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THREE MILE ISLAND NUCLEAR STATION
UNIT #1 REFUELING PROCEDURE 1507-1

POLAR CRANE OPERATION

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Unit 1 Staff Recommends Approval

Approval _____ Date _____
Cognizant Dept. Head

Unit 2 Staff Recommends Approval

Approval _____ Date
Cognizant Dept. Head

Unit 1 PORC Recommends Approval

J. P. Ott, Jr. Date 12-20-75
Chairman of PORC

PORC comments of _____ included
(date)

By _____ Date _____

Unit 2 PORC Recommends Approval

_____ Date _____
Chairman of PORC

PORC comments of _____ included
(date)

By _____ Date _____

Approval J. J. Colitz Date 1-6-76
Station Superintendent
Unit Superintendent

TMI-55-A 11-74

THREE MILE ISLAND NUCLEAR STATION

UNIT 1

REFUELING PROCEDURE 1507-1

POLAR CRANE OPERATION

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1.0 PURPOSE

The purpose of this procedure is to provide instructions for the operation of the polar crane in a safe and proper way.

2.0 DESCRIPTION

The polar crane is a floor operated double trolley type crane located in the Reactor Building. The crane is used for fueling, maintenance lifts, and any other loads a crane might be needed for. The main trolley has two hooks; the main hook with a name plate rating of 185 tons (certified rated at 200 tons) and an auxiliary hook rated at 25 tons. The main and auxiliary hooks are variable speed, with maximum speeds of four (4) FPM and 20 FPM, respectively. The trolley and bridge traverse speeds are variable with a maximum speed of 40 FPM and 75 FPM, respectively. All operations are controlled from a 13 button pendant control station. (See Figure #1)

3.0 REFERENCES

3.1 Whiting Cranes Instruction Manuals (MG-1)
Serial Numbers 9847 and 9987

3.2 MP 1402-2.1, "Cranes-Routine Inspection"

3.3 Met-Ed Safety Manual (Section 4)

3.4 TMI Unit 1 Technical Specifications

3.5 Overhead and Gantry Cranes--USAS B 30.2.0--1967

4.0 TOOLS, EQUIPMENT AND SUPPLIES

None

5.0 PRECAUTIONS AND LIMITATIONS

5.1 The Reactor Building polar crane hoists shall not be operated over the fuel transfer canal when any fuel assembly is being moved. (TS 3.12.1)

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5.2 During the period when the reactor vessel head is removed and irradiated fuel is in the Reactor Building and fuel is not being moved, the Reactor Building polar crane hoists shall be operated over the fuel transfer canal only where necessary and in accordance with approved operating procedures. (TS 3.12.2)

5.3 During the period when the reactor coolant system is pressurized above 300 psig, and is above 200°F., and fuel is in the core, the Reactor Building polar crane hoists shall not be operated over the steam generator compartments. (TS 3.12.3)

5.4 Whenever taking slack out of the hoist cables, do not exceed an approximate hoist speed of six (6) FPM.

5.5 Whenever load is within one (1) foot of the floor or other resting place, do not exceed an approximate hoist speed of two (2) FPM.

5.6 Whenever load is within five (5) feet of a wall or other obstruction, do not exceed a bridge or trolley speed of approximately two (2) FPM.

5.7 All objects on the polar crane shall be tied down to prevent their falling into the transfer canal.

5.8 The crane shall not be loaded beyond its nameplate rated load.

Polar Crane Hook	Nameplate rated load
Main	185 tons
Auxiliary	25 tons

5.9 Attaching the Load

5.9.1 The hoist cable shall be free from kinks or twists and shall not be wrapped around the load.

5.9.2 The load shall be attached to the load block hook by means of slings or other approved devices.

5.9.3 Care shall be taken to make certain that the sling clears all obstacles.

5.10 Moving the Load

5.10.1 The appointed individual directing the lift shall see that the load is well secured and properly balanced before it is lifted more than a few inches.

5.10.2 Care shall be taken that there is no sudden acceleration or deceleration of the moving load, and also that the load does not contact any obstructions.

5.10.3 Cranes shall not be used for side pulls.

5.10.4 The operator shall not hoist, lower, or travel while anyone is on the load or hook.

5.10.5 Personnel shall stand clear of suspended loads.

5.10.6 The operator shall test the brakes each time a load approaching the rated load is handled by raising the load a few inches and applying the brakes.

5.10.7 The load shall not be lowered below the point where less than two (2) full wraps of rope remain on the hoisting drum.

5.10.8 An operator shall be at the controls while a load is suspended.

5.11 Insure proper hand signals are used. (See Hand Signal Chart, Attachment #1)

5.12 Observe all crane safety precautions as per Met-Ed Safety Manual, when operating crane.

5.13 Conduct of Operators

5.13.1 The operator shall not engage in any practice which will divert his attention while actually engaged in operating the crane.

5.13.2 The operator shall respond to signals only from the person who is directing the lift, or an appointed signal man. However, he shall obey a stop signal at all times, no matter who gives it.

5.13.3 The operator shall be held directly responsible for the safe operation of his equipment. Whenever there is any doubt as to safety, the operator shall have the authority to stop and refuse to handle loads until safety has been assured.

5.13.4 The warning bell shall be sounded each time before travelling, and intermittently during travel, particularly when approaching workmen.

5.13.5 If the operator finds the main or emergency switch open when starting on duty, he shall not close it until he has received permission from the Mechanical Maintenance Foreman.

5.14 Qualification for Operators

5.14.1 Personnel shall be required to complete the training MP 1406, and pass a practical examination on crane operation to be considered qualified.

5.14.2 The crane shall only be operated by qualified personnel and trainees under the direct supervision of a qualified operator.

6.0 PREREQUISITES

6.1 MP 1402-2.1, "Cranes-Routine Inspection" shall be completed prior to operating crane.

7.0 PROCEDURE TEXT

7.1 Start-Up and Inspection (See 6.1)

7.1.1 At the start of each shift during which the polar crane is manned, conduct visual inspection as follows:

(a) Deterioration or leakage in lines, tanks, valves, drain pumps and other parts of air or hydraulic systems.

(b) Hooks for deformation or cracks.

(c) Hoist or load attachment chains, including end connections, for excessive wear, twist, or distorted links interfering with proper functions.

(d) All cables and shieves for evidence of wear or damage.

7.1.2 Push Start button and observe red light on push button station is lit. If red light does not light, check that power supply breaker Unit 3D on 1L reactor plant 480 volt switchgear is closed.

Note: Observe 5.13.5

7.1.3 Main Hoist Checks

Caution: Do this test in an open floor area.

a. Push "down" button and observe hook moves down. Daily verify its downward limit is functional.

Note: The downward limit verification is not required if working above 320 ft. elevation.

b. Push "up" button and observe hook moves up. Daily verify its upward limit is functional.

7.1.4 Auxiliary Hoist Check

Caution: DO THIS TEST IN AN OPEN FLOOR AREA.

a. Push "down" button and observe hook moves down. Daily verify its down limit is functional.

Note: Down limit not required if work being done above 320 ft. elevation.

b. Push "up" button and observe hook moves up. Daily verify its up limit is functional.

7.1.5 Bridge and Main Trolley Checks

a. Ensure bridge and main trolley run in right direction when forward and reverse buttons are actuated. (Directions will be defined and marked on bridge and trolley.)

b. Daily run Bridge and Trolley to both limits of travel and verify that limit switches are functional.

7.1.6 Pendant Traverse Check

Ensure pendant runs in right direction when forward and reverse buttons are actuated.

7.2 Normal Operation

7.2.1 Select proper hook.

7.2.2 Observe Section 5.0, "Limits and Precautions."

7.2.3 Ensure checks in Sections 6.1 and 7.1 have been run prior to lifting any loads.

7.3 Shutdown

7.3.1 Before leaving this crane unattended, the operator shall land any load and ensure all hooks are raised to within ten (10) feet of the up limits.

7.3.2 Push "stop" button and ensure the red light on the control panel goes out.

7.4 Storage

7.4.1 Ensure all hooks are raised to within ten (10) feet of the up limit switches.

7.4.2 Ensure bridge is parked as per Attachment 2 "Polar-Crane-Storage" so the trolley is within ten (10) feet of the hard stops on the trolley rails.

7.4.3 Ensure pendant is in a position such that it is accessible yet does not provide a bumping hazard.

7.4.4 Push "STOP" button and ensure red light on control station goes out.

7.4.5 Open the power supply breaker Unit 3D on 1L reactor plant 480 volt switchgear.

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FIGURE 01

POLAR CRANE

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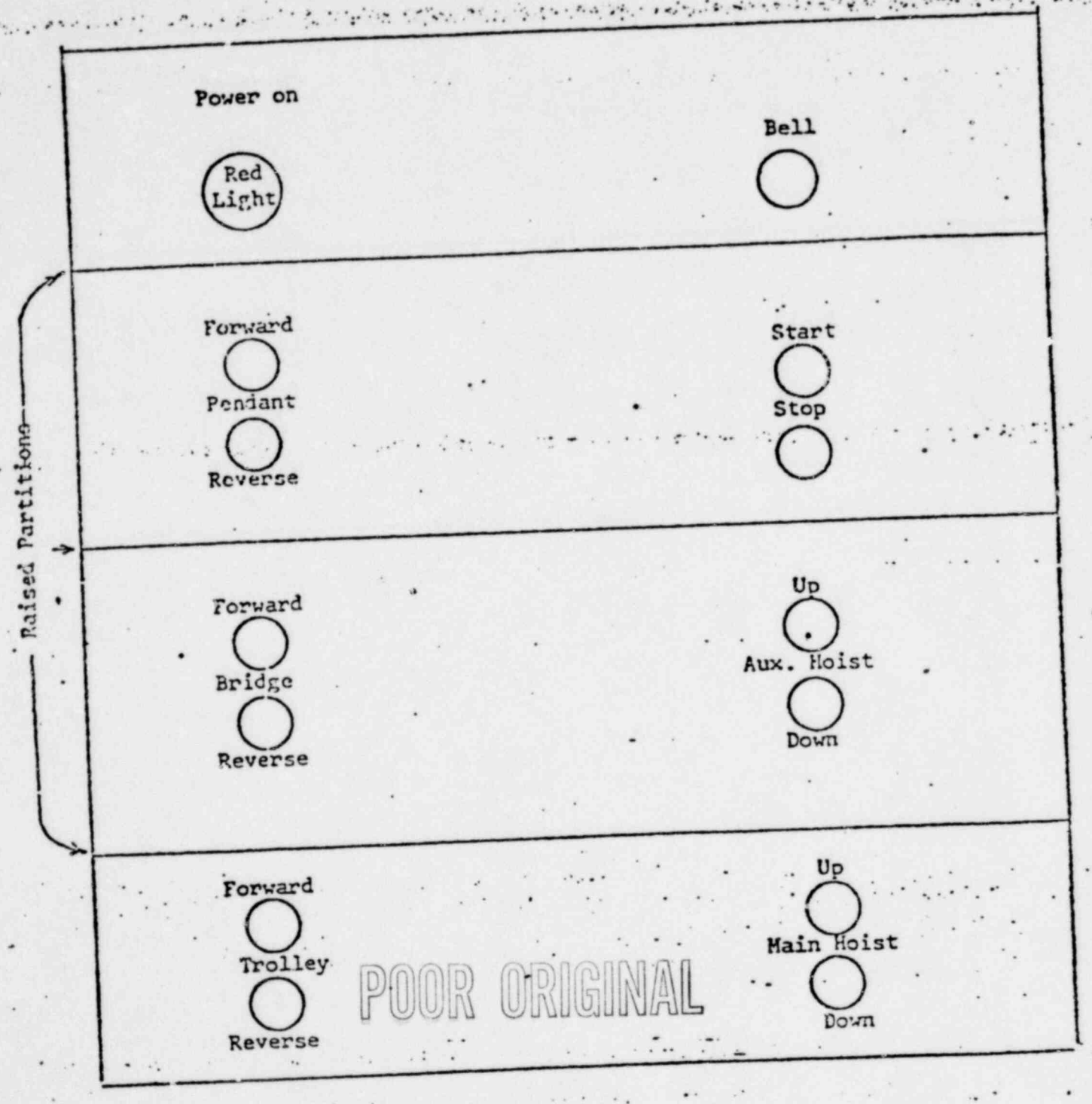
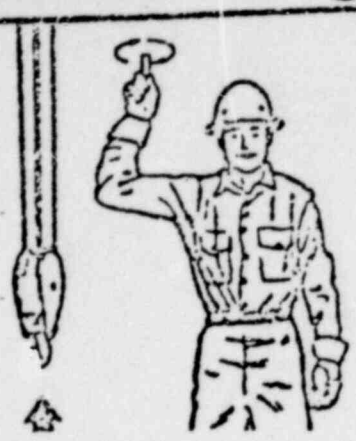
Pushbutton Pendant Control Station



ATTACHMENT #1

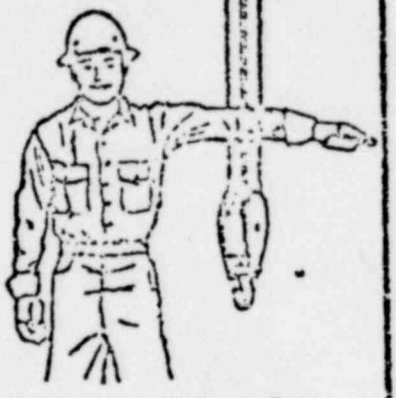


HOIST. With forearm vertical, forefinger point up, move hand in small horizontal circle.

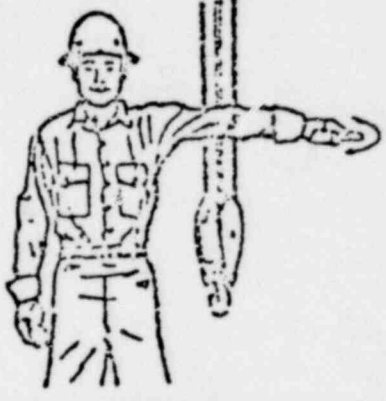
LOWER. With arm extended downward, forefinger pointing down, move hand in small horizontal circle.

BRIDGE TRAVEL. Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.

TROLLEY TRAVEL. Palm up, fingers closed, thumb pointing in direction of motion, jerk hand horizontally.



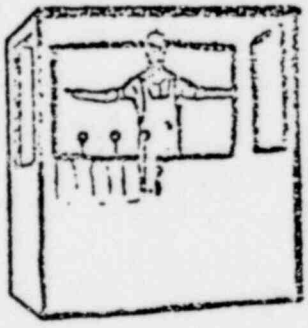
STOP. Arm extended, palm down, hold position rigidly.



EMERGENCY STOP. Arm extended, palm down, move hand rapidly right and left.

MULTIPLE TROLLEYS. Hold up one finger for block marked "1" and two fingers for block marked "2". Regular signals follow.

MOVE SLOWLY. Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal. (Hoist slowly shown on example)



MAGNET IS DISCONNECTED. Crane operator spreads both hand apart - palms up.

STANDARD HAND SIGNALS FOR CONTROLLING OVERHEAD AND GANTRY CRANES

ATTACHMENT 2

Polar Crane Storage