TESORO

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May 22, 2008

Chris Hoidal
Director, Western Region
Pipeline and Hazardous Materials Safety Administration
12300 W. Dakota Ave., Suite 100
Lakewood, CO 80228

Dear Mr. Hoidal:

SUBJECT: RESPONSE TO CPF NO. 5-2007-5018M – PROCEDURE REVISION

Pursuant to a conversation with Huy Nguyen on 04/21/08, Tesoro Refining and Marketing Company (Tesoro) is revising its in-line Inspection procedure, IM007, in Response to CPF No. 5-2007-5018M.

This revision is a response to Item 5 of the initial correspondence, as stated below.

Item 5 – Process for Establishing Pressure Reductions

Tesoro's approach does not adequately address the process for establishing pressure reductions of corrosion anomalies to be determined from Section 451.7 of ANSI/ASME B31.4.

The following two changes have been made (as indicated in yellow highlighting as well as in the **REVISIONS** section in Procedure IM007):

1. Section 451.7 of ASME/ANSI B31.4 will be used to calculate safe operating and burst pressures (see ***Validate Pressure Calculations*** section on page 8).

2. In **Table 7-1: Anomaly Categorization Table** (page 13) the historical high pressures must be documented by records to have occurred within the past 60 days

Should you have any questions or concerns regarding this letter or any other matters, please do not hesitate to me at 210-626-6465 or bfrieh@tsocorp.com .

Sincerely

Bernie Frieh

Bernadette Frieh, P.E.
Manager Environmental, Compliance, and Training

CC: Mike McCann

H. Nguyen (PHMSA) – .pdf via e-mail

Attachments:

IM007, In-Line Inspection

SCOPE	This procedure applies to running an in-line inspection (ILI) tool in pipelines for integrity assessment. It focuses on items that need to be performed prior to running a tool as well as procedures for inspection, repair, and reporting of results.
INTRODUCTION	ILI is one of many integrity assessment methods that Tesoro uses to help evaluate the condition of pipelines to ensure integrity. ILI tools can detect various types of conditions and data including: ♦ Metal loss ♦ Cracks and crack-like defects (axial) ♦ Circumferential cracking ♦ Dents, wrinkle bends and buckles ♦ Gouges ♦ Tees, valves, fabricated assemblies and previous repairs ♦ Lamination or inclusions ♦ Mill-related anomalies ♦ Excessive strain ♦ Hard spots ♦ Close metal objects ♦ Pipeline coordinates ♦ Weld counts ♦ Sleeves ♦ Patches ♦ Bends, ovalities *NACE RP0102-2002, In-Line Inspection of Pipelines,* provides recommendations to pipeline operators based on successful, industry-proven practices for ILI.
RESPONSIBILITY	♦ Project Manager ♦ ECM
FREQUENCY	As determined by assessment schedule (see IM003, Risk Assessment)

EVALUATING THE NEED FOR ILI	A determination to use an ILI tool should be made only after an Information Analysis and Risk Assessment is completed per IM002, Information Analysis, and IM003, Risk Assessment. This will ensure that in-line inspection is the optimal integrity assessment method based on the risk drivers and that the appropriate ILI tool(s) is selected for a particular pipe segment. Several factors should be considered before recommending an ILI for integrity assessment. Factors include, but are not limited to: ♦ Pipe History – age, manufacturing process, construction records, leak history ♦ External Corrosion – cathodic protection records, coating type and condition, soil characteristics, operating temperature, coating surveys ♦ Internal Corrosion – medium type and corrosivity, flowrate (water drop-out and pick-up), inhibitor injection and monitoring data (coupons) ♦ Previous ILI results – successive ILI survey data can be used to track the progression of an integrity threat (e.g. corrosion growth). Such information is useful in determining re-inspection intervals as well as the success and need of prevention and mitigation measures. ♦ Mechanical damage – Consideration of third party activity, encroachment information, geological events and location, and construction damage. ♦ Operation conditions ♦ Pipeline configuration ♦ Pipeline service – crude or products ♦ Operation risk associated with the pipe segment ♦ Regulatory requirements[1] The ILI vendor should be consulted to ensure that the best ILI tool is selected based on the integrity threats of concern and the state of technology. ILI vendors have differing technologies, therefore care must be taken to ensure that the appropriate vendor and tool(s) is selected.
EVALUATING THE FEASIBILITY OF ILI	Once a determination is made that an ILI is the optimal integrity assessment and the appropriate tool(s) are selected, numerous checks must be made to ensure successful tool passage and inspection. Some of the items to consider include: ♦ The presence of appropriately sized and configured launcher and receiver ♦ The presence of any restriction, such as: o Short radius elbows or fittings

[1] When an ILI is used as a baseline assessment or re-assessment as required by *49 CFR 195.452*, a geometry (a.k.a. deformation, caliper) tool must be run in addition to a high-resolution metal loss tool.

	○ Corrosion probes, quills, thermowells or other protruding articles ○ Any previously identified restrictions including dents and deformations ♦ The presence of internal deposits ♦ The presence of non-barred tees or other openings ♦ The ability to ensure materials, equipment or contingency plans are in place should an emergency cut-out be required (e.g. stuck pig, immediate repair) The Project Manager is responsible for contacting the ILI vendor at the beginning or planning stages of an ILI project to review and complete an ILI Vendor Questionnaire (refer to *NACE RP0102-2002, In-Line Inspection of Pipelines, Appendix A,* for an example questionnaire). Based on the information in the ILI Vendor Questionnaire, the ILI vendor will provide ILI survey recommendations. If it is not feasible or desirable to make the necessary changes to accommodate an ILI, alternative integrity assessment methods, such as hydrostatic testing or direct assessment, should be explored (see IM005, Selection of an Integrity Assessment Method).
ILI VENDOR CONTRACT	Once an ILI tool(s) is selected, a Vendor Contract specifying defect-sizing criteria, reporting format, timing and other inspection expectations is executed between Tesoro and the ILI vendor. The Vendor Contract specifications should include the following: ♦ Defect sizing criteria ♦ Report format ♦ Timing final report ♦ Pricing ♦ Incidental costs such as stand-by, additional survey analysis, re-runs, insurance, above ground markers ♦ Personnel qualifications ♦ Liability clauses
ILI QUALIFICATIONS	The vendor providing the in-line inspection results shall have conducted similar in-line inspections for a minimum period of five (5) years. When requested by Tesoro, an acceptable list of clients with similar inspections shall be provided demonstrating compliance with this requirement. Any contractors assisting Tesoro in the evaluating of results of an in-line inspection assessment or preparing the excavation and/or remediation lists shall have the following qualifications 1) conduct similar work for a minimum period of three (3) years or be supervised by someone having this qualification; 2) possess knowledge of 49 CFR Part 195, ASME, API, NACE, and information from other guidance organizations, as applicable. Note: *NACE RP0102-2002, API 1163,* and *ANST ILI-PQ-2005,* regarding qualifications for ILI personnel and systems, will supersede the

	above qualifications as soon as they are published in final form.
PRELIMINARY ILI WORK	In order to prepare a pipe segment for an ILI, ILI Plans must be prepared by the Project Manager to allow for communication between the control center, field crews, contract support, and operations. This helps to ensure a safe and successful inspection. The plans should include the following elements, as necessary: ♦ Contingency for a stuck ILI tool ♦ Contingency for an immediate repair condition identified by the ILI tool ♦ ILI tool loading and retrieval procedures ♦ ILI tool run schedule and tracking plan ♦ Minimum and maximum flowrate requirements ♦ Control center and pump station operations procedures ♦ Above Ground Markers (AGM) - typically one every mile where tees, sidetaps, valves, pipe wall changes etc. are not available as identification points. AGMs should have accurate station numbers and GPS coordinates to assist in the locating of anomalies after the ILI. ♦ Environmental disposal requirements ♦ Consideration of weather and seasons for construction and repair-related issues ♦ Other project-specific issues In order to prepare a pipe segment for an ILI, the tool must be able to successfully transverse and inspect the segment. This is accomplished by: ♦ Pipeline cleaning ♦ Launcher and receiver modifications ♦ Other modifications A clean pipeline is essential for a successful ILI run. Deposits in the pipeline such as debris or wax can have detrimental effects on data quality and should be addressed accordingly based on the requirements of the ILI tool that is selected for the inspection. The ILI vendor can provide guidance as to the cleanliness requirements for a specific tool. Typically, the cleaner the pipeline, the higher the degree of confidence in the ILI data. There are several techniques for cleaning a pipeline in preparation for an ILI, including maintenance pigging (poly brush, disc and magnet pigs), solvents, and dummy pigs. Running a cleaning pig and gauge plate pig helps to ensure that the ILI tool will transverse the pipeline and also provides a practice run for managing the ILI tool speed in the pipeline. The Project Manager is responsible for determining the need for, and development of, a Pipeline Cleaning Program.

	If the pipeline does not have launching and receiving facilities, or if the existing launching and receiving facilities are not adequate, they must be installed or modified to accommodate the ILI tool(s) being used. When designing or modifying launching and receiving facilities, consideration must be given to tool size, launching and receiving procedures, and the need for future ILI surveys. ILI vendors can provide standard launcher and receiver designs, however they must be reviewed and modified to accommodate Tesoro's operating and maintenance practices. The Project Manager is responsible for adding or modifying launching and receiving facilities. If the pipeline has any issues that would result in the ILI tool getting stuck or data quality issues, they must be resolved. Such issues include: ♦ Restricted port valves ♦ Non-barred tees or other openings ♦ Short radius elbows or fittings ♦ Corrosion probes, quills, thermowells or other protruding articles ♦ Previously identified restrictions including dents and deformations The Project Manager is responsible for the identification and resolution of these issues.
LAUNCHING AND HANDLING THE ILI TOOL	Before launching the ILI tool the following checks should be made: ♦ ILI vendor to activate the tool, set parameters and perform the appropriate equipment checks ♦ Mainline block valves are in fully open position Tesoro will launch and control the ILI tool speed in the pipeline. Every effort should be made to keep the speed constant. The ILI tool should be run at the speed recommended by the ILI vendor. Tesoro will repeat the ILI until a confirmed survey within vendor and company specifications is achieved. The Project Manager develops ILI Plans specific to each assessment.
ILI VENDOR REPORT	The ILI vendor will provide a Final Report within the time period and format specifications defined in the Vendor Contract after running the tool and verifying data quality. If specified in the contract, the vendor may report any immediate repair conditions as soon as they are determined.
TOOL ACCURACY	Each in-line inspection tool has a given accuracy, depending on the tool manufacturer, the type of tool, and the wall thickness of pipe. When categorizing anomalies detected by the tool, Tesoro will take the vendor's specified tool tolerance into account. The vendor's specified tool tolerance, usually expressed as a plus or minus percentage (i.e., +/- 10%), will be applied to the metal loss and dent depth dimensions called in the vendor's Final Report to correct for tool inaccuracy. After at least

	three verification digs have been conducted to determine sizing accuracy (see ASSESSING TOOL PERFORMANCE section below), and a 1:1 plot has been determined, the anomaly size predictions from the vendor's Final Report may be modified.
DISCOVERY OF CONDITION	Tesoro considers "Discovery of a Condition" to occur when Tesoro receives sufficient information about an anomaly to make the determination that it is a potential pipeline threat (e.g. an immediate, 60-day, 180-day, or "other" repair condition – refer to Anomaly Categorization section, below). Tesoro's process of discovery, resulting in a Final Anomaly List, consists of the following steps: 1. ILI Vendor predicts anomaly size/location and submits a Final Report to Tesoro 2. Tesoro Project Engineer or designee categorizes anomalies given in Vendor's Final Report using criteria given in this procedure and taking vendor's tool tolerance into account (see Tool Accuracy section above) **3. Discovery Occurs** 4. After at least three verification digs (these will most likely be actual repair conditions), assess tool performance (refer to Assess Tool Performance section) 5. If tool performance assessment indicates that initially-predicted anomaly size may be inaccurate, revise Final Anomaly List This process of discovery cannot take longer than 180 days after an ILI survey is successfully completed, unless Tesoro can demonstrate that the 180-day timeframe is impracticable. Tesoro considers an ILI survey to be successful if the tool functioned properly and satisfactory data was received.
ANOMALY CATEGORIZATION	Tesoro will categorize anomalies according to the following repair criteria: ♦ Immediate repair conditions ♦ 60-day repair conditions ♦ 180-day repair conditions ♦ Other conditions These categories are described in the following sections as well as in Table 7-1: Anomaly Categorization Table. Anomalies may be exempt from repair if there is documentation to show no indications of growth since the previous ILI survey and the defect was previously excavated, measured, recoated, repaired, and/or found to meet the appropriate strength calculation. The Project Manager will verify that the remaining wall thickness, which may have been affected

	by corrosion, is adequate (refer to Validate Pressure Calculations Section). If Tesoro cannot meet the schedule for repairs and cannot provide safety through a temporary reduction in operating pressure adequate (refer to Validate Pressure Calculations Section), Tesoro's ECM will notify DOT's Office of Pipeline Safety per IM006, Communications Plan.
Immediate Repair Conditions	Upon discovery of an immediate repair condition, Tesoro will immediately initiate mitigative action. Mitigative actions include, but are not limited to: temporarily reducing the operating pressure to a calculated safe operating pressure based on remaining pipe strength, resetting relief valves, or shutting down the pipeline until the repair can be completed. Temporary actions will remain in place until the anomaly can be excavated, assessed, and/or until permanent repairs can be made. Permanent repairs of anomalies requiring immediate repair will be made within 30 days of the date of discovery per *API 1160.* The following conditions require immediate repair: ♦ Metal loss greater than 80 % of nominal wall thickness, regardless of dimensions. ♦ Predicted burst pressure less than the MOP at the location of the anomaly. (Refer to Validate Pressure Calculations section.) ♦ Dents on the top of the pipeline (above 4 and 8 o'clock position) with any indicated metal loss, cracking, or stress riser ♦ Dents located on the top of the pipeline (above 4 and 8 o'clock positions) with a depth greater than 6% of the nominal pipe diameter ♦ Significant anomaly that, in the judgment of the evaluator, requires immediate action
60-Day Conditions	The following conditions require repair as soon as possible but no later than 60 days after discovery: ♦ Dents located on the top of the pipeline (above 4 and 8 o'clock position) with a depth greater than 3% (but less than or equal to 6%) of the pipeline diameter, or greater than 0.250 inches in depth for a pipeline diameter less than a Nominal Pipe Size (NPS) of 12 inches ♦ Dents located on the bottom of the pipeline that have any indication of metal loss, cracking, or a stress riser

180-Day Conditions	The following conditions require evaluation and repair within 180 days of discovery: ♦ Dents with depth greater than 2% of the pipeline's diameter (or 0.250 inches in depth for a pipeline diameter less than an NPS of 12) that affect pipe curvature at a girth weld or a longitudinal seam weld ♦ Dents located on the top of the pipeline (above the 4 and 8 o'clock position) with a depth greater than 2% (but less than or equal to 3%) of the pipeline diameter, or greater than 0.250 inches in depth for a pipeline diameter less than NPS of 12 ♦ Dents located on the bottom of the pipeline with a depth greater than 6% of the pipeline's diameter ♦ Calculated remaining strength of pipe results in a safe operating pressure that is less than the current established MOP at the location of the anomaly (Refer to Validate Pressure Calculations Section.) ♦ Areas of general corrosion with a predicted metal loss of greater than 50% of nominal wall ♦ Predicted metal loss of greater than 50% of nominal wall thickness at a pipeline crossing, in an area with widespread circumferential corrosion, or in an area that could affect a girth weld ♦ A potential crack indication that, when excavated, is determined to be a crack ♦ Corrosion of or along a longitudinal seam weld ♦ A gouge or groove greater than 12.5% or nominal wall thickness
Other Conditions	The following conditions will be scheduled for repair when warranted: ♦ Any change in pipe condition since the last assessment ♦ Mechanical damage that is located on the top side of the pipe ♦ An anomaly abrupt in nature ♦ An anomaly longitudinal in orientation ♦ An anomaly over a large area ♦ An anomaly located in or near casings, crossing of another pipeline, or an area with suspect cathodic protection
Validate Pressure Calculations	Tesoro calculates safe operating and burst pressures using the formula in Section 451.7 of ASME/ANSI B31.4). In order to validate that the information used for the calculation is correct, the appropriate interaction rules must be applied, and the appropriate pipe parameters must be used. The rules to be used to determine if corrosion anomalies interact must be applied in accordance with the Tesoro ILI Vendor Contract specifications. Validation of interaction rules occurs when excavations are made, and the anomaly is visually examined and measured via field non-destructive examinations.

	Table 7-1, Anomaly Categorization Table, and accompanying footnotes, specify when pressure reductions must occur. *FM016-01, Management of Change Worksheet,* or equivalent, must be followed. Any time the reduction in operating pressure is regarded as a temporary remedial action, the reduction cannot exceed 365 days without further remedial action being taken to ensure the safety of the pipeline.
ASSESSING TOOL PERFORMANCE	ILI tool accuracy is assessed by excavating and comparing the predicted anomaly parameters to actual measurements. Discrepancies that cannot be resolved internally by Tesoro must be submitted to the ILI vendor for further analysis and re-grading.Tesoro will assess ILI tool performance by using two defect metrics: characterization, and accuracy.
Defect Characterization	Defect characterization is used to verify that the ILI tool is accurately characterizing defects. A defect characterization table must be developed that compares the type and number of defects identified through excavation vs. the ILI tool characterization of those same defects. Ideally, the reported characterization will be identical to the excavation characterization.
Sizing Accuracy	The sizing accuracy of the ILI tool is determined by using a correlation plot ("as reported" vs. "as identified after excavation"). Data points that lie on a 1:1 line ("unity plot") represent accurate tool measurement, and data points that lie off of the 1:1 line represent measurement error.
Defect Detection (optional)	Defect detection may be used to verify that the ILI tool is reporting all defects. Defects that have been excavated and examined fall into three categories: ♦ True positive (TP) ♦ False negative (FN) ♦ False positive (FP) (e.g. true positive is confirmed to exist by Tesoro and was identified by the ILI tool). Anomaly detection accuracy of the ILI tool can be determined by the following equation, where M_1 equal to the sum of the true positives (TP) is considered ideal. $$M_1 = \Sigma TP - \Sigma FP - \Sigma FN$$.

REPAIR PLAN	Using the Final Anomaly List, the Project Manager will develop a written Dig List which may aggregate multiple anomalies into each prescribed excavation, or "dig", and review if the identified conditions are on pipe segments that could affect an HCA. Anomaly repair is required only for pipe segments that could affect an HCA. Anomalies in pipe segments not affecting an HCA, or other anomalies that do not meet *49 CFR 195.452(h)* criteria, will be considered for evaluation and remediation or repair. Based on the Final Anomaly List and Dig List, the Project Manager is responsible for preparing a Repair Plan, which should include at least the following elements: evaluation and repair priority (based on anomaly severity, potential impact to operations, and existence of HCA), excavation procedures, repair methods and available materials, non-destructive evaluation (NDE) technique, and plan for assessing tool performance. When practicable, repairs of anomalies with more severe potential impacts to HCAs will be prioritized on the repair schedule. Tesoro will comply with *49 CFR 195.452* when making repairs. The ECM must be notified immediately if the repair timeframe for a condition on a pipe segment that could affect an HCA cannot be met so that the appropriate notification can be made to the OPS (see IM006, Communications Plan).
CLOSURE REPORT	The Project Manager will submit an ILI Closure Report to the ECM within 90 working days after the defects are verified and repairs completed. The report will document ILI results, aboveground marker sites, actions taken as a result of the integrity assessment, pipe inspected and recoated or replaced, and any recommendations for re-inspection interval which are derived from the ILI results.
REFERENCES	♦ *49 CFR 195.452(h), What actions must an operator take to address integrity issues?* ♦ *API 1163, ILI Systems Qualifications Standards* ♦ *ASME B31.4 – 2002 (Section 451.7)* ♦ *ANST ILI-PQ-2005 In-line Inspection Personnel Qualification and Certification* ♦ *Kiefner, J. F., and Vieth, P. H, "A Modified Criterion for Evaluating the Remaining Strength of Corroded Pipe"* ♦ *NACE RP0102-2002, In-Line Inspection of Pipelines* ♦ *PT&T Engineering Standards Manual* ♦ *IM002, Information Analysis* ♦ *IM003, Risk Assessment* ♦ *IM006, Communications Plan* ♦ *IM011, Preventive and Mitigative Measures*

APPLICABLE PROTOCOLS

This procedure applies to the following Integrity Management Inspection Protocols:

- Protocol 2: Baseline Assessment Plan
- Protocol 3: Integrity Assessment Results Review
- Protocol 4: Remedial Action

REVISION CONTROL

DATE	DESCRIPTION OF CHANGES
12/30/04	REV. No. 0
12/30/06	REV. No 1 – Added three sections: Responsibility, Frequency, and References
05/21/07	REV. No 2 – ♦ Revised Qualifications section to add qualifications of contractors assisting in evaluation of ILI results ♦ Redefined "Discovery of Conditon" ♦ Removed reference to Preliminary ILI Report and
10/31/07	REV. No 3 – ♦ Rearranging of some sections (content remains same) ♦ Revised Date of Discovery section to account for tool accuracy and validation of data and clarified "Date of Discovery". ♦ Renamed Data Analysis section to Tool Accuracy to account for vendor tool tolerance. ♦ Revised Assessing Tool Performance section such that two of three portions are no longer optional. ♦ Referenced Table 7-1, Anomaly Categorization in the Pressure Validation section. ♦ Relocated Repair Conditions from *IM010 Pipe Repairs* to this IM007, and renamed it Anomaly Categorization, Relocated Table 10-2 HCA Response Table from IM010 Pipe Repairs to this IM007, and renamed it Table 7-1 Anomaly Categorization

	05/21/08	REV. No. 4 • In the *Validate Pressure Calculations* section on page 8; in calculating safe operating and burst pressures, replaced the following: *RSTRENG 85% Area Criterion*[2] (also referred to as 'modified B31G', '0.85 dL method', or 'RSTRENG Case 2' With: Section 451.7 of ASME/ANSI B31.4 And added appropriate reference to REFERENCES Section. • Table 7-1, Footnote 2: Time period for historical documented pressure records changed from six months to 60 days.

[2] Kiefner, J. F., and Vieth, P. H, "A Modified Criterion for Evaluating the Remaining Strength of Corroded Pipe", Project PR-3-805, Pipeline Research Committee, American Gas Association, Catalog No. L51609 (1989).

Table 7-1: Anomaly Categorization Table For Pipe Segments that Could Affect an HCA

Metal Loss >80%	Reduce operating pressure ≤ P_{safe}[4] Shutdown Repair before returning to normal pressure or restarting.
Predicted Burst is < MOP	Reduce operating pressure ≤ P_{safe}[4] or Shutdown Repair before returning to normal pressure or restarting.
Top-side dent[1] w/ metal loss, cracking, or stress riser	Reduce operating pressure ≤ P_{safe}[4] or Shutdown Repair before returning to normal pressure or restarting.
Top-side Dent[1] >6%	Reduce operating pressure ≤ P_{safe}[4] or Shutdown Repair before returning to normal pressure or restarting.
Judgement[3]	Reduce operating pressure ≤ P_{safe}[4], or other mitigative actions as determined by qualified person(s), or Shutdown Repair Before returning to normal pressure or restarting.

(FOOTNOTES AND COMMENTS)

[1]Above the 4 and 8 o'clock position

[2]Pressure level identified as historical high pressure (4-hr. minimum duration) documented by records to have occurred within the past 60 days

[3]Judgement of the Operations Manager, Project Manager, or ECM

[4]Pressure reduction at the location of the anomaly considering surge and deadhead conditions (refer to section in this procedure). As dictated by 49CFR195.452(h)(4)(i), a temporary reduction in operating pressure or shut down of the pipeline will be instated until the immediate repair conditions are completed. This reduction in operating pressure cannot exceed 365 days without taking further remedial action.

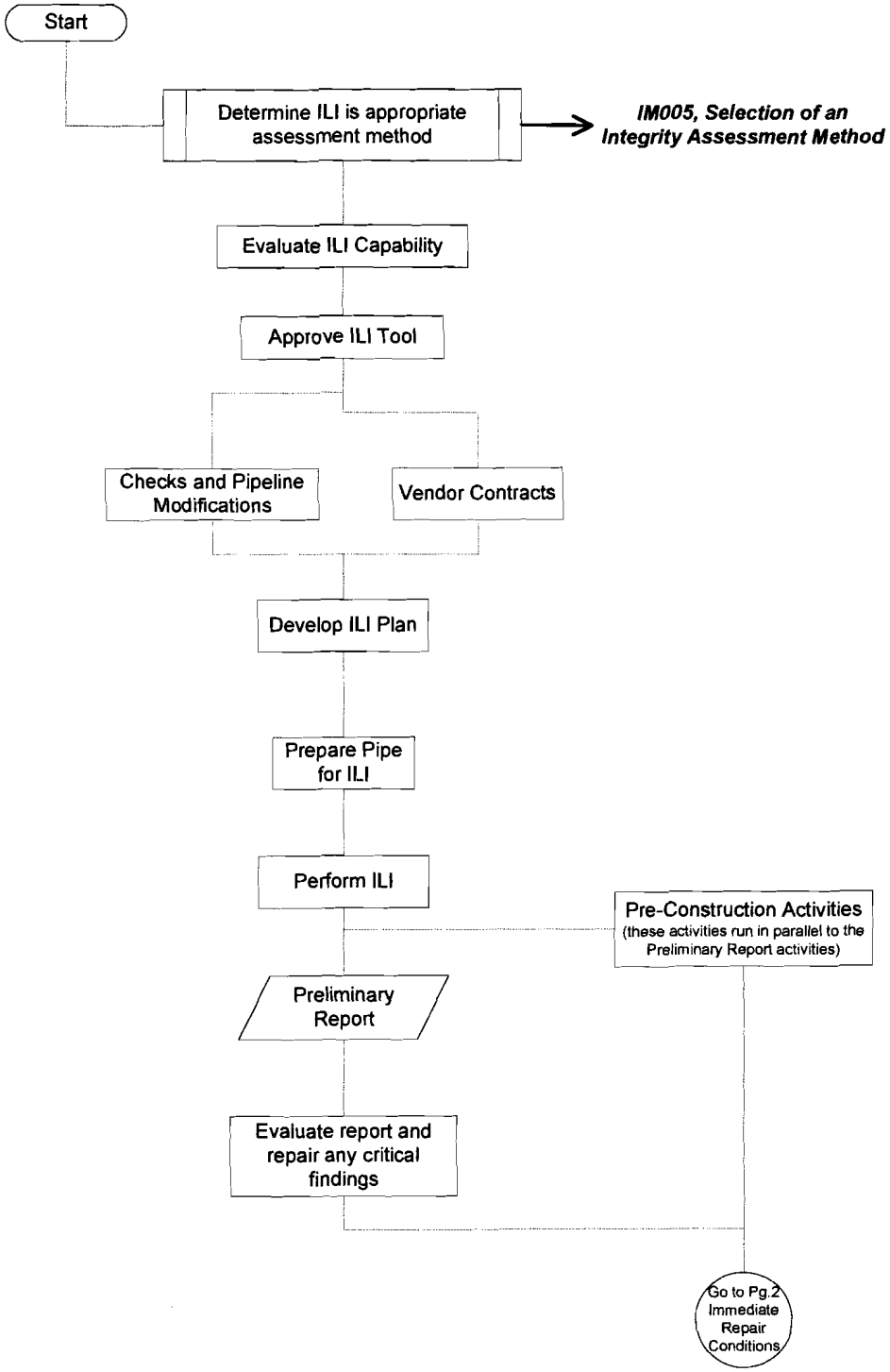
[5]At or below the 4 & 8 o'clock position

[6]Discovery of a Condition – refer to section in this procedure.

Other Conditions that could impair pipeline integrity must be evaluated and scheduled for remediation, as appropriate. Such conditions include (refer to section in this procedure):

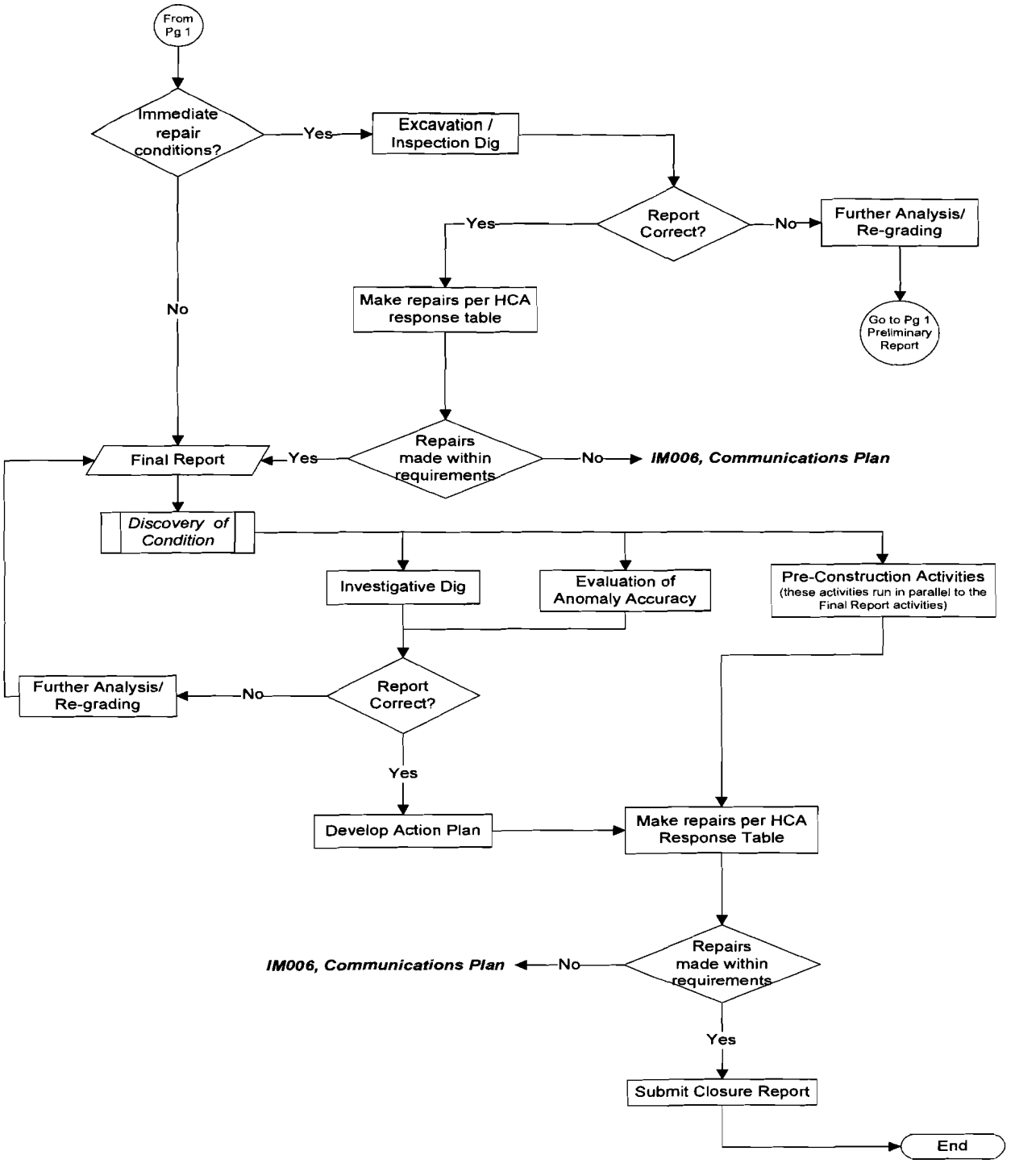
- Any change since the previous assessment
- Mechanical damage that is located on the top-side of the pipe[1]
- An anomaly abrupt in nature
- An anomaly longitudinal in orientation
- An anomaly over a large area
- An anomaly in or near a crossing, a crossing of another pipeline, or an area with suspect cathodic protection

Top-side dent[1] >3% or >0.25" for pipe <12"	Evaluate & Remediate	60 Day
Bottom-side dent w/metal loss, cracking or stress riser[5]	Evaluate & Remediate	60 Day
Dent >2% or 0.25" for pipe <12" Affects curvature of pipe at weld or seam	Evaluate & Remediate	180 Day
Top-side dent[1] >2% or 0.25" for pipe <12"	Evaluate & Remediate	180 Day
Bottom-side dent[5] >6%	Evaluate & Remediate	180 Day
An area of general corrosion with predicted metal loss >50%	Evaluate & Remediate	180 Day
Predicted Metal Loss >50% @ foreign line crossings	Evaluate & Remediate	180 Day
Predicted Metal Loss >50% in area with widespread circumferential corrosion	Evaluate & Remediate	180 Day
Predicted Metal Loss >50% in an area that could affect a girth weld	Evaluate & Remediate	180 Day
Potential cracks	Evaluate & Remediate	180 Day
Corrosion of or along a longitudinal seam weld	Evaluate & Remediate	180 Day
Gouge or groove >12.5% of wall thickness	Evaluate & Remediate	180 Day



Unless otherwise noted all tasks are the responsibility of the PM.

Figure 7-1: In-Line Inspection Flowchart



Unless otherwise noted all tasks are the responsibility of the PM.

Figure 7-1: In-Line Inspection Flowchart Cont.