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ENBRIDGE™

October 31, 2007

Rodrick M Seley
Director, Southwest Region
Pipeline and Hazardous Materials
Safety Administration
8701 South Gessner, Suite 1110
Houston TX 77074

RE: CPF 4-2007-5006M

Dear Mr Seeley:

In response to the Notice of Amendment dated March 1, 2007, we offer the following comments:

Item A
Enbridge Energy procedures did not contain a formal procedure to periodically review the work of personnel to determine the effectiveness of the O&M procedures relating to the pipeline safety regulations. Enbridge needs to amend their procedures to include reviewing the work of personnel to determine the effectiveness of the O&M procedures relating to the pipeline safety regulations.
Response: See Attachment "Item A"

Item B
Enbridge Energy procedures did not clearly state that employees are trained on an ongoing basis to recognize safety related conditions. Enbridge needs to amend their procedures to state that employees are trained on an ongoing basis to recognize safety related conditions.
Response: See Attachment "Item B"

Item C
Enbridge Energy procedures did not clearly state that supervisors are included in the annual training. Enbridge needs to amend their procedures to state that supervisors are included in annual training.
Response: See Attachment "Item C"

Item D
Enbridge Energy procedures did not fully describe the actual description of two-way communication methods and procedures (e.g. cell phones, landline to radio towers, etc) between the Edmonton Control Center and the scene of abnormal operations or emergencies. Enbridge needs to amend their procedures to describe the actual description of two-way communication methods between the Edmonton Control Center and the scene of abnormal operations or emergencies.
Response:
See Attachment "Item D" Part 1 and Part 2 (Book 1, Forward, page 2 and 3 of 4 which existed but we were unable to demonstrate during the audit).

Item E
Enbridge Energy procedures did not fully describe the practice of placing a sufficient number of line markers along the right-of-way. Enbridge needs to amend their procedures to describe the practice of placing a sufficient number of line markers along the right-of-way.
Response: See Attachment "Item E"

Item F
Enbridge Energy procedures did not address how the capacity of the relief valve is determined to be adequate. Flow capacity needs to be verified in light of changing operational parameters since the relief valves were originally installed. Enbridge needs to amend their procedures to describe how the capacity of the relief valve is determined to be adequate. Enbridge procedures need to take into account changing operational parameters for relief valves since they were originally installed.
Response: See Attachment "Item F" Part 1 and 2

Item G
Enbridge Energy procedures did not fully describe the installation of overfill protection per API RP 2350 on breakout tanks that are significantly altered. Enbridge needs to amend their procedures to describe the installation of overfill protection per API RP 2350 on breakout tanks that are significantly altered.
Response: See Attachment "Item G"

Item H
Enbridge Energy procedures did not describe how the list of excavators is kept current.
Response: See Attachment "Item H"

Item I
Enbridge Energy procedures do not describe how one-call notifications are handled once notifications are received. Enbridge needs to amend their procedures to describe how one-call notifications are handled once notifications are received.
Response: See Attachment "Item I"

Item J
Enbridge Energy procedures were not clear on the requirement for supervisors to maintain a thorough knowledge of corrosion control procedures, nor did the procedures state how supervisor knowledge of corrosion control was to be verified. Enbridge needs to amend their procedures need to be clearly state the requirement for supervisors to maintain a thorough knowledge of corrosion control procedures and these procedures need to state how supervisor knowledge of corrosion control is verified.
Response: See Attachment "Item J"

Item K
Enbridge Energy procedures were not clear on how test leads are maintained. Enbridge needs to amend their procedures to state how test leads are maintained.
Response: See Attachment "Item K"

Item L
Enbridge procedures did not address IR drop considerations for the (-850 mV) on-criteria. Enbridge needs to amend their procedures to address IR drop considerations.
Response: See Attachment "Item L"

Item M
Enbridge Energy procedures did not describe in what circumstances close interval surveys are completed. Enbridge needs to amend their procedures to describe in what circumstances close interval surveys are completed.
Response: See Attachment "Item M"

Item N
Enbridge Energy procedures need to ensure hat cathodic protection system maintenance and testing of breakout tanks is in conformance with API 651. Enbridge needs to amend their procedures to ensure that cathodic protection system maintenance and testing of breakout tanks is in conformance with API 651.
Response: See Attachment "Item N"

Item O
Enbridge Energy procedures did not describe the timing for correction of deficiencies found. Enbridge needs to amend their procedures to describe the timing for corrections f deficiencies found.
Response: See Attachment "Item O"

Item P
Enbridge Energy procedures need detailed descriptions of electrical isolation installations, inspections, tests, safeguards and when they are required. Enbridge needs to amend their procedures to provide detailed descriptions of electrical isolation installations, inspections, test, safe guards and when they are required.
Response: See Attachment "Item P"

Item Q
Enbridge Energy procedures do not specify the retention time for atmospheric corrosion inspections. Enbridge needs to amend their procedures need to specify the retention time for atmospheric corrosion inspections.
Response: See Attachment "Item Q"

I trust these explanations have addressed all concerns expressed during the audit. Should you have any further questions, please feel free to contact me.

Sincerely,

Jay Johnson

Enclosure

cc: Steve Irving
Mark Willoughby

ITEM A

O&MP Quality Management System (QMS)	ENBRIDGE
Revision Request	Effective Date: August 01, 2006

Revision Request Form

Submitter: Jay A Johnson		Date: 10/30/07
Select Book:	☒ Book 1: General Reference ☐ Book 2: Safety ☐ Book 3: Pipeline Facilities	☐ Book 4: Welding ☐ Book 5: Petroleum Quality & Measurement ☐ Book 7: Emergency Response
Subject Number: Book 1, Tab 5	Subject Title: Reviewing the Effectiveness of Operational Procedures	
Subject Revision Date (printed on bottom of page): Whenever the revision pack goes out.		

Existing Wording:

There is no existing wording in the Main Line O & MP Series. The procedure below comes from the Enbridge Gathering Systems O & MP Manual and has been approved by Region Management.

Proposed Wording:

Reviewing the Effectiveness of Operational Procedures
During the course of the year Enbridge completes various measures to ensure the work done by operating personnel is effective utilizing the procedures found in this manual, in Maximo and in the Operators Qualification (OQ) program.

They may include:

- Annual manual review with select operating personnel
- Manual revision process and Revision Request form
- Incentive based safety program which promotes procedure revisions
- All manual revisions are reviewed at local safety meetings to communicate changes and solicit additional comments and/or changes.
- Pipe Line Maintenance Technical committee meets quarterly to review and address on-going procedural problems.
- Maintain Pipeline Facilities team is available for addressing procedural issues.
- Quarterly Operations meetings/Annual Gathering Systems meetings
- Annual ride-a-longs with personnel to discuss issues/concerns regarding job tasks
- Monthly safety meetings at local offices include operations discussions
- In addition to the tri-annual required review of OQ tasks, new employees are operator qualified in "off-cycle" years, thus nearly annual review of OQ procedures.
- Table top exercises

Documentation of the above mentioned will be maintained by the Departments and/or on the appropriate databases.

O&MP Quality Management System (QMS)	ENBRIDGE
Revision Request	**Effective Date: August 01, 2006**

Reason for Change:

Compliance requirement;

195.402 (C) (13). Periodically reviewing the work done by operator to determine the effectiveness of the procedures used in normal operations and maintenance and taking corrective action where deficiencies are found.

Please submit this form to Canadian Compliance by:
Mail/Interoffice: 10201 Jasper Avenue, Edmonton AB T5J 3N7
Fax: (780) 420-8801
Email: janet.huggett@enbridge.com or tamara.leshchyshyn@enbridge.com

ITEM B

O&MP Quality Management System (QMS)	ENBRIDGE
Revision Request	Effective Date: August 01, 2006

Revision Request Form

Submitter: Jay A Johnson		Date: 10/30/07
Select Book:	☒ Book 1: General Reference ☐ Book 2: Safety ☐ Book 3: Pipeline Facilities	☐ Book 4: Welding ☐ Book 5: Petroleum Quality & Measurement ☐ Book 7: Emergency Response
Subject Number: Book 1, Tab 5	Subject Title: Recognizing Safety Related Condition	
Subject Revision Date (printed on bottom of page): Whenever the revision package goes out.		

Existing Wording:

There is no existing wording to describe the process that the Compliance Department is completing on an annual basis.

Proposed Wording:

Recognizing Safety Related Conditions

During the annual Hazwoper/emergency response training sessions, Compliance will instruct Operations personnel, local and regional management and control center personnel in how to recognize what constitutes a safety related condition per 3.1.5; Reporting Criteria, page 35. In addition, Compliance will outline who personnel need to contact for any interpretations. Compliance will take the lead in completing the required paperwork per the Compliance Manual. To verify personnel have a thorough knowledge of safety related conditions or where to find the information, questions will be included on the Hazwoper/emergency response exam which requires a passing grade of 70%. The same rules apply where they will be required to repeat the group training or online course.

Reason for Change: Compliance requirement

195.402 (f) Safety-Related condition reports. The Manual required by paragraph (a) of this section must include instructions enabling personnel who perform operation and maintenance activities to recognize conditions that potentially may be safety-related conditions that are subject to the reporting requirements of 195.55.

Please submit this form to Canadian Compliance by:
Mail/Interoffice: 10201 Jasper Avenue, Edmonton AB T5J 3N7
Fax: (780) 420-8801
Email: janet.huggett@enbridge.com or tamara.leshchyshyn@enbridge.com

ITEM C

O&MP Quality Management System (QMS)	ENBRIDGE
Revision Request	**Effective Date: January 26, 2006**

O&MP Revision Request Form

Submitter: Terri Picton		**Date:** October 15, 2007
Select Book:	☒ **Book 1: General Reference** ☐ **Book 2: Safety** ☐ **Book 3: Pipeline Facilities**	☐ **Book 4: Welding** ☐ **Book 5: Petroleum Quality & Measurement** ☐ **Book 7: Emergency Response**
Subject Number: Book 1, Tab 5	**Subject Title:** Supervisor Knowledge of Emergency Response Procedures	
Subject Revision Date (printed on bottom of page): Whenever the revision pack goes out		

Existing Wording:

There is no existing wording that states that Supervisors are required to complete the training.

Proposed Wording:

To verify and ensure that personnel and supervisors learn and maintain a thorough knowledge of Hazwoper and emergency response procedures, an annual exam will be given to which employees must attain a score of 70% or greater to pass. Employees who do not receive a passing grade will be required to repeat the training or complete an online version until they are successful. Any employee who has not received a passing grade is limited to work activities where this training is not required. Copies of the exam and scores are available from the Safety Department.

Reason for Change:
Compliance Requirement;
§195.403(c). Each operator shall require and verify that its supervisors maintain a thorough knowledge of that portion of the emergency response procedures established under 195.402 for which they are responsible to ensure compliance.

Please submit this form to Canadian Compliance by:
Mail/Interoffice: 10201 Jasper Avenue, Edmonton AB T5J 3N7
Fax: (780) 420-8801
Email: janet.huggett@enbridge.com or tamara.leshchyshyn@enbridge.com

ITEM D PART 1

Jim D Stephenson/CNPL/Enbridge @IPL
05/31/2006 08:23 AM

To Mike D Goman/LPL@LPL
cc
bcc
Subject Fw: Revised Verbal Communication Procedure

----- Forwarded by Jim D Stephenson/CNPL/Enbridge on 05/31/2006 07:22 AM -----

ENBRIDGE

Next >> Prev << Tof C Backtrack Quit

a) Call Out / Verbal Communications - Equipment Problems/AOC's

In the event of equipment problems or Abnormal Operating Conditions after hours, contact:

- residence
- pager
- cellular
- 24-hour manned location (in the specific area)
- regional/district management

In the event of equipment problems or Abnormal Operating Conditions during normal working hours, contact:

- station or location (with man on-site)
- radio/call unit in truck
- pager
- cellular
- other maintenance personnel in the area (to attempt to make contact)
- 24-hour manned location (in the specific area)
- regional/district management

Note: If the equipment problem or Abnormal Operating Condition is of a nature that will require ongoing non-routine communications between the field and the control centre (e.g. mainline leak), develop a site specific communications plan with on-call or emergency response personnel to ensure that two-way voice communications are available, as required, between the control centre and the location(s) of the AOC. These communication methods could include cellular phones, pagers, company radio towers, satellite telephones, or other technology. This communication plan should be maintained for the duration of the AOC and changed when site conditions change (e.g. command post established, shift change, etc.).

Pipeline Control System

Operators rely on a computer-based pipeline control system (PCS) for safe and efficient control of flow and pressure. This supervisory control and data acquisition (SCADA) system includes subsystems to ensure pipelines do not exceed the maximum operating pressure (MOP) limits required by Code of Federal Regulations (CFR) Title 49, Part 195.406 Maximum Operating Pressure (USA) and the National Energy Board – Onshore Pipeline Regulations (CAN).

NOTE: Design and pressure testing records that justify MOP are permanently maintained as identified in Tab 04, Recordkeeping.

The line pressure monitor, a main subsystem, protects the pipeline from overpressure in the event of a communications failure. The line pressure monitor uses pressure limits calculated by the operating pressure limits program. This program calculates the allowable pressure limits for individual segments of each pipeline using MOP data and taking into account operational factors such as liquid density and viscosity. As well, each pump station on the pipeline is equipped with double-redundant high-pressure shutdown devices that ensure pressure does not exceed MOP limits.

The PCS continually archives operating data, messages, and alarms, which can be also exported to an external database called the pipeline information (PI) system. The PI system assists technical and operations employees in identifying and analyzing abnormal or unusual operating conditions.

Operators use the PCS and SCADA systems to operate the mainline pump units, station control valves, and sectionalizing valves on the mainline. Operators regulate pressure and flow rate in the pipeline, while tank farm operators handle injections and breakout volumes at field locations where receipts come in from the shippers. Deliveries are also handled locally by employees from a variety of job classifications.

Like the pipeline operators, field workers also rely on computer-based systems to complete tank swings, start and stop deliveries and/or injections, prove meters, and generate tickets. Area Operations staff are responsible for these tasks and other related tasks. Pipeline Maintenance (PLM) crews are responsible for tasks related to pipe modifications or repair and right-of-way maintenance. Area Operations groups and PLM crews are based at strategic locations in each region.

Communications

Operating the equipment and coordinating the efforts of employees dispersed over hundreds of miles requires sophisticated and reliable communications facilities to ensure safe, efficient, system operation.

The PCS depends on telecommunications technology to link control center computers to remote terminal units (RTUs) located at pump stations. The data circuits are primarily leased telephone lines, which are a combination of copper wire, fiber optic cable, and microwave systems.

The leased lines are asynchronous, full-duplex dedicated lines. This means that any number of data characters can be transmitted simultaneously in both directions, over lines reserved for data transmission (i.e., no voice communications).

Voice communication in each region relies on a general mobile radio system, consisting of mobile radio/telephone units, hand-held units, base stations, and repeater towers. Each vehicle is equipped with a mobile radio/telephone. Key personnel are assigned a cellular telephone or a pager.

Voice communication between the control center and tank farm operators relies on the traditional long distance telephone system. To provide a record and to prevent misunderstandings, electronic mail and fax machines supply printed operating instructions and confirmation of actions taken.

Each mode of communication has a backup system. For the PCS data circuits, this is the standard dial-in telephone voice line. Since the PCS relies on these circuits to protect the pipeline from high pressure, the system includes a provision for communications failure called COMM-OUT discharge protection. This software program automatically applies a set point that prevents discharge pressure from exceeding static maximum pressure values, and activates an appropriately calibrated pressure switch. Like other discharge pressure safeguards, this includes separate redundant hardware.

ITEM E

O&MP Quality Management System (QMS)	ENBRIDGE
Revision Request	**Effective Date: January 26, 2006**

O&MP Revision Request Form

Submitter: Terri Picton		**Date:** October 15, 2007
Select Book:	☐ **Book 1: General Reference** ☐ **Book 2: Safety** ☒ **Book 3: Pipeline Facilities**	☐ **Book 4: Welding** ☐ **Book 5: Petroleum Quality & Measurement** ☐ **Book 7: Emergency Response**
Subject Number: 03-02-02	**Subject Title:** Right-of-Way Signs and Markers	
Subject Revision Date (printed on bottom of page): Whenever the revision pack goes out		

Existing Wording:
There is no existing wording in the Main Line O&MP Series that describes the procedures of placing sufficient number of line markers along the right of way. The procedure below comes from the Enbridge Gathering Systems O&MP Manual and has been approved by Region Management.

Proposed Wording:
Add the following as a bullet point to the Requirements for Warning Signs.

In general, pipeline markers should be visible at any point you are standing.

Reason for Change:
Compliance Requirement
§195.410. Line Markers. (a) (1) Except as provided in paragraph (b) of this section, each operator shall place and maintain line markers over each buried pipeline in accordance with the following:
(1) Markers must be located at each public road crossing, at each railroad crossing, and in sufficient number along the remainder of each buried line so that its location is accurately know.

Please submit this form to Canadian Compliance by:
Mail/Interoffice: 10201 Jasper Avenue, Edmonton AB T5J 3N7
Fax: (780) 420-8801
Email: janet.huggett@enbridge.com or tamara.leshchyshyn@enbridge.com

REPORT: JPPRINT

Job Plan Report

Job Plan: MP2022R

Description: Relief Valves, Full Flow - PMREG

MP2022R replaces:

MP00001746

as of AUG/17/2006

Lead Craft:

WO Priority: 1

Downtime: N

Interruptible: N

Duration: 1.5

OP	Description	Hours
5	Prior to Inspection Contact Region Engineering to Ensure Pressure Relief Valve is Properly Sized This will be based on Potential Changing Operation Parameters, it is required to contact regional engineering to ensure that it is adequate from the stand point of capacity and reliability of operation for the service in which it is employed.	0
10	Inspect and test as per CSA Z662 - to ensure it is in good operating condition.	0
20	Check that PSV is adequate from the standpoint of capacity and reliability for its service.	0
30	Set to function at the correct pressure.	0
40	Check that PSV is properly installed and protected from dirt and other conditions that might prevent its operation.	0
50	Test via the in-place pop test or remove and have bench tested.	0
60	Time to complete Job Plan: 1.5 hours	1.5

ITEM F PART 2

Job Plan Report

Job Plan: MP2003QR

Description: Pressure Relief Valve - DOT

MP2003QR replaces:

MP255

as of AUG/17/2006

Lead Craft:

WO Priority: 1

Downtime: N

Interruptible: N

Duration: 1

OP	Description	Hours
5	Prior to Inspection Contact Region Engineering to Ensure Pressure Relief Valve is Properly Sized This will be based on Potential Changing Operation Parameters, it is required to contact regional engineering to ensure that it is adequate from the stand point of capacity and reliability of operation for the service in which it is employed.	0
10	Isolate thermal relief valve by closing inlet valve	0
20	Connect testing pump or supply bottle and check relief valve set point.	0
30	Adjust if valve relieves out of tolerance. See long description for tolerance standards. The pop pressure from the set pressure should not exceed + 0/- 2 psi. for pressure settings less than or equal to 70 psi, or + 0/- 3 percent for set pressures greater than 70 psi. In other words, relief valves with a specified setting of 70 psi or less are within tolerance and do not have to be adjusted (leave as found) if they relief under a test pressure of plus 0 psi or minus 2 psi of the specified setting. Example - a relief valve with a 60 psi specified setting is within tolerance if found to relief under a test pressure of 58 to 60 psi. If 62 psi is the relief pressure then re-adjustment the relief valve to relief at the specified setting of 60 psi. For relief valves with specified settings of over 70 psi, the valve is	0

ITEM G PART 1

Manual Title: Book 3. Pipeline Facilities	Operations Manual REVISION REQUEST

Name: Mike D Goman Aug 3, 2006
Subject Title: Tank Repair and Alteration
Subject No.: 09 - 03 - 07 (e.g. 02-01-03)
Subject Date: April 1, 2006 (printed at bottom of the page)

Existing wording: None

Approved wording: Overfill Protection
If an aboveground tank over 600 gallons in capacity is significantly altered, an overfill protection system must be installed in accordance with API RP 2350, Overfill Protection for Storage Tanks in Petroleum Facilities.

Subject Title: Overview of Tank Maintenance
Subject No.: 09 - 01 - 01 (e.g. 02-01-03)
Subject Date: April 1, 2006 (printed at bottom of the page)

Existing wording: None

Approved wording: Related Standards, Industry
American Petrolum Institute (API):
- Std 2510, Design and Construction of LPG Installations

Reason for Change: To ensure compliance with 49CFR 195.428(c).

Protocol Question:

.428(c)	Aboveground breakout tanks that are constructed or significantly altered according to API Standard 2510 after October 2, 2000, must have an overfill protection system installed according to section 5.1.2 of API Standard 2510. Tanks over 600 gallons (2271 liters) constructed or significantly altered after October 2, 2000, must have overfill protection according to API Recommended Practice 2350 unless operator noted in procedures manual (' 195.402) why compliance with API RP 2350 is not necessary for the safety of a particular breakout tank.			

ITEM G PART 2

Manual Title: Book 3. Pipeline Facilities	Operations Manual REVISION REQUEST

Name: Mike D Goman Aug 3, 2006
Subject Title: Tank Repair and Alteration
Subject No.: 09 - 03 - 07 (e.g. 02-01-03)
Subject Date: April 1, 2006 (printed at bottom of the page)

Existing wording: None

Proposed wording: Add Definition: Significant Alteration - An alteration to an aboveground storage tank or pressure vessel that requires subsequent hydrostatic testing of the tank to comply with regulatory requirements and/or to verify the integrity of the tank or vessel after the alteration has been made.

Add verbiage:
(US Flag) If an aboveground storage tank over 600 gallons in capacity is significantly altered, an overfill protection system must be installed (if not already installed prior to the alteration) in accordance with API RP 2350. For tanks constructed to API Standard 2510, overfill protection systems must be installed in accordance with Section 5.1.2 of API Standard 2510.

Reason for Change: This will be a Notice of Amendment (NOA) stemming from the recent Team O&MP audit by the Office of Pipeline Safety. We have been requested to add this verbiage to ensure compliance with §195.428(c).

Protocol Question:

.428(c)	Aboveground breakout tanks that are constructed or significantly altered according to API Standard 2510 after October 2, 2000, must have an overfill protection system installed according to section 5.1.2 of API Standard 2510. Tanks over 600 gallons (2271 liters) constructed or significantly altered after October 2, 2000, must have overfill protection according to API Recommended Practice 2350 unless operator noted in procedures manual (' 195.402) why compliance with API RP 2350 is not necessary for the safety of a particular breakout tank.				

From the O&MP Exit Notes:

1. 195.428(c) – There should be procedures in the O&M manual about installing overfill protection per API RP 2350 on breakout tanks (API 2510, API 650, etc) when the tanks are significantly altered.

ITEM H

O&MP Quality Management System (QMS)	ENBRIDGE
Revision Request	Effective Date: August 01, 2006

Revision Request Form

Submitter: Jay A Johnson		Date: 10/30/07
Select Book:	☒ Book 1: General Reference ☐ Book 2: Safety ☐ Book 3: Pipeline Facilities	☐ Book 4: Welding ☐ Book 5: Petroleum Quality & Measurement ☐ Book 7: Emergency Response
Subject Number: 03-02-01	Subject Title: Maintain current list of Excavators/Contractors/Farmers	
Subject Revision Date (printed on bottom of page): During next revision package		

Existing Wording:

The existing wording does not cover how we maintain a current list of excavators.

Proposed Wording:

In accordance with regulatory requirements, each region will maintain a list of persons who normally engage in excavation activities in the areas in which the pipeline is located. This list may be generated by using any of the following resources:

- information gathered from invitation lists of existing damage prevention meetings
- contractor /excavators known by company personnel to operate within their region
- lists generated by state one call / damage prevention agencies based on one call requests
- contractors identified in the field via "Documentation of ONE CALL Violations" forms

In areas where logging activities may impact our ROW or is identified as an issue, the region shall make every effort to educate the loggers of the following:

- basic pipeline safety information
- location of pipelines
- Enbridge crossing policies
- how logging equipment may pose a threat to the pipeline and the safety of the logging operation.

Records of this communication/education must be maintained in the Region Office.

O&MP Quality Management System (QMS)	ENBRIDGE
Revision Request	**Effective Date: August 01, 2006**

Reason for Change:

Compliance requirement;

195.442 Damage Prevention Program. (C) The damage prevention program required by paragraph (a) of this section must, at a minimum: (1) Include the identity, on a current basis of persons who normally engage in excavation activities in the area in which the pipeline is located.

Please submit this form to Canadian Compliance by:
Mail/Interoffice: 10201 Jasper Avenue, Edmonton AB T5J 3N7
Fax: (780) 420-8801
Email: janet.huggett@enbridge.com or tamara.leshchyshyn@enbridge.com

ITEM I

ENBRIDGE

Manual Title: Book 3. Pipeline Facilities	Operations Manual
	Revision Request

Name: US Compliance

Date: 06/02/2006
Subject Title: Damage Prevention
Subject No.: 04 - 02 - 02
Subject Date: 04/01/2006

Existing wording: none

Proposed wording: One-Call System
Notify the One-Call Center at least 2 to 3 working days before beginning any below grade activity

NOTE: The One-Call Center will ~~advise~~ notify facility owners and request that all buried facilities in the area of the proposed activity are located and staked.

NOTE: In the USA, the Information Retrieval Ticket Handling (IRTH) system receives notification from the One-Call Center and assigns One-Call tickets to the appropriate service area. In the USA, for emergency work during normal working hours and as backup to the IRTH system, the One-Call Center or the region (depending on the service area) will notify the locator directly. For emergency work after hours, the Edmonton Control Center (ECC) or the region (depending on the service area) will notify the locator directly.

Reason for Change: to ensure compliance with CFR 49, 195.442 (c) (3)

ITEM J

O&MP Quality Management System (QMS)	ENBRIDGE
Revision Request	Effective Date: August 01, 2006

Revision Request Form

Submitter: Jay A. Johnosn		Date: 10/30/07
Select Book:	☐ Book 1: General Reference ☐ Book 2: Safety ☐ Book 3: Pipeline Facilities	☐ Book 4: Welding ☐ Book 5: Petroleum Quality & Measurement ☐ Book 7: Emergency Response
Subject Number: Corrosion Control Guidelines	Subject Title: Ensuring Supervisor Knowledge	
Subject Revision Date (printed on bottom of page): Whenever the next revision goes out.		

Existing Wording:

We did not have existing wording to cover this however all Enbridge Corrosion Technicians are required to get a NACE CP Level 1 certification within one year of employment or transferring to the position.

Proposed Wording:

To ensure supervisors have knowledge of what tasks their personnel complete, they are responsible to either OQ qualify or witness the cathodic protection related qualifications. In addition, the Senior Corrosion Technician will maintain a list of what CP specific tasks each non-cathodic supervisor is responsible for to maintain compliance with DOT Part 195 and the Enbridge Corrosion Control Guidelines. The Senior Corrosion Technician will review these tasks with the Area Supervisors at least once per calendar year.

Reason for Change:

Compliance Requirement;

195.555 What are the qualifications for Supervisors? You must require and verify that supervisors maintain a through knowledge of that portion of the corrosion control procedures established under 195.402 (C) (3) for which they are responsible for insuring compliance.

Please submit this form to Canadian Compliance by:
Mail/Interoffice: 10201 Jasper Avenue, Edmonton AB T5J 3N7
Fax: (780) 420-8801
Email: janet.huggett@enbridge.com or tamara.leshchyshyn@enbridge.com

(d) Breakout tanks. You must inspect each cathodic protection system used to control corrosion on the bottom of an aboveground breakout tank to ensure that operation and maintenance of the system are in accordance with API Recommended Practice 651. However, this inspection is not required if you note in the corrosion control procedures established under §195.402(c)(3) why compliance with all or certain operation and maintenance provisions of API Recommended Practice 651 is not necessary for the safety of the tank.

(e) Corrective action. You must correct any identified deficiency in corrosion control as required by §195.401(b). However, if the deficiency involves a pipeline in an integrity management program under §195.452, you must correct the deficiency as required by §195.452(h).

13.3.2 - Federal Regulations for Test Stations

§192.469 - External Corrosion Control: Test stations.

Each pipeline under cathodic protection required by this subpart must have sufficient test stations or other contact points for electrical measurement to determine the adequacy of cathodic protection.

§195.567 - Which pipelines must have test leads and what must I do to install and maintain the leads?

(a) General. Except for offshore pipelines, each buried or submerged pipeline or segment of pipeline under cathodic protection required by this subpart must have electrical test leads for external corrosion control. However, this requirement does not apply until December 27, 2004 to pipelines or pipeline segments on which test leads were not required by regulations in effect before January 28, 2002.

(b) Installation. You must install test leads as follows:

(1) Locate the leads at intervals frequent enough to obtain electrical measurements indicating the adequacy of cathodic protection.

(2) Provide enough looping or slack so backfilling will not unduly stress or break the lead and the lead will otherwise remain mechanically secure and electrically conductive.

(3) Prevent lead attachments from causing stress concentrations on pipe.

(4) For leads installed in conduits, suitably insulate the lead from the conduit.

(5) At the connection to the pipeline, coat each bared test lead wire and bared metallic area with an electrical insulating material compatible with the pipe coating and the insulation on the wire.

(c) Maintenance. You must maintain the test lead wires in a condition that enables you to obtain electrical measurements to determine whether cathodic protection complies with §195.571.

Once the equipment is verified to be in working order, the FDC operator attaches the spool of wire on the backpack. One end of the wire is attached to a pipeline test lead, and the other to the negative terminal of the FDC. The half-cell walking poles are then connected in parallel to the positive terminal. At this point, once the FDC is turned on and loaded with the proper program, the surveying begins. The pipeline is flagged, usually at 100 feet intervals, either beforehand or while the survey is occurring. The FDC operator then walks at a standard pace (typically 2-½ feet) while the FDC automatically collects data. When a flag is passed or if a portable counter is used and it hits 100 feet, the operator enters this into the FDC and the computer adds 100 feet to the survey distance. This is how distance is accounted for.

12.5.3 - Typical Crew Organization for Close-Interval Survey

A close-interval survey can be performed with three people: a lead person, an FDC operator, and a trail person.

This crew option has the lead person flagging (locating) the line immediately ahead of the FDC operator with a 100-foot long rope attached.

When the end of the rope passes the previously laid flag, another flag is placed. It is the FDC operator's responsibility to notify the lead person when another flag should be placed.

The trail person's responsibilities are to help maneuver the automobiles and pick up the wire. It is most important that all wire be picked up after the survey is complete, as it can cause problems for farmers, etc.

Another option is to flag the line ahead of time. This consumes more total personnel hours than the first option, but the footage accuracy is improved because less flagging errors will be made. This can become very important when trying to relocate indicated trouble spots.

12.5.4 - Correcting for IR Drop in Close-Interval Surveys

49 CFR Part 192, Appendix D, II states that "Voltage (IR) drops other than those across the structure-electrolyte boundary must be considered for valid interpretation of the voltage measurement..." Additional information can be found in the "A. W. Peabody Book."

The "other" IR drops mentioned above are soil and metal IR drops. Soil IR drop is caused by cathodic protection current flowing in the soil. Metal IR drop is caused by cathodic protection current flowing in the pipe.

The interpretation of the voltage measurement which requires the consideration of soil and pipe IR drops is that a correction for this voltage drop is not required at any test point and does not require any changes with the survey data, which was taken with the current applied in the system. The term "considered" as set forth in the law means that there may be instances where large amounts of currents are flowing in the soil and carrier pipe and may cause the observed reading to be higher. This IR drop is maximum at the rectifier groundbed locations and decreases with remoteness to the groundbed and perhaps decreases to zero at the midpoint between two current sources.

The interpretation of the current law is that readings for annual test point surveys are to be taken with the protective current applied and the IR drops considered, but not necessarily subtracted. It is desirable to aim for potentials near -1.0 Volt, rather than -0.850 Volt. This allows a "cushion" of 150 mV for IR drop. Other methods of consideration rely on experience and line history. If either the current to the line (I) or the soil resistivity (R) is low, the IR drop is also expected to be low. If the inspection of the lines documentation shows that corrosion is not occurring and the potentials are at least -0.850 Volts, then it can be assumed that the IR drop is not significant enough to cause a problem. The occurrence of significant corrosion, high currents, high soil resistivity, large changes in pipe depth, or other conditions may warrant the actual determination of the IR drop.

Soil IR drop should be considered at many road crossing, where the pipe may be twice as deep as the normal depth away from roads, gullies and rivers, which multiplies the IR drop proportionally to the depth of the pipe.

There are three common methods of ascertaining the amount and the effect of IR drop on pipe to soil readings, which are current interruption, location of the reference cell at the pipe/soil interface, and the remote step-wise reading with calculations. None of these three methods are perfect in predicting the amount of IR drop present, and each is described in the next three following paragraphs.

Current interruption comes closest to removing the IR drop in both the soil and pipe if done properly. This method requires all current sources to be interrupted simultaneously and synchronization of all influencing rectifiers, bonds and galvanic anodes, and must be timed to have identical "on-off" cycles for the best and most accurate results. Remotely located galvanic anodes to the testing area probably have little or no effect on this method due to the low current output, low driving voltage and distant location. This method is usually chosen when making a close-interval survey and is the best method to employ when attempting to satisfy the 100 millivolt polarization shift criterion with no current there is no "IR drop." It should be realized that in most cases it is impossible to stop all current flow and some error will always be present when using this method. Lateral or branch lines which have no current sources other than through the bond to the mainline or other lateral or branch lines probably come closest to measuring true IR drop when the current supplying bond is opened and closed with an interrupter with a very short off-cycle.

ITEM M

O&MP Quality Management System (QMS)	ENBRIDGE
Revision Request	Effective Date: August 01, 2006

Revision Request Form

Submitter: Jay A Johnson		Date: 10/30/07
Select Book:	☐ Book 1: General Reference ☐ Book 2: Safety ☐ Book 3: Pipeline Facilities	☐ Book 4: Welding ☐ Book 5: Petroleum Quality & Measurement ☐ Book 7: Emergency Response
Subject Number: Cathodic Protection Guidelines 12.5	Subject Title: Close Interval Surveys	
Subject Revision Date (printed on bottom of page): During the next revision cycle		

Existing Wording:

The existing wording describes the process to complete a Close Interval Survey but not the criteria for completing one.

Proposed Wording:

Alternative Survey Methodology
In areas where the Annual Survey identifies sub-standard potentials, a close interval survey or other survey capable of detecting specific anomalies should be considered. In USA, additional survey measures may be required to accomplish the objectives of NACE RP0169, section 10.1.1.3. Such measures may identify locations where:

- Additional protective current is required through expansion of or addition to the existing CP system,
- An unknown interference issue inhibits the performance of the existing CP system,
- Repair of coating damage may improve performance of the existing CP system, or
- Additional assessment methods should be considered.

Results of these additional measures will be analyzed and compared with the In-Line Inspection Tool Runs, by the lead Corrosion Control Coordinator, regional CP Specialist and Pipeline Integrity

Reason for Change:

Compliance Requirement;

195.573 What must I do to monitor external corrosion control? (a) Protected pipelines. You must do the following to determine whether cathodic protection required by this subpart complies with Sec. 195.571;

(2) Identify before December 29, 2003 or not more than 2 years after cathodic protection is installed, whichever comes later, the circumstances in which a close-interval survey or comparable

technology is practicable and necessary to accomplish the objectives of paragraph 10.1.1.3 of NACE standard RPO0169-96 (incorporated by reference, see Sec. 195.3).

Please submit this form to Canadian Compliance by:
Mail/Interoffice: 10201 Jasper Avenue, Edmonton AB T5J 3N7
Fax: (780) 420-8801
Email: janet.huggett@enbridge.com or tamara.leshchyshyn@enbridge.com

ITEM N

O&MP Quality Management System (QMS)	ENBRIDGE
Revision Request	Effective Date: August 01, 2006

Revision Request Form

Submitter: Jay A Johnson		Date: 10/30/07
Select Book:	☐ Book 1: General Reference ☐ Book 2: Safety ☐ Book 3: Pipeline Facilities	☐ Book 4: Welding ☐ Book 5: Petroleum Quality & Measurement ☐ Book 7: Emergency Response
Subject Number: Cathodic Protections Guidelines 11.3.2	Subject Title: CP Design for Above Ground Storage Tanks	
Subject Revision Date (printed on bottom of page): When the next revision package goes out		

Existing Wording:

The existing verbiage references NEC and NACE but not API

Proposed Wording:

All regulated buried or submerged pipeline and breakout tanks must be protected by a cathodic protection system no later than 1 year after the pipeline is constructed, relocated, replaced or otherwise changed.

The cathodic protection system shall be operated and maintained in accordance with API Recommended Practice 651 for the useful life of the breakout tank. In addition, the cathodic protection system (on the pipeline) shall be maintained for the useful life of the pipeline.

NOTE: In the USA, tanks moved or constructed on a new location after October 2, 2000 shall have a cathodic protection system installed in accordance with API Recommended Practice 651.

Reason for Change:

Compliance Requirement;

195.573 What must I do to monitor external corrosion control? (d) Breakout tanks. You must inspect each cathodic protection system used to control corrosion on the bottom of an above ground storage tank to ensure that operation and maintenance of the system are in accordance with API Recommended Practice 651. However, this inspection is not required if you note in the corrosion control procedures established under Sec. 195.402(c) (3) why compliance with all or certain operation and maintenance provisions of API recommended Practice 651 is not necessary for the safety of the tank.

O&MP Quality Management System (QMS)	ENBRIDGE
Revision Request	**Effective Date: August 01, 2006**

Please submit this form to Canadian Compliance by:
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ITEM 0

O&MP Quality Management System (QMS)	ENBRIDGE
Revision Request	**Effective Date: August 01, 2006**

Revision Request Form

Submitter: Jay A Johnson		**Date: 10/30/07**
Select Book:	☐ **Book 1: General Reference** ☐ **Book 2: Safety** ☐ **Book 3: Pipeline Facilities**	☐ **Book 4: Welding** ☐ **Book 5: Petroleum Quality & Measurement** ☐ **Book 7: Emergency Response**
Subject Number: Corrosion Control Guidelines	**Subject Title: Repair Timing**	
Subject Revision Date (printed on bottom of page): Whenever the next revision goes out		

Existing Wording:

We currently don't have wording that addresses this.

Proposed Wording:

Any corrosion or cathodic protection related deficiencies that could adversely affect the safe operation of the pipeline shall be reviewed and prioritized by the appropriate supervisor.

In general, repairs will be made as soon as practicable before the next annual survey or, if required, during the next budget cycle. However, if any deficiencies, such as but not limited to:

- critical bond connection problems,
- rectifier component failure which may pose an electrical hazard,
- broken bond cables which may result in significant interference across an isolation device,
- discovery of a new sever interference problem causing detrimental damage to EPL,
- broken DC cables which may pose a spark hazard in a hazardous area,

that present a hazard to persons or property, the repair will be made immediately or the affected part of the system shall not be operated until the deficiency has been corrected and/or temporary restrictions have been put in to place.

Reason for Change:

Compliance requirement;

195.573 What must I do to monitor external corrosion control/ (e) Corrective Action. You must correct any identified deficiency in corrosion control as required by Sec. 195.401 (b)

Please submit this form to Canadian Compliance by:
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ITEM P

O&MP Quality Management System (QMS)	ENBRIDGE
Revision Request	**Effective Date: January 26, 2006**

O&MP Revision Request Form

Submitter: Jay A Johnson		**Date:** 10//30/07
Select Book:	☐ **Book 1: General Reference** ☐ **Book 2: Safety** ☐ **Book 3: Pipeline Facilities**	☐ **Book 4: Welding** ☐ **Book 5: Petroleum Quality & Measurement** ☐ **Book 7: Emergency Response**
Subject Number: Corrosion Control Guidelines	**Subject Title:** Electrical Isolation	
Subject Revision Date (printed on bottom of page): Whenever next version is released		

Existing Wording:

No existing wording clearly covered this.

Proposed Wording:

Electrical isolation must be achieved and maintained in accordance with NACE SPO286, Electrical Isolation of Cathodically Protected Pipelines. Electrical isolation must be checked annually, not exceeding 15 months. Methods for checking may include;

- Interrupted pipe-to-soil readings measured on both sides of isolation kits.
  - A shift in the potential of a foreign facility that is greater than 10mV and due to the interruption of Company rectifiers may indicate a shorted isolation device. Further investigation of an expected short may include:
    - Checking the device with an electronic insulation checker to identify the shorted component(s), or
    - Separating the insulating device to inspect the insulating surfaces for damage and recording additional pipe-to-soil readings on both sides of the device while it is separated. No change from the previously recorded readings would indicate a stray current interference problem rather than a short and additional investigation would be required to correct the problem.

      CAUTION: Piping must be bonded while separating a pipeline to prevent unintentional static discharge.

- Where bonds are installed across Company facilities for continuity purposes, bond integrity will be confirmed by:
  - Measuring similar pipe-to-soil potentials on both sides of the bond.
  - Measuring current magnitude and direction through the bond, and
  - Observing a change in potential when the bond connection is opened.

NOTE: High resistant bonds between Company facilities shall be repaired or replaced as outlined in repair timing section

- Where resistance bonds are required between Company and foreign facilities to control stray current interference, bond integrity will be confirmed by:
    - Measuring a foreign pipe to soil potential equal to or more negative than the potential of the foreign facility with no depressing effects due to interference,

NOTE: Foreign facilities that are independently cathodically protected should be maintained at a protected level of at least negative 0.85 volts with respect to a saturated copper/copper sulfate half-cell. This minimum protection level is not required when the foreign facility is not independently cathodically protected.

    - Measuring current magnitude and direction through the bond, and
    - Observing a change in potential when the bond connection is opened.

Reason for Change:

Compliance Requirement;

195.575 Which facilities must I electrically isolate and what inspections, tests, safe guards and when they are required.

Please submit this form to Canadian Compliance by:
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13.3.3 - Federal Regulations for Corrosion Control Records

§192.491 - Corrosion control records.

(a) Each operator shall maintain records or maps to show the location of cathodically protected piping, cathodic protection facilities, galvanic anodes, and neighboring structures bonded to the cathodic protection system. Records or maps showing a stated number of anodes, installed in a stated manner or spacing, need not show specific distances to each buried anode.

(b) Each record or map required by paragraph (a) of this section must be retained for as long as the pipeline remains in service.

(c) Each operator shall maintain a record of each test, survey, or inspection required by this subpart in sufficient detail to demonstrate the adequacy of corrosion control measures or that a corrosive condition does not exist. These records must be retained for at least 5 years, except that records related to §§192.465 (a) and (e) and 192.475(b) must be retained for as long as the pipeline remains in service.

§195.589 - What corrosion control information do I have to maintain?

(a) You must maintain current records or maps to show the location of --

(1) Cathodically protected pipelines;

(2) Cathodic protection facilities, including galvanic anodes, installed after January 28, 2002; and

(3) Neighboring structures bonded to cathodic protection systems.

(b) Records or maps showing a stated number of anodes, installed in a stated manner or spacing, need not show specific distances to each buried anode.

(c) You must maintain a record of each analysis, check, demonstration, examination, inspection, investigation, review, survey, and test required by this subpart in sufficient detail to demonstrate the adequacy of corrosion control measures or that corrosion requiring control measures does not exist. You must retain these records for at least 5 years, except that records related to §§195.569, 195.573(a) and (b), and 195.579(b)(3) and (c) must be retained for as long as the pipeline remains in service.

13.4 - Test Points

In order to help inspect and maintain the integrity of the pipeline, test points have been installed at approximately one-mile intervals. Keep in mind, that in some instances it may be impractical to install test stations at a one-mile interval. Therefore, it is possible to find them spaced further apart. In addition to the standard test stations, foreign line test stations, isolation flange test stations, casing test stations; block valves, permanent reference cells, transitions and aboveground storage tank perimeters are also used as test points. Although Enbridge's standard test station is the Cott "Big Fink" or "Little Fink", we will discuss other brands of test stations. Basically, they all serve the same purpose of providing a means to monitor the cathodic protection system.