ENCLOSURE 2

REVISED CHANGED PAGES FOR UNIT 2

3/4.6 CONTAINMENT SYSTEMS

3/4.6.1 PRIMARY CONTAINMENT

CONTAINMENT INTEGRITY

LIMITING CONDITION FOR OPERATION

3.6.1.1 Primary CONTAINMENT INTEGRITY shall be maintained.

APPLICABILITY: MODES 1, 2, 3 and 4

ACTION:

Without primary CONTAINMENT INTEGRITY, restore CONTAINMENT INTEGRITY within one hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.1.1 Primary CONTAINMENT INTEGRITY shall be demonstrated:

a. At least once per 31 days by verifying that all penetrations* listed in Sections A, B and C of Table 3.6-1 not capable of being closed by OPERABLE containment automatic isolation valves and required to be closed during accident conditions are closed by valves, blind flanges, or automatic valves secured** in their positions, except as provided in Table 3.6-1 of Specification 3.6.3.

b. By verifying that each containment air lock is in compliance with the requirements of Specification 3.6.1.3.

c. After each closing of each penetration subject to Type B testing, except containment air locks, if opened following a Type A or B test, by leak rate testing the seal with gas at P_a 55.7 psig and verifying that when the measured leakage rate for these seals is added to the leakage rates determined pursuant to Specification 4.6.1.2.d for all other Type B and C penetrations, the combined leakage rate is less than 0.60 L_a.

---

*Except valves, blind flanges, and automatic valves which are located inside the containment and are locked, sealed or otherwise secured in the closed position. These penetrations shall be verified closed during each COLD SHUTDOWN except that such verification need not be performed more often than once per 92 days.

**Locked, sealed or otherwise prevented from unintentional operation.

3/4.6.3 CONTAINMENT ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

3.6.3 The containment isolation valves specified in Table 3.6-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

1. With one or more of the isolation valve(s) specified in Section A, B and C of Table 3.6-1 inoperable, maintain at least one isolation valve OPERABLE in each affected penetration* that is open and either:

   a. Restore the inoperable valve(s) to OPERABLE status within 4 hours, or

   b. Isolate each affected penetration within 4 hours by use of at least one automatic valve secured** in the isolation position, or one closed manual valve or blind flange, or

   c. Be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

   d. The provisions of Specification 3.0.4 are not applicable.

2. With one or more of the valves specified in Section D of Table 3.6-1 inoperable, the appropriate ACTION statement(s) of those Limiting Conditions for Operation pertaining to the valve(s) or system in which it is installed shall be applicable.

SURVEILLANCE REQUIREMENTS

4.6.3.1 The isolation valves specified in Section A and B of Table 3.6-1 shall be demonstrated OPERABLE prior to returning the valve to service after maintenance, repair or replacement work is performed on the valve or its associated actuator, control or power circuit by performance of testing pursuant to Specification 4.0.5. Valves secured** in their actuated position are considered OPERABLE pursuant to this specification.

---

*Any flow path from the atmosphere or a piping system inside of containment to the atmosphere or a piping system outside of containment. Each flow path is considered as a separate "penetration".

**Locked, sealed or otherwise prevented from unintentional operation.

SURVEILLANCE REQUIREMENTS (Continued)

4.6.3.2 Each isolation valve (except check valves) specified in Section A and B of Table 3.6-1 shall be demonstrated OPERABLE during the COLD SHUTDOWN or REFUELING MODE at least once per 18 months by verifying that on an ESFAS test signal, each isolation valve actuates to its isolation position.

4.6.3.3 The isolation time of each power operated or automatic valve (except check valves) in Section A and B of Table 3.6-1 shall be determined to be within its limit when tested pursuant to Specification 4.0.5.

4.6.3.4 The manual isolation valves specified in Section C of Table 3.6-1 shall be demonstrated OPERABLE in accordance with specifications 4.6.1.1.a and 4.6.1.2.d.

4.6.3.5 The isolation valves specified in Section D of Table 3.6-1 shall be demonstrated OPERABLE as required by Specification 4.0.5 and surveillance requirements associated with those Limiting Conditions for Operation pertaining to each valve or system in which it is installed. Valves secured** in the ESFAS actuated position are considered OPERABLE pursuant to this specification.

** Locked, sealed or otherwise prevented from unintentional operation.

TABLE 3.6-1
CONTAINMENT ISOLATION VALVES

PENETRATION NUMBER	VALVE NUMBER	FUNCTION	MAXIMUM ISOLATION TIME (SEC)
A. AUTOMATIC CONTAINMENT ISOLATION			
1	HV-0510	Pressurizer steam space sample	40
1	HV-0511	Pressurizer steam space sample	40
2	TV-9267	Letdown line to letdown heat exchanger	40
2	HV-9205	Letdown line to letdown heat exchanger	40
4	HV-0508	Reactor Coolant Loops hot leg sample	40
4	HV-0509	Reactor Coolant Loops hot leg sample	40
4	HV-0517	Reactor Coolant Loops hot leg sample	40
6	HV-9334	Safety injection drain to RWST	40
7	HV-9217	Reactor coolant pump seal bleed off	40
7	HV-9218	Reactor coolant pump seal bleed off	40
11	HV-7911	Demineralized water to service station and sump pump	40
11	3"-236-C-675	Demineralized water to service station and sump pump check valve	NA
12	HV-0512	Pressurizer surge line sample	40
12	HV-0513	Pressurizer surge line sample	40
13	HV-5803	Containment sump pump discharge	40
13	HV-5804	Containment sump pump discharge	40
14	HV-5686	Fire protection	40
14	4"-061-C-681	Fire protection check valve	NA
16C	HV-7805	Containment air radioactivity monitor inlet	1
16C	HV-7810	Containment air radioactivity monitor inlet	1
20	2"-573-C-611	Quench tank makeup check valve	NA
21	2"-017-C-627	Service air supply line check valve	NA
22	HV-5388	Instrument air supply line	40
22	1 1/2"-016-C-617	Instrument air supply line check valve	NA
23A	HV-5437	LP N_2 to containment	40
23A	3/4"-002-C-611	LP N_2 to containment check valve	NA
26	HV-7512	Reactor coolant drain tank pump discharge	40
26	HV-7513	Reactor coolant drain tank pump discharge	40
27C	HV-7806	Containment air radioactivity monitor outlet	1
27C	HV-7811	Containment air radioactivity monitor outlet	1
30A	HV-7802	Containment air radioactivity monitor outlet	1
30A	HV-7803	Containment air radioactivity monitor outlet	1
30B	HV-7801	Containment air radioactivity monitor outlet	1
30B	HV-7800	Containment air radioactivity monitor outlet	1
30B	HV-7816	Containment air radioactivity monitor outlet	1
30C	HV-0516	Quench tank and drain tank gas sample	40
30C	HV-0514	Quench tank and drain tank gas sample	40
30C	HV-0515	Quench tank and drain tank gas sample	40
42	HV-6211	Component cooling water inlet	40
42	HV-6223	Component cooling water inlet	40
43	HV-6236	Component cooling water outlet	40

TABLE 3.6-1
CONTAINMENT ISOLATION VALVES (Continued)

PENETRATION NUMBER	VALVE NUMBER	FUNCTION	MAXIMUM ISOLATION TIME (SEC)
A. AUTOMATIC CONTAINMENT ISOLATION (Cont.)			
43	HV-6216	Component cooling water outlet	40
45	HV-9900	Containment normal A/C chilled water inlet	40
45	HV-9920	Containment normal A/C chilled water inlet	40
46	HV-9971	Containment normal A/C chilled water outlet	40
46	HV-9921	Containment normal A/C chilled water outlet	40
47	HV-7258	Containment waste gas vent header	40
47	HV-7259	Containment waste gas vent header	40
68	2"-129-A-554	Charging line to auxiliary spray check valve	NA
77	HV-5434	Nitrogen supply to safety injection tanks	40
77	2"-108-C-627	Nitrogen supply to safety injection tanks check valve	NA
B. CONTAINMENT PURGE (CPIS)			
18	HV-9949**	Containment purge inlet (normal)	12
18	HV-9948**	Containment purge inlet (normal)	12
18	HV-9821	Containment mini-purge inlet	5
18	HV-9823	Containment mini-purge inlet	5
19	HV-9950**	Containment purge outlet (normal)	12
19	HV-9951**	Containment purge outlet (normal)	12
19	HV-9824	Containment mini-purge outlet	5
19	HV-9825	Containment mini-purge outlet	5
C. MANUAL *			
6	2"-099-C-334	Safety injection drain to RWST	NA
9	HV-9337#@	Shutdown cooling to LPSI pumps	NA
9	HV-9377#@	Shutdown cooling to LPSI pumps	NA
9	HV-9336#@	Shutdown cooling to LPSI pumps	NA
9	HV-9379#@	Shutdown cooling to LPSI pumps	NA
10B	3/4"-038-C-396	Integrated leak rate test pressure sensor	NA
10B	3/4"-039-C-396	Integrated leak rate test pressure sensor	NA
16A	HV-0500	Post LOCA hydrogen monitor	NA
16A	HV-0501	Post LOCA hydrogen monitor	NA
16B	HV-0502	Post LOCA hydrogen monitor	NA
16B	HV-0503	Post LOCA hydrogen monitor	NA
20	2"-321-C-376	Quench tank makeup	NA

* Manual valves may be opened on an intermittent basis under administrative control.
** Power to the valve removed in accordance with Specification 3.6.1.7.
\# Not subject to Type C leakage tests.
@ Shutdown cooling valves may be opened in MODE 4.

TABLE 3.6-1
CONTAINMENT ISOLATION VALVES (Continued)

PENETRATION NUMBER	VALVE NUMBER	FUNCTION	MAXIMUM ISOLATION TIME (SEC)
C. MANUAL * (Cont.)			
21	2"-055-C-387	Service air supply line	NA
25	10"-100-C-212	Refueling canal fill and drain	NA
25	10"-101-C-212	Refueling canal fill and drain	NA
31	HV-9946	Containment hydrogen purge inlet	NA
31	HCV-9945	Containment hydrogen purge inlet	NA
68	2"-130-C-334	Charging line to auxiliary spray	NA
70	2"-037-C-387	Auxiliary steam inlet to utility stations	NA
70	2"-038-C-387	Auxiliary steam inlet to utility stations	NA
74	HV-9917	Containment hydrogen purge outlet	NA
74	HCV-9918	Containment hydrogen purge outlet	NA
D. OTHER***			
3	3"-018-A-551#	High pressure safety injection	NA
3	HV-9323#	High pressure safety injection	NA
3	HV-9324#	High pressure safety injection	NA
5	3"-019-A-551#	High pressure safety injection	NA
5	HV-9326#	High pressure safety injection	NA
5	HV-9327#	High pressure safety injection	NA
8	2"-122-C-554	Charging line to regenerative heat exchanger	NA
8	HV-9200	Charging line to regenerative heat exchanger	NA
10A	HV-0352A#	Containment pressure detectors	NA
27A	HV-0352D#	Containment pressure detectors	NA
39	3"-020-A-551#	High pressure safety injection	NA
39	HV-9329#	High pressure safety injection	NA
39	HV-9330#	High pressure safety injection	NA
40A	HV-0352B#	Containment pressure detectors	NA
41	3"-021-A-551#	High pressure safety injection	NA
41	HV-9332#	High pressure safety injection	NA

* Manual valves may be opened on an intermittent basis under administrative control.

*** Valves secured in the ESFAS actuated position are considered OPERABLE pursuant to this specification.

Not subject to Type C leakage tests.

TABLE 3.6-1
CONTAINMENT ISOLATION VALVES (Continued)

PENETRATION NUMBER	VALVE NUMBER	FUNCTION	MAXIMUM ISOLATION TIME (SEC)
D. OTHER*** (Cont.)			
41	HV-9333#	High pressure safety injection	NA
48	8"-072-A-552#	Low pressure safety injection	NA
48	HV-9322#	Low pressure safety injection	NA
49	8"-073-A-552#	Low pressure safety injection	NA
49	HV-9325#	Low pressure safety injection	NA
50	8"-074-A-552#	Low pressure safety injection	NA
50	HV-9328#	Low pressure safety injection	NA
51	8"-075-A-552#	Low pressure safety injection	NA
51	HV-9331#	Low pressure safety injection	NA
52	8"-004-C-406	Containment spray inlet	NA
52	HV-9367	Containment spray inlet	NA
53	8"-006-C-406	Containment spray inlet	NA
53	HV-9368	Containment spray inlet	NA
54	HV-9304#	Containment emergency sump recirculation	NA
54	HV-9302#	Containment emergency sump recirculation	NA
55	HV-9305#	Containment emergency sump recirculation	NA
55	HV-9303#	Containment emergency sump recirculation	NA
56	HV-6366	Containment emergency A/C cooling water inlet	NA
57	HV-6372	Containment emergency A/C cooling water inlet	NA
58	HV-6368	Containment emergency A/C cooling water inlet	NA
59	HV-6370	Containment emergency A/C cooling water inlet	NA
60	HV-6369	Containment emergency A/C cooling water outlet	NA
61	HV-6371	Containment emergency A/C cooling water outlet	NA
62	HV-6367	Containment emergency A/C cooling water outlet	NA
63	HV-6373	Containment emergency A/C cooling water outlet	NA
67	3"-157-A-550	Hot leg injection	NA
67	HV-9434	Hot leg injection	NA
71	3"-158-A-550	Hot leg injection	NA
71	HV-9420	Hot leg injection	NA
73A	HV-0352C#	Containment pressure detectors	NA

*** Valves secured in the ESFAS actuated position are considered OPERABLE pursuant to this specification.
# Not subject to Type C leakage tests.

3/4.6.3 CONTAINMENT ISOLATION VALVES

The OPERABILITY of the containment isolation valves ensures that the containment atmosphere will be isolated from the outside environment in the event of a release of radioactive material to the containment atmosphere and is consistant with the requirements of GDC 54 through 57 of Appendix A to 10 CFR 50. Containment isolation within the time limits specified for those power operated isolation valves designed to close automatically upon a CIAS signal ensures that the release of radioactive material to the environment will be consistent with the assumptions used in the analyses for a LOCA. Such valves are listed in Sections A and B of Table 3.6-1 and Surveillance requirements to verify OPERABILITY of these valves are explicitly stated in 4.6.3.1 thru 4.6.3.3. Check valves located inside containment are considered OPERABLE provided their leak rate is within limits when tested pursuant to 10 CFR 50 Appendix J.

Section C of Table 3.6-1 contains a listing of manual valves that are normally closed and assumed to be closed under design basis accident conditions, but which may be opened intermittently for service, maintenance or test during normal operation provided adequate administrative controls are implemented to ensure operator action is taken to close such valves in the event of an accident.

All valves in Section A, B or C are considered OPERABLE for containment isolation purpose if they are indeed locked, sealed or otherwise secured in the closed position and leakage through the affected flow path is shown to be within limits when tested pursuant to 10 CFR 50 Appendix J.

Section D of Table 3.6-1 contains a listing of valves which operate automatically on an ESFAS signal to prevent or mitigate the consequences of the design basis accident. Surveillance requirement 4.6.1.1.a is not applicable to such valves. The OPERABILITY of such valves is determined by ESFAS response time testing of specification 3/4.3.2. Valves in Section D that are locked, sealed or otherwise secured in their ESFAS actuated position will permit performance of their safety function and are, therefore, considered OPERABLE pursuant to this specification.

ENCLOSURE 3

REVISED CHANGED PAGES FOR UNIT 3

3/4.6 CONTAINMENT SYSTEMS

3/4.6.1 PRIMARY CONTAINMENT

CONTAINMENT INTEGRITY

LIMITING CONDITION FOR OPERATION

3.6.1.1 Primary CONTAINMENT INTEGRITY shall be maintained.

APPLICABILITY: MODES 1, 2, 3 and 4

ACTION:

Without primary CONTAINMENT INTEGRITY, restore CONTAINMENT INTEGRITY within one hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.1.1 Primary CONTAINMENT INTEGRITY shall be demonstrated:

a. At least once per 31 days by verifying that all penetrations* listed in Sections A, B and C of Table 3.6-1 not capable of being closed by OPERABLE containment automatic isolation valves and required to be closed during accident conditions are closed by valves, blind flanges, or automatic valves secured** in their positions, except as provided in Table 3.6-1 of Specification 3.6.3.

b. By verifying that each containment air lock is in compliance with the requirements of Specification 3.6.1.3.

c. After each closing of each penetration subject to Type B testing, except containment air locks, if opened following a Type A or B test, by leak rate testing the seal with gas at P_a 55.7 psig and verifying that when the measured leakage rate for these seals is added to the leakage rates determined pursuant to Specification 4.6.1.2.d for all other Type B and C penetrations, the combined leakage rate is less than 0.60 L_a.

---

*Except valves, blind flanges, and automatic valves which are located inside the containment and are locked, sealed or otherwise secured in the closed position. These penetrations shall be verified closed during each COLD SHUTDOWN except that such verification need not be performed more often than once per 92 days.

**Locked, sealed or otherwise prevented from unintentional operation.

3/4.6.3 CONTAINMENT ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

3.6.3 The containment isolation valves specified in Table 3.6-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

1. With one or more of the isolation valve(s) specified in Section A, B and C of Table 3.6-1 inoperable, maintain at least one isolation valve OPERABLE in each affected penetration* that is open and either:

   a. Restore the inoperable valve(s) to OPERABLE status within 4 hours, or

   b. Isolate each affected penetration within 4 hours by use of at least one automatic valve secured** in the isolation position, or one closed manual valve or blind flange, or

   c. Be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

   d. The provisions of Specification 3.0.4 are not applicable.

2. With one or more of the valves specified in Section D of Table 3.6-1 inoperable, the appropriate ACTION statement(s) of those Limiting Conditions for Operation pertaining to the valve(s) or system in which it is installed shall be applicable.

SURVEILLANCE REQUIREMENTS

4.6.3.1 The isolation valves specified in Section A and B of Table 3.6-1 shall be demonstrated OPERABLE prior to returning the valve to service after maintenance, repair or replacement work is performed on the valve or its associated actuator, control or power circuit by performance of testing pursuant to Specification 4.0.5. Valves secured** in their actuated position are considered OPERABLE pursuant to this specification.

---

*Any flow path from the atmosphere or a piping system inside of containment to the atmosphere or a piping system outside of containment. Each flow path is considered as a separate "penetration".

**Locked, sealed or otherwise prevented from unintentional operation.

SURVEILLANCE REQUIREMENTS (Continued)

4.6.3.2 Each isolation valve (except check valves) specified in Section A and B of Table 3.6-1 shall be demonstrated OPERABLE during the COLD SHUTDOWN or REFUELING MODE at least once per 18 months by verifying that on an ESFAS test signal, each isolation valve actuates to its isolation position.

4.6.3.3 The isolation time of each power operated or automatic valve (except check valves) in Section A and B of Table 3.6-1 shall be determined to be within its limit when tested pursuant to Specification 4.0.5.

4.6.3.4 The manual isolation valves specified in Section C of Table 3.6-1 shall be demonstrated OPERABLE in accordance with specifications 4.6.1.1.a and 4.6.1.2.d.

4.6.3.5 The isolation valves specified in Section D of Table 3.6-1 shall be demonstrated OPERABLE as required by Specification 4.0.5 and surveillance requirements associated with those Limiting Conditions for Operation pertaining to each valve or system in which it is installed. Valves secured** in the ESFAS actuated position are considered OPERABLE pursuant to this specification.

** Locked, sealed or otherwise prevented from unintentional operation.

TABLE 3.6-1
CONTAINMENT ISOLATION VALVES

PENETRATION NUMBER	VALVE NUMBER	FUNCTION	MAXIMUM ISOLATION TIME (SEC)
A. AUTOMATIC CONTAINMENT ISOLATION			
1	HV-0510	Pressurizer steam space sample	40
1	HV-0511	Pressurizer steam space sample	40
2	TV-9267	Letdown line to letdown heat exchanger	40
2	HV-9205	Letdown line to letdown heat exchanger	40
4	HV-0508	Reactor Coolant Loops hot leg sample	40
4	HV-0509	Reactor Coolant Loops hot leg sample	40
4	HV-0517	Reactor Coolant Loops hot leg sample	40
6	HV-9334	Safety injection drain to RWST	40
7	HV-9217	Reactor coolant pump seal bleed off	40
7	HV-9218	Reactor coolant pump seal bleed off	40
11	HV-7911	Demineralized water to service station and sump pump	40
11	3"-236-C-675	Demineralized water to service station and sump pump check valve	NA
12	HV-0512	Pressurizer surge line sample	40
12	HV-0513	Pressurizer surge line sample	40
13	HV-5803	Containment sump pump discharge	40
13	HV-5804	Containment sump pump discharge	40
14	HV-5686	Fire protection	40
14	4"-095-C-681	Fire protection check valve	NA
16C	HV-7805	Containment air radioactivity monitor inlet	1
16C	HV-7810	Containment air radioactivity monitor inlet	1
20	2"-573-C-611	Ovench tank makeup check valve	NA
21	2"-017-C-627	Service air supply line check valve	NA
22	HV-5388	Instrument air supply line	40
22	1 1/2"-016-C-617	Instrument air supply line check valve	NA
23A	HV-5437	LP N_2 to containment	40
23A	3/4"-002-C-611	LP N_2 to containment check valve	NA
26	HV-7512	Reactor coolant drain tank pump discharge	40
26	HV-7513	Reactor coolant drain tank pump discharge	40
27C	HV-7806	Containment air radioactivity monitor outlet	1
27C	HV-7811	Containment air radioactivity monitor outlet	1
30A	HV-7802	Containment air radioactivity monitor outlet	1
30A	HV-7803	Containment air radioactivity monitor outlet	1
30B	HV-7801	Containment air radioactivity monitor outlet	1
30B	HV-7800	Containment air radioactivity monitor outlet	1
30B	HV-7816	Containment air radioactivity monitor outlet	1
30C	HV-0516	Quench tank and drain tank gas sample	40
30C	HV-0514	Quench tank and drain tank gas sample	40
30C	HV-0515	Quench tank and drain tank gas sample	40
42	HV-6211	Component cooling water inlet	40
42	HV-6223	Component cooling water inlet	40
43	HV-6236	Component cooling water outlet	40

TABLE 3.6-1
CONTAINMENT ISOLATION VALVES (Continued)

PENETRATION NUMBER	VALVE NUMBER	FUNCTION	MAXIMUM ISOLATION TIME (SEC)
A. AUTOMATIC CONTAINMENT ISOLATION (Cont.)			
43	HV-6216	Component cooling water outlet	40
45	HV-9900	Containment normal A/C chilled water inlet	40
45	HV-9920	Containment normal A/C chilled water inlet	40
46	HV-9971	Containment normal A/C chilled water outlet	40
46	HV-9921	Containment normal A/C chilled water outlet	40
47	HV-7258	Containment waste gas vent header	40
47	HV-7259	Containment waste gas vent header	40
68	2"-129-A-554	Charging line to auxiliary spray check valve	NA
77	HV-5434	Nitrogen supply to safety injection tanks	40
77	2"-108-C-627	Nitrogen supply to safety injection tanks check valve	NA
B. CONTAINMENT PURGE (CPIS)			
18	HV-9949**	Containment purge inlet (normal)	12
18	HV-9948**	Containment purge inlet (normal)	12
18	HV-9821	Containment mini-purge inlet	5
18	HV-9823	Containment mini-purge inlet	5
19	HV-9950**	Containment purge outlet (normal)	12
19	HV-9951**	Containment purge outlet (normal)	12
19	HV-9824	Containment mini-purge outlet	5
19	HV-9825	Containment mini-purge outlet	5
C. MANUAL *			
6	2"-099-C-334	Safety injection drain to RWST	NA
9	HV-9337#@	Shutdown cooling to LPSI pumps	NA
9	HV-9377#@	Shutdown cooling to LPSI pumps	NA
9	HV-9336#@	Shutdown cooling to LPSI pumps	NA
9	HV-9379#@	Shutdown cooling to LPSI pumps	NA
10C	3/4"-038-C-396	Integrated leak rate test pressure sensor	NA
10C	3/4"-039-C-396	Integrated leak rate test pressure sensor	NA
16A	HV-0500	Post LOCA hydrogen monitor	NA
16A	HV-0501	Post LOCA hydrogen monitor	NA
16B	HV-0502	Post LOCA hydrogen monitor	NA
16B	HV-0503	Post LOCA hydrogen monitor	NA
20	2"-321-C-376	Quench tank makeup	NA

* Manual valves may be opened on an intermittent basis under administrative control.
** Power to the valve removed in accordance with Specification 3.6.1.7.
\# Not subject to Type C leakage tests.
@ Shutdown cooling valves may be opened in MODE 4.

TABLE 3.6-1
CONTAINMENT ISOLATION VALVES (Continued)

PENETRATION NUMBER	VALVE NUMBER	FUNCTION	MAXIMUM ISOLATION TIME (SEC)
C. MANUAL * (Cont.)			
21	2"-055-C-387	Service air supply line	NA
25	10"-100-C-212	Refueling canal fill and drain	NA
25	10"-101-C-212	Refueling canal fill and drain	NA
31	HV-9946	Containment hydrogen purge inlet	NA
31	HCV-9945	Containment hydrogen purge inlet	NA
68	2"-130-C-334	Charging line to auxiliary spray	NA
70	2"-037-C-387	Auxiliary steam inlet to utility stations	NA
70	2"-038-C-387	Auxiliary steam inlet to utility stations	NA
74	HV-9917	Containment hydrogen purge outlet	NA
74	HCV-9918	Containment hydrogen purge outlet	NA
D. OTHER***			
3	3"-018-A-551#	High pressure safety injection	NA
3	HV-9323#	High pressure safety injection	NA
3	HV-9324#	High pressure safety injection	NA
5	3"-019-A-551#	High pressure safety injection	NA
5	HV-9326#	High pressure safety injection	NA
5	HV-9327#	High pressure safety injection	NA
8	2"-122-C-554	Charging line to regenerative heat exchanger	NA
8	HV-9200	Charging line to regenerative heat exchanger	NA
10A	HV-0352A#	Containment pressure detectors	NA
27A	HV-0352D#	Containment pressure detectors	NA
39	3"-020-A-551#	High pressure safety injection	NA
39	HV-9329#	High pressure safety injection	NA
39	HV-9330#	High pressure safety injection	NA
40A	HV-0352B#	Containment pressure detectors	NA
41	3"-021-A-551#	High pressure safety injection	NA
41	HV-9332#	High pressure safety injection	NA

* Manual valves may be opened on an intermittent basis under administrative control.

Not subject to Type C leakage tests.

*** Valves secured in the ESFAS actuated position are considered OPERABLE pursuant to this specification.

TABLE 3.6-1
CONTAINMENT ISOLATION VALVES (Continued)

PENETRATION NUMBER	VALVE NUMBER	FUNCTION	MAXIMUM ISOLATION TIME (SEC)
D. OTHER*** (Cont.)			
41	HV-9333#	High pressure safety injection	NA
48	8"-072-A-552#	Low pressure safety injection	NA
48	HV-9322#	Low pressure safety injection	NA
49	8"-073-A-552#	Low pressure safety injection	NA
49	HV-9325#	Low pressure safety injection	NA
50	8"-074-A-552#	Low pressure safety injection	NA
50	HV-9328#	Low pressure safety injection	NA
51	8"-075-A-552#	Low pressure safety injection	NA
51	HV-9331#	Low pressure safety injection	NA
52	8"-004-C-406	Containment spray inlet	NA
52	HV-9367	Containment spray inlet	NA
53	8"-006-C-406	Containment spray inlet	NA
53	HV-9368	Containment spray inlet	NA
54	HV-9304#	Containment emergency sump recirculation	NA
54	HV-9302#	Containment emergency sump recirculation	NA
55	HV-9305#	Containment emergency sump recirculation	NA
55	HV-9303#	Containment emergency sump recirculation	NA
56	HV-6366	Containment emergency A/C cooling water inlet	NA
57	HV-6372	Containment emergency A/C cooling water inlet	NA
58	HV-6368	Containment emergency A/C cooling water inlet	NA
59	HV-6370	Containment emergency A/C cooling water inlet	NA
60	HV-6369	Containment emergency A/C cooling water outlet	NA
61	HV-6371	Containment emergency A/C cooling water outlet	NA
62	HV-6367	Containment emergency A/C cooling water outlet	NA
63	HV-6373	Containment emergency A/C cooling water outlet	NA
67	3"-157-A-550	Hot leg injection	NA
67	HV-9434	Hot leg injection	NA
71	3"-158-A-550	Hot leg injection	NA
71	HV-9420	Hot leg injection	NA
73A	HV-0352C#	Containment pressure detectors	NA

*** Valves secured in the ESFAS actuated position are considered OPERABLE pursuant to this specification.
# Not subject to Type C leakage tests.

3/4.6.3 CONTAINMENT ISOLATION VALVES

The OPERABILITY of the containment isolation valves ensures that the containment atmosphere will be isolated from the outside environment in the event of a release of radioactive material to the containment atmosphere and is consistant with the requirements of GDC 54 through 57 of Appendix A to 10 CFR 50. Containment isolation within the time limits specified for those power operated isolation valves designed to close automatically upon a CIAS signal ensures that the release of radioactive material to the environment will be consistent with the assumptions used in the analyses for a LOCA. Such valves are listed in Sections A and B of Table 3.6-1 and Surveillance requirements to verify OPERABILITY of these valves are explicitly stated in 4.6.3.1 thru 4.6.3.3. Check valves located inside containment are considered OPERABLE provided their leak rate is within limits when tested pursuant to 10 CFR 50 Appendix J.

Section C of Table 3.6-1 contains a listing of manual valves that are normally closed and assumed to be closed under design basis accident conditions, but which may be opened intermittently for service, maintenance or test during normal operation provided adequate administrative controls are implemented to ensure operator action is taken to close such valves in the event of an accident.

All valves in Section A, B or C are considered OPERABLE for containment isolation purpose if they are indeed locked, sealed or otherwise secured in the closed position and leakage through the affected flow path is shown to be within limits when tested pursuant to 10 CFR 50 Appendix J.

Section D of Table 3.6-1 contains a listing of valves which operate automatically on an ESFAS signal to prevent or mitigate the consequences of the design basis accident. Surveillance requirement 4.6.1.1.a is not applicable to such valves. The OPERABILITY of such valves is determined by ESFAS response time testing of specification 3/4.3.2. Valves in Section D that are locked, sealed or otherwise secured in their ESFAS actuated position will permit performance of their safety function and are, therefore, considered OPERABLE pursuant to this specification.

ENCLOSRE 4

GE LETTER DATED JUNE 9, 1983

Attachment (1)

GENERAL ELECTRIC

SPACE SYSTEMS DIVISION
GENERAL ELECTRIC COMPANY • VALLEY FORGE SPACE CENTER • P.O. BOX 8555 • PHILADELPHIA, PENNSYLVANIA 19101 • (215) 962-2000

June 9, 1983

Southern California Edison Company
P O Box 800
2244 Walnut Grove Avenue
Rosemead, CA 91770

ATTN: Peter Smith
Room 412 G O# 1

TO: Peter Smith:

The purpose of this letter is to reiterate the subjects discussed during our meeting on May 10th. The first topic that should be adressed is the component failure you have observed with the Acromag Power Supply Card (781-AC Rev A). The cause of the failure has been attributed to a resistor (R22) that overheated that subsequently caused the capacitor (C-7) to degrade to a point of shorting out. The above stated resistor is part of the voltage protection circuit. During normal operation the current through R22 is low enough not to cause the resistor to over heat. The protection circuit has a two ampere fuse installed on the card that will blow if the circuit is overloaded or if the regulator circuits deliver too high an output voltage. The function of R22 is to prevent the fuse from blowing if an over voltage was to occur for a period of less than one second. If the over voltage is maintained for a period longer than this the fuse will blow. If R22 has dissipated enough heat to melt C-7,there must be a problem with the circuit. We would like to have the card returned to perform a failure analysis. Before you return the card there are a few checks you can make that could account for the failure. Check the fuse located on the Power Supply Card (should be 2 amp) and verify that the fuse located at the rear of the Card Cage Assembly is a one ampere fuse. The second item to check are the voltage regulators located inside the Card Cage Assembly. Remove the Power Supply Card (781-AC) from the Card Cage Assembly and located on the inside wall of the Card Cage Assembly are two voltage regulators. There should be a plastic shim mounted between the regulator and the wall of the Card Cage Assembly. If this shim is not installed this could cause the failure that has been observed. The output stability problem you have experienced with the 712-MD card has not been duplicated by any of our testing. A possible cause could be attributed to RF infiltration of the circuit. The Card Cage Assembly you have is not RF protected. There is a Card Cage Assembly available that is identical to your assembly except that it is RF protected.

After observing the performance characteristics demonstrated by the hydrogen sensors you have on-site I would recommend some changes that would eliminate the problems. The first problem that was discussed was the length of time required to perform a calibration cycle. The linearity of the hydrogen sensor is tested at GE and after this verification has been performed there is no reason to check the linearity in the field. The sensor has been designed not to allow the degradation of linearity during the operational life of the sensor. It is therefore not required to use more than one hydrogen concentration gas during the calibration cycle. GE would recommend the use of a zero gas and one sample gas. This would substantially reduce your calibration cycle time.

The hydrogen sensors that are on-site have exhibited an extremely slow response time. Your calibration is being performed at ambient temperature. This temperature would require a four hour maximum exposure to the hydrogen sample gas to reach stability. The factor that can be attributed to the discrepancy observed between on-site sensors and normal sensor response performance would be that the on-site sensors have been stored in a hydrogen free environment in excess of six months. If the hydrogen ion concentration in the sensor is not maintained by purging the cell with hydrogen then eventually the ion concentration would be depleted thus causing an oxidation of the sensing electrode. The performance characteristics observed as a result of the oxidation process would be a reduction in response time and a reduction in sensitivity. GE would be able to supply a storage container (47C240604) that should be purged every 90 days with two percent hydrogen that will accommodate long term storage of the sensor without degradation of performance. The dimension of the storage container is 11" by 10" by 7" and will accommodate a purge line with a 1/8" swaglok fitting.

During our meeting we discussed the gradual increase in output that has been observed during the calibration cycle. The phenomenon is caused by a long exposure of dry sample gas being applied to the sensor which causes the sensor to dry out at the face of the sensor. This condition is temporary and can be corrected by the application of humidified gas or exposure to a humidified environment. During our meeting we discussed the possibility of applying a humidified sample gas to eliminate the drying effect. If this method is used it would be imperative that the exact RH value is known. The hydrogen sensor monitors the partial pressure of hydrogen and by introducing humidity into a sample gas would reduce the partial pressure of hydrogen. Attached is the method used to determine the partial pressure of hydrogen with a known amount of humidity.

You should replace the on-site sensors that are suspected of having oxidized sensing electrodes with new units that will be stored in a hydrogen environment. The new sensors will not require humidity to be added to the sample gas because the time to reach stability will be four hours or less. To minimize the amount of dry gas exposure it is recommended that only one sample gas be used (2% to 4% H_2). This would substantially reduce the period of time required to complete a calibration cycle.

I would like to inform you of a new hydrogen sensor that we have developed. The Sensor is physically identical to the units you have on -site and would easily be adaptable to your system. They exhibit considerable better response time at ambient temperatures than the present sensors (90% < 30 minutes). The new sensors have not been qualified as of yet but we hope to have them qualified in the near future. If you have any questions or if I can help you any way please feel free to contact me.

cc: D Scheyer (Bechtel Power Corporation)

Very truly yours,

Larry R. Heverly

Larry Heverly
Project Engineer
Analyzer Program
Room 1342M Ext. 1518

GENERAL ELECTRIC
SPACE DIVISION
PHILADELPHIA

PROGRAM INFORMATION REQUEST / RELEASE

PIR NO.	*CLASS. LTR.	OPERATION	PROGRAM	SEQUENCE NO.	REV. LTR.
			— 1454 —	— 297	

*USE "C" FOR CLASSIFIED AND "U" FOR UNCLASSIFIED

FROM	TO
Larry Heverly - Project Engineer Analyzer Programs Room 1342M VF Ext 1518	Distribution

DATE SENT	DATE INFO. REQUIRED	PROJECT AND REQ. NO.	REFERENCE DIR. NO.
6-8-83			

SUBJECT

HYDROGEN PARTIAL PRESSURE EFFECTS WITH HUMIDITY

INFORMATION REQUESTED/RELEASED

DRY GAS

For the calibration tests, dry gas is used to exercise the sensor. The concentration of the hydrogen in the sample is simply the certified mixture analysis on the bottle. The relationship to hydrogen partial pressure is as follows:

$$\text{Concentration, volume \%} = \frac{\text{hydrogen partial pressure}}{\text{ambient total pressure}}$$

$$V = \frac{PH_2}{PT} \times 100$$

where $PT = PH_2 + PN_2$

HUMIDITY EFFECT

The hydrogen sample is again supplied from a certified high pressure bottle but the addition of water vapor to the mixture modifies the hydrogen concentration in the chamber.

The equations therefore are modified as follows:

$$V = \frac{PH_2}{PT} \times 100$$

where $PT = PH_2 + PN_2 + PH_2O$

To calculate the resulting hydrogen concentration, it is necessary to determine the partial pressure of the water vapor in the mixture from the due point data. For example,

CC:

F DiSanto
M Cunningham
L Heverly
N Cerone (4)

✓ RETENTION REQUIREMENTS

COPIES FOR	MASTERS FOR
☐ 1 MO.	☐ 3 MOS.
☐ 3 MOS.	☐ 6 MOS.
☐ 6 MOS.	☐ 12 MOS.
☐ MOS.	☐ MOS.
☐	☐ DO NOT DESTROY

TEST CONDITIONS

Test temperature	77^{o} F
Ambient pressure	14.7 psia
Dew Point	72^{o} F
Certified mixture	4.0% H_2

CALCULATIONS

Pt = 14.7 psia (Barometer) (1)

PH_2O @ 72^{o} F = 0.3883 psia (steam tables) (2)

p H_2/N_2 = 14.7 - 0.388 = 14.31 psia (3)

PH_2 = 14.31 X 0.04 = 0.57 psia

Conc. $H_2 = \frac{0.57}{14.7}$ X 100 = 3.89%

PARTIAL PRESSURE

The hydrogen partial pressure may be computed for both the wet and dry conditions and the sensitivity of the sensor compared strictly on the basis of response to partial pressure. These calibrations are performed as follows:

Span (MV) = Response (MV) - Zero (MV)

$$\text{Sensitivity (MV/psia } H_2) = \frac{\text{Span (MV)}}{\text{partial pressure (psia)}}$$

CONCENTRATION

The same calculations may be made in terms of the hydrogen concentration by substituting the actual % hydrogen for hydrogen partial pressure resulting in a sensitivity in terms of MV/% hydrogen.

The sensor performances may then be compared at any level of hydrogen selected. Calibration time can now be computed for each unit by:

(1) determining the sensitivity of the sensor during calibration (MV/%)

(2) multiplying the sensitivity by the concentration of the calibration gas used in the calibration test and determining the span, MV

(3) adding the zero offset from the calibration test to the sensor span resulting in the absolute sensor response, MV

(4) drawing a line on the calibration curve at this level to intersect with the calibration response curve at time,+ which is the prescribed calibration time.