PACIFIC GAS AND ELECTRIC COMPANY

CALIFORNIA GAS TRANSMISSION
GAS SYSTEM MAINTENANCE & TECHNICAL SUPPORT
SYSTEM INTEGRITY SECTION
Risk Management

Procedure for In-Line Inspections

Procedure No. RMP-11

Integrity Management Program

[redacted]

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Table of Contents

Appendix A

List of Tables

List of Figures

List of Attachments

References

1. ANSI No. ILI-PQ-2003 "In-Line Inspection Personnel Qualifications & Certification"
2. API 1163 "Qualification of In-Line Inspection Systems"
3. NACE RP 0102-2002 "Standard Recommended Practice, In-Line Inspection of Pipelines"
4. ASME B31.8S-2001 "Managing System Integrity of Gas Pipelines"
5. 49 CFR Part 192, Subpart O "Pipeline Integrity Management"
6. CGT Clearance Procedure

1.0 PURPOSE

The purpose of this procedure is to describe the process of performing an In Line Inspection (ILI) on specified buried gas transmission pipeline segments. This procedure is in accordance with 49CFR Part 192, Subpart O – Pipeline Integrity Plan and ASME B31.8S-2001, *Supplement to B31.8 on Managing System Integrity of Gas Pipelines*. It provides instructions, guidance, and requirements to ensure consistent inspections, responses to anomalies and documentation of the ILI results.

2.0 INTRODUCTION

In-Line Inspection requires a structured process that is intended to improve safety by assessing and mitigating the pipeline integrity threats, such as, corrosion, mechanical damage, S.C.C, etc. By identifying and sizing anomalies in the pipeline, the ILI process seeks to proactively prevent anomalies from growing to sizes that are large enough to effect the structural integrity of the pipeline segments inspected.

2.1 ILI Methodology

The ILI methodology is a four-step process that requires the integration of data from the In-Line Inspection, direct pipe surface examinations, and the pipe's physical characteristics. The four steps of the process are:

Pre-Assessment: The Pre-Assessment step collects historic and current data to determine whether the ILI is feasible and what tool is appropriate and to assist in the interpretation and analysis of the inspection results. The types of data to be collected are typically available in GIS, transmission and distribution plat sheets, as-built job files, district and division records. This step also defines the work necessary to verify the pipeline segments are "piggable" or to make the segment "piggable."

In-Line Inspection: The In-Line Inspection step covers the route preparation and pipeline cleaning. This step also includes performing In-Line Inspection runs and the data analysis by the vendor to identify and quantify the pipe wall anomalies.

Direct Examination: The Direct Examination step includes reviewing of In-Line Inspection data to prioritize the anomalies for excavations and evaluations. Data from the direct examinations are utilized to verify the accuracy of the ILI results and evaluate the identified anomalies in regards to pipeline integrity. It also includes requirements of repairs, performing the root cause analysis, and the requirements of the final ILI report.

Post-Assessment: The Post-Assessment step covers analyses of data collected from the previous three steps and the development of a Post Assessment Plan to mitigate any significant deficiencies identified by the Root Cause Analysis and the ILI final report. The plan includes assigning re-inspection intervals and assessing/monitoring the overall effectiveness of the ILI process.

2.2 Roles and Responsibilities

Manager of System Integrity: The Manager of System Integrity has the overall responsibility to ensure that this procedure is implemented effectively. This procedure is used to assign approval of documents, plans and exceptions to this procedure. The Manager of System Integrity may delegate some or all of these approving responsibilities.

Manager of Pipeline Engineering: The Manager of Pipeline Engineering has responsibility for the operational changes to the pipeline system. In order to ensure support and effective communication, this procedure assigns the responsibility for concurring with operational changes. The Manager of Pipeline Engineering may delegate this concurrence.

ILI Program Manager: The ILI Program Manager is responsible for ensuring that all aspects of the ILI program are conducted in full compliance with this procedure. The Program Manager is responsible for overall compliance, budgeting, and resource planning necessary to implement the ILI program.

ILI Engineer (ILE): The ILI Engineer is responsible for the implementation of key engineering aspects of this procedure including the pre-assessment and direct examination phases, reviewing the vendor report and performing RSTRENG analysis.

ILI Technical Consultant (TC): The ILI Technical Consultant is responsible for the quality control of the ILI projects. This person will be the consultant to the ILI Team and Integrity Management Team for all ILI projects. This person is responsible for reviewing the critical interim phases and the final ILI report for the

compliance of this procedure and provide consultations to the Integrity Management Team on post assessment plan.

ILI Project Manager (PM): A Project Manager will be assigned to manage each ILI project. This person is responsible for ensuring that all aspects of the assigned ILI project is performed in full compliance with this procedure. In addition, the Project Manager is responsible for effectively planning, documenting and communicating the various aspects and stages of the assigned ILI project. The project is the responsibility of the Project Manager until the final report is completed and formally transmitted to the Integrity Management Program Manager.

Integrity Management Program Manager (IMPM): This person is responsible for ensuring the post assessment is completed for each ILI and the pipeline re-assessment interval is documented and scheduled. This person is also a resource to the ILI Program Manager for risk assessments and for determining if shorter re-inspection intervals will be acceptable.

Corrosion Engineer: The Corrosion Engineer is responsible for the technical evaluation of direct examinations and preparing root cause analysis in accordance with this procedure.

Direct Examination Personnel: The In-Line Inspection Personnel are responsible for performing direct examinations in accordance with this procedure and other testing procedures that have been referenced in the assessment process.

2.3 Qualifications

The provisions of this procedure shall be applied under the direction of competent persons who, by reason of knowledge of the physical sciences and the principles of engineering and mathematics, acquired by education and related practical experience, are qualified to engage in the practice of pipeline engineering on transmission piping systems. The specific qualifications are described below.

Manager of System Integrity: Shall be a degreed engineer and have sufficient gas transmission corrosion related experience to provide guidance and oversight to personnel conducting the ILI process.

Manager of Pipeline Engineering: Shall be a degreed engineer and have sufficient gas transmission corrosion related experience to provide guidance and oversight to personnel conducting the ILI process.

ILI Program Manager: The Program Manager shall be a degreed engineer with a minimum of 5 years of experience (or equivalent) performing In-Line Inspections in the pipeline industry. The Manager shall be formally trained on this procedure, RMP-11. In addition, the Manager shall have documented training on the use of RSTRENG.

ILI Engineer (ILE): The ILE shall be a degreed engineer or have equivalent pipeline experience. The ILE shall have taken CGT Corrosion Control training course and be formally trained on this procedure, RMP-11. In addition, the ILE shall have documented training on the use of RSTRENG.

ILI Technical Consultant (TC): The TC shall be a degreed engineer with a minimum of 5 years of experience (or equivalent) performing In-Line Inspections in the pipeline industry. The TC shall have taken CGT Corrosion Control training course and be formally trained on this procedure, RMP-11 and the Procedure for Risk Management RMP-06.

ILI Project Manager (PM): The PM shall have project management experience within the gas industry and training on PM techniques per CGT PM Guidelines. The PM shall be formally trained on this procedure, RMP-11 and the project management technique per CGT Project Management Guidelines.

Integrity Management Program Manager (IMPM): The IMPM shall be a degreed engineer with a minimum of 5 years of experience (or equivalent) performing integrity management in the pipeline industry. The Manager shall be formally trained on this procedure, RMP-11 and the Procedure for Risk Management RMP-06.

Corrosion Engineer: The Corrosion Engineer shall be a degreed engineer with a minimum 5 years of experiences (or equivalent) with corrosion control in the pipeline industry. The engineer shall have taken CGT Corrosion Control training course and be formally trained on this procedure, RMP-11. In addition, the Corrosion Engineer shall have documented training on the use of RSTRENG.

Direct Examination Personnel: The personnel performing the direct examinations shall meet the CGT Operator Qualification Requirements as well as being certified with supporting training documentation for the specific inspections they are conducting. The Direct Examination Personnel shall be qualified in

accordance with the PG&E Operator Qualification Program for the performance of the task "Corrosion Control 03-05."

2.4 **Record Retention:** All forms and reports created for the ILI run shall be on file for the life of the facility.

2.5 **Definitions**

The following are definitions of some key terms used in this procedure:

Shall: Is a requirement that must be complied with or its exception approved and documented in accordance with Section 7.0 of this procedure.

Should: Is a recommendation that is desirable to follow if possible. Not following the recommendation does not have to be documented or approved.

Required: "Required" data listed in Table 3.3.1 must be obtained for an effective ILI project or its omission be approved and documented in accordance with Section 3.7 of this procedure.

Desired: "Desired" data listed in Table 3.3.1 should be obtained if it is documented or easily measured. Its omission is not required to be approved or documented.

Considered: "Considered" is a recommendation that a data element is taken into account for the selection of In-Line Inspection tools, interpretation, or analysis of test results.

Failure Pressure (Pf): Calculated burst pressure from ILI or RSTRENG

Discovery Pressure (Pdis): Pdis is defined as the pipeline pressure at the time the condition was discovered and for the purpose of this procedure we will use the highest pipeline operating pressure during the in-line inspection tool ILI run or the maximum operating pressure between the ILI run and the time the immediate anomalies are identified.

Safe Pressure (Ps): Pf * class location design factor

GIS: Geographic Information System. The computerized graphics and database used to store the location, specifications, and integrity assessment of all pipeline facilities.

GPS: Global Positioning System. Process by which coordinates are captured for mapping purposes.

AGM: Above Ground Marker. Used for tracking ILI tool while traveling through pipe

CPA: Cathodic Protection Area

MAOP: Maximum allowable operating pressure for a section of pipeline between pressure controlling points. This is often determined by the "weakest" link of segments, fitting or valve between the pressure controlling points.

3.0 PRE-ASSESSMENT

3.1 Objectives

The objectives of the pre-assessment process are to:

- Determine the feasibility of conducting an ILI
- Determine if sufficient data exists to conduct an ILI
- Collect the required pipeline data to assist in the interpretation and analysis of inspection results
- Document pre-assessment results

3.2 Pipeline Segments Requiring ILI

3.2.1 **Identification of ILI Projects:** Pipeline segments needing or requiring an ILI can be identified from multiple sources. Usually the requests for an ILI will come from the Integrity Management or Risk Management Programs. However, the company may utilize ILI for other business or operating initiatives. This procedure does not address the identification or ranking processes of pipeline segments requiring ILI. Please refer to RMP-06 for details.

3.2.2 **Information Provided With ILI Request:** The request for an ILI shall have the following information supplied to the ILI Program Manager:

- Route number
- Starting and ending mile points of requested ILI
- Risk Ranking
- Location of HCA, if present, within the ILI project mile points (starting and ending)

3.3 Data Collection (Pre-Field Visit)

3.3.1 **Data Collection Objectives:** A key aspect of the Pre-assessment step is the collection of pipeline data. Table 3.3.1 PRE-ASSESSMENT DATA provides a checklist of the data elements needed to conduct the ILI.

3.3.2 **Data Collection Phases:** Data collection and analysis is a continuous activity throughout the ILI process. In the Pre-assessment step this procedure divides the data collection into two steps; "Pre-Field Data Collection" and "Field Data Collection."

3.3.3 **Data Requirements:** The "Need" for the data elements is identified in Table 3.3.1 as either "REQUIRED" or "DESIRED." Data elements that are identified as REQUIRED **shall** be obtained before completion of the Pre-assessment step or approved to be delayed or omitted from data collection in accordance with Section 3.7 of this procedure. "DESIRED" data elements should be obtained if the data is available in existing records or can be obtained from easily conducted measurements or examinations. The Program Manager may consider desired data sufficiently important to classify it as "REQUIRED" for a specific ILI analysis.

3.3.4 **Data Sources:** Table 3.3.1 provides guidance to the possible sources for each data element. If the data element is not available in the listed sources the ILI Engineer should use good judgment on seeking the data elsewhere. A pipeline features list **shall** be compiled to identify all information about the pipeline such as: pipe wall thickness, grade, seam, fittings, valves, etc. for this purpose.

3.3.5 **Data Documentation:** The collection of information **shall** be indicated on the "DATA ELEMENT CHECK SHEET" (Form A). Items should be signed off by the person who checked/filled the specific data element row.

Table 3.3.1: Pre-assessment Data List

ID #	Data Element Description	In-Line Inspection Tool Selection	Interpretation and Analysis Of Inspection Results	Description: Need[1]	Requirements: Inspection Tool[2]	Requirements: Interpretation and Analysis of Inspection Results[2]	Data Source: GIS	Data Source: As-built Job file	Data Source: Field	Data Source: Drawings or Database	Data Source: Other	Comments
1.0 Pipeline Physical Characteristics												
1.1	Diameter	May indicate detection capability or problem passing of tool	Pre-processing ASTREM	R	R	R	X	X				
1.2	Wall thickness	May indicate detection capability or problem passing of tool	Increases critical anomaly size	R	R	R	X	X				
1.3	Grade		Pre-processing ASTREM	R	N/R	R	X	X				
1.4	Seam Type		Older pipe typically has lower wall shear toughness that reduces critical anomaly size. Pre-1970 ERW or flash welded pipe may be subject to higher corrosion rates than the base metal	D	N/R	C	X	X				
2.0 Environmental Characteristics												
2.1	Year installed		Impacts time over which coating degradation may occur, anomaly population estimates, and corrosion rate estimates	D	N/R	C	X	X				
2.2	Known repair changes/ modifications that may affect ILI			D	C	N/R		X	X	X		
2.3	Construction practices		May indicate construction problems that may have occurred, e.g., HIC/SCC, rotor bends, wrinkle bends, etc.	D	C	C		X			Prog. Rpt., drawings	
2.4	Presence of major pipe appurtenances such as valves and taps	Investigate potential need for replacement of the installation of bars for tool	Provides a "known" reference for geo-referencing indications	R	R	C	X	X	X			
2.5	Presence of bends, including mitre bends and wrinkle bends	May indicate locations at which replacements are needed to make the pipeline piggable	Provides a "known" reference for geo-referencing indications	R	R	C		X			Trans. Pln Sheet	
2.6	Presence of casings		Provides a "known" reference for geo-referencing indications	D	N/R	C		X	X	X		

[1] R = Required, D = Desired (See paragraph 2.6 for definitions)
[2] R = Required, C = Considered, N/R = Not required

RMP-11

Description				Requirements			Data Source					
ID #	Data Element Description	In-Line Inspection Tool Selection	Interpretation and Analysis Of Inspection Results	Need[1]	Responsible Party[1]	Interpretation and Analysis of Inspection Results[1]	GIS	As-built Info Bk	Field	Districts or Division	Other	Comments
3.7	Proximity to other pipeline structures, RW corridor, transmission lines and rail crossings			D	C	C	X		X			
3.0	Soil Characteristics											
3.1	Soil characteristics & types		Can be useful in interpreting results. Influences corrosion rate	D	C	C	X		X		Form 41-0	
3.2	Assessment of environmental conditions		May indicate potential environmentally sensitive areas	D	N/R	C	X		X			
4.0	Construction Data											
4.1	CP System Type (anode, rectifier, and location)			D	N/R	C			X		CPA Records	
4.2	Stray Current sources/locations			D	N/R	C			X	X	CPA Records, Past survey records	
4.3	Test point Readings (pipe across public)		May provide geographic reference for ILI run	D	N/R	C	X		X	X	CPA Records	
4.4	CP evaluation criteria		Used in past assessment analysis	D	N/R	C					CPA Records, Paradigm	
4.5	CP maintenance history			D	N/R	C				X	CPA Records, Paradigm	
4.6	Years without CP applied		Impact only affects ability to extrapolate corrosion rates	D	N/R	C		X		X		
4.7	Coating type		Coating type may influence time at which corrosion begins and estimates of corrosion rate based on measured wall loss	D	N/R	C	X	X				
4.8	Coating condition		May help with root cause analysis of anomalies	D	N/R	C	X			X	Direct Assessment	
4.9	Current demand			D	N/R	C				X	CPA Records	
4.10	CP survey data/history			D	N/R	C					CPA Records Paradigm, Corrosion Group	
5.0	Environmental Data											

RMP-11

Description				Requirements			Data Source					
ID #	Data Element Description	In-Line Inspection Tool Selection	Interpretation and Analysis Of Inspection Results	Need[1]	Inspection Tool[2]	Interpretation and Analysis of Inspection Results[2]	GIS	As-built Job file	Field	Districts or Division	Other	Comments
5.1	Operating stress level Pressure, Flow Rate	For controlling the pigging velocity	Impacts critical anomaly size	R	R	R	X				OSCI, TSP	
5.2	Monitoring programs (Patrol leak surveys etc.)		May impact repair, remediation and replacement schedules	D	N/R	C					Corrosion Group, Form 4110	
5.3	Pipe inspection reports-excavation		Provide useful data for post assessment analysis or data verification	D	N/R	C	X			X	Form 4110	
5.4	Repair history/records, steel/composite repair sleeves, repair locations		Provide useful data for post assessment analysis or data verification	D	N/R	C	X			X	Form 4110	
5.5	Leak rupture history		Provide useful data for post assessment analysis	D	N/R	C	X			X	Form 4110	
5.6	Type and frequency of third party damage (Review construction activities with operating personnel.)		High third party damage areas may have increased coating fault anomalies.	R	N/R	R	X		X	X	Form 4110 USA Data Base	
5.7	Other prior integrity related activities – CIS, DA tests, etc.		Useful post assessment data	R	N/R	R	X				Corrosion Group, System Integrity	If applicable
5.8	Hydro Test dates/pressures			D	N/R	C	X	X				

3.4 Data Analysis (Pre-field visit)

3.4.1 **Identification of Missing Data:** Once the Pre-field Visit data is collected the ILI Engineer should analyze the data to identify missing elements, and develop a list of data that will need to be obtained in the field. Form A - DATA ELEMENT CHECK SHEET in APPENDIX A can be used for this purpose.

3.5 Field Visit

3.5.1 **General Description:** Examining the physical locations where the ILI is to be conducted is a key activity in the gathering of data. It is important to collect as much data as possible to achieve the objectives of the Pre-assessment and effectively plan for the In-Line Inspection step of the ILI process. Hence, preparation is key to conducting an effective field visit. Some of the data elements from Table 3.5.1 that may require field collection or verification in the field are:

TABLE 3.5.1: TYPICAL FIELD COLLECTED DATA

ID	Description	ID	Description
2.2	Recent route changes/modifications in the pipeline that may not be in GIS	3.2	Assessment of environmental conditions
2.4	Presence of major pipe appurtenances such as valves and taps	4.1	CP system type (anodes, rectifiers, and locations)
2.6	Presence of casings	4.2	Stray Current source/locations
2.7	Proximity to other pipeline structures, HV electric transmission lines and rail crossings	4.3	Test point locations (pipe access points)
3.1	Soil characteristics & types	5.8	Type and frequency of third party damage (Review construction activities with operating personnel)

3.5.2 **Documentation:** All data collected in the field that will be used in the ILI project shall also be included on Form A.

3.6 **Data Filing:** All data collected during pre-assessment phase shall be stored in the project file.

3.7 Data Analysis

Once the Field Visit data is collected the ILI Engineer shall analyze the data to identify missing REQUIRED data elements, and conduct a SUFFICIENT DATA ANALYSIS – FORM B.

3.7.1 **Sufficient Data Analysis:** The data shall be analyzed to determine if there is sufficient data to conduct an ILI. The analysis should include the following:

- **Missing Required Data:** If there is missing required data and it is felt that this data is not essential to the ILI then the reason it is not necessary shall be explained in Form B - SUFFICIENT DATA ANALYSIS FORM.
- **Missing Desired Data:** The ILI Engineer should review the missing desired data to identify if any of those data elements are essential to conduct the ILI. If some of the missing desired data is essential it should be identified in the analysis and document on Form B.

3.7.2 **Documentation:** The ILI Engineer shall document if there is sufficient data to conduct an ILI. Form B - SUFFICIENT DATA ANALYSIS FORM can be used for this purpose.

3.8 Feasibility Analysis

3.8.1 **Analysis:** The ILI Team shall integrate and analyze the data collected on the pipeline segments and determine whether the use of ILI is appropriate. The framework for this analysis is that the

Program Manager shall examine the existing data in each of the five categories in Table 3.3.1 (Form A) and assess the following:

- **In-Line Inspection:** In-Line Inspection should address physical, operational and economic considerations.
- **Direct Examination:** Direct Examination should address physical, operational and economic considerations.

3.8.2 **Documentation:** The ILI Engineer **shall** prepare Form C - FEASIBILITY ANALYSIS FORM and have it approved by the ILI Program Manager.

3.9 **ILI Pre-assessment Review Meeting**

3.9.1 **Purpose:** The ILI Program Manager **shall** conduct a meeting to review the pre-assessment results, communicate the plan of how the ILI will be conducted, and build consensus for the plan.

3.9.2 **Agenda:** The meeting should have the following in its agenda:

- Review the ILI Request information, DATA ELEMENT CHECK SHEET (Form A), SUFFICIENT DATA ANALYSIS FORM (Form B), and FEASIBILITY ANALYSIS FORM (Form C)
- GIS Maps
- Discussion of required pipeline modifications

3.9.3 **Attendees:** The meeting may have the following attendees:

- Project Manager
- ILI Program Manager
- Manager of System Integrity or Pipeline Engineering
- ILI Technical Consultant
- Corrosion Engineer
- Pipeline Engineer of the area
- Crew member familiar with the pipeline
- ILI Engineer

3.9.4 **Changes:** Changes agreed upon in the meeting should be documented on the Pre-assessments forms.

3.10 **Pre-assessment Report**

3.10.1 **Report:** The report **shall** have the following data and have been incorporated with the changes from the Pre-assessment meeting described in paragraph 3.9. All required forms shall be signed and dated by the ILI Program Manager.

- ILI Request Information
- GIS Maps
- DATA ELEMENT CHECK SHEET (Form A)
- SUFFICIENT DATA ANALYSIS FORM (Form B)
- FEASIBILITY ANALYSIS FORM (Form C)
- Scope of work to modify pipeline, if applicable
- The proposed inspection tool requirements

3.10.2 **Review, Approval and Filing:** The report **shall** be reviewed and approved by the ILI Program Manager. A copy **shall** then be kept in the project file.

3.11 **Pipeline Retrofit**

3.11.1 **Purpose:** The step is to do necessary physical modification to make the pipeline piggable and install launcher and receiver. Pipeline to be pigged for the first time the Pre-assessment Report provides useful information for retrofit.

3.11.2 Retrofit Plan: The ILI Program Manager shall prepare a plan including funding, resource, engineering design and construction for the retrofit. The retrofit phase of a pipeline to be pigged for the first time may take more than a year to complete.

4.0 IN-LINE INSPECTION

4.1 Objectives: The objectives of the In-Line inspection process are to:

- Clean the pipeline adequately for inspection
- Geometrically inspect the pipeline for dents or other geometric anomalies
- Inspect the pipeline for corrosion or other metal loss anomalies
- Map the pipeline to assure correct alignment and ability to locate anomalies
- Obtain ILI vendor report that will locate and quantify the severity of damage to the pipe wall and identify other anomalies

4.2 Selection and Marking of Above-Ground Markers (AGM)

4.2.1 Objective: Prior to conducting an In-Line inspection, the location of aboveground markers shall be identified in the field and centimeter GPS coordinates obtained for these locations along with the depth of cover. A minimum of one AGM should be established approximately every mile. Markers shall be established in the field to identify the physical location of the AGMs. GIS themes shall be created for all AGMs and stored in GIS.

4.2.2 Type of AGMs: AGMs can be established every mile by utilizing one of the following:

4.2.2.1 Significant bends, taps, valves, above ground crossings, wall thickness changes or the start of casings that can be accurately located in the field

4.2.2.2 Pre-selected GPS locations for "pig trackers"

4.2.3 Documentation: The location and method of marking shall be indicated on the IN-LINE INSPECTION ABOVE GROUND MARKER LOCATIONS form (Form D)

4.3 Preparation for In-Line Inspections

4.3.1 Specifications:

4.3.1.1 Each ILI Project shall have a written specification prepared for cleaning. These specifications shall provide adequate information to ensure the pipeline is cleaned to meet the ILI inspection requirements.

4.3.1.2 Each ILI Project shall have a written specification prepared for ILI. This specification shall provide adequate information to ensure the vendor's inspection results meet the integrity assessment requirements. As a minimum the specification shall include the following:

- Safety: The vendor shall meet PG&E's specified minimum requirements.
- Sizing Accuracy: The required anomaly sizing shall be specified to determine an acceptable inspection. Allowable exceptions to the accuracy may be specified to account for short distances of speed excursions, etc.
- Caliper Accuracy: The required anomaly sizing shall be specified to determine an acceptable inspection. Inspection shall be performed to collect data on dents, ovalities, or other geometric features that impact the integrity of the pipeline.
- Geospatial Accuracy: Where practical, in addition to collecting the data about the condition of the pipe wall, all in-Line inspections will also collect geospatial information throughout the survey. The geospatial information should enable the coordinate location of all anomalies, pipe joints, the location of all pipeline appurtenances, and the accurate development of the pipeline profile. The aboveground markers will be used to georeference the data to a horizontal accuracy of +/- 3'.

- **Operator Qualifications:** Documentation needed to verify the competency of the vendor personnel who calibrate and operate the ILI and analyze the data, including required training and testing. (ASNT No. ILI-PQ-2003)
- **Schedule:** Required Immediate repair anomaly report as they are identified and 90-day response time for final report.
- **Report Format:** Data required in immediate repair anomaly report, final report, and the data format.

4.3.2 **Contract:**

- PG&E shall follow existing corporate contracting guidelines, including sending out a request for proposal to qualified cleaning and inspection vendors, evaluating bids and contracting for cleaning, inspection and mapping of the pipeline.
- **Vendor Qualification:** A PG&E ILI Team shall review and approve the vendor's qualification noting any exceptions to the minimum requirements (Form E).

4.3.3 **In-Line Inspection Plan Review:** The Project Manager shall assemble and submit an In-Line Inspection Plan to the ILI Program Manager for review.

4.3.3.1 **Plan contents:** The plan shall have the following documents:

- IN-LINE INSPECTION ABOVE GROUND MARKER LOCATION FORM (Form D)
- ILI VENDOR QUALIFICATION FORM (Form E)
- ILI Specification(s)
- ILI Contract
- Schedule

4.4 **In-Line Inspection Field Operations**

4.4.1 **In-Line Inspection Field Meeting:** The Project Manager shall conduct a field meeting with the ILI vendor and the personnel supporting the inspection. At this meeting they should cover the following while referring to the ILI Contract, GIS Maps as well as other documents prior to the inspection run:

- **ILI Access:** View the launch and receipt points for the ILI.
- **ILI Procedure:** Review contractor's process and clarify the support PG&E will provide during the run.
- **Access to Above Ground Markers (AGM):** Ensure the contractor is familiar with accessing each (AGM) and has the maps necessary to return to those locations.
- **Tracking:** Review which party is responsible for pig tracking.
- **Schedule:** What exact dates and times the vendor will conduct the inspection.
- **Landowner Contact:** Provide Landowner notification information that will be sent to properties that will be accessed by PG&E or Contractor personnel. Also discuss protocol if landowners question field personnel.
- **Safety and Environmental Hazards:** Discuss safety hazards, such as traffic, overhead lines, rectifier potentials, flora and fauna and other environmental concerns.
- **Notification Procedure:** The vendor shall notify the Project Manager when abnormal conditions or situations develop.

4.4.2 **Operation Safety:** PG&E shall follow all existing CGT Clearance Procedure requirements in launching, running and receiving pigs. These procedures detail clearance points, use man-on-line tags, etc.

4.4.3 **Contamination Prevention:** PG&E shall develop and implement a plan to collect and remove debris generated from cleaning and inspection operations and to minimize debris spreading to off-line taps and downstream customers on the pipeline. This plan may require the installation of filters and/or separators at receiver location or at major off-line taps. It may also require that taps be closed for the duration of the pigging project or pig run or temporarily closed during pig passage.

4.4.4 **Customer Service:** PG&E shall develop and implement a plan to accommodate customers being fed from pipeline to the extent reasonable and practical. These options may include temporary shutdown, back feed, cross-tie or alternative gas supply via CNG or LNG.

4.4.5 **Pig Tracking:** PG&E shall track all pigs which are run in the pipeline at spacing intervals adequate to ensure that pigs are operating within velocity parameters of cleaning or inspection requirements and to maintain the ability to locate the pig within the pipeline should it become lodged or damaged.

4.4.6 **Vendor Performance:** The In-Line Inspections shall be performed strictly in accordance with the approved specification. Any significant deviation from the specification shall be approved and documented in the EXCEPTION PROCESS (Form M) of this procedure described in Section 7.

4.4.7 **Verification of ILI Quality:** Prior to leaving the site, the ILI contractor shall verify that the run was of sufficient quality to ensure meaningful data about the anomalies and to meet the sizing accuracy and the geospatial requirements. The Project Manager should document variances and PG&E's acceptance of these variances.

5.0 Direct Examination

For a typical Direct Examination Process see the flow chart shown in Attachment A.

5.1 **Objective:** The objective of the Direct Examination phase is to:

- Validate the ILI Vendor's Report
- Verify the pipeline's integrity
- Perform necessary repairs
- Restore the pipeline's MAOP, if required
- Determine the root cause of corrosion or damage
- Complete an ILI Project Report

5.2 **Final ILI Vendor Report:** The contractor shall notify PG&E immediately when anomalies that are described by CFR 49, Part 192, Section O, as "immediate repair conditions" are identified (Table 5.5.1). No later than 180 days after the completion of the in-line inspection, the ILI contractor shall submit a final report. The notification shall include C-scans and dig sheets.

5.3 **Pressure Reduction Review Process:** Within **5 days** of receipt of the immediate anomalies report, the ILI program manager shall review the anomalies and take proper action to ensure pipeline safety according to the following steps:

5.3.1 **Create a list of "immediate" anomalies:** The ILI Program Manager shall review the immediate anomalies report and document them on Form F.

5.3.2 **Verify pipe specifications and re-assess each anomaly on Form F:** The ILI Program Manager shall determine the approximate location of each "immediate" anomaly and shall identify the relative consequences (class location, structures, etc.) in the vicinity of the anomaly, determine the actual pipe specifications and use RSTRENG to reassess the ILI tool Pf. Record the highest Pf value from RSTRENG calculation of each anomaly and prioritize the anomalies on Form F. If there are no "immediate" anomalies remaining on the list, Proceed to Section 5.5.

5.3.3 **Pressure Reduction:** If there are any "Immediate" anomalies left on Form F after reassessment of Pf, immediately reduce the operating pressure according to the following steps:

5.3.3.1 **Determine Pdiscovery (Pdis):** Pdis is defined as the pipeline pressure at the time the condition was discovered and for the purpose of this procedure the highest pipeline operating pressure during the ILIT run or the maximum operating pressure between the ILIT run and the time the immediate anomalies are identified will be used. This pressure shall be recorded on Form F.

5.3.3.2 **Pressure Reduction Limits:**

- If there are any non-corrosion anomalies or metal loss greater than 80% of wall thickness on Form F, the operating pressure shall be reduced to 80% of Pdis and proceed with Section 5.3.4.
- If all anomalies on Form F are corrosion metal loss anomalies, proceed with the following. For each anomaly on the short list calculate Ps by multiplying the Pf value by the class location design factor and record the pressure on Form F. The operating pressure shall be reduced to the higher of 80% of Pdis or the lowest Ps of all the anomalies on the short list.

5.3.4 **Operational/Pressure Change Concurrence:** If operational or pressure changes are required, the ILI Program Manager shall notify the GSM&TS Director, the Pipeline Engineering Manager and the System Integrity Manager. He shall then communicate and document all required operational/pressure changes to Gas System Operations (GSO) on Form F.

5.3.5 **Operational/Pressure Change:** GSO shall execute and order the required changes and the responsible superintendent shall ensure that the changes executed by GSO are implemented immediately. The ILI Program Manager shall review SP 4413 to determine if additional reporting is required to the CPUC.

5.4 **Immediate Anomaly Inspection/Repair Plan:** If the pressure of the pipeline needs to be restored prior to the receipt and verification of the Final ILI Report, the ILI Program Manager shall prepare and submit an Immediate Anomaly/Repair Plan (Form G) to the Project Manager.

5.4.1 **Field Inspection:** The Project Manager is responsible for all project management aspects of funding, initiating and completing the Immediate Anomaly/Repair Plan. See Section 5.5, for details.

5.4.2 **Root Cause Analysis:** See Section 5.8

5.4.3 **Operational/Pressure Change Concurrence:** After all immediate anomalies are inspected/repaired, the ILI Program Manager shall evaluate the repairs and determine the timing of restoring the MAOP. He shall then gain concurrence from the GSM&TS Director, the Manager of Pipeline Engineering and the Manager of System Integrity to restore the MAOP, communicate and document all required operational/pressure changes to Gas System Operations (GSO).

5.4.4 **Operational/Pressure Change:** GSO shall execute and order the required changes and the responsible district superintendent shall ensure that the changes executed by GSO are implemented.

5.5 **Inspection/Repair Plan:** Within 45 days of receipt of the final report, the ILI Program Manager shall prepare an inspection plan and submit to the Project Manager. The inspection plan shall be documented on Form G.

5.5.1 Prioritization of Anomalies: For each In-Line Inspection, the anomalies shall be prioritized following the criteria in Table 5.5.1. All anomalies prioritized as Immediate, Scheduled-one year and Scheduled-other, shall be recorded on Form G.

Table 5.5.1 In-Line Inspection Tool Anomaly Prioritization Guide

%SMYS at MAOP	Immediate	Scheduled – One Year	Scheduled - Other	Monitored
At or above 50%	• P/MAOP <=1.1 • Dents with metal loss, cracks or a stress riser • PG&E's judgment • SCC • Metal Loss > 80% W.T.	• A smooth dent with depth greater than 6% (0.5" in depth dent for 12" or smaller diameter pipe) • A smooth dent with depth greater than 2% (0.25" in depth dent for 12" or smaller diameter pipe) that affects girth weld or long seam	• P/MAOP <=1.39	• P/MAOP <=1.46 • d/t > 0.5 • All scheduled dents that engineering analyses demonstrate critical strain levels are not exceeded and left in place.
30% to 50%	• P/MAOP <=1.3 • Dents with metal loss, cracks or a stress riser • PG&E's judgment • SCC • Metal Loss > 80% W.T.	• A smooth dent with depth greater than 6% (0.5" in depth dent for 12" or smaller diameter pipe) • A smooth dent with depth greater than 2% (0.25" in depth dent for 12" or smaller diameter pipe) that affects girth weld or long seam	• P/MAOP <=2.0	• P/MAOP <=2.3 • d/t > 0.5 • All scheduled dents that engineering analyses demonstrate critical strain levels are not exceeded and left in place.
Less than 30%	• P/MAOP <=1.5 • Dents with metal loss, cracks or a stress riser • PG&E's judgment • SCC • Metal Loss > 80% W.T.	• A smooth dent with depth greater than 6% (0.5" in depth dent for 12" or smaller diameter pipe) • A smooth dent with depth greater than 2% (0.25" in depth dent for 12" or smaller diameter pipe) that affects girth weld or long seam	• P/MAOP <=2.73	• P/MAOP <=2.47 • d/t > 0.5 • All scheduled dents that engineering analyses demonstrate critical strain levels are not exceeded and left in place.

d/t – Defect depth to wall thickness ratio

5.5.2 Number of Excavations: The inspection plan shall specify the number and location of excavations. The required excavations are as follows:

- "Immediate": All Immediate anomalies (See Table 5.5.1) shall be excavated for direct examination.
- "Scheduled-one year": All Scheduled-one year anomalies (See Table 5.5.1) shall be excavated for direct examination.
- "Scheduled-other": If it is feasible and economical, all scheduled-other anomalies (See Table 5.5.1) shall be included in the inspection plan unless the Integrity Mgmt Program Manager approves a shorter re-inspection interval, so a lower P/MAOP value is used that allows them to be Monitored until next scheduled re-inspection, per Figure 5.5.2
- "Monitored": No Monitored anomalies (See Table 5.5.1) are required to be excavated under these specifications.
- Minimum Excavations: A minimum of two excavations shall be made for each ILI run. If there are no Immediate, Scheduled-one year or Scheduled-other anomalies, the Monitored anomalies may be selected for excavation by the ILI Program Manager. If two excavations are not sufficient to validate the ILI data, more excavations shall be performed.

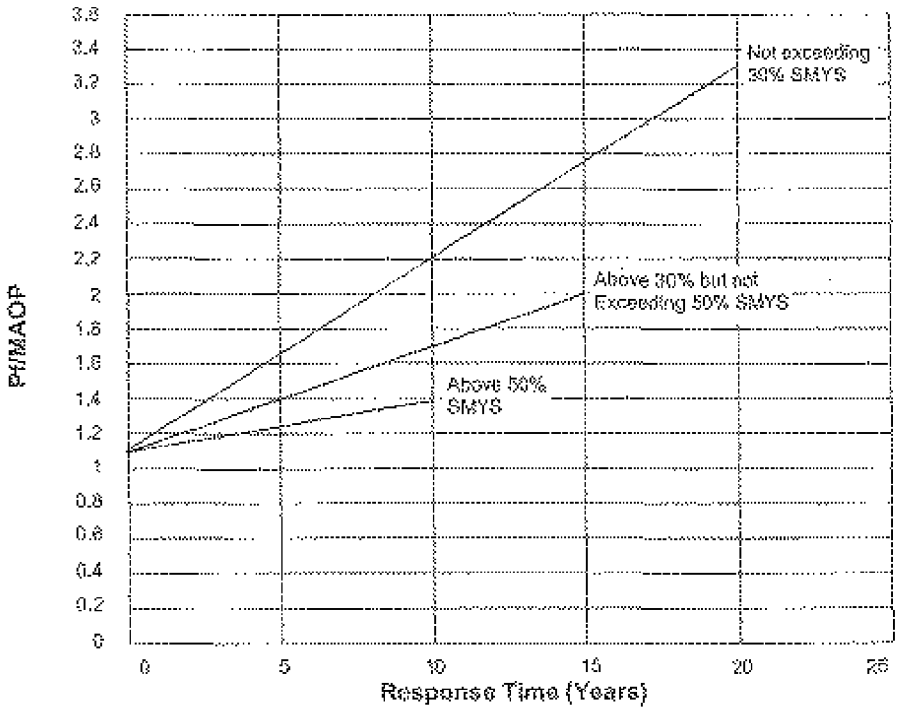

Figure 5.5.2
(ASME B31.8S, Section 7, Figure 4)
TIMING FOR SCHEDULED RESPONSES—TIME DEPENDENT THREATS
PRESCRIPTIVE INTEGRITY MANAGEMENT PLAN

5.5.3 **Documentation:** The Inspection Plan (Form G) shall be reviewed and approved by the ILI Program Manager and the Manager of System Integrity or his designate.

5.6 **Field Examination:** All Immediate anomalies on Form G shall be repaired not exceeding 365 days from the pressure reduction date (Form F) and the remaining excavations and repairs on Form G shall be completed within 366 days of receipt of the final report from the ILI vendor. For the purpose of the procedure, the date shown on the ILI vendor's report will be used. This step mitigates any Immediate, Scheduled – one year, and selected Scheduled – other anomalies in the Inspection Plan. It also validates the In-Line Inspection Vendor's Report. The step includes:

- Scheduling the excavations
- Excavating the anomalies and collecting data at the identified locations
- Comparing the field data with ILI data
- Evaluating remaining strength of the pipe segment
- Performing repairs, if needed

5.6.1 **Scheduling the Excavations:** The Project Manager is responsible for scheduling the excavations to ensure that they are performed with consideration of the order determined in section 5.5 and consideration of the excavation efficiency.

5.6.2 **Pipe Excavation and Data Collection:** The Project Manager shall schedule and monitor the excavations, until all excavations needed to validate the re-inspection interval are completed. The pipe shall be excavated in accordance with PG&E Utility Operations Guideline G14413 "*Procedure for Excavating Pipeline and Services*." In addition, the following requirements shall be met:

- **Location and Size of Excavation:** The location and size of the excavation site shall be identified and recorded on Form H: EXCAVATION DATA SHEET. Each end of the excavation shall be located and recorded with a GPS instrument. The length of the excavation shall be physically measured and recorded on Form H.
- **Data Collection:** Collecting data on the condition of the coating and the pipe at the excavation site is a key step of the ILI process. Either company personnel and/or the contractor can perform the data collection. The data that is to be collected for Form H is identified in Table 5.6.2. At least one of the excavation sites shall include wet magnetic particle inspection to test for SCC.
- **Qualified Personnel:** Pipe shall be inspected by a person that is qualified by PG&E Operator Qualification Program for the performance of the task "Corrosion Control 03-05." The person shall complete and sign the EXCAVATION DATA SHEET, Form H.

TABLE 5.6.2 DIRECT EXAMINATION DATA COLLECTION REQUIREMENTS (FORM H)

Data Element	Data Type	Required	Description
1.0 Before Coating Removal			
1.1	Holiday Testing	R	Holiday testing shall be performed at voltages consistent with manufacturers recommendations. For thin soft tester, the range shall be approximately 125 V/mil for epoxies. For other coating systems, the "wet sponge" device is preferred and the range shall be approximately 90-75 volts total.
1.2	Measurement of pipe to soil potential	R	These measurements shall be performed in accordance with NACE Standard TM 0497. The reference electrode shall be placed in the bank of the excavation and/or at the ground surface. These potential may help identify dynamic stray currents.
1.3	Soil Resistivity	R	Soil resistivity measurements shall be taken near the pipe but no closer than half of the pin spacing on the soil resistivity measurement device.
1.4	Soil Sample	D	Soil immediately adjacent to the pipe surface shall be collected with a clean spatula or trowel and placed in an 8 oz. plastic jar with a plastic lid. The sample jar should be packed full to displace as much air as possible. Tightly close the jar, seal with plastic tape and using a permanent marker to record the sample location on both jar and lid.
1.5	Ground Water Samples	D	Ground water sample shall be taken if water is present in excavation. Water should always be collected from the open ditch when possible. Completely fill the plastic jar and seal and identify location as described above.
1.6	Coating Condition	R	Documentation of general coating condition. Three conditions could exist 1) Coating is in good condition and completely adhered to pipe. 2) Coating is in fair condition and is partially disbonded and/or degraded. 3) Coating is in poor condition and completely missing and the pipe surface is bare.
1.7	Photo Documentation	R	Document the coating condition with digital camera. Photos shall have ruler or other device to determine magnification of photographs showing details of the pipe and coating condition. Macro as well as perspective views shall be recorded.
1.8	Mapping of Coating Degradation	R	All areas of coating degradation, locations of cathodic deposits, blistering, disbondment, and other anomalous conditions in the coating shall be mapped.
1.9	Coating Sample	D	A sample of the coating shall be obtained if the coating is partially or fully disbonded. This sample will be used to determine the electrical and physical properties of the coating as microbial tests.
1.10	Under coating liquid analysis	R	If any liquid is detected underneath the coating a sample shall be collected for pH determination and chemical constituents.
1.11	Corrosion Product Removal	R	Carefully remove any corrosion deposit for analysis
1.12	Soil pH	R	An antiseptic reference electrode shall be utilized to perform this measurement. SS electrode shall be properly cleaned prior to use.
2.0 After Coating Removal			
2.1	Pipe Temperature	D	Measure the bare pipe surface temperature.
2.2	Weld Seam Identification	D	The type of weld seam shall be identified and recorded.
2.3	Girth Weld Coordinates for RJ Excavation	R	Record GPS coordinates of girth weld so that they can be utilized as a reference to the location of the anomaly identified by the ILI run.
2.4	Examination of External Corrosion	R	Careful examination of the corrosion surface shall be conducted to collect data to determine visually if corrosion is active or inactive.
2.5	Other Damage	R	Other damage to the pipe surface that can be visual detected shall be recorded. Examples of such damage would include gouges, cracking, dents and out of roundness
2.6	UT Wall Thickness Measurements	R	Ultrasonic wall thickness shall be taken at every quadrant on the pipe to establish original/nominal wall thickness.
2.7	Wet Mag Particle Inspection	D	Wet magnetic particle inspection may be performed to test for SCC and other linear anomalies
2.8	Photographic Documentation of Corroded Area	R	The corroded surface shall be photographed, preferable with a digital camera to document the morphology.
2.9	Mapping and measurement of corrosion areas	R	Corrosion damage shall be measured sufficiently to enable accurate RSTRENG analyses of the corrosion area. A grid of wall loss measurements shall be taken over the entire corroded areas. The grid shall be oriented so that columns are circumferentially oriented on the pipe and the rows be parallel to the longitudinal axis of the pipe. The grid size should be sufficiently fine to document the variation of wall thickness but in no case shall be greater than a one-inch mesh. Record the pit depths of the corroded area in a grid format for small corrosion areas (less than 2" in length), use ¼" grid spacing. For larger corroded areas, grid spacing shall be designed to obtain approximately 10 wall measurements along the length of the corroded area.
2.10	Recoat Type	D	Include a description of the recoat product used. This will be used as a check to assure that the correct coating has been used for each environment, and that all critical application parameters are met.
3.0 Repair Data			

Data Element	Data Type	Required	Description
3.1	Sandblast Media	D	Document and measure media used and actual anchor profile.
3.2	Soil Type	R	Record the soil type found. Examples are clay, sand, loam, etc.
3.3	Environmental Conditions	R	Record actual environmental conditions at the time of recoating activity.
3.4	Repair Coating Data	D	Document actual hardness, thicknesses, and holiday test data prior to backfill.
3.5	Coupon Test Stations	R	Document that coupon test stations or ETS's have been installed.
3.6	Backfill material	R	Note any change in backfill material or the addition of a protective layer on the coating.
3.7	P/S readings	R	Measure and record the final P/S readings after backfilling the test hole.

5.6.3 **Comparing Field Data with ILI Data:** This step is to compare the field data with the ILI reported data in terms of locations and sizing of the anomalies. The result will be used to validate the ILI inspection. Refer to Form J "FIELD DATA AND ILI DATA COMPARISON."

5.6.4 **Evaluating Remaining Strength:** The RSTRENG calculation is performed and the summary is recorded on Form I "DIRECT EXAMINATION SUMMARY" for the exposed corroded areas to evaluate the remaining strength of the pipe. The RSTRENG calculations are used to determine the following:

- **Predicted Failure Pressure:** The Pf shall be calculated using RSTRENG for each corroded area that is direct examined and determine if action needs to be taken. Other analytical techniques may be used if approved by the Manager of System Integrity or his designate. An individual trained and qualified to use RSTRENG shall make these calculations. Records of the qualification shall be maintained in the Integrity Management Program file.
- **Reassessment Interval:** The ratio of Pf/MAOP is a key factor in determining the reassessment interval (Table 5.6.5).
- **Repair Requirements:** In general, all corroded areas with *Pf* less than those shown in Table 5.6.5 shall be repaired so that the maximum re-inspection interval can be achieved.

5.6.5 **Performing Repairs:** Standard Practice CGT Standard S4134 shall be followed by the ILI Engineer to determine if and how the anomalies should be repaired. Any exceptions shall be documented on Form M "EXCEPTION REPORT" and approved by the Manager of System Integrity.

TABLE 5.6.5 MINIMUM PF TO JUSTIFY MAXIMUM RE-INSPECTION INTERVAL[1]

INTERVAL (YEARS)	CRITERIA		
	AT OR ABOVE 50% SMYS	AT OR ABOVE 30% UP TO 50%	LESS THAN 30% SMYS
MAXIMUM	*Pf* above 1.39 times MOP	*Pf* above 2.0 times MOP	*Pf* above 3.3 times MOP

5.7 **MAOP Restoration Review/Concurrence:** If the pipeline pressure has been reduced, the ILI Program Manager shall evaluate the repairs and determine the timing of restoring the MAOP. He shall then gain concurrence from the GSM&TS Director, the Manager of Pipeline Engineering and the Manager of System Integrity to restore the MAOP, communicate and document all required operational/pressure changes to Gas System Operations (GSO).

5.7.1 **Operational/Pressure Change:** GSO shall execute and order the required changes and the responsible district superintendent shall ensure that the changes executed by GSO are implemented.

[1] ASME B31.8S 2001, *Supplement to B31.8 on Managing System Integrity of Gas Pipelines*, pg. 27, Figure 4

5.8 Root Cause Analysis

Procedure: The ILI Program Manager **shall** ensure that a root cause analysis is performed on all Direct Examined pipe. Where it is determined that a significant number of direct examined anomalies are due to the same cause, a common single root cause report shall be sufficient. Where multiple causes are implicated, the number of root cause investigation shall be increased to adequately document the individual causes.

Documentation: The root cause of all Direct Examined pipe **shall** be documented on Form K "ROOT CAUSE ANALYSIS REPORT."

5.8.1 **Description of Damage:** Types of damage observed e.g. coating, pipe, and damage mechanism (external corrosion, third party, etc.).

5.8.2 **Extent of Damage:** Review GIS and other historical maintenance data to determine if they may assist in quantifying the extent of the damage or the needed extent of the mitigation activities.

5.8.3 **Review of Existing Damage Mitigation Measures:** Review of the existing mitigative measures that should address the threat causing the damage. Describe any problems with existing mitigation.

5.8.4 **Root Cause of Damage:** As a result of the review of the damage, historical data, and the existing mitigative measures, describe the root cause of the damage found.

5.8.5 **Review of Damage Mitigation Measures Taken:** Describe the actions taken to mitigate the damage found as a result of the ILI.

5.8.6 **Evaluation of additional Mitigation Efforts:** Describe any additional mitigation efforts that may help address the root cause of the damage. This may include coating replacement, the installation of additional CP, Landowner notifications, etc.

5.8.7 **Evaluation of need for additional testing:** If the root cause analysis identifies a mechanism that the ILI process is not well suited to detect, then it **shall** be documented on Form M and brought to the attention of the Manager of System Integrity.

5.9 In-Line Inspection Final Report

Responsibility: Within 90 days after the ILI run, subsequent direct examinations and root cause analyses are complete, the ILI Program Manager **shall** be responsible for developing the final report and submit to the Manager of System Integrity for approval.

5.9.1 **Report Content:** The report **shall** have the following content.

- **Purpose and Scope:** Discussion of why the ILI was performed and the scope of the project (Job estimate, ILI specification, and contract).
- **Pre-Assessment Report:** Documentation of the ILI feasibility, Forms A, B and C.
- **AGM Locations:** Documentation of AGM locations, Form D.
- **ILIT Vendor Qualification:** Documentation of the ILIT vendor qualification, Form E.
- **ILIT Operation Report:** Summary documentation of how the ILIT field operation went. It should include, but not limited to; pipe segments where inspections were performed as well as the dates they were conducted, whether the specifications were followed, list of personnel conducting the inspection, ILIT pre-inspection calibration record, exceptions, cleaning operation, geometry inspection, pig tracking spreadsheet, in-line inspection, etc.
- **ILI Vendor Report:** Documentation of All Immediate, Scheduled - one year, Scheduled - other and Monitored anomalies (Attach ILIT spreadsheet). Also include the ILI vendor report that includes the hard copy, associated software, and electronic data provided by the ILI vendor.
- **Direct Examination Report:** Documentation of all direct examinations, Forms F, G, H, I and J.
- **Root Cause Analysis:** Documentation of root cause analysis, Form K
- **Exception Reports:** Documentation of exceptions report, Form M.

6.9.2 GIS Anomaly Documentation: All Immediate, Scheduled-one year, Scheduled-other, and Monitored anomalies listed in ILI Indication Report and the Direct Examination Report shall be documented in GIS including but not limited to the following information for data integration and future monitoring:

- Geographic Location: In UTM, Zone 10, NAD83, meters.
- ILI Log Distance
- Severity Prioritization: Whether it is Immediate, Scheduled-one year, Scheduled-other, or Monitored
- Type of Anomaly: Ext ML, Int ML, Dent, etc.
- Relative Location of Anomaly: Anomaly on pipe, weld or close to girth weld
- O'clock position: Location around the circumference
- Size: Maximum depth, length and width per ILIT
- Box: Cluster and Cluster ID
- ILIT Pf: Calculated (Pf) derived from Vendor's ILIT report
- Direct Examination (Y or N)
- Actual Size: Maximum depth, length and width per direct examination, if available.
- RSTRENG Pf: Calculated (Pf) derived from direct examination, if available
- Pf/MAOP: Use RSTRENG failure value for Pf, if available. Otherwise, use ILIT report Pf.
- Record of Repairs: Type of repair, date of repair, if available
- Quality Assurance
- ILI date: Date of the ILI run
- Vendor Name: ILI Vendor

6.9.3 Distribution: A hard copy of the final report shall be distributed to the Integrity Management Program Manager for filing in the Integrity Management Library (Kettleman Conference Room 200). An electronic copy of the final report shall be distributed to the following persons:

- ILI Program Manager
- Integrity Management Program Manager
- ILI Technical Consultant
- Pipeline Engineer responsible for the pipeline
- District Superintendent/Distribution T&R Supervisor responsible for the pipeline

6.0 Post Assessment

Objective: The objective of the Post Assessment process is to develop a Post Assessment plan to mitigate any significant deficiencies identified by the Root Cause Analysis and the ILI final report. The plan shall include assigning re-inspection intervals and assessing/monitoring the overall effectiveness of the ILI process.

Responsibility: After completing the ILI Final Report, the ILI Program Manager will turn over the project to the Integrity Management Program Manager who shall be responsible for determining and documenting the re-inspection interval, ensuring the re-inspection occurs prior to the end of the interval, and that a project is planned to mitigate any significant deficiencies identified by the Root Cause Analysis and the ILI Final Report. The Manager of System Integrity shall approve the Post Assessment Plan.

Documentation: The Post Assessment Plan including re-inspection interval for the pipeline segment shall be recorded on Form 1.

6.1 Re-Inspection Intervals: The Integrity Management Program Manager will review the anomalies in the ILI report that are not direct examined and the root cause analysis to determine the appropriate re-inspection intervals and recommend any additional long-term mitigation that needs to be done. Maximum re-inspection interval is provided in Table 6.1.

TABLE 6.1 TIMING SCHEDULE RESPONSES – TIME DEPENDENT THREAT[1]

INTERVAL (YEARS)	CRITERIA		
	AT OR ABOVE 50% SMYS	AT OR ABOVE 30% UP TO 50%	LESS THAN 30% SMYS
5	PF above 1.25 – 1.39 times MAOP	PF above 1.4 – 1.7 times MAOP	PF above 1.7 – 2.2 times MAOP
10	PF above 1.39 times MAOP	PF above 1.7 – 2.0 times MAOP	PF above 2.2 – 2.8 times MAOP
15	Not Allowed	PF above 2.0 times MAOP	PF above 2.8 – 3.3 times MAOP
20	Not Allowed	Not Allowed	PF above 3.3 times MAOP

6.2 **Data Integration:** The following systems will be updated to ensure on-going data integration

GIS: All Immediate, Scheduled-one year, Scheduled-other, and Monitored anomalies will be incorporated into the ILI anomaly theme. In addition, the Risk Mitigation theme will be updated to reflect the recent inspection of the pipeline segment. If the inspection reveals any data discrepancies in GIS, these will also be updated.

Integrity Management Plan: The integrity management plan for the pipeline segment will be updated to reflect the ILI inspection results.

Integrity Management Schedule: The Integrity Management Schedule will be updated with the re-inspection date for the pipeline segment.

Long-term Mitigation: A project may be scheduled to mitigate any significant deficiencies identified by the root cause analyses.

7.0 Exception Process

Objective: The objective of this section is to provide control and documentation of exceptions taken. This control and documentation is required to ensure the compliance with the ILI process, to continuously improve the process by providing feedback, and to have an auditable trail. It is expected that all requirements of this procedure be met in conducting an ILI. However, when it is not feasible to meet certain requirements then exceptions can be taken by obtaining approval; and documenting the exceptions as prescribed in this section.

Documentation: Document the above steps on Form M - EXCEPTION REPORT. Include all exception reports in the ILI project final report.

7.1 **Exception Requirements:** The following process is required for taking an exception with this procedure. It shall be documented on Form M - EXCEPTION REPORT:

- **Paragraph Number of Exception:** State the specific paragraph number where the exception is being taken.
- **Requirements of Paragraph:** Briefly state in your own words the requirements of the paragraph.
- **Alternative Plan:** State what is proposed instead of what is required in the procedure.
- **Reason for Exception:** Provide the reason the exception is needed.
- **Recommendation:** Indicate if it is recommended to change the procedure or if this exception is project specific.
- **Approval:** Obtain approval from the Manager of System Integrity or his designate prior to acting on the exception.

[1] ASME B31.8S 2001, *Supplement to B31.8 on Managing System Integrity of Gas Pipelines*, pg. 27-6, Figure 4 (Section 5, Figure 5.5)

8.0 Documentation and Record Keeping

Purpose: Table 8.0 summarizes the required forms and authorizations for each paragraph of the ILI process.

TABLE 8.0 - DOCUMENTATION AND RECORD KEEPING REQUIREMENTS

PARAGRAPH	FORM	PURPOSE	AUTHORIZATION
3.0 PRE-ASSESSMENT	A	Data Element Check List	ILI Engineer
	B	Sufficient Data Analysis	ILI Engineer
	C	Feasibility Analysis	ILI Program Manager (This form includes the authorization of Forms A&B also.)
4.0 IN-LINE INSPECTION	D	AGM Locations	ILI Engineer
	E	ILI Vendor Qualification Form	ILI Program Mgr
5.0 DIRECT EXAMINATION	F	Immediate Anomalies Analysis	ILI Program Mgr
	G	Indication Prioritization and Direct Examination Form (Inspection/Repair Plan)	ILI Program Mgr Manager of System Integrity
	H	Document all immediate and scheduled anomalies	ILI Engineer or Corrosion Engineer
	I	Direct Examination Summary	ILI Program Manager
	J	Field Data and ILI Data Comparison	ILI Program Manager
	K	Root Cause Analysis	Manager of System Integrity
	A thru K and M	Final Report	Manager of System Integrity
6.0 POST ASSESSMENT	L	Post Assessment Plan	Manager of System Integrity
OTHER	M	Exception Reports	Manager of System Integrity

APPENDIX A
ILI Forms

FORM A: DATA ELEMENT CHECK SHEET

ROUTE NUMBER: _____

STARTING MILE POINT: _____

ENDING MILE POINT: _____

REFERENCE SECTION: TASK 3.3.1

PROJECT MANAGER: _____

	Description	Requirements			Data Source					Sign Off	
ID #	Data Element Description	Need[1]	In-Line Inspection Tool Selection[2]	Interpretation and Analysis of Inspection Results[2]	GIS	As-built Job Pkg.	Field	Districts or Divisions	Other	Sign-off	Comments
Pipe Material Properties											
1.1	Diameter	R	R	R	X	X					
1.2	Wall thickness	R	R	R	X	X					
1.3	Grade	R	NR	R	X	X					
1.4	Seam Type	D	NR	C	X	X					
Pipe Construction Related											
2.1	Year installed	D	NR	C	X	X					
2.2	Section route changes/ modifications that may not be in GIS	D	C	NR		X	X	X			
2.3	Construction practices	D	C	C		X			Engr. Std. drawings		
2.4	Presence of major pipe appurtenances such as valves, and taps	R	R	C	X	X	X				
2.5	Presence of welds, including major bends and weld to bends	R	R	C		X			Trans. Pipl Spec		

[1] R = Required, D = Desired (See paragraph 2.3 for definitions)

[2] R = Required, C = Considered

FORM A: DATA ELEMENT CHECK SHEET

ROUTE NUMBER: _____
STARTING MILE POINT: _____
ENDING MILE POINT: _____

REFERENCE SECTION: Table 3.3.1

PROJECT MANAGER: _____

	Description	Requirements			Data Source					Sign Off	
ID #	Data Element Description	Need[1]	In-Line Inspection Tool Selection[2]	Interpretation and Analysis of Inspection Results[3]	GIS	As-built Job File	Field	Districts or Division	Other	Sign off	Comments
2.6	Presence of casings	D	N/R	C		X	X	X			
2.7	Proximity to other pipeline structures, HV electric transmission lines and rail crossings	D	C	C	X		X				
3.0 Soil Environment											
3.1	Soil characteristics & types	D	C	C	X		X		Form 4110		
3.2	Assessment of environmental conditions	D	N/R	C	X		X				
4.0 Corrosion Control											
4.1	CP system type (anodes, rectifiers, and locations)	D	N/R	C			X		CPA Records		
4.2	Stray Current sources/locations	D	N/R	C			X	X	CPA Records, Past Survey Reports		
4.3	Test point locations (pipe access points)	D	N/R	C	X		X	X	CPA Records		
4.4	CP evaluation criteria	D	N/R	C					CPA Records, Paradigm		
4.5	CP maintenance history	D	N/R	C				X	CPA Records, Paradigm		
4.6	Years without CP applied	D	N/R	C		X		X			
4.7	Coating type	D	N/R	C	X	X					
4.8	Coating condition	D	N/R	C	X			X	Direct Assessment		

RMP-11

FORM A: DATA ELEMENT CHECK SHEET

ROUTE NUMBER: _____
STARTING MILE POINT: _____
ENDING MILE POINT: _____

REFERENCE SECTION: Table 3.3.1

PROJECT MANAGER: _____

	Description	Requirements			Data Source					Sign Off	
ID #	Data Element Description	Need[1]	In-line Inspection Data Collected[2]	Interpretation and Analysis of Inspection Results[3]	GIS	As-built Job File	Field	Electronic or Previous	Other	Sign off	Comments
4.9	Current demand	D	N/R	C				X	CPA Records		
4.10	CP survey data/history	D	N/R	C					CPA Records, Paradigm, Corrosion Group		
5. PIPELINE INTEGRITY											
5.1	Operating stress level, pressure, flow rate	R	R	R	X				GIS, TSP		
5.2	Monitoring programs (pump) leak surveys data	D	N/R	C					Corrosion Group, Form 4110		
5.3	Pipe inspection reports/ excavation	G	N/R	C	X			X	Form 4110		
5.4	Repair history records, excavation/ field repair reports, report location	D	N/R	C	X			X	Form 4110		
5.5	Leak/rupture history	D	N/R	C	X			X	Form 4110		
5.6	Type and frequency of third party damage. Review construction activities with operating personnel.	R	N/R	R	X		X	X	Form 4110		
5.7	Other prior integrity related activities – CIS, DA runs, etc.	R	N/R	R	X				Corrosion Group, System Integrity		
5.8	Hydro test dates/pressures	D	N/R	C	X	X					

ILI Engineer: _____ Date: _____

RMP-11

Form B: Sufficient Data Analysis Form

REFERENCE: SECTION 3.7

ROUTE NUMBER:

STARTING MILE POINT:

ENDING MILE POINT:

PROJECT MANAGER:

SUFFICIENT DATA ANALYSIS

Missing Required Data Elements

ID#	Data Element Description	Pipe Segments	Reason for missing data	Explanation why it is not needed (if any)

Sufficient Data: Yes____ No____ ILI Engineer: _____ Date: _____

Form C: Feasibility Analysis Form

ROUTE NUMBER: _____
STARTING MILE POINT: _____
ENDING MILE POINT: _____

REFERENCE SECTION: SECTIONS 3.6

PROJECT MANAGER: _____

Instructions: Analyze each data and note any of the issues listed below. In answering the question include the following:

1) Any adverse conditions that may make the pipe segments unusable to ILI. Refer to Table 3.3.1 for guidance.
2) Any special considerations, techniques that need to be incorporated or considered in conducting the ILI to overcome the adverse conditions
3) A conclusion on the feasibility of conducting an ILI for all the pipe segments in the ILI project

ILI FEASIBILITY ANALYSIS

ID #	Data Categories	In-Line Inspection Can existing In-Line inspection tools be applied to the pipe segments identified in the ILI project and be expected to provide meaningful results on potential locations where the pipe wall is damaged?	Direct Examination Is it physically and economically feasible to gain access to the pipeline to conduct direct examination and be expected to gain meaningful data?
1.0	Pipe Related		
2.0	Construction Related		
3.0	Soils/Environmental		
4.0	Corrosion Control		
5.0	Operational Data		

ILI Feasible: Yes ____ No ____

ILI Engineer: _____ Date: _____

ILI Program Manager: _____ Date: _____

NOTE: Signing this form confirms authorization of forms A-C.

RMP-11

Form B: Above Ground Marker Locations

Reference Section: Section 4.2

Route Number: _____

Starting Mile Point: _____

Ending Mile Point: _____

Project Manager: _____

Above Ground Marker #	Mile Point (From GIS)	Above Ground Distance Between AGMs	ILI Log Distance	Easting (UTM NAD83)	Northing (UTM NAD83)	Ground Elevation (UTM NAD83)	Depth of Cover[1]	Type of AGM[2]	Type of Marker[3]	Comments

Project Manager: _____ Date: _____

ILI Engineer: _____ Date: _____

[1] To top of pipe

[2] Examples include – Point on line, major pipe appurtenances

[3] Examples include – Concrete, iron pipe, rebar, nail and shine, etc.

RMP-11

Form E: ILI Vendor Qualification Form

REFERENCE: SECTION 4.3

ILI METHOD: _____

VENDOR NAME: _____

INSTRUCTIONS: Paragraph 4.3.1.4 of the ILI Procedure provides instructions on completing and filing of this form.

Specification Content Review

Acceptable	Not Acceptable		Comments
☐		Safety	
☐		Sizing Accuracy	
☐		Caliper Accuracy	
☐		Geospatial Accuracy	
☐		Operator Qualification	
☐		Schedule	
☐		Report Format	

General Comments/Exceptions: _____

Approved	Not Approved	
☐		Comment: _____

ILI Engineer: _____ Date: _____

ILI Program Mgr: _____ Date: _____

Form F: Immediate Anomalies Analysis
(To be completed when Immediate Anomalies are received.)

STARTING MILE POINT: ______________
ENDING MILE POINT: ______________

REFERENCE SECTION: Section 5.3
ROUTE NUMBER: ______________
ILI RUN DATE: ______________
PG&E NOTIFICATION DATE: ______________
PROJECT MANAGER: ______________

ILI Data							ENGINEERING						Assessment					
MP	ILI Log Distance	Type of Indication[1]	% Thru Wall	% Dent	Length	[illegible] (ILI Report)	O.D.	W.T.	Grade	Class Location	[illegible]	[illegible]	MAOP	[illegible]	[illegible]	[illegible]	[illegible]	Comments

Per the evaluation above, the safe operating pressure is: ______________
GSO Notification Date: ______________
Pressure Reduction Date: ______________

ILI Program Manager: ______________ Date: ______________

---

[1] Metal loss-external, metal loss-internal, dents, etc.
[2] See Table 5.5.1
[3] Pdis equals the highest pressure during the ILIT run or the maximum pressure between the ILIT run and the time the immediate anomalies are identified.

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Form G: - Anomaly Prioritization and Direct Examination Form (Inspection/Repair Plan)
(To be used when ILI Final Report is received.)

ROUTE NUMBER: ____________________
STARTING MILE POINT: ____________________
ENDING MILE POINT: ____________________

REFERENCE SECTION: ______SECTIONS 5.4, 5.5______
ILI FINAL REPORT DATE: ____________________
ILI RUN DATE: ____________________
PROJECT MANAGER: ____________________

	ILI Report								RSTRENG					Assessment					
Order of Excavation	MP	ILI Log Distance	Type of Indication[1]	% Thru Wall	% [illegible]	Length	O'clock Position	PF/MAOP (ILI Report)	O.D.	W.T.	Grade	Class Location	Pf	MAOP	PF/MAOP (RSTRENG)	%SMYS at MAOP	Priority[2]	Dig (Y/N)	Comments

ILI Engineer: ____________________ Date: ____________________

ILI Program Manager: ____________________ Date: ____________________

Manager of System Integrity: ____________________ Date: ____________________

[1] Metal loss-external, metal loss-internal, dents, etc.
[2] See table 5.5.1

RMP-11

FORM H: DIRECT EXAMINATION DATA SHEET 1 OF 2

ECDA/ILI | **ECDA** | **ILI**

ROUTE NUMBER: _____ IMA NUMBER: _____ ILI LOG DISTANCE: _____

DATE OF EXCAVATION: _____ REGION NUMBER: _____ RMP-11 REF. SECTION: Table 5.6.2

MILE POINT: _____ DATE REQUIRED: _____

EXAMINATION PERFORMED BY: _____

PROJECT MANAGER: _____

APPROVED BY: _____

ORDER NUMBER: _____

EXCAVATION PRIORITY: ☐ IMMEDIATE ☐ SCHEDULED (FOR ILI - ☐ 1 YEAR ☐ OTHER) ☐ MONITOR

EXCAVATION REASON: ☐ ECDA ☐ ILI ☐ REGDAT

PLANNED EXCAVATION DETAILS: CENTERLINE GPS COORDINATES:

NORTHING: _____ PLANNED EXCAVATION LENGTH (FT.): _____

EASTING: _____ ACTUAL EXCAVATION LENGTH (FT.): _____

ACTUAL CENTERLINE GPS COORDINATES:

NORTHING: _____ PIPE DIAMETER (IN.): _____

EASTING: _____ CENTERLINE DEPTH OF COVER (FT.): _____

COATING TYPE: ☐ HAA ☐ SOLVENTS ☐ TAPE ☐ FBE ☐ OTHER-EPOXY ☐ BARE/NONE ☐ PAINT ☐ OTHER: _____

IF PRACTICAL, TAKE P/S OR CIS READS BEFORE EXCAVATION: _____

1.0 DATA BEFORE COATING REMOVAL

1.1 HOLIDAY TESTING PERFORMED?: ☐ YES ☐ NO VOLTAGE USED: _____ LOCATION OF HOLIDAYS MARKED BELOW? ☐ YES ☐ NO

DEVICE USED: ☐ CAPE ☐ WET SPONGE

1.2 PIPE-TO-SOIL POTENTIALS IN DITCH (-MV): _____

COMMENTS: _____

1.3 SOIL RESISTIVITY IN DITCH (Ω-CM): _____

METHOD: ☐ 4-PIN ☐ SOIL BOX

1.4 SOIL SAMPLE(S) COLLECTED?: ☐ YES ☐ NO

1.5 GROUND WATER PRESENT? ☐ YES ☐ NO SAMPLE(S) COLLECTED?: ☐ YES ☐ NO

COMMENTS: _____

1.6 COATING CONDITION: ☐ GOOD – ADHERED TO PIPE ☐ FAIR – COATING PARTIALLY DISBONDED OR DISTORTED ☐ POOR – COATING COMPLETELY MISSING, PIPE BARE

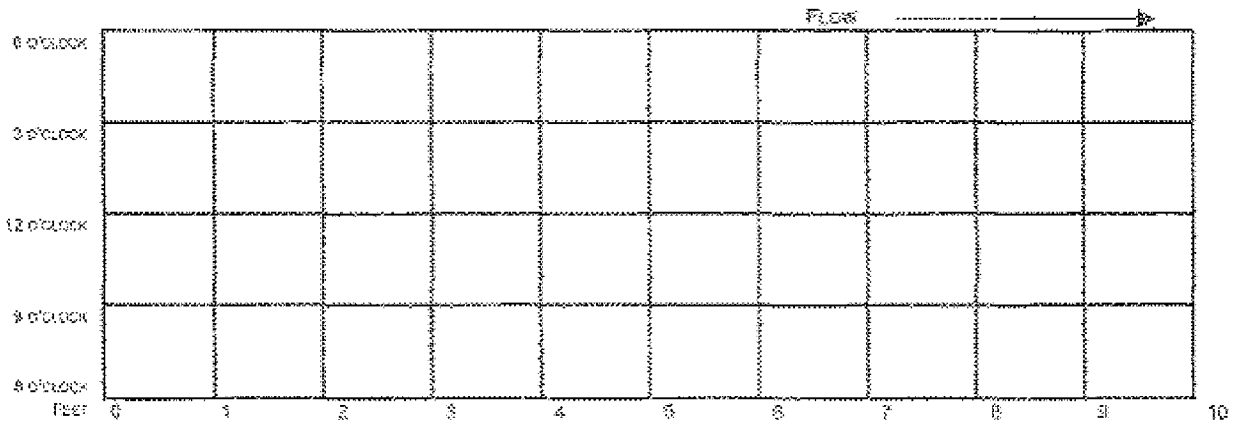
COMMENTS: _____

1.7 PHOTOS TAKEN?* ☐ YES ☐ NO

*SEE PHOTO LOG FOR ADDITIONAL INFORMATION.

1.8 MAP OF COATING DEGRADATION*: ZERO REFERENCE POINT: _____

*NOTE ANY GALVANEGIC OFFSET LOCATIONS



1.8 COATING SAMPLE TAKEN? ☐ YES ☐ NO LOCATION OF SAMPLE: _____

RMP-11

Form H: Direct Examination Data Sheet 2 of 2

ECDA/ILI | **ECDA** | **ILI**

Route Number: _____ MA Number: _____ ILI Log Distance: _____

Date of Excavation: _____ Region Number: _____ RMP-11 Ref. Section: Table 5.6.2

Mile Point: _____ Date Required: _____

Examination Performed By: _____

Project Manager: _____

Approved By: _____

Excavation Priority: ☐ Immediate ☐ Scheduled (For ILI - ☐ 1 year ☐ Other) ☐ Monitor

Excavation Reason: ☐ ECDA ☐ ILI ☐ Recoat

1.10 Liquid Underneath Coating? ☐ Yes ☐ No If Yes, pH of Liquid: _____

1.11 Corrosion Product Present? ☐ Yes ☐ No If Yes, Was Sample Taken? ☐ Yes ☐ No

Comments: _____

1.12 Soil pH (SB electrode): _____

2.0 Data After Coating Removal

2.1 Pipe Temperature (°F): _____ 2.2 Weld Seam Type: ☐ DSAW ☐ SSAW ☐ ERW ☐ SMLS ☐ Spiral ☐ Lap ☐ Flash ☐ AO Smith

2.3 Girth Weld Coordinates for ILI Excavation

Northing: _____

Easting: _____

2.4 Identification of Corrosion ☐ Active ☐ Inactive

Comments: _____

2.5 Other Damage: _____

2.6 UT Wall Thickness Measurements: TDC: _____ 3 O'clock: _____ 6 O'clock: _____ 9 O'clock: _____

UT Wall Thickness Grid @ 0.0: ☐ Yes ☐ No If Yes, attach grid.

Excessive Laminations Present? ☐ Yes ☐ No If Yes, report average hardness: _____

2.7 Wet Mag. Particle Inspection Performed? ☐ Yes ☐ No

If Mag. particle inspection performed, were there any linear indications? ☐ Yes ☐ No If Yes, attach TES report and disposition.

2.8 Photos Taken?* ☐ Yes ☐ No

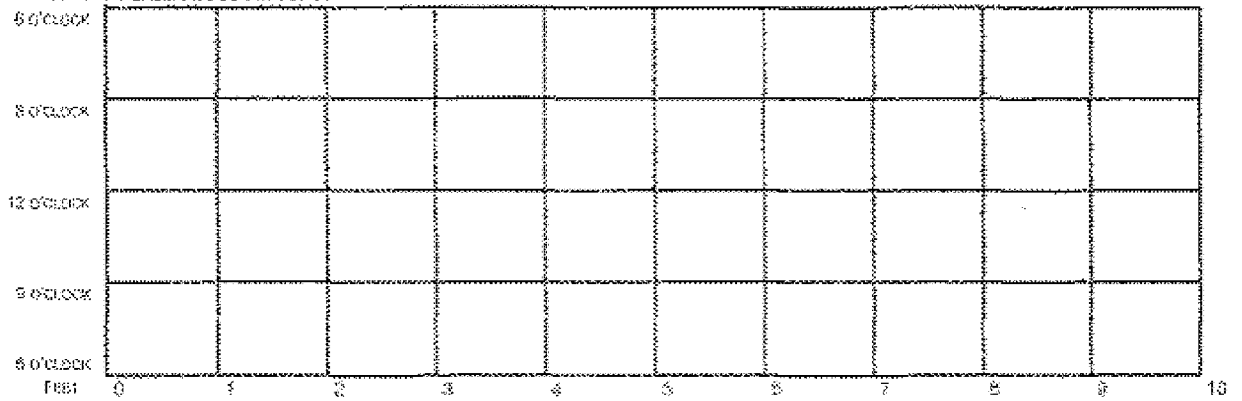
*See photo log for additional information.

2.9 Overview Map of Corroded Area*:

*See pit depth measurement grid for additional information

Zero Reference Point: _____

*Note any calcareous deposits.



2.10 Pipe Recoated With: *See recoat data for additional information

☐ Powercrete J ☐ Wax Tape ☐ Bar-Rust 235 ☐ Dev Grip 238 ☐ Dev Tar 247 ☐ Protal 7200 ☐ PE Tape

RMP-11

Form H

PIT DEPTH MEASUREMENT GRID SHEETS

ECDA/ID: _____ SCDA: _____ ILI: _____

ROUTE NUMBER: _____ IMA NUMBER: _____ ILI LOG DISTANCE: _____

DATE OF EXCAVATION: _____ REGION NUMBER: _____ RMP-11 REF. SECTION: Table 5.6.2

MILE POINT: _____ DATE RECEIVED: _____ REFERENCE GIRTH WELD: _____

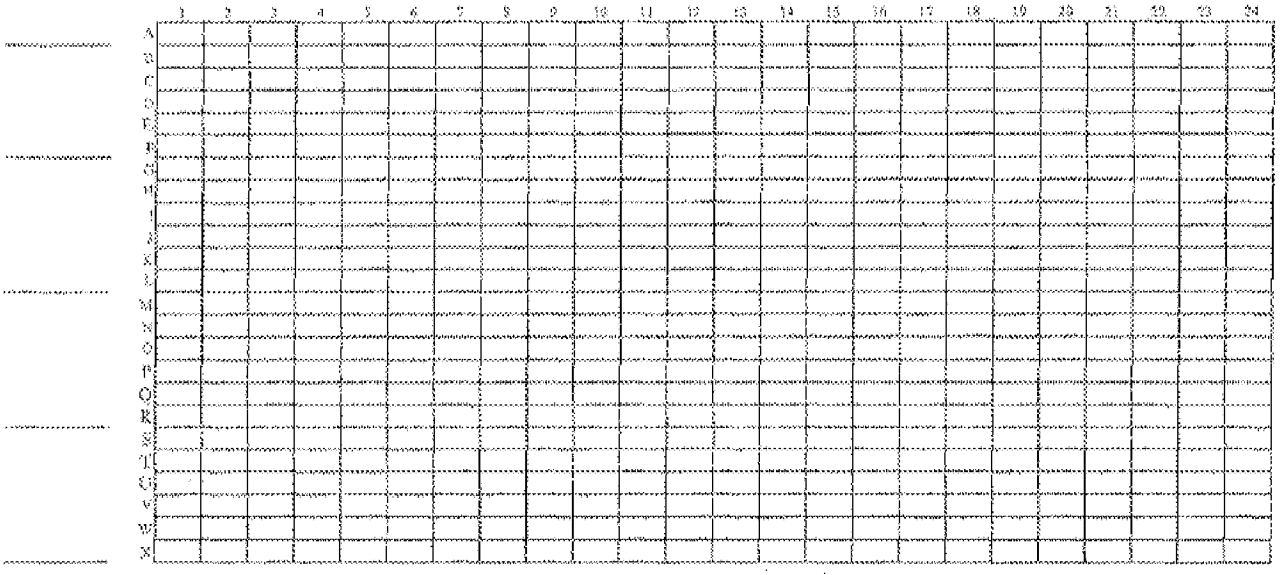
EXCAVATION PERFORMED BY: _____ DISTANCE FROM GIRTH WELD: _____

PROJECT MANAGER: _____

APPROVED BY: _____

GRID SIZE = _____ INCH x _____ INCH (SPECIFY GRID SIZE)

Check Position (Specify below)



PIT DEPTH GRID 1 OF 2

Form H

PIT DEPTH MEASUREMENT GRID SHEETS

ECDA/LI | ECDA | LI

ROUTE NUMBER: | IMA NUMBER: | ILI LOG DISTANCE:

DATE OF EXCAVATION: | REGION NUMBER: | RMP-11 REF. SECTION: Table 5.6.2

MILE POINT: | DATE REQUIRED: | REFERENCE GIRTH WELD:

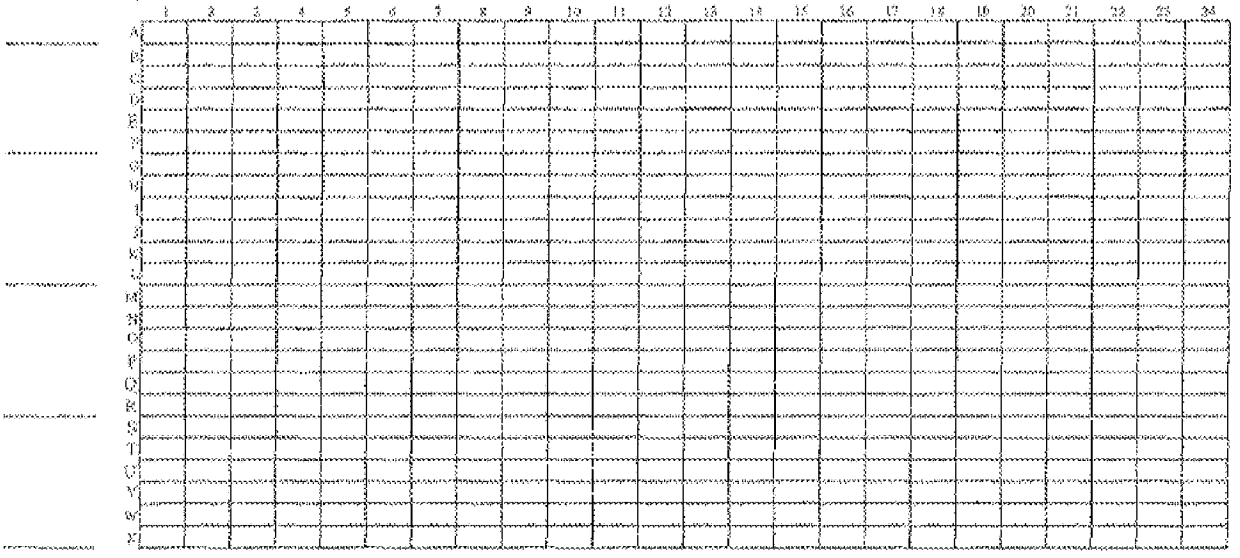
EXCAVATION PERFORMED BY: | DISTANCE FROM GIRTH WELD:

PROJECT MANAGER:

APPROVED BY:

GRID SIZE = _____INCH x _____INCH (SPECIFY GRID SIZE)

Clock Position (Specify Below)



PIT DEPTH GRID 2 OF 2

PHOTO LOG

ECDA/ILI

Route Number: ____
Date of Excavation: ____
Mile Point: ____
Examination Performed By: ____
Project Manager: ____
Approved By: ____

ECDA

IMA Number: ____
Region Number: ____
Date Required: ____

ILI

ILI Log Distance: ____
RMP-11 Ref. Section: Table 5.5.2

PHOTO NO.	LOCATION	DESCRIPTION	COMMENTS

RMP-11
Form H

ECDA/ILI		ECDA		ILI	
Route Number:		IMA Number:		ILI Log Distance:	
Date of Excavation:		Region Number:		RMP-11 Ref. Section:	Table 5.6.2
Mile Point:		Date Required:			
Examination Performed By:					
Project Manager:					
Approved By:					

Excavation Reason: ☐ ECDA ☐ ILI ☐ Recoat

RECOAT DATA

3.1 Sandblast Media: ______ Anchor Profile Measurement: ______

Repair Coating: ______

3.2 Soil Type: ______

Comments: ______

3.3 For Epoxy Coating Systems, Record Environmental Conditions

Temperature: ______ Relative Humidity: ______

Dew Point: ______ Time of Day: ______

3.4 Repair Coating Hardness (If RDD Coating): ______

Measured Coating Thickness: 3:00 ______ 6:00 ______ 9:00 ______ 12:00 ______

Holiday Tested?: ☐ Yes ☐ No Voltage Used: ______

Device Used: ☐ Coil ☐ Wet Sponge

3.5 Coupon Test Station Installed?: ☐ Yes ☐ No If Yes, Date Installed: ______

ETS Installed?: ☐ Yes ☐ No

3.6 Backfill Material: ☐ Native ☐ Sand ☐ Other: ______

Coating Protection: ☐ Yes ☐ No

If yes, check one: ☐ Rockguard ☐ Tuff-N-Nuff ☐ Crushed Other: ______

3.7 Pipe-to-Soil Readings Over Bell Hole After Backfill: ______

*If needed, a CIS should be done for approximately 100' on either side of the bellhole. Attach data.

Comments: ______

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Form I: Field Examination RSTRENG Summary

ROUTE NUMBER: ____________________
STARTING MILE POINT: ____________________
ENDING MILE POINT: ____________________

REFERENCE SECTION: SECTION 5.6
ILI FINAL REPORT DATE: ____________________
PROJECT MANAGER: ____________________

ILI Data (From Form G)														RSTRENG Calculation Based on Field Data				Evaluation			
Order of Excavation	MP	ILI Log Distance	Type of Indication[1]	% Thru Wall	% Dent	Length	O'clock	Priority	O.D.	W.T.	Grade	MAOP	%SMYS at MAOP	Pf[2]	RSMAOP	Engineer	Date	Repair Required Yes/No	Was Priority Scheduled – Other or Reaffirmed	Repair Date	Comments

ILI Engineer: ______________________________ Date: ____________________

ILI Program Manager: ______________________________ Date: ____________________

[1] Metal loss-external, metal loss-internal, dents, etc.
[2] Pf = highest burst pressure calculated from RSTRENG.

RMP-11

Form J: Field Data and ILI Data Comparison

ROUTE NUMBER: _____
STARTING MILE POINT: _____
ENDING MILE POINT: _____

REFERENCE SECTION: SECTION 2.6
ILI FINAL REPORT DATE: _____
PROJECT MANAGER: _____

ILI Data (From Form G)										Field Data (From Form H)				Evaluation ILI vs. Direct Examination			
Order of Excavation	ME	ILI Log Distance	% Thru Wall	% Deet	Length	O'clock	O.D.	W.T.	%SMYS at MAOP	% Thru Wall	Length	% Deet	O'clock	Δ[1] % Thru Wall	Δ[1] % Deet	Δ[1] Length	Comments

ILI Engineer: _____ Date: _____

ILI Program Manager: _____ Date: _____

[1] Δ = ILI Data – Field Data.

RMP-11

Form K (1 of 2): Root Cause Analysis Report

REFERENCE: SECTION 5.8

DATE OF EVALUATION: _____

ROUTE NUMBER: _____

MILE POST: _____

Description of Damage: (For Example – Pitting, Wall Loss, Coating Damage, Dents, Gouges, etc. and the degree and extent of damage.)

_____

_____

_____

_____

_____

_____

Extent of Damage: (Review GIS and evaluate the historical maintenance and repair history to determine if there are trends that can be identified that may assist in the quantification of the extent of damage or potential extent of mitigating activities.)

_____

_____

_____

_____

_____

_____

Review of Existing Damage Mitigation Measures. (Is the CP, Pipe Line Markers, Coating, etc. adequate? If External Corrosion, was it reviewed by a Corrosion Engineer? Is there interference with the CP? If Third Party Damage, was the PSIP Lead consulted? If Land Movement issues where involved with the damage does a Geologist need to be consulted?)

_____

_____

_____

_____

_____

Root Cause of Damage: (For Example – Coating Damage, Inadequate CP, Low Soil Resistivity, Third Party Dig-Ins, or a combination of these or other causes?)

_____

_____

_____

_____

_____

_____

RMP-11

Form K (2 of 2): Root Cause Analysis Report

ROUTE NUMBER: _____
MILE POST: _____

REFERENCE: Section 5.8
DATE OF EVALUATION: _____

Review of Damage Mitigation Measures Taken: (During ILI)

Evaluation as to the Benefit of Additional Risk Mitigation Efforts: (For example, does the CP system need to be upgraded, do more Line Markers need to be added, is it prudent to send Land Owner Notification Letters, does the depth of cover need to be increased?)

Evaluation of Need for Additional Testing: (Did the Direct Examination results indicate that additional testing would be prudent to identify the extent of damage or better evaluate a damage condition for which the ILI method used is not the most appropriate? For example, if the damage to coating caused by Third Party Dig-Ins in an agricultural area, would DCVG testing be appropriate? Were hard spots identified and another ILI method would be more appropriate to evaluate the condition? If the pipe to soil readings were low, is a CIS warranted.)

Performed By: _____ Date: _____
Corrosion Engineer

Approved By: _____ Date: _____
Manager, System Integrity

Form L: Post Assessment Plan
ROUTE NUMBER: _____
STARTING MILE POINT: _____
ENDING MILE POINT: _____

REFERENCE: Section 6.0
DATE: _____
PROJECT MANAGER: _____

Maximum Pf/MAOP unexamined for portions at or above 50% SMYS: _____
Maximum Pf/MAOP unexamined for portions at or above 30% up to 50% SMYS: _____
Maximum Pf/MAOP unexamined for portions less than 30% SMYS: _____

Planned re-inspection interval: _____
Planned re-inspection method: _____
Re-inspection must be completed prior to: _____
CDA must be completed prior to: _____

Additional Risk Mitigation Efforts or Testing that will be performed: (included mitigation or assessment, scope, PSMS ID and date planned)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

CDA and Re-inspection dates entered into Integrity Management Scheduling Tool? _____

Integrity Management Plan Update Required: Yes _____ No _____ If required, plan updated on: _____

Performed By: _____ Date: _____
Integrity Management Program Manager

Approved By: _____ Date: _____
Manager, System Integrity

Form M: Exception Report

REFERENCE: SECTIONS 7.0

ROUTE NUMBER:

DATE OF REPORT:
FMA NUMBER:
PROJECT MANAGER:

Paragraph Number of Exception:

Requirements of paragraph (Your own words):

Alternative Plan:

Reason for Exception:

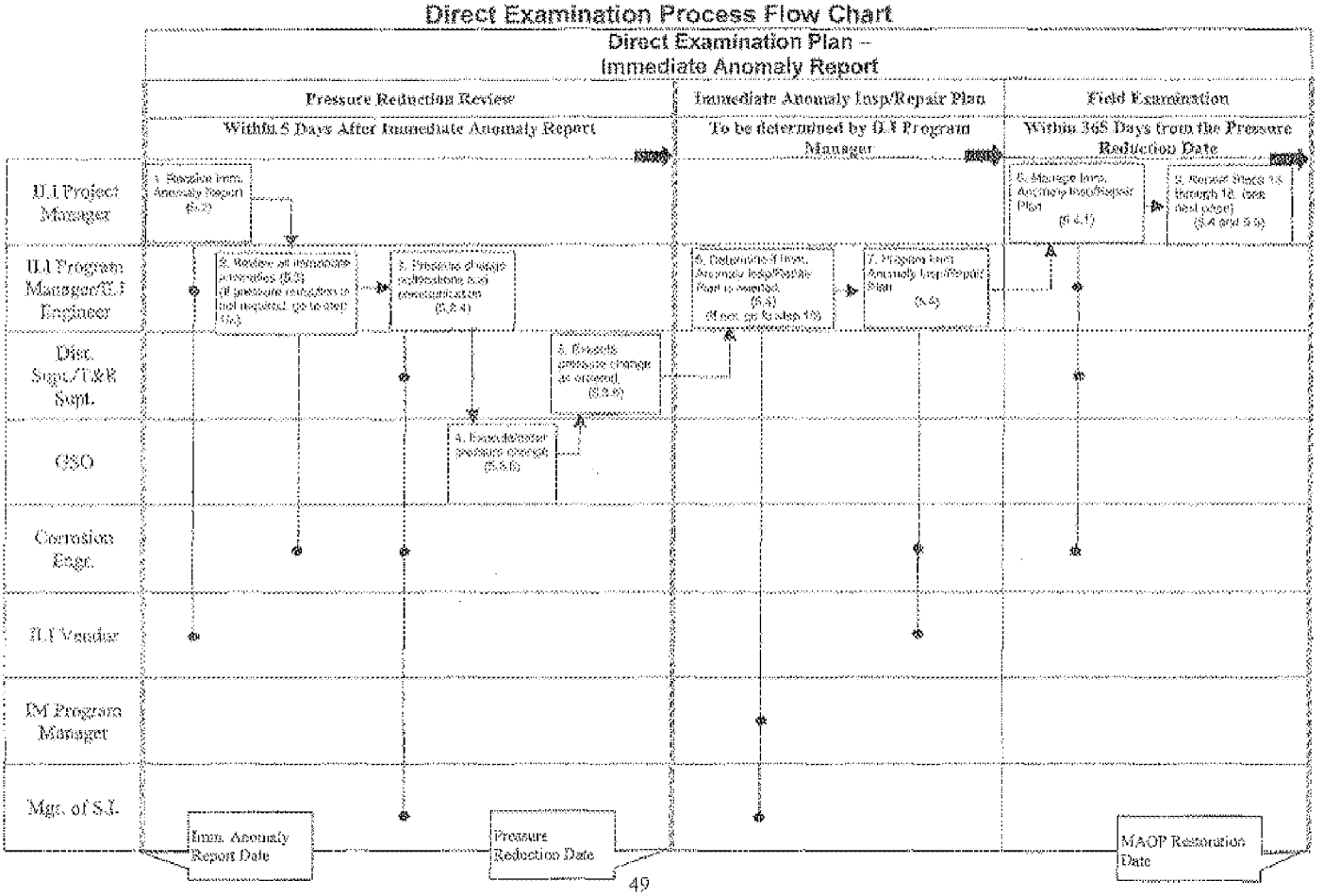
Recommendation: Should the procedure be changed? ○ Yes ○ No
COMMENTS:

ILI Program Manager: Date:

Manager, System Integrity: Date:

ATTACHMENTS

Direct Examination Process Flow Chart



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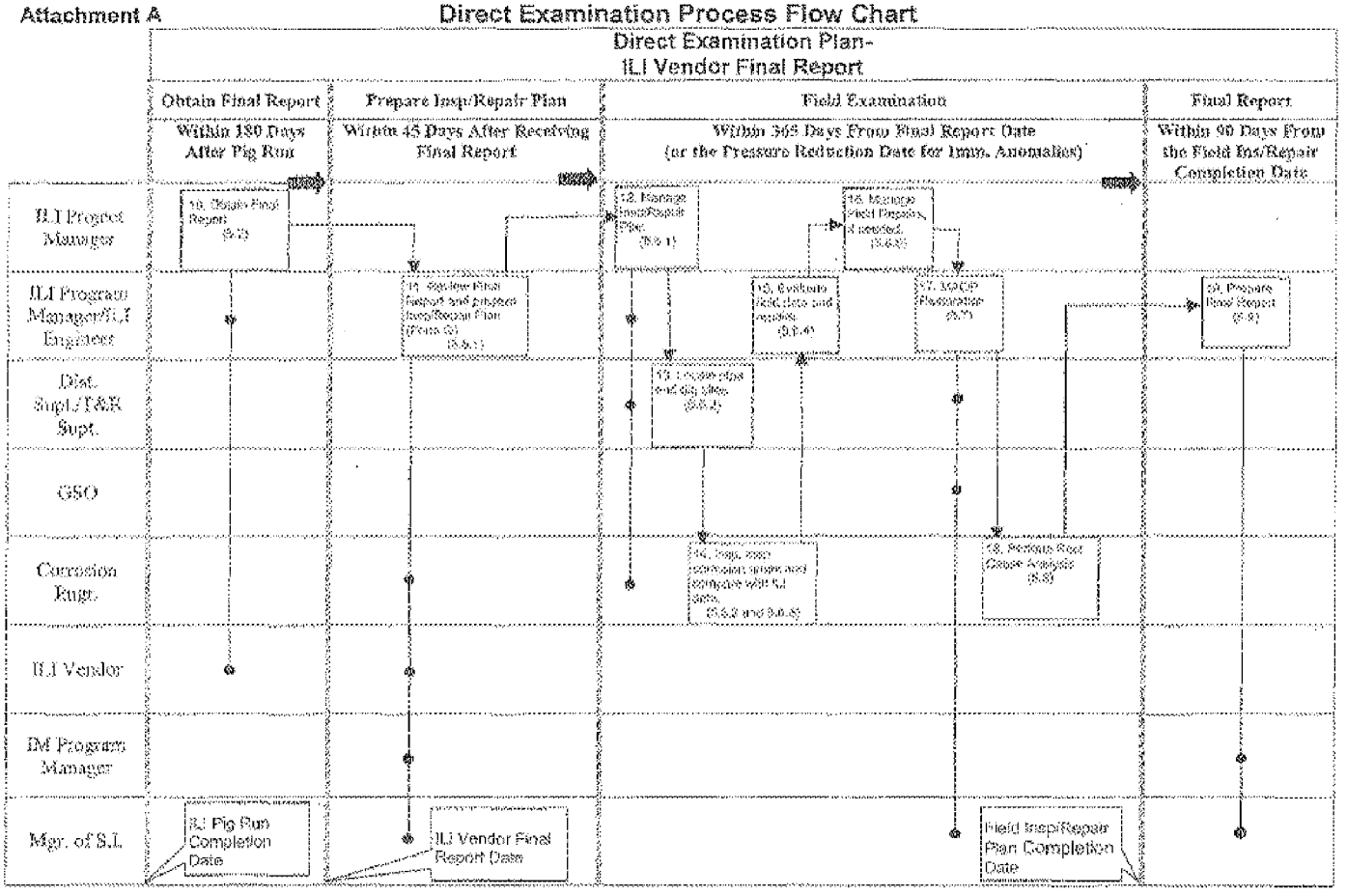
RMP-11

Attachment A

Direct Examination Process Flow Chart



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