Florida Gas Transmission

Implementation and Management of ECDA Program

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Bob Bouchard
NACE ECDA Seminar
January 27th 2009
Overview of ECDA Process

- White Papers
  - How do we address the PHMSA protocols?
  - How do we address RP0502 requirements?
  - Incorporate existing SOPs and Specifications
  - Identify and close gaps

- Standard Operating Procedures
  - Above Grade Electrical Surveys
  - Environmental Surveys
  - Excavation / Inspection / Evaluation / Repair

- Process Documentation
  - Historically our weakest area
ECDA / Integrity Process
**Inspection Protocols**

The PHMSA Inspection Protocols for implementing Gas Integrity Management, Revision 0, are provided below. Please note the Inspection Protocols are subject to change. Following the links for each protocol will provide additional detail and regulation references. If you would like to print the entire set of protocols for a single program element, navigate to that element below, and use the either the "Protocol as Offline Form" or "Protocol as Offline Document" (same, but without fillable form areas) links to display all the protocols for that element. A single downloadable Microsoft Word (doc) version of all protocol elements as well as flowchart diagrams of the protocols are also available from the Key Documents page.

See: related downloads...

Follow links below to see protocol elements for each area:

- A. Identify HCAs [View as Form...]
  - A.01 Program Requirements

- B. OA Plan [View as Form...]
  - B.01 ECDA Programmatic Requirements
  - B.02 ECDA Pre-Assessment
  - B.03 ECDA Indirect Examination
  - B.04 ECDA Direct Examination
  - B.05 ECDA Post-Assessment
  - B.06 Dry Gas ICDT Programmatic Requirements
  - B.07 Dry Gas ICDT Pre-Assessment, Region Identification and Use of Model
  - B.08 Dry Gas ICDT Direct Examination
  - B.09 Dry Gas ICDT Post-Assessment
  - B.10 Wet Gas ICDT Programmatic Requirements
  - B.11 SCCDA Data Gathering and Evaluation
  - B.12 SCCDA Assessment, Examination and Threat Remediation
Position Papers

- Company Philosophy
  - Why
  - What
  - When
### Protocol Area D. DA Plan

**D.01 ECDA Programmatic Requirements**

**Protocol Response – D1a**

<table>
<thead>
<tr>
<th>Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.01.a. Verify that the operator developed a documented ECDA plan, and developed procedures to implement the plan. [§192.925(b)]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ICAM Functionality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within ICAM we have developed a series of processes designed to manage the ECDA plan. There are 4 segment specific areas for the ECDA process</td>
</tr>
</tbody>
</table>

2 - ECDA Segment Specific Pre-Assessment

- Identification and Collection of ECDA Pre-Assessment Data
- Data Management (Missing and/or Unsubstantiated)
Standard Operating Procedures

- Backbone of Company Operations
  - Who
  - How
  - What
  - When
# Close Interval Survey

<table>
<thead>
<tr>
<th>Code Reference</th>
<th>Procedure No.: D.15</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Effective Date: January 2, 2007</td>
</tr>
<tr>
<td></td>
<td>Page 1 of 15</td>
</tr>
</tbody>
</table>

## 1.0 Procedure Description

This Standard Operating Procedure (SOP) describes Close Interval Surveys (CIS) conducted by company personnel or contractors.

## 2.0 Scope

CIS involves measuring pipe-to-soil potentials at varying distance intervals directly over a pipeline. Data obtained during a CIS can facilitate a more thorough evaluation of the level of Cathodic Protection (CP) on the pipeline section.

## 3.0 Applicability

This SOP applies to all company owned buried or submerged piping.

## 4.0 Frequency

As required, conduct Close Interval Surveys to:
- Determine the level of CP between test stations.
- Facilitate use of an alternative CP criterion.
Utilizing Existing Corrosion SOPs

- D.06, Soil Resistivity Testing
- D.07, pH Measurement
- D.15, Close Interval Survey
- D.35, Pipe Inspections and Evaluations
- D.47, Evaluation of Remaining Strength of Metal Loss Defects
Corrosion SOP Gaps

- D.27, Direct Current Voltage Gradient Surveys
- D.36, Investigation of Pipeline Anomalies
- D.45, Wet Magnetic Particle Testing
- D.35, Pipe Inspections and Evaluations
- D.49, Assessment of Pipeline Segments Using Guided Wave Ultrasonic Inspections
Procedural SOP Gaps

- J.10, Pre-Assessment
- J.11, Indirect Inspection
- J.12, Direct Examinations
- J.23, Post Assessment
Contractor Specifications

Exhibit B
Specifications for Above Grade Electrical Surveys

A. Above Grade Electrical Survey to be performed in accordance with Company Specifications including allowable charges for re-runs.

B. Mobilization and Demobilization charges are for all personnel and equipment required to perform specified Above Grade Electrical Surveys.

C. The intent of these specifications is to provide requirements for performing Above Grade Electrical Survey at Company facilities. No deviations from these specifications are allowed without prior written consent from an authorized Company representative.

D. Contractor will supply all manpower, equipment, supervision, tools, technical capability, transportation, materials and supplies required to perform Above Grade Electrical Surveys.

E. Contractor vehicles shall have their company name / logo on both sides of every vehicle utilized for the project. Contractor employees shall be readily identifiable (i.e. matching hard hats with logos) when on the ROW and carry proper identification at all times.
Process Management

- Documentation of Compliance for Each Step / PHMSA Protocol.
- What was the Decision?
- Who Made Decision?
- Why Was the Decision Made?
- What are the Qualifications of the Decision Maker?
- Where is the Data
ICAM – Activity Tracking

1. ECDA Protocol Response Management
   - ECDA Programmed Requirements
   - ECDA Pre-Assessment
   - ECDA Inkind Examination
   - ECDA Direct Examination
   - ECDA Post-Assessment

2. ECDA Segment Specific Pre-Assessment
   - Identification and Collection of ECDA Pre-Assessment Data
   - Data Management as an Input for Unobstructed Data
   - Data Analysis to Determine Feasibility
   - Establish ECDA Response
   - Selection of Induced Inspection Tools Per ECDA Region
   - Induced Inspection Preparation

3. ECDA Segment Specific Inkind Inspection
   - Indirect Inspection Survey Quality Control
   - Integrate and Analyze Induced Inspection Data

4. ECDA Excavation Specific Direct Examination
   - Develop Direct Examination Plan
   - Perform Direct Examinations
   - Analysis of Direct Examination Data
   - Remediation of Anomalous Conditions
   - Critical Target找到了
   - Precise Identification of Indications
   - Remaining Unresolved Indications
   - Root Cause Analysis
   - Root Cause Driven ECDA Feasibility Check
   - Direct Examination Immediate Condition Response

5. ECDA Excavation Specific Post-Assessment
   - Determine Postassessment Intervals
   - Perform Root Cause Analysis on Significant Corrosion

6. Process Evaluation / Improvement
   - Process Review
   - Process Review
   - Process Follow-on Performance Review
Pre Assessment

Process / Task

• Identification and Collection of ECDA Pre-Assessment Data

<table>
<thead>
<tr>
<th>Task</th>
<th>Text Instructions</th>
<th>Attachment Instructions</th>
<th>Branching</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collect the required Data Elements</td>
<td>Confirm data in GIS web reports</td>
<td>Attach ECDA Data Elements from GIS</td>
<td></td>
</tr>
</tbody>
</table>

Perform site visit for data elements as required

<table>
<thead>
<tr>
<th>Answer</th>
<th>Text Instructions</th>
<th>Attachment Instructions</th>
<th>Branching</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Site visit completed</td>
<td>Confirm accuracy of GIS records</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Pre Assessment

Process / Task

- Data Management (Missing and/or Unsubstantiated)
Indirect Inspections

Process / Task

- Data Management (Missing and/or Unsubstantiated)
Indirect Inspections

Process / Task

- ECDA Segment Specific Indirect Inspection

**Indirect Inspection Survey Quality Control**
- Confirm the ECDA regions were marked and that the indirect inspections covered the entire length of each.
- Verify indirect inspections conducted in accordance with applicable specifications and SOPs.
- Verify indirect inspections were performed no longer than 80 days apart.

**Integrate and Analyze Indirect Inspection Data**
- Log receipt of Final report from Indirect Inspection Vendor(s)
- Integrate data with pipe properties and historical information
- Analyze individual data sets and compare for consistency
- Resolution of data conflicts
- Prioritize indications based on severity
- Document all immediate and scheduled investigations in Dia Tracker

Submit  Export  Cancel
# Direct Examinations

## Processes / Tasks

<table>
<thead>
<tr>
<th>Process / Task</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop Direct Examination Plan</td>
<td>Active</td>
</tr>
<tr>
<td>• Is this the first ECDA of the segment?</td>
<td></td>
</tr>
<tr>
<td>• Determine number of excavations; if first DA on segment verify at least two Direct Examinations are scheduled in each segment.</td>
<td></td>
</tr>
<tr>
<td>• Determine priority and schedule for Direct Examinations in Did Tracker</td>
<td></td>
</tr>
<tr>
<td>Perform Direct Examinations</td>
<td>Active</td>
</tr>
<tr>
<td>• Collect Direct Examination data per SOP J.12 Direct Examination Section 7.2</td>
<td></td>
</tr>
<tr>
<td>• Were all Direct Examinations performed within the allowable time limits?</td>
<td></td>
</tr>
<tr>
<td>Analysis of Direct Examination Data</td>
<td>Active</td>
</tr>
<tr>
<td>• Were anomalous conditions found?</td>
<td></td>
</tr>
<tr>
<td>• Did Direct Examination discover evidence of a threat to the integrity of the pipeline other than External Corrosion?</td>
<td></td>
</tr>
<tr>
<td>• Does severity of corrosion found correlate with initial prioritization schedule?</td>
<td></td>
</tr>
<tr>
<td>• Does the data obtained during Direct Examination correlate with the initial indication classification?</td>
<td></td>
</tr>
<tr>
<td>• Did Direct Examination of any non-immediate indication find a corrosion defect greater than 20% WT that was deeper or more severe than a corrosion defect at an immediate indication?</td>
<td></td>
</tr>
<tr>
<td>• Were Direct Examinations performed to evaluate the effectiveness of DA in accordance with SOP J.12 Section 7.3?</td>
<td></td>
</tr>
<tr>
<td>Remediation of Anomalous Conditions</td>
<td>Active</td>
</tr>
<tr>
<td>• Were anomalous conditions remediated?</td>
<td></td>
</tr>
<tr>
<td>Other Threats Found</td>
<td>Active</td>
</tr>
<tr>
<td>• Was the threat found already a known threat in the Threat Susceptibility Matrix for this segment?</td>
<td></td>
</tr>
<tr>
<td>• Is ECDA an appropriate tool to access this threat?</td>
<td></td>
</tr>
<tr>
<td>• Update Assessment Scheduler</td>
<td></td>
</tr>
</tbody>
</table>
### Post Assessment

**Integrity Compliance Activity Manager**  
*Welcome David McQuilling*

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**Area Header**

<table>
<thead>
<tr>
<th>Protocol Element</th>
<th>Direct Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area</td>
<td>5 - ECDA Excavation Specific Post-Assessment</td>
</tr>
<tr>
<td>Sequence</td>
<td>5</td>
</tr>
</tbody>
</table>

---

**Processes List**

- **Show Description**

**Reference links**

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**Process / Task**

<table>
<thead>
<tr>
<th>Determine Reassessment Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Calculate corrosion rate in accordance with Section 7.4 of SOP J.12.</td>
</tr>
<tr>
<td>- Calculate the Maximum Reassessment Interval(s) using steps 3-6 of Section 7.1 of SOP J.23.</td>
</tr>
<tr>
<td>- Schedule reassessment(s) in Assessment Scheduler for each specific segment</td>
</tr>
</tbody>
</table>

**DA Process Effectiveness**

- Evaluate data obtained during DA effectiveness digs in accordance with step 1 in Section 7.2 of SOP J.23.  
- Are additional digs required?  
- Was ECD feasible?  
- Evaluate any and all data obtained during investigation of scheduled indications and any excavation performed to evaluate the long-term effectiveness of DA.
### Process Evaluation / Improvement

<table>
<thead>
<tr>
<th>Area Description</th>
<th>Area Configuration</th>
<th>Process List</th>
</tr>
</thead>
</table>

#### Area Header
- Protocol Element: Direct Assessment
- Area: 6 - Process Evaluation / Improvement
- Sequence: 6

#### Processes List

<table>
<thead>
<tr>
<th>Process / Task</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Process Review</strong></td>
<td></td>
</tr>
<tr>
<td>• Review the processes associated with this area</td>
<td>Active</td>
</tr>
<tr>
<td>• Review the tasks associated with the various processes</td>
<td></td>
</tr>
<tr>
<td>• Review the supporting documentation requirements for the tasks associated with the processes</td>
<td></td>
</tr>
<tr>
<td>• Review the timelines associated with the various processes</td>
<td></td>
</tr>
<tr>
<td>• Review the roles associated with the various processes</td>
<td></td>
</tr>
<tr>
<td><strong>Results Review</strong></td>
<td></td>
</tr>
<tr>
<td>• Review the results of each process included in this area</td>
<td></td>
</tr>
<tr>
<td><strong>Protocol Position Paper Review</strong></td>
<td></td>
</tr>
<tr>
<td>• Review and Update all Protocol Position Papers associated with the processes in this protocol element</td>
<td></td>
</tr>
</tbody>
</table>

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**Integrity Compliance Activity Manager**

Welcome David McQuilling

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Panhandle Energy

Pipeline Integrity Group

“At a Glance” Template Schedule Report Configuration Edit Profile System

Suggestion Logout
Case History / Lesson Learned

- DA is not Feasible for Many Locations
Case History / Lesson Learned

- Weird Stuff Happens
## Case History / Lesson Learned

- **Extremely Conservative Re-Inspection Intervals**

### Task and Task Response Selections

Identify the root cause for corrosion in the DA segment per SOP J.12 Section 7.6.

<table>
<thead>
<tr>
<th>Response Options Selected</th>
<th>Details</th>
<th>Attachments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cathodic Shielding</td>
<td>CIS indicated that all potentials (on &amp; off) were more negative than -850 mV throughout the ECDA region. Metal loss combined with low pH levels (5.5 - 7.0) beneath disbonded tape is indicative of cathodic shielding. ILI of an upstream segment of the Sanford Lateral (same vintage pipe / coating) indicated four (4) anomalies with RPR &lt; 1.39. Direct Examination results indicate Indirect Inspection tools are capable of finding areas of disbonded coating; however, CIS results may not be indicative of pipe surface conditions beneath tape.</td>
<td></td>
</tr>
</tbody>
</table>

Did Root Cause Analysis indicate corrosion was due to shielding by disbonded coating or biological corrosion?

<table>
<thead>
<tr>
<th>Response Options Selected</th>
<th>Details</th>
<th>Attachments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Metal loss and low pH were discovered beneath disbonded coating in areas where CIS indicated adequate CP.</td>
<td>[View Description]</td>
</tr>
</tbody>
</table>

Where remedial actions needed to mitigate corrosion?

<table>
<thead>
<tr>
<th>Response Options Selected</th>
<th>Details</th>
<th>Attachments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>An evaluation of the unpiggable sections of the Sanford Lateral will be conducted to further evaluate cathodic shielding and the ability of above grade measurement techniques to locate and evaluate the severity of areas of disbonded coating.</td>
<td>[View Description]</td>
</tr>
</tbody>
</table>
Case History / Lesson Learned

- Extremely Conservative Re-Inspection Intervals

<table>
<thead>
<tr>
<th>Task and Task Response Selections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculate corrosion rate in accordance with Section 7.4 of SOP J.12.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Response Options Selected</th>
<th>Details</th>
<th>Attachments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete</td>
<td>Due to concerns about the potential for cathodic shielding, the worst case / default corrosion rate of 16 mpy will be utilized. [View Description] [View Message Board]</td>
<td></td>
</tr>
</tbody>
</table>

Calculate the Maximum Reassessment Interval(s) using steps 3-6 of Section 7.1 of SOP J.23.

<table>
<thead>
<tr>
<th>Response Options Selected</th>
<th>Details</th>
<th>Attachments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reassessment set</td>
<td>MRI is 2.44 years. Next integrity assessment must be conducted on or before May 1, 2010. [View Description] [View Message Board]</td>
<td>[WCML &amp; MRI Worksheet]</td>
</tr>
</tbody>
</table>

Schedule reassessment(s) in Assessment Scheduler for each specific segment.

<table>
<thead>
<tr>
<th>Response Options Selected</th>
<th>Details</th>
<th>Attachments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reassessment(s) added to Assessment Scheduler</td>
<td>Assessment Scheduler application is currently not operational. The attached memo was used to communicate the next assessment interval. [View Description] [View Message Board]</td>
<td>[Reinspection Interval]</td>
</tr>
</tbody>
</table>
Direct Assessment - Summary

- FGT Developed DA Procedures in 2007
- FGT Has Been Extremely Conservative in Approach to DA
- Informal Analysis of PHMSA Integrity Audits (through Sept. 2007) Revealed 69 IOCs, NOAs, and NOPVs on DA.