PM/IG-019
July 22, 1980
Date _____ Rev. _____

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
EXH - CONTAINMENT POLAR CRANE

1.0 PURPOSE

To perform periodic Preventive Maintenance Inspections, tests and servicing on the Whiting 175/25 Ton Containment Polar Cranes (Serial Nos. 11245 and 11246).

2.0 REFERENCES

2.1 29CFR 1910.79; OSHA

2.2 29CFR 1910.80; OSHA

FOR INFORMATION ONLY

2.3 ANSI B30.2.0 - 1976; Overhead cranes

2.4 CNM-1125.01.69; Whiting manual

2.5 Station Directive 3.1.1; Safety Tags and Delineation Tags

2.6 Station Directive 3.1.21; Oil Spill Prevention, Control and Countermeasure Plan.

2.7 Hooks - Safety Inspection MP/0/B/7650/08

2.8 Cranes and Hoists - Safety Inspection Procedure MP/0/B/7650/05

3.0 SPECIAL TOOLS/TEST EQUIPMENT (Record test equipment on Enclosure 7.4 and 7.5)

3.1 General Shop/Hand Tools

3.2 Flashlight

3.3 Wiping rags - lint free ½ lb.

3.4 Micrometer 1-3 inch

3.5 Caliper with 12 inch scale

3.6 Sheave gauges (see PM Coordinator)

3.7 Safety belts and hooks

3.10 Fine bristle brush 1-1½"

3.11 Hand Grease Gun w/Unirex N-2

3.12 Hand Grease Gun w/Ronex MP

3.13 Lubricant Teresstic - 150

3.14 Hyraulic Fluid - Atlas 450 Super Heavy Duty

3.15 Container for used oil, 10 gallons

3.16 Small Funnel

3.8 Multimeter - Simpson 260 or equal

3.9 500V megger

3.17 Lubricant Nuto-H68

3.18 Lubricant Teresstic-68

4.0 SAFETY CONSIDERATIONS

Record on Enclosures 7.4 and 7.5.

4.1 Warning signs posted as necessary to protect personnel under the crane.

4.2 If possible, move the crane to an area where the inspection work will cause minimum interference with other work.

4.3 Upon completion of the PM Inspection, insure that all guards and other safety devices are replaced and that all maintenance equipment is removed.

4.4 Insure crane operator and maintenance personnel are instructed in recognizing signs of heat stress and heat stroke and to act to prevent injury.

4.5 When specified in the procedure, electrical power shall be de-energized and tagged out. All electrical checks to be performed with equipment de-energized.

4.6 Oil must be checked for radiation contamination prior to disposal.

4.7 Radiation work permit issued (RWP or SRWP) as necessary.

5.0 STATION/EQUIPMENT STATUS

5.1 Record on Enclosures 7.4 and 7.5.

5.2 Shutdown; crane must be out-of-service for PM inspection.

6.0 PROCEDURE

Preventive Maintenance inspections, tests and servicing will be performed on a periodic basis by trained, qualified individuals as designated by Maintenance Sections.

Check each item on the inspection checklist, Enclousre 7.4 or 7.5, to indicate satisfactory or unsatisfactory conditions and initial. Explain all unsatisfactory items in "Remarks" section.

6.1 Yearly or before return to service (after 6 months); Mechanical Maintenance will perform Section 6.1 of this procedure, and complete Enclosure 7.4.

6.1.1 Have crane operator perform operational tests and verify all operating controls to be in proper adjustment and not interfering with proper operation. Perform the following:

6.1.1.1 The crane should be operated to all the limits of its travel without a load on the hook. Check proper release, coastdown, and holding of main hoist motor, and auxiliary hoist motor brakes.

CAUTION

Each motion shall be inched into its limit or run in at slow speed. If a limit switch malfunctions, stop motion immediately.

6.1.1.2 Test the operation of all braking systems.

6.1.1.3 Check that bridge and trolley collector shoes do not arc.

6.1.1.4 Perform operational check of motion alarms.

6.1.1.5 Check that sheaves are all turning on main and auxiliary hoist operations.

6.1.1.6 Check that cables do not rub on framework or block housing and go into grooves properly.

6.1.2 Have each hoist hook lowered for inspection.

6.1.3 Have Operations deenergize and tag out crane for PM Inspection.

6.1.4 Inspect main bridge.

6.1.4.1 Visually check overall general conditions, i.e., dust, dirt, oil, grease, loose or broken equipment or components.

6.1.4.2 Check that gear case covers fit tight; check seals for leaks. Check/clean drip pan if supplied.

6.1.4.3 Check couplings, pillow blocks and mounting brackets; they should not be loose, cracked or broken.

6.1.4.4 Check oil level in bridge drive gear case, if low add Teresstic-150.

6.1.5 Inspect trolley in accordance with step 6.1.4.

6.1.6 Inspect main hoist in accordance with step 6.1.4.

6.1.7 Inspect auxiliary hoist in accordance with step 6.1.4.

6.1.8 Inspect gear motors on main and auxiliary hoists as follows:

6.1.8.1 Inspect for oil leakage at seals, caps, plugs, pipe fittings, etc.

6.1.8.2 Check/clean oil breather with standard cleaning solution and blow dry.

6.1.8.3 Check bearing supports and bearings.

6.1.8.4 Clean oil, dirt, grime, grease from gearmotors.

6.1.8.5 Check oil level; if low, fill with Teresstic 150 to level recommended on lube plate attached to side of reducer.

6.1.9 Inspect the "Maxitorq" cluches and sprocket assemblies on the main and auxiliary hoists.

6.1.9.1 Check for broken or missing nuts, fasteners, springs, keepers, etc.

6.1.9.2 Inspect chain links for wear, cracks, broken or bent pins, etc.

6.1.9.3 Check sprocket wheels for wear, cracks, missing or broken teeth.

6.1.10 Visually inspect each hoist drum for wear. Check grooves for wear and rope gouges.

6.1.11 Visually inspect the hook swivel assembly.

6.1.11.1 Inspect condition of the V Belts; if cut, nicked, broken, etc., replace.

6.1.11.2 Check oil level in gear case; if low, add Teresstic 150.

6.1.12 Visually inspect upper, lower and equalizing sheaves on main and auxiliary hoists.

6.1.12.1 Check sheaves for excessive wear or breakage.

6.1.12.2 Measure wear - use sheave gauge in accordance with Enclosure 7.2.

6.1.13 Inspect wire rope on main and auxiliary hoists. Record on Enclosure 7.4. The presence of any one of the following conditions requires that the wire rope be replaced.

6.1.13.1 Measure the diameter of each rope above the block with a dial caliper or micrometer in accordance with Enclosure 7.2. Record the smallest measurement. The diameter for each main hoist wire rope should not be less than 1 1/16 (1.06) inches. The diameter for each auxiliary wire rope should not be less than 29/64 (0.453) inches.

6.1.13.2 Less than twelve (12) randomly distributed broken wires in one rope lay, or four (4) broken wires in one (1) strand of one (1) rope lay.

6.1.13.3 Wear of one-third (1/3) the original diameter of outside individual wires.

6.1.13.4 Kinking, crushing, bird-caging, or other damage resulting in distortion of rope structure.

6.1.13.5 Check end connector condition - must have at least two (wraps) of cable around the drum.

6.1.14 Inspect the hooks on main and auxiliary hoists in accordance with Enclosure 7.2. The presence of any of the following conditions requires that the hook be removed from service. Record on Enclosure 7.4.

6.1.14.1 Evidence of damage from chemicals.

6.1.14.2 Throat opening greater than 15% of original opening.

6.1.14.3 More than 10 degree twist from the plane of unbent hook.

6.1.14.4 Request QA perform Non-Destructive Examination (NDE) of the hooks. Attach the QA Report to Enclosure 7.3.

6.1.15 Check with I&E Technician to insure the Electrical PM Inspection has been completed. Have the I&E Technician sign this step on Enclosure 7.4.

6.1.16 Clean up area of rags and other debris. Insure all rags and waste are disposed of properly in accordance with Health Physics instructions.

6.1.17 Remove signs and rope from PM Inspection area.

6.1.18 Have Operations remove red tags, energize system (if applicable), and return crane to service.

6.1.19 Complete Enclosures 7.3 and 7.4. Insure all QA documents and other enclosures are completed, signed and attached.

6.2 Yearly or before return to service (after 6 months); I&E will perform Section 6.2 of this procedure and complete Enclosure 7.5.

6.2.1 Check Operations has deenergized and tagged out the crane for PM Inspection. If this has not been done, check with the Maintenance Technician to verify that steps 6.1.1 and 6.1.2 have been completed.

6.2.2 Inspect each of the two (2) 15 HP bridge drive motors.

6.2.2.1 Check/clean exterior - remove oil, grease, dirt, grime, etc., as required.

6.2.2.2 Remove brush inspection cover and inspect brushes for cracks, chips, wear, and spring tension. Insure brushes are free to move.

6.2.2.3 Check that brush holders are tight. Commuter should be smooth with polished appearance.

6.2.2.4 Inspect motor coupling for misalignment, loose, or broken parts.

6.2.2.5 Perform an insulation resistance test of motors at the motor starter or maintenance disconnect and record on Enclosure 7.5.

6.2.2.6 The insulation resistance should not be less than that given by the formula:

$$\text{Insulation Resistance (megohms)} = \frac{\text{Rated Motor Voltage} + 1000}{1000}$$

6.2.3 Inspect the 10 HP trolley drive motor in accordance with step 6.2.2.

6.2.4 Inspect the 50 HP auxiliary hoist motor in accordance with step 6.2.2.

6.2.5 Inspect the 3 HP auxiliary hoist slow speed motor in accordance with step 6.2.2.

6.2.6 Inspect the 60 HP main hoist motor in accordance with step 6.2.2.

6.2.7 Inspect the 5 HP main hoist slow speed motor in accordance with step 6.2.2.

6.2.8 Inspect the hook swivel motor in accordance with step 6.2.2.

6.2.9 Inspect the 1 HP trolley wheel lock motor.

6.2.9.1 Check the oil sump level - should be at second mark from top. If low, add NUTO H-68.

6.2.9.2 Check/clean the filler breather.

6.2.10 Inspect the 1 HP bridge wheel lock motor in accordance with step 6.2.9.

6.2.11 Inspect the Eddy current brakes on the main and auxiliary hoists as follows:

6.2.11.1 Check/clean exteriors.

6.2.11.2 Visually inspect for loose or missing parts, dents, etc.

6.2.11.3 Remove the intake screens and blow out with low pressure air (use the bristle brush to dislodge stubborn particles).

6.2.11.4 Clean screen and replace.

6.2.12 Inspect each of the "SESA" Electric bridge brakes (there are two) as follows:

6.2.12.1 Remove the cover from each brake.

6.2.12.2 Check for loose, missing or broken pins, nuts, retainers, springs, etc.

6.2.12.3 Insure that a small clearance exists between the drum and lining. The shoes should not be dragging.

6.2.12.4 Insure the brake lining is not less than 1/16" thick.

6.2.12.5 Inspect the drum and lining for grease, glazing or grooves. Clean as necessary. Check brake mounting bolts.

6.2.12.6 Check electrical connector is finger tight.

6.2.12.7 Check fluid level in the solenoid, if low add Teresstic-68.

6.2.12.8 Replace the covers.

6.2.13 Inspect the "SESA" Electric brakes (there are two) on the main and auxiliary hoists in accordance with step 6.2.12. Lubricate the ratchet teeth with Ronex MP.

6.2.14 Inspect the bridge, trolley, and hoist resistor banks for dirt, damaged or broken resistors, leads, etc.; clean as required.

6.2.15 Remove covers and inspect controllers, motor starters, disconnects, circuit breaker, etc. Check/adjust/tighten as required. Replace covers when completed.

6.2.16 Inspect the bridge and trolley conductor systems. Check each carbon shoe (brush) of each collector assembly for chips, cracks, wear, tension, etc. Ensure the brush pigtail is securely fastened.

6.2.17 Check with Maintenance Technician for clearnace to obtain a temporary lift of red tags.

CAUTION

Do not continue to the next step until the Maintenance Technician has been notified and is aware the electric brakes are to be tested. Both Maintenance and I&E must initial this caution on Enclosure 7.5.

6.2.18 Request a temporary lift of Red Tags from Operations to check brakes and lights.

6.2.19 Check operation of "SESA" electric brakes on the bridge, trolley, main and auxiliary hoists.

6.2.19.1 Observe if brake shoes clear drums with motor(s) engaged. Adjust if required.

6.2.19.2 Check that brake stops the motor movement when the controller button is released.

6.2.20 Check and replace burned out 1500 Watt crane light bulbs. Replace with Halophane #694-1500 Watt.

6.2.21 Notify Maintenance Technician when tests are completed.

6.2.22 If tests are satisfactory, request a permanent lift of Red Tags from Operations.

6.2.23 Clean up area of tools, rags and other debris. Insure all rags and waste are disposed of properly in accordance with Health Physics instructions.

6.2.24 Remove all signs and barricades from PM Inspection area.

6.2.25 Complete Enclosure 7.5 and attach to PM Standing Work Request.

6.3 Two year or before return to service (after 1 year); Mechanical Maintenance will perform Section 6.3 of this procedure and complete Enclosure 7.4.

6.3.1 Perform PM inspections and servicing, steps 6.1.1 through 6.1.15. Record on Enclosure 7.4.

6.3.2 Inspect walks and handrails for sound safe structural condition. Insure Operation's cab area, as well as other areas are free of grease, dirt, oil, oily rags, tools, loose equipment, etc.

6.3.3 Perform general inspection as follows:

6.3.3.1 Check runway structure and rails for loose bolts, rivets, welds, rust, chips, etc.

6.3.3.2 Check/clean rails and remove sand, dirt, oil, grease, metal shavings, and other foreign materials.

6.3.3.3 Check for loose bolts on end trucks and girder connections by tapping with a hammer.

6.3.3.4 Check girders and tracks for weld cracks, breaks, or other visual damage.

6.3.3.5 Inspect bridge and trolley wheels for flanging, wear, flat spots.

6.3.4 Lubricate bridge and trolley wheels with Unirex N-2. Use one (1) pump on the hand grease gun for each fitting.

6.3.5 Lubricate and inspect main bridge gear case (See Enclosure 7.1).

6.3.5.1 Drain gear case, drain oil in suitable container.

6.3.5.2 Remove inspection covers and check gears for excessive backlash, cracked, broken, or missing teeth. Check bearing races for cracks or breaks.

6.3.5.3 Clean and replace drain plug and air breather.

6.3.5.4 Refill with Teresstic 150.

6.3.5.5 Insure oil is at level required on oil dipstick or gauge.

6.3.6 Lubricate and inspect main hoist gear case in accordance with step 6.3.5.

6.3.7 Lubricate and inspect auxiliary hoist gear case in accordance with step 6.3.5.

6.3.8 Lubricate the flexible couplings on main bridge drive motors.

6.3.8.1 Rotate coupling until lube plugs are in horizontal positions.

6.3.8.2 Remove both lube plugs; insert pressure gun in one hole leaving the other open.

6.3.8.3 Fill the couplings with Ronex MP until it starts to come out the other hole.

6.3.8.4 Replace both lube plugs.

6.3.9 Lubricate the flexible couplings on the trolley drive motor in accordance with step 6.3.8.

6.3.10 Lubricate the flexible couplings on the main hoist motor in accordance with step 6.3.8.

6.3.11 Lubricate the flexible couplings on the auxiliary hoist motor in accordance with step 6.3.8.

6.3.12 Change oil in main hoist gearmotor.

6.3.12.1 Remove the drain plug and drain oil into a suitable container.

6.3.12.2 Clean breather and drain plug before replacing.

6.3.12.3 Refill gearmotor with Teresstic 150. Fill to level indicated on oil level indicating plate.

6.3.13 Change oil in auxiliary hoist gearmotor in accordance with step 6.3.12.

6.3.14 Change oil in hook swivel assembly gearmotor in accordance with step 6.3.12.

6.3.15 Lubricate main hoist sheaves with Unirex N-2. Use one (1) pump on the hand grease gun for each fitting as follows:

6.3.15.1 Hook swivel block and sheaves.

6.3.15.2 Equalize sheaves.

6.3.15.3 Upper sheave nest.

6.3.16 Lubricate auxiliary hoist sheaves in accordance with step 6.3.15.

6.3.16.1 Block and sheaves.

6.3.16.2 Upper sheave nest.

6.3.17 Inspect control cab air conditioning unit as follows:

6.3.17.1 Inspect and clean/change filters.

6.3.17.2 Check/clean condenser coils - blow out with low pressure air, loosen stubborn dirt with brush.

6.3.17.3 Grease compressor and fan motor bearings with Unirex N-2. Use one (1) pump on hand grease gun each fitting.

6.3.17.4 Check refrigerant oil level (compressor must be warmed up before checking) level should be half-full on sight glass.

6.3.18 Inspect "Rescuematic" unit as follows:

6.3.18.1 Remove metal cover and blow out dust accumulation.

6.3.18.2 Check cable for wear - if worn it must be replaced immediately.

6.3.18.3 Check operation by making a practice descent after inspection.

6.3.19 Clean up area of rags and other debris caused by inspection. Properly dispose of contaminated rags and debris in accordance with Health Physics instructions.

6.3.20 Dispose of used oil/greases/coolants as follows:

6.3.20.1 Draw one (1) liter sample of used oil and send to Health Physics Counting Room.

6.3.20.2 Dispose of oil in accordance with Health Physics instructions.

6.3.21 Check with the I&E Technician to insure that section 6.2 is completed. Have I&E Technician sign this step on Enclosure 7.4.

6.3.22 Remove ropes and signs used during inspection.

6.3.23 Have Operations remove red tags, energize system (if applicable), and return crane to service.

6.3.24 Complete Enclosure 7.3 and 7.4. Insure all QA Documents and other enclosures are completed, signed and attached.

7.0 ENCLOSURES

7.1 Lubrication Chart

7.2 Schematics, Drawings, Hook and Sheave Inspection

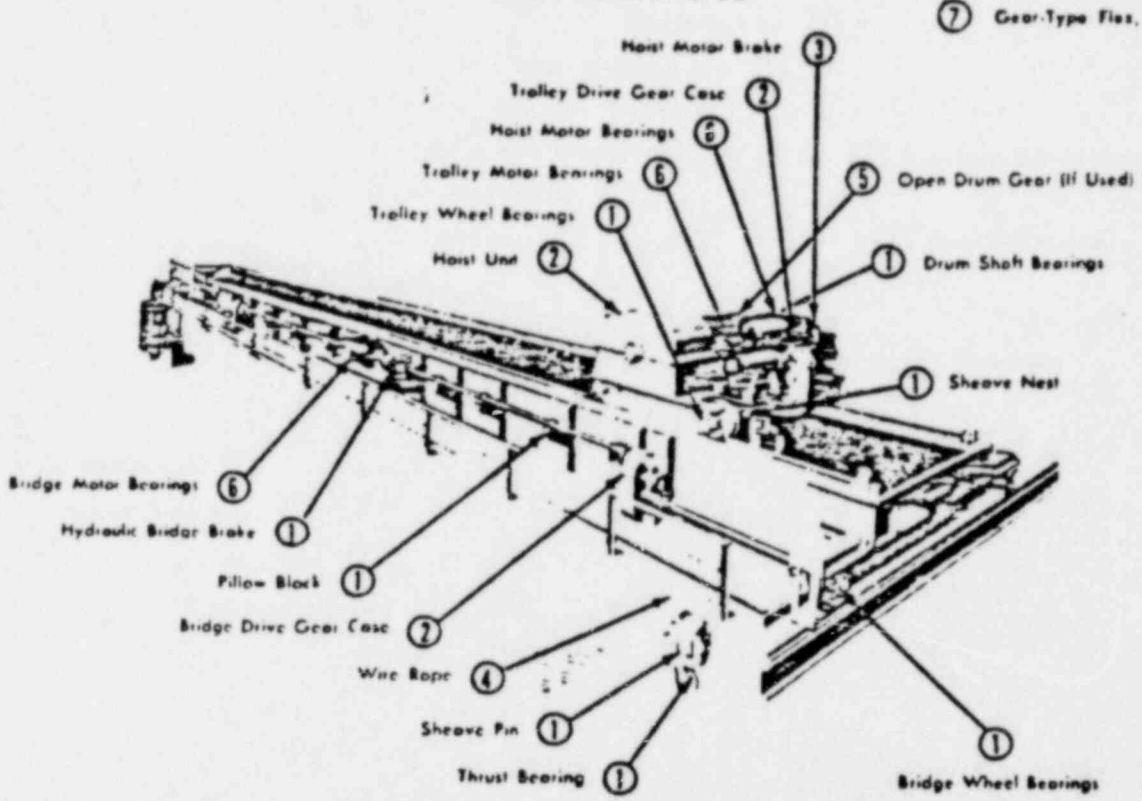
7.3 Inspection Cover Sheet

7.4 Mechanical - Inspection Guide

7.5 Electrical - Inspection Guide

Operation and Maintenance Chart 1-D-R1

Lubrication

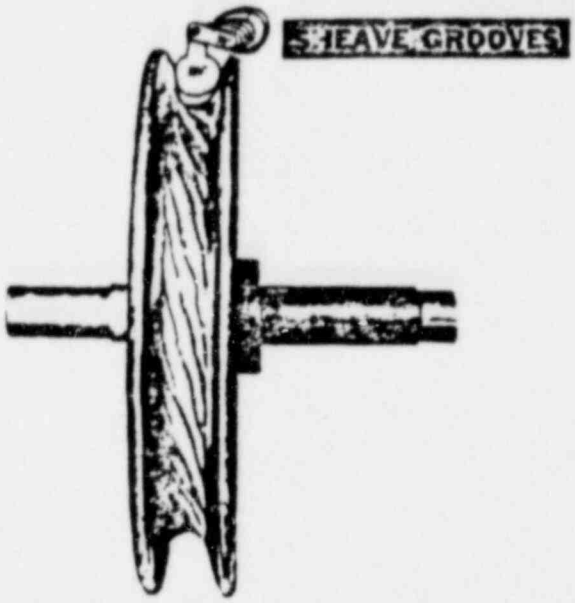


Maintain Lubricant Levels As Required by Operating Conditions
Change Lubricant at 2000 Hour or Six Month Intervals Unless Otherwise Noted
All Lubrication Intervals Are Based On 8 HR. Per Day Industrial Service.

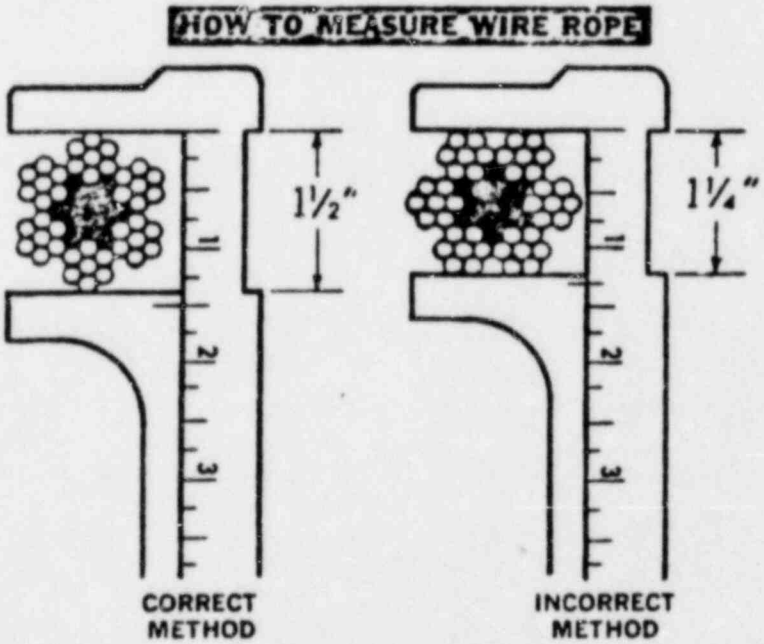
POINT	LUBRICANT	INSTRUCTIONS
	AMOCO RYKON #2EP	Lifetime Lubricated; Change every 5 Years
1*	Exxon Unirex N-2	When Crane is Supplied with Fittings, Bearings Should be Lubricated Sparingly With Pressure Gun.
2	Exxon Teresstic-150	Below 32° F. use: Mobilfluid 350 Shell Clavus Oil 33 Texaco Meropa Lubricant 1 (Approx. 200 Saybolt @ 100°)
3	Exxon Teresstic-150	Oil linkage.
4	Exxon Surett Fluid-4-K	Every 3 months for outdoor crane. Every 6 months for indoor crane. Apply sparingly.
5	Exxon Surett N-80-K	Every 6 months. Apply to each tooth.
6	Exxon Ronex MP	DO NOT OVERGREASE!
7	Exxon Ronex MP	All gear-type flexible couplings (if used).

* Use Mobilplex 45 if a central greasing system is employed.

Printed in U.S.A.
DeL. 1M—4-72



This illustration explains why worn sheaves will rapidly destroy wire rope. This sheave was originally grooved for 1¼" rope, but the 1¼" sheave gauge no longer fits the groove. In addition, the sheave is made of such soft material that it has become badly corrugated. Unless this sheave is repaired or replaced, subsequent ropes used on it will be badly pinched at the groove, and quickly worn out by the corrugations.



WIRE ROPE TOLERANCES

DIAMETER OF WIRE ROPE

The components of a wire rope each has a small but definite size tolerance. Therefore, the rope itself must have a diameter tolerance. All wire rope is required to have a diameter at least equal to the nominal, or catalog, size . . . never smaller. Standard ropes may exceed the nominal diameter by the amounts shown below.

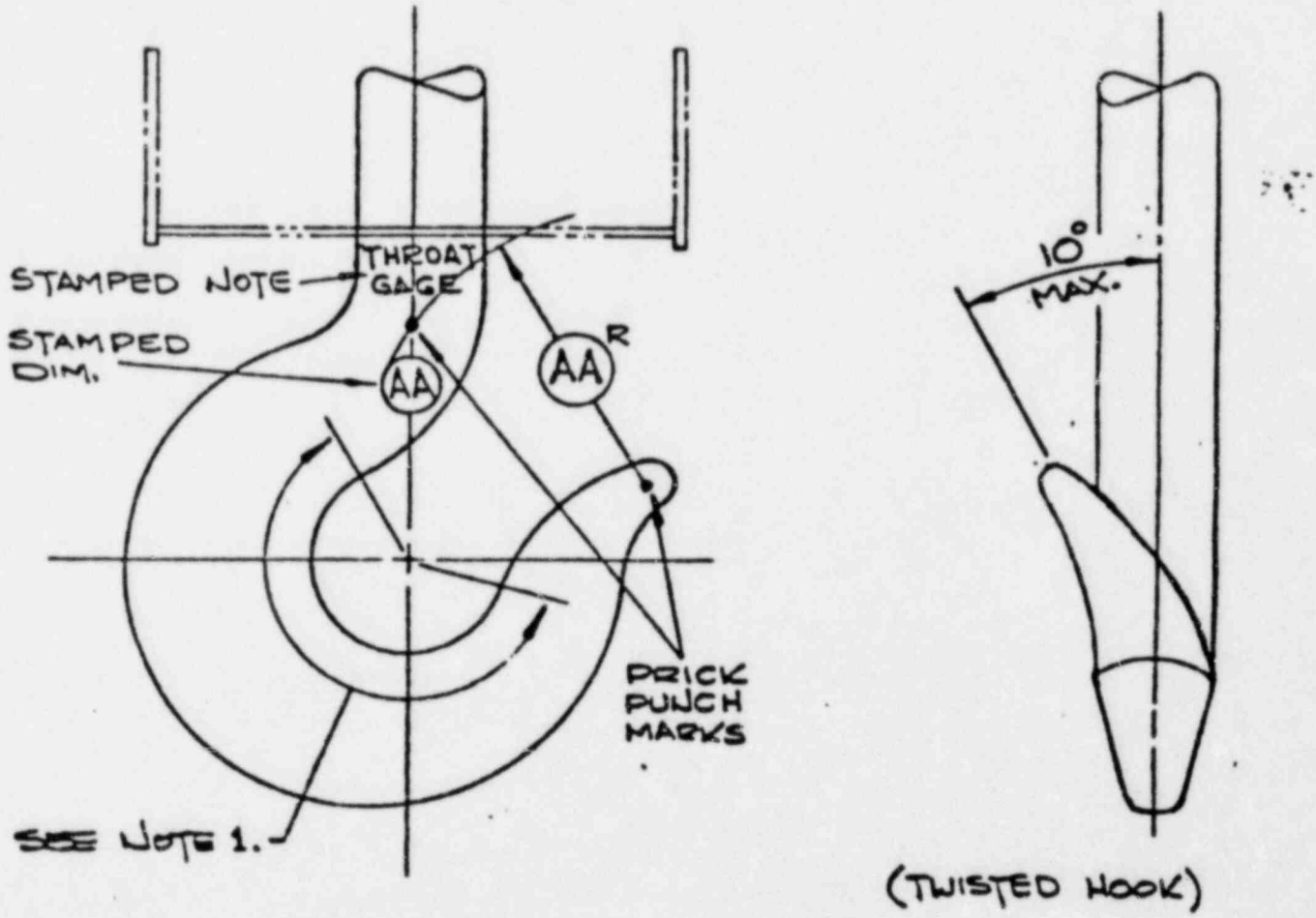
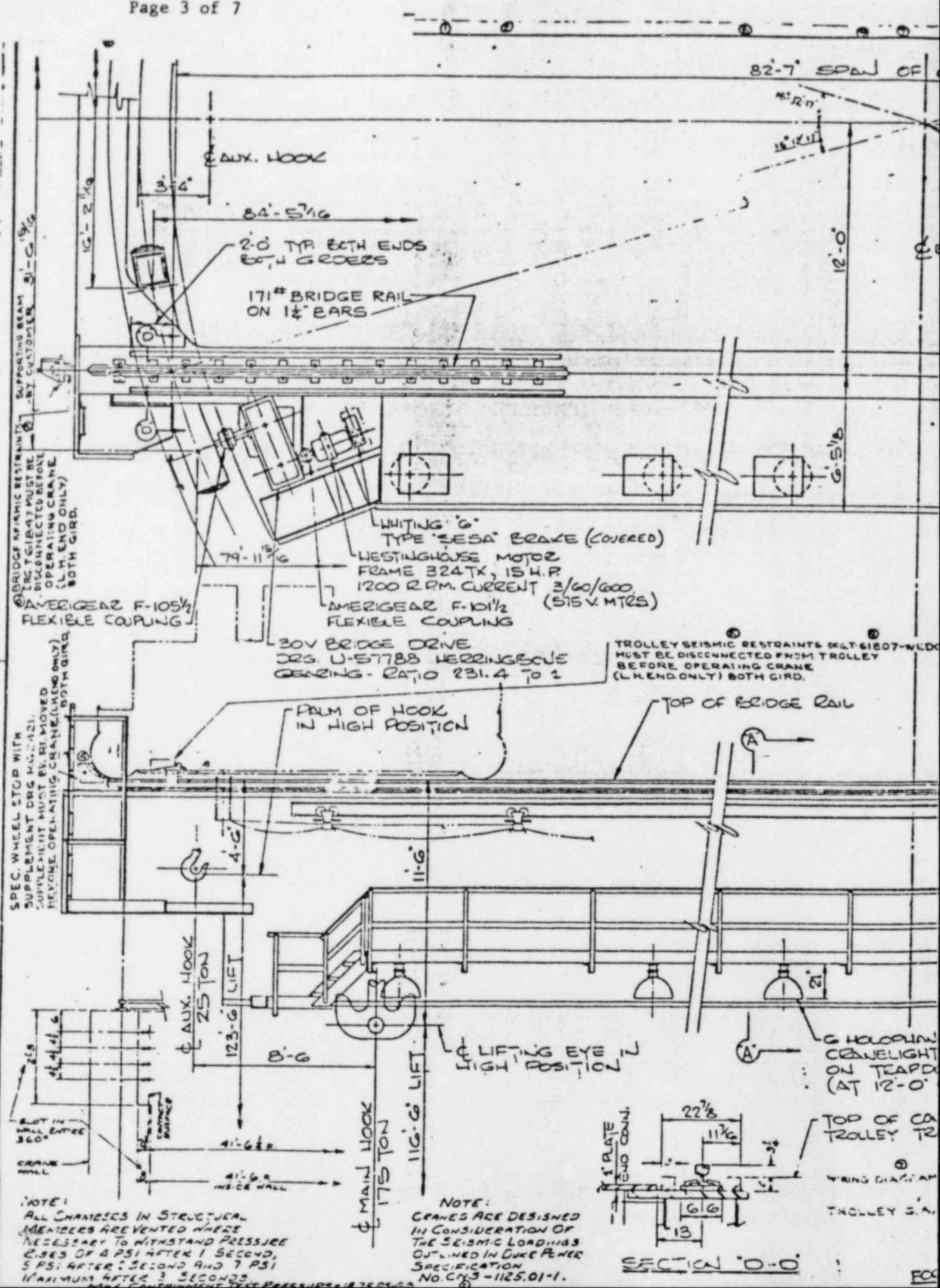


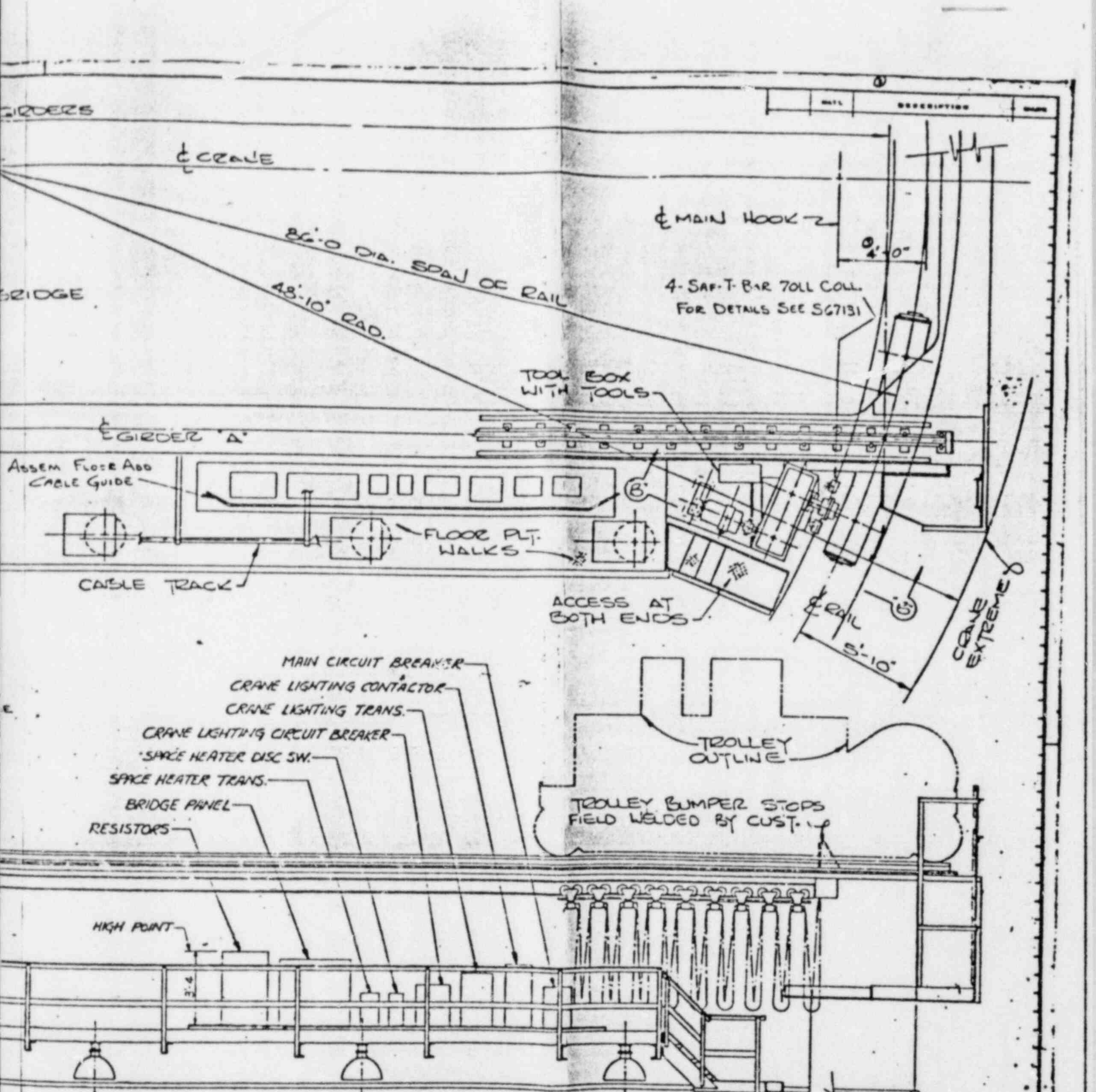
FIG. 4 INSPECTION OF CRANE HOOKS

1. NO VISIBLE TRANSVERSE CRACKS PERMITTED IN THE AREA SHOWN OR IN THE HOOK SHANK.
2. MEASURE (AA) BETWEEN PRICK PUNCH MARKS. REPLACE THE HOOK IF (AA) MEASURES MORE THAN 1.15 × ORIGINAL THROAT GAGE STAMPED ON HOOK.
3. IF HOOK IS TWISTED MORE THAN 10°, HOOK SHALL BE REPLACED.



NOTE:
ALL CHANGES IN STRUCTURAL MEMBERS ARE VENTED WHERE NECESSARY TO WITHSTAND PRESSURE RISES OF 4 PSI AFTER 1 SECOND, 5 PSI AFTER 2 SECOND AND 7 PSI MAXIMUM AFTER 3 SECONDS

NOTE:
CRANES ARE DESIGNED IN CONSIDERATION OF THE SEISMIC LOADINGS OUTLINED IN DUKE POWER SPECIFICATION NO. CNS-1125.01-1.



E # 694-1500 WATT
S MOUNTED
ORES (NO BULBS).
CTR'S.)

STRUCTION
ACK

U-77457
U-77424
U-77455
6.1457
V-7703-10

MILL POWER SUPPLY CO. ORDER NO. C39984
DUKE POWER CO. ITEM NO. 1125.01-1

CRANE DATA

INSIDE SERVICE
BRIDGE SPEED 50 F.P.M.
TROLLEY SPEED 50 F.P.M.
MAIN HOOK 4 F.P.M. & .28 FPM
AUX. HOOK 28 F.P.M. & 1.4 FPM
REQN. 65781 - CR.# 11245 - UNIT #1
REQN. 65789 - CR# 11246 - UNIT #2

SECTIONS "A-A" & "B-B" SEE T-61036

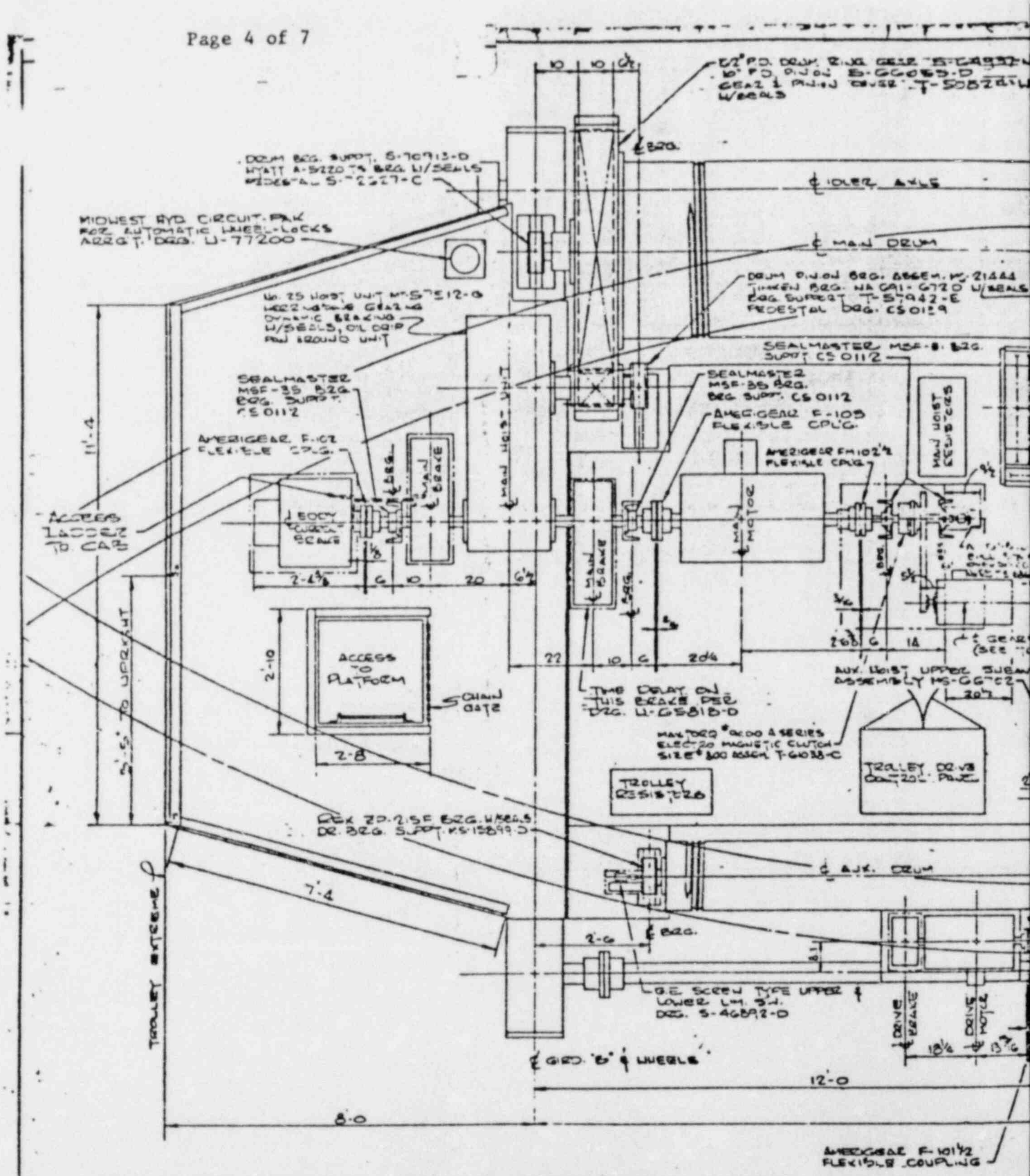
REPRO. FROM
U-65065

1	10-26-76 (1) TEST PRESSURE WAS NOT SHOWN (2) WAS "MCS" (3) WAS 4'-2"
2	2-24-77
3	2-25-77 AS
4	3-8-77

WHITING CORPORATION

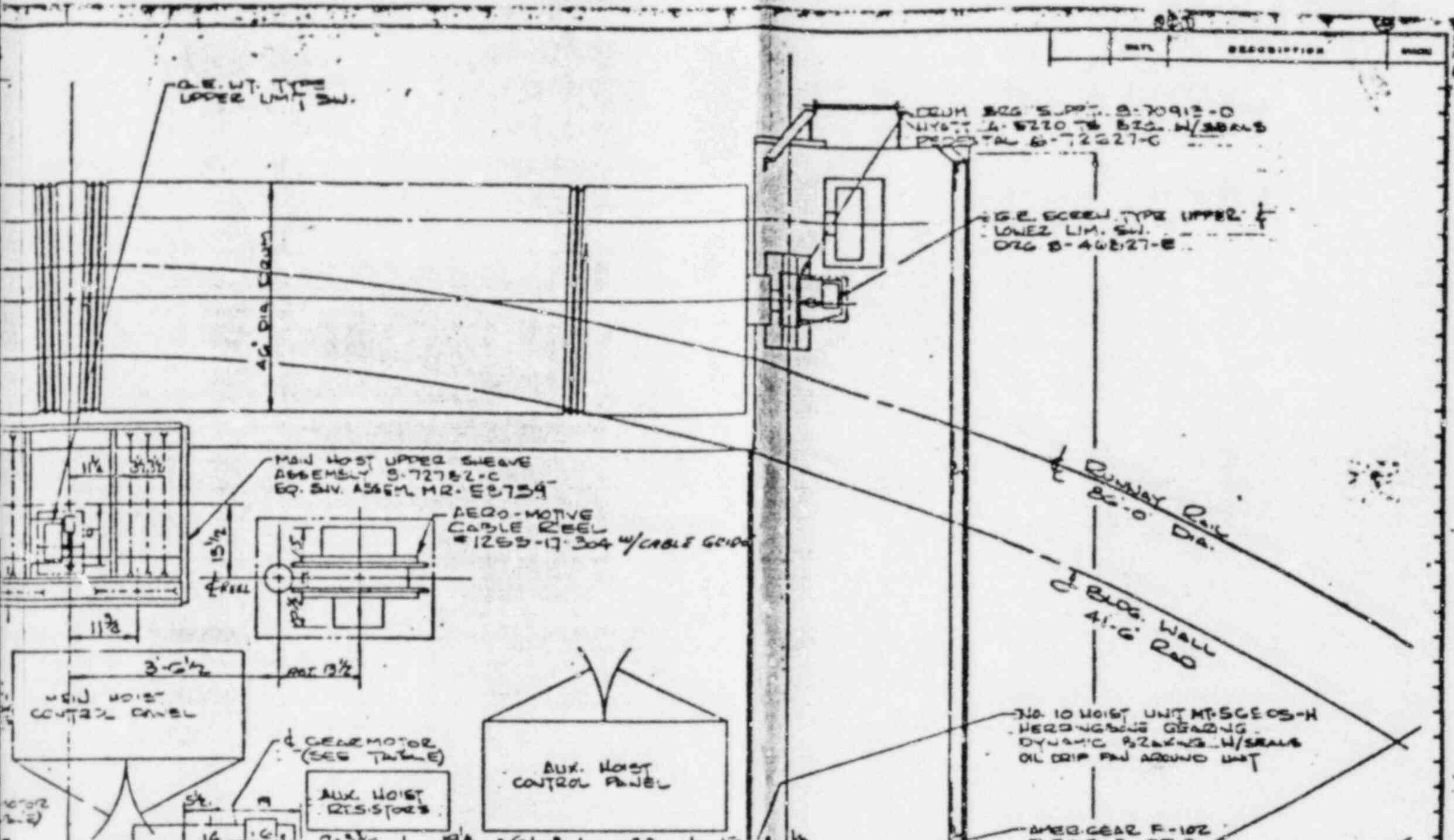
Req. 68781 & 68789
Title GEN'L ARR'GT. OF TWO MOTOR BRIDGES
Scale 3/8"
Capacity 175 TON MAIN, 25 TON AUX.
For DUKE POWER CO
CATAWBA NUCLEAR STA. UNIT 1 & 2
NEWPORT, S.C.

U-77020



CRANE NO. & SERIAL G.A.	UNIT	RATIO	SPEED F.P.M.	H.P.	RPM	FRAME	SOLENOID & HYD. BRAKES	EDDY CURRENT BRAKE	CURRENT & CONDUCTORS	GENERAL ELECTRIC HOIST LIMIT SWITCHES
#11243 • UNIT #1 REQ. 4. 68782-84	MAIN STD.	66.18:1 + 6.7:1	4	60	1200	444-TX W/BLOWER	TWO WHITING 13" "SESA" - ONE W/TIME DELAY	AB 706 W/ALT.		
#11246 • UNIT #2 REQ. 63790-92	MAIN PREC.	7.34	0.28	5	1650/179	LOUIS ALLIS GEAR MTR 7225G2150	TWO WHITING 13" "SESA" - ONE W/TIME DELAY	AB 706 W/ALT.		
	AUX. STD.	30.59:1	23	50	1200	405-TX	WHITING 13" "SESA"	AB 706 W/ALT.	3/60/600 (575 V. MOTORS) LOOPED CABLES ON GIRD. "A"	IC-0443-C... UPPER CR-118-E-C... UPPER & LO...
U-77020 T-61076	AUX. PREC.	7.89	1.4	3	1650/179	LOUIS ALLIS GEAR MTR 7218G2130	WHITING 13" "SESA"	AB 706 W/ALT.		
	TROLLEY DRIVE	175.29:1	50	10	1200	286-TX	WAGNER 6" HM	—		

WESTINGHOUSE MOTORS



STATION: CATAWBA UNITS #1 & #2
DUKE POWER CO. ITEM NO. 1125.01-1
MILL POWER SUPPLY ORDER NO. C 3998 F
FILE NO. CN-1125.01 POLAR CRANE

FOR END ELEVATION SEE U-77010
FOR CAB ELEVATION SEE U-77011

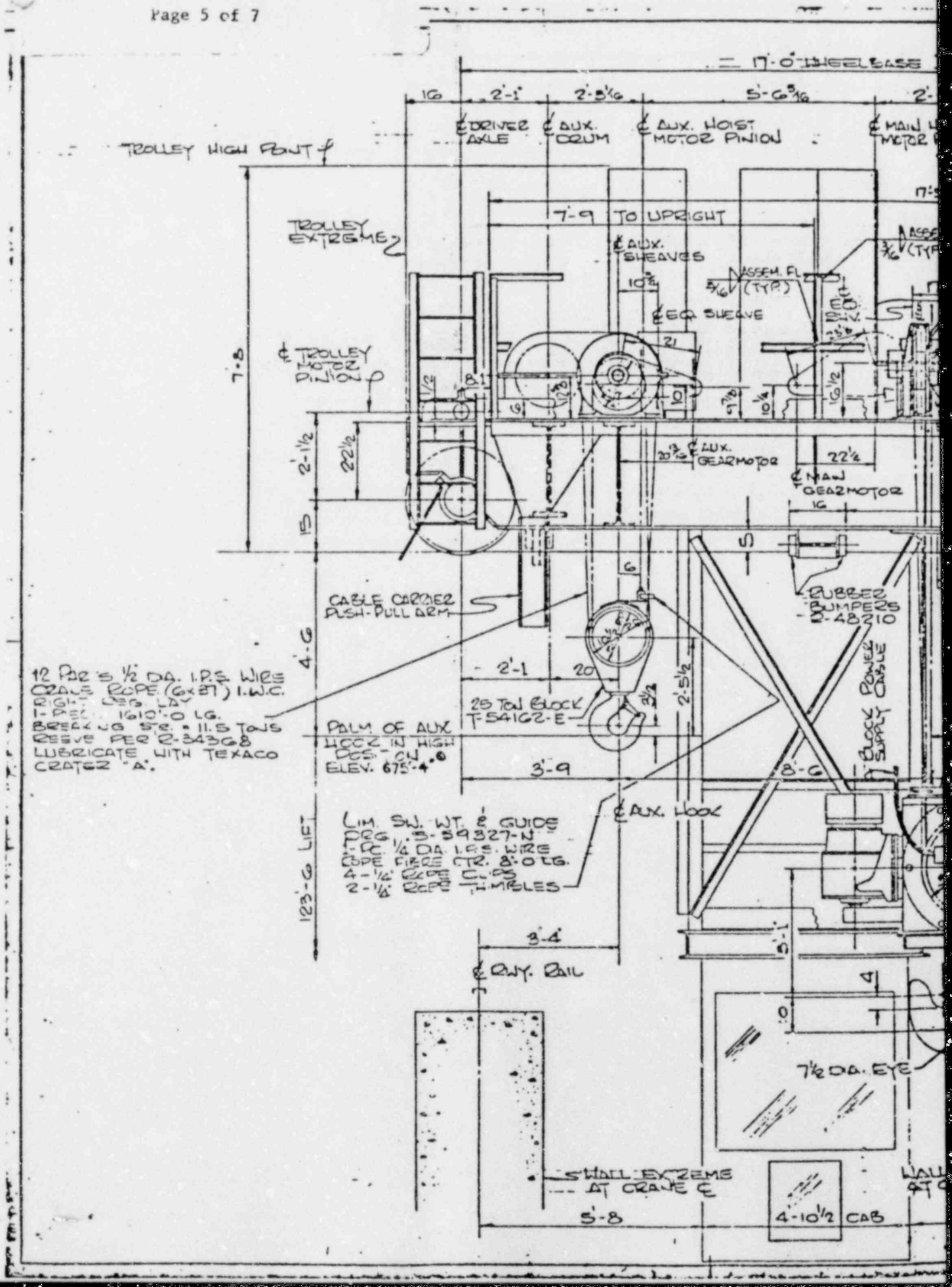
POLAR CRANE	INSIDE	ALEMITE HYD. FITTINGS ACCESSIBLE FROM DECK	134,000# TROLLEY 8000# CAB & SPACER	COVERS ON MAIN & AUX. PRECISION DRIVES - ALL BRAKES - REEL & LIMIT SWITCHES.
	SERVICE	LUBRICATION	EST. WT.	REMARKS

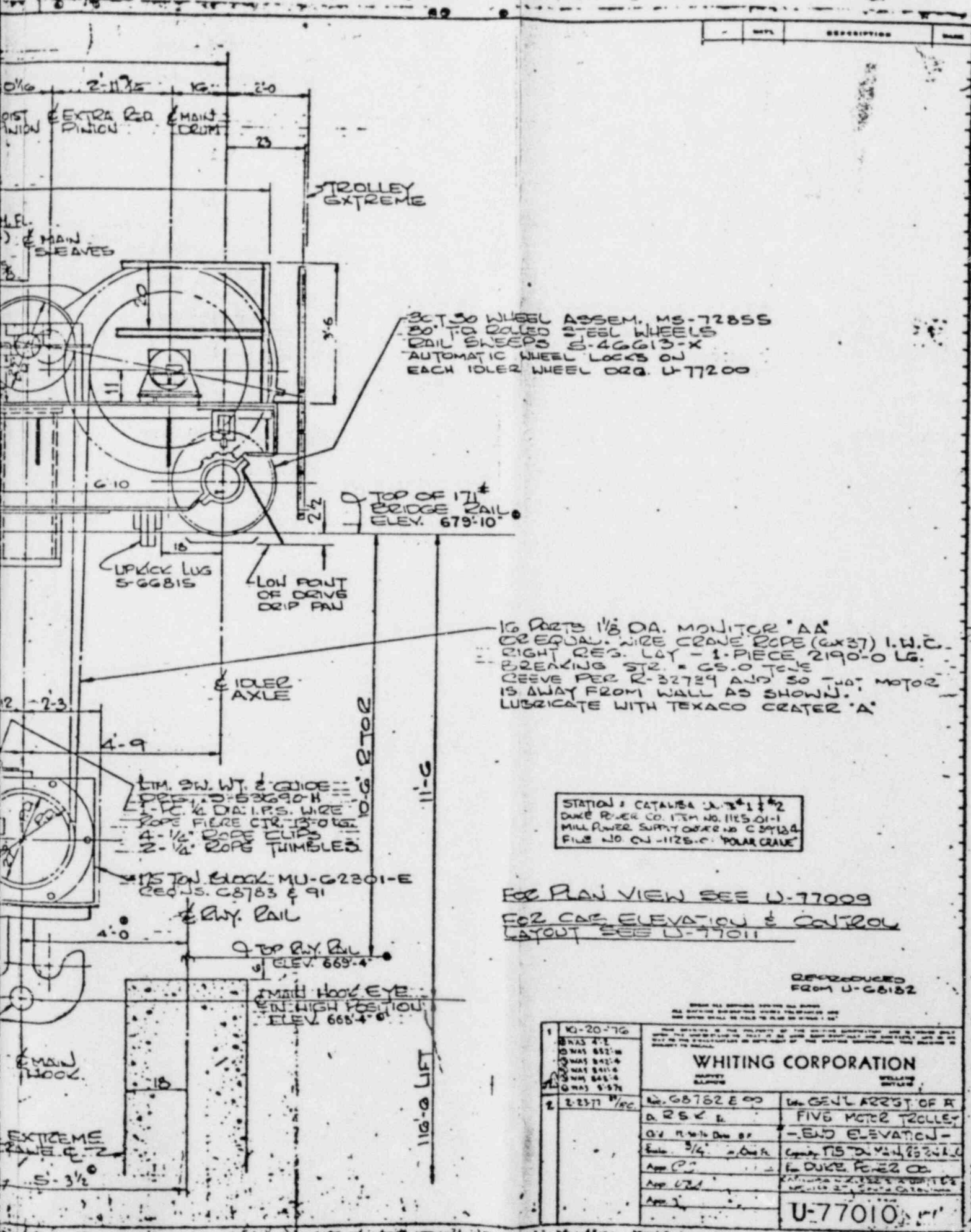
1	10-20-76	WAS NOT SHOWN
2	3-8-77	
3	4-18-77	

WHITING CORPORATION

Ord. 68782, 68790 — GEN'L ARR'G'T. OF A FIVE MOTOR TROLLEY — PLAN VIEW —
Dr. R.S.K. — Date 12-30-76
Scale 3/4" = One Ft.
Capacity 175 TON MAIN
For DUKE POWER CO.

U-77009


17'-0" WHEELBASE
TROLLEY HIGH PONT
DRIVER AXLE
AUX. DRUM
AUX. HOIST MOTOR PINION
MAIN MOTOR
TROLLEY EXTREME
7'-9 TO UPRIGHT
AUX. SHEAVES
EQ SHEAVE
TROLLEY MOTOR PINION
7'-8
AUX. GEARMOTOR
MAIN GEARMOTOR
CABLE CARRIER PUSH-PULL ARM
RUBBER BUMPERS B-48210
12 PAR 5 1/2 DIA. I.P.S. WIRE ROPE (6x37) I.W.C. RIGHT REG. LAY 1-PER 1610'-0 LG. BREAKING STR. = 11.5 TONS REEVE PER B-34368 LUBRICATE WITH TEXACO CRATER "A".
4'-6
25 TON BLOCK T-54162-E
PALM OF AUX HOOK IN HIGH POSITION ELEV. 675'-4"
BLOCK POWER SUPPLY CABLE
3'-9
8'-6
AUX. HOOK
LIM. SW. WT. & GUIDE REG. B-39327-N
PC 1/4 DIA. I.P.S. WIRE ROPE FIBRE CTR. 8'-0 LG.
4-1/2" ROPE CLIPS
2-1/4" ROPE THIMBLES
123'-6 LIFT
3'-4
CRWY. RAIL
7 1/2 DIA. EYE
5'WALL EXTREME AT CRANE C
5'-8
4-10 1/2 CAB



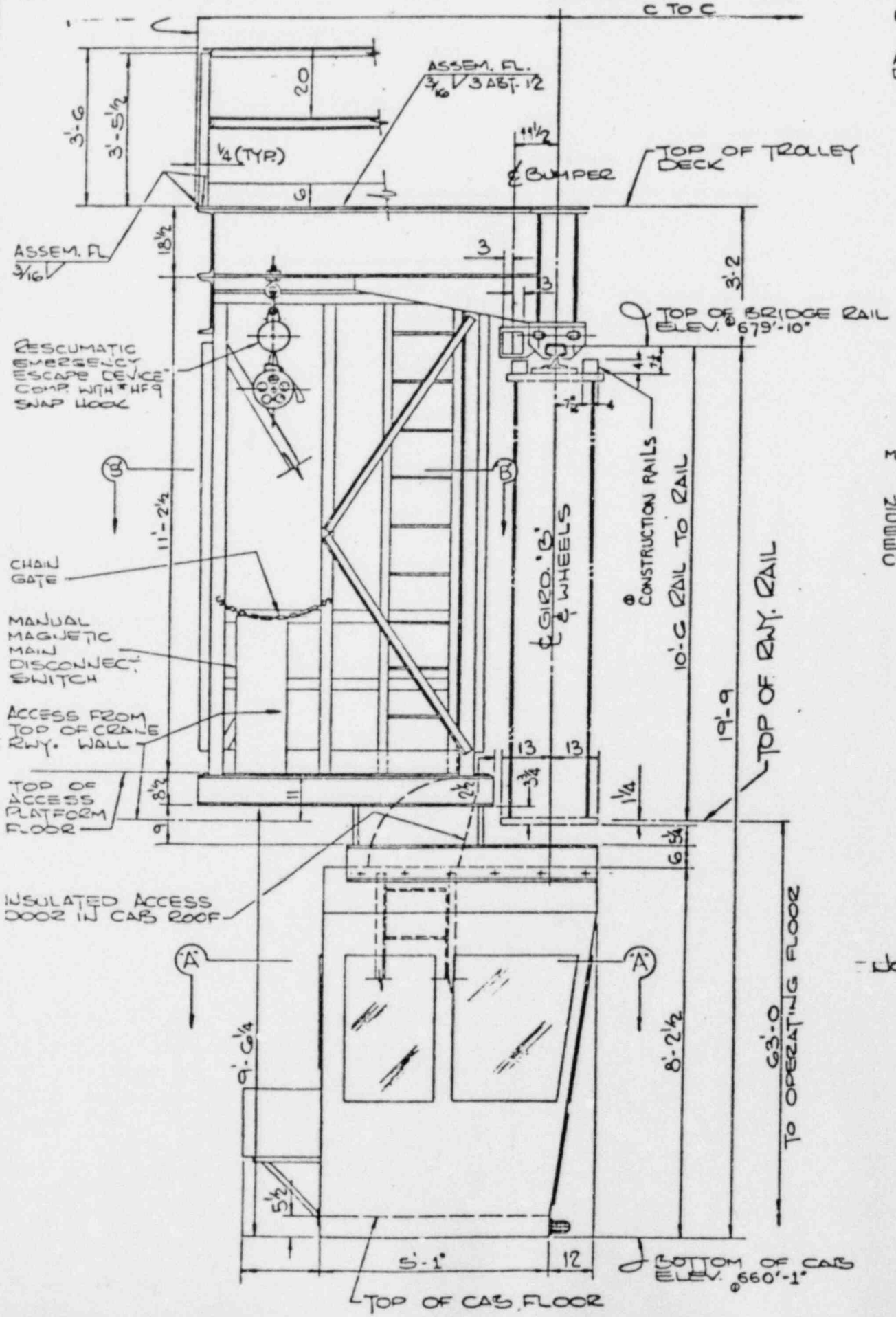
STATION : CATALINA
DUKE POWER CO. ITEM NO. 1125.01-1
MILL POWER SUPPLY ORDER NO. C 59184
FILE NO. CN-1125-C POLAR CRANE

FOR PLAN VIEW SEE U-77009

FOR CAB ELEVATION & CONTROL LAYOUT SEE U-77011

REPRODUCED FROM U-68182

1	10-20-76	WHITING CORPORATION	
2	2-23-77	Ord. 68782 E 00	Title GEN'L ARRGT OF R
		Drawn R.S.K.	FIVE MOTOR TROLLEY
		Checked	-END ELEVATION-
		Scale 3/4" = 1'-0"	Copyright THE DUKE POWER CO.
		Approved C.J.	For DUKE POWER CO.
		Approved	
		Approved	U-77010



ELECTRICAL

AREA FOR ELE
DUCTS, ETC.

AIR CONDITIONER TO MAINTAIN A TEMPERATURE OF 75°F IN CAB. MAX. REACTOR BUILD AIR TEMP. AT THIS LEVEL IS 120°F @ 100% HUMIDITY

4'-10½

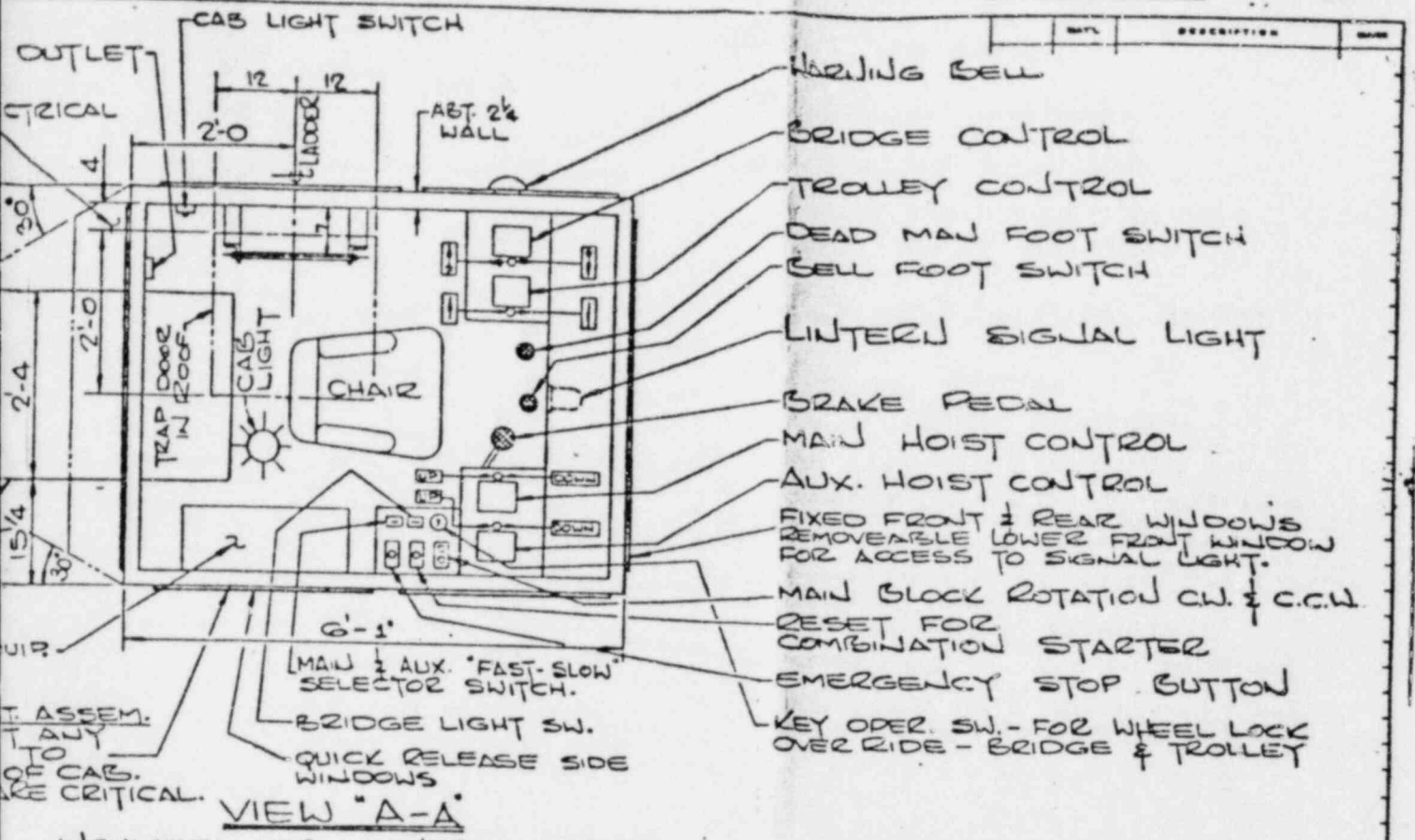
MISC. ELECT. EQ

NOTE TO ELEC
DO NOT MOUN
ELECT. EQUIP
EITHER SIDE
CLEARANCES

EJD CONN.

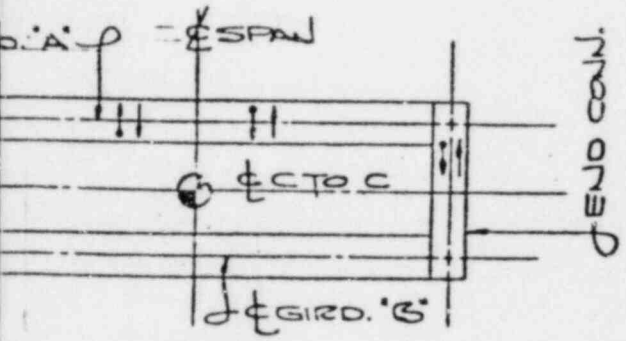
FOR

NOTE:
COLOR O
CONTRA
ARROWS



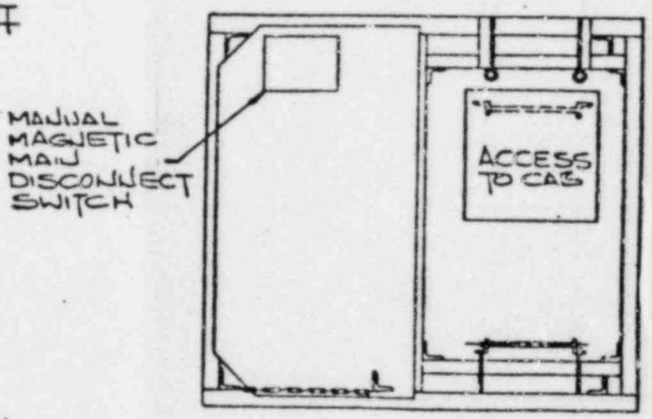
VIEW "A-A"

INSULATED CAB - CONTROL LAYOUT



COLOR CODING DIAGRAM
BRIDGE MOTION BY CUSTOMER

F ARROWS ON MASTER
WILL CORRELATE WITH
ON BRIDGE.



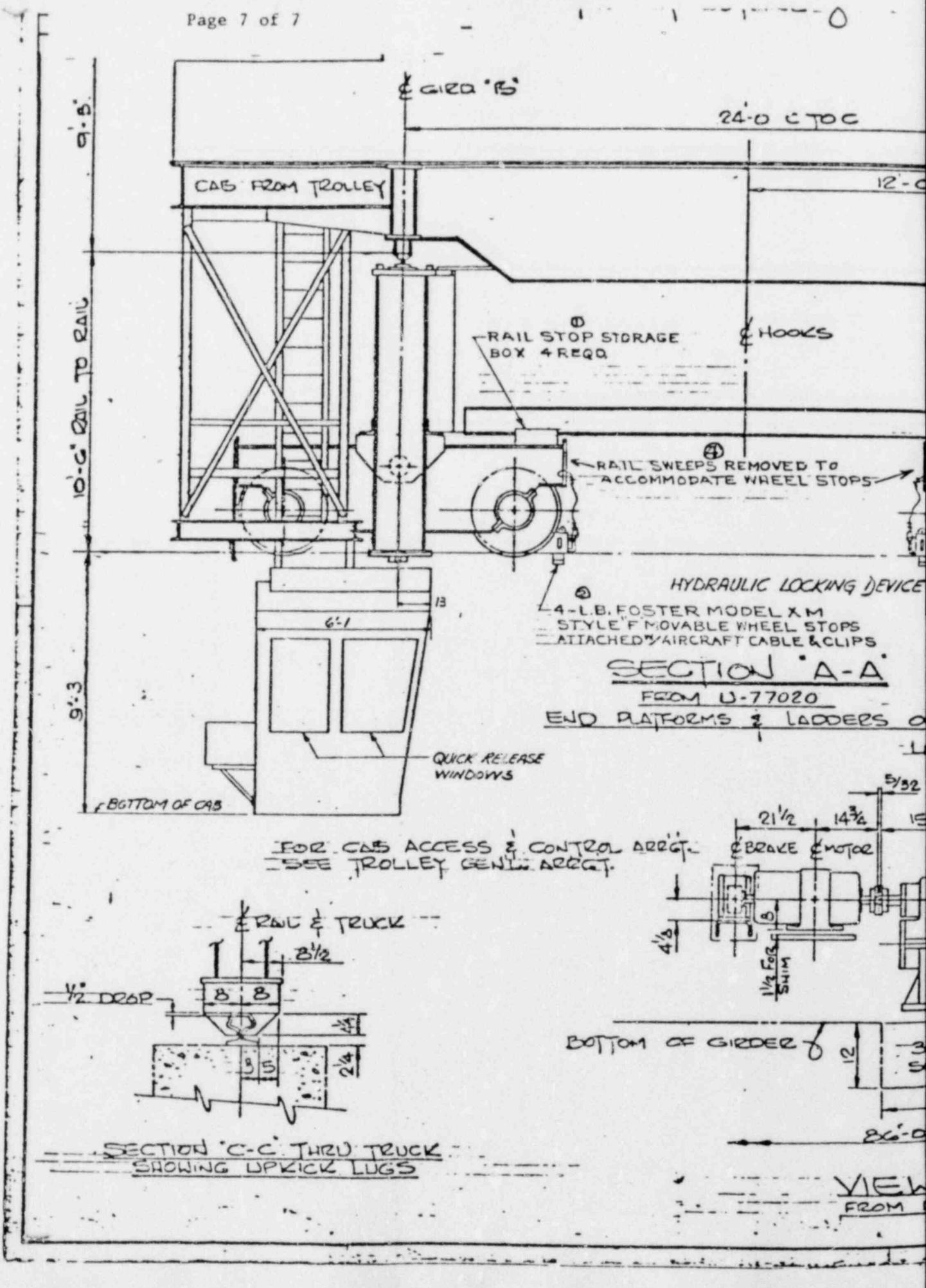
SECTION "B-B"

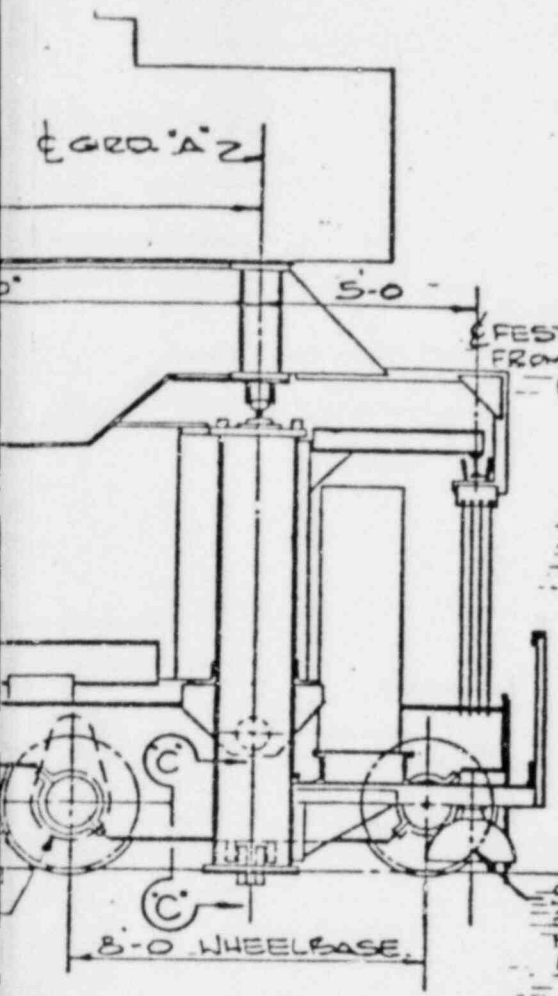
FOR PLAN VIEW SEE U-77009

FOR END ELEVATION SEE U-77010

STATION CATAWBA UNITS #1 & #2
DUKE POWER CO. ITEM NO. 1125.01-1
MILL POWER SUPPLY ORDER NO. C39984
FILE NO. CN-1125.01 'POLAR CRANE'

1	10-20-76	WHITING CORPORATION	
2	3-8-77	Proj. GB782 & 90	Title GEN'L ARRGT. OF A FIVE MOTOR TROLLEY — CAB ELEVATION —
		D.R.S.K.	
		Ckd BF Date 11-30-76	
		Scale 3/4" & 1" = One Ft.	Capacity 175 TON MAIN, 25 TON AUX
		App PC	For DUKE POWER CO. CATAWBA NUCLEAR STA. UNITS #1 & #2
		App VBC	
		App	U-77011


℄ GIRD "B"
24'-0 C TO C
9'-8"
CAB FROM TROLLEY
10'-6" RAIL TO RAIL
RAIL STOP STORAGE BOX 4 REQD
℄ HOOKS
RAIL SWEEPS REMOVED TO ACCOMMODATE WHEEL STOPS
HYDRAULIC LOCKING DEVICE
4-L.B. FOSTER MODEL XM STYLE 'F' MOVABLE WHEEL STOPS ATTACHED W/ AIRCRAFT CABLE & CLIPS
6'-1
9'-3
QUICK RELEASE WINDOWS
℄ BOTTOM OF CAB
SECTION "A-A"
FROM U-77020
END PLATFORMS & LADDERS
FOR CAB ACCESS & CONTROL ARR'GT. SEE TROLLEY GEN'L ARR'GT.
℄ RAIL & TRUCK
8 1/2
1/2" DEEP
8 8
9 15
2 1/4
SECTION "C-C" THRU TRUCK SHOWING UPKICK LUGS
21 1/2
14 3/4
℄ BRAKE
℄ MOTOR
4 1/8
1 1/2 FOR SHIM
BOTTOM OF GIRDER
12
5/32
VIEW
FROM



REF. DRG. LIST

TROLLEY W/CAB	U-77009, 10 & 11
GIRDERS	U-77035 & 37
TRUCK	U-77440
END CONN.	T-54198
DRIVE SUPPT.	U-68064
END PLTFM.	U-68191

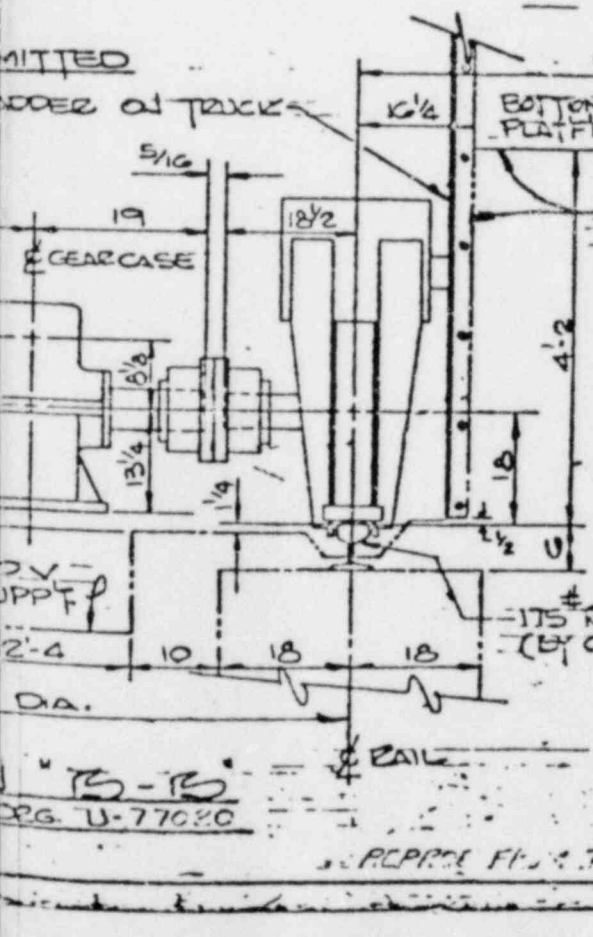
BRIDGE WEIGHTS

GIRD "A" W/WALK, RAILING, DRVG ETC. —	105,900#
GIRD "B"	29,200#
TRUCKS — 4 @ 8,500#	34,000#
END CONN. 2 @ 5,000#	10,000#
MISC. PLATFM., LADDERS ETC.	12,000#
TOTAL	251,100#

36" R.S. WHLS. S.R. TRD. EQUALIZING BOGIE TRUCKS
36 J 36 BRG. ASSEM. S-59440 & S-72809
MAX. CONSTRUCTION WHEEL LOAD = 225,000#
BASED ON A) 9½ TON & (1) 5½ TON LOADS 11'-0 FROM ℄ RAIL
THIS INCLUDES LIFTED LOAD AND DEAD WGT. OF CONSTRUCTION TROLLEY.
MAX. NORMAL WHL. LOAD W/ 175 TON ON HK. = 152,000#

WIRING DIAGRAMS ⓓ U-77457, U-77484, U-77485, Z-61407

TROLLEY G.A. U-77009-10



MILL POWER SUPPLY CO.
ORDER NO. C39984
DUKE POWER CO.
ITEM NO. 1125.01-1

68781
68789

BREAK ALL CORNERS. REMOVE ALL BURRS
ALL MACHINE FINISH ONE WHERE TOLERANCES ARE NOT GIVEN SHALL BE HELD TO PLUS OR MINUS 1/64"

1	1-18-77	
		WAS NOT SHOWN
2	2-22-77	

WHITING CORPORATION
HARVEY, ILLINOIS — WELLAND, ONTARIO

TITLE GEN'L. ARR'GT. OF TWO MOTOR BRIDGES
END ELEVATION

DATE 1-18-77 SCALE 3/4" = 1'-0"
APPROVED [illegible]
DR. R.S.K.
TR.
CH. [illegible]

T-61026

Enclosure 7.3

PM/IG-019
July 22, 1980

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
INSPECTION COVER SHEET

Inspected By:

Mech. Maint. Technician _____ Date _____

I&E Maint. Technician _____ Date _____

Lubricated By _____ Date _____

NDE performed _____ (Attach Report) Date _____

QA reviewed _____

Reviewed (Maint. Supr.) _____ Date _____

Crane Ready for Service _____ Date _____
(PM Coordinator)

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
CONTAINMENT POLAR CRANE
MECHANICAL

Equipment No. _____ SWR No. _____
Date _____

Equipment Description: "Whiting" Containment Polar Crane

3.0 Test Equipment

Type	CN No.	Cal. Due

4.0 Safety Considerations: _____/_____
Initials Date

5.0 Station/Equipment Status: _____/_____
Initials Date

Step	Item	Sat.	Unsat.
Annual			
6.1.1	Crane operator perform operational checks	_____	_____
6.1.2	Lower Hook(s) for inspection	_____	_____
6.1.3	Operations Tag out Crane	_____	_____
6.1.4	Inspect Main Bridge	_____	_____
6.1.5	Inspect Trolley	_____	_____
6.1.6	Inspect Main Hoist	_____	_____
6.1.7	Inspect Auxiliary Hoist	_____	_____
6.1.8	Inspect Gear motors on Main & Aux. Hoists	_____	_____
6.1.9	Inspect "Maxitorque" clutches on Main and Auxiliary Hoists	_____	_____
6.1.10	Inspect Hoist Drums; Main & Auxiliary	_____	_____
6.1.11	Inspect Hook Swivel Assembly	_____	_____
6.1.12	Inspect Sheaves:		
	1. Main Hoist Upper _____ Lower _____ Equalizing _____		
	2. Aux. Hoist Upper _____ Lower _____ Equalizing _____		

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
CONTAINMENT POLAR CRANE
MECHANICAL

Step	Item (Mechanical)	Sat.	Unsat.
6.1.13	Inspect Wire Rope		
	1. Main Hoist Rope Diameter _____ (must be greater than 1.06 inches)		
	2. Aux. Hoist Rope Diameter _____ (must be greater than 0.453 inches)		
	3. Randomly distributed broken wires	_____	_____
	4. Excessive wear of individual wires	_____	_____
	5. Structural damage of wire rope	_____	_____
	6. End connections	_____	_____
6.1.14	Inspect Hooks:		
	Main Hoist		
	1. Damage from chemicals	_____	_____
	2. Throat opening <15% above original	_____	_____
	3. Less than 10 degree twist	_____	_____
	4. Request QA perform NDE	_____ (Maintenance Technician Signature)	
	Auxiliary Hoist		
	1. Damage from chemicals	_____	_____
	2. Throat opening <15% above original	_____	_____
	3. Less than 10 degree twist	_____	_____
	4. Request QA perform NDE	_____ (Maintenance Technician Signature)	

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
CONTAINMENT POLAR CRANE
MECHANICAL

Step	Item (Mechanical)	Sat.	Unsat.
6.1.15	Check with I&E Technician that Electrical PM Inspection is completed	_____ (I&E Technician Signature)	
6.1.16	Clean up area	_____	_____
6.1.17	Remove signs and ropes	_____	_____
6.1.18	Operations Remove Red Tags	_____	_____
6.1.19	Insure all QA Documents, Enclosures, and Electrical Checklists are completed, signed and attached.	_____	_____

Two Years or After One Year

6.3.1	Perform yearly or after 6 months inspection Steps 6.1.1 through 6.1.15	_____	_____
6.3.2	Inspect walks and handrails	_____	_____
6.3.3	Inspect general condition of crane	_____	_____
6.3.4	Lubricate bridge and trolley wheels	_____	_____
6.3.5	Lubricate/inspect main bridge gear case	_____	_____
6.3.6	Lubricate/inspect aux. hoist gear case	_____	_____
6.3.7	Lubricate/inspect main hoist gear case	_____	_____
6.3.8	Lubricate flexible couplings main bridge drive motors	_____	_____
6.3.9	Lubricate flexible couplings trolley drive motor	_____	_____
6.3.10	Lubricate flexible couplings main hoist motor	_____	_____
6.3.11	Lubricate flexible couplings aux. hoist motor	_____	_____
6.3.12	Lubricate/inspect main hoist gearmotor	_____	_____

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
CONTAINMENT POLAR CRANE
MECHANICAL

Step	Item (Mechanical)	Sat.	Unsat.
6.3.13	Lubricate/inspect aux. hoist gearmotor	_____	_____
6.3.14	Lubricate/inspect swivel assembly gear motor	_____	_____
6.3.15	Lubricate main hoist sheaves:		
	1. Hook swivel block and sheaves	_____	_____
	2. Equalizer sheaves	_____	_____
	3. Upper sheave nest	_____	_____
6.3.16	Lubricate auxiliary hoist sheaves:		
	1. Lower block and sheaves	_____	_____
	2. Equalizer sheaves	_____	_____
	3. Upper sheave nest	_____	_____
6.3.17	Inspect/check control cab air conditioner	_____	_____
6.3.18	Inspect/check "Rescuematic" Unit	_____	_____
6.3.19	Clean up area	_____	_____
6.3.20	Dispose of used oil/greases/coolants	_____	_____
6.3.21	Check with I&E Technician that Electrical PM Inspection is completed	_____ (I&E Technician Signature)	
6.3.22	Remove ropes and signs	_____	_____
6.3.23	Operations remove red tags	_____	_____
6.3.24	Insure Enclosure 7.3, 7.4, 7.5, QA Inspection documents and other Enclosures are completed, signed and attached.	_____	_____

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
CONTAINMENT POLAR CRANE
MECHANICAL

Comments, Action Taken: _____

_____

_____

_____

Performed by _____ Date _____
(Maintenance Technician)

Reviewed by _____ Date _____
(PM Coordinator)

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
CONTAINMENT POLAR CRANE
ELECTRICAL

Equipment No. _____ SWR No. _____
Date _____

Equipment Description "Whiting" Containment Polar Crane

3.0 Test Equipment

Type	CN I&E No.	Cal. Due

4.0 Safety Considerations: _____/_____
Initials Date

5.0 Station/Equipment Status: _____/_____
Initials Date

Step	Item (I&E)	Sat.	Unsat.
Yearly or After 6 Months			
6.2.1	Operations Tag Out Crane	_____	_____
6.2.2	Inspect Bridge Drive Motors	_____	_____
	Perform Insulation Resistance Test:		
	Bridge Motor #1: Phase X _____ Phase Y _____ Phase Z _____		
	Bridge Motor #2: Phase X _____ Phase Y _____ Phase Z _____		
6.2.3	Inspect Trolley Drive motor	_____	_____
	Perform Insulation Resistance Test:		
	Phase X _____ Phase Y _____ Phase Z _____		
6.2.4	Inspect Auxiliary Hoist Motor	_____	_____
	Perform Insulation Resistance Test:		
	Phase X _____ Phase Y _____ Phase Z _____		
6.2.5	Inspect Auxiliary Hoist Slow Speed Motor	_____	_____
	Perform Insulation Resistance Test:		
	Phase X _____ Phase Y _____ Phase Z _____		
6.2.6	Inspect Main Hoist Motor	_____	_____
	Perform Insulation Resistance Test:		
	Phase X _____ Phase Y _____ Phase Z _____		

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
CONTAINMENT POLAR CRANE
ELECTRICAL

Step	Item (I&E)	Sat.	Unsat.
6.2.7	Inspect Main Hoist low Speed Motor	_____	_____
	Perform Insulation Resistance Test:		
	Phase X _____ Phase Y _____ Phase Z _____		
6.2.8	Inspect Hook Swivel Motor		
	Perform Insulation Resistance Test:		
	Phase X _____ Phase Y _____ Phase Z _____		
6.2.9	Inspect Trolley Wheel Lock Motor	_____	_____
6.2.10	Inspect Bridge Wheel Lock Motor	_____	_____
6.2.11	Inspect and Clean Eddy Current Brakes:		
	1. Main Hoist	_____	_____
	2. Auxiliary Hoist	_____	_____
6.2.12	Inspect/clean "SESA" Electric Bridge Brakes	_____	_____
6.2.13	Inspect/clean "SESA" Electric Hoist Brakes		
	1. Main Hoist	_____	_____
	2. Auxiliary Hoist	_____	_____
6.2.14	Inspect/clean Resistor Banks:	_____	_____
6.2.15	Inspect/clean controllers, motor starters, etc.	_____	_____
6.2.16	Inspect Bridge and Trolley Conductor Systems	_____	_____
6.2.17	Check with Maintenance Technician that Mechanical PM Inspection is completed	_____ (Maintenance Technician Signature)	
6.2.18	Request Temporary Lift of Red Tags	_____	_____
6.2.19	Check Operation of "SESA" Electric Brakes:		
	1. Bridge Brakes	_____	_____
	2. Trolley Brakes	_____	_____
	3. Main Hoist	_____	_____
	4. Auxiliary Hoist	_____	_____
6.2.20	Check/replace Burned Out 1500 Watt Bulbs	_____	_____

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
CONTAINMENT POLAR CRANE
ELECTRICAL

Step	Item (I&E)	Sat.	Unsat.
6.2.21	Notify Maintenance Technician Tests Completed		
6.2.22	Request Permanent Lift of Red Tags		
6.2.23	Clean Up Area		
6.2.24	Remove Signs and Barricades		
6.2.25	Insure all Enclosures are Completed, Signed, and Attached to PM Work Request		

Comments, Action Taken: _____

Performed by _____ Date _____
(I&E Technician)

Reviewed by _____ Date _____
(PM Coordinator)