

SAUDI ARABIAN OIL COMPANY (Saudi Aramco) GENERAL INSTRUCTION MANUAL

G. I. NUMBER **2.702** Approved

ISSUING ORG.: POWER DISTRIBUTION DEPARTMENT

SUBJECT : MOVING DRILLING RIGS, HIGH CLEARANCE EQUIPMENT / LOADS,
OR OPERATING CRANES UNDER OR NEAR POWER-LINES

ISSUE DATE
4/1/2003

REPLACES
2/27/91

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CONTENT

This General Instruction (GI) outlines the requirements for moving drilling rigs, high clearance equipment and loads under, or operating cranes near, overhead power-lines to avoid power-line contact. The text includes:

- 1.0 Purpose
- 2.0 Scope
- 3.0 References
- 4.0 Definitions
- 5.0 General Requirements
- 6.0 Responsibilities
- 7.0 Rig Moves
- 8.0 Crane Operations
- 9.0 Moving Oversized Equipment
- 10.0 Approvals

Attachments:

- 1A - Pre-Rig Move Checklist
- 1B - Pre-Rig Move Checklist (Contractors)
- 2 - Oversized Equipment Pre-Move Checklist

1.0 PURPOSE

The purpose of this GI is to protect personnel and high clearance equipment moving under, or operating near, overhead power-lines and to prevent damage to power-lines or unscheduled interruption of the power supply during such operations.

2.0 SCOPE

This General Instruction shall apply to all Saudi Aramco proponent departments and contractor companies moving high clearance equipment and loads under, or operating equipment near, power-lines, regardless of power-line location, voltage rating, or the type of equipment involved. This GI does not apply to moving mobile cranes along roadways where overhead power-line crossing heights are posted and/or equipped with telltales indicating safe overhead clearance.

3.0 REFERENCES

Abbreviations:

ANSI: American National Standards Institute
ASME: American Society of Mechanical Engineers
GI: General Instruction

The Standards and references listed below shall apply to this G.I. It shall be the responsibility of Saudi Aramco proponent organizations and contractors to be familiar with the most current version of the referenced publications. (ASME standards are adopted by ANSI):

- | | | |
|-----|-------------|--|
| 3.1 | ASME B30.5 | Mobile and Locomotive Cranes |
| 3.2 | ASME B30.23 | Personnel Lifting Systems |
| 3.3 | GI 2.100 | Work Permit System |
| 3.4 | GI 7.027 | Crane Suspended Personnel Platforms (Manbasket) Operations |

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- | | | |
|-----|--------------------------------|---|
| 3.5 | GI 7.028 | Crane Lifts: Types and Procedures |
| 3.6 | GI 7.029 | Below-the-hook Lifting Equipment For Cranes |
| 3.7 | DOE-STD 1090-99 | Department of Energy U.S.A |
| 3.8 | Library of Congress # 95234053 | IPT's Crane and Rigging Handbook by Ronald G. Garby |
| 3.9 | Library of Congress # 72362605 | Handbook for Riggers by W.G. Newberry |

4.0 DEFINITIONS

Competent Person: A person who, by possession of a recognized pertinent degree or certificate of professional standing or who, by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work. The proponent department manager should consult with various Saudi Aramco departments, such as Roads and Heavy Equipment Department (R&HED), Training and Career Development Department (T&CD), etc., for assistance in the determination of qualifications and credentials of the person being designated as a competent person.

Critical Lift Plan: Document that identifies a specific load and the operating restrictions. Pertinent information includes all weights on hook blocks and attachments.

High Humidity: Humidity levels exceeding 80% wet bulb.

High Temperature: Temperatures exceeding 41° C (105° F)

Others: Proponents, other than the listed departments, who occasionally move equipment or oversized loads under, or operate cranes near, power-lines.

Outage: Controlled or uncontrolled loss of electric power to a community, facility, or equipment.

Power Dispatcher: Power Distribution Department (PDD) employee who monitors the power system and coordinates switching from the Dhahran Power Control Center (manned 24 hours).

Power-line: Overhead, non-insulated electrical conductor.

Rig: Drilling rig and all auxiliary components.

Rigger: Person certified by Saudi Aramco to prepare a detailed "Critical Lift Plan" for specialized lifts, calculate load weight and hitch capacity, prepare crane site area, select size and type of rigging equipment to rig loads, inspect and maintain slings, select hitch arrangements, direct crane operators with approved hand signals, and tie ropes with correct knots and hitches. (Refer to GI 7.028 and GI 7.029).

Service Dispatcher: Power Distribution Department (PDD) employee who monitors the power system and coordinates switching. Located in respective areas local dispatch office (manned 24 hours).

Signalman: Person who has been assigned the responsibility to warn and stop drivers or crane operators when high clearance equipment or loads may come in contact with power-lines and/or other obstructions to insure safe movement of the equipment and/or loads.

Telltale: Wire strung above and across the path of an approaching vehicle which warns of clearance heights of the object above that is being approached.

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5.0 GENERAL REQUIREMENTS

5.1 If a controlled outage is required, the proponent department of the move or work shall contact the PDD Electric System Operator (ESO) and initiate a Work Permit request. The ESO shall determine if an outage of the overhead power-line can or should be scheduled before the move or work is permitted to proceed. (Facility involved shall be notified by PDD for the scheduled power outage.) Scheduled outages required on any Saudi Electric Company (SEC) owned and operated power-lines shall be coordinated by the PDD Power Dispatcher. Overhead power-line(s) shall be considered energized until the PDD indicates that it is not energized.

5.1.1 All equipment moving under energized power-lines shall maintain the proper clearances shown below.

LINE VOLTAGE (kV)	ABSOLUTE LIMIT OF APPROACH
2.4, 4.16, 13.8	1.22 meters (4 feet)
34.5	1.53 meters (5 feet)
69	1.7 meters (5 feet 7 inches)
115	1.95 meters (6 feet 5 inches)
230	2.7 meters (8 feet 8 inches)
380	3.65 meters (12 feet)

5.1.2 The PDD Power Dispatch Scheduler shall obtain the concurrence of the Oil Supply Planning and Scheduling Department (OSPAS) if the scheduled outage will require shut down of any GOSP, pump station, or other producing facility.

5.1.3 The facility proponent department shall issue a work permit only if the ESO declares the power-line is de-energized and gives clearance to proceed with the work.

5.2 A work permit is required for equipment lifts or crane operations which exceed the absolute limit of approach as shown in the tables under paragraphs 5.1.1 and 8.2.2 of this GI.

6.0 INTER-DEPARTMENT COORDINATION

Coordination between PDD and proponent departments initiating rig, high clearance equipment and/or load moves, or operating cranes, in the vicinity of power-lines shall be in accordance with the matrix below:

ACTIVITY / COORDINATION	TD	R&HED	D&WO	PMT	OTHERS
Rig Moves – Saudi Aramco	X		X		
Rig Moves - Contractors			X		
Crane Moves – Saudi Aramco		X	X		
Crane Moves - Contractor			X	X	
Crane Operations – Saudi Aramco		X	X		X
Crane Operations - Contractor			X	X	X
Oversized Equipment Moves				X	X

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7.0 RIG MOVES

The assigned Saudi Aramco Foreman for Saudi Aramco drilling/work over rigs and for Contractor drilling/work over rigs shall notify the Wellsites Division, Drilling & Workover Services Department (D&WOSD) of the date of the rig move. Wellsites Division shall be responsible for:

- 7.1 Selecting the most appropriate route for moving the drilling rig components with high clearance requirements to minimize power-line crossings.
- 7.2 Directly notifying the Power Dispatcher (if overhead power lines have to be crossed) at least 7 work days before the equipment move of the date, time, location of crossing, power-line(s) affected, and estimated duration of the scheduled outage required so that facilities affected by the outage can be notified and the effect on Producing Operations evaluated.
- 7.3 Transportation Department (TD) shall prepare and obtain PDD's concurrence on the Rig Pre-Move Checklist Form, Attachment 1 for Saudi Aramco rig moves. Wellsites Division, D&WOSD shall prepare and obtain PDD's concurrence on the Rig Pre-Move Checklist Form, Attachment 1B (Contractor rigs) for moves by contractors.
- 7.4 If clearances cannot be met and the power-line cannot be de-energized, Wellsites Division, D&WOSD for Contractor rigs and TD for Saudi Aramco rigs shall initiate a request for a Hot Work Permit (Refer to GI 2.100) signed by PDD's local area Service Dispatcher or ESO. The Hot Work Permit shall indicate clearly that the overhead power-line is energized and that the Drilling Foreman for Saudi Aramco drilling rigs or assigned Liaison Man for Contractor drilling rigs is familiar with this GI. The Hot Work Permit shall also indicate precautions to be taken to prevent power-line contact. Where practical, the power-line crew shall be advised to cover the line conductors with protective equipment made for the purpose.
- 7.5 Notifying the PDD Power Dispatcher or ESO of any changes in timing as soon as they are known.

8.0 CRANE OPERATIONS

- 8.1 The crane operator shall maintain proper clearances between power-lines and the crane during travel, as per the table shown in paragraph 5.1.1. If this is not possible, the proponent department shall immediately contact the PDD Power Dispatcher or ESO. Hydraulic crane booms shall be fully retracted with no load attached. "Pick and Carry" operations shall not be permitted under energized power-lines as per GI 7.028, section 6.3.1.
- 8.2 Operating cranes near energized power-lines shall be in accordance with GIs 7.027 and 7.028.
 - 8.2.1 The facility proponent department shall issue a Hot Work Permit (Refer to GI 2.100) countersigned by PDD's local area Service Dispatcher or ESO. The Hot Work Permit shall indicate clearly that the overhead power-line is energized and that the Supervising Craftsman, Rigger-I or rigging competent person is familiar with this GI. It shall also indicate precautions to be taken to prevent power-line contact or to minimize losses if contact occurs. Where practical, the power-line crew shall be advised to cover the line conductors with protective equipment made for the purpose.
 - 8.2.2 When working less than 1-1/2 fully extended boom lengths from energized power-lines, a designated signalman shall ensure the following minimum distances are maintained:

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LINE VOLTAGE	ABSOLUTE LIMIT OF APPROACH
Up to 250,000 volts	6.1 meters (20 feet)
Over 250,000 volts	7.6 meters (25 feet)

8.2.3 If the crane operation includes lifting near energized power-lines, it shall be considered a critical lift and requires an approved Critical Lift Plan as per GI 7.028. The Critical Lift Plan shall be prepared by a Rigger-I or rigging competent person with PDD participation and co-signed by the facility proponent department and PDD.

8.2.4 Crane lifts near energized power-lines shall not be performed in wind speeds exceeding 32 km/h (20 mph – 17.4 knots), unless otherwise specified by the crane manufacturer. No crane lift shall be performed if the Wet Bulb humidity is above 80%.

8.2.5 Use of a personnel platform (manbasket) near an energized power-line shall be done as a last resort and shall not to be used, unless all other options (scaffolding, manlifts, etc.) have been explored and found unacceptable. The use of a personnel platform (manbasket) shall be considered a critical lift and requires an approved Critical Lift Plan as per GI 7.028. Use shall be approved through PDD's concurrence on the work permit. (Refer to GI 7.027 and 7.028)

8.2.6 Operation of the crane boom or personnel platform (Manbasket) over power-lines shall be approved with PDD's concurrence on the work permit.

8.2.7 Electrical system protective devices that automatically re-energize the circuit after a power-line contact occurrence shall be blocked or disengaged to inhibit this function.

8.2.8 Load control, when required, shall utilize non-conductive taglines near energized power-lines.

8.2.9 Non-conductive barricades shall be used during the crane lift near an energized power-line to restrict access to the crane work area for personnel other than lifting crew. All combustible and flammable materials shall be removed from the vicinity of the energized power-line.

8.2.10 No one shall be permitted to touch the crane or the load near energized power-lines, unless the Rigger-I or a competent person indicates it is safe to do so.

8.2.11 Use of a crane to move loads near an energized power-line shall be considered as a last resort and they shall not to be used unless all other options (forklifts, flatbed trucks, skids, etc.) have been explored and found unacceptable. If a crane must be used, it shall be considered a critical lift and requires an approved Critical Lift Plan, as per GI 7.028. Use shall be approved through PDD's concurrence on the work permit. (Refer to GI 7.027 and 7.028)

9.0 MOVING OVERSIZED EQUIPMENT

The proponent department shall prepare a Move Plan that shall include drawings, showing the overall dimensions of the equipment mounted on the vehicle and the proposed route to be taken. If the route is to cross under power-lines, a PDD representative shall be included in the development and approval of the Move Plan. Clearances shall conform to those listed in paragraph 5.1.1. Prior to the move, the proponent department shall prepare and obtain PDD's concurrence on the Oversized Equipment Pre-Move Checklist (Attachment 2).

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10.0 APPROVALS

Recommended by:

Concur:

Manager, Power Distribution Department

Manager, Roads & Heavy Equipment Department

Manager, Transportation Department

General Manager, Drilling & Work Over

Approved:

V. P. Supply Planning & Terminal

ATTACHMENTS: 1A - RIG PRE-MOVE CHECKLIST
1B - RIG PRE-MOVE CHECKLIST (CONTRACTORS)
2 - OVERSIZED EQUIPMENT PRE-MOVE CHECKLIST

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Attachement "1A" G.I. 2.702

RIG PRE-MOVE CHECKLIST (SAUDI ARAMCO)

Date: _____

Rig: _____ Old Location: _____ New Location: _____

Expected Move Date: _____ ☐ Rig ☐ Rig & Camp Distance: _____ KM

Rig Foreman/Drilling Dept.: _____ Phone: _____ Charge No.: _____

Prepared by: _____

Rig Move Support Unit / SATD

ROAD INSPECTION SURVEY:

1	Road Condition:	<input type="checkbox"/> Paved	<input type="checkbox"/> Skid (Marl)	<input type="checkbox"/> Up / Down Hill	<input type="checkbox"/> Deep Sand	<input type="checkbox"/> Tight Turns
2	Road Defects:	<input type="checkbox"/> Deep Ruts	<input type="checkbox"/> Mud	<input type="checkbox"/> Under Construction	<input type="checkbox"/> No Defects	
3	Road Obstruction:	<input type="checkbox"/> Bridge	<input type="checkbox"/> Sign Board	<input type="checkbox"/> Highway Crossing	<input type="checkbox"/> Power-line	
4	Road Map Provided:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	5	Highest Equipment	_____ Meters
					Lowest Clearance	_____ Meters

Is the road clear and safe for the move? No ☐ Yes ☐

If no, specify what and why: _____

Corrective action to be taken: _____

☐ Electric Power Outage Required

Estimated Duration: _____

Comments: _____

Inspected By: _____
Supv. Rig Move/SATD Convoy Leader/SATD PDD Service Dispatcher Well Sites Rep. Drilling Rig Foreman

Date: _____

cc: Supt./SATD
Supv. Rig Move Support Unit
Supv. Rig Move & HH Unit
PDD, Dispatcher
Rig File

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Attachment "1B" G.I. 2.702

RIG PRE-MOVE CHECKLIST (CONTRACTORS)

Date: _____

Rig: _____ Old Location: _____ New Location: _____

Expected Move Date: _____ ☐ Rig ☐ Rig & Camp Distance: _____ KM

Rig Foreman/Drilling Dept. _____ Phone: _____ Charge No.: _____

Prepared by: _____

Well Sites Division / D&WOD

ROAD INSPECTION SURVEY:

1	Road Condition:	<input type="checkbox"/> Paved	<input type="checkbox"/> Skid (Marl)	<input type="checkbox"/> Up / Down Hill	<input type="checkbox"/> Deep Sand	<input type="checkbox"/> Tight Turns
2	Road Defects:	<input type="checkbox"/> Deep Ruts	<input type="checkbox"/> Mud	<input type="checkbox"/> Under Construction	<input type="checkbox"/> No Defects	
3	Road Obstruction:	<input type="checkbox"/> Bridge	<input type="checkbox"/> Sign Board	<input type="checkbox"/> Highway Crossing	<input type="checkbox"/> Power-line	
4	Road Map Provided:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	5	Highest Equipment _____ Meters	
					Lowest Clearance _____ Meters	

Is the road clear and safe for the move? No ☐ Yes ☐

If no, specify what and why: _____

Corrective action to be taken: _____

☐ Electric Power Outage Required Estimated Duration: _____

Comments: _____

Inspected By:

Date:

Rig Contractor Representative_____
PDD Service Dispatcher_____
Well Site Inspector_____
Drilling Rig Foremancc: Supt. D&WOD
Supt. Wellsites
PDD Service Dispatcher
Rig Contractor
Rig Well File

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Attachment 2 GI 2.702

OVERSIZED EQUIPMENT PRE-MOVE CHECKLIST

Date: _____

Transport Date: _____

Location: From: _____ **To:** _____

Distance: _____ **KM**

Brief Description:

Truck Type: _____

Load Type: _____

Highest Point: _____ **M** **Maximum Width:** _____ **M**

Road Description:	? Paved	? Skid (Marl)	? Up/Down Hill	Deep Sand	? Tight Turns
Road Surface:	? Deep Ruts	? Mud	? Under Construction		? No Defects
Road Obstructions:	? Bridge	? Sign Board	? Highway Crossing		? Power-lines

Remarks: _____

Road map available?	? Yes	? No	
Power-line crossing?	? Yes	? No	If yes, lowest point: _____ M
Power outage required?	? Yes	? No	Duration _____ Hours
Power Distribution Department approval required?	? Yes	? No	
Government approvals required?	? Yes	? No	
Valid Saudi Aramco truck inspection sticker?	? Yes	? No	

Approval:

Superintendent, Area Transportation Division, TD : _____ **Date:** _____

cc: Area Power Dispatcher, PDD