

**SAUDI ARABIAN OIL COMPANY (Saudi Aramco)**

**GENERAL INSTRUCTION MANUAL**

**ISSUING ORG.** MECHANICAL SERVICES SHOPS DEPARTMENT

**SUBJECT:** MECHANICAL SERVICES SHOPS DEPARTMENT -  
POLICIES AND PRACTICES

**G. I. NUMBER**

Approved

1000.501

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COMPLETE REVISION ☐

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**1.0 SCOPE**

This General Instruction shall describe the policies and practices for equipment repair performed by Mechanical Services Shops Department (MSSD).

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**2.0 MSSD SINGLE POINT CONTACT AND WORK SCHEDULE**

**2.1 OBJECTIVE:**

This section shall establish a system to inform proponents of Saudi Aramco Industrial Equipment, being repaired at MSSD, of respective area single point contact to facilitate their enquiries, comments and concerns. Additionally this section shall provide proponents with MSSD working hours. (Planners during the working hours, shift coordinator in other shifts).

**2.2 MSSD IN-HOUSE & IN-KINGDOM CONTRACTOR SHOPS WORK COVERAGE:**

MSSD In-House Repair Shops shall provide 16 hours coverage Saturday to Wednesday (07:00 AM to 11:00 PM). Thursday and Friday (07:00 AM to 03:00PM) and twenty four (24) hour coverage for a Priority 1 (Emergency-Start Immediately) Jobs.

MSSD In-Kingdom Contractor Repair Shops shall provide 16 hours coverage, Saturday to Wednesday (07:00 AM to 11:00 PM). Thursday and Friday (07:00 AM to 03:00PM) and twenty four (24) hour coverage for Priority 1 (Emergency-Start Immediately) & Priority 2 Urgent-Start Jobs.

\*\*

**2.3 SAUDI ARAMCO CENTRAL AREA:**

2.3.1 Central area Shift coordinator Contact Telephone# 876-2031.  
E-mail Address; \*MSSD/ DSD Shift Coordinators  
Fax# 876-7087.

\*\*

**2.4 SAUDI ARAMCO NORTHERN AREA:**

2.4.1 Northern area Shift coordinator Contact Telephone# 678-9184.  
E-mail Address; \*MSSD/ NSD Shift Coordinators  
Fax# 678-9302.



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#### 4.1 OBJECTIVE:

- 4.1.1 Shall identify the specific MSSD responsibilities required to fully implement the intent of GI 1000.500, "Maintenance Work Order".
- 4.1.2 Shall describe guidelines and supporting criteria used by MSSD shop coordinators in assigning "shop priorities" to incoming work.
- 4.1.3 Shall describe MSSD criteria in monitoring jobs per assigned work priority.
- 4.1.4 Shall describe the procedures followed to determine the maximum recommended expenditures for repair of individual equipment sent to MSSD.

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- 4.1.5 Shall identify spare parts/ material availability and responsibilities.

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#### 4.2 APPROVALS AND FORMS REQUIRED FOR WORK ORDERS PROCESS:

All sub-orders stepped to MSSD will be treated as "Normal Priority" unless they are accompanied by a written request approved by proponent department head to hot list the required repair.

Equipment Proponent shall utilize the following MSSD Shops Work templates;

- Exhibit III, Hot List Equipment Repair Request – MSSD Shops Work, for a typical format of Hot Listed equipment repair written request.
- Exhibit IV, T& I Equipment Repair Request – MSSD Shops Work, for a typical format of T& I equipment repair written request.

Equipment Proponents are requested to use these templates when shipping hot-listed and/ or T& I equipment for repairs at MSSD shops. Actual Production equipment is to be concurred by OSPAS prior assignment to MSSD for emergency work handling.

Approved hot list requests are to be sent to the concerned area MSSD Shift Coordinator group e-mail address and a copy to respective areas Shift Coordinators, as stated in item 2.0 above. Once received, the concerned area MSSD Shift Coordinator shall attach a copy of the hot list to the equipment sub-order in SAP. The proponent is to advise MSSD, as early as possible, of the equipment they are hot-listing. This will assist concerned area MSSD Shops in arranging the required recourses and overtime coverage.

The written hot listing request concerning priority '1' or priority '2' work shall include, as a minimum:

- The date required by the equipment proponent.
- The actual or potential loss consequences and costs to Saudi Aramco if the work is not completed by the requested date.
- Materials mode of shipment if required parts are not available In-Kingdom.
- Equipment information and contact name using E-form SA 981-6.

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**4.3 MSSD WORK ORDER PRIORITY AND CONTRACTOR SCHEDULING:**

4.3.1 SAP PM uses five(5) work priorities as defined by GI 1000.500, "Maintenance Work Orders";

- Priority 1 – Emergency-Start Immediately.
- Priority 2 – Urgent-Start within 48 hours.
- Priority 3 – Medium-Schedule within 10 days.
- Priority 4 – Low-Schedule within 30 days.
- Priority 5 – Long Range Planning.

The work order priority shall be determined by the following criteria when work is received at MSSD:

4.3.1.1 Hot List (High Priority): MSSD's response to field-designated 'Emergency' (1) and 'Urgent' (2) work are normally combined and managed under the term "hot list". In order to schedule manpower efficiently, ensure all departments are treated equally, ensure critical equipment is repaired rapidly and to minimize the possibility of working on a less critical piece of equipment at the expense of another department, all customers shall be advised if:

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- (If the percentage of hot-listed jobs at MSSD exceeds 30% of total MSSD workload, and the proponent having more than one hot-listed job will be requested to re-prioritize or force-rank work requests at MSSD to ensure best service to all Saudi Aramco organizations.

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- Reason of Loss Nature/ Problem can be tolerated to other hot-listed Jobs.

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- State Loss in US Dollar (\$) value.

If either of the above conditions occurs, the proponent may be requested to re-prioritize or "force rank"

The two (2) "hot list" designations are further explained in the following paragraphs:

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#### 4.3.1.1.1 Priority '1' (Emergency-Start Immediately):

Upon receipt of equipment and its complete documentation, meeting the criteria mentioned below, MSSD will start work immediately and overtime is automatically approved. Work continues on a twenty four (24) hours per day basis until the job is completed. Equipments repaired under this classification are those required to:

- Prevent injury to personnel or any damage to equipment and/ or property.
- Repair critical industrial equipment in any Saudi Aramco medical facility.
- Correct all safety and fire hazards.
- Prevent actual loss of products in storage or in transit, or actual loss of required production of crude, gas, condensate, water injection, or other products/ activities, which affect OSPAS targets.
- Prevent loss of electrical power, raw or sweet water, and air conditioning.
- Prevent a situation, which will result in Contractor Stand-by Charges.
- Correct a condition, which could prevent a scheduled T& I Plant from meeting its restart date.

T& I work shall be considered emergency work as long as the T& I is in progress. This ensures the work meets established criteria and does not displace other customers' "hot list" work without sufficient cause.

#### 4.3.1.1.2 Priority '2' (Urgent-Start within 48 hours):

All urgent work should be approved, using Exhibit III, Hot List Repair Request – MSSD Shops Work form or letter signed by the respective proponent maintenance department head shall be transmitted via fax or e-mail.

Upon receipt of the criteria mentioned below, MSSD will start work within forty eight (48) hours and



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continue on a sixteen (16) hour per day basis during normal workdays (Saturdays – Wednesdays) and eight (8) hour per day during weekends (Thursdays and Fridays) or holidays until the job is complete. Jobs included in this priority shall be those required to:

- Correct a potential loss of production in crude, gas condensate and/or associated water injection.
- Correct a potential loss of electrical power, raw or sweet water, and air conditioning.
- Prevent a situation, which will result in Contractor Stand-by Charges.
- Correct a condition, which could prevent or delay a new plant start-up/ commissioning.

4.3.1.1.3 Priority "3 and 4" (Medium and Low-Schedule Start):

All Normal work, MSSD will start work between ten (10) to thirty (30) days from the receipt date.

4.3.2 Authorized Overtime and Contractor Premium Guidelines:  
'Hot list' work shall normally be accomplished in-house by MSSD shops facilities. Overtime will be authorized by MSSD management, as appropriate, to expedite the repair. **‘Urgent’ work does not automatically result in the use of overtime**, but the job shall be evaluated and overtime may be authorized based on the amount of 'hot list' work in MSSD shops. In those cases where a job is already at a contractor and the priority is changed to 'hot list', **MSSD management shall have the option to authorize a premium payment** to expedite the job completion if deemed necessary, as decided by MSSD.

4.3.3 Monitoring Emergency, Urgent and T& I Jobs:

The progress of priority '1' (Emergency-Start Immediately), priority '2' (Urgent-Start within 48 hours) and T & I jobs shall be monitored on a daily basis and the status shall be updated by the respective area Planning and Coordination Unit into the SAP system. For any technical assistance to the proponents or shops, P&TSD/ Quality Assurance Unit shall be consulted. **Proponent must NOT contact any repair agency, directly (separate item)**. All contacts should be made through MSSD shift

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coordinators, refer to item 2.0 above for contact telephone numbers and e-mail addresses.

- \*\*** 4.3.4 Monitoring Priority "3 and 4" (Medium and Low-Schedule Start) Jobs:
- Work that does not qualify for priority '1' (Emergency-Start Immediately) or priority '2' (Urgent-Start within 48 hours) shall be planned as priority '3' (Medium-Schedule within 10 days) or '4' (Low-Schedule within 30 days). Repairs shall be scheduled for completion by the MSSD Planning & Coordination Units into the SAP System to meet Proponent stated required date as appropriate.

4.3.5 Changing Priority of Work Orders After Works has started:

- \*\*** 4.3.5.1 No work shall be expedited or its priority upgraded until an approved written request is received from the respective proponent maintenance department head, justifying the action, and an approved Exhibit III, Hot List Equipment Repair Request – MSSD Shops Work, is completely filled, approved and transmitted to respective MSSD Shop Coordination Unit copying MSSD manager.

- 4.3.5.2 Downgrading equipment repairs priority shall be agreed between MSSD Planning& Coordination Units Shop Coordinator and equipment proponent maintenance engineer. This downgrading may be due to reasons that will prevent equipment daily repair progress. A documented agreement between MSSD and equipment proponent to be made as a record.

- \*\*** 4.3.5.3 Should the status of priority '1' or '2' jobs be changed to a "hold" status due to material/spare parts unavailability/ long delivery time. The respective proponent maintenance department head shall be notified when such action is executed and shall be requested to revise the original hotlist letter and Mode of Shipment accordingly.

- 4.3.5.4 When all the requested material/ spare parts are received, the job status in question shall be classified as 'workable' and the repairs shall commence as scheduled.

#### 4.3.6 MSSD Jobs at In-Kingdom and/ or Out-of-Kingdom Contractor Repair Shops:

MSSD shall review the incoming work orders and evaluate them against the internal resources to determine if a job shall be contracted to an MSSD In-Kingdom or Out-of-Kingdom repair facilities.

Work shall only be contracted when capable in-house MSSD shops divisions are fully loaded or no technical capability/ facility are available. The level of backlog within the MSSD divisions and the available technical resources shall be factored into the decision to determine if a job should be assigned to an In-Kingdom and/ or Out-of-Kingdom repair facilities, as applicable.

In some cases where In-Kingdom Contractor shops are more qualified and have the spare parts available, jobs shall be awarded to them.

\*\*\*

#### 4.4 MSSD REPAIR COSTING GUIDELINES:

Proponent shall **PRE-APPROVE** sub-orders for all equipment repaired at MSSD shops and shall attach SA 981-6 form and all required documentations to the sub-order documentations prior to sending the equipment to MSSD for repairs.

\*\*\*

##### 4.4.1 Repair Cost Estimate

After equipment is disassembled and inspected by MSSD, the required repair will be planned in SAP and proponent shall be requested to approve the repair cost in SAP via workflow.

4.4.1.1 Routine repair work shall not be started/ completed until the appropriate level of concurrence to the "total cost of repair" via SAP workflow is obtained from the proponent. The equipment shall be automatically backlogged if a proponent response is not received within two (2) working days.

4.4.1.2 Equipment shall be returned un-repaired if it is backlogged for more than two (2) weeks awaiting proponent's response.

##### 4.4.2 MSSD Fabrication Policy:

MSSD is deemed responsible to provide repair/ overhaul work on Saudi Aramco industrial equipment in a timely manner. Usually, MSSD shall perform components/ parts fabrication work only on an **emergency basis** or in support of on-going repair jobs at MSSD Repair facilities.

**NO ROUTINE/ URGENT FABRICATION PRIME WORK ORDER JOBS WILL BE ACCEPTED BY MSSD.**

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#### 4.4.3 Project Work:

MSSD may contract work on behalf of project engineering/ construction departments in direct support of capital projects.

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#### 4.5 SPARE PARTS/ MATERIAL AVAILABILITY:

It is the responsibility of the equipment proponent departments to forecast all spare parts/ material required for their **ALL** equipment repairs at MSSD including T& I work, and to ensure that these parts are adequately stocked and available when needed.

Equipment with long lead-time spare parts for more than two months shall be returned to the proponent without repair (Work Order Closed), and its his responsibility to order the spare parts. Once all those equipment spare material/ parts become available; equipment to be sent back to MSSD for repair with a new Work Order Documentations along with all the received spare material/ parts.

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### 5.0 INTERNAL INSPECTION DOCUMENTATION

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#### 5.1 OBJECTIVE:

5.1.1 Shall establish a system to inform proponents of repairs **being made** and parts/ material being replaced on their equipment while it's being repaired at MSSD in-house, in-kingdom and out-kingdom repair facilities through the Initial (Incoming) Inspection Report documentation and associated documentations.

5.1.2 Shall inform the equipment proponents of repairs made and parts/ material replaced on their equipment upon repairs completion by MSSD in-house, in-kingdom and out-kingdom repair facilities through Final (Outgoing) Inspection Report documentation and associated documentations.

5.1.3 Shall inform proponent of shipped repaired equipment documentations.

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#### 5.2 INITIAL INSPECTION (INCOMING) REPORT (SEE EXHIBIT I):

This report shall mention pertinent information related to equipment identification at MSSD. Additionally, this report shall document equipment condition as received at MSSD, recommended work to be performed and parts/ material to be replaced to bring the being equipment to a satisfactory operating condition.

This report along with other documentation shall be attached to equipment SAP work order for the proponent information, upon completion of equipment disassembly and diagnose.

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This report shall highlight the following sections:

- 5.2.1 Equipment received date and original equipment proponent works required.
- 5.2.2 Visual Inspection, MSSD observation on the equipment as received.
- 5.2.3 Condition of Equipment as received.
- 5.2.4 Missing/ Damaged items received on and/ or with the equipment.
- 5.2.5 Recommended Work to be Performed:  
MSSD recommended work to be performed on the equipment to bring to an operational condition as recommended by available manufacturers' repair instructions. MSSD Technical Repair Procedures and MSSD previous experience.
- 5.2.6 Recommended Parts/Material to be replaced:  
MSSD recommended spare parts/ material to be replaced on the equipment as recommended by available manufacturers' repair instruction, MSSD Technical Repair Procedures and MSSD previous experience.
- 5.2.7 Cost of Spare Parts/ Material and Invoices.

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5.3 REPAIRS IN – PROGRESS DOCUMENTATION:

Equipment proponent may receive documentations related to equipment repairs at MSSD which shall be furnished for his information and may request his approval through the SAP system. These documents shall be:

- 5.3.1 Copy of "In-house Equipment Additional Work Request".
- 5.3.2 Copy of "Equipment Memo-to-File".
- 5.3.3 "Additional Cost Approval" form though Work Flow.

\*\*\*

5.4 FINAL INSPECTION REPORT (SEE EXHIBIT II):

This report shall mention pertinent information related to equipment was repaired at MSSD. This report shall mention work performed, parts/ components repaired and parts/material replaced.

This report along with accompanying replaced parts list of replaced parts shall be forwarded to the proponent upon equipment repairs completion through the SAP system.

This report will highlight the following sections:

- 5.4.1 Equipment received date, MSSD unit performed the repairs and original proponent work requested.

**5.4.2 Works Performed:**

Work performed by MSSD on the equipment to bring to an operational condition as recommended by available manufacturers' repair instructions, MSSD Technical Repair Procedures and MSSD previous experience.

**5.4.3 Parts/ Components Repaired:**

Parts/ Components repaired by MSSD as decided rather than replacement due to various reasons as recommended by available manufacturers' repair instructions, MSSD Technical Repair Procedures and MSSD previous experience.

**5.4.4 Parts/Material Replaced:**

Parts/Material diagnosed to be replaced on the equipment as recommended by available manufacturers' repair instruction, MSSD Technical Repair Procedures and MSSD experience.

**5.5 DOCUMENTS SHIPPED WITH THE REPAIRED EQUIPMENT:**

\*\*

**5.5.1 Final (Outgoing) Inspection Report.****5.5.2 Final repair data records;**

These records were utilized by MSSD in the repair of the equipment. Authorized MSSD Quality Control and Quality Assurance Inspections approve those repair record documents. Final repair data records are provided to equipment proponent as a repair history record for future use.

**5.5.3 Parts/ Material Replaced;**

A list of parts/ material replaced shall accompany the repaired equipment shipment to its proponent.

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**6.0 RETURNED JOB INVESTIGATION REPORTING**

This section shall define MSSD's policy and practice for handling, documenting and controlling equipment returned as a return job or for equipment requiring re-work in place.

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**6.1 OBJECTIVES:**

This section shall define Returned Job, inform repaired equipment proponent of MSSD requirements regarding return jobs investigations and shall establish a system for recording proponent complaints, analyzing and issuing Return Job Reports and identifying the root causes and providing corrective actions

\*\*\*

**6.2 DEFINITION OF A RETURNED JOB:**

MSSD defines a "returned job" as any equipment, originally repaired by MSSD or its contractors, that is subsequently identified by the field as being unsatisfactory or unacceptable. Unless otherwise specified, the proponent must identify any such situations within a reasonable period {within Six (6) months or as stated by MSSD Contractual Agreements usually one year} after the equipment has been shipped by MSSD to its proponent.

Repaired Equipment Proponent is requested to NOT disassemble such equipment identified as a returned job, for MSSD Inspection personnel to perform the required investigations to identify the root causes and recommend appropriate corrective actions.

Disassembled repaired equipment by the proponent, that is identified as a returned job, at site, SHALL void the repair warranty if disassembled during the warranty period.

MSSD recognizes that the proponent may not return the equipment for problem correction for various reasons (i.e. the proponent may need to use the equipment 'as is' although repairs are considered unsatisfactory or the proponent may elect to make corrections on site in-situ in lieu of returning to MSSD shops the equipment for repair). However, MSSD requests that any unsatisfactorily repaired equipment, for whatever reason, shall be reported so the problem may be investigated and documented through the utilization of MSSD's Field Visit Form (See Exhibit VI).

6.2.1 The MSSD "Field Visit Form", Exhibit VI is used whenever a repaired equipment proponent calls MSSD and requests a representative (usually a Quality Assurance Unit inspector) to investigate a problem with repaired equipment.

After the field visit, MSSD representative shall complete this form and forward it to the Supervisor, Quality Assurance Unit (QAU), who in-turn shall review, take appropriate action based on the representative's findings and retain the form for future reference. This form may eliminate the need for developing a Returned Job Report.

**NOTE:** If the job was performed by Contractor, the Supervisor of CROU/ DSD shall be advised so that arrangements can be made for the Contractor to participate in the field visit activities.

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6.2.2 If the field elects to return the repaired equipment to MSSD as a returned job, a new sub-order shall be created by the proponent stating equipment failure cause clearly in Saudi Aramco/ MSSD form 981-6 mentioning the previous work order for reference facilitation. MSSD's Shift Coordinators shall log, indicating the



complete information, in their logbook, add the User Status "WREW" in the SAP Work Order attached to a returned job and initiate a Returned Job Notification form.

MSSD's' Shift Coordinators shall e-mail an electronic form of the Returned Job Notification form to the supervisor of Quality Assurance Unit for follow up and further processing of the Returned Job and Corrective Action Report as required.

#### 6.2.3 MSSD Return Job Report Documentations;

- Field Visit Form, Exhibit VI.
- In House Return Job Report, Exhibit VII.
- And/ or Contractors Return Job Report, Exhibit VIII.

The Return Job Report shall document the circumstances leading to a return job. It includes the original repair instructions from the field, problem found in field, Failure Investigation, Repair action and Corrective Action & Recommendation to Prevent Re-Occurrence.

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### **7.0 CONTROL OF EQUIPMENT HAVING LIMITED SERVICE LIFE**

This section shall describe MSSD procedure for controlling shop repair of equipment having limited service life.

#### **7.1 OBJECTIVES:**

7.1.1 Shall establish a uniform policy for handling equipment with limited service life.

7.1.2 Shall define MSSD's criteria for determining equipment having limited service life.

7.1.3 Shall ensure that the appropriate field organization is notified to take necessary action to replace equipment having limited service life.

#### **7.2 CRITERIA AND HANDLING PROCEDURE:**

7.2.1 Equipment may have limited economic service life for the following reasons:

7.2.2 If the nature of repairs performed is outside MSSD repair standards, it shall be classified as limited service life.

7.2.3 The repaired equipment's service life is limited, thus requiring continuous repairs.



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- 7.2.4 Equipment repairs fail to return equipment performance to meet specifications (e.g. static hydro-testing), or when such repairs quickly deteriorate to below equipment's specifications.
- 7.2.5 When a piece of equipment sent for repairs is identified as meeting one or more of the criteria mentioned in item 6.2.1 above, the concerned MSSD operation division shall take the following action:
- 7.2.5.1 Shall contact concerned proponent organization and send a follow-up letter recommending replacement. (See Exhibit IX)
- 7.2.5.2 Shall provide supporting information (including cost analysis, if required) to assist the proponent organization in justifying replacement.
- 7.2.6 In some urgent cases, an interim repair may be performed on equipment that is beyond its service life in order to give the proponent enough lead-time to procure a replacement. However, if the proponent does not take any action to replace the equipment and it is sent back to MSSD for repair, field executive management approval shall be required prior to MSSD repairing such equipment. MSSD resources are limited and this policy is required to ensure that these resources are allocated in the most productive manner to support all field maintenance organizations.

\*\*\*

## **8.0 MSSD FIELD SERVICES FOR HEAVY INDUSTRIAL GAS TURBINES (HIT)**

\*\*\*

### **8.1 OBJECTIVE**

Shall perform the Systematic Periodic Field Combustion, Hot Gas Path and Major Inspections of Saudi Aramco Heavy Industrial Gas Turbines (HIT) in accordance with OEM Standards and Specifications.

8.1.2 This program shall be applicable only to HIT and their driven equipment; electrical generator and gearboxes. Generally, it does not apply to accessories such as control systems and all equipment in the accessory compartments including but not limited to lube oil systems, starting equipment; motors, engines or turbines or to other major driven equipment such as Compressors and Pumps.

8.1.3 Shall inform the proponent of MSSD Quality Assurance and Quality Control Inspections practices regarding HIT equipment.

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## 8.2 WORK SCHEDULE

The work schedule shall depend on the priority to return the gas turbine back into service and is subject to agreement with the equipment proponent based on the field operation. However, as agreed with MSSD and depending on the availability of manpower, proponents can select one of the below five work schedules to perform the inspection, or as otherwise agreed upon:

- 8.2.1 Six days a week, 10 hours a day.
- 8.2.2 Six days a week, 12 hours a day.
- 8.2.3 Seven days a week, 10 hours a day.
- 8.2.4 Seven days a week, 12 hours a day.
- 8.2.5 Seven days a week, 24 hours a day.

\*\*\*

## 8.3 PARTS ORDERING

The gas turbine parts shall be classified into three categories:

- 8.3.1 Consumable parts:  
Such as nuts, bolts and gaskets, etc. These parts shall be classified/ listed and ordered by MSSD/HIT Field Services Unit against a work order created and approved by the proponent.
- 8.3.2 Major (Capital) Parts:  
Such as turbine buckets, diaphragms, nozzles, bearings and combustion baskets. These parts shall be classified/ listed by the proponent with assistance from MSSD/HIT Field Services Unit if requested.  
The major parts ordering shall be the equipment proponent responsibility.
- 8.3.3 Miscellaneous parts:  
Such as expansion joints, operational and accessory parts not related directly to the gas turbine. These parts shall be classified, listed and ordered by the proponent.

\*\*\*

## 8.4 TOOLS

The tools shall be classified as standard/general and special tools as per the Operation and Maintenance Manual of the gas turbine. The standard/general tools shall be MSSD/vendor responsibility to provide during the inspection. The special tools shall be provided by the proponent.

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## 8.5 WORK SCOPE

The inspection work scope shall be prepared by MSSD HIT Engineering Support Group. When the work scope is accepted by both parties; MSSD and HIT's owner, the proponent shall complete the "Maintenance Work Order" form (981-6) and attach the work-scope and send it to MSSD shift coordinator for further processing.

\*\*\*

## 8.6 OUTAGE SCHEDULING

Proponents are requested to provide their outage schedules at least one year ahead of time. Proponents shall update MSSD with any changes in the outage schedule at least 6 months ahead of time.

\*\*\*

## 8.7 LOGISTICAL REQUIREMENTS

There are basic logistical requirement that shall be provided by the equipment proponent based on a mutual agreement with MSSD in order to facilitate MSSD being able to effectively conduct the field inspections:

- 8.7.1 An office equipped with a telephone line and workstation for MSSD representatives.
- 8.7.2 Crane and fork lift.
- 8.7.3 Scaffolding as required.
- 8.7.4 Compressed air and all other utilities in the amount of electric power and welding machine to support execution of the stated, agreed and approved scope of works.
- 8.7.5 Portable storage van to store the consumable spare parts close to the gas turbine.
- 8.7.6 Climate controlled office (portable office) and lavatory facilities close to the gas turbine for the contractor crew or otherwise to be supplied by the contractor as an optional additional item.
- 8.7.7 Air transportation, accommodation and meals for MSSD representatives and contractor personnel when the inspection is conducted in remote areas. Contractor shall transport any equipment, tools or materials that cannot be shipped on Saudi Aramco flight to the jobsite. All heavy and hazardous material shall not be shipped by plane.
- 8.7.8 The Plant Machine Shops shall be available for the needed simple machining or drilling work during inspection activities.

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8.7.9 Gas turbine, gearbox and generator “Operation and Maintenance Manuals” and “Drawing Reference Manuals”.

8.7.10 The Quality Assurance/Quality Control Inspections (QA/QC) shall be provided by MSSD representative in conjunction with the at site during the inspection duration.

\*\*\*

#### 8.8 WORK ORDER CHARGES

All inspections costs including consumable parts ordered by MSSD, contracted services, regular and overtime of MSSD representative(s) in the field shall be charged against proponent account.

\*\*

### 9.0 MSSD VISITATION POLICY & CUSTOMER INFORMATION SYSTEM

This section shall establish MSSD guidelines for visits by other Saudi Aramco employees or non-Saudi Aramco support organizations to MSSD Shops in Dhahran, Juaymah, Shedgum, Central and Western Area or to MSSD In-Kingdom Contractor Shops. In addition, it shall explain to field maintenance organizations how to access information on their equipment forwarded to MSSD for repairs.

#### 9.1 OBJECTIVES:

- 9.1.1 Shall establish a uniform visitation policy for all authorized representatives of field maintenance or support organizations.
- 9.1.2 Shall eliminate the unauthorized interference, which could affect MSSD repair activities and/or safety regulations.
- 9.1.3 Shall provide proponent maintenance organizations with instructions on how to view the status of the job repair progress through the SAP system

\*\*

#### 9.2 VISITS TO MSSD FACILITIES

\*\*

- 9.2.1 Visitors intending to enter MSSD without Saudi Aramco ID cards, or vehicles without Saudi Aramco stickers, must call the shift coordinator (Dhahran at 876-2031, Juaymah at 678-9184, Shedgum at 577-1280, Yanbu at 04-397-4264, Jeddah at 02-427-2619 and Riyadh at 01-285-6981), when they arrive at any MSSD gates.
- 9.2.2 The shift coordinator, each at his respective MSSD area is authorized to validate deliveries and/ or sponsor visitors into the respective MSSD area.
- 9.2.3 All visitors to MSSD repair divisions shall report to the shift coordinator's office or the superintendent's office before proceeding to the repair shop.

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This is necessary to ensure visitors safety and to minimize disruption to ongoing repair works in the shops.

- 9.2.4 On arrival at the respective shift coordinator's office, details relating to time of visit, destination and purpose of visit shall be logged.
- 9.2.5 The shift coordinator shall ensure that the visitors are issued with a Visitor's Tag for identification purposes and have proper safety equipment before authorizing them to proceed to the repair shop. Also, the respective area shift coordinator shall assist the visitors in locating the appropriate MSSD personnel with whom they shall discuss business related concerns.
- 9.2.6 Once inside the shops, authorized visitors shall not attempt to directly intervene in on-going repair activities.
- 9.2.7 On completion of the visit, visitors shall return to the respective shift coordinator's office. Departure time and any other information or comments shall then be entered in the respective area shift coordinator visitors' logbook.

\*\*

### 9.3 VISITS TO MSSD CONTRACTOR FACILITIES:

- 9.3.1 Proponents intending to visit any contractor shop relating to their equipment which was contracted through MSSD shall contact the shift coordinator (Dhahran Shops division/ Dhahran at 876-2031), to confirm job status from SAP then contact the respective contracts assigned job planner/ coordinator.
- 9.3.2 Proponents shall NOT communicate directly with the contractors' management or craftsmen on any equipment sent by MSSD.
- 9.3.3 All communications relating to equipment at contractor shops shall be directed to MSSD Contract Coordination.

\*

- 9.3.4 Proponents shall not give any instructions to contractors or intervene in any on-going repair activities at the contractor shops. If proponents wish to make any changes to the scope of work, then this shall be directed to MSSD Contract Coordination in order to revise the contract work scope and obtain the required approvals prior to the recommended changes/ additions for implementation.
- 9.3.5 When visiting contractor shops, proponent representatives shall not discuss any commercial aspects related to the repair cost of their equipment with the contractor.

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#### 9.4 ACCESSING AND USING SAP SYSTEM;

Proponent shall access SAP or MSSD website to view the status and related information concerning their equipment being repaired at MSSD and/ or in-kingdom and out-of-kingdom contractors repair facilities.

\* CHANGE

\*\* ADDITION

\*\*\* NEW INSTRUCTION

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EXHIBIT I

MECHANICAL SERVICES SHOPS DEPARTMENT

EQUIPMENT INITIAL (INCOMING) INSPECTION REPORT

Shops Division

Repair Unit

Proponent; \_\_\_\_\_

Plant#; \_\_\_\_\_

Work Order#; \_\_\_\_\_

Engineering Account Number; \_\_\_\_\_

Equipment Description; \_\_\_\_\_

Model#; \_\_\_\_\_ Serial#; \_\_\_\_\_

Subject (Equipment) was received on \_\_\_\_ / \_\_\_\_ / \_\_\_\_ for \_\_\_\_ (State Original Proponent Work Requested).

I. Visual Inspection:

Upon receipt the followings were observed:

A. Condition of Equipment as Received:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

B. Missing/ Damaged Items:

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

II. Recommended Works to be Performed:

Upon disassembly and diagnosis the following Work was recommended to be Performed;

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

III. Recommended Parts/ Material to be Replaced:

Upon disassembly and diagnose the following Parts/ Material are required to be replaced;

- |          |          |
|----------|----------|
| 1. _____ | 2. _____ |
| 3. _____ | 4. _____ |
| 5. _____ | 6. _____ |
| 7. _____ | 8. _____ |

Prepared By;  
Team Leader/ Craftsman

Name; \_\_\_\_\_

Badge# \_\_\_\_\_

Signature; \_\_\_\_\_

Date; \_\_\_\_\_

Reviewed and Confirmed By;  
Quality Control Inspection

Name; \_\_\_\_\_

Badge# \_\_\_\_\_

Signature; \_\_\_\_\_

Date; \_\_\_\_\_

Reviewed and Concurred By;  
Quality Assurance Inspection

Name; \_\_\_\_\_

Badge# \_\_\_\_\_

Signature; \_\_\_\_\_

Date; \_\_\_\_\_

\* CHANGE

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EXHIBIT II

MECHANICAL SERVICES SHOPS DEPARTMENT

EQUIPMENT FINAL (OUTGOING) INSPECTION REPORT

\_\_\_\_\_ Shops Division

\_\_\_\_\_ Repair Unit

Proponent; \_\_\_\_\_

Plant#; \_\_\_\_\_

Work Order#; \_\_\_\_\_

Engineering Account Number; \_\_\_\_\_

Equipment Description; \_\_\_\_\_

Model#; \_\_\_\_\_

Serial#; \_\_\_\_\_

Subject (Equipment) was received on \_\_\_\_ / \_\_\_\_ / \_\_\_\_ at \_\_\_\_ Repair Unit for \_\_\_\_ (State Original Proponent work requested).

Shops Team Leader/ Craftsman; Use addressed attachment (s) for below sections as required.

I. The following works were Performed;

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_

II. The following Parts/ Components were Repaired;

- |          |           |
|----------|-----------|
| 1. _____ | 2. _____  |
| 3. _____ | 4. _____  |
| 5. _____ | 6. _____  |
| 7. _____ | 8. _____  |
| 9. _____ | 10. _____ |

III. The following Parts/ Material were Replaced;

- |          |           |
|----------|-----------|
| 1. _____ | 2. _____  |
| 3. _____ | 4. _____  |
| 5. _____ | 6. _____  |
| 7. _____ | 8. _____  |
| 9. _____ | 10. _____ |

PLEASE NOTE; Shipped damaged Items/ Parts/ Material List, with the Equipment, is attached

Prepared By;  
Team Leader/ Craftsman

Name; \_\_\_\_\_

Badge# \_\_\_\_\_

Signature; \_\_\_\_\_

Date; \_\_\_\_\_

Reviewed and Confirmed By;  
Quality Control Inspection

Name; \_\_\_\_\_

Badge# \_\_\_\_\_

Signature; \_\_\_\_\_

Date; \_\_\_\_\_

Reviewed and Concurred By;  
Quality Assurance Inspection

Name; \_\_\_\_\_

Badge# \_\_\_\_\_

Signature; \_\_\_\_\_

Date; \_\_\_\_\_

\* CHANGE

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### EXHIBIT III

#### HOT LIST EQUIPMENT REPAIR REQUEST – MSSD SHOPS WORK

<b>DEPARTMENT (Proponent) NAME;</b> <b>ADDRESS;</b> <b>Tel:            Fax:</b> <b>Date:</b>
<b>TO: SUPERINTENDENT:</b> <input type="checkbox"/> DSD <input type="checkbox"/> NSD <input type="checkbox"/> SSD <input type="checkbox"/> FS&SD Yanbu <input type="checkbox"/> FS&SD Jeddah <input type="checkbox"/> FS&SD Riyadh Fax #:                      03-876-7087      03-678-9302      03-577-1294      04-397-4775      02-427-2471      02-285-6809

<b>EQUIPMENT RELATED INFORMATION</b>	
<b>SAP Order No:</b>	
<b>Date Sent/ Will Be Sent To MSSD</b>	
<b>Equipment Description</b>	
<b>Manufacturer/Model</b>	
<b>Plant No:</b>	
<b>Equipment No.</b>	
<b>Equipment Service</b>	
<b><u>JUSTIFICATION</u></b> <input type="checkbox"/> Safety <input type="checkbox"/> Actual Loss <input type="checkbox"/> Potential Loss <input type="checkbox"/> T & I (Emergency) <input type="checkbox"/> T & I (Urgent) <input type="checkbox"/> Medical	
<b>Reason (Amount Of Production Loss/ Product) and/ or Nature of Problem:</b>  	
<b>Date Equipment Required:</b>	
<b>Technical/ Planner Personnel: Contact</b>	NAME; _____ TEL/ FAX; _____    Pager; _____    MOBILE; _____
<b>Air Delivery Mode of Shipment</b>	Approved <input type="checkbox"/>
<b>Approved By:</b>	_____ DEPARTMENT MANAGER
<b>FOR MSSD USE ONLY</b>	
DATE RECEIVED AT MSSD; _____ PRIORITY WHEN RECEIVED; _____ NEW PRIORITY; _____ ASSIGNED TO; _____	PROONENT; _____ STATUS; _____ PREPARED BY; _____ DATE/ TIME; _____

Cc: MSSD Manager, Fax # 876-2796  
Respective Areas Shift Coordinator.

\* CHANGE

\*\* ADDITION

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EXHIBIT IV

T&I EQUIPMENTS REPAIR REQUEST – MSSD SHOPS WORK

DEPARTMENT NAME (Proponent)

ADDRESS; \_\_\_\_\_

Tel: \_\_\_\_\_ Fax: \_\_\_\_\_

Date: \_\_\_\_\_

TO: SUPERINTENDENT: ☐ DSD ☐ NSD ☐ SSD ☐ FS&SD Yanbu ☐ FS&SD Jeddah ☐ FS&SD Riyadh  
Fax #: 03-876-7087 03-678-9302 03-577-1294 04-397-4775 02-427-2471 02-285-6809

We are planning to conduct T& I for Plant number \_\_\_\_\_ on \_\_\_\_\_. The following equipments listed below will be sent to MSSD for overhaul/ repair as required on \_\_\_\_\_ as per detail work scope at 981-6 form.

T&I Start Date:

T&I End Date;

EQUIPMENT RELATED INFORMATION

SAP ORDER #	EQUIPMENT DESCRIPTION	SAP EQUIPMENT#	MANUFACTURER/ MODEL	SPARE PARTS AVAILABLE		REQUIRED DATE	RANK
				YES	NO		

Date Equipment Required:

Technical/ Planner Personnel Contact :

NAME; \_\_\_\_\_  
TEL/ FAX; \_\_\_\_\_ PAGER; \_\_\_\_\_ MOBILE; \_\_\_\_\_

Approved By:

\_\_\_\_\_  
T & I DIRECTOR Date; \_\_\_\_\_

FOR MSSD USE ONLY

DATE RECEIVED AT MSSD; _____	PROONENT; _____
PRIORITY WHEN RECEIVED; _____	STATUS; _____
NEW PRIORITY; _____	PREPARED BY; _____
ASSIGNED TO; _____	DATE/ TIME; _____

Cc: MSSD Manager, Fax # 876-2796

\* CHANGE

\*\* ADDITION

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**EXHIBIT V**

**MECHANICAL SERVICES SHOPS DEPARTMENT**

OPERATION SHOPS DIVISION

Address

Tel: XXX-XXXX, Fax: XXX-XXXX

Date

DIV: 00/0000

**MSSD Total Repair Program**

**XXXXXXXXXXXXXXXXXX**, Superintendent

Customer Maintenance Division

Address

Tel.: XXX-XXXX

Fax: XXX-XXXX

This is to inform you that your high priority equipment ----- received on ----- is potential candidate to be included in MSSD Total Repair Program (TRP). TRP is a program established by MSSD to work with its customer to proactively plan the repairs of all field critical similar equipment at less cost and shorter turnaround repair time.

Our evaluation indicates that the next sister equipment could be repaired at ---- less cost and --- less time. Moreover, you will have the advantage of eliminating the possibility of unplanned shutdown as a result of the pre-planned repairs and material procurement a head of the equipment arrival to the shop.

To further pursue this matter; please assign a single point of contact engineer to contact our Shops Maintenance Engineer, XXXXXXXXXXXXX at XXX-XXXX and discuss all requirements.

---

**XXXXXXXXXXXXXXXXXX**, Superintendent  
Operation Shops Division

XXX; xxx

Cc; MSSD& Proponent Managers.

P&TSD Superintendent.

SMEU& QAU Supervisors.

TRP Coordinator File.

Division Letter book.

\* CHANGE

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**EXHIBIT VI**

**Mechanical Services Shops Department**

**FIELD VISIT FORM**

DATE:

WORK ORDER #;

**SECTION I (COMPLETED BY CALL RECEIVER)**

EQUIPMENT PLANT NO.

LOCATION

EQUIPMENT DESCRIPTION

PROPONENT DEPT/DIV

CONTACT NAME

PHONE

☐ Investigate Return Job Request

☐ Discuss a Repair Work Scope

☐ Follow upon Repaired Equipment/Component

☐ Assist Field with Equipment Installation.

☐ Other (Specify);

Visit Requested By;

Telephone #

**SECTION II (COMPLETED BY QAU SUPERVISOR)**

Original Repair Work Performed By;

☐ DSD ☐ NSD ☐ SSD ☐ FS& SD ☐ In-Kingdom Contractor (Name)

QA Inspector Assigned,

QAU Supervisor Approval; \_\_\_\_\_

Total Hours to complete Field Visit Activities; \_\_\_\_\_Hrs

**SECTION III (COMPLETED BY ASSIGNED QAU INSPECTOR)**

**Findings;**

**Recommendations/ Action;**

**Return Job Report #** \_\_\_\_\_

**QAU Inspector;**

**Date;**

**QAU Supervisor;** \_\_\_\_\_

**Date:**

Cc; Superintendent, \_\_\_\_\_Shops Division Superintendent, Proponent Division; \_\_\_\_\_  
Administrator, CR&OU (For In-Kingdom Contractor Shops Jobs  
QAU Field Visit Folder

\* CHANGE

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## EXHIBIT VII

### MECHANICAL SERVICES SHOPS DEPARTMENT IN – HOUSE RETURN JOB REPORT

MSSD 8698 (0/2000)

RJR#; /

<b>PLANNING&amp; TECHNICAL SERVICES DIVISION</b>		<input type="checkbox"/> <b>FINAL REPORT</b>	
<b>DATE;</b>	<b>OLD WORK ORDER#;</b>	<b>NEW WORK ORDER#;</b>	<b>EQUIPMENT TYPE;</b>
<b>PLANT#;</b>	<b>ACCTG.PLT#;</b>	<b>LOCATION;</b>	
<b>MODEL#</b>	<b>MANUFACTURER;</b>	<b>SERIAL#;</b>	<b>APPLICATION;</b>
<b>FIELD DEPARTMENT/ DIVISION</b>		<b>MSSD DIVISION/ UNIT</b>	
<b>I. ORIGINAL REPAIR INSTRUCTION FROM FIELD;</b>		<b>DATE RECEIVED BY SHOP;</b>	
<b>II. PROBLEM FOUND IN FIELD;</b>		<b>DATE SHIPPED;</b>	
<b>III. FAILURE INVESTIGATION</b>		<b>DATE RETURNED TO SHOP;</b>	
<b>IV. REPAIR ACTION</b>		<b>DATE RE-RE-SHIPPED;</b>	
<b>V. CORRECTIVE ACTION &amp; RECOMMENDATION TO PREVENT REOCCURRENCE</b>			
<b>Cause Category</b>	<b>%In-House Shops</b>	<b>%Proponent</b>	<b>%Uncertain</b>
<b>Initiated By QAU Inspector</b>	Date:	<b>Co-Initiated By Shop Foreman</b>	Date:
<b>Concurred By Supervisor QAU</b>	Date:	<b>Approved By Supt. P&amp;TSD</b>	Date:

Distribution;

Manager, MSSD

Proponent Superintendent, \_\_\_\_\_

Superintendent, \_\_\_\_\_Shops Division

Supervisor, MSSD/ P&amp;TSD/ SMEU &amp; QAU

\* CHANGE

\*\* ADDITION

\*\*\* NEW INSTRUCTION

COMPLETE REVISION ☐

**SAUDI ARABIAN OIL COMPANY (Saudi Aramco)**

**GENERAL INSTRUCTION MANUAL**

**ISSUING ORG.** MECHANICAL SERVICES SHOPS DEPARTMENT

**SUBJECT:** MECHANICAL SERVICES SHOPS DEPARTMENT -  
POLICIES AND PRACTICES

**G. I. NUMBER**

1000.501

Approved

**ISSUE DATE**

03/30/2011

**REPLACES**

06/ 01/ 2010

**APPROVAL**

MIS

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**EXHIBIT VIII**

**MECHANICAL SERVICES SHOPS DEPARTMENT**

**CONTRACTORS – RETURN JOB REPORT**

**SAUDI ARAMCO 8698 (07/2001)**

**RJR#;** /

**PLANNING& TECHNICAL SERVICES DIVISION**

☐ **FINAL REPORT**

<b>DATE;</b>	<b>OLD WORK ORDER#;</b>	<b>NEW WORK ORDER#;</b>	<b>TYPE OF EQUIPMENT;</b>	
<b>PLANT#</b>	<b>ACCTG.PLT#</b>	<b>LOCATION;</b>	<b>FIELD DEPARTMENT/ DIVISION;</b>	
<b>MODEL#</b>	<b>MANUFACTURER;</b>	<b>MACHINE SERIAL#;</b>	<b>APPLICATION;</b>	
<b>CONTRACTOR;</b>	<b>CONTRACT#</b>	<b>PURCHASE ORDER;</b>	<b>DATE P.O. IS SIGNED;</b>	<b>WITHIN WARRANTY:</b> <input type="checkbox"/> YES <input type="checkbox"/> NO

**I. ORIGINAL REPAIR INSTRUCTIONS FROM PROPONENT:** **DATE RECEIVED BY SHOP;**

**II. PROBLEM(S) FOUND IN FIELD** **DATE RETURNED TO FIELD;**

**III. FAILURE INVESTIGATION**

**IV. REPAIR ACTION TAKEN TO CORRECT PROBLEM(S)** **DATE RE-SHIPED TO FIELD;**

**V. CORRECTIVE ACTION & RECOMMENDATION TO PREVENT REOCCURRENCE**

<b>Cause Category</b>	<b>%Contractor Shops</b>		<b>%Proponent</b>		<b>%Uncertain</b>
<b>Initiated By QAU Inspector</b>		Date:	<b>Co-Initiated By Shop Foreman</b>		Date:
<b>Concurred By Supervisor QAU</b>		Date:	<b>Approved By Supt. P&amp;TSD</b>		Date:

**Distribution;**

**Manager, MSSD**

**Proponent Superintendent, \_\_\_\_\_**

**Superintendent, \_\_\_\_\_Shops Division**

**Supervisors, MSSD/ P&TSD/ SMEU& QAU**

\* CHANGE

\*\* ADDITION

\*\*\* NEW INSTRUCTION

COMPLETE REVISION ☐

SAUDI ARABIAN OIL COMPANY (Saudi Aramco)

GENERAL INSTRUCTION MANUAL

ISSUING ORG. MECHANICAL SERVICES SHOPS DEPARTMENT

SUBJECT: MECHANICAL SERVICES SHOPS DEPARTMENT -  
POLICIES AND PRACTICES

G. I. NUMBER

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EXHIBIT IX

MECHANICAL SERVICES SHOPS DEPARTMENT

SHOPS DIVISION

Tel: XXX-XXXX, Fax: XXX-XXXX

Address, Area

August 27, 2011

MSSD/ XXX/XXX.XXXX

LIMITED EQUIPMENT SERVICE LIFE

Equipment Plant Number

W/O# XXXXXXXXXX, S/N#XXXXXX

Equipment Proponent, Superintendent

----- Division

----- Department

Tel: XXX-XXXX

Fax: XXX-XXXX

Please be advised that the subject *equipment*, which was sent to XXXXXX Shops Division and was returned to you on XXXXXXXXXX, XXXX, has been tagged as “**Limited Equipment Service Life Equipment**” in the SAP system.

Quality Control and Quality Assurance Inspections of the *equipment* at our shops revealed that;

However, due to your very urgent operational requirements, it was mutually agreed to temporarily repair this *equipment*, thus resulting in a “**Limited Equipment Service Life**”.

MSSD/ XXXXXXXXXX Shops Division also recommend this *equipment* be returned for the *required parts* replacement, at a convenient future date, once the replacement parts become available.

Should you require any additional information in this regard, please contact XXXXXXXXXX Shops Division Planning & Coordination Supervisor at XXX-XXXX

Your support and cooperation are always appreciated.

XXXXXXXXXXXXXXXXXXXX, Superintendent  
XXXXXXXXXXXX Shops Division

XXX/ XXX : xxx

Cc: MSSD/ ----- (Proponent) Managers

MSSD Supt's.

----- Asst. Supt/ Unit Foreman

Letter book

\* CHANGE

\*\* ADDITION

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<b>SAUDI ARABIAN OIL COMPANY (Saudi Aramco)</b> <b>GENERAL INSTRUCTION MANUAL</b> <b>ISSUING ORG.</b> MECHANICAL SERVICES SHOPS DEPARTMENT <b>SUBJECT:</b> MECHANICAL SERVICES SHOPS DEPARTMENT - POLICIES AND PRACTICES	<b>G. I. NUMBER</b> <span style="float: right;">Approved</span> 1000.501	
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## EXHIBIT X

### SAUDI ARAMCO INDUSTRIAL EQUIPMENTS REPAIRED AT MSSD

#### 3.1 Electric Rotating Equipment and components

- |  |                                    |
|--|------------------------------------|
| 3.2.1 All Types of Motors              | 3.2.2 Motor Stator.                |
| 3.2.3 Motor Rotor.                     | 3.2.4 Motor Components.            |
| 3.2.5 Generator Sets.                  | 3.2.6 All Types of Generators.     |
| 3.2.7 Generator Stator.                | 3.2.8 Generator Rotors.            |
| 3.2.9 All Types of Generator Exciters. | 3.2.10 Generator Exciters Stators. |
| 3.2.11 Generator Exciters Rotors.      | 3.2.12 Instrumentations.           |
| 3.2.13 Generator Components.           | 3.2.14 Rectifiers                  |
| 3.2.15 Air Compressors Stators.        | 3.2.16 All Types of Transformers   |
| 3.2.17 Circuit Breakers                | 3.2.18 P.D. Meters                 |
| 3.2.19 Switchgear.                     | 3.2.20                             |

#### 3.2 Stationary equipment and Components;

- |  |                                      |
|--|--------------------------------------|
| 3.2.1 All Types of Valves              | 3.2.2 Mokveld Control Valve.         |
| 3.2.3 Gate Valves.                     | 3.2.4 Globe valves.                  |
| 3.2.5 Relief valves.                   | 3.2.6 Vacuum Relief valves.          |
| 3.2.7 Smart Valve.                     | 3.2.8 Butterfly Valve.               |
| 3.2.9 Surge Relief Valve.              | 3.2.10 Ball Valve.                   |
| 3.2.11 Check Valves.                   | 3.2.12 Pilot Valve.                  |
| 3.2.13 Control Valves.                 | 3.2.14 Throttle Valve.               |
| 3.2.15 All Types of Valves Components. | 3.2.16 All Types of Heat Exchangers. |
| 3.2.17 Fin-Fan Exchangers.             | 3.2.18 Radiators.                    |

#### 3.3 Mechanical Rotating Equipments and Components;

- |  |                                   |
|--|-----------------------------------|
| 3.3.1 Horizontal/ vertical pumps.        | 3.3.2 Pump Components.            |
| 3.3.3 Mechanical Seals.                  | 3.3.4 Hydraulic Cylinders.        |
| 3.3.5 Steam Turbines                     | 3.3.6 Steam Turbines Components   |
| 3.3.7 Reciprocating Engines.             | 3.3.8 Fire Pump Engine Sets       |
| 3.3.9 Engine Components.                 | 3.3.10 Transmission               |
| 3.3.11 Instrument Air Compressors.       | 3.3.12 Turbochargers              |
| 3.3.13 Torque Converters                 | 3.3.14 Governors.                 |
| 3.3.15 Air Compressors.                  | 3.3.16 Air Compressor Components. |
| 3.3.17 Atomizing Compressors             | 3.3.18 Gas Compressors.           |
| 3.3.19 Gearboxes.                        | 3.3.20 Gearbox Components.        |
| 3.3.21 Reduction/ Accelerator gearboxes. | 3.3.22 Air Blowers                |

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COMPLETE REVISION ☐



<b>SAUDI ARABIAN OIL COMPANY (Saudi Aramco)</b> <b>GENERAL INSTRUCTION MANUAL</b> <b>ISSUING ORG.</b> MECHANICAL SERVICES SHOPS DEPARTMENT <b>SUBJECT:</b> MECHANICAL SERVICES SHOPS DEPARTMENT - POLICIES AND PRACTICES	<b>G. I. NUMBER</b> <span style="float: right;">Approved</span> 1000.501	
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**EXHIBIT X**  
(Continued)

**3.3 Mechanical Rotating Equipments and Components;**

- |   |                                      |
|---|--------------------------------------|
| 3.3.23 Mixers.  | 3.3.24 Mixer Components.             |
| 3.3.25 Differentials  | 3.3.26 Flow meter                    |
| 3.3.27 Gas Turbine Components   | 3.3.28 Air Conditioning Compressors. |
| 3.3.29 Tank mixers.   |                                      |
| 3.3.30 Fabrications and Weldings (NOT Prime Work Orders).   |                                      |
| 3.3.31 Aero-Derivative as Turbine Engines; Allison 501KB, Solar Saturn, Rolls- Royce RB-211 and Pratt & Whitney FT-4 engines. |                                      |
| 3.3.32 Heavy Industrial Gas Turbine Engines; GE Frames 5, 6, & 7, Westinghouse and Mitsubishi engines.                        |                                      |

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**RECOMMENDED BY;**

\_\_\_\_\_

**Saad I. Al-Shamrani**, Superintendent  
Planning & Technical Services Division

**RECOMMENDED BY;**

\_\_\_\_\_

**Ibrahim A. Al-Baheli**, Superintendent  
Dhahran Shops Division

**RECOMMENDED BY;**

\_\_\_\_\_

**Ahmed S. Al-Rouq**, Superintendent  
Northern Shops Division

**RECOMMENDED BY;**

\_\_\_\_\_

**Abdulaziz A. Al-Modhi**, Superintendent  
Southern Shops Division

**RECOMMENDED BY;**

\_\_\_\_\_

**Mamdouh A. Saati**, Superintendent  
Field Shops& Services Division

**CONCURRED BY;**

\_\_\_\_\_

**Mohammed S. Al-Ghamdi**, Manager  
Mechanical Services Shops Department

**APPROVED BY;**

\_\_\_\_\_

**Mazen I. Snobar**, Executive Director  
Industrial Services

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