

Engineering Procedure

SAEP-308

31 May, 2004

Plant Inspection Unit Assessments

Document Responsibility: Inspection Department

Saudi Aramco DeskTop Standards

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1 Scope

This SAEP is to provide guidelines relative to the Saudi Aramco Inspection Department's functional responsibility to periodically assess the performance of inspection program within all Saudi Aramco plants and facilities. A team assigned by the Inspection Department will conduct the assessment.

2 Conflicts and Deviations

Direct all conflicts or requests to deviate from this procedure to the Manager, Inspection Department.

3 Applicable Documents

All mandatory standards, plus the following and their references:

3.1 Saudi Aramco References

Saudi Aramco General Instructions

<i>GI-0002.600</i>	<i>Plant Unit Acceptance after T & I Shutdown</i>
<i>GI-0428.001</i>	<i>Cathodic Protection Responsibilities</i>
<i>GI-1809.001</i>	<i>Job Certification</i>

Saudi Aramco Procedures

<u>SAEP-20</u>	<i>Equipment Inspection Schedules</i>
<u>SAEP-122</u>	<i>Project Records</i>
<u>SAEP-309</u>	<i>Inspection of Community and Operations Support Facilities</i>
<u>SAEP-316</u>	<i>Performance Qualification of Coating Personnel</i>
<u>SAEP-317</u>	<i>Testing and Inspection (T&I) of Shell and Tube Heat Exchangers</i>
<u>SAEP-318</u>	<i>Pressure Relief Valve Program Authorization for RV Installation, Deletion, and Changes</i>
<u>SAEP-319</u>	<i>Pressure Relief Valves – Routine Test, Inspection, Quality Assurance and Regulation</i>
<u>SAEP-321</u>	<i>Performance Qualification Testing of Saudi Aramco Welders</i>
<u>SAEP-322</u>	<i>Performance Qualification Testing of Saudi Aramco Brazers</i>

<u>SAEP-325</u>	<i>Inspection Requirements for Pressurized Equipment</i>
<u>SAEP-1131</u>	<i>Pressure Relief Valve Program Use of Form 3099A-ENG, RV Authorization</i>
<u>SAEP-1132</u>	<i>Instruction for Using the Relief Valve Test Stand</i>
<u>SAEP-1133</u>	<i>Form 3750-ENG, Pressure Relieving Device Test Report</i>
<u>SAEP-1134</u>	<i>Relief Valve Technician Certification</i>
<u>SAEP-1135</u>	<i>On-Stream Inspection Administration</i>
<u>SAEP-1140</u>	<i>Qualification of Saudi Aramco NDT Personnel</i>
<u>SAEP-1142</u>	<i>Qualification of Non-Saudi Aramco NDT Personnel</i>
<u>SAEP-1143</u>	<i>Radiographic Examination</i>
<u>SAEP-1144</u>	<i>Magnetic Particle Examination</i>
<u>SAEP-1145</u>	<i>Liquid Penetrant Examination</i>
<u>SAEP-1146</u>	<i>Manual Ultrasonic Thickness Testing</i>

Saudi Aramco Inspection Procedures

<u>00-SAIP-06</u>	<i>Pressure Test Requirements</i>
<u>00-SAIP-07</u>	<i>Positive Material Identification Requirements</i>
<u>00-SAIP-51</u>	<i>Electrical Inspection</i>
<u>00-SAIP-71</u>	<i>Plant Inspection Index</i>
<u>00-SAIP-72</u>	<i>Inspection Involvement in Management of Change</i>
<u>00-SAIP-73</u>	<i>Inspection Manning Determination Guidelines</i>
<u>00-SAIP-74</u>	<i>Corrosion under Insulation and Fireproofing Inspection</i>
<u>00-SAIP-75</u>	<i>External Inspection</i>
<u>00-SAIP-76</u>	<i>Worksheet Control and Tracking</i>
<u>00-SAIP-77</u>	<i>Technical Alert Implementation and Tracking</i>
<u>00-SAIP-78</u>	<i>Inspection Records /Filing</i>
<u>00-SAIP-79</u>	<i>Assessment Recommendations Tracking System</i>
<u>01-SAIP-01</u>	<i>Small Nipple Inspection Program</i>
<u>01-SAIP-04</u>	<i>Injection Point Inspection Program</i>

[32-SAIP-11](#)

Inspection of Air-Cooled Heat Exchangers

Plant Inspection Unit Procedures and Quality Manuals

Saudi Aramco Approved Inspection Job Descriptions

3.2 Industry Codes and Standards

American Petroleum Institute

API RP 580

Risk-Based Inspection

International Electrotechnical Commission

ISO/IEC 17020

*General Criteria for the Operation of Various
Types of Bodies Performing Inspection*

4 Definitions and Abbreviations

4.1 Definition of Important Terms

Corrective Action: An action taken to eliminate the causes of any existing nonconformity or other undesirable situation in order to prevent recurrence.

Objective Evidence: Qualitative or quantitative information, records or statements of fact pertaining to the quality of an item or service, or to the existence and implementation of an inspection system or program, which is based on observation, measurement, or test and which can be verified.

Observation: A statement of fact made during an assessment and substantiated by objective evidence.

Plant Inspection Index (PII): A tool to periodically measure PIU performance based on scoring a set of measures related to each inspection program or function.

4.2 Abbreviations

GI General Instruction

ID Inspection Department

IEU Inspection Engineering Unit of the Inspection Department

NDT Nondestructive Testing

OID Operations Inspection Division

PIU Plant or Pipelines Inspection Unit

SAEP Saudi Aramco Engineering Procedure

SAES Saudi Aramco Engineering Standard

SAIP Saudi Aramco Inspection Procedure

5 Responsibilities

5.1 Inspection Engineering Unit (IEU)

5.1.1 IEU shall be responsible for coordinating the plant inspection unit assessments. This coordination includes:

5.1.1.1 Scheduling the assessment as outlined in Paragraph 6.2.

5.1.1.2 Selection of leader for each assessment.

5.1.1.3 Selection of assessment team members for each assessment.

5.1.1.4 Notifying involved members of their specific assignments.

5.1.1.5 Conducting a pre-assessment meeting at least 10 weeks before the field assessment per 6.3.1.

5.1.1.6 Conducting a post-assessment meeting with the PIU before leaving the site.

5.1.1.7 Preparation of assessment materials/guides, such as the unit data forms, questions for interviews, checklists, and format.

5.1.1.8 Presenting observations to plant management and issuance of the final report as outlined in Paragraph 6.5.

5.1.2 IEU shall be responsible for determining the number of team members, their discipline and their minimum qualification requirements per 6.3.2 of this SAEP.

5.1.3 IEU shall be responsible for providing the assessment package including the previous assessment report to the appointed leader and team members. At least two weeks prior to the start of the assessment, the leader should brief the team members on all aspects of the assessment (i.e., schedule, report format, transportation and lodging plans, special access requirements, etc.).

5.1.4 Individuals chosen as assessors have the following responsibilities:

5.1.4.1 Evaluate the PIU system and conformance to established company standards and procedures.

- 5.1.4.2 Carry out assigned assessment tasks.
- 5.1.4.3 Comply with assessment requirements.
- 5.1.4.4 Respect all confidentiality requirements.
- 5.1.4.5 Collect and document objective evidence about the systems conformance to existing company criteria.
- 5.1.4.6 Safeguard assessment documents, records, and reports.

5.2 Plant Inspection Unit (PIU) Responsibilities

- 5.2.1 The PIU supervisor shall be the leader's primary contact for scheduling interviews with personnel in the unit.
- 5.2.2 Upon receiving a request from the assessment team leader, the PIU supervisor shall provide information related to his unit by completing survey data forms that will be provided as a part of the request. The PIU will be allotted 6 weeks to collect and forward the appropriate information to the assessment team leader.
- 5.2.3 The PIU will provide access to the assessment team to inspect its facilities, interview its employees and assess its documents as requested by the assessment team leader.
- 5.2.4 PIU supervisor shall explain paragraph 5.2.7 to the Unit personnel and ensure their compliance.
- 5.2.5 The PIU shall provide logistical support to the assessment team as required, such as office space, access to photocopier, and security permits.
- 5.2.6 The PIU department will respond to assessment recommendations and provide status reports as outlined in section 6.6 of this SAEP.
- 5.2.7 The PIU supervisor shall schedule and conduct the annual unit self-assessment and inform ID of the schedule per section 6.2 of this SAEP.
- 5.2.8 The PIU employees' responsibilities are:
 - 5.2.8.1 Cooperate fully with the assessment team.
 - 5.2.8.2 Allow assessors to examine all documents, records, and facilities.

- 5.2.8.3 Respond to assessor's questions so that a true representation of the units systems, procedures, methods and policies are provided.

6 Instructions

6.1 Assessment Objectives

- 6.1.1 To verify that Saudi Aramco standards and procedures are being properly implemented along with the applicable industry standards.
- 6.1.2 To assess the effectiveness and functional readiness of the unit's inspection activities by examining its capabilities.
- 6.1.3 To review the implementation of recommendations made during previous plant inspection unit assessments.
- 6.1.4 To capture and share best practices company-wide.

6.2 Scheduling of Plant Inspection Unit Assessments

- 6.2.1 Each autonomous plant inspection unit within the Company will be scheduled for an assessment by the Inspection Department on a frequency not to exceed five years. However, all inspection units are required to conduct an interim internal self-assessment annually to assess their strengths and weaknesses in all inspection programs listed in Attachment A. The Inspection Engineering Unit of the Inspection Department shall be informed of the internal assessments schedule and scope by end of December every year for possible participation. The performance of the inspection unit will be evaluated based on the results from the internal self-assessment and unit performance as indicated by the performance index designed for this purpose per [00-SAIP-71](#). If, based on the performance, an assessment is judged by the Inspection Department as needed before the normal five year schedule, the Inspection Department will inform the Proponent of a partial or complete assessment.
- 6.2.2 To ensure that the maximum assessment frequency is not exceeded for any inspection unit, OID shall prepare a long range (5 year) assessment schedule that shall be updated annually to coincide with preparation of the Inspection Department's Operating Plan. The schedule will be posted on the ID website.
- 6.2.3 During the fourth quarter of each year, OID will contact all inspection units that are due for an assessment the next year and establish tentative

dates. A final schedule shall be based on firm commitments secured through formal correspondence with the PIU's superintendent or general supervisor. A pre-assessment meeting shall be scheduled with the PIU to discuss details of the planned assessment.

6.3 Assessment Preparational Activities

- 6.3.1 Approximately ten weeks prior to the assessment the leader will visit the PIU to explain the objective of the assessment to the PIU Personnel as mentioned under 5.1.1.5. During this meeting, the PIU supervisor will be requested to provide information about his unit by completing unit survey data forms in electronic format within 6 weeks. This form can be accessed from the ID website. This information will be utilized when making assignments and planning the assessment activities. Within two days of receiving the unit data, the data shall be posted on the shared folder and all Team members are informed about it and requested to review and analyze the data to plan their part of the assessment activities accordingly.
- 6.3.2 An assessment team will be assembled based on individual expertise in the areas to be assessed. The assessor should be a subject matter expert and has training or certification in auditing quality systems. First time assessors should accompany senior members and his input reviewed by them. The Team leader should have an excellent writing skill and should have previously participated in at least four reviews. At least 25%, but no less than one member shall be requested from another operating facility. If deemed necessary by the Team leader, a CSD specialist may be requested to review some activities such as corrosion monitoring and control programs.

Commentary Note:

The Team Leader will provide for familiarizing Non-IEU Team members with assessment process and basic auditing skills as replacement for training/certification requirements.

- 6.3.3 The Team members from other departments should be determined and requested at the time of planning the reviews for the upcoming year.
- 6.3.4 Assessment assignments will be made based on each team members' area of expertise. Assignments will be made for evaluating each of the following inspection functions and programs against the associated procedures and applicable standards listed in Attachment A.
- 6.3.5 A pre-assessment organizational meeting of all the team members should be held approximately two weeks prior to the scheduled assessment. At

this meeting, an assessment package containing, specific assignments, schedules, unit data which would have been already posted on the shared folder, interview questions forms, will be issued to team members. Assignments, schedules and other pertinent information will be discussed and questions relative to the assessment will be answered. Members from other departments should attend this meeting to be familiarized with the assessment process.

6.4 PIU Field Assessment

- 6.4.1 Field assessment shall be between 3 to 5 days depending on the facility size, performance and geographical location.
- 6.4.2 To begin the field assessment, the assessment team will have a kick-off meeting with the PIU personnel. The PIU should prepare a presentation that gives an idea about the facility size, process, manpower, areas of concerns for the team to focus. The leader shall introduce the team members and clearly state the objective of the assessment to the PIU personnel. The schedule and plans will also be discussed with the PIU supervisor who will coordinate the work of his personnel to make them available for interviews.
- 6.4.3 The PIU shall arrange for a walkthrough of the facility or part of it, as agreed with the leader prior to the assessment, to verify compliance with the standards and procedures and to verify the effectiveness of the PIU inspection programs.

Commentary Note:

This is not a punch listing exercise and is aimed at collecting objective evidence of strengths, non-conformances or areas of improvement using checklists for guidance for each program. These will be used to cross-check the records and during interviews with Unit personnel and be cited as examples when writing non-conformances or observations.

- 6.4.4 Team members shall conduct interviews, inspect testing and measuring equipment, facilities, reference materials and programs in accordance with their specific assignments. They shall be guided in the assessment by the prepared interview questions and references in 6.3.4 but will not be limited to them if additional investigation is deemed necessary for a thorough evaluation. They shall document their findings in the format shown in Attachment B.
 - 6.4.5 At the end of the field assessment, the team shall brief the PIU supervisor on the major observations before presenting them to the proponent management and issuance of the final report.
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6.5 Assessment Reporting

- 6.5.1 Immediately after completing the field assessment but no more than two days after the field assessment, team member shall enter his observations, impact, category of the recommendation and the recommendation in the shared folder. All reports shall be written following prepared template which will include;
 - 6.5.1.1 Observation
 - 6.5.1.2 Observation Impact
 - 6.5.1.3 Category of the Recommendation/Observation (see Attachment D for guidelines)
 - 6.5.1.4 Recommendation
 - 6.5.1.5 Repeat or New Recommendation
- 6.5.2 All team member reports shall be prepared within 2 days following the field assessment. These reports shall be given to the team leader who will prepare the preliminary report within 4 working days of receipt of the team member reports. This will be used to prepare the presentation for the PIU management.
- 6.5.3 The final report will be presented and issued, within 10 working days after completion of the field assessment.
- 6.5.4 The Team should conduct an after-action-review to discuss the assessment preparations, field assessment, presentations and other phases of the review to capture lesson learned and continuously improve the process.

6.6 Implementation and Tracking Process

- 6.6.1 Upon receipt of the report, the PIU supervisor shall develop corrective action to close each recommendation with an estimated to complete (ETC) dates for all recommendations. This corrective action shall be agreed by the assessor to facilitate closure of the recommendation. This agreed corrective action for each recommendation shall be submitted to IEU within a month from submittal of the final report.
 - 6.6.2 The PIU shall track the implementation of all recommendations. When the pending recommendations are not completed on the estimated date, IEU will issue a letter of non-conformance or an electronic notification per [00-SAIP-79](#) to the PIU Superintendent or General Supervisor. The
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non-conformance letters will be issued progressively to higher level of management at one month intervals until the pending major recommendations are completed or resolved. If the original estimated date of completion needs to be revised, the division head approval for the first revision and the department head approval for the second revision is required. Further revision for major recommendations shall be approved by the admin area head.

Notes:

- 1) Revisions made after issuance of the first non-conformance letter shall not be accepted.*
- 2) The new ETC after the first and second revision shall not exceed a period of six months from the original ETC.*
- 3) Implementation progress will be monitored also through the PIU performance Index.*

- 6.6.3 If the PIU disagrees with or is unable to comply with a major or potential major recommendation as defined in Attachment II , a clarification letter shall be obtained from the PIU department's manager at the time of the corrective action submittal mentioned under paragraph 6.6.1. This letter should state the justification for non-compliance. A copy of this letter shall be forwarded to the Manager, Inspection Department. If this letter is not accepted by ID, PIU shall obtain an admin area head clarification letter.
- 6.6.4 The PIU shall submit implementation status reports, at three months intervals, for all major or potential major recommendations identified in the final report, to the Manager, Inspection Department. These reports shall be continued until all recommendations are implemented or otherwise resolved.
- 6.6.5 When the status reports are not received by the Manager, Inspection Department at the above stated intervals, IEU will issue a letter of non-conformance. The non-conformance letters will be issued progressively to higher level of management starting with the superintendent or general supervisor at one month intervals until the status reports are issued or recommendations resolved.

Commentary Note:

00-SAIP-79 shall be used for detilas on tracking system including electronic flagging and reporting of Status reports and ETC.

- 6.6.6 IEU will maintain a summary of the unit's implementation progress from the quarterly reports submitted by each unit. Progress on implementation will be factored in the periodic unit's Plant Inspection Index (PII).
- 6.6.7 Verification of recommendations implementation shall be performed as part of subsequent OID assessments and the internal self-assessment. Each report shall indicate if the recommendation is repeated from the previous assessment.

31 May, 2004

Revision Summary
Major revision.

Attachment A – Core Assessment Areas

Item	Assessment Area	Reference	Assessor
1	Technical Administration	Job Description, 00-SAIP-71 , 00-SAIP-73	
2	Worksheets	00-SAIP-72	
3	Management of Recommendations	00-SAIP-77 , 00-SAIP-79	
4	Positive Material Identification	00-SAIP-07	
5	On-Stream Inspection	SAEP-1135 , 01-SAIP-01 , 00-SAIP-74 , 00-SAIP-75 , 01-SAIP-04 .	
6	Plant Record Books and Files	SAEP-122 , 00-SAIP-78	
7	Equipment Inspection Schedules	SAEP-20 , GI-02.600, SAEP-309	
8	Relief Valve Program	SAEP-318 , 319, 1131, 1132, 1133, and 1134.	
9	NDT Operations	SAEP-1140 , 1141, 1142, 1143, 1144, 1145 & 1146	
10	Corrosion/CP Monitoring	SAEP-1135 and Plant Corrosion Control Manual, GI.0428.001	
11	Plant and Equipment Inspection	SAEP-325 , SAEP-317 and 32-SAIP-11	
12	Welding Inspection	SAEP-321 , 322 and 323	
13	Electrical Inspection	00-SAIP-51	
14	Civil Inspection	SAEP-309	
15	Coatings Inspection	SAEP-316	
16	Training Program	AJTS, GI-1809.001 and Job Description	
17	Involvement in Management of Change	00-SAIP-72	

Attachment B – Observations and Recommendations Reporting Form
Observations and Recommendations Reporting Form

Plant Inspection Unit Name :

Assessment Date :

Assessor Name & Badge Number:

Program/System:

Report Item #	Observation (SAEP 308 6.4.4 & 6.5.1)	Impact of the Observation	Category (SAEP-308 Attach D)	Recommendation	Repeat/ New
1					
2					
3					
4					
5					

Attachment C – Status of Major Recommendations
Status of Major Recommendations
(Plant Inspection Unit Name)

(Date)

Report Item #	Recommendation (SAEP 308 6.4.4 & 6.5.1)	Corrective Action to be taken (See 6.6.1 of SAEP-308 for details)	ETC (To be completed first month)	Revised ETC (see 6.6.2 of SAEP 308)	Status
1	☐				In Progress Completed Date:/...../
2	☐				In Progress Completed Date:/...../
3	☐				In Progress Completed Date:/...../
4	☐				In Progress Completed Date:/...../

Attachment D – Recommendation Classification Criteria

Immediate Recommendations: Any observations deemed too critical to wait until the issuance of the final report. These items are communicated to plant Inspection Unit Supervisor and copied to his management by individual memos so that they can be implemented without delay. This memo will also be attached to the final report. This includes:

- Imminent safety risk

Major Recommendations: Any recommendation that falls under any of these categories or combination of them:

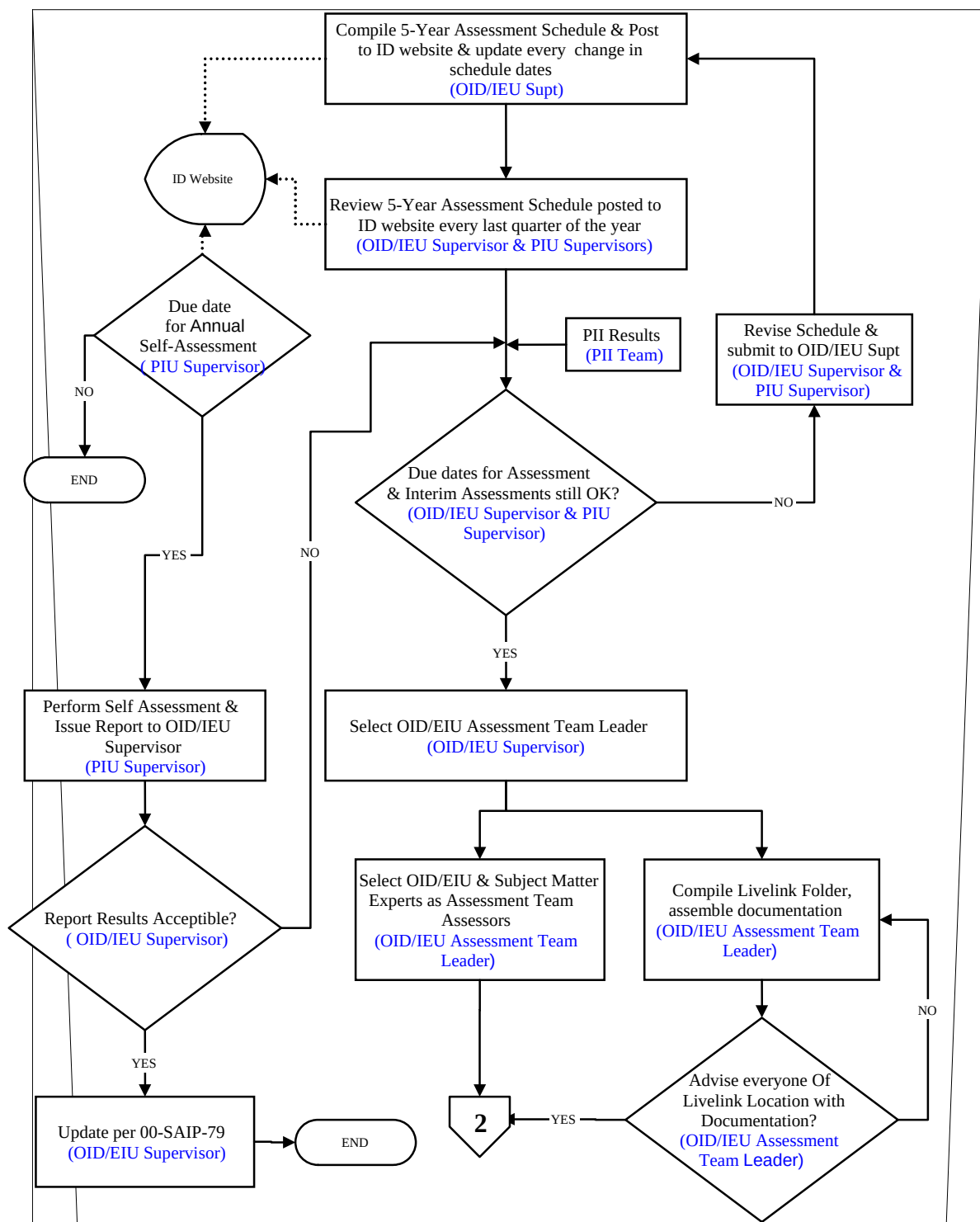
- Violations to Corporate standards or procedures (Overdue equipment without Deviation request, RV not included in the tracking system, improper installation of PZV or associated isolation valves...etc.)
- Failure of an inspection program (e.g., unavailability of manpower to make program functional)
- Deficiencies making the inspection program ineffective (e.g., inadequately trained inspectors)
- Production loss (> \$100M).
- Major safety risk, e.g., fire, explosions, or personal injuries. (as per RBI guidelines API RP 580)
- Loss of assets (>\$100M).
- Increased equipment life cycle cost (>\$100M).
- Increased operating costs as a result of fuel/feedstock interruption, catalyst damage, maintenance rework, etc. (> 100M/yr)

Potential Major Recommendations: Any recommendation that are considered to have a long term effect on plant integrity that, if left unattended, could possibly become a major impact item with respect to reliability and safety.

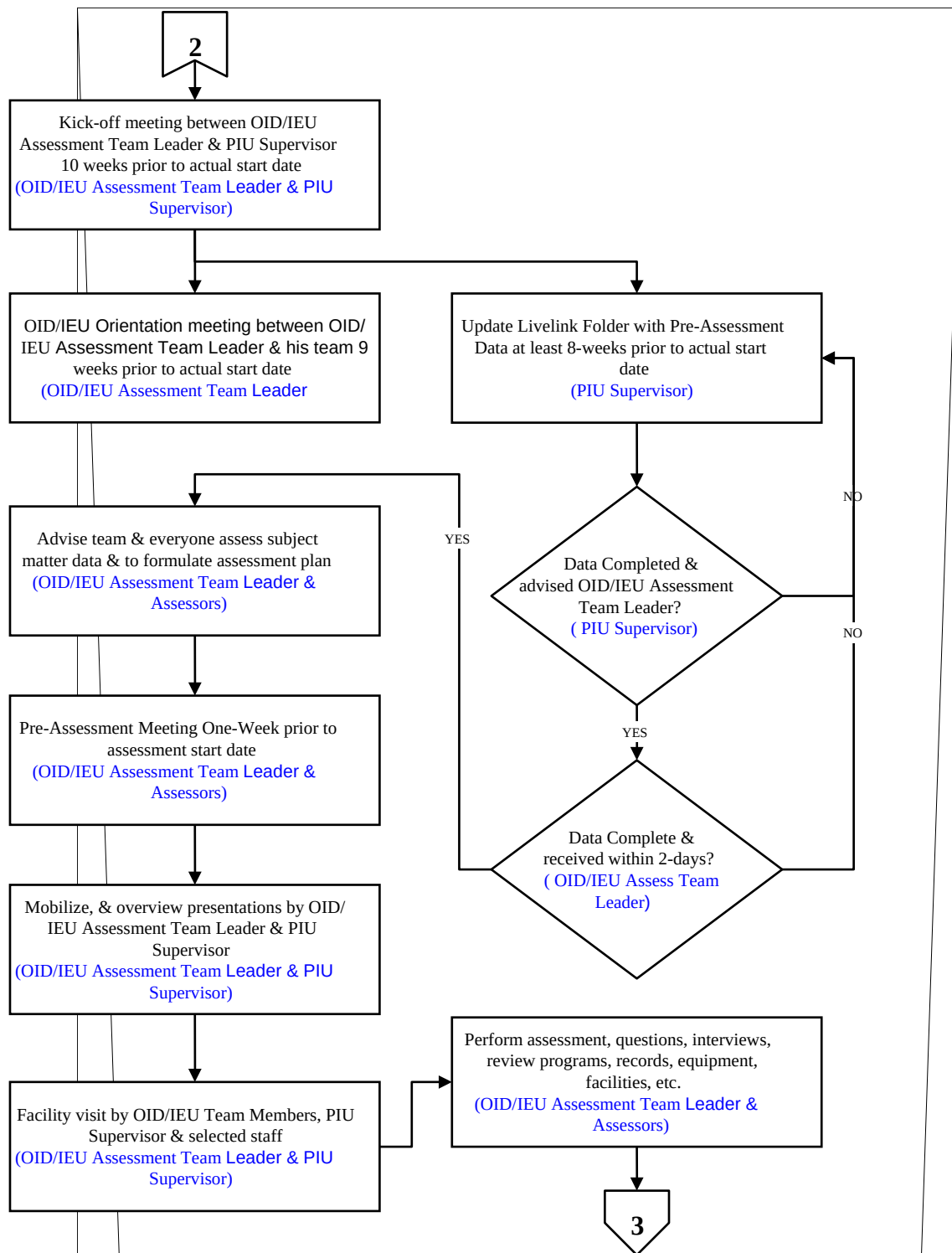
Good Practice Recommendations: Any recommendation that falls under any of these categories or combination of them:

- Observations and recommendations that include the areas of Best Practices, Plant Equipment Optimization and Cost Effectiveness. These items are considered to have long range impact on integrity however they have a more heavy effect on economical plant operations, efficiency and best use of resources.
 - Observations and Recommendations that are judged by the assessor as a practice that will increase the effectiveness of the PIU or the integrity of the equipment and is being followed by good performance units.
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Attachment E – Flowchart



Attachment E – Flowchart (continued)



Attachment E – Flowchart (continued)

