric Co.	EVRAZ
WELDER/S:	Wade Pilgren, Blake McAnnaley				
WELDING MACHINE/S:	Lincoln SA-200; Miller Pipe Pro 304				
TEST PROC. NO.:	WP-140			LAB REFERENCE NO. : O903257	

DESTRUCTIVE TEST RESULTS PER API 1104 for 36" - 0.438wt with External Clamps (originally WP 142)

TENSILE TESTS						
SPECIMEN	WIDTH (INCHES)	THICKNESS (INCHES)	AREA (SQ. IN.)	MAX. LOAD (LBS.)	U.T.S. (PSI)	FRACTURE LOCATION
T-1	1	.473	.473	42,500	89,852	PIPE
T-2	1.002	.450	.451	45,000	99,800	PIPE
T-3	1	.448	.448	45,000	100,446	PIPE
T-4	1.003	.454	.455	45,000	98,822	PIPE

FACE BEND TESTS		ROOT BEND TESTS		NICK BREAK TESTS	
SPECIMEN	RESULTS	SPECIMEN	RESULTS	SPECIMEN	RESULTS
FB-1	Acceptable	RB-1	Acceptable	NB-1	Acceptable
FB-2	Acceptable	RB-2	Acceptable	NB-2	Acceptable
FB-3	Acceptable	RB-3	Acceptable	NB-3	Acceptable
FB-4	Acceptable	RB-4	Acceptable	NB-4	Acceptable

SIDE BEND TESTS			
SPECIMEN	RESULTS	SPECIMEN	RESULTS
SB-1	N/A	SB-5	N/A
SB-2	N/A	SB-6	N/A
SB-3	N/A	SB-7	N/A
SB-4	N/A	SB-8	N/A

VICKERS MICRO-HARDNESS SURVEY - 10 kg load (Optional Test)
(Two rows of readings within 2 mm of each surface across parent metal, weld metal and HAZ on both sides of weld)

TEST NO.	LOCATION	A - A 1	TEST NO.	LOCATION	B - B 1
1	PIPE	225	12	PIPE	221
2	HAZ	204	13	HAZ	186
3	HAZ	211	14	HAZ	189
4	HAZ	215	15	HAZ	193
5	WELD	205	16	WELD	183
6	WELD	210	17	WELD	177
7	WELD	200	18	WELD	179
8	HAZ	215	19	HAZ	188
9	HAZ	208	20	HAZ	179
10	HAZ	204	21	HAZ	179
11	PIPE	235	22	PIPE	224

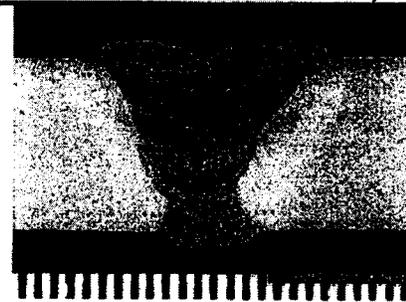


Photo-Macrograph of Weld Cross-section

CHARPY V-NOTCH TEST DATA (Optional Test)

Test Temp.: 23° F.

HAZ @ 3 O'clock (Dimensions: 10 x 10 x 2V)		WELD @ 3 O'clock (Dimensions: 10 x 10 x 2V)	
SPECIMEN	RESULTS (Ft.-Lbs.)	SPECIMEN	RESULTS (Ft.-Lbs.)
1	73	1	38
2	73	2	37
3	73	3	34
AVERAGE	73	AVERAGE	36.3

Test Facility: Bodycote

Test Laboratory Representative: Jim Blevins

Date: 6/03/09



ENBRIDGE ENERGY WELDING PROCEDURE SPECIFICATION

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Root (Pass 1)	Elect Dia.	Electrode	Amps		Volts		Travel	
			Low	High	Low	High	Low	High
20"	1/8"	6010	79	120	22	28	12	18.9
20" (3/16")	1/8"	6010	87	114	21	27	9	13.6
20" Tie-in	1/8"	6010	105	127	21	34	6	15
			79	127	21	34	6	18.9
36"	5/32"	6010	114	160	22	28	10.8	18.6
36" (3/16")	5/32"	6010	93	170	20	28	8	15
36" EC	5/32"	6010	98	170	20	29	6	14.5
36" Tie-in	5/32"	6010	88	235	21	30	5.75	15
			88	235	20	30	5.75	18.6

Hot (Pass 2)	Elect Dia.	Electrode	Amps		Volts		Travel	
			Low	High	Low	High	Low	High
20"	5/32"	8010	115	146	22	29	9.3	12.4
36"	5/32"	8010	108	195	21	30	6.8	13
36" EC	5/32"	8010	99	183	22	34	6.8	15.5
20" Tie-in	5/32"	8010	121	149	22	30	9	14
			99	195	21	34	6.8	15.5
20" (3/16")	3/16"	8010	134	170	22	32	9.7	16
36" (3/16")	3/16"	8010	97	194	22	32	6.8	15
36" Tie-in	3/16"	8010	132	189	21	32	8.5	14
			97	194	21	32	6.8	16

Fill (20") Hot Fill (36") (Pass 3)	Elect Dia.	Electrode	Amps		Volts		Travel	
			Low	High	Low	High	Low	High
20"	3/16"	8010	156	202	25	30	12	15
20" (3/16")	3/16"	8010	142	189	24	30	10.1	14.6
36"	3/16"	8010	131	185	22	32	5.5	9.3
36" (3/16")	3/16"	8010	148	210	24	34	6	10
36" EC	3/16"	8010	142	201	24	34	6	9.75
20" Tie-in	3/16"	8010	136	162	24	30	10.2	17
36" Tie-in	3/16"	8010	101	189	24	33	6	9.4
			101	210	22	34	5.5	17

Fill (36") and Cap (20") (Pass 4)	Elect Dia.	Electrode	Amps		Volts		Travel	
			Low	High	Low	High	Low	High
20"	3/16"	8010	128	178	25	30	6	10
20" (3/16")	3/16"	8010	121	173	24	30	5.7	8
36"	3/16"	8010	125	192	24	33	4.75	9
36" (3/16")	3/16"	8010	92	182	22	32	5.5	7.5
36" EC	3/16"	8010	105	188	23	34	4.5	9.5
20" Tie-in	3/16"	8010	128	159	23	30	7.6	10.2
36" Tie-in	3/16"	8010	121	166	23	32	5	9.3
			92	192	22	34	4.5	10.2

Strip	Elect Dia.	Electrode	Amps		Volts		Travel	
			Low	High	Low	High	Low	High
36"	3/16"	8010	135	184	25	34	9.4	14
36" (3/16")	3/16"	8010	90	178	22	32	10.6	15
36" EC	3/16"	8010	129	182	25	33	9.7	16
36" Tie-in	3/16"	8010	134	179	23	32	21.5	22
			90	184	22	34	9.4	22

36" Cap (Pass 5)	Elect Dia.	Electrode	Amps		Volts		Travel	
			Low	High	Low	High	Low	High
36"	3/16"	8010	116	185	23	35	4.4	10.8
36" (3/16")	3/16"	8010	92	175	22	33	3.2	9
36" EC	3/16"	8010	116	181	22	33	3.9	9.2
36" Tie-in	3/16"	8010	92	165	22	33	3.4	9.7
			92	185	22	35	3.2	10.8

Exit Interview
Enbridge Southern Lights Construction Inspection
October 7, 2009
Manhattan Terminal
Manhattan, IL

Records Review Issues

The welder qualification records from Continental Fabrication were reviewed on October 7. While the continuity records were satisfactory, the initial qualification record for Nathan Owen for GMAW was not found. ***It is requested that Enbridge provide PHMSA the initial welder qualification for the GMAW process.***

Weld issue

The cracked weld of 9/25 was discussed. Enbridge is to submit the cut out weld to metallurgical examination if possible in conjunction with the cracked weld cut outs to be examined from the mainline welding. ***It is requested that Enbridge provide PHMSA the followup analysis on this cracked weld and how weld cracking will be minimized in the future.***

Thank you for your prompt attention to the issues listed.

Exit Interview
Enbridge Southern Lights Construction Inspection
October 6-9, 2009
Manhattan to Streator 20" line
Morris, IL

Records review issues

No issues

Field review issues

Welding

1. The four cracks discovered on mainline welding from October 2 were discussed. All four welds have been cut out and will be sent for metallurgical analysis. ***It is requested that Enbridge provide PHMSA the analysis process that will be used to identify possible causes for these cracks and provide PHMSA metallurgical analyses as soon as they are available.***
2. On October 7, welding was observed at Doyle Road where the previously mentioned cracked welds had been cut out. The welder helper was asked to check pipe temperature between passes, with the pipe temperature being less than 250 degrees F. The pipe was subsequently heated up to the proper temperature. ***Welding inspectors should verify that pipe temperature is always above 250 degrees F during the welding process to minimize hydrogen induced cracking problems.***

Coating

3. The Avoid Verbal Order (AVO) issued 9/29/09 states that the 3M patch stick is to be applied only to "pinholes" ¼ by ¼ inch or less. The 3M Scotchkote patch stick instructions state that patch stick can be used on holidays 2 mm (~5/64 inch) or smaller. ***It is requested that Enbridge provide PHMSA the rationale for allowing patch stick repairs to anomalies much greater than the manufacturer's recommendations.***

Thank you for your prompt attention to the issues listed.

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Lights (20")		Date: 10_09_09
Location: Morris, IL Manhattan to Streator 20" line		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Carter Saline	Construction Manager	Enbridge (contract)
Dave Stafford (phone conferenced in)	Compliance	Enbridge
RJ Hammer	Sr. Welding Inspector	contract
Ernie Hanus	PHMSA records coordinator	Enbridge (contract)
Josh Schults	Engineer	Enbridge (contract)
Jerrid Anderson (phone conferenced in)	Director of Southern Lights	Enbridge
Activities Observed/Performed: Held exit interview. See separate document		Results/Comments:
Summary:		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Lights (20")		Date: 10_08_09
Location: Morris, IL construction office and ROW Manhattan to Streator 20" line		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Carter Saline	Construction Manager	Enbridge (contract)
Richard Robbins	Jeeping/coating inspector	Contractor
Josh Matthews	Jeeping/coating inspector	Contractor
Richard Blanchard	Welding inspector	contractor
CJ Hammer	Sr. Welding Inspector	Contractor
Activities Observed/Performed:		Results/Comments:
<p>1. Observed HDD pull in at Kankakee River. String was split into two and was welding halfway into pull. Pull started at 10:00 am in the rain and was not completed at 7:00 pm at night. Difficulty in keeping pipe dry during jeeping. Two large coating gouges were repaired, one with normal 2 part epoxy and one with power crete. Weld was coated with power crete. A number of jeeping anomalies were properly repaired with green patchstick. Jeeping voltage and travel speed were ok. Welding preheat was ok, did not witness initial fit up in external clamps. Pipe was relatively clean during jeeping, though it fell off the rollers once into the mud.</p>		<p>1. No issues.</p>
Summary:		
No issues to report		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Lights (20")		Date: 10_07_09
Location:	Morris, IL construction office and ROW, Manhattan to Streator 20" line Manhattan Station	Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Carter Saline	Construction Manager	Enbridge (contract)
Dave Stafford	Compliance	Enbridge
Jacob Weertz	Mechanical inspector	Contractor
Kelly Harless	Construction Manager	Enbridge (contract)
David Grogan	Firing line welding inspector	Contractor
Rocky Schnold	Tie in welding inspector	Contractor
Jack Sanger	Coating inspector	Contractor
Activities Observed/Performed:	Results/Comments:	
1. Manhattan Station - reviewed welder qualifications for Continental Fabrication. Did not have original qualification for GMAW for Nathan Owen.	1. Enbridge to provide GMAW qualification as requested.	
2. Discussed cracked weld on 20" valve welded 9/25/09. Crack was on a 0.375 to 0.500 wall thickness weld. Crack was on the bottom. Weld procedure WP-12, Rev. 7. Xray after one hour ok, xray on 9/28 showed crack. Cut out ring to be submitted to lab evaluating mainline cracked welds.	2. Enbridge to provide analysis of cracked weld.	
3. Firing line south of Manhattan Station. Preheating, weld splatter guards ok. Cap - V 27-28, A 150 ok. Pipe gang had finished in station.	3 No issues.	
4. Doyle Road, observed welds being made at cracked weld cut outs. Preheat, splatter guards ok. Filler V 28-30, A 155-160 and V 28-30, A 135 to 140. ok	4. While welding and preheat parameters were ok, it was apparent that the inspector was not familiar with taking volts and amps and welder helpers had to be reminded to check pipe temperature between passes, which should not have to be done.	
5. Offner Road, observed mainline coating crew coating repair welds with FBE. Blasting ok, coating thickness ~ 40 mil	5. No issue	
Summary:	Enbridge to address issues 1 and 2. Will make comment at exit interview on item 4.	
Inspector(s):	Carl Griffis	

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Lights (20")	Date: 10_06_09	
Location: Morris, IL construction office and ROW Manhattan to Streator 20" line	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Carter Saline	Construction Manager	Enbridge (contract)
Dave Stafford	Compliance	Enbridge
RJHammer	Sr. Welding Inspector	Enbridge (contract)
Richard Blanchard	Pipe gang welding inspector	Contractor
Jerrell Bryan	Chief Inspector	Contractor
Harvey Goracke	Tie in welding inspector	Contractor
Kirk Neuman	Lowering in inspector	Contractor
Activities Observed/Performed:	Results/Comments:	
1. Reviewed Enbridge response on patch stick repair criteria. The AVO (Avoid Verbal Order) states that anomalies smaller than ¼ inch can be repaired with patch stick. The manufacturer recommendation states that anomalies smaller than 2 mm (~1/8 inch can be repaired with patch stick)	1. Enbridge to provide rationale for allowing larger area for patch stick repair than manufacturer recommends.	
2. Four cracks occurred on 10/3/09 on the pipe gang/firing line. All four cracks were detected on one day delayed radiograph and were on the bottom of the pipe. Weather was windy, rainy and moderate temperatures. All four welds to be examined by metallurgical lab.	2. Enbridge to provide metallurgical results as soon as possible.	
3. Reviewed weld log history.	3. No issues	
4. Pipe gang North of Hoff Road Observed preheat, welding of root, hot pass, hot filler root A 120 V 22-24, A 112-118 V 25-26, hot pass A 150 V 23-27, hot fill A 160-170 V 28, A 160-170 V 24-26 blankets were used to protect the welds. Rain finally shut down the operation.	4. No issues	
5. CECO Park area Observed dummy pipe being 'thumped' under 3 BP lines and the RR. The line is ~4 ½ feet under the live BP line, which was partially exposed. 2 BP personnel on site to observe operation	5. No issues	
6. Lowering in east of Kankakee Street Observed jeeping, cleaning of pipe, patch stick repair. Pipe was generally clean, one piece of tape noted. Pipe did fill off the skids and had to be recleaned. Patch stick repair was adequate. Noted two different colors of patch stick being used.	6. Enbridge to provide the specific type of patch sticks being used.	
7. Coating east of Broadway Street Observed blasting of girth weld prior to coating. Noted missed areas and lack of feathering of parent coating to bare metal.	7. Discussed improved blasting of pipe and feathering with operator.	
Summary:		
Issues 1, 2, 6 - Enbridge to provide information as requested.		
Inspector(s): Carl Griffis		

CENTRAL REGION OFFICE
Daily Construction Inspection Report

Project:	Alberta Clipper/Southern Lights Audit	Date:	10/5-9/2009
Location:	Superior, WI, Joliette, ND, Thief River Falls, MN	Station/Survey or Pipeline Marker:	Spread Offices 1,2,6 Multiple – As Noted
Personnel Contacted:	Title/Position:	Company/Affiliation:	
Boyd Haugrose	Project Compliance Inspector	Enbridge	
Bill Bennett	Asst. Chief Inspector – Spread 6	EnGlobal	
Paul Eberth	Project Manager – Spread 6	Enbridge	
Avery Schott	Construction Manager – Spread 6	Enbridge	
Earnest Coleman	Sr. Welding Inspector – Spread 6	EnGlobal	
Mack Taylor	HDD Inspector – Spread 6	Mustang	
Tony Madden	Construction Manager – Spreads 1&2	EnGlobal	
Dale Pyland	Sr. Welding Inspector – Spread 1	Mustang	
Lavalle Warren	Acting Chief Inspector – Spread 1	EnGlobal	
Chris Leslie	NDT Auditor - Spread 1	Mustang	
Toby Hiner	Welding Inspector – Spread 1	Mustang	
Bart Scarborough	Lead Technician - Serimax – Spread 1	Michaels	
Eric Lewis	AUT Technician – Spread 1	JanX	
Joel Mixon	Welding Inspector – Spread 1 Tie-in	Mustang	
Bill Schutt	Coating Inspector – Spread 1	Mustang	
Jaimie Prieto	Coating Inspector – Spread 1	Mustang	
Rick Fleming	Sr. Welding Inspector – Spread 2	EnGlobal	
David Bennett	NDT Auditor – Spread 2	Enbridge	

Activities Observed/Performed:

October 5, 2009 – Brian Pierzina met Boyd Haugrose at the Spread 6 construction office, near Cloquet. We met with Paul Eberth, Avery Schott, and Bill Bennett at various times to discuss the project status, and Enbridge's response to issues identified during preceding weeks. The 20" seam issue is still under investigation, and is being tracked by Jack Olin. We spoke with Jack via conference call, and he said he hadn't received any results yet. He did say that they did some on-site NDT, and determined the pipe was within code. He said it doesn't appear there is an issue with the pipe, although I questioned the long term implication of having a stress concentrator such as the groove running along the seam of the pipe. In addition, Paul Eberth had previously mentioned some level of plate edge misalignment in the subject pipe joints, which Jack Olin didn't have any details of, but which would be of some concern, particularly coupled with a groove in the weld seam. It appears Enbridge will await the results of metallurgical analysis being performed in Canada before any further action is taken. We also discussed patch stick coating repairs which are now limited to repairs on FBE coating, and the incidence of improper coating removal for a girth weld (pup joint 29A). However, we could not determine the location of this joint, even after meeting with the survey folks. We also discussed the amperage range concerns for WP-140 that had been raised by Darren Lemmerman, but had not been responded to by Enbridge as of the time of the inspection.

We travelled the pipeline construction right of way from Wrenshall, MN to Superior, WI, stopping at the HDD site near the CN Pokegema facility, and met with Mack Taylor, HDD Inspector. Mr. Taylor informed us they were currently doing the 30" back-ream, and were approximately 850 feet into the 5000 foot drill. It would be another three days or so before the back reaming operation would be completed. They had a problem with one of the engines in the filtration system that had shut them down for about a day, and had considered moving in a larger drill rig, but for the time being they were proceeding with the equipment they had on site. We also stopped at various sites to look at pipe that had been welded up and coated along the right-of-way. No deficiencies were observed.

October 6, 2009 – Brian Pierzina met Boyd Haugrose at the Spread 6 construction office near Cloquet. The weather began as a light rain, and gradually got heavier through the day. Ultimately, work was rained out by late morning. The majority of time was spent reviewing welding records, primarily with Ernie Coleman, Sr. Welding Inspector. We discussed the 24 hour delayed X-ray program, and reviewed overall results to date. The overall rate is 23% (372 out of 1622 total). The delay shots are not necessarily a random sample of welds, as they are often comprised of 7-9 consecutive welds in a string, as opposed to a random distribution of welds throughout the project. This has been mentioned to Enbridge representatives, but as it is a discretionary program on their part, they can implement it as they deem necessary. No defects have been reported on Spread 6 as a result of the 24 hour delayed x-ray program. One crack was identified on Spread 6 (Weld # 13S6ML183E). It was replaced by Weld # 13S6ML183ECN. The overall repair rate is at 4.1% on Spread 6. Two welders have been dismissed, and a few others have been moved and/or cautioned for excessive repairs. Three arc burns were identified prior to x-ray, and those welds were cut out, but they are not included in the repair rate because they were not x-rayed. No deficiencies were identified.

October 7, 2009 – Brian Pierzina met Boyd Haugrose at the Spread 1 construction office in Joliette, ND. Also at the construction office was Tony Madden – Construction Manager, Lavalle Warren – Acting Chief Inspector, and Dale Pyland – Sr. Welding Inspector. Tony Madden mentioned a recent rash of 14 crack calls on Spread 2, that they had determined were not cracks, but defects involving the internal line-up clamp shoes (more on this later). Dale Pyland provided his Weld Log, which logs the status of each weld since the start of the project. A handful of rejected welds were selected, and reviewed with Chris Leslie – NDT Auditor. We went to the right-of-way east of I-29, where the Serimax automated welding crew was setting up for welding operations. Toby Hiner was the welding inspector on site, and Bart Scarborough was the Lead Welding Technician for Michels. The welding process being used is a dual torch with the root bead and hot pass being performed approximately 2-1/2 inches apart simultaneously. Bart Scarborough is the Lead Welding Technician for Michels, and appeared to have a very good handle on process control. No defects were identified in any of the welds performed while on site. One repair had been identified earlier in the day, on the west side of I-29. We then proceeded to a location where a tie-in weld was being completed (Sta 465+55). Joel Mixon was the welding inspector on site. The weld was a transition from .469 wall to .562 wall. The x-ray of the completed weld was reviewed the following day. No defects were identified. Nearby, just upstream, a 320' bore had just been completed.

October 8, 2009 – Went to the Spread 1 construction office and met with Dale Pyland and Chris Leslie. Reviewed film from x-rays shot the previous day, including ML0085-D-TI-N, which was a new weld to replace a cracked weld. The new weld required a repair at 6:00 for gas pockets. The initial weld reportedly cracked as a result of a backhoe bleeding off fluid while the welding was being performed. The welder reportedly mentioned it prior to the x-ray.

We returned to the tie-in location at 465+55, where the 2nd tie-in weld was being performed. Jan-X Rig D was on-site waiting for the weld to be completed. We reviewed the x-ray for the initial tie-in transition weld (ML0091-TI-D-X), which was used as a delayed shot. We also reviewed the film for the crack that was identified for weld ML0085-TI-D, and discussed with the NDT technician aspects of radiography and UT, and how slight shifting of the source placement can result in masking of defects such as cracks.

It was discovered during the inspection that there are inconsistencies in how the delayed NDT program is being implemented. On Spread 6, delayed shots also had an accompanying initial shot, whereas on Spread 1, delayed shots did not have an accompanying initial shot. One of the primary purposes of the delayed NDT program is to help assess whether delayed hydrogen cracking is occurring during construction. Without having initial NDT, Enbridge is unable to ascertain whether a defect existed at completion of the weld, or developed sometime later. Boyd Haugrose made an inquiry and reported that the automated welding did not require initial NDT for delay shots, but that the manual (stick) welding did. It does not appear that this may be well understood between Spreads 1 & 2. In any case, the concern remains the same – without the initial NDT, it becomes difficult to ascertain whether a defect is related to delayed hydrogen cracking, or not.

We observed girth weld coating operations at various locations along the right-of-way. At Sta 826+91 we met Coating Inspector Bill Schutt. Manual two-part epoxy coating was being performed on weld MLA0936-A. Uneven coating application was identified near the 10:00 position, where a glob approximately 1-1/2" each side was observed. The coating foreman explained that if the two part epoxy cools too fast this can happen, and he didn't believe it was a concern. The coating thickness was well beyond the capability of the thickness gauges on site, but there is no maximum coating thickness specification for two part epoxy coating. We also observed coating being performed at Sta 697+37, where Jaimie Prieto was the coating inspector. No deficiencies were noted. Just downstream, at Sta 705+74, several hundred feet of pipe had recently been lowered in. No deficiencies were noted.

October 9, 2009 – Travelled to the Spread 2 construction office near Thief River Falls, and met with Rick Fleming – Sr. Welding Inspector, David Bennett – NDT Auditor, and Mark Devarens – Project Manager. We reviewed and discussed the weld history and defects for Spread 2. A recent cracking problem had developed on Spread 2, where 10 cracks were identified out of 125 completed welds. This was the issue that Tony Madden had referred to earlier (10/7), but he mentioned 14, and also that they weren't actually cracks. However, in reviewing information with David Bennett, including AUT scans and confirmatory x-rays, it appears the 10 cracks mentioned are accurate. There appears to be somewhat of a characteristic signature to the defects. In particular for the welds observed, there was internal concavity of 1 – 1.5 mils, associated with cracks approximately 4 mils in depth in the center of the weld. The problem started showing up at Sta 4688+20, in .375 wall pipe. They believe it was associated with worn shoes on the internal line-up clamps. Following replacement of the shoes they have had 0 repairs. They had 2 cracks earlier in the project that were attributed to inadvertent early release of the line-up clamps. The process used on Spread 1 was that following completion of the root and hot pass with the dual torch, the welder would open the door of the shack and push a button that would blow a horn, and signal to the crew they could release the clamp. This appeared to take place within a few seconds of completion of the weld for the welds that were completed while on site. There had been another group of defects in the 3:00 and 9:00 positions that were attributed to the motherboard going out in the computer of the Serimax welding machine. There were a number of cutouts associated with inadequate repairs, which Rick Fleming reported were associated with a new repair welder. In those cases, the target defects were not removed, and they do not allow repairs in a previously repaired area, so the defective welds had to be cut out. The new welds were made manually, however they retained the initial designation of MLA (A signifying automated welding), but had the N designation for a new weld.

Summary:

Issue Summary

1. It appears there are inconsistencies between spreads as to implementation of the 24 hour delayed NDT program. PHMSA recognizes this program is discretionary on the part of Enbridge, however it is important to have a clear understanding of the expectations, and whether there are any planned deviations among the spreads. Please clarify whether and/or under what circumstances initial NDT is expected to be followed up by delayed NDT. Please also clarify the expectations for any differences in the program between main line welds, tie-in welds, transition welds, and repair welds, and whether there are any planned deviations among the spreads.

2. Please clarify the discrepancy between the 14 welds with indications of cracks mentioned by Construction Manager Tony Madden, and the 10 welds with indications of cracks mentioned by NDT Auditor David Bennett. David Bennett mentioned on October 9th, that the 10 welds were "pending". Please indicate the total number of confirmed cracked welds attributed to the worn shoe issue, and the number of initially reported crack like defects that were determined satisfactory after further investigation. Follow-up on October 22 indicated the 10 defects reported by David Bennett were the accurate number. They are also being referred to as "centerline indications".

Inspector(s): Brian Pierzina

MNOPS Pipeline Construction Inspection Guide

10/8/2009

Inspector: Jonathan C. Wolfram
Case Number: 109724

AFO: 2 Days

Summary of Inspection Items:

Inspection Date	Inspection Area	Inspection Summary	Page Reference
10/1/2009	Spread 3 & 5 (Clearbrook to Deer River)	Welding and Coating Inspection at Lakeview Road	1
10/1/2009	Spread 3 & 5 (Clearbrook to Deer River)	Welding Inspection at Grant Creek Road	2
10/1/2009	Spread 3 & 5 (Clearbrook to Deer River)	HDD & Coating Inspection at Four-Legged Lake	3
10/1/2009	Spread 5 (Clearbrook to Deer River)	Coating Inspection North of Grant Creek Road	4
10/1/2009	Spread 5 (Clearbrook to Deer River)	Coating Inspection South of Grant Creek Road	5
10/2/2009	Spread 3 & 5 (Clearbrook to Deer River)	Record Reivew at Bemidji Field Offices	6

Summary Personnel Observed:

Name	Title / Role	Company	Phone	Email
Jack Olin	Pipeline Const. Manager	Enbridge	715-398-4541	john.olin@enbridge.com
Jeff Wiklund	Sr. Compliance Spec.	Enbridge	218-269-5518	jeffrey.wiklund@enbridge.com
Boyd Haugrose	Complinance Inspector	Enbridge	218-441-2366	boyd.haugrose@enbridge.com
Michael Maciel	Safety Inspector	Enbridge	915-217-7301	mwmaciel1981@hotmail.com
Ryan Davis	Forman	USPL	207-217-1698	
Steve Mayfield		Englobal		
Jerid Kemper	Weld Inspector	Englobal		
Todd Lundsford	Utily Inspector	Englobal		
Jim Sevams	HDD Inspector	TIR	906-287-0226	
Tracy Peterson	Coating	USPL		
Byron Johnson	Coating	USPL		
Diane Anderson	Coating	USPL		
John Rayon	Coating Inspector			
KD Lloyd	Coating Inspector			
Marshall Russel	Welding Technician	Englobal		
Sam Ralls	Weld. Inspect. Tech.	Englobal		
Jack Alexander	NDT Inspector	Englobal		

Summary of Inspection Observations:

During the week of September 28th MNOPS traveled to Bemidji Minnesota to inspect spreads 3 and 5 of the Enbridge Alberta Clipper and Southern Lights pipe line construction project. During the inspection days of October 1st and 2nd MNOPS performed inspections in the following areas:

- Coating Inspections: Verification of procedures and in field condition / appearance of applied coatings.
- Welding inspections: Verification of welding procedures and inspections made by onsite welding inspectors.
- Record Checks: Review of records for NDT (reject and repair of welds) and coating application records.

The daily reports noted above outline, in detail, the observations and any issues noted during the inspection.

Summary of Violations & Non-Compliance Issues.

During the inspection from October 1 to October 2, no violations or non-compliance issues were noted. A few items regarding field applied coating practices have been included in this inspection summary. These issues regard to the blistering of portions of the FBE coating on the 36" pipe at the Mississippi River crossing. This issue has been noted by Enbridge and is being addressed before insertion of the pipe into the river crossing. Tape (Packing Tape & Duct Tape) on the pipe also seems to be an issue on in regards to the coating process. As noted in the daily reports, tape was found between the factory coating and the field applied coating. This has been a recognized issue by Enbridge.

MNOPS Pipeline Construction Inspection Guide

Inspection Date: Date Submitted: Case Number:

Inspector: Inspection Area:

Inspection Details:		Welding:		Coating:	
Inspection Item:	Welding & Coating	Pass		Type	FBE
Location:	Bemidji, MN	Electrode Dia.		Thickness	
M.P. Station:	MP 940 to MP 940.5	Electrode Type			
Intersection:	Lakeview Road	Amperage		A	
Weather:	45 Degrees and Rainy	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	20" & 36"	Pre-Heat Temp	250 - 300	° F	
Joint Number:		Soil Type:			
Weld Number:		Sand			

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Ryan Davis	Forman	USPL	207-217-1698	

Notes / Observations:

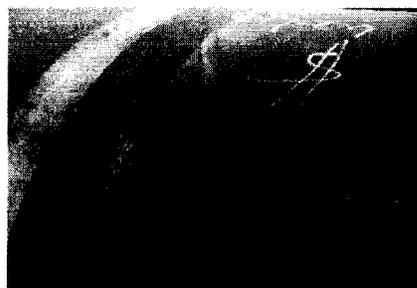
– Observed coating issues on 36" pipe at Mississippi River Coating in Bemidji. The issues noted (blistering) were noted in a previous inspection. These issues will be reassessed before pulling the pipe under the river.

Violations / Non-Compliance Issues:

– Coating blistering as noted above.



Photograph Description
A view of the coating blistering of the FBE coating.



Photograph Description
A view of the patch stick repair made to the coating on the spiral seam of the pipe.

MNOPS Pipeline Construction Inspection Guide

Inspection Date: Date Submitted: Case Number:

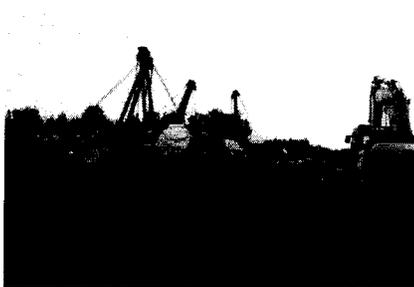
Inspector: Inspection Area:

Inspection Details:		Welding:			Coating:	
Inspection Item:	Welding	Pass			Type	
Location:	Bemidji, MN	Electrode Dia.			Thickness	
M.P. Station:	AC STA 8220+00 to 8230+00	Electrode Type				
Intersection:	Grant Creek Road	Amperage	Photo	A		
Weather:	45 Degrees and Rainy	Voltage	Photo	V		
Pipe Information		Travel Rate	Photo	in / min		
Pipe Size:	36" Weighted Pipe	Pre-Heat Temp	300	° F		
Joint Number:		Soil Type:				
Weld Number:		Swamp				

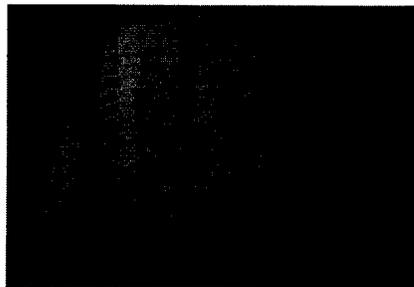
Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Steve Mayfield		Englobal		
Jerid Kemper	Weld Inspector	Englobal		
Todd Lundsford	Utility Inspector	Englobal		

Notes / Observations:
 -Observed tack weld process of 36" weighted pipe (see photo) and reviewed Amperage, Voltage, and Travel rate checks by welding inspector.

Violations / Non-Compliance Issues:
 -NA



Photograph Description
 A view of the transport of the 36" Weighted Pipe.



Photograph Description
 A view of the travel rate, amperage, and voltage checks for the welding process. These items were recorded by the Welding Inspector.



Photograph Description
 A view of the 2-Part coating application for the girthweld of the 36" Weighted Concrete Pipe.



Photograph Description
 A view of the thermocouple reading taken to verify the preheat temperature of the pipe before welding.

MNOPS Pipeline Construction Inspection Guide

Inspection Date: Date Submitted: Case Number:

Inspector: Inspection Area:

Inspection Details:		Welding:		Coating:	
Inspection Item:	HDD & Coating	Pass		Type	2-Part Epoxy
Location:	Bemidji, MN	Electrode Dia.		Thickness	
M.P. Station:	AC STA. 7630+00 to 7600+00	Electrode Type		Notes:	
Intersection:	County 2	Amperage	A		
Weather:	45 Degrees and Rainy	Voltage	V		
Pipe Information		Travel Rate	in / min		
Pipe Size:	36" .625" Wall	Pre-Heat Temp	°F		
Joint Number:		Soil Type:			
Weld Number:		Sand			

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Jim Sevarns	HDD Inspector	TIR	906-287-0226	

Notes / Observations:

--Observed the HDD at Four-Legged-Lake for the installation of the 36" pipe. On this day, 1946' of total drilling progress was complete out of the total length of 3038'. The HDD crew was using a 50" reaming to aid in the installation of the pipe. This process was observed on day 14 of the 32 day process.

-- Inspected the coating the first (3) 2-part applied, coating joints. It was observed that the excess coating must have been removed with a file for areas that were over the allowable specified thickness.

Violations / Non-Compliance Issues:

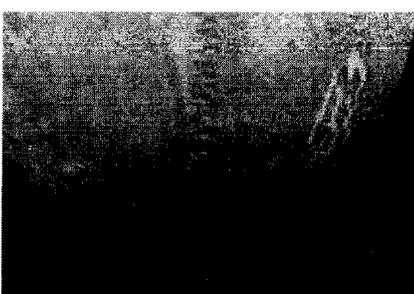
--NA



Photograph Description
A view of the HDD Rig.



Photograph Description



Photograph Description
A view of the excess coating removed by filing of the coating.



Photograph Description
A view of the excess coating removed by filing of the coating.

MNOPS Pipeline Construction Inspection Guide

Inspection Date: Date Submitted: Case Number:

Inspector: Inspection Area:

Inspection Details:		Welding:		Coating:	
Inspection Item:	Coating	Pass		Type	Patch Stick for FBE
Location:	Bemidji, MN	Electrode Dia.		Thickness	
M.P. Station:	AC STA. 1025+00 to 1030+00	Electrode Type			
Intersection:	North of Grant Creek Road	Amperage		A	
Weather:	45 Degrees and Rainy	Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	20"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Tracy Peterson	Coating	USPL		
Byron Johnson	Coating	USPL		
Diane Anderson	Coating	USPL		

Notes / Observations:

-- Observed the jeepling, of the 20" diameter pipe after the FBE coating had been applied. The jeep was being used at a setting of 1.8.

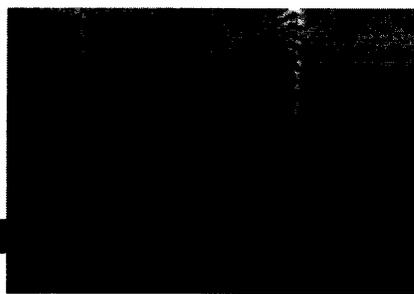
--Observed the repair of holidays in the FBE coating with the DuPont patch stick. The areas of concerned were roughened with a cordless grinder and then re-coated with the patch stick. The patch stick was applied by heating the pipe / stick on the area of concern with a torch.

Violations / Non-Compliance Issues:

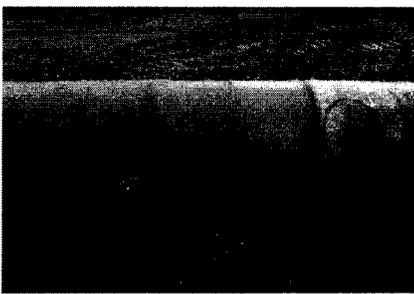
-- It was noted that tape was left on the pipe during the welding and coating process. The tape was left on the factory applied coating and the FBE was placed over the tape. It was common to find tape left of the pipe from the factory.



Photograph Description
A view of a patch stick repair.



Photograph Description
A view of a patch stick repair.



Photograph Description
A view of the tape left between the factory coating and FBE coating. (A larger photo will be submitted)

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
<i>Inspection Item:</i>	Coating	<i>Pass</i>		<i>Type</i>	FBE
<i>Location:</i>	Bemidji, MN	<i>Electrode Dia.</i>		<i>Thickness</i>	32 to 35 mils
<i>M.P. Station:</i>	AC STA 8250+00	<i>Electrode Type</i>		438 to 488 Degree Preheat Temp	
<i>Intersection:</i>	South of Grant Creek Road.	<i>Amperage</i>			
<i>Weather:</i>	45 Degrees and Rainy	<i>Voltage</i>		A	
Pipe Information		<i>Travel Rate</i>		V	
<i>Pipe Size:</i>		<i>Pre-Heat Temp</i>		in / min	
<i>Joint Number:</i>		Soil Type:		°f	
<i>Weld Number:</i>		Sand			

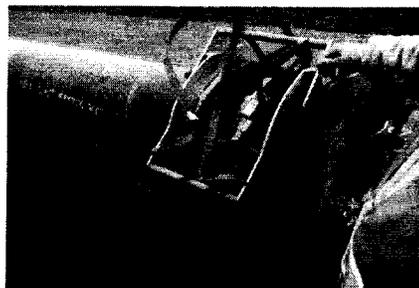
Personnel Observed:				
<i>Name</i>	<i>Title / Role</i>	<i>Company</i>	<i>Phone</i>	<i>Email</i>
John Rayon	Coating Inspector			
KD Lloyd	Coating Inspector			

Notes / Observations:

--Observed a portion of the FBE coating process. Due to weather conditions the coating was placed on hold.

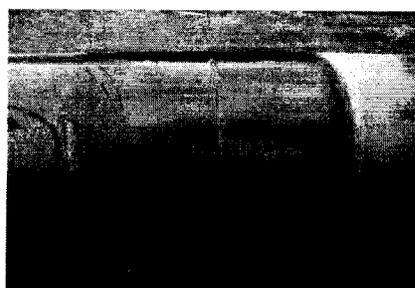
--Reviewed the daily report by the inspector which recorded coating thickness, temperature, relative humidity, and lot number for the coating used each day. The inspector stated that he may record weather conditions up to 6 times during the working day.

Violations / Non-Compliance Issues:



Photograph Description

A view of the heating ring used to heat the pipe for the FBE coating process.



Photograph Description

A view of the FBE coated section of pipe.

MNOPS Pipeline Construction Inspection Guide

Inspection Date: Date Submitted: Case Number:

Inspector: Inspection Area:

Inspection Details:		Welding:		Coating:	
Inspection Item:	Record Review	Pass		Type	
Location:	Bemidji Field Office	Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:		Amperage		A	
Weather:		Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	20"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Marshall Russell	Welding Technician	Englobal		
Sam Ralls	Weld. Inspect. Tech.	Englobal		
Jack Alexander	NDT Inspector	Englobal		

Notes / Observations:

- Reviewed NDT records for weld reject/repairs. As of 10/02/2009, the reject / repair rate is as follows for spreads 3 and 5.
 - 20" Repair Rate: 3.12%
 - 36" Repair Rate: 2.79%
- Reviewed the coating inspection matrix for coating on 9/26/2009. The inspection data logged the application of the 2-part coating for the girth welds at the following locations (*no compliance issues noted*):
 - 221st Avenue: Sta. 25+100
 - 119th Avenue: Sta. 111+69 & Sta. 114+62.
- Noted "Damaged Pipe Report #54," for 9-26-2009. The report documented damage and repair to joints 8054 and 8270 of the 20" pipe.
- Reviewed x-rays for the girth weld connections of the 20" and 36" pipes. As of 10/01/2009, the x-ray data is as follows:
 - 20" Pipe: 1570 X-Rays Total & 43 Repairs
 - 36" Pipe: 219 X-Rays Total & 8 Repairs

Violations / Non-Compliance Issues:

-- NA

Enbridge Pipelines (Lakehead) L.L.C.
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Superior, WI 54880
www.enbridgepartners.com

James Crawford
Director
Engineering & Construction (US)
Major Projects
Tel 715 398 4516
Jim.Crawford@enbridge.com

October 9, 2009

To: Marc DeVarennes Jack Olin Paul Eberth
 Tony Madden Tommy Shifflett Avery Schott

Re: PHMSA Audit Issues 32-39 (September 23-25, 2009) from PHMSA's Issue Summary Reports

Attached is a summary of PHMSA findings and their disposition based on the PHMSA audit that occurred September 23 – 25 on spreads 1,2 and 3. Please review these findings/responses and ensure that proper contractor and inspection staff are informed and take appropriate action.

In addition, the following points have come up on the Alberta Clipper/Southern Lights Project or the Streator-Manhattan Project. Please take the following actions:

1. Ensure that attached AVO-AC-9009 on the use of Patch Sticks for coating repairs on FBE has been communicated to appropriate contractor/inspection personnel.
2. Ensure that attached AVO-AC-9008 WP-140 Rev 4 and WPS 140 Rev 3, which allow a two or three beaded cap on W.T. over 0.500", has been communicated to appropriate contractor/inspection personnel.
3. Communicate to appropriate contractor/inspector welding personnel the need for weld heat management/maintaining preheat temperatures (especially as the weather cools).

Please positively confirm with me by email when these actions are completed. I appreciate your prompt attention to these matters.



Jim Crawford

cc: Dan Plume, Tom Hodge, Shaun Kavajecz, Dave Hoffman,
 Jerrid Anderson, Randy Rice, Carter Saline

Regulatory Compliance Audit Report

Alberta Clipper/Southern Lights (Clearbrook, MN to Superior, WI)

Report Number: 5

Date of Report: October 9, 2009

Preparer: Jeff Wiklund

Audit Reference(s): The responses contained in this report reference Audit Issues found in the PHMSA audit that occurred from September 23-25 on spreads 1-3. Audit points were communicated to Dave Hoffman in the following emails:

- email received from Darren Lemmerman (PHMSA) on September 25, 2009

Please note that audit communications and observations by both PHMSA and MNOPS are also included in this report but are prefaced by (C/O).

Audit Issues (from Tracking Spreadsheet) / Resolution:

32.925 After reviewing the welding procedures and the PQR for WP-140 the following has been noticed. The welding procedures are developed from the PQR's. WP-140 contains parameters that are outside of the PQR parameters. The root pass on the PQR is documented with a min and max of 88 amps to 235 amps and the procedure throws out the highest 235 amp reading and uses a max 175 amps, which is a little higher than the most common high amps recorded on the PQR, but less than the max and raises the min to 90 amps from 88 amps. This provides a nice welding procedure for the root pass with parameters that fail within the PQR. This is true for passes 1 and 2. Pass 3 uses the maximum amps recorded in the PQR of 210 amps, which is still within the PQR parameters. Passes 4 and 5 and the stripper pass have amp ranges in the WP-140 that fall well outside of the PQR ranges. For the PQR the 3rd pass had a max of 192 amps while the procedure allows 210 amps. For the PQR the 5th pass had a max of 185 amps while the procedure allows 210 amps. For the PQR, the stripper pass had a max of 184 amps while the procedure allows 210 amps. The WP-140 has not been qualified for these amp ranges. The Weld Data Sheet Revision 2 had maximum amp ranges that fell within the PQR. Revision 3 ignored the maximums and changed them all to 210 amps and Rev 3 lowered the minimums to provide weld ability, yet the lower amp allowances are still within the PQR parameters. Why are the welding procedures not within the parameters of the PQR? What will Enbridge do for the welds that have been produced in production that have fallen outside of the PQR parameters?

(1)The welding parameters shown on page 9 of the Welding Procedure Specification (WPS) reflect the actual values recorded during the qualification of the procedure. The values specified on page 1 of the WPS and subsequently on the Weld Data Sheet reflect those values

that Enbridge engineering has determined to be suitable for welding API 5L Grade X70 pipe using cellulose electrodes. These values are based on the recorded values but have been modified (rounded) to values which simplify the monitoring process by standardizing the values according to electrode diameter.

API 1104 (20th Edition) Section 5.3 Procedure Specification requires that the WPS record the electrical characteristics (amps, volts, travel speed) but does not list these values as being essential for the requalification of a welding procedure. Consequently it is understood that welding procedure specifications may include the amperage, voltage and travel speed which represent the desired values to produce a sound weld capable of meeting the design and mechanical property requirements of the welds being made.

33.925 The procedure calls for a 3 pass cap for .500 wall pipe or an oscillating (weave) cap not to exceed 3 electrode widths. There is no mention of a 2 pass cap in the procedure. See pics above.

Please see AVO-AC-9008. This AVO addresses the October 1, 2009 revision of WP-140 Rev 4 and WPS 140 Rev 3, which allows either a two or three beaded cap on W.T. over 0.500".

34.925 (C/O) It was noticed on the 36" Mississippi River bore pipe for spread 3 while with MNOPS that weld cap heights on a couple of welds exceeded the unified construction specifications. It was also noticed that a couple welds had questionable workmanship and should have been addressed with the visual inspection process.

AVO-AC-9006 was issued on September 29, 2009 and addresses weld cap height. Spread Management have had meetings with the contractor and Inspection staff regarding the importance of understanding and following project specifications/procedures for all inspection areas. In addition, Boyd Haugrose has developed a supplemental training addressing workmanship, specifications and procedures for both contractor and inspection staff coating/welding personnel that has been/will be presented at each spread. We believe our continued communication on these issues has yielded positive impacts on all aspects of the project.

35.925 (C/O) Excessive grinding of the long seams for automatic welding/ UT was noticed on Spread 1. See 009.jpg

Seam grinding methods and criteria have been reviewed with the contractor and inspection staff.

36.925 (C/O) On spread 1 the ROW was covered with construction garbage. This included wire wheels, cigarette butts, skids buried randomly in the mud, chew cans, rags, welding wire and so on. This obviously is not a code issue but reflects on the local land owners in a negative light on Enbridge and the pipeline industry as a whole.

The Inspector at the site had the worksite cleaned up. Maintaining a clean worksite/ROW is

b. Spread 3 has reviewed this with appropriate contractor and inspection staff and this practice will not be used. All repairs will be made in accordance with coating specifications.

38.925 In a couple of areas patch sticks have been used. Enbridge's specification matches the factory application maximum of 1 square inch. As seen in 032.jpg this has been slightly exceeded.

Please see AVO-AC-9009. This requirement is in accordance with the NACE standard.

(Sec. 8.3.1) For repair of FBE using a patch/hot melt stick. The appropriate use of patch sticks has been communicated to contractor and inspection staff.

39.925 (C/O) The two part applications on Spread 1 looked well done.

Reviewed/Approved by


(initials)

**Avoid Verbal Order
Internal Memo**

ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Project Title:	Alberta Clipper Pipeline & Southern Lights Clearbrook to Sup	AVO Number:	AVO-AC-9008
Project Number:	N/A	Contractor Ref Num:	none
Contract Number:	Amended Alliance	Date:	10/08/09
Attention:	All E&C Managers	From:	Dan Plume
Subject:	Revision 4 to WP-140 Weld Data Sheet and Revision 3 to WP-140 Welding Procedure Specification		

The Following Instructions Are Communicated:

Please note Revision 4 to WP-140 Weld Data Sheet and Revision 3 to WP-140 Welding Procedure Specification (Attached) and communicate to appropriate contractor and inspection personnel.

This revision provides for a *two or three* beaded cap to be used for W.T. over 0.500".



**WP-140
WELD DATA SHEET**

WP-140 Rev3
Page No.: 1 of 1
Revision: 4
Date: 10/1/09

WELDING PROCESS:	Manual Shielded Metal Arc (SMAW)	APPLICATION:	Mainline / Tie In Welding
PIPE AND FILLER MATERIAL REQUIREMENTS			
PIPE GRADES QUALIFIED:	API 5L Grade X70		
PIPE DIAMETER/W.T. RANGE QUALIFIED:	Over 12 3/4" O.D. / 3/16" Through 3/4" W.T.		
FILLER MATERIAL:	AWS E6010 Root Pass; E8010-P1 (G) - Remaining Passes		
PRODUCTION WELDING CONDITIONS			
PRODUCTION PIPE POSITION:	Horizontal - Fixed Position	WELDING DIRECTION:	Vertical Down-All Passes
NUMBER OF WELDERS:	Two Minimum - Root and 2 nd Pass One minimum - All Remaining Passes	WELDING TECHNIQUE:	Stringer / Weave
PREHEAT METHOD:	Propane or Induction	TEMP. MEASUREMENT:	Pyrometer or Tempil Sticks
METHOD OF WELD CLEANING:	Clusters of surface porosity, bead starts and high points shall be removed by power brushing or grinding before depositing weld metal over them to the satisfaction of the company as required.		
WELD CURRENT/ POLARITY:	Direct Current, Reverse Polarity		
TYPE/REMOVAL OF CLAMP:	Internal / External; After 100% of Root Pass Complete with Internal; After 50% of Root Pass complete with External.		
PIPE MOVEMENT:	Lifting of pipe to facilitate set-up of the subsequent joint shall be permitted if the root pass is complete. Welding shall continue without additional pipe movement until a minimum of 3 weld passes, or 2/3 of the weld thickness is filled, whichever is greater.		
TIME BETWEEN PASSES:	10 Minutes between Root and Hot Pass, 1 hour between Hot Pass and Hot Fill, 24 hrs Maximum for remaining passes (unless otherwise authorized by Enbridge assigned designate).		
PREHEAT/INTERPASS TEMP.:	250° F. Minimum - 400° F. Maximum regardless of ambient temperature. Preheat for an area of at least 2" on each side of the weld joint for the entire circumference prior to welding.		

WELD JOINT DESIGN

<p>For pipe ends of the same nominal thickness, internal offset larger than 1/8" is permissible provided the offset is caused by variations of the pipe end dimensions within the pipe purchase specification tolerances, and such variations have been distributed essentially uniformly around the circumference of the pipe.</p>	QUALIFIED JOINT DESIGN CONDITIONS	<p>TYPICAL WELD PASS SEQUENCE FOR 0.250" W.T. <small>Stripper Pass prior to Cap if required</small></p> <p>TYPICAL WELD PASS SEQUENCE FOR 0.438" W.T.</p> <ul style="list-style-type: none"> A two or three beaded cap may be used for W.T. over 0.500". Weave width shall be limited to 3x electrode diameter. 1/8" max cap reinforcement height. 															
	<table border="1"> <tr> <td>A</td> <td>30° + 5°, -0°</td> </tr> <tr> <td>B</td> <td>1/16" ± 1/32"</td> </tr> <tr> <td>C</td> <td>1/16" ± 1/32"</td> </tr> <tr> <td colspan="2">Minimum No. of Passes</td> </tr> <tr> <td>W.T.</td> <td>Min. Passes</td> </tr> <tr> <td>0.250" ≤ 0.400"</td> <td>4</td> </tr> <tr> <td>>0.400" ≤ 0.650"</td> <td>5</td> </tr> <tr> <td>>0.650" ≤ 0.750"</td> <td>7</td> </tr> </table>		A	30° + 5°, -0°	B	1/16" ± 1/32"	C	1/16" ± 1/32"	Minimum No. of Passes		W.T.	Min. Passes	0.250" ≤ 0.400"	4	>0.400" ≤ 0.650"	5	>0.650" ≤ 0.750"
A	30° + 5°, -0°																
B	1/16" ± 1/32"																
C	1/16" ± 1/32"																
Minimum No. of Passes																	
W.T.	Min. Passes																
0.250" ≤ 0.400"	4																
>0.400" ≤ 0.650"	5																
>0.650" ≤ 0.750"	7																

WELDING PARAMETERS AND ELECTRICAL CHARACTERISTICS

PASS NO.	FILLER MATERIAL		WELDING PARAMETERS		TRAVEL SPEED (IPM)
	SIZE	CLASSIFICATION	AMPERAGE	VOLTAGE	
1	5/32"	E6010	90-175	20-30	6-19
2	5/32"	E8010-P1	100-185	21-34	7-16
3	3/16"	E8010-P1	120-210	22-34	5-17
4	3/16"	E8010-P1	120-210	22-34	5-10
Stripper Pass (as needed)*	3/16"	E8010-P1	120-210	22-34	10-20
5	3/16"	E8010-P1	120-210	22-34	3-11

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 electrodes are shown below. A stripper pass may be made on the sides if needed using the parameters of weld pass shown above. E8010-P1 and E8010-G may be used interchangeably.

OPTIONAL APPROVED WELDING PARAMETERS WITHIN THE ABOVE CLASSIFICATION

ELECTRODE DIAMETER	AMPERAGE RANGE	VOLTAGE RANGE	TRAVEL SPEED(IPM)
1/8" (E6010, E8010)	80-125	21-30	6-19
5/32" (E8010)	100-185	20-34	6-19
3/16" (E8010)	120-210	22-34	5-20

The procedure qualification was conducted in accordance with the requirements of the 20th Edition of API 1104, CFR Part 195 and Enbridge Energy Engineering Specifications.

Enbridge Review & Approval:	<i>Junfang Lu</i> Junfang Lu	Date:	<i>Oct. 1, 2009</i>
Enbridge Project Approval:		Date:	
Contractor's Name:	Contractor's Acceptance:	Date:	

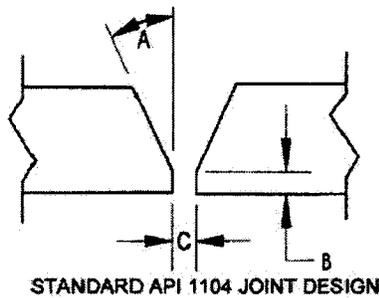


**ENBRIDGE ENERGY
WELDING PROCEDURE SPECIFICATION**

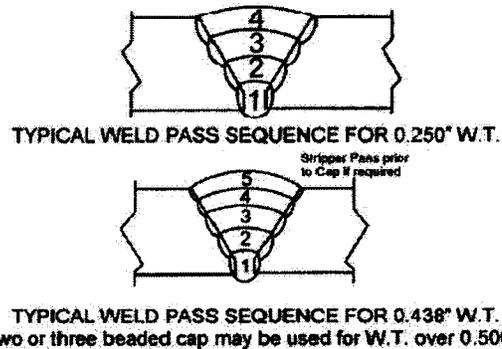
WP-140
Page No.: 1 of 9
Revision: 3
Date: 10/1/09

WELDING PROCESS:	Manual Shielded Metal Arc (SMAW)	APPLICATION:	Mainline / Tie In Welding
PIPE AND FILLER MATERIAL REQUIREMENTS			
PIPE GRADES QUALIFIED:	API 5L Grade X70		
PIPE DIAMETER/W.T. RANGE QUALIFIED:	Over 12 3/4" O.D. / 3/16" Through 3/4" W.T.		
FILLER MATERIAL:	AWS E6010 Root Pass; E8010-P1 (G) - Remaining Passes		
PRODUCTION WELDING CONDITIONS			
PRODUCTION PIPE POSITION:	Horizontal - Fixed Position	WELDING DIRECTION:	Vertical Down-All Passes
NUMBER OF WELDERS:	Two Minimum - Root and 2 nd Pass One minimum - All Remaining Passes	WELDING TECHNIQUE:	Stringer / Weave
PREHEAT METHOD:	Propane or Induction	TEMP. MEASUREMENT:	Pyrometer or Tempil Sticks
METHOD OF WELD CLEANING:	Clusters of surface porosity, bead starts and high points shall be removed by power brushing or grinding before depositing weld metal over them to the satisfaction of the company as required.		
POSTHEAT TREATMENT:	None Required		
WELD CURRENT/ POLARITY:	Direct Current, Reverse Polarity		
TYPE/REMOVAL OF CLAMP:	Internal / External; After 100% of Root Pass Complete with Internal; After 50% of Root Pass complete with External.		
TIME BETWEEN PASSES:	10 Minutes between Root and Hot Pass, 1 hour between Hot Pass and Hot Fill, 24 hrs Maximum for remaining passes. This procedure also qualified for 6 day delay after Hot Fill Pass.		
PREHEAT/INTERPASS TEMP.:	250° F. Minimum - 400° F. Maximum regardless of ambient temperature.		

WELD JOINT DESIGN



QUALIFIED JOINT DESIGN CONDITIONS	
A	30° + 5°, -0°
B	1/16" ± 1/32"
C	1/16" ± 1/32"
Minimum No. of Passes	
W.T.	Min. Passes
0.250" ≤ 0.400"	4
>0.400" ≤ 0.650"	5
>0.650" ≤ 0.750"	7



WELDING PARAMETERS AND ELECTRICAL CHARACTERISTICS

PASS NO.	PROCESS	FILLER MATERIAL		WELDING PARAMETERS		TRAVEL SPEED (IPM)	Gas Mixture and Flow Rate
		SIZE	CLASSIFICATION	AMPERAGE	VOLTAGE		
1	SMAW	5/32"	E6010	90-175	20-30	6-19	---
2	SMAW	5/32"	E8010-P1	100-185	21-34	7-16	---
3	SMAW	3/16"	E8010-P1	120-210	22-34	5-17	---
4	SMAW	3/16"	E8010-P1	120-210	22-34	5-10	---
(Strip)*	SMAW	3/16"	E8010-P1	120-210	22-34	10-20	---
5	SMAW	3/16"	E8010-P1	120-210	22-34	3-11	---

*Stripper Pass as needed

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 electrodes are shown below. A stripper pass may be made on the sides if needed using the parameters of weld pass shown above. E8010-P1 and E8010-G may be used interchangeably.

OPTIONAL APPROVED WELDING PARAMETERS WITHIN THE ABOVE CLASSIFICATION

ELECTRODE DIAMETER	AMPERAGE RANGE	VOLTAGE RANGE	TRAVEL SPEED RANGE (IPM)
1/8" (E6010, E8010)	80-125	21-30	6-19
5/32" (E8010)	100-185	20-34	6-19
3/16" (E8010)	120-210	22-34	5-20

The procedure qualification was conducted in accordance with the requirements of the 20th Edition of API 1104, CFR Part 195 and Enbridge Energy Engineering Specifications.

Revision details:

Rev 1: Revised minimum wall thickness requiring 3 beaded cap (from over 0.600" to over 0.500").

Rev 2: Revised amperage range to reflect minimum values used during procedure qualification.

Rev 3: Revised the cap bead number for W.T. over 0.500". The method of weld cleaning is modified as well.

ENBRIDGE Integrity: Junfang Lu
ENBRIDGE Pipeline Project Manager (US): _____

Date: Oct. 1, 2009
Date: _____



**ENBRIDGE ENERGY
WELDING PROCEDURE SPECIFICATION**

WP-140
Page No.: 2 of 9
Revision: 3
Date: 10/1/09

This page provides the procedure qualification test conditions and a sample of the results for the above Enbridge Energy welding procedure.

TEST PIPE / FILLER MATERIAL AND TEST CONDITIONS FOR PROCEDURE QUALIFICATION					
TEST LOCATION:	United Piping Inc.-Duluth, MN		TEST CONDITIONS:	Inside, 50-60° F.	
PIPE/FITTING GRADE USED FOR TESTING:	API 5L X70		TEST PIPE DIA./W.T.:	20" x 0.250"	PIPE MFG. / PIPE HEAT NO.
TEST PIPE POSITION:	Horizontal-Fixed		TO TEST PIPE OR FITTING DIA./W.T.:	20" x 0.250"	EVRAZ / 594777
ELECTRODE CLASS.:	E6010;E8010-P1		ELECTRODE MFG.:	Lincoln Electric Co.	
WELDER/S:	Sam Sandbothe, Travis Crabtree, Eddie Jones				
WELDING MACHINE/S:	Lincoln SA-200				
TEST PROC. NO.:	WP-140		LAB REFERENCE NO. : O903252		

DESTRUCTIVE TEST RESULTS PER API 1104 for 20" - 0.250wt with 5/32" Hot Pass

TENSILE TESTS						
SPECIMEN	WIDTH (INCHES)	THICKNESS (INCHES)	AREA (SQ. IN.)	MAX. LOAD (LBS.)	U.T.S. (PGI)	FRACTURE LOCATION
T-1	1.074	0.268	0.287	27,500	95,818	PIPE
T-2	1.000	0.262	0.262	27,500	104,961	PIPE
T-3	1.063	0.260	0.276	26,250	95,108	PIPE
T-4	1.064	0.260	0.276	25,000	90,579	PIPE

FACE BEND TESTS		ROOT BEND TESTS		NICK BREAK TESTS	
SPECIMEN	RESULTS	SPECIMEN	RESULTS	SPECIMEN	RESULTS
FB-1	Acceptable	RB-1	Acceptable	NB-1	Acceptable
FB-2	Acceptable	RB-2	Acceptable	NB-2	Acceptable
FB-3	Acceptable	RB-3	Acceptable	NB-3	Acceptable
FB-4	Acceptable	RB-4	Acceptable	NB-4	Acceptable

SIDE BEND TESTS			
SPECIMEN	RESULTS	SPECIMEN	RESULTS
SB-1	N/A	SB-5	N/A
SB-2	N/A	SB-6	N/A
SB-3	N/A	SB-7	N/A
SB-4	N/A	SB-8	N/A

VICKERS MICRO-HARDNESS SURVEY - 10 kg load (Optional Test)

(Two rows of readings within 2 mm of each surface across parent metal, weld metal and HAZ on both sides of weld)

TEST NO.	LOCATION	A - A 1	TEST NO.	LOCATION	B - B 1
1	PIPE	215	12	PIPE	225
2	HAZ	213	13	HAZ	191
3	HAZ	220	14	HAZ	201
4	HAZ	221	15	HAZ	207
5	WELD	216	16	WELD	195
6	WELD	211	17	WELD	197
7	WELD	213	18	WELD	200
8	HAZ	220	19	HAZ	207
9	HAZ	220	20	HAZ	198
10	HAZ	209	21	HAZ	189
11	PIPE	213	22	PIPE	216

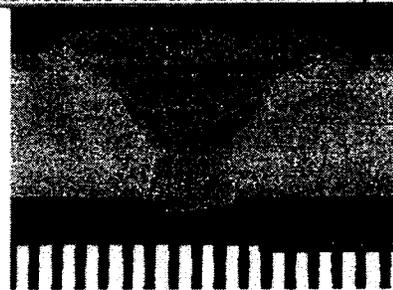


Photo-Macrograph of Weld Cross-section

CHARPY V-NOTCH TEST DATA (Optional Test)

Test Temp.: 23° F.

HAZ @ 3 O'clock (Dimensions: 10 x 5 x 2V)			WELD @ 3 O'clock (Dimensions: 10 x 5 x 2V)		
SPECIMEN	RESULTS (Ft.-Lbs.)		SPECIMEN	RESULTS (Ft.-Lbs.)	
1	48		1	30	
2	41		2	29	
3	50		3	28	
AVERAGE	46.3		AVERAGE	29	

Test Facility: Bodycote

Test Laboratory Representative: Jim Blevins

Date: 6/01/09



**ENBRIDGE ENERGY
WELDING PROCEDURE SPECIFICATION**

WP-140
Page No.: 3 of 9
Revision: 3
Date: 10/1/09

This page provides the procedure qualification test conditions and a sample of the results for the above Enbridge Energy welding procedure.

TEST PIPE / FILLER MATERIAL AND TEST CONDITIONS FOR PROCEDURE QUALIFICATION						
TEST LOCATION:	United Piping Inc. Duluth, MN		TEST CONDITIONS:	Inside; 50-60° F.		
PIPE/FITTING GRADE USED FOR TESTING:	API 5L X70		TEST PIPE DIA./W.T.:	20" x 0.250"	PIPE MFG.	PIPE HEAT NO.
TEST PIPE POSITION:	Horizontal-Fixed		TO TEST PIPE OR FITTING DIA./W.T.:	20" x 0.250"	EVRAZ	594777
ELECTRODE CLASS.:	E6010, E8010-P1		ELECTRODE MFG.:	Lincoln Electric Co.		
WELDER/S.:	Travis Crabtree, Eddie Jones, Joe Parrow.					
WELDING MACHINE/S.:	Lincoln SA-200					
TEST PROC. NO.:	WP-140			LAB REFERENCE NO.: 0903254		
DESTRUCTIVE TEST RESULTS PER API 1104 for 20" - 0.250wt with 3/16" Hot Pass						
TENSILE TESTS						
SPECIMEN	WIDTH (INCHES)	THICKNESS (INCHES)	AREA (SQ. IN.)	MAX. LOAD (LBS.)	U.T.S. (PSI)	FRACTURE LOCATION
T-1	1.056	.254	.268	25,000	93,283	PIPE
T-2	1.058	.254	.268	25,000	93,283	PIPE
T-3	1.080	.256	.276	26,250	95,108	PIPE
T-4	1.054	.252	.265	25,000	94,339	PIPE
FACE BEND TESTS		ROOT BEND TESTS		NICK BREAK TESTS		
SPECIMEN	RESULTS	SPECIMEN	RESULTS	SPECIMEN	RESULTS	
FB-1	Acceptable	RB-1	Acceptable	NB-1	Acceptable	
FB-2	Acceptable	RB-2	Acceptable	NB-2	Acceptable	
FB-3	Acceptable	RB-3	Acceptable	NB-3	Acceptable	
FB-4	Acceptable	RB-4	Acceptable	NB-4	Acceptable	
SIDE BEND TESTS						
SPECIMEN	RESULTS		SPECIMEN	RESULTS		
SB-1	N/A		SB-5	N/A		
SB-2	N/A		SB-6	N/A		
SB-3	N/A		SB-7	N/A		
SB-4	N/A		SB-8	N/A		
VICKERS MICRO-HARDNESS SURVEY - 10 kg load (Optional Test)						
(Two rows of readings within 2 mm of each surface across parent metal, weld metal and HAZ on both sides of weld)						
TEST NO.	LOCATION	A - A1	TEST NO.	LOCATION	B - B1	
1	PIPE	215	12	PIPE	227	
2	HAZ	209	13	HAZ	184	
3	HAZ	211	14	HAZ	194	
4	HAZ	211	15	HAZ	194	
5	WELD	204	16	WELD	187	
6	WELD	201	17	WELD	184	
7	WELD	196	18	WELD	186	
8	HAZ	208	19	HAZ	196	
9	HAZ	203	20	HAZ	196	
10	HAZ	202	21	HAZ	184	
11	PIPE	211	22	PIPE	216	
CHARPY V-NOTCH TEST DATA (Optional Test)						
Test Temp.: 23° F.						
HAZ @ 3 O'clock (Dimensions: 10 x 5 x 2V)			WELD @ 3 O'clock (Dimensions: 10 x 5 x 2V)			
SPECIMEN	RESULTS (Ft.-Lbs.)		SPECIMEN	RESULTS (Ft.-Lbs.)		
1	43		1	27		
2	42		2	29		
3	37		3	26		
AVERAGE	40.7		AVERAGE	27.3		

Test Facility: Bodycote

Test Laboratory Representative: Jim Blevins

Date: 6/01/09



**ENBRIDGE ENERGY
WELDING PROCEDURE SPECIFICATION**

WP-140
Page No.: 4 of 9
Revision: 3
Date: 10/1/09

This page provides the procedure qualification test conditions and a sample of the results for the above Enbridge Energy welding procedure.

TEST PIPE / FILLER MATERIAL AND TEST CONDITIONS FOR PROCEDURE QUALIFICATION					
TEST LOCATION:	United Piping Inc.-Duluth, MN		TEST CONDITIONS:	Inside; 50-60° F.	
PIPE/FITTING GRADE USED FOR TESTING:	API 5L X70		TEST PIPE DIA./W.T.:	20" x 0.250"	PIPE MFG.
TEST PIPE POSITION:	Horizontal-Fixed		TO TEST PIPE OR FITTING DIA./W.T.:	20" x 0.250"	PIPE HEAT NO.
ELECTRODE CLASS.:	E6010;E8010-P1		ELECTRODE MFG.:	Lincoln Electric Co.	
WELDER/S:	Travis Crabtree, Joe Parrow,				
WELDING MACHINE/S:	Lincoln SA-200				
TEST PROC. NO.:	WP-140		LAB REFERENCE NO. : 0903258		

DESTRUCTIVE TEST RESULTS PER API 1104 for 20" - 0.250wt with External Clamps

TENSILE TESTS						
SPECIMEN	WIDTH (INCHES)	THICKNESS (INCHES)	AREA (SQ.IN.)	MAX. LOAD (LBS.)	U.T.S. (PSI)	FRACTURE LOCATION
T-1	1	.264	.264	25,000	94,696	PIPE
T-2	1	.263	.263	25,000	95,057	PIPE
T-3	1	.262	.262	25,000	95,419	PIPE
T-4	1	.263	.263	25,000	95,057	PIPE

FACE BEND TESTS		ROOT BEND TESTS		NICK BREAK TESTS	
SPECIMEN	RESULTS	SPECIMEN	RESULTS	SPECIMEN	RESULTS
FB-1	Acceptable	RB-1	Acceptable	NB-1	Acceptable
FB-2	Acceptable	RB-2	Acceptable	NB-2	Acceptable
FB-3	Acceptable	RB-3	Acceptable	NB-3	Acceptable
FB-4	Acceptable	RB-4	Acceptable	NB-4	Acceptable

SIDE BEND TESTS			
SPECIMEN	RESULTS	SPECIMEN	RESULTS
SB-1	N/A	SB-5	N/A
SB-2	N/A	SB-6	N/A
SB-3	N/A	SB-7	N/A
SB-4	N/A	SB-8	N/A

VICKERS MICRO-HARDNESS SURVEY - 10 kg load (Optional Test)

(Two rows of readings within 2 mm of each surface across parent metal, weld metal and HAZ on both sides of weld)

TEST NO.	LOCATION	A - A 1	TEST NO.	LOCATION	B - B 1
1	PIPE	202	12	PIPE	203
2	HAZ	207	13	HAZ	178
3	HAZ	205	14	HAZ	186
4	HAZ	204	15	HAZ	195
5	WELD	187	16	WELD	184
6	WELD	189	17	WELD	185
7	WELD	187	18	WELD	184
8	HAZ	205	19	HAZ	201
9	HAZ	198	20	HAZ	196
10	HAZ	186	21	HAZ	193
11	PIPE	213	22	PIPE	219

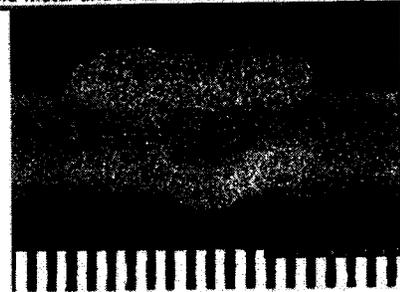


Photo-Macrograph of Weld Cross-section

CHARPY V-NOTCH TEST DATA (Optional Test)

Test Temp.: 23° F.

HAZ @ 3 O'clock (Dimensions: 10 x 5 x 2V)			WELD @ 3 O'clock (Dimensions: 10 x 5 x 2V)		
SPECIMEN	RESULTS (Ft.-Lbs.)		SPECIMEN	RESULTS (Ft.-Lbs.)	
1	27		1	30	
2	32		2	28	
3	35		3	30	
AVERAGE	31.3		AVERAGE	29.3	

Test Facility: Bodycote

Test Laboratory Representative: Jim Blevins

Date: 6/03/09



**ENBRIDGE ENERGY
WELDING PROCEDURE SPECIFICATION**

WP-140
Page No.: 5 of 9
Revision: 3
Date: 10/1/09

This page provides the procedure qualification test conditions and a sample of the results for the above Enbridge Energy welding procedure.

TEST PIPE / FILLER MATERIAL AND TEST CONDITIONS FOR PROCEDURE QUALIFICATION

TEST LOCATION:	United Piping Inc.-Duluth, MN	TEST CONDITIONS:	Inside; 50-60° F.		
PIPE/FITTING GRADE USED FOR TESTING:	API 5L X70	TEST PIPE DIA./W.T.:	36" x 0.438"	PIPE MFG.	PIPE HEAT NO.
TEST PIPE POSITION:	Horizontal-Fixed	TO TEST PIPE OR FITTING DIA./W.T.:	36" x 0.438"	EVRAZ	593024 (36)
ELECTRODE CLASS.:	E6010;E8010-P1	ELECTRODE MFG.:	Lincoln Electric Co.		
WELDER/S:	Sam Sandbothe, Travis Crabtree, Eddie Jones, Joe Parrow, Wade Pilgren, Blake McAnalely				
WELDING MACHINE/S:	Lincoln SA-200; Miller Pipe Pro 304				
TEST PROC. NO.:	WP-140	LAB REFERENCE NO. : O903254; O903241; O903258; O903257			

DESTRUCTIVE TEST RESULTS PER API 1104 for 36" - 0.438wt with 5/32" Hot Pass

TENSILE TESTS

SPECIMEN	WIDTH (INCHES)	THICKNESS (INCHES)	AREA (SQ.IN.)	MAX. LOAD (LBS.)	U.T.S. (PSI)	FRACTURE LOCATION
T-1	1.086	0.442	0.480	45,000	93,750	PIPE
T-2	0.931	0.446	0.415	40,000	96,385	PIPE
T-3	1.054	0.439	0.482	45,000	97,402	PIPE
T-4	1.019	0.442	0.450	42,500	94,444	PIPE

FACE BEND TESTS

ROOT BEND TESTS

NICK BREAK TESTS

SPECIMEN	RESULTS	SPECIMEN	RESULTS	SPECIMEN	RESULTS
FB-1	Acceptable	RB-1	Acceptable	NB-1	Acceptable
FB-2	Acceptable	RB-2	Acceptable	NB-2	Acceptable
FB-3	Acceptable	RB-3	Acceptable	NB-3	Acceptable
FB-4	Acceptable	RB-4	Acceptable	NB-4	Acceptable

SIDE BEND TESTS

SPECIMEN	RESULTS	SPECIMEN	RESULTS
SB-1	N/A	SB-5	N/A
SB-2	N/A	SB-6	N/A
SB-3	N/A	SB-7	N/A
SB-4	N/A	SB-8	N/A

VICKERS MICRO-HARDNESS SURVEY - 10 kg load (Optional Test)

(Two rows of readings within 2 mm of each surface across parent metal, weld metal and HAZ on both sides of weld)

TEST NO.	LOCATION	A - A1	TEST NO.	LOCATION	B - B 1
1	PIPE	234	12	PIPE	235
2	HAZ	198	13	HAZ	191
3	HAZ	213	14	HAZ	190
4	HAZ	224	15	HAZ	199
5	WELD	218	16	WELD	192
6	WELD	218	17	WELD	185
7	WELD	216	18	WELD	190
8	HAZ	220	19	HAZ	191
9	HAZ	219	20	HAZ	197
10	HAZ	211	21	HAZ	193
11	PIPE	236	22	PIPE	235

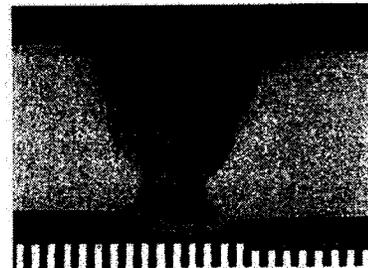


Photo-Macrograph of Weld Cross-section

CHARPY V-NOTCH TEST DATA (Optional Test)

Test Temp.: 23° F.

HAZ @ 3 O'clock (Dimensions: 10 x 10 x 2V)			WELD @ 3 O'clock (Dimensions: 10 x 10 x 2V)		
SPECIMEN	RESULTS (Ft.-Lbs.)		SPECIMEN	RESULTS (Ft.-Lbs.)	
1	56		1	52	
2	63		2	41	
3	65		3	45	
AVERAGE	61.3		AVERAGE	46	

Test Facility: Bodycote

Test Laboratory Representative: Jim Blevins

Date: 6/01/09



**ENBRIDGE ENERGY
WELDING PROCEDURE SPECIFICATION**

WP-140
Page No.: 6 of 9
Revision: 3
Date: 10/1/09

This page provides the procedure qualification test conditions and a sample of the results for the above Enbridge Energy welding procedure.

TEST PIPE / FILLER MATERIAL AND TEST CONDITIONS FOR PROCEDURE QUALIFICATION						
TEST LOCATION:	Unked Piping Inc.-Duluth, MN		TEST CONDITIONS:	Inside; 50-60° F.		
PIPE/FITTING GRADE USED FOR TESTING:	API 5L X70		TEST PIPE DIA./W.T.:	36" x 0.438"	PIPE MFG.	PIPE HEAT NO.
TEST PIPE POSITION:	Horizontal-Fixed		TO TEST PIPE OR FITTING DIA./W.T.:	36" x 0.438"	EVRAZ	593024
ELECTRODE CLASS.:	E6010;E8010-P1		ELECTRODE MFG.:	Lincoln Electric Co.		
WELDER/S:	Travis Crabtree, Joe Parrow, Blake McAnnaley					
WELDING MACHINE/S:	Lincoln SA-200					
TEST PROC. NO.:	WP-140			LAB REFERENCE NO. : 0903253		
DESTRUCTIVE TEST RESULTS PER API 1104 for 36" - 0.438wt with 3/16" Hot Pass						
TENSILE TESTS						
SPECIMEN	WIDTH (INCHES)	THICKNESS (INCHES)	AREA (SQ. IN.)	MAX. LOAD (LBS.)	U.T.S. (PSI)	FRACTURE LOCATION
T-1	1.129	.450	.508	45,000	88,582	PIPE
T-2	1.117	.448	.500	45,000	90,000	PIPE
T-3	1.041	.449	.467	43,750	93,683	PIPE
T-4	1.011	.451	.455	42,500	93,406	PIPE
FACE BEND TESTS		ROOT BEND TESTS			NICK BREAK TESTS	
SPECIMEN	RESULTS	SPECIMEN	RESULTS	SPECIMEN	RESULTS	
FB-1	Acceptable	RB-1	Acceptable	NB-1	Acceptable	
FB-2	Acceptable	RB-2	Acceptable	NB-2	Acceptable	
FB-3	Acceptable	RB-3	Acceptable	NB-3	Acceptable	
FB-4	Acceptable	RB-4	Acceptable	NB-4	Acceptable	
SIDE BEND TESTS						
SPECIMEN	RESULTS	SPECIMEN	RESULTS			
SB-1	N/A	SB-5	N/A			
SB-2	N/A	SB-6	N/A			
SB-3	N/A	SB-7	N/A			
SB-4	N/A	SB-8	N/A			
VICKERS MICRO-HARDNESS SURVEY - 10 kg load (Optional Test)						
(Two rows of readings within 2 mm of each surface across parent metal, weld metal and HAZ on both sides of weld)						
TEST NO.	LOCATION	A - A1	TEST NO.	LOCATION	B - B 1	
1	PIPE	228	12	PIPE	238	
2	HAZ	203	13	HAZ	218	
3	HAZ	221	14	HAZ	230	
4	HAZ	216	15	HAZ	227	
5	WELD	217	16	WELD	218	
6	WELD	208	17	WELD	211	
7	WELD	216	18	WELD	214	
8	HAZ	232	19	HAZ	223	
9	HAZ	230	20	HAZ	225	
10	HAZ	223	21	HAZ	212	
11	PIPE	232	22	PIPE	231	
						
Photo-Macrograph of Weld Cross-section						
CHARPY V-NOTCH TEST DATA (Optional Test)						
Test Temp.: 23° F.						
HAZ @ 3 O'clock (Dimensions: 10 x 7.5 x 2V)				WELD @ 3 O'clock (Dimensions: 10 x 7.5 x 2V)		
SPECIMEN	RESULTS (Ft.-Lbs.)			SPECIMEN	RESULTS (Ft.-Lbs.)	
1	48			1	32	
2	41			2	30	
3	44			3	41	
AVERAGE	44.3			AVERAGE	34.3	

Test Facility: Bodycote

Test Laboratory Representative: Jim Blevins

Date: 6/01/09

This page provides the procedure qualification test conditions and a sample of the results for the above Enbridge Energy welding procedure.

TEST PIPE / FILLER MATERIAL AND TEST CONDITIONS FOR PROCEDURE QUALIFICATION				
TEST LOCATION:	United Piping Inc. - Duluth, MN	TEST CONDITIONS:	Inside, 50-60° F.	
PIPE/FITTING GRADE USED FOR TESTING:	API 5L X70	TEST PIPE DIA./W.T.:	36" x 0.438"	PIPE MFG. PIPE HEAT NO.
TEST PIPE POSITION:	Horizontal-Fixed	TO TEST PIPE OR FITTING DIA./W.T.:	36" x 0.438"	EVRAZ 593024 (36")
ELECTRODE CLASS:	E6010; E8010-P1	ELECTRODE MFG.:	Lincoln Electric Co.	
WELDER/S:	Wade Pilgren, Blake McAnnaley			
WELDING MACHINE/S:	Lincoln SA-200; Miller Pipe Pro 304			
TEST PROC. NO.:	WP-140	LAB REFERENCE NO.:	O903251	

DESTRUCTIVE TEST RESULTS PER API 1104 for 36" - 0.438wt with External Clamps

TENSILE TESTS						
SPECIMEN	WIDTH (INCHES)	THICKNESS (INCHES)	AREA (SQ. IN.)	MAX. LOAD (LBS.)	U.T.S. (PSI)	FRACTURE LOCATION
T-1	1.059	.435	.460	45,000	97,826	PIPE
T-2	1.075	.436	.468	47,500	101,495	PIPE
T-3	1.051	.436	.460	45,000	97,826	PIPE
T-4	1.087	.439	.477	46,250	96,980	PIPE

FACE BEND TESTS		ROOT BEND TESTS		NICK BREAK TESTS	
SPECIMEN	RESULTS	SPECIMEN	RESULTS	SPECIMEN	RESULTS
FB-1	Acceptable	RB-1	Acceptable	NB-1	Acceptable
FB-2	Acceptable	RB-2	Acceptable	NB-2	Acceptable
FB-3	Acceptable	RB-3	Acceptable	NB-3	Acceptable
FB-4	Acceptable	RB-4	Acceptable	NB-4	Acceptable

SIDE BEND TESTS			
SPECIMEN	RESULTS	SPECIMEN	RESULTS
SB-1	N/A	SB-5	N/A
SB-2	N/A	SB-6	N/A
SB-3	N/A	SB-7	N/A
SB-4	N/A	SB-8	N/A

VICKERS MICRO-HARDNESS SURVEY - 10 kg load (Optional Test)

(Two rows of readings within 2 mm of each surface across parent metal, weld metal and HAZ on both sides of weld)

TEST NO.	LOCATION	A - A 1	TEST NO.	LOCATION	B - B 1
1	PIPE	227	12	PIPE	225
2	HAZ	209	13	HAZ	202
3	HAZ	217	14	HAZ	219
4	HAZ	227	15	HAZ	222
5	WELD	216	16	WELD	204
6	WELD	205	17	WELD	199
7	WELD	211	18	WELD	206
8	HAZ	228	19	HAZ	226
9	HAZ	222	20	HAZ	216
10	HAZ	209	21	HAZ	202
11	PIPE	234	22	PIPE	232

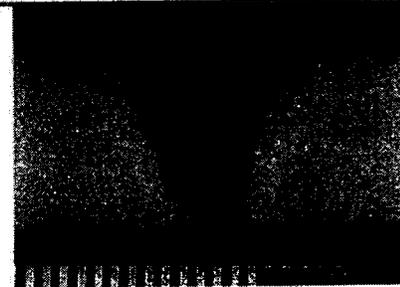


Photo-Micrograph of Weld Cross-section

CHARPY V-NOTCH TEST DATA (Optional Test)

Test Temp.: 23° F.

HAZ @ 3 O'clock (Dimensions: 10 x 10 x 2V)		WELD @ 3 O'clock (Dimensions: 10 x 10 x 2V)	
SPECIMEN	RESULTS (Ft.-Lbs.)	SPECIMEN	RESULTS (Ft.-Lbs.)
1	62	1	36
2	50	2	36
3	79	3	48
AVERAGE	63.7	AVERAGE	40



**ENBRIDGE ENERGY
WELDING PROCEDURE SPECIFICATION**

WP-140
Page No.: 8 of 9
Revision: 3
Date: 10/1/09

This page provides the procedure qualification test conditions and a sample of the results for the above Enbridge Energy welding procedure.

TEST PIPE / FILLER MATERIAL AND TEST CONDITIONS FOR PROCEDURE QUALIFICATION					
TEST LOCATION:	United Piping Inc.-Duluth, MN		TEST CONDITIONS:	Inside; 50-60° F.	
PIPE/FITTING GRADE USED FOR TESTING:	API 5L X70		TEST PIPE DIA./W.T.:	36" x 0.438"	PIPE MFG. PIPE HEAT NO.
TEST PIPE POSITION:	Horizontal-Fixed		TO TEST PIPE OR FITTING DIA./W.T.:	36" x 0.438"	EVRAZ 593024 (36")
ELECTRODE CLASS:	E6010,E8010-P1		ELECTRODE MFG.:	Lincoln Electric Co.	
WELDER/S:	Wade Pilgren, Blake McAnalely				
WELDING MACHINE/S:	Lincoln SA-200; Miller Pipe Pro 304				
TEST PROC. NO.:	WP-140		LAB REFERENCE NO.: 0903257		

DESTRUCTIVE TEST RESULTS PER API 1104 for 36" - 0.438wt with External Clamps (originally WP 142)

TENSILE TESTS						
SPECIMEN	WIDTH (INCHES)	THICKNESS (INCHES)	AREA (SQ. IN.)	MAX. LOAD (LBS.)	U.T.S. (PSI)	FRACTURE LOCATION
T-1	1	.473	.473	42,500	89,852	PIPE
T-2	1.002	.450	.451	45,000	99,800	PIPE
T-3	1	.448	.448	45,000	100,446	PIPE
T-4	1.003	.454	.455	45,000	98,822	PIPE

FACE BEND TESTS		ROOT BEND TESTS		NICK BREAK TESTS	
SPECIMEN	RESULTS	SPECIMEN	RESULTS	SPECIMEN	RESULTS
FB-1	Acceptable	RB-1	Acceptable	NB-1	Acceptable
FB-2	Acceptable	RB-2	Acceptable	NB-2	Acceptable
FB-3	Acceptable	RB-3	Acceptable	NB-3	Acceptable
FB-4	Acceptable	RB-4	Acceptable	NB-4	Acceptable

SIDE BEND TESTS			
SPECIMEN	RESULTS	SPECIMEN	RESULTS
SB-1	N/A	SB-5	N/A
SB-2	N/A	SB-6	N/A
SB-3	N/A	SB-7	N/A
SB-4	N/A	SB-8	N/A

VICKERS MICRO-HARDNESS SURVEY - 10 kg load (Optional Test)
(Two rows of readings within 2 mm of each surface across parent metal, weld metal and HAZ on both sides of weld)

TEST NO.	LOCATION	A - A1	TEST NO.	LOCATION	B - B 1
1	PIPE	225	12	PIPE	221
2	HAZ	204	13	HAZ	186
3	HAZ	211	14	HAZ	189
4	HAZ	215	15	HAZ	193
5	WELD	205	16	WELD	183
6	WELD	210	17	WELD	177
7	WELD	200	18	WELD	179
8	HAZ	215	19	HAZ	188
9	HAZ	208	20	HAZ	179
10	HAZ	204	21	HAZ	179
11	PIPE	235	22	PIPE	224

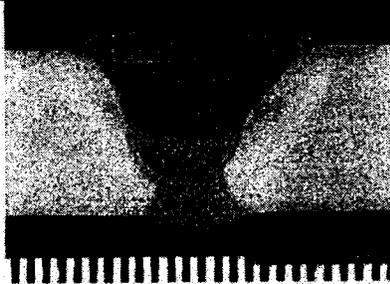


Photo-Micrograph of Weld Cross-section

CHARPY V-NOTCH TEST DATA (Optional Test)

Test Temp.: 23° F.

HAZ @ 3 O'clock (Dimensions: 10 x 10 x 2V)			WELD @ 3 O'clock (Dimensions: 10 x 10 x 2V)		
SPECIMEN	RESULTS (Ft.-Lbs.)		SPECIMEN	RESULTS (Ft.-Lbs.)	
1	73		1	38	
2	73		2	37	
3	73		3	34	
AVERAGE	73		AVERAGE	36.3	

Test Facility: Bodycote

Test Laboratory Representative: Jim Blevins

Date: 6/03/09



ENBRIDGE ENERGY WELDING PROCEDURE SPECIFICATION

WP-140
Page No.: 9 of 9
Revision: 3
Date: 10/1/09

Root (Pass 1)	Elect Dia.	Electrode	Amps		Volts		Travel	
			Low	High	Low	High	Low	High
20"	1/8"	6010	79	120	22	28	12	18.9
20" (3/16")	1/8"	6010	87	114	21	27	9	13.6
20" Tie-in	1/8"	6010	105	127	21	34	6	15
			79	127	21	34	6	18.9
36"	5/32"	6010	114	160	22	28	10.8	18.6
36" (3/16")	5/32"	6010	93	170	20	28	8	15
36" EC	5/32"	6010	98	170	20	29	6	14.5
36" Tie-in	5/32"	6010	88	235	21	30	5.75	15
			88	235	20	30	5.75	18.6

Hot (Pass 2)	Elect Dia.	Electrode	Amps		Volts		Travel	
			Low	High	Low	High	Low	High
20"	5/32"	8010	115	146	22	29	9.3	12.4
36"	5/32"	8010	108	195	21	30	6.8	13
36" EC	5/32"	8010	99	183	22	34	6.8	15.5
20" Tie-in	5/32"	8010	121	149	22	30	9	14
			99	195	21	34	6.8	15.5
20" (3/16")	3/16"	8010	134	170	22	32	9.7	16
36" (3/16")	3/16"	8010	97	194	22	32	6.8	15
36" Tie-in	3/16"	8010	132	189	21	32	8.5	14
			97	194	21	32	6.8	16

Fill (20") Hot Fill (36") (Pass 3)	Elect Dia.	Electrode	Amps		Volts		Travel	
			Low	High	Low	High	Low	High
20"	3/16"	8010	156	202	25	30	12	15
20" (3/16")	3/16"	8010	142	189	24	30	10.1	14.6
36"	3/16"	8010	131	185	22	32	5.5	9.3
36" (3/16")	3/16"	8010	148	210	24	34	6	10
36" EC	3/16"	8010	142	201	24	34	6	9.75
20" Tie-in	3/16"	8010	136	162	24	30	10.2	17
36" Tie-in	3/16"	8010	101	189	24	33	6	9.4
			101	210	22	34	5.5	17

Fill (36") and Cap (20") (Pass 4)	Elect Dia.	Electrode	Amps		Volts		Travel	
			Low	High	Low	High	Low	High
20"	3/16"	8010	128	178	25	30	6	10
20" (3/16")	3/16"	8010	121	173	24	30	5.7	8
36"	3/16"	8010	125	192	24	33	4.75	9
36" (3/16")	3/16"	8010	92	182	22	32	5.5	7.5
36" EC	3/16"	8010	105	188	23	34	4.5	9.5
20" Tie-in	3/16"	8010	128	159	23	30	7.6	10.2
36" Tie-in	3/16"	8010	121	166	23	32	5	9.3
			92	192	22	34	4.5	10.2

Strip	Elect Dia.	Electrode	Amps		Volts		Travel	
			Low	High	Low	High	Low	High
36"	3/16"	8010	135	184	25	34	9.4	14
36" (3/16")	3/16"	8010	90	178	22	32	10.6	15
36" EC	3/16"	8010	129	182	25	33	9.7	16
36" Tie-in	3/16"	8010	134	179	23	32	21.5	22
			90	184	22	34	9.4	22

36" Cap (Pass 5)	Elect Dia.	Electrode	Amps		Volts		Travel	
			Low	High	Low	High	Low	High
36"	3/16"	8010	116	185	23	35	4.4	10.8
36" (3/16")	3/16"	8010	92	175	22	33	3.2	9
36" EC	3/16"	8010	116	181	22	33	3.9	9.2
36" Tie-in	3/16"	8010	92	165	22	33	3.4	9.7
			92	185	22	35	3.2	10.8

**Avoid Verbal Order
Internal Memo**

ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Project Title:	Alberta Clipper Pipeline & Southern Lights Clearbrook to Sup	AVO Number:	AVO-AC-9009
Project Number:	N/A	Contractor Ref Num:	none
Contract Number:	Amended Alliance	Date:	10/08/09
Attention:	All E&C Managers	From:	Dan Plume
Subject:	Variance for Specification for Pipeline Construction, United States - 2009 – Appendix E Coating Specification		

The Following Instructions Are Communicated:

Please note the project specific variance to the Specification for Pipeline Construction, United States – 2009 - Appendix E Coating Specification, C-310 Section 9.1.

Delete the current two sentences contained in Section 9.1 and insert the following:

9.1 Repairs to FBE coating shall be repaired as follows:

- Areas 0.25" in diameter (about the size of the tip of a pencil eraser) and smaller may be repaired with a hot-melt stick or two-part epoxy, or equivalent.
- If any holiday is 0.25" in diameter or larger, the coating shall be repaired in accordance with C-210 Section 9.0.

Regulatory Compliance Audit Report

Alberta Clipper/Southern Lights (Clearbrook, MN to Superior, WI)

Report Number: 5

Date of Report: October 9, 2009

Preparer: Jeff Wiklund

Audit Reference(s): The responses contained in this report reference Audit Issues found in the PHMSA audit that occurred from September 23-25 on spreads 1-3. Audit points were communicated to Dave Hoffman in the following emails:

- email received from Darren Lemmerman (PHMSA) on September 25, 2009

Please note that audit communications and observations by both PHMSA and MNOPS are also included in this report but are prefaced by (C/O).

Audit Issues (from Tracking Spreadsheet) / Resolution:

32.925	<p>After reviewing the welding procedures and the PQR for WP-140 the following has been noticed. The welding procedures are developed from the PQR's. WP-140 contains parameters that are outside of the PQR parameters. The root pass on the PQR is documented with a min and max of 88 amps to 235 amps and the procedure throws out the highest 235 amp reading and uses a max 175 amps, which is a little higher than the most common high amps recorded on the PQR, but less than the max and raises the min to 90 amps from 88 amps. This provides a nice welding procedure for the root pass with parameters that fail within the PQR. This is true for passes 1 and 2. Pass 3 uses the maximum amps recorded in the PQR of 210 amps, which is still within the PQR parameters. Passes 4 and 5 and the stripper pass have amp ranges in the WP-140 that fall well outside of the PQR ranges. For the PQR the 3rd pass had a max of 192 amps while the procedure allows 210 amps. For the PQR the 5th pass had a max of 185 amps while the procedure allows 210 amps. For the PQR, the stripper pass had a max of 184 amps while the procedure allows 210 amps. The WP-140 has not been qualified for these amp ranges. The Weld Data Sheet Revision 2 had maximum amp ranges that fell within the PQR. Revision 3 ignored the maximums and changed them all to 210 amps and Rev 3 lowered the minimums to provide weld ability, yet the lower amp allowances are still within the PQR parameters. Why are the welding procedures not within the parameters of the PQR? What will Enbridge do for the welds that have been produced in production that have fallen outside of the PQR parameters?</p> <p>(1)The welding parameters shown on page 9 of the Welding Procedure Specification (WPS) reflect the actual values recorded during the qualification of the procedure. The values specified on page 1 of the WPS and subsequently on the Weld Data Sheet reflect those values</p>
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that Enbridge engineering has determined to be suitable for welding API 5L Grade X70 pipe using cellulose electrodes. These values are based on the recorded values but have been modified (rounded) to values which simplify the monitoring process by standardizing the values according to electrode diameter.

API 1104 (20th Edition) Section 5.3 Procedure Specification requires that the WPS record the electrical characteristics (amps, volts, travel speed) but does not list these values as being essential for the requalification of a welding procedure. Consequently it is understood that welding procedure specifications may include the amperage, voltage and travel speed which represent the desired values to produce a sound weld capable of meeting the design and mechanical property requirements of the welds being made.

- 33.925 The procedure calls for a 3 pass cap for .500 wall pipe or an oscillating (weave) cap not to exceed 3 electrode widths. There is no mention of a 2 pass cap in the procedure. See pics above.

Please see AVO-AC-9008. This AVO addresses the October 1, 2009 revision of WP-140 Rev 4 and WPS 140 Rev 3, which allows either a two or three beaded cap on W.T. over 0.500".

- 34.925 (C/O) It was noticed on the 36" Mississippi River bore pipe for spread 3 while with MNOPS that weld cap heights on a couple of welds exceeded the unified construction specifications. It was also noticed that a couple welds had questionable workmanship and should have been addressed with the visual inspection process.

AVO-AC-9006 was issued on September 29, 2009 and addresses weld cap height. Spread Management have had meetings with the contractor and Inspection staff regarding the importance of understanding and following project specifications/procedures for all inspection areas. In addition, Boyd Haugrose has developed a supplemental training addressing workmanship, specifications and procedures for both contractor and inspection staff coating/welding personnel that has been/will be presented at each spread. We believe our continued communication on these issues has yielded positive impacts on all aspects of the project.

- 35.925 (C/O) Excessive grinding of the long seams for automatic welding/ UT was noticed on Spread 1. See 009.jpg

Seam grinding methods and criteria have been reviewed with the contractor and inspection staff.

- 36.925 (C/O) On spread 1 the ROW was covered with construction garbage. This included wire wheels, cigarette butts, skids buried randomly in the mud, chew cans, rags, welding wire and so on. This obviously is not a code issue but reflects on the local land owners in a negative light on Enbridge and the pipeline industry as a whole.

The Inspector at the site had the worksite cleaned up. Maintaining a clean worksite/ROW is

the responsibility of both the crews and inspection staff. The contractor was counseled that debris shall be cleaned up by the end of the day by each crew.

37.925 FBE Coating application has several issues that were noticed and is being actively reviewed by Enbridge. This is occurring on about 1 in 10 joints.

a. While heating the pipe for application the coating is blistering and becoming disbonded from the pipe. When the pipe is flocked the 3M powder FBE is bonding well to the steel blasted pipe area with issues found at the transition and over lap areas. In the over lap area there are undercuts, pin holes, bubbles and blister defects. The general cause is from heating the DuPont factory coating for FBE application. How to address this and prevent this is still being investigated. This has occurred on spread 1 and 3, 36 inch pipe and to a lesser extent on the 20" pipe. Any area where blistering has occurred is disbonded from the pipe and needs repair (see 027).

b. Spread 3 is using a method to cover some of these defect areas with a manual FBE application method. They call it the "Ketchup bottle" application process. Where undercut, bubbles and defects are found, and while the pipe is still hot they will manually spray FBE powder in these areas. I am not sure if this is an approved technique by Enbridge but it seems to work for the weld cap areas, however I have concerns about using it in areas where feathering is poorly done or to cover disbonded factory coating areas and undercut. These areas should be repaired to sound metal for proper coating adhesion. Areas where this "repair" method is used in the transition area should be visually reviewed and repaired as needed.

c. The coating transition is not being feather back in many locations as well as it should be. This is even more important since it seems that there is a 1 cm area along the transition that can have bonding issues with the factory DuPont FBE. I believe this is the cause of some of the undercutting noticed in the FBE application. With proper feathering these disbonded areas can be identified and blasted away (see pic 024).

a and c. On Spread 1, the FBE application was ceased and coating was continued with 2 part epoxy. On all spreads, areas of the FBE coating where blistering, undercuts, pin holes or bubble defects occurred were identified and repaired. Additional steps to analyze and correct coating issues have included:

- Contacting and having Bredero Shaw pipe coating representatives visit spreads 1 & 2 (9/25/09). Enbridge accompanied these representatives to the field to review surface preparation and the application process/techniques. Discussion was focused on the potential cause for some of the coating anomalies discovered.
- Instructing inspection staff in the steps to properly pre-heat the pipe prior to coating
- Instructing inspection staff to monitor sandblasting techniques with attention to feathering and cut-back area
- Having inspectors continue to precisely monitor heat-ring parameters

Enbridge is continuing to monitor coating and share any "best practices" that evolve through this review process.

b. Spread 3 has reviewed this with appropriate contractor and inspection staff and this practice will not be used. All repairs will be made in accordance with coating specifications.

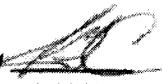
38.925 In a couple of areas patch sticks have been used. Enbridge's specification matches the factory application maximum of 1 square inch. As seen in 032.jpg this has been slightly exceeded.

Please see AVO-AC-9009. This requirement is in accordance with the NACE standard.

(Sec. 8.3.1) For repair of FBE using a patch/hot melt stick. The appropriate use of patch sticks has been communicated to contractor and inspection staff.

39.925 (C/O) The two part applications on Spread 1 looked well done.

Reviewed/Approved by


(initials)

Exit Interview
Enbridge Southern Lights Construction Inspection
September 23, 2009
Manhattan Terminal
Manhattan, IL

Records Review Issues

1. On September 23, welder qualification records for Continental Fabrication were reviewed. While the continuity records for the welders did show a six month weld being radiographed as per 195 requirements, it could not be verified what process the welder was using. ***It is requested that Enbridge provide PHMSA the welder qualification continuity records identifying the weld process being used to maintain the six month continuity.***

Field observation issues

Welding issues

2. On September 23, two welds were observed being made in the manifold area of the tanks. Weld splatter guards were not used in either case. ***Splatter guards are important to minimize the coating damage adjacent to the girth welds.***
3. The mechanical inspector noted that voltage during the welding was measured at the welding machine, not as close to the weld as possible. ***It is good practice to verify the voltage as close as possible to the welding in order to verify the procedure is being followed.***

Thank you for your prompt attention to the issues listed.

Exit Interview
Enbridge Southern Lights Construction Inspection
September 22-25, 2009
Manhattan to Streator 20" line
Morris, IL

Records Review Issues

1. On September 22 the weld log history was reviewed. Several typos and mistakes were noted that would be corrected.

Field observation issues

Pipe bending issue

2. On September 22 west of the Kankakee River it was observed that a bend at 8241+26 was made with the long seam 60 degrees off the neutral axis, not within 30 degrees as Enbridge's specification states. This particular bend was discarded and another bend was made adhering to the specification. On September 24 a bend was observed on the Grohne property (Joint 975) that also had the seam approximately 60 degrees off the neutral axis. This particular bend was not going to be used due to ROW changes. In addition to this bending issue in a single plane, compound bends in two planes would also have to follow the current Enbridge specification. ***Enbridge is to provide PHMSA followup action on this particular bending issue and how Enbridge will address this issue with compound bends in different planes.***

Welding issue

3. On September 23 west of the golf course at approximately 7900+00, a tie in weld was observed. Upon removal of the external line up clamp after the initial root pass was made, it was requested the pipe temperature be checked before welding was continued. The temperature of the pipe was below the minimum 250 degree F requirement of the procedure. ***It is important to maintain the minimum preheat requirement at all times and this should be emphasized to the welding inspectors, in particular with tie in welds.***

Coating and jeeeping issues

4. It was observed in several locations that two part epoxy repairs made on the pipe showed little signs of abrasion of the parent coating before the two part repair was made. ***An area larger than the intended application area of the two part (or patch stick) should be made in order to ensure proper adhesion to the parent coating.*** It was not clear in Enbridge's procedure what the largest application area for a patch stick is allowed. ***Enbridge is to provide PHMSA the definitive procedures describing the maximum allowed area for patch stick repairs.***

5. While the pipe was observed as being relatively clean of dirt prior to jeeing, tape was noted still being on jeeed pipe. ***It is important to remove all foreign material from the pipe prior to jeeing in order to properly detect coating anomalies.***
6. On September 24 a weld was observed being blasted prior to coating on the Grohne property at an HDD. Upon completion of the blasting, an area on the bottom of the pipe was noted that was not completely blasted. This area was blasted again to a satisfactory finish. **It is important to adequately blast girth welds in order for the coating to adequately adhere to the pipe.** No areas of blasting on the main line coating crew were noted as insufficient.

Thank you for your prompt attention to the issues listed.

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Lights (20")		Date: 09_25_09
Location: Morris, IL Manhattan to Streator 20" line		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Carter Saline	Construction Manager	Enbridge (contract)
Dave Stafford	Compliance	Enbridge
RJ Hammer	Sr. Welding Inspector	contract
Ernie Hanus	PHMSA records coordinator	Enbridge (contract)
Josh Schults	Engineer	Enbridge (contract)
Randy Rice (phone conferenced in)	Manager Pipeline Design & Construction	Enbridge
Matt Bordson	Project Engineer	Enbridge
Activities Observed/Performed: Held exit interview. See separate document		Results/Comments:
Summary:		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Lights (20")	Date: 09_24_09	
Location: Morris, IL construction office and ROW Manhattan to Streator 20" line	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Carter Saline	Construction Manager	Enbridge (contract)
Dave Stafford	Compliance	Enbridge
Kirk Neuman	Lowering in inspector	contractor
Bruce Dainwood	Pipe gang welding inspector	contractor
Dave Kole	Firing line inspector	contractor
David Grogan	Firing line inspector	contractor
Richard Blanchard	Repair welding inspector	contractor
Jack Sager	Coating inspector	contractor
Mike Bittle	HDD pull inspector	contractor
Activities Observed/Performed:	Results/Comments:	
1. West of Broadway observed weight placement. Rock shield is taped to the line before the weight is placed. Weight also has feld liner. Observed several patch stick repairs. Application area was approximately size of a quarter. Check jeep calibration - at 1800 volts, readout was 1900 volts.	1. Observed one patch stick repair where the stick was preferentially heated over the pipe. Several other repairs were satisfactory. Scuffed area of the coating was larger than the repair area. Need clarification on largest area allowable on patch stick repair	
2. East of 53 observed pipe gang. Root pass V 24-27, A 125, hot pass V 23-27 A 130-150. Splatter guards were being used. Firing line - cap V 25-30 A 135-150 A splatter guards being used.	2. No issues	
3. West of Kankakee Street observed weld repair. Low hydrogen rods are keep in a hot box powered by a portable generator on the welding rig. At the end of the day, the hot box is returned to the yard and the box is plugged in overnight. Welder says he like to heat up at least 1/2 of the pipe in the repair area.	3. No issues	
4. West of Kankakee River, east of I-55 8144+00 observed mainline coating with FBE. Blasting did look good, heating pipe to 465 degrees before powder applications. Coating thickness 29-40 mils	4. No issues	
5. CECO Park area crossing 3 BP lines, very tight ROW	5. No issues	
6. Grohne Property observed pipe bending and HDD. Pipe with 4 1/2 degree bend, SKW 2290A, Joint 975 was bend with seam approximately 60 degrees off neutral axis. See pictures. This particular bend was not going to be used for other design issues. HDD girth weld coating - heated to 150 degrees then blasted. Two part application thickness - 40-49 miles. Jeoped pipe without any coating repairs	6. Reemphasize the issue of bending pipe in the neutral axis. Noted girth weld blaster missed area on bottom of pipe.	
Summary:		
1. Enbridge to make sure inspectors are having patch stick repairs made properly. Enbridge to clarify largest area of patch stick applications.		
6. Enbridge to make sure bending inspectors are adhering to Enbridge specs. Coating inspector to make sure blast is complete.		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Lights (20")	Date: 09_23_09	
Location: Morris, IL construction office and ROW, Manhattan to Streator 20" line Manhattan Station	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Carter Saline	Construction Manager	Enbridge (contract)
Dave Stafford	Compliance	Enbridge
Richard Sandell	Welding inspector	Contractor
Jimmy Schott	NDE technician	Shaw
Todd Carroll	Coating inspector	Contractor
Jacob Weertz	Mechanical inspector	Contractor
Kelly Harless	Construction Manager	Enbridge (contract)
Activities Observed/Performed:	Results/Comments:	
<p>1. Cedar Ridge Golf Course - observed girth weld coating FBE application. Looked good. Several two part spot repairs and patch stick repairs.</p> <p>2. West of golf course 7900+00 Observed two segments being welded. Seam alignment was ok. Pipe was cold (less than 250 degrees) immediately after the external line up clamps were removed prior to finishing the root. Pipe temperature also needs to be measured at least two inches on either side of the weld. Root welding info V 23-25, A 104, hot pass V 24-26, A 148 ok.</p> <p>3. West of golf course near 7900+00 observed NDE technician. Reviewed two welds. Acceptable welds, good see essential wire easily</p> <p>4. Manhattan Station records. Reviewed welder qualifications of fab contractor. Continuity dates were ok but could verify process used on NDE reader sheets</p> <p>5. Observed 30" weld on manifold to tanks. Minimum preheat of 150 degrees ok. Using WP 33. Fill V 26-28 A 130-145, V 28-30 A 130-145. Both V and A measured at the machine, not at the weld. Also observed that platter guards were not being used on this weld or another 20" weld made</p>	<p>1. FBE coating area needs to be scuffed larger than application area of the two part or patch stick for proper adhesion. Patch stick repairs appeared to be larger than the supposed 1/4 inch area allowable. Need to get clarification from Enbridge on the maximum size allowed. Noted tape still left on pipe even though the pipe had been jeeped.</p> <p>2. Preheat needs to be checked after alignment clamps removed and prior to welding after grinding.</p> <p>3. No issues</p> <p>4. Enbridge to provide process verification for welder qualifications.</p> <p>5. Good practice to measure voltage at the weld to verify proper voltage. Emphasize the use of splatter guards to minimize coating damage.</p>	
Summary:		
Issue 1 Enbridge to provide clarification on patch stick useage		
Issues 2 and 5 Enbridge to reinforce these issues with inspectors		
Issue 4 Enbridge to followup with information requested.		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Lights (20")	Date: 09_22_09	
Location: Morris, IL construction office and ROW Manhattan to Streator 20" line	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Carter Saline	Construction Manager	Enbridge (contract)
Dave Stafford	Compliance	Enbridge
RJHammer	Sr. Welding Inspector	Enbridge (contract)
Ernie Hanus	PHMSA records coordinator	Contractor
Richard Robbins	Bending inspector	Contractor
Activities Observed/Performed:	Results/Comments:	
<p>1. Reviewed welder qualifications Stencil A - WP 140 retest ok, B - WP 140 retest ok, C WP 140 retest ok, WP 144 retest ok, D WP 144 retest ok, new stencils EE, FF, GG, HH, KK ok</p> <p>2. Reviewed weld log history</p> <p>3. Kankakee River HDD west side. Observed two strings of pipe welded together. Girth welds were not coated.</p> <p>4. Bending west of Kankakee Street. Looked at three bends, two were acceptable, one was not. The bend was approximately 60 degrees from the neutral axis, should be within 30 degrees. Bend at 8241+26 joint 324 has a 7 1/2 LT and a 16 LT. 35 pulls at 10" pulls. The seam is about 10" off the neutral axis, should be within ~ 5 inches of the neutral axis.</p>	<p>1. No issues</p> <p>2. Noted some typos and inconsistencies. Sr. Welding inspector noted that the records needed to be corrected. No further issues.</p> <p>3. No issues.</p> <p>4. Enbridge engineering is to determine whether this bend is acceptable (it was decided to rebend). In addition, Enbridge needs to develop the procedure for compound bends in two different plains since it will be impossible to keep the seam within 30 degrees of the neutral axis if two bend in two plains on the same pipe are done.</p>	
Summary:		
Issue 4 - Enbridge to provide PHMSA the procedure for compound bends and maintaining neutral axis orientation and any additional criteria for evaluating single bends that don't maintain the 30 degree neutral axis orientation.		
Inspector(s): Carl Griffis		

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:		Pass		Type	
Location:		Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:		Amperage		A	
Weather:		Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:		Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Inspectors:				
Name	Title / Role	Company	Phone	Email
PJD = Pat Donovan	Engng Specialist	MNOPS	Cell 612-708-6373	pat.donovan@state.mn.us
TDS = Todd Stansbury	Sr. Engineer	MNOPS	Cell 651-335-7501	todd.stansbury@state.mn.us

Notes :

Travel Day

Violations / Non-Compliance Issues:

 <p align="center">SAMPLE PHOTO "Right Click and Change Photo"</p>	<p align="center">Photograph Description</p>

 <p align="center">SAMPLE PHOTO "Right Click and Change Photo"</p>	<p align="center">Photograph Description</p>

 <p align="center">SAMPLE PHOTO "Right Click and Change Photo"</p>	<p align="center">Photograph Description</p>

 <p align="center">SAMPLE PHOTO "Right Click and Change Photo"</p>	<p align="center">Photograph Description</p>

MNOPS Pipeline Construction Inspection Guide

Inspection Date: Date Submitted: Case Number:

Inspector: Inspection Area:

Inspection Details:		Welding:		Coating:	
Inspection Item:		Pass		Type	
Location:		Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:		Amperage		A	
Weather:		Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:		Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email

Notes / Observations:

- Travel to Bemidji.

 <p>SAMPLE PHOTO</p> <p>"Right Click and Change Photo"</p>	Photograph Description

 <p>SAMPLE PHOTO</p> <p>"Right Click and Change Photo"</p>	Photograph Description

 <p>SAMPLE PHOTO</p> <p>"Right Click and Change Photo"</p>	Photograph Description

 <p>SAMPLE PHOTO</p> <p>"Right Click and Change Photo"</p>	Photograph Description

MNOPS Pipeline Construction Inspection Guide

Inspection Date:
Date Submitted:
Case Number:

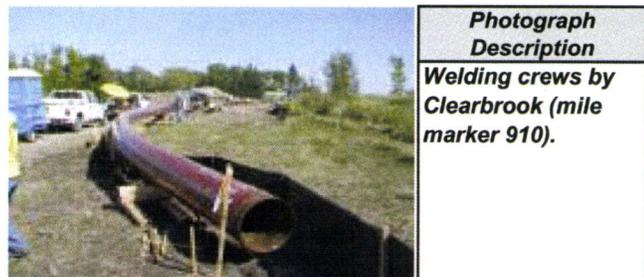
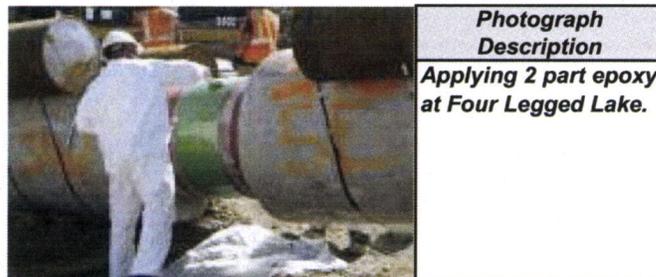
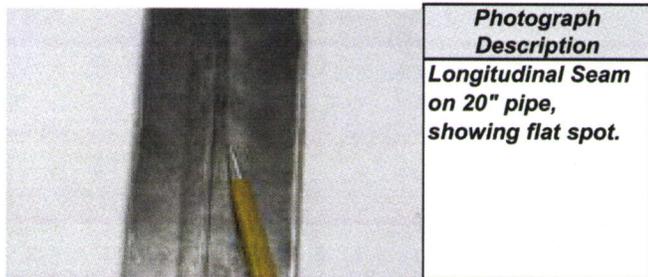
Inspector:
Inspection Area:

Inspection Details:		Welding:		Coating:	
Inspection Item:		Pass		Type	
Location:		Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:		Amperage		A	
Weather:		Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	20" & 36"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone (cell)	Email
Sam Ralls	Technical Weld	Enbridge	661-619-0825	
Steve Browning	Senior Weld	Enbridge	661-559-4301	
Jack Alexander	NDE	Enbridge	918-691-2275	
Ronne Whitaker	Chief Inspector	Enbridge	281-389-3871	
Mel Will	Mobile Coating	Enbridge	218-368-7446	
Jack Olin	Project Manager	Enbridge	218-269-5504	
Corrine Sullivan	Assoc. Compliance	Enbridge	651-246-6162	
Berwyn Calcote	Supervisor	JanX	517-879-6173	

Notes / Observations:

- Talked with Sam Ralls and Jack Alexander at the Bemidji Field Office about welding procedures and weld defects. Sam gave us the latest revision (3) dated 9/12/09 of their WP 140 spec. It increases the amperage range starting at pass 3 to (120-210). This revision also lowers the W.T. from 0.600" to 0.500" for the required 3 beaded cap. (a copy is attached). Also spoke with Berwyn Calcote regarding x-ray weld defect findings. We looked at an "extended slag and porosity defect". The repair had been made but the film was not back in the field office at that time.
- Talked with Jack Olin and Jack Alexander regarding the weld anomaly found on the longitudinal seam of the 20" dia. pipe. At this time it was believed to be a weld flaw which Enbridge filmed while scanning the girth welds. Note: from the 9/22 inspection it now appears to be a "flat spot" running parallel to the weld - more about this in the week of 9/22's report.
- Observed coating and jeping at the Four Legged Lake crossing. Coating was the 2 part epoxy. All coating procedures were noted to be followed.
- Traveled to Clearbrook (mile marker 910). Thirteen welding crews and 3 welding inspectors were working on the 36" pipe. All the inspectors were recording amp, volt and weld travel speeds. No activity outside of the specification were noted or observed. We checked three ends of 20" bent pipe. The longitudinal seam was marked with approximately a 2" long white line on the pipe ID. All three ends were bent properly with the seam in the neutral axis.
- At a road collapse (Carr Lake Rd) crossing in Bemidji. Enbridge is having problems with the HDD under some roads due to the sandy soil mixed with large boulders. This collapse was in a particularly bad area (below a MERC, 4" steel, 900psi gas line). Enbridge open cut the area after the HDD failed and checked to make sure the MERC line was not undermined. Jack Olin said "as a rule of thumb" they are planning to open cut for 36" pipe and still use the bore for 20".



MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:		Pass		Type	
Location:		Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:		Amperage		A	
Weather:		Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	36"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone (cell)	Email
Marc DeVarennnes	Senior Engineer	Enbridge	715-718-1030	marc.devarennnes@enbridge.com
Lavielle Warren	Chief Inspector	Enbridge	318-450-5104	
Rick Fleming	Sr Weld Inspector	Enbridge	360-910-7804	
Todd Hammans	UT Technician	JanX	918-816-0762	

Notes / Observations:

- Observed the auto welding process on 36" pipe. No activity outside of procedure were observed or noted.
- Talked with Rick and Marc about the minimum 6" weld repair length specification which we learned of at the Bemidji Office. They were not familiar with this specification. It basically requires that during a root bead repair, the minimum new weld cap repair length is 6" long. By default, the welder would probably be at 6" by the time the cap was put on but there appears to be some confusion/lack of communication at Enbridge on this specification. We were assured that the repair welding inspector, repair welder and the NDT Technician would be made aware of this requirement.
- Observed the ultrasonic testing on the 36" auto welds. There appears to be a change in the "burn through" assessment procedure. Their ECA allows a 3 dimensional volume criteria for "burn through's" according to Appendix A of the API 1104 20th edition for AUT examination of anomalies.
- Observed the failure of a highway 2 crossing. Enbridge attempted to push a 36" dia pipe under the highway with a machine called a "thumper". It basically uses brute force and thumps the pipe. In this case, a large boulder was hit and deflected the pipe upward. The pipe pierced the surface about 4ft on the east side of the north bound lane. The crossing was then open cut during the weekend with the damaged pipe removed and a new pipe section installed.



Photograph Description
Auto weld shack positioned.



Photograph Description
Hwy 2 crossing "failure" of the 36" pipe using the "thumper".



Photograph Description
Running the ultrasonic scan on 36" pipe.

Description

MNOPS Pipeline Construction Inspection Guide

Inspection Date: **Date Submitted:** **Case Number:**

Inspector: **Inspection Area:**

Inspection Details:		Welding:		Coating:	
Inspection Item:		Pass		Type	
Location:		Electrode Dia.		Thickness	
M.P. Station:		Electrode Type			
Intersection:		Amperage		A	
Weather:		Voltage		V	
Pipe Information		Travel Rate		in / min	
Pipe Size:	20" & 36"	Pre-Heat Temp		° F	
Joint Number:		Soil Type:			
Weld Number:					

Personnel Observed:				
Name	Title / Role	Company	Phone	Email
Paul Eberth	Project Manager	Enbridge	218-391-0442	paul.eberth@enbridge.com
Jim Eisenhauer	Chief Inspector	Enbridge	989-424-1394	jim.eisenhauer@enbridge.com
Jeff Wiklund	Sr. Compliance Spec.	Enbridge	218-269-5518	jeffrey.wiklund@enbridge.com
Frank Vigil	HDD Inspector	Enbridge	806-674-9413	
Mike Helm	Coating Inspector	Enbridge	361-660-4830	
Roger Bell	X-Ray Technician	JanX		

Notes / Observations:

- Observed an HDD under the Prairie River. Bore run - approximately 55ft under river bottom, approximately 2,000ft total length.
- Looked at some fusion bond epoxy coating, 20" dia. pipe. Coating looked good on areas that were checked.
- Observed an x-ray on 20" dia pipe. Watched procedure and film development. X-ray film showed no weld flaws.
- Observed the welding/pipe gang on 20" dia. pipe.

• **Note:** Found a "hollow bead" weld flaw when reviewing x-ray film for spread 4 (week of 9/22) that had not been repaired adequately after reviewing the approved repair x-ray film. Enbridge made the decision to cut-out the area after reviewing x-rays again. More to come on this in the report for the week of 9/22 or directly from Enbridge.



Photograph Description
Welding/firing gang crew.



Photograph Description
HDD under the Prairie River.



Photograph Description
Prepping for weld



Photograph Description
Inserting internal x-ray unit.

MNOPS Pipeline Construction Inspection Guide

Inspection Date: Date Submitted: Case Number:

Inspector: Inspection Area:

Inspection Details:		Welding:		Coating:		
Inspection Item:		Pass		Type		
Location:		Electrode Dia.		Thickness		
M.P. Station:		Electrode Type				
Intersection:		Amperage				A
Weather:		Voltage				V
Pipe Information		Travel Rate				in / min
Pipe Size:		Pre-Heat Temp				° F
Joint Number:		Soil Type:				
Weld Number:						

Personnel Observed:				
Name	Title / Role	Company	Phone	Email

Notes / Observations:

 <p align="center">SAMPLE PHOTO "Right Click and Change Photo"</p>	<p align="center">Photograph Description</p>

 <p align="center">SAMPLE PHOTO "Right Click and Change Photo"</p>	<p align="center">Photograph Description</p>

 <p align="center">SAMPLE PHOTO "Right Click and Change Photo"</p>	<p align="center">Photograph Description</p>

 <p align="center">SAMPLE PHOTO "Right Click and Change Photo"</p>	<p align="center">Photograph Description</p>

Inspector	Check Box	Soil Types	Operator
BRA	X	Silt	Alliance Pipeline Ltd.
DSM	NA	Silt / Sand	Alliant Energy
ESS		Sand	Archer Daniels Midland Corn Processors
JCW		Sand / Gravel	Argyle, City of
JTM		Gravel	Austin Public Utilities
PJD		Gravel / Clay	Bagley Utilities Commission
RJW		Clay	Ballard's Resort Inc.
TDS		Rock	Big Sandy Lodge & Resort
VL		Organic	BP Pipelines North America
		Not Observed	Calpine Natural Gas LP.
			Camp Ripley
			Cast Away Club
			Cenex Harvest States, Inc -CHS
			Centennial Utilities
			CenterPoint Energy
			CenterPoint Energy - Dakota Station LNG
			Centra Pipeline Minnesota
			Clarissa/Eagle Bend Utl. Com.
			Clearbrook, City of
			Cohasset Municipal NG System
			Como Oil & Propane
			Duluth Dept of Pub Works and Utilities
			Enbridge Energy Company, Inc.
			Enbridge Pipelines (North Dakota) LLC
			Enterprise Products Operating LP (EPOLP)
			Fairfax Municipal Gas Utilities
			Ferrellgas Inc
			Fosston Utilities Commission
			Gas Service Company
			Goodhue Public Utility Commission
			Grand Superior Lodge
			Great Lakes Gas Transmission Co.
			Great Plains Natural Gas - Interstate
			Great Plains Natural Gas - Intrastate
			Great River Energy
			Greater Minnesota Gas, Inc.
			Hallock, City of
			Hallock, City of
			Hawley Public Utilities Commission
			Henning, City of
			Hibbing Public Utilities
			High Plains Cooperative
			Hutchinson Utilities Commission
			Hutchinson Utilities Commission
			Inergy Propane/ Calendonia Tru-Gas
			Kinder Morgan Cochin LLC
			Koch - Flint Hills Resources - (Airport)
			Koch - Koch Pipeline Co. LP (Inter)
			Lake Park Public Utilities
			Lakes Gas Company
			Magellan Midstream Partners LP
			Marathon Pipeline
			Minnesota Energy Resources
			Minnesota Intrastate Pipeline Company

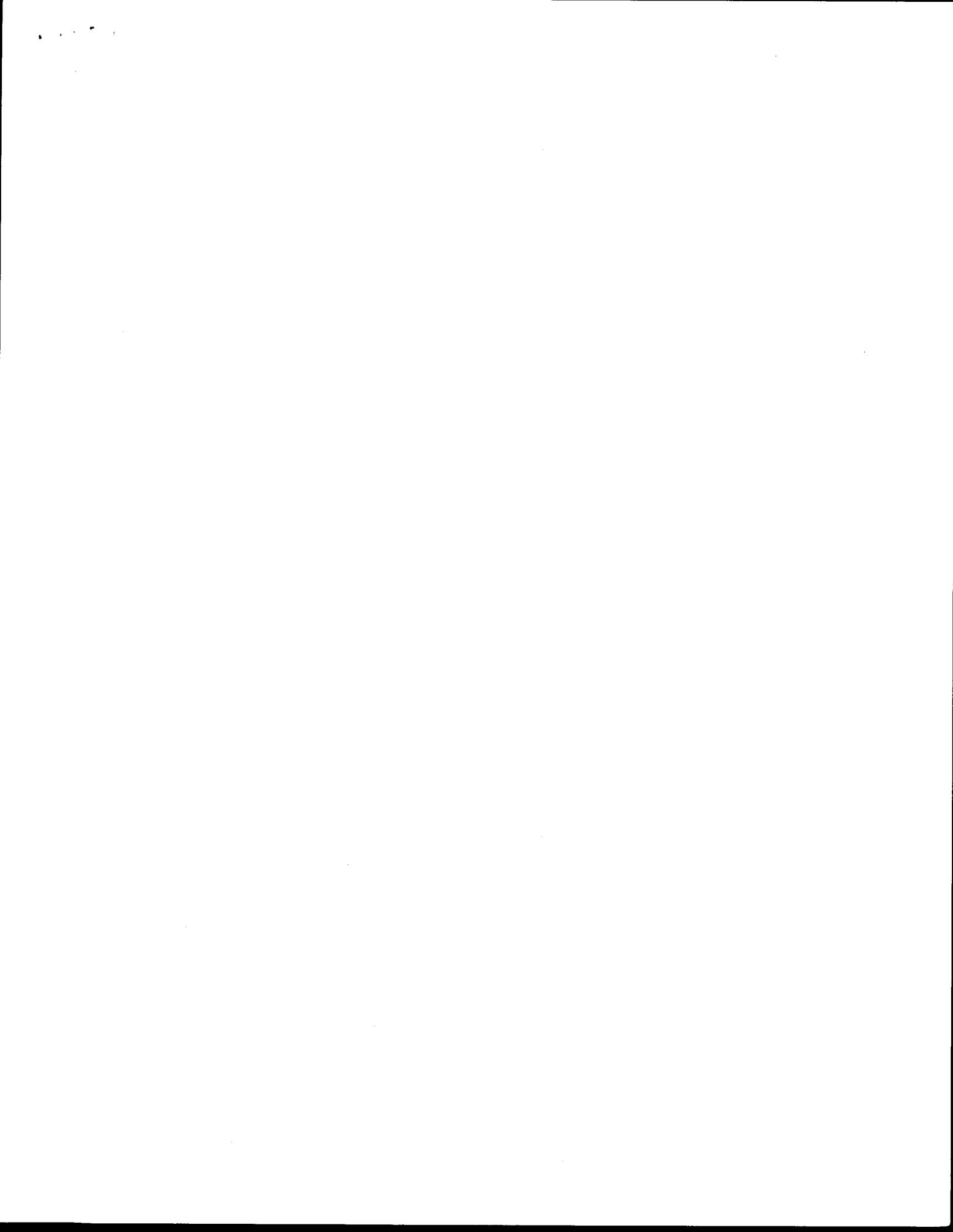
Minnesota Soybean Processors
Morgan, City of
New Ulm Public Utilities
New York Mills Municipal Gas
Northern Natural Gas Co. - LNG
Northern Natural Gas Co. OPID-13751
Northern States Power
Northern States Power - Wescott LNG
Northern States Power - Wescott LPG
Northwest Gas
Northwest Gas Cass Lake
Northwest Natural Gas
NuStar Energy Pipe Line
Owatonna Public Utilities
Owatonna Public Utilities
Perham Municipal Gas System
Plymouth Christian Youth Cent
POET Biorefining - Bingham Lake
Racine Community Utilities
Randall Municipal Gas Utilities
Round Lake, City of
Sheehan Gas
Stephen, City of
Stephen, City of
Thistledeu Camp (Dept. of Corrections)
TransCanada Northern Border Inc.
Two Harbors Municipal Gas System
Tyler, City of
Viking Gas Trans.
Virginia Public Utilities
Warren, City of
Warren, City of
Westbrook Municipal Utilities

Contractor

Northern Pipeline Construction (NPL)
Michels Pipeline Construction
Minnesota Limited, Inc.
Precision Pipeline

Inspection Area

Spread 1 (ND to Clearbrook)
Spread 2 (ND to Clearbrook)
Spread 3 (Clearbrook to Deer River)
Spread 4 (Deer River to Superior)
Spread 5 (Clearbrook to Deer River)
Spread 6 (Deer River to Superior)



Inspection Item	Submitted	PipeSize
Excavation	Not Submitted	20"
Welding		36"
Coating		20" & 36"
Material Handling		
NDT		
Crossing		
HDD / Boring		

Enbridge Pipelines (Lakehead) L.L.C.
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James Crawford
Director
Engineering & Construction (US)
Major Projects
Tel 715 398 4516
Jim.Crawford@enbridge.com



September 30, 2009

To: Marc DeVarenes Jack Olin Paul Eberth
 Tony Madden Tommy Shiflett Avery Schott

Re: PHMSA Audit Issues 23 and 26 (September 14, 2009) and Audit Issues 27-31
(September 19, 2009) from PHMSA's Issue Summary Reports

Attached is a summary of PHMSA findings and their disposition based on the PHMSA/MNOPS audits that occurred during the weeks of September 8 – 10 and September 16 – 18 on spreads 2,3,4,5 and 6. Please review these findings/responses and ensure that proper contractor and inspection staff are informed and take appropriate action.

In addition, the following points have come up on the Alberta Clipper/Southern Lights Project or the Streator-Manhattan Project. Please take the following actions:

1. Ensure that attached AVO-AC-9006 on weld caps has been communicated to appropriate contractor/inspection personnel.
2. Ensure that attached AVO-AC-9007 on strip cap repair has been communicated to appropriate contractor/inspection personnel.
3. Reemphasize the importance of understanding and following project specifications/procedures for all inspection areas with additional focus on welding, coating, NDE and Hydro-test requirements. Along these same lines, please contact Boyd Haugrose to set a time for a supplemental training for both contractor and inspection staff coating/welding personnel.
4. Communicate to bending personnel, in accordance with project specifications and AVO-AC-9005 issued last week, compound bends must be within 30 degrees of the neutral axis or the bend must be made using separate joints with the pipe welded together to form the compound bend.
5. Remind welding and coating personnel that preheat requirements must be maintained at all times (this requirement is accentuated by the cooling weather).
6. Communicate to appropriate personnel that the maximum allowed area for patch stick repairs to FBE coating is 0.0625 (1/16th) square inches.
7. Communicate that prior to jeepring, the pipe should be clean and tape should be removed. However, tape residue does NOT have to be removed. If a jeep spring becomes coated with tape residue build up, then the jeep spring should be changed to ensure proper jeepring of pipe.

Please positively confirm with me by email when these actions are completed. I appreciate your prompt attention to these matters.

A handwritten signature in blue ink, appearing to read 'Jim Crawford'.

Jim Crawford

cc: Dan Plume, Tom Hodge, Shaun Kavajecz, Dave Hoffman,
 Jerrid Anderson, Randy Rice, Carter Saline

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Jim.Crawford@enbridge.com

September 23, 2009

To: Marc DeVarenes Jack Olin Paul Eberth
Tony Madden Tommy Shiflett Avery Schott

Re: PHMSA Audit Issues 21-26 from **September 14, 2009 Issue Summary Report**

Attached is a summary of PHMSA findings and their disposition based on the PHMSA/MNOPS audits that occurred during the week of September 14 – 18 on spreads 2,3,4,5 and 6. Please review these findings/responses and ensure that proper personnel are informed and take appropriate action. In addition, the following immediate actions should be taken re: contractor/spread personnel:

1. Ensure that attached AVO on bending has been communicated to appropriate contractor/inspection personnel.

Please positively confirm with me when these actions are completed. I appreciate your prompt attention to these matters.



Jim Crawford

cc: Dan Plume, Tom Hodge, Shaun Kavajecz, Dave Hoffman,
Jerrid Anderson, Randy Rice, Carter Saline

**Avoid Verbal Order
Internal Memo**

ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Project Title:	Alberta Clipper Pipeline & Southern Lights Clearbrook to Sup	AVO Number:	AVO-AC-9005
Project Number:	N/A	Contractor Ref Num:	none
Contract Number:	Amended Alliance	Date:	09/17/09
Attention:	All E&C Managers	From:	Dan Plume
Subject:	Variance for Field Bends (One Time)		

The Following Instructions Are Communicated:

Background:

The Specification for Pipeline Construction Unified Construction Specification United States & Canada – 2009 was adopted for use by this project and contains a modification from previous versions related to bending found in part 12.3.5.

"12.3.5. In all bends of longitudinally welded pipe, the longitudinal seams shall be on the neutral axis, with the neutral axis being defined as within thirty degrees (30°) of the 12:00 o'clock position for side bends and within thirty degrees (30°) of either the 3:00 o'clock and 9:00 o'clock positions for sag and overbends."

It has come to the attention of construction management that the Contractor may have made some bends under the former specification wherein the pipe seam may be found outside 30 degrees from the neutral axis.

Part 434.7.1 of B31.4(e) specifies

"When bends are made in longitudinally welded pipe, the longitudinal weld should be located on or near the neutral axis of the bend."

Exception - Company will inspect all bends made prior to 9/17/09 and all bends where the seam fall within a 10:00 to 2:00 orientation (+/- 60 degrees) will be approved on an exception basis. All bends not meeting this criteria will be removed from the pipeline.

Direction – All bends made on or after 9/17/09 will be subject to the 30 degree acceptance criteria of the 2009 Specification.

Regulatory Compliance Audit Report

Alberta Clipper/Southern Lights (Clearbrook, MN to Superior, WI)

Report Number: 3

Date of Report: September 23, 2009

Preparer: Jeff Wiklund

Audit Reference(s): The responses contained in this report reference Audit Issues found in the PHMSA audit that occurred from September 8-10 on spread 6. Audit points were communicated to Dave Hoffman in the following emails:

- email received from Darren Lemmerman (PHMSA) on September 14, 2009

Please note that audit communications and observations by both PHMSA and MNOPS are also included in this report but are prefaced by (C/O).

Audit Issues (from Tracking Spreadsheet) / Resolution:

21.914	<p>Two part coating applications at the hwy 5 river crossing bore pipe was noticed having icicles nearly an inch long on the bottom, droops and sags along with in some large areas coating that was over 80 mils thick. The application was not uniform as required by the construction specs. The coating was filled with pinholes (small bubbles) along with larger bubbles the size of a small finger nail. The jeeeping of these coated girth welds was not observed, but it would seem to be difficult with the icicles on the bottom. Note: The two part was mixed with a wooden stir stick and installed in one application with no accelerated heating.</p> <p>The Highway #5 C-210 coating anomalies referred to above were removed and recoated according to specifications. Coating crews and inspection staff were communicated that the application shall be done in a manner that minimizes sags and runs and is uniform in color and free of porosity. Additionally, a SPC representative was brought on-site to observe application and provide on-site training to coating crews.</p>
22.914	<p>At the Superior terminal the coating on the girth welds where reviewed. Pin holes and bubbles where noticed. One girth weld was jeepped and needed repair with the two part. The repair was not mixed thoroughly and dark blue and white streaks where observed in the application. The spec requires a thorough mixing of the two part.. Note: The two part was mixed with a paint stirring mixer with a drill and the repair was by hand.</p> <p>New mixing paddles were purchased from SPC to improve mixing and reduce the introduction of air to the mixture. These new paddles appear to be working well (also see 21.914 above).</p>
23.914	<p>(C/O) The welding cap height was a continual issue. The cap height was noticed to exceed the maximum allowed in several areas. The WP 140 allows an 1/8" cap while the construction</p>

spec allows for a different cap height. Inspectors were not familiar with what the maximum height requirements are and were not guided with what to do if they were found to be out of spec. The tools they have were not easily used to determine cap heights. Section 8.8.7 of Appendix A (Welding Specifications) to the Unified Construction Specification states: "At no point shall the top of the cap pass be...above the pipe surface by more than: 0.100 inch (1/10") for pipe with wall thickness 0.394 inch or less and 0.138 inch (1/8") for pipe with wall thickness greater than 0.394 inch. An additional 0.04 inch of weld reinforcement shall be permitted for localized areas at the discretion of the Company".

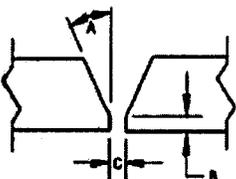
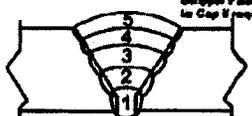
Enbridge is conducting further review of this issue and will communicate its findings upon completion of the review.

- 24.914 (C/O) The location for taking of welding voltage readings was randomly done. When this is done the recorded voltage has varying voltage drops and is not consistent. White tape was applied at 20' to provide a consistent reading. Audit report 2 – 10.903.
- 25.914 The welding procedure WP140 as used in the field was not the same as what was used during qualification (according to several personal in the field). The Field procedure WP140 has 140 amp minimum for several of the passes. Several personal remember the procedure having lower amp minimums during qualification. It is also noted that the 140 amps was not being met regularly as observed in the field. The amperage ranges found in Weld Procedure 140 Revision 3 (Attachment 1) are the same amperage ranges used to qualify welders. During the review process, the Enbridge integrity group implemented a more restrictive amperage range (increasing the lower end of the range based on Lincoln welder recommendations) than was originally qualified for this project. Subsequent to this change, and in accordance with the amp range originally qualified, project management requested that the integrity group reconsider their arbitrary change. The tolerance ranges were subsequently (with Rev 3) changed back to what was originally included in the WPS.
- 26.914 (C/O) In some girth welds near the Wrenshall, MN crossing, welders were adding an extra strip cap in small areas as if they were repairing pinholes or just adding more cap where it was needed. There is no guidance on what to do when this is found if anything. Some inspectors after discussion decided these will not be allowed and if the cap needs additional reinforcement that it will receive a full cap. *Enbridge is conducting further review of this issue and will communicate its findings upon completion of the review.*

Reviewed/Approved by 
(initials)

ENBRIDGE	WP 140 WELD DATA SHEET	WP-140 Rev2 Page No.: 1 of 1 Revision: 3 Date: 9/12/09
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WELDING PROCESS: <i>Manual Shielded Metal Arc (SMAW)</i>		APPLICATION: <i>Mainline / Tie In Welding</i>	
PIPE AND FILLER MATERIAL REQUIREMENTS			
PIPE GRADES QUALIFIED: <i>API 5L Grade X70</i>			
PIPE DIAMETER/W.T. RANGE QUALIFIED: <i>Over 12 3/4" O.D. / 3/16" Through 3/4" W.T.</i>			
FILLER MATERIAL: <i>AWS E6010 Root Pass; E6010-P1 (G) - Remaining Passes</i>			
PRODUCTION WELDING CONDITIONS			
PRODUCTION PIPE POSITION:	<i>Horizontal - Fixed Position</i>	WELDING DIRECTION:	<i>Vertical Down-All Passes</i>
NUMBER OF WELDERS:	<i>Two Minimum - Root and 2nd Pass One minimum - All Remaining Passes</i>	WELDING TECHNIQUE:	<i>Stringer / Weave</i>
PREHEAT METHOD:	<i>Propane or Induction</i>	TEMP. MEASUREMENT:	<i>Pyrometer or Tempil Sticks</i>
METHOD OF WELD CLEANING:	<i>Power Brushing or Grinding as required</i>		
WELD CURRENT/ POLARITY:	<i>Direct Current, Reverse Polarity</i>		
TYPE/REMOVAL OF CLAMP:	<i>Internal / External; After 100% of Root Pass Complete with Internal; After 50% of Root Pass complete with External.</i>		
PIPE MOVEMENT:	<i>Lifting of pipe to facilitate set-up of the subsequent joint shall be permitted if the root pass is complete. Welding shall continue without additional pipe movement until a minimum of 3 weld passes, or 2/3 of the weld thickness is filled, whichever is greater.</i>		
TIME BETWEEN PASSES:	<i>10 Minutes between Root and Hot Pass, 1 hour between Hot Pass and Hot Fill, 24 hrs Maximum for remaining passes (unless otherwise authorized by Enbridge assigned designate).</i>		
PREHEAT/INTERPASS TEMP.:	<i>250° F. Minimum - 400° F. Maximum regardless of ambient temperature. Preheat for an area of at least 2" on each side of the weld joint for the entire circumference prior to welding.</i>		

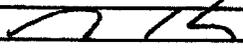
WELD JOINT DESIGN																	
 <p>For pipe ends of the same nominal thickness, internal offset larger than 1/8" is permissible provided the offset is caused by variations of the pipe end dimensions within the pipe purchase specification tolerances, and such variations have been distributed essentially uniformly around the circumference of the pipe.</p>	QUALIFIED JOINT DESIGN CONDITIONS	 <p style="text-align: center;">TYPICAL WELD PASS SEQUENCE FOR 0.250" W.T.</p>  <p style="text-align: center;">TYPICAL WELD PASS SEQUENCE FOR 0.438" W.T.</p> <ul style="list-style-type: none"> • A three beaded cap shall be used on W.T. over 0.500" • Weave width shall be limited to 3x electrode diameter • 1/8" max cap reinforcement height 															
	<table border="1"> <tr> <td>A</td> <td>30° ± 5°, 0°</td> </tr> <tr> <td>B</td> <td>1/16" ± 1/32"</td> </tr> <tr> <td>C</td> <td>1/16" ± 1/32"</td> </tr> <tr> <td colspan="2" style="text-align: center;">Minimum No. of Passes</td> </tr> <tr> <td style="text-align: center;">W.T.</td> <td style="text-align: center;">Min. Passes</td> </tr> <tr> <td>0.250" ≤ 0.400"</td> <td>4</td> </tr> <tr> <td>>0.400" ≤ 0.650"</td> <td>5</td> </tr> <tr> <td>>0.650" ≤ 0.750"</td> <td>7</td> </tr> </table>		A	30° ± 5°, 0°	B	1/16" ± 1/32"	C	1/16" ± 1/32"	Minimum No. of Passes		W.T.	Min. Passes	0.250" ≤ 0.400"	4	>0.400" ≤ 0.650"	5	>0.650" ≤ 0.750"
A	30° ± 5°, 0°																
B	1/16" ± 1/32"																
C	1/16" ± 1/32"																
Minimum No. of Passes																	
W.T.	Min. Passes																
0.250" ≤ 0.400"	4																
>0.400" ≤ 0.650"	5																
>0.650" ≤ 0.750"	7																

WELDING PARAMETERS AND ELECTRICAL CHARACTERISTICS					
PASS NO.	FILLER MATERIAL		WELDING PARAMETERS		TRAVEL SPEED (IPM)
	SIZE	CLASSIFICATION	AMPERAGE	VOLTAGE	
1	5/32"	E6010	90-175	20-30	6-19
2	5/32"	E6010-P1	100-185	21-34	7-16
3	3/16"	E6010-P1	120-210	22-34	5-17
4	3/16"	E6010-P1	120-210	22-34	5-10
Stripper Pass (as needed)*	3/16"	E6010-P1	120-210	22-34	10-20
5	3/16"	E6010-P1	120-210	22-34	3-11

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 electrodes are shown below. A stripper pass may be made on the sides if needed using the parameters of weld pass shown above. E6010-P1 and E6010-G may be used interchangeably.

OPTIONAL APPROVED WELDING PARAMETERS WITHIN THE ABOVE CLASSIFICATION			
ELECTRODE DIAMETER	AMPERAGE RANGE	VOLTAGE RANGE	TRAVEL SPEED (IPM)
1/8" (E6010, E6010)	80-125	21-30	6-19
5/32" (E6010)	100-185	20-34	6-19
3/16" (E6010)	120-210	22-34	5-20

The procedure qualification was conducted in accordance with the requirements of the 20th Edition of API 1104, CFR Part 195 and Enbridge Energy Engineering Specifications.

Enbridge Review & Approval:	SEAN KEANE P. ENG. 	Date: SEPT 14-2009
Enbridge Project Approval:	John H. Olin	Date: Sept 15, 2009
Contractor's Name:	Contractor's Acceptance:	Date:

Spread 4, Grand Rapids, 9/23/2009

ENBRIDGE

Southern Lights

Report #: _____
 Day: _____
 Date: 9/14/2009

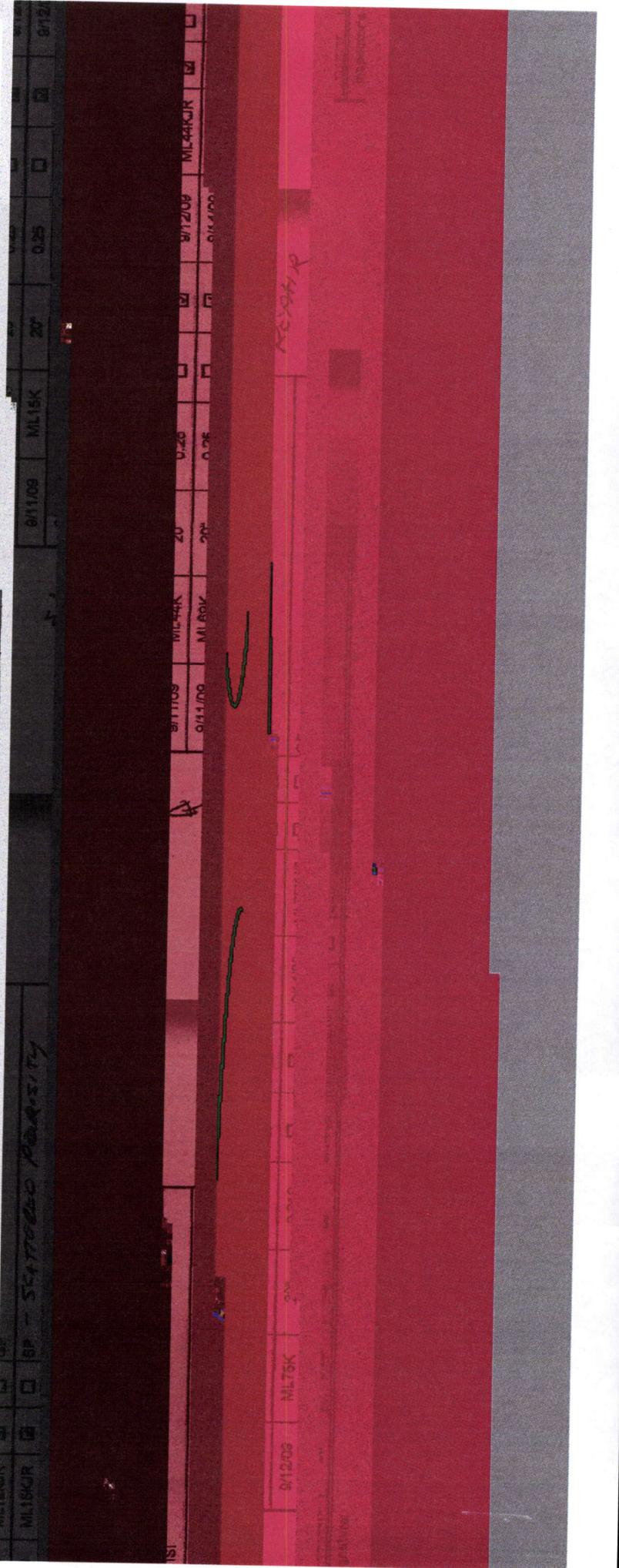
PAGE 1

3

NDE FILM INTERPRETER'S WELD REJECT REPORT

CONTRACTOR: Precision Pipeline ENDING MP: _____
 RADIOGRAPHIC INSPECTION CO.: Jan-x INSPECTOR (PRINT): Frank Bennett

REJECTED WELD	PIPE		DISPOSITION		RE-X RAY		REMARKS / LOCATION FOR REJECT	(REASON)
	WELD NUMBER 13-S4	O.D.	W.T.	CHECK ONE		NEW WELD NUMBER		
				CUT OUT	REPAIR			
9/9/09	RBML10H	20"	0.312	<input type="checkbox"/>	<input checked="" type="checkbox"/>		RBML10RH	GP - GAS POCKET
9/10/09	HDDML6K	20"	0.5	<input type="checkbox"/>	<input checked="" type="checkbox"/>		HDDML6RK	ISI - / SKATED SCABS INCLUSION
9/11/09	ML10K	20"	0.25	<input type="checkbox"/>	<input checked="" type="checkbox"/>		ML10KJR	ISI&EU - EXTENSIVE UNDERCUT



Exit Interview
Enbridge Southern Lights Construction Inspection
September 10-11, 2009
Manhattan Terminal
Manhattan, IL

Records Review Issues

1. On September 1, welder qualification records for Continental Fabrication were reviewed. The continuity records for the welders did not show a six month weld being radiographed as per 195 requirements. ***It is requested that Enbridge provide PHMSA the welder qualification continuity records that show the six month welds being radiographed.***
2. Enbridge to provide the following information:
Post heat treatment information on hot bend assembly received from Continental Fabrication, Bend Tec number 77461.

Field observation issues

Coating and jeeping issues

3. On September 10 and 11 it was observed that the jeeping crew was not removing all foreign material (stickers in this case) from the pipe prior to jeeping on station piping. In addition, it was noted that a sticker was coated over at a girth weld.
4. On September 11 it was observed that the girth weld area was not being blasted to a white metal finish as required by Enbridge. In addition, parent pipe coating was not being blasted to a 'feathered' edge to assure proper adhesion of the two part girth weld coating. Over spray from the fabrication shop was also not being removed in the area of the girth welds to be coated.
It is important the pipe be clean in order to properly detect coating holidays.
It is requested that Enbridge provide PHMSA follow up action regarding the proper training of jeeping/coating inspectors so that proper jeeping and girth weld preparation techniques for coating application are implemented.

Other field issue

5. On September 10 it was observed that large pieces of gravel were being caught between the protective pad and piping on pipe supports to be buried. See picture. While some soil will collect between the pipe and the pad, large pieces of gravel as shown could become point loads on the pipe after the pipe is buried, leading to coating or pipe damage. ***It is requested the Enbridge provide PHMSA follow up action on how to minimize large pieces of gravel lodging between the pipe and the pad.***

Thank you for your prompt attention to the issues listed.

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Lights (20")

Date: 09_10_09

Location: Manhattan, IL
Manhattan Station - records Breakout Tanks, Pumps and Piping

Station/Survey or Pipeline Marker:

Personnel Contacted:

Title/Position:

Company/Affiliation:

Glen Jones	Project Specialist	Enbridge
Kelly Harless	Construction Manager	Enbridge (contract)
Kraig Erickson	Tank Project Manager	Lake Superior Consulting
Walter Ames	Tank Inspector Chief	Enbridge (contract)
Jacob Weerts	Mechanical Inspector	Enbridge (contract)
Dave Stafford	Compliance	Enbridge
Josh Burchett	Tank inspector	Enbridge (contract)
Gerald Fethke	Quality Control Manager	Matrix - tank contractor

Activities Observed/Performed:

Results/Comments:

1. Discussed tank welder qualification issues with Matrix. They keep a continuity log certified by the welding foreman per the ASME Section IX requirements. The welds in the continuity log are not specifically designated as to being radiographed.
2. Reviewed weld log history for tank and station welding.
3. Enbridge to obtain post heat treatment information on Bend Tec bend 77461 - two hot bends welded together at the fab shop
4. Observed jeeping operation on station piping.
5. Observed piping protection at buried pipe supports.

1. No issues at this time. Will continue to get input from PHMSA staff as to whether tank welder must have the six month weld radiographed or NDE'd per 195 requirements.
2. No issues
4. Personnel need to make sure all stickers are removed from the pipe prior to jeeping. Observed a sticker that was coated over near a girth weld.
5. It was noted that large pieces of gravel were between the pipe protective sleeve and the pipe. This gravel could become a point load, damaging coating or the pipe once the pipe is buried if soil preferentially sits on the outside of the protective pad and applies pressure to the pad with gravel next to the pipe.

Summary:

1. Issue 1 - Will continue to get input from PHMSA staff as to whether tank welder must have the six month weld radiographed or NDE'd per 195 requirements.
2. Issue 3 - Enbridge to provide hot bend information.
3. Issue 4 - Enbridge inspection to reinforce good coating practice.
4. Issue 5 - Enbridge to respond to PHMSA how gravel will be kept out of the protective pad on buried piping supports to minimize point loading on the pipe.

Inspector(s): Carl Griffis

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Lights (20")

Date: 09_11_09

Location: Manhattan, IL
Manhattan Station - records Breakout Tanks, Pumps and Piping

Station/Survey or Pipeline Marker:

Personnel Contacted:

Title/Position:

Company/Affiliation:

Kelly Harless	Construction Manager	Enbridge (contract)
Walter Ames	Tank Inspector Chief	Enbridge (contract)
Jacob Weerts	Mechanical Inspector	Enbridge (contract)
Dave Stratton	Compliance	Enbridge
Jack Marshon	Coating inspector	Enbridge (contract)
Mark Montpetit	NDE Level II	Calumet Testing tank NDE contractor
Mike Dempsey	NDE Level II	Shaw tank NDE contractor

Activities Observed/Performed:

Results/Comments:

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Reviewed welder qualifications and NDE technician qualifications for pre-fabbed piping contractor Continental Fabrications. 2. Reviewed film with Calumet Testing technician. He uses shim penetrameters. 3. Reviewed film with Shaw technician. One shot was too dark - density was 4.1. Enbridge spec is 2.5 to 4.0 4. Observed crew blasting girth welds in preparation for coating. | <ol style="list-style-type: none"> 1. NDE qualifications ok. Welder qualifications do not show 6 month continuity. 2. No issues 3. Shaw to reshoot film that was too dark. 4. Noted that blasting was not adequately removing damaged coating due to weld splatter and pipe cut. Also overspray from pre-fabrication coating was also not being adequately removed in the area of girth welds. |
|---|--|

Summary:

1. Enbridge to provide a list of qualified welders from the fabrication shop, along with a complete continuity record of weld qualifications.
2. Shaw to reshoot weld with radiograph too dark.
3. Enbridge inspection to ensure that girth welds are adequately blasted so that all damaged coating is removed prior to coating.

Inspector(s): Carl Griffis

Below are items that were identified and discussed during the Spread 6 inspection September 8-10, 2009

1. Two part coating applications at the hwy 5 river crossing bore pipe was noticed having icicles nearly an inch long on the bottom, droops and sags along with in some large areas coating that was over 80 mils thick. The application was not uniform as required by the construction specs. The coating was filled with pinholes (small bubbles) along with larger bubbles the size of a small finger nail. The jeeeping of these coated girth welds was not observed, but it would seem to be difficult with the icicles on the bottom. Note: The two part was mixed with a wooden stir stick and installed in one application with no accelerated heating.
2. At the Superior terminal the coating on the girth welds where reviewed. Pin holes and bubbles where noticed. One girth weld was jeepeed and needed repair with the two part. The repair was not mixed thoroughly and dark blue and white streaks where observed in the application. The spec requires a thorough mixing of the two part.. Note: The two part was mixed with a paint stirring mixer with a drill and the repair was by hand.
3. The welding cap height was a continual issue. The cap height was noticed to exceed the maximum allowed in several areas. The WP 140 allows an 1/8" cap while the construction spec allows for a different cap height. Inspectors where not familiar with what the maximum height requirements and where not guided with what to do if they where found to be out of spec. The tools they have where not easily used to determine cap heights.
4. The location for taking of welding voltage readings was randomly done. When this is done the recorded voltage has varying voltage drops and is not consistent. White tape was applied at 20' to provide a consistent reading.
5. The welding procedure WP140 as used in the field was not the same as what was used during qualification (according to several personal in the field). The Field procedure WP140 has 140 amp minimum for several of the passes. Several personal remember the procedure having lower amp minimums during qualification. It is also noted that the 140 amps was not being met regularly as observed in the field.
6. In some girth welds near the Wrenshall MN crossing, welders where adding an extra stripper cap in small areas as if they where repairing pinholes or just adding more cap where it was needed. There is no guidance on what to do when this is found if anything. Some inspectors after discussion decided the these will not be allowed and if the cap needs additional reinforcement that it will receive a full cap.

Regulatory Compliance Audit Report

Alberta Clipper/Southern Lights (Clearbrook, MN to Superior, WI)

Report Number: 1

Date of Report: September 8, 2009

Preparer: Jeff Wiklund

Audit Reference(s): The responses contained in this report reference Audit Issues 1-6 found in the Audit Issue Summary email received from Brian Pierzina on August 29, 2009.

Audit Issues / Resolution:

- | | |
|-------|---|
| 1.829 | <p>Welders qualified outside the parameters of the procedure specification – Two welders had repair weld qualifications that were out of the specifications, and one welder had a branch weld qualification that was outside the specification. These were going to be re-done, however it is important that the inspectors ensure that qualification welds are completed within the parameters of the procedure specification. Please communicate the results of any remedial actions to PHMSA/MNOPS.</p> |
| | <p>A directive from Jim Crawford was issued to each spread reviewing the documentation required for the qualification of welders. This documentation has been provided to all personnel involved with the qualification of welders. Please see Jim Crawford's September 8, 2009 letter and Attachments A and B, thereto.</p> |
| 2.829 | <p>Identical values for amperage, voltage, and travel speed were indicated on the repair weld qualification records on Spread 2. The field notes were not available at the time of the audit to determine if these were actual measured values. This needs to be looked into, and the results communicated to PHMSA/MNOPS.</p> |
| | <p>There was a clerical error transcribing from the field notes to the Weld Procedure Sheets. This error has been reviewed and corrected. Please see Attachment - A, to Jim Crawford's September 8, 2009 letter, regarding the weld qualification procedure sent to all spread management.</p> |
| 3.829 | <p>The repair weld qualification tests require a repair from both the top and bottom quadrants of the pipe. While this appeared to be done in all cases, on all spreads, there was inconsistency between the spreads on how this was being documented. Some spreads only had documentation of one test on the welder qualification forms. It is assumed that Enbridge's intention is to document the results for each quadrant. The information should be available from the field notes and the x-rays. Please communicate the resolution of this issue to PHMSA/MNOPS.</p> |
| | <p>A directive from Jim Crawford was issued to each spread reviewing what documentation was required for the qualification of welders. This documentation has been communicated to all</p> |

personnel involved with the qualification of welders. Please see Attachment - A to Jim Crawford's September 8, 2009 letter.

- 4.829 There were additional documentation inconsistencies between spreads related to welder qualifications. Documentation ranged from high and low ranges for amperage, voltage, and travel speed for each pass of each qualification test, including rod type and diameter for each pass, to single values of amperage, voltage and travel speed, with no indication of the rod type and diameter. **Please indicate the expectations for welder qualification records associated with these welding parameters.**

A directive from Jim Crawford was issued to each spread reviewing what documentation was required for the qualification of welders. This documentation has been communicated to all personnel involved with the qualification of welders. Please see Attachment - A to Jim Crawford's September 8, 2009 letter.

- 5.829 Coating repairs to two part epoxy were allowed to be made using patch sticks, and this is allowed by the Enbridge specifications. It has been stated however, that the preference is that these repairs be made using two part epoxy. **Please indicate the circumstances under which repairs to two part epoxy coating are expected to be made using two part epoxy, and those which other methods such as patch sticks are expected.**

A directive from Jim Crawford was issued to each spread indicating the circumstances under which coating repairs are expected to be made using two part epoxy, and those which other methods such as patch sticks are appropriate. This documentation will be provided to all personnel involved with coating application. Please see Attachment - B to Jim Crawford's September 8, 2009 letter.

- 6.829 Enbridge has stated efforts were being made to ensure welds were not exhibiting the effects of delayed hydrogen cracking through a program of 24 hour delayed non-destructive testing. This was not done for the road bore pipe at County Road 62. It was also stated at Spread 2 that the program was going to be implemented for 20% of the mainline welds. **Please provide further specifics associated with Enbridge's plan related to NDT and delayed hydrogen cracking.**

Enbridge plans to implement a program of delayed radiographic inspection on all manual welding. Approximately 20% of all manual welds on each spread will undergo next-day delayed radiographic inspection. This will provide a comparison of defect rates found immediately after weld completion to defect rates found with next-day radiography.

Reviewed/Approved by


(initials)

Regulatory Compliance Audit Report

Alberta Clipper/Southern Lights (Clearbrook, MN to Superior, WI)

Report Number: 2

Date of Report: September 16, 2009

Preparer: Jeff Wiklund

Audit Reference(s): The responses contained in this report reference Audit Issues found in the following PHMSA and MNOPS Audits. These issues are based on audits that occurred from September 1-3 on spreads 1,2,4, 5 and 6. Audit points were communicated to Dave Hoffman in the following emails:

- email received from Darren Lemmerman (PHMSA) on September 4, 2009
- email received from Rick Gulstad (PHMSA) on September 6, 2009
- email received from Elizabeth Skalneek (MNOPS) on September 8, 2009

Please note that audit communications and observations by both PHMSA and MNOPS are also included in this report but are prefaced by (C/O).

Audit Issues (from Tracking Spreadsheet) / Resolution:

7.903	<p>During the first day (Tuesday September 1) it was noticed that there was a lack of familiarity with the Unified Construction Specifications with the inspectors. A meeting was held on Wednesday morning to address this.</p> <p>Completed. Please note that this meeting was also followed up on with a formal training session on 9/3/09 to further discuss inspector responsibilities in regard to both specifications and documentation.</p>
8.903	<p>(C/O) The automatic welding just kicked off on Wednesday September 2 and they were doing well. It was noticed that the weld cap at 6:00 ('o clock position) was being cut short. There was a 1 to 3 inch area where the weld cap was not full height, however it does pass the API 1104 visual. The Michaels welding foreman said this will be improved upon.</p> <p>Completed.</p>
9.903	<p>The WP 140 welding procedure requires stripper passes and a cap on .600 (inch) wall pipe or thicker. I had asked for clarity for consistency sake on when or if stripper caps can be used on pipe wall less than .600 (inches). The procedure appears to allow a 3 cap pass on thinner wall, please confirm.</p> <p>The WP140 Weld Data Sheet has been revised to allow a 3 bead strip cap on .500 inch wall and heavier pipe.</p>

- 10.903 Welding inspectors are required to take voltage readings during the welding process. Since it is well known that voltage drops occur in the welding leads which are dependent on length and gauge, a consistent reading technique should be used. It was suggested by Alberta Clipper personal that they would ask Michels if they could take readings 20 feet back from the welder's stinger and mark location with tape. If this was agreed to by Michaels all welding inspectors would take the readings at the same location.
When taking voltage and amperage readings, the amperage reading may be taken anywhere along the lead. However, the voltage reading should be taken as near to the electrode as practical. Consistency can be facilitated by placing a small hole in the lead and then covering it with visible tape so the hole can be readily located for each reading.
- 11.903 (C/O) The stick weld cap heights are limited to 4.5 mm's (after adding 1 mm for thicker wall pipe) according to the Unified Construction Specifications, some cap areas exceeded this maximum and where subsequently sanded (grinded) down to be within spec.
Enbridge Specifications for Pipeline Construction – Pipeline Welding Specification allow the repair of any weld that does not meet code or workmanship standards.
- 12.903 (C/O) One arc burn was identified and the weld was cutout. The Unified Construction Specifications allows for repairs however spread 2 is requiring that all arc burns on pipe be cutout. This same weld that incurred an arc burn also appeared to not have the minimum 50% root pass completed before the external clamp was removed. These issues were discussed in the morning of Wednesday September 2 with all welding inspectors.
Completed.
- 13.903 The Unified Construction Specifications do not address the securing of welding grounds to the pipe during welding processes. It was discussed that they will begin doing this as a standard practice.
Section 4.11 of Appendix A to the Specification for Pipeline Construction – Pipeline Welding Specification (US-2009) states that "Grounding devices shall be securely fastened to ensure freedom from arcing during welding and shall be designed such that the grounding location is inside the joint bevel.
- 14.903 Operator Qualifications, 6 individuals from the Environmental gang were reviewed for OQ and all six were qualified per records. This method of auditing was successful, however it is still unclear what methodology is used to determine who needs qualifications. Do all operators need OQ, do all excavators need OQ, do Foreman need OQ, are there specific union titles or contractor titles that can be used as filters to determine this? Please provide a repeatable filter process supported by documentation that will allow an Office audit, which will provide a level of certainty that the required people are OQ'd.
The OQ program was developed in coordination with all contractors to ensure that persons working on the project in a capacity or task that had potential to affect the operation or integrity of the existing operating pipelines were Operator Qualified. Filtering is done through review of people's job tasks in relation to covered tasks. Certain crews (e.g., trucking/maintenance, stringing, bending, firing-line) not performing covered tasks are excluded from the OQ process. Persons working on crews that may fall under a covered task are interviewed to determine what their tasks will be. If a determination is made that a

person will be performing a covered task, they are Operator Qualified for the work to be conducted. During project on-boarding, OQ training offices have been staffed at each of the six construction sites by KCI Consulting. Records of Operator Qualifications are provided by KCI to the contractors and Enbridge on a daily basis to ensure up-to-date tracking of qualified individuals.

- 15.903 (C/O) Welder qualifications were witnessed for SMAW and automatic welding. Welder qualification documentation was reviewed mainly for SMAW. The documentation appeared to be adequate to ensure that welders were welding within the constraints of the welding procedures such as volts, amps, and travel speed.
Completed. Please also note that this was addressed in Appendix A of Regulatory Audit Compliance Report submitted to PHMSA/MNOPS on 9/8/09.
- 16.903 (C/O) Radiographic film was reviewed with Chris Leslie, Level II NDE technician and several other Level II technicians for welder qualifications, HDD section girth welds and road bores. In addition radiographic interpreter qualifications and procedures were reviewed. No repair areas were identified during the week.
Completed. Please also note that this was addressed in Regulatory Audit Compliance Report audit issue # 6.829 submitted to PHMSA/MNOPS on 9/8/09.
- 17.903 (C/O) Automatic welder qualifications were witnessed along with the ultrasonic testing of the welds. A comment was made to ensure that the ground clamp is secured to prevent arcing as arc burns are not allowed to be repaired per the construction specifications. Also a gauss meter was available to check the magnetism of the pipe.
See above #13.903.
- 18.903 (C/O) Operator qualification paperwork was reviewed for the contractor for those covered tasks being performed per the NCCER data available. The documentation appeared to be well organized.
Completed. Information was provided by Operations Compliance while on-site.
- 19.903 A joint of pipe for a HDD section was examined and had damage to the bevels due to lifting with hooks.
Based on a conversation with the Enbridge representative accompanying the PHMSA auditor, the use of hooks to lift a section of pipe was not witnessed. What was witnessed was damage to bevels. Enbridge procedures strive to ensure safety and minimize the potential for pipe damage. Enbridge construction management states that all lifting of pipe for storage, transport and stringing will be accomplished using vacuum lifts or belts. Lower-in is accomplished through use of cradles. Although we do not know the reason for the damage to the bevels witnessed, a directive will be issued that pipe is not to be lifted by hooks.
- 20.903 Provide a copy of an Enbridge coating procedure that allows for thicker applications (beyond 40-50 mils) or; a QA/QC process that will keep the coating thickness within the limits in your current procedures.
Please see Appendix A.

Reviewed/Approved by 
(initials)

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James Crawford
Director
Engineering & Construction (US)
Major Projects
Tel 715 398 4516
Jim.Crawford@enbridge.com

September 16, 2009

To: Marc DeVarenes Jack Olin Paul Eberth
 Tony Madden Tommy Shiflett Avery Schott

Re: PHMSA Audit Issues 7-20 from September 3, 2009 Issue Summary Reports

Attached is a summary of PHMSA findings and their disposition based on the PHMSA audit that occurred during the week of August 31 – September 4 on spreads 1,2 and 4,6. In addition, the following immediate actions should be taken re: contractor/spread personnel:

1. Communicate the revisions to WP-140 (WDS) and WP-144 (WDS).
2. Communicate that when welding inspectors are taking voltage readings, the reading should be taken as near to the electrode as practical. Consistency can be facilitated by placing a small hole in the lead and then covering it with visible tape so the hole can be readily located for each reading. Amperage readings may be taken anywhere along the lead.
3. Communicate that the welding inspector, acting as an Enbridge representative, can allow the use of wedges to obtain line-up and spacing of the weld joint.
4. Communicate that hooks are NOT to be used to lift pipe sections.
5. Communicate the Technical Standards Bulletin (attached) that removes use of the 3M Patch Stick in repairing pinholes for coatings applied according to C-210.

Please positively confirm with me when these actions are completed. I appreciate your prompt attention to these matters.



Jim Crawford

cc: Dan Plume, Tom Hodge, Shaun Kavajecz, Dave Hoffman,
 Jerrid Anderson, Randy Rice, Carter Saline

BUL-026-2009

Enbridge Pipelines Inc.
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P.O. Box 398
Edmonton, AB T5J 2J9
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www.enbridge.com



Technical Standards Bulletin

Title: Removal of Use of Epoxy Patch Stick		
Bulletin #: BUL-026-2009	Date: Sept. 11, 2009	File #:
Issued By: Kelly Marx, Technical Writer, Technical Standards		
Approved By: Jim Huber, Manager, Engineering Services		
This Change is Effective Immediately		
In Reference To:		
Painting Specification C-210 – <i>Coating of Buried Steel with Rollable or Brushable Coatings</i> , Appendix I – Repair Materials		
The requirements referenced in the above mentioned standards and specifications are superseded by:		
The use of a 3M 226P Epoxy Patch Stick for pinhole repairs in Appendix I of C-210 will be removed from the specification and will no longer be used as a viable method for pinhole repairs.		
JUSTIFICATION:		
For quality control of field applications, it is best practice to not use the 3M 226P Epoxy Patch Sticks.		

Please post this bulletin and file with any hardcopies of the above referenced standards or specifications. The change will be incorporated into the next revision.

FIELD COATING APPLICATIONS

ENBRIDGE SPECIFICATION C-210

Coating of Buried Steel with Rollable or Brushable Coatings

SCOPE:

An issue has been raised by regulatory inspectors regarding thickness application of 2 part epoxy coatings on girth welds. The issue concerns the maximum allowable thickness of the coating as Enbridge Specification C-210 does not address maximums.

SPECIFICATIONS:

Enbridge:

In accordance with Appendix I of this specification spreads 1, 2, 4, & 6 are using SP 2888 BRUSH GRADE 2 part epoxy coatings as manufactured by Specialty Polymer Coatings, Inc. (SPC) on tie in and drill pipe girth welds as the following table allows:

Approved Rollable / Brushable Coatings (Section 1.3):

System 1 Canusa – CPS HBE-95

System 2 Covalence – Powercrete F-1

System 3 Denso Protal 7000 Epoxy

System 4 Denso Protal 7200 Epoxy

System 5 Specialty Polymer Coatings SP-3888 Epoxy

System 6 Specialty Polymer Coatings SP-2888 R.G. Urethane Epoxy

The application method is specified as follows:

- 7.2 The coatings shall be rolled or brushed. APPLICATOR shall obtain preapproval from the COMPANY if trowelling is selected as an application technique. The material shall not be sprayed.

The specification spells out the coating thickness applications as follows:

- 7.4 The coating thickness shall be 0.64 mm (**25 mils**) nominal with an even thickness distribution over the coating area (see 8.2.2.1). The **minimum coating thickness shall be 0.50 mm (20 mils)**. The APPLICATOR shall measure and record coating thickness using a thickness gauge that is acceptable to the COMPANY.

Section 8.0 of the specification speaks of Quality Control as follows:

8.2 Coating Thickness

- 8.2.1 The coating thickness may be measured during coating application using a wet film thickness gauge.
- 8.2.2 After the coating has cured to a tack-free condition, the APPLICATOR shall measure the coating thickness using magnetic pull off or fixed probe gauges that are calibrated daily.
 - 8.2.2.1 The APPLICATOR shall obtain readings at four quadrants (1, 4, 7, 10 o'clock) circumferentially at each girth weld. No more than two quadrants shall be below the nominal. Other PARTS shall be measured so as to obtain representative thickness data as determined by the APPLICATOR.

Specialty Polymer Coatings, Inc.:

SPC's specification does not specify a maximum coating thickness. The manufacturer's specification does state that "A maximum Dry Film Thickness (DFT) of 1.0 mm (40mils) can be applied to a vertical surface in a single application. Higher builds are possible on horizontal surfaces..."

During a telephone query by Enbridge personnel with SPC representatives, SPC stated that there is no limit as to what maximum thickness can be as long as the coating is cured prior to burial.

Summary:

Neither Enbridge's C-210 Specification nor SPC's specification specify a maximum coating thickness regarding the application of brushable two-part epoxy coating.

As long as the coating is evenly applied and properly cured, maximum thickness of the coating is not a factor involved in maintaining good coating application and resistance to corrosive factors. The primary factor is the minimum thickness applications, which are specified in all Enbridge specs.

Regulatory Compliance Audit Report

Alberta Clipper/Southern Lights (Clearbrook, MN to Superior, WI)

Report Number: 5

Date of Report: October 9, 2009

Preparer: Jeff Wiklund

Audit Reference(s): The responses contained in this report reference Audit Issues found in the PHMSA audit that occurred from September 23-25 on spreads 1-3. Audit points were communicated to Dave Hoffman in the following emails:

- email received from Darren Lemmerman (PHMSA) on September 25, 2009

Please note that audit communications and observations by both PHMSA and MNOPS are also included in this report but are prefaced by (C/O).

Audit Issues (from Tracking Spreadsheet) / Resolution:

32.925 After reviewing the welding procedures and the PQR for WP-140 the following has been noticed. The welding procedures are developed from the PQR's. WP-140 contains parameters that are outside of the PQR parameters. The root pass on the PQR is documented with a min and max of 88 amps to 235 amps and the procedure throws out the highest 235 amp reading and uses a max 175 amps, which is a little higher than the most common high amps recorded on the PQR, but less than the max and raises the min to 90 amps from 88 amps. This provides a nice welding procedure for the root pass with parameters that fail within the PQR. This is true for passes 1 and 2. Pass 3 uses the maximum amps recorded in the PQR of 210 amps, which is still within the PQR parameters. Passes 4 and 5 and the stripper pass have amp ranges in the WP-140 that fall well outside of the PQR ranges. For the PQR the 3rd pass had a max of 192 amps while the procedure allows 210 amps. For the PQR the 5th pass had a max of 185 amps while the procedure allows 210 amps. For the PQR, the stripper pass had a max of 184 amps while the procedure allows 210 amps. The WP-140 has not been qualified for these amp ranges. The Weld Data Sheet Revision 2 had maximum amp ranges that fell within the PQR. Revision 3 ignored the maximums and changed them all to 210 amps and Rev 3 lowered the minimums to provide weld ability, yet the lower amp allowances are still within the PQR parameters. Why are the welding procedures not within the parameters of the PQR? What will Enbridge do for the welds that have been produced in production that have fallen outside of the PQR parameters?

(1)The welding parameters shown on page 9 of the Welding Procedure Specification (WPS) reflect the actual values recorded during the qualification of the procedure. The values specified on page 1 of the WPS and subsequently on the Weld Data Sheet reflect those values

that Enbridge engineering has determined to be suitable for welding API 5L Grade X70 pipe using cellulose electrodes. These values are based on the recorded values but have been modified (rounded) to values which simplify the monitoring process by standardizing the values according to electrode diameter.

API 1104 (20th Edition) Section 5.3 Procedure Specification requires that the WPS record the electrical characteristics (amps, volts, travel speed) but does not list these values as being essential for the requalification of a welding procedure. Consequently it is understood that welding procedure specifications may include the amperage, voltage and travel speed which represent the desired values to produce a sound weld capable of meeting the design and mechanical property requirements of the welds being made.

- 33.925 The procedure calls for a 3 pass cap for .500 wall pipe or an oscillating (weave) cap not to exceed 3 electrode widths. There is no mention of a 2 pass cap in the procedure. See pics above.

Please see AVO-AC-9008. This AVO addresses the October 1, 2009 revision of WP-140 Rev 4 and WPS 140 Rev 3, which allows either a two or three beaded cap on W.T. over 0.500".

- 34.925 (C/O) It was noticed on the 36" Mississippi River bore pipe for spread 3 while with MNOPS that weld cap heights on a couple of welds exceeded the unified construction specifications. It was also noticed that a couple welds had questionable workmanship and should have been addressed with the visual inspection process.

AVO-AC-9006 was issued on September 29, 2009 and addresses weld cap height. Spread Management have had meetings with the contractor and Inspection staff regarding the importance of understanding and following project specifications/procedures for all inspection areas. In addition, Boyd Haugrose has developed a supplemental training addressing workmanship, specifications and procedures for both contractor and inspection staff coating/welding personnel that has been/will be presented at each spread. We believe our continued communication on these issues has yielded positive impacts on all aspects of the project.

- 35.925 (C/O) Excessive grinding of the long seams for automatic welding/ UT was noticed on Spread 1. See 009.jpg

Seam grinding methods and criteria have been reviewed with the contractor and inspection staff.

- 36.925 (C/O) On spread 1 the ROW was covered with construction garbage. This included wire wheels, cigarette butts, skids buried randomly in the mud, chew cans, rags, welding wire and so on. This obviously is not a code issue but reflects on the local land owners in a negative light on Enbridge and the pipeline industry as a whole.

The Inspector at the site had the worksite cleaned up. Maintaining a clean worksite/ROW is

the responsibility of both the crews and inspection staff. The contractor was counseled that debris shall be cleaned up by the end of the day by each crew.

37.925 FBE Coating application has several issues that were noticed and is being actively reviewed by Enbridge. This is occurring on about 1 in 10 joints.

a. While heating the pipe for application the coating is blistering and becoming disbonded from the pipe. When the pipe is flocked the 3M powder FBE is bonding well to the steel blasted pipe area with issues found at the transition and over lap areas. In the over lap area there are undercuts, pin holes, bubbles and blister defects. The general cause is from heating the DuPont factory coating for FBE application. How to address this and prevent this is still being investigated. This has occurred on spread 1 and 3, 36 inch pipe and to a lesser extent on the 20" pipe. Any area where blistering has occurred is disbonded from the pipe and needs repair (see 027).

b. Spread 3 is using a method to cover some of these defect areas with a manual FBE application method. They call it the "Ketchup bottle" application process. Where undercut, bubbles and defects are found, and while the pipe is still hot they will manually spray FBE powder in these areas. I am not sure if this is an approved technique by Enbridge but it seems to work for the weld cap areas, however I have concerns about using it in areas where feathering is poorly done or to cover disbonded factory coating areas and undercut. These areas should be repaired to sound metal for proper coating adhesion. Areas where this "repair" method is used in the transition area should be visually reviewed and repaired as needed.

c. The coating transition is not being feathered back in many locations as well as it should be. This is even more important since it seems that there is a 1 cm area along the transition that can have bonding issues with the factory DuPont FBE. I believe this is the cause of some of the undercutting noticed in the FBE application. With proper feathering these disbonded areas can be identified and blasted away (see pic 024).

a and c. On Spread 1, the FBE application was ceased and coating was continued with 2 part epoxy. On all spreads, areas of the FBE coating where blistering, undercuts, pin holes or bubble defects occurred were identified and repaired. Additional steps to analyze and correct coating issues have included:

- Contacting and having Bredero Shaw pipe coating representatives visit spreads 1 & 2 (9/25/09). Enbridge accompanied these representatives to the field to review surface preparation and the application process/techniques. Discussion was focused on the potential cause for some of the coating anomalies discovered.
- Instructing inspection staff in the steps to properly pre-heat the pipe prior to coating
- Instructing inspection staff to monitor sandblasting techniques with attention to feathering and cut-back area
- Having inspectors continue to precisely monitor heat-ring parameters

Enbridge is continuing to monitor coating and share any "best practices" that evolve through this review process.

b. Spread 3 has reviewed this with appropriate contractor and inspection staff and this practice will not be used. All repairs will be made in accordance with coating specifications.

38.925 In a couple of areas patch sticks have been used. Enbridge's specification matches the factory application maximum of 1 square inch. As seen in 032.jpg this has been slightly exceeded.

Please see AVO-AC-9009. This requirement is in accordance with the NACE standard.

(Sec. 8.3.1) For repair of FBE using a patch/hot melt stick. The appropriate use of patch sticks has been communicated to contractor and inspection staff.

39.925 (C/O) The two part applications on Spread 1 looked well done.

Reviewed/Approved by



(Initials)

Regulatory Compliance Audit Report

Alberta Clipper/Southern Lights (Clearbrook, MN to Superior, WI)

Report Number: 6

Date of Report: October 27, 2009

Preparer: Jeff Wiklund

Audit Reference(s): The responses contained in this report reference audit issues found in the MNOPS audit that occurred from October 1-2, 2009 on spreads 3 and 5. These issues were communicated to Dave Hoffman in the following email:

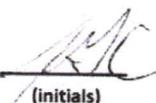
- email received from Darren Lemmerman on October 13, 2009 which contained the MNOPS report prepared by Jonathan Wolfram.

Please note that audit communications and observations by both PHMSA and MNOPS, when included in this report, are prefaced by (C/O).

Audit Issues (from Tracking Spreadsheet) / Resolution:

40.1001	<p>Coating blistering of the FBE coating was noted on 36" pipe at the Mississippi River crossing in Bemidji. The issues noted (blistering) were noted in a previous inspection.</p> <p>FBE girth weld coating issues (i.e., blistering) at the transition and overlap areas continue to be monitored and addressed by all spreads. Efforts to resolve these issues have included continued consults with internal and external experts (e.g., Bredero Shaw), evaluation of various methods of coating preparation (e.g. heating and surface preparation) and inter-spread communication of best practices to eliminate these anomalies.</p>
41.1001	<p>It was noted that tape was left on the pipe during the welding and coating process. The tape was left on the factory applied coating and the FBE was placed over the tape. It was common to find tape lift on the pipe from the factory.</p> <p>The issue of tape on the pipe was addressed in the September 30th communication (Issue #7) from the Project Director to spread management. When Enbridge/MNOPS were in the field, coating inspection staff and a jeeping crew both stated that tape was being taken off the pipe. Given that the conversations with the jeeping crew and inspection staff occurred on 10/1, it is evident that spread management had communicated the 9/30 directive to remove tape from the pipe. Based on conversations with spread management, all spreads are removing tape from the pipe.</p>

Reviewed/Approved by


(initials)

Regulatory Compliance Audit Report

Alberta Clipper/Southern Lights (Clearbrook, MN to Superior, WI)

Report Number: 7

Date of Report: November 11, 2009

Preparer: Jeff Wiklund

Audit Reference(s): The responses contained in this report reference Audit Issues found in the October 19-23, 2009 PHMSA audit and the October 13-16, 2009 MNOPS audit. Audit points were communicated to Dave Hoffman in the following emails:

- email received from Brian Pierzina (PHMSA) on October 26, 2009
- email received from Darren Lemmerman (PHMSA) on October 27, 2009

Please note that audit communications and observations by PHMSA or MNOPS, when made, are included in this report but are prefaced by (C/O).

Audit Issues (from Tracking Spreadsheet) / Resolution:

42.1026	<p>Improper patch stick coating repairs were observed at a lower-in operation at Station # 11854+23. The crew was observed melting the patch stick directly with a torch. Operations improved once the crew was directed. Also, weld # 67-S4-ML-285-M-X appeared to have excessive area repaired using patch stick, and also appeared charred due to excessive heat. Photos taken – but impossible to determine the actual repaired area.</p> <p>Jim Crawford's November 10th communication to all spreads directed spread management to discuss this with inspection staff/contractors to emphasize the need to follow specifications in the use of patch sticks. The pipe where this issue was observed was jeeped and there were no coating anomalies found in the areas of question.</p>
43.1026	<p>Improper support of 36-inch concrete coated pipe near MP 1002. A section of double jointed concrete coated pipe, with an uncompleted weld, was observed to be improperly supported, such that one end was approximately 6 inches off the skids, with the only skids providing support approximately 5 feet from the girth weld. Due to the weight of the pipe, this creates a large bending moment on the uncompleted girth weld. When this was pointed out, the pipe was re-supported. As the weld was not completed, no x-ray had been performed yet. A request was made for the girth weld # and the status of the x-ray, but that information has not been provided to date. In addition, a review of the specifications for supporting the pipe indicate that the expectations are not clear, so this is an area that should be clarified, to ensure that pipe is properly supported, and not contributing excessive stress to the welds.</p> <p>The girth weld number (67S4PPML115LX) was provided to PHMSA on 10/27/09. The NDE results x-ray results show that a delayed shot was taken (on 10/22/09) and the weld was good. An applied stress calculation was also done showing that undue stress was not</p>

applied to the weld. However, Jim Crawford's November 10th communication to all spreads directed spread management to discuss with inspection staff and contractors the proper use of skids to support pipe.

- 44.1026 36-inch cracking issues. It appears Spreads 3 and 4 have experienced similar cracking issues, although the majority of cracks on Spread 4 occurred the weekend of October 10th, and the majority of cracks on Spread 3 occurred the weekend of October 17th. A number of steps have been taken to mitigate the problem, including better heat management techniques, and eliminating use of the 8010 P+ welding rod. The vast majority of cracking is occurring at or near the 6:00 position. Please provide (as soon as possible) weld logs for 36-inch welds completed from October 10-12, and October 17-19 for Spreads 3 and 4 (Clearbrook to Superior). Include the date the weld was started, the date the weld was completed, the date of initial NDT, and the date of each subsequent NDT, as well as comments related to the type and location of any defects that were identified. Please distinguish between welds that were made using the 8010 P+ electrode, and those made using the 8010 G electrode. Please also provide the results of metallurgical analyses when they are received.

Enbridge management, inspection staff and contractor staff have been actively analyzing and monitoring the weld process to eliminate/mitigate the cracking issues. Crack sections have been cutout and submitted to Ludwig Associates Ltd. for metallurgical analysis. Additionally, an external expert (R. Huntley) was brought on site in mid-October to review procedures and conduct awareness training for spread management, inspection and contractor staff. A number of procedural changes have been implemented including but not limited to heat management approaches, brother-in-law welding, tenting, tightening pipe-gang/firing line, and stress management at girth welds. Additionally, this project has added crawlers to attain the highest practical level of delayed inspection. As additional information is obtained from both internal and external analysis, it will be communicated to PHMSA.

Please note that a CD titled *Exhibit 1 – Audit Point 44.1026 Weld and NDE Reports* is being sent to PHMSA. This contains weld logs and daily reports from weld and NDE inspection staff for the period of October 10 – 20, 2009.

- 45.1027 There is an apparent problem with cracks appearing in the bottom of the welds on the welding on spread 2.

On October 5, 2009 NDT observed centerline indications on welds on Spread 2. Subsequent investigation lead to the replacement of copper shoes and the backing plate on the internal line up clamp. Increased vigilance has been placed on monitoring the condition of the copper shoes and replacement(s) will be made when necessary.

- 46.1027 We observed weld spatter and an unknown substance (melted) on pipe.

Jim Crawford's November 10th communication to all spreads directed spread management to discuss cleaning of the pipe with inspection staff/contractors to emphasize the need to ensure the pipe is cleaned in accordance with specifications. The Specification for Pipeline

Construction – Pipeline Welding Specification 8.8.8 states “The completed surface of the weld shall be thoroughly power-brushed clean of all spatter and slag and the reinforcement shall blend smoothly with the adjacent pipe surface.

47.1027

During the machine applied coating, aka “flocking”, we observed inconsistently applied coating and what can be best described as dimples. Because of the precipitation, one might deduce that these observations were weather related. Also, the coating crew seemed to be intent on checking the temp and as such we didn’t observe the previous “blistering” problems in the factory applied coating.

All spreads have gone to great lengths to put heating and coating protection procedures/processes (e.g., pre-heat, use of tents, etc.) into place to prevent coating anomalies from occurring. However, this does not ensure that anomalies will not occur. The significant number of variables that can affect coating application are constantly monitored by each crew and considered throughout the day in both the pre-heat and coating process. When an anomaly does occur, each crew follows specifications to repair the problem. As observed, the crews are intent on monitoring the pre-heat process to reduce the potential for blistering (which can occur during the heating process as moisture absorbed by the coating is driven from that coating). Jeeping is done a minimum of two times to ensure the integrity of the coating before it is lowered in.

Reviewed/Approved by


(initials)

Regulatory Compliance Audit Report

Alberta Clipper/Southern Lights (Clearbrook, MN to Superior, WI)

Report Number: 9

Date of Report: January 4, 2010

Preparer: Jeff Wiklund

Audit Reference(s): The responses contained in this report reference audit issues found in the PHMSA/MNOPS audit that occurred from December 14-17 on spreads 4 and 6. Audit points were communicated to Jeff Wiklund in an email from Darren Lemmerman (PHMSA) on December 21, 2009.

Please note that audit communications and observations by both PHMSA and MNOPS are also included in this report but are prefaced by (C/O).

Audit Issues (from Tracking Spreadsheet) / Resolution:

54.1214	<p>Heat management -</p> <p>While observing the pipe gang and firing lines on spreads 4 and 6 it was identified that the heat management requirements were not occurring consistently according to the construction procedures. The procedures require a minimum temperature 250 degrees F shall be maintained while performing welding. On spread 6 it was observed that the preheating was adequate, however the inter-pass temperatures where not maintained by all welders on the firing line. On several instances the temperatures where below 200 degrees F. On spread 4 the pipe gang was measuring the initial preheat while inter-pass temperatures where falling and not measured during interim passes. The firing line preheated the pipe prior to installing the line up clamp, however while completing the root passes the pipe temperatures fell below the minimum with no heat maintenance. The Foreman stated that it would be more detrimental to stop welding and maintain the heat than it would to continue heating below the minimum</p> <p>The recent communication from the Project Director (attached) directs spread management to discuss with contractor and inspection staff the specifications for pre-heat and interpass heating of pipe and the requirement to <i>maintain</i> heat during the welding process at a minimum of 250 degrees. Crews and Inspectors have been asked to test heat more frequently with temp sticks or other approved Enbridge methods such as with contact thermometers. Pyrometers may additionally be used for informational purposes to gage the rate of heat loss. We continue to look at additional ways to ensure adherence to the specifications (e.g., positioning of the star assembly, modifying the star burner to deliver increased heat, reheat after clamping, etc.). With respect to the foreman's comment, spread management has been assured by contractor management that all personnel understand</p>
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and will do their utmost to adhere to the specifications regarding preheat, interpass heat and heat maintenance.

55.1214 Jeeping equipment -

Just east of hwy 23 we observed some jeeping. The coating crew stated that they calibrated the jeep to 1750 volts prior to us arriving on site. We asked if they would show us how it was calibrated. The unit's digital readout showed 1750 volts when the volt meter was used it was showing 1100 volts. The jeeping unit was required to be turned up until the digital display read 2700 volts, while the testing meter read 1750 volts. We did not have additional equipment to see where the issue was. It is possible the jeeping voltage was being done significantly lower than required.

The specific jeeping crew referred to in this issue had not started jeeping for the day. Because neither the volt meter nor the jeep could be tested with a second volt meter, we could not determine whether a problem existed in the jeep or the meter. Spread management directed this crew to check their equipment and verify that both the volt meter and jeep are functioning properly. Although practice has been for jeeping crews to calibrate jeeps using a volt meter, we have directed crews to ensure the calibration is done using a volt meter. In addition, we have directed inspectors to double check the calibration with their volt meter.

Last, the result of a check (while on spread 6) in voltage differences using alternative grounding methods (e.g., to pipe, using jeep tail and to side boom) showed only minor differences of less than 100 volts. However, we have also recommended that the calibration be based on the grounding method to be used by the jeeping crew.

56.1214 Coating blisters and cracking-

A newly identified coating issue (by MNOPS or PHMSA) was noted. See picture above. The coating is cracking and chipping from the parent FBE do to some unknown causes. It is believed to be caused by inadequate heat sink into the metal prior to flocking the pipe others have suggested that the lack of an anchor pattern in that area is to blame. I would comment that there has never been an anchor pattern in that region and the chipping has only been observed recently. For the limited observations we made it does not appear that the disbonded FBE or cracks extend beyond the parent FBE surface.

In some locations blisters where identified and repaired. One joint was noted as having the disbonded blistering and was not repaired. There are concerns that disbonded blistered coating is being installed without being repaired.

The issue noted in the first paragraph above was discussed with PHMSA on-site. As stated above, the majority of these are hairline cracks that have occurred to the FBE applied over parent pipe coating. Because they do not extend into the bare metal or sandblasted area, there is no indication that FBE girth weld coatings have been compromised. PHMSA also saw that all pipe continues to be pre-jeeped, areas of concern or anomalies are identified and repairs have been made. In addition, all pipe continues to be jeeped again as lower-in occurs to ensure the integrity of the coating.

As stated in this audit point, what appears to have been blisters on girth welds were all repaired with the exception of one location. The anomaly in this location was about the size of a dime and no determination was made if this blister area was disbanded. To help ensure that all blistering is found and necessary repairs made, the contractor coating crews, coating inspection staff as well as the jeeping crews and inspectors will be re-educated on indentifying and repairing blisters.

57.1214 (C/O) Delayed cracking documentation-

While reviewing x-rays of cracked welds it was noticed that the documentation process for determining if an x-ray is to be considered delayed or not is difficult. When x-rays are taken the following day after weld completion it is not noted that these are delayed shots. In some instances when a weld is cut out for a crack the delayed notation "X" is replaced with a cut-out notation "N". These are only issues when trying to determine the validity and benefit of delayed NDT.

The overwhelming majority of welds that are delayed shots are identifiable on the Weld History Report. These xrays are identified by an "X" in the weld number and each has the date of acceptance. Although it appeared that delayed xrays on these cracked welds were difficult to track, we did not review all the documentation available as the focus was to review film. Enbridge will review this area to see if there is an opportunity to improve documentation. As noted by PHMSA and MNOPS, this is a new process that significantly exceeds what has been done by the industry in the past. Enbridge appreciates suggestions to improve the information/data that could benefit this study and will continue to review our process and determine if there are ways to improve the process.

58.1214 Grinding back of the long seams-

While observing the pipe gang SW of Cloquet it was observed that the engineered cuts were not getting the long seam ground back. The construction procedures require a ½ inch minimum grind back.

This was identified in a prior audit point and communicated to both inspection staff and the contractor that seams require a ½ inch minimum grind back. Spread management

brought this up at the Thursday (12/17/09) morning meeting with contractor and inspection staff. In addition, Project management has asked that this issue be addressed in an AVO with additional review at the morning contractor meeting.

Reviewed/Approved by


(initials)

Regulatory Compliance Audit Report

Alberta Clipper/Southern Lights (Clearbrook, MN to Superior, WI)

Report Number: 10

Date of Report: January 25, 2010

Preparer: Jeff Wiklund

Audit Reference(s): The responses contained in this report reference Audit Issues/Comments found in the January 4-7 PHMSA audit and January 13, 2010 PHMSA/MNOPS audit. Audit points and comments were communicated to Jeff Wiklund in emails from Darren Lemmerman dated January 8th and January 14th.

Please note that audit communications and observations by PHMSA or MNOPS, when made, are included in this report but are prefaced by (C/O).

Audit Issues (from Tracking Spreadsheet) / Resolution:

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| 59.0104 | <p>Heat Management - While observing the pipe gang and firing lines on spreads 4 and 6 it was identified that the heat management requirements were significantly improved since the December 14-17 inspection. On Monday January 4th on spread 4 observations found all of the pipe gang and all but 1 welder on the firing line were maintaining the 250 F minimum heat requirements. On Thursday January 7 on spread 6 observations found all but one welder was maintaining the 250 F minimum requirement. Those welders found using the 250 F temp sticks where having difficulty with maintaining the min. temp. Welders using 300 F temp sticks did not appear to be having trouble staying above the minimum requirements. It was discussed that all welders should only be using the 300 F temp sticks. While the pipe gang was setting up for the first weld on a new segment, a new hand placed the ground on the end on the pipe and in doing so the end cap was removed. The strong parallel winds and the below zero temps made it very difficult to weld more than ½ a rod before the pipe was too cold to weld. This field observation was brought forward to the welding foreman and the pipe end cap was installed. After installation the minimum preheat temps where maintained for several rods before additional heat was needed. Prior to this audit, spread management discussed the use of temp sticks with both the contractor and inspectors. Contractor crews were asked to use 300 degree temp sticks to manage heat. Inspectors have both 250 degree and 300 degree temp sticks. The 300 degree temp sticks are used similar to contractor crews and the 250 degree stick is used for verification that the weld was done according to specification.</p> <p>During both welding and coating, contractor crews and inspection staff have been asked to verify that end caps are in place to facilitate heat maintenance.</p> |
| 60.0104 | <p>Jeeping Equipment - On Monday January 4th on spread 4 observations where noted that a jeeping hand was using a rigid 80 grit grinding wheel to remove coating on the pipe</p> |

for the grounding magnet. His use of this removed steel from the pipe wall and the area was buffed and UT tested for remaining wall thickness.

The UT test showed that the metal in this location was sufficient. Although this method of grounding is appropriate, the contractor and inspection staff have been directed to make sure that the angle the grinder is positioned such that it just removes enough coating to allow for grounding of the jeeping equipment.

- 61.0104 Coating (dimples, blisters and cracking) - This issue continues to be a problem area. Observations on spread 4 and 6 found disbonded blister dimples on the pipe in an area that had been prepped for final jeeping and lowering in. The majority of these blister dimples were noted as having fine cracks in the coating. A couple were destructively tested in the field and found disbonded from the carrier pipe. Another blister dimple crack was tested to see if it would jeep. The current procedure calls for 1400 to 1700 volts for testing. The contractor is using up to 2300 volts while pre-jeeping. The cracks would not jeep at these settings. Our testing showed that one pin sized spot on the 8 inch coating crack would jeep at 2500 volts when the spring was forced into the blister dimple, but only in one spot. When the voltage was increased to 3000 volts approximately 4 inches of the crack would jeep. With current procedures jeeping is ineffective for identifying these defects. A more stringent visual inspection program needs to be implemented, jeeping alone will not identify the blister dimples or coating cracks in the transition area. It was agreed that all remaining pipe that is above ground would get a more stringent visual inspection. During this inspection the amount of pipe and the number and type of defects found would be recorded and a copy of those findings provided to PHMSA. All findings would be repaired according to the procedures. It was agreed that all inspectors will be trained to identify these defect types and that they will be repaired.

Formal discussions with inspection staff on spreads 4/6 regarding the importance of visual identification along with added training to identify/repair these anomalies were completed. In approximately 4 miles of pipe that was reviewed, 6 or 7 anomalies were found by PHMSA/spread management. These anomalies were repaired in accordance with specifications. Inspection staff have also conducted a thorough visual review of all coated pipe west of I-35 and west of Highway 210 and made required repairs. Because these anomalies may not be found in the jeeping process, spread management has implemented a concerted visual review effort to identify and repair them prior to or during the pre-jeep process. This effort includes having inspection staff walk the line and visually inspect all girth welds with a focus on finding any indication of these anomalies. In addition, jeeping crews have been trained to identify, mark and repair these anomalies in accordance with specifications as they clean the pipe prior to pre-jeep. Inspection staff and jeeping crews will continue to monitor and look for any indication of these anomalies during both the pre-jeep and final jeeping process.

In addition to the instruction provided at morning contractor/inspection meetings on all

spreads regarding the need for careful visual inspection of coating and review of coating repair procedures, an additional formal training and process for assessing hairline anomalies as well as fisheyes/blisters was conducted on 1/18-20 on all spreads.

- 62.0104 Other coating issues - On spread 6 a newly identified issue was noted. The coating crew was repairing defective areas by cutting the defect with a sharp knife, while the FBE coating was still hot and pliable. The coating was then peeled from the pipe. In several instances a bottle containing FBE powder was manually applied over the removed coating area. Neither the preparation of the repair nor the temperature was appropriate for this activity. The inspector was interviewed and he stated that a stop to this practice occurred the same day that he noticed it. Another section 981 was removed with this technique and repaired with 2 part epoxy. The area was not prepped properly and the 2 part did not cover the entire exposed metal pipe surface. A visual inspection of this repair was not performed. According to the coating inspector the bare metal most likely would not have jeeped because of the coating irregularities and thickness. On Spread 4, 2 joints were found on Brandon Road with visual defects present after pre-jeeping. One had the entire area of the girth weld covered with circumferential cracks in the new FBE. The other had a large defect with bare steel exposed about the size of a quarter. The procedures Section C310 6.6 calls for feathering the FBE coating back 1 to 2 inches and all sharp edges for the factory coating is to be removed in addition to any loose or disbanded coating. There is some improvement; however additional training still needs to be done with the sandblasters in this area. Sandblasting to sound coating is critical for quality coating applications. According to C210 holidays > 25 square inches requires sandblasting. This did not occur on the above mentioned 981 girth weld. If I read this section correctly it also requires a 1.5 inch radially feathered area around the holiday and a 1 inch over lap of the coating. This will create a visible .5 inch radial area around the new coating where the gloss of the base coating has been removed.

The coating issues referred to in this audit point have been repaired in accordance with specifications. The majority of these coating issues related to a practice that was stopped the same day it started. Spread management has discussed with contractor and inspection staff the specifications relating to repair of coating anomalies, as well as the proper sandblasting requirements to be used for coating repair. The meetings with contractor and inspection staff also included discussion regarding the need for careful visual inspection. A project directive was issued to review coating repair and sandblasting technique for both FBE application and coating repairs.

- 63.0104 Welding Ground - While observing the a tie in crew east of hwy 73 on spread 4 it was noted that the welding ground was not in the groove of the joint during welding. While the welding was occurring an arc was noted at the base of the ground and pipe surface. Closer review found an arc burn in the pipe wall about ¼ from the groove. The welding inspector was not concerned since he believed the arc burn would be covered by the weld cap. The arc burn

was buffed out and no close observation was made by the welding inspector to assure that it was covered by the cap.

Although regulatory and spread management personnel left this site prior to completion of the weld, spread management contacted this inspector to discuss this situation. The weld inspector did verify that the cap covered the area where the arc burn occurred. Additionally, the integrity of the weld was verified in the NDE review.

- 64.0104 Securing Ground Straps - While observing the tie-in crews on spread 4 it was noted that the welding grounds were not consistently being secured to the pipe.

Tie in crews use a variety of means to ensure that the ground is secured to the pipe. In most instances, a bungee cord or strap is used while in others, the welder's helper holds the ground in the proper place or may use the weight of the leads draped over both sides of the pipe to secure the grounding device in the joint bevel. A combination of these approaches may be used in a tie-in as a helper holds the ground in the joint bevel while the first rods are burned and then moves the ground to the top of the pipe for remainder of the pass. Inspection staff and crews have been directed that it is essential that the grounding device be secured and placed inside the joint bevel.

- 65.0113 Surface preparation is key to providing a sound application to field applied coatings. The Unified Construction Specification 6.6 requires the mill applied coating to be sand blasted to a point where all disbonded coating has been removed. In addition it requires the coating to be feathered back 1 to 2 inches. When the coating is feathered back properly it is possible for the blaster to notice the disbonded areas. When the coatings edge is thin enough the edges of the coating will move freely or "flap" when disbonded. Additional blasting to sound coating is required. When FBE is required to be manually applied at the coating transition areas, it is a sign of a poorly blasted transition area. The first location we observed had significantly more manually applied FBE than the second location. The sandblasters should be reminded of these expectations.

Project directive #10 included the requirement to review coating sandblasting specifications with coating crew and inspection personnel. Because weld heat maintenance during cold weather has greater potential to damage parent coating, coating personnel will be alerted to these impacts and the potential need to expand the area of sandblast during the winter.

66.0113 According to the Unified Construction Specification the coating inspectors are assigned several tasks. Some tasks that were noticed to need attention include collection of spent abrasive materials, the marking of holidays when identified and a thorough visual inspection for coating problems. Spent abrasive materials were noticed under all sandblasted girth welds at both locations. Several holiday repairs were identified. None of the locations we observed had the required markings. The coating inspectors are to visually inspect coating applications to assure they are free of problems. As with welding, the visual inspection must pass before other inspection equipment is used. If the coating fails visual inspection the visual repairs should be completed prior to jeepping the joint. One blister dimple was noted on this inspection. The defect was disbonded from the pipe yet had a sound enough surface and passed the jeepping inspection. It was not identified by the coating inspectors or jeepping crews for repair. Inspectors need to be reminded to identify visual defects and have them repaired prior to jeepping. The visual and jeepping tools are designed to complement each other and both stand alone.

Throughout this project, in accordance with environmental requirements, coating crews on all spreads have used tarps under the joint and other means to collect sandblast residue and abrasive materials. Two areas that required repair on a section of pipe were not marked in accordance with the Specification for Pipeline Construction, Coating, C-310, 8.3.3. The need for holidays to be plainly marked immediately after detection was discussed the next morning at Spread 3 and 5 inspector meetings. In addition, the need for marking pipe holidays according to this specification has been communicated in the recent Hairline Anomaly (HA) training of contractor and coating inspection staff conducted on all spreads. The recent HA training highlighted the need for visual inspection to find HA as well as blisters/fisheyes.

67.0113 FBE coating is an extremely tough and durable coating when properly applied. This coating when under-cured will form cracks ranging in size from hairline cracks at the surface to deeper cracks which reach to the steel substrate. Under-curing occurs when the coating cools too quickly after application. It was noted at the second location that several joints had hair line cracks on the south side of the pipe (working side) and mainly on the upstream side of the girth weld. No cracking was identified on the north side. The coating inspectors commented that there were strong south winds during the application in the area of the noted hairline cracks. The manufacture requires a specific temperature range to be maintained for proper curing. This is difficult to monitor under field conditions so when the visual consequences are observed these areas should be repaired. There was discussion with Enbridge's Pipeline Integrity group to determine if these are detrimental. They are looking into this. Depending to those findings, Enbridge will need to train inspectors on how to tell the difference from a detrimental cracks versus a cosmetic crack and to provide the procedures of acceptance to PHMSA.

Attached as Appendix A is a report on the HA found while on the ROW. This is the only instance where HA were found within the sandblasted area of a joint. Appendix B contains the procedures recommended by Enbridge Integrity Management to be followed for

assessing HA within the sandblasted area of a joint. Based on this information as well as discussions with PHMSA and MNOPS while on the ROW, Enbridge developed a training presentation that was provided to all spreads by Jeff Wiklund and Spread Management on January 18-20. Handout materials were also provided to inspection and contractor staff. The training and handout materials were communicated to PHMSA on January 19, 2010. Discussion and review of these HA procedures was also conducted in the field with three coating crews and inspection staff.

Reviewed/Approved by


(initials)

Regulatory Compliance Audit Report

Alberta Clipper/Southern Lights (Clearbrook, MN to Superior, WI)

Report Number: 11

Date of Report: February 12, 2010

Preparer: Jeff Wiklund

Audit Reference(s): The responses contained in this report reference Audit Issues/Comments found in the January 25-29 PHMSA audit. Audit points and comments were communicated to Jeff Wiklund in emails from Darren Lemmerman dated February 1st.

Please note that audit communications and observations by PHMSA or MNOPS, when made, are included in this report but are prefaced by (C/O).

Audit Issues (from Tracking Spreadsheet) / Resolution:

- | | |
|---------|---|
| 68.0125 | <p>Heat Management - While observing the pipe gang on spread 5 near Forest RD 2127, it was identified that the heat management requirements were not occurring consistently according to the construction procedures. The procedures require a minimum temperature 250 degrees F shall be maintained while performing welding. It was noted that welders and their helpers who were using the 300 degree tempilsticks were doing significantly better than those using 250 degree tempilsticks. It was stated by the welding inspector that the coating crew had concerns that the welding crews were over heating the coating and damaging it. This was not the first time we heard this comment. A tie in crew was observed east of Cass Lake performing a 30" tie-in. It appeared that they were performing adequate heat management. They were using 250 degree tempilsticks. The work was being performed in a deep trench and the inspector stated that he was not that limber any more to enter the trench for direct observation of the weld. It was also our understanding that all welders were to use the 300 degree tempilsticks for heat management. Contractor welding crews were asked to use 300 degree tempilsticks to help ensure proper heat management. This audit observation was brought to the attention of the Sr. Weld Inspector who immediately communicated to both inspection staff and contractor that 300 degree temp sticks were to be used. This was reiterated the next day with inspection staff and contractor staff at morning meetings. Although spread management has asked welding inspection and contractor staff to be mindful of the issue of burned coating and to monitor this in an effort to minimize it, they have emphasized the fact that no welding should take place unless the minimum inter-pass temperature of 250 degrees is maintained.</p> |
| 69.0125 | <p>Coating/Jeeping - jeeping crews were observed working on the 36" pipe. About a half mile of pipe was walked and it was noted that several visual defects were missed during the jeeping process. These included two locations consisting of blisters, about 5 locations where the flocking ring damaged the coating by being set down on the transition area while still hot</p> |

and improperly repaired, an area that was feathered for repair with no coating applied and a repair that did not cover the entire coating defect. The jeeping crew should be commended for finding a defect that existed in the coating and pipe metal surface near weld number 1471. The pipe had a surface anomaly that was inspected for pipe integrity, which could have been just covered up. Jeff W updated me on this location and stated that the defect was fairly shallow. Additional questions on this defect are as follows; How was the depth of the defect measured? Was this defect buffed out? Was the remaining wall thickness measured?

Required repairs were made to the areas identified in this audit. A cam gauge was used to measure the surface anomaly which, when buffed out by the weld inspector, was about 5 mils deep with no impairment to the .406 wall pipe. Due to the minimal depth, x-ray was not required to measure remaining wall thickness.

70.0125 Delayed Cracking Documentation - Brian Pierzina asked for information on cracks found with the delayed x-ray inspections. Jeff W provided a verbal summary of this. We would also like copies of the weld cutout logs for the entire Alberta Clipper project for all spreads.

Electronic copies of the Weld Cutout Logs for the entire project will be provided to PHMSA.

71.0125 Brian Pierzina asked for a section of pipe containing factory Dupont coating. This was provided last week during the inspection. PHMSA will update you on the findings of any testing performed on the pipe segment.

C/O

Reviewed/Approved by 

(initials)

CENTRAL REGION OFFICE
Daily Inspection Report

Project: Enbridge Southern Lights (20")	Date: 09_04_09	
Location: Morris, IL Manhattan to Streator 20" line	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Carter Saline	Construction Manager	Enbridge (contract)
Dave Stafford	Compliance	Enbridge
RJHammer	Sr. Welding Inspector	contract
Ernie Hanus	PHMSA records coordinator	Enbridge (contract)
Matt Ruskowsky	Chief inspector	Contract
Josh Schults	Engineer	Enbridge (contract)
Randy Rice (phone conferenced in)	Manager Pipeline Design & Construction	Enbridge
Activities Observed/Performed:	Results/Comments:	
Held exit interview. See separate document		
Summary:		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Lights (20")	Date: 09_03_09	
Location: Morris, IL Manhattan to Streator 20" line construction field office and locations on ROW	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Carter Saline	Construction Manager	Enbridge (contract)
Dave Stafford	Compliance	Enbridge
Richard Robbins	Bending inspector	contractor
Richard Blanchard	Repair weld inspector	contractor
Ken Durham	Welding tie in inspector	contractor
Dale Chase	NDE technician	Shae
Josh Matthews	Coating inspector	Contractor
R.J. Hammer	Sr. Welding inspector	Contractor
Dustin Monier	NDE technician	Shaw
Bruce Freeman	NDE technician	Shaw
Jimmie Schatt	NDE technician	Shaw
Richard Sandell	Welding tie in inspector	Contractor
Wayne Daniel	HDD inspector	contractor
Activities Observed/Performed:	Results/Comments:	
1. E of 2 nd 15 th Road crossing tie in - observed preheat with inspector Durham. Pipe was cold after clamps were removed. Inspector does not take V at pipe, only at machine. Hot pass A 127-140, V 25-25 at pipe, V 28-32 at machine. This demonstrates the voltage is higher at the machine due to voltage drop through the leads	1. Preheat needs to be checked more frequently to ensure it is within spec. Best practice is to measure V at pipe to reduce effect of voltage drop through the leads	
2. E of 2 nd 15 th road - Chase NDE technician. Looked at film, could easily see smallest wire, film density of 2.5 ok	2. No issues	
3. W of 2 nd 15 th Road tie in coating crew. Discussed coating specs with inspector Matthews. He ensure pipe temperature is at least 5 deg F above dew point temperature. Blasting looked good. Put a final coating of two part on weld bead. Jeep ok	3. No issues	
4. W of Johnny Run Road observed repair being made with low hydrogen rods at 90 degrees F. Temp is below min of 250 degrees F. Hot box was unplugged. Preheat was ok. Ground out repair and redid with fresh rods. Discussed this issue with R.J. Hammer and inspector Blanchard.	4. Low hydrogen rods must be maintained at 248 to 300 degrees F per Enbridge's specs or be discarded after one hour or redried per mfr specs.	
5. W of Johnny Run Road - Monier NDE technician. Looked at film, could see 6 th wire easily.	5. No issues	
6. E of Johnny Run Road - Freeman NDE technician Observed operation of NDE xray crawler	6. No issues	
7. N of State - Schatt NDE technician. Looked at repair film - gas pocket in the root. Could clearly see the smallest wire	7. No issues	
8. N of State - weld repair inspector Sandell - low hydrogen rods were cold and were being reheated. Welder did not know roads had to be maintained at temperature once the container was open. WP-144 root V 26-29, A 84 - 95, hot pass V 25 - 28, A 115 - 140, filler V 20 - 24, A 80 - 85 ok.	8. Again reemphasize keeping low hydrogen roads hot once opened.	
9. S of State HDD inspector Daniel were prejeeping, pipe clean	9. No issues	
10. West of Hayden bending inspector Robbins. Observed two bends being made. Correct neutral axis bend and seam separation	10. No issues	

Activities Observed/Performed:

Results/Comments:

11. Mazon River HDD shut down for the day

11. No issues

Summary:

Will discuss issues 1, 4 and 8 with Enbridge and ask for a response on how these issues will be addressed.

Inspector(s): Carl Griffis

CENTRAL REGION OFFICE
Daily Inspection Report

Project: Enbridge Southern Lights (20")	Date: 09_02_09	
Location: Morris, IL Manhattan to Streator 20" line construction field office and locations on ROW	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Carter Saline	Construction Manager	Enbridge (contract)
Dave Stafford	Compliance	Enbridge
Gene Baerge	Stringing inspector	contractor
Richard Robbins	Bending inspector	contractor
Mike Bittle	Coating inspector	contractor
Bruce Dainwood	Pipe gang welding inspector	contractor
David Grogan	Pipe gang welding inspector	contractor
Rocky Schenold	Firing line inspector	contractor
Richard Blanchard	Repair weld inspector	contractor
Jack Sager	Coating inspector	contractor
David Gardner	Lowering in inspector	contractor
James Gallagher	Back fill inspector	contractor
Activities Observed/Performed:	Results/Comments:	
1. E of Vbaergeerona - W of Ward discussed duties of stringing inspector	1. No issues	
2. E of Divison - discussed bending criteria with inspector Robbins, 1 reject so far. Get MTR for 0.250" wt SKW JT 3330, HT 477204 and 0.375" SKW 0290 JT 389 HT 477286	2. No issues	
3. W of Division pulling in HDD discussed coating inspection with Bittle. Voltage set at 5 volts on 40 mil coating. Does verify voltage setting in the yard in the morning. Inspector didn't know maximum travel speed for jeeping - 1 foot/sec. Roughing coating surface with file for repair. Reminded inspector that area larger than repair area needed to be roughed up for good adhesion.	3. Inspector needs to know jeep travel speed.	
4. West of Gonnarn RD/East of Johnny Run pipe gang, Dainwood is inspector. Preheating pipe to 325 F. Crew has 250 and 350 temp stick to maintain preheat. Splatter guards are in use. Hot pass - 140 to 150 A ok , root 130 A, 27-28 V, TS 11 IPM ok. Also talked to Grogan.	4. While preheat is ok on pipe gang, temperature is not being checked at clamps every time as Enbridge procedures require.	
5. West of Johnny Run - firing line inspector Schenold. Preheat ok on one weld measured.	5. Inspector did not have meter to measure V, A or temp stick to measure preheat. One crew was not using splatter guards	
6. East of Kinsman repair inspector Blanchard Observed low hydrogen rods in hot box were being heated. Welder said rods at the end of the day were thrown out	6. Inspector did not know what acceptable range of low hydrogen rod storage was or how temperature was verified	
7. East of Kinsman coating crew Sager inspector observed blast profile 3-5 mil, heating to 463 F, check 4 quadrants periodically and across weld. No issues so far. Maintaing 425 to 488 application temp of Scotchkote 6233 Blast profile observed not quite white metal at bottom of one weld.	7. Reminded inspector that blast profile had to be consistently white metal.	
8. Jeeping crew west of Kinsman Observed tape, dirt on the pipe. Jeeping crew was shut down	8. All foreign material on the pipe must be removed before jeeping.	
9. West of 28 th lowering in. Inspector Gardner Observed patch stick repair on two part. Inspector was not aware of proper coating repair techniques.	9. Inspectors need to know proper coating repair techniques.	

Activities Observed/Performed:

Results/Comments:

10. West of 28th back fill inspector Gallagher observed backfill 10. No issues
- mostly clean fill, no rocks

Summary:

Issues 3, 4, 5, 6, 7, 8 to be discussed with Enbridge to resolve and have Enbridge provide response. Enbridge to provide information requested in item 2.

Inspector(s): Carl Griffis

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Lights (20")	Date: 09_01_09	
Location: Morris, IL construction office and Precision spread office Manhattan to Streator 20" line	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Carter Saline	Construction Manager	Enbridge (contract)
Dave Stafford	Compliance	Enbridge
Randy Rice	Manager Pipeline Design & Construction	Enbridge
RJHammer	Sr. Welding Inspector	contract
Ernie Hanus	PHMSA records coordinator	Enbridge (contract)
David Jones	NDE auditor	Enbridge (contract)
Activities Observed/Performed:	Results/Comments:	
<p>Mainline welding started 8/24/09. Initial repair rate was 40 to 50%. Welder were changed around and repair rate is currently 4 to 5% with about 350 mainline welds made. Received revised WP-140 (butt weld) as of 8/27/09</p> <p>1 Reviewed welder qualifications at Morris construction office.</p> <p>2 Observed welder qualification at Precision yard</p> <p>3 Reviewed film and NDE personnel certifications with David Jones</p> <p>4 Got valve information for mainline valves Ser # 07440001 and 074600003</p> <p>5 Got information for hot bends Bendtec Nos. 73626 45 degree 20" x 0.5" wt IPSCO ht no 471753 and 73799 30 degree 20" x 0.5" wt IPSCO ht no 471751</p>	<p>1 Welder stencil A WP-140 documentation shows hot pass to be 6 IPM - spec is 7 IPM Welder stencil B WP-140 while both are range, both the work sheet and the WQR show different V, A and TS Welder stencil C - WP-140 work sheet hot pass TS of 6 IPM (spec is 7 IPM), WQR shows different TS in spec no worksheet for WP-144 Welder stencil D WP-140 worksheet hot pass TS is 6 IPM (spec is 7 IPM) while WQR shows different values all in spec WP-144 no worksheet WQR ok Welder stencil K WP-146 no worksheet WQR ok Welder stencil N WP-144 no worksheet, WQR ok Welder Stencil Y WP 144 worksheet incomplete WQR ok</p> <p>2 No issues. Welder was disqualified due to visual inspection</p> <p>3 No issues. Using .010 wire for 0.250" wall and 0.13 wire for 0.375 wall</p> <p>4 Enbridge to provide MTR and pressure test information</p> <p>5 Enbridge to provide MTR and post heat treatment and NDE testing</p>	
Summary:		
Issue 1 Enbridge to provide response as to disposition of Welders A, C and D whether they will requalify for WP-140. They will review all paperwork to identify any other inconsistencies		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Construction Inspection Report**

Project: Alberta Clipper/Southern Lights Audit

Date: 09/01-04/2009

Location: MN

**Station/Survey or
Pipeline Marker:** Spread 2

Personnel Contacted:

Title/Position:

Company/Affiliation:

Boyd Haugrose	Project Compliance Inspector	Enbridge
Dave Stafford	Sr. Compliance Coordinator	Enbridge
Mark DeVarens	Construction Manager – Spread 2	Enbridge
Lavelle Warren	Sr. Welding Inspector – Spread 2	EnGlobal
Corrine Sullivan	Compliance Specialist	Enbridge
Jeff Wiklund	Sr. Compliance Specialist	Enbridge
Billy William	Welding Inspector	Mustang
Tom Burns	Welding Inspector	Mustang
Richard Fleming	Sr. Welding Inspector	Mustang
Tony Shiftless	Construction Manager	EnGlobal
Jarred West	Welding Inspector	Mustang

Activities Observed/Performed:

9-1-2009

Spread 2 Office Thief River.

Perform an OQ record tracking review. It is hard to determine with any consistency who needs OQ training. Each contractor provides a list of names to Enbridge under the umbrella of “who will move dirt within 10 of a live line” needs OQ coverage. Enbridge has been asked to come up with a better method of determining who by title or job duty needs to be OQ’d.

County RD 2 bore.

Observed welding and talked to Billy Williams, welding inspector. The inspector was not familiar with the welding construction specs nor was he familiar with the inspection equipment. I observed several pin holes in the weld cap which were repaired after I identified them and the showed them to Lavelle. They met 1104 specs. The next weld was completed and it was noticed that the external clamp was removed before 50% completion and it was also noted that I identified an arc burn which was missed by the inspector. The weld was cut out. This spread has determined that all arc burns will be cut out even though provisions allow them to be repaired. The grounds were not secured and Lavelle is requiring it even though it is not in the construction specs.

9-2-2009

Environmental was working over an active line, Jason Revling, Kevin Erickson, Rodney Bolenbaugh, Mike Golombeski, Robert Brown, Gary Jacka of the environmental gang were reviewed for OQ and all were on the OQ records as being qualified. Went to 250th street and observed welding which was inspected by Jarred West. The previous day a long seam was welded into the girth weld. This should have been ground back at least .5 inches. Weld caps also exceeded the 4.5 mm maximum at the button on top, which was ground down to be within spec.

9-3-2009

Went to the Clearwater river bore and observed the first mainline automatic welding. A 2 welding house gang was working and will be expanded to 4 houses as more get trained in. The welding was going well with only 2 repairs on 25 joints. An EAC has not been established yet and may allow the defects to remain. The cap at 6:00 was being cut short leaving a small portion about 1 to 2 inches of weld with less than a full cap but thicker than the carrier pipe reinforcement. This was shared with the gang and they will improve this area.

Summary:

- 1) During the first day (Tuesday September 1) it was noticed that there was a lack of familiarity with the Unified Construction Specifications with the inspectors. A meeting was held on Wednesday morning to address this.
- 2) The automatic welding just kicked off on Wednesday September 2 and they were doing well. It was noticed that the weld cap at 6:00 was being cut short. There was a 1 to 3 in area where the weld cap was not full height, however it does pass the API 1104 visual. The Michaels welding foreman said this will be improved upon.
- 3) The WP 140 welding procedure requires stripper passes and a cap on .600 wall pipe or thicker. I had asked for clarity for consistency sake on when or if stripper caps can be used on pipe wall less than .600. The procedure appears to allow a 3 cap pass on thinner wall, please confirm.
- 4) Welding inspectors are required to take voltage readings during the welding process. Since it is well known that voltage drops occur in the welding leads which are dependent on length and gauge, a consistent reading technique should be used. It was suggested by Alberta Clipper personal that they would ask Michaels if they could take readings 20 feet back from the welder's stinger and mark location with tape. If this was agreed to by Michaels all welding inspectors would take the readings at the same location.
- 5) The stick weld cap heights are limited to 4.5 mm's (after adding 1 mm for thicker wall pipe) according to the Unified Construction Specifications, some cap areas exceeded this maximum and were subsequently sanded down to be within spec.
- 6) One arc burn was identified and the weld was cutout. The Unified Construction Specifications allows for repairs however spread 2 is requiring that all arc burns on pipe be cutout. This same weld that incurred an arc burn also appeared to not have the minimum 50% root pass completed before the external clamp was removed. These issues were discussed in the morning of Wednesday September 2 with all welding inspectors.
- 7) The Unified Construction Specifications do not address the securing of welding grounds to the pipe during welding processes. It was discussed that they will begin doing this as a standard practice.
- 8) Operator Qualifications, 6 individuals from the Environmental gang were reviewed for OQ and all six were qualified per records. This method of auditing was successful, however it is still unclear what methodology is used to determine who needs qualifications. Do all operators need OQ, do all excavators need OQ, do Foreman need OQ, are there specific union titles or contractor titles that can be used as filters to determine this? Please provide a repeatable filter process supported by documentation that will allow an Office audit, which will provide a level of certainty that the required people are OQ'd.

Inspector(s): Darren Lemmerman

Exit Interview
Enbridge Southern Lights Construction Inspection
September 1-4, 2009
Manhattan to Streator 20" line
Morris, IL

Records Review Issues

1. On September 1, welder qualification records were reviewed:

Welder stencil A WP-140 documentation (work sheet and welder qualification record (WQR)) showed the hot pass travel speed (TS) of 6 inches per minute (IPM) - specification is a minimum of 7 IPM.

Welder stencil B WP-140 documentation showed that while both the work sheet and the WQR variables were in range, both the work sheet and the WQR show different volts, amps and travel speed.

Welder stencil C WP-140 work sheet documentation showed the hot pass TS of 6 IPM (specification is a minimum of 7 IPM) while the WQR shows a different TS in specification. There was no worksheet for WP-144.

Welder stencil D WP-140 worksheet documentation showed a hot pass TS of 6 IPM (specification is a minimum TS of 7 IPM) while WQR showed different values all in specification. There was no worksheet for WP-144.

Welder stencil K WP-146 no worksheet documentation

Welder stencil N WP-144 no worksheet documentation

Welder Stencil Y WP-144 no worksheet documentation.

It is important to have complete and accurate records for welder qualifications to ensure they are properly qualified. ***It is requested that Enbridge provide PHMSA the follow up action to be taken to correct record deficiencies and in particular what actions will be taken to document welder stencils A, C and D are properly qualified.***

2. Enbridge to provide the following information:

MTR and pressure test information for mainline valves Ser # 07440001 and 074600003

MTR and NDE post heat treatment information for hot bends Bendtec Nos. 73626 45 degree 20" x 0.5" wt IPSCO HT No. 471753 and 73799 30 degree 20" x 0.5" wt IPSCO HT No. 471751

3. Enbridge to provide PHMSA a weld cut summary on a weekly basis that shows at a minimum the welds that were cut out and the reason for the cut out.

Field observation issues

Welding issues

4. On September 2 west of Gonnam Road/East of Johnny Run it was observed on the pipe gang that preheat temperature was not being consistently checked immediately after the pipe was fixed in the internal clamp prior to welding. ***While periodic preheat checking by the pipe gang inspector showed that the pipe temperature was above 250 degrees F, it was understood that the pipe gang should be checking preheat at this location consistently.***
5. On September 2 west of Johnny Run Road, it was observed that the firing line inspector did not have a voltmeter to measure welding parameter or a tempil stick to measure preheat. ***Without the proper tools, the inspector cannot effectively verify that the welding is being within procedure or the proper pipe preheat temperature is being maintained.*** It was also observed in this location that one welding crew was not using splatter guards. ***The guards are important to minimize coating damage in the girth weld area.***
6. On September 2 west of Johnny Run Road, it was observed that the repair inspector did not know the proper storage temperature for low hydrogen repair welding rods. Enbridge procedures require that rods be kept in a heated storage box at a temperature between 248 and 300 degrees F once they are removed from a sealed can. In addition, rods kept outside the heated box longer than one hour must be discarded or processed per manufacturer procedures for reuse. While the rods appeared to be hot, there was no way on the hot box to verify the temperature. On September 3 at this location a repair was observed being made with low hydrogen rods that were not hot. The repair was redone with new rods obtained from the contractor. Also on September 3 north of State Street a repair was in the process of being made when it was noted that the low hydrogen rods were not hot. It is apparent that the contractor, welders and welding inspectors are not aware of the proper storage requirements for the low hydrogen rods. ***It is requested that Enbridge provide PHMSA the follow up action to be taken to ensure that the low hydrogen rods will be stored properly and how welders and inspectors in the field can verify the temperature of the hot box. In addition, Enbridge is to provide a plan addressing the integrity issue of previous repairs made with low hydrogen rods that potentially were improperly stored.***
7. On September 3 east of the second 15th Road crossing, it was observed that on a tie in weld the pipe was below 250 degrees F immediately before the welders were beginning to finish the root pass with the external clamp removed. The inspector was prompted to check the pipe temperature, with the previously mentioned result. ***It is particularly important to maintain proper preheat temperature for critical welds, such as tie ins.***
8. On September 3 at the same location as item 7, it was requested the inspector measure voltage and amperage during welding. The inspector measured voltage and amperage at the welding machine, rather than at the pipe. While Enbridge does not specifically require measuring voltage at the pipe, it is good practice to follow since there is a voltage drop between the machine and the welding location. Voltage was measured both at the pipe and the machine and voltage at the pipe was 3 to 4 volts lower than at

the machine. ***Enbridge should reinforce with inspectors the good practice of measuring voltage at the pipe to ensure that welding is within procedures.***

Coating and jeeping issues

9. On September 2 west of 28th Road on lowering in, it was observed that a coating repair was made with a patch stick on top of a two part epoxy repair. This repair is improper and not allowed by Enbridge. (See attached photo) In addition, the inspector was not aware that any patch stick repair must be smaller than ¼ inch square area, not the size of the actual coating anomaly.
10. On September 2 west of Division at an HDD drill section, a discussion with the jeeping/coating inspector indicated he did not know the maximum travel speed allowed for jeeping (2.5 feet/sec). ***Jeep speed must be kept below this maximum value to adequately detect coating holidays.***
11. On September 2 west of Kinsman Road, it was observed that jeeping crew was not removing tape, dirt or other foreign object prior to jeeping. ***It is important the pipe be clean in order to properly detect coating holidays.***
It is requested that Enbridge provide PHMSA follow up action regarding the proper training of jeeping/coating inspectors so that proper jeeping speeds and coating repair techniques are implemented.

Thank you for your prompt attention to the issues listed.

Enbridge Alberta Clipper - Spread 1 Inspection - Sept 1-3, 2009

Construction commenced on Spread 1 from MP 773.7 to MP 843.3 this week with limited activities to inspect. The following observations were made:

1. Welder qualifications were witnessed for SMAW and automatic welding. Welder qualification documentation was reviewed mainly for SMAW. The documentation appeared to be adequate to ensure that welders were welding within the constraints of the welding procedures such as volts, amps, and travel speed.

Comment: A question was posed as to how far above or below the ranges on volts, amps, and travel speed a welder being qualified would have to be before they were considered disqualified.

2. Radiographic film was reviewed with Chris Leslie, Level II NDE technician and several other Level II technicians for welder qualifications, HDD section girth welds and road bores. In addition radiographic interpreter qualifications and procedures were reviewed. No repair areas were identified during the week.

Comment: Questions were asked regarding time delayed X-rays such as:

Who will decide on location for delays, whether an initial and time delay x-ray must be shot for locations for locations selected for time delay or just the time delay shot?

3. Automatic welder qualifications were witnessed along with the ultrasonic testing of the welds. A comment was made to ensure that the ground clamp is secured to prevent arcing as arc burns are not allowed to be repaired per the construction specifications. Also a gauss meter was available to check the magnetism of the pipe.
4. Operator qualification paperwork was reviewed for the contractor for those covered tasks being performed per the NCCER data available. The documentation appeared to be well organized.

Comment: OQ paperwork for any Enbridge employees performing covered tasks on Spread 1 was not available but was requested as a follow-up item.

5. A joint of pipe for a HDD section was examined and had damage to the bevels due to lifting with hooks.

Comment: A question was asked whether lifting of the pipe was allowed using hooks per construction specifications?

**CENTRAL REGION OFFICE
Daily Construction Inspection Report**

Project:	Enbridge - Alberta Clipper/Southern Lights	Date:	09/01-03/2009
Location:	MN	Station/Survey or Pipeline Marker:	Spread 4 & 6
Personnel Contacted:	Title/Position:	Company/Affiliation:	
Dave Hoffman	Supervisor, US Compliance	Enbridge	
Avery Schott	Contract Inspection	Enbridge	
Ernie Coleman	Sr Welding Insp.	Enbridge	
Sonny Dawson	Plant Manager	Polymer Coatings USA Inc	
Billy Cox	Welding	Enbridge	
Mike Duffy		Enbridge	
Jeff Fox	Assistant Superintendent	Precision	
Gary Thompson	Qualified Individual	Precision	
Dennis Raisanen	Boring	Enbridge	
Frank Bennet	NDT Auditor	Enbridge	
Roger Bell	Supervisor	Enbridge	
Donald Lacour	Rig I	JanX	
Dana Disney	Rig J	JanX	
Eddie Jones		JanX	
Stan Stevenson		Enbridge	
James Stephens	Welding	Enbridge	
Stan Wemeling	Tie-In	Enbridge	
Bill Williams	Tie-In	Enbridge	
Activities Observed/Performed:			
9-1-2009 None; ESS travel only			
9-2-2009 Looked at 3 river crossing dry cuts: tributary to Little Otter (no pipeline activity); Little Otter – welding & NDT; and tributary to Clear Creek – Tie In, burial depth, buoyancy bags, and excavation practices.			
9-3-2009 Went to 3 sites: 1 st stop no welding; 2 nd stop Hawkins gravel pit open cut spread 4-36” – welding, X-ray, excavation; 3 rd stop Pinecherry Rd Directional Bore 20” spread 4 – excavation practices. Coating thickness was discussed and the manufacturer (Sonny Dawson) verified that thicker coating was permissible.			
Issue Summary:			
<ol style="list-style-type: none"> 1) I observed a potential trench safety issue on 9-2-09 at 9171+99 MP 1082 at the tributary to Clear Creek open cut crossing. After checking the burial depth, it was discovered that the trench was not deep enough at the crossing. Buoyancy bags had already been placed on the pipe and needed to be removed to deepen the trench. The backhoe could not hook the buoyancy bags without human assistance in the trench. ESS observed a team carrying a ladder to the un-sloped trench area. When Avery Schott was questioned as to whether the team would be going into an un-sloped trench, he stopped the crew from proceeding into the trench until it could be properly sloped. Gary Thomason was Precision's Qualified Individual and should have known that the trench was unsafe. A potential OSHA violation was prevented through MNOPS intervention. A safety reminder was given to all employees the next morning. 2) On 9-3-09, at 12205+58 PineCherry Rd directional bore, a footprint was observed 4 feet beyond the sloped trench wall (photos available). One footprint was photographed and pointed out to Enbridge. Enbridge was reminded that trench safety violations might be reported to OSHA. 3) The coating thickness issue (thicker than 40 mils) was resolved with the manufacturer but should be documented by Enbridge in the construction specifications. 			
Inspector(s):	Elizabeth Skalneek & Jon Wolfgram (MNOPS)	AFO(s)	4 (3 ESS and 1 JCW)

Enbridge Pipelines (Lakehead) L.L.C.
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James Crawford
Director
Engineering & Construction (US)
Major Projects
Tel 715 398 4516
Jim.Crawford@enbridge.com

September 8, 2009

To: Marc DeVarrenes Jack Olin Paul Eberth
 Tony Madden Tommy Shiflett Avery Schott

Re: PHMSA Audit Issues 1-6 from August 29, 2009 Issue Summary Report

Attached is a summary of PHMSA findings and their disposition based on the PHMSA audit that occurred from August 25-27 on spreads 2 through 6. Based on these findings, I have included two procedure alerts for distribution:

Attachment A - WELDER QUALIFICATION DOCUMENTATION
Attachment B - COATING REPAIR PROCEDURE ALERT

Please communicate these procedure alerts immediately to all appropriate personnel on your spreads and positively confirm with me when these actions are completed.

One additional note that is not related to the audit but should also be communicated by you to appropriate personnel is the addition of a "Modifier" in the weld number. The new modifier, which is the letter "X", is to be used as part of the weld number to denote a "next day" time delayed weld. Please ensure all required personnel are aware of it and have incorporated it into their procedures.

I appreciate your prompt attention to these matters.



Jim Crawford

cc: Dan Plume, Tom Hodge, Shaun Kavajecz, Dave Hoffman,
 Jerrid Anderson, Randy Rice, Carter Saline

WELDER QUALIFICATION DOCUMENTATION PROCEDURE ALERT

In accordance with an Issue Summary as a result of the inspection by Brian Pierzina, PHMSA Inspector, conducted during August 25 – 27, 2009, the following guidelines shall be followed as it pertains to documentation of Welders Qualification Records.

Each record must include the following documents as a Minimum:

1. Welder Qualification Record (WPS 140 Mainline Weld)
2. Field Notes (for the specific procedure, WPS 140) handwritten
3. Weld Data Sheet (WPS 140)
4. Radiographers Daily Work Log indicating welders name and the procedures he has been qualified to.

For Weld Procedure 144 Thru Wall Repair, the procedure requires two welds, one in the top quadrant and one in the bottom quadrant. The following documents shall be included for this qualification record:

1. Welder Qualification Record WPS 144 – Top quadrant
2. Welder Qualification Record WPS 144 – Bottom Quadrant
3. Field Notes hand written Top Quadrant
4. Field Notes hand written Bottom Quadrant
5. Weld Data Sheet (WPS 144)
6. Radiographers Daily Work Log as above

Weld Procedure 146 is the Branch Weld. The following documents are required:

1. Welder Qualification Record WPS 146
2. Field Notes handwritten
3. Weld Data Sheet (WPS 146)
4. Radiographers Daily Work Log as above

Summary:

- Each Welders Qualification Record shall consist of a minimum of 14 pages of documentation if the welder is to be qualified to all 3 of the above procedures. Should the Construction Manager not require all welders to be qualified to the 3 above procedures, the documentation must be complete for the procedure that the welder will be qualified to as per the above instructions.
- Should other procedures be utilized, the welder qualification record shall be in accordance with the above instructions.
- The Welders Qualification records shall be readily available for PHMSA/MNOPS examination in the administrative offices.
- The complete Welding Procedure Specification (WPS) shall be readily available for PHMSA/MNOPS examination in the administrative offices. The welding inspector shall have available on site the complete Welding Inspection Specification (WIS) for PHMSA/MNOPS examination as well as the Weld Data Sheet (WDS) for each specification. The welding inspector shall provide each welder with the WDS.
- The complete Welding Procedure Qualification Record (PQR) for each WPS should be available for examination by PHMSA/MNOPS inspectors in the Administrative Offices.
- A list of qualified welders shall be maintained and be available to PHMSA/MNOPS inspectors at the Administrative Offices.
- A list of unqualified welders shall be maintained with the date of disqualification. Those welders on the disqualified list may be re-tested after 30 days of disqualification.
- During welder qualification, the welding inspector must ensure:
 - ✓ Volts/amps & rate of travel are within the parameters of the WPS and duly recorded. In the event a welder fails to meet the minimum

requirements of the specifications, Appendix A, Section 7.1.5 of the Specification for Pipeline Construction – Unified Construction Specifications shall apply. *[Sec. 7.1.5 Welders failing to meet the minimum requirements of this specification shall not be permitted to retest for a period of 30 days unless approved by the Company.]*

- ✓ The Radiographic Test Procedure Number on the Welder Qualification Record page is correct.
- ✓ All pages are completely filled out and all required signatures are evident.
- The Senior Weld Inspector shall verify the documentation for welder qualification is complete and attest so by his signature.

COATING REPAIR PROCEDURE ALERT

(FOR 2 PART ROLLABLE/BRUSHABLE EPOXY COATINGS)

Enbridge Specification C-210, Coating of Buried Steel with 2-Part Epoxy Coatings, specifies coating repair methods and approved 2-part epoxy coatings that can be utilized,

Such coatings can be used for girth welds on mainline piping, buried valves and appurtenances and is mandatory for girth welds that are part of any drills. The specification is encompassed in the Unified Construction Specification as Appendix E.

Section 9 (see below for methodology) of the specification outlines the proper methods of coating repairs. Appendix I specifies which coatings can be used to make repairs.

Appendix I, as shown below, allows repairs to be made on 2-Part Epoxy (in this case Specialty Polymer Coatings SP-2888) with any of the 6 listed 2-part epoxy coatings following the coating repair procedures as well as manufacturers procedures. The appendix also allows patch stick repairs for pinholes only. Any repair larger than a pinhole must be repaired in accordance with the coating repair procedures using any of the 6 listed 2-part epoxy systems.

9.0 Coating Repairs

9.1 APPENDIX I describes the selection of repair materials.

9.2 Remove the defect, or defective coating, to sound coating or to bare steel by abrading the repair area with coarse sandpaper, power sander or a file.

9.3 If, after defect removal, more than 160 cm² (25 in.²) of bare steel is exposed, Prepare entire surface as per Section 6.0 of this specification.

9.4 Abrade the surrounding coating for a distance of 4 cm. (1.5 in.) radially to ensure proper intercoat adhesion. Feather edges of the sound coating.

9.5 Remove all loose particles and dust with dry compressed air or a very clean, dry cloth prior to patching.

9.6 Recoat the prepared surfaces in accordance with Section 7.0 to the specified dry film thickness, lapping at least 2.5 cm (1 in.) over the surrounding coating.

9.7 Holiday test the repair at the same voltage as used for the original coating.

APPENDIX I

Approved Rollable / Brushable Coatings (Section 1.3)

System 1 Canusa – CPS HBE-95

System 2 Covalence – Powercrete F-1

System 3 Denso Protal 7000 Epoxy

System 4 Denso Protal 7200 Epoxy

System 5 Specialty Polymer Coatings SP-3888 Epoxy

System 6 Specialty Polymer Coatings SP-2888 R.G. Urethane Epoxy
Repair Materials (Section 9.0)

Systems 1-6 can be used to repair the following materials:

- Fusion Bond Epoxy (see Coating Specification C-010)
- Multi-Component Spray Applied Coatings (see Coating Specification C-110)

The following materials can be used to repair Systems 1-6:

- Systems 1-6 (all size repairs)
- 3M 226P Epoxy Patch Stick (pinhole repairs)
- Denso Protal 7125 (pinhole repairs)
- Jotun RP 46F640 Epoxy Patching Compound [repairs <160 cm² (25 in²)]

Shieh, Hans (PHMSA)

From: David Hoffman [David.Hoffman@enbridge.com]
Sent: Tuesday, September 08, 2009 4:44 PM
To: Pierzina, Brian (PHMSA)
Cc: Lemmerman, Darren (PHMSA); Gulstad, Rick (PHMSA); Huntoon, Ivan (PHMSA); Elizabeth.Skalnek@state.mn.us; Boyd Haugrose; Jeffrey Wiklund; Shaun Kavajecz; David Stafford
Subject: RE: PHMSA (Pierzina) Exit Interview Spreads 2-6, 8/25-27/2009
Attachments: PHMSA Rept #1.pdf; JC Letter Rept #1_090809.pdf; Appnd A_PHMSA Rept #1_.pdf; Appnd B_PHMSA Rept #1.pdf

Importance: High

Brian,

Please find enclosed Enbridge's response to the inspection issues noted in your report for Spreads 2-6, dated Aug 29, 2009. We feel the attached information should address the concerns noted and/or provide additional information for clarification.

Our response includes a Regulatory Audit communication, as well as a Directive (and associated information) issued by Jim Crawford, Project Director, to address the noted issues.

Please call if you have any questions or concerns.

Thanks Brian,

Dave

Dave Hoffman

Supervisor, US Compliance - | Enbridge Energy Company, Inc.
119 N 25th Street E | Superior, WI 54880
☎ Office: (715) 394-1540 | ☎ Cell: (715) 718-1179

From: brian.pierzina@dot.gov [mailto:brian.pierzina@dot.gov]
Sent: Saturday, August 29, 2009 8:39 AM
To: Boyd Haugrose; David Hoffman
Cc: Darren.Lemmerman@dot.gov; rick.gulstad@dot.gov; ivan.huntoon@dot.gov; Elizabeth.Skalnek@state.mn.us
Subject: Exit Interview Spreads 2-6, 8/25-27/2009

Following are the issues we identified during the audit this week. I don't believe these are necessarily compliance issues, just things we identified that may have been different than expectations. From talking to Boyd, this morning, it sounds like things are really starting to get moving, so there should be plenty of field work to observe from here on out. Thanks for your time this week!

Issue Summary

1. Welders qualified outside the parameters of the procedure specification – Two welders had repair weld qualifications that were out of the specifications, and one welder had a branch weld qualification that was outside the specification. These were going to be re-done, however it is

important that the inspectors ensure that qualification welds are completed within the parameters of the procedure specification. Please communicate the results of any remedial actions to PHMSA/MNOPS.

2. Identical values for amperage, voltage, and travel speed were indicated on the repair weld qualification records on Spread 2. The field notes were not available at the time of the audit to determine if these were actual measured values. This needs to be looked into, and the results communicated to PHMSA/MNOPS.
3. The repair weld qualification tests require a repair from both the top and bottom quadrants of the pipe. While this appeared to be done in all cases, on all spreads, there was inconsistency between the spreads on how this was being documented. Some spreads only had documentation of one test on the welder qualification forms. It is assumed that Enbridge's intention is to document the results for each quadrant. The information should be available from the field notes and the x-rays. Please communicate the resolution of this issue to PHMSA/MNOPS.
4. There were additional documentation inconsistencies between spreads related to welder qualifications. Documentation ranged from high and low ranges for amperage, voltage, and travel speed for each pass of each qualification test, including rod type and diameter for each pass, to single values of amperage, voltage and travel speed, with no indication of the rod type and diameter. Please indicate the expectations for welder qualification records associated with these welding parameters.
5. Coating repairs to two part epoxy were allowed to be made using patch sticks, and this is allowed by the Enbridge specifications. It has been stated however, that the preference is that these repairs be made using two part epoxy. Please indicate the circumstances under which repairs to two part epoxy coating are expected to be made using two part epoxy, and those which other methods such as patch sticks are expected.
6. Enbridge has stated efforts were being made to ensure welds were not exhibiting the effects of delayed hydrogen cracking through a program of 24 hour delayed non-destructive testing. This was not done for the road bore pipe at County Road 62. It was also stated at Spread 2 that the program was going to be implemented for 20% of the mainline welds. Please provide further specifics associated with Enbridge's plan related to NDT and delayed hydrogen cracking.

***** IMPORTANT NOTICE*****

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Regulatory Compliance Audit Report

Alberta Clipper/Southern Lights (Clearbrook, MN to Superior, WI)

Report Number: 1

Date of Report: September 8, 2009

Preparer: Jeff Wiklund

Audit Reference(s): The responses contained in this report reference Audit Issues 1-6 found in the Audit Issue Summary email received from Brian Pierzina on August 29, 2009.

Audit Issues / Resolution:

1.829	<p>Welders qualified outside the parameters of the procedure specification – Two welders had repair weld qualifications that were out of the specifications, and one welder had a branch weld qualification that was outside the specification. These were going to be re-done, however it is important that the inspectors ensure that qualification welds are completed within the parameters of the procedure specification. Please communicate the results of any remedial actions to PHMSA/MNOPS.</p> <p>A directive from Jim Crawford was issued to each spread reviewing the documentation required for the qualification of welders. This documentation has been provided to all personnel involved with the qualification of welders. Please see Jim Crawford's September 8, 2009 letter and Attachments A and B, thereto.</p>
2.829	<p>Identical values for amperage, voltage, and travel speed were indicated on the repair weld qualification records on Spread 2. The field notes were not available at the time of the audit to determine if these were actual measured values. This needs to be looked into, and the results communicated to PHMSA/MNOPS.</p> <p>There was a clerical error transcribing from the field notes to the Weld Procedure Sheets. This error has been reviewed and corrected. Please see Attachment - A, to Jim Crawford's September 8, 2009 letter, regarding the weld qualification procedure sent to all spread management.</p>
3.829	<p>The repair weld qualification tests require a repair from both the top and bottom quadrants of the pipe. While this appeared to be done in all cases, on all spreads, there was inconsistency between the spreads on how this was being documented. Some spreads only had documentation of one test on the welder qualification forms. It is assumed that Enbridge's intention is to document the results for each quadrant. The information should be available from the field notes and the x-rays. Please communicate the resolution of this issue to PHMSA/MNOPS.</p> <p>A directive from Jim Crawford was issued to each spread reviewing what documentation was required for the qualification of welders. This documentation has been communicated to all</p>

personnel involved with the qualification of welders. Please see Attachment - A to Jim Crawford's September 8, 2009 letter.

- 4.829 There were additional documentation inconsistencies between spreads related to welder qualifications. Documentation ranged from high and low ranges for amperage, voltage, and travel speed for each pass of each qualification test, including rod type and diameter for each pass, to single values of amperage, voltage and travel speed, with no indication of the rod type and diameter. **Please indicate the expectations for welder qualification records associated with these welding parameters.**

A directive from Jim Crawford was issued to each spread reviewing what documentation was required for the qualification of welders. This documentation has been communicated to all personnel involved with the qualification of welders. Please see Attachment - A to Jim Crawford's September 8, 2009 letter.

- 5.829 Coating repairs to two part epoxy were allowed to be made using patch sticks, and this is allowed by the Enbridge specifications. It has been stated however, that the preference is that these repairs be made using two part epoxy. **Please indicate the circumstances under which repairs to two part epoxy coating are expected to be made using two part epoxy, and those which other methods such as patch sticks are expected.**

A directive from Jim Crawford was issued to each spread indicating the circumstances under which coating repairs are expected to be made using two part epoxy, and those which other methods such as patch sticks are appropriate. This documentation will be provided to all personnel involved with coating application. Please see Attachment - B to Jim Crawford's September 8, 2009 letter.

- 6.829 Enbridge has stated efforts were being made to ensure welds were not exhibiting the effects of delayed hydrogen cracking through a program of 24 hour delayed non-destructive testing. This was not done for the road bore pipe at County Road 62. It was also stated at Spread 2 that the program was going to be implemented for 20% of the mainline welds. **Please provide further specifics associated with Enbridge's plan related to NDT and delayed hydrogen cracking.** Enbridge plans to implement a program of delayed radiographic inspection on all manual welding. Approximately 20% of all manual welds on each spread will undergo next-day delayed radiographic inspection. This will provide a comparison of defect rates found immediately after weld completion to defect rates found with next-day radiography.

Reviewed/Approved by


(initials)

**CENTRAL REGION OFFICE
Daily Construction Inspection Report**

Project: Alberta Clipper/Southern Lights Audit	Date: 08/25-27/2009	
Location: MN	Station/Survey or Pipeline Marker: Spread Offices 2,3,4,5,6 ES 5020 + 92	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Boyd Haugrose	Project Compliance Inspector	Enbridge
Dave Stafford	Sr. Compliance Coordinator	Enbridge
Ronnie Whitaker	Chief Inspector – Spread 3	Mustang
Steve Browning	Sr. Welding Inspector – Spread 3	EnGlobal
Phil Russell	Sr. Welding Inspector – Spread 5	EnGlobal
Marshall Russell	Technical Welding Inspector – Spread 5	EnGlobal
Drake Smith	Welding Inspector – Spread 5	EnGlobal
John Latham	Sr. Welding Inspector – Spread 4	EnGlobal
Frank Bennett	NDE Auditor – Spread 4	EnGlobal
Mike Helm	Coating Inspector – Spread 6	EnGlobal
Ernie Tyson	Welding Inspector – Spread 4	EnGlobal
Avery Schott	Construction Manager – Spreads 4, 6	Enbridge
Bob Grenfell	Chief Inspector – Spread 6	Mustang
Ernie Coleman	Sr. Welding Inspector – Spread 6	EnGlobal
Mark DeVarens	Construction Manager – Spread 2	Enbridge
Lavalle Warren	Sr. Welding Inspector – Spread 2	EnGlobal

Activities Observed/Performed:

The field activities associated with Enbridge's Alberta Clipper/Southern Lights construction project is just beginning in earnest. The primary activities associated with the PHMSA audit this week were welder qualification activities, and welding of main line pipe for road bores.

August 25, 2009 – Brian Pierzina met with Boyd Haugrose – Project Compliance Inspector, and Dave Stafford – Enbridge Sr. Compliance Coordinator at the Spread 3 offices near the Bemidji High School. The overall status of project activities was discussed, and Appendices for Welding (A), Non-Destructive Testing (B), Hydrostatic Testing (C), Horizontal Directional Drilling (D), Coating (E), and Bag Weights (unlabelled) were provided. Each was dated June 9, 2009. The highest priorities for construction are some stream crossings (Necktie River, Clearwater River, and Little Otter Creek) and some tributaries, which have deadlines of September 1 or September 15. It is not likely that all of this can be completed by the established deadlines, so variances will likely be requested in some cases.

We met with Ronnie Whitaker – Chief Inspector and Steve Browning – Sr. Welding Inspector and discussed documentation for welder qualification records. It is Enbridge's intention to attach the welding inspector's field notes for each welder qualification to the welder's qualification record. The AM portion included a walk-through of the construction yard, where welders were performing their branch weld qualification test, preparation for a bore of U.S. Hwy 2 was being made, and 20 inch pipe was being strung out for a bore of Beltrami County Road 7.

In the PM, we reviewed the available welder qualification records. Welders J-3 and J-8 had travel speeds documented for their repair weld qualification (WP-144) which were outside the parameters of the specification for the root and hot pass. Both were at 6 inches/min, while the specification indicates a minimum of 7 inches/min. It was decided that these welders would redo their repair weld qualification tests.

We observed welding of the 20 inch bore pipe (3rd weld – joints SL 51208 & 51207) for County Road 7. The welding inspector was Drake Smith, who was observed to be closely monitoring the welding parameters. No issues were identified.

We travelled to the Spread 5 offices, also in Bemidji, off of County Road 404, and met with Phil Russell – Lead Welding Inspector, and Marshall Russell – Technical Welding Inspector. They had 14 welders qualified thus far. No issues were identified with the welder qualification records.

August 26, 2009 - Brian Pierzina met Boyd Haugrose at the Spread 4 offices near Grand Rapids. Spread 4 has 2 mainline welds completed for a guided bore at Itasca County Road 62, near Cohasset. We met with John Latham – Sr. Welding Inspector, and Frank Bennett – NDE Auditor. We reviewed the film for the two completed welds, and the NDT qualification records. Spread 4 has qualified 9 welders to date, six with branch weld and back-weld qualifications. The records were at the Deer River pipe yard, where the qualification tests are being performed.

We went to the Co. Rd. 62 bore site and met Mike Helm – Coating Inspector. The bore string is 239 feet long. The two girth welds were coated with two part epoxy, and there were four jeeps which had been repaired with patch sticks. This is allowed by the procedures, although Enbridge had previously indicated a general preference to repair two part epoxy coating anomalies with two part epoxy.

We went to the Deer River pipe yard and met Ernie Tyson – Welding Inspector. We had previously observed two bead caps on welding repair qualifications, but Spread 4 was doing it with a one bead cap. This is left to the discretion of the welder/inspector, although the heavier the wall thickness, the more likely a two bead cap would be used. We identified that the pass/fail check boxes for the nick break tests were already marked Pass for a branch weld test that hadn't been completed yet. This was an issue related to cloning a document, and will be corrected.

We travelled to the Spread 6 office, near Cloquet, and met with Avery Schott – Construction Manager, Bob Grenfell – Chief Inspector, and Ernie Coleman – Sr. Welding Inspector. Spread 6 has 7 welders qualified to date. We reviewed the welder qualification records, and identified welder 6A as having a branch weld filler pass travel speed that was outside the parameters of the procedure. The qualification record indicated 4-8 inches/min, and the procedure specifies 5-9 inches/min. It was indicated that they would have the welder redo his branch weld test.

August 27, 2009 - Brian Pierzina and Boyd Haugrose travelled to the Spread 2 offices near Thief River Falls. We met with Mark Devarens – Construction Manager, and Lavalley Warren – Sr. Welding Inspector. We reviewed welder qualification records, and noticed that at least three welders had identical parameters indicated for each pass of their repair weld (WP – 144) qualification tests. This indicated that the documented values might not reflect the actual measured values, however the field notes were not available at the time of the visit. This issue would be looked into, and the results will be communicated back to PHMSA. We reviewed the x-ray film for the one main line weld that had been completed thus far with the NDE Auditor, Dave Bennett. No issues were identified.

We travelled to the lay down yard, where the Seramax automated welding shacks were being staged and prepped. One shack was set-up to complete a weld, and determine whether enough coating had been removed from the pipe ends to allow for completion of the automated ultrasonic testing. To date, no welders had been qualified for the automated welding process. This process would be used for HDD strings and main line welding on both spreads 1 and 2.

We travelled back towards Bemidji, stopping by a HDD site being prepped near the Lost River. Pipe was also being strung out for welding at this location.

Summary:

1. Welders qualified outside the parameters of the procedure specification – Two welders had repair weld qualifications that were out of the specifications, and one welder had a branch weld qualification that was outside the specification. These were going to be re-done, however it is important that the inspectors ensure that qualification welds are completed within the parameters of the procedure specification. Please communicate the results of any remedial actions to PHMSA/MNOPS.
2. Identical values for amperage, voltage, and travel speed were indicated on the repair weld qualification records on Spread 2. The field notes were not available at the time of the audit to determine if these were actual measured values. This needs to be looked into, and the results communicated to PHMSA/MNOPS.
3. The repair weld qualification tests require a repair from both the top and bottom quadrants of the pipe. While this appeared to be done in all cases, on all spreads, there was inconsistency between the spreads on how this was being documented. Some spreads only had documentation of one test on the welder qualification forms. It is assumed that Enbridge's intention is to document the results for each quadrant. The information should be available from the field notes and the x-rays. Please communicate the resolution of this issue to PHMSA/MNOPS.
4. There were additional documentation inconsistencies between spreads related
5. to welder qualifications. Documentation ranged from high and low ranges for amperage, voltage, and travel speed for each pass of each qualification test, including rod type and diameter for each pass, to single values of amperage, voltage and travel speed, with no indication of the rod type and diameter. Please indicate the expectations for welder qualification records associated with these essential variables.
6. Coating repairs to two part epoxy were allowed to be made using patch sticks, and this is allowed by the Enbridge specifications. It has been stated however, that the preference is that these repairs be made using two part epoxy. Please indicate the circumstances under which repairs to two part epoxy coating are expected to be made using two part epoxy, and those which other methods such as patch sticks are expected.
7. Enbridge has stated efforts were being made to ensure welds were not exhibiting the effects of delayed hydrogen cracking through a program of 24 hour delayed non-destructive testing. This was not done for the road bore pipe at County Road 62. It was also stated at Spread 2 that the program was going to be implemented for 20% of the mainline welds. Please provide further specifics associated with Enbridge's plan related to NDT and delayed hydrogen cracking.

Inspector(s): Brian Pierzina

Exit Interview
Enbridge Southern Lights Construction Inspection
August 18-19, 2009
Manhattan Terminal
Manhattan, IL

Records Review Issues

1. Enbridge to provide Station Facilities Design Basis Memorandum (DBM).
2. Documentation is required to show that welders Stout and Kueteman performed qualified welds within the required six month period.
3. Documentation is required for the Matrix tank welders to verify that all welders were properly qualified on the welding processes with in the required six month period.
4. Followup is required for the status of the following welds observed on the NDE reader sheets: (notes in italics per discussion with Walter Armes 8/20/09)

1300-V17-S1-02W H-I no accepted repair weld *radiographed 8/20*

1300-V16-S1-02W H-I no accepted repair weld *radiographed 8/20*

1300-V04-S1-02W A-B no accepted repair weld *replaced by door*

1300-V17-S1-TJ A-B repair weld documentation, no original reject weld

5. Documentation is required on valves MM-210-BSV-11 and MM-145-V-1 to verify that the seats were pressure tested to API 6D requirements.
6. It is recommended that weld log history documents be initiated for both tank and station work to more easily track weld repair history.

Field Review Issues

1. It was noted on girth weld coating near the pump manifolds that an excessive amount of coating was applied. Large icicles were seen hanging from the bottom of the pipe. These icicles can break off, leaving potential anomalies susceptible to corrosion. Coating applicators should be trained to apply coating in such a manner to eliminate the icicles and reduce the coating thickness. In addition, the large variations in coating thickness make it difficult for the jeep to accurately detect anomalies.
2. In the same piping area it was noted that patch stick repairs were made that were larger than what Enbridge allows (1/2" square area maximum). Two part epoxy repairs are required for such areas.
3. In several locations on the same piping, tape was observed on the pipe. All tape and foreign objects must be removed from the pipe surface prior to jeeping in order to adequately check the coating for anomalies.

These issues were discussed with the coating inspector on site.

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Lights (20")	Date: 08_18_09	
Location: Manhattan, IL Manhattan Station - Breakout Tanks, Pumps and Piping	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Glen Jones	Project Specialist	Enbridge
Kelly Harless	Construction Manager	Enbridge (contract)
Boyd Haugrose	Compliance	Enbridge (contract)
Kraig Erickson	Tank Project Manager	Lake Superior Consulting
Walter Ames	Tank Inspector Chief	Enbridge (contract)
Dave Hoffman	Compliance	Enbridge
Jacob Weerts	Mechanical Inspector	Enbridge (contract)
Activities Observed/Performed:	Results/Comments:	
Reviewed tank welder qualifications	Record of production weld with qualified NDE examination is necessary for most welders to show qualification	
Reviewed station welder qualifications	Record qualified NDE examination is necessary for two welders to show qualification	
Reviewed station welding reader sheets	No issues	
Inspected field work on tanks	No issues	
Summary:		
<p>Enbridge to follow up with the tank contractor Matrix to provide welder qualification records. Enbridge to follow up with qualified NDE records for station welders. Enbridge to provide Station Facilities Design Basis Memorandum.</p>		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Lights (20")	Date: 08_19_09	
Location: Manhattan, IL Manhattan Station - Breakout Tanks, Pumps and Piping	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Dave Hoffman	Compliance	Enbridge
Boyd Haugrose	Compliance	Enbridge (contract)
Walter Ames	Tank Inspector Chief	Enbridge (contract)
Glen Jones	Project Specialist	Enbridge
Jack Mershon	Coating Inspector	Enbridge (contract)
Atul Sumra	Sr. Project Manager	Matrix
Kraig Erickson	Tank Project Manager	Lake Superior Consulting
Activities Observed/Performed:	Results/Comments:	
Inspected station piping work, in particular coating and repair areas.	It was noted that there were several areas where patch stick was improperly applied (too large of an area). In addition, the girth weld coating was too thick, causing icicles to hang off the bottom of the pipe. Tape was also observed on the pipe, which must be removed for proper jeeping.	
Collected information on two valves	Enbridge to provide seat pressure test documentation	
Reviewed tank welder qualification information provided by Matrix.	Addition NDE documentation is necessary.	
Reviewed the tank NDE reader sheets.	Followup is required on seven welds identified on the two tanks which did not have repair welds, or were repair welds and did not have original weld rejection records. It was difficult to track weld repair records.	
Summary:		
Enbridge to followup with Matrix to provide provide NDE documentation		
Enbridge to provide valve pressure test information		
It is recommended that a weld log history sheet be developed for the tank welds to more easily track weld repairs.		
Inspector(s): Carl Griffis		

Cline, Sandy (PHMSA)

From: David Hoffman [David.Hoffman@enbridge.com]
Sent: Monday, September 14, 2009 4:37 PM
To: Griffis, Carl (PHMSA)
Cc: Shaun Kavajecz
Subject: Manhattan Terminal Construction Inspection August 18 - 20
Attachments: Enbridge Letter TOSV Testing to API 598 & EES110.pdf; Enbridge Exhibits for TOSV.pdf; Enbridge Specification EES110 vs API 6D.pdf; Enbridge Engineering Standard EES110.pdf

Hi Carl, hope you are well.

Attached is the documentation required to close the final inspection finding from your construction inspection of the Manhattan Terminal August 18 – 20. I believe you had a verbal discussion with Glen Jones last week regarding the Triple Offset Valves meeting the requirements of 49 CFR Part 195. 116 – Valve Seat Testing in compliance with API 6D.

Inspection Finding:

“Documentation is required on valves MM-210-BSV-11 and MM-145-V-1 to verify that the seats were pressure tested to API 6D requirements”.

Enbridge Response:

At the time of the inspection, Enbridge was only able to demonstrate that Triple Offset Valves (TOSV) MM-210-BSV-11 and MM-145-V-1 being installed at the Manhattan Terminal Facility, were seat tested per API 598. A question arose if this testing method meets or exceeds seat testing requirements per 49 CFR Part 195.116(d).

The attached documents titled *Enbridge Letter TOSV Testing to API 598 & EES110.pdf* and *Enbridge Exhibits for TOSV.pdf* provide documentation from the valve manufacturer, TYCO (Vanessa), verifying that ALL TOSV purchased by Enbridge are and have been seat tested to the Enbridge Engineering Standard EES-110 and API 598.

Also attached is a memo from the Enbridge Engineering Standards Department (Calvin Cheng) demonstrating that Enbridge Engineering Standard – *Specification for Triple Off-set Valves* (attached), which outlines TOSV seat testing requirements, meets and/or exceeds the seat testing requirements of API 6D, as required by code.

Please call me if you have any additional question and/or concerns.

Regards,

Dave

Dave Hoffman

Supervisor, US Compliance - | Enbridge Energy Company, Inc.
119 N 25th Street E | Superior, WI 54880
☎ Office: (715) 394-1540 | ☎ Cell: (715) 718-1179

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tyco

Flow Control

Vanessa

Tyco Valves & Controls Italia S.r.l.

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Full paid-up capital EURO 11.560.000,00 - R.E.A. PC N. 121627

Company records reg. no. Piacenza 01018590339

V.A.T. 01018590339 - C.C.I.A.A. reg. no. PC 003979

Company with a sole shareholder under the management

and coordination of Tyco International Finance Group GmbH - Switzerland

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Tel. +39 0523 890201 - Fax +39 0523 890290

Lugagnano Val d'Arda (PC) - Italy
September 10, 2009

To: ENBRIDGE
Attn: To whom it may concern
From: Vanessa Manufacturing Plant – Q.A./Q.C. Department

We (VANESSA) declare that all Series 30,000 Vanessa valves supplied for various ENBRIDGE projects have been seat tested in accordance with API 598 and with Enbridge Specification EES110-2007 Version 0 (April 24th, 2007) Par. 11.3 for what concerns duration of such tests.

Starting from the new Vanessa Series 30,000 valves we will supply with our ack. VA08/1544 (PO N° 3024742) we have implemented a new certification procedure. In our final EN 1024 3.1 certificates we will add the above mentioned Enbridge Specification about test duration in the field named: "notes" (See Attachment 1).

Previously, as the EN 10204 3.1 inspection certificates is computer generated, we recorded that the tests were performed only in accordance with API 598. The information of the extended duration of the seat leakage tests in accordance with paragraph 11.3 of Enbridge specification EES110 was only reported in our internal form named: FTC-01-91 Rev.8 "Final assembly & test report".

Enclosed (see Attachment 2) you can find this form where we have highlighted, for one of the main order we have supplied to Enbridge, the extended duration of these seat leakage tests. We apologize but being this an internal report is in Italian language.

We are at your disposal for any additional information you may need.

Best regards,


Franco Castagnetti

Q.A Manager

Tyco Valves & Controls Italia S.r.l.

VANESSA Manufacturing Plant

Q.A.

Enbridge Pipelines Inc.
10201 Jasper Avenue
P.O. Box 398
Edmonton, AB T5J 2J9
Canada
Tel: 780 378-2230
www.enbridge.com



memo

File Number: ENG-523

Date: September 11, 2009

To: Glen Jones

From: Calvin Cheng, P.Eng

Re: **API 6D vs. API 598 Testing Requirements**

Enbridge purchases Triple Offset Valves (TOSV) for use in its Canadian and US Pipeline Systems, including those under the scope of DOT 49 CFR Part 195. Purchased TOSV must meet the requirements of Enbridge Equipment Specification 110-2007 – Specification for Triple Off-set Valves.

49 CFR Part 195 – Transportation of Hazardous Liquids by Pipeline para. 195.116 specifies that “[e]ach valve installed in a pipeline system must comply with the following:

- (a) The valve must be of a sound engineering design ...
- (d) Each valve must be both hydrostatically shell tested and hydrostatically seat tested without leakage to at least the requirements set forth in section [11] of API Standard 6D”

API 6D specifies the requirements and provides recommendation for the design, manufacturing, testing and documentation of ball, check, gate, and plug valves for application in pipeline systems.

API 598 covers inspection, examination, supplementary examinations and pressure test requirements for valves designed to various API valve standards.

Valves designed to API 6D are not covered in the testing requirements of API 598.

Hydrostatic seat (closure) test criteria outlined in Enbridge Equipment Specification 110-2007 – Specification for Triple Off-Set Valves meets or exceeds the requirements of both API 598 and API 6D on the basis of test pressure, test duration and acceptance criteria. Valves manufactured and tested to the requirements of EES 110 therefore comply and are suitable for use in DOT 49 CFR Part 195 pipeline systems.

Minimum hydrostatic seat (closure) test pressure

API 598*	API 6D	EES 110	EES 110 vs. API 598	EES 110 vs. API 6D
60-100 PSIG	1.1 times 38°C/100°F pressure rating determined in accordance with ASME B16.34 material	1.1 times the design differential pressure (for automated valves), or 1.1 times the design rating (for manual valves), followed by low pressure air (6 bar/90 PSI) in accordance with API 598	Exceeds	Exceeds

* Low-pressure closure test for butterfly valve NPS >4 & ASME Class ≤ 600

Minimum hydrostatic seat (closure) test duration

	API 598*	API 6D	EES 110	EES 110 vs. API 598	EES 110 vs. API 6D
NPS ≤ 2	15 sec	2 min.	2 min.	Exceeds	Meets
NPS 2½ to 6	60 sec	2 min.	2 min.	Exceeds	Meets
NPS 8 to 12	120 sec	5 min.	5 min.	Exceeds	Meets
NPS 14 to 36	120 sec	5 min.	5 min.	Exceeds	Meets
NPS > 36	120 sec.	5 min.	10 min.	Exceeds	Exceeds

Minimum hydrostatic seat (closure) test acceptance criteria

	API 598*	API 6D	EES 110	EES 110 vs. API 598	EES 110 vs. API 6D
NPS ≤ 2	0 drops/min.	For metal-seated valves the leakage rate shall not exceed ISO 5208 Rate D (0.1 cubic mm/sec x DN when testing with liquid).	Seat leakage shall not exceed ISO 5208 Rate A (no leakage). Valve seat leakage shall be zero drops and zero bubbles for the duration of the test.	Exceeds	Exceeds
NPS 2½ to 6	12 drops/min.			Exceeds	Exceeds
NPS 8 to 12	20 drops/min.			Exceeds	Exceeds
NPS ≥ 14	2 drops per min. per in. NPS			Exceeds	Exceeds

CKC
Attachments

Distribution:
G. Jones
J. Perez
J. Huber
G. Henningsen
K. Jones
R. Tadic

tyco / <i>Flow Control</i> vanessa Tyco Valves & Controls Italia S.r.l. Vanessa Manufacturing Plant. Via Piacenza - 29018 Lugagnano Val D'Ardia - (Pc) - Italy		Company with Quality System Certified by DNV UNI EN ISO 9001		Company with Environmental Management System Certified by DNV UNI EN ISO 14001		INSPECTION CERTIFICATE EN 10204 : 2004 <input checked="" type="checkbox"/> 3.1 <input type="checkbox"/> 3.2		CERTIFICATE N: 09/5635		DATE: 07/09/2009	
CUSTOMER TYCO VALVES & CONTROLS CANADA INC. (CANTECH)		END USER		ORDER -3024742		PROJECT TCPL KEYSTONE CUSTODY TRANSFER		ACK VA09/1544		ITEM 001	
VALVE VANESSA 30000 SERIES ISO 7005 PN 20 750MM - 30" DOUBLE FLANGED ASTM A216 WCB		Q.TY 2		SERIAL NUMBER FROM: VA09/1544-001-001 TO: VA09/1544-001-002		TAG N: 204-V-1700 204-V-1800					
BODY HYDRAULIC TEST 30 bar g		HYDRAULIC TIGHTNESS TEST: BIDIRECTIONAL 20.9 bar g		PNEUMATIC TIGHTNESS TEST: BIDIRECTIONAL 5 bar g		ALL THE TESTS HAVE GIVEN POSITIVE RESULTS					
TEST PROCEDURE - API 598 RESILIENT - LEAKAGE ZERO											
ITEM	BODY	ITEM	DISC	ITEM	SHAFT	ITEM	BOTTOM FLANGE				
MATERIAL	ASTM A216 WCB	MATERIAL	ASTM A216 WCB	MATERIAL	ASTM A479 UNS S41000	MATERIAL	ASTM A516 GR 70				
HEAT	F903013, F903029	HEAT	810063, 810065	HEAT	843014, 848002	HEAT	07810021				
ITEM		ITEM		ITEM		ITEM					
MATERIAL		MATERIAL		MATERIAL		MATERIAL					
HEAT		HEAT		HEAT		HEAT					
SEAT MATERIAL	COBALT ALLOY (STELLITE 21)	SEAL RING MATERIAL	UNS S31803 (DUPLEX) + GRAPHITE	PACKING MATERIAL	GRADED GRAPHITE + GRAPHITE						
ACTUATOR TYPE		ACTUATOR MODEL		ACTUATOR SERIAL NUMBER							
ACTUATOR CERTIFICATE N:											
NOTES	BODY TEST DURATION TIME 60 MIN - SEAT TESTS DURATION TIME 5 MIN ACCORDING TO CUSTOMER SPECIFICATION EES110-2007 PARA 11.3 ALSO CARRIED OUT VISUAL/DIMENSIONAL AND FLANGE FINISH EXAMINATION IN ACCORDANCE TO VANESSA DRAWING 09-1544-00-01 WITH SATISFACTORY RESULTS.										
SHOP INSPECTOR			PURCHASER AUTHORIZED INSPECTOR		OFFICIAL AUTHORIZED INSPECTOR		VANESSA AUTHORIZED INSPECTOR				

RAPPORTO DI ASSEMBLAGGIO E COLLAUDO FINALE

VANESSA 30000 SERIES

vanessa

Flangiatura: ASME B 16.5 CL.150		Conferma: VA08/2397		Prova Idraulica Corpo: 2,0682 Bar		Tenuta Idraulica: 1,496 Bar		Tenuta Pneumatica: 0,4136 Bar			
Diametro Nominale: 500mm - 20"		Posizione: 002		Coppia Richiesta (allo stelo)		Lato stelo: Nm		Lato disco: Nm			
Trim: FOR MAXIMUM dp 25 BAR		Codice Valvola: 1KF20P30		Coppia Richiesta (al volantino)		Lato stelo: Nm		Lato disco: Nm			
Trim style: TRIM STYLE 2		Identificativo: MFFAC50082AA100BB		Coppia Massima Raccomandata In Apertura		Per chiudere: Nm		Per aprire: secondi			
Materiale Corpo: ASTM A216 WCB		Tipo Attuatore: Bare Shaft		Costruttore Attuatore:		Modello Attuatore:		Regolazione Attuatore			
Configurazione: BASIC		PED: NO ATEX: NO		Guadagno Meccanico del Riduttore:		Specificato		Eseguito			
Design Differential Pressure: 1,35815 Bar		Max Design Temperature: 426 °C		Test di Tenuta Idraulico		Test di Tenuta Pneumatico		Shelli test			
Design Pressure at Max Design Temp.: 0,38607 Bar		Orientam.		Test lato stelo		Test lato disco		Test Corpo			
Conferma Pos. Matr.	TAG NUMBER (marca)	Numero di Matricola Attuatore	Montaggio		G.	P. D.	Corpo	Disco	Stelo	Flangia di Fondo	Colonnina
VA082397 002 001			OK	OK	OK	OK	OK	OK	OK	OK	OK
VA082397 002 002			OK	OK	OK	OK	OK	OK	OK	OK	OK
VA082397 002 003			OK	OK	OK	OK	OK	OK	OK	OK	OK
VA082397 002 004			OK	OK	OK	OK	OK	OK	OK	OK	OK
VA082397 002 005			OK	OK	OK	OK	OK	OK	OK	OK	OK
VA082397 002 006			OK	OK	OK	OK	OK	OK	OK	OK	OK
VA082397 002 007			OK	OK	OK	OK	OK	OK	OK	OK	OK

Lista di controllo e ispezione finale

Descrizione delle attività	Risultato del controllo	Rapporto di Non Conformità	NOTE ATTUATORE
1 Controllo conformita' dei componenti da assemblare con riferimento all'U.C.	Conforme Data: 13.06.2008	R.N.C.: h7	Norma di Riferimento: EESMO-2007 DURATA SEAT EST 5717N
2 Ispezione visiva dei componenti durante il montaggio e rilievo calse secondo VMS027 - VAP-MF-008	Conforme Data: 13.06.2008	R.N.C.: OK	NOTE ATTUATORE:
3 Assemblaggio e regolazione attuatore secondo VMS 010 (se presente)	Conforme Data: N.A.	R.N.C.: OK	NOTE VALVOLA: VERN: POUSSA
4 Colauodo finale valvole secondo SDF066	Conforme Data: 13.06.2008	R.N.C.: OK	IMC
5 Controllo ed ispezione visiva della verniciatura VAP-CA-011	Conforme Data: 13.06.2008	R.N.C.: OK	Manual Gear da utilizzare in fase di assemblaggio (vedi VMS 027)
6 Ispezione visiva, marcatura e taratura PDV0337 - VAP-MF-010	Conforme Data: 13.06.2008	R.N.C.: OK	Coppia di input al volantino
7 Ispezione visiva della misura flangia (Flangiate - Lug - Water) Ispezione visiva della estensita' a saldare (Butt weld)	Conforme Data: 13.06.2008	R.N.C.: OK	Differenza tra la posizione ideale e quella reale del disco riferita al piano flangia del corpo (Eventuali posizioni di altre corsa andranno segnalate preceute dal simbolo -)
8 Verifica imballaggio e marcatura cassa VAP-MF-009	Conforme Data: 13.06.2008	R.N.C.: OK	G = Gioco tra anello e disco valvola montata



Specification for
Triple Off-Set Valves
EES110 - 2007

Version: 0
Approval Date: April 24, 2007

UNCONTROLLED COPY

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1 Scope

This Specification covers requirements for the manufacture, inspection, testing and shipment of Triple Off Set rotary disc valves intended for use in crude oil, petroleum product, and natural gas liquid pipeline systems. The pipeline systems are designed and constructed in accordance with:

Canada:

- i. National Energy Board, Onshore Pipeline Regulations
- ii. CSA Z662 Oil and Gas Pipeline Systems

United States:

- i. Code of Federal Regulations, Title 49, Volume 3, Part 195 – Transportation of Hazardous Liquids by Pipeline
- ii. ASME B31.4 Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids

This Specification covers valves in sizes from NPS 2 to NPS 60, inclusive.

Nominal pressure classes covered include:

Class Designation	
CSA	ASME
PN 20	150
PN 50	300
PN 68	400
PN 100	600
PN 150	900

2 Intent

Valves shall be manufactured in accordance with the requirements of industry standard *ASME B16.34* and the requirements provided in this specification.

The Application Datasheet shall be completed by the company or the company's Engineer.

Any and all deviations from this specification shall be brought to the attention of the company in writing for resolution prior to final acceptance.

All design documentation shall be submitted for approval in a retrievable and reproducible format.

3 Terms, Definitions

For the purposes of this specification, the following terms and definitions apply:

ANSI Rating Class: Numerical pressure design class defined in ASME B16.34 and used for reference purposes. *NOTE: The ANSI rating class is designated by the word "Class" followed by a number.*

Bi-Directional Valve: Valve designed for blocking the fluid in both downstream and upstream directions.

Breakaway Thrust and Breakaway Torque: Thrust or torque required for opening a valve with maximum pressure differential.

By Agreement: Agreed between manufacturer and Enbridge purchaser.

Drive Train: All parts of a valve drive between the operator and the disc, including the disc but excluding the operator.

Flow Coefficient: Kv – Volumetric flow rate, in cubic meters per hour, of water at a temperature between 5°C (40°F) and 40°C (104°F) passing through a valve and resulting in a pressure loss of 1 bar (14.7 psi). *NOTE: Kv relates to the flow coefficient Cv in US gallons per minute at 15.6°C (60°F) resulting in a 1-psi pressure drop as follows:*

$$Kv=Cv/1156$$

Handwheel: Wheel consisting of a rim connected to a hub, for example, by spokes, and used to operate manually a valve requiring multiple turns.

Locking Device: Part or an arrangement of parts for securing a valve in the open and/or closed position.

Manual Operator: handwheel with or without a gearbox.

Maximum Pressure Differential (MPD): Maximum difference between the upstream and downstream pressure across the disc at which the disc may be operated. MPD value is provided on the Application Datasheet.

Nominal Pipe Size (NPS): Numerical inches designation of size, which is common to components in piping systems of any one size. *NOTE: the letters NPS followed by a number designates the nominal pipe size.*

Nominal Pressure (PN) Class: Numerical pressure design class as defined in ISO 7005-1 and used for reference purposes. *NOTE the nominal pressure (PN) class is designated by the abbreviation PN followed by a number.*

Nominal Size (DN): Numerical metric designation of size, which is common to components in piping systems of any one size. *NOTE: Nominal size is designated by the letters DN followed by a number.*

Disc / Closure Member: Part of a valve, such as a ball, clapper, disc, gate or plug, which is positioned in the flow stream to permit or block flow.

Operator: Device (or assembly) for opening or closing a valve.

Position Indicator: Device to show the position of the valve disc.

Electric Actuator: Electric device bolted to the valve for powered opening and closing of the valve.

Pressure Class: Numerical pressure design class expressed in accordance with either the nominal pressure (PN) class or the ANSI rating class. *NOTE: In this Standard, the pressure class is stated by the PN class followed by the ANSI rating class between brackets.*

Pressure-Containing Parts: Parts, such as bodies, bonnets, glands, stems, gaskets and bolting, designed to contain the pipeline fluid.

Pressure-Controlling Parts: Parts, such as seat and disc, intended to block or permit the flow of fluids.

Process-Wetted Parts: Parts exposed directly to the pipeline fluid.

Seating Surfaces: Contact surfaces of the disc and seat, which ensure valve sealing.

Stem: Part that connects the disc to the operator and which may consist of one or more components.

Stem Extension Assembly: Assembly consisting of the stem extension and the stem extension housing.

4 Symbols and Abbreviations

4.1 Symbols

C_v Flow coefficient in Imperial units.

K_v Flow coefficient in Metric units.

4.2 Abbreviations

BM	Base Metal
CE	Carbon Equivalent
DBB	Double-Block-and-Bleed
DN	Nominal Size
HAZ	Heat-Affected Zone
HR	Rockwell Hardness
HV	Vickers Hardness
MPD	Maximum Pressure Differential
MT	Magnetic-Particle Testing
NDE	Non-Destructive Examination
NPS	Nominal Pipe Size
PN	Nominal Pressure
PQR	Procedure Qualification Record
PT	Penetrant Testing
PWHT	Post-Weld Heat Treatment
TOSV	Triple Off-Set Valve
WM	Weld Metal
WPS	Weld Procedure Specification
WQR	Welder Qualification Record

5 TOSV Design Requirements

Valve Body and Seat

The valve seat shall be integral with the valve body. Stellite or stainless steel welded overlay shall be applied on the seating surface of the valve body. Plated carbon steel seating surfaces are not allowed.

The valve seat shall be machined together with the valve body. The valve seat shall be an inclined conical shape specifically designed for non-rubbing, non-jamming, zero leakage, bi-directional shut-off.

The valve body shall contain valve position indicator bosses on the bracket-mounting flange. The indicator bosses shall be integral with the body and, when aligned with the position indicator dimple on the shaft, shall provide positive disc position as either open or closed.

Valve Disc and Seat Ring

The valve disc shall be of the same material as specified for the valve body. It shall be attached to the shaft by means of pins, keys or both.

The seal ring shall consist of stainless steel lamination for WCB & CF8M bodies. The seal ring shall be machined on the outside diameter to an inclined conical shape that matches the seat in the valve body. The overall geometry of the seal ring shall be formed into an elliptical shape that will provide resilient seating while maintaining uniform contact pressure around the entire sealing surface. The seat ring shall be designed to flex and compress elastically on the seating surface to insure uniform pressure on the entire outside diameter of the seat ring.

The seal ring shall be held securely in place by a retaining ring bolted to the valve disc. A spiral wound gasket shall be provided between the seal ring and the disc to prevent any possible leakage around the seal ring.

Valve Shaft

The valve shaft shall be stainless steel. It shall be a through shaft of one-piece construction. Two-piece shafts are not acceptable. The shaft shall be pinned, keyed or both to the disc. The shaft to disc connection shall be designed to allow for longitudinal adjustment during assembly and to accommodate expansion during thermal transients. Roll pin connections are not acceptable. The shaft shall contain a position indicator dimple which, when aligned with the position indicator bosses on the bracket mounting flange on the body, shall provide positive disc position as either open or closed.

The valve shaft shall be designed in such a manner to prevent the valve shaft from a blowout in the event that the internal connection between the shaft and disc is broken.

A shaft retaining system shall be included to prevent the valve shaft from a blowout in the event that the shaft is fractured above the shaft to disc connection and below the packing in accordance with the latest requirements of API 609. The external shaft retaining system shall be integral to the valve.

The valve shaft shall have clockwise rotation to close.

Packing and Bearings

A thrust bearing shall be provided to absorb thrust in both directions. Access to the thrust bearing shall be a flanged connection, secured by a minimum of four bolts, sealed with a spiral wound or flat gasket with a retainer groove/recess.

A bearing protector shall be provided to isolate the bearing from grit and debris in the pipeline

A two-piece adjustable packing gland shall be supplied, designed in such a manner to prevent galling of the stuffing box in the event of unequal loading of the packing gland studs. The packing shall consist of two braided graphite anti-extrusion rings top and bottom and a minimum of two die-formed graphite rings.

6 Design - General Requirements

6.1 Pressure and Temperature Rating

The nominal pressure (PN) class required is identified on the Application Datasheet.

Pressure classes shall be specified in accordance with the applicable rating tables for material groups in *ASME B16.34*.

The pressure and temperature ratings for metal seats of valves shall be the same as for the flanges and shell.

The maximum operating pressure at the minimum and maximum operating temperatures shall be marked on the nameplate.

6.2 Sizes

All valves shall be furnished in the nominal sizes (DN).

6.3 Face-to-Face and End-to-End Dimensions

Tolerances on the face-to-face and end-to-end dimensions shall be ± 2 mm for valve sizes DN 250 and smaller, and ± 3 mm for valve sizes DN 300 and larger.

The face-to-face dimension shall conform to:

6.3.1 Double Flanged: ISO 5752

Short Pattern: Table 1, Col. 13 (for Class 150 & 300).

Long Pattern: Table 1, Col. 14 (for Class 600); Table 1, Col. 8 (for Class 900).

ASME B16.10, Table 1 Col. 7 (for Class 150); Table 2 Col. 10 (for Class 300)

6.3.2 Lug: API 609 Table 2 up to 24”; ISO 5752 for larger sizes

6.3.3 Wafer: API 609 Table 2 up to 24”; ISO 5752 for larger sizes

6.3.4 Buttweld: ASME B16.34

6.4 Valve Operation

The maximum pressure differential (MPD) at which the valve is required to be opened by the gearbox or actuator is indicated on the Application Datasheet.

The pressure rating as determined in accordance with *Clause 6.1* for material at 38°C (100°F) shall be the MPD, unless otherwise specified.

6.5 Valve Ends

The type of body style/end connections shall be as indicated on the Application Data Sheet

6.5.1 Flange Ends

Standard end flanges shall be furnished with a raised face or ring joint faces (raised face or full face). Dimensions, tolerances and finishes, including drilling templates, flange facing, spot facing and back facing, shall be in accordance with:

- a) *ASME B16.5* Steel Pipe Flanges and Flanged Fittings (up to 24 inch).
- b) *ASME B16.47* Large Diameter Steel Flanges Series A) (over 24 inch).

6.5.2 Weld Ends

Welding ends shall conform to the requirements of ASME B16.34 .

The outside diameter, wall thickness, material grade, SMYS and special chemistry of the mating pipe, shall be specified in the Application Datasheet.

6.5.3 Lug Ends

Valve shall be designed with facings that permit installation between ASME B16.5 or B16.47 Series A flanges

6.5.4 Wafer (Flangeless)

Valve shall be designed with facings that permit installation between ASME B16.5 or B16.47 Series A flanges

6.6 Handwheels

The maximum force required at the handwheel or wrench to apply the breakaway torque or thrust shall be limited to 360 N (80 lb) for most applications.

The handwheel of the gearbox input shaft shall be provided with a torque-limiting device, such as a shear pin, to prevent damage to the drive train.

The gear operators shall be designed to operate against the maximum differential pressure.

6.7 Position Indicators

Valves fitted with manual or electric actuators shall be furnished with a visible indicator to show the open and the closed position of the disc.

The position indicator shall be in line with the pipeline when the valve is open and transverse when the valve is closed. The design shall be such that the component(s) of the indicator and/or wrench cannot be assembled to falsely indicate the valve position.

Valves without position stops shall have provision for the verification of open and close alignment with the operator/actuator removed.

6.7.1 Requirements for Stem Extension Assemblies

6.7.2 Stem Extensions

Valves that require stem extensions will be indicated on the Application Datasheet. Stems shall be constructed of one piece, or two pieces. Where the Vendor offers a two-piece stem design, he shall submit a stem assembly drawing for Company review.

For electric motor operated valves, the valve Vendor shall supply the dimensional details for review with the actuator vendor to ensure the desired extension dimensions are met.

Extended stem assemblies shall be strengthened as required to withstand the additional loading. All flanged, bolted, or machined surfaces on stem extensions shall have gaskets or have O-rings on mating surfaces to prevent water ingress into the valve stems.

The dimension of centreline of valve opening to the face of the gear/actuator mounting flange is specified on the Application Datasheet.

6.7.3 Misalignment

Misalignment or improper assembly of components shall be prevented by suitable means, such as a dowel pin or fitting bolt, which ensure the unique location of manual or powered operators and stem extension assemblies. Intermediate shaft guides shall be installed on extensions greater than 2500 mm (8 ft) in length.

6.7.4 Sealing

External connections shall be sealed, for example with gaskets or O-rings, to prevent external contaminants entering the mechanism.

6.7.5 Overpressure Protection

Operators and stem extension assemblies shall be provided with a means of preventing pressure build-up in the mechanism resulting from stem or bonnet seal leakage.

6.8 Lifting Lugs

Valves of size DN 200 (NPS 8) and larger may require with lifting lugs.

Where required, this feature will be indicated as such on the Application Datasheet.

6.9 Valve Operator Provisions

6.9.1 Manual

The type of operator required is specified on the Application Datasheet.

Handwheel shall have a maximum rim pull of 35 kg (80 lb). A clockwise rotation of the handwheel shall close the valve.

6.9.2 Electric

Valves to be operated by electric actuators are specified on the Application Datasheet.

Electric Actuators shall be supplied in accordance with EES 10 Electric Valve Actuator

The interface between actuators and valve bonnet or stem extension assemblies shall be designed to prevent misalignment or improper assembly of the components. Fabrication drawings of the valve–actuator interface plate and stem connection details shall be provided with the vendor at time of purchase.

Valves that are to be fitted with actuators by others shall be supplied bare stem only. The interface between actuators and valve bonnet or stem extension assemblies shall be sealed with gaskets or O-rings to prevent external contaminants from entering the assembly.

The output of the actuator shall not exceed the maximum load capacity of the valve drive train.

Unless stated otherwise on the Application Datasheet, for electrically operated valves, the electric motor operator shall be supplied and installed by others.

6.10 Drive Trains

6.10.1 Design Thrust or Torque

The design thrust or torque for all drive train calculations shall be at least two times the breakaway thrust or torque.

Gearbox and internal lubricant shall be suitable for the service conditions indicated on The Application Data Sheet.

6.10.2 Allowable Stresses

Tensile stresses in drive train components, including stem extensions, shall not exceed 67% of SMYS when delivering the design thrust or torque. The maximum design von Mises stress (combined bending, shear, torsion and bearing stresses) shall not exceed the 1/2 of the yield stress of the material for any component under any anticipated load.

6.10.3 Allowable Deflections

The total torsion deflection of the extended drive train when delivering the design torque shall not exceed the overlap contact angle between the seat and disc.

Deflections of the extended drive train shall not prevent the disc from reaching the fully closed position.

6.11 Stem Retention

Valves shall be designed with a stem anti-blow-out device to prevent stem ejection by internal pressure when the stem packing and/or retainer have been removed.

7 Materials

It is the Vendor's responsibility to ensure that all materials used in the completed valve assembly are suitable for the pressure, temperature, environment, and hydrocarbon types described in the Application Data Sheet.

The materials of construction shall include but not be limited to the following:

- a) Valve body, bonnet and other pressure containment components;
- b) Valve Trim;
- c) Shaft;
- d) Bolts and nuts;
- e) Seals
- f) Yokes, gland housings and other non-pressure containing components

7.1 Valve Shell

The valve shell is the primary pressure containment assembly and typically includes body, bonnet, and end connections.

Materials of construction shall per ASME B16.34. Manufacturers shall submit positive identification certificates in the form of a certified Material Test Report (MTR) for all pressure containing components. The minimum information to be provided shall be:

- g) Chemical properties;
- h) Heat treatment;
- i) Mechanical properties;
- j) Test results;
- k) Manufacturers Certification.

7.2 Valve Seating Members

Vendor to ensure valve seats, including seat rings and inserts are suitable for the application per the information supplied in the Application Data Sheet. Vendor to provide material types in the bid submission.

7.3 Sealing Components: Gaskets, O-Rings, Stem Seals

Stem seals shall be low fugitive emission design using graphite or PTFE packing sets. All alternate stem seal arrangements shall be submitted with bid documents and require prior approval by Enbridge Engineering.

The metallic portion exposed to the service environment shall be of a material that has a corrosion resistance at least equal to that of the body material.

Gaskets shall be either corrugated metal with graphite filler or stainless steel spiral wound with graphite filler

Inside diameter mating gaskets shall not be smaller than the inside diameter of the flanges.

O-ring material shall have a durometer number of 70 to 90. Acceptable materials, depending upon service conditions, are:

- a) Nitrile (Buna-N) (-40° to 275° F);
- b) Highly Saturated Nitrile HSN (-40° to 350° F);
- c) Viton® (Fluorocarbon) (-20° to 400° F);
- d) Braided PTFE graphite.
- e) Kalrez (-40° to 600° F)

Manufacturer shall confirm suitability of sealing material for service. Manufacturer shall also confirm suitability of sealing material for field hydrotesting with methanol and or glycol mixes.

Vendor to provide material types of all sealing components in the bid submission.

7.4 Stem and Stem Nut

Vendor to provide stem material type in his bid submission.

Valve stem nuts used to engage electric motor operators shall be of bronze or aluminum-bronze alloy material.

7.5 Service Compatibility

All process-wetted parts, metallic and non-metallic, and lubricants shall be suitable for the field hydrotest fluids and service specified by on the Application Datasheet.

The description and properties of the fluid handled, including minimum and maximum temperature, specific gravity, viscosity, etc shall be provided to the manufacturer prior to valve fabrication.

The manufacturer shall consider all of the data in the Valve Datasheet when selecting the appropriate materials of manufacture for the valve. Asbestos and asbestos compounds shall not be used.

7.6 Forged Parts

Forged pressure containing parts shall be forged close to the finished shape and size.

7.7 Welding Ends

The chemistry of carbon steel welding ends shall meet the following requirements:

- a) The carbon content shall not exceed 0.23% by mass in the ladle (heat) analysis or 0.25% by mass in the product (check) analysis;
- b) The maximum content of both sulfur and phosphorus shall not exceed 0.035% by mass;
- c) The carbon equivalent (CE) shall not exceed 0.43 in the ladle (heat) analysis or 0.45 in the product (check) analysis. The CE shall be calculated in accordance with the following formula:

$$CE = \%C + (\% Mn/6) + (\% Cr + \% Mo + \% V)/5 + (\% Ni + \% Cu)/15$$

The chemistry of austenitic stainless steels for welding ends shall meet the following requirements:

- a) The carbon content shall not exceed 0.03% by mass, except under the conditions outlined in b) and c) below;
- b) A carbon content of up to 0.08% by mass is permissible provided the material is stabilized with niobium and the niobium content is at least 10 times the carbon content by mass;
- c) For steels stabilized with niobium or tantalum, the combined mass of niobium and tantalum shall be at least eight times the mass of the carbon. Requirements for the chemistry of welding ends made of other materials shall be established by agreement.

Welded ends shall be bevelled to accommodate a butt weld connection to pipe in accordance with the manufacturing specification. The specifics of the matching pipe are provided on the Application Datasheet.

The Vendor shall indicate whether pipe transition pieces would be required to accommodate the butt weld to the matching pipe. Valves ends made of cast materials shall have transition pieces supplied and installed by the Vendor to accommodate the butt weld to matching pipe.

If transition pieces are required, the Company and Vendor shall agree on the supply of materials and the design of the end connection.

7.8 Toughness Test Requirements

Valves intended for PN 20 service do not require proven notch toughness.

Manufacturer will provide the results of impact testing when the minimum service temperature is below -29°C.

All carbon and low-alloy steels for pressure-containing parts in valves with a specified design temperature below -29°C (-20°F) shall be impact-tested using the Charpy V-notch technique in accordance with *ISO 148* or *ASTM A 370*.

Materials shall be procured to documented specifications.

Toughness testing may be performed during the qualification of the valve manufacturing procedure provided that the material for testing is heat-treated using the same equipment as during valve production.

The impact test temperature shall be as defined in the Application Datasheet for minimum temperature.

7.9 Bolting

Bolting shall be suitable for the specified valve service and pressure rating.

ASTM Specifications:

- d) Bolts A 193 Gr. B7, or A 320 Gr. L7 for low temperature service.
- e) Nuts A 194 Gr. 2H, or A 194 Gr. 7 for low temperature service.

8 Welding

8.1 Qualifications

Welding, including repair welding, of pressure - containing and pressure-controlling parts shall be performed in accordance with procedures qualified to *ASME Section IX or EN 288-3*, Welders and welding operators shall be qualified in accordance with *ASME Section IX or EN 287-1*.

The manufacturer shall provide an adequate quality control of welding and welding repair.

The results of all qualification tests shall be documented in a procedure qualification record (PQR). Post-weld heat treatment (PWHT) shall be performed in accordance with the relevant material specification.

8.2 Impact Testing – Welding

Impact testing shall be carried out for the qualification of procedures for welding on valves with a design temperature below -29°C (-20°F). Where required impact testing temperature shall be as specified on the Application Datasheet.

Impact testing shall be performed in accordance with *ISO 148 or ASTM A 370* using the Charpy V-notch technique. Specimens shall be etched to determine the location of the notch.

The impact test temperature for welds and heat-affected zones shall be at or below the minimum design temperature specified for the valve.

9 Painting/Coating

9.1 Coating

Valves for below grade service shall be coated. Vendor shall provide the coating procedure with his bid submission for approval by the company. The vendor shall quote alternative to coat the valve using Enbridge's "C-110 Coating of Buried Steel with Plural Component Spray Applied Coatings" procedure.

9.2 Painting

Valves for above grade service shall be painted. The Vendor shall provide the painting procedure with his bid submission for company approval. The Vendor shall quote alternative to paint the valve using Enbridge's "P-210 Shop and Field Painting" procedure.

Stainless-steel valves shall not be painted.

10 Quality Control

10.1 Non-Destructive Examination

Manufacturers shall supply a copy of their Quality Test plan verifying NDE requirements are met and that they are in accordance with the material specification for review and acceptance. Non-Destructive testing shall be conducted to the extent necessary to detect all defects in the manufactured piece or pieces and to determine compliance with dimensional requirements. The Manufacturer shall clearly indicate which procedures (Radiographic, Ultrasonic, Magnetic particle, Liquid Penetrant) are used and to what extent. Acceptable procedures are given in *Table 10.1* below.

Manufactured Component	Examination	Exam Procedure	Acceptance Criteria
Weldments – all pressure boundary welds require 100% examination	Radiographic	ASME V, Article 22	ASME VIII, Div. 1 Part UW51 for linear indications and Appendix 4 for rounded indications
	Ultrasonic	ASME V, Article 23	ASME VIII, Div. 1, Appendix 12
Castings	Radiographic	ASME V, Article 22	ASME VIII, Div. 1, Appendix 7
Castings	Ultrasonic	ASME V, Article 23	ASTM A 609, Table 2, Quality Level 1
Castings	Magnetic Particle	ASME V, Article 25	ASME VIII, Div. 1, Appendix 6
Castings	Liquid Penetrant	ASME V, Article 24	ASME VIII, Div. 1, Appendix 8
Castings	Visual	MSS SP-55	MSS SP-55
Forgings	Ultrasonic	ASTM A 388	ASTM A 388
Forgings	Magnetic Particle	ASME V, Article 25	ASME VIII, Div. 1, Appendix 6
Plates (as applicable)	Ultrasonic	ASTM A 435 or A 577	ASTM A 435 or A 577

Table 10.1 Non Destructive Testing Requirements

10.2 Non-Destructive Test Records

All radiographs shall be identified and shall be available for the Company representative to view. A written record of all non-destructive examinations required by this Specification and the results shall be submitted to the Company upon completion of the order.

10.3 Measuring and Test Equipment

10.3.1 General

Equipment used to inspect, test or examine material or equipment shall be identified, controlled and calibrated at intervals specified in the manufacturer's instructions.

10.3.2 Dimension-Measuring Equipment

Equipment for measuring dimensions shall be controlled and calibrated in accordance with methods specified in documented procedures.

10.3.3 Pressure-Measuring Devices

10.3.4 Type and Accuracy

Test pressure measuring devices shall be either pressure gauges or pressure transducers, which are accurate to within $\pm 2.0\%$ of the full-scale reading.

10.3.5 Gauge Range

Pressure measurements shall be made between 25% and 75% of the full pressure range of the measuring device.

10.3.6 Calibration Procedure

Pressure-measuring devices shall be periodically recalibrated with a master pressure-measuring device or a deadweight tester at 25%, 50%, 75% and 100% of the full pressure scale.

10.3.7 Temperature-Measuring Devices

Devices for measuring temperature, if required, shall be capable of indicating and recording temperature fluctuations of 3°C (5°F).

10.4 Qualification of Inspection and Test Personnel

10.4.1 NDE Personnel

NDE personnel shall be qualified in accordance with the requirements specified in ASNT SNT-TC-1A or EN 473 Level II as a minimum.

Personnel performing visual examinations shall have passed an annual eye examination in accordance with ASNT SNT-TC-1A or EN 473 within the previous twelve months.

10.4.2 Welding Inspectors

Personnel performing visual inspection of welding operations and completed welds shall be qualified and certified to the requirements of AWS QC1, or equivalent, or a manufacturer's documented training program.

10.5 NDE of Repair Welding

After defect removal, the excavated area shall be examined by magnetic particle (MT) or liquid penetrant (PT) methods prior to starting repair welding.

Repair welds on pressure-containing parts shall be examined using MT or PT methods. Acceptance criteria shall be specified in documented procedures.

10.6 Shop Inspection

The Company may have a Company Inspector present in the Vendor's manufacturing facility at any time during the manufacture of the valves. The Company Inspector may witness all hydrostatic tests and may be present for other tests and NDE. The Company Inspector may also witness the final inspection of each valve prior to shipment to ensure the valves meet all requirements of this Specification and the purchase order.

The Company shall be notified of any injurious defects found on any pressure containing valve component during non-destructive tests.

11 Pressure Testing

11.1 General

Each valve shall be tested in accordance with API 598 Valve Inspection and Testing and shall include additional requirements of this specification. Pressure testing shall be performed in accordance with documented procedures.

Shell pressure testing shall be carried out before painting of the valves.

Test fluids shall be fresh water, which may contain corrosion inhibitors. The chloride content of test water for austenitic and ferritic-austenitic (duplex) stainless-steel body/bonnet valves shall not exceed 30 ppm.

Valves shall be tested with the seating and sealing surfaces free from sealant except where the sealant is the primary means of sealing.

Valve torque seating and unseating values shall be provided prior to testing. The value for the seating and unseating torques shall be published at the maximum valve shutoff pressure or the specified shutoff pressure on the data sheet. The published torque shall be applied to the valve during the valve seat test, additional torque applied to the valve to achieve zero leakage shall not be allowed during the seat leak test procedure.

Tests specified with the valve half-open may also be performed with the valve fully open provided the body cavity is simultaneously filled and pressurized through a cavity connection.

Methods for monitoring pressures and/or leakage shall be adequate also when valve body connections are not available for direct monitoring. A sufficient stabilization period shall be allowed for all pressure tests.

Tests may be witnessed by Enbridge or designate.

11.2 Hydrostatic Shell Test

Hydrostatic shell testing shall be performed on the fully assembled valve prior to painting or coating.

Valves shall be closed off and the disc placed in the partially open position during the test. The method of closing the ends shall permit the transmission of the full-pressure force acting on the end blanks to the valve body.

The test pressure shall be 1.5 or more times the pressure rating. These pressure values are provided in Table 11.2.

Nominal Pressure Class	Hydrostatic Test Pressures, Minimum (kPa)	
	Shell Test	Seat Test
PN 20	2,850	2,090
PN 50	7,440	5,460
PN 68	9,930	7,280
PN 100	14,900	10,920
PN 150	22,340	16,380

Table 11.2 Hydrostatic Test Pressure

Note:

(1) Pressure shall not fall below the specified test pressure during the test period.

The duration shall not be less than that specified in Table 11.3.

Where the longer test durations are required, these will be indicated on the Application Datasheet.

Valve Size		Test Duration	
DN (mm)	NPS (inches)	Canada (hours)	U.S. (hours)
15 -100	½ - 4	1	4
150 -250	6 -10	1	4
300 -450	12 -18	1	4
500 - 915	20 - 36	1	4
Over 915	> 36	1	4

Table 11. 3 Minimum Duration of Hydrostatic Shell Tests

The test shall be documented on a chart recorder.

Alternatively, a continuously witnessed test by a qualified person may be performed. Pressure readings shall be recorded on a frequency of no longer than 5 minutes between recorded readings.

The final pressure test record shall be dated and signed by the qualified test person.

No visible leakage or permanent distortion is permitted during the hydrostatic shell test.

11.3 Hydrostatic Seat Test

Each valve shall be tested for seat leakage with liquid first at 1.1 times the design differential pressure (for automated valves), or 1.1 times the design rating (for manual valves), followed by low pressure air (6 bar/90 psi) in accordance with API 598.

11.3.1 Preparation

Lubricants shall be removed from seats and disc sealing surfaces except, by agreement, for assembly lubricants for metal-to-metal contact surfaces.

11.3.2 Test Pressure and Duration

The test pressure for all seat tests shall not be less than 1.1 times the pressure rating (see Table 11.2). The test duration shall be in accordance with *Table 11.4*

When longer test durations are required, these will be indicated on the Application Datasheet.

Valve Size		Test Duration (minutes)
DN (mm)	NPS (inches)	
15 -100	½ - 4	2
150 - 915	6 – 36	5
Over 915	> 36	10

Table 11. 4 Minimum Duration of Seat Tests

The test shall be documented on a chart recorder or by a continuously witnessed test by a qualified person may be performed. Pressure readings shall be recorded on a frequency of no longer than 5 minutes between recorded readings.

The final pressure test record shall be dated and signed by the qualified test person.

11.3.3 Acceptance Criteria

Seat leakage shall not exceed ISO 5208 Rate A (no leakage).

Valve seat leakage shall be zero drops & zero bubbles for the duration of the test with the published torque figures applied.

11.4 Draining

Valves and valve cavities shall be drained and dried of test fluids and, where applicable, lubricated before shipment.

12 Marking Requirements

12.1 Marking

Valves shall be marked in accordance with *Figure 12.1*.

On valves whose size or shape limits the body markings, they may be omitted in the following order:

1. Size
2. Rating
3. Material
4. Manufacturer's name or trademark.

Valves shall be marked as per MSS-SP-25 plus:

Each valve shall be fitted with a stainless metal tag of 16 BWG minimum thickness, securely attached with stainless steel wire. Tags shall normally be attached to the yoke. When that is not possible, the tag may be attached to the handwheel or other appropriate location. Tags shall not be attached through bolt holes of end flanges.

These additional metal tags shall have the following information:

- a) Enbridge Valve Shipping Tag Number;
- b) Purchase order number;
- c) Functional tag number; and
- d) Any other markings as stipulated on the purchase order.

The minimum letter size shall be 0.2".

The nameplate and serial number may be omitted for valves smaller than DN 50 (NPS 2).

For valves with one seat uni-directional and one seat bi-directional only, the directions of both seats shall be specified on a separate identification plate as illustrated in *Figure 12.1*. In *Figure 12.1*, one symbol indicates the bi-directional seat and the other symbol indicates the uni-directional seat.

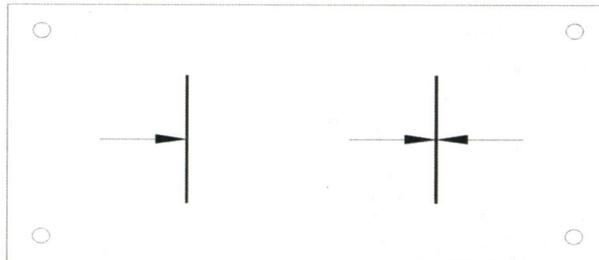


Figure 12.1 Typical Identification Plate for Valve with One Seat Uni-Directional and One Seat Bi-Directional

	Marking	Application
1	Manufacturer's name or trademark	On both body and nameplate
2	Pressure Class	On both body and nameplate
3	Pressure/temperature rating: a) Maximum operating pressure at maximum operating temperature b) Maximum operating pressure at minimum operating temperature	On nameplate
4	Face-to-face/end-to-end dimension	On nameplate
5	Body material designation: Material symbol (AISI, ASME, ASTM, ISO) Note: When body is fabricated of more than one type of steel, the end connection material governs marking.	On both body and nameplate. Melt identification (i.e., cast or heat number) on body only
6	Bonnet/cover material designation: Material symbol (AISI, ASME, ASTM, ISO)	On bonnet/cover, including melt identification (i.e., heat number)
7	Trim identification: Symbols indicating material of stem and sealing faces of closure members if different from that of body. Note: MSS-SP-25 gives guidance on marking.	On nameplate
8	Nominal valve size: a) Full-opening valves: nominal valve size b) Reduced-opening valves: shall be marked as specified in <i>Clause 6.2</i> .	On body or nameplate or both (where practicable)
9	Ring joint groove number	On valve flange edge
10	SMYS and minimum wall thickness	On body weld bevel ends
11	Flow direction	On body of uni-directional valves only
12	Seat sealing direction	Separate identification plate on valve body
13	Unique serial number	On both body and nameplate
14	Date of manufacture (month and year)	On nameplate
15	ISO 14313	On nameplate

Table 12.1 Valve Marking

13 Storage and Shipping

13.1 Shipping

Each container shall be identified with its contents as well as the purchase order number.

Valves shall be protected from damage during shipping.

When a manufacturer transports by sea, all valves and their components shall be supplied as below deck cargo in waterproof containers.

All non-corrosion-resistant valves shall be primed and/or painted externally in accordance with the manufacturer's standards.

Flange faces, weld bevel ends and exposed stems shall not be painted.

13.2 Corrosion Prevention

Prior to shipment, parts and equipment, which have bare metallic surfaces, shall be protected with a rust preventative, which will provide protection at temperatures up to 50°C (122°F).

13.3 Openings

Valve flanged and welding ends shall be blanked off to protect the surfaces, welding ends and valve internals during shipment and storage. Protective covers shall be made of wood, wood fiber, plastic or metal and shall be securely attached to the valve ends by bolting, steel straps, steel clips or suitable friction-locking devices. The design of the covers shall prevent the valves from being installed unless the covers have been removed.

Valves provided with stem extensions without an operating mechanism shall have the annular space closed and the stem extension secured against the outer housing.

14 Documentation

14.1 Bid Submission Documents and Information Package

The Vendor is advised that a complete documents and information package is a bid-qualifying requirement.

The elements of this package shall include:

- a) Verification of Enbridge valve specification number and revision
- b) Verification of conformance to EES110 and the Application Datasheet(s)

A copy of the Application Datasheet shall accompany each valve offering. Note that the Application Datasheet may apply to one valve offering or a group of identical valve offerings.

- c) Material specifications for all components of the valve at the time of actual valve manufacture. The valve torque seating and unseating values at the specified shut off pressure.

d) Alternative Features

Where the Vendor is proposing an alternative feature, the Vendor shall also provide an explanation of the benefits of the alternative.

Alternatives include exceptions and substitutions.

e) Manufacturer's Quality Control Plan

The Plan shall be precisely the Plan for use on the referenced valve order. General plans are not acceptable.

Industry certificates of conformance and quality program audit certificates shall be supplied.

f) Coating or Painting Procedures

g) Manufacturing and valve assembly locations, including third party service providers

h) Valve Assembly Drawings

Valve assembly drawings including dimensions, weights, details of sealing design and materials, auxiliary piping and valves, stem extensions, and drive train elements.

i) Delivery Dates per Valve

j) Cost per Valve

Basic Valve	
Stem Extension	
Gear Operator	
Electric Actuator Adaptation	
Coating/Painting	
NDE and Pressure Testing	
Shipping	
Documentation and Other Costs	
TOTAL	

k) Torque values for electric actuator operation

14.2 Post Award

The Vendor shall submit a minimum of the following for Company approval at an agreed upon date after award and prior to manufacture and assembly:

- a) Drawings for Approval: Dimensional outline drawings, cross-sectional drawings and detail drawings for complete valve assembly (see Clause 14.4 Vendor Documentation Schedule for details);
- b) Details of transition pieces supplied by the Vendor;
- c) Any proposed weld and heat treatment procedures;
- d) Shipping weights, lengths and widths; and
- e) Production schedule (every 2 weeks until shipment is complete).

14.3 Final Documentation

The documentation for valves shall include:

- a) Operations and Maintenance Manuals;
- b) Positive Material Identification (MTR);
- c) Weld procedure specification (WPS);
- d) Weld procedure qualification record (PQR);
- e) Welder qualification record (WQR);
- f) Records of test equipment calibration;
- g) Charpy V-notch test, when applicable
- h) Non-destructive examination records;
- i) Melt identification certificates for body bonnet/cover(s) and end connector(s) traceable to the unique valve serial number;
- j) All valve drawings;
- k) Detailed parts lists;
- l) Any other specific requirements listed in the purchase order;
- m) Confirmation that the valve provided has been fabricated and shipped in accordance with the requirements of this specification and the purchase order;
- n) Completed Maximo data sheet;
- o) Serial number for tracing the valve bill of materials;
- p) Charts or test certificates for hydrostatic tests; and
- q) Final QA/QC documentation package.

One copy of each of the above items is to be shipped with the valve. The remaining copies are to be shipped to the location listed in the purchase order as directed by the Company. Documentation shall be provided by the manufacturer in legible, retrievable and reproducible form, and free of damage.

14.4 Vendor Documentation Schedule

DATA AND DRAWINGS REQUIRED	Bid Proposal	Post Award	Shipment
	No. of Copies	No. of Copies	No. of Copies
1. Dimensioned Outline Drawings	1P (1E)	2P, 1E	2P, 1E
2. Cross Sectional Drawings		2P, 1E	2P, 1E
3. Detail Drawings		2P, 1E	2P, 1E
4. Assembly - Erect Drawings			
5. Foundation/Anchor Bolt Drawings			
6. Piping Drawings			
7. Wiring/Schematic Diagrams (Hydraulic)			
8. Parts List			2P
9. Priced Recommended Spare Parts List			2P
10. Installation, Operations and Maintenance Manuals			2P
11. Equipment Data Sheets	1P (1E)	2P	2P
12. Shipping Weight(s)	1P (1E)	2P	2P
13. Manufacturers Test Reports			2P
14. Mill Test Certificates			2P
15. Nameplate Data		2P	2P
17. Hydrostatic Test Charts			2P
18. Materials Specification and Manufacturing Standard	2P (1E)	2P	2P
19. Certified Final Drawings			
20. MAXIMO Information			
21.			
22.			

P – Print E – Electronic

Appendix I
Application Datasheet

**SPECIFICATION FOR TRIPLE OFF-SET VALVES
EES110-2007**



Valve Application Datasheet (Page 1 of 2)

Date: (To be completed by Enbridge representative.)

Material Requisition No. Revision:

Quantity Required:

Project Location: Canada USA

Project Name / Number:

Description of Application:

Functional Tags:

Shipping Tags:

Below Grade Yes No

Fluid: Oil NGL Refined Products Ambient Temperature °C min / °C max

Fluid Product Description Max. Differential Pressure

Process Conditions	Temp (°C)	Vapor Pressure (kPa)	Viscosity (CP)	Density (kg/m ³)	Flow Rate (m ³ /hr)	Pressure (kPa)	Solids %	Corrosives
Minimum								
Normal								
Maximum								

Valve Size: mm / inch **Port Size:** Full Reduced

Piping Class (PN) ANSI	Valve Body Style	Additional Dimensional Requirements	
<input type="checkbox"/> (20) 150	<input type="checkbox"/> Buttweld		
<input type="checkbox"/> (50) 300	<input type="checkbox"/> Lugged		
<input type="checkbox"/> (68) 400	<input type="checkbox"/> Wafer		
<input type="checkbox"/> (100) 600	<input type="checkbox"/> Flanged	<input type="checkbox"/> Short Pattern	<input type="checkbox"/> Long Pattern
<input type="checkbox"/> (150) 900			

Charpy V-notch test required? Yes No Test Temperature: _____ No

Supplemental Information for Welded Valves (to be completed when specifying welded valves)

Pipe Material and Grade

Pipe OD mm (inch)

Wall thickness mm (inch)

Auxiliaries

Additional valve support members? Yes No

Description:

Lifting Lugs Yes No

Valve Application Datasheet (Page 2 of 2)

Drive Train Elements:					
Manual	Yes	No	By Manufacturer	By Others	
Electric	Yes	No	By Manufacturer	By Others	
Electric / Hydraulic	Yes	No	By Manufacturer	By Others	
Gear Operation with Handwheel	Yes	No	By Manufacturer	By Others	
Valve Stem Extension?	<input type="checkbox"/> Yes	<input type="checkbox"/> No			
Stem Extension Dimension	_____mm(inch)				
Valve Opening Centreline to gearbox or actuator mounting flange:	_____mm(inch)				
Actuator Adaptation	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> By Manufacturer	<input type="checkbox"/> By Others	
Actuator Mounting	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> By Manufacturer	<input type="checkbox"/> By Others	
Coating/Painting:					
Coating for below grade valve?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A		
Painting for above grade valve?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A		
Hydrostatic Testing:					
Hydrostatic Shell Test	Pressure:		Duration:		
Hydrostatic Seat Test	Pressure:		Duration:		
Extended Hydrostatic Shell Test required?	<input type="checkbox"/> Yes	<input type="checkbox"/> No			
Extended Hydrostatic Shell Test	Pressure:		Duration:		
Gasket / O-Ring Material:	<input type="checkbox"/> Kalrez	<input type="checkbox"/> Nitrile	<input type="checkbox"/> Viton	<input type="checkbox"/> Other	
Seat Material					
Additional Notes:					
Reference Drawings:					
Prepared by:					
Engineer / Designer Name:					
Revision	Description	By	Reviewed	Approved	Date

**Appendix II
Maximo Data**

Cline, Sandy (PHMSA)

From: David Hoffman [David.Hoffman@enbridge.com]
Sent: Sunday, September 06, 2009 5:12 PM
To: Griffis, Carl (PHMSA)
Cc: Shaun Kavajecz
Subject: Manhattan Terminal Inspection Aug 18 - 19
Attachments: Enbridge Justification regarding applicability to Breakout Tank Construction to 49 CFR Part 195.222(b)(2).doc; Matrix Response Letter.pdf; Matrix Proposal - Manhattan Tanks 10-18-07.pdf

Carl,

Again, I apologize for the delay in responding to the two final inspection issues.

Following your inspection, Enbridge Project and Compliance personnel reviewed your concern regarding the requirement to have radiographic evidence to support continued welder qualifications for welders constructing the tanks at the Enbridge Manhattan Terminal. Following discussions with Matrix, and internal resources, Enbridge believes that 49 CFR Part 195.222(b)(2) is not applicable to breakout tank welders, welding per ASME Boiler and Pressure Vessel Code/API 650 pursuant to 49 CFR Part 195.214. As such, this information is not maintained by nor available from Matrix. Please find attached Enbridge's justification, as well as an information package from Matrix, which further describes their welder qualification process.

Also attached is a copy of the "Matrix Proposal – Manhattan Tanks 10-18-07", which highlights that Tank Project specifications. This document should replace the *Part 5 Specific Conditions* that was previously provided (tank spec binder). The Part 5 Specific Conditions are not applicable to the Manhattan Tank Project and were provided in error. Please replace Tab 1 – Part 5 Specific Conditions with the attached Matrix Proposal. This proposal document, along with the *Project Specifications – Part 6* and the *API Data Sheets* are applicable to the tank construction at the Manhattan Terminal.

Following your/PHMSA review of this information, please feel free to call to discuss anytime.

The information in response to your issue regarding Triple Offset Valve seat testing meeting the requirements of API 6D is forthcoming.

Regards,

Dave

Dave Hoffman

Supervisor, US Compliance - | Enbridge Energy Company, Inc.
119 N 25th Street E | Superior, WI 54880
☎ Office: (715) 394-1540 | ☎ Cell: (715) 718-1179

***** IMPORTANT NOTICE *****

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September 2, 2009

From: Gerald W. Fethke

Subject: DOT Audit

To: Kraig Erickson

Kraig,

We certify our welders to ASME Section IX QW 300. We have a welder take a 2G, 3G, and 4G positions for SMAW and FCAW processes that they will be welding with. The weld test can be either bend test or X-Ray. We do the bend test and the results are reviewed and either accepted or rejected by me. The information for the weld test is reported on the Welder or Welding Operator Performance Qualification (WPQ) which goes into the welders file. The test results are listed in the Guided Bend Test (QW-160) of the welders WPQ. Also under that section is a location for Radiographic test results if X-Ray was used for his certification. Attached is a sample copy of both.

Welder's continuity is done in accordance with ASME Section QW 322. A welder has to weld with each process during a six month period to maintain his continuity. The foreman fill out the continuity update and send it into me or call it in and I do the continuity update. Attached is a Sample of the continuity up date and Continuity Report.

Eye exam's are in accordance with our Visual inspection procedure and our Vacuum Box Leak Testing of Welds procedure and they are given a Jaeger Type No. 2 eye exam which is good for one year from exam date. The eye exams where given by myself. I am a CWI 04111331 Expiration Date 11/1/2010, Welding Inspector and ACCP Level II, Method VT, Sector GI, Technique D, Exp Date 11/10, CP No. 156366. Attached is a copy of the Eye Exams and my eye continuity concerning personnel at Manhattan.

Weld Maps are done by the foreman and are in their trailers along with the X-Ray locations. We X-Ray the tank per API 650 Section 8, par. 8.1 Radiographic Method. Attached is a sample copy of the X-Ray and welder locations.

The above information will be supplied in the close out binders. Any questions please feel free to contact me at 734-847-4605 ext. 113 or my cell 734-497-2282.

Regards,


Gerald W. Fethke
Quality Control Manager

Matrix Service, Inc.
6945 Crabb Road
Temperance, MI 48182

SAMPLES

Welder or Welding Operator Performance Qualification (WPQ)

Welder's Name: Bosch, Jared Stamp: JB3395

Test WPS No.: FC-014-1 Rev.: 14 WPQ No.: _____

Date: 3/13/2007

Welding process(es) / type(s) used: FCAW / Semiautomatic

Type of joint welded: Plate Groove weld Joint type(s) qualified: Groove and Fillet Welds

Base metal(s) welded: SA-36 to SA-36

Welder Variables (QW-350)	Actual Values Used	Range Qualified
P- or S-Number to P- or S-Number	P-No. 1 to P-No. 1	P-1 thru P-11, P-34 & P-4X
Base metal thickness (in.)	0.625	WPS Limits
Pipe diameter (in.)	N/A	2.875" minimum (n1)
	FCAW / Semiauto	FCAW / Semiauto
Backing **	No backing used	With or without backing
AWS classification	E71T-1	
Filler metal specification (SFA)	5.20	5.xx
Filler metal F-No.	6	F-No. 6
Filler metal product form	N/A	N/A
Consumable insert	N/A	N/A
Deposit thickness (in.) [≥ 3 layers]	0.625 [Yes]	WPS Limits
Welding position	2G, 3G, & 4G	All Positions
Weld progression	Vertical up	Vertical up (n4)
Backing gas	No backing gas used	With or Without backing gas
GMAW / FCAW transfer mode	Spray arc	Spray, Pulsed, or Globular

Machine Welding Variables (QW-360)	Actual Values Used	Range Qualified
Direct / remote visual control	N/A	N/A
Automatic voltage control	N/A	N/A
Automatic joint tracking	N/A	N/A
Welding position	N/A	N/A
Consumable insert	N/A	N/A
Backing **	N/A	N/A
Single / multiple pass per side	N/A	N/A

Fillet Welds: Qualified to make fillet welds of any size on all base material thicknesses and pipe diameters of any size.
 ** Welds with backing include fillets and double-welded groove welds.
 Notes: (n1) Pipe with O.D. ≤ 24 " limited to flat rotated & horizontal.
 (n4) The root pass, when removed to sound weld metal in preparation for welding the second side, and the cover or wash pass may be up or down.

Guided Bend Test (QW-160)

Figure Number and Type	Result	Figure Number and Type	Result
QW-462.2 Side bend	Satisfactory	QW-462.2 Side bend	Satisfactory
QW-462.2 Side bend	Satisfactory	QW-462.2 Side bend	Satisfactory
QW-462.2 Side bend	Satisfactory	QW-462.2 Side bend	Satisfactory

Visual examination results: Visual exam satisfactory per QW-302.4 and QW-194

Radiographic test results: None

Welding test conducted by: Matrix Service, Inc.

Mechanical/Radiographic tests conducted by: Matrix Service Industrial Contractors, Inc.

Lab test no.: JB5084

We certify that the statements in this record are correct and that the test coupons were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME code.

Organization: Matrix Service, Inc.

Certified By: *Marcus W. Fittler*

3/13/2007 Quality Control
Date

Matrix Service Company
6945 Crabb Road
Temperance, MI 48182

SAMPLE

Welder or Welding Operator Performance Qualification (WPQ)

Welder's Name: Bosch, Jared Stamp: JB3395

Test WPS No.: EG-003-1 Rev.: 0 WPQ No.: _____

Date: 6/17/2009

Welding process(es) / type(s) used: EGW / Machine

Type of joint welded: Plate Groove weld

Joint type(s) qualified: Groove and Fillet Welds

Base metal(s) welded: SA-36 to SA-36

Welder Variables (QW-350)	Actual Values Used	Range Qualified
P- or S-Number to P- or S-Number	P-No. 1 to P-No. 1	All base metals
Base metal thickness (in.)	0.925	WPS Limits
Pipe diameter (in.)	N/A	All diameters
	EGW / Machine	EGW / Mach. and Auto.
Backing **	N/A	N/A
AWS classification	N/A	N/A
Filler metal specification (SFA)	N/A	N/A
Filler metal F-No.	N/A	N/A
Filler metal product form	N/A	N/A
Consumable insert	N/A	N/A
Weld deposit thickness (in.)	N/A	N/A
Welding position	N/A	N/A
Weld progression	N/A	N/A
Backing gas	N/A	N/A

Machine Welding Variables (QW-360)	Actual Values Used	Range Qualified
Direct / remote visual control	Direct control used	Direct control required
Automatic voltage control	N/A	N/A
Automatic joint tracking	Manual tracking	With or Without auto tracking
Welding position	3G - Vertical	F & V (Fillet - F, H, & V)
Consumable insert	N/A	N/A
Backing **	N/A	N/A
Single / multiple pass per side	Single pass	Single pass

Fillet Welds: Qualified to make fillet welds of any size on all base material thicknesses and pipe diameters of any size.

** Welds with backing include fillets and double-welded groove welds.

Notes: This EGW test recertifies him for all EGW process per ASME Section IX para QW 322.2.

Guided Bend Test (QW-160)

Figure Number and Type	Result	Figure Number and Type	Result
None		None	
None		None	
None		None	

Visual examination results: Visual exam satisfactory per QW-302.4 and QW-194

Radiographic test results: Acceptable Per QW-302.2 and QW-191

Welding test conducted by: Matrix Service Company

Mechanical/Radiographic tests conducted by: Calument Testing Services

Lab test no.: JB3395

We certify that the statements in this record are correct and that the test coupons were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME code.

Organization: Matrix Service Company

Certified By: Gerald W. Fethke
Gerald W. Fethke

6/17/2009 Quality Control Manager
Date

Date

Matrix Service Company
6945 Crabb Road
Temperance, MI 48182

SAMPLE

Update Summary

Report Date: 8/6/2009

Foreman: Douglas D

Location: Michigan

Sorted By: Welder Name

Generated: 8/6/2009

A struck-out date indicates an expired process.

Process	Welder Name	ASME	Expiration Date(s)	Stamp Number	Weld Date	Inspection Type	Inches Inspected	Inches of Defect	Job	Witnessed By
SMAW / Manual	Bosch, Jared	ASME	9/4/2009	JB3395						
FCAW / Semiautomatic		ASME	9/2/2009							
SAW / Machine		ASME	9/9/2009							
EGW / Machine		ASME	12/17/2009							
SMAW / Manual	Dennison, Douglas C.	ASME	1/8/2010	DD6425						
SAW / Semiautomatic		ASME	9/24/2006							
SAW / Machine		ASME	12/29/2009							
GTAW / Manual	Squires, Rayman E.	ASME	8/18/2009	RS0578						
SMAW / Manual		ASME	1/23/2010							
FCAW / Semiautomatic		ASME	1/16/2010							
SAW / Machine		ASME	1/28/2010							
EGW / Machine		ASME	10/2/2008							
SMAW / Manual	Stout, Ronnie	ASME	11/21/2009	RS2661						
FCAW / Semiautomatic		ASME	1/28/2010							
SMAW / Manual	Stout, Stacy	ASME	1/8/2010	SS0180						
FCAW / Semiautomatic		ASME	9/2/2009							
SAW / Machine		ASME	12/4/2009							

A strike-out date indicates an expired process.

Process	Expiration Date(s)	Weld Date	Inspection Type	Inches Inspected	Inches of Defect	Job	Witnessed By
---------	--------------------	-----------	-----------------	------------------	------------------	-----	--------------

Certified by: *Gerald W. Pithers*

8/6/09 Date
Quality Control

SAMPLE

Matrix Service Company
6945 Crabb Road
Temperance, MI 48182

SAMPLE

CONTINUITY HISTORY 2 COLUMN

Generated: 9/2/2009

Page 1 of 5

This Report will only show information where:
Foreman = 'Douglas Dennison'

Welder: **Bosch, Jared** Status: **Active** Stamp: **JB3395**

Process	Weld Date	Job Number	Weld Date	Job Number
Foreman Douglas Dennison				
Foreman Douglas Dennison				
EGW / Machine	6/17/2009	WPS: EG-003-1	4/3/2008	0087
	10/16/2007	0083	9/18/2007	WPS: EG-001-1
FCAW / Semiautomatic	3/2/2009	0109	2/3/2009	0109
	9/9/2008	0085	4/21/2008	0083
	11/30/2007	0083	6/12/2007	0072
	3/13/2007	WPS: FC-014-1		
SAW / Machine	3/9/2009	0109	9/30/2008	0085
	4/1/2008	0083	12/6/2007	0083
	10/17/2007	WPS: SA-009-1		
SMAW / Manual	3/4/2009	0109	1/26/2009	0109
	9/8/2008	0085	4/21/2008	0083
	12/6/2007	0083	6/12/2007	0072
	3/13/2007	WPS: SM-064-1		

Date: _____ *SAMPLE*

To Whom It May Concern:

This is to certify that _____ has successfully passed his Jaeger 2 eye exam and color contrast plates. He has successfully demonstrated his ability to do reinforcing pad air test, diesel test of welds, vacuum box test, and the hydro test.

Certify by,

Gerald w. Fethke
Quality Control Manager
ACCP Level II VT

Eye continueity

Name	Date of exam	Date of experation
Jeff L. Franke	9-Sep-08	9-Sep-09
Burtis Franke Jr.	8-Sep-08	Sep-09
Josh Zeigler	8-Sep-08	Sep-09
J. D. Shaver	9-Sep-08	Sep-09
Doug Kamhout	9-Sep-08	Sep-09
Raymond Squires	8-Sep-08	8-Sep
Andrew Long	9-Sep-08	9-Sep
David Marlow	9-Sep-08	9-Sep
Barry Coppage	3-Feb-09	3-Feb-10
Barry K. Coppage	3-Feb-09	3-Feb-10
Carl Corley	8-Apr-08	8-Apr-09
Rick Bobzien	16-Dec-08	16-Dec-09
Jake Bobzien	16-Dec-08	16-Dec-09

William Payne	20-Jan-09	20-Jan-10
Dan Cottrill	20-Jan-09	20-Jan-10
Trevor Edgar	20-Jan-09	20-Jan-10
Ryan Bevans	20-Jan-09	20-Jan-10
Shannon Heidebur	20-Jan-09	20-Jan-10
Steve Toman	20-Jan-09	20-Jan-10
Tim Goodman	3-Feb-09	3-Feb-10
Jonathan Leftwich	3-Feb-09	3-Feb-10
Kevin Cecil	3-Feb-09	3-Feb-10
Brian Williams	3-Feb-09	3-Feb-10
Craig Foster	3-Feb-09	3-Feb-10
Larry Roubebush	21-Jan-09	21-Jan-10
David Roberts	21-Jan-09	21-Jan-10
Jared Bosch	21-Jan-09	21-Jan-10
Jeff Medendorph	21-Jan-09	21-Jan-10
Kyle Bremner	21-Jan-09	21-Jan-10
Kyle Parks	21-Jan-09	21-Jan-10
Bradley Rose	21-Jan-09	21-Jan-10
Lanny Fowler	20-Jan-09	20-Jan-10
Keith Curnel	20-Jan-09	20-Jan-10
Kevin Sears	20-Jan-09	20-Jan-10
Joe Satterly	20-Jan-09	20-Jan-10
Danny Aaron Fowler	20-Jan-09	20-Jan-10
Anthony Minton	21-Jan-09	21-Jan-10
Mike Brown	21-Jan-09	21-Jan-10
Ben Wright	21-Jan-09	21-Jan-10
Mike Casey	21-Jan-09	21-Jan-10
James Courtney	21-Jan-09	21-Jan-10
Donny Pickles II	21-Jan-09	21-Jan-10
Donnie Pickles SR	21-Jan-09	21-Jan-10

Mike Bush	5-May-08	5-May-09
Scott James	13-Apr-09	13-Apr-10

James Bush	7-Jul-08	7-Jul-09
Trinity Holberet	13-Apr-09	13-Apr-10
Trent Goodman	7-Jul-08	7-Jul-09

Clay Harris	13-Apr-09	13-Apr-10
Donald M. Phillips	13-Apr-09	13-Apr-10

Johnny Allman	13-Apr-09	13-Apr-10
Mike Whitney	13-Apr-09	13-Apr
Wyatt Miel	13-Apr-09	13-Apr
Zack Jacobs	13-Apr-09	13-Apr
Seth Shaw	13-Apr-09	13-Apr

Jeremy Autry	13-Apr-09	13-Apr-10
Dustin Raley	13-Apr-09	13-Apr-10
Cory Shadburn	13-Apr-09	13-Apr-10
Jack Autry	13-Apr-09	13-Apr-10
Mike Grant	16-Mar-09	16-Mar-10
Jarod Allen	16-Mar-09	16-Mar-10
Larry Schroader	16-Mar-09	16-Mar-10
Jason Osborne	16-Mar-09	16-Mar-10
Jerry Bailey	16-Mar-09	16-Mar-10
Andrew Kissel	12-Feb-09	12-Feb-10
Brian Stultz	12-Feb-09	12-Feb-10
Derek Bailey	12-Feb-09	12-Feb-10
William Merwin	12-Feb-09	12-Feb-10
Frank Hoskins	12-Feb-09	12-Feb-10
James Bonnett	5-Feb-09	5-Feb-10
Steve Romager	5-Feb	5-Feb-10
Allen Smyth	5-Feb-09	5-Feb-10

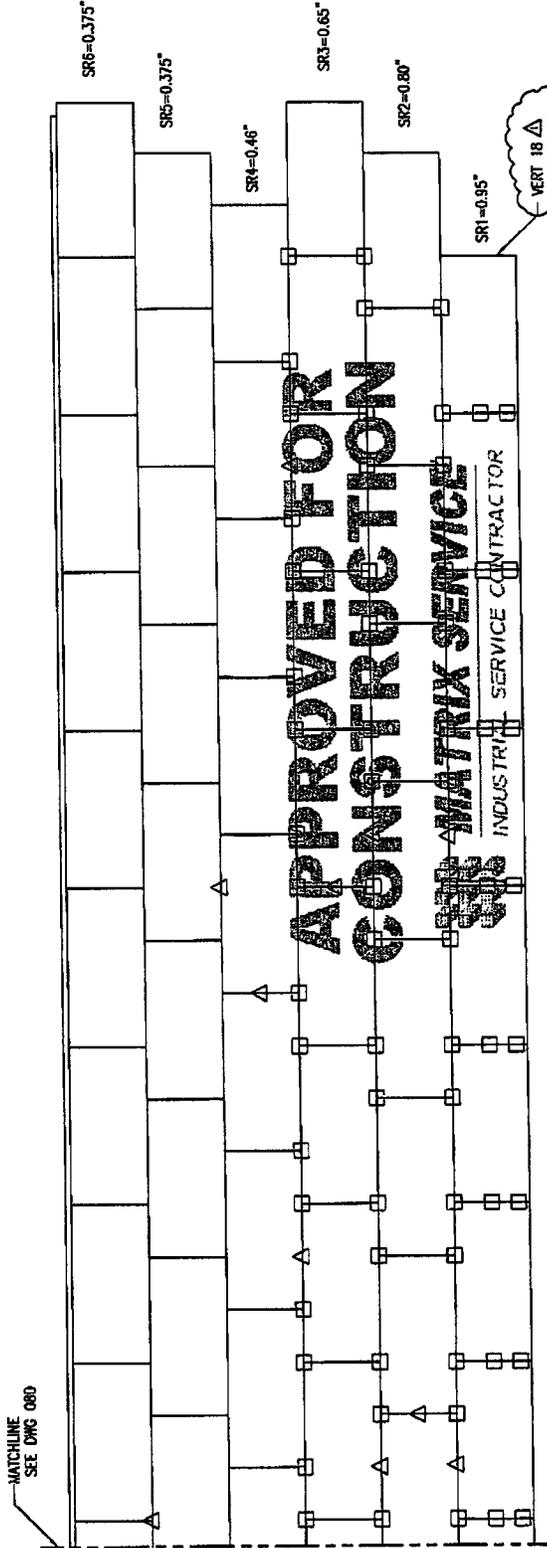
Jim Merritt	5-Feb-09	5-Feb-10
Ronnie Stout	5-Feb-09	5-Feb-10
Jason Stultz	5-Feb-09	5-Feb-10
Douglas Dennison	14-Apr-09	14-Apr-10
Tim Starkey	8-Sep-08	8-Sep-09
Joseph Farrell	8-Sep-08	8-Sep-09
Nate Kelly	9-Sep-08	9-Sep-09
Joel Johnson	8-Sep-08	8-Sep-09
Joshua H. Cook	11-Jun-09	11-Jun-10
Stacy Stout	11-Jun-09	11-Jun-10
Mike Coy	12-Jun-08	12-Jun-09
Jason Calloway	12-Jun-08	12-Jun-09
Mark Coy	12-Jun-08	12-Jun-09
Aaron Muscari	20-May-09	20-May-10

James Call	20-May-09	20-May-10
Charles McDermitt	20-May-09	20-May-10
Mike Swartzmiller	20-May-09	20-May-10

Andrew Williams	13-Apr-09	13-Apr-10
------------------------	------------------	------------------

Bill Corley	13-Apr-09	13-Apr-10
Will Ashby	13-May-08	13-May-09
Keith Williams	13-Apr-09	13-Apr-10

Sample



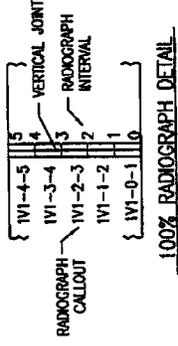
SHELL PLATE DEVELOPMENT
VIEWED FROM OUTSIDE TANK

RADIOGRAPH TAG LEGEND

111	HORIZONTAL RADIOGRAPH
111B-1	REPAIR RADIOGRAPH
111-1	RADIOGRAPH NUMBER
111-2	HORIZONTAL SEAM
111-3	SHELL RING NUMBER
111-4	VERTICAL RADIOGRAPH
111-5	OR 8
111-6	TRACER RADIOGRAPH
111-7	REPAIR NUMBER
111-8	MIDDLE
111-9	VERTICAL SEAM NUMBER
111-10	VERTICAL SEAM
111-11	SHELL RING NUMBER
111-12	100% RADIOGRAPH
111-13	OR 1
111-14	INTERVAL
111-15	TOP OF VERTICAL SEAM
111-16	BOTTOM OF VERTICAL SEAM
111-17	VERTICAL SEAM NUMBER
111-18	VERTICAL/HORIZONTAL JUNCTION
111-19	SHELL RING NUMBER

NOTE:

- FIELD IS TO MARK 0 DEGREES ON THE WELD MAP.
- AND ○ SYMBOLS REPRESENT RADIOGRAPHS THAT MUST BE TAKEN AT THE EXACT LOCATION SHOWN ON THE DRAWING. EXACT LOCATION TO BE MARKED BY FIELD, HOWEVER, LOCATION SELECTED MUST BE IN THE SAME COURSE AS SHOWN.
- △ SYMBOL REPRESENTS RANDOM LOCATION OF RADIOGRAPHS. EXACT LOCATION TO BE MARKED BY FIELD, HOWEVER, LOCATION SELECTED MUST BE IN THE SAME COURSE AS SHOWN.
- SYMBOL REPRESENTS RADIOGRAPHS THAT MUST BE TAKEN IN THE FIRST TEN FEET OF WELD OF THE TYPE SHOWN. EXACT LOCATION TO BE MARKED BY FIELD. SYMBOL FOR FIRST TEN FEET OF VERTICAL WELD IS NOT SHOWN IN THE BOTTOM RING DUE TO THE REQUIREMENT TO TAKE A RADIOGRAPH IN EVERY VERTICAL JOINT IN THE BOTTOM RING. QUANTITIES OF RADIOGRAPHS TO BE TAKEN IN THE FIRST TEN FEET OF WELD, NOTE 4, ARE CALCULATED ASSUMING ONLY ONE WELDER. ADD ONE ADDITIONAL RADIOGRAPH FOR EACH ADDITIONAL WELDER.



3	REV	TANK NUMBER	REV NUMBER	DATE
2	1	REV	1	04/02/2008
1	1	REV	1	04/02/2008
MATRIX SERVICE INDUSTRIAL SERVICE CONTRACTOR				
TITLE: SHELL RADIOGRAPH				
CUSTOMER: ENBRIDGE ENERGY COMPANY, INC.				
CITY: HAWTHAYN STATE/PROVINCE: IL				
TANK NO.: 2 WEST TANK DIAMETER: 186'-0" HEIGHT: 56'-2"				
DRAWN: AR 02/05/2008 DWG: 08E				
CHECKED: DJL 04/02/2008				
APPROVED: SH 04/02/2008 JOB NO.: 3121-0094 REV. NO.: 1				



MATRIX SERVICE INC.

INDUSTRIAL SERVICE CONTRACTOR

October 18, 2007



Bassam Abukhodair, P.E.
Enbridge Energy Company, Inc.
119 N. 25th Street East
Superior, WI 54880

Attn: Bassam Abukhodair, P.E.

Reference: Matrix Proposal Number: 312100700071
Manhattan, Illinois Terminal

Mr. Bassam Abukhodair:

Matrix Service is pleased to submit this target price proposal to provide engineering, material, labor and freight to erect the following tanks per your request.

Construction of:

(2) Manhattan, IL @ 208,107 Barrel – 180'Ø x 56'2" CRT w/ IRF

I. Includes:

- A. Engineering, materials, fabrication, and construction of the tanks referenced above.
- B. Hydro-test tanks, with the exceptions noted below.
- C. Tank appurtenances as listed below.
- D. Foam Fire System Piping & Chambers
- E. Tank Strapping
- F. NDE / Radiography per API 650.
- G. Tank Foundation.
- H. Internal & External Coating.
- I. Cathodic protection supply and installation.

II. Excludes:

- A. Tank Insulation or insulation brackets
- B. Heating coils.
- C. Hydro-pneumatic testing.
- D. Electrical & Instrumentation
- E. Tank Mixers

III. Design Information / General Details:

- A. See attached Preliminary Designs for design parameters.
- B. Net working capacity is computed from low product level of 5' -0" to the floating roof deck at 50'-11".
- C. The design temperature is -5 degrees F
- D. Tank to be constructed and tested per API 650 10th edition addition 4, Appendix M, Matrix standard construction procedures, and Enbridge specifications.
- E. Matrix Service considers the new tanks during construction a non-permit required confined space until the door sheets is secured.

- F. Price includes any safety personnel as required by Matrix Service.
- G. Continuous air monitoring of the tank site's atmosphere is included.
- H. Matrix Service will utilize the wind girder as an exterior scaffold or approved tank builder scaffolding for the tank construction.
- I. Price includes site-specific safety training. Tank to be constructed in accordance with Matrix standard safety rules and regulations. A copy of the Matrix Service Corporate Safety Manual can be provided upon request.
- J. Proposal does not include building, construction and/or environmental permits.
- K. Electrical, valves, and instrumentation are not included.
- L. Unless otherwise noted in this proposal, Matrix Service, Industrial Constructors Inc. scope stops at the face of each flange.
- M. Tank nozzles and flanges will be installed per Industry and Matrix standard practice tolerances. Matrix will not be responsible for piping outside the first flange on the tanks.
- N. We have not included any internal tank appurtenances other than the diffusers, roof drain, and bottom draw.
- O. Tank is swept clean at construction completion.
- P. Additional work will be estimated and added to the original target price.

IV. Welding:

- A. All welding procedures, welders, and welder qualification will be per API 650, ASME Section IX and Matrix standard policy.
- B. Welder procedures and qualifications will be provided upon request.
- C. All bottom and roof welds are fillet welds on the topside only. We have also included stitch welding of the underside of the floating roof.
- D. Matrix Service standard NDE includes radiography per applicable code noted above, vacuum box test the tank bottom, diesel test the corner weld and pneumatic test all shell reinforcing pads.

V. Site Conditions:

- A. There will be no overhead obstructions of any kind.
- B. Dewatering of site by others.
- C. Construction equipment can move completely around the tank.
- D. There will be sufficient space around the immediate tank site to shake out steel and store it for erection.
- E. The work area will be safe for our work and that we will be able to proceed according to a pre-planned construction schedule, working 4 days per week 10 hours per day, and that we will not be delayed.

VI. Hydro-testing:

- A. Proposal includes hydro test of tanks.
- B. Based on 752 man-hours for hydrostatic testing and cleaning.
- C. Hydro-testing based on filling and draining the water twenty-four hours per day.
- D. Proposal excludes permits for hydro-test and/or testing the water before or after the hydro-test.
- E. Proposal excludes any treatment (filtering) of the test water.
- F. Proposal based on water source for hydro-test is within 200 Ft. of the tank and is based on 1,000/gpm fill and drain rates.
- G. The hydro-test water will be disposed of within 200 Ft. of the tank. If required, the owner will do treatment of the hydro-test water before disposal.
- H. Proposal includes survey level measurements before, during and/or after testing.
- I. Matrix Service will readjust target cost for any delays or other costs associated with foundation settlement or retesting of the tank due to causes that are not a direct result of tank construction.

VII. Appurtenances:

Shell Nozzles:

- (1) 3" 150# RFSO Nozzle
- (2) 4" 150# RFSO Nozzle
- (1) 10" 150# RFSO Nozzle
- (1) 12" 150# RFSO Nozzle
- (3) 24" 150# RFSO Nozzle

Shell Manways & FCO's:

- (1) 36" x 48" API 650 FCO
- (3) 24" API Shell Manways
- (2) 30" API Shell Manways

Roof Nozzles:

- (1) 4" 150# RFSO Nozzle
- (1) 6" 150# RFSO Nozzle
- (2) 8" 150# RFSO Nozzle

Roof Manway:

- (1) 24" API 650 Deck Manway w/ pressure relief
- (2) 10" Vacuum Breakers

Misc. Appurtenances:

- (3) 8" Combination Gauge Poles
- (2) 24" Tank Mixer Manways
- (1) 4" Roof Drain Mesa hose system

Stairway and/or ladder:

- (1) Radial Stairway
- (1) Top of Tank platform
- (1) Intermediate Tank platform

Seals

- (1) Stainless Primary Shoe Seal w/ urethane vapor barrier
- (1) Stainless Matrix Secondary Flex-a-Seal w/ urethane vapor barrier
- (1) Wax Scrapper

VIII. Construction Crew:

- A. Tank erection crew size will be approximately 5-6 men per tank based upon the type of work being performed.
- B. Works hours are to be 40 hours per week using a 4/10 schedule (Mon. - Thurs.).
- C. One site mobilization and de-mobilization is included.

IX. Schedule:

- A. Preliminary schedule is based on a site mobilization date of August 1st, 2008.
- B. Should this schedule not meet your requirements, please allow us to make necessary adjustments to our proposal.
- C. No cost has been added due to weather delay for this project.

X. Pricing Summary – Break out pricing provided using Enbridge Pricing Forms and included with Proposal Package

Item #	Qty	Description	Per BBL Price	Total Price
1	1	Standard Tank Construction including 1/16" Corrosion Allowance	\$20.70	\$6,851,045
2	1	Standard Tank Construction including 1/16" Corrosion Allowance	\$20.70	\$6,851,045

- 4-10's pricing reflected above
- Price per BBL is based on the Nominal Capacity and does not reflect Painting & Civil/Foundation work.

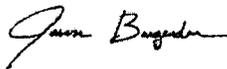
Terms:

- A. The Target Price is firm for 30 days.
- B. Matrix reserves the right to review the material cost from the vendors after 30 days.
- C. The price of carbon or alloy products in this bid includes current surcharges for the month in which it is quoted. Due to the instability of the metals market all material prices are subject to reconfirmation at time of delivery.
- D. Please note that the Lump Sum Bid Price includes all applicable taxes.
- E. Performance and/or payment bonds are not included.
- F. Matrix Service is confident that if awarded the contract that both parties will be able to reach mutually agreeable terms and conditions.
- G. All payments due, net Fifteen (15) days. Payment schedule to follow Enbridge / Matrix Service Master Service Agreement (MSA).
- H. Matrix will supply Purchaser evidence, through a valid Certificate of Insurance, of current coverage for Workmen's Compensation, Employer's Liability, Comprehensive General Liability, and Comprehensive Automobile Liability.
- I. Matrix will warranty for a period of twelve (12) months from date of tank completion, all material and workmanship. Matrix offers no warranty for chemical and/or other actions, which occur between the tank and the product stored therein.
- J. Guarantees from manufactures of equipment, installed on the tank by Matrix, shall be for the benefit of the Purchaser. Matrix liability shall be limited to that of the equipment manufacturer.

Thank you for the opportunity to submit this proposal. We look forward to working with you on this project. Please feel free to contact me should you have questions or require additional information.

Sincerely,

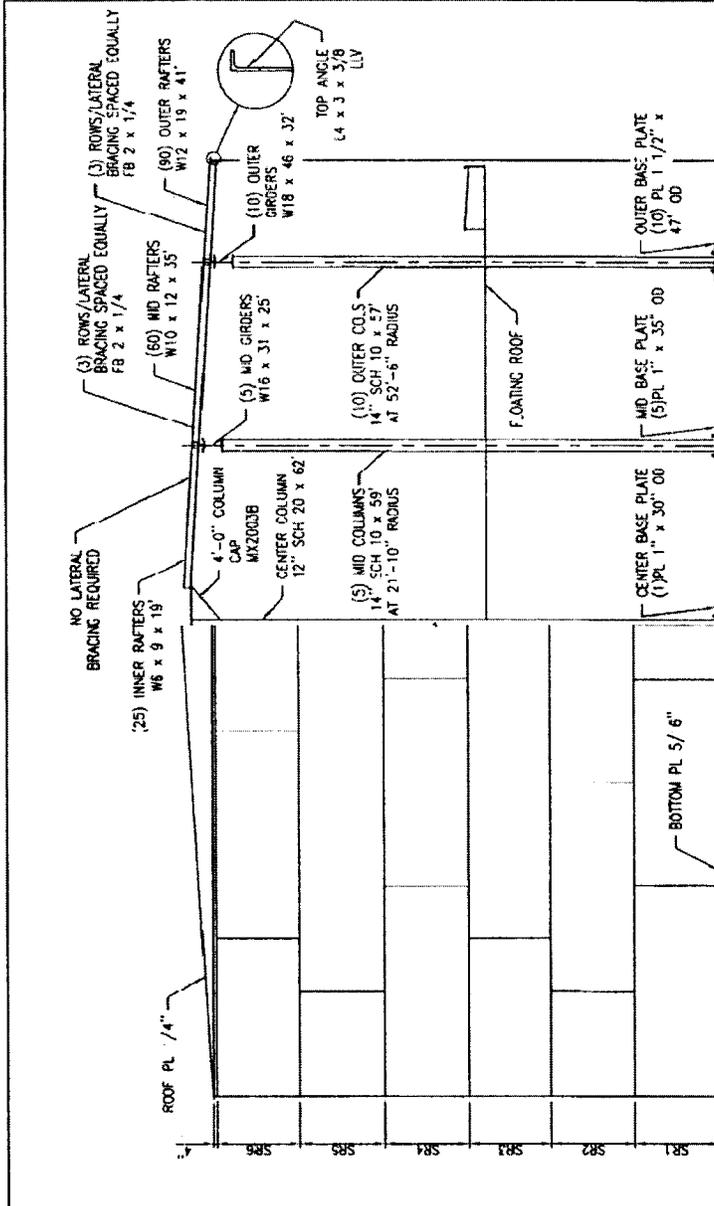
MATRIX SERVICE



Jason Bargender, E.I.T.
Project Manager

- NOTES:
- NET WORKING CAPACITY COMPUTED FROM LOW PRODUCT LEVEL OF 5'-0" TO THE FLOATING ROOF DECK AT 50'-11". FLOATING ROOF DECK IS 4" BELOW THE DESIGN LIQUID LEVEL.
 - BASE FLATES DESIGNED USING AN ALLOWABLE BEARING PRESSURE OF 2500 PSF.
 - A36 GR. IS API GROUP II MATERIAL AND SHALL HAVE A MANGANESE CONTENT BETWEEN 0.82-1.24 BY HEAT ANALYSIS.
 - ALL WIRE FLANGE BEAMS (W SHAPES) TO BE A572-50 OR A992 MATERIAL.
 - A CORROSION ALLOWANCE OF 1/32" HAS BEEN APPLIED TO EACH SURFACE OF ROOF STRUCTURE FOR A TOTAL CORROSION ALLOWANCE OF 1/16".
 - SHELL MATERIAL IN COILSSES SRI THROUGH SRI REQUIRE IMPACT TESTING AT 5'-1". THE MINIMUM AVERAGE IMPACT ENERGY FOR THREE SPECIMENS IS 15 FT-LBS IF TAKEN LONGITUDINALLY OR 13 FT-LBS IF TAKEN TRANSVERSE. NO MORE THAN ONE SPECIMEN SHALL BE LESS THAN THE MINIMUM AVERAGE VALUE. IMPACTS ARE REQUIRED PER HEAT.
 - ROOF TO SHELL JOINT IS FRANGIBLE.
 - MATRIX TO PROVIDE (8) WILLIAMS LW-9 FOAM CHAMBERS WITH A FLOW RATE OF 5C GPM AT 50 PSI MINIMUM FOR SEAL AREA FIRE PROTECTION.

TANK DESIGN DATA		BOTTOM DESIGN DATA	
CODE: API 650, 10TH EDITION, ADD 4	MATERIAL SPECIFICATION: A36		
INSIDE DIAMETER: 180'-0"	WELDING: LAP WELDED		
HEIGHT: 58'-2"	CORROSION ALLOWANCE: 1/16"		
	SLOPE: 1" IN 0'-0" CONE DOWN		
NOMINAL CAPACITY: 255,696 BBL		ANNULAR PLATE DATA	
MAXIMUM CAPACITY: 231,902 BBL		MATERIAL SPECIFICATION: N/A	
NET WORK CAPACITY: 208,107 BBL		WELDING: N/A	
PRODUCT: WULST		CORROSION ALLOWANCE: N/A	
PRODUCT SPECIFIC GRAVITY: 0.732			
DESIGN SPECIFIC GRAVITY: 0.732		FIXED ROOF DATA	
DESIGN LIQUID LEVEL: 51'-3"		TYPE: RAFTER SUPPORTED CONE	
INTERNAL PRESSURE: ATMOSPHERIC		MATERIAL SPECIFICATION: A36 / NOTE 4	
EXTERNAL PRESSURE: ATMOSPHERIC		WELDING: LAP WELDED	
MAXIMUM DESIGN TEMPERATURE: 207 F		UNIFORM LIVE LOAD: 31 PSF (SNOW)	
MAXIMUM OPERATING TEMPERATURE: 127 F		ADDITIONAL DEAD LOAD: NONE	
DESIGN METAL TEMPERATURE: -5 F		PLATE CORROSION ALLOWANCE: 1/16"	
WIND CODE: API 650, 10TH EDITION		STRUCTURE CORROSION ALLOWANCE: NOTE 5	
WIND SPEED: 90 MPH		SLOPE: 3/4" IN 12"	
WIND CHECK: AS-BUILT		ROOF INSULATION THICKNESS: NONE	
WIND IMPORTANCE FACTOR: 1.0		FLOATING ROOF DATA	
EARTHQUAKE CODE: API 650, 10TH EDITION		TYPE: INTERNAL REVERSE SLOPE	
EARTHQUAKE ZONE: SA=20.0kg / SI=7.6kg		OUTER RIM CORROSION ALLOWANCE: 1/16"	
SITE COEFFICIENT: 3IE CLASS D		DECK CORROSION ALLOWANCE: 1/16"	
EARTHQUAKE IMPORTANCE FACTOR: 1.0			
TANK FILL RATE: 7,500 BPH			
SHELL INSULATION THICKNESS: NONE			



PRELIMINARY DESIGN
NOT APPROVED FOR CONSTRUCTION

ELEVATION/SECTION

DESIGN BY: CMH	DATE: 10/12/2007	DESIGN CHK. BY: D.B.
NO.	REVISION DESCRIPTION	APPD. DATE
1		
2		
3		

MATRIX SERVICE
INDUSTRIAL SERVICE CONTRACTOR

TITLE: DESIGN DATA/THREE BAY CONE ROOF

CUSTOMER: ENERGE
CITY: MANITOWAN
STATE: IL
TANK NO.: 1, 2

SCALE: NONE
STD. NO.: 48/1230A
DIA: 180'-0"
HT.: 56'-2"

DRN. BY: CMH
DATE: 10/12/2007
JOB NO.:

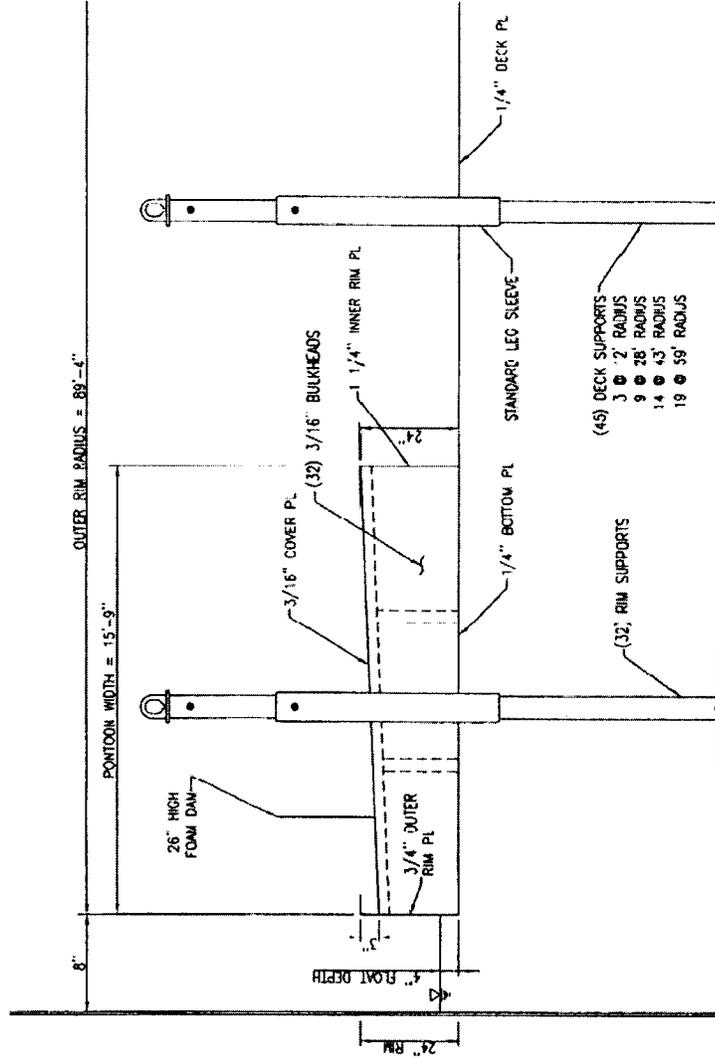
CHK. BY: D.B.
DATE: 10/12/2007
DWC. NO.: SYA

APPD. BY: D.B.
DATE: 10/12/2007
REV. NO.: 0

SHELL DESIGN

RING NO.	API MATL. GROUP	MATT. SPEC.	THK. USED (IN.)	WIDTH USED (FT-IN.)	DESIGN FOR PRODUCT		DESIGN FOR HYDROSTATIC TESTING		CCR. ALLOW (N.)
					ALLOWABLE STRESS (PSI)	CALCULATED THK. (IN.)	ALLOWABLE STRESS (PSI)	CALCULATED THK. (IN.)	
S81	I	A36 C2*	0.85	7'-11"	23200	0.802	24900	0.945	0.625
S82	I	A36 C2*	0.80	8'-3"	23200	0.682	24900	0.796	0.625
S83	I	A36 C2*	0.65	9'-11"	23200	0.542	24900	0.641	0.625
S84	I	A36 C2	0.46	9'-11"	23200	0.422	24900	0.455	0.625
S85	I	A36 C2	0.375	9'-11"	23200	0.272	24900	0.288	0.625
S86	I	A36 C2	0.375	9'-11"	23200	0.122	24900	0.082	0.625

*IMPACT TESTING IS REQUIRED, SEE NOTE 6



PRELIMINARY DESIGN
NOT APPROVED FOR CONSTRUCTION

ELEVATION/SECTION

DESIGN BY: CWH	DATE: 10/12/2007	DESIGN CHK: BY: DUB	
1			
2			
3			
4			
NO	REVISION DESCRIPTION	APVD	DATE
MATRIX SERVICE INDUSTRIAL SERVICE CONTRACTOR			
TITLE: REVERSE SLOPE FLOATING ROOF			
CUSTOMER: ENBRIDGE			
CITY: MANAWATU			
STATE: IL			
TANK NO.: 1 2			
E.I. NO.: 14834			
DIA.: 180'-0"			
SCALE: NONE			
STD. NO.: 10/22007			
HT.: 56'-2"			
DRN. BY: CWH			
DATE: 10/13/2007			
JOB NO.:			
CHK. BY: DUB			
DATE: 10/17/2007			
DWS. NO.: SZA			
APVD. BY: DUB			
DATE: 10/17/2007			
REV. NO.: 0			

FLOATING ROOF DESIGN	
QUANTITY OF CIRCULATION VENTS: (19) NSF HATCHES	PONTOON POSTS: (28) L 2 1/2 x 2 1/2 x 1/4 x 2'-0"
QUANTITY OF OVERFLOW VENTS: NONE/NOTE 2	ESTIMATED WEIGHT: 444,100 LBS
MAXIMUM FILL RATE: 7,500 BPH	DIFFUSER RECOMMENDED: YES
CENTER VENT: 8" MATRIX MESHROOM	DIFFUSER EXIT VELOCITY: 3 FT/SEC
CORROSION ALLOWANCE: 1/16"/NOTE 5	INTERNAL/EXTERNAL: INTERNAL
PRODUCT: INULTEC	MAXIMUM DESIGN TEMPERATURE: 167 F
PRODUCT SPECIFIC GRAVITY: 0.732	MAXIMUM OPERATING TEMPERATURE: 122 F
DESIGN SPECIFIC GRAVITY: 0.70	
SUPPORT LEGS: (77) 2 1/2" SCH 80	
SUPPORT SLEEVES: (77) 3" SCH 40	
LOW LEG SETTING: 3'-6"	
HIGH LEG SETTING: 6'-4"	
PRIMARY SEAL: MECHANICAL SHOE	
SECONDARY SEAL: WFER (ASSUMED)	
PONTOON BATTERS: (64) C1 x 5.4 x 1.5'-9"	

NOTES:

1. FLOATING ROOF IS DESIGNED TO FLOAT WITH TWO PUNCTURED COMPARTMENTS AND A PUNCTURED DECK.
2. DESIGN ASSUMES NO OVERFLOWS ARE REQUIRED.
3. PROVIDE (1) 8" BLEEDER VENT'S PER CUSTOMER REQUIREMENT.
4. WAX SCRAPPERS ARE REQUIRED ON THE ROOF SEALS PER CUSTOMER REQUIREMENT.
5. A CORROSION ALLOWANCE OF 1/16" HAS BEEN APPLIED TO THE DECK AND OUTER RIM ONLY.



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 15637 W. Bruns Rd.
 Manhattan, IL 60442
 USA

Cline, Sandy (PHMSA)

From: David Hoffman [David.Hoffman@enbridge.com]
Sent: Thursday, August 20, 2009 6:30 PM
To: Griffis, Carl (PHMSA)
Subject: RE: Enbridge Southern Lights Construction Audit Exit Interview August 18-19, 2009
Manhattan Terminal
Attachments: Andy Stout Documentation.pdf; Jeff Kueteman Documentation.pdf

Carl,

Please find enclosed the information to close off inspection finding number 2.

2. *Documentation is required to show that welders Stout and Kueteman performed qualified welds within the required six month period.*

Info attached is the following documentation:

1. Andy Stout (AS) Documentation – Radiographic Reader Sheet and Welder Inspection Check Sheet dated 4/29/09.
2. Jeff Kueteman (JK) Documentation – Radiographic Reader Sheet and Welder Inspection Check Sheet dated 3/27/09

I will try to minimize the number of emails to close the audit items in a timely fashion.

Good to see you this week.

Regards,

Dave

Dave Hoffman

Supervisor, US Compliance - | Enbridge Energy Company, Inc.
119 N 25th Street E | Superior, WI 54880
☎ Office: (715) 394-1540 | ☎ Cell: (715) 718-1179

From: CARL.GRIFFIS@dot.gov [mailto:CARL.GRIFFIS@dot.gov]
Sent: Thursday, August 20, 2009 2:51 PM
To: David Hoffman; David Stafford; Glen Jones; kerickson@isconsulting.com; walterarmes@yahoo.com; Kelly Harless; Shaun Kavajecz
Cc: ivan.huntoon@dot.gov; Gregory.Ochs@dot.gov; David.Barrett@dot.gov
Subject: Enbridge Southern Lights Construction Audit Exit Interview August 18-19, 2009 Manhattan Terminal

Attached is the exit interview from the subject audit. If you have any questions, please contact me.

Carl Griffis
Pipeline and Hazardous Materials Safety Administration
Office of Pipeline Safety
Chicago Area

10316 Floyd Street
Crown Point, IN 46307-3063
phone 219-661-8586
cell 219-629-5140
fax 219-661-8586
email carl.griffis@dot.gov

* * * * * IMPORTANT NOTICE * * * * *

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PIPELINE DIVISION
 1913 S. Briggs Street • Joliet, IL 60433
 Ph: 815-207-6717
 Fax: 815-207-6718

DAILY RADIOGRAPHIC REPORT

TERMS AND ABBREVIATIONS
 I.P. - Inadequate Penetration H.B. - Hollow Bead I.P.D. - Inadequate Penetration due to Hi-Low
 I.F. - Incomplete Fusion P. - Porosity I.F.D. - Incomplete Fusion due to Cold Lap
 B.T. - Burn Through C. - Crack E.S. - Exaggerated Sag No Fusion
 B.T.A. - Burn Through Areas I.U. - Internal Undercut I.S.J. - Inverted Slag Inclusion
 W.T. - Sog Wagon Tracks E.U. - External Undercut C.P. - Cluster Porosity
 V.I.R. - Visual Inspection Required LC - Internal Concavity

Customer **MIDWESTERN CONTRACTORS** Address **West Chicago, IL** Service Call No. **127983** Station Pipeline

X-RAY	WELD BY	LOCATION	WITHIN CODE		EXPOSURE		No. of Expos. Surps	PIPE SIZE	X-RAY	GAMMA RAY	V.I.R.	DEFECT LOCATION AND REMARKS
			YES	NO	IN-SIDE	OUT-SIDE						
1. L5530-001	AS/SK		/		/		3	24x35	/			
2. SW-TI												
3.												
4. L5530-002	AS/SM		X				3					Por 37-38"; 43-45"
5. SW-TI												
6.												
7. L5530-002	CD		/		/		1	24x35	/			
8. SW-TI-R												
9.												
10.												
11.												
12.												
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32.												
33.												ENBRIDGE FLANAGAN STATION
34.												LINE 55
35.												AFE 0730091100
36.												
37.												
38.												
39.												
40.												PER DIEM REQUIRED
41.												
42.												
43.												
44.												
45.												TECH: MIKE DEMPSEY
46.												
47.												
48.												
49.												ASST: ANDY BYRNE

Date **4/29/09** Customer's Job No. **309** Type Film **AGAD5** Code **AP1104** Job Location **PONTIAC IL** Report No. **253** Unit No. **2** No. Men on Job **2** No. Welds Radiographed **3**

Travel If Applicable Hours **9** Miles **4/29/09** Hours Worked **9** To **AM** And **PM** Total Hours **9**

Signature of Customers Representative **[Signature]** Certifies Time and Material Correct
 Signature of Radiographer **[Signature]** **LEVEL II**

SUBJECT TO THE TERMS AND CONDITIONS ON REVERSE SIDE

Contractor Midwestern Enbridge Energy, Limited Partnership
 Spread/Facility Installation / Tie-In
 Stage/Phase Installation / Tie-In
 Date: 29-Apr-09
 Report No. 5530 FNB
 Project FNB

Welder Inspection Check Sheet

AFE# 0730091100 Crew _____ Location Flanagan, IL

WELDER	Weld Procedure	Weld Pass	Volt Range	Amp Range	Travel Speed	Preheat Range	Comments
NAME: Andy Stout WELDER ID # AS	WP-21	1	15/22	70/110	4-8	250°F	
NAME: Jeff Kueteman WELDER ID # JK	WP-21	2	19/25	25/20	2/1	250°F	New to New ONLY
NAME: Steve Monzingo WELDER ID # SM	DB-48	2	19/30	60/40	2.2/4	250°F	
NAME: Chris Daluga WELDER ID # CD	DB-48	4	19/24	60/10	2.8/30	250°F	
NAME: WELDER ID #							
NAME: WELDER ID #							
NAME: WELDER ID #							
NAME: WELDER ID #							
NAME: WELDER ID #							

Contractor Midwestern INSPECTOR: John Reynolds
 Signature David Brown Signature

Contractor Midwestern
Spread/Facility Flanagan Terminal
Stage/Phase Fab. / Install / Tie-In

Enbridge Energy, Limited Partnership

AFE# 0730091100 Crew _____
Location Pontiac, IL

Date: 3/27/2009
Job Loc. Meter/Prover
Project 5530 FNB

Welder Inspection Check Sheet

<u>WELDER</u>	<u>Weld Procedure</u>	<u>Weld Pass</u>	<u>Volt Range</u>	<u>Amp Range</u>	<u>Travel Speed</u>	<u>Preheat Range</u>	<u>Comments</u>
NAME: Jeff Kueteman WELDER ID # JK	WP-20	P1	18-22	82-125	5-9 I/M	250°	
NAME: WELDER ID #							
NAME: WELDER ID #							
NAME: WELDER ID #							
NAME: WELDER ID #							
NAME: WELDER ID #							
NAME: WELDER ID #							
NAME: WELDER ID #							
NAME: WELDER ID #							
NAME: WELDER ID #							

Contractor Midwestern Inspector: Kurt Sons
Signature Ronald Beards Signature Kurt Sons



PIPELINE DIVISION
1913 S. Briggs Street • Joliet, IL 60433
Ph: 815-207-6717
Fax: 815-207-6718

DAILY RADIOGRAPHIC REPORT

TERMS AND ABBREVIATIONS
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 B.T.A. - Burn Through Areas I.U. - Internal Undercut I.S.I. - Isolated Slag Inclusion
 W.T. - Weld Wagon Tracks E.U. - External Undercut C.P. - Cluster Porosity
 V.I.R. - Visual Inspection Required I.C. - Internal Concavity

Customer MIDWESTERN CONTRACTORS Address WEST CHICAGO, IL Service Call No. 127983 Station Pipeline

X-RAY	WELD BY	LOCATION	WITHIN CODE		EXPOSURE		No. OF EXPOSURES	PIPE SIZE	X-RAY	GAMMA RAY	V.I.R.	DEFECT LOCATION AND REMARKS
			YES	NO	IN-SIDE	OUT-SIDE						
1. 5530-477	GH		/		/		3	24" 280	/			
2. SW	↑		/		↑							
3. 5530-470			/									
4. SW	↓		/									
5. 5530-473	GH		/					24" 280				
6. SW			/									
7. 5530-494	JK		/					34" 300				
8. SW	↑		/									
9. 5530-475			/									
10. SW	↓		/		↓							
11. 5530-496	JK		/				3	34" 300	/			
12. SW			/									
13.			/									
14.			/									
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ENBRIDGE FLANAGAN STATION
SSE AFE 730091100

TRAVEL BILLED FROM JOLIET, IL TO PONTIAC, IL

TECH: MIKE DEMOREY

ASST: HAL GURGONE

Date	Customer's Job No.	Type Film	Code	Job Location	Report No.	Unit No.	No. Men on Job	No. Welds Radiographed	
3/27/04	329	AGFA D3	AP1104	PONTIAC, IL		253	2	6	
Travel If Applicable Hours	Miles	Hours Worked	To	AM. And	To	PM.	Total Hours		
	70		2003/03/27				6 1/2		
Signature of Customers Representative Certifies Time and Material Correct				Signature of Radiographer				FORM # S-12 5/2008 Pipeline	

SUBJECT TO THE TERMS AND CONDITIONS ON REVERSE SIDE

Cline, Sandy (PHMSA)

From: David Hoffman [David.Hoffman@enbridge.com]
Sent: Tuesday, August 18, 2009 9:18 PM
To: Griffis, Carl (PHMSA)
Subject: Manhattan Audit - Follow-up items
Attachments: 090729-393.jpg; 090729-431.jpg; 090729-404.jpg; 090729-417.jpg; 090729-418.jpg

Carl,

Attached are some aerials of the new Manhattan Terminal site. Hope they meet your needs.

From today outstanding items are:

1. Station Facilities Design Basis Memorandum (DBM) – Glen Jones
2. Technical drawing showing under tank CP System – Kraig Erickson
3. Confirmation of 6-month welding qualifications – Jacob Weerts and Walter Armes (should be able to resolve tomorrow AM)

I have sent emails to both Kraig and Glen as reminders and we can make sure we discuss tomorrow morning with them to get the info.

See you tomorrow at 8am.

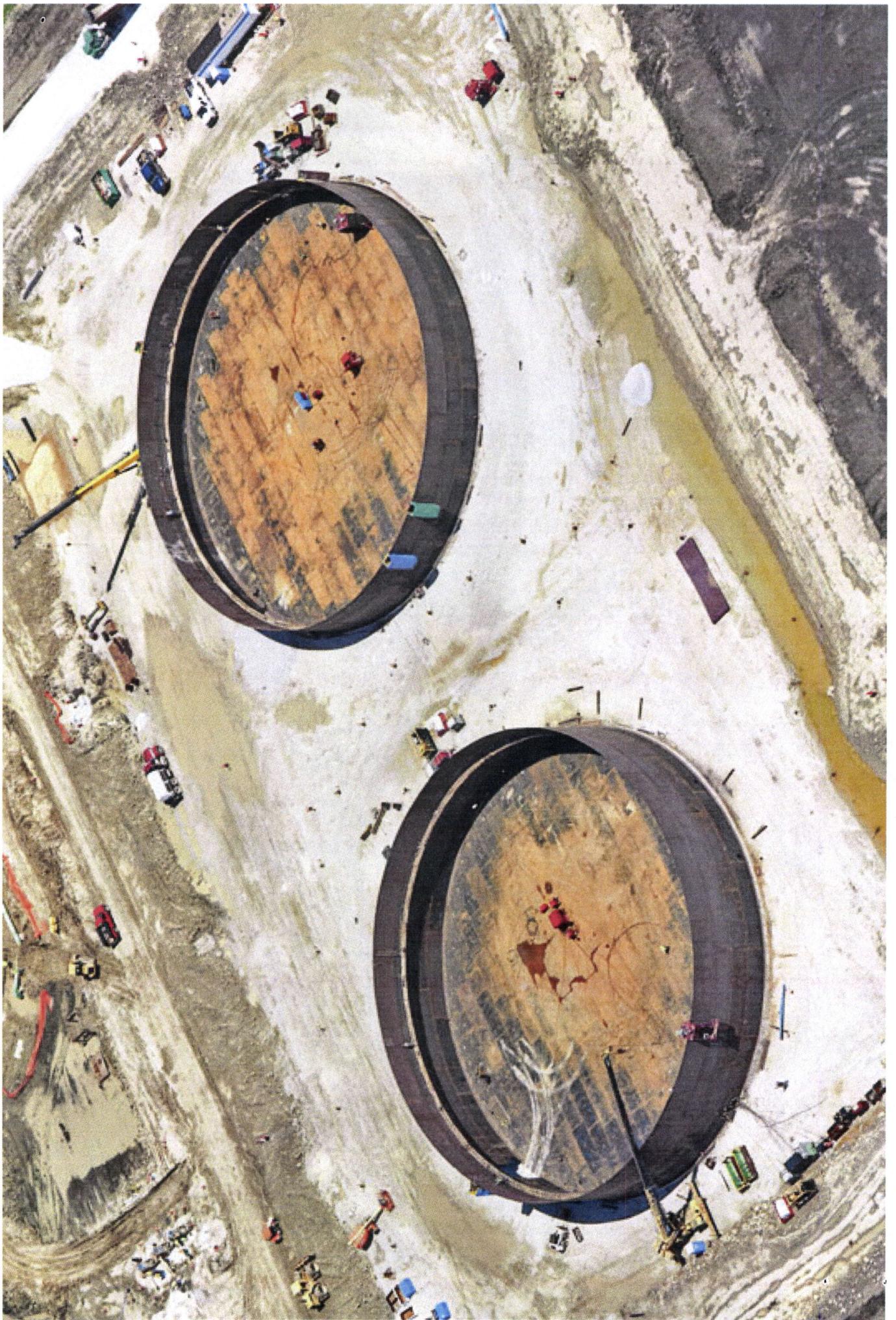
Dave

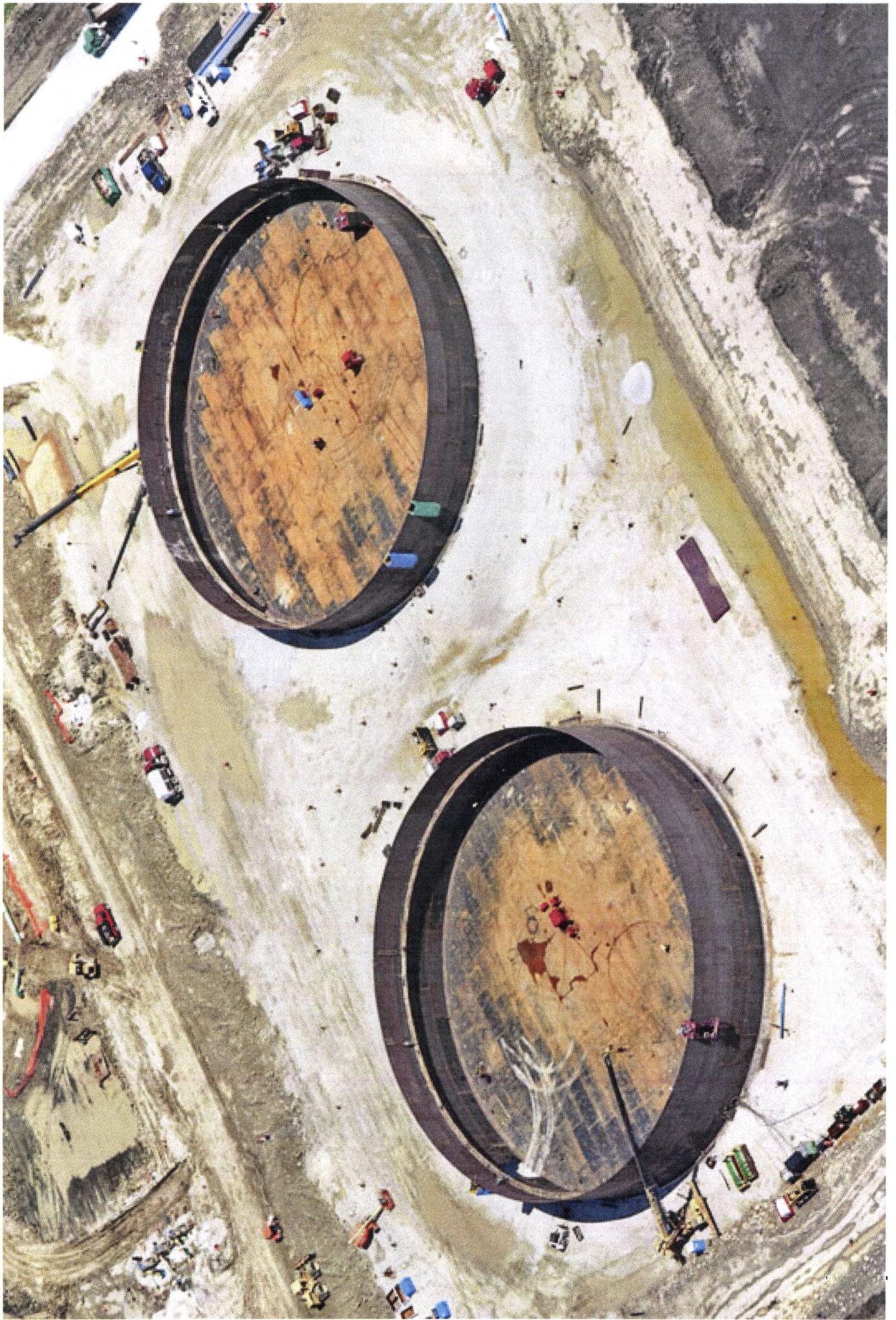
Dave Hoffman

Supervisor, US Compliance - | Enbridge Energy Company, Inc.
119 N 25th Street E | Superior, WI 54880
☎ Office: (715) 394-1540 | ☎ Cell: (715) 718-1179

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**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Lights (20")		Date: 08_19_09
Location: Manhattan, IL Manhattan Station - Breakout Tanks, Pumps and Piping		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Dave Hoffman	Compliance	Enbridge
Boyd Haugrose	Compliance	Enbridge (contract)
Walter Ames	Tank Inspector Chief	Enbridge (contract)
Glen Jones	Project Specialist	Enbridge
Jack Mershon	Coating Inspector	Enbridge (contract)
Atul Sumra	Sr. Project Manager	Matrix
Kraig Erickson	Tank Project Manager	Lake Superior Consulting
Activities Observed/Performed:		Results/Comments:
Inspected station piping work, in particular coating and repair areas.		It was noted that there were several areas where patch stick was improperly applied (too large of an area). In addition, the girth weld coating was too thick, causing icicles to hang off the bottom of the pipe. Tape was also observed on the pipe, which must be removed for proper jeeeping. Enbridge to provide seat pressure test documentation
Collected information on two valves		
Reviewed tank welder qualification information provided by Matrix.		Addition NDE documentation is necessary.
Reviewed the tank NDE reader sheets.		Followup is required on seven welds identified on the two tanks which did not have repair welds, or were repair welds and did not have original weld rejection records. It was difficult to track weld repair records.
Summary:		
Enbridge to followup with Matrix to provide provide NDE documentation		
Enbridge to provide valve pressure test information		
It is recommended that a weld log history sheet be developed for the tank welds to more easily track weld repairs.		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Lights (20")	Date: 08_18_09	
Location: Manhattan, IL Manhattan Station - Breakout Tanks, Pumps and Piping	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Glen Jones	Project Specialist	Enbridge
Kelly Harless	Construction Manager	Enbridge (contract)
Boyd Haugrose	Compliance	Enbridge (contract)
Kraig Erickson	Tank Project Manager	Lake Superior Consulting
Walter Ames	Tank Inspector Chief	Enbridge (contract)
Dave Hoffman	Compliance	Enbridge
Jacob Weerts	Mechanical Inspector	Enbridge (contract)
Activities Observed/Performed:	Results/Comments:	
Reviewed tank welder qualifications	Record of production weld with qualified NDE examination is necessary for most welders to show qualification	
Reviewed station welder qualifications	Record qualified NDE examination is necessary for two welders to show qualification	
Reviewed station welding reader sheets	No issues	
Inspected field work on tanks	No issues	
Summary:		
Enbridge to follow up with the tank contractor Matrix to provide welder qualification records.		
Enbridge to follow up with qualified NDE records for station welders.		
Enbridge to provide Station Facilities Design Basis Memorandum.		
Inspector(s): Carl Griffis		

Exit Interview
Enbridge Southern Lights Construction Inspection
August 18-19, 2009
Manhattan Terminal
Manhattan, IL

Records Review Issues

1. Enbridge to provide Station Facilities Design Basis Memorandum (DBM).
2. Documentation is required to show that welders Stout and Kueteman performed qualified welds within the required six month period.
3. Documentation is required for the Matrix tank welders to verify that all welders were properly qualified on the welding processes with in the required six month period.
4. Followup is required for the status of the following welds observed on the NDE reader sheets: (notes in italics per discussion with Walter Armes 8/20/09)

1300-V17-S1-02W H-I no accepted repair weld *radiographed 8/20*

1300-V16-S1-02W H-I no accepted repair weld *radiographed 8/20*

1300-V04-S1-02W A-B no accepted repair weld *replaced by door*

1300-V17-S1-TJ A-B repair weld documentation, no original reject weld

5. Documentation is required on valves MM-210-BSV-11 and MM-145-V-1 to verify that the seats were pressure tested to API 6D requirements.
6. It is recommended that weld log history documents be initiated for both tank and station work to more easily track weld repair history.

Field Review Issues

1. It was noted on girth weld coating near the pump manifolds that an excessive amount of coating was applied. Large icicles were seen hanging from the bottom of the pipe. These icicles can break off, leaving potential anomalies susceptible to corrosion. Coating applicators should be trained to apply coating in such a manner to eliminate the icicles and reduce the coating thickness. In addition, the large variations in coating thickness make it difficult for the jeep to accurately detect anomalies.
2. In the same piping area it was noted that patch stick repairs were made that were larger than what Enbridge allows (1/2" square area maximum). Two part epoxy repairs are required for such areas.
3. In several locations on the same piping, tape was observed on the pipe. All tape and foreign objects must be removed from the pipe surface prior to jeeping in order to adequately check the coating for anomalies.

These issues were discussed with the coating inspector on site.

Cline, Sandy (PHMSA)

From: David Hoffman [David.Hoffman@enbridge.com]
Sent: Tuesday, September 01, 2009 10:16 AM
To: Griffis, Carl (PHMSA)
Cc: David Stafford; Shaun Kavajecz
Subject: Enbridge Southern Lights - Manhattan Terminal Inspection Aug 18-19, 2009
Attachments: Attachment 1.pdf; Attachment 2.pdf; Attachment 3.pdf

Carl,

First I apologize for the delay in providing information to address the inspection findings in a more timely fashion. Realize we are a little rusty out of the gates, but this will improve.

I have attached the information to close your finding #4. We have provided information to address #1 (D. Stafford should provide you with copy of DBM), #2 was provided by me via email dated 8/20/09. Item #6 recommendation regarding "weld log" has been developed and can be viewed during your next visit, as well as improvement to the field issues identified.

Items #3 and #5 are still being worked on by Project Management and we will provide information as soon as we can.

This submission – Issue #4.

Attachment 1: Reader sheet that demonstrates 1300-V16-S1-02W H-I and 1300-V17-S1-02W H-I recorded an acceptable radiograph for repairs, dated 8/20/09.

Attachment 2: This weld 1300-V17-S1-TJ R1 was investigated. The original reader sheet was mislabeled to indicate this was a repair, when in fact it was the original weld shot, and was found to be acceptable.

Attachment 3: Pictures are attached to demonstrate that bottom portion of vertical weld number 1300-V04-S1-02W A-B no longer existent, as it was replaced by insert plate. The insert plate was (Insert 100% radiographed).

Regards,

Dave

Dave Hoffman

Supervisor, US Compliance - | Enbridge Energy Company, Inc.
119 N 25th Street E | Superior, WI 54880
☎ Office: (715) 394-1540 | ☎ Cell: (715) 718-1179

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Calumet Testing Services
1946 N. Griffith Blvd.
Griffith, Indiana 46319
(219) 923-0000 - (708) 474-5850

RADIOGRAPHIC EXAMINATION REPORT

Sheet 1 of 1
Date of Report 8-20-09

Date of RT 8-20-09

CUSTOMER: LITRIX TANK SERVICES LOCATION: LAKEVIEW, IL - SUBURGE GTS JOB NO. 14328

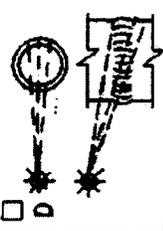
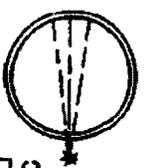
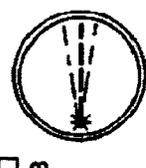
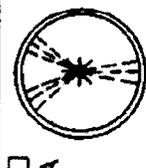
Job No: 0094 Acceptance Standard: ASME SEC VIII Edition/Appendix: 2007 / 08

Isotope: Ir-192 Curies: 35 Source/Film Distance: 21" Front: .005 .010

X-Ray KV: 190 MA: 10 Focal Spot Size: 1/4 Back: .005 .010

Film Mfg./Type: KODAK T Film Size: 4 1/2" Technique: Spt Del Center: .005 .010

Weld Number	Weld Area	Welder Stencil	Pipe Size or Plate Thickness	Weld Thickness	Penetrometer	Accept	Reject	Root Concavity	Root Convexity	Root Undercut	Crack	Flattened Indication	Inclusion	Incomplete Penetration	Incomplete Fusion	Undercut	Burn-Thru	High-Low	Surface Indications	Film Artifact	Other	Remarks
1300 N-16-S1-02W 92 H-I			1" A	1/2S 25	✓								✓									TANK 402W
1300 N-17-S1-02W 92 H-I					✓																	



Other - See Attachment

Examiner: Walter H. Collins Level: II Contractor Acceptance: _____ Date: _____
 Interpreter: M. P. S. Level: II Owner Acceptance: [Signature] Date: 8/20/09



Callmet Testing Services
1845N. Griffin Blvd.
Griffith, Indiana 46319
(219) 923-9800 - (708) 474-5660

RADIOGRAPHIC EXAMINATION REPORT

Sheet 2 of 2
Date of Report 7-22-09

Date of RT 7-22-09

CUSTOMER: MATRIX TANK SERVICES LOCATION: 6550 D.L. MANHATTAN III CTS JOB NO. 14328

Job No: 0094 Acceptance Standard: ASME SEC. VIII Edition/Addenda: 2007/08

Isotope: I¹²⁵ Curies: 95 Source Size: 1"x.1" Source/Film Distance: 18" Lead Screens: Front: .005 .010 Back: .005 .010 Center: .005 .010

X-Ray: KV MA 2/A Focal Spot Size: 2/A Focal/Film Distance: JA Technique: Spt. Dbl.

Film Mfg./Type: KODAK T Film Size: 4 1/2 x 10

Weld Number	Weld Area	Welder Stencil	Pipe Size or Plate Thickness	Weld Thickness	Penetrator	Accept	Reject	Root Concavity	Root Convexity	Root Undercut	Crack	Founded Indication	Inclusion	Incomplete Penetration	Incomplete Fusion	Undercut	Burn-Thru	High-Low	Surface Indications	Film Artifact	Other	Remarks	Lead Screens
1300	V16 S3 B1 A-B		.650	.775	20	✓						✓										TANK 02 WEST	<input type="checkbox"/> A
1300	V17 S3 B1					✓																	<input type="checkbox"/> B
1300	V12 SATURN A-B		.820	.950	25	✓						✓											<input type="checkbox"/> C
1300	V16 S1 R1		.950	1.075	30	✓						✓											<input type="checkbox"/> D
1300	V17 S1 R1					✓																	<input type="checkbox"/> E
1300	V13 S3		.650	.775	20	✓																	<input type="checkbox"/> F
1300	V1 S3					✓																	
1300	V1 S3					✓																	
1300	V13 S3					✓																	
1300	V16 S3 B1 A-B		.650	.775	20								X									TANK 02 WEST	
1300	V14 S3 B1 R1					✓						✓											
1300	V6 S3 B1 R2		.650	.775	20	✓																	

Examiner Gaillespice / Pappas Level II Contractor Acceptance [Signature] Date 7/22/09

Interpreter [Signature] Level II Owner Acceptance [Signature] Date 7/22/09

1500-1104-S1-02W

← R3057

5

← SC 0180

revised

FERT
IMPLATE

09/01/2009

09/01/2009

100-V04-S1-02W

TRAILER
FLAT

TS 4915

TS 4915

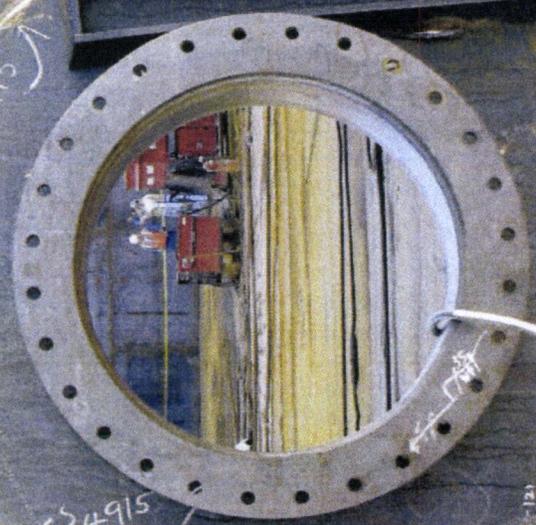
TS 4915

TS 4915

232 423-121
310004
P-214 MK-2 MK-2 MK-2
TS 4915/62 MK-2 MK-2 MK-2

232 423-121
310004
P-214 MK-2 MK-2 MK-2
TS 4915/62 MK-2 MK-2 MK-2

P. A



Karaus, Bryn (PHMSA)

From: David.Hoffman@enbridge.com
Sent: Sunday, November 23, 2008 9:36 PM
To: Griffis, Carl <PHMSA>
Cc: Shaun.Kavajecz@enbridge.com; Nolan.Baugh@enbridge.com
Subject: Enbridge Southern Access/Southern Lights RT Audit
Attachments: RT Audit Follow-up 11-20-08.docx

Carl,

As follow-up to last week's PHMSA RT Audit of Enbridge's Southern Access/Southern Lights Stage 2 Project, please find Enbridge's response to the one issue identified by Doug Kyle.

Following correspondence with Nolan, it is my understanding that on Spread 1 Doug found 1 or 2 radiographs with some very light scattered slag lines that could possibly have been rejected for repair. I understand that it was very close based on interpretation, and as follow-up Doug recommended some additional training on interpreting and measuring this type of defect for the particular technician who had completed the original review. Nolan organized the follow-up and Larry Lake, Level III NDE Auditor on Spread 1 conducted some additional training per Doug's recommendation. Attached below is documentation from Larry Lake.

I also understand that Doug was pleased with the overall film quality, interpretation, rejection of defects, and documentation across the Project.

If you require further information regarding this issue, please do not hesitate to contact me anytime.

Dave

Dave Hoffman
Supervisor, U.S. Compliance
Enbridge Energy Company, Inc.
Ph. (715) 394-1540
Cell. (715) 718-1179

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November 20, 2008

Nolan,

In response to the audit conducted by PHMSA, on November 17, 2008.

During the audit of Mr. Dana Disney's film, Mr. Doug Kyle identified a weld with scattered slag lines that when measured correctly and added together totaled $2 \frac{1}{2}$ inches in a continuous 12 inch length.

On November 18, 2008 I held a meeting with all five of the Radiographers on Spread 1 including Mr. Dana Disney. Dana assured me he had measured the slag indications, but used a 6 inch ruler and found less than 2 inches in the 12 inch continuous length.

I reviewed section 9.3.8 of the API Standard 1104 19th Edition, and explained the best and most accurate method for measuring indications. Each and every Radiographer received instructions regarding the interpretation, measurement and disposition of scattered slag indications.

I hope this meets with your approval and if you have any suggestions or comments please let me know.

Sincerely,

Larry Lake

Larry.Lake@enbridge-energy.com

NDT Auditor Stage 2 Spread 1

ASNT ACCP Professional Level III

**USDOT Office of Pipeline Safety
Construction Inspection Form
Daily Log**

Pipeline Project: Enbridge spread 1

Date: 11/17/2008

Owner/Operator: Enbridge Energy Company, Inc.

Contractor: JANX, Weld Sonics

Supt/Foreman: Nolan Baugh

Subcontractor(s):

Site Condition: Dry

Weather: partly cloudy

Temp: 30s/40s

Start Time: 7:00am

End Time: 4:30pm

Report (Include description of work, location, and identification and resolution of any problems)

Reported to the spread office in Darien, WI at 7am and meet with Nolan Baugh (Enbridge Compliance Coordinator), and Larry Lake (LV III film auditor.) I then started on a sample review of the 42" and 20" crude line film.

On the 42" line I reviewed film from the x-ray rigs that are still currently on the spread. These are Rig "H", "LL", "P", and "K". I randomly picked welds from these rigs so as to assess film quality and interpretation of the rig and the film auditor. I generally concentrated on repaired welds so I could get a feel for the type and severity of indications that are being rejected. I also sampled thickness transitions due to the difficulties that arise during welding and x-ray.

Rig "H", reviewed 11 welds and found film quality, density, sensitivity, and interpretation to meet the requirements of API 1104 19th and Enbridge Radiography specification.

Rig "LL", reviewed 12 welds and found film quality, density, sensitivity, and interpretation to meet the requirements of API 1104 19th and Enbridge Radiography specification.

Rig "K", reviewed 16 welds and found film quality, density, sensitivity, and interpretation to meet the requirements of API 1104 19th and Enbridge Radiography specification.

Rig "P", reviewed 18 welds and found film quality, density, and sensitivity, to meet the requirements of API 1104 19th and Enbridge Radiography specification. Due to the relatively conservative nature of the rejections that I had witnessed thus far I was a little concerned with one particular weld I reviewed, weld ML-41-TI-P. This weld exhibited several pieces of ESI (elongated slag inclusions) that at first appeared to be over the acceptance limits. After further review and measurements with Nolan Baugh and Larry Lake it was found to be acceptable. It was decided that the level II of this rig should be shown this example and be given

Inspector Signature _

Page ___ of ___

**USDOT Office of Pipeline Safety
Construction Inspection Form
Daily Log
(Continuation Form)**

Report (Include description of work, location, and identification and resolution of any problems)

Additional instruction on the acceptable levels of accumulated ESI.

On the 20" line I again randomly picked welds so as to assess film quality and interpretation of the rig and the film auditor. I reviewed a total 68 welds x-rayed by rigs "H", "K", "J", and "P". I found the film quality, density, sensitivity, and interpretation to meet the requirements of API 1104 19th and Enbridge Radiography specification.

In total I reviewed 125 welds from this spread and was satisfied that the QC/QA of the radiography is in compliance.

Inspector Douglas Kyle

Date: 11/17/08

**USDOT Office of Pipeline Safety
Construction Inspection Form
Daily Log**

Pipeline Project: Enbridge spread 3

Date: 11/19/2008

Owner/Operator: Enbridge Energy Company, Inc.

Contractor: JANX, Weld Sonics

Supt/Foreman: Nolan Baugh

Subcontractor(s):

Site Condition: Dry

Weather: sunny

Temp: 30s/40s

Start Time: 7:00am

End Time: 5:30pm

Report (Include description of work, location, and identification and resolution of any problems)

Arrived at the spread office at 7:00 am and continued to review film from spread 2, southern lights 20" crude line with Nolan Baugh (Enbridge Compliance Coordinator), and Joe Hollingshead (spread 2 NDE auditor).

On the 20" line (southern lights) I continued to randomly picked welds so as to assess film quality and interpretation of the rig and the film auditor. I reviewed a total of 49 more welds x-rayed by rigs "A", "D", and "G". I found the film quality, density, sensitivity, and interpretation to meet the requirements of API 1104 19th and Enbridge Radiography specification.

I have reviewed a total of 137 welds on spread 2 split between the 42" and 20".

I left the spread 2 at approximately 10:00 am and arrived in Morris, IL at the spread 3 office at 11:30 with Nolan Baugh. I met with Dan Carrol (NDE auditor) and started to review film for this spread. There has been some film transferred to the Enbridge main office.

I started the 42" line (Southern Access.) I reviewed film from some of the x-ray rigs that are still currently on the spread, rigs "T", "U", "V", and "W". I randomly picked welds from these rigs so as to assess film quality and interpretation of the rig and the film auditor. I generally concentrated on repaired welds so I could get a feel for the type and severity of indications that are being rejected. The repaired welds are stored in a separate box than the original film which is a little inconvenient but easier to get film in and out of the boxes. I also sampled thickness transitions due to the difficulties that arise during welding and x-ray.

I reviewed a total of 39 welds from these rigs and found film quality, density, sensitivity, and interpretation to meet the requirements of API 1104 19th and Enbridge Radiography specification.

Inspector Signature _

Page ___ of ___

**USDOT Office of Pipeline Safety
Construction Inspection Form
Daily Log
(Continuation Form)**

Report (Include description of work, location, and identification and resolution of any problems)

At 3:30 the crawler crew from the 42" brought their film in for the day and I spent the next hour observing the auditor reviewing the film, making changes to their rejection list because of indications he considered a reject. He also makes a list of different film views that did not meet the film quality requirements so they can be re-shot and reinterpreted. He informed me that this was not a good day for his crawler crew because he did not normally have re-shots or different calls. I was happy that I got the chance to observe him doing his job and feel he is performing an effective Q/A of the film.

I will spend Thursday at spread 3 and continue the film review.

Inspector Douglas Kyle

Date: 11/19/08

Southern Access / Southern Lights	
Stage One	
Request for Information	
Attention: Lee Farber / Enbridge Mainline SA Engineering Team Ben Ploederl / GPP	Date: 16-Jan-07
Sender: CE Pattillo WeldSonix to Floyd Mott	
106	
Description of Contractor Issue	
WeldSonix requests the following changes. Part 41.7.1 - All darkrooms shall have "Radioactive " signs removed to comply with Homeland Security Department Rules. Part 41.9.1 - Request the use of an automatic 70MM film dryer be restricted for use only in Mainline film trailer, not in mobile units. Part 41.13.1.1 - Request that radiographer follow API Standard 1104, which will allow Type II film when the image quality can be achieved. Part 41.14 - Request approval of the use Table 7, wire type Penetrimeters in lieu of API Standard 1104 hole type penetrimeters.	
Comments & Discussions	
The Enbridge approval of the WeldSonix request for changes shall be contingent upon the following conditions. Concerning Part 41.7.1 - the WeldSonic Radiographic Specification shall include wording which complies with Homeland Security Department Rules. Part 41.9.1 - The 70MM film dryer may be located in a secure and stationary area that can prevent damage to the unit, from shaking or bouncing, which may be encountered within a mobile Radiographic Rig. The type of film dryer used in the mobile Radiographic Rigs shall be capable of drying film in a manner acceptable to the Enbridge NDT Inspector. Part 41.13.1.1 - Enbridge will allow the use of Class II film as long as Image Clarity, Sensitivity, Contrast and Definition are acceptable to the Enbridge NDT Inspector. If the Enbridge Inspector determines that any one of the stated conditions are unacceptable, then a Class I film shall be used, as originally specified. Part 41.14 - Enbridge will allow the substitution of the Wire Type Penetrimeters shown in API Standard 1104, Table 7 in lieu of the Hole Type Penetrimeters shown on API Standard 1104, Table 5. The API Standard 1104 Nineteenth Edition shall be used for this project.	

Enbridge Resolution Authority

Floyd Mott

**USDOT Office of Pipeline Safety
Construction Inspection Form
Daily Log**

Pipeline Project: Enbridge spread 2

Date: 11/18/2008

Owner/Operator: Enbridge Energy Company, Inc.

Contractor: JANX, Weld Sonics

Supt/Foreman: Nolan Baugh

Subcontractor(s):

Site Condition: Dry

Weather: sunny

Temp: 20s/40s

Start Time: 7:00am

End Time: 4:00pm

Report (Include description of work, location, and identification and resolution of any problems)

Reported to the spread 2 office after traveling from Darien, WI at 8:30 with Nolan Baugh (Enbridge Compliance Coordinator), and I then started on a sample review of the 42" and 20" crude line film with Joe Hollingshead (spread 2 NDE auditor).

On the 42" line (Southern Access) I reviewed film from the x-ray rigs that are still currently on the spread. These are Rig "A", "C", and "D". I randomly picked welds from these rigs so as to assess film quality and interpretation of the rig and the film auditor. I generally concentrated on repaired welds so I could get a feel for the type and severity of indications that are being rejected. I also sampled thickness transitions due to the difficulties that arise during welding and x-ray.

Rig "A", reviewed 27 welds. This is the crawler film shot with 225kv x-ray and I am satisfied that the film quality, density, sensitivity, and interpretation meet the requirements of API 1104 19th and Enbridge Radiography specification. There was an apparent problem with internal undercutting, and a large percentage of rejects are for this type of indication.

Rig "C", reviewed 21 welds and found film quality, density, sensitivity, and interpretation to meet the requirements of API 1104 19th and Enbridge Radiography specification.

Rig "D", reviewed 15 welds and found film quality, density, sensitivity, and interpretation to meet the requirements of API 1104 19th and Enbridge Radiography specification.

Total of 63 welds were reviews from the 42" line on spread 2.

Inspector Signature _

Page ___ of ___

**USDOT Office of Pipeline Safety
Construction Inspection Form
Daily Log
(Continuation Form)**

Report (Include description of work, location, and identification and resolution of any problems)

On the 20" line (Southern Lights) I again randomly picked welds so as to assess film quality and interpretation of the rig and the film auditor. I started to review welds x-rayed by rigs "E", "B", and "C". I have so far reviewed 24 welds from this line size and found the film quality, density, sensitivity, and interpretation to meet the requirements of API 1104 19th and Enbridge Radiography specification.

87 total weld.

I will spend 2-3 hours Wednesday morning reviewing more of the 20" welds. Then travel to spread 3.

Inspector Douglas Kyle

Date: 11/18/08

**USDOT Office of Pipeline Safety
Construction Inspection Form
Daily Log**

Pipeline Project: Enbridge spread 3

Date: 11/20/2008

Owner/Operator: Enbridge Energy Company, Inc.

Contractor: JANX, Weld Sonics

Supt/Foreman: Nolan Baugh

Subcontractor(s):

Site Condition: Dry
Start Time: 7:00am

Weather: partly cloudy
End Time: 4:30pm

Temp: 30s/40s

Report (Include description of work, location, and identification and resolution of any problems)

Arrived at spread 3 office in Morris, IL at 7:00am with Nolan Baugh. I met with Dan Carrol (NDE auditor) and continued to review film for this spread.

I spent 2 hours in the morning observing as Dan Carrol completed his audit of the previous days film.

I then started back with my random review now moving on to the 20" line (southern lights.) I continued to randomly pick welds so as to assess film quality and interpretation of the x-ray rig technician and the film auditor, generally concentrating on repaired welds and transition welds. I reviewed 62 more welds x-rayed by rigs "S", "V", "W", and "X". I found the film quality, density, sensitivity, and interpretation to meet the requirements of API 1104 19th and Enbridge Radiography specification.

I have reviewed a total of 101 welds on spread 3 split between the 42" and the 20" line.

One additional item to report from the first day of the radiography audit is that the Enbridge Radiography specification (I do not have a document number) says that hole type penetrometer shall be used. I have attached a copy of the RFI 106 that is an addendum to the specification allowing the use of wire type penetrometer (the predominate type being used), along with some other minor changes.

There are several items relating to radiography that Enbridge mandates which are above and beyond what is required. Such as the practice they have of initially x-raying all thickness transition welds and then waiting 48 hour and x-raying these welds again. Also Enbridge has a practice of periodically x-raying welds after they have been moved into the ditch. I am sure that these practices add additional cost to the project but show the commitment Enbridge has for assuring a quality job.

Inspector Signature _

Page ___ of ___

**USDOT Office of Pipeline Safety
Construction Inspection Form
Daily Log
(Continuation Form)**

Report (Include description of work, location, and identification and resolution of any problems)

Inspector Douglas Kyle
Date: 11/20/08

Karaus, Bryn (PHMSA)

From: David.Hoffman@enbridge.com
Sent: Monday, November 24, 2008 11:37 AM
To: Griffis, Carl <PHMSA>
Cc: Shaun.Kavajecz@enbridge.com; Nolan.Baugh@enbridge.com
Subject: Enbridge Follow-up to PHMSA Audit SA/SL Michels Spread 1 Nov 10 - 14, 2008
Attachments: sign-in sheet 11-18-08.pdf; Meeting 11-18-08-exit interview,sp 3.docx; Spread 1 meeting sign in sheet 11.14.08.pdf

Carl, here is Enbridge's response to the inspection you conducted on Enbridge's SA/SL Project Nov 10 - 14, 2008.

I spoke to Ron Ramer and he presented the audit findings Friday Nov 14, 2008 to the Spread 1 Inspection staff. Additionally he passed out copies of the Lowering-in drawing that was prepared to clarify and reinforce the boom spacing per the ECA. The sign-in sheet is attached.

I also recieved an email from John Ellis, Enbridge Construction Manager for Spread 1 (exerpt below) regarding the information that was reinforced with Spread 1 personnel.

1. Jeeping and coating inspection and crews informed to clean and wash pipe prior to jeeping.

Coating crews and inspection staff informed that coating is to be removed by sandblasting and not by torch.

2. Inspection and contractor personnel met again to reinforce spacing for lower-in. Engineer Dave Hokanson submitted an additional drawing to include two additional tractors to assure the ECA spacing of lower-in tractors are observed.

3. Chief inspector and Sr. Welding inspector informed all welding inspectors again that interpass temperatures must be checked and heat input maintained.

4. Coating crews and inspection personnel reminded to clean and wash pipe prior to jeeping .

John Ellis

Additionally, as a proactive measure E.W. Whiddon from Spread 2, communicated the findings from the Spread 1 audit (especially if there is a chance for any inspectors to move Spreads - he wanted to make them aware of the boom spacing specifics required under the ECA for Mechanized Welding).

Dave,

Please see the second attachment response action taken on Spread 2 to Enbridge Inspection group, Welded Foremen's and Assistant Superintendent's meeting that was held as a result of the PHMSA, Spread 1 Exit Audit. The first attachment is the Enbridge sign-in attendance record for that meeting which was conducted on November 18, 2008. If I can be of further assistance, please let me know.

Thank you,

E.W. Whiddon
Chief Inspector
Enbridge, Spread 2

If you require any additional information, please let me know.

Dave

Dave Hoffman
Supervisor, U.S. Compliance
Enbridge Energy Company, Inc.
Ph. (715) 394-1540
Cell. (715) 718-1179

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ENBRIDGE PIPELINE PROJECTS - DAILY SIGN IN SHEET

Foremen's & Inspectors meeting @ 5:45 AM

PAGE 1 OF 1

Tues.

LOCATION: Malta, IL.

DATE: 11-18-08

ATTENDEES:

	Name (print)	Company	Title	Signature	Initial
1	Bill DUNCAN	Englobal	Asst. Chief	Bill Duncan	BD
2	John Gross	"	SWI	John Gross	JG
3	Richard Thomas	"	WT	Richard Thomas	RT
4	Ron Hoff	"	WE	Ron Hoff	RH
5	NICK WITHEL	LHB	Auditor	Nick Witel	NW
6	F.W. Whiddon	Englobal	Chief	F.W. Whiddon	F.W.
7	Michael Elliott	Enbridge	Oper. Cond	M.H. Elliott	ME
8	Rick Wilbur	Englobe	UTILITY	Rick Wilbur	R.W.
9	Gene Boary	TIR	FMC	Gene Boary	GB
10	Charles Neal	Englobal	Utility	Charles Neal	CN
11	Bill Smith	ENGLOBAL	UTILITY	Bill Smith	BS
12	John Black	SALEM	Row	John Black	JB
13	Rory Vardick	ENGLUBE	TECH	Rory Vardick	RV
14	Donald Casper	"	W.T	Donald Casper	DC
15	Tom MATHES	"	WT	Tom Mathes	TM
16	JACK SEAMAN	WELDED	LAND HAND	Jack Seaman	JS
17	W.S. Moon	"	Foreman	W.S. Moon	WSM
18	THOMAS D. MATHS	ENGLOBAL	UTILITY	Thomas D. Maths	DM
19	DON WALKER	WELDED	Foreman	Don Walker	DW
20	JAMES ARNDT	ENBRIDGE	TILE	James Arndt	JA
21	RON ALEXANDER	"	WI	Ron Alexander	RA
22	DUANE KISRO	WELDED	FOREMAN	Duane Kisro	DK
23	MARK ELLIOTT	WELDED	FOREMAN	Mark Elliott	ME
24	Darrel Kumb	"	FOREMAN	Darrel Kumb	DK
25	Ken Bonbrugh	Lunda	Fore.	Ken Bonbrugh	KB
26	Dale Cole	Lunda	Foreman	Dale Cole	DC
27	Keith Hettand	Enbridge	Tile	Keith Hettand	KH
28	Art Steve	SKW	Engineer	Art Steve	AS
29	Chris Brennan	Englobal	Project Manager	Chris Brennan	CB
30					
31					

ENBRIDGE PIPELINE PROJECTS - DAILY SIGN IN SHEET

Tues.

Inspectors & Foremen's

PAGE 1 OF 2

LOCATION: Malta, IL

DATE: 11-18-08

ATTENDEES:

	Name (print)	Company	Title	Signature	Initial
1	GRT6 BOEK	WELD (W)	ENG	[Signature]	G.B.
2	Curtis Brooks	Welded	Foreman	[Signature]	
3	Randy Starcher	Welded	PA	[Signature]	RS
4	BLAKE EMMING	"	M.M.	[Signature]	B.F.
5	Greg Hinson	"	ASST. Supt	[Signature]	G.H.
6	Shawn McKenzie	?	Foreman	[Signature]	S.M.
7	Kenneth Koken	"	"	[Signature]	K.K.
8	Todd Woicowski	Welded	Foreman	[Signature]	T.W.
9	Bobbi Korney	welded	ASST Supt	[Signature]	B.K.
10	Charles Neal	Englabal	Utility	[Signature]	C.N.
11	RETTA	welded	PSM	[Signature]	R.H.
12	Barbara McKenzie	Welded	Supt	[Signature]	B.M.
13	Ben Lehner	Hygem	ET	[Signature]	B.L.
14	Mark Wilhelm	LHB	Auditor	[Signature]	M.W.
15	Fred Johnson	U.S. Pipe	Electric Cons	[Signature]	F.J.
16					
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ENERIDGE PIPELINE PROJECTS - MEETING SIGN IN SHEET

MEETING SUBJECT: Daily Assignments

PAGE 1 OF 1

LOCATION: Darius Wisconsin

DATE: November 14 2008

ATTENDEES:

	Name (print)	Company	Title	Signature	Initial
1	MARTE KELGAN	TIR	Asst	<i>[Signature]</i>	<i>[Initial]</i>
2	ED SHEWAN	TIR	INSP	<i>[Signature]</i>	<i>[Initial]</i>
3	Tom McVicker	TIR	INSP	<i>[Signature]</i>	<i>[Initial]</i>
4	For Shaup	TIR	INSP	<i>[Signature]</i>	<i>[Initial]</i>
5	Chuck Roberts	TIR	utility	<i>[Signature]</i>	<i>[Initial]</i>
6	Lannie Carr	TIR	INSP	<i>[Signature]</i>	<i>[Initial]</i>
7	Rob Frahm	TIR	INSP	<i>[Signature]</i>	<i>[Initial]</i>
8	Jon Britton	TIR	UTILITY	<i>[Signature]</i>	<i>[Initial]</i>
9	Michael F. Walker	Enbridge	Project Chief	<i>[Signature]</i>	<i>[Initial]</i>
10	Tom Burns	TIR	WELDR	<i>[Signature]</i>	<i>[Initial]</i>
11	Connie Owen	TIR	Utility	<i>[Signature]</i>	<i>[Initial]</i>
12	David McDade	TIR	Weld	<i>[Signature]</i>	<i>[Initial]</i>
13	LANE ARMSTRONGS	TIR	UTILITY	<i>[Signature]</i>	<i>[Initial]</i>
14	WELLS	TIR	WELDR	<i>[Signature]</i>	<i>[Initial]</i>
15	Billy Robinson	TIR	UTILITY	<i>[Signature]</i>	<i>[Initial]</i>
16	CHIEF BAUGH	Enbridge	utility	<i>[Signature]</i>	<i>[Initial]</i>
17	Paul Bahui	TIR	weld	<i>[Signature]</i>	<i>[Initial]</i>
18	MARK BERGMAN	TIR	UTILITY	<i>[Signature]</i>	<i>[Initial]</i>
19	Josh Gray	TIR	Utility	<i>[Signature]</i>	<i>[Initial]</i>
20	Jessie C. Sheehan	TIR	WELD	<i>[Signature]</i>	<i>[Initial]</i>
21	Bill Vaden	TIR	Feck	<i>[Signature]</i>	<i>[Initial]</i>
22	CHARLES W. HUNT	TIR	BENDING	<i>[Signature]</i>	<i>[Initial]</i>
23	FRANK DOMBER	TIR	WELD	<i>[Signature]</i>	<i>[Initial]</i>
24	TON MACKY	UTQ	AUT	<i>[Signature]</i>	<i>[Initial]</i>
25	Vince Walsh	TIR	WELD	<i>[Signature]</i>	<i>[Initial]</i>
26	Don Herbert	TIR	UTILITY	<i>[Signature]</i>	<i>[Initial]</i>
27	LARRY LAKE	MBF	NDE	<i>[Signature]</i>	<i>[Initial]</i>
28	Derek Morse	LHB	survey	<i>[Signature]</i>	<i>[Initial]</i>
29	Mark Spahay	Enbridge	Survey	<i>[Signature]</i>	<i>[Initial]</i>
30	Jack Spates	Enbridge	INSPECTOR	<i>[Signature]</i>	<i>[Initial]</i>
31	BRUCE BARBER	XTREEM	E.I.	<i>[Signature]</i>	<i>[Initial]</i>

Paul Asmus TIR
 William Baker TIR
 GARY NASH TIR
 Richard Ehrke TIR
 LIVER
 WITH INSPECTOR
 Weld Insp
 L. Tracy
 Ron Mann
 Wick. IS. b.
 BRN
 RR

JOHN TOWLES XTREEM LCI John Tack Q.

Exit Interview
Enbridge Southern Access Construction Inspection
November 10-14, 2008
Michaels Construction Spread
Darien, WI

1. Jeeping and coating operation south of Blaine Road, MP 26 on November 10 on 42" pipe. It was observed that there was substantial dirt on the top and side of the pipe even after the pipe was washed prior to jeeping. This was due to the inability of the washing crew to clean the ditch side of the pipe. This issue was brought to the attention of the inspector, who said the ditch side of the pipe would be washed prior to jeeping. A girth weld coating that was to be recoated was being removed by burning with the heating torch, rather than being blasted off. This is not a recommended practice, since this burning process could damage the parent pipe coating. This operation was also brought to the attention of the inspector.
2. Lowering in operation south of Blaine Road, MP 26 on November 11 on 42" pipe. It was observed that the boom spacing for lowering in did not meet the criteria specified in the Engineering Critical Analysis (ECA). Boom spacing was observed to be approximately 140, 104, and 20 feet between the four booms, when it should have been 100, 60 and 40 feet per the ECA criteria. It was communicated to the lowering in inspector that the boom spacing needed to be corrected. The lowering in foreman was notified of the needed correction and attempted to continue lowering in with the correct spacing. The foreman stopped the lowering in when he determined he could not safely lower the pipe with the specified ECA criteria boom spacing. Enbridge issued a procedure modification on November 12 that would maintain the correct boom spacing by having the operator utilize extra booms when necessary. It is important for the lowering in inspector to monitor for correct boom spacing, since lowering in subjects the pipe to significant stresses.
3. Tie-in north of Hunter Road, MP 27 on November 12 on 42" pipe. It was observed that when the root pass has been completed on a tie-in, the interpass temperature was not checked prior to beginning the hot pass. The inspector was requested to check the weld temperature, which was found to be less than the specified 250 degrees F. The weld was heated until the required 250 degrees F was achieved. It is important for the inspector to closely monitor weld temperatures, particularly at tie-ins where additional stress on the pipe may be present.
4. Directional drill of Turtle Creek on November 13 on 42" pipe. It was observed while the pipe was being pulled that the jeeping crew was not cleaning all dirt and contamination off the pipe prior to jeeping. This was brought to the attention of the inspector, who directed the jeeping crew to make sure all dirt was removed from the pipe prior to jeeping.

All of these issues were discussed with Ron Ramer, Merle Leigh and Nolan Baugh on November 14 and were to be addressed. In addition, these issues were communicated to the inspectors in the field when they were observed.

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 11/14/08
Location: Michels Spread 1 Darien, WI	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
Ron Ramer	Inspection chief	Tulsa Inspection Resources
Merle Leigh	Assistant Chief	Tulsa Inspection Resources
Activities Observed/Performed: Held exit interview.		Results/Comments:
Summary: Issues communicated through exit interview.		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 11/12/08
Location: Michels Spread 1 Darien, WI	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
Ron Ramer	Inspection chief	Tulsa Inspection Resources
Dave Hoffman	Supervisor, US Compliance	Enbridge
Lonny Carr	Lowering in inspector	Tulsa Inspection Resources
Billy Jones	Senior welding inspector	Tulsa Inspection Resources
Ron Horacek	Welding inspector	Tulsa Inspection Resources
JD Foreman	Lowering foreman	Tulsa Inspection Resources
Activities Observed/Performed:		Results/Comments:
<p>1. Lowered in section north of Tighe Road. A section of 42" had a 200 foot span. Sand bags were positioned to support pipe in span</p> <p>2. Tie in north of Hunter Road on 42". Observed welders were about to start hot pass without checking heat. Instructed inspector to check temperature, which was less than 250 degrees F. Pipe was heated to greater than 250. Told inspector to make sure heat is checked before and during welding.</p> <p>3. Creek crossing N of County W. 20" girth welds were being recoated, 42" was being lowered into creek bed.</p> <p>Missed pipe repair, screw anchor installation due to rain.</p>		<p>1. No issues</p> <p>2. Communicate issue at exit interview.</p> <p>3. No issues</p>
Summary:		
Communicate issues at exit interview.		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 11/11/08
Location: Michels Spread 1 Darien, WI	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
Ron Ramer	Inspection chief	Tulsa Inspection Resources
Merle Leigh	Assistant Chief	Tulsa Inspection Resources
Dave Hoffman	Supervisor, US Compliance	Enbridge
Dennis Raisanen	Pipe gang welding inspector	Tulsa Inspection Resources
Bart Scarborough	Mechanized welding technician	Michels
Carl Overstreet	Welding foreman	Michels
Lonny Carr	Lowering in inspector	Tulsa Inspection Resources
Pat Sharp	Coating inspector	Tulsa Inspection Resources
Kelly Tkuchuk	Coating QC inspector	contractor
John Malesky	UT auditor	contractor
Billy Jones	Senior welding inspector	Tulsa Inspection Resources
Activities Observed/Performed:	Results/Comments:	
<p>1. Observed the pipe gang/firing line on mechanized 42" pipe at MP 43.1, south of Genoa Road 2nd shack checked gas flow rate 55 l/min ok Root pass V 24, A 257, hot pass 26 V, 244 A 120 cm/min TS ok 1st fill V 26, A 235, 73 cm/min TS ok Cap V 23.4, A 207, TS 73 cm/min, WS 8.6 cm/min ok Cap V 22, A 200, TS 53, WS 8.4 ok Preheating the pipe to maintain 125 degree F temperature, interpass temperature maintained above 125 degrees F</p> <p>2. Lowering in south of Blaine Road MP 25 Observed tractor spacing of approximately 120, 100, 20 between 1,2,3,4 tractors See picture of spacing between 1 and 2. This exceeded spec and was brought to the inspectors attention. The inspector talked to the foreman, who attempted to reduce spacing. He started having problems, and told the inspector and other personnel on site he could not maintain the requested spacing and shut down the operation. Spacing when the operation was shut down was 140, 104 and 20 between 1,2,3,4. See picture of tractor spacing. Enbridge personnel talked to Michels and will provide resolution. Two sections were lowered in today, from 1338+86 to 1398+18.</p> <p>3. Coating of Turtle Creek HDD at MP 14.2, Hofstrom Road Girth weld coating were being recoated to defective coating applied initially. Improper thickness, insufficient adhesion. QC inspector measured dry film thicknesses ranging from 35 to 89 mils. Spec is 40 to 40 mils. This coating was repaired in one area where coating was thin.</p> <p>4. Reviewed 20" and 42" weld log histories and NDE reader sheets.</p> <p>5. Discussed AUT scans with NDE auditor. Reviewed satisfactory and repair welds. All repair welds are scanned with the auto UT, as well as a manual scan.</p>	<p>1. No issues 2. Get resolution from Enbridge 3. No issues 4. No issues 5. No issues</p>	
Summary:		

Communicate issues at exit interview.

Inspector(s): Carl Griffis

CENTRAL REGION OFFICE
Daily Inspection Report

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 11/10/08
Location: Michels Spread 1 Darien, WI	Station/Survey or Pipeline Marker:	
Personnel Contacted: Nolan Baugh Lonny Carr	Title/Position: Construction Records Auditor Lowering in inspector	Company/Affiliation: Enbridge Tulsa Inspection Resources
Activities Observed/Performed: 1. Lowering in south of Blaine Road MP 26 Observed contractor washing off pipe with dirt on it Washing was only getting dirt off the working side. The ditch side still had a large amount of dirt after washing. See two pictures. 2. Same location of above. Observed the coating crew removing two part coating on the girth weld by burning off with a propane burner. This is not a good practice, in that it can damage the parent pipe FBE coating		Results/Comments: 1. This was brought to the attention of the inspector. He said the ditch side of the pipe would be washed prior to lowering in. 2. This was brought to the attention of the inspector. He had the coaters complete the two part removal with grit blasting.
Summary: Communicate issues at exit interview.		
Inspector(s): Carl Griffis		

Exit Interview
Enbridge Southern Access Construction Inspection
October 21-23, 2008
Welded Construction Spread
Malta, IL

1. There were two instances of jeep springs found to be damaged and dirty. One spring was said to be damaged immediately prior to the inspection. Both springs required replacement. It is recommended to inspect and clean all jeep springs on a routine basis so that damaged springs can be replaced as needed.
2. Final coating inspection at the tie in near Minnegan Road was not completed according to specifications for application of two part epoxy. The coating was applied at less than the 50 degree minimum temperature. This was corrected after discussion with the inspector.
3. A pipe segment south of Minnegan Road was set on the skids without felt pads. Pads are required per Enbridge procedures as they prevent coating damage from the skids.
4. The welding crew at HWY 23 near Sanderson Rd. failed to follow several procedures during line up and welding of the root bead. The welders adjusted the position of the lineup before 50% of the root bead had been completed, putting unnecessary stress on the incomplete weld. The welder on the west side of the pipe was observed welding the root bead in a gap that significantly exceeded the 3/32 allowed by WP12 R6. This was done at the direction of the contractor's welding steward. The weld was ultimately marked for cut-out by the inspection team. It is recommended to communicate to the contractor that adherence to the Enbridge specifications and the approved API 1104 qualified procedure is required by DOT regulations.

Karaus, Bryn (PHMSA)

From: David.Hoffman@enbridge.com
Sent: Sunday, November 09, 2008 6:32 PM
To: Griffis, Carl <PHMSA>
Cc: Nolan.Baugh@enbridge.com; Theresa.Picton@enbridge.com;
Shaun.Kavajecz@enbridge.com
Subject: Enbridge Follow-up - PHMSA Construction Field Audit Nov 3 - 7, 2008

Carl,

Following your construction field audit of Enbridge's Southern Access Project - USPL Spread 3 November 3 - November 7, 2008, please find below a response from Jon Conoway, Enbridge Construction Manager, to address and reinforce your findings.

Excerpt from email from Jon Conoway, Saturday November 8, 2008.

"We have added an inspector to the mini pipe gang to insure an adequate inspection presence and proper preheat is applied and maintained. Tomorrow, Sunday, November 9, 2008, ALL Spread 3 inspection staff will be attending a SPC Training put on by SPC, Kelly Tkachuk, and Steve Berkemeier. The Enbridge coating Specifications will be reviewed, as well. On Spread 3, we had insured coating training was given to all of the Utility inspectors, but we omitted some of the Welding inspectors. Tomorrow's training will also include all of the welding inspectors. The preheat requirements will also be addressed in this meeting. We will send you a copy of the sign in sheet from this training. Additional trainings will be put on during the work week for the contractor employees. We already had SPC scheduled to arrive to put on 'cold weather application' trainings for the spreads".

Carl, I will forward a copy of the sign-in sheet from Sunday's inspector training to you when received.

Additionally, Bryan Harper, Enbridge Construction Manager, Welded Spread 2, issued the following email to Spread 2 personnel as proactive follow-up based on findings from your Spread 3 audit.

Excerpt from email from Bryan Harper, Friday November 7, 2008.

"E.W. & Freddie,
Please review the attachment regarding the recent PHMSA SA/SL Spread 3 Exit Interview. During tomorrows Contractors Foremens Meeting and Inspectors Meeting review each of the issues, identified during the PHMSA Audit. I realize this audit was performed on a different spread, however Welded Foremen and Spread 2 Inspectors need to be informed of the deficiencies and remain vigilant in their efforts to insure Enbridge Energy Specifications and Procedures are strictly adhered to at all times. Please provide a sign in sheet, for all foremen and inspectors attending the meetings. I will also need a bullet list of topics and issues discussed. Forward the sign in sheet and topics of discussion to me ASAP".

Regards,

Dave

Dave Hoffman
Supervisor, U.S. Compliance
Enbridge Energy Company, Inc.
Ph. (715) 394-1540
Cell. (715) 718-1179

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**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Energy Southern Access/ Southern Lights Phase 2 – Welded Spread		Date: 10/23/08
Location: Malta, Illinois	Station/Survey or Pipeline Marker:	Various locations on ROW
Personnel Contacted:	Title/Position:	Company/Affiliation:
W.E. Whiddon	Chief Inspector	Enbridge Contractor (TIR)
Nolan Baugh	Lead Compliance Coordinator	Enbridge Contractor (TIR)
Bob Catrell	Chief Welding Inspector	Enbridge Contractor
Joe Hollingshead	NDE Auditor	Enbridge Contractor
Bryan Harper	Construction Manager	Enbridge Contractor
Activities Observed/Performed:	Results/Comments:	
Inspected NDE personnel qualification records and NDE / weld repair logs.	No issues identified.	
Discussed repair rate and welding issues with Joe H.	Repair rate overall is coming down but is in the 22% range. This was due to a large number of poor root beads / internal undercut. Joe related that the high number of calls caused some tension between Welded and the NDE team and that the job had been a difficult one. No issues identified.	
Observed mainline coating crew prepping for coating of girth weld at location south of Minnegan Rd.	This crew was the one that made the sloppy repairs on the bend section at HWY 23. No issues were identified at this location.	
Prepared exit interview issues documentation for discussion with Chief Whiddon.	Bryan Harper, Chief Whiddon, and Nolan Baugh attended the exit interview discussion.	
Summary:		
Inspector(s): Gabriel Hodill		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge	Date: 10/23/08	
Location: Darian, WI	Station/Survey or Pipeline Marker: Spread 1 Stage 2	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Ron Ramer	Chief Inspector	Enbridge
Merle Leigh	Asst Chief Inspector	Enbridge
Patsy Bolk	Enbridge Compliance	Enbridge
Billy Jones	Chief Welding Inspector	Enbridge
Dennis Raisanen	Welding Inspector	Enbridge
Activities Observed/Performed:	Results/Comments:	
<p>Observed Welder testing and evaluation of coupons at the yard on Hwy 69 just north of the Michels Office/Warehouse. Both a new welder and the Chief Welding Inspector tested and passed.</p> <p>Observed Mainline welding. Everything running smoothly. All shacks are together and AUT in close behind. The technicians on the internal clamp continue doing a good job of brushing the copper pads between welds. This assures a good fit against the inside of the pipe, resulting in consistent heat sinking.</p>		
Summary: No issues		
Inspector(s): Mark A. Spann P.E. Oak Ridge National Laboratory For the USDOT PHMSA		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Energy Southern Access/ Southern Lights Phase 2 – Welded Spread		Date: 10/22/08
Location: Malta, Illinois	Station/Survey or Pipeline Marker: Various locations on ROW	
Personnel Contacted:	Title/Position:	Company/Affiliation:
W.E. Whiddon	Chief Inspector	Enbridge Contractor (TIR)
Nolan Baugh	Lead Compliance Coordinator	Enbridge Contractor (TIR)
Steve Berkemeier	QA/QC auditor	Enbridge Contractor (TIR)
Bob Catrell	Chief Welding Inspector	Enbridge Contractor
Activities Observed/Performed:	Results/Comments:	
Observed tie in crews south of Minnegan Rd. and north of RR tracks. Also observed crew north of McGirr Rd. and south of RR tracks. at the end of the spread.	Crew north of tracks was observed applying two part epoxy without preheat or abrasion. The ambient temperature was below 50 F and conditions were cloudy and windy. This was contrary to procedures and was brought to the attention of the inspector who was in his truck and was not aware of the work going on. One patch repair was redone at my request and heat was applied by torch for all repairs.	
	The crew south of tracks was observed and all procedures were followed during tie in. No issues.	
	Went back to crew north of tracks. The lowering in had been completed and tie in was done to spec. Preheat and lineup were ok. No issues.	
Observed tie in crew at Sanderson Rd a second time.	The tie in was completed this time within the procedures. No issues.	
Observed road bore crew at Hwy 30 crossing.	The crew was using a thumper and excavating the pipe by hand as it was emerging from the ditch on the other side of railroad tracks. RR personnel were on site examining the stability of the tracks above the pipe crossing. No issues.	
Summary: Due to colder weather the crews were using 300 temp sticks instead of 250 to make sure heat was maintained.		
Inspector(s): Gabriel Hodill		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge		Date: 10/22/08
Location: Darian, WI	Station/Survey or Pipeline Marker:	Spread 1 Stage 2
Personnel Contacted:	Title/Position:	Company/Affiliation:
Ron Ramer	Chief Inspector	Enbridge
Merle Leigh	Asst Chief Inspector	Enbridge
Patsy Bolk	Enbridge Compliance	Enbridge
Pat Sharp	Coating Inspector	Enbridge
Scott Hicks	Tie-in Foreman	Michels
Activities Observed/Performed:	Results/Comments:	
Met with Chief, and Chief Welding Inspector.		
Located Tie-in crew extremely windy conditions and cool. Pre-heats were good, and weld was reheated after bead pass was completed and cleaned		
Located and observed coating crew. Induction coil heating was providing very consistent pre-heat. The crew was putting a second coat directly over the weld bead. Prior to the second coating, there had been a lot of jeeps directly over the weld bead, Second coating had corrected the problem.		
Located and observed HDD both North and South of Kishwaukee River. No issues.		
Summary:		
No Issues		
Inspector(s):	Mark A. Spann P.E. Oak Ridge National Laboratory For the USDOT PHMSA	

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Energy Southern Access/ Southern Lights Phase 2 – Welded Spread		Date: 10/21/08
Location: Malta, Illinois	Station/Survey or Pipeline Marker: Various locations on ROW	
Personnel Contacted:	Title/Position:	Company/Affiliation:
W.E. Whiddon	Chief Inspector	Enbridge Contractor (TIR)
Nolan Baugh	Lead Compliance Coordinator	Enbridge Contractor (TIR)
Steve Berkemeier	QA/QC auditor	Enbridge Contractor (TIR)
Shaun McKenzie	Foreman, tie in crew	Welded
Bob Catrell	Chief Welding Inspector	Enbridge Contractor
Activities Observed/Performed:	Results/Comments:	
Reviewed welder qualification and welder daily check logs.	One daily check log from Oct 3 rd was noted that contained a comment that E6010 welding rods were used on the hot pass. Since 8010 rods are required for all passes except the root bead, I request that this issue be investigated. I questioned the foreman of the welding crew about the issue and he related that the comment was made in error by the inspector. This was verified later according to personnel who contacted the inspector.	
Observed tie in / lower in crew at HWY 23 and Sanderson Rd.	Inspected jeep voltage with Steve B. before lowering in and went to lunch. After lunch the crew had skipped break and had completed lowering in of the main segment of pipe. Inspected coating repairs of bend section waiting to be lowered in next. Several sloppy repairs were found and the coating crew was called in by Steve B. to correct it. The jeep spring was inspected at my request and due to excessive dirt and bent coils the spring was made to be replaced by Steve's direction.	
	Later two welds were being completed to set up for the final tie in weld. The weld on the bend section was completed to spec but the weld D/S at STA 4453+46 was completed with an excessively wide gap. The crew also hinged the pipe before completion of 50% of the root bead in order to try to shorten the gap. This was discussed with Nolan B. and after some phone calls the weld was scheduled for cut out. The crew then completed the weld anyway in spite of the inspector's decision to cut it out later.	
Summary:		
Inspector(s): Gabriel Hodill		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge		Date: 10/21/08
Location: Darian, WI	Station/Survey or Pipeline Marker:	Spread 1 Stage 2
Personnel Contacted:	Title/Position:	Company/Affiliation:
Ron Ramer	Chief Inspector	Enbridge
Merle Leigh	Asst Chief Inspector	Enbridge
Patsy Bolk	Enbridge Compliance	Enbridge
Larry Lake	NDE Auditor	Enbridge
Frank Dombeck	Inspector	Enbridge
Activities Observed/Performed:	Results/Comments:	
Met with Chief, Asst Chief, and NDE Auditor to discuss project status.		
Made two attempts to observe coating crew, but ROW was extremely slick and they were battling stuck vehicles - - as the crew foreman said, "not a good time."		
Observed Mainline Welding. Slick Conditions were slowing them down, but no other issues. AUT was immediately behind them. As of 12:00 Noon, 30 welds complete, no rejects.		
Located lower-in crew. They were performing a tie-in		
Summary:		
ROW was very wet and slick. Crews were working well considering the conditions.		
Inspector(s):	Mark A. Spann P.E. Oak Ridge National Laboratory For the USDOT PHMSA	

Karaus, Bryn (PHMSA)

From: Griffis, Carl <PHMSA>
Sent: Friday, November 14, 2008 9:34 AM
To: 'Patsy.Bolk@enbridge.com'; 'Nolan Baugh (Enbridge)'; 'ron.ramer@yahoo.com';
'leighmj@hotmail.com'; Dave Hoffman (Enbridge)
Cc: 'Patsy.Bolk@enbridge.com'
Subject: Enbridge Southern Access Phase 2 Construction Audit Exit Interview October 9, 2008, Spread
1 - Michels
Attachments: Enbridge Southern Access Exit Interview 10_09_08.doc

Dave: This exit interview is a written summary of the issue Mark Spann talked with your personnel about on October 9, 2008. I just wanted to put it in writing. This issue has been addressed by Ron Ramer and Merle Leigh.

Carl Griffis
Pipeline and Hazardous Materials Safety Administration
Office of Pipeline Safety
Chicago Area
10316 Floyd Street
Crown Point, IN 46307-3063
phone 219-661-8586
cell 219-629-5140
fax 219-661-8586
email carl.griffis@dot.gov

Exit Interview
Enbridge Southern Access Construction Inspection
Mark Spann, Oak Ridge National Laboratory
October 7-9, 2008.
Michaels Construction Spread
Darien, WI

1. On the afternoon of October 7, 2008, a tie-in was observed in the area of E L and J Townline Rd. From cutting the pipe to length until the bead pass had been completed and the hot pass had been started was observed. Preheat and interpass temperature between root and hot pass were checked. During the time the tie-in was being observed the welding inspector never went down into the trench. This observation was mentioned to Nolan Baugh. While the inspector was in the immediate area and talking with the tie-in crew, is important for the inspector to visually inspect the fit up of the tie-in weld in the ditch prior to welding initiation.

This issue was discussed with Ron Ramer and Nolan Baugh on October 9 and was to be addressed with the inspector.

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge		Date: 010/09/08
Location: Darian, WI	Station/Survey or Pipeline Marker:	Spread 1 Stage 2
Personnel Contacted:	Title/Position:	Company/Affiliation:
Ron Ramer	Chief Inspector	Michels
Merle Leigh	Asst Chief Inspector	Michels
Nolan Baugh	Lead Compliance Coordinator	Enbridge
Dave Hoffman	Supervisor US Compliance	Enbridge
David Stafford	Project Manager	Enbridge
Ron Horacek	Tie-in inspector	
Activities Observed/Performed:		Results/Comments:
<p>Observed mainline welding. Observed welding in progress. A 5 joint gap between the hot pass and first fill pass operation. Pre-heat crew was on top of it and reheated the joint before the fill pass. Also observed the mainline welding operation restarting after a break. Pre-heating was performed on all joints.</p> <p>Observed repair welder repairing a cover pass (6 o'clock position). Joint was preheated to above 302deg F all the way around. Welder was storing rods in a rod oven properly.</p> <p>Was un able to observe lowering in. Crew was working on tie-ins.</p>		
Summary:		
Mechanized welding is doing well. ROW was dry. Windy conditions/		
Inspector(s): Mark A. Spann P.E. Oak Ridge National Laboratory For the USDOT PHMSA		

Cline, Sandy (PHMSA)

From: David.Hoffman@enbridge.com
Sent: Tuesday, October 28, 2008 8:57 AM
To: Hodill, Gabe <PHMSA>
Cc: Nolan.Baugh@enbridge.com; Griffis, Carl <PHMSA>
Subject: Welded Spread #2 PHMSA Field Audit - Follow-up
Attachments: inspector sign in 10 24.pdf

Gabe,

Thanks for providing me a copy of last week's Exit Interview for Welded Spread #2. The information has been passed to Enbridge Construction Management and Project Management Teams with a request for follow-up information regarding how the deficient items are communicated, reinforced, and corrective actions taken as follow-up.

Below are details regarding follow-up/corrective actions conducted by Enbridge to discuss and communicate the issues identified and to reinforce the various procedures that must be followed during construction. I have included an excerpt from an email from E.W. Whiddon, Inspection Chief you met, that was sent to me by Bryan Harper, Enbridge Construction Manager for Spread 2.

Gabriel C. Hodill with the U.S. Department of Transportation along with Nolan Bough visited Spread # 2 from October 21 to October 23 2008. On October 23, 2008, I met with Mr. Hodill and Mr. Bough for the exit interview relating to their observations while on the ROW. Listed below are four items he had observed on the right of way.

On October 24 2008 at the 6.30.a.m. meeting with Inspectors I passed out copies of the observations to all Inspectors. We discussed each item that was listed and corrective actions to be taken.

Item # 1 – Jeep spring dirty & damaged. The inspector at this site said this was corrected that the spring fell off pipe in the mud and was going to be replaced. It was reinforced that all jeeps must be clean and in good repair prior to use.

Item # 2 Coating pipe at Minnegan Road. The Inspector that was on site said the crew applying the field coating at this location was normally not the crew that usually apply coating. The inspector was not present during the beginning of the coating application. The inspector stated he was making out paper work when the crew began the coating application. He was instructed to be present while crews were applying any coating to the pipe to ensure it met procedure and preheat was discussed. The previously applied coating was removed, the location was sand blasted, pre-heated, and reapplied the coating to the pipe following procedure.

Item # 3 Pipe on skids with out felt pads. I instructed all inspectors to check pipe in their work area for pipe not having pads between skids and pipe. Inspector was instructed to inform the contractor foremen to correct any locations where pipe pads were not being used to protect the pipe.

Item # 4 The Welding Inspector advised the Welding Steward that the tie-in welding line up and welding process was out of compliance with Enbridge Welding Procedure WP12 Revision 6. However, the contractor continued to complete the tie-in weld despite of the fact that the Welding Inspector informed them the weld would be an automatic cut out. The following morning the weld was cut out and replaced following correct procedure.

Attached is the inspector sign in sheet for 10/24/08 where we went over the results from the exit interview.

If you have any further concerns or questions, please give me a call anytime.

Regards,

Dave

Dave Hoffman
Supervisor, U.S. Compliance
Enbridge Energy Company, Inc.
Ph. (715) 394-1540
Cell. (715) 718-1179

* * * * * IMPORTANT NOTICE * * * * *

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ENBRIDGE PIPELINE PROJECTS - DAILY SIGN IN SHEET

Inspectors meeting 6:30am
 LOCATION: Maltz. El.

PAGE 1 OF 1

FRI

DATE: 10-24-08

ATTENDEES:

	Name (print)	Company	Title	Signature	Initial
1	Michael F. Valle	Englobal	W&E Coordinator	Michael Valle	MV
2	Bill DUNCAN	"	ASST. Chief	Bill Duncan	BD
3	DON ELLIOTT	ENGlobal	UTILITY	Don Elliott	DE
4	Ben Hoff	Englobal	WE	Ben Hoff	BH
5	Rick Wilbur	"	UTILITY	Rick Wilbur	RW
6	Charles Neal	Englobal	Utility	Charles Neal	CN
7	MARK HILYARD	Englobal	UTILITY	Mark Hilyard	MH
8	Bill Schurr	ENGLOBAL	UTILITY	Bill Schurr	BS
9	John Gross	"	CWI	John Gross	JG
10	Lo MATTHEW	"	WE	Lo Matthew	LM
11	MARK STANLEY	Englobal	Coating	Mark Stanley	MS
12	RICHARD THOMAS	"	W-4	Richard Thomas	RT
13	RON ALEXANDER	"	WI	Ronald Alexander	RA
14	Jordan Wagner	LHB	Survey	J Wagner	JW
15	Robert Stever	SRW	Engineer	Robert Stever	RS
16	DONALD WOOD	ENGlobal	COATING	Donald Wood	DW
17	Pam Vaisukku	"	TECH	Pam Vaisukku	PV
18	Gene Baour	TRR	FMC	Gene Baour	GB
19	Glenn Carlson	ENGLOBAL	LI	Glenn Carlson	GC
20	Michael Elliott	ENBRIDGE	OPER. COORD.	Michael Elliott	ME
21	DIMMICK DIMITS	ENGLOBAL	WTR TECH	Dimmick Dimitis	DD
22	Earl Williams	ENGLOBAL	W.I.	Earl Williams	EW
23	E.W. Whidden	Englobal	Chief	E.W. Whidden	EW
24	John Black	Salem	POW	John Black	JB
25	Kath Holland	Enbridge	T.K	Kath Holland	KH
26	JAMES ARNOT	ENBRIDGE	TILE	James Arnot	JA
27	Bob E. Gentry	Englobal	S. WI	Bob Gentry	BG
28	Harold Smith	"	W.I.	Harold Smith	HS
29	Noah Crisp	Englobal	WE	Noah Crisp	NC
30	Brandon Hoop	"	UTILITY	Brandon Hoop	BH
31	Karen Lane	Englobal	OC	Karen Lane	KL
32	Chris Brennan	Englobal	Office Manager	Chris Brennan	CB

Karaus, Bryn (PHMSA)

From: Hodill, Gabe <PHMSA>
Sent: Thursday, October 02, 2008 11:24 PM
To: bob.johnson@enbridge-energy.com; Nolan.Baugh@enbridge.com
Cc: David.Hoffman@enbridge.com; Patsy.Bolk@enbridge.com; john.connorway@enbridge-energy.com; Barrett, David <PHMSA>; Griffis, Carl <PHMSA>
Subject: Exit Interview So. Access USPL
Attachments: so lights Exit InterviewUSPL.doc

Thanks again for your assistance during this week's inspection. The attached exit interview outlines the items of concern/follow-up. There isn't much to read, USPL is doing a pretty good job.

Gabriel Hodill, Staff Engineer
PHMSA Office of Pipeline Safety - Central Region
Ph: (816) 329-3819
Fax: (816) 329-3831
Mobile (816) 728-3069

Exit Interview
Enbridge Southern Access Construction Inspection
September 9-11, 2008
USPL Construction Spread
Morris, IL

1. The new welding procedure WP12 Rev6 alters welding parameters such that many welds being made now would not meet the procedure requirements. The changes specific to the different welding rods merit the need for welding inspectors to check and record the type of welding rods used. It is recommended to check the welding rod type for both root bead and hot pass during daily welder checks to ensure compliance.
2. In one observation of a tie in crew the welders had difficulty putting in the root bead due to what inspectors across USPL agree is a poor quality welding rod issue. This extended the time needed to complete the bead and preheat was rechecked and needed additional flame heat during the completion of the bead. It is recommended to recheck the preheat as soon as any problems are encountered that extend the time necessary to finish the root bead.

Exit Interview
Enbridge Southern Access Construction Inspection
September 9-11, 2008
Michels Construction Spread
Darien, WI

1. At the Milton Pipe yard there were a number of 42" X70 .500t pipe segments that were observed to have an unusual amount of what appeared to be roller marks or impressions. These marks were in a spiral pattern that matched the spiral seam and were present at approximately 3" intervals along the length of the pipe both inside and outside. It is recommended to investigate these surface imperfections. Also please provide a copy of the MTR for pipe # 28386 (HT 591029) which was one of the segments found to have the imperfections.
2. The tie-in crew near Herbert Rd. was observed on 9/10 to have allowed the pipe to cool for approximately 10 minutes while line up was completed. The heat was not checked after lineup was achieved. The welding inspector on site agreed to check for proper preheat after lineup. It is important to ensure that all tie-in crews and inspectors are checking for proper preheat immediately before welding begins.
3. The coating crew at the Chrysler Rd tie-in was observed on 9/10 applying the two-part epoxy immediately after heating with a direct flame. The weld was not brush blasted after the flame was applied. After noting this issue, it was promptly addressed by Enbridge personnel and the Asst. Chief Inspector and the weld was subsequently sandblasted and recoated. It is recommended to continue to emphasize the importance of following the coating training and procedures.
4. It was observed on 9/11 that the pipe gang crew near Co. Rd. X was not using splatter guards on the top of the 42" pipe. This was corrected by the welding inspector. The pipe gang crew was also not consistently using pads between the pipe and the skids. Pads under the pipe were also missing in many places in the area of Tighe Rd. It is recommended to continue to stress that these two areas of the specifications be followed in order to ensure coating integrity.
5. It was observed on 9/11 that the crew responsible for pre-jeeing was only removing large clods of dirt and loose tape from the pipe before using the holiday detector. Dust, loose sand, and dirt were still present on the top and it is recommended that coating crews use a brush or cloth to clean up the pipe before jeeing.
6. The inspector for the main coating crew appeared to have taken only one profile measurement of the sandblasted surface of each weld checked. It was later noted that Enbridge procedure C-210 section 6.9 calls for measurements to be taken at a minimum of three (3) locations. Please provide a response to confirm the number of measurements taken by coating inspectors, or provide a copy by .pdf

format if possible, of each coating inspectors daily report for the preceding 3 days.

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Energy Southern Access/ Southern Lights Phase 2 – Michels Spread		Date: 9/11/08
Location: Darien, Wisconsin	Station/Survey or Pipeline Marker: Various locations on ROW	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Ron Ramer	Chief Inspector	Tulsa Inspection Resources, Inc.
Nolan Baugh	Lead Compliance Coordinator	Enbridge
Dave Hoffman	Supervisor, US Compliance	Enbridge
Merle Leigh	Asst. Chief Inspector	Tulsa Inspection Resources, Inc.
Dennis Raisannen	Welding Inspector – Pipe Gang	
Activities Observed/Performed:	Results/Comments:	
Observed Pipe Gang at Co. Rd. X near MP 16.	When we first arrived the splatter guards were not in use to protect coating. The crews were also not using pads under the pipe. I discussed this with the welding inspector and he admitted that I was his job to make sure that these two aspects were covered. He said he would correct it. Welding appeared to be within parameters, the travel speed was high, at very near to 18"/min which was the max. Preheat and lineup were good.	
Observed coating crew at Tighe Rd. near MP 20.	The coating crew was working efficiently. Preheat was completed far ahead of coating, and was done prior to blasting by the same worker. Welds had significantly cooled, but the outside temperature was about 70 degrees and the dew point was in the low 60's. The jeeping team was not cleaning the pipe very well. I brought this to the attention of the inspector. I asked about the anchor pattern profile, and he took one measurement. I later noted that the procedures call for three measurements on each weld that is checked. This was not being done, according to the compliance coordinator. It was addressed by inspectors following the audit.	
Audited the welder daily inspections and new welder qualification tests.	No issues noted.	
Conducted Exit Interview meeting.	Document separate.	
Summary: Overall, the quality of Michels construction practices seems to have improved over Phase 1.		
Inspector(s): Gabriel Hodill		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Energy Southern Access/ Southern Lights Phase 2 – Michels Spread		Date: 9/10/08
Location: Darien, Wisconsin	Station/Survey or Pipeline Marker: Various locations on ROW	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Ron Ramer	Chief Inspector	Tulsa Inspection Resources, Inc.
Nolan Baugh	Lead Compliance Coordinator	Enbridge
Dave Hoffman	Supervisor, US Compliance	Enbridge
Ron Horacek	Welding inspector	
Steve Berkemeier	Coating inspector	Enbridge
Merle Leigh	Asst. Chief Inspector	Tulsa Inspection Resources, Inc.
Activities Observed/Performed:	Results/Comments:	
Went down to end of spread to observe lowering in crew near MP 46.	Crews were involved in a tie-in. The final jeepling was conducted with care and the pipe was actually washed. Patch sticks were used properly to repair the coating. The holiday detector was also calibrated. The welding crew tied in the line and achieved approximately 50% of the bead before removal of the clamp, but the preheat was not checked after the linup clamp was removed. Approximately 10 minutes had passed after the prehead had been checked at 250, which was the minimum. The welding inspector was asked about this and agreed to have the preheat checked immediately before.	
Went up to Chrysler Road to observe tie-in crew #1.	Welding crew was following procedures. The coating crew was following most of the procedures but the inspector was not aware that after heating with a direct flame that the steel needed to be brush blasted. This issue was discussed at length in the afternoon with inspectors and addressed by the Enbridge QA/QC team and also the Assistant Chief. One weld that was observed to be coated incorrectly in this way was tested for coating hardness and blasted and recoated the following day.	
Observed HDD operations at Turtle Creek.	No issues.	
Summary:		
Inspector(s): Gabriel Hodill		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Energy Southern Access/ Southern Lights Phase 2		Date: 9/9/08
Location: Darien, Wisconsin	Station/Survey or Pipeline Marker: Various locations on ROW	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Ron Ramer	Chief Inspector	Tulsa Inspection Resources, Inc.
Nolan Baugh	Lead Compliance Coordinator	Enbridge
Dave Hoffman	Supervisor, US Compliance	Enbridge
Charlie Hunt	Contract Inspector – Bending	
Carl Overstreet	Welding Foreman – Firing Line	Michels
Activities Observed/Performed:	Results/Comments:	
Conducted Safety and Environmental Training.	N/A	
Inspected line pipe at Milton Pipe Yard.	Some joints of pipe were observed to have unusually frequent spiral markings that appeared to be roller marks. The marks were on both the inside and outside of the pipe. The pipe was 42" X70 .500t. Pipe #28386 from HT 591029 was noted as an example.	
Inspected pipe strung out at the kickoff near Delavan Pump Station. The pipe was heavy wall pipe as required for the wetlands in that area.	The abrasion resistant coating was damaged on the top of the pipe by excessive heat at one of the girth welds. This was brought to the attention of the chief inspector.	
Observed 42" bending operations near MP 1.	No issues noted. Bending was limited to 0.3 degrees per foot according to the inspector.	
Observed welding operations of Firing Line near MP 20.	Preheat good. No issues noted.	
Inspected pipe on ROW near Tighe Rd.	Two girth welds were found to have been coated with SPC 2888 two-part epoxy. A close visual inspection showed that the coating was chipping off in places and revealed bare steel. This was brought to the attention of the chief inspector and by the following day the welds had been identified as being coated at the pipe yard and were not of good quality. The welds had not been inspected by NDE. The coating was blasted off and NDE was conducted.	
Summary:		
Inspector(s): Gabriel Hodill		

Exit Interview
Enbridge Southern Access Construction Inspection
September 9-11, 2008
Michels Construction Spread
Darien, WI

1. At the Milton Pipe yard there were a number of 42" X70 .500t pipe segments that were observed to have an unusual amount of what appeared to be roller marks or impressions. These marks were in a spiral pattern that matched the spiral seam and were present at approximately 3" intervals along the length of the pipe both inside and outside. It is recommended to investigate these surface imperfections. Also please provide a copy of the MTR for pipe # 28386 (HT 591029) which was one of the segments found to have the imperfections.
2. The tie-in crew near Herbert Rd. was observed on 9/10 to have allowed the pipe to cool for approximately 10 minutes while line up was completed. The heat was not checked after lineup was achieved. The welding inspector on site agreed to check for proper preheat after lineup. It is important to ensure that all tie-in crews and inspectors are checking for proper preheat immediately before welding begins.
3. The coating crew at the Chrysler Rd tie-in was observed on 9/10 applying the two-part epoxy immediately after heating with a direct flame. The weld was not brush blasted after the flame was applied. After noting this issue, it was promptly addressed by Enbridge personnel and the Asst. Chief Inspector and the weld was subsequently sandblasted and recoated. It is recommended to continue to emphasize the importance of following the coating training and procedures.
4. It was observed on 9/11 that the pipe gang crew near Co. Rd. X was not using splatter guards on the top of the 42" pipe. This was corrected by the welding inspector. The pipe gang crew was also not consistently using pads between the pipe and the skids. Pads under the pipe were also missing in many places in the area of Tighe Rd. It is recommended to continue to stress that these two areas of the specifications be followed in order to ensure coating integrity.
5. It was observed on 9/11 that the crew responsible for pre-jeeping was only removing large clods of dirt and loose tape from the pipe before using the holiday detector. Dust, loose sand, and dirt were still present on the top and it is recommended that coating crews use a brush or cloth to clean up the pipe before jeeping.
6. The inspector for the main coating crew appeared to have taken only one profile measurement of the sandblasted surface of each weld checked. It was later noted that Enbridge procedure C-210 section 6.9 calls for measurements to be taken at a minimum of three (3) locations. Please provide a response to confirm the number of measurements taken by coating inspectors, or provide a copy by .pdf

format if possible, of each coating inspectors daily report for the preceding 3 days.

Cline, Sandy (PHMSA)

From: Griffis, Carl <PHMSA>
Sent: Tuesday, August 26, 2008 2:37 PM
To: 'Patsy.Bolk@enbridge.com'; 'Nolan Baugh (Enbridge)'; 'ew.whiddon@enbridge-energy.com'; bryanjharper@yahoo.com; 'bill.duncan@enbridge-energy.com'
Cc: 'Floyd.Mott@enbridge.com'; 'Dave.McNeill@enbridge.com'; 'Shaun.Kavajecz@enbridge.com'
Subject: Enbridge Southern Access/Southern Lights Phase 2 Construction Audit Exit Interview August 22, 2008 Spread 2 - Welded
Attachments: Enbridge Southern Access_Southern Lights Exit Interview 08_22_08.doc; Enbridge SA patch stick repair.jpg; Enbridge SA narrow splatter guards a.jpg; Enbridge SL wide splatter guarda.jpg; Enbridge SL mud on pipe .jpg

Patsy:

Attached is the summary of issues I discussed with Nolan Baugh and W.W. Whidden on August 22, 2008. Please contact me if you have any questions.

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Exit Interview
Enbridge Southern Access/Southern Lights Construction Inspection
August 18-22, 2008
Welded Construction Spread
Malta, IL

1. Coating repair and training

It was observed on August 18 during lowering in of the 42" pipe south of Base Line Road that a coating repair on the pipe was improperly made. A scratch made on the pipe to check the jeep was larger than 1" and by Enbridge requirements should have been repaired with two part epoxy. The Enbridge operations representative acting as the inspector on site disagreed and did not repair the scratch two part epoxy. See patch stick repair picture. It is also noted that the Enbridge operations representative had not attended the coating school which all inspectors and personnel involved in coating repairs are required to take per Enbridge requirements.

The coating inspector and repair person jeeping a 20" pipe segment north of Carson Road on August 20 had not received the mandatory coating school training. The inspector did not know jeeping calibration requirements and did not know that patch stick repair was only allowed during lowering in. When the foreman arrived with the jeep calibration box, the calibration showed the jeep read 200 volts higher than the actual voltage. The voltage setting on the jeep when I arrived on site was 1.7 KV, so the pipe was being jeeped at 1.5 KV, 500 volts lower than required.

A section of 20" pipe north of Kessler Road that was to be lowered in on August 20 had been jeeped that day before. Pipe should be jeeped immediately prior to lowering in to eliminate the possibility of pipe damage going unnoticed between jeeping and lowering in. The inspector on site had not been to the coating school, an Enbridge requirement. A patch stick repair was observed on the pipe which should have been repaired with 2 part epoxy. This repair was redone properly. The coating crew also did not understand when patch stick and two part epoxy repair could be made. The tie in crew responsible for coating typically grounded the jeep in water underneath the pipe when jeeping the coated tie in weld. If no water was available, or the ground appeared too dry to provide a good ground, the crew was grinding a small patch on the pipe FBE coating to provide a ground. Once the tie in weld was jeeped, this patch was repaired with two part epoxy, but it was not jeeped. It was pointed out that all coating repairs had to be jeeped, and the use of a grounding rod for the jeep rather than grounding the jeep to the pipe should be satisfactory.

2. Welding issues

It was observed on August 20 on the pipe gang north of Highway 38 that the hot filler welders were not using splatter guards until requested to do so. The hot pass welders were using narrow splatter guards that should be wider. See pictures showing narrow and wide splatter guards

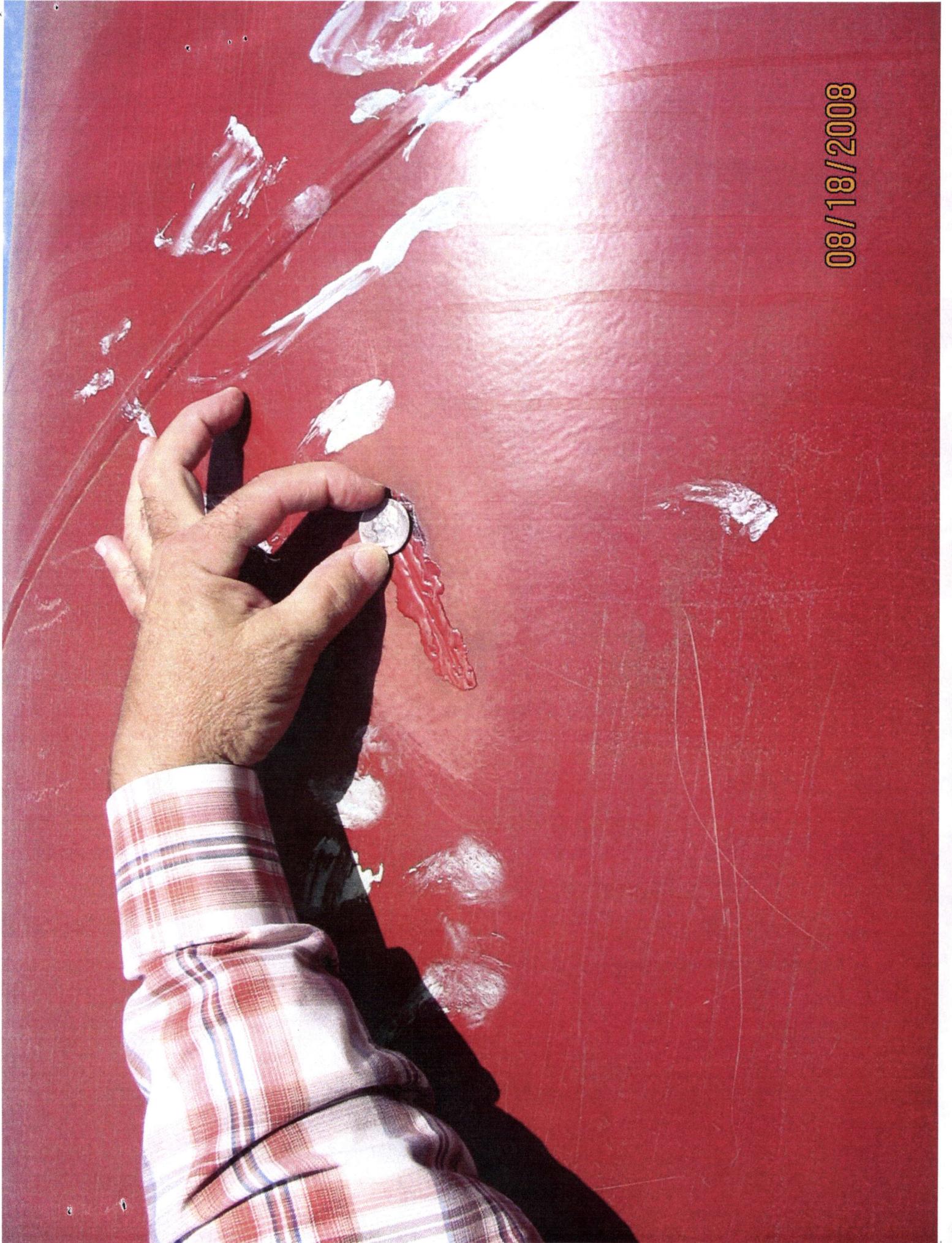


08/19/2008



08/20/2008

08/18/2008



08/21/2008



**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 8/22/08
Location: Welded spread office Malta, IL, ROW locations	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
E. W. Whidden	Chief	EN Global
Ron Chaney	Degaussing Technician	Serimax
Kevin Moore	Degaussing Foreman	Welded
Activities Observed/Performed:		Results/Comments:
<p>1. Conducted exit interview with Nolan Baugh and E.W. Whidden. E.W. responded that the issues discussed would be addressed.</p> <p>2. North of Gurler Road – degaussing of 42" pipe. Discussed degaussing with representative from Serimax and Welded. Gauss readings under 10 are desirable, readings appear to be higher on the bottom of the pipe. Serimax is using a 250 amp DC ring to degauss the pipe, prior to this Welded was using their own version of a degaussing ring using 120 amp DC. The Serimax representative said they were successful in degaussing large diameter pipe, particularly in off shore applications. Did not get to actually witness the operation due to the delay in getting equipment to transport the degaussing equipment down the muddy right of way.</p>		<p>1. No issues</p> <p>2. No issues</p>
Summary:		
Discussed previous issues identified with chief		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20") observations on 20" construction		Date: 8/21/08
Location: Welded spread office Malta, IL, right of way	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
Earl Williams	Lowering in inspector	EN Global
Dean Farless	Quality control specialist	Enbridge
Brandon Hogle	Tie in coating inspector	EN Global
Richard Moore	Welding inspector	EN Global
Don Elliott	Lowering in inspector	EN Global
Mike Elliott	Enbridge operations representative	Enbridge
Brook Parton	Level II X ray technical	Janx
Activities Observed/Performed:		Results/Comments:
<p>1. Lowering in north of Kessinger Road 20" jeep calibrated prior to lowering in and pipe jeeped. Tie in weld – preheated to 300 degrees F, pipe maintained 280 degrees F during welding. 50% of root completed before releasing external clamps Hot pass V 24-27 24-28 A 93-100 120-130 TS 8 inches/min</p> <p>Xrays of both tie ins looked acceptable. Using 7 penny hole penetrometer. Coating of welds preheating to 180 degrees F. Crews are not checking jeep after each tie in completed, must per Enbridge requirements. When calibration was checked, jeep had to be raised 100 V to 2000 V. Initial coating on girth weld was too thin – 14 – 17 mils, had to add coating. Blasted bare metal ok - good feathering between FBE and bare metal. This crew was typically grounding the jeep in water in the ditch, but if they felt they couldn't get a good ground, they were grinding a small patch through the coating for this ground. This hole was repaired, but not jeeped because they would have to grind another hole. Suggested the crew use a grounding rod.</p> <p>2. Between Aldrich and Old State Road welding on 42" cut out repairs. Weld temperature on cap was 170 degrees as measured by inspector. When heated, the temperature was still 210 degrees. Also told inspector they had to get 250 degrees 4 inches on either side of the weld, not just at the weld.</p> <p>3. 42" lowering north of Old State Road jeeps properly calibrated. Repairs made on two part were made with two part. Two part was heated to 190 degrees to minimize drying time. Lowering in was stopped due to rain.</p>		<p>1. Jeep must be calibrated after each use by a tie in crew per Enbridge requirements. All repairs in the coating must be jeeped.</p> <p>2. 250 degrees must maintained during welding.</p> <p>3. No issues</p>
Summary:		
Discuss items 1 and 2 with chief.		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project:	Enbridge Southern Access (42") and Southern Lights (20") observations on 20" construction	Date:	8/20/08
Location:	Welded spread office Malta, IL, right of way	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:	
Nolan Baugh	Construction Records Auditor	Enbridge	
Richard Thomas	Coating inspector	EN Global	
Earl Williams	Lowering in inspector	EN Global	
Steve Berkemeier	Quality control specialist	Enbridge	
Activities Observed/Performed:		Results/Comments:	
<p>1. Jeeping/coating north of Carson Road 20" two joints and pup. Observed tape on bottom of pipe after it had been jeeped. The inspector did not know when the jeep had been calibrated and had not observed the calibration. A calibration box was not available. When the Welded foreman brought the box, the jeep was reading 200 volts higher than it was putting out. Calibration – box 2.0 KV, jeep 2.2 KV. Initially the jeep read 1.7 KV. The crew was going to repair the pipe with patch sticks, rather than two part epoxy. The inspector and laborer had not been to coating school, an Enbridge requirement for the jeeping/coating crews. Observed a how digging a trench lifting soil over the pipe, dropping muds and small rocks on the pipe. Pipe should be protected with rock shields or tarps. See picture.</p> <p>2. Observed 210 feet of unsupported 2627+05 to 2625+0520" pipe partially in the ditch just north of above activity. Enbridge specs limit maximum unsupported pipe length to 250 feet. Is this both the 20" and 42".</p> <p>3. Tie in north of Kessler Road The 20" section to be lowered in had been jeeped the day before. Asked to rejeep the section. The inspector had not been to coating school. Patch stick repair was made on an area larger than 1" square. Numerous jeeps were found even though supposedly this section had been jeeped. There was confusion on when patch sticks could be used.</p>		<ol style="list-style-type: none"> 1. Discuss jeep calibration, training, coating repair criteria, lifting soil over pipe without protection with chief. 2. Get clarification of amount of pipe unsupported allowed during lowering in. 3. Discuss coating repair requirements and training with chief. 	
Summary:			
Discuss items 1 and 3 with chief.			
Inspector(s): Carl Griffis			

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project:	Enbridge Southern Access (42") and Southern Lights (20") observations on 42" construction	Date:	8/19/08
Location:	Welded spread office Malta, IL,	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:	
Nolan Baugh	Construction Records Auditor	Enbridge	
E. W. Whidden	Chief	EN Global	
Bob Gattrell	Sr. Welding Inspector	EN Global	
Joe Hollingshead	Level II technician	contractor	
John Gross	Pipe gang welding inspector	ENGlobal	
Curtis Gunter	Firing line inspector	ENGlobal	
Dean Farless	Enbridge QA/QC auditor	Contractor	
Noah Cripe	Welding inspector	ENGlobal	
Activities Observed/Performed:	Results/Comments:		
<p>1. Discussed inspection of lowering in issues with E.W. Whidden.</p> <p>2. Reviewed 42" weld logs – as of 8/15/08 reject rate was 33.9% 1003 welds, of this internal UC was 26.5% - 266 welds.</p> <p>3. Discussed high reject rate with Bob Gattrell. Pipe magnetism is thought to be a factor in the high reject rate. They are currently measuring gauss readings on every pipe joint and facing pipe joints. The facing appears to be helping the reject rate. Discussion with Noah Cripe, who is monitoring gauss readings – 30 to 50 gauss readings are seen on individual pipe joints. At the "slot" the measurements increased above 100 gauss.</p> <p>4. Pipe gang north of Highway 38 Preheat in general was ok. Root measurements V 22-25 22-25 A 140 110-130 TS 12-13 inch/min</p> <p>The hot pass crew welding the top needed wider splatter guards. See pictures. The hot filler crew was not using splatter guards until requested to do so.</p> <p>5. Firing line north of Highway 38 preheat good Cap V 28-30 A 155-165 TS 7 inch/min</p>	<p>1. E.W. said a contractor would take over lowering in inspection duties.</p> <p>2. No issues, other than an abnormally high reject rate.</p> <p>3. No issues.</p> <p>4. Welding crews need to use splatter guards to protect pipe coating.</p>		
Summary:	Discuss issue 4 at exit interview		
Inspector(s):	Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 8/18/08
Location: Welded spread office Malta, IL, ROW locations	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
E. W. Whidden	Chief	EN Global
Mike Elliot	Operation representative	Enbridge
Don Elliot	Lowering in inspector	ENGlobal
Activities Observed/Performed:		Results/Comments:
<p>1. Reviewed 20" weld log history. Got 20" and 42" weld stats up through 8/15/08. See attached sheets.</p> <p>2. Lowering in south of Baseline Road 42" Observed section lowered in with belts. A scratch put in the pipe to check the jeep was larger than 1" dimension and was repaired with patch stick. It should have been repaired with two part. The inspector (actually the Enbridge operations representative) was asked twice to repair the scratch with two part and it was not. See picture taken at 2798+00. The section was lowered in with the patch stick repair. The jeep voltage was checked – ok. The Enbridge representative was acting as the inspector, but was not actually watching the patch stick repair – making sure the coating was prepared adequately and the FBE coating was not burned during patch stick application. It was pointed out parts of the next section to be lowered had mud on the sides and the bottom and would have to be cleaned before lowered.</p>		<p>1. No issues</p> <p>2. Coating scratch was improperly repaired. Inspector on site was not adequately overseeing patch stick repair.</p>
Summary:		
Discuss issue 2 with chief at exit interview.		
Inspector(s): Carl Griffis		

Exit Interview
Enbridge Southern Access Construction Inspection
August 4-7, 2008
USPL Construction Spread
Morris, IL

1. It was observed on 8/6/08 on the pipe gang north of 44th Avenue that that pipe was being moved prior to completion of the root bead. In this particular case, an external line up clamp was being used. The line up clamp was removed after 50% of the root bead was completed and the pipe was moved approximately 2" while the remainder of the root bead was completed. The pipe was moved to place it on a skid. While Enbridge's procedures do not prohibit movement of the pipe prior to root bead completion, this is not a good practice in that root bead cracking is more susceptible due to pipe movement.
2. It was observed on 8/6/08 on the firing line at 44th Avenue that one welder helper had a 350 degree Tempilstik rather than a 250 degree Tempilstik. It is important that personnel measuring preheat have the proper Tempilstiks to ensure preheat is within the proper temperature range.
3. It was observed on 8/7/08 on the lowering in section north of US 34 that the jeeping crew was not removing all the tape and felt pads stuck to the pipe during jeeping. The pipe needs to be clean of any foreign objects to assure all coating anomalies are detected. It was also observed that some of the jeeping crew was improperly applying the patch stick – heating the stick first and then applying it to the pipe, rather than heating the pipe first and melting the stick into the repair area. This particular jeeping crew had not been through the mandatory coating training as required by Enbridge. The Enbridge quality control specialist was on site to provide a short training course.
4. It was observed on 8/7/08 at the Serena pipe yard that the bending inspector was not filling out the bend QC sheet properly. While the inspector understood what measurements were to be taken, the QC sheet was not being filled out properly.
5. It was observed at numerous locations during the audit that pads were not being placed between the pipe and the skids. This is an Enbridge requirement and helps to minimize coating damage during pipe handling.

These items were discussed with Bob Johnson, Pat Burton and Nolan Baugh on Thursday, August 7. These items were also discussed with the inspectors on site.

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 8/5/08
Location: USPL Spread 3 Morris, IL Spread office		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
Dan Carroll	NDE Auditor	Janx??
Wade Pilgreen	Welding foreman	USPL
Activities Observed/Performed:		Results/Comments:
<p>1. No work today – rained out.</p> <p>2. Talked to Dan Carroll and Wade Pilgreen about the pipe magnetism issue. This appears to be a bigger issue on the Welded, Spread 2. This spread has been measuring random lengths of pipe and seen anywhere from +100 to -100 gauss. Pipe is typically oriented + to – on the row for several joints, then the polarity reverses. It depends on how the pipe was load on the trucks at the pipe yard. When the + to – ends of pipe are joined together the gauss reading increases dramatically. For instance, -5 to +100 gauss pipe ends brought together can produce a reading of several hundred gauss at the pipe weld joint. They have welded such joints with no apparent defects. They would expect to see internal undercut or “arc blowback” where they are closing up the weld – typically at the top or bottom. This has not been observed on Spread 3.</p>		<p>2. Discuss this issue with Spread 2 personnel on the next visit.</p>
Summary:		
Discuss the magnetism issue with Spread 2 personnel on the next visit.		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 8/7/08
Location: USPL Spread 3 Morris, IL Spread office, ROW locations		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
Steve Burkemeir	Enbridge QA/QC auditor	Contractor
John Neinstadt	Lowering in inspector	MBF
Kirby Kirchner	Lowering in inspector	MBF
Dave Pauls	Bending inspector	MBF
Bob Johnson	Chief inspector	MBF
Activities Observed/Performed:		Results/Comments:
<p>1. Lowering in north of US 34. Noted pieces of tape, felt pads stuck to pipe after prejeeping. Checked jeep output – jeep meter read 1.6 to 1.7 KV – calibrated meter read 2.0 kv – ok. Patch stick was not being applied properly – personnel were heating the stick and then applying to the pipe. There were numerous jeeps on the pipe and the girth weld during lowering in. Steve Burkemeir worked with the personnel to show the proper way of using the patch stick and applying the two part repair. He gave the personnel a short training course on site since they had not received the coating training.</p> <p>2. Watched bending at the Serena pipe yard. The inspector was not filling out the bending sheet properly. This was pointed out to him.</p> <p>Exit interview with Bob Johnson, Pat Burton and Nolan Baugh</p>		<p>1. Pipe needs to be free of tape, felt pads, etc to get an effective jeep. Personnel need to be properly trained on applying the patch stick. They had not been to the coating school which Enbridge required mandatory.</p> <p>2. Bending inspector should be trained in the proper way to fill out the bending sheet.</p>
Summary:		
Discuss issues 1 and 2 and exit interview		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 8/4/08								
Location: USPL Spread 3 Morris, IL Spread office		Station/Survey or Pipeline Marker:								
Personnel Contacted:	Title/Position:	Company/Affiliation:								
Nolan Baugh	Construction Records Auditor	Enbridge								
Pat Burton	Asst. Chief (welding)	MBF								
Larry LeJeune	Sr. Welding Inspector	MBF								
Shane Slettom	Asst. Chief (craft)	MBF								
Dan Carroll	NDE Auditor	Janx??								
Bob Johnson	Chief Inspector	MBF								
Activities Observed/Performed:		Results/Comments:								
<p>1. Talked with Pat Burton concerning magnetism on pipe. There have been some issues on Spread 2, but it is not apparent here.</p> <p>2. Shane Slettom said they are running a sizing plate through bends. He thought they were doing 100% of the bends. 42" bends are made at the pipe yard, 20" in the field.</p> <p>3. Reviewed welder qualifications, NDE technician qualifications, NDE reader sheets, weld log histories, NDE procedures.</p> <p>4. Serena Pipe Yard pipe information</p> <p>1. 42" X70 0.5" wt Pipe No. 18194, Heat No. 590657</p> <p>2. 42"X70 0.422" wt TJ-2372</p> <table style="margin-left: 40px;"> <tr> <td>Pipe No.</td> <td>Heat No.</td> </tr> <tr> <td>30985B</td> <td>474235</td> </tr> <tr> <td>31990B</td> <td>591563</td> </tr> <tr> <td>30985A</td> <td>474235</td> </tr> </table> <p>3. 20" X70 0.250" wt Pipe No. 7365, Heat No. 590982</p> <p>4. 20" X70 0.375" wt Pipe No. 467, Heat No. 590697</p> <p>5. 20" X70 0.500" wt Pipe No. 470, Heat No. 473916</p>		Pipe No.	Heat No.	30985B	474235	31990B	591563	30985A	474235	<p>1. No issue</p> <p>2. No issue</p> <p>3. No issue</p> <p>4. Enbridge to provide MTR's on requested pipe.</p>
Pipe No.	Heat No.									
30985B	474235									
31990B	591563									
30985A	474235									
Summary:										
Enbridge to provide information on issue 4.										
Inspector(s): Carl Griffis										

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 8/6/08
Location: USPL Spread 3 Morris, IL Spread office and ROW locations		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
Wayne George	Pipe gang welding inspector	MBF contractor
Russell Ryals	Mainline coating inspector	MBF contractor
Mark Nelson	Firing line welding inspector	MBF contractor
Steve Burkemeir	Enbridge QA/QC auditor	contractor
Activities Observed/Performed:		Results/Comments:
<p>1. Observed pipe gang north of 44th Ave. They are using external clamps on sections of the 20" near the road. Volts, amps, travel speed on root/hot pass ok. It was observed that the pipe was moved slightly (2") after the external clamp was taken off (>50% of the root had been welded prior to releasing the clamps) while finishing the root bead.</p> <p>2. Observed coating crew north of 4650. Blasting looked good, preheating to 160 degrees F with induction heater. Observed several skids with no pads. Steve Burkemeir measured thickness on several girth welds – average was 27 mils – ok. Jeeping was picking up pinholes on the girth weld coating. Pipe was being cleaned prior to jeeping.</p> <p>3. Observed the firing line at 44th Ave. Preheating was satisfactory and splatter guards were in use. Cap V 26-28 A 141 TS 10 all ok It was noted one welder helper had a 350 degree Tempilstik – should be a 250.</p>		<p>1. Moving the pipe before the root bead is completed after the external clamps are released is not a recommended practice.</p> <p>2. No issues</p> <p>3. Make sure welder helpers have the proper – 250 degree – Tempilstiks.</p>
Summary:		
Discuss issues 1 and 3 and exit interview		
Inspector(s): Carl Griffis		

Exit Interview
Enbridge Southern Access Construction Inspection
August 3-7, 2008
USPL Construction Spread
Morris, IL

1. On November 4, it was observed on the mini pipe gang south of N.15th Road that the 42" pipe temperature was less than 250 degrees F when half the root bead was welded. At that time, the welding inspector was not present during the bead welding. The lack of preheat was brought to his attention and the weld was marked for cut out due to inadequate preheat. It is important to maintain minimum preheat temperature in order to prevent hydrogen induced cracking.

2. On November 4, it was observed on a 42" tie in south of N 12th St., MP 126 that the pipe joint in the ditch being welded to bore pipe contained two patch stick repairs larger than allowed (larger than a quarter). These two repairs should have been repaired with two part epoxy. The inspector and the three USPL personnel were not familiar with the size limitation for patch sticks. The inspector and two of the USPL personnel had not been to a coating training session. The two patch stick repairs, as well as three other patch stick repairs were ground off and two part epoxy applied. All personnel associated with coating repaired should be trained in the proper use of patch stick and two part epoxy coating repair.

3. On November 5, it was observed on a 42" pipe segment to be lowered in south of the Fox River (north of N 3559th Road) that numerous coating repairs were improperly made prior to lowering in with patch stick. These repairs should have been made with two part epoxy since they were repaired well in advance of lowering in. These repairs were removed and two part epoxy applied. There were areas covered in dirt and tape that were pointed out to the inspector that needed to be removed before jeeeping. The inspector had not been to coating school and only one USPL personnel out of 3 had been to the school. Again, as stated in item 2, all personnel associated with should be trained in the proper use of patch stick and two part epoxy coating repair.

These items were discussed with Bob Johnson, Pat Burton and Nolan Baugh on Friday, November 7. These items were also discussed with the inspectors on site.

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 11/3/08
Location: USPL Spread 3 Morris, IL Spread office and right of way		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
Pat Burton	Asst. Chief (welding)	MBF
Larry LeJeune	Sr. Welding Inspector	MBF
Shane Slettom	Asst. Chief (craft)	MBF
Dan Carroll	NDE Auditor	Janx??
Bob Johhnsn	Chief Inspector	MBF
Danny Sullivan	Pipe end inspector	MBF
Mark Nelson	Firing line welding inspector	MBF
Wayne George	Pipe gang welding inspector	MBF
Chris Harris	Hot filler welding inspector	MBF
Roy Burton	Firing line inspector	MBF
John Connaway	Construction manager	Enbridge
Activities Observed/Performed:		Results/Comments:
<p>1. Reviewed weld log history and NDE reader sheets for 20" and 42"</p> <p>2. Inspected various pipe joints at E23 and N 21st that were having ends cut off due to mill marks defects. See pictures of: JT 300226BA JT20493B JT30049</p> <p>Apparently the welding end facing process at the pipe mill has damaged the inside of some pipe, causing Enbridge to cut off some ends. Inspector currently has no guidance, other than marking for cut out and defect that reduces pipe wall thickness > 8% of nominal wall thickness.</p> <p>3. Witnessed pipe gan/firing line at E23rd and N 21st. Preheat, splash guards and time between root, hot pass and filler pass was within spec.</p>		<p>1. No issue</p> <p>2. Talk to John Connaway today. Enbridge is developing a criteria for inspectors to use for evaluating mill marks. An end facing machine will be used starting this week to enable the pipe gang/firing line to proceed at a normal pace.</p> <p>3. No issues</p>
Summary:		
Will talk to John Connaway today regarding issue 2.		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 11/4/08
Location: USPL Spread 3 right of way	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
Danny Sullivan	Pipe end inspector	MBF
John Connaway	Construction manager	MBF
Kenney Shirley	Mini pipe gang welding inspector	MBF
Dave Pauls	Bending inspector	MBF
Mike Myers	Tie in inspector	MBF
Activities Observed/Performed:		Results/Comments:
<p>1. N of 15th road minipipe gang Fill pass A 160-210 pass completed before volts and travel speed Cap pass V 24-31 TS 7"/min</p> <p>2. South of 15th minipipe gang Observed that pipe temperature was less than 250 degrees F when half the root bead was welded. JT21648. The welding inspector was not present during the bead welding. The lack of preheat was brought to his attention. He asked what should be done and Nolan Baugh told him that was his decision. The Sr. welding inspector was consulted and the weld was marked for cut out. The welding foreman was notified and the personnel were reminded of adequate preheat.</p> <p>3. Discussed pipe end anomalies with John Connaway. When the end facing machine is being used later this week, all anomalies associated with mill defects will be cut out.</p> <p>4. Bending south of 3000 N Rd. Observed pipe bending process</p> <p>5. Tie in south of N 12th St. MP 126 Observed pipe joint in ditch being welded to bore pipe that contained two patch stick repairs larger than allowed. See two pictures. The welding inspector and the three laborers were not familiar with the size limitation for patch sticks. Only one laborer had been to the coating school. The two patch stick repairs, as well as three other patch stick repairs were ground off and two part epoxy applied.</p>		<p>1.No issues</p> <p>2. Discuss the preheat issue with the Chief Inspector. Also recommend a 350 degree tempil stick be used as the weather gets colder in order to maintain pipe temperature at a minimum of 250 degrees F.</p> <p>3. Will discuss this issue further tomorrow with Floyd Mott's visit.</p> <p>4. No issues</p> <p>5. Discuss the lack of training with the chief inspector. Recommend training of all personnel associated with this tie in in coating repair, including the inspector.</p>
Summary:		
Discuss issues identified with inspection staff.		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 11/5/08
Location: USPL Spread 3 right of way		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
Bob Johnson	Chief Inspector	MBF
Shane Slettom	Asst. Chief Inspector	MBF
Pat Burton	Asst. Chief Inspector	MBF
Mike Worrell	Lowering in, welding inspector	MBF
John Neinstadt	Lowering in inspector	MBF
Kirby Kirchner	Tie in welding inspector	
Activities Observed/Performed:		Results/Comments:
<p>1. Discussed previous day issues with Johnson, Burton, Slettom</p> <p>2. Lowering in and tie in south of Fox River. No of 3359 Road. Crew was not checking jeep calibration after every use, but it was learned that Enbridge has changed this requirement to once a shift. Jeep was checked and was ok. Numerous coating repairs were improperly made prior to lowering in with patch stick. See picture These repairs were removed and two part epoxy applied. There were areas covered in dirt and tape that were pointed out to the inspector that needed to be removed before jeeping. Inspector had not been to coating school and only one USPL had out of 3 had been to the school. Tie in weld - > 50% of root welded before clamps released. Root welding parameters on west side with 1/8" rod V-22, A-120, TS-13, all ok. Preheat and maintaining interpass temperature was good</p> <p>3. Lowering in, tie in south of 25th Road. Weld - preheat and interpass temperature was good, > 50% of the root was welded before the clamps were released.</p>		<p>1. Coating QC personnel will retrain personnel. Refresher courses will also be put on Spreads 1 and 3 by the coating vendor.</p> <p>2. All personnel repairing coating (including inspectors) need to be properly trained.</p> <p>3. No issues</p>
Summary:		
Discuss issue 2 with inspection staff		
Inspector(s): Carl Griffis		

CENTRAL REGION OFFICE
Daily Inspection Report

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 11/6/08
Location: USPL Spread 3 office right of way	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
Dan Carroll	NDE auditor	contractor
Floyd Mott	Project manager	Enbridge
John Connaway	Construction manager	Enbridge
No		
Activities Observed/Performed:	Results/Comments:	
1. Reviewed X film to see how pipe end mill marks looked on the xray. 2. Discussed mill mark issue with Floyd Mott and John Connaway. Also discussed my request for procedure qualification document for WP-12, Rev. 6. 3. Travelled to mainline coating site and three tie in sites. All sites were either shut down by rain, or no work was happening.	1. No issue 2. Enbridge to provide followup to my request for procedure documentation.	
Summary: Enbridge to provide response to issue 2.		
Inspector(s): Carl Griffis		

CENTRAL REGION OFFICE
Daily Inspection Report

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 11/7/08
Location: USPL Spread 3 office right of way	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
Russell Ryalls	Coating inspector	Contractor
Bob Johnson	Chief inspector	Contractor
Pat Burton	Assistant chief inspector	contractor
Activities Observed/Performed:	Results/Comments:	
1. Coating on 42" at MP 116. Observed blasting – feathering and blast surface was satisfactory. Preheating pipe to 160 degrees F before applying two part epoxy. Good application on welds. Repair crew is properly repairing anomalies found with jeep with two part epoxy. 2. Reviewed week audit issues with Nolan Baugh, Bob Johnson and Pat Burton	1. No issue 2. Enbridge will provide followup to issues.	
Summary: Enbridge to provide followup on item 2.		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Energy Southern Access/ Southern Lights Phase 2 – USPL Spread		Date: 9/30/08
Location: Morris, Illinois	Station/Survey or Pipeline Marker: Various locations on ROW	
Personnel Contacted: Bob Johnson Nolan Baugh	Title/Position: Chief Inspector Lead Compliance Coordinator	Company/Affiliation: Tulsa Inspection Resources, Inc. Enbridge
Activities Observed/Performed: Met with OIG agents. Observed tie in crew at contractor rd Observed Pipe Gang operations Observed Bending operations	Results/Comments: Discussed construction activities with Nolan and Safety team. OIG completed safety briefing. A two- joint section of 42” pipe was lowered in and tied in. The welder experienced difficulty keeping his arc and discarded several welding rods during the root bead pass. I requested that pre heat be checked due to additional time taken for the bead. The inspector agreed and said I was right, and it needed more heat. He informed me that this spread was dealing with a welding rod quality problem. Some boxes had 25-50 percent bad rods. Lineup and release were acceptable. The inspector confirmed the welding rod problems. Splatter guards, and pipe pads were used. Preheat – OK. Lineup and release – OK. No issues. No issues identified.	
Summary: Today two OIG Special Agents Andrea Kropf and Jacquie Wentz accompanied me on the ROW during the inspection process to learn about pipeline construction.		
Inspector(s): Gabriel Hodill		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Energy Southern Access/ Southern Lights Phase 2 – USPL Spread		Date: 10/2/08
Location: Morris, Illinois	Station/Survey or Pipeline Marker: Various locations on ROW	
Personnel Contacted: Bob Johnson Nolan Baugh	Title/Position: Chief Inspector Lead Compliance Coordinator	Company/Affiliation: Tulsa Inspection Resources, Inc. Enbridge
Activities Observed/Performed:	Results/Comments:	
Reviewed qualifications of NDE personnel at field office.	No. Issues.	
Discussed repair rate to date and problems resolved so far on the spread with chief NDE auditor.	A hollow bead issue was resolved by identifying a bad welding machine.	
Discussed the changes to WP12 (Rev6) with chief inspector	Field personnel were instructed to discard the old procedures. The chief inspector believed that the new procedure would cause a little stir in the field due to tighter parameters.	
Observed lowering in operations	The lowering in crew rested the end of the pipe on the end of the ditch and proceeded to lower in about 1000 feet of pipe. Nearly 200 feet of pipe was suspended over the ditch while the last side boom was bumper to bumper with the next one. It appeared that this put unnecessary stress on the pipe and that the last side boom could have backed off more. The max allowed per specs is 250 feet. After discussion of this with Nolan I concluded that due to the height of the pipe at the end of the ditch that 200 feet of unsupported pipe was perhaps necessary to prevent a severe deflection.	
Observed taper bore crew at MP 117		
Reviewed daily welder check logs	No issues. It is noteworthy that various welds are recorded to be completed that do not meet the new specification effective in the field on 10/3/08	
Concluded inspection with exit interview discussion at field office	Identified the welding rods and welding parameters as issues and made recommendations to include rod type on daily welder checks and to pay close attention to weld pre heat whenever encountering problems during welding.	
Summary:		
Inspector(s): Gabriel Hodill		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Energy Southern Access/ Southern Lights Phase 2 – USPL Spread		Date: 10/1/08
Location: Morris, Illinois	Station/Survey or Pipeline Marker: Various locations on ROW	
Personnel Contacted: Bob Johnson Nolan Baugh Steven Berkemeier John Connaway	Title/Position: Chief Inspector Lead Compliance Coordinator QC Specialist Construction Manager	Company/Affiliation: Tulsa Inspection Resources, Inc. Enbridge Enbridge Enbridge
Activities Observed/Performed: Discussed general construction operations with Chief Bob Johnson Observed backfill crew near tie in Observed mainline coating crew Observed Firing line /welding operations Observed sacrificial coating operations Returned to the spread office and had a discussion about the welding rod issue with Bob Johnson.	Results/Comments: N/A Soil was free of rocks. No issues. Crews were applying a “primer coat” immediately after induction ring was removed by using the leftover material on the rollers used on the previous weld coat. Sand blasting was maintaining a good profile but was not feathering the edge properly. This was discussed with the inspector on site who thought the blasting was done properly. I discussed this with Steve Berkemeier by phone and Construction Manager John Connaway who agreed that the Firing line inspector’s were involved and did a good job carefully checking their welders for quality. Preheat was good. Splatter guards good. It was a windy day and only one welder used a wind board. I asked inspectors about this and they said that they don’t enforce the wind board issue, they let the welders handle it. SPC2888 spray on application coating process. Heat and thickness of application all appeared OK. No issues. Mr. Johnson did not have a concern about the welding rods because he trusted that all his inspectors would continue to discard them and would not use rods from a bad box.	
Summary:		
Inspector(s): Gabriel Hodill		

Exit Interview
Enbridge Southern Access Construction Inspection
September 9-11, 2008
USPL Construction Spread
Morris, IL

1. The new welding procedure WP12 Rev6 alters welding parameters such that many welds being made now would not meet the procedure requirements. The changes specific to the different welding rods merit the need for welding inspectors to check and record the type of welding rods used. It is recommended to check the welding rod type for both root bead and hot pass during daily welder checks to ensure compliance.
2. In one observation of a tie in crew the welders had difficulty putting in the root bead due to what inspectors across USPL agree is a poor quality welding rod issue. This extended the time needed to complete the bead and preheat was rechecked and needed additional flame heat during the completion of the bead. It is recommended to recheck the preheat as soon as any problems are encountered that extend the time necessary to finish the root bead.

Exit Interview
Enbridge Southern Access Construction Inspection
July 7-10, 2008
Michaels Construction Spread
Darien, WI

1. At the following locations it was observed that the pipe was not being adequately preheated to 250 degrees F:
July 8 north of Berg Road hot pass on the pipe gang 20"
July 9 EBC Townline Road 42" bore pipe filler pass
July 10 Haake Road 42" bore pipe filler pass

In addition, in general, the pipe temperature is not being properly measured for adequate preheat. Enbridge specifications call for pipe temperature to be measured at least 4 inches on either side of the weld for proper preheat. It was observed in the field that while the proper Tempilstik was being used, pipe temperature was being measured anywhere from directly on the weld to only 2 inches away from the weld. Proper preheat temperature is important to ensure a quality weld.

2. On July 10 at Haake Road, 42" bore pipe, it was observed that the welding inspector was taking volt and amp measurements at the welding machine. It is important to measure these parameters at the pipe to ensure the proper voltage and amperage is used in the welding procedure. In addition, the inspector was not calculating travel speed properly.
3. Splatter guards were not being used in the following locations:
July 8 firing line south of Pioneer Road
July 10 Haake Road 42" bore pipe
The use of the splatter guards is important to minimize coating damage during the welding process.
4. In discussion on July 9 with the road bore inspector at Town Hall Road, he understood the proper voltage for jeeping was 100 V/mil. Enbridge specifications require 125 V/mil. The road bore inspector at East Lake Shore Road understood that the maximum jeep travel speed to be 2.5 ft/sec. Enbridge specifications require a maximum of 1.0 ft/sec jeeping speed. Inspectors observing the jeeping operation should witness the contractor's calibration of the jeep per Enbridge's specifications.
5. It was observed at numerous locations the pads were not being used between the pipe and the skids:
July 9 East Lake Shore Road 42" road bore
July 9 South of Delavan Station
July 10 Haake Road 42" bore pipe
Use of the pads is mandatory per Enbridges specifications in order to minimize coating damage.

6. It was observed on July 10 at the Haake Road 42" bore pipe location, that the pipe was not skidded in a safe manner. One end of the bore pipe was not adequately stabilized and potentially could fall off the skids.

All of these issues were discussed with Ron Ramer and Merle Leigh on July 10 and were to be addressed. In addition, these issues were communicated to the inspectors in the field when they were observed.

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 7/10/08
Location: Michels Spread 1 Darien, WI		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
Ron Ramer	Inspection chief	Tulsa Inspection Resources
Merle Leigh	Assistant Chief	Tulsa Inspection Resources
Charles Hunter	Bending inspector	Tulsa Inspection Resources
Jessie Shoemaker	Road bore inspector	Tulsa Inspection Resources
Activities Observed/Performed:		Results/Comments:
<p>1. South of E Creek Road bending. Inspector demonstrated how bends are measured for ovality.</p> <p>2. Haake Road 42" road bore Noted pipe was below 250 degrees on bottom. Pipe was not being checked 4" on either side of the weld for proper preheat. No splatter guards were being used on one weld. Numerous felt pads were missing between the pipe and skids. The inspector was taking V and A at the machine, not at the pipe. He did not appear to know how to properly take the readings at the pipe and measure the travel speed.</p> <p>Filler V 24-28 A 120-130 TS 9.5 IPM ok</p> <p>Bore pipe appeared to be skidded in an unsafe manner. 1 crotched skid, 2 flat skids, barely supported at the farthest skid from the crotched skid.</p> <p>3. Exit interview with Ron Ramer and Merle Leigh</p>		<p>1. No issues.</p> <p>2. Inadequate preheat, improper measuring of pipe temperature (Enbridge specs call for 4" on either side of the pipe), missing felt pads, unsafe skidding arrangement, no use of splatter guards noted on one weld (not the one currently being welded).</p>
Summary:		
Communicate issues at exit interview.		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 7/09/08
Location: Michels Spread 1 Darien, WI		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
Herman Ware	Road bore inspector	Tulsa Inspection Resources
Charles Hunt	Bending Inspector	Tulsa Inspection Resources
Stan Wermeling	Road bore inspector	Tulsa Inspection Resources
Tom Burns	Road bore inspector	Tulsa Inspection Resources
Pat Sharp	Coating inspector	Tulsa Inspection Resources
Merle Leigh	Assistant chief	Tulsa Inspection Resources
Activities Observed/Performed:		Results/Comments:
<p>1. Road bore at Town Hall Road. Inspector though jeep spec for road bore coating was 4000 V. (100 V/mil) He got this information from coating vendor who recommended a minimum of 100 V/mil</p> <p>2. East Creek Road bending. Inspector did not have the up to date construction specifications.</p> <p>3. EBC Townline Road 42" road bore. Preheat was only being done 2" on either side of the weld. Weld was below 250 degrees F outside 2" band. First filler V 25-28 A 140-154 TS 13 IPM</p> <p>4. E Lake Shore Rd road bore. Inspector thought max travel speed for jeep was 2.5 ft/sec. This is the max travel speed recommended by the 2 part coating vendor for jeeping 2 part coating. Noted that felt pads needed to be placed between the pipd and skids</p> <p>5. South of Delavan Station coating. Pipe is preheated to 200 degrees F before 2 part coating is applied. 20 to 40 mils is the coating thickness. Sandblasting appears to be good. Jeeping at 2000 volts, a number of holidays are being detected at girth welds. Noted numerous felt pads missing from pipe skids.</p>		<p>1. Enbridge spec is 125 V/mil. Road bore coating should be jeeped at 5000 V, not 4000 V.</p> <p>2. All inspector need the current Enbridge construction specifications.</p> <p>3. Enbridge spec is 250 degrees F 4 inches on either side of the weld.</p> <p>4. Enbridge spec for max travel speed is 1.0 ft/sec. Make sure felt pads are used between pipe and skid</p> <p>5. Same comment as item 4 about felt pads.</p>
Summary:		
Discuss issues in exit interview		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 7/08/08
Location: Michels Spread 1 Darien, WI		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
Dennis Raisenen	Pipe gang welding inspector	Tulsa Inspection Resources
Mike Steiner	Firing line welding inspector	Tulsa Inspection Resources
Herman Ware	Road bore inspector	Tulsa Inspection Resources
John Hoge	NDT technician	Weld Sonix
Activities Observed/Performed:		Results/Comments:
<p>1. North of Berg Road – pipe gang Observed there was not adequate preheat 4" to either side of the weld. Reminded the inspector that splatter guards should be used at all times possible. Root pass amp 124-134 volts 24-25 travel speed 18-19 IPM (upper end) ok Hot pass amp 155 volts 24-27 travel speed 11-12 IPM ok</p> <p>2. South of Pioneer Road firing lines Observed splatter guards were not being used in most cases. Preheat appeared to be ok. Filler pass amps 166-170 volts 25-28 travel speed 12 IPM ok</p> <p>3. Bradford Road Crossing no issues on road bore. Looked at film taken of transition on road bore piping.</p>		<p>1. Adequate preheat is necessary at ALL times. Use splatter guards at all times. 2. Use of splatter guards is necessary at all times. 3. No issues</p>
Summary:		
Communicate issues at exit interview		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 7/07/08
Location: Michels Spread 1 Darien, WI		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
Ron Ramer	Inspection chief	Tulsa Inspection Resources
Larry Lake	NDE Auditor	MBF
Rick Cripe	Sr. Welding Inspector	Tulsa Inspection Resources
Doyle Balzer	Repair welding inspector	Tulsa Inspection Resources
Activities Observed/Performed:		Results/Comments:
<ol style="list-style-type: none"> 1. Observed welder qualification. Procedures and destructive testing satisfactory. This welder had been dismissed from Spread 2 (Welded) due to a high repair rate. 2. Mechanized welding (Serimax) to start in early September on the 42" pipe. Procedures have not been received by Michels. 3. Reviewed welder and NDT technician qualifications. 4. Reviewed NDT reader sheets for welds made to date. 		<ol style="list-style-type: none"> 1. No issues 2. No issues 3. No issues 4. No issues
Summary:		
Inspector(s): Carl Griffis		

CENTRAL REGION OFFICE
Daily Inspection Report

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 6/20/08
Location: Welded spread office Malta, IL, various field locations	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
E. W. Whidden	Chief	EN Global Inspection
Bill Duncan	Assistant Chief	EN Global Inspection
Mark Stanley	Coating inspector	EN Global Inspection
Activities Observed/Performed:	Results/Comments:	
1. Discussed exit interview items	1. See exit interview doc for 6/20/08	
2. South of Carson Road – observed coating and jeeping inspections. Discussed the importance of jeep calibration and removing tape and other contaminants from pipe before jeeping with inspector and Welded foreman.	2. No issues	
Summary: Exit interview to be finalized and emailed to Enbridge and PHMSA personnel		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 6/19/08
Location: Welded spread office Malta, IL, various field locations		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
E. W. Whidden	Chief	EN Global
Brian Harper	Construction Manager	Enbridge
Joe Hollingshead	NDE Tech Level II	Weld Sonix
Dan Mathis	Coating inspector	ENGlobal
Wayne Scott	Coating inspector	ENGlobal
Curtis Gunter	Bending inspector	ENGlobal
Doug Moths	Road bore inspector	ENGlobal
Leroy Travis	Coating inspector	ENGlobal
Activities Observed/Performed:	Results/Comments:	
<p>1. Discussed issue of measuring preheat before welding is to begin. Also discussed moving the pipe before the root pass was complete.</p> <p>2. Reviewed X rays and reader sheet with Hollingshead. Was not clear on what type of wire penetrameters were being used.</p> <p>3. Girth weld coating south of Carson Road. Observed blasting, coating application. Preheat of the girth weld was not done due to pipe temperature and induction heater was not available. Two induction heaters will be used when the main line coating crew gets in operation.</p> <p>4. Bending south of Baseline Road observed bending and documentation on QC sheet. Bends appeared acceptable. Was not clear on what measurements were being made to measure ovality. The inspector was measuring diameter increase at the bend when the specification addresses diameter decrease at the bend.</p> <p>5. Road bore – Old State Road currently boring 42" Inspected coating on 42" bore pipe</p> <p>6. Road bore – Mayfair Road observed coating application on 20", profile measurement,</p>	<p>1. Enbridge is putting a preheat check on the welding sheet to ensure the helpers are checking preheat. The directive was issued that the pipe would not be moved while in the internal lineup clamps until the root pass was completed.</p> <p>2. Request clarification on what type of wire penetrameters are being used.</p> <p>3. No issues.</p> <p>4. Get clarification on what measurements should be taken for ovality measurement and what the specifications are.</p> <p>5. No issues</p> <p>6. No issues</p>	
Summary:		
Brought up issues to Nolan Baugh immediately and will discuss at exit interview.		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 6/18/08
Location: Welded spread office Malta, IL, Cherry Valley road crossing	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
E. W. Whidden	Chief	EN Global
Ray Shannon	Welding inspector pipe gang	EN Global
Howard Crawford	Welding inspector firing line	EN Global
Bob Gattrell	Sr. Welding Inspector	EN Global
Daryl Patterson	Level II technician	Weldsonix
Brian Harper	Construction Manager	Enbridge
Activities Observed/Performed:	Results/Comments:	
<p>1. Attended classroom coating training for girth weld coating</p> <p>2. Pipe gang Cherry Valley Road observed preheating of pipe. Inspector (Shannon) said helpers were to check preheat prior to beginning welding. I observed that they were not doing this and the response was that "the pipe was hot enough, he knew since he had 30 years experience." Several pipes check were hot enough prior to welding. I also asked to take volts and amps at the welding stinger. The inspector responded that he took them at the machine, since "there was no difference." The inspector would not take measurements at the pipe and said the Sr. welding inspector would take them for me.</p> <p>3. Firing line Cherry Valley roadchecked preheat, volts and amps on cap Amps - 148-158, volts 30, travel speed - 9-11 inches/min</p> <p>4. Xray Cherry Valley road observed xrays of 42" pipe, currently setting up for 20" pipe using wire penetrometer</p> <p>5. Pipe gang Cherry Valley road - Gattrell took over for Shannon checked preheat on several welds and was found to be insufficient. One weld was marked for cut out because of insufficient preheat. Welder helps did not have the proper temp sticks. Some had 300 degree sticks, others had 350 degree sticks. Gattrell also showed helps the proper method to measure preheat - across the weld, coating to coating - not down the pipe next to the weld. Observed the pipe being moved while the internal clamps were in place before the root pass was completed. Took measurements at root pass</p> <p>Volts 23-26/28-30 two welders in spec Amps 114/112 two welders in spec</p> <p>Noted splatter guards were not being consistently used. Noted coating damager well outside the weld zone.</p>	<p>1. No issues</p> <p>2. Preheat needs to be checked prior to welding, not just at the pipe being heated ahead of the initial weld. Volts/amps need to be measure at the stinger, not at the machine.</p> <p>4. No issues.</p> <p>5. Preheat needs to be checked in the proper way. Personnel need to have the proper temp sticks. Splatter guards need to be used. Question the practice of moving the pipe while the clamps are engaged before the root pass was complete.</p>	
Summary:		
Relay the issues identified - 2 and 5 to Enbridge personnel in 6/20/08 exit interview.		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 6/17/08
Location: Welded spread office Malta, IL, Aldridge Road crossing		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
E. W. Whidden	Chief	EN Global
John Gross	Welding inspector	EN Global
Mike Valle	NDE Coordinator	EN Global
Bob Gattrell	Sr. Welding Inspector	EN Global
Activities Observed/Performed:		Results/Comments:
1. Went through Environmental Train 2. Aldridge Road crossing Attended field training session for applying two part epoxy to girth welds and damaged coating. Only two part epoxy repairs will be allowed on the pipe, except for patch stick repair during lowering in. 3. Observed two welding qualification in pipe yard in Rochelle.		1. No issues 2. No issues 3. No issues
Pipe		
42" road bore	42" line pipe	
0.531" wt	0.422" wt	
Heat No. 590561	Heat No. 591587	
Joint No. 3347B	Pipe No. 11603	
Hot bends		
42" B/N 74077	20" B/N 74493	
0.625" wt	0.500" wy	
Berg Heat No. 802U39160	IPSCO Heat No. 590754	
Valves		
42"	20"	
M-303D	M-303D	
Class 600	Class 600	
Serial No. 080900018	081100019	
Summary:		
Obtain MTR and relevant heat treating and pressure test records for the above pipe, valves and hot bends		
Inspector(s): Carl Griffis		

CENTRAL REGION OFFICE
Daily Inspection Report

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 6/16/08
Location: Welded spread office Malta, IL	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Construction Records Auditor	Enbridge
Bryan Harper	Assistant Construction Mgr.	Enbridge
Bobby Sever	Construction Engineer	Enbridge
Mike Valle	NDE Coordinator	EN Global Inspection
Activities Observed/Performed:	Results/Comments:	
<ol style="list-style-type: none">1. Received construction specifications for Phase 2 construction, welding procedures and spread contacts.2. Reviewed welder qualifications, NDE technician qualifications, NDE procedures, xray reader sheets and weld log history.	<ol style="list-style-type: none">1. Emsure that PHMSA receives the most recent information2. No issues. Ask Enbridge to provide the Cut Out spread sheet on a weekly basis.	
Summary: Request Patsy Bolk send PHMSA the latest construction specifications in electronic form.		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: So. Lights / So. Access		Date: 11/26/07
Location: Ladysmith, WI	Station/Survey or Pipeline Marker:	
Personnel Contacted: Dick Reese Rick Gulstad	Title/Position: Chief Inspector Precision Spread DOT Compliance	Company/Affiliation: Contractor/Precision Enbridge
Activities Observed/Performed: 1. Arrived at Ladysmith in afternoon: discussed work progress. Audited daily welder check sheets and welder qualification records.	Results/Comments: One welder (mark 'K') was found to have welded out of the specified voltage range on 2 of the 5 passes on his qualification test for branch weld procedure LPL 34BR Rev1. -- later in the week the chief inspector notified me that the issue was addressed. Two temporary welds for a test header completed by the welder were scheduled to be cut out and replaced and the welder was scheduled for re-qualification to the procedure.	
Summary:		
Inspector(s): Gabriel Hodill		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: So. Lights / So. Access		Date: 11/28/07
Location: Ladysmith, WI *Cold and Windy		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Dick Reese	Chief Inspector Precision Spread	Contractor/Precision
Rick Gulstad	DOT Compliance	Enbridge
Kelley K	Coating Quality Inspector	
Michael Zocche		
Activities Observed/Performed:	Results/Comments:	
1. Talked over issues with Chief Inspector at Ladysmith office.	Welder qualification issue from Monday was resolved. The padding screen issue was not really resolved. They did not seem to have any intention of changing the screen to match the specification.	
2. Observed tie-in welding crew at access road #1 near Co. Rd. F South of Hayward, WI	Site flagging was good and work was proceeding safely around the hot lines. Preheat and welding - Satisfactory NDE crew provided by Shaw - Satisfactory	
3. Observed drilling operations and 20" coating crews at Namekagon River crossing.	Discussed coating repair with patch sticks once again. Precision is the only spread currently using the patch stick for more than at final lowering. Kelly Tkachuk was on site that day checking girth weld coating thickness and had already found that the pipe to be pulled under the river had girth welds coated with unapproved coating and had had it removed. – Satisfactory.	
Summary:		
Inspector(s): Gabriel Hodill		

Exit Interview
PHMSA Construction Inspection/ Inspector: Gabriel Hodill
Project: Southern Lights/Southern Access Construction
Operator: Enbridge Energy
Contractor: Precision/United

To:
Rick Gulstad, DOT compliance

Precision follow up issues:

1. The specification for 1-1/2" max padding material is not being followed. The padding machines appear to have been operating for quite some time using a 2" screen. With drier conditions it should be possible to follow the specs. On-site inspector Stan Mackley was not aware of the specs. He had been on the job for several weeks.
2. Jeeping crew was observed on 11/27/07 North of Hwy 48 using a spring which had two part coating stuck to it. This adds to the overall problem of coating repair quality. Jeep springs need to be uncontaminated for proper holiday detection.
3. Coating repairs with patch stick seem to be a problem yet again. We observed the crew at Superior Station making several mistakes even after discussion of repair procedure with the site inspector Bob Ralston. The coating inspector Pat Hunt was on hand watching the coating but did not seem to be aware of the proper patch stick application procedures. The crew dabbed a partially melted stick onto the pipe without preheating the surface. They also jeeped the girth weld coating with weeds stuck in-between the spring and the pipe. This crew should be retrained.

United follow up issues:

1. Some welders have used a rod size not allowed by the procedure for their qualification tests. The procedure should be followed during ongoing welding operations to comply with this variable. If the welders are currently using different rod sizes than specified in the procedure, the procedure needs to be revised.
2. LPL WP 6 Qualification test for welder mark "ORM" was missing the 4 Nick Break tests required by API 1107 19th edition for pipe diameter above 12.75". If the tests are found not to be completed the welder should be requalified and his completed welds should be checked for quality.

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: So. Lights / So. Access		Date: 11/27/07
Location: Ladysmith, WI *Very Cold and Windy		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Dick Reese	Chief Inspector Precision Spread	Contractor/Precision
Rick Gulstad	DOT Compliance	Enbridge
Stan Mackley	Backfill/Cleanup Inspector	Contractor/ Precision
Activities Observed/Performed:	Results/Comments:	
1. Observed tie-in and backfilling crews North of Ladysmith at Co. Rd C and also 1 mile north of HWY 48	<p>Flagging of the hot lines at both areas was visible and well maintained. Progress slow and steady, tie in crews completing about 1-2 tie in sites per day each. Welders were doing good work and following procedures. Welding inspectors were checking welder V, and A and using Tempilstik to verify preheat.</p> <p>NDE X-ray crews at both locations were furnished by Shaw and were very knowledgeable and had procedures on hand for reference. One repair was called at Co. Rd. C location.</p> <p>Missed our chance to observe coating crew at work but did verify that the jeeping was done at 2200 V. The jeeping crew at HWY 48 was using a spring that had been very gunked up with two-part coating. It needed to be cleaned up but most likely should have been replaced.</p> <p>Both of the padding machines in operation were using a 2" screen for producing padding material. While the backfill from this machine appeared to be very good there was still room for a small amount of rock larger than 1-1/2 inch to get through.</p> <p>When I mentioned the specification for 1-1/2 inch max size rock to the inspector, it seemed to be new information to him. He did not have any specs on hand. The crew admitted that they had been using a 2" screen for some time because it was "too wet" and a 1-1/2 inch screen "doesn't work". After discussing this with the chief, he admitted that they had used the 2" screen for some time because of wet conditions, but that conditions had recently improved.</p>	
Summary:		
Misc:		
A utility inspector asked me if I had any safety concerns about the exposed portions of Line 6A in the marsh areas around Hwy 8 West of Ladysmith. I responded that I had no knowledge of it and would check into it after the construction audit.		
Inspector(s): Gabriel Hodill		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: So. Lights / So. Access		Date: 11/29/07
Location: Ladysmith, WI *Very Cold and Windy		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Dick Reese	Chief Inspector Precision Spread	Contractor/Precision
Rick Gulstad	DOT Compliance	Enbridge
Scott Bordick	DOT Compliance	Enbridge
Terry Engstrom	Welding Inspector	Contractor/United Pipeline
Bob Ralston	Crew Chief Inspector	Contractor/Precision
Pat Hunt	Coating Inspector	Contractor/Precision
Activities Observed/Performed:	Results/Comments:	
1. Observed tie-in crew at perimeter of Superior Station	<p>Welders completed a double joint pipe section for lowering in across the fence line into the station just before lunch. I talked with the site inspector Bob Ralston about the patch stick coating repair problems we had seen so far. When we returned after lunch we found the coating repair crew jeeping the two-part coated girth weld and repairing holidays with a patch stick and doing a pretty poor job of it. The pipe was not preheated, the stick was partially melted and dabbed onto the pipe in a little glob. The coating inspector was on hand to see the work being done but said nothing. When asked about the poor repair he said he was new to the task and would tell the crew to get it done right. He and Bob R. expressed concern about blistering the parent coating. I explained that some discoloration was not a problem.</p> <p>Rick Gulstad also noticed that the jeep was rolled over some dry weeds sticking up underneath the pipe, the crew made no attempt to resolve the problem.</p>	
2. Reviewed NDE records & welder qualification records at United construction office in the station for the station welding work	<p>NDE was in good order, only 1 repair called so far on over 100 welds. Welder qualifications found that three welders used a smaller rod size in several passes during their qualification test than was allowed by the accepted procedure. The procedure did not specify that a different rod size could be used.</p> <p>Welder mark "ORM" qualification test to LPL WP6 was found to be missing the nick break tests required per API 1104 19th ed. Rick Gulstad is following up on the issue.</p>	
Summary:		
Inspector(s): Gabriel Hodill		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20") Observed activities only on the 42"		Date: 9/18/07
Location: Ladysmith, WI spread office and ROW locations	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Dick Reese	Chief Inspector	McDaniel's Technical Service
Rick Gulstad	Senior Compliance Coordinator	Enbridge
Larry Lake	Sr. NDT auditor	Contractor to Precision
Todd Gilseth	Enbridge Operations Representatives	Enbridge
Stanley McMinn	Senior Welding Inspector	Contractor
Patsy Volk	Compliance	Enbridge
Activities Observed/Performed:		Results/Comments:
Ladysmith spread office for Precision spread		1. No issues
Both 20" and 42" line are being laid from MP 58 south to MP 84		2. No issues
<p>1. Reviewed NDE reader sheets, weld log history and recent welder qualification documentation.</p> <p>2. Observed 42" HDD of Chippewa River at Hiway 40, ~MP 88. See pictures of beam supporting Line 14. Voids creating by the HDD of the 42" caused several areas of soil subsidence. Plans to pull 42" line from west to east under the river may change due to difficulty in pulling loose material in the rock bore hole near the river. The pull section may be moved to the other side of the river.</p> <p>3. Heavy rain caused all pipeline activities to shut down in the early afternoon.</p>		
Summary:		
No issues identified.		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 9/20/07
Location: Ladysmith, WI spread office Precision Pipeline And ROW locations		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Dick Reese	Chief Inspector	McDaniel's Technical Service
Rick Gulstad	Senior Compliance Coordinator	Enbridge
David Jones	Coating Inspector	Contractor
Ron Hart	Tie in inspector	Contractor
Gene Roberts	Coating inspector	Contractor
Activities Observed/Performed:		Results/Comments:
<p>1. MP 59.6 Stone Lake Road 42" Observed blasting, coating and jeeping activities. Crew was preheating the pipe to 250 degrees F, then blasting and then applying the 2888 S. G. two part epoxy coating to girth welds. The coating inspector did not have the proper instrument to measure the coating thickness as applied. A larger than 2 square inch area was noted that was repaired by patch stick, rather than using the 2 part epoxy.</p> <p>2. MP 57.9 SS County Road E 42" tie in. Observed tie in fit up, pre heat and weld completion with external alignment clamps on. All were ok. Observed coating application on a tie in weld. Blasting, coating application and jeeping repairs were ok. Approximately 40 mils of two part was being applied to the girth weld.</p>		<p>1. Preheat of the pipe should be limited to 212 degrees F per the coating manufacturer's recommendations. The inspector should have the proper instrument to measure the coating thickness. Areas large than 2 square inches should be repaired with 2 part epoxy, not patch sticks.</p>
Summary:		
The issues identified will be discussed with the chief inspector and Rick Gulstad.		
Inspector(s): Carl Griffis		

Exit Interview
Enbridge Southern Access Construction Inspection
September 18-20, 2007
Precision Pipeline Construction Spread
Ladysmith, WI

1. It was observed on September 19 on the 42" pipe gang at MP 59.55, downstream of Stone Lake Road, that the minimum preheat temperature of 250 degrees F was not being checked consistently once the internal alignment clamps were set prior to welding. The welding inspector said the procedure was for the temperature to be checked prior to welding and he would reemphasize that fact to the personnel
2. It was observed on September 19 on the 20" lowering crew at MP 4.84 that tape was not being removed from the pipe prior to jeepling. I discussed this issue with the lowering in inspector and he directed the personnel to ensure that tape was removed prior to jeepling. In addition, coating repairs were not being performed correctly. Personnel were heating the patch stick and then applying it to the pipe, rather than preheating the pipe first.. I discussed this issue with the inspector also and he instructed the personnel on the proper method for coating repair.
3. It was observed on September 20 on the 42" pipe coating crew at MP 59.6 Stone Lake Road that the coating inspector did not have the proper instrument for measuring coating thickness. It is important to have the proper instrument to verify the coating is being applied at the proper thickness. The coating crew was preheating the pipe to 250 degrees F prior to applying the coating. According to the manufacturer's recommendations, a maximum pipe temperature of 212 degrees F is allowed. Coating crews need to keep the girth weld preheat temperature below 212 degrees F when applying the SP 2888 S.G. two part epoxy. It was also observed that a repair area greater than two square inches had been repaired by patch sticks. Enbridge's procedures call for a two part epoxy repair when the repair area is greater than two square inches. This issue was discussed with the coating inspector.

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20") Observed activities on the 20" and 42"		Date: 9/19/07
Location: Ladysmith, WI spread office Precision Pipeline And ROW locations		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Rick Gulstad	Senior Compliance Coordinator	Enbridge
Patsy Volk	Compliance	Enbridge
Nick Coleman	Bending Inspector	Contractor
Stan Wermeling	Firing line welding inspector	Contractor
Jesse Webb	Pipe gang welding inspector	Contractor
John Bechtel	Lowering in inspector	Contractor
Larry Danforth	Backfill inspector	Contractor
Activities Observed/Performed:		Results/Comments:
<p>1. MP 60 Observed bending on the 42". Discussed new specifications with inspector. Maximum kink allowed is 0.5% of pipe diameter measured from top to bottom of trough. Also, a minimum of 1" is allowed between long seams on adjacent bends, compared to 4" on straight pipe. Inspector said one bend rejected. Several were measured and oked.</p> <p>2. MP 3103+00, observed kink on 42" at sag. The kink was 0.19", less than the allowable 0.21".</p> <p>3. Mp 59.55, DS of Stone Lake Road, observed 42" firing line activities. Questioned inspector on high cap on bottom of pipe, measured 1/4". Preheating was satisfactory. Measured cap parameters on two welders. Chris Holcman V 26-30 A 149-156 Mike (Union Steward) V 25-28 A 144-160</p> <p>4. MP 59.7, observed 42" pipe gang activities. Noted that preheat was not consistently checked after pipe was clamped and lined up. Informed inspector of this, he said he would remind personnel.</p> <p>5. MP 4.84, observed 20" lowering in and backfill. Noted that jeepers were not removing tape on pipe. Personnel were not applying patch stick correctly, they were heating the stick and then applying to pipe. Informed inspector of the tape issue and repair issue. He said that coating inspector had told him not to removed the tape. I will follow-up on this. Inspector instructed personnel on proper application of the patch stick. Noted a large number of jeeps during lowering in. Inspector commented that the prejeep crew was not doing a good job. Pipe was lowered onto foam blocks due to rocky area. Areas where the pipe was not sitting on the blocks was later adjusted properly. An Ozziepadder was used to backfill the trench with rock free soil.</p>		<p>1. No issues</p> <p>2. No issues</p> <p>3. Followup on maximum cap height allowed</p> <p>4. Ensure preheat is checked prior to welding once internal clamp is activated.</p> <p>5. Tape needs to be removed from the pipe prior to jeeping. Patch stick repair needs to be properly followed</p>
Summary:		

I will followup with Rick Gulstad on the noted issues.

Inspector(s): Carl Griffis

Karaus, Bryn (PHMSA)

From: Rick.Gulstad@enbridge.com
Sent: Monday, August 27, 2007 1:29 PM
To: Griffis, Carl <PHMSA>
Cc: McMaster, Tom <PHMSA>; Floyd.Mott@enbridge.com; Art.Grell@enbridge.com; David.Stafford@enbridge.com; Gail.Follis@enbridge.com; Nolan.Baugh@enbridge.com; wayne.tompkins@enbridge-energy.com; jdconnaway@americonnnect..net; Jay.Johnson@enbridge.com; Patsy.Bolk@enbridge.com
Subject: Re: Exit interview Enbridge Southern Access Construction inspection 8/23/07
Attachments: Enbridge Southern Access Exit Interview 08_23_07.doc; Scotchkote 6233.pdf

Enbridge response to issues:

#2: At the exit interview with the Chief Inspector, Wayne Thompkins, he agreed to require jeeping of a repaired coating area immediately following the repair.

#3: A clarification from 3M was obtained (attached) and indicates a preheat temperature of 400 F is adequate

#4: The welding inspector has stated he was near the welding activity and may have been updating as-builts but as noted by Carl he did not appear to be directly overseeing the welding of the tie-in. The Chief Inspector stated in the exit interview that this is required and was re-enforced with the inspection staff following the event.

<CARL.GRIFFIS@dot.gov>

08/27/2007 10:25 AM

To <Rick.Gulstad@enbridge.com>

cc <Tom.McMaster@dot.gov>, <ivan.huntoon@dot.gov>, <David.Barrett@dot.gov>, <Gery.Bauman@dot.gov>

Subject Exit interview Enbridge Southern Access Construction inspection 8/23/07

Rick: Attached is the exit interview issues we discussed last week.

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Exit Interview
Enbridge Southern Access Construction Inspection
August 21-23, 2007
US Pipeline Construction Spread
Marshfield, WI

1. It was noted on two occasions that splatter guards were not being consistently used during girth welding (pipe gang on August 21 and tie in on August 22). It is important to have splatter guards in place to minimize coating damage.
2. While observing coating and pre-jeeping on August 22 at approximately MP 132 south of French Town Avenue, it was noted that while coating damage was being properly repaired, the repaired area was not being re-jeeped. The reason for this according to the coating inspector was that the USPL coating foreman had instructed the repair crew not to re-jeep in order to keep the pre-jeeping crew up with the coating crew. After discussion with the chief inspector that evening, the procedure was changed to re-jeep after coating repair. While the pipe is jeeped just prior to lowering in (and damaged coating previously repaired will be jeeped at this time), it is important that damaged coating is re-jeeped immediately to make sure the repair is adequate.
3. The coating inspector noted that the pre-heat temperature for the FBE applied to the girth welds is 438 degrees F. While the minimum temperature is 425 degrees F per Enbridge's specifications, this higher temperature is used to take into account cooling between the time the heating ring is removed and the coating is actually applied. The coating inspector pointed out coating damage on the pipe that was apparently being caused by the girth weld preheating. Discussions with Jon Connaway, Enbridge Assistant Construction Manager, indicate that Enbridge is investigating this problem to determine a solution. Per 3M correspondence on 8/24/07, a pre-heat temperature of 400 degrees F is acceptable. This temperature will be communicated to the field.
4. While observing a tie on August 22 at MP 142.7 north of County Road X and south of RR, it was noted that the welding inspector was not present for direct observation of fit up, preheating or initial welding of the pipe. The pipe was preheated, but the helpers did not verify the temperature of the pipe until I made a comment to the US Pipeline lowering-in inspector on site, at which time he directed the helpers to check the pipe temperature, which was satisfactory. It is important that the inspector have direct observation of critical aspects of the tie in operation, such as weld fit up and preheat. Please provide PHMSA an explanation as to why the inspector was not on site for direct observation during the time I was at this tie in.

From: mklatham@mmm.com
To: robert.stever@enbridge.com
Subject: Scotchkote 6233
Date: 08/24/2007 03:14 PM

Robert,

Per our conversation earlier today, when field applying the Scotchkote 6233 it is acceptable to lower the temperature down to 400F when preheating.

Please let me know if you have any further questions.

Regards,

Michelle Latham

3M Corrosion Protection Products

512-984-7801

Exit Interview
Enbridge Southern Access Construction Inspection
August 21-23, 2007
US Pipeline Construction Spread
Marshfield, WI

1. It was noted on two occasions that splatter guards were not being consistently used during girth welding (pipe gang on August 21 and tie in on August 22). It is important to have splatter guards in place to minimize coating damage.
2. While observing coating and pre-jeeping on August 22 at approximately MP 132 south of French Town Avenue, it was noted that while coating damage was being properly repaired, the repaired area was not being re-jeeped. The reason for this according to the coating inspector was that the USPL coating foreman had instructed the repair crew not to re-jeep in order to keep the pre-jeeping crew up with the coating crew. After discussion with the chief inspector that evening, the procedure was changed to re-jeep after coating repair. While the pipe is jeeped just prior to lowering in (and damaged coating previously repaired will be jeeped at this time), it is important that damaged coating is re-jeeped immediately to make sure the repair is adequate.
3. The coating inspector noted that the pre-heat temperature for the FBE applied to the girth welds is 438 degrees F. While the minimum temperature is 425 degrees F per Enbridge's specifications, this higher temperature is used to take into account cooling between the time the heating ring is removed and the coating is actually applied. The coating inspector pointed out coating damage on the pipe that was apparently being caused by the girth weld preheating. Discussions with Jon Connaway, Enbridge Assistant Construction Manager, indicate that Enbridge is investigating this problem to determine a solution. Per 3M correspondence on 8/24/07, a pre-heat temperature of 400 degrees F is acceptable. This temperature will be communicated to the field.
4. While observing a tie on August 22 at MP 142.7 north of County Road X and south of RR, it was noted that the welding inspector was not present for direct observation of fit up, preheating or initial welding of the pipe. The pipe was preheated, but the helpers did not verify the temperature of the pipe until I made a comment to the US Pipeline lowering-in inspector on site, at which time he directed the helpers to check the pipe temperature, which was satisfactory. It is important that the inspector have direct observation of critical aspects of the tie in operation, such as weld fit up and preheat. Please provide PHMSA an explanation as to why the inspector was not on site for direct observation during the time I was at this tie in.

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20") Observed activities only on the 42"		Date: 8/22/07
Location: Marshfield spread office for USPL 42" Various locations along the ROW		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Sr. Technical Records Auditor	Contractor
Rick Gulstad	Compliance	Enbridge Energy
Wayne Scott	Coating inspector	Contractor
Wayne Tompkins	Chief	Contractor
Activities Observed/Performed:		Results/Comments:
<p>1. MP 132.7 South of French Town Avenue Observed coating and jeeping. Sandblasting of girth joints was adequate, clean, white metal was observed completely around the pipe. Crews were cleaning tape and mud off the pipe ahead of the coating applicator and the jeeping crew. Voltage of the jeep was 1900 V and the crew was properly repairing the coating damage. Once the damage was repaired, however, the jeeping crew did not come back and check the damaged area. The coating inspector said that the USPL coating foreman had instructed his crew to do this so that the jeeping crew did not have to come back and recheck repairs. The jeeping crew would not the area to be repaired. The coating inspector said that he did not have any feedback that the lowering in crews were seeing a large amount of anomalies to repair. The coating inspector said the girth weld was preheated to 438 F using a Tempilstick to maintain 425 F when the FBE was being applied. Some pipe coating damage was observed at the temperature and was pointed out to me by the inspector. The damage was being repaired by the jeeping crew.</p> <p>2. MP 142.7 Tie in north of County Road X and south of RR. Welding inspector was not present for fit up, preheating or initial welding of pipe. The pipe was preheated, but the helpers did not verify the temperature of the pipe with Tempilsticks. I noted this to the USPL lowering in foreman standing there, who had the helpers check the temperature with Tempilsticks. At least 50% of the root bead was put in before the clamps were released.</p>		<p>1. The jeeping crew should recheck damaged areas repaired so that additional repairs are not required during lowering in. A lower preheat temperature should be investigated in order to eliminate pipeline coating damage.</p> <p>2. Preheat needs to be checked during the welding process. There was no inspector on site to verify preheat. In addition, there was no inspector present to observe welding with the clamps on.</p>
Summary:		
I will bring these issues up with Rick Gulstad and the chief inspector of the spread and ask for a response.		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20") Observed activities only on the 42"		Date: 8/21/07
Location: Marshfield spread office for USPL 42" Various locations along the ROW		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Sr. Technical Records Auditor	Contractor
Wayne Tompkins	Chief	McDaniels (Contractor)
Joe Hollingshead	NDE Auditor	Contractor
Gerry LeBlanc	Pipe gang welding inspector	Contractor
Activities Observed/Performed:		Results/Comments:
<p>1. Reviewed records in office. 3 welder qualifications, NDE reader sheets since July 10. All were ok. Reviewed several xray films – weld rejects, NDE rejects, cracks. All were ok Welding statistics to date – Mainline xrays – 4475 Repairs - 209 Repair rate .0% Tie in xrays - 521 Repairs - 5 Repair rate - 1.0%</p> <p>2. MP 136.7 West of Sidney Ave. Observed pipe gang and firing line welding and preheating. Preheat is being maintained between 250 and 400 F. Observed welding on concrete coated pipe string for Black River.</p>		<p>1. No issues 2. Reminded welding inspector to keep splatter guards on pipe at all times</p>
Summary: No issues identified		
Inspector(s): Carl Griffis		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20") Observed activities only on the 42"		Date: 8/23/07
Location: Marshfield spread office for USPL 42" Various locations along the ROW		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan Baugh	Sr. Technical Records Auditor	Contractor
Rick Gulstad	Compliance	Enbridge Energy
Wayne Tompkins	Chief inspector	Contractor
Jon Connaway	Assistant Construction Manager	Contractor
Activities Observed/Performed:		Results/Comments:
<p>1. Discussed construction schedule with Jon Connaway. Stage 1 is currently under construction ends at Delavan, WI. If permitting and ROW acquisition continues on schedule, Stage 2 winter work in WI and IL may continue in 07/08. 20" winter work in MN and ND may continue this winter.</p> <p>2. Discussed pipe coating damage from girth weld coating pre-heat process. Enbridge will be talking with 3M about this issue.</p> <p>3. Received update from Nolan Baugh on Stage 1 spread progress:</p> <p>Welded – 42" currently at Wisconsin Rapids. They are moving to Pardeeville, WI (east of Portage) on ~ 9/10/07</p> <p>Precision – 20" currently at Ladysmith. They plan to move to Vesper, WI between 9/15 and 10/01</p> <p>USPL – 42" currently at Marshfield. They plan to move to Hayward ~9/15/07</p> <p>Michels – 20" currently at Endeavor. No plans to move in the near future.</p> <p>4. Looked at two locations where the 20" and 42" lines cross both the existing line 14 and 6A:</p> <p>MP 198.05 NS Cranmoore Road MP 198.13 SS Cranmoore Road. Crossing west to east back to west (from N to S) Neither the 20" or the 42" have been laid in this area, including the road bores. The lines are going around structures on the SS of Cranmoore Road. On the NS of the road the lines will go under a driveway. On the SS of the road the lines will cross the existing lines on a low spot. A good crossing to observe. This is the Welded spread.</p>		<p>2. Per email on 8/27/07, Enbridge will reduce preheat from 425 to 400 degrees F to reduce blistering.</p>
<p>MP MP 102.63 WS Ambrose Road MP 103.63 ES Ambrose Road Crossing east to west back to east On the west side existing line 14 crosses 6A to go around a structure. That is the reason both new lines have to cross over. The 20" has been installed, except for the road bore. The 42" has not been installed, including the road bores. The terrain on the west side of Ambrose Road is slightly hilly, with the lines going through a feed lot. The east side terrain is flat and wet. This would also be good crossing to observe. This is the USPL spread.</p>		
Summary:		
No issues		
Inspector(s): Carl Griffis		

Enbridge Southern Access
Exit Interview July 12, 2007

1. Welding: Pipe gang did not verify 250 F preheat before making root bead and hot pass welding passes. Before making next root bead pass the pipe gang was asked to verify 250 F preheat, but no one had a temperature indicating crayon (Tempilstik). The Enbridge inspector then provided a 250 F Tempilstik and found the pipe at 3 o'clock less than the required 250 F.
2. Lowering-In: Enbridge inspector did not have a copy of Enbridge construction specifications. On jeep repair contractor did not abrade coating or pipe holiday before applying patch stick repair. Contractor was properly heating pipe and applying coating repair patchstick to holiday.
3. ML Girth Weld FBE Coating: Coating crew heated pipe to only 400 F when manufacturer (3M) application instructions show 425 F is required for this FBE coating. Enbridge inspector said that the 438 F Tempilstiks previously being used were damaging the line pipe coating, but 400 F did not. Inspector claimed at 400 F the coating looked very good.

Question: Enbridge should find out from 3M if the lower 400 F application temperature provides a satisfactory coating!

4. Pre-Jeep Holiday Repair: Coating repair crew heated the patchstick and did not heat the pipe as required by manufacturer's procedures; they were properly abrading holidays before applying patch stick, however.

CENTRAL REGION OFFICE
Daily Construction Inspection Report

Project:	Enbridge - Southern Access 42" US Pipeline Spread	Date:	7/11/2007
Location:	Marshfield, WI	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:	
Steve Wooten	Asst. Chief Inspector	Contract Inspector	
Nolan Baugh	Sn Tech Records Auditor	Contract Inspector	
Bob Gatrell	Sn Welding Inspector	Contract Inspector	
Matt Lucas	Road Bore Inspector	Contract Inspector	
Jerry LeBlanc	Welding Inspector – Pipe Gang	Contract Inspector	
Audrey Tsinnie	Welding Inspector – Firing Line	Contract Inspector	
Activities Observed/Performed:	Results/Comments:		
Reviewed OQ program & records for contractor's personnel in construction office	No concerns noted		
Visited section of 20"/42" construction on Co. Rd. Y crossing.	Using rock shield before Ozzie padder on no. side on backfill of 20". Backfilling with sand around tie-in at the bellhole. No concerns noted.		
Visited pipe gang and firing line near landfill at Sta. 8797+00.	Welders were checking preheat temperatures before root & hot pass beads. Observed welding parameters being taken by welding inspectors. Reviewed today's and previous day's parameter records kept by inspectors. No concerns noted.		
Summary:			
Satisfactory			
Inspector(s):	T. McMaster		

**CENTRAL REGION OFFICE
Daily Construction Inspection Report**

Project: Enbridge - Southern Access 42" US Pipeline Spread		Date: 7/10/2007
Location: Marshfield, WI	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Wayne Tompkins	Chief Inspector	Contract Inspector
Nolan Baugh	Sn Tech Records Auditor	Contract Inspector
Bob Gatrell	Sn Welding Inspector	Contract Inspector
Joe Hollinhshead	NDT Auditor	Contract Inspector
Larry Mersnick	Sn. Pipeliner	Enbridge
Bruce Coffman	Coating Inspector	Contract Inspector
Matt Lucas	Road Bore Inspector	Contract Inspector
Jerry LeBlanc	Welding Inspector - Pipe Gang	Contract Inspector
Activities Observed/Performed:	Results/Comments:	
Reviewed welder qualification records for new welders, X-ray reader sheets, film on rejected/repared welds & weld tracking log all in construction office	No concerns noted	
Visited section of 20"/42" construction requiring blasting of rock on either side of Co. Rd. Y. No. side road already shot and tying-in & backfilling. Shot the so. Side today.	Using 2-part epoxy on 20" tie-in welds and using Ozzie padder on no. side to backfill 20". Coating inspector had Mfg. instruction sheet for coating & following them. No concerns noted. On south side shoot Enbridge's Sn. Pipeliner was present & conducted post-blast leak monitor process per OQ task 18.1. Discussed Riechel Road incident. No concerns noted.	
Visited pipe gang near Falcon Rd. Sta. 8824+00	Welders were not checking preheat temperatures before root or hot pass beads. When asked to check they found side of pipe at 250F but bottom of pipe less than 250F.	
Summary:		
Discussed Enbridge construction spec for checking preheat temperatures with Enbridge pipe gang welding inspector.		
Inspector(s): T. McMaster		

CENTRAL REGION OFFICE
Daily Construction Inspection Report

Project: Enbridge - Southern Access 42" US Pipeline Spread		Date: 7/12/2007
Location: Marshfield, WI	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Wayne Tompkins	Chief Inspector	Contract Inspector
Nolan Baugh	Sn. Tech Records Auditor	Contract Inspector
Dale Galloway	Lowering-in Inspector	Contract Inspector
Wayne Scott	Coating Inspector	Contract Inspector
Activities Observed/Performed:		Results/Comments:
Visited 3000' section of 42" being lowered-in near Sta. 8899+00.		Enbridge inspector did not have a copy of Enbridge construction specifications. On jeep repair contractor did not abrade coating or pipe holiday before applying patch stick repair. Contractor was properly heating pipe and applying coating repair patchstick to holiday.
Visited girth weld coating crew near landfill at Sta. 8797+00.		Coating crew heated pipe to only 400 F when manufacturer (3M) application instructions show 425 F is required for this FBE coating. Enbridge inspector said that the 438 F Tempilstiks previously being used were damaging the line pipe coating, but 400 F did not. Inspector claimed at 400 F the coating looked very good. Also, coating repair crew heated the patchstick and did not heat the pipe as required by manufacturer's procedures; they were properly abrading holidays before applying patch stick, however.
Interviewed as-built survey crew.		Question: Enbridge was asked to find out from 3M if the lower 400 F application temperature provides a satisfactory coating! As-built survey collects GPS of all pipeline data (girth welds, pipe info, sags, o-bends, side bends, double joints, foreign line crossings, creeks & other features). No concerns noted.
Summary:		
All 3 days issues were discussed in the exit interview with Wayne Tompkins and Nolan Baugh. Exit interview was also emailed to Enbridge's Rick Gulstad.		
Inspector(s): T. McMaster		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Energy - So. Lights / So. Access		Date: 11/8/07
Location: Marshfield, WI		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Noland Baugh	DOT Records and Compliance	Enbridge
Rick Gulstad	DOT Compliance	Enbridge
Kelly Tkachuk	Construction Mgmt. - Coating QAQC	Enbridge
Steve Burkemeier	Construction Mgmt. - Coating QAQC	Enbridge
John Gross	Pipe Gang Foreman	Contractor/USPL
Activities Observed/Performed:		Results/Comments:
<ol style="list-style-type: none"> Conducted a morning meeting about coating issues seen on the project throughout the year. 		<p>The main issue of importance was the repeated misuse of the 3M patch stick for coating repair, as seen at various time and locations by PHMSA inspectors this year. Also the procedures and acceptability of the patch stick on top of two part coating was discussed.</p> <p>A second concern was the adequacy of the procedures for detection of holidays. Enbridge procedures of 125V/mil don't seem to be explicitly followed when inspection of girth welds is conducted. Coating of girth welds is at a higher mil thickness but the voltage is typically not increased due to the impracticability of repeatedly changing jeep settings.</p> <p>The issue of dirty pipe during inspection was also discussed. Enbridge claims that the pipe is power washed when muddy, but this does not seem to be happening in the field.</p>
<ol style="list-style-type: none"> Observed Pipe Gang crew at MP 96 		<p>Preheated to 250 degr. Welders worked quickly, near the limits of travel speed, but were within specs. Welding foreman related that power washing isn't really done in the field, he was</p>
Summary:		
<p>The construction management team assigned to coating was very forthright about the problems they have had with crews not following procedures. Several things have been done to improve quality of repairs, ranging from review of training by vendors, passing out and checking on knowledge of procedures in the field, additional inspections, and a recommendation to upper management to revise the procedures to include a change disallowing patch stick repair except for during final lowering.</p> <p>Enbridge is looking forward to Phase II with the hope that better training, procedures and communication, that coating repair quality will be improved. A main concern has been personnel turnover.</p>		
Inspector(s): Gabriel Hodill		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Energy - So. Lights / So. Access		Date: 11/7/07
Location: Marshfield, WI		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Wayne Tompkins	Chief Inspector USPL Spread	Contractor/USPL
Noland Baugh	DOT Records and Compliance	Enbridge
Leroy Travis	Utility Inspector	Contractor/USPL
Howard Crawford	Welding Inspector	Contractor/USPL
Activities Observed/Performed:		Results/Comments:
<ol style="list-style-type: none"> Traveled N to MP 93. Observed lowering-in crew, tie-in welding and girth weld coating. 		<p>Lowering in was waiting on the coating of a girth weld before lowering in could finish. This was due to water in the ditch. The coating crew was careful about their work, and did a good job. Preheat, blasting and thickness were all checked properly by the inspector. After curing the girth weld was jeeped at 1900V and scratched areas near the weld were repaired with patch stick. All patch stick repair was according to procedure. - Satisfactory</p>
<ol style="list-style-type: none"> Observed tie-in weld at MP 93 at Hay Creek. 		<p>Preheat – OK, clamp release – OK, Splatter guards – OK. The inspector was new, but had the procedures and actively checked the welders' work. - Satisfactory</p>
<ol style="list-style-type: none"> Visited with tie-in crews at MP 148.5 at Owen Station before heading back South. 		<p>The 42" pipeline had been installed under the active lines by the time we arrived. Crews were continuing to dig ditch around the station to complete the section.</p>
Summary:		
Inspector(s): Gabriel Hodill		

No exit interview

no exit interview.txt

There were no issues to report for the USPL spread. About the only little thing I could find was that the pipe was generally dirty during coating repair, but this is par for the course, so didn't appear to be worth a discussion. Enbridge claims they wash the pipe, but I don't believe that they actually do unless the mud is caked on over the top of the pipe.

Karaus, Bryn (PHMSA)

From: Rick.Gulstad@enbridge.com
Sent: Thursday, August 16, 2007 9:52 AM
To: Griffis, Carl <PHMSA>
Cc: Nolan.Baugh@enbridge.com
Subject: Re: FW: Enbridge Southern Access Construction Inspection Exit Interview 7/17-19/07
Attachments: Exit Interview 7_19_07.doc; Allowed-span-lowering-OPS.doc

Carl: Attaching a draft memo that addresses Item 4(a) regarding maximum spans of pipe while lowering. We are still working on part (b) regarding the maximum span of pipe as it lays in the ditch.

<CARL.GRIFFIS@dot.gov>

To <Rick.Gulstad@enbridge.com>

cc <Tom.McMaster@dot.gov>, <Gery.Bauman@dot.gov>, <David.Barrett@dot.gov>

08/02/2007 08:52 AM

Subject FW: Enbridge Southern Access Construction Inspection Exit Interview 7/17-19/07

Rick: What is the status of responding to issue 4 in the attached exit interview:

-----Original Message-----

From: Griffis, Carl <PHMSA>
Sent: Sunday, July 22, 2007 10:55 PM
To: rick.gulstad@enbridge.com
Cc: Bauman, Gery <PHMSA>; Barrett, David <PHMSA>; McMaster, Tom <PHMSA>
Subject: Enbridge Southern Access Construction Inspection Exit Interview 7/17-19/07

Rick: Attached is the exit interview for last week. The last item - maximum unsupported span came up after we talked and I reviewed the construction specifications.

* * * * * IMPORTANT NOTICE * * * * *

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To: Art Grell
From: Robert Stever

Date: August 10, 2007

RE: SOUTHERN ACCESS PROJECT – LOWERING IN PIPE SUPPORTING SPAN REVIEW

Specific Conditions Part 5 section 5.4.12.9 states:

“When lowering the pipe the unsupported length or straight pipe or pipe containing sag or overbends shall not exceed 250 feet. All sidebends shall be supported to minimize torsional stress in the pipe.”

The 250 ft spacing is a function of safety, pipe strength and controllability during lower. When lowering the pipe into the ditch inspectors are on site to monitor that the process is done safely and correctly.

The spacing allowed by strength is derived from calculating the maximum allowable bending for a pipe supported at the ends only. The maximum allowable stress is 80 percent of SMYS or 56,000 psi for X70 grade pipe.

For a 42 inch 0.422wt pipe the maximum pipe span due to bending is 335.04 ft with a deflection of 154.83 in.

For a 20 inch 0.250wt pipe the maximum pipe span due to bending is 229.09 ft with a deflection of 152.02 in.

The 20 inch maximum pipe span spacing due to bending is 229.09 ft. This is less than the 250 feet allowed for in the specifications. However, to achieve the max bending stress the pipe would need to deflect 152.02 in or 12ft-8in. If the spacing of the support is at 229 ft or more and the deflection is less 12ft-8in then the pipe is not at its maximum bending. Any pipe on the outside of a support span will reduce the sagging between supports and allow for an increase in the allowable span length caused by bending. As long as the allowable deflection is not approached, 250 ft is allowed.

The ditch depth needed to allow for 4 feet of cover over a 20 inch pipe line is 5ft-8in. To achieve the maximum bending the ends of the pipeline would need to be held 7 feet over the top of ditch and the pipe sagging to the point where it was touching the bottom of the ditch. This would not be allowed due to safety issues.

Exit Interview

Enbridge Southern Access Construction Inspection

July 17-19, 2007

Welded Construction Spread Wisconsin Rapids

1. On the pipe gang, preheat needs to be measured at the internal line up clamp. While preheat is measured on the pipe prior to activating the internal line up clamp, it is important to verify the proper preheat is present at the clamps prior to welding. The pipe gang crew had Tempil sticks, but were not using them.
2. Ensure that the pipe is preheated before patch sticks are used to repair coating damage. Personnel were properly preparing the coating surface with sand paper, but in one occasion the pipe was not preheated prior to applying the patch stick.
3. Welding inspectors need to have proper working equipment in order to measure welding parameters. One inspector on the firing line did not have a working voltmeter.
4. Construction specification 5.4.12.9 concerning lowering in states that the maximum length of unsupported pipe is 250 feet. After reviewing this specification, I believe this specification pertains to the lowering in process. The maximum length of 250 feet is between lowering in cradles. Enbridge construction specifications state that the pipe must rest on undisturbed trench bottom (5.4.13.9), however, there is no specification for the maximum span of unsupported pipe once lowered. It was observed on 7/29/07 at Eagle Road that there were two unsupported spans of approximately 90 and 150 feet. The lowering in inspector could not provide any guidance as to what should be the maximum unsupported span in the ditch. Please provide the following information:
 - a. The engineering justification for allowing a maximum of 250 feet of unsupported span when lowering in.
 - b. Specifications for maximum length of unsupported span once the pipe is lowered and the engineering justification for the specification.

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20") Observed activities only on the 42"		Date: 7/17/07
Location: Wisconsin Rapids spread office for Welded 42" Various locations along the ROW		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Rick Gulstad	Senior Compliance Coordinator	Enbridge
Dan Carroll	SR. NDE Inspector Level III	MBF inspection services
Marty Throckmorton	NDE inspector	MBF inspection services
Roy Burton	Pipe gang welding inspector	MBF inspection services
Wayne George	Road bore inspector	MBF inspection services
Activities Observed/Performed:		Results/Comments:
<p>Spread 3 of Southern Access goes from MP 173 to MP 254. Pipe is being laid from spread midpoint to south end, then north from midpoint</p> <p>1. Reviewed NDE reader sheets, weld log history, welder qualifications, NDE qualifications.</p> <p>2. Discussed exit interview of 7/12/07 with Rick Gulstad. He is checking on manufacturer recommendations for the minimum application temperature of the FBE on the girth welds.</p> <p>3. Observed pipe gang at MP 239, west side of CR A Pipe ahead of the clamps was being preheated, but the temperature was not being checked at the clamps. The crew had temp sticks, but were not using them. Checked preheat at the clamps twice and it was satisfactory. Pipe was preheated after the afternoon break. Measured root and hot pass V and A Root 22V, 150A 22V, 130A Hot pass 26V, 190A 28V, 195A</p> <p>4. Observed road bore problem at MP 240 Fern Road Pipe was being bored from north to south under road and came up extremely high on south side of road – only one foot of cover in the ditch. Noted that the 20" Southern Lights line had been installed by open cut.</p>		<p>1. No issues</p> <p>3. I reminded the inspector that it was important to verify preheat at the clamps. He responded that they hadn't had a problem and felt confident that preheat was adequate.</p>
Summary:		
Rick Gulstad to follow up on application temperature of girth weld FBE coating		
Inspector(s): Carl Griffis		

CENTRAL REGION OFFICE

Daily Inspection Report

Project: Enbridge Southern Access (42") and Southern Lights (20") Observed activities only on the 42"		Date: 7/19/07
Location: Wisconsin Rapids spread office for Welded 42" Various locations along the ROW	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Bob Johnson	Chief Inspector	MBF inspection services
Pat Burton	Assistant Inspector	MBF inspection services
Tom Stark	Tie in welding inspector	MBF inspection services
Freddie McKenzie	Superintendent	Welded Construction
Rock Rohach	Tie in welding inspector	MBF inspection services
Jim Lowry	Backfill inspector	MBF inspection services
Mark Nelson	Tie in welding inspector	MBF inspection services
Activities Observed/Performed:	Results/Comments:	
1. MP 205 7 mile creek Observed creek crossing, getting ready for tie in	1. No issues	
2. Flew ROW in helicopter	2. No issues	
3. MP 233 South of Eagle Dr Observed tie in and Ozziepadder at work. Two segments of pipe had large unsupported spans – one span was ~90 feet and the other span was 150 feet. Welded foreman said the second span would be supported by foam blacks. Line up, preheat, release of clamps with at least 50% of the root bead was satisfactory. Root bead 28-30 V (at machine) 120-130 A 28-29 V (at machine) 100 A (may have been low due to welder welding only a small area – hot pass A ok) Hot pass 30V 160 A 29V 170 A	3. Welding inspector seemed unsure how to measure V and A of welder. Confirm with Enbridge what maximum length of unsupported span in ditch is allowed.	
Summary:	Will request Rick Gulstad provide Enbridge specification for maximum allowed free span in ditch.	
Inspector(s):	Carl Griffis	

Exit Interview

Enbridge Southern Access Construction Inspection

July 17-19, 2007

Welded Construction Spread Wisconsin Rapids

1. On the pipe gang, preheat needs to be measured at the internal line up clamp. While preheat is measured on the pipe prior to activating the internal line up clamp, it is important to verify the proper preheat is present at the clamps prior to welding. The pipe gang crew had Tempil sticks, but were not using them.
2. Ensure that the pipe is preheated before patch sticks are used to repair coating damage. Personnel were properly preparing the coating surface with sand paper, but in one occasion the pipe was not preheated prior to applying the patch stick.
3. Welding inspectors need to have proper working equipment in order to measure welding parameters. One inspector on the firing line did not have a working voltmeter.
4. Construction specification 5.4.12.9 concerning lowering in states that the maximum length of unsupported pipe is 250 feet. After reviewing this specification, I believe this specification pertains to the lowering in process. The maximum length of 250 feet is between lowering in cradles. Enbridge construction specifications state that the pipe must rest on undisturbed trench bottom (5.4.13.9), however, there is no specification for the maximum span of unsupported pipe once lowered. It was observed on 7/29/07 at Eagle Road that there were two unsupported spans of approximately 90 and 150 feet. The lowering in inspector could not provide any guidance as to what should be the maximum unsupported span in the ditch. Please provide the following information:
 - a. The engineering justification for allowing a maximum of 250 feet of unsupported span when lowering in.
 - b. Specifications for maximum length of unsupported span once the pipe is lowered and the engineering justification for the specification.

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20") Observed activities only on the 42"		Date: 7/18/07
Location: Wisconsin Rapids spread office for Welded 42" Various locations along the ROW	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Rick Gulstad	Senior Compliance Coordinator	Enbridge
Bob Johnson	Chief Inspector	MBF inspection services
Jim Schaaf	Assistant Inspector	MBF inspection services
Mindy Crifasi	Lowering in jeep inspector	MBF inspection services
Mike Elliot	Enbridge operations representative	MBF inspection services
Gary Brack	Coating/blasting/jeeping inspector	MBF inspection services
Booker Inabinett	Firing line welding inspector	MBF inspection services
Johnny Cooper	Senior welding inspector	MBF inspection services
Activities Observed/Performed:	Results/Comments:	
<p>1. MP 219 north side of Cottonville Road Observed lowering in of 2200 feet of pipe. Pipe repair was being done correctly, reminded inspector to make sure pipe was heated before applying the patch stick. The repair area was being abraided with sand paper. Talked to Welded foreman about proper application of patch stick.</p> <p>2. MP 219 south side of Cottonville Road Observed lowering in of 2000 feet of pipe. One repair.</p> <p>3. MP 223 North of Eagle Road Observed back fill operation with Ozzie padder. Foam was sprayed into the ditch prior to lowering in in areas of sags and overbends as padding. There were several areas where the pipe was 12' to 18" above the ditch bottom. Also there were unsupported spans of ~50 feet. Enbridge specs allow 250 feet of unsupported span in the ditch.</p> <p>4. MP 238 North of Fawn Avenue Observed blasting, coating and jeeping. Pipe was being blasted properly to white metal. FBE coating was applied to girth welds at 425 degrees F. Coating thickness was ~ 20 mils. Reminded the inspector to preheat the pipe prior to applying the patch stick.</p> <p>5. MP 238 NW of County Road A Observed the firing line. The inspector did not have a working volt meter for measureing welding parameters. He obtained a new meter from the senior welding inspector.. Cap 25V, 150A 31V(at machine) 26-27V at the stinger 160A</p>	<p>1. No issues 2. No issues 3. No issues 4. No issues 5. Make sure the inspector has the proper tools for the job. In this case, the inspector did not have a working voltmeter to measure welding parameters.</p>	
Summary: Rick Gulstad is still following up proper application temperature of FBE on girth welds. See exit interview 7/12/07.		
Inspector(s): Carl Griffis		

11/1/07

Exit Interview

Enbridge Southern Access/Southern Lights– Welded Spread 3 – Wisconsin Rapids

PHMSA – Roger Sneegas

Enbridge – Nolan Baugh and Bob Johnson (Chief)

1. Coating

On 10/30/07 we observed the coating crew near Wilcox road. The coating of girth welds looked generally good. The sand blast crew was tapering the edge of the existing coating and the coating appeared uniform. The exception was the appearance of small globs near the top of the pipe. This may come from the machine as it drops extra powder on the melted area.

The wind was strong enough to blow dirt and sand on to the pipe. The crew had installed plywood wind shields on the sides of the coating machine.

Concerns/Recommendations

The wind shields did not appear adequate to keep all the blowing dust and sand out of the hot melt. Enbridge needs to develop a plan to exclude dust and sand or not do coating on very windy days.

2. Holiday Detection

The coating on the 42" pipe was about 14 or 16 mils. The coating inspector and I measured the thickness at the girth welds at 20-30 mils. They have been setting the jeep at about 2000 volts to detect holidays.

Concerns/Recommendations

The construction specification for holiday detection (5.4.11.11) asks for the detector to be set at 125 volts per mil of coating thickness. Enbridge is not currently in compliance with this specification. For 30 mils of coating the detector would need to be set at 3750 volts. Using the higher voltage everywhere or changing the voltage of the detector at each weld is not a practical solution. So Rick, unless I am missing something, I suggest you look at revising 5.4.11.11. You can probably re-word it and still meet the requirements of 195.561a.

3. Coating Repair

We looked at coating repairs using the 3M Melt Sticks at every area we visited where repairs had been done. We never saw any that appeared to have been done correctly and several could have their edges peeled off with a fingernail. All the repairs we saw had the appearance of the melt stick being dribbled on. The manufacturer asks that the pipe be hot enough to melt the stick. If the pipe were properly pre-heated the repairs would have a smooth appearance. Evidence of abrasion prior to repair was also absent from most of the observed repairs.

We visited the Vesper pump Station on 10/31/07. They had coated the girth welds with two-part epoxy, and then applied melt stick on top of the two-part to repair defects.

Concerns/Recommendations

The 3M sticks need to be applied using the manufacturer's instructions.

Using melt sticks on top of two part coating appears to be incorrect. Rick, please provide an approved procedure for this or remove the melt stick applications at Vesper and have them repaired with two part.

4. Welding

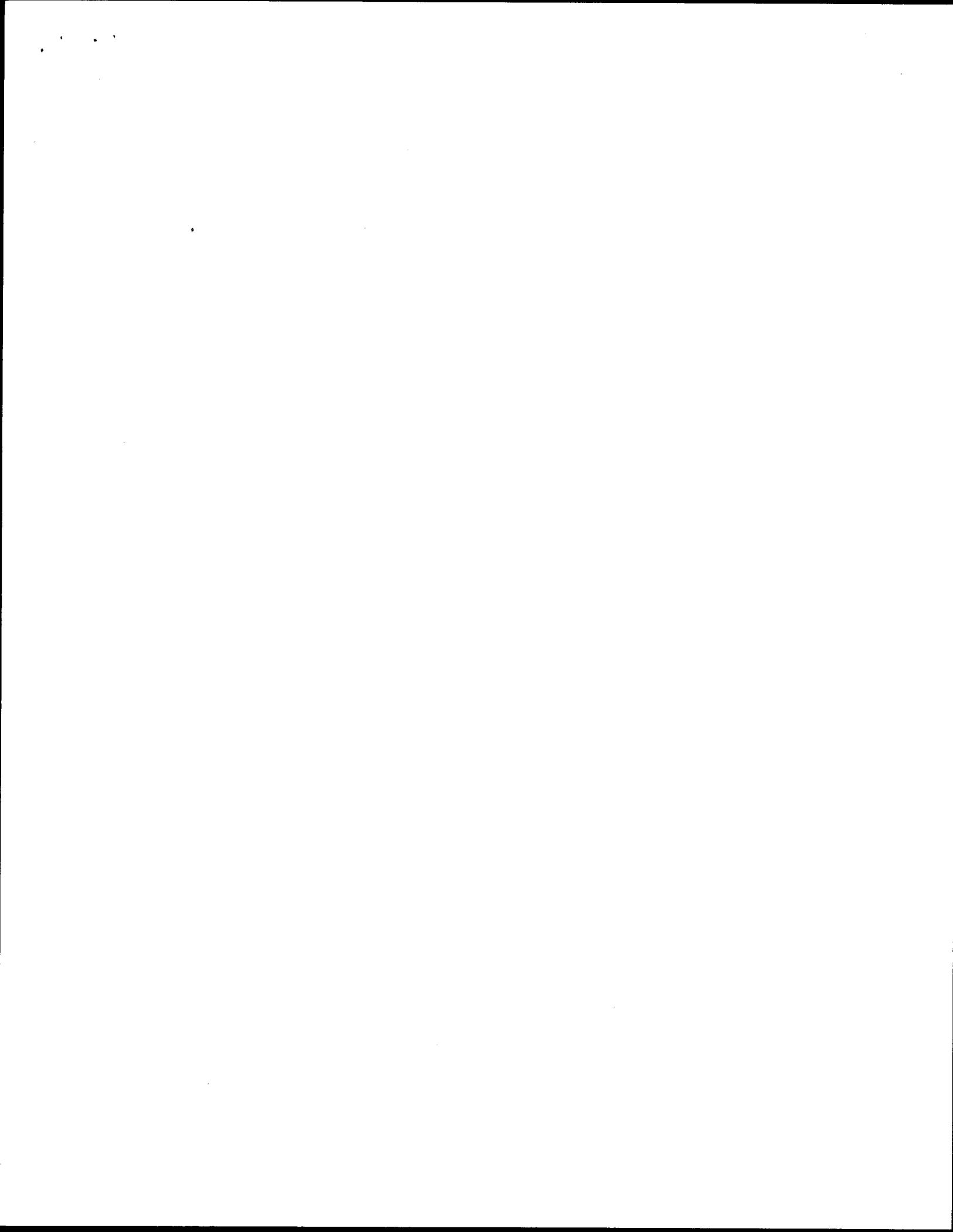
We visited the firing line on 10/30 and the tie in crew the next day. Everything about the welding looked good to me – particularly the overall repair rate of 5.4%. We also reviewed the NDT records and some films and they appeared adequate.

Concerns/Recommendations

We reviewed the daily forms used by the welding inspectors on 11/1. They record speed of travel, volts, amps and the welding procedure. I asked about the absence of a notation on pre-heat or the type of welding rod. I'm not sure we need to note all the 1104 essential variables, but I would like to see these two. I have seen them check for pre-heat so I know it is done, so why not record it?

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access		Date: 10/30/07
Location: Wisconsin Rapids - Welded 3 42"	Station/Survey or Pipeline Marker:	Near Portage Wisconsin MP 200-250
Personnel Contacted:	Title/Position:	Company/Affiliation:
Bob Johnson	Chief Inspector	Enbridge Contract Inspector
Pat Burton	Assistant Chief	Enbridge Contract Inspector
Dan Carroll	NDT Auditor	Enbridge Contract Inspector
John Cooper	Senior Welding Inspector	Enbridge Contract Inspector
Roy Burton	Welding Inspector	Enbridge Contract Inspector
Gary Black	Coating Inspector	Enbridge Contract Inspector
Lyle Arnett	Coating Foreman	Welded
Nolan Baugh	Auditor	Enbridge
Activities Observed/Performed:		Results/Comments:
1. Attended Safety training at Welded		1. No issues noted
2. Visited with the Chief Inspector to get daily activity.		2. No issues noted
3. Visited the coating crew at Wilcox Road. Talked to the foreman – Lyle Arnett and the inspector. It was windy, and he said they put up plywood shields on the sides of the coater. I observed areas of melt stick that appeared to be applied incorrectly – globs dribbled on that could be removed by fingernail. Nolan and I explained that the correct procedure was not being used. The foreman wanted to argue and said he had doing this all his life. I noted that some of the coated areas had globs of material maybe the diameter of a dime in places near the top of the pipe. I asked if this was foreign material blown into the melt but he said it is a characteristic of the machine they use; it drops extra powder sometimes around the top of the pipe. The coating inspector and I measured the thickness of several coated areas – all 20 to 30 mils. He said the minimum was 16 but they apply it thick on windy days to assure enough coating everywhere. The pre-heat crew was heating to 400. The coating generally looked good.		3. If the coating at girth welds is 20 to 30 mils, are they using the specified voltage to jeep (125 V per mil)? Will check with the Chief. The wind shields did not appear to keep all blown dust out of the melt. Melt stick is being incorrectly applied – will check with the Chief.
4. Visited firing line near Dumke Road. They are trying for 35-45 welds per day. Checked the rods they were using – 6010 root – 8010 fill.		4. No issues noted
5. Visited the Bending crew at Hwy 22. They had ripples on a joint and were in the process of greasing the bender (the part that slides inside) to fix the problem. Subsequent bends had no ripples.		5. The ripple was about 1/8 inch. Nolan said the spec is 1/16 but the inspector said it was changed to 3/16. Will check on this.
Summary: The coating crew, in particular, does not appear to be following Enbridge procedures.		
Inspector(s): Roger Sneegas		



**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access		Date: 11/1/07
Location: Wisconsin Rapids - Welded 3 42"	Station/Survey or Pipeline Marker:	Near Portage Wisconsin MP 200-250
Personnel Contacted:	Title/Position:	Company/Affiliation:
Bob Johnson	Chief Inspector	Enbridge Contract Inspector
Pat Burton	Assistant Chief	Enbridge Contract Inspector
Dan Carroll	NDT Auditor	Enbridge Contract Inspector
John Cooper	Senior Welding Inspector	Enbridge Contract Inspector
Roy Burton	Welding Inspector	Enbridge Contract Inspector
Felix Martinez	Welding Inspector	Enbridge Contract Inspector
Jim Lowrey	Testing Inspector	Enbridge
Nolan Baugh	Auditor	Enbridge
Activities Observed/Performed:	Results/Comments:	
1. Visited a road boring crew at Highway 39. They were welding parts of the pipe to go under the highway. Looked at many joints of welded and coated pipe near there. The girth coatings all looked pretty good but the patch stick repairs all looked wrong. Evidence of dribbling instead of melting a puddle.	1. The same melt stick problem was noted.	
2. Visited a tie in crew near Highway 173.	2. No issues noted.	
3. Reviewed records in the Welded office – particularly the daily inspection reports from the welding inspectors. The inspectors apparently record a check on every welder they see in a day. They record speed of travel, amps, volts, and the welding procedure. Pre-heat was not recorded. I asked why and no one knew.	3. The inspectors should be documenting checks on all the welding parameters.	
4. Had an exit meeting with Nolan and Bob Johnson. Reviewed all the things Nolan and I saw this week. In general welding looked very good. We discussed coating repair and melt sticks in particular. I expressed the opinion that no one in the field seemed to know the correct procedure to apply the 3M melt sticks and suggested that the inspectors at lease get a refresher and try to get the troops to do it right. Discussed dust blowing into girth weld coatings – no resolution. They are not strictly following their holiday detection procedure (5.4.11.11). This procedure wants 125 volts pre mil of coating. So at 20-30 mils on girth welds the 2000V jeep setting is way low.	4. See Below	
Summary: Coating repair and jeeping were the most common problem noted.		
Inspector(s): Roger Sneegas with Nolan Baugh from Enbridge		

Exit Interview
Enbridge Southern Access Construction Inspection
June 16-20, 2007
Welded Pipeline Construction Spread
Malta, IL

1. A weld cut out spread sheet has been developed to document cut outs on all three Phase 2 spreads. This spread sheet should be emailed to PHMSA on a weekly basis. Furnish PHMSA the following documents:
 - Phase 2 Construction specifications electronic and hard copy
 - Coating inspector handbook electronic and hard copy
 - Enbridge QA/QC handbook (when it is finalized) electronic and hard copy
2. It was observed on June 18 on the 20" pipe gang crew south of Cherry Valley Road that the pipe temperature was not being consistently checked prior to welding the root pass. In addition, some of the welder helpers did not have the proper Tempilstik for measuring the minimum pipe temperature of 250 degrees. Some helpers had 300 and 350 degree Tempilstiks. Lack of proper preheat temperature caused one weld to be cut out. It is important to maintain the preheat temperature prior to welding. In addition, weld splatter guards were not being consistently used by the pipe gang. These issues were discussed with Enbridge personnel and corrective action has been taken.
3. It was also noted in a discussions with a welding inspector on a tie-in crew that Tempilstiks in excess of 250 degrees were being used. The 250 degree Tempilstik should be used in order to verify minimum preheat temperature and avoid pipe coating damage due to excessive heat.
4. At the above location, the pipe gang inspector was taking volt/amp measurements at the welding machine, rather than at the pipe. Accurate volt/amp measurements can only be taken at the pipe. This issue was discussed with Enbridge personnel.
5. At the above location, it was observed that the pipe was being moved while the internal lineup clamp was engaged, but before the root pass was completed. This is not a good practice and was discussed with the senior welding inspector. This practice will not be allowed in the future.
6. Based on discussion with the pipe bending inspector south of Baseline Road on June 20, it was not clear what measurements were to be taken to determine pipe ovality and what the ovality specification was. The inspector was measuring pipe diameter increase at the bend, while the specification addresses pipe reduction. This issue was discussed with the inspector on Friday, June 20. The Enbridge QA/QC manual is currently being modified to clarify this issue.
7. The coating manufacturer representative stressed during the coating training that a contact pyrometer or a Tempilstik should be used for proper pipe temperature, not an infrared thermometer. An infrared thermometer may be used as long as the temperature is also checked with a contact pyrometer or Tempilstik.

Exit Interview
Enbridge Southern Access Construction Inspection
June 16-20, 2007
Welded Pipeline Construction Spread
Malta, IL

1. A weld cut out spread sheet has been developed to document cut outs on all three Phase 2 spreads. This spread sheet should be emailed to PHMSA on a weekly basis. Furnish PHMSA the following documents:
 - Phase 2 Construction specifications electronic and hard copy
 - Coating inspector handbook electronic and hard copy
 - Enbridge QA/QC handbook (when it is finalized) electronic and hard copy
2. It was observed on June 18 on the 20" pipe gang crew south of Cherry Valley Road that the pipe temperature was not being consistently checked prior to welding the root pass. In addition, some of the welder helpers did not have the proper Tempilstiks for measuring the minimum pipe temperature of 250 degrees. Some helpers had 300 and 350 degree Tempilstiks. Lack of proper preheat temperature caused one weld to be cut out. It is important to maintain the preheat temperature prior to welding. In addition, weld splatter guards were not being consistently used by the pipe gang. These issues were discussed with Enbridge personnel and corrective action has been taken.
3. At the above location, the pipe gang inspector was taking volt/amp measurements at the welding machine, rather than at the pipe. Accurate volt/amp measurements can only be taken at the pipe. This issue was discussed with Enbridge personnel.
4. At the above location, it was observed that the pipe was being moved while the internal lineup clamp was engaged, but before the root pass was completed. This is not a good practice and was discussed with the senior welding inspector. This practice will not be allowed in the future.
5. It was also noted in a discussion with a welding inspector on a tie-in crew that Tempilstiks in excess of 250 degrees were being used. The 250 degree Tempilstik should be used in order to verify minimum preheat temperature and avoid pipe coating damage due to excessive heat.
6. Based on discussion with the pipe bending inspector south of Baseline Road on June 20, it was not clear what measurements were to be taken to determine pipe ovality and what the ovality specification was. The inspector was measuring pipe diameter increase at the bend, while the specification addresses pipe reduction. This issue was discussed with the inspector on Friday, June 20. The Enbridge QA/QC manual is currently being modified to clarify this issue.
7. The coating manufacturer representative stressed during the coating training that a contact pyrometer or a Tempilstik should be used for proper pipe temperature, not an infrared thermometer. An infrared thermometer may be used as long as the temperature is also checked with a contact pyrometer or Tempilstik.

Enbridge Southern Access/Southern Lights Pipelines
Exit Interview 6/14/07

1. Office review of recent welder qualification tests, X-ray reader sheets, NDT weld tracking log and welder inspection parameter checksheets:
 - a. All were satisfactory except for X-ray reader sheets. One reader sheet dated 6/1/2007 contained 3 welds where neither the "Accept" nor "Reject" box was checked, but the reader sheet was signed by the X-ray unit technician and the Enbridge NDT auditor. The NDT auditor checked the X-rays for the 3 welds and found them acceptable and had the X-ray technician change the reader sheet accordingly.
2. Observations on field activities:
 - a. Coating jeepling observations - Patch stick repairs were observed where 3M procedures were not being followed to abrade the coating (coating was not abraded with neither sandpaper nor a file) and the pipe was not heated before heating the patchstick.
 - b. PHMSA observed the new "workhorse" welding procedure qualification testing and will receive a copy following completion of the procedure.

CENTRAL REGION OFFICE
Daily Construction Inspection Report

Project: Enbridge - Southern Lights Access	Date: 6/13/2007	
Location: Endeavor, WI	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
James Stafford	Welding Inspector	Contract Inspector
Dave Isom	Welder	Pipeline Contractor – Michels
Ramey Rodgers	Welder	Pipeline Contractor – Michels
Kevin Olerud	Foreman – Lowering Crew	Pipeline Contractor – Michels
Dennis Cokely	Inspector	Contract Inspector
Bud Samson	Foreman – Lowering Crew	Contract Inspector
Jack Johnson	Welding Inspector	Contract Inspector
Activities Observed/Performed:	Results/Comments:	
Went back to the tie-in crew at County Rd. D and talked to the welding inspector about the x-ray of the tie-in weld. The weld had two gas pockets and required a repair. Observed the repair of the weld.	No concerns noted.	
At the same location, the lowering crew began lowering the line and jeeping the coating. Checked the set point of the jeep and observed them making repairs to any coating defects.	The concern noted here was that the repairs using the patch sticks were not being applied per 3M's direction. Observed the one repair where the surface was not prepped with a file or sand paper. Observed other repairs where the pipe surface was not heated prior to the application of the patch stick.	
At 14 th Ave and Akron Ave, observed a tie-in crew that was in the process of lowering a section of line. They were also jeeping that section prior to lowering it in. The jeep voltage setting was checked and found to be satisfactory.	As noted at the other location, the patch sticks were not being applied correctly. Noted where they again, did not prep the surface correctly, and they were not applying heat to the pipe surface prior to applying the patch stick.	
Visited the Pipe gang and firing line at Browndeer Lane. They were headed south.	No concerns noted.	
Summary:		
Discussed the coating issue of both the abrading of the coating and the application of heat to the pipe before the patchsticks with both foremen of the crews, as well as the inspectors. They all indicated that they would do it per the instructions. However, it appears that this problem is pretty widespread. This issue was discussed with Rick Gulstad of Enbridge, and he indicated that the issue would be brought to the attention of all personnel and addressed by the following week.		
Inspector(s): T. McMaster, H. Shieh		

CENTRAL REGION OFFICE
Daily Construction Inspection Report

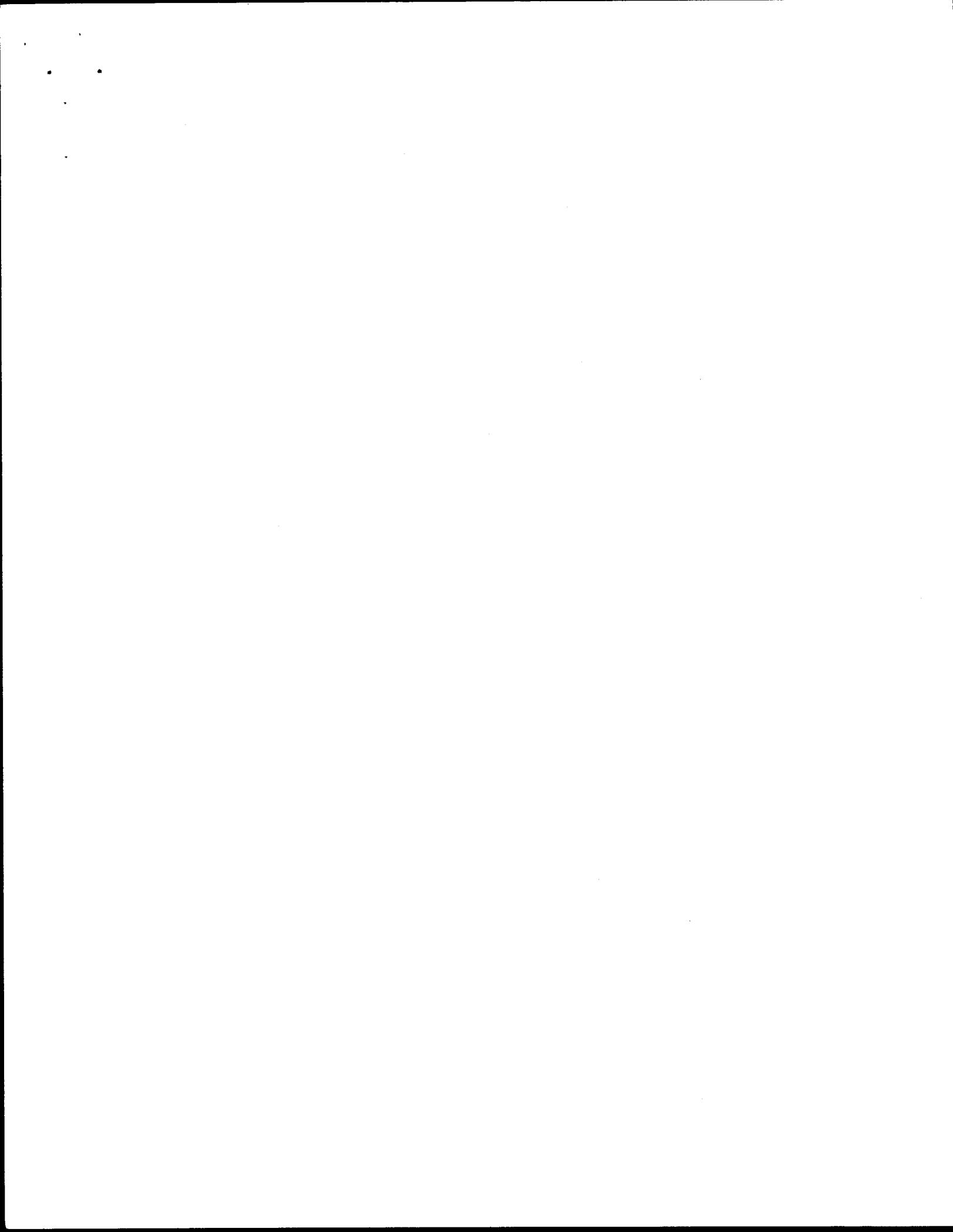
Project: Enbridge - Southern Lights Access	Date: 6/12/2007	
Location: Endeavor, WI	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Charlie Hunt	Bending Inspector	Contract Inspector
Tim Ashley	Foreman – Bending Crew	Pipeline Contractor – Michels
James Stafford	Welding Inspector	Contract Inspector
Dave Isom	Welder	Pipeline Contractor – Michels
Ramey Rodgers	Welder	Pipeline Contractor – Michels
Mattie Stapp	Coating Inspector	Contract Inspector
Buddy Kervin	Welding Forman	Pipeline Contractor – Michels
Activities Observed/Performed:	Results/Comments:	
Reviewed welding qualification records for new welders, X-ray reader sheets and weld tracking log.	Found one X-ray reader sheet dated 6/1/07 for X-ray Unit “U” that had 3 welds that were not marked either accepted or rejected and the reader sheet was signed by both the X-ray unit technician and the Enbridge NDT auditor. The Enbridge NDT auditor tracked the 3 welds with the Unit “U” technician and found the 3 welds to be acceptable and corrected the reader sheet.	
Observed field bends between Chicago and Cottonville Rd. The bend was an 11° bend in a joint, with a PI left on the same joint. Seam was placed such that when the pipe is rotated and in the ground, the long seam will be in the top 120°.	Discussed the placement of the seam during the field bends, and the placement of the seam during compound field bends. No concerns noted.	
Went to County Rd D at Sta 10921+82 to observe the tie-in crew. Watched the inspector check pre-heat temps, and inter-pass temps. Also observed the inspector take voltage and amperage readings and travel speeds.	No concerns noted.	
Summary:		
Discussed the issue of the inaccurate record with the Enbridge NDT auditor. Indicated that the record was missed, but that the 3 welds were found to be acceptable. The record would be corrected.		
Inspector(s): T. McMaster, H. Shieh		

CENTRAL REGION OFFICE
Daily Construction Inspection Report

Project: Enbridge - Southern Lights/Southern Access		Date: 6/14/2007
Location: Endeavor, WI	Station/Survey or Pipeline Marker:	
Personnel Contacted: Rick Gulstad Jack Johnson	Title/Position: Compliance Engineer Welding Inspector	Company/Affiliation: Enbridge Contract Inspector
Activities Observed/Performed: Observed the qualification of their new workhorse welding procedure to take the place of existing WP-12. Qualified the procedure on 20" and 42" X70 pipe. Observed the destructive testing of the straps. The welds were also x-rayed and found to be satisfactory.	Results/Comments: No concerns noted.	
Summary: No concerns noted.		
Inspector(s): T. McMaster, H. Shieh		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")	Date: 3/6/07	
Location: Ladysmith spread office. Other locations along the ROW.	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Rick Gulstad	Senior Compliance Coordinator	Enbridge
Marvin (Jr.) Mautino	Chief Inspector, Michels Spread	Enbridge Const'n Inspection Contractor
Mitch Pendergraft	Sr. Welding Inspector, Michels Spread	Enbridge Const'n Inspection Contractor
Robert Wardlow	Coating Inspector	Enbridge Const'n Inspection Contractor
Dan Peterson	Operations Representative	Enbridge
Matt Sanlan	Potholing Foreman	Enbridge Const'n Inspection Contractor
Dean Edings	Lowering-in Inspector	Enbridge Const'n Inspection Contractor
Ed Porter	NDT Inspector	Enbridge Const'n Inspection Contractor
Activities Observed/Performed:	Results/Comments:	
<ol style="list-style-type: none"> 1. Michels spread office – Ladysmith Reviewed welding procedures, welding qualifications, NDE reader sheets, weld logs, OQ qualifications. 2. Visited jeeping and coating crew at MP 92.0 near Burkeypile Rd, work slow due to snow. 3. Visited road crossing at Fairview Rd MP91.0. 4. Observed potholing crew at MP86.5. 5. Observed lowering-in at Reichel Rd. at MP84.8. 6. Observed D/S valve site for Flambeau River and confirmed U/S valve site location at existing valve site. 	<ol style="list-style-type: none"> 1. Noted that another welder was found to be welding outside the specified rod parameters for voltage on the stringer bead. The issue was brought to the attention of Junior Mautino and Mitch Pendergraft. The visual acuity test record for new NDE Inspector Ed Porter was not found. Records are being sent. 2. Preheat of pipe at 150 degrees for 2-part epoxy coating work. Small jeep repairs being made with "patch sticks" in accordance with manufacturer's recommendations. Satisfactory. 3. The new flag marking and offsets for work and installation near the hot lines was checked. Satisfactory. 4. An Enbridge representative is reported to be continuously assigned to potholing crew to confirm contract workers accurately spot Enbridge's active pipeline(s). Satisfactory. 5. Jeeping at very end of pipe section (last 20') was not made in good contact with pipe due to difficulty of crew member to reach out over the trench. Junior Mautino was advised to discuss a remedy with contractor. Contractor was satisfactorily installing polyurethane "pillows" in the trench bottom that the pipe sits on to protect it from any hard objects. 6. Valve locations U/S and D/S of the Flambeau River were confirmed to be in satisfactory locations. 	
Summary:		
New revisions to welding procedure LPL WP-12 are now being used. Will advise Enbridge's Rick Gulstad of items #1 and #5.		
Inspector(s): Gabe Hodill, Tom McMaster		



**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 3/8/07
Location: Ladysmith spread office. Other locations along the ROW.		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Marvin (Jr.) Mautino	Chief Inspector, Michels Spread	Enbridge Const'n Inspection Contractor
Ed Porter	NDE inspector/auditor	Enbridge Const'n Inspection Contractor
Mitch Pendergraft	Sr. Welding Inspector, Michels Spread	Enbridge Const'n Inspection Contractor
James Taylor	Welding Inspector	Enbridge Const'n Inspection Contractor
Don Coffey	Welding Inspector	Enbridge Const'n Inspection Contractor
Activities Observed/Performed:		Results/Comments:
<ol style="list-style-type: none"> 1. Michels spread office – Ladysmith 2. MP119.0 at Rued Road, observed 42" road crossing construction procedures. 3. MP 119.0 at Rued Road the pipe section to be installed contained 2 double-joint sections with 2 pipe mill girth welds. 4. MP120.5 north of Miller Ave. observed welding crews. 		<ol style="list-style-type: none"> 1. Discussed weld quality issues and importance of maintaining parameters within values given on the WP-12 welding procedure with Senior Inspectors. Audited recent 20" and 42" NDT records – satisfactory. 2. Crews operated a pneumatic ram device to push a dummy pipe under the road. The dummy pipe reached the opposite side of the road without incident or encroaching on the hot lines. Hot lines were marked and offset barricaded in accordance with new procedures. Satisfactory. 3. Requested Junior Mautino to determine if his spread is responsible for obtaining and confirming the acceptability of the NDT on double-joint welds, or if it is Enbridge's duty. PHMSA has already reviewed the pipe mill double-joint welding procedures and has found them to be satisfactory. 4. Observed 42" welding crews. Two of yesterday's welds needed repairs for Hollow Bead. Today, all voltage, current and travel speed readings were satisfactory. Checked final weld quality, welds were capped properly and were in good condition. No arc burns were seen.
Summary:		
Will advise Enbridge's Rick Gulstad of item #3.		
Inspector(s): Gabe Hodill, Tom McMaster		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 3/7/07
Location: Ladysmith spread office. Other locations along the ROW.		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Marvin (Jr.) Mautino	Chief Inspector, Michels Spread	Enbridge Const'n Inspection Contractor
Charlie Hunt	Field Bending Inspector, Michels Spread	Enbridge Const'n Inspection Contractor
Mitch Pendergraft	Sr. Welding Inspector, Michels Spread	Enbridge Const'n Inspection Contractor
James Taylor – Pipe Gang	Welding Inspector	Enbridge Const'n Inspection Contractor
Shawn Smith	NDE technician	Shaw NDT Contractor
Don Coffey – Firing Line	Welding Inspector	Enbridge Const'n Inspection Contractor
Activities Observed/Performed:		Results/Comments:
<ol style="list-style-type: none"> 1. Michels spread office and storage yard – Ladysmith 2. MP118.5 north of Rued Rd, observed bending crew. 3. MP 121.0 observed welding north of Miller Road 4. Investigated a 20" long seam potential issue wherein NDT technician questioned an out-of-code wall thickness indication adjacent to a girth weld. 		<ol style="list-style-type: none"> 1. A 42" valve body assembly was inspected and found to be in new condition and marked IAW API 6D code requirements. 2. 20" bending machine crew. Bends smooth with no ripples. Inspected several 42" bends on ROW smooth with no ripples. 3. Observed 42" welding crews (pipe gang and firing line). Two weeks earlier when 42" welding began there was a problem with a number of welds rejected for Hollow Bead. Various changes were made, one being putting 4 welders on the Root Bead. Since then the repair rate has been minimal. Welding and parameters were checked and found satisfactory. Contractor observed using a 275F temp stick to confirm at least 250F preheat. 4. Shaw's NDE technician showed us the Xray film of the 20" long seam in question. Area in question appears to be caused during internal weld trim at the pipe mill. Junior Mautino later reported that wall thickness measurements were obtained in several places on the long seam and Enbridge personnel found them within API 5L specifications.
Summary:		
No issues.		
Inspector(s): Gabe Hodill, Tom McMaster		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 3/8/07
Location: Ladysmith spread office. Other locations along the ROW.		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Marvin (Jr.) Mautino	Chief Inspector, Michels Spread	Enbridge Const'n Inspection Contractor
Ed Porter	NDE inspector/auditor	Enbridge Const'n Inspection Contractor
Mitch Pendergraft	Sr. Welding Inspector, Michels Spread	Enbridge Const'n Inspection Contractor
James Taylor	Welding Inspector	Enbridge Const'n Inspection Contractor
Don Coffey	Welding Inspector	Enbridge Const'n Inspection Contractor
Activities Observed/Performed:		Results/Comments:
<ol style="list-style-type: none"> 1. Michels spread office – Ladysmith 2. MP119.0 at Rued Road, observed 42" road crossing construction procedures. 3. MP 119.0 at Rued Road the pipe section to be installed contained 2 double-joint sections with 2 pipe mill girth welds. 4. MP120.5 north of Miller Ave. observed welding crews. 		<ol style="list-style-type: none"> 1. Discussed weld quality issues and importance of maintaining parameters within values given on the WP-12 welding procedure with Senior Inspectors. Audited recent 20" and 42" NDT records – satisfactory. 2. Crews operated a pneumatic ram device to push a dummy pipe under the road. The dummy pipe reached the opposite side of the road without incident or encroaching on the hot lines. Hot lines were marked and offset barricaded in accordance with new procedures. Satisfactory. 3. Requested Junior Mautino to determine if his spread is responsible for obtaining and confirming the acceptability of the NDT on double-joint welds, or if it is Enbridge's duty. PHMSA has already reviewed the pipe mill double-joint welding procedures and has found them to be satisfactory. 4. Observed 42" welding crews. Two of yesterday's welds needed repairs for Hollow Bead. Today, all voltage, current and travel speed readings were satisfactory. Checked final weld quality, welds were capped properly and were in good condition. No arc burns were seen.
Summary:		
Will advise Enbridge's Rick Gulstad of item #3.		
Inspector(s): Gabe Hodill, Tom McMaster		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge So. Lights / So. Access		Date: 10/2/07
Location: Endeavor, WI		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan, Baugh	Sr. Technical Records Auditor	Enbridge
Tom Burns	Welding Inspector	
Charlie Marsh	Utility Inspector	TIR
Bud Sanson	Lowering-in Foreman	
Steve Burkemeier	Coating QAQC	Contractor
Activities Observed/Performed:		Results/Comments:
Discussed records retention and reviewed daily construction work locations with Nolan Baugh at Enbridge construction office.		
Visited road bore crews at Waterloo Rd, Cherry Ln.		No activity
Visually inspected welds and coating of road crossing section ready for installation at Co. Rd. 106.		Satisfactory
Observed Pneumatic Ram at work on dummy pipe at road crossing of Co. Rd. O.		Satisfactory
Observed 20" final coating inspection and repair and also lowering-in South of Kunz Rd. Maximum spans were observed to be approx. 180 feet. Sag deflection was observed to be several feet.		The foreman was asked about the maximum allowable unsupported span during lowering in. He did not have a maximum allowed, his understanding was that if the span was too long, the pipe would buckle, anything else was not a problem. Coating crew was improperly applying the melt-on patch stick. Supervisory personal were on site to correct the situation. Coating crew improved adherence to the coating procedure. According to the inspectors, improper coating has been an ongoing problem.
Summary:		
Inspector(s): Gabriel Hodill, Roger Sneegas		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge So. Lights / So. Access		Date: 10/4/07
Location: Endeavor, WI Atkinson, WI		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Rick Gulstad Dwayne Harper James Taylor Charlie Hunt	Compliance Specialist Chief Inspector (Michels Spread) Welding Inspector (pipe gang) Bending crew inspector	Enbridge
Activities Observed/Performed:		Results/Comments:
Traveled to Atkinson area, observed 42" welding crew south of HWY 12 road crossing.		Very muddy conditions, mud and dirt on the pipe and nearly within the welding. Weld bevels were cleaned before welding. Root bead hand welding at ¼ diameter per 2 minutes or approximately 17"/min. Max allowed root bead speed per procedure is 18"/min. Voltage and amperage for root bead and hot pass welders were also within allowable range.
Visited bending crew near Route J, West of Atkinson and inspected pipe joints. No ripples or wrinkles.		It was noted that the welding inspector James Taylor was only checking the welders "about once per day". This was brought to the attention of Dwayne Harper, who said that the welders should be checked several times per day.
Traveled back to Endeavor for exit interview with Dwayne Harper.		According to Charlie Hunt, two pipe joins buckled during bending this week due to uneven pipe temperature from the sun and were discarded. No bends were made near girth welds.
		Dwayne Harper related that the coating crews at pre-jeeping would be changing over to two-part epoxy to avoid the problem of improper application of melt stick patch coating. He believed personnel change-over and training were a factor for melt stick
Summary:		
<p>Michels is making slow and steady progress on the job. Welding reject rates were about 2% for the 20" and about 4% for the 42 inch. Michels spread office was in the process of moving to Darien, WI on Friday and over the weekend. The office will remain in Darien for the remainder of Phase I and the start of Phase II beginning at Delevan, WI.</p> <p>The overall Phase I project is supposed to be complete in 2007 but it appears that hydro-testing will not take place until late January at the earliest.</p>		
Inspector(s): Gabriel Hodill, Roger Sneegas		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge So. Lights / So. Access		Date: 10/3/07
Location: Endeavor, WI Vesper, WI		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Nolan, Baugh	Sr. Technical Records Auditor	Enbridge
Dwayne Harper	Chief Inspector (Michels Spread)	
Rick Gulstad	Compliance Specialist	Enbridge
Felix Martinez	Welding Inspector	
Pat Burton	Asst. Chief (Welded Spread)	
Activities Observed/Performed:		Results/Comments:
Audited NDT records and recently qualified welder qualification tests. Reviewed lowering-in and coating repair procedures with chief inspector.		Safety procedures call for no more than 250 feet of unsupported pipe. Satisfactory
Observed welding and installation of Vesper station piping. Inspected mainline valves ready for installation.		NDT and coating were not yet on site. Would be approximately 30 more days before welding on the station was complete. Satisfactory
Verified welder qualifications to welding procedures. (Vesper Station)		Satisfactory
Observed tie-in at Lincoln Rd. South of Vesper, WI.		Pre heat was verified with temple sticks, At least 50% of the root-bead was complete before the line-up clamp was released. Satisfactory.
Summary:		
Inspector(s): Gabriel Hodill, Roger Sneegas		

EXIT INTERVIEW

PHMSA Construction Inspection/ Inspectors: Gabriel Hodill & Roger Sneegas
Project: Southern Access / Southern Lights
Operator: Enbridge Energy Co.
Contractor: Michels/ Chief Inspector: Dwayne Harper

Tuesday Oct, 2nd

1. Final coating repair crew was observed using patch stick repair incorrectly at MP 310. The patch stick was heated directly by the torch and melted onto the holiday without any preheating of the pipe. The laborer doing the repair was instructed several times how to the repair properly and after several attempts was doing a better job.

The Chief Inspector indicated that this was an ongoing problem and two-part epoxy repair would replace patch stick repair in the future for the initial coating inspection to reduce instances of incorrect application of the patch sticks. The Chief also indicated that one of the possible reasons for the problem was the turnover rate of personnel trained in the application of 3M patch stick repair of coating. Coating QAQC inspector Steve Burkemeier also related (on site) that there were not enough people on the project verifying coating repair quality.

PHMSA Concerns/Recommendations:

Patch stick coating repair quality has been noted as a problem on multiple PHMSA inspections of Southern Access Construction Spreads. Training and quality control for coating application needs to be improved in order to better adhere to Enbridge construction standards and product specifications. Specifically, the task of patch stick coating repair needs an improved training process or more supervision by inspection team to ensure coating quality.

Rick: What is the Enbridge guideline for training of coating repair crews? What is the status of the QAQC team assigned to coating quality?

2. 195.246 requires that pipe be installed in the ditch in a manner that minimizes stress on the pipe. 20" Lowering crews at MP 310 did not appear to follow any guidelines to ensure this. While there is a safety guideline Enbridge has adopted, and a maximum deflection allowed for pipe while lowering, it was not clear if the crew had any knowledge of it. They did not believe the pipe could be damaged unless it buckled.

PHMSA Concerns/Recommendations:

Lowering crews need to be aware of the maximum safe unsupported span distance and should be looking to prevent excess sag or other strain on the pipeline while lowering.

Wednesday, Oct 3rd

PHMSA audited the NDT records and new welder qualification records at Michels Spread office. PHMSA also inspected the welding crew and qualification records at the Vesper Pump Station construction site. PHMSA observed the Welded Spread tie-in crew north of Lincoln Rd. near Wisconsin Rapids, WI.

No issues identified.

Thursday, Oct 4th

On Thursday, Oct 4th, PHMSA observed welding crew south of HWY 12 near MP 307 west of Atkinson, WI. The pipe gang was getting started back up on the 42" line after a delay through the morning. At the request of PHMSA, the welding inspector verified that welding was performed within specified voltage and amperage for the procedure; proper pre-heat was verified with Tempilstik. Root bead welder travel speed was approximately 17"/min (max = 18"/min).

PHMSA Concerns/Recommendations:

The pipe gang welding inspector informed PHMSA that welders were checked to the procedure about once per day. However the Chief Inspector believed that they should be checked several times per day. Given that the pipe gang crew had not welded on 42" for several months, it seemed appropriate to check each of the welders more than once in a day's work.

ENBRIDGE ENERGY COMPANY, INC

Southern Access / Southern Lights Construction

PHMSA / OPS Central Region Construction Audit Meeting

February 13, 2006

AGENDA ITEMS

- **Safety & Environmental Training**

- **Construction Work Plan (Pipeline, HDD's, Valve Settings, Pump Stations)**

- **Operator Qualification Requirements**

- **QA / QC Plan and Organization, Org. Chart, etc.**

- **Construction Specifications / Specific Conditions: i) Pipe damage limits, ii) Bending, iii) Coating & coating repair, iv) Blasting, v) Backfill (rock size & padding), vi) Cover, vii) Valves, viii) Hydrostatic testing, ix) Deformation tool run**

- **Materials (Pipe, Valves, Fittings)**

- **Welding: i) Pipeline WPS's & Fab Shop WPS's, ii) Welder qualification tests, iii) Welder roster, iv) Welding parameter documentation, v) Daily welding reports**

- **NDT: i) Acceptance criteria, ii) Specifications (RT, PT & MT), iii) Test procedures, iv) Daily NDT reports, v) Mill jointer NDT**

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")	Date: 2/14/07	
Location: Superior Welded spread office Hayward USPL and Precision spread offices Other locations along ROW	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Rick Gulstad	Senior Compliance Coordinator	Enbridge
Art Grell	Project Manager	Enbridge
Steve Thibodeux	Project Manager	Enbridge
Bryan Harper	Assistant Construction Manager	Enbridge Const'n. Inspection Contractor
Bob Johnson	Chief Inspector, Welded Spread	Enbridge Const'n. Inspection Contractor
Pat Burton	Assistant Chief, Welded Spread	Enbridge Const'n. Inspection Contractor
Lloyd Beasley	Chief Inspector, Precision Spread	Enbridge Const'n. Inspection Contractor
Larry Lake	NDE Inspector, Precision Spread	Enbridge Const'n. Inspection Contractor
Wayne Tompkins	Chief Inspector, USPL Spread	Enbridge Const'n. Inspection Contractor
Activities Observed/Performed:	Results/Comments:	
<ol style="list-style-type: none"> 1. Visited Welded spread office in Superior, WI and reviewed welding procedures, individual welder qualification records for mainline welding procedures (tested on 42" x 0.422" w.t. X-70 pipe), qualified welder roster, and daily welder inspection check sheets. Reviewed NDE procedure qualification documentation, NDE technician qualification, NDE reader sheets and project weld logs. 2. Reviewed OQ qualification documentation. 3. Observed welding of pipe joints at MP 1.8 and 7.5 and a 42" cut for tie-in @ MP 25.7. 4. Visited pipe yard at Solon Springs Municipal Airport. 5. Visited D/S valve site at Nemadji River, MP 1.8 (U/S valve is in Enbridge Superior Pump Sta.), U/S and D/S valve sites at St Croix River, MP 32.9 and 34.5 and U/S valve site, Namekagon River, MP 53.2. 6. Visited Precision Pipeline and USPL spread offices at Hayward, WI and reviewed same records as #1, above. 	<ol style="list-style-type: none"> 1. Noted that for weld procedure WP-12, a 5/32" rod is specified for the root bead and hot pass, whereas all welders were qualified with a 5/32" root bead and 3/16" rod for hot pass and other passes – Enbridge agreed to revise WP-12 to allow rods one size either smaller or larger on any pass than specified. 2. Satisfactory. 3. Crew @ MP 1.8 (by south Nemadji River valve) observed to release the lineup clamp early, did not take much care to prevent coating damage by lineup clamp. Small cuts in coating were seen. Have not yet observed coating repair process. Crew @ MP 7.5 covering welds with blankets to prevent cracking due to cold weather. NDT after 3hr delay. Only one crack found. Crew @ MP 25.7 had sandbags in ditch to set pipe on. 4. Pipe had material ID markings per API 5L. Pipe marked for different WT's. Pipe in stockpile separated by ropes. 5. New valve sites are at existing valve sites for existing Line 6A and Line 14 and appear to be satisfactorily sited. 6. Two welders qualification records showed out-of-range test parameters (low amps on RB and high travel speed on cap). Daily welder inspection sheets were reviewed and documentation on those 2 welders showed acceptable parameters. Enbridge inspection staff was informed to call these incidents to the attention of the welding inspectors and welders. 	
Summary:		
Enbridge agreed to revise WP-12 to reflect the option of using rods one size smaller or larger than specified for any pass. At several spreads noted that some NDE technicians were due for eye exams in the next few months. Enbridge will be providing OQ documentation in a consistent format in the future from all the spreads.		
Inspector(s): Carl Griffis, Gabe Hodill, Tom McMaster		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")	Date: 2/13/07	
Location: Superior, WI construction office	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Rick Gulstad	Senior Compliance Coordinator	Enbridge
Mark Willoughby	Manager, Compliance	Enbridge
Art Grell	Project Manager – Mainline	Enbridge
David Stafford	Project Manager	Enbridge
Scott Mershon	Project Manager – Pump Stations	Enbridge
Dave Hoffman	Sr. Environmental Analyst	Enbridge
Steve Thibodeaux	Field Compliance Auditor	Enbridge
Shaun Kavajecz	Supervisor, Environment	Enbridge
Phil Powers	Project Manager	Enbridge
Cameron Klein	Field Safety Coordinator	Enbridge
Bill Johnsen	Environment	Enbridge
Activities Observed/Performed:	Results/Comments:	
<p>This orientation meeting was held to provide OPS inspectors with the status of Enbridge construction and to review what inspection activities OPS would perform this year. The following items were covered:</p> <ul style="list-style-type: none"> Construction progress, timelines of mainline Environmental issues Safety orientation Construction progress of pump stations and timeline QA/QC procedures, welding procedures, location of records in the field Vector Compressor station construction progress Spread locations, contractors, chief inspectors, inspector organization chart Safety Improvement Plan reflecting more stringent pipeline location requirements following the 2/02/07 incident 		
Summary:		
<p>Enbridge will provide OPS with the criterion for assessing damaged pipe in the field. The current specifications do not cover damaged pipe criteria. OPS will coordinate with Rick Gulstad and the local construction managers concerning OPS field audits</p>		
Inspector(s): Carl Griffis, Gabe Hodill, Tom McMaster		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 2/15/07
Location: Ladysmith and Wisconsin Rapids spread offices Other locations along the ROW		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Rick Gulstad	Senior Compliance Coordinator	Enbridge
Bryan Harper	Assistant Construction Manager	Contractor??
Marvin (Jr.) Mautino	Chief Inspector, Michels Spread	Contractor??
Mitch Pendergraft	Sr. Welding Inspector, Michels Spread	Contractor??
Dan Peterson	Operations Representative	Enbridge
Jerry Voight	Assistant Chief Inspector, Michels Spread (Wisconsin Rapids)	Contractor??
Jon Connaway	Assistant Construction Manager (Wisconsin Rapids)	Contractor??
Activities Observed/Performed:		Results/Comments:
<p>Michels spread office – Ladysmith Reviewed welding procedures, welding qualifications, NDE reader sheets, weld logs, OQ qualifications</p> <p>Other locations along ROW??</p> <p>Michels spread office – Wisconsin Rapids Reviewed same records as above</p>		<p>Noted several individuals need OQ certification documents: Andy Lehtener – LW Survey, Nick Doorman SKW Survey, the following Michels employees did not have OQ documents for the noted tasks – Tyler Hoie 17.2, 17.3; Matt Sandlund 17.3; Jared Solie 17.2, 17.2, 17.3; Brent Sherburne – don't know what covered task he performed; Jason Edney 17.2; Curt Emblom 17.2, 17.3, 32.0; Taylor Steiner 17.2; Robert Kimberly 17.2, 32.0</p>
Summary:		
Enbridge will follow-up on the OQ documentation issues at Ladysmith Michels spread office		
Inspector(s): Carl Griffis, Gabe Hodill, Tom McMaster		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 2/13/07
Location: Superior, WI construction office	Station/Survey or Pipeline Marker:	
Personnel Contacted:	Title/Position:	Company/Affiliation:
Rick Gulstad	Senior Compliance Coordinator	Enbridge
Mark Willoughby	Manager, Compliance	Enbridge
Art Grell	Project Manager – Mainline	Enbridge
David Stafford	Project Manager	Enbridge
Scott Mershon	Project Manager – Pump Stations	Enbridge
Dave Hoffman	Sr. Environmental Analyst	Enbridge
Steve Thibodeaux	Field Compliance Auditor	Enbridge
Shaun Kavajecz	Supervisor, Environment	Enbridge
Phil Powers	Project Manager	Enbridge
Cameron Klein	Field Safety Coordinator	Enbridge
Bill Johnsen	Environment	Enbridge
Keith Learmonth	Project Construction Manager	Enbridge
Activities Observed/Performed:	Results/Comments:	
<p>This orientation meeting was held to provide OPS inspectors with the status of Enbridge construction and to review what inspection activities OPS would perform this year. The following items were covered:</p> <ul style="list-style-type: none"> Construction progress, timelines of mainline Environmental issues Safety orientation Construction progress of pump stations and timeline QA/QC procedures, welding and NDT procedures, location of records in the field Vector Compressor station construction progress Spread locations, contractors, chief inspectors, inspector organization chart Safety Improvement Plan reflecting more stringent pipeline location requirements following the 2/02/07 incident Materials (Pipe, valves and fittings) 		
Summary:		
<p>Enbridge will provide OPS with the criterion for assessing damaged pipe in the field. The current specifications do not cover damaged pipe criteria. OPS will coordinate with Rick Gulstad and the local construction managers concerning OPS field audits</p>		
Inspector(s): Carl Griffis, Gabe Hodill, Tom McMaster		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 2/15/07
Location: Ladysmith and Wisconsin Rapids spread offices Other locations along the ROW		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Rick Gulstad	Senior Compliance Coordinator	Enbridge
Bryan Harper	Assistant Construction Manager	Enbridge Const'n. Inspection Contractor
Marvin (Jr.) Mautino	Chief Inspector, Michels Spread	Enbridge Const'n. Inspection Contractor
Mitch Pendergraft	Sr. Welding Inspector, Michels Spread	Enbridge Const'n. Inspection Contractor
Dan Peterson	Operations Representative	Enbridge
Jerry Voight	Assistant Chief Inspector, Michels Spread (Wisconsin Rapids)	Enbridge Const'n. Inspection Contractor
James Taylor	Welding Inspector	Enbridge Const'n. Inspection Contractor
Jon Connaway	Assistant Construction Manager (Wisconsin Rapids)	Enbridge Const'n. Inspection Contractor
Activities Observed/Performed:		Results/Comments:
<ol style="list-style-type: none"> 1. Visited Michels spread office in Ladysmith, WI and reviewed welding procedures, individual welder qualification records for mainline welding procedures (tested on 42" x 0.422" w.t. X-70 pipe), qualified welder roster, and daily welder inspection check sheets. Reviewed NDE procedure qualification documentation, NDE technician qualification, NDE reader sheets and project weld logs. 2. Reviewed OQ qualification documentation. 3. Visited U/S and D/S valve sites at Chippewa River, MP 85.0 and MP 87.0. 4. Visited 2/2/07 accident site near Exeland at MP 84.9 and observed Enbridge operations personnel cleaning crude spill. 5. Observed 20" road crossing pipe being installed under Burkepile Road with pneumatic ram equipment. 6. Visited 20" pipe gang and firing line laying pipe at MP 92.5. 7. Visited Michels spread office at Wisconsin Rapids, WI and Reviewed same records as in #1, above. Current Michels welders were qualified at Ladysmith and split between the Ladysmith and Wisconsin Rapids field offices. 		<ol style="list-style-type: none"> 1. Again it was noted that for weld procedure WP-12, a 5/32" rod is specified for the root bead and hot pass, whereas all welders were qualified with a 5/32" root bead and 3/16" rod for hot pass and other passes. Also, an instance of low current was observed on welding parameters recorded on the daily welder inspection check sheet. The current was at the lower limit of the rod specifications but well below the approved Enbridge welding procedure limits. A copy was made by Rick Gulstad in order to bring up the overall issue of not following procedures with Steve Thibodeaux, and the project management team. Enbridge inspection staff was also informed to call these incidents to the attention of the welding inspectors and welders. NDT was being performed on a 24hr delay to ensure no cracks were missed. 2. Noted several individuals need OQ certification documents: Andy Lehtener – LW Survey, Nick Doorman SKW Survey and the following Michels employees did not have OQ documents for the noted tasks – Tyler Hoie 17.2, 17.3; Matt Sandlund 17.3; Jared Solie 17.2, 17.2, 17.3; Brent Sherburne – don't know what covered task he performed; Jason Edney 17.2; Curt Emblom 17.2, 17.3, 32.0; Taylor Steiner 17.2; Robert Kimberly 17.2, 32.0. 3. New valve sites are at existing valve sites for existing Line 6A and Line 14 and appear to be satisfactorily sited. 4. Satisfactory. 5. Satisfactory. 6. Satisfactory. 7. Satisfactory.
Summary:		
Enbridge agreed to follow-up on the OQ documentation issues at Ladysmith Michels spread office.		
Inspector(s): Carl Griffis, Gabe Hodill, Tom McMaster		

**CENTRAL REGION OFFICE
Daily Inspection Report**

Project: Enbridge Southern Access (42") and Southern Lights (20")		Date: 2/14/07
Location: Superior Welded spread office Hayward USPL and Precision spread offices Other locations along ROW		Station/Survey or Pipeline Marker:
Personnel Contacted:	Title/Position:	Company/Affiliation:
Rick Gulstad	Senior Compliance Coordinator	Enbridge
Art Grell	Project Manager	Enbridge
Steve Thibodeux	Project Manager	Enbridge
Bryan Harper	Assistant Construction Manager	Contractor??
Bob Johnson	Chief Inspector, Welded Spread	Contractor??
Pat Burton	Assistant Chief, Welded Spread	Contractor??
Lloyd Beasley	Chief Inspector, Precision Spread	Contractor??
Larry Lake	NDE Inspector, Precision Spread	Contractor??
Wayne Tompkins	Chief Inspector, USPL Spread	Contractor??
Activities Observed/Performed:	Results/Comments:	
Welded spread office – Superior Reviewed welding procedures, welding qualifications, NDE reader sheets, weld logs, OQ qualifications	Noted that for weld procedure WP-12, a 5/32" rod is required for the hot pass, whereas all welders were qualified with a 3/16" rod	
Stops along the way??		
Precision spread office – Hayward Reviewed same records as above		
USPL spread office – Hayward Reviewed same records as above	Noted that it was difficult to tell who was actually doing covered tasks.	
Summary:		
Enbridge will be revising WP-12 to reflect the option of using a 3/16" rod for hot pass. At several spreads noted that some NDE technicians were due for eye exams in the next few months. Enbridge will be providing OQ documentation in a consistent format in the future from all the spreads.		
Inspector(s): Carl Griffis, Gabe Hodill, Tom McMaster		