

SAUDI ARABIAN OIL COMPANY (Saudi Aramco) <b>GENERAL INSTRUCTION MANUAL</b>		G. I. Number Approved
ISSUING ORG. LOSS PREVENTION DEPARTMENT		2.100
SUBJECT	WORK PERMIT SYSTEM	ISSUE DATE 06/29/2017    REPLACES 09/01/2016
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## SUPPLEMENTS

\* Supplement 2.100-1, Minimum Criteria for Restricted Areas, Restricted Activities, and High Risk Activities

Supplement 2.100-2, Training/Certification Courses

Supplement 2.100-3, Joint Site Inspection

Supplement 2.100-4

Refer to SA FORM 9873-1 (EQUIPMENT OPENING/LINE BREAK)  
 SA FORM 9873-2 (HOT WORK)  
 SA FORM 9873-3 (COLD WORK)  
 SA FORM 9873-4 (CONFINED SPACE ENTRY)

Supplement 2.100-5

Refer to (CERTIFICATE TO RECEIVE WORK PERMITS)

Supplement 2.100-6

Refer to (CERTIFICATE TO ISSUE WORK PERMITS)

## 1.0 PURPOSE

The purpose of this General Instruction (GI) is to establish minimum requirements for issuing/receiving work permits at Saudi Aramco (SA) facilities and project sites. The work permit system authorizes specific construction, maintenance, inspection or repair activities to be conducted that pose a hazard to personnel, damage to equipment or facilities, disruption of operations or harm to the environment. A work permit is not simply permission to carry out a hazardous activity, but is an essential part of a process that determines the hazards associated with a particular activity and the precautions to take so the job can be carried out safely. When issued,

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work permits serve as official records of conditions and minimum safety precautions agreed upon by the issuer and receiver to control hazards associated with the work.

## 2.0 SCOPE

- 2.1 All SA departments shall apply this instruction to work activities performed in *restricted areas* and to *restricted activities* designated by proponent organization managers that present a potential hazard to company operations, facilities, personnel or equipment at all SA facilities, SA project sites and at project support facilities covered under SA Land Use Permits, including laydown yards.
- 2.2 Low-risk activities, as determined by proponent organization managers, may be exempted from the work permit system.
- 2.3 During the construction phase of grassroots projects and before a facility, or portion thereof, is certified as mechanically complete, the contractor shall implement an approved work permit system in line with this instruction for all hazardous work requiring the appropriate planning, control, and authority that does not meet the criteria defined in Section 2.1. After mechanical completion or during electrical work on systems that are attached to the SA electrical distribution system (e.g., pre-commissioning of substations), the SA work permit system shall be implemented per this instruction.
- 2.4 During drilling and workover (D&WO) activities, the D&WO contractor shall implement a work permit system in line with this instruction to ensure safe execution of D&WO activities.

## 3.0 REFERENCES

- GI 2.102, *Pressure Testing Safely*
- GI 2.702, *Moving Drilling Rigs, High Clearance Equipment/Loads, or Operating Cranes Under or Near Power Lines*
- GI 2.709, *Use of Portable Gas Monitors*
- GI 2.710, *Mechanical Completion and Performance Acceptance of Facilities*
- GI 6.012, *Isolation, Lockout and Use of Hold Tags*
- GI 475.001, *Rock Blasting Near Existing Facilities*
- SAES-B-068, *Electrical Area Classification*
- SAES-P-119, *Substations*
- Saudi Aramco *Construction Safety Manual (CSM)*

## 4.0 DEFINITIONS

- 4.1 Cold Work: Activities that will not produce sufficient energy to ignite flammable atmospheres or combustible materials. Examples may include work with hand tools, scaffold erection, asbestos removal, sand removal, etc.
- 4.2 Confined Space: Any space that:

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- a.) Has limited or restricted means of entry or exit.
- b.) Is not designed for human occupancy.
- c.) Contains or has the potential to contain a hazardous atmosphere.
- d.) Contains any other recognized serious safety or health hazard(s).

Examples of confined spaces include tanks, vessels, vessel skirts, vaults, manholes, sewers, valve boxes, lift stations, and structures or excavations 1.2 m (4 ft) deep or deeper. Areas above floating roof tanks where the top of the roof is more than 1.2 m (4 ft) below the rim of the tank are also considered confined spaces.

- 4.3 Confined Space Entry: The entrance of *any* part of the body into a space that meets the criteria for a confined space. Entry includes all periods of time when the confined space is occupied.
- 4.4 Confined Space Entry Standby Man: Individual(s) assigned by the confined space entry supervisor at each designated entry point to continuously monitor the confined space entry while personnel (entrants) are inside the confined space. Confined space entry standby men shall be trained and qualified to carry out their responsibilities per the Saudi Aramco *Construction Safety Manual* (CSM) and this instruction.
- 4.5 Confined Space Entry Supervisor: A work permit issuer, or an individual who has been assigned by an issuer, who is responsible for directing all aspects of the confined space entry. Confined space entry supervisors shall be trained and qualified to carry out their responsibilities per the Saudi Aramco CSM and this instruction.
- 4.6 Countersignature: Signature of employees who are designated by their division or department heads to countersign work permits. They are individuals who have supervisory responsibilities of work areas and have authority over activities that occur, and personnel who work in those areas, to ensure that safe working conditions are maintained.
- 4.7 Designated Representative: An employee designated by their division or department heads to perform the duties associated with issuing work permits. They are individuals who are experienced, competent and familiar with the requirements of this instruction. Designated representatives cannot issue work permits.
- 4.8 Emergency Work: Activities undertaken during a declared emergency at a SA facility or project site, under the direction of the Incident Commander.
- 4.9 Equipment Opening/Line Break: Activities associated with the *initial* opening of equipment, vessels or piping that is part of a closed system that contains (or has the potential to contain) flammable, combustible, toxic or injurious materials (e.g., high-pressure steam).
- 4.10 Extended (Work Permit): A work permit that is issued for a period greater than two consecutive operating shifts, but not in excess of 30 days.
- 4.11 Fire Watch: An individual designated by the issuer on the work permit form who:
  - a.) Is aware of the inherent hazards of hot work and the types of fires that may result.
  - b.) Monitors activities related to hot work activities and is knowledgeable in the controls required to prevent fires from occurring.
  - c.) Has fire protection equipment readily available and is trained in its use.
  - d.) Is familiar with the procedures for notifying appropriate personnel in the event of a fire.
- 4.12 Grassroots Project: An SA project for construction of a new plant/unit or facility that is under the control of an SA construction agency and the construction contractor until start-up/occupancy. A grassroots construction project is normally at a previously undisturbed site. However, a project located within an

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existing SA plant or facility is also considered to be a grassroots project if the SA proponent organization has turned over control of the project site to the construction agency and the contractor until start-up/occupancy.

- 4.13 Hazard Analysis: An assessment of work activity conducted during the joint site inspection before the work is started. It is performed by the work permit issuer (or his designated representative) and the receiver. For this purpose, the individual steps, the work equipment to be used and the working environment are discussed at the job site. The protective measures specified by the applicable work permit(s) are reviewed to verify they are in place and address the hazards of the work activity.
- \*\* 4.14 High Risk Activity: Activities/tasks that present additional or unique hazards to personnel and require additional approvals by proponent management prior to work commencing. See Supplement 2.100-1 for the minimum criteria for high risk activities.
- 4.15 Hot Work: Any activity that may develop sparks, flames or heat sufficient to cause ignition. Examples include internal combustion engines in restricted areas, welding, torch use, grinding, abrasive blasting, work on or in close proximity to live electrical apparatus, or the use of a device not rated for the electrical classification of the area.
- 4.16 Joint Site Inspection: An inspection conducted by the work permit issuer (or his designated representative) and the receiver, to conduct a job site hazard analysis, perform necessary gas tests and review the work permit conditions. See Supplement 2.100-3 for the minimum criteria for conducting joint site inspections.
- 4.17 Lower Explosive Limit (LEL): The lower vapor concentration boundary for a specific compound or material of interest at which the vapor-air mixture will propagate a flame (i.e., explode) if ignited. When testing for combustible gas using gas monitoring instruments, the amount of combustible gas present is specified in terms of % LEL: 0% LEL being a combustible gas-free atmosphere and 100% LEL being an atmosphere in which the gas is at its LEL.
- 4.18 Low Risk Activity: Jobs that proponent organization managers have determined can be conducted safely in restricted areas without work permits. In such cases, the work activity shall follow all applicable SA safety rules and standards and the proponent organization shall maintain adequate control and account for personnel in all areas.
- 4.19 Mechanically Complete: Achieved when a facility or portion thereof, as defined in the approved scope, construction documentation, drawings, specifications and material requisitions, has been installed and tested (precommissioned) and is available for commissioning and start-up per GI 2.710.
- 4.20 Renewed (Work Permit): A work permit that authorizes work to *continue* for one consecutive operating shift, regardless of shift duration, under the conditions of the original work permit. The total permit duration (including the renewal period) cannot exceed 24 hours.
- 4.21 Restricted Activity: An activity/task that has been designated by proponent organization managers as requiring the work permit system no matter the location within SA facilities or project sites. These include activities that present a potential hazard to personnel, facilities, equipment or operations. See Supplement 2.100-1 for the minimum criteria for restricted activities.
- 4.22 Restricted Area: An area that has been designated by proponent organization managers as requiring the work permit system. These include all areas where hydrocarbons, flammable liquids or gases, or toxic agents are handled, stored, piped or processed in bulk quantities. See Supplement 2.100-1 for the minimum criteria for restricted areas.
- 4.23 Standby Man: An individual designated by the issuer on the work permit form who monitors and is familiar with the work activities. Examples include an operations representative during an instrument loop check or

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partial stroking of an emergency shutdown (ESD) valve, or an instrument technician monitoring a preventive maintenance activity.

- 4.24 Work Crew: A group of workers who report to a common supervisor (e.g., foreman, supervisor or lead). Workers in the crew may have different craft skills; however, they are performing activities under the direction of a single supervisor.
- 4.25 Work Permit Issuer: An SA employee who supervises work areas and has authority over work activities and personnel in those work areas and is certified by their division or department heads to issue work permits (also referred to as *issuers*). This individual must have the experience and knowledge to adequately assess job related hazards and is capable and authorized to prescribe appropriate precautionary measures.
- 4.26 Work Permit Receiver: An SA employee (including proponent organization employees) who has been certified by their division or department head, and contractor employees sponsored by the SA organization head that has contractual authority over the contractor to sign and receive work permits (also referred to as *receivers*).

## 5.0 RESPONSIBILITIES

- 5.1 Proponent Management (managers, division heads and supervisors)
  - 5.1.1 Develop a department work permit process that will satisfy the requirements of this instruction.
  - 5.1.2 Specify the *restricted areas* and *restricted activities* that require implementation of the work permit process *and* low-risk activities that are exempt from the department's work permit process. Supplement 2.100-1 identifies the minimum criteria for restricted areas and restricted activities that proponent management must include in the department's work permit process.
  - \* 5.1.3 Specify the *high risk activities* that require additional approval by proponent management as well as the level of management that will authorize the work to commence. At a minimum, this additional approval shall be at the plant foreman or higher level (or equivalent). Supplement 2.100-1 identifies the minimum criteria for high risk activities that proponent management must include in the department's work permit process.
  - 5.1.4 Establish criteria for the selection of work permit issuers/receivers and designated representatives per Section 6.4. Proponent organizations should consider additional training and a period of mentoring for issuer/receiver candidates.
  - 5.1.5 Ensure issuer/receiver candidates meet all required qualifications and have completed all required prerequisite training (see Section 6.0 and Supplement 2.100-2) prior to their enrollment in the applicable work permit certification training.
  - 5.1.6 Authorize and certify work permit candidates to issue and receive permits. Candidates become certified when their certificate is signed by the employee's division head or, in the case of a contractor, by the proponent organization division head.
  - 5.1.7 Ensure designated representative candidates meet all required qualifications and have completed all required prerequisite training (see Section 6.0 and Supplement 2.100-2) prior to their approval as designated representatives.
  - 5.1.8 Maintain records of the organization's certified work permit issuers/receivers and designated representatives.

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- 5.1.9 Ensure employees involved in the process for issuing/receiving work permits are in compliance with the requirements in this instruction.
- 5.1.10 Verify the department's work permit process is implemented in accordance with this instruction by conducting work permit reviews (including job site inspections).
- 5.1.11 Establish criteria for correcting significant or repeat non-compliance with this instruction or the department's work permit process. This may include work permit certificate withdrawal, re-training or an extended period of mentoring.

5.2 Work Permit Issuers

- 5.2.1 Maintain in their possession a valid SA work permit issuer certificate. They shall attend and pass the work permit certification course and all required prerequisite courses (see Section 6.0) conducted by SA Training & Development (T&D).
- 5.2.2 Authorize and issue work permits per the requirements of this instruction.
- 5.2.3 Ensure that a joint site inspection, including completion of the Hazard Analysis Checklist, has been conducted with the receiver.
- 5.2.4 Monitor the job site frequently to make sure all work permit conditions and applicable SA safety and health requirements are being met.
- 5.2.5 Cancel active permits and immediately stop work if a change occurs in the work activities or site conditions per Section 8.
- 5.2.6 Close work permits after completion of the job or when the permit duration has expired.

5.3 Work Permit Receivers

- 5.3.1 Maintain in their possession a valid SA work permit receiver certificate. They shall attend and pass the work permit certification course and all required prerequisite courses (see Section 6.0) conducted by SA T&D.
- 5.3.2 Receive the proper work permit(s) from an SA-certified issuer prior to executing any job.
- 5.3.3 Participate in the joint site inspection, including the hazard analysis with the issuer (or his designated representative).
- 5.3.4 Perform the work in accordance with the conditions and requirements agreed upon with the issuer and specified on the work permit.
- 5.3.5 Remain at the job site and monitor the work to make sure all work permit conditions and applicable SA safety and health requirements are being met.
- 5.3.6 Immediately stop work if a change occurs in the work activities or site conditions per Section 8.
- 5.3.7 Close work permits after completion of the job or when the permit duration has expired.

5.4 Training & Development (T&D)

- 5.4.1 Conduct work permit issuer/receiver classes and administer certification and recertification tests. Administer certificates for proponent organizations' successful candidates.
- 5.4.2 Conduct prerequisite classes and administer required tests for work permit issuers, designated representatives and SA employee work permit receivers (per Sections 6.6, 6.8 and 6.7, respectively).

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- 5.4.3 Reissue certificates for employees transferring to another organization per written request from the proponent organization's division head per Section 6.14.

## **6.0 QUALIFICATIONS AND CERTIFICATION OF WORK PERMIT ISSUERS/RECEIVERS AND DESIGNATED REPRESENTATIVES**

- 6.1 Work permit issuers/receivers and designated representatives shall have sufficient knowledge and experience, be capable of recognizing hazards and be competent in the requirements of this instruction.
- 6.2 Work permit issuers/receivers shall attend and pass the classroom work permit certification course every two years in order to maintain certification. Work permit issuers/receivers shall complete all required prerequisite training and certifications (see Sections 6.6 and 6.7, respectively). Issuers/receivers shall maintain in their possession a valid SA work permit certificate.
- 6.3 Designated representatives shall complete and pass the prerequisite training courses per Section 6.8 prior to their designation by the proponent organization to perform the duties associated with issuing work permits.
- 6.4 Proponent organizations shall establish any additional criteria for the selection of work permit issuers/receivers and designated representatives based on demonstrated safety leadership and behaviors that discourage bypassing established procedures and company requirements. Criteria may include level of experience, additional training, period of mentoring and verification of competency in safety rules and standards.
- 6.5 SA Work Permit System certification course shall be administered by T&D. The purpose of the course is to train potential issuers/receivers on the work permit system and administer written tests.
- 6.6 Effective July 1, 2017, work permit issuer candidates are required to successfully complete the following classroom courses as prerequisites before being allowed to take the issuer's certification course:
  - 6.6.1 Hazard Recognition and Control.
  - 6.6.2 Lock Out/Tag Out.
  - 6.6.3 Confined Space Entry.
  - 6.6.4 Gas Testing Program.

Note: See Supplement 2.100-2 for Business Event Type (BET) listings for all training/certification courses.
- 6.7 Effective July 1, 2017, work permit receiver candidates are required to successfully complete the following classroom courses as prerequisites before being allowed to take the receiver's certification course:
  - 6.7.1 Hazard Recognition and Control.
  - 6.7.2 Lock Out/Tag Out.
  - 6.7.3 Confined Space Entry.
- 6.8 Effective July 1, 2017, designated representatives are required to successfully complete the following classroom courses:
  - 6.8.1 Hazard Recognition and Control.
  - 6.8.2 Lock Out/Tag Out.
  - 6.8.3 Confined Space Entry.

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- 6.8.4 Gas Testing Program.
- 6.8.5 Work Permit 2016 (e-Learning).
- 6.9 All proponent organizations must maintain records of their certified work permit issuers/receivers and approved designated representatives.
- 6.10 Work permit issuer and receiver certificates expire two years after the date of issue. Candidates must complete the corresponding e-Learning prerequisite courses listed in Sections 6.6 and 6.7, respectively, as well as the classroom work permit certification course prior to each recertification exam.
- 6.11 Designated representative approval expires two years after completing the Work Permit 2016 e-Learning course. Designated representatives must complete the corresponding e-Learning courses listed in Section 6.8 every two years.
- 6.12 Work permit certificates will be issued by T&D to the employee's management indicating that candidates have successfully completed the certification exam for issuers/receivers.
- 6.13 Work permit issuer/receiver candidates become certified when their certificate is signed by the employee's division head, or in the case of a contractor, by the SA organization division head that has contractual authority over the contractor.
- 6.14 Work permit certificates will not be reissued when an issuer/receiver transfers to another organization if they have less than six months validity. The issuer or receiver must be recertified. Certificates with more than six months validity must be reissued with the same expiration as the original. Valid certificates can be reissued upon written request to T&D from the proponent organization's division head with the original certificate attached.
- 6.15 Work permit issuer or receiver certificates may be revoked by the proponent organization manager with proper justification. The reason(s) for revoking an issuer/receiver certificate shall be documented and communicated to T&D. The certificate shall be surrendered by the individual and destroyed by the proponent organization.

## 7.0 ISSUING WORK PERMITS

- 7.1 Work permits shall be issued to personnel (operations, maintenance or contractors) for all work activities not classified as low risk in restricted areas, and for all restricted activities per the proponent organization's local work permit process and this instruction. See Section 5.1.2 and Supplement 2.100-1. Before issuing a work permit, all necessary actions to authorize the proposed work and/or possible configuration changes must be completed.  

Note: Work permits are not required for routine activities conducted during normal operations when proponent organization procedures exist and they define all the necessary precautions. This does not apply to confined space entry activities.
- 7.2 When work permits are required, SA-certified receivers shall request the permit(s) from a SA-certified issuer of the facility/project site prior to executing any job. Work permits shall identify the specific work to be performed by the work crew at a specific location.
- 7.3 The issuer shall determine the correct permit(s) for the job: cold work, hot work, equipment opening/line break and/or confined space entry. More than one permit may be required for some jobs.

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- 7.4 The issuer must verify that the receiver's certificate is valid and approved by the proponent organization for the type of work to be performed (i.e., cold work, hot work, equipment opening/line break, confined space entry or a combination of these).
- 7.5 The issuer or receiver must complete "Section 1 - Work Description" of the work permit form.
- 7.6 The issuer will issue the work permit(s) after he (or his designated representative) has performed the following:
- 7.6.1 Verified that "Section 1 - Work Description" of the work permit form has been completed. Work permits shall clearly specify date and duration of the work, work location, work to be performed and equipment to be used at the job site.
  - 7.6.2 Completed "Section 2 - Hazard Identification and Control" of the work permit form. Work permits shall clearly identify the types of energy, isolation method(s), potential exposures, required protective equipment, fire protection methods, additional safety precautions and actions to be taken in the event of an emergency.
  - 7.6.3 Reviewed precautions and restrictions to control the hazards associated with the job site and/or work activity (see applicable work permit sections in this instruction) with the receiver and listed them on the work permit.
  - 7.6.4 Attached applicable checklists/forms to the work permit that provide supplemental information and/or approvals for the particular work activity, including but not limited to excavation checklist, confined space entry log and gas test form, blind list/isolation plan, critical lift plan or hydrotest form. All checklists/forms shall be completed.
  - 7.6.5 Conducted a joint site inspection with the receiver using the Hazard Analysis Checklist on the back of the work permit form. The individuals who participate in the joint site inspection shall sign the Hazard Analysis Checklist on the work permit to verify the checklist was completed. See Supplement 2.100-3 for information regarding conducting the joint site inspection and completion of the checklist.
- 7.7 The issuer (or his designated representative) shall ensure that atmospheric gas tests have been performed by a certified gas tester as required by GI 2.709 and that "Section 3 – Gas Testing/Monitoring" of the work permit form has been completed. If continual or periodic gas monitoring is required, the frequency shall be specified on the permit. The proponent organization's division head signature is required in the event of certain atmospheric conditions per Section 10.6.6.
- 7.8 The issuer shall obtain the approval and countersignature of any other organizations whose operations or facilities will be affected, before issuing a work permit. Countersigning organizations have the option of conducting a joint site inspection with the issuer and receiver.
- 7.9 The issuer's and receiver's signatures plus any other approvals and signatures shall be provided in "Section 4 – Permit Authorization & Closure" of the work permit form. These additional approvals or signatures are required for *extended* permits (see Section 7.12), certain atmospheric conditions (see Section 10.6) or for *high risk activities* as required by the organization's criteria for issuing/receiving particular types of work permits (see Section 5.1.3).

\*\*Note: The purpose of an additional approval for a high risk activity is to ensure that the appropriate level of proponent management understands and is aware that the specific work activity will be taking place. As such, for purposes of a high risk activity, proponents have the option of allowing the additional approval to sign "Section 4 – Permit Authorization & Closure" prior to the joint site inspection being conducted.

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- 7.10 Work permits are normally issued for a single operating shift.
- 7.11 Work permits may be *renewed* for one consecutive operating shift, regardless of the shift duration, but the total permit duration cannot exceed 24 hours. This renewal requires the signatures of both the issuer and receiver coming on shift, and the notification of all countersigning organizations.
  - 7.11.1 Signing the work permit indicates complete agreement with the conditions stated on the form and transfers the responsibility to the issuer/receiver coming on shift.
  - 7.11.2 Any changes to the work scope, equipment used, job site hazards or precautions requires issuing new work permit(s).
- 7.12 Work permits (except for equipment opening/line break permits) may be issued for a period greater than two consecutive operating shifts, but not in excess of 30 days. This *extended* duration applies to prolonged construction or maintenance work where the job site hazards and precautions remain unchanged. The permit shall be approved by the division head or above of the issuing and receiving organizations, and the following conditions must be satisfied:
  - 7.12.1 It is highly unlikely that conditions will develop that would create an additional hazard to personnel, damage to equipment or facilities, disruption in operations or harm to the environment.
  - 7.12.2 Both the issuing organization's division head and the receiver organization's division head (and countersignature organizations' division head, if applicable) agree to the job conditions and control measures to be used and shall sign the work permit.
- 7.13 The custody of open work permits shall be transferred to an alternate issuer in the event that the issuer is required to leave work. This transfer of custody of the work permit shall follow the same process as a *renewed* work permit per Section 7.11; however, the notification of all countersigning organizations is not required.
- 7.14 The work permit receiver shall keep a copy of the permit in his possession or in view at the job site for the duration of the job so that it is available for inspection and cancellation if necessary.
- 7.15 The receiver shall remain at the job site at all times. However, if the receiver must leave the immediate work area, he shall give the permit to another SA-certified permit receiver. This alternate receiver shall be agreed to in advance by the issuer and his name, certificate number and badge number recorded on the work permit.

## 8.0 CANCELING WORK PERMITS

- 8.1 Work permit(s) shall be immediately canceled, the work stopped and new permit(s) issued if a change occurs in the work activities or site conditions that could potentially create an additional hazard to personnel, damage to equipment or facilities, disruption in operations or harm to the environment.
  - 8.1.1 When work is stopped the issuer must obtain the work permit, write on the permit the reason for the work cancelation, the time and other relevant information.
  - 8.1.2 The issuer and receiver shall take action to correct deficiencies to allow the job to resume.
  - 8.1.3 When all deficiencies have been corrected, the issuer shall issue a new work permit(s).
- 8.2 The issuer and/or receiver has the responsibility to stop work any time the job site does not meet the work permit conditions or any applicable SA safety and health requirements. The issuer and/or receiver shall take action to correct the deficiencies before work can resume.

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- 8.3 In the event of an emergency, all work permits are canceled within the area affected by the emergency condition and as specified by the Incident Commander.
- 8.4 Emergency work can be authorized without applicable work permits under the direction of the Incident Commander. However, the work activity shall follow all SA safety rules and standards normally applicable for the specific emergency situation. Once the "All Clear" has been declared, the work permit system shall be used for all subsequent work activities.

## 9.0 CLOSING WORK PERMITS

- 9.1 After completion of the job or when the permit's duration has expired, the issuer (or his designated representative) shall ensure a joint site inspection has been conducted with the receiver to verify that the work area has been left in a safe and secure condition before the work permit can be closed.
- 9.2 Work permits shall be closed by both the issuer and the receiver signing the permit form. When distance and remoteness make signing impractical, an alternative closing method is determined and stated on the work permit when it is issued.
- 9.3 The issuer (proponent organization) shall keep the issuer's copy of the work permit(s) for a minimum of three months.

## 10.0 WORK PERMIT GENERAL REQUIREMENTS

- 10.1 The issuer and receiver are jointly responsible for the safety of personnel and equipment at the job site.
- 10.2 A joint site inspection shall be conducted for *all* work permits (see Supplement 2.100-3). Work shall not begin before the work permit has been properly signed.
- 10.3 All personnel who are not actively involved in performing, managing or reviewing the work being performed must be kept away from the job site.
- 10.4 Board operators in control rooms of SA facilities shall have constant access to a log of all work permit activities within their area of control.
- 10.5 Prior to executing work all equipment, sources of energy (electrical, mechanical, hydraulic, chemical, pneumatic, etc.) and hazardous materials shall be isolated in accordance with GI 6.012.
- 10.6 Atmospheric gas testing shall be conducted with SA-approved gas monitoring equipment in accordance with GI 2.709 requirements prior to initiating work activities.
  - 10.6.1 Hot work is not permitted if the atmosphere is above 0% LEL.
  - 10.6.2 Work is not permitted if the atmosphere has an oxygen (O<sub>2</sub>) concentration above 23.5%.
  - 10.6.3 Work is not permitted in areas where the atmosphere is at or above 10% LEL or hydrogen sulfide (H<sub>2</sub>S) concentration is at or above 100 parts per million (ppm).
  - 10.6.4 Confined space entry is not permitted if the atmosphere is at or above 10% LEL, H<sub>2</sub>S concentration is at or above 100 ppm or carbon monoxide (CO) concentration is at or above 1,000 ppm.
  - 10.6.5 A breathing apparatus (e.g., self-contained breathing apparatus [SCBA]) shall be used if any of the following atmospheric conditions exist:
    - a.) O<sub>2</sub> concentration is below 20.0%.

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- b.) Flammable/combustible mixtures are at or above 5% LEL.
  - c.) H<sub>2</sub>S concentration is at or above 10 ppm.
  - d.) CO concentration is at or above 35 ppm.
- 10.6.6 The proponent organization division head must sign applicable work permits when H<sub>2</sub>S concentration is at or above 10 ppm and below 100 ppm, or O<sub>2</sub> concentration is below 20.0%.
- 10.7 Personnel working in areas that contain (or have the potential to contain) H<sub>2</sub>S shall have a properly prepared work permit that includes, but not be limited to, the following precautions:
- 10.7.1 Calibrated gas monitoring equipment and personal H<sub>2</sub>S monitors.
  - 10.7.2 Available standby man who is trained in the hazards and effects of H<sub>2</sub>S exposure.
  - 10.7.3 Notification of personnel in the immediate area before work begins, including the posting of warning signs and/or barricades.
  - 10.7.4 Contingency plan/emergency actions to take, including preplanned escape route(s) and assembly areas, in the event of an H<sub>2</sub>S release or personnel exposure to elevated levels of H<sub>2</sub>S.
  - 10.7.5 During the *initial* opening/line break of any equipment, vessel or piping, the use of respiratory protection equipment (i.e., SCBA or air-line respirator) is required. Continuous use of respiratory protection equipment shall be based on subsequent atmospheric testing per GI 2.709 and this instruction.
  - 10.7.6 Use of the “buddy system” if atmospheric testing indicates H<sub>2</sub>S levels at or above 10 ppm. A “buddy system” involves organizing personnel into work groups so that each individual is designated to be observed by at least one other individual (e.g., in line-of-sight with each other).
  - 10.7.7 See SA CSM, Chapter I-10, *Hazardous Materials*, for additional precautions and training requirements when working in areas that have the potential to contain H<sub>2</sub>S.
- 10.8 Work may also be subject to requirements or regulations as specified in applicable GIs, SA Engineering Procedures (SAEPs), SA Inspection Procedures (SAIPs), SA CSM, or other department/organization instruction manuals or procedures.

## 11.0 COLD WORK PERMIT

- 11.1 When work permits are required, cold work permits control work activities that will not produce sufficient energy to ignite flammable atmospheres or combustible materials.
- 11.2 Use SA Form 9873-3 (BLUE).
- 11.3 Cold work can still involve hazards that must be evaluated during the joint site inspection. Basic precautions of conducting atmospheric gas tests, wearing personal protective equipment (PPE), use of barricades and warning signs, and any special work procedures may still be required for cold work activities.

## 12.0 HOT WORK PERMIT

- 12.1 When work permits are required, hot work permits control work activities that may produce enough energy to ignite flammable atmospheres or combustible materials.

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- 12.2 Activities in restricted areas requiring a hot work permit include, but are not limited to:
  - a.) Open flames, welding or torch cutting.
  - b.) Use of spark-producing tools or equipment.
  - c.) Abrasive blasting.
  - d.) Use of internal combustion engines.
  - e.) Work on or in close proximity to live electrical apparatus.
  - f.) Use of a device not rated for the electrical classification of the area.
- 12.3 Use SA Form 9873-2 (RED).
- 12.4 In hydrocarbon facilities, all sewers within 23 m (75 ft) of all ignition sources must be covered or water sealed to prevent escape of flammable/combustible vapors or gases.
- 12.5 Hot work is not permitted if the atmosphere is above 0% LEL.
- 12.6 Fire protection equipment (e.g., fire extinguishers) shall be readily available.
- 12.7 During activities that involve cutting, welding or open flame, a fire watch shall remain in the area for no less than 30 minutes after the hot work is finished.
- 12.8 Combustible material around the work area shall be protected against sparks, welding slag or heat using fireproof material or by wetting.
- 12.9 Open fires and/or open burning of materials require an authorization obtained from the SA Fire Protection Department.

### 13.0 EQUIPMENT OPENING/LINE BREAK PERMIT

- 13.1 When permits are required, equipment opening/line break permits ensure that workers properly plan and take appropriate precautions during work activities that require the opening of equipment, vessels, or pipe that is part of a closed system.
- 13.2 Use SA Form 9873-1 (YELLOW).
- 13.3 Activities that involve opening equipment, vessels, tanks or piping that contain (or have the potential to contain) flammable, combustible, toxic or injurious materials (e.g., high-pressure steam) require an equipment opening/line break permit. Examples include, but are not limited to:
  - a.) Opening oil or gas lines or systems.
  - b.) Opening steam and condensate lines or systems.
  - c.) Opening lines or systems containing H<sub>2</sub>S.
  - d.) Opening lines or systems containing nitrogen (N<sub>2</sub>).
  - e.) Opening lines or systems containing a hazardous material (e.g., caustic or sulfuric acid).

Note: If existing proponent organization procedures for activities related to opening facility equipment (e.g., venting or draining) do not include necessary precautions including, but not limited to, those listed in this instruction, equipment opening/line break permits shall be issued.

- 13.4 In the majority of cases, a cold or hot work permit is also required for work involved in opening equipment (e.g., vessels, tanks, columns or piping).
- 13.5 Prior to equipment opening/line break, *all* associated systems shall be isolated in accordance with GI 6.012.

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- 13.6 Precautions for equipment opening/line break permits shall include, but not be limited to:
- 13.6.1 Remove all ignition sources within 23 m (75 ft) of the point of opening during the initial opening/line break of any equipment, vessel or piping in flammable liquid or gas service.  
Note: This may include suspending all Hot Work Permits adjacent to the area where the equipment opening/line break will occur until it is verified that no flammable or combustible material is present. Subsequent atmospheric gas tests for LEL per GI 2.709 may be required.
  - 13.6.2 Notify activities downwind of the equipment opening/line break when there is a potential release of flammable or toxic materials.
  - 13.6.3 Designate a fire watch and/or standby man to initiate proper emergency response in the event of a release.
  - 13.6.4 Use personal protective equipment appropriate for the potential hazard(s) associated with the material contained within the equipment/vessel/pipe. Refer to the Chemical Hazard Bulletin (or Material Safety Data Sheet) for the material.
- 13.7 Use the proper type of respiratory protection specific to the hazardous material during the *initial* opening/line break of any equipment, vessel or piping in toxic service. Opening systems that contain (or have the potential to contain) H<sub>2</sub>S shall include the requirements of Section 10.7.
- 13.8 When unbolting/disconnecting any flange assume the line is pressurized. The bolts must be loosened so that cracking the flange connection occurs at the “5 o’clock” position (down and away from the person performing the work) to allow any potential liquids or gases to be released away from personnel.
- 13.9 Atmospheric gas testing shall be conducted *after* the initial opening/line break of any equipment, vessel or piping in flammable or toxic service to verify acceptable atmospheric conditions exist per Section 10.6 before continuing work activities. Personnel shall continue to use the proper type of respiratory protection per Section 13.7 until the atmospheric conditions are acceptable.

#### **14.0 CONFINED SPACE ENTRY PERMIT**

- 14.1 A confined space entry permit ensures that workers properly plan and take appropriate precautions during work activities that require entering a confined space.
- 14.2 A confined space entry permit shall be issued in accordance with this instruction prior to entry into *all* confined spaces.
- 14.3 For confined space entry performed only by personnel from an SA proponent department/organization (e.g., plant operations), the confined space entry permit shall be issued to an SA-certified work permit receiver from the proponent department/organization.
- 14.4 Use SA Form 9873-4 (GREEN).
- 14.5 Proponent organizations shall maintain an inventory of locations and/or equipment that meet the definition of a confined space per this instruction. Personnel shall be made aware of those locations that are classified as confined spaces.
- 14.6 All confined space openings that can be entered without the use of tools, special equipment or key(s) shall have a warning sign identifying them as a confined space that requires a permit for entry. Confined spaces such as vessels, tanks, columns, reactors, etc., may also be identified with a sign to assist personnel in their awareness of confined spaces.

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- 14.7 In the majority of cases, a cold or hot work permit is also required depending on the type of work to be performed within the confined space.

Note: Entry into a confined space to perform activities such as visual inspection or gas testing does not require an additional work permit.

- 14.8 Every job that requires entry into a confined space shall have a designated *confined space entry supervisor* (CSES). A designated *confined space entry standby man* shall be assigned by the CSES at each designated entry point to continuously monitor the confined space entry while personnel are inside the confined space.

- 14.9 Each confined space entry standby man shall maintain a confined space entry log and a continuous count of entrants.

- 14.10 All equipment, sources of energy (electrical, mechanical, hydraulic, chemical, pneumatic, etc.) and hazardous materials shall be isolated in accordance with GI 6.012.

- 14.11 Atmospheric gas tests shall be in accordance with GI 2.709 and the SA CSM. Atmospheric gas testing shall be performed and immediately recorded prior to entry, after breaks or interruptions in the work, changes to the conditions inside the confined space and at periodic intervals specified on the permit.

- 14.12 A confined space entry plan shall be developed prior to entry into a confined space and made available for review by personnel involved in the entry. The plan shall include, but not be limited to, the following:

14.12.1 Results of hazard evaluation (hazards within the space and the adjacent area).

14.12.2 Location and method of each isolation point of the confined space.

14.12.3 Procedures for flushing, purging and/or ventilating the confined space.

14.12.4 Access/egress requirements, including necessary barriers to prevent unauthorized entry.

14.12.5 Types and frequency of atmospheric testing.

14.12.6 Types of equipment required for the entry (e.g., scaffolding, air movers, communication and rescue equipment), PPE and fall protection plan/equipment as required.

14.12.7 Potential hazards that could develop as a result of simultaneous operations adjacent to the confined space.

14.12.8 Emergency response/rescue procedures.

- 14.13 The designated confined space entry standby man shall never attempt to enter the confined space and shall remain at the designated confined space entry point until relieved by another qualified standby man or until all entrants have exited the confined space.

- 14.14 See SA CSM, Chapter I-6, *Confined Spaces*, for additional precautions and training requirements when performing work inside confined spaces.

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RECOMMENDED: \_\_\_\_\_ DATE: \_\_\_\_\_  
MANAGER  
Loss Prevention Department

APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_  
PRESIDENT & CEO

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\* **SUPPLEMENT 2.100-1, Minimum Criteria for Restricted Areas, Restricted Activities, and High Risk Activities**

- 1.0 *Restricted areas* are locations that have been designated by proponent organization managers as requiring the work permit system. The criteria used to determine *restricted areas* within a proponent organization's area of responsibilities shall include the minimums provided in 2.100-1, Section 5.0.
- 2.0 *Restricted activities* are activities/tasks that have been designated by proponent organization managers as requiring the work permit system no matter their location within (or outside) SA facilities or locations. The criteria used to determine *restricted activities* within a proponent organization's area of responsibilities shall include the minimums provided in 2.100-1, Section 6.0.
- \*\* 3.0 *High risk activities* are activities/tasks that present additional or unique hazards to personnel and require additional approvals by proponent management prior to work commencing. The criteria used to determine *high risk activities* within a proponent organization's area of responsibilities shall include the minimums provided in 2.100-1, Section 7.0.
- \* 4.0 Restricted areas, restricted activities, and high risk activities shall be identified for all SA operated facilities and locations, and for project sites.
- 5.0 Minimum criteria for restricted areas shall include the following:
  - 5.1 All areas where hydrocarbons, flammable liquids or gases, or toxic agents are handled, stored, piped or processed in bulk quantities. Examples include:
    - Petroleum processing units.
    - Chemical processing units.
    - Gas processing units.
    - Pump stations.
    - Bulk plants.
    - Tank farms.
    - Air fueling operations.
    - Loading piers.
    - Pipelines and pipeline corridors.
    - Oil and gas wells.
    - Gasoline service stations.
    - Flammable, oxidizer, reactive and/or toxic material storage and handling areas.
  - 5.2 Areas within 23 m (75 ft) of hydrocarbon containing pipelines, manifolds or scraper launchers/receivers.
  - 5.3 Water and gas injection wells and pipelines; water or sewage treatment plants; lift stations (industrial and sanitary) and cooling towers.
  - 5.4 Areas where explosives or radioactive materials are used or stored.
  - 5.5 Areas within classified locations per SAES-B-068, *Electrical Area Classification*.
  - 5.6 Electrical substations per SAES-P-119, *Substations*.
  - 5.7 Areas within 15 m (50 ft) of energized power lines.
- 6.0 Minimum criteria for restricted activities shall include the following:

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6.1 Activities/tasks that present a potential hazard to personnel, facilities, equipment or operations. Examples include:

- Welding, torch cutting or open flame within 23 m (75 ft) of a pipeline or facility containing hydrocarbons.
- Installation of a hot tap connection.
- Excavation around known or suspected underground utilities.
- Confined space entry, including entry into excavations greater than 1.2 m (4 ft) in depth.
- Opening of equipment, vessel or piping that is part of a closed system that contains (or has the potential to contain) flammable, combustible, toxic or injurious materials (e.g., high-pressure steam, cryogenic liquids).
- Removal or disturbance of asbestos-containing material (ACM).
- Industrial radiography, such as non-destructive testing (NDT).
- Pressure testing of mechanical systems per GI 2.102, *Pressure Testing Safely*.
- Rock blasting operations per GI 475.001, *Rock Blasting Near Existing Facilities*.

\*\* 7.0 Minimum criteria for high risk activities shall include the following:

- 7.1 Initial opening of equipment, vessels, tanks or piping that contain (or have the potential to contain) flammable, combustible, toxic or injurious materials.
- 7.2 Initial confined space entry into vessels, tanks, drums, or other process equipment that previously contained flammable, combustible, or toxic materials.

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## SUPPLEMENT 2.100-2, Training/Certification Courses

- 1.0 Work permit *certification* and prerequisite training courses for issuers are as follows:
- 1.1 Work Permit Issuer: BET #40069980
  - 1.2 Hazard Recognition and Control: BET #40069794
  - 1.3 Lock Out/Tag Out: BET #40069962
  - 1.4 Confined Space Entry: BET #40069961
  - 1.5 Gas Testing Program: BET #40069981
- 2.0 Work permit *certification* and prerequisite training courses for SA employee receivers are as follows:
- 2.1 Work Permit Receiver: BET # 40071809
  - 2.2 Hazard Recognition and Control: BET #40069794
  - 2.3 Lock Out/Tag Out: BET #40069962
  - 2.4 Confined Space Entry: BET #40069961
- \*3.0 Work permit *certification/recertification* and prerequisite training courses for contractor employee receivers are as follows:
- 3.1 Work Permit Receiver: BET # 40071809
  - 3.2 Prerequisite course material per GI 2.100, Section 6.7 that has been approved by Saudi Aramco.
- 4.0 Work permit *recertification* and prerequisite training courses for issuer candidates are as follows:
- 4.1 Work Permit Issuer: BET #40069980
  - 4.2 Hazard Recognition and Control (e-Learning): BET #40041977
  - 4.3 Lock Out/Tag Out (e-Learning): BET #40041980
  - 4.4 Confined Space Entry (e-Learning): BET #40033081
  - 4.5 Gas Testing Program (e-Learning): BET #40041978
- \*5.0 Work permit *recertification* and prerequisite training courses for SA employee receivers are as follows:
- 5.1 Work Permit Receiver: BET # 40071809
  - 5.2 Hazard Recognition and Control (e-Learning): BET #40041977
  - 5.3 Lock Out/Tag Out (e-Learning): BET #40041980
  - 5.4 Confined Space Entry (e-Learning): BET #40033081
- 6.0 Prerequisite training courses for the *initial* approval of designated representatives are as follows:
- 6.1 Hazard Recognition and Control: BET #40069794
  - 6.2 Lock Out/Tag Out: BET #40069962
  - 6.3 Confined Space Entry: BET #40069961

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- 6.4 Gas Testing Program: BET #40069981  
6.5 Work Permit 2016 (e-Learning): BET #40086788
- 7.0 Prerequisite training courses for the *reapproval* of designated representatives are as follows:
- 7.1 Hazard Recognition and Control (e-Learning): BET #40041977
  - 7.2 Lock Out/Tag Out (e-Learning): BET #40041980
  - 7.3 Confined Space Entry (e-Learning): BET #40033081
  - 7.4 Gas Testing Program (e-Learning): BET #40041978
  - 7.5 Work Permit 2016 (e-Learning): BET #40086788

Note: In cases where an e-Learning BET is specified, candidates may select to take the corresponding classroom BET instead.

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## **SUPPLEMENT 2.100-3, Joint Site Inspection**

- 1.0 A joint site inspection shall be conducted for all permits by the issuer (or his designated representative) and the receiver.
- 2.0 The joint site inspection allows for the sharing of information before commencing work. The following shall be completed by the involved parties during the joint site inspection:
  - 2.1 Conduct applicable atmospheric gas tests per GI 2.100 and GI 2.709 and record the results on the permit form and/or supplemental gas test records attachment.
  - 2.2 Conduct an assessment of the work activity to be conducted (i.e., *hazard analysis*), including the individual job steps, the equipment to be used and the working environment at the job site.
  - 2.3 Review the protective measures specified by the applicable work permit(s) to verify they are in place and address the hazards of the work activity.
- 3.0 The “Hazard Analysis Checklist” on the back of the applicable permit form shall be completed using the following considerations:
  - 3.1 Observe the work area and surroundings.
  - 3.2 Take action to control any hazards that may be created because of the work activity.
  - 3.3 Discuss experience/lessons learned when performing the same work previously.
  - 3.4 The issuer (or his designated representative) and receiver should repeat the steps of the hazard analysis whenever they encounter an unexpected problem.
- 4.0 The hazard analysis should evaluate/recognize the following hazards and controls, at a minimum:
  - 4.1 Is the correct type of permit(s) issued for the work?
  - 4.2 Have the Job Safety Analysis (JSA) and other applicable supplementary forms been communicated to the work crew?
  - 4.3 Are weather conditions (e.g., wind speed) acceptable to perform the work?
  - 4.4 Are slip and trip hazards controlled?
  - 4.5 Does the work crew have the correct tools/equipment for the job? Are they in good condition?
  - 4.6 Do personnel have the proper certifications to perform the activity and/or operate the equipment?
  - 4.7 Is the equipment’s inspection sticker valid?
  - 4.8 Have all requirements for working at heights (i.e., fall protection) been applied?
  - 4.9 Is the scaffold tag completed correctly, signed and with a valid inspection date?
  - 4.10 Has the potential for contact with sharp objects, rotating equipment, hot/cold surfaces or live electricity been eliminated?
  - 4.11 Is the system/equipment properly isolated and locked out? Did all workers apply their personal locks?
  - 4.12 Has the system/equipment been depressurized, drained and/or purged before opening it?
  - 4.13 Has the potential for releasing flammable liquids and gases been controlled?
  - 4.14 Are all ignition sources eliminated or controlled?

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- 4.15 Does the fire watch have firefighting equipment readily available and know how to use the equipment?
  - 4.16 Has the potential for exposures to high noise levels, H<sub>2</sub>S, hydrocarbons, asbestos, hazardous chemicals or radioactive materials been controlled?
  - 4.17 Is the correct personal protective equipment (PPE) available for use by personnel?
  - 4.18 If the work may impact others nearby, or vice versa, have the work crews discussed their activities with each other (i.e., simultaneous operations [SIMOPS])?
  - 4.19 Is there an emergency contingency plan in place to respond to the work being performed?
  - 4.20 Does the work crew know what to do in the event of an emergency, such as evacuation routes, location of emergency equipment and where assembly areas are located?
- 5.0 Any hazards listed in Section 4.0 that are not sufficiently addressed (i.e., answered ‘NO’) shall initiate a “STOP” point where the issuer and receiver are to analyze the hazard(s) and develop methods to adequately control the hazard(s). The issuer and receiver shall list any additional precautions on the applicable work permit(s) and discuss these improvements with the work crew.

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### **SUPPLEMENT 2.100-4, Work Permit Forms**

Refer to:

- SA FORM 9873-1 (EQUIPMENT OPENING/LINE BREAK)
- SA FORM 9873-2 (HOT WORK)
- SA FORM 9873-3 (COLD WORK)
- SA FORM 9873-4 (CONFINED SPACE ENTRY)

* CHANGE	** ADDITION	NEW INSTRUCTION		COMPLETE REVISION	
Saudi Aramco: Company General Use					

SAUDI ARABIAN OIL COMPANY (Saudi Aramco)  
**GENERAL INSTRUCTION MANUAL**

ISSUING ORG. LOSS PREVENTION DEPARTMENT  
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**SUPPLEMENT 2.100-5, Certificate to Receive Work Permits**

Refer to: (CERTIFICATE TO RECEIVE WORK PERMITS)

\* CHANGE

\*\* ADDITION

NEW INSTRUCTION

COMPLETE REVISION

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SAUDI ARABIAN OIL COMPANY (Saudi Aramco)  
**GENERAL INSTRUCTION MANUAL**

ISSUING ORG. LOSS PREVENTION DEPARTMENT  
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**SUPPLEMENT 2.100-6, Certificate to Issue Work Permits**

Refer to: (CERTIFICATE TO ISSUE WORK PERMITS)

\* CHANGE

\*\* ADDITION

NEW INSTRUCTION

COMPLETE REVISION

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