

Engineering Procedure

SAEP-301

13 November 2005

Instructions for Establishing and Maintaining
Mandatory Saudi Aramco Engineering Requirements

Document Responsibility: Standards Coordinator

Saudi Aramco DeskTop Standards

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1 Scope

This procedure establishes the instructions for issuing new Mandatory Saudi Aramco Engineering Requirement (MSAER) documents, and for revising or canceling existing MSAER documents. MSAER documents include engineering standards, specifications, procedures and drawings that are developed for uniformity and applied Company-wide.

2 Applicable Documents

Saudi Aramco Engineering Procedures

<i>SAEP-15</i>	<i>Preparation of Restricted Vendor Lists for Process Automation Systems</i>
<i>SAEP-110</i>	<i>Saudi Aramco Standard Drawings</i>
<i>SAEP-119</i>	<i>Saudi Aramco Materials System Specifications</i>
<i>SAEP-125</i>	<i>Saudi Aramco Engineering Standards</i>
<i>SAEP-133</i>	<i>Instructions for the Development of "Regulated Vendors List" Engineering Standards</i>
<i>SAEP-134</i>	<i>Saudi Aramco Engineering Procedure Preparations</i>
<i>SAEP-302</i>	<i>Instructions for Obtaining a Waiver of a Mandatory Saudi Aramco Engineering Requirement</i>

3 Instructions

3.1 Assignment of MSAER Document Responsibility

The responsibility for establishing and maintaining each MSAER document is assigned to the most appropriate Responsible Department. For departments with a number of MSAER documents in a specific discipline, a Standards Committee headed by a Chairman may be formed to assume this responsibility. The Standards Coordinator will resolve MSAER assignment conflicts.

3.2 Initiation of MSAER Documents

The Responsible Department designee or Standards Committee Chairman (SCC) will initiate all actions concerning MSAER documents, including new MSAER documents, and revisions or cancellations of existing MSAER documents.

Proposals for new MSAER documents or revising or deleting existing MSAER documents can be made by organizations not associated with the Responsible Department or Standards Committee. These organizations can submit their proposals, along with back-up documentation and justification, as appropriate, to the Responsible Department or Standards Committee for evaluation and further processing.

3.3 Major Revisions and New MSAER Documents

A major revision is defined as changes, additions, or deletions in requirements which are safety related, or would have a significant effect on operations, maintenance costs, or reliability.

The Standards Coordinator will send all proposed major revisions and new MSAER documents to all Board of Engineer (BOE) members for review. All BOE members will have at least four weeks to review the proposal and respond to the Standards Coordinator. The response shall indicate their acceptance of the proposal or suggest revisions. After the Responsible Department or Standards Committee has resolved all review comments, the final document shall be routed by the Standards Coordinator for approval by the Chief Engineer, Engineering Services. The Standards Coordinator shall notify all BOE members of completed actions.

Exception:

Development and maintenance of manufacturers to the "Regulated Vendors List" shall follow "SAEP-133". Addition and deletion of manufacturers to the "Restricted Vendor Lists for Process Automation Systems" shall follow "SAEP-15".

3.4 Minor Revisions of MSAER Documents

A minor revision is defined as changes, additions, or deletions in requirements that are not safety related, nor would they have a significant effect on operations, maintenance costs, or reliability. These changes usually involve rewording for clarification, additional explanations, options or changes in reference documentation.

Minor revision actions shall be approved by the Chief Engineer, Engineering Services. The Minor revisions will not be sent to the BOE for review. The Standards Coordinator shall notify all BOE members of completed actions.

3.5 Editorial Changes to MSAER Documents

The Standards Coordinator shall be authorized to make editorial changes to approved MSAER documents. He will act based on written recommendations from the Responsible Department or Standards Committee for the following situations:

- a) Organizational name and position title changes already approved by Management.
 - b) Typographical errors.
 - c) Deletion of outdated references, which have no impact on the requirements of the MSAER.
 - d) Clarification in the wording of a sentence to better explain the intent of the requirements.
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- e) Changes to a MSAER where the requirements are also included in another approved MSAER.
- f) A Change to the MSAER document's "Next Planned Update" only.

When editorial changes are made, issue dates of the MSAER documents will subsequently be changed.

3.6 Cancellation of MSAER Documents

Obsolete or superseded MSAER documents shall be cancelled. Cancellation actions shall be approved by the Chief Engineer, Engineering Services. The Standards Coordinator shall notify all BOE members of completed actions.

3.7 Maintaining MSAER Documents

Each MSAER document shall be reviewed and updated on a regular basis, but not limited to the following:

- 3.7.1 Each MSAER document shall be reviewed and revised as necessary, whenever there is a significant change in the International Standard(s) used as the basis for the company's MSAER document. The Responsible Department designee or Standards Committee Chairman shall determine the optimum timing for revising the MSAER.
- 3.7.2 The MSAER document shall be reviewed and revised as necessary, whenever an approved waiver cited the need to revise the standard or when repetitive waivers have been approved against a particular requirement of the standard.
- 3.7.3 In general, the review date will be five years after the last BOE review. Any MSAER document not revised for a period of five years from its issue date shall be reviewed and re-issued to re-affirm its contents and requirements against Company needs.

The review cycle shall be formalized by including the date of the "Next Planned Update" in the document.

3.8 Interpretation/Clarification of MSAER Documents

If there is uncertainty as to the exact meaning of specific clauses, paragraphs, or sections of a MSAER, the ultimate responsibility for interpretation shall be by the relevant Standards Committee Chairman or Responsible Department designee where no Standards Committee exists.

3.9 Responsible Standardization Agent (RSA)

The RSA represents the highest level of engineering or technical expertise within Saudi Aramco for a specific class or subclass of material master items. Assignment of an RSA shall be made by the Manager of the Responsible Department at the request of Material Supply (MS) management.

3.10 DeskTop Standards (DTS)

The Standards Coordinator will ensure that copies of all approved MSAER documents are installed on the corporate Intranet for access using the DeskTop Standards software computer program. Other means of distribution using electronic publishing methods may also be developed.

The DTS installation on the Engineering Standards Home webpage on the Intranet is the official version of MSAER documents. This webpage is periodically updated with copies of approved documents. Other sources of MSAER documents are available. However, because updating of other sources is not always accomplished simultaneously and instantaneously with the DeskTop Information System, when differences occur, the Engineering Standards Home webpage documents shall be considered the "official" approved version.

Other sources of the DTS include:

- Quarterly distribution of the entire document collection, together with the DeskTop Standards software computer program on CD ROM.

Commentary Note:

Four distributions are made per year, although the frequency could be revised in response to a changed need by users. Distribution is made to named department representatives. To obtain a copy of the latest CD ROM, contact the department representative. The representative's names are published on the Engineering Standards Home webpage, and can also be obtained by contacting the Standards Coordinator.

4 Responsibilities

4.1 Standards Committee Chairman (SCC)

The SCC is appointed to serve for a renewable period of five years. The SCC is responsible for the following:

- a) Coordinating all activities of the Standards Committee (SC) and not override a decision taken at a SC meeting or a consensus of the SC members without justifying this action to the SC. The activities the SCC coordinates include, but are not limited to:
 - Holding formal or informal meetings of the SC to review all MSAER documents and other related engineering documentation on a regular basis, to ensure that all documents are up-to-date.
 - Delegating MSAER document reviews to qualified engineers and then ensuring that the review is endorsed by SC before submitting any resulting revisions for approval.
 - Sending draft major revisions to operating facilities for review and comment before submitting the revisions for approval.
 - Ensuring that the existing MSAER documents are revised to reflect all known requirements needed to achieve optimum balance of technical, safety, economics, and implementation issues. As the result of document revisions, identifying their impact on other MSAER documents, particularly where conflicts are created and must be resolved.
 - Ensuring that an Impact Summary Sheet is prepared for new MSAER documents, major or minor revisions, and cancellation of existing MSAER documents.
 - Ensuring that the Comments Resolution Sheet is prepared for MSAER documents routed and BOE comments received.
 - Identifying the need for new MSAER documents to cover subjects not covered by other documents, and ensuring that draft documents are prepared for review and approval.
 - Setting appropriate review cycles for each MSAER document that may be less than but not more than the maximum five-year review cycle requirement of paragraph 3.7.3 of this engineering procedure.
 - Ensuring that the SC has at least one RSA as a member.
 - b) Resolving all BOE member comments. Interfacing with the BOE on all major comments to ensure they are satisfactorily resolved.
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- c) Submitting to the Standards Coordinator all proposed actions on MSAER documents.
- d) Ensuring that their committee is composed of members from varying departments who are technically competent in the committee's discipline, capable of drafting and reviewing standards, and able to spend the time necessary to accomplish the work of the committee.
- e) Ensuring that organizations within the Company, who do not have members on the SC or are not BOE members, review major changes in MSAER documents where these changes have a significant cost or operational impact on their operations.
- f) Evaluating the nominations of new members and nominating new members to serve on the SC and recommending to the Department Manager their acceptance.
- g) Evaluating SC member participation and recommending replacement or removal of inactive ones.
- h) Keeping the Standards Coordinator informed of changes in the membership of their individual SC.
- i) Including the Standards Coordinator on distribution of all significant correspondence related to MSAER documents.
- j) Providing interpretations of MSAER's under his jurisdiction.

4.2 Standards Committee Vice Chairman (SCVC)

During the absence of the SCC, the SCVC shall perform the duties of the SCC as stipulated in item 4.1.

4.3 Responsible Standardization Agent (RSA)

- a) Assisting in resolving technical problems when requested by Standardization engineers or analysts.
 - b) Reviewing the technical details of proposed material master items by for complete specifications, technical acceptability, and conformance to Saudi Aramco Standards.
 - c) Assigning Commodity Material (9COM) Commodity Classification Codes (CCC's) to Cataloged Material (9CAT).
 - d) Reviewing and concurring with material master item specification changes, as required.
 - e) Reviewing and concurring with material master product approvals, as required.
 - f) Participating in evaluations and technical approvals of manufacturers and products proposed for addition to the material master item when required.
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- g) Initiating revisions to Saudi Aramco materials specifications involving item descriptions or the obsolescence of material master items.
- h) Assisting customers in standardizing and simplifying material master items, when requested.
- i) Coordinating with Material Standardization Engineers or Analysts to ensure adequate coverage in terms of number of suppliers and geographical distribution.
- j) Assisting in the development of local manufacturers.

4.4 Department Manager

The Manager is responsible for all actions on MSAER documents associated with his Responsible Department, either by assignment or through Standards Committees. If Standards Committees in one or more disciplines have been formed, he will ensure that all items listed in paragraph 4.1 are satisfied. If there is no Standards Committee, he may delegate the responsibilities listed in paragraph 4.1 to one or more persons in his organization and then ensure that they are fulfilled.

He is also responsible for the following:

- a) Concurs to all actions related to MSAER documents assigned to him before approval.
- b) Approves nomination of new members and changes in SC membership. Recommends the creation of new committees and the cancellation of committees no longer needed. He also recommends the chairman and vice chairman of the Standards Committee for approval by the Chief Engineer.
- c) Approves special studies, activities and projects related to MSAER document activities.
- d) Approves nomination of primary and alternate RSAs.

4.5 Board of Engineers

As a regular committee of the Company, the BOE reviews and provides guidance with regard to corporate technical issues and the application of engineering standards and specifications.

The BOE reviews new MSAER documents and major revisions to existing MSAER documents to ensure they are acceptable from the technical, safety, economics, and implementation standpoints.

4.6 Chief Engineer, Engineering Services

The Chief Engineer, Engineering Services is the approval authority on all actions pertaining to most of the MSAER documents. He also approves the

creation or cancellation of Standards Committees, and the appointment of all Standards Committee Chairmen and Vice Chairmen.

4.7 Standards Coordinator

Responsibilities of the Standards Coordinator include:

- a) Coordinating all actions relating to MSAER documents with the Responsible Department or Standards Committee, from initiation through final approval, and beyond. This includes, but is not limited to:
 - Determining if proposed revisions to existing MSAER documents are considered editorial, minor, or major revisions.
 - Compiling all responses from BOE members and transmitting them to the SCC.
 - Reviewing all documents prior to BOE review or submittal to the Chief Engineer, Engineering Services for approval.
- b) Ensuring compliance with the requirements in this procedure for the revision of MSAER documents.
- c) Assigning and maintaining a numbering system for all MSAER documents.
- d) Assigning every MSAER document to a Responsible Department or Standards Committee, as appropriate.
- e) Determining the design details, including layout, fonts, styles, etc., of all MSAER documents.
- f) Issuing the word processing instructions to be used by the Responsible Department or Standards Committee for all submitted documents.
- g) Maintaining copies of all approved MSAER documents on the Engineering Standards Home page. Quarterly distributing copies of the MSAER documents on CD ROMs, for those without other means of access.
- h) Maintaining historical records of all MSAER documents.
- i) Notifying all BOE members of completed actions.
- j) Maintaining RSA listing in the SAP system and Engineering Standards website.

5 Notes

5.1 Mandatory Saudi Aramco Engineering Requirement Documents

MSAER documents shall consist of all the Saudi Aramco Engineering Standards (SAEP-125), Saudi Aramco Materials System Specifications (SAEP-119), Saudi Aramco Engineering Procedure Preparations (SAEP-134) and Saudi Aramco

Standard Drawings (SAEP-110). Documents referenced in MSAER documents shall also be considered mandatory, to the extent indicated. These references include documents such as Industry Codes and Standards, Engineering Reports, non-Saudi Aramco publications, Sanitary Code, Inspection Requirements (Form 175), engineering forms and data sheets, General Instructions, etc.

5.2 Impact Summary Sheet

The Impact Summary Sheet is intended to give an overview of the changes and the impact of the new, revised or cancelled document on the Company. The Impact Summary Sheet shall include the following:

- a) History of the revision or new document and what initiated the change or cancellation of the document.
- b) Impact the revision, cancellation or new document will have on safety, operations, maintenance, costs, spare parts, materials inventory, and inspection activities.
- c) Other relevant information on the impact of the new requirements and reason for revision.

The Impact Summary Sheet shall be prepared and distributed with draft copies of documents sent to the BOE for review. If major revisions are made to the document as a result of the BOE review, the Impact Summary Sheet shall be updated accordingly. The Impact Summary Sheet shall be prepared as applicable and included with all the documents requiring the approval of the Chief Engineer and above.

5.3 Standards Committees

- 5.3.1 Standards Committees (SCs) plan, initiate, and review drafts of new and revised MSAER documents within their particular technical discipline before submittal to the Board of Engineers (BOE) for review and to the Chief Engineer, Engineering Services for approval.
- 5.3.2 The individual SC shall be headed by a Chairman from the Responsible Department. The Chairman shall be recommended by the Manager of the Responsible Department and approved by the Chief Engineer, Engineering Services. Changes in Chairmanship shall also be approved by the Chief Engineer, Engineering Services.
- 5.3.3 SC membership shall consist of individuals who are considered the most technically qualified and knowledgeable in their particular discipline. BOE members, and other department managers from throughout the Company can nominate individuals to serve on committees. The Standards Committee Chairman shall determine the acceptability of a nominee and recommend his addition to the Standards Committee if he possesses the necessary technical qualifications. Acceptance of the

nominated individual shall be approved by the Manager of the Responsible Department.

5.3.4 The following SCs are established for specific technical areas:

- Cathodic Protection
- Civil
- Co-generation
- Communications
- Compressors, Gears & Steam Turbines
- Custody Measurement
- Drilling & Workover Wellheads & Valves
- Electrical Substations Equipment
- Electrical Systems Design & Automation
- Environmental
- Flare Systems Design
- Gas Turbines & Diesel Engines
- HVAC
- Heat Transfer Equipment
- High Integrity Protective Systems
- Instrumentation
- Loss Prevention
- Lubrication Systems & Lubricants
- Materials & Corrosion Control
- Motors and Generators
- Nondestructive Testing
- Offshore Structures
- Onshore Structures
- Paints & Coatings
- Piping
- Plumbing & Utilities
- Process Control
- Pumps, Seals & Mixers
- Safety & Security
- Trays & Packing Process Design
- UPS, DC Systems & Power Electronics
- Valves
- Vessels

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- Welding

5.3.5 To form a new committee, the Manager of the Responsible Department shall define the scope of the committee, identify chairman, recommend organizations which should be represented from throughout the company and obtain the approval of the Chief Engineer, Engineering Services.

5.4 Responsible Departments

The organizations listed below have MSAER documents assigned to them and are designated within the context of this procedure as Responsible Departments. Other organizations may be added by the assignment of MSAER document responsibility.

- Consulting Services
- Drilling & Workover Engineering
- Engineering Drawing Services
- Environmental Protection
- Facilities Planning
- Fire Protection
- Industrial Security
- Inspection
- Loss Prevention
- Materials Control
- Process & Control Systems
- Project Support & Controls
- Technical Information Center
- Terminal
- Training and Career Development

Revision Summary

30 April 2002	Major revision.
31 March 2003	Minor revision.
31 May 2003	Editorial revisions to renumber SAEP-10 to SAEP-134, change Engineering Standards Home webpage to Consulting Services Department Home webpage, and add new Standards Committees under 5.3.4.
31 May 2004	Minor revision to add RSA and Standards Committee Vice Chairman functions.
31 January 2005	Editorial revisions to change Consulting Services Department Home webpage to Engineering Standards Home webpage, and add/replace/remove Responsible Departments under 5.4.
29 June 2005	Editorial revision to add new Standards Committees.
13 November 2005	Minor revision to re-classify the approval authority of "Next Planned Update" from Minor to Editorial revision. Replaced Rotating Equipment Standard Committee with 4 newly created Committees.