

50-261

NRC DISTRIBUTION FOR PART 50 DOCKET MATERIAL

FILE NUMBER

TO:

Mr. Robert W. Reid

FROM:

Carolina Power & Light Company
Raleigh, North Carolina
B. J. Furr

DATE OF DOCUMENT

10/19/77

DATE RECEIVED

10/25/77

☒ LETTER☐ NOTORIZED

PROP

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1 cc

DESCRIPTION

Re only 5-18-77 1K

ENCLOSURE

Consists of response to NRC request for
Reactor Vessel Material Surveillance
Program Data.....

(1-P)

(1-P)+(6-P)

PLANT NAME : H. B. Robinson Unit No. 2
RJL 11/11/77

1 CY ENCL Rec'd *

SAFETY

FOR ACTION/INFORMATION

ENVIRONMENTAL

ASSIGNED AD:		ASSIGNED AD:	V. MOORE (LTR)
☒ BRANCH CHIEF:	Reid	BRANCH CHIEF:	
☒ PROJECT MANAGER:	Zwetzig	PROJECT MANAGER:	
☒ LIC. ASST:	Ingram	LIC. ASST:	
			B. HARLESS

INTERNAL DISTRIBUTION

☒ REG FILES	SYSTEMS SAFETY	PLANT SYSTEMS	SITE SAFETY &
☒ NRC-PDR	R. MATTSON	TEDESCO	ENVIRON ANALYSIS
☒ I & E (2)	SCHROEDER	BENAROYA	DENTON & MULLER
☒ OELD		LAINAS	CRUTCHFIELD
GOSSICK & STAFF	ENGINEERING	IPPOLITO	
☒ HANAUER	KNIGHT	F. ROSA	ENVIRON TECH
☒ MIPC	BOSNAK		ERNST
CASE	SIHWEIL	OPERATING REACTORS	BALLARD
ROYD	☒ PAWLICKI	STELLO	YOUNGBLOOD
		☒ EISENHUT	
PROJECT MANAGEMENT	REACTOR SAFETY	☒ SHAO	SITE TECH
SKOVHOLT	ROSS	☒ BAER	GAMMILL (2)
P. COLLINS	NOVAK	☒ BUTLER	
HOUSTON	ROSZTOCZY	☒ GRIMES	SITE ANALYSIS
MELITZ	CHECK		VOLLMER
HELTEMES			BUNCH
SK	AT & I	☒ R. Gamble	J. COLLINS
☒ Hoge	SALTZMAN	☒ RANDALL	KREGER
☒ HAZELTON	RUTBERG		

EXTERNAL DISTRIBUTION

CONTROL NUMBER

☒ LPDR: HARTSVILLE, S.C.	NAT LAB:	
☒ TIC		
☒ NSIC		
REG V (J. HANCHETT)		
☒ 16 CYS SENT CATEGORY	B	

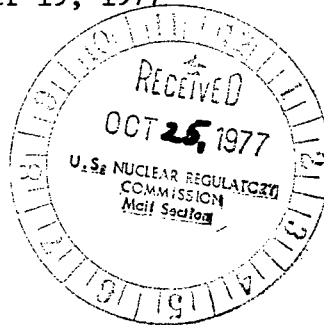
773150135



Carolina Power & Light Company

REGULATORY SECRET FILE COPY

October 19, 1977



NG 3514 (R)

SERIAL: NG-77-1202

Office of Nuclear Reactor Regulation
ATTN: Robert W. Reid, Chief
Operating Reactors Branch #4
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23

REACTOR VESSEL MATERIAL SURVEILLANCE PROGRAM DATA

Dear Mr. Reid:

In response to your request for data dated May 18, 1977, you will find attached the available information. The attachment covers both the vessel and the material surveillance program and provides all of the requested data which is available. We trust that this information is adequate for your review.

Yours very truly,

B. J. Furr - Manager
Generation

CSB/gsm

773150135

H. B. Robinson Unit No. 2
Reactor Vessel Material Surveillance Program

- 1.) The estimated maximum fluence ($E > 1 \text{ Mev}$) at the inner surface of the reactor vessel wall as of March 31, 1977 is $8.57 \times 10^{18} \text{ n/cm}^2$.
- 2.) The effective full power years (EFPY) of operation accumulated as of March 31, 1977 is 4.35 EFPY.
- 3.) Fabrication of the reactor vessel was performed by Combustion Engineering Inc.
- 4.)
 - a.) Sketch of the reactor vessel showing the materials in the beltline region is shown in Figure 1.
 - b.) Information on welds in the vessel beltline region is shown in Tables 1 through 4.
 - c.) Information on each of the plates in the vessel beltline region is shown in Tables 4 through 7.
- 5.) Information relative to weld and plate material included in the material surveillance program is shown in Tables 1 through 3 and 5 through 7.

FIGURE 1

IDENTIFICATION AND LOCATION OF BELTLINE REGION
MATERIAL FOR THE H. B. ROBINSON UNIT NO. 2 REACTOR VESSEL

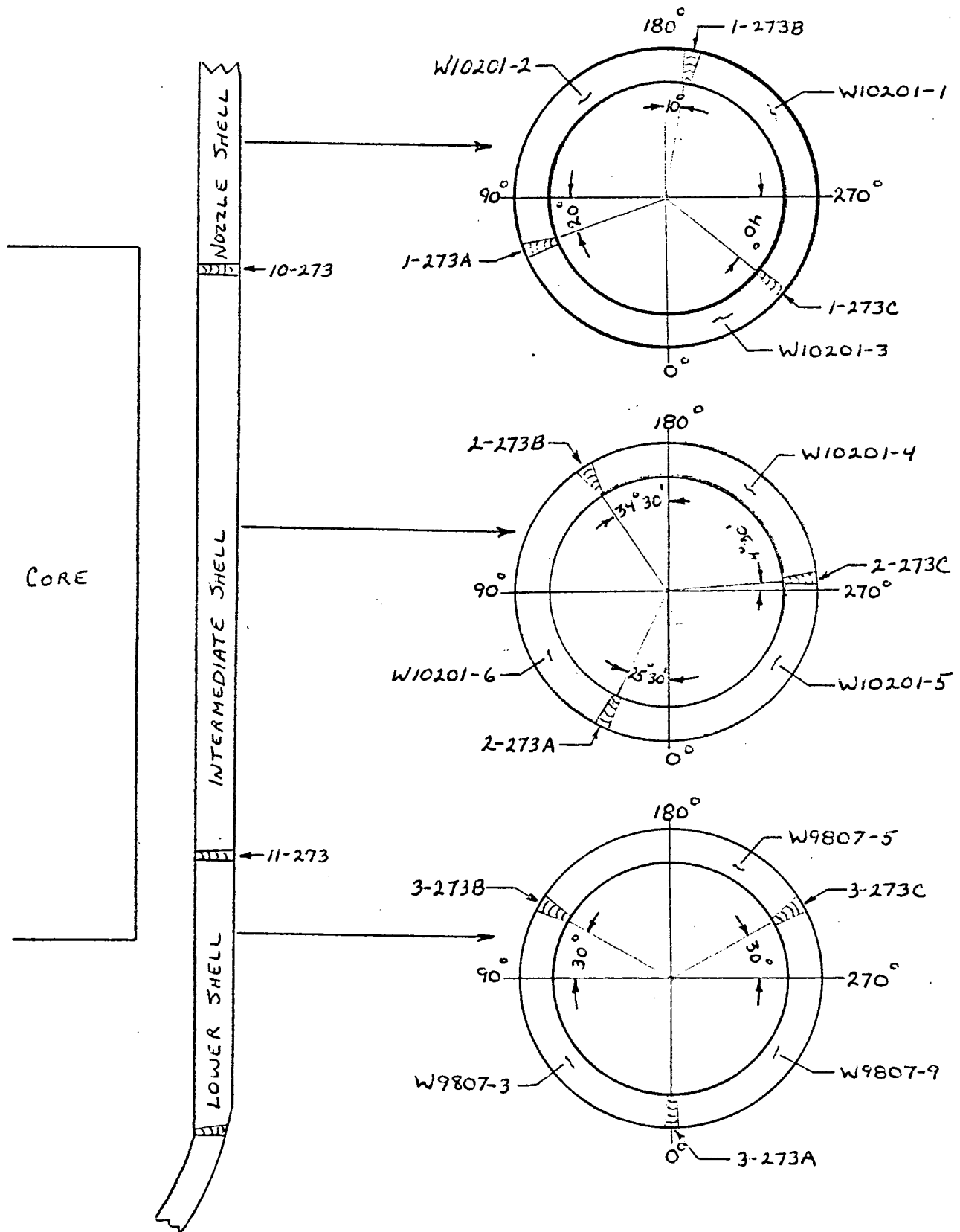


TABLE 1

IDENTIFICATION OF H. B. ROBINSON UNIT NO. 2 REACTOR VESSEL BELTLINE REGION WELD METAL

<u>Weld Location</u>	<u>Welding Process</u>	<u>Weld Control No.</u>	<u>Weld Wire</u>		<u>Flux</u>		<u>Post Weld Heat Treatment</u>
			<u>Type</u>	<u>Heat No.</u>	<u>Type</u>	<u>Lot No.</u>	
Nozzle Shell Vertical Seams	Records Unavailable						
Nozzle Shell to Inter. Shell Circle Seam 10-273	Submerged Arc	M2.01	RACO 3 +Ni 200	W5214 N7753A	Linde 1092	3617	1150°F <u>±</u> 25°F - 40 HR-FC
Inter. Shell Vertical Seams	Records Unavailable						
Inter. Shell to Lower Shell Circle Seam 11-273	Submerged Arc	M1.03	RACO 3	34B009	Linde 1092	3724	1150°F <u>±</u> 25°F - 40 HR-FC
Lower Shell Vertical Seams	Records Unavailable						
Surveillance Weld	Submerged Arc		RACO 3 +Ni 200	W5214 N7753A	Linde 1092	3617	1150°F <u>±</u> 25°F - 30 HR-FC

TABLE 2

CHEMICAL COMPOSITION OF VESSEL BELTLINE REGION WELD METAL

<u>Weld Wire</u>		<u>Flux</u>		<u>Weight Percent</u>								
<u>Type</u>	<u>Heat No.</u>	<u>Type</u>	<u>Lot No.</u>	<u>C</u>	<u>Mn</u>	<u>P</u>	<u>S</u>	<u>Si</u>	<u>Mo</u>	<u>Ni</u>	<u>Cu</u>	<u>V</u>
RACO 3	W5214	Linde 1092	3617	.077	1.05	.021	.012	.26	.50	1.20	----	----
RACO 3	34B009	Linde 1092	3724	.14	2.01	.010	.017	.040	.51	----	----	-----*
Surveillance Weld				.16	.98	.021	.014	.34	.46	----	.34	.001

*Wire Analysis

TABLE 3

MECHANICAL PROPERTIES OF VESSEL BELTLINE REGION WELD METAL

<u>Weld Wire</u>		<u>Flux</u>		<u>T_{NDT}*</u>	<u>Energy</u>	<u>RT_{NDT}*</u>	<u>Upper</u>	<u>YS</u>	<u>UTS</u>	<u>Elong.</u>	<u>RA</u>
<u>Type</u>	<u>Heat No.</u>	<u>Type</u>	<u>Lot No.</u>	<u>°F</u>	<u>at 10°F</u>	<u>°F</u>	<u>Shelf</u>	<u>ksi</u>	<u>ksi</u>	<u>%</u>	<u>%</u>
					<u>ft-lbs</u>		<u>ft-lbs</u>				
RAC0 3	W5214	Linde 1092	3617	0	35,39,48	0	---	65.3	80.4	28.0	69.5
RAC0 3	34B009	Linde 1092	3724	0	55,75,84	0	---	65.8	82.9	28.5	70.4
Surveillance Weld				0	73.5,68.65.5	0	113	64.1	79.8	28.2	73.3

*Estimated per NRC Standard Review Plan Section 5.3.2

TABLE 4
MAXIMUM END-OF-LIFE FLUENCE AT VESSEL INNER WALL LOCATIONS

<u>Plate or Plate Location</u>	<u>Seam No.</u>	<u>Fluence</u> <u>n/cm²</u>
Nozzle Shell Vertical Seam	1-273A	9.8×10^{18}
" "	1-273B	1.8×10^{19}
" "	1-273C	4.1×10^{18}
Nozzle Shell to Inter. Shell Circle Seam	10-273	2.5×10^{19}
Inter. Shell Vertical Seam	2-273A	1.5×10^{19}
" "	2-273B	1.0×10^{19}
" "	2-273C	5.1×10^{19}
Inter. Shell to Lower Shell Circle Seam	11-273	5.5×10^{19}
Lower Shell Vertical Seam	3-273A	5.5×10^{19}
" "	3-273B	1.2×10^{19}
" "	3-273C	1.2×10^{19}
Nozzle Shell Plates		2.5×10^{19}
Inter. Shell Plates		6.3×10^{19}
Lower Shell Plates		5.5×10^{19}

TABLE 5
IDENTIFICATION OF VESSEL BELTLINE REGION PLATE MATERIAL

Component	Plate No.	Heat No.	Matl. Spec. No.	Supplier	Heat Treatment		
					Austenitize	Temper	Stress Relief
Nozzle Shell	W10201-1	A6623-1	A302B	Lukens	1550-1600°F-4 HRS-WQ	1200-1250°F-4 HR-AC	1125-1175°F-30 HR-FC
"	W10201-2	A6520-1	"	"	"	"	"
"	W10201-3	B1255-1	"	"	"	"	"
Inter. Shell	W10201-4	A6604-1	"	"	"	"	"
"	W10401-5	B1256-1	"	"	"	"	"
"	W10201-6	B1250-1	"	"	"	"	"
Lower Shell	W9807-3	B0650-1	"	"	"	"	1125-1175°F-24 HR-FC
"	W9807-5	A5891-1	"	"	"	"	"
"	W9807-9	P1444-1	"	"	"	"	"
Surveillance Plates - Three Plates from the Intermediate Shell Course as Above.							1125-1175°F-15-1/2 HR-FC

TABLE 6
CHEMICAL COMPOSITION OF VESSEL BELTLINE REGION PLATE MATERIAL

Plate No.	Weight Percent						
	C	Mn	P	S	Si	Mo	Cu
W10201-1	.20	1.40	.010	.017	.20	.47	.13
W10201-2	.20	1.37	.009	.017	.19	.48	.15
W10201-3	.20	1.40	.006	.019	.23	.48	.11
W10201-4*	.19	1.35	.007	.019	.23	.48	.12
W10201-5*	.20	1.29	.010	.021	.22	.46	.10
W10201-6*	.19	1.32	.010	.015	.19	.49	.09
W9807-3	.19	1.43	.012	.020	.25	.48	.12
W9807-5	.19	1.41	.012	.014	.20	.46	.15
W9807-9	.20	1.27	.015	.020	.18	.48	.14

*Surveillance Plates - No Analyses Performed Other Than Performed Above by Lukens.

TABLE 7

MECHANICAL PROPERTIES OF VESSEL BELTLINE REGION PLATE MATERIAL

<u>Plate No.</u>	<u>T_{NDT}</u> <u>°F</u>	<u>RT_{NDT}*</u>	<u>Upper Shelf</u> <u>Energy*</u> <u>ft/lbs</u>	<u>YS</u> <u>ksi</u>	<u>UTS</u> <u>ksi</u>	<u>Elong.</u> <u>%</u>	<u>RA</u> <u>%</u>	
W10201-1	-30	17	54	62.5	85.0	28.5	63.5	
W10201-2	-10	6	80.5	58.7	81.6	32.0	67.1	
W10201-3	-10	0	61.5	60.9	83.6	29.0	63.0	
W10201-4	-30	46	58.5	55.0	77.5	33.0	62.7	
W10201-5	-20	37	50	58.8	81.5	29.2	64.3	
W10201-6	-30	20	69.5	53.5	77.6	32.0	65.0	
W9807-3	-20	20	78	64.0	83.5	26.0	63.5	
W9807-5	-20	8	74	67.0	85.0	29.0	69.5	
W9807-9	-30	15	77.5	59.8	81.5	24.0	66.0	
W10201-4	---	5	61.5	66.0	87.4	25.7	66.0	} Surveillance Test Results
W10201-5	---	15	64.5	56.3	78.4	27.9	66.0	
W10201-6	---	30	74.5	57.8	80.4	27.4	66.0	

*Estimated from Longitudinal Data per NRC Standard Review Plan Section 5.3.2