Question 423.22

Our review of your test program description disclosed that the operability of several of the systems and components listed in Regulatory Guide 1.68 (Revision 2) Appendix A may not be demonstrated by your initial test program. Expand your test description to address the following listed items:

1. Preoperational Testing

- 1.a(2) (a) - Pressurizer
- 1.a(2) (b) - Pumps, motors, and associated power sources
- 1.a(2) (c) - Steam generators
- 1.a(2) (d) - Pressurizer relief valves and supports and restraints
- 1.a(2) (e) - Main steam isolation valves
- 1.a(2) (g) - Instrumentation used for monitoring system performance or performing permissive or prohibit interlock functions
- 1.a(2) (h) - Reactor vessel and internals
- 1.a(2) (i) - Safety valves
- 1.a(3) - Vibration test
- 1.a(4) - Pressure boundary integrity test
- 1.d(1) - Turbine bypass valves
- 1.d(2) - Steam line atmospheric dump valves
- 1.d(3) - Relief valves
- 1.d(4) - Safety valves
- 1.d(9) - Condensate storage system
- 1.e(1) - Steam generators
- 1.e(5) - Steam extraction system
- 1.e(10) - Feedwater heater and drain systems
- 1.h(1) (c) - ECCS demonstration
- 1.h(1) (d) - ECCS interlocks and isolation valves
- 1.h(4) - Containment combustible gas control
- 1.h(8) - Tanks and other sources of water for ECCS
- 1.h(10) - Ultimate heat sink
- 1.j(1) - Pressurizer pressure and level control
- 1.j(6) - Loose parts monitoring
- 1.j(7) - ECCS leak detection systems
- 1.j(8) - Automatic reactor power control system, T_{avg} control system
- 1.j(9) - Seismic instrumentation
- 1.j(17) - FW heater temperature, level, and bypass control
- 1.j(20) - Flooding detection
- 1.j(22) - PAMS
- 1.j(25) - Process computers
- 1.k(2) - Personnel monitors and radiation survey instruments
- 1.k(3) - HEPA filter and charcoal absorber in place tests
- 1.k(5) - Isolation of condenser offgas
- 1.k(7) - Isolation of liquid radwaste effluent
- 1.n(10) - Purification and cleanup of RCS
- 1.n(14) - HVAC systems (specifically Containment Subsystems other than RCFC, Purge, and Isolation Valve Cubicle HVAC, Fuel Handling Building HVAC, and Supplementary Fuel Pool Cooling)

Question 423.22 (Continued)

1.n(18)	-	Heat tracing and freeze protection
1.o(1)	-	Crane load tests
1.o(2)	-	Component handling interlocks
1.o(3)	-	Safety devices on fuel handling equipment

4. Low Power Testing

4.h	-	Chemical and radiochemical tests to demonstrate chemical control and analysis systems
4.i	-	Rod withdrawal inhibit and interlock
4.k	-	Operability of steam driven equipment
4.l	-	Operability of MSIVs and branch steam line valves at rated temperature and pressure
4.n	-	Control room computer
4.p	-	Demonstration of pressurizer and main steam relief valves at rated temperature
4.t	-	Performance of natural circulation test
	-	

5. Power Ascension Tests

5.l	-	ECCS demonstration
5.m	-	RCS demonstration
5.n	-	Loose parts monitoring baseline data
5.o	-	RCS leak detection
5.q	-	Verification of computer inputs and calculations
5.u	-	MSIV and branch line isolation valves
5.v	-	Main steam and feedwater verification
5.aa	-	Chemical and radiochemical control demonstration
5.bb	-	Neutron and gamma surveys
5.cc	-	Radwaste demonstrations
5.ii	-	Reactor coolant pump trip tests
5.kk	-	Loss of feedwater heater tests
5.mm	-	MSIV closure test
5.nn	-	Load rejection test
5.oo	-	Piping movement, vibration, and expansion

Response

The operability of the systems and components will be demonstrated either as a prerequisite to or during the tests as described by the test summaries as noted below.

1. Preoperational Testing

Item No.	Test Description No.
1.a(2)(a)	98
1.a(2)(b)	Applicable systems
1.a(2)(c)	98
1.a(2)(d)	98
1.a(2)(e)	84
1.a(2)(g)	All applicable tests

Response (Continued)

1.a(2)(h)	73, 98
1.a(2)(i)	84
1.a(3)	77, 101
1.a(4)	73
1.d(1)	84, 98
1.d(2)	84, 98
1.d(3)	84, 98
1.d(4)	84, 98
1.d(9)	64
1.e(1)	98
1.e(5)	98
1.e(10)	98
1.h(1)(c)	76
1.h(1)(d)	78
1.h(4)	103
1.h(8)	All applicable tests
1.h(10)	88
1.j(1)	98
1.j(6)	Startup Test 30
1.j(7)	94
1.j(8)	Startup Test 21
1.j(9)	102
1.j(17)	65
1.j(20)	94
1.j(22)	41, 50
1.j(25)	105
1.k(2)	Personnel Monitoring and Survey Instrumentation will be tested, operated and maintained by the Nuclear Plant Operations Department
1.k(3)	Applicable HVAC System Tests
1.k(5)	50
1.k(0)	50
1.k(7)	50
1.n(10)	809
1.n(14)	98
1.n(18)	18
1.o(1)	86
1.o(2)	86
1.o(3)	86

4. Low Power Testing

4.h	See Section 14.2.12.2 Test Summaries 48, 54, 62, 66, and 80.
4.i	Demonstration of the operability of the control rods will be accomplished during the performance of Test 3 in Section 14.2.12.3 and Test 47 in Section 14.2.12.2.
4.k	See Section 14.2.12.2 Test Summary 65 and 98. Main turbine and steam-driven feed pumps will be demonstrated to be operable during the power ascension testing. See Section 14.2.12.3 Test Summary 20.

Response (Continued)

4.l	See revised Section 14.2.12.2 Test Summary 98.
4.n	See revised Section 14.2.12.2 Test Summary 105.
4.p	See revised Section 14.2.12.2 Test Summary 98.
4.t	See revised Section 14.2.12.3 Test Summary 13.

5. Power Ascension Test

5.l	Test to demonstrate design capability of all systems and components provided to remove residual or decay heat from the Reactor Coolant System (RCS), including Turbine Bypass System, atmospheric steam dump valves, Residual Heat Removal System (RHRS) and Auxiliary Feedwater System (AFWS) will be performed during the preoperational hot functional test.
5.m	These tests are described in Section 14.2.12.3 Test Summary 6.
5.n	See Section 14.2.12.3 Test Summary 30.
5.o	A leak integrity test will be performed as a standard operating procedure every time the reactor vessel head is installed.
5.q	Various systems that will be acceptance tested.
5.u	See the response to NRC Question 640.08N, 5.mm.
5.v	See revised Section 14.2.12.3 Test Summary 20.
5.aa	See revised Section 14.2.12.3 Test Summary 29.
5.bb	See revised Section 14.2.12.3 Test Summary 14.
5.cc	These tests are described in Section 14.2.12.2 test summary 91, 96, and 97.
5.ii	This test appears to be a requirement for BWR facilities and does not apply to STPEGS.
5.kk	See revised Section 14.2.12.3 test description 32.
5.mm	See the response to NRC Question 640.08N, 5.mm.
5.nn	See revised Section 14.2.12.3 Test Description 23.
5.oo	These test are performed earlier in the test program (see Section 14.2.12.2 Test Descriptions 99 and 101) and need not be repeated.

Question 423.25

Our review of recent licensee event reports disclosed that a significant number of reported events concerned the operability of hydraulic and mechanical snubbers. Provide a description of the inspections or tests that will be performed following system operation to assure yourself that the snubbers are operable.These inspections or tests should be performed preoperationally if system operation can be accomplished prior to generation of nuclear heat.

Response

Following preoperational testing and prior to initial criticality, safety-related and designated high-energy snubbers will be inspected in accordance with the manufacturer's recommendations to assure that there are no visible signs of damage to the snubbers or loosening of secured attachments as a result of system operation.

Question 423.26

Provide test descriptions or modify existing test descriptions to assure that tests will be performed to demonstrate (1) that the plant's ventilation systems are adequate to maintain all ESF equipment within its design temperature range during normal operations and (2) that the emergency ventilation systems are capable of maintaining all ESF equipment within its design temperature range with the equipment operating in a manner that will produce the maximum heat load in the compartment. If it is not possible to operate equipment to produce maximum heat loads, describe how the tests performed satisfy the objectives listed above. Also include testing in accordance with Regulatory Guide 1.52 or 1.140, as applicable.

Response

1. To the extent practical, it is intended that HVAC systems will be operated during hot functional testing. Doing this will produce the maximum heat load attainable to verify design requirements. In those cases where certain equipment cannot be subject to an adequate heat load, data will be collected to confirm design calculations.

2. Emergency ventilation systems testing has been included as part of the integrated testing during diesel generator testing.

Question 423.27

1. Provide descriptions of the electrical lineups of both units during preoperational testing of Unit 1 in accordance with Regulatory Guide 1.41. Include an evaluation of how this lineup precludes inadvertently powering Unit 1 buses from Unit 2 sources. Address both normal and emergency power distribution systems.

2. Provide descriptions of the electrical lineups of both units during preoperational testing of Unit 2 in accordance with Regulatory Guide 1.41 subsequent to initial criticality of Unit 1. Provide assurance that crossties between the units that could result in loss of power to any Unit 1 emergency power distribution systems.

3. Provide a test description for integrated electrical system testing to accomplish these objectives.

Response

1. Initially, power for Unit 1 preoperational testing will be derived from Standby 1 and 2 transformers. Prior to major load accumulation, Unit 1 auxiliary transformer will replace the need for Standby 2 transformers except for the testing of Engineered Safety Features (ESF) preferred and alternate power sources. (Reference Test Description 2, Section 14.2.12.2.)

2. Standby 1 transformer will not be required in support of Unit 2 preoperational testing. Standby 2 transformer loading will be administratively restricted to its normal Unit 2 plant loads. In the event this backup alternate ESF power source is required for Unit 1 an adequate pretested power source for Unit 1 ESF loads will be available.

3. Test Descriptions 2, 3, and 14, Section 14.2.12.2, provide the test coverage to demonstrate the capability of these alternate ESF power sources for Unit 1 and 2.

Question 423.29

Describe the testing to be conducted to verify that the capacity of pressurizer and steam generator power-operated reliefs and steam dump and turbine bypass valves are within the minimum and maximum values assumed in the accident analysis.

Response

Testing of each pressurizer and steam generator power-operated relief valve (PORV) and each steam dump and turbine bypass valve, to demonstrate that the capacity of each valve is within the minimum and maximum values assumed in the accident analysis, is neither practical nor justified for the following reasons.

1. There is no practical method of measuring steam flow rate from any of these valves after they are installed.

2. Assuming that a method of measuring flow rate could be developed, testing of each valve would put the unit through numerous undesirable transients, because there are 2 pressurizer PORVs, 4 steam generator PORVs, 20 steam safety valves, and 12 condenser steam dump valves. A relatively lengthy blowdown period would be required for each test in order to measure either (a) steam flow rate or (b) cooldown rate, which could be extrapolated to flow rate. Imposing a modified Condition II event on the unit is not justified.

3. Testing of the unit's full load rejection capability adequately demonstrates that the capacities of the PORVs and steam dump valves are consistent with design.

4. The safety valves are ASME Section III components and as such have been tested by the manufacturer in accordance with the code requirements. The other relief/dump valve capacities have been verified by the respective manufacturers to be in accordance with design flow rates. These verifications are based on standard industry practices, which include obtaining flow characteristics by testing and/or calculating flow capacities based on specified conditions. The present test program verifies the valve stroke length to be in accordance with the manufacturers' specifications for each valve, thus ensuring that the specified valve opening is not exceeded.

Question 640.3N

List any tests, or portions of tests, described in Subsection 14.2.12 which you do not intent to perform on Unit No. 2 and provide technical justification for the deletion of each.

Response

Test 18. Axial Xenon Oscillation Test

The Axial Xenon Oscillation Test performed on STPEGS Unit 1 verified that axial xenon oscillations are controllable and need not be repeated on STPEGS Unit 2 in accordance with the provisions of Regulatory Guide 1.68, Rev. 2, Appendix A.5.d.

Test 28. Pseudo Rod Ejection Test

The Pseudo Rod Ejection Test performed on STPEGS Unit 1 validated the rod ejection analysis and need not be repeated on STPEGS Unit 2 in accordance with the provisions of Regulatory Guide 1.68, Rev. 2, Appendix A.5.e.

Question 640.4N

Your response to item 423.17, part 3, and item 423.22, part nn is not acceptable. It is the staff position that the preoperational testing of diesel generator units conform to positions C.2.a and C.2.b of Regulatory Guide 1.108. Modify Section 3.12 and Phase II test number 81, Standby Diesel Generator Test, accordingly.

Response

Preoperational testing will be conducted on the diesel generator units to conform to Regulatory Guide 1.108, Rev. 1 - positions C.2.a and C.2.b.

Question 640.7N

Certain terminology used in the individual test descriptions does not clearly indicate the source of the acceptance criteria to be used in determining test adequacy. An acceptable format for providing acceptance criteria for test results includes any of the following:

- Referencing technical specifications (Chapter 16)
- Referencing accident analysis (Chapter 15)
- Referencing other specific sections of the FSAR (ex. 7.4.1.2)
- Referencing vendor technical manuals
- Providing specific quantitative bounds (only if the information cannot be provided in any of the above ways).

Modify the individual test description abstracts presented below to provide adequate acceptance criteria for all items in the respective test summaries or, if applicable, add a paragraph to Subsection 14.2.12 that provides an acceptable description to each of the following unclear terms.

(1) Phase II Tests

(a) required, required, tolerance, as required, within required limits

5.b.2	33.b.3
6.b.1	35.b.1
11.b.1	40.b.1
11.b.2	47.b.3
12.b.2	48.b.3
13.b.1	49.b.1
14.b.1	67.b.1
16.b.1	69.b.1
20.b.3	70.b.1
21.b.1	72.b.1
26.b.2	79.b.3
26.b.3	92.b.3
27.b.1	
29.b.2	

(b) as designed, appropriate design documents, design minimum, within design limits, below design maximum, in accordance with system design, per design, design requirements, in accordance with design, within the limits prescribed by system design, design, design function

2.b.3	30.b.1	43.b.5
5.b.1	30.b.2	44.b
7.b.1	31.b.1	45.b.1
8.b.2	31.b.2	46.b.1
9.b.2	32.b.1	47.b.1
10.b.1	32.b.21	47.b.2
12.b.1 (twice)	32.b.3	48.b.1
14.b.1	32.b.4	49.b.1

Question 640.7N (Continued)

15.b.1	32.b.5	50.b.1
15.b.2	33.b.1	50.b.3
16.b.3	33.b.2	51.b.3
17.b.1	33.b.3	51.b.4
18.b.2	33.b.4	52.b.1
19.b.1	33.b.5	52.b.2
20.b.1	34.b.1	52.b.3
22.b.2	34.b.2	53.b.1
23.b.2	35.b.1	53.b.2
24.b.2	35.b.2	54.b.1
25.b.1	35.b.3	54.b.2
25.b.4	36.b.1	55.b.1
26.b.1	36.b.2	55.b.2
27.b.1	37.b.1	56.b.1
27.b.2	38.b.2	57.b.1
28.b.1	38.b.3	57.b.2
28.b.2	39.b.1	58.b.2
28.b.3	41.b.2	59.b.1
29.b.1	42.b.1	59.b.2
29.b.2	43.b.1	60.b.1
29.b.3	43.b.1	60.b.2
61.b.3	76.b.6	87.b.3
62.b.1	78.b.1	88.b.1
62.b.2	78.b.2	88.b.3
63.b.1	78.b.3	89.b.1
64.b.1	79.b.1	89.b.2
64.b.2	79.b.4	90.b.1
65.b.1	80.b.1	90.b.2
66.b.1	80.b.2	91.b.1
66.b.2	80.b.3	91.b.2
66.b.3	80.b.4	94.b.1
67.b.1	80.b.5	94.b.2
68.b.2	80.b.6	95.b.1
69.b.1	81.b.1	95.b.2
69.b.2	81.b.3	96.b.1
70.b.1	81.b.4	96.b.2
70.b.2	82.b.1	97.b.1
71.b.1	82.b.2	97.b.2
71.b.2	82.b.3	97.b.3
72.b.1	82.b.4	98.b.2
72. b.2	84.b.1	101.b.1
75.b.1	84.b.2	102.b
76.b.1	85.b.1 (twice)	103.b.1
76.b.2	85.b.2	103.b.2
76.b.3	86.b.3	104.b.1
76.b.4	86.b.4	105.b.1
76.b.5	87.b.1	105.b.1

Question 640.7N (Continued)

(c) within the rating, rated, near rated, within their ratings

2.b.1
3.b.4
7.b.1
8.b.1
10.b.5
14.b.2

(d) undue

9.b.1
17.b.2
22.b.1
23.b.1
24.b.1
100.b.3

(e) as specified, specified, within specified tolerances, equipment specifications, specified

5.b.3
10.b.3
12.b.3
25.b.3
42.b.1
96.b.3
99.b.2
99.b.3

(f) peturbance

10.b.2
25.b.2

(g) sufficient

4.b.1
4.b.2
4.b.3

(h) minimum, above minimum, acceptable minimum

10.b.5
18.b.1
41.b.3

Question 640.7N (Continued)

(i) within acceptable limits, within limits, within prescribed limits, allowed limits

2.b.1
2.b.3
5.b.4
12.b.4
15.b.1
16.b.2
39.b.2
48.b.2
61.b.2
81.b.2
87.b.2

(j) as necessary, as prescribed

15.b.1
43.b.4
50.b.4
58.b.1

(k) adequate

15.b.1
50.b.1
61.b.1
68.b.1

(l) recommended

21.b.4

(m) correct

40.b.1
42.b.2
102.b

(n) function properly, responds properly, properly calibrated to reference standard sources, proper

56.b.2
65.b.3
65.b.4
92.b.1
104.b.1

(o) approximate

77.b.2
100.b.4

Question 640.7N (Continued)

(p) consistent

77.b.1
74.b.2

(q) applicable, applicable regulatory guides

49.b.1
77.b.3
93.b.1

(r) allowable, within the allowed

40.b.2
93.b.2
93.b.3

(s) within the required tolerances, tolerances

41.b.1
50.b.2
100.b.1

(t) satisfactorily verifies, satisfactory

73.b.1
98.b.1

(u) misalignments

77.b.1
100.b.3

(v) change in status, evidence, excessive

37.b.2
38.b.1
77.b.1

(w) function to protect both equipment and personnel, acceptable, discrepancy

1.b.1
2.b.2
46.b.2
99.b.1
99.b.4

Question 640.7N (Continued)

(x) in accordance with approved procedures, established criteria, code requirements

99.b.1
99.b.4
101.b.1

(y) anticipated transients, nominal output

1.b.2
5.b.2

(z) degradation, capabilities

2.b.4
10.b.4

(2) Phase III Tests

(a) design

3.b.2
4.b
6.b.1
16.b.1
16.b.2
17.b
18.b
21.b
22.b.1
27.b.1
31.b.2
31.b.3

(b) in accordance with those specified, within the limits specified

3.b.1
12.b.1

(c) satisfactory

2.b

(d) no major deviation

8.b.1

(e) consistent

15.b.3

Question 640.7N (Continued)

(f) confirmed by laboratory or other analysis

16.b.1

(g) compatible

19.b.2

(h) responsive

22.b.2

(i) significant

22.b.3

Response

As stated in Section 14.2.12.2, the test summaries contain the general objectives and acceptance criteria. Specific details, objectives, acceptance criteria, and prerequisites will be in the individual preoperational test procedures. Acceptance criteria for preoperational procedures are obtained from a variety of project design controlled documents. These documents are subject to change as the project progresses, therefore, preoperational procedures will be revised accordingly. For this reason, test summaries containing general information are provided in Section 14.2.

Preoperational Test Procedures are prepared in the format described in Section 14.2.3.3 which includes a "References" section. Source documents utilized in the procedure preparation will be listed. The responsible design organization, via the Joint Test Group, will perform a technical review of the procedure preparation will be listed. The responsible design organization, via the Joint Test Group, will perform a technical review of the procedure prior to its being accepted by the Startup Manager per Section 14.2.3.1. In addition, a draft of the procedure will be submitted to the NRC at least 60 days prior to the conduct of the test.

HL&P does not agree that the terms identified by the NRC as "unclear" in this question are unclear. These are common terms whose usage is straight-forward and easily understood when taken in context with the test summary.

Initial Startup test abstracts (Section 14.2.12.3) have been revised to use terminology which more clearly indicates the source of the acceptance criteria. See revised Sections 14.2.12.3; Test Summaries 2, 3, 4, 6, 8, 9, 12, 15, 16, 17, 18, 19, 21, and 27.

Question 640.8N

Our review of your test program description and your response to item 423.22 disclosed that the operability of several of the systems and components listed in Regulatory Guide 1.68 (Revision 1) Appendix A may not be demonstrated by your initial test program. Expand your test description to address the following items:

1. Preoperational Testing

1.a (2) (i) - Expand the preoperational test phase such that the safety valves of the reactor coolant systems are tested at temperature.

1.e (5) (10) - Expand that preoperational test phase such that the steam extraction system and feedwater heater and drain systems are tested.

1.h (10) - Verify that containment recirculation fan motor current is within its design valve at conditions representative of accident conditions. Address such issues as air density, temperature, humidity, fan speed, and blade angle.

1.j (17) - Expand Phase II test number 65, Main Feedwater System, to include testing of feedwater heater temperature and level control systems.

1.j (22) - Expand the preoperation test phase such that the following instrumentation used to track the course of postulated accidents is tested:

a) containment wide range pressure indicators
b) containment sump level monitors
c) humidity monitors

1.k (4) - Modify the appropriate test abstracts to ensure that testing in accordance with Regulatory Guide 1.52, position C.5.a, is accomplished (in-place DOP [Dioctyl phthalate] tests).

4. Low Power Testing

4k - Modify Phase II test number 58, Feedpump Turbine (FPT) and FPT Gland Steam Test, such that testing of the main feedwater pump is included.

4t - (See Q423.56)

Question 640.8N (Continued)

5. Power Ascension Tests

5.0 - Include an abstract of the leak integrity test which will be performed as standard operating procedure every time the reactor head is removed.

5w - Provide a preoperational test description to test containment penetration coolers. On these penetrations where coolers are not used, provide a startup test description that will demonstrate that concrete temperatures surrounding hot penetrations do not exceed design limits.

5.kk - Revise Phase II test number 32, Feedwater Temperature Reduction Test, such that the testing occurs at both 50 percent and 90 percent power levels.

5.mm - Either provide technical justification for performing the MSIV closure test at 15 percent power and demonstrate how the results of this test can be extrapolated to show proper plant response at full power, perform this test at higher power level where such a justification or extrapolation can be made, or perform this test at full power.

The response to Regulatory Guide 1.68, Appendix A.5.W, is to be provided later. Provide either the information or a schedule for its delivery.

Response

HL&P is committed to use Revision 2 of Regulatory Guide (RG) 1.68 in the development of the STPEGS Startup Program.

HL&P now intends to conduct acceptance tests on nonsafety-related systems. Acceptance testing is defined in Section 14.2.1.1 and a partial list of systems that will be acceptance tested is provided in Section 14.2.12.2.

The preoperational test summaries in Section 14.2.12.2 contain only the general objectives and acceptance criteria. Specific information regarding the test will be contained in the individual test procedures. Preoperational test procedures are submitted to the responsible design organization for a technical review prior to approval by the Startup Manager.

Therefore, in response to the individual parts of Question 640.8N, the details requested will be included in the individual preoperational test rather than in the test summary. Identification has been provided for the preoperational test summary number and/or the acceptance test that will be prepared for the specific system.

Response (Continued)

1. Preoperational Testing

1.a (2) (i) - See revised Test Summary 98. The pressurizer safety valves will be bench tested to verify their setpoints. Data will be obtained during hot functional testing to determine the actual environmental temperature of the pressurizer safety valves and allow extrapolation of any temperature effects on the setpoint.

1.e (5) (10) - See new Section 14.2.12.3, Test Summary 33.

1.h (10) - See revised Section 14.2.12.2, Test Summaries 29 and 93.

1.j (17) - See revised Section 14.2.12.2, Test Summary 65.

1.j (22) - See revised Section 14.2.12.2, Test Summary 44.

1.k (4) - See revised Section 14.2.12.2, Test Summaries 29, 32, 33, and 35.

4. Low Power Testing

4.k - See new Section 14.2.12.3 Test Summary 33.

4.t - Unable to respond, Question 423.56 does not exist.

5. Power Ascension Tests

5.0 - Individual startup test procedures will include instructions and precautions for establishing conditions necessary for conducting the test. The completion of a leak integrity test will be a necessary condition for startup testing and will be performed as a standard operating procedure every time the head is removed, utilizing approved plant operating procedures. Since the leak integrity test is a standard plant operating procedure rather than a startup test, the abstract is not included in Chapter 14. Standard operating procedures will be completed and available for review six months prior to initial fuel load as per Section 13.5.1.2.

5.w - Heat transfer analyses for those penetrations with operating temperatures above 200°F, have been performed. For those penetrations where the concrete temperature exceeds the design basis temperature of 200°F, cooling will be provided.

Response (Continued)

The penetrations where localized heating, ventilating, and air conditioning (HVAC) cooling is to be provided include the mainstream feedwater primary sampling penetrations.

Local temperature surveys will be made to verify concrete temperature during power ascension testing.

5.kk - See revised Section 14.2.12.3, Test Summary 32.

5.mm - Section 14.2.12.3 Test Summary for the steam line isolation valve closure test has been deleted. The plant response to a transient for the case of automatic closure of all main steam line isolations valves (MSIVs) will be similar to the plant response to a turbine trip at 100 percent power except that the automatic closure of all MSIVs at 100 percent power would force the opening of safety-relief valves and place unnecessary burden upon the plant protective systems. The demonstration of proper plant response to this type transient is described in Section 14.2.12.3 Test Summary 23 Full Load Rejection Test

Operability testing and functional testing of the MSIVs will be demonstrated during the Hot Functional Testing performed in the Preoperational Testing program and through surveillance testing of the MSIVs required by Technical Specifications.

The current design creates the capability of testing the electrical circuit logics, the air actuation system, and the movement of the MSIV at any power level. A test circuit is provided to test the signal and logics from the control panel to the air controlling solenoid without necessitating any actuation of the MSIVs. This test serves to verify the functionality of the circuitry. Additionally, a test circuit is provided to individually close each MSIV in turn to the 90 percent open position and return each to the full open position.

Technical Specification surveillance testing will assure that the MSIVs are operable (not sticking). As each MSIV plant protection system is presented

The steam pressure in the main steam lines during hot functional testing will be approximately 1180 psia. The 100 percent load has a line pressure of 1100 psia. Therefore, the line pressure of steam does not differ appreciably between Hot Functional Testing and 100 percent, and the velocity pressure is insignificant in comparison to the line pressure.

Response (Continued)

RG 1.68, Appendix A.5.W requires that licensees provide a preoperational test description to test containment penetration coolers. On these penetrations where coolers are not used, provide a startup test summary that will demonstrate that concrete temperatures surrounding hot penetrations do not exceed design limits.

Heat transfer analysis for those penetrations with operating temperatures above 200°F have been performed. For those penetrations where the concrete temperature exceeds the design basis concrete temperature exceeds the design basis temperature of 200°F, cooling will be provided.

The penetrations where localized HVAC cooling is to provided includes the main steam, feedwater, steam generator blowdown, and primary sampling penetrations.

Local temperature surveys will be made to verify concrete temperature during power ascension testing.

Question 640.11N

Our review of licensee event reports has disclosed that many events have occurred because of dirt, condensed moisture, or other foreign objects inside instruments and electrical components (e.g., relays, switches, breakers). Describe any tests or inspections that will be implemented during your initial test program to prevent component failures such as these at your facility.

Response

When systems are released or turned over from Construction to Startup, the components in the system are included in the normal plant maintenance program which includes preventive maintenance procedures for maintaining proper component cleanliness on a predetermined schedule.

Question 640.12N

Review of licensee event reports disclosed that a number of sensing lines were rendered inoperable due to being frozen and/or blocked with crud, dirt, and entrapped gas. Provide a description of the inspections or tests that will be performed to ensure that the sensing lines are clear prior to utilization.

Response

A documented flushing program, which includes instrument sensing lines, will be conducted to eliminate the crud and dirt problem. Instrument calibration and/or surveillance procedures will include provisions for ensuring entrapped gas is removed when placing the instrument in service. In the event a system is drained for maintenance etc., instruments will be vented when the system is refilled in preparation for placing the system in operation.

Question 640.13N

Review of licensee event reports disclosed that some instrumentation drift problems are due, in part, to extremes of local temperature and humidity. Provide a description of the inspections or tests that will be performed to minimize set point drift due to local temperature and humidity extremes.

Response

As part of the normal calibration and/or surveillance program, which begins with initial instrument calibration, test results will be reviewed for set point drift. When a drift problem is identified, all factors including local temperature and humidity extremes will be investigated in determining corrective actions.

Question 640.14N

We could not conclude from our review of the preoperational test phase description (Phase II tests) and the response to item 423.33 that comprehensive testing is scheduled for several systems and components. Therefore, clarify or expand the description of the preoperational test phase to address the following:

1) The response item 423.23 (f) is inadequate. Modify your test descriptions to ensure that individual cell limits are not exceed during the design discharge test and to demonstrate that the DC loads will function as necessary to assure plant safety at a battery terminal voltage equal to the acceptance criterion that has been established for minimum battery terminal voltage for the discharge load test.

2) The response to item 423.23 (k) is inadequate. Modify Phase II test number 31, Containment HVAC Isolation Valve Critical Subsystem Test, such that all auxiliary feedwater pumps are in operation to assure that design heat loads are produced in the AFW pump areas. Note - this can be done in conjunction with the Hot Functional Test (Phase II test number 98) test methods 9 and 16.

3) Recently the Westinghouse Water Reactor Division's Safety Review Committee identified a potential control and protection system interaction concern involving Volume Control Tank (VCT) level instrumentation. The concern involves failure of the VCT level control system resulting in a loss of suction to the charging pumps. Modify Phase II test number 80, Chemical and Volume Control System (CVCS) Test, to verify that adequate procedures, testing, operator training, design, changes, and/or circuitry modifications are being conducted prior to fuel loading to address this potential safety system failure.

4) Modify Phase II test number 85, Auxiliary Feedwater System (AFWS), to address the following:

   a) Include testing to ensure that a loss of auxiliary feedwater (AFW) flow will not occur due to pump runout and subsequent tripping of the AFW pump motors.

   b) Our review of licensee event reports has disclosed several instances of emergency feedwater pump failure to start on demand. It appears that many of these failures could have been avoided if more thorough testing had been conducted during the plant's initial test programs. In order to discover any problems affecting pump startup and to demonstrate the reliability of our emergency cooling system, state your plans to demonstrate at least five consecutive, successful, cold, quick pump starts during your initial test program.

5) The response to item 423.34 (kk) is inadequate. Include in Phase II test number 86, Fuel-Handling Equipment Test, the polar crane, and cask handling crane. Furthermore, specify the levels of the static (125 percent rated load) and dynamic (100 rated load) tests.

Question 640.14N (Continued)

6) The response to item 423.23 (mm) is inadequate. Include testing of the compartment watertight doors in Phase II test number 88, Essential Cooling Water System (ECWS) Test.

7) Expand the Reactor Coolant System (RCS) Hot Functional Preoperational Test Summary (Phase II test number 98) or other tests to address the following:

   a) Modify test method 8 to reference the pre and post-hot functional examinations presented in Section 3.9.2.4.

   b) Modify test method 23 or provide an additional Phase II test abstract that demonstrates conformance with Regulatory Guide 1.68.2, position C.4 (Cold Shutdown Demonstration Procedure).

Response

1) See revised Section 14.2.12.2 Test Summary 21.

2) See revised Section 14.2.12.2 Test Summary 31.

3) Section 14.2.12.2 Test Summary 28 defines the testing requirements for the volume control tank (VCT) level control system as currently designed. Design changes and/or circuitry modifications, if required, will be referenced in the UFSAR chapter which describes the VCT level control system. The purpose of the startup program described in Chapter 14 is to test the systems as designed. Any design changes will be tested appropriately.

4) a) See revised Section 14.2.12.2 Test Summary 85.

   c) The present testing requirements require the demonstration of a minimum of three successful cold, quick pump starts for each pump in the following tests:

      1. Test 85 - (d.3) - Auxiliary Feedwater preoperational testing
      2. Test 81 - (d.3) - Diesel generator individual preoperational testing
      3. Test 81 - (d.4) - Diesel generator integrated preoperational testing

      The performance of five successful, cold, quick pump starts is not expected to provide significant additional assurance of pump start reliability as opposed to the present testing requirements outlined above.

5) See revised Section 14.2.12.2 Test Summary 86.

Response (Continued)

6) No preoperational tests are planned for the Essential Cooling Water (ECW) Structure compartment watertight doors because (a) they are passive in nature, (b) they are conservatively designed and constructed, (c) simulation of flooding conditions is impractical, and (d) minor leakage can be tolerated by the compartment sumps and floor drains.

7) See revised Section 14.2.12.2 Test Summary 98.

Question 640.15N

The response to item 423.27 is inadequate. Expand Phase II test number 2, Unit Startup Transformer test to include testing of the automatic transfer feature as stated in the response to item 423.27.

Response

Subsequent design changes have eliminated the automatic transfer. Therefore, this question is no longer valid.

Question 640.17N

The response to item 423.31 is inadequate. Provide assurance that any preoperational tests unintentionally not completed prior to fuel load will be completed and that rescheduling information (cite power level at which test will be performed) will accompany the technical justification submitted to the NRC.

Response

The Startup Program has been structured to ensure that any test which has been delayed due to unforeseen circumstances such as design changes, unavailability of materials, or constructibility problems will be rescheduled and completed. Each of the affected systems will be evaluated to determine if there is any impact to the fuel load schedule, or to determine if the test may be accomplished after fuel load. At that point in time, rescheduling information, technical justification, and anticipated power level will be provided to the NRC.

Question 640.21N

By letter dated August 17, 1981, you stated your intent to comply with the TMI-2 Action Plant Item I.G.1 testing requirements by referencing the results of testing completed at "comparable plants." You also indicated you intend to comply with the training requirements by use of your simulator.

Comparisons of STPEGS Units 1 and 2 with other plants reveal design differences in electrical distribution systems, circulating water systems, HVAC Systems, and possibly other support systems. Therefore, it is considered unlikely that any other plant is comparable with STPEGS Units 1 and 2. However, if you can provide adequate verification that the results of natural circulation tests performed at another plant are valid for STPEGS, we will accept your position. In particular, we are interested in the results of testing that verified the ability to feed and steam the steam generators in the event of the testing items of our June 12, 1981, letter.

NOTE: An acceptable response to this concern is contained in a letter from E. P. Rahe (Westinghouse) to H. R. Denton dated July 8, 1981, (NS-EPR-2465).

With respect to the "training" objectives being accomplished by the use of a simulator, you should verify that your simulator training program includes the natural circulation operations noted in our June 12, 1981, letter. Furthermore, it should be demonstrated that the simulator to be used for natural circulation training, tracks real plant behavior by comparing the simulator responses with test data from a plant which has performed the tests.

Response

The STPEGS startup program has been revised to meet the recommendations listed in Appendix 4 of the Westinghouse Letter from E. P. Rahe to H. R. Denton dated July 8, 1981 (NS-EPR-2465).

The guidance followed in our startup program revision is listed below:

1. During Hot Functional testing (or prior to fuel loading) with reactor coolant pumps (RCPs) supplying heat input to the secondary side, remove onsite AC power sources and operate the plant utilizing manual control and steam-driven auxiliary feedwater (AFW) pump.

2. After fuel loading, but prior to Initial Criticality, establish stable conditions at T_{no} load and 2235 psig with two RCPs in operation (RCPs are not to be in loops with pressurizer surge line or spray lines). Reduce pressure by turning off pressurizer heaters noting depressurization rate. Reestablish heaters and reduces pressure further by use of auxiliary spray noting depressurization rate and effect on margin to saturation temperature.

Response (Continued)

At reduced pressure observe the effects of changes in charging flow and steam flow on margin to saturation temperature.

3. Per requirements of Regulatory Guide (RG) 1.68, Rev. 2 (item 4.t), place the plant in natural circulation mode observing the length of time for plant to stabilize, flow distribution, power distribution, and ability to maintain cooling mode.

4. Per requirements of RG 1.68, Rev. 2 (item 5.j.j), perform Loss-of-Offsite Power/Station Blackout test with plant trip from 10-20 percent rated thermal power. Operate plant establishing stable conditions in natural circulation using batteries and emergency diesels.

5. Referencing boration and cooldown tests performed at Sequoyah I, North Anna II, Farley II, and Diablo Canyon I, verify similar plant response by parameter and plant comparison. Operator training for cooldown on natural circulation will be provided on plant simulator at the earliest opportunity.

We have implemented the above recommendations as follows:

1. See revised Section 14.2.12.2, Test Summary 85.

2. See new Section 14.2.12.3, Test Summary 33.

3. See revised Section 14.2.12.3, Test Summary 13.

4. See revised Section 14.2.12.3, Test Summary 24.

5. The South Texas Project Electric Generating Station (STPEGS) simulator training program for reactor operator (ROs) and senior reactor operator (SROs) will include initiation, maintenance and recovery from natural circulation. ROs and SROs will be trained to recognize when natural circulation has stabilized, and to control saturation margin, RCS pressure, and heat removal rate without exceeding specified operating limits. The STPEGS simulator response will be compared with test data from a plant that has performed natural circulation tests to demonstrate that the simulator tracks real plant behavior.

Question 640.26N

The response to Item 640.7 is not acceptable. Modify existing preoperational and startup test abstracts to indicate the source of acceptance criteria to be used in determining test adequacy.

Response

As stated in the response to Question 640.7N, HL&P does not intend to include the details of the test acceptance criteria or its source in the test summaries in Section 14.2.12.2. These details will be in the individual preoperational test procedures.

Acceptance criteria for preoperational tests will be derived from project approved documents, reviewed by the responsible design organization (via the Joint Test Group), and approved by the Startup Manager before they are utilized in the field.

Startup test abstracts for initial startup testing have been modified to indicate the source of acceptance criteria to be used in determining test adequacy. See revised Section 14.2.12.3 and Test Summaries 2, 3, 4, 6, 8, 9, 12, 15, 16, 17, 18, 19, 21, and 27.

Question 640.27N

The response to Item 640.10 is not appropriate. Verify that the essential cooling pond is tested to verify adequate NPSH and the absence of vortexing over the range of pond level for maximum to the minimum calculated 30 days following LOCA.

Response

There are no current plans to test the essential cooling water (ECW) pumps for net positive suction head (NPSH) and vortexing over the anticipated range of essential cooling pond levels. The pumps will be tested for proper operation at the pond level existing during Startup which will be at or below the normal maximum operating level.

The pump vendor has supplied a typical NPSH curve for the pump. A calculation was performed which shows that adequate NPSH is available. The pond level will not fall below the minimum submergence required for the ECW pumps.

The matter of vortexing has been considered. The design of the sumps is in close agreement with the guidance provided in the Hydraulic Institute Standards and Cameron Hydraulic Data. The ECW pumps are within individual sumps and they have satisfactory clearance from the back wall, bottom and traveling screens.

As delineated in Table 9.2.5-3.1 of the UFSAR, the ECP has a level which ranges from 25.5 to 21.5 ft during the worst case scenario. The ECW pumps are of the vertical type with a required submergence of 6.3 ft. Based on the lowest ECP water level (21.5 ft), there will be approximately 3 ft of margin available to the pumps, thus ensuring their continued operation.

Question 640.30N

The response to Item 640.16 is incomplete.

a) Performance testing of pressurizer PORVs will be addressed later via response to Item II.D.1 of NUREG-0737, "Clarification of TMI Action Plan requirements". Provide a schedule for the response.

b) Describe the manufacturer's test of valve capacity as described in response to Item 423.29 in sufficient detail or provide a test abstract to demonstrate that the maximum capacity of any single steam dump or relief valve is less than the value assumed in FSAR Section 15.1.4 (Inadvertent Depressurization of the Main Steam System).

Response

a) A report has been prepared by Westinghouse to address NUREG-0737, Item II.D.1. This report has been completed and was provided under separate cover letter (see ST-HL-AE-1466, dated October 31, 1985).

b) No manufacturer of which Westinghouse is aware has capacity tested the steam dump valves. This is due to the expense associated with full flow steam testing of a valve this size (8-inch). Rather, the manufacturers use formulas provided by the Instrument Society of America Standard ISA-S39.3 for compressible flows for steam sizing and flow verification.

Using the valve flow coefficient C, for the steam dump valve listed on the valve drawing (Fisher Drawing 56A2244) and applying the critical sizing formula recommended by the ISA Control Valve Handbook, the valve flow capacity at 1300 psia is 273 1b/sec which is less than the maximum capacity assumed in Section 15.1.4 (292 lb/sec at 1300 psia). The SG PORVs are specified with a maximum flow rate of 1,050,000 lb/hr which will not exceed the 292 lb/sec used in the analysis found in Section 15.1.4. In order to ensure this maximum flow rate is not exceeded, the valve supplier has provided a flow with a flow coefficient (C_v = 398) which is approximately 80 percent of that required to pass 1,050,000 lb/hr of steam at 1300 psia. This will ensure the safety analysis value of 292 lb/sec is not exceeded.

In addition, please note that startup tests which have been conducted at the Surry Station suggest that valve inlet pressures are considerably lower than 1300 psia. The highest pressure that was recorded was 865 psig (880 psia). This lower pressure which is more realistic yields a flow rate of 185 lb/sec.