#### APPENDIX B SUPPLEMENT TO GENERIC LICENSING TOPICAL REPORT EDR-1

#### SUMMARY OF PLANT SPECIFIC CRANE DATA SUPPLIED BY EDERER, INCORPORATED .

PALISADES NUCLEAR POWER PLANT

SPENT FUEL POOL CRANE

PURCHASE ORDER # G0337468

EDERER S.O. NO. F2681

**REVISION B** 

PREPARED ER INCORPORATED CHIEF ENGINEER

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**REVISION B** 09/05/01

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### EDR-1 APPENDIX B SUPPLEMENT SUMMARY OF PLANT SPECIFIC CRANE DATA SUPPLIED BY EDERER, INCORPORATED

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## PALISADES NUCLEAR POWER PLANT

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### PALISADES NUCLEAR POWER PLANT

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REG.GUIDE 1.104 POSITION	REPORT		INFORMATION TO BE PROVIDED		SPECIFIC CRANE DATA
C.i.a	III.C (C.1.a)	1.	THE ACTUAL CRANE DUTY CLASSIFICATION OF THE CRANE SPECIFIED BY THE APPLICANT	1.	THE CRANE HAS A CLASS "A" CRANE DUTY CLASSIFICATION IN ACCORDANCE WITH CMAA SPECIFICATION #70.
С.1.ь	III.C (C.1.b)	<b>1.</b>	THE MINIMUM OPERATING TEMPERATURE OF THE CRANE SPECIFIED BY THE APPLICANT.	1.	THE TROLLEY WAS DESIGNED AND FABRICATED FOR A MINIMUM OPERATING TEMPERATURE OF 50°F.
С.2.Ь	III.C (C.2.b) III.E.4	<b>1.</b>	THE MAXIMUM EXTENT OF LOAD MOTION AND THE PEAK KINETIC ENERGY OF THE LOAD FOLLOWING A DRIVE TRAIN FAILURE.	<b>i.</b>	THE MAIN HOIST WAS DESIGNED SUCH THAT THE MAXIMUM VERTICAL LOAD MOTION FOLLOWING A DRIVE TRAIN FAILURE IS LESS THAN 1.5 FOOT AND THE MAXIMUM KINETIC ENERGY OF THE LOAD IS LESS THAN THAT RESULTING FROM ONE INCH OF FREE FALL OF THE MAXIMUM CRITICAL LOAD. STRUCTURES WITHIN THE HEAVY LOAD PATH WERE QUALIFIEL FOR THIS ENERGY. THIS IS DOCUMENTED IN EA-FC-973-09.
		2.	PROVISIONS FOR ACTUATING THE EMERGENCY DRUM BRAKE PRIOR TO TRAVERSING WITH THE LOAD, WHEN REQUIRED TO ACCOMMODATE THE LOAD MOTION FOLLOWING A DRIVE TRAIN FAILURE.	2.	PROVISIONS FOR AUTOMATICALLY ACTUATING THE EMERGENCY DRUM BRAKE PRIOR TO TRAVERSING WITH THE LOAD ARE NOT REQUIRED SINCE THE MAXIMUM AMOUNT OF LOAD MOTION AND KINETIC ENERGY HAS BEEN FACTORED INTO THE FACILITY DESIGN AS DOCUMENTED IN EA-FC-973-09

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•	REG.GUIDE 1.104 POSITION	TOPICAL REPORT SECTION		INFORMATION TO BE PROVIDED		SPECIFIC CRANE DATA
• •	<b>C.3.</b> ¢	III.C(C.3.c)	1.	THE MAXIMUM CABLE LOADING FOLLOWING A WIRE ROPE FAILURE IN TERMS OF THE ACCEPTANCE CRITERIA ESTABLISHED IN SECTION III.C (C.3.0)	1.	THE MAXIMUM CABLE LOADING FOLLOWING A WIRE ROPE FAILURE IN THE MAIN HOIST MEETS THE MAXIMUM ALLOWED BY THE ACCEPTANCE CRITERIA ESTABLISHED IN SECTION III.C (C.3.e).REFERENCE EDERER DESIGN CALC.EA-FC-976-04 AND DOCUMENTS IN PALISADES MODIFICATION . PACKAGE FC-976.
	C.3.f		1.	MAXIMUM FLEET ANGLE	1.	3.5 DEGREES, MAIN HOIST
• •	· ·		2.	NUMBER OF REVERSE BENDS	2.	NONE, OTHER THAN THE ONE BETWEEN THE WIRE ROPE DRUM AND THE FIRST SHEAVE IN THE LOAD BLOCK.
<b>6</b> a	• • • • •		3.	SHEAVE DIAMETER	. 3.	16 X WIRE ROPE DIAMETER. PER CMAA-70 4.5.2
C	2.3.h	Ш.С (С.3.Ь) Ш.Е. 11	<b>1.</b>	THE MAXIMUM EXTENT OF MOTION AND PEAK KINETIC ENERGY OF THE LOAD FOLLOWING A SINGLE WIRE ROPE FAILURE.	1.	THE MAIN HOIST WAS DESIGNED SUCH THAT THE MAXIMUM LOAD MOTION FOLLOWING A SINGLE WIRE ROPE FAILURE IS LESS THAN 1.5 FOOT AND THE MAXIMUM KINETIC ENERGY OF THE LOAD IS LESS THAN THAT RESULTING FROM ONE INCH OF FREE FALL OF THE MAXIMUM CRITICAL LOAD.STRUCTURES WITHIN THE HEAVY LOAD PATH WERE QUALIFIED FOR THIS ENERGY. THIS IS DOCUMENTED IN

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•					EA-FC-973-09.
REG.GUIDE 1.104 POSITION	TOPICAL REPORT SECTION	INF	ORMATION TO BE PROVIDED		SPECIFIC CRANE DATA
<b>.</b>	III.C (C.3.i)	1.	THE TYPE OF LOAD CONTROL SYSTEM SPECIFIED BY THE APPLICANT.	1.	ELECTROMOTIVE AC FLUX VECTOR MAIN HOIST MODEL 4041-FVG+ & AUX HOIST MODEL 4034-FVG+
•		2.	WHETHER INTERLOCKS ARE RECOMMENDED BY REGULATORY GUIDE 1.13 TO PREVENT TROLLEY AND BRIDGE MOVEMENTS WHILE FUEL ELEMENTS ARE BEING LIFTED AND WHETHER THEY ARE PROVIDED FOR THIS APPLICATION.	2.	MOVEMENT OF HEAVY LOADS IN THE SPENT FUEL POOL AREA IS CONTROLLED BY PALISADES PROCEDURE FHS-M-23. THIS PROCEDURE INCLUDES CONTROL OF MOVEMENT USING BYPASS KEYS #20 AND #21 LOCATED ON THE CONTROL BOX THAT PROHIBIT MOVEMENT IN FUEL POOL AREAS.

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REG.GUIDE 1.104 POSITION

C.3.j

TOPICAL REPORT SECTION

III.C (C.3.j)

**INFORMATION TO BE PROVIDED** 

SPECIFIC CRANE DATA

1. THE MAXIMUM CABLE AND 1. MACHINERY LOADING THAT WOULD RESULT IN THE EVENT OF A HIGH SPEED TWO BLOCKING, ASSUMING A CONTROL SYSTEM MALFUNCTION THAT WOULD ALLOW THE FULL BREAKDOWN TORQUE OF THE MOTOR TO BE APPLIED TO THE DRIVE MOTOR SHAFT.

2. MEANS OF PREVENTING TWO BLOCKING OF AUXILIARY HOIST, IF PROVIDED.

THE ENERGY ABSORBING TORQUE LIMITER (EATL) WAS DESIGNED SUCH THAT THE MAXIMUM MACHINERY LOAD, WHICH WOULD **RESULT IN THE EVENT A TWO BLOCKING OCCURS WHILE LIFTING** THE RATED LOAD AT THE RATED SPEED AND THAT ALLOWS THE FULL BREAKDOWN TORQUE OF THE MOTOR TO BE APPLIED TO THE DRIVE SHAFT, WILL NOT **EXCEED 3 TIMES THE DESIGN** RATED LOADING. IN ADDITION. THE EATL DESIGN DOES NOT ALLOW THE MAXIMUM CABLE LOADING TO EXCEED THE ACCEPTANCE CRITERIA ESTABLISHED IN SECTION III.C (C.3.e) DURING THE ABOVE DESCRIBED TWO-BLOCKINGS, AS DOCUMENTED IN EA-FC-973-27.

2. THE 15 TON AUXILIARY HOIST IS NOT SINGLE FAILURE PROOF DESIGN. IT IS PROVIDED WITH AN ARM ACTUATED UPPER LIMIT SWITCH. LOADS HANDLED BY THE 15 TON HOIST WILL BE CONTROLLED IN ACCORDANCE WITH PALISADES HEAVY LOAD PROCEDURE FHS-M-023. RESION B 09/05/01 Page 5 OF 9

#### EDR-1 APPENDIX B SUPPLEMENT SUMMARY OF FACILITY SPECIFIC CRANE DATA SUPPLIED BY EDERER FOR PALISADES NUCLEAR POWER PLANT

1.

REG.GUIDE 1.104 POSITION

C.3.k

C.3.0

C.3.p -

SECTION

III.C(C.3.k)

TOPICAL

REPORT

INFORMATION TO BE PROVIDED

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TYPE OF DRUM SAFETY SUPPORT PROVIDED.

I.

SUPPORT PROVIDED.

- 1. TYPE OF HOIST DRIVE TO PROVIDE INCREMENTAL MOTION.
- 1. MAXIMUM TROLLEY SPEED
- 2. MAXIMUM BRIDGE SPEED
- 3. TYPE OF OVERSPEED PROTECTION FOR THE TROLLEY AND BRIDGE DRIVES.

THE ALTERNATE DESIGN DRUM SAFETY RESTRAINT SHOWN IN FIGURE III.D.4 OF EDR-J IS ARRANGED TO COUNTER GEAR AND BRAKE FORCES AS WELL AS DOWNWARD LOADS. THESE BRACKETS ACT ON THE DIAMETER OF THE ENDS OF THE DRUM ON THE MAIN HOIST. THE DRUM SAFETY RESTRAINT IS ANALYZED IN EA-FC-976-20.

SPECIFIC CRANE DATA

I. ELECTROMOTIVE AC FLUX VECTOR MAIN HOIST MODEL 4041-FVG+ AND AUX HOIST MODEL 4034-FVG+.

1. THE TROLLEY IS PROVIDED WITH VARIABLE SPEED CONTROL WITH A RANGE OF 9 FPM UP TO 25 FPM (MAX). OVER SPEED SENSORS ARE PROVIDED TO TRIP THE TROLLEY DRIVE.

2. THE BRIDGE IS PROVIDED WITH VARIABLE SPEED CONTROL WITH A RANGE OF 9 FPM UP TO 25 FPM (MAX). OVER SPEED SENSORS ARE PROVIDED TO TRIP THE BRIDGE DRIVE.

3. OVERSPEED SWITCHES CONNECTED TO THE MOTOR THAT SHUT DOWN THE DRIVE. RECEION B 09/05/01 Page 6 OF 9

REG.GUIDE 1.104 POSITION	TOPICAL REPORT SECTION	INF	FORMATION TO BE PROVIDED		SPECIFIC CRANE DATA
C.3.q	-	i.	CONTROL STATION LOCATION	1.	THE COMPLETE OPERATING CONTROL SYSTEM, INCLUDING AN EMERGENCY STOP BUTTON, IS LOCATED ON THE REMOTE RADIO CONTROL STATION. IN ADDITION, A LOCAL POWER DISCONNECT SWITCH FOR L-3 IS LOCATED ON ELEV. 649 OF THE AUX BLDG NEXT TO THE SPENT FUEL POOL.
· · · · · · · · · · · · · · · · · · ·	<b>III.D.1</b>	I.	THE TYPE OF EMERGENCY DRUM BRAKE USED, INCLUDING TYPE OF RELEASE MECHANISM.	1.	PNEUMATICALLY RELEASED BAND BRAKE WILL BE USED FOR THE MAIN HOIST.
		<b>2.</b> .	THE RELATIVE LOCATION OF THE EMERGENCY DRUM BRAKE	2.	THE EMERGENCY DRUM BRAKE ENGAGES THE WIRE ROPE DRUM OF THE MAIN HOIST.
-		3.	EMERGENCY DRUM BRAKE CAPACITY.	3.	THE MAIN HOIST EMERGENCY DRUM BRAKE HAS A MINIMUM CAPACITY OF 125% OF THAT REQUIRED TO HOLD THE DESIGN RATED LOAD.
	111.D.2	1.	NUMBER OF FRICTION SURFACES IN EATL.	1.	THE MAIN HOIST EATL HAS 21 FRICTION SURFACES, AS DOCUMENTED IN EA-FC-973-27.
	·	2.	EATL TORQUE SETTING	2.	THE SPECIFIED EATL TORQUE SETTING IS APPROXIMATELY 130% OF THE MAIN HOIST DESIGN RATED LOAD, AS DOCUMENTED IN EA-FC-973-27.



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• • • •	REG.GUIDE 1.104 POSITION	TOPICAL REPORT SECTION	INF	ORMATION TO BE PROVIDED		SPECIFIC CRANE DATA
• .	· · · · · · · · · · · · · · · · · · ·	III.D.3	1.	TYPE OF FAILURE DETECTION SYSTEM.	ι.	A TOTALLY MECHANICAL DRIVE TRAIN CONTINUITY DETECTOR AND EMERGENCY DRUM BRAKE ACTUATOR HAVE BEEN PROVIDED IN ACCORDANCE WITH APPENDIX G OF REVISION 3 OF EDR-1 FOR THE MAIN HOIST.
• • •	-	III.D.5	1.	TYPE OF HYDRAULIC LOAD EQUALIZATION SYSTEM.	1.	MAIN HOIST HYDRAULIC LOAD EQUALIZATION SYSTEM INCLUDES BOTH FEATURES DESCRIBED IN SECTION III.D.5.
•	-	III.D.6	1.	TYPE OF HOOK.	1.	BOTH THE MAIN & AUX HOOKS HAVE A SINGLE LOAD PATH.
• • •	•		2.	HOOK DESIGN LOAD	2.	A. THE MAIN HOOK DESIGN CRITICAL LIFT LOAD IS 110 TONS WITH A 10:1 FACTOR OF SAFETY ON ULTIMATE.
-	•					B. THE AUX HOOK DESIGN LIFT LOAD IS 15 TONS WITH A 5:1 FACTOR OF SAFETY ON ULTIMATE. REF. ORIG. CRANE SPEC. M-61A(Q).

REG.GUIDE 1.104 POSITION	TOPICAL REPORT SECTION	INFORMATION TO BE PROVIDED			SPECIFIC CRANE DATA				
	III.D.6	<b>3.</b> .	HOOK TEST LOAD	3.	MAIN HOOK WILL BE PULL TESTED AT 200% RATED LOAD PER ANSI B30.10.	$\left( \right)$			
* <b></b> *	III.F.1	1.	DESIGN RATED LOAD.	1.	MAIN HOIST - 110 TONS AUX HOIST - 15 TONS				
í ·		2.	MAXIMUM CRITICAL LOAD RATING.	2.	MAIN HOIST - 110 TONS AUX HOIST 15 TONS				
	÷	3.	TROLLEY WEIGHT (NET).	3.	68,000 LBS. (INCLUDING HOOKS), AS DOCUMENTED IN EA-FC-973-05.				
n `		4.	TROLLEY WEIGHT (WITH LOAD)	<b>4.</b>	288,000 LBS, AS DOCUMENTED IN EA-FC-973-05.				
· · · · · · · · · · · · · · · · · · ·		5.	HOOK LIFT.	5.	MAIN HOOK – 54 FEET, 0 INCHES AUXILIARY HOOK – 108 FEET, 5 INCHES	(			
· · · · · · · · · · · · · · · · · · ·	、	6.	NUMBER OF WIRE ROPE DRUMS	6.	THE MAIN & THE AUXILIARY HOISTS EACH HAVE ONE WIRE ROPE DRUM.				
		7.	NUMBER OF PARTS OF WIRE.	7.	MAIN HOIST - 4 PARTS PER WIRE ROPE, 2 ROPES, WITH (2) ROPES OFF DRUM. DRAWIN B-40328.AUXILIARY HOIST 4 PARTS DUAL REEVING (1) ROPE. DRAWING D-40345.	۱G			
		8.	DRUM SIZE (PITCH DIAMETER).	8.	MAIN HOIST - 52.5 INCHES AUXILIARY HOIST - 15 INCHES, AS DOCUMENTED IN EA-FC-973-16.				

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•	REG.GUIDE . 1.104 POSITION	REPORT SECTION	INFORMATION TO BE PROVIDED			SPECIFIC CRANE DATA		
	<b>-</b> .	11 <b>1.F.</b> 1		· .	-			
•	•		9.	WIRE ROPE DIAMETER	9.	MAIN HOIST 1 3/4 INCH AUXILIARY HOIST- 3/4 INCH , AS DOCUMENTED IN EA-FC-973-04.		
-			10.	WIRE ROPE TYPE.	10.	MAIN HOIST-6x36 SS/IWRC RR6-T304 AUXILIARY HOIST 6X37SS 302 IWRC (AUX ROPE BY CUST), AS DOCUMENTED IN EA-FC-973-04.		
	•	,	11.	WIRE ROPE MATERIAL.	• 11.	STAINLESS STEEL MAIN HOIST TYPE T304 & AUXILIARY HOIST (BY CUSTOMER)		
•			12.	WIRE ROPE BREAKING STRENGTH.	12.	MAIN HOIST 242,506 LBS. AUXILIARY HOIST 44,400 LBS, AS DOCUMENTED IN EA-FC-973-04.		
	• •		13.	WIRE ROPE YIELD STRENGTH	13.	MAIN HOIST 194,005 AUXILIARY HOIST N/A, AS DOCUMENTED IN EA-FC-973-04.		
• •	* <b>.</b>		14.	WIRE ROPE RESERVE STRENGTH.	14.	MAIN HOIST - 0.595 AUXILIARY HOISTN/A, AS DOCUMENTED IN EA-FC-973-04.		
			15.	NUMBER OF WIRE ROPES.	<b>15.</b> .	THE MAIN HOIST HAS TWO ROPES. THE AUXILIARY HOIST HAS ONE ROPE.		