PSEG Public Service Electric and Gas Company

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Robert L. Mittl General Manager
Nuclear Assurance and Regulation

September 5, 1984

Director of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
7920 Norfolk Avenue
Bethesda, MD 20814

Attention: Mr. Albert Schwencer, Chief
Licensing Branch 2
Division of Licensing

Gentlemen:

HOPE CREEK GENERATING STATION
DOCKET NO. 50-354
DRAFT SAFETY EVALUATION REPORT
OPEN ITEM STATUS

Attachment 1 is a current list which provides a status of the open items identified in Section 1.7 of the Draft Safety Evaluation Report (SER). Items identified as "complete" are those for which PSE&G has provided responses and no confirmation of status has been received from the staff. We will consider these items closed unless notified otherwise. In order to permit timely resolution of items identified as "complete" which may not be resolved to the staff's satisfaction, please provide a specific description of the issue which remains to be resolved.

Attachment 2 is a current list which identifies Draft SER Sections not yet provided.

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1/1

In addition, enclosed for your review and approval (see Attachment 4) are the resolutions to the Draft SER open items listed in Attachment 3. A signed original of the required affidavit is provided to document the submittal of these items.

Should you have any questions or require any additional information on these open items, please contact us.

Very truly yours,

Attachments/Enclosure

C D. H. Wagner
USNRC Licensing Project Manager

W. H. Bateman
USNRC Senior Resident Inspector

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
DOCKET NO. 50-354

PUBLIC SERVICE ELECTRIC AND GAS COMPANY

Public Service Electric and Gas Company hereby submits the enclosed Hope Creek Generating Station Draft Safety Evaluation Report open item responses.

The matters set forth in this submittal are true to the best of my knowledge, information, and belief.

Respectfully submitted,

Public Service Electric
and Gas Company

By: Thomas J. Martin
T. J. Martin
Vice President - Engineering
and Construction

Sworn to and subscribed
before me, a Notary Public
of New Jersey, this 5th day
of September 1984.

David K. Burd

DAVID K. BURD
NOTARY PUBLIC OF NEW JERSEY
My Comm. Expires 10-23-85

GJ02/2

DATE: 9/5/84

ATTACHMENT 1

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
1	2.3.1	Design-basis temperatures for safety-related auxiliary systems	Complete	8/15/84
2a	2.3.3	Accuracies of meteorological measurements	Complete	8/15/84 (Rev. 1)
2b	2.3.3	Accuracies of meteorological measurements	Complete	8/15/84 (Rev. 1)
2c	2.3.3	Accuracies of meteorological measurements	Complete	8/15/84 (Rev. 2)
2d	2.3.3	Accuracies of meteorological measurements	Complete	8/15/84 (Rev. 2)
3a	2.3.3	Upgrading of onsite meteorological measurements program (III.A.2)	Complete	8/15/84 (Rev. 2)
3b	2.3.3	Upgrading of onsite meteorological measurements program (III.A.2)	Complete	8/15/84 (Rev. 2)
3c	2.3.3	Upgrading of onsite meteorological measurements program (III.A.2)	NRC Action	
4	2.4.2.2	Ponding levels	Complete	8/03/84
5a	2.4.5	Wave impact and runup on service Water Intake Structure	Complete	8/20/84 (Rev. 1)
5b	2.4.5	Wave impact and runup on service water intake structure	Complete	8/20/84 (Rev. 1)
5c	2.4.5	Wave impact and runup on service water intake structure	Complete	7/27/84
5d	2.4.5	Wave impact and runup on service water intake structure	Complete	8/20/84 (Rev. 1)
6a	2.4.10	Stability of erosion protection structures	Complete	8/20/84
6b	2.4.10	Stability of erosion protection structures	Complete	8/20/84
6c	2.4.10	Stability of erosion protection structures	Complete	8/03/84

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
7a	2.4.11.2	Thermal aspects of ultimate heat sink	Complete	8/3/84
7b	2.4.11.2	Thermal aspects of ultimate heat sink	Complete	8/3/84
8	2.5.2.2	Choice of maximum earthquake for New England - Piedmont Tectonic Province	Complete	8/15/84
9	2.5.4	Soil damping values	Complete	6/1/84
10	2.5.4	Foundation level response spectra	Complete	6/1/84
11	2.5.4	Soil shear moduli variation	Complete	6/1/84
12	2.5.4	Combination of soil layer properties	Complete	6/1/84
13	2.5.4	Lab test shear moduli values	Complete	6/1/84
14	2.5.4	Liquefaction analysis of river bottom sands	Complete	6/1/84
15	2.5.4	Tabulations of shear moduli	Complete	6/1/84
16	2.5.4	Drying and wetting effect on Vincentown	Complete	6/1/84
17	2.5.4	Power block settlement monitoring	Complete	6/1/84
18	2.5.4	Maximum earth at rest pressure coefficient	Complete	6/1/84
19	2.5.4	Liquefaction analysis for service water piping	Complete	6/1/84
20	2.5.4	Explanation of observed power block settlement	Complete	6/1/84
21	2.5.4	Service water pipe settlement records	Complete	6/1/84
22	2.5.4	Cofferdam stability	Complete	6/1/84

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
23	2.5.4	Clarification of FSAR Tables 2.5.13 and 2.5.14	Complete	6/1/84
24	2.5.4	Soil depth models for intake structure	Complete	6/1/84
25	2.5.4	Intake structure soil modeling	Complete	8/10/84
26	2.5.4.4	Intake structure sliding stability	Complete	8/20/84
27	2.5.5	Slope stability	Complete	6/1/84
28a	3.4.1	Flood protection	Complete	8/30/84 (Rev. 1)
28b	3.4.1	Flood protection	Complete	8/30/84 (Rev. 1)
28c	3.4.1	Flood protection	Complete	8/30/84 (Rev. 1)
28d	3.4.1	Flood protection	Complete	8/30/84 (Rev. 1)
28e	3.4.1	Flood protection	Complete	8/30/84 (Rev. 1)
28f	3.4.1	Flood protection	Complete	7/27/84
28g	3.4.1	Flood protection	Complete	7/27/84
29	3.5.1.1	Internally generated missiles (outside containment)	Complete	8/3/84 (Rev. 1)
30	3.5.1.2	Internally generated missiles (inside containment)	Closed (5/30/84-Aux.Sys.Mtg.)	6/1/84
31	3.5.1.3	Turbine missiles	Complete	7/18/84
32	3.5.1.4	Missiles generated by natural phenomena	Complete	7/27/84
33	3.5.2	Structures, systems, and components to be protected from externally generated missiles	Complete	7/27/84

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
34	3.6.2	Unrestrained whipping pipe inside containment	Complete	7/18/84
35	3.6.2	ISI program for pipe welds in break exclusion zone	Complete	6/29/84
36	3.6.2	Postulated pipe ruptures	Complete	6/29/84
37	3.6.2	Feedwater isolation check valve operability	Complete	8/20/84
38	3.6.2	Design of pipe rupture restraints	Complete	8/20/84
39	3.7.2.3	SSI analysis results using finite element method and elastic half-space approach for containment structure	Complete	8/3/84
40	3.7.2.3	SSI analysis results using finite element method and elastic half-space approach for intake structure	Complete	8/3/84
41	3.8.2	Steel containment buckling analysis	Complete	6/1/84
42	3.8.2	Steel containment ultimate capacity analysis	Complete	8/20/84 (Rev. 1)
43	3.8.2	SRV/LOCA pool dynamic loads	Complete	6/1/84
44	3.8.3	ACI 349 deviations for internal structures	Complete	6/1/84
45	3.8.4	ACI 349 deviations for Category I structures	Complete	8/20/84 (Rev. 1)
46	3.8.5	ACI 349 deviations for foundations	Complete	8/20/84 (Rev. 1)
47	3.8.6	Base mat response spectra	Complete	8/10/84 (Rev. 1)
48	3.8.6	Rocking time histories	Complete	8/20/84 (Rev. 1)

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
49	3.8.6	Gross concrete section	Complete	8/20/84 (Rev. 1)
50	3.8.6	Vertical floor flexibility response spectra	Complete	8/20/84 (Rev. 1)
51	3.8.6	Comparison of Bechtel independent verification results with the design-basis results	Complete	8/20/84 (Rev. 2)
52	3.8.6	Ductility ratios due to pipe break	Complete	8/3/84
53	3.8.6	Design of seismic Category I tanks	Complete	8/20/84 (Rev. 1)
54	3.8.6	Combination of vertical responses	Complete	8/10/84 (Rev. 1)
55	3.8.6	Torsional stiffness calculation	Complete	6/1/84
56	3.8.6	Drywell stick model development	Complete	8/20/84 (Rev. 1)
57	3.8.6	Rotational time history inputs	Complete	6/1/84
58	3.8.6	"O" reference point for auxiliary building model	Complete	6/1/84
59	3.8.6	Overturning moment of reactor building foundation mat	Complete	8/20/84 (Rev. 1)
60	3.8.6	BSAP element size limitations	Complete	8/20/84 (Rev. 1)
61	3.8.6	Seismic modeling of drywell shield wall	Complete	6/1/84
62	3.8.6	Drywell shield wall boundary conditions	Complete	6/1/84
63	3.8.6	Reactor building dome boundary conditions	Complete	6/1/84

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
64	3.8.6	SSI analysis 12 Hz cutoff frequency	Complete	8/20/84 (Rev. 1)
65	3.8.6	Intake structure crane heavy load drop	Complete	6/1/84
66	3.8.6	Impedance analysis for the intake structure	Complete	8/10/84 (Rev. 1)
67	3.8.6	Critical loads calculation for reactor building dome	Complete	6/1/84
68	3.8.6	Reactor building foundation mat contact pressures	Complete	6/1/84
69	3.8.6	Factors of safety against sliding and overturning of drywell shield wall	Complete	6/1/84
70	3.8.6	Seismic shear force distribution in cylinder wall	Complete	6/1/84
71	3.8.6	Overturning of cylinder wall	Complete	6/1/84
72	3.8.6	Deep beam design of fuel pool walls	Complete	6/1/84
73	3.8.6	ASHSD dome model load inputs	Complete	6/1/84
74	3.8.6	Tornado depressurization	Complete	6/1/84
75	3.8.6	Auxiliary building abnormal pressure	Complete	6/1/84
76	3.8.6	Tangential shear stresses in drywell shield wall and the cylinder wall	Complete	6/1/84
77	3.8.6	Factor of safety against overturning of intake structure	Complete	8/20/84 (Rev. 1)
78	3.8.6	Dead load calculations	Complete	6/1/84
79	3.8.6	Post-modification seismic loads for the torus	Complete	8/20/84 (Rev. 1)

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
80	3.8.6	Torus fluid-structure interactions	Complete	6/1/84
81	3.8.6	Seismic displacement of torus	Complete	8/20/84 (Rev. 1)
82	3.8.6	Review of seismic Category I tank design	Complete	8/20/84 (Rev. 1)
83	3.8.6	Factors of safety for drywell buckling evaluation	Complete	6/1/84
84	3.8.6	Ultimate capacity of containment (materials)	Complete	8/20/84 (Rev. 1)
85	3.8.6	Load combination consistency	Complete	6/1/84
86	3.9.1	Computer code validation	Complete	8/20/84
87	3.9.1	Information on transients	Complete	8/20/84
88	3.9.1	Stress analysis and elastic-plastic analysis	Complete	6/29/84
89	3.9.2.1	Vibration levels for NSSS piping systems	Complete	6/29/84
90	3.9.2.1	Vibration monitoring program during testing	Complete	7/18/84
91	3.9.2.2	Piping supports and anchors	Complete	6/29/84
92	3.9.2.2	Triple flued-head containment penetrations	Complete	6/15/84
93	3.9.3.1	Load combinations and allowable stress limits	Complete	6/29/84
94	3.9.3.2	Design of SRVs and SRV discharge piping	Complete	6/29/84

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
95	3.9.3.2	Fatigue evaluation on SRV piping and LOCA downcomers	Complete	6/15/84
96	3.9.3.3	IE Information Notice 83-80	Complete	8/20/84 (Rev. 1)
97	3.9.3.3	Buckling criteria used for component supports	Complete	6/29/84
98	3.9.3.3	Design of bolts	Complete	6/15/84
99a	3.9.5	Stress categories and limits for core support structures	Complete	6/15/84
99b	3.9.5	Stress categories and limits for core support structures	Complete	6/15/84
100a	3.9.6	10CFR50.55a paragraph (g)	Complete	6/29/84
100b	3.9.6	10CFR50.55a paragraph (g)	Complete	8/20/84
101	3.9.6	PSI and ISI programs for pumps and valves	Complete	8/20/84
102	3.9.6	Leak testing of pressure isolation valves	Complete	6/29/84
103a1	3.10	Seismic and dynamic qualification of mechanical and electrical equipment	Complete	8/20/84
103a2	3.10	Seismic and dynamic qualification of mechanical and electrical equipment	Complete	8/20/84
103a3	3.10	Seismic and dynamic qualification of mechanical and electrical equipment	Complete	8/20/84
103a4	3.10	Seismic and dynamic qualification of mechanical and electrical equipment	Complete	8/20/84

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
103a5	3.10	Seismic and dynamic qualification of mechanical and electrical equipment	Complete	8/20/84
103a6	3.10	Seismic and dynamic qualification of mechanical and electrical equipment	Complete	8/20/84
103a7	3.10	Seismic and dynamic qualification of mechanical and electrical equipment	Complete	8/20/84
103b1	3.10	Seismic and dynamic qualification of mechanical and electrical equipment	Complete	8/20/84
103b2	3.10	Seismic and dynamic qualification of mechanical and electrical equipment	Complete	8/20/84
103b3	3.10	Seismic and dynamic qualification of mechanical and electrical equipment	Complete	8/20/84
103b4	3.10	Seismic and dynamic qualification of mechanical and electrical equipment	Complete	8/20/84
103b5	3.10	Seismic and dynamic qualification of mechanical and electrical equipment	Complete	8/20/84
103b6	3.10	Seismic and dynamic qualification of mechanical and electrical equipment	Complete	8/20/84
103c1	3.10	Seismic and dynamic qualification of mechanical and electrical equipment	Complete	8/20/84
103c2	3.10	Seismic and dynamic qualification of mechanical and electrical equipment	Complete	8/20/84
103c3	3.10	Seismic and dynamic qualification of mechanical and electrical equipment	Complete	8/20/84
103c4	3.10	Seismic and dynamic qualification of mechanical and electrical equipment	Complete	8/20/84
104	3.11	Environmental qualification of mechanical and electrical equipment	NRC Action	

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
105	4.2	Plant-specific mechanical fracturing analysis	Complete	8/20/84 (Rev. 1)
106	4.2	Applicability of seismic ardd LOCA loading evaluation	Complete	8/20/84 (Rev. 1)
107	4.2	Minimal post-irradiation fuel surveillance program	Complete	6/29/84
108	4.2	Gadolina thermal conductivity equation	Complete	6/29/84
109a	4.4.7	TMI-2 Item II.F.2	Complete	8/20/84
109b	4.4.7	TMI-2 Item II.F.2	Complete	8/20/84
110a	4.6	Functional design of reactivity control systems	Complete	8/30/84 (Rev. 1)
110b	4.6	Functional design of reactivity control systems	Complete	8/30/84 (Rev. 1)
111a	5.2.4.3	Preservice inspection program (components within reactor pressure boundary)	Complete	6/29/84
111b	5.2.4.3	Preservice inspection program (components within reactor pressure boundary)	Complete	6/29/84
111c	5.2.4.3	Preservice inspection program (components within reactor pressure boundary)	Complete	6/29/84
112a	5.2.5	Reactor coolant pressure boundary leakage detection	Complete	8/30/84 (Rev. 1)
112b	5.2.5	Reactor coolant pressure boundary leakage detection	Complete	8/30/84 (Rev. 1)

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
112c	5.2.5	Reactor coolant pressure boundary leakage detection	Complete	8/30/84 (Rev. 1)
112d	5.2.5	Reactor coolant pressure boundary leakage detection	Complete	8/30/84 (Rev. 1)
112e	5.2.5	Reactor coolant pressure boundary leakage detection	Complete	8/30/84 (Rev. 1)
113	5.3.4	GE procedure applicability	Complete	7/18/84
114	5.3.4	Compliance with NB 2360 of the Summer 1972 Addenda to the 1971 ASME Code	Complete	7/18/84
115	5.3.4	Drop weight and Charpy v-notch tests for closure flange materials	Complete	9/5/84 (Rev. 1)
116	5.3.4	Charpy v-notch test data for base materials as used in shell course No. 1	Complete	7/18/84
117	5.3.4	Compliance with NB 2332 of Winter 1972 Addenda of the ASME Code	Complete	8/20/84
118	5.3.4	Lead factors and neutron fluence for surveillance capsules	Complete	8/20/84
119	6.2	TMI item II.E.4.1	Complete	6/29/84
120a	6.2	TMI Item II.E.4.2	Complete	8/20/84
120b	6.2	TMI Item II.E.4.2	Complete	8/20/84
121	6.2.1.3.3	Use of NUREG-0588	Complete	7/27/84
122	6.2.1.3.3	Temperature profile	Complete	7/27/84
123	6.2.1.4	Butterfly valve operation (post accident)	Complete	6/29/84

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
124a	6.2.1.5.1	RPV shield annulus analysis	Complete	8/20/84 (Rev. 1)
124b	6.2.1.5.1	RPV shield annulus analysis	Complete	8/20/84 (Rev. 1)
124c	6.2.1.5.1	RPV shield annulus analysis	Complete	8/20/84 (Rev. 1)
125	6.2.1.5.2	Design drywell head differential pressure	Complete	6/15/84
126a	6.2.1.6	Redundant position indicators for vacuum breakers (and control room alarms)	Complete	8/20/84
126b	6.2.1.6	Redundant position indicators for vacuum breakers (and control room alarms)	Complete	8/20/84
127	6.2.1.6	Operability testing of vacuum breakers	Complete	8/20/84 (Rev. 1)
128	6.2.2	Air ingestion	Complete	7/27/84
129	6.2.2	Insulation ingestion	Complete	6/1/84
130	6.2.3	Potential bypass leakage paths	Complete	6/29/84
131	6.2.3	Administration of secondary containment openings	Complete	7/18/84
132	6.2.4	Containment isolation review	Complete	6/15/84
133a	6.2.4.1	Containment purge system	Complete	8/20/84
133b	6.2.4.1	Containment purge system	Complete	8/20/84
133c	6.2.4.1	Containment purge system	Complete	8/20/84

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
134	6.2.6	Containment leakage testing	Complete	6/15/84
135	6.3.3	LPCS and LPCI injection valve interlocks	Complete	8/20/84
136	6.3.5	Plant-specific LOCA (see Section 15.9.13)	Complete	8/20/84 (Rev. 1)
137a	6.4	Control room habitability	Complete	8/20/84
137b	6.4	Control room habitability	Complete	8/20/84
137c	6.4	Control room habitability	Complete	8/20/84
138	6.6	Preservice inspection program for Class 2 and 3 components	Complete	6/29/84
139	6.7	MSIV leakage control system	Complete	6/29/84
140a	9.1.2	Spent fuel pool storage	Complete	8/15/84 (Rev. 1)
140b	9.1.2	Spent fuel pool storage	Complete	8/15/84 (Rev. 1)
140c	9.1.2	Spent fuel pool storage	Complete	8/15/84 (Rev. 1)
140d	9.1.2	Spent fuel pool storage	Complete	8/15/84 (Rev. 1)
141a	9.1.3	Spent fuel cooling and cleanup system	Complete	8/30/84 (Rev. 1)
141b	9.1.3	Spent fuel cooling and cleanup system	Complete	8/30/84 (Rev. 1)
141c	9.1.3	Spent fuel pool cooling and cleanup system	Complete	8/30/84 (Rev. 1)

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
141d	9.1.3	Spent fuel pool cooling and cleanup system	Complete	8/30/84 (Rev. 1)
141e	9.1.3	Spent fuel pool cooling and cleanup system	Complete	8/30/84 (Rev. 1)
141f	9.1.3	Spent fuel pool cooling and cleanup system	Complete	8/30/84 (Rev. 1)
141g	9.1.3	Spent fuel pool cooling and cleanup system	Complete	8/30/84 (Rev. 1)
142a	9.1.4	Light load handling system (related to refueling)	Complete	8/15/84 (Rev. 1)
142b	9.1.4	Light load handling system (related to refueling)	Complete	8/15/84 (Rev. 1)
143a	9.1.5	Overhead heavy load handling	Open	
143b	9.1.5	Overhead heavy load handling	Open	
144a	9.2.1	Station service water system	Complete	8/15/84 (Rev. 1)
144b	9.2.1	Station service water system	Complete	8/15/84 (Rev. 1)
144c	9.2.1	Station service water system	Complete	8/15/84 (Rev. 1)
145	9.2.2	ISI program and functional testing of safety and turbine auxiliaries cooling systems	Closed (5/30/84-Aux.Sys.Mtg.)	6/15/84
146	9.2.6	Switches and wiring associated with HPCI/RCIC torus suction	Closed (5/30/84-Aux.Sys.Mtg.)	6/15/84

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
147a	9.3.1	Compressed air systems	Complete	8/3/84 (Rev 1)
147b	9.3.1	Compressed air systems	Complete	8/3/84 (Rev 1)
147c	9.3.1	Compressed air systems	Complete	8/3/84 (Rev 1)
147d	9.3.1	Compressed air systems	Complete	8/3/84 (Rev 1)
148	9.3.2	Post-accident sampling system (II.B.3)	Complete	8/20/84
149a	9.3.3	Equipment and floor drainage system	Complete	7/27/84
149b	9.3.3	Equipment and floor drainage system	Complete	7/27/84
150	9.3.6	Primary containment instrument gas system	Complete	8/3/84 (Rev. 1)
151a	9.4.1	Control structure ventilation system	Complete	8/30/84 (Rev. 1)
151b	9.4.1	Control structure ventilation system	Complete	8/30/84 (Rev. 1)
152	9.4.4	Radioactivity monitoring elements	Closed (5/30/84-Aux.Sys.Mtg.)	6/1/84
153	9.4.5	Engineered safety features ventilation system	Complete	8/30/84 (Rev 2)
154	9.5.1.4.a	Metal roof deck construction classificiation	Complete	6/1/84
155	9.5.1.4.b	Ongoing review of safe shutdown capability	NRC Action	
156	9.5.1.4.c	Ongoing review of alternate shutdown capability	NRC Action	

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
157	9.5.1.4.e	Cable tray protection	Complete	8/20/84
158	9.5.1.5.a	Class B fire detection system	Complete	6/15/84
159	9.5.1.5.a	Primary and secondary power supplies for fire detection system	Complete	6/1/84
160	9.5.1.5.b	Fire water pump capacity	Complete	8/13/84
161	9.5.1.5.b	Fire water valve supervision	Complete	6/1/84
162	9.5.1.5.c	Deluge valves	Complete	6/1/84
163	9.5.1.5.c	Manual hose station pipe sizing	Complete	6/1/84
164	9.5.1.6.e	Remote shutdown panel ventilation	Complete	6/1/84
165	9.5.1.6.g	Emergency diesel generator day tank protection	Complete	6/1/84
166	12.3.4.2	Airborne radioactivity monitor positioning	Complete	7/18/84
167	12.3.4.2	Portable continuous air monitors	Complete	7/18/84
168	12.5.2	Equipment, training, and procedures for inplant iodine instrumentation	Complete	6/29/84
169	12.5.3	Guidance of Division B Regulatory Guides	Complete	7/18/84
170	13.5.2	Procedures generation package submittal	Complete	6/29/84
171	13.5.2	TMI Item I.C.1	Complete	6/29/84
172	13.5.2	PGP Commitment	Complete	6/29/84
173	13.5.2	Procedures covering abnormal releases of radioactivity	Complete	6/29/84

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
174	13.5.2	Resolution explanation in FSAR of TMI Items I.C.7 and I.C.8	Complete	6/15/84
175	13.6	Physical security	Open	
176a	14.2	Initial plant test program	Complete	8/13/84
176b	14.2	Initial plant test program	Complete	9/5/84 (Rev. 1)
176c	14.2	Initial plant test program	Complete	7/27/84
176d	14.2	Initial plant test program	Complete	8/24/84 (Rev. 2)
176e	14.2	Initial plant test program	Complete	7/27/84
176f	14.2	Initial plant test program	Complete	8/13/84
176g	14.2	Initial plant test program	Complete	8/20/84
176h	14.2	Initial plant test program	Complete	8/13/84
176i	14.2	Initial plant test program	Complete	7/27/84
177	15.1.1	Partial feedwater heating	Complete	8/20/84 (Rev. 1)
178	15.6.5	LOCA resulting from spectrum of postulated piping breaks within RCP	NRC Action	
179	15.7.4	Radiological consequences of fuel handling accidents	NRC Action	
180	15.7.5	Spent fuel cask drop accidents	NRC Action	
181	15.9.5	TMI-2 Item II.K.3.3	Complete	6/29/84
182	15.9.10	TMI-2 Item II.K.3.18	Complete	6/1/84
183	18	Hope Creek DCRDR	Complete	8/15/84

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
184	7.2.2.1.e	Failures in reactor vessel level sensing lines	Complete	8/1/84 (Rev 1)
185	7.2.2.2	Trip system sensors and cabling in turbine building	Complete	6/1/84
186	7.2.2.3	Testability of plant protection systems at power	Complete	8/13/84 (Rev. 1)
187	7.2.2.4	Lifting of leads to perform surveillance testing	Complete	8/3/84
188	7.2.2.5	Setpoint methodology	Complete	8/1/84
189	7.2.2.6	Isolation devices	Complete	8/1/84
190	7.2.2.7	Regulatory Guide 1.75	Complete	6/1/84
191	7.2.2.8	Scram discharge volume	Complete	6/29/84
192	7.2.2.9	Reactor mode switch	Complete	8/15/84 (Rev. 1)
193	7.3.2.1.10	Manual initiation of safety systems	Complete	8/1/84
194	7.3.2.2	Standard review plan deviations	Complete	8/1/84 (Rev 1)
195a	7.3.2.3	Freeze-protection/water filled instrument and sampling lines and cabinet temperature control	Complete	8/1/84
195b	7.3.2.3	Freeze-protection/water filled instrument and sampling lines and cabinet temperature control	Complete	8/1/84
196	7.3.2.4	Sharing of common instrument taps	Complete	8/1/84
197	7.3.2.5	Microprocessor, multiplexer and computer systems	Complete	8/1/84 (Rev 1)

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
198	7.3.2.6	TMI Item II.K.3.18-ADS actuation	Complete	8/20/84
199	7.4.2.1	IE Bulletin 79-27-Loss of non-class IE instrumentation and control power system bus during operation	Complete	8/24/84 (Rev. 1)
200	7.4.2.2	Remote shutdown system	Complete	8/15/84 (Rev 1)
201	7.4.2.3	RCIC/HPCI interactions	Complete	8/3/84
202	7.5.2.1	Level measurement errors as a result of environmental temperature effects on level instrumentation reference leg	Complete	8/3/84
203	7.5.2.2	Regulatory Guide 1.97	Complete	8/3/84
204	7.5.2.3	TMI Item II.F.1 - Accident monitoring	Complete	8/1/84
205	7.5.2.4	Plant process computer system	Complete	6/1/84
206	7.6.2.1	High pressure/low pressure interlocks	Complete	7/27/84
207	7.7.2.1	HELBs and consequential control system failures	Complete	8/24/84 (Rev. 1)
208	7.7.2.2	Multiple control system failures	Complete	8/24/84 (Rev. 1)
209	7.7.2.3	Credit for non-safety related systems in Chapter 15 of the FSAR	Complete	8/1/84 (Rev 1)
210	7.7.2.4	Transient analysis recording system	Complete	7/27/84
211a	4.5.1	Control rod drive structural materials	Complete	7/27/84
211b	4.5.1	Control rod drive structural materials	Complete	7/27/84
211c	4.5.1	Control rod drive structural materials	Complete	7/27/84

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
211d	4.5.1	Control rod drive structural materials	Complete	7/27/84
211e	4.5.1	Control rod drive structural materials	Complete	7/27/84
212	4.5.2	Reactor internals materials	Complete	7/27/84
213	5.2.3	Reactor coolant pressure boundary material	Complete	7/27/84
214	6.1.1	Engineered safety features materials	Complete	7/27/84
215	10.3.6	Main steam and feedwater system materials	Complete	7/27/84
216a	5.3.1	Reactor vessel materials	Complete	7/27/84
216b	5.3.1	Reactor vessel materials	Complete	7/27/84
217	9.5.1.1	Fire protection organization	Complete	8/15/84
218	9.5.1.1	Fire hazards analysis	Complete	6/1/84
219	9.5.1.2	Fire protection administrative controls	Complete	8/15/84
220	9.5.1.3	Fire brigade and fire brigade training	Complete	8/15/84
221	8.2.2.1	Physical separation of offsite transmission lines	Complete	8/1/84
222	8.2.2.2	Design provisions for re-establishment of an offsite power source	Complete	8/1/84
223	8.2.2.3	Independence of offsite circuits between the switchyard and class IE buses	Complete	8/1/84
224	8.2.2.4	Common failure mode between onsite and offsite power circuits	Complete	8/1/84

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
225	8.2.3.1	Testability of automatic transfer of power from the normal to preferred power source	Complete	8/1/84
226	8.2.2.5	Grid stability	Complete	8/13/84 (Rev. 1)
227	8.2.2.6	Capacity and capability of offsite circuits	Complete	8/1/84
228	8.3.1.1(1)	Voltage drop during transient conditions	Complete	8/1/84
229	8.3.1.1(2)	Basis for using bus voltage versus actual connected load voltage in the voltage drop analysis	Complete	8/1/84
230	8.3.1.1(3)	Clarification of Table 8.3-11	Complete	8/1/84
231	8.3.1.1(4)	Undervoltage trip setpoints	Complete	8/1/84
232	8.3.1.1(5)	Load configuration used for the voltage drop analysis	Complete	8/1/84
233	8.3.3.4.1	Periodic system testing	Complete	8/1/84
234	8.3.1.3	Capacity and capability of onsite AC power supplies and use of administrative controls to prevent overloading of the diesel generators	Complete	8/1/84
235	8.3.1.5	Diesel generators load acceptance test	Complete	8/1/84
236	8.3.1.6	Compliance with position C.6 of RG 1.9	Complete	8/1/84
237	8.3.1.7	Decription of the load sequencer	Complete	8/1/84
238	8.2.2.7	Sequencing of loads on the offsite power system	Complete	8/1/84

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
239	8.3.1.8	Testing to verify 80% minimum voltage	Complete	8/15/84
240	8.3.1.9	Compliance with BTP-PSB-2	Complete	8/1/84
241	8.3.1.10	Load acceptance test after prolonged no load operation of the diesel generator	Complete	8/20/84 (Rev. 1)
242	8.3.2.1	Compliance with position 1 of Regulatory Guide 1.128	Complete	8/1/84
243	8.3.3.1.3	Protection or qualification of Class 1E equipment from the effects of fire suppression systems	Complete	8/1/84
244	8.3.3.3.1	Analysis and test to demonstrate adequacy of less than specifi[illegible] separation	Complete	8/30/84 (Rev. 1)
245	8.3.3.3.2	The use of 18 versus 36 inches of separation between raceways	Complete	8/15/84 (Rev. 1)
246	8.3.3.3.3	Specified separation of raceways by analysis and test	Complete	8/1/84
247	8.3.3.5.1	Capability of penetrations to withstand long duration short circuits at less than maximum or worst case short circuit	Complete	8/1/84
248	8.3.3.5.2	Separation of penetration primary and backup protections	Complete	8/1/84
249	8.3.3.5.3	The use of bypassed thermal overload protective devices for penetration protections	Complete	8/1/84
250	8.3.3.5.4	Testing of fuses in accordance with R.G. 1.63	Complete	8/1/84

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
251	8.3.3.5.5	Fault current analysis for all representative penetration circuits	Complete	8/1/84
252	8.3.3.5.6	The use of a single breaker to provide penetration protection	Complete	8/1/84
253	8.3.3.1.4	Commitment to protect all Class 1E equipment from external hazards versus only class 1E equipment in one division	Complete	8/1/84
254	8.3.3.1.5	Protection of class 1E power supplies from failure of unqualified class 1E loads	Complete	8/1/84
255	8.3.2.2	Battery capacity	Complete	8/1/84
256	8.3.2.3	Automatic trip of loads to maintain sufficient battery capacity	Complete	8/20/84
257	8.3.2.5	Justification for a 0 to 13 second load cycle	Complete	8/1/84
258	8.3.2.6	Design and qualification of DC system loads to operate between minimum and maximum voltage levels	Complete	8/1/84
259	8.3.3.3.4	Use of an inverter as an isolation device	Complete	8/1/84
260	8.3.3.3.5	Use of a single breaker tripped by a LOCA signal used as an isolation device	Complete	8/1/84
261	8.3.3.3.6	Automatic transfer of loads and interconnection between redundant divisions	Complete	8/1/84
262	11.4.2.d	Solid waste control program	Complete	8/20/84

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
263	11.4.2.e	Fire protection for solid radwaste storage area	Complete	8/13/84
264	6.2.5	Sources of oxygen	Complete	8/20/84
265	6.8.1.4	ESF Filter Testing	Complete	8/13/84
266	6.8.1.4	Field leak tests	Complete	8/13/84
267	6.4.1	Control room toxic chemical detectors	Complete	8/13/84
268		Air filtration unit drains	Complete	8/20/84
269	5.2.2	Code cases N-242 and N-242-1	Complete	8/20/84
270	5.2.2	Code case N-252	Complete	8/20/84
TS-1	2.4.14	Closure of watertight doors to safety-related structures	Open	
TS-2	4.4.4	Single recirculation loop operation	Open	
TS-3	4.4.5	Core flow monitoring for crud effects	Complete	6/1/84
TS-4	4.4.6	Loose parts monitoring system	Open	
TS-5	4.4.9	Natural circulation in normal operation	Open	
TS-6	6.2.3	Secondary containment negative pressure	Open	
TS-7	6.2.3	Inleakage and drawdown time in secondary containment	Open	
TS-8	6.2.4.1	Leakage integrity testing	Open	
TS-9	6.3.4.2	ECCS subsystem periodic component testing	Open	

ATTACHMENT 1 (Cont'd)

OPEN ITEM	DSER SECTION NUMBER	SUBJECT	STATUS	R. L. MITTL TO A. SCHWENCER LETTER DATED
TS-10	6.7	MSIV leakage rate		
TS-11	15.2.2	Availability, setpoints, and testing of turbine bypass system	Open	
TS-12	15.6.4	Primary coolant activity		
LC-1	4.2	Fuel rod internal pressure criteria	Complete	6/1/84
LC-2	4.4.4	Stability analysis submitted before second-cycle operation	Open	

ATTACHMENT 2 DATE: 9/5/84

DRAFT SER SECTIONS AND DATES PROVIDED

SECTION	DATE	SECTION	DATE
3.1			
3.2.1		11.4.1	See Notes 1&5
3.2.2		11.4.2	See Notes 1&5
5.1		11.5.1	See Notes 1&5
5.2.1		11.5.2	See Notes 1&5
6.5.1	See Notes 1&5	13.1.1	See Note 4
8.1	See Note 2	13.1.2	See Note 4
8.2.1	See Note 2	13.2.1	See Note 4
8.2.2	See Note 2	13.2.2	See Note 4
8.2.3	See Note 2	13.3.1	See Note 4
8.2.4	See Note 2	13.3.2	See Note 4
8.3.1	See Note 2	13.3.3	See Note 4
8.3.2	See Note 2	13.3.4	See Note 4
8.4.1	See Note 2	13.4	See Note 4
8.4.2	See Note 2	13.5.1	See Note 4
8.4.3	See Note 2	15.2.3	
8.4.5	See Note 2	15.2.4	
8.4.6	See Note 2	15.2.5	
8.4.7	See Note 2	15.2.6	
8.4.8	See Note 2	15.2.7	
9.5.2	See Note 3	15.2.8	
9.5.3	See Note 3	15.7.3	See Notes 1&5
9.5.7	See Note 3	17.1	8/3/84
9.5.8	See Note 3	17.2	8/3/84
10.1	See Note 3	17.3	8/3/84
10.2	See Note 3	17.4	8/3/84
10.2.3	See Note 3		
10.3.2	See Note 3		
10.4.1	See Note 3		
10.4.2	See Notes 3&5		
10.4.3	See Notes 3&5		
10.4.4	See Note 3		
11.1.1	See Notes 1&5		
11.1.2	See Notes 1&5		
11.2.1	See Notes 1&5		
11.2.2	See Notes 1&5		
11.3.1	See Notes 1&5		
11.3.2	See Notes 1&5		

Notes:

1. Open items provided in letter dated July 24, 1984 (Schwencer to Mittl)
2. Open items provided in June 6, 1984 meeting
3. Open items provided in April 17-18, 1984 meeting
4. Open items provided in May 2, 1984 meting
5. Draft SER Section provided in letter dated August 7, 1984 (Schwencer to Mittl)

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DATE: 9/5/84

ATTACHMENT 3

Open Item	DSER Section	Subject
115	5.3.4	Drop weight and Charpy V-notch tests for closure flange materials
176b	14.2	Initial plant test program

M P84 95/03 02

ATTACHMENT 4

DSER Open Item No. 115 (Section 5.3.4)

DROP WEIGHT AND CHARPY V-NOTCH TESTS FOR CLOSURE FLANGE MATERIALS

Provide drop weight test and Charpy V-notch test results from the closure flange region materials to demonstrate compliance with the closure flange requirements of Appendix G, 10 CFR 50.

RESPONSE

For the information requested above, see the response to Question 251.4.

QUESTION 251.4:

Provide drop weight test and Charpy V-notch test results from the closure flange region materials to demonstrate compliance with the closure flange requirements of Appendix G, 10 CFR 50.

RESPONSE

Available drop-weight and Charpy V-notch test results for the Hope Creek Unit 1 closure flange ^region materials are provided below:

Material	Orientation	NDT Temp. (°F)	Test Temp. (°F)	Absorbed Energy (Ft-lbs)	Lateral Expansion (Mils)
SA508, Cl.2	Longitudinal	-20/	-40	64.1,70.6,20.8,77.1	48,51,11,58,
(Head Flange)		-10	-10	93.1,114.7,106.6,	64,78,62,55,
		@180°		87.8,97.1,71.9	64,49
		AWAY	10	81.1,108,133.6,	49,68,78,95,
				137.6,165.1	68,74
			40	157.4,121.5,137.6,	89,73,77,86,
				134.9,144.3,137.6	79,85
			60	199.9,154.8,159.9,	77,69,88,87,
				195.4,144.3,170.1	82,73
SA508,Cl.2	Longitudinal	-10	10	120.1,122.8,130.9,	77,81,83,81,
(Shell Flange)				130.9,132.3,116.1	77,64
			-10	120.1,95.8,128.2,	72,58,80,75,
				109.3,101.2,87.8	59.57
			+40	141.6,134.9,141.6,	81,77,84,82,
				145.6,167.6,182.4	85,89
			-40	13.4,69.3,59.0,55.2,	7,48,41,38,
				74.5,101.2	54,68
SA533 Gr.B Cl.1 (Top 'Petal' Plate connected to Head Flange)					
(PIECE T2A)	Longitudinal		10	46.5, 39.2, 39.2	36, 34, 33
				103.9, 81.1, 95.8	73, 59, 54
(PIECE T2B)	"		10	77.1, 70.6, 79.8	55, 55, 64
				74.5, 71.9, 61.5	59, 55, 50
(PIECE T2C)	"		10	85.1, 70.6, 81.1	67, 53, 62
				95.8, 86.1, 85.1	70, 65, 70
(PIECE T2D)	"		10	69.3, 73.2, 87.8	57, 57, 72
				61.5, 66.7, 85.1	59, 63, 72
SA 533, Gr.B, Cl.1 (UPPER SHELL CONNECTED TO Shell Flange)					
(PIECE S1C)	Longitudinal		10	71.8, 46.9, 61.5	59, 39, 53
				66.7, 73.2, 62.4	52, 58, 49
(PIECE S2A)	"		10	74.6, 87.8, 59.0	57, 74, 45
				65.4, 74.6, 79.8	52, 55, 65
(PIECE S2C)	"		10	84.7, 95.8, 96.8	65, 75, 79
				90.0, 55.2, 89.1	70, 44, 71

* In accordance with the ASME Code and G.E. specification requirements the weld metals joining the flange region materials have CVN absorbed energy values of at least 30 Ft-lbs at +10°F.

Rev 1

DSER OPEN ITEM 176b (Section 14.2)

INITIAL PLANT TEST PROGRAM

The following FSAR Subsection 14.2.12 test abstracts should be modified as stated to provide adequate acceptance criteria:

Test Abstract	Modification
1.5.d.1	A reference should be provided for acceptable closing times.
1.7.d.1 1.15.d.2	A reference should be provided for the design specifications.
1.23.d.4 d.6	Reference should be 6.2.5.2.5 Reference should be 6.2.5.2.3
1.35.d.6	A reference should be provided regarding safe levels of hydrogen buildup
1.41.d.1	A reference should be provided regarding the appropriate accuracy of response
1.47.d.4	A reference should be provided for the prescribed time.
1.52.d.2 1.60.d.3 1.61.d.1 1.65.d.2 1.71.d.2 3.24.d.5	The parameters in these tests should meet or exceed the design values described in their respective references; they should not simply "be comparable" or "compare favorably.
1.68.e.1	A reference should be provided regarding the negative pressure specification.

Additionally, all startup tests should be modified to specify the appropriate level of acceptance criteria (Level 1, 2, or 3) as defined in FSAR Subsection 14.2.12.2.

RESPONSE

FSAR Section 14.2.12.1 was revised in Amendment 6 to provide the information requested above.

In addition, Section 14.2.12.1.7.d.1 and 14.2.12.3.24.d.5 has been revised to reflect the new GE Test Specifications and additional NRC comments and all the startup tests in Section 14.2.12.3 have been modified to specify the appropriate level of acceptance criteria.

d. Acceptance Criteria

1. All valves, alarms, controls, interlocks, and logic shall function in accordance with the ~~system electrical schematics~~ GE Preoperational test specification for core spray.

2. For the core spray test mode and core spray injection mode, the pump head/flow requirements, the NPSH requirements, and the system design flow requirements meet the GE preoperational test specification acceptance criteria.

3. All modes of operation and flow paths shall be as specified in the GE preoperational test specifications.

4. The jockey pump can fill and pressurize the core spray system

14.2.12.1.8 BF-Control Rod Drive - Hydraulic

a. Objective

The test objective is to demonstrate that the control rod drive (CRD) system is fully operational, and that all components, including the hydraulic drive mechanism, manual control system, rod position indicator system, and all safety and control devices, function per design.

b. Prerequisites

1. All component tests have been completed and approved.

2. AC and dc power are available.

3. All instrumentation has been calibrated and instrument loop checks completed.

their recommendations. This report must discuss alternatives of action, as well as the concluding recommendation, so that it can be evaluated by all related parties.

Level 3

If level 3 performance is not satisfied, plant operating or startup test plans would not necessarily be altered. The numerical limits stated in this category are associated with expectations of individual component or inner control loop transient performance. Because overall system performance is a mathematical function of its individual components, one component whose performance is slightly worse than specified can be accepted if a system adjustment elsewhere will positively overcome this small deficiency. Large deviations from Level 3 performance are not allowable. Level 3 performance is also not specified in fuel or vessel protective systems. When a Level 3 performance is not satisfied, the subject component or inner loop must be analyzed closely. If all Level 1 and Level 2 criteria are satisfied, then it is not required to repeat the transient test to satisfy Level 3 performance. The occurrence must be documented in the test report. Level 3 performance is to be viewed as highly desirable rather than required to be satisfied. Good engineering judgement is necessary in the application of these rules.

During performance of startup tests, technical specifications override any test in progress if plant conditions dictate.

14.2.12.3 Startup Test Procedures

14.2.12.3.1 Chemical and Radiochemical Monitors and Sample Systems

a. Objectives

The tests provide verification of the sample systems' ability to:

1. Maintain quality control of the plant systems' chemistry and ensure that sampling equipment, procedures, and analytical techniques supply the

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data required to demonstrate that fluids meet quality specifications and process requirements

2. Monitor fuel integrity, operation of filters and demineralizers, condenser tube integrity, operation of the offgas system and steam separator-dryer, and tuning of system monitors.

b. Prerequisites

Intrument calibration and preoperational testing of chemical, radiation, and radiochemical monitors have been completed.

c. Test Method

Prior to fuel loading, a complete set of chemical and radiochemical samples are taken to ensure that all sample stations are functioning properly and to determine the initial concentrations. During reactor heatup, subsequent to fuel loading, samples are taken and measurements made at each major power level plateau to determine the chemical and radiochemical quality of reactor water and reactor feedwater, amount of radiolytic gas in the steam, gaseous activities after the air ejectors, decay time in the gaseous radwaste lines, and performance of filters and demineralizers. Baseline data for the main steam process radiation monitoring subsystems and the offgas monitoring subsystems is also taken at each major power level plateau. Adjustments are made, as required, to monitors in the liquid waste management system (LWMS), liquid process lines, and offgas treatment system.

d. Acceptance Criteria

Level 1:

The chemical and radiochemical, and water of quality factors are maintained within the technical specifications and fuel warranty requirements. Gaseous, particulate, and liquid effluents' activities shall conform with Technical Specifications.

14.2.12.3.2 Radiation Measurements

a. Objective

The test objective is to monitor radiation at selected power levels during plant operation to ensure the adequacy of shielding for personnel protection, and to verify compliance with 10 CFR 20.

b. Prerequisites

Prior to fuel loading, a survey of natural background radiation is made at selected locations throughout the plant site.

c. Test Method

During reactor heatup and at selected power levels subsequent to fuel loading, gamma dose rates, and where appropriate, neutron dose rate measurements are made at specific locations around the plant including all potentially high radiation areas.

d. Acceptance Criteria

Level 1:

Plant radiation doses and personnel occupancy times shall be within allowable limits, as defined in 10 CFR 20.

14.2.12.3.3 Fuel Loading

a. Objective

The test objective is to load fuel safely and efficiently to the full core size.

b. **Prerequisites**

Section 14.2.10 (initial fuel loading) describes the prerequisites for commencing fuel loading.

c. **Test Procedure**

The fuel loading procedure includes any tests performed during the fuel loading evolution, including subcriticality checks, shutdown margin verifications, and control rod functional checks.

d. **Acceptance Criteria**

Level 1:

The core shall be fully loaded in accordance with established procedures and the core shall be subcritical by at least 0.38% $\Delta K/K$ with the analytically determined strongest rod withdrawn.

14.2.12.3.4 **Full Core Shutdown Margin**

a. **Objective**

The test objective is to demonstrate that the reactor will remain subcritical throughout the first fuel cycle with the most reactive control rod withdrawn.

b. **Prerequisites**

The core is fully loaded at ambient temperature in the xenon-free condition.

c. **Test Method**

The shutdown margin is measured by withdrawing selected control rods until criticality is reached. The empirical data is reviewed and compared with design data to determine the test results.

d. Acceptance Criteria

Level 1:

The shutdown margin measurements shall verify that the core remains subcritical with the most reactive control rod withdrawn and all other control rods fully inserted by at least 0.38% ΔK/K. ~~Additionally,~~ criticality should occur within ±1.0% ΔK/K of the predicted critical.

Level 2:

14.2.12.3.5 Control Rod Drive System

a. Objective

The test objective is to obtain the baseline data for the CRD system, and to demonstrate that the system operates over the full range of primary coolant conditions, from ambient to operating.

b. Prerequisites

Preoperational testing of the CRD system has been completed and the system is ready for operation.

c. Test Method

The startup tests performed on the CRD system are an extension of the preoperational tests. Initial post fuel load tests with zero reactor pressure include position indication, normal insert/withdraw stroking, friction testing, and scram testing. Coupling checks are verified using station operating procedures. Following initial heatup to rated reactor pressure, the friction and scram test is accomplished. Following initial heatup, the four slowest CRDs are measured for scram times following planned reactor scram as detailed on Figure 14.2-5. In addition, proper response of the CRD flow control valve will be verified.

d. Acceptance Criteria

The insert and withdrawal times, scram times, and friction test results shall meet the requirements of the GE startup test specification limits. The CRD system flow requirements and flow control valve

Level 1:

The withdrawal speeds and scram times shall meet the requirements of the GE startup test specifications.

Level 2:

The friction test results shall meet the requirements of the GE startup test specifications.

Level 3:

The CRD system flow requirements and flow control value response shall meet the requirements of the GE startup test specifications.

~~response meets the requirements of the GE startup test specification.~~

14.2.12.3.6 Source Range Monitor Performance and Control Rod Sequence

a. Objective

The test objective is to demonstrate that the neutron sources, SRM instrumentation, and rod withdrawal sequences provide adequate information to achieve criticality and increase power in a safe and efficient manner. ~~The effects of typical rod movements on reactor power are recorded and evaluated.~~

Delete

b. Prerequisites

Fuel loading is complete, neutron sources have been installed, and all control rods have been inserted. The CRD system is operational.

c. Test Method

With the neutron sources installed, source range monitor count rate data is taken and compared to the required signal count and signal count-to-noise count ratio. Source range data is taken during rod withdrawals to the point of criticality. [See Attach B.] During heatup to rated temperature, critical rod patterns are recorded. Rods will be withdrawn in accordance with a pre-established withdrawal sequence. Movement of rods in a prescribed sequence is monitored by the RWM and RSCS which prevents out of sequence movement. ~~As the withdrawal of each rod group is completed during power ascension, the electrical power, system flow, and APRM response will be recorded.~~

Delete

d. Acceptance Criteria

Attach. A →

~~The neutron signal count-to-noise count ratio and minimum counts of the SRMs shall meet the requirements of the GE startup test specification.~~ See attach.

ATTACH. A

Level 1:

There must be a neutron signal count-to-noise count ratio of at least two and a minimum neutron count rate of 1/2 counts/second on the required operable SRMs.

ATTACH. B.

Initial criticality will be approached with a period greater than 30 seconds.

14.2.12.3.7 Rod Sequence Exchange

This Test Has Been Deleted

14.2.12.3.8 Intermediate Range Monitor Performance

a. Objective

The test objective is to determine IRM system response to neutron flux and to optimize the IRM overlap with the SRMs and APRMs.

b. Prerequisites

The reactor is critical and the IRM gains have been set at maximum for conservatism.

c. Test Method

After criticality, and when flux level is sufficient, the IRM response to neutron flux and the IRM/SRM overlap is verified. Following the calibration of the APRM, the IRM gains are adjusted if necessary. If any adjustments are made, the overlap of the SRM and IRM is verified when flux levels are in the appropriate range.

d. Acceptance Criteria

Level 1:

Each IRM channel must be on scale before the SRMs exceed their rod block setpoint. Each APRM must be on scale before the IRMs exceed their rod block setpoint. Level 2: ~~Also,~~ each IRM should be adjusted for half decade overlap with SRMs and one decade overlap with APRMs.

14.2.12.3.9 Local Power Range Monitor Calibration

a. Objective

The test objective is to calibrate the LPRM.

b. Prerequisites

Reactor power and LPRM gains are sufficient to observe detector response. The process computer or other means are available for determining calibration factors.

c. Test Method

Core power is maintained at the specified level for a sufficient time to allow equilibrium conditions to be established. The process computer computes the average heat flux and calibration factor for each LPRM. Each LPRM is calibrated in accordance with the calibration procedure.

d. Acceptance Criteria

Level 2:

Each LPRM reading should be within 10% of its calculated value.

14.2.12.3.10 Average Power Range Monitor Calibration

a. Objective

The test objective is to calibrate the APRM.

b. Prerequisite

The core is in a steady-state condition at the desired power level and core flow rate. Instrumentation used to determine core thermal power has been calibrated.

c. Test Method

A heat balance is taken at selected power levels. Each APRM channel reading is adjusted to agree with the core thermal power as determined from the heat balance. In addition, the APRM channels are calibrated at the frequency required by the Technical Specifications.

d. Acceptance Criteria

Level 1:

1. The APRM channels must be calibrated to read equal to or greater than the actual core thermal power.

2. Technical specification limits on APRM scram and rod block must not be exceeded.

3. In the startup mode, all APRM channels must produce a scram at less than or equal to the thermal power setpoint required by technical specification.

Level 2:

1. With the above criteria met, the APRMs are considered accurate if they agree with the heat balance ~~required by the GE startup test specification~~ or the minimum value required based on TPF, MLHGR, and fraction of rated power to within the limits specified in the GE startup test specification.

14.2.12.3.11 NSSS Process Computer

a. Objective

The test objective is to verify the performance of the process computer under plant operating conditions.

b. Prerequisites

Computer calculational programs have been verified using simulated input conditions. The computer room HVAC is operational and plant data is available for computer processing.

c. Test Method

During plant heatup and ascension to rated power following fuel loading, the NSSS and the balance-of-plant system process variables sensed by the computer become available. The validity of these variables is verified and the results of performance calculations of the NSSS and the balance-of-plant (BOP) are checked for accuracy.

d. Acceptance Criteria

Level 2:

1. The process computer performance codes calculating the minimum critical power ratio (MCPR), linear heat generation rate (LHGR), and maximum average planar heat generation rate (MAPLHGR), and an independent method of calculation shall not differ in their results by more than the value specified in the GE startup test specification.

2. The LPRM calibration factors calculated by the independent method and the process computer shall not differ by more than the value specified in the GE startup test specification.

Delete ~~3. The remaining programs shall be considered operational upon successful completion of the static and dynamic testing.~~

14.2.12.3.12 Reactor Core Isolation Cooling System

a. Objective

The test objective is to verify the proper operation of the RCIC over its required operating pressure range.

b. Prerequisite

Fuel loading has been completed and sufficient nuclear heat is available to operate the RCIC pump. Instrumentation has been installed and calibrated.

c. Test Method

The RCIC system is designed to be tested in two ways:

1. By flow injection into a test line leading to the condensate storage tank (CST), and

2. By flow injection directly into the reactor vessel.

The earlier set of CST injection tests consist of manual and automatic mode starts at 150 psig and near rated reactor pressure conditions. The pump discharge pressure during these tests is throttled to be 100 psi above the reactor pressure to simulate the largest expected pipeline pressure drop. This CST testing is done to demonstrate general system operability and for making most controller adjustments.

Reactor vessel injection tests follow to complete the controller adjustments and to demonstrate automatic starting from a cold standby condition. "Cold" is defined as a minimum 72 hours without any kind of RCIC operation. Data will be taken to determine the RCIC high steam flow isolation trip setpoint while injecting at rated flow to the reactor vessel.

After all final controller and system adjustments have been determined, a defined set of demonstration tests must be performed with that one set of adjustments. Two consecutive reactor vessel injections starting from cold conditions in the automatic mode must satisfactorily be performed to demonstrate system reliability. Following these tests, a set of CST injections are done to provide a benchmark for comparison with future surveillance tests.

After the auto start portion of certain of the above tests is completed, and while the system is still operating, small step disturbances in speed and flow command are input (in manual and automatic mode respectively) in order to demonstrate satisfactory stability. This is to be done at both low (above minimum turbine speed) and near rated flow initial conditions to span the RCIC operating range.

A demonstration of extended operation of up to two hours (or until pump and turbine oil temperature is stabilized) of continuous running at rated flow conditions is to be scheduled at a convenient time during the startup test program.

Depressing the manual initiation pushbutton is defined as automatic starting or automatic initiation of the RCIC system.

d. Acceptance Criteria

Level 1:

1. Following automatic initiation, the pump discharge flow must be equal to or greater than rated flow as specified in Section 5.4.6 within the time specified by the GE startup test specification.

2. The RCIC turbine shall not trip or isolate during automatic or manual start tests.

Level 2:

3.1. The turbine gland seal system is capable of preventing steam leakage to the environment.

4.2. The delta-pressure setpoints for RCIC steam supply line high flow isolation trip shall be calibrated to the requirements of technical specifications using actual flow conditions.

5.3. To provide overspeed and isolation trip avoidance margin, the transient start speed peaks must not exceed the requirements of the GE startup test specification.

6.4. The speed and flow control loops are adjusted to meet the decay ratio specified in the GE startup test specification.

14.2.12.3.13 High Pressure Coolant Injection System

a. Objective

The test objective is to verify the proper operation of the HPCI over its required operating pressure range.

b. Prerequisite

Fuel loading has been completed and sufficient nuclear heat is available to operate the HPCI pump. Instrumentation has been installed and calibrated.

c. Test Method

The HPCI system is designed to be tested in two ways:

1. By flow injection into a test line leading to the condensate storage tank (CST), and

2. By flow injection directly into the reactor vessel.

The earlier set of CST injection tests consist of manual and automatic mode starts at 150 psig and near rated reactor pressure conditions. The pump discharge pressure during these tests is throttled to be 100 psi above the reactor pressure to simulate the largest expected pipeline pressure drop. This CST testing is done to demonstrate general system operability and for mal .ng most controller adjustments.

Reactor vessel injection tests follow to complete the controller adjustments and to demonstrate automatic starting from a cold standby condition. "Cold" is defined as a minimum 72 hours without any kind of HPCI operation. Data will be taken to determine the HPCI high steam flow isolation trip setpoint while injecting at rated flow to the reactor vessel. Dpressing the manual initiation pushbutton is defined as automatic starting or automatic initiation of the HPCI system.

After all final controller and system adjustments have been determined, a defined set of demonstration tests must be performed with that one set of adjustments. Two consecutive reactor vessel injections starting from cold conditions in the automatic mode must satisfactorily be performed to demonstrate system reliability. Following these tests, a set of CST injections are done to provide a benchmark for comparison with future surveillance tests.

After the auto start portion of certain of the above tests is completed, and while the system is still operating, small step disturbances in speed and flow command are input (in manual and automatic modes respectively) in order to demonstrate satisfactory stability. This is to be done at both low (above minimum turbine speed) and near rated flow initial conditions to span the HPCI operating range.

A continuous running test is to be scheduled at a convenient time during the startup test program. This demonstration of extended operation should be for up to 2 hours or until steady turbine and pump conditions are reached or until limits on plant operation are encountered.

d. Acceptance Criteria

Level 1:

1. Following automatic initiation, the pump discharge flow must be equal to or greater than the rated flow, and within the time specified in Section 6.3.2.2.1.

2. The HPCI turbine shall not isolate or trip during automatic or manual start tests.

Level 2:

3. The speed and flow control loops are adjusted to meet the decay ratio specified in the GE startup test specification.

4. The turbine gland seal system is capable of preventing steam leakage to the atmosphere.

5. The delta-pressure setpoints for HPCI steam supply line high flow shall be calibrated to technical specification requirements using actual flow conditions.

6. In order to provide overspeed and isolation trip avoidance margin, the transient start speed peaks must not exceed the requirements of the GE startup test specification.

14.2.12.3.14 Selected Process and Water Level Reference Leg Temperatures

a. Objectives

1. To establish low speed limits for the recirculation pumps to avoid coolant temperature stratification in the reactor pressure vessel (RPV) bottom head region

2. To ensure that the measured bottom head drain temperature corresponds to bottom head coolant temperature during normal operation.

3. To measure the reactor water level instrument reference leg temperature and recalibrate the affected indicators if the measured temperature is different than expected.

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b. Prerequisites

The plant is in a hot standby condition. System and test instrumentation have been installed.

c. Test Method

During initial heatup at hot standby conditions, the bottom drain line temperature and applicable reactor parameters are monitored as the recirculation pump speed is slowly lowered to determine the proper setting of the low speed limiter. The parameters above are also monitored during planned recirculation pump trips to determine if temperature stratification occurs in the idle loop(s) and to assure that idle loop-to-bulk coolant temperature differentials are within Technical Specification limits prior to restarting the pump(s). The bottom drain line temperature and applicable parameters are monitored when core flow is 100% of rated flow.

A test is also performed at rated temperature and pressure under steady state conditions to verify that the reference leg temperature of the level instrumentation is the value assumed during initial calibration. Recalibration will be performed if necessary.

d. Acceptance Criteria

Level 1:

1. The reactor recirculation pumps shall not be started unless the loop to loop delta-temperatures and steam dome to bottom drain delta-temperatures are within the technical specification limits.

Level 2:

2. 1. During two pump operation at 100% core flow, the difference between the bottom drain line thermocouple and recirculation loop thermocouple is within the delta-temperature required in the GE startup test specification.

3. 2. The difference between actual reference leg temperature and the value used for calibration is less than the amount specified in the GE startup test specification.

14.2.12.3.15 System Expansion

a. Objective

The test objective is to demonstrate that major components and piping systems throughout the plant are free and unrestrained with regard to thermal expansion.

b. Prerequisites

Fuel loading has been completed and cold plant data has been recorded. Instrumentation required has been installed and calibrated. The system piping to be tested is supported and restrained properly.

c. Test Method

During heatup, observations and recordings of the horizontal and vertical movements of major equipment and piping in the NSSS and auxiliary systems are made in order to ensure that components are free to move as designed. Adjustments are made if necessary to allow freedom of movement. Snubbers, whose testing requirements are governed by technical specifications, will be monitored for thermal movement. The systems to be monitored are listed in Section 3.9.2.

d. Acceptance Criteria

Level 1

1. There shall be no evidence of blocking of the displacement of any system component caused by thermal expansion of the system.

2. Inspected hangers shall not be bottomed out or have the spring fully stretched.

3. The position of the shock suppressors shall be such as to allow adequate movement at operating temperature.

4. The piping displacements at the established transducer locations shall not exceed the limits

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specified by the piping designer, which are based on not exceeding ASME Section III Code stress values. These specified displacements will be used as acceptance criteria in the appropriate startup test procedures.

14.2.12.3.16 ~~Core Power Distribution~~ TIP Uncertainty

a. Objective

The test objective is to demonstrate the reproducibility of the TIP system readings.

b. Prerequisites

The core is at steady-state power level with equilibrium xenon, so as to require no rod motion or change in core flow to maintain power level during data acquisition by the TIP system.

c. Test Method

1. Core power distribution data are obtained during the power ascension test program. Axial power distribution data are obtained at each TIP location. At intermediate and higher power levels, several sets of TIP data are obtained to determine the overall TIP uncertainty.

2. TIP data are obtained with the reactor operating with a symmetric rod pattern and at steady-state conditions. The total TIP uncertainty for the test is calculated by averaging the total TIP uncertainty determined from each set of TIP data. The TIP uncertainty is made up of random noise and geometric components.

3. Core power symmetry is also calculated using the TIP data. Any asymmetry, as determined from the analysis, will be accounted for in the calculations for MCPR.

d. Acceptance Criteria

Level 2:

The total TIP uncertainty shall be within the specified limits required in the GE startup test specification.

14.2.12.3.17 Core Performance

a. Objective

The test objective is to evaluate the principal thermal and hydraulic parameters associated with core behavior.

b. Prerequisites

The plant is operating at a steady-state power level.

c. Test Method

With the core operating in a steady-state condition, the core performance evaluation is used to determine the following principal thermal and hydraulic parameters associated with core behavior:

1. Core flow rate

2. Core thermal power level

3. MLHGR

4. MCPR

5. MAPLHGR.

d. Acceptance Criteria

Level 1:

Core flow rate, core thermal power level, MLHGR, MCPR, and MAPLHGR not exceed the limits specified by the plant technical specifications.

14.2.12.3.18 Warranty Test

a. Objective

The test objective is to demonstrate the reliability of the NSSS and to measure the steam production rate and plant heat rate.

b. Prerequisite

The plant has been stabilized at rated conditions. All required instrumentation has been installed and calibrated.

c. Test Method

The plant is operated for 100 hours at rated conditions. During the 100-hour run, the steam production rate and plant heat rate is measured.

d. Acceptance Criteria

Level 1:

The reliability of the NSSS and the ability of the NSSS to develop rated output shall be demonstrated to be within warranty specifications.

14.2.12.3.19 Core Power - Void Mode

a. Objective

The objective of this test is to measure the stability of the core power void dynamic response, and to demonstrate that its behavior is within specified design limits.

b. Prerequisites

The core is maintained in a steady-state condition prior to the starting of this test.

c. Test Method

The core power void loop mode, that results from a combination of the neutron kinetics and core thermal hydraulics dynamics, is least stable near the natural circulation end of the rated 100% power rod line. A fast change in the reactivity balance is obtained by two methods: (1) pressure regulator step change, and (2) by moving a very high worth control rod one or two notches. Both local flux and total core response will be evaluated by monitoring selected LPRMs during the transient.

d. Acceptance Criteria

Level 1:

The transient response of any system-related variables to any test input must not diverge. System related variables are heat flux and reactor pressure.

14.2.12.3.20 Pressure Regulator

a. Objectives

1. To determine optimum pressure regulator setting to control transients induced in the reactor pressure control system.

2. To demonstrate the takeover capability of the backup pressure regulator via simulated failure of the controlling pressure regulator and to set the regulating pressure difference between the two regulators and an appropriate value.

3. To demonstrate smooth pressure control transition between the turbine control valves and bypass valves.

b. Prerequisites

Instrumentation has been checked and calibrated. The plant is at a steady-state power level.

c. Test Method

The pressure setpoint is decreased rapidly and then increased rapidly by about 10 psi. The response of the system is measured in each case. The backup pressure regulator is tested by simulating failure of the operating pressure regulator. The bypass valve is tested by reducing the load limit, which requires the bypass valves to open and control the bypass steam flow. At certain test conditions, the results of the backup regulator test will be included with the core power - void mode test report.

d. Acceptance Criteria

Level 1:

1. The transient response of any pressure control system related variable to any test input must not diverge.

Level 2:

2.1 In the recirculation manual mode the response time from initiation of pressure setpoint change to the turbine inlet pressure peak should be less than that specified in the GE startup test specification.

3.2 Pressure control system deadband should be small enough that steady state limit cycles shall produce steam flow variations no greater than specified in the GE startup test specification.

4. 3 For all pressure regulator transients the peak neutron flux/peak vessel pressure should remain below the scram settings by the margins specified in the GE startup test specification.

8.4, The ratio of the maximum to the minimum value of the incremental change in pressure control signal divided by the incremental change in steam flow shall meet the requirements of the GE startup test specification.

Level 3:

6.1. Control or bypass valve motion responds to pressure input with deadband no greater than that required in the GE startup test specification.

~~7. Dynamics of both pressure regulators are similar.~~ DELETE

14.2.12.3.21 Feedwater Control System

a. Objectives

1. To evaluate and adjust feedwater controls

2. To demonstrate capability of the automatic core flow runback feature to prevent low water level scram following the trip of one feedwater pump at 100% power

3. To calibrate the feedwater speed controller and to verify that the maximum feedwater flow during pump runout does not exceed the flows assumed in Section 15.1.2.

4. To demonstrate response to feedwater temperature loss

5. To demonstrate acceptable reactor water level control.

b. Prerequisite

Instrumentation has been checked and calibrated as appropriate. The plant is operating at steady-state conditions.

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c. Test Method

1. Reactor water level setpoint changes of several inches are used to evaluate and adjust the feedwater control system (FCS) settings for all power and feedwater pump modes. The level setpoint change also demonstrates core stability to subcooling changes.

2. From near 100% power, one of the operating feedwater pumps is tripped. The automatic recirculation runback circuit will reduce recirculation pump speed to drop power to within the capacity of the remaining turbine driven feedwater pumps. It is not expected that the reactor will scram on low water level.

3. The condensate/feedwater system will be subjected to a loss of feedwater heating. The initial power level will be approximately 80% prior to the start of the test. It is expected that the feedwater temperature decrease will be less than 100°F.

4. Feedwater pumps and turbine parameters are monitored during the power ascension to demonstrate operability within specifications. This test includes initial calibration of the speed controllers, and verification that maximum feedwater flows do not exceed the flows assumed in the FSAR.

d. Acceptance Criteria

Level 1:

1. The transient response of any level control system related variable must not diverge.

Level 2:

~~2.~~ 1. Level control system oscillatory modes of response, open loop dynamic response, response to step disturbances, and steady state operation shall meet the requirements specified in the GE startup test specification.

3.2 For feedwater heater loss the maximum feedwater temperature decrease due to single failure is less than that specified in the GE startup test specification, and the resultant MCPR must be greater than the fuel thermal safety limit specified in the FSAR.

4.2 On the trip of one feedwater pump, the reactor shall avoid low water level scram by the margin specified by the GE startup test specification.

5.3 Maximum speed attained shall deliver flows consistent with the requirements specified by the GE startup test specification limits.

14.2.12.3.22 Turbine Valve Surveillance

a. Objective

The test objective is to demonstrate the methods to be used and the maximum power level for routine surveillance testing of the main stop, control, and bypass valves.

b. Prerequisite

The plant has been stabilized at the required power level.

c. Test Method

Individual main stop, control, and bypass valves are manually closed and reset at selected power levels. The response of the reactor is monitored and the maximum power level conditions for the performance of this test are determined. The rate of valve stroking and timing of the closed-open sequence are chosen to minimize the disturbance introduced.

d. Acceptance Criteria

Level 2:

Peak heat flux, vessel pressure, and steam flow shall remain below scram or isolation trip settings by a margin consistent with the GE startup test specification.

14.2.12.3.23 Main Steam Isolation Valves

a. Objectives

1. To functionally check the MSIVs at selected power levels and determine the maximum power level they can be tested at individually

2. To determine isolation valves' closure times.

3. To determine reactor transient behavior during and following simultaneous closure of all MSIVs.

b. Prerequisites

The plant has been stabilized at the required power level.

c. Test Method

1. Individual closure of each MSIV is performed at selected power levels to verify functional performance and to determine closure times. The maximum power level is determined for individual closure with ample margin to scram.

2. A test of the simultaneous full closure of all MSIVs is performed at about 100% power. Operation of the RCIC system and the relief valves is demonstrated. Reactor parameters are monitored to determine transient behavior of the system during the simultaneous full closure test. The reactor will immediately scram due to the actuation of the

MSIV position switches. Recirculation pumps will trip if Level 2 in the RPV is reached. The feedwater control system will prevent the RPV water level from reaching the steam lines.

d. Acceptance Criteria

Level 1:

1. MSIV closure times shall be as specified in the GE startup test specification.

Level 2:

2.1. Peak neutron flux, vessel pressure, and steam flow shall remain below scram or isolation trip settings by a margin consistent with design requirements when individually testing the MSIVs.

3.2. Following the full closure of all MSIVs, vessel pressure and heat flux level shall be as specified in the GE startup test specification.

put under Level 1

4.2. The RCIC system and relief valves shall function in accordance with the GE startup test specification following the MSIV closure from high power.

put under Level 2

put under Level 1 → 5.3 The reactor must immediately scram and the feedwater control system must prevent the water from reaching the main steam lines following full closure of MSIVs from high power.

14.2.12.3.24 Relief Valves

a. Objectives

1. To demonstrate proper operation of the main steam relief valves and determine their capacity

2. To demonstrate their leaktightness following operation.

b. Prerequisites

The reactor is on pressure control with adequate bypass or main steam flow.

c. Test Method

A functional test of each safety relief valve (SRV) shall be made as early in the startup program as practical. This is normally the first time the plant reaches 250 psig. The test is then repeated at rated reactor pressure. Bypass valves (BPV) response is monitored during the low pressure test and the electrical output response is monitored during the rated pressure test. The test duration will be about 10 seconds to allow turbine valves and tailpipe sensors to reach a steady state.

The tailpipe sensor responses will be used to detect the opening and subsequent closure of each SRV. The BPV and MWe responses will be analyzed for anomalies indicating a restriction in an SRV tailpipe.

Valve capacity will be based on certification by ASME code stamp and the applicable documentation being available in the onsite records. Note that the nameplate capacity/pressure rating assumes that the flow is sonic. This will be true if the back pressure is not excessive. A major blockage of the line would not necessarily be offset and it should be determined that none exists through the BPV response signatures.

Vendor bench test data of the SRV opening responses will be available onsite for comparison with Section 5.2.2. The acoustic monitoring subsystem will be monitored during the relief valve test program to determine that the setpoints do reflect valve open/valve closed conditions.

SRV opening and reclosure setpoint data will be obtained and evaluated during each high power trip test at which an SRV actuation is anticipated.

d. Acceptance Criteria

Level 1

1. There should be positive indication of steam discharge during the manual actuation of each valve.

See attached →

Level 2

2.1. Decay ratio for pressure control variables is as specified in the GE startup test specification.

3.2. The temperature measured by thermocouples on the discharge side of the valves should return to the temperature recorded before the valve was open as required in the GE startup test specification. The acoustic monitors shall indicate the valve is closed after valve closure.

4.3. During the 250 psig and the rated pressure functional tests, steam flow through each relief valve as compared to average relief valve flow is as specified in the GE startup test specification.

See Attached

~~5. The vendor bench data for SRV capacity compares favorably with Section 5.2.2 and the accident analysis.~~

14.2.12.3.25 Turbine Trip and Generator Load Rejection

a. Objective

The test objective is to demonstrate the proper response of the reactor and its control systems following trips of the turbine and generator.

b. Prerequisites

Power testing has been completed to the extent necessary for performing this test. The plant is stabilized at the required power level.

2. The vendor bench data for SRV capacity is greater than or equal to the values stated in Section 5.2.2 and the accident analysis.

c. Test Method

See insert #3 attached

~~The turbine is tripped at three different power levels throughout the power ascension program. For the turbine trip, the main generator breakers remain loaded for a time so there is no rise in turbine generator speed, whereas, in the generator trip, the main generator breakers open and residual turbine steam will cause a momentary rise in the generator speed.~~

At test condition 3, a turbine trip will be initiated manually from the control room. At test condition 6, a generator trip (load rejection) will be initiated by simulating a condition that will cause the generator output breakers to open. During both transients it is expected that the reactor will scram. ~~It is not expected the HPCI or RCIC will initiate.~~ see insert #4 attached Reactor water level, pressure, and heat flux will be monitored. The action of relief valves will be monitored.

A generator trip will be performed at low power such that nuclear boiler system steam generation is just within bypass valve capacity. The purpose of this test is to demonstrate scram avoidance.

During all three transients, main turbine stop, control, and bypass valve positions will be monitored. Prior to the low power generator trip, bypass valve capacity will be measured.

d. Acceptance Criteria

Level 1:

1. For turbine and generator trips at power levels greater than 50%, the response times of stop, control, and bypass valves shall be as specified in the GE startup test specification.

2. Feedwater control system settings must prevent flooding the main steam lines.

3. The reactor recirculation pump drive flow coastdown shall be as specified in the GE startup test specification.

INSERT # 3

This test is performed at three different power levels in the power ascension program. For the turbine trip, the main generator remains loaded for a time so there is no rise in turbine generator speed, whereas, in the generator trip, the main generator output breakers open and residual steam will cause a momentary rise in turbine generator speed.

INSERT # 4 (add to the sentence)

and the recirculation pump trip (RPT) breakers will open.

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4. The positive change in vessel dome pressure and heat flux must not exceed the limits specified in the GE startup test specification.

5. The total time delay from start of turbine stop valve motion or turbine control valve motion to complete suppression of electrical arc between the fully open contacts of the RPT circuit breakers shall be less than the limit specified in the GE startup test specification.

Level 2:

~~6~~. 1. The measured bypass valve capacity shall be equal to or greater than that required by the GE startup test specification, which compares bypass valve capacity to the accident analysis.

~~7~~. 2. There shall be no MSIV closure during the first three minutes of the transient and operator action shall not be required during that period to avoid the MSIV trip.

~~8~~. 3. For the generator trip within bypass valves capacity, the reactor shall not scram for initial thermal power valves within that bypass valve capacity and below the power level at which trip scram is inhibited.

~~9~~. 4. Low water level recirculation pump trip, HPCI and RCIC shall not be initiated.

~~10~~. 5. Feedwater level control shall avoid loss of feedwater due to high level trip during the event.

~~11~~. 6. The temperature measured by thermocouples on the discharge side of the valves should return to the temperature recorded before the valve was open as required in the GE startup test specification. The acoustic monitors shall indicate the valve is closed after valve closure.

14.2.12.3.26 Shutdown From Outside the Main Control Room

a. Objective

The test objective is to demonstrate that the reactor can be brought from an initial steady-state power level to hot standby and that the plant has the potential for being safely taken to a cold shutdown condition from hot standby from outside the main control room.

b. Prerequisites

The plant is operating at the required power level.

c. Test Method

Delete

The test will be performed at a low power level and will consist of demonstrating the capability to scram and initiate controlled cooling from outside the control room. The reactor will be scrammed ~~and isolated~~ from outside the control room after a simulated control room evacuation. Reactor pressure and water level will be controlled using SRVs, RCIC, and RHR from outside the control room during subsequent cooldown. The cooldown will continue until RHR shutdown cooling mode is placed in service from outside the control room. Alternatively, verification of satisfactory operation of RHR shutdown cooling mode from outside the control room may be done at some other, more convenient time during the startup program. In either case, coolant temperature must be lowered at least 50°F while in the shutdown cooling mode. During the shutdown cooling mode demonstration, cooling to the RHR heat exchanger via the safety auxiliaries cooling system and the station service water system will be accomplished from the remote shutdown panel. All other operator actions not directly related to reactor vessel level, temperature, and pressure control will be performed in the main control room. The plant will be maintained in hot standby condition for at least 30 minutes during the performance of this test.

d. Acceptance Criteria

Level 2:

During a simulated main control room evacuation, the ability to bring the reactor to hot standby and subsequently cool down the plant and control vessel pressure and water level shall be demonstrated using equipment and controls located outside the main control room.

14.2.12.3.27 Recirculation Flow Control

a. Objectives

1. To determine plant response to changes in the recirculation flow

2. To optimize the setting of the master flow controller

3. To demonstrate plant loading capability.

b. Prerequisites

The reactor is operating at steady-state conditions at the required power level.

c. Test Method

With the reactor plant at the 50% load line, the recirculation speed loops are tested using large plus and minus step changes and and the speed controller gains are optimized. After the speed loops have been optimized, the system may be switched to the master manual mode and the automatic load following mode loop shall be optimized.

When the plant is tested along the 100% load line, the recirculation system shall be tested by inserting small plus and minus step changes in the local manual and master manual modes. The automatic load following loop is also tested by means of small load demand changes.

During recirculation flow control testing at the 50% and 100% load lines no scrams due to neutron flux or heat flux changes transients are expected.

d. Acceptance Criteria

Level 1

1. The transient response to any recirculation system related variable to any test input must not diverge.

Level 2

~~2.~~ 1. A scram shall not occur due to recirculation flow maneuvers. Neutron flux and heat flux trip avoidance margins are as specified in the GE startup test specification.

~~3.~~ 2. The decay ratio of any oscillatory controlled variable must be less than that required by the GE startup test specification.

Delete ~~4. Closed and open speed loop adjustments are as specified in the GE startup test specification.~~

~~5.~~ 3. Steady state limit cycles shall not produce turbine steam flow variations greater than the value of steam flow specified in the GE startup test specification.

~~6.~~ 4. In the scoop tube reset function, if the speed demand meter has not been replaced by an error meter, the speed demand meter must agree with the speed meter within the GE startup test specifications.

14.2.12.3.28 Recirculation System

a. Objectives

1. To determine transient responses and steady-state conditions following recirculation pump trips at selected power levels

2. To obtain recirculation system performance data

3. To verify that cavitation in the recirculation system does not occur in the operating region of the power/flow map.

4. To verify the adequacy of the recirculation runback to mitigate a scram upon loss of one feedwater pump.

5. To verify that the feedwater control system can control water level without causing a turbine trip/scram following a single recirculation pump trip.

6. To demonstrate the adequacy of the recirculation pump restart procedure at the highest possible power level.

b. Prerequisites

The reactor is operating at steady-state conditions at required power level.

c. Test Method

Single pump trips are performed at test condition 3 and 6. Dual pump trip is demonstrated at test condition 3. The one-pump trip tests are to demonstrate that water level will not rise enough to threaten a high level trip of the main turbine or the feedwater pumps. The dual pump trip verifies the performance of the RPT circuit and the recirculation pump flow coastdown prior to the high power turbine generator trip tests. Single pump trips are initiated by tripping the MG set generator output breaker. ~~M-G set drive motor breaker.~~ Adequate margins to scrams and capability of the feedwater system to prevent a high level trip will be monitored. The two pump trip will be initiated by simultaneously tripping both recirculation RPT breakers using a test switch. The recirculation pump restart demonstrates the adequacy of the restart operating procedure at the highest possible power level.

delete

At several power and flow conditions, and in conjunction with sihgle pump trip recoveries, recirculation system parameters are recorded.

At test condition 3 and at near rated recirculation flow, a loss of a feedwater pump is simulated. This is done prior to an actual feedwater pump trip to determine the adequacy of recirculation pump runback feature in preventing a scram.

While at test condition 3, it will be demonstrated that the cavitation interlocks which runback the recirculation pumps on decreased feedwater flow are adequate to prevent operation where recirculation pump or jet pump cavitation can occur.

d. Acceptance Criteria

Level 1

1. During recovery from one pump-trip, the reactor shall not scram.

Level 2

2. Neutron flux, heat flux, and reactor water level scram avoidance margins are as specified in the GE startup test specification.

3. 2 The two pump drive flow coastdown time following a dual recirculation pump trip is as specified in the GE startup test specification.

4. 2 System performance parameters, including core flow, drive flow, jet pump M-ratio, core delta-pressure, recirculation pump efficiency and jet pump nozzle and riser plugging criteria are as specified in the GE startup test specification.

5. 3 Runback logic shall have settings adequate to prevent operation in areas of potential cavitation.

6. 4 The recirculation pump shall runback upon a trip of the runback circuit as required by the GE startup test specification.

14.2.12.3.29 Recirculation System Flow Calibration

a. Objective

The test objective is to perform a complete calibration of the installed recirculation system flow instrumentation, including specific signals to the plant process computer.

b. Prerequisites

The reactor is operating at steady-state conditions. The initial calibration of the recirculation system flow instrumentation has been completed.

c. Test Method

During the testing program at operating conditions required for rated flow at rated power, the jet pump flow instrumentation is adjusted to provide correct flow indication based on the jet pump flow. The flow-biased APRM/RBM system is adjusted to correctly follow core flow based on drive flow. Additionally, the total core flow and recirculation flow signals to the process computer will be calculated to read these two process variables.

d. Acceptance Criteria

Level 2

1. Jet pump flow instrumentation shall be adjusted such that the jet pump total flow recorder provides core flow at rated conditions.

2. The APRM/RBM flow bias instrumentation shall be adjusted to function per design at rated conditions, as specified in the GE startup test specification.

3. see attached

~~INSERT #~~ 5

The flow control system shall be adjusted to limit maximum core flow to the value specified by the GE startup test specification.

14.2.12.3.30 Loss of Turbine-Generator and Offsite Power

a. Objective

The objective of this test is to demonstrate the response of the reactor and electrical equipment and systems during loss of the main generator and offsite power.

b. Prerequisites

The SDGs are in the auto-start mode, and the plant is operating at power.

c. Test Method

With the power plant synchronized to the grid between 20% and 30% power, the main turbine generator will be tripped followed by manual trips of all offsite power to the 13.8 kV ring bus. This will simulate loss of turbine generator and offsite power.

Reactor water level and the operation of safety systems, including RPS, standby diesels, RCIC, and HPCI, will be monitored.

The loss of offsite power condition will be maintained for at least 30 minutes to demonstrate that necessary equipment, controls, and indication are available following the station blackout to remove decay heat from the core using only emergency power supplies and distribution systems.

d. Acceptance Criteria

Level 1:

1. All safety systems, such as the RPS, SDG, RCIC, and HPCI, function per design without manual assistance. Reactor parameters are maintained within acceptable design limits. Normal reactor cooling systems maintain adequate suppression pool water temperature, adequate drywell cooling, and

prevent actuation of the automatic depressurization system.

Level 2

2. Proper instrument display to the reactor operator shall be demonstrated, including power monitors, pressure, water level, control rod position, suppression pool temperature, and reactor cooling system status.

3.2. The temperature measured by thermocouples on the discharge side of the valve should return to the temperature recorded before the valve was open as required in the GE startup test specification. The acoustic monitors shall indicate the valve is closed after valve closure.

14.2.12.3.31 ~~Drywell~~ Piping Vibration Tests

a. Objective

The test objective is to verify that steady state vibration and transient induced pipe motion of systems discussed in Section 3.9.2 are acceptable.

b. Prerequisites

The system piping to be tested is supported and restrained properly. Instrumentation for monitoring vibration has been installed and calibrated, where applicable.

c. Test Method

This test is an extension of the preoperational test program. During steady state operation, designated pipes as delineated in Section 3.9.2 will be monitored for vibration. Dynamic vibration measurements will be made on applicable piping following various plant and system transients as specified in Sections 3.9.2.1.2.3, 3.9.2.1.3, and 3.9.2.2.4.

d. Acceptance Criteria

Level 1

The piping displacements at the established locations shall not exceed the limits specified by the piping designer, which are based on not exceeding ASME Section III Code stress values or ANSI B31.1 values. These acceptable vibration levels will be used as acceptance criteria in the appropriate piping vibration startup test procedures.

14.2.12.3.32 Reactor Water Cleanup System

a. Objective

The test objective is to demonstrate the operation of the RWCU system.

b. Prerequisites

The reactor has been operated at a near rated temperature and pressure long enough to achieve a steady-state condition.

c. Test Method

With the reactor at rated temperature and pressure, process variables are recorded during steady-state operation in three modes of operation of the RWCU system: blowdown, hot standby, and normal. The bottom head drain flow indicator will be calibrated by taking flow from the bottom drain only and using the RWCU system inlet flow indicator as a standard to compare against.

d. Acceptance Criteria

Level 2

1. The data indicating operation in the listed modes shall be acceptable as specified by the GE startup test specification.

2. Recalibrate bottom head flow indicator against RWCU flow indicator if the deviation is greater than GE startup test specifications.

3. Pump vibration as measured on the bearing housing and coupling end shall be less than or equal to GE startup test specifications.

14.2.12.3.33 Residual Heat Removal System

a. Objectives

1. To demonstrate the ability of the RHR system to remove residual and decay heat from the nuclear system, so that refueling and nuclear system servicing can be performed

2. To condense steam while the reactor is isolated from the main condenser, in conjunction with the RCIC system.

b. Prerequisites

Preoperational testing has been completed. The test procedure has been reviewed, approved, and released for testing. Instrumentation has been checked or calibrated as appropriate. The plant is at or near normal operating pressure and temperature.

c. Test Method

Three modes are tested to verify system capability under actual operating conditions. The modes to be tested are suppression pool cooling, shutdown cooling and steam condensing. During the operations, the heat transfer rate is controlled to maintain acceptable cooldown rates. Data are recorded and reviewed to verify the satisfactory operation of the RHR system within design limits.

d. Acceptance Criteria

Level 2:

1. The RHR system performance in the steam condensing mode, suppression pool cooling mode and shutdown cooling mode meets the requirements of the GE startup test specification.

14.2.12.3.34 Drywell and Steam Tunnel Cooling ~~System~~

a. Objective

The test objective is to demonstrate, under actual operating conditions, satisfactory ~~performance of the drywell atmospheric cooling systems~~ cooling of the drywell and steam tunnel, including concrete surrounding hot piping penetrations.

b. Prerequisites

Appropriate preoperational tests have been completed.
~~Airflow balancing of the system has been completed~~. Drywell Cooling
Power ascension testing is in progress.
Representative penetrations have been instrumented.

c. Test Method

Drywell atmospheric, steam tunnel atmospheric and penetration temperatures are monitored and recorded during plant heatup and power operation up to rated power. ~~Drywell temperatures are demonstrated to be at or below the design limits. Adjustments to air flows and/or cooling water flows are made, if required, to maintain acceptable temperature limits~~.

see attached #1

d. Acceptance Criteria

Level 1:

1. Drywell and steam tunnel atmospheric temperature control shall meet or exceed the limits specified in the plant technical specifications.

see attached #2

, steamtunnel atmospheric, (#1:)

In addition, drywell atmospheric, and hot piping penetration concrete temperatures are checked at various power levels, up to rated, with minimum drywell cooling capacity in service. Design temperature limits are verified to be met, and cooling system adjustments are made as required to maintain acceptable temperatures. 480/66

(#2:)

2. The concrete temperatures surrounding hot piping penetrations during normal operation shall not exceed the allowable local area limit for normal operations, specified in Section 3.8.2.

Gaseous Radwaste

14.2.12.3.35 ~~Offgas Treatment~~ System

a. Objective

The test objective is to demonstrate proper operation of the ~~offgas treatment~~ Gaseous Radwaste system over its expected operating range.

b. Prerequisites

Initial calibration of instrumentation has been completed. Power ascension testing is in progress.

c. Test Method

See attached #1

~~During startup and power operations, condenser offgas is processed by the offgas treatment system. During power ascension testing at steady-state conditions, system parameters of the offgas treatment system are monitored and recorded for evaluation of system performance.~~ Adjustments will be made, if necessary, to meet acceptable system performance.

d. Acceptance Criteria

Level 2:

~~The radioactive gaseous and particulate effluent from the offgas treatment system shall not exceed limits specified in the technical specifications.~~ System performance as verified by data analysis shall meet design requirements specified in Section 11.3.1. d and k.

14.2.12.3.36 Water Level Measurement

This test was included in Section 14.2.12.3.14.

#1/ During power ascension testing at steady-state conditions, gaseous radwaste system operational data for system flow, pressure, temperature, and dewpoint are recorded.

#2/

14.2.12.3.37 Penetration Temperature Test

This test was included in Section 14.2.12.3.34.

a. Objective

To verify that the drywell penetrations associated with hot piping systems provide adequate protection for the surrounding concrete.

b. Prerequisites

1. Power ascension testing is in progress.

2. Instrumentation is calibrated.

c. Test Method

During heatup and power operations, the concrete temperatures surrounding hot penetrations will be monitored.

d. Acceptance Criteria

The concrete temperatures surrounding hot piping penetrations shall not exceed 200°F.

Delete

14.2.12.3.38 Safety Auxiliaries Cooling System

a. Objective

The test objective is to demonstrate that the safety auxiliaries cooling system (SACS) performance margin is adequate to support engineered safety features equipment over their full range of design requirements.

b. Prerequisites.

Initial instrument calibrations have been completed. The plant is operating at the required test condition.

c. Test Method

During the performance of the RHR shutdown cooling mode test, the SACS will also be evaluated to determine the heat removal capacity of the system and demonstrate the capability of achieving cold shutdown within the time specified in the design specificiation. ~~During operation of other ESF equipment, the capability of SACS to maintain the required environment will be verified~~.

Delete

d. Acceptance Criteria

Level 1

~~The SACS cooling capability shall meet or exceed the requirements of Section 9.2.2.~~

14.2.12.3.39 BOP Piping Vibration and Expansion

This test was included in Sections 14.2.12.3.15 and 14.2.12.3.31.

See Attachment 2

Level 2:

The SACS heat exchanger shall meet or exceed the design heat removal capacity listed in Table 9.2-3.

Attachment 1

14.2.12.3.40 CONFIRMATORY INPLANT TEST OF SAFETY-RELIEF VALVE DISCHARGE

a. OBJECTIVE

The objective of this test is to confirm assumptions and methodologies used in the plant unique analysis (PUA) (see a summary report in Appendix 3B) and show that the loads and structural responses documented in the PUAR for SRV discharge related loads are conservative compared to the responses which occur during actual SRV discharges.

b. PREREQUISITES

1. Power level should be sufficient to support steady steam flow, during the test duration, through SRV discharge line with normal plant operating pressure at the SRV.

2. Instrumentation for monitoring loads and structural responses has been installed and calibrated.

c. TEST METHOD

A shakedown test will be conducted to verify the test set-up is functioning properly. The testing will consist of single valve actuations (SVA) and subsequent consecutive valve actuations (CVA) of the same valve. Selection of the SRV discharge line used for testing will be based on NUREG-0763, "Guidelines for Confirmatory Inplant Tests of Safety-Relief Valve Discharges for BWR Plants," recommendations. Data will be collected and analyzed by computer code to verify design analysis.

d. ACCEPTANCE CRITERIA

Level 1

The peak pool boundary pressure during air clearing and steam discharge during the valve actuation is less than the predicted valve specified in the PUAR.