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SUBJECT: Forwards util leakage monitoring testing program results per NUREG-0737, Item III. D. 1. 1 & util 820524 ltr. Results part of util commitment to program to reduce leakage, during accident, of radioactive fluids from sys outside containment.

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November 13, 1987

U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

ATTN: Document Control Desk

References: (1) Letter from E. E. Van Brunt, Jr. to G. W. Knighton, (NRC), dated May 24, 1982 (ANPP-20853). Subject: Amendment 3 to PVNGS Lessons Learned Implementation Report.

(2) NUREG-0857, Supplement No. 2; "Safety Evaluation Report Related to the Operation of Palo Verde Nuclear Generating Station, Units 1, 2 and 3", dated May, 1982.

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Unit 3
Item III.D.1.1 of NUREG-0737
File: 87-F-056-026

ANPP previously committed to implement a program to reduce leakage from systems outside containment that could contain highly radioactive fluids during a serious transient or accident to as low as practical levels. As a part of this program, ANPP has agreed to submit a report to the NRC Staff which presents the results of the initial leak rate tests for the subject fluid systems. The attachment to this letter is the report which details the leak rate test that has been performed.

If you have any questions on this matter, please contact Mr. A. C. Rogers of my staff.

Very truly yours,

E. E. Van Brunt, Jr.
Executive Vice President
Project Director

8711170285 871113
PDR ADOCK 05000530
P PDR

EEVB/SGB/ls
Attachment

cc: O. M. De Michele (all w/a)
E. A. Licitra
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A. C. Gehr

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RESULTS OF LEAKAGE MONITORING TESTING OF SYSTEMS OUTSIDE CONTAINMENT WHICH COULD CONTAIN RADIOACTIVE FLUIDS FOLLOWING AN ACCIDENT

PALO VERDE NUCLEAR GENERATING STATION - UNIT 3

I. SUMMARY

The objective of the leakage monitoring testing program is to locate and minimize leakage from those portions of the Safety Injection System and the Post-Accident Sampling System which could contain highly radioactive fluids during a serious transient or accident. This testing ensures that leakage from these systems is maintained to as low as practical levels.

The leakage monitoring tests are performed on a schedule of at least once per refueling cycle in order to meet the requirements of PVNGS Unit 3 Technical Specifications 4.5.2.e.4 and 6.8.4.a and NUREG-0737, Item III.D.1.1.

The leakage monitoring tests were performed on those portions of the Safety Injection System and the Post-Accident Sampling System outside containment which are likely to contain radioactive fluids following an accident. The detailed results of these leakage tests are presented in Section III of this report.

The overall estimated leakage from the safety injection system is as follows: (Please note that leakage estimates were not made for the sampling system which was inspected for indications of leakage in order to determine where corrective measures were needed).

	Estimated Leakage (gpm)
Combined Safety Injection/Containment Spray (Trains A and B)	0.06

II. LEAKAGE MONITORING TESTING PROGRAM DISCUSSION

This testing program is designed to identify any leakage from the applicable portions of the Safety Injection System (low pressure, high pressure, and containment spray) and the Post-Accident Sampling System. For the Safety Injection System, the system is pressurized to greater than 40 psig at such time an inspector walks down the piping systems to identify any leakage from the potential leakage paths (i.e., valves, fittings, seals, etc.). For the Post-Accident Sampling System, the system is inspected while it is operating in the normal sampling mode for each of the separate sample points (i.e., RCS hot leg, letdown line, containment radwaste sump, auxiliary building sump, safety injection lines). The Post-Accident Sampling System gas sampler is tested by pressurizing the system with nitrogen gas and then checking for indications of a leak.

III. LEAKAGE MONITORING TESTING PROGRAM RESULTS

The Tables presented in this section of this report summarize the testing program results and the identified leakage from the outside containment portions of the Safety Injection System and the Post-Accident Sampling System. The following codes are used in the Tables to identify the location of the leak: (Note that the estimated leakage numbers in the tables are given in units of ml/minute).

Location of Leak:

P	=	Packing/Stem Leak
DC	=	Drain Cap Leak
VC	=	Vent Cap Leak
S	=	Seal Leak
O	=	Other Type of Leak

Emergency Core Cooling System Sump - Train A

	Location of Leak	Estimated Leakage
Recirc. sump pene. outside flange	-	0
SI-V864, test	0	1 ml/min
PSV-151	-	0
SI-V207 and flange, test connection	-	0
SI-V205, sump to SI pump check	-	0
SIA-UV-674, CTMT isolation valve	-	0
SI-V828, SI suction vent	-	0
SIA-UV-708, sample valve to PASS	-	0
SI-V105, CS pump suction	0	1 ml/min
SIA-HV-683, LPSI suction from RWT	P	1 ml/min
SI-V470, HPSI "A" suction	0	1.5 ml/min
CH-V306, RWT outlet check	S	1 ml/min
SIA-HV-531, RWT outlet to SI	-	0

Emergency Core Cooling System Sump - Train B

	Location of Leak	Estimated Leakage
Recirc. sump pene. outside flange	-	0
SI-V862, test	-	0
PSV-140	-	0
SI-V208 and flange, test connection	-	0
SI-V206, sump to SI pump check	-	0
SIB-UV-676, CTMT isolation	-	0
SI-V829, vent	-	0
CH-V327, charging pump suction from SI	-	0
SI-V104, CS pump suction	-	0
SIB-HV-692, LPSI suction from RWT	-	0
SI-V402, HPSI "B" Suction	-	0
CH-V305, RWT outlet check	-	0
CHB-HV-530, RWT outlet	-	0

Trains "A" and "B" High Pressure Safety Injection and Containment Spray Piping

	Location of Leak	Estimated Leakage
SI-V470, HPSI pump "A" suction	S	2 ml/min
SI-V552 and cap, test	-	0
SIA-F02, suction strainer	0	0.5 ml/min
SI-V009, test connection	-	0
SI-V981, HPSI pump "A" vent	-	0
SI-V980, HPSI pump "A" drain	0	0.5 ml/min
SI-V955, HPSI pump "A" drain	-	0
SI-V956, HPSI pump "A" drain	-	0
HPSI pump "A" balancing line	0	0.5 ml/min
HPSI pump "A" outboard seal	-	0
HPSI pump "A" cyclone filter	-	0
HPSI pump "A" casing	S	1 ml/min
SI-V966, PT-308 isolation	P	0.5 ml/min
PT-308	-	0
FO-25, mini-flow recirc. orifice	-	0
SI-V218, FO-25 bypass valve	-	0
SI-V424, mini-flow recirc. check	-	0
SIA-UV-666, HPSI "A" mini-flow recirc.	S	0.5 ml/min
SI-V404, HPSI "A" discharge check	-	0
SI-V105, CS pump normal suction	S	0.5 ml/min
SI-V157, CS pump suction check	-	0
SI-V184, CS pump suction from SDC	-	0
SI-V130, SCAP discharge check	-	0
SI-V551, drain and test	-	0
SI-V006, test connection	-	0
SIA-F03, CS pump strainer	0	10 ml/min
SI-V960, test connection	-	0
SI-V007, test connection	-	0
SI-V976, CS pump vent	-	0
CS Pump "A" seal	-	0
SI-V016, test connection	-	0
SI-V070, drain	P	1 ml/min
SI-V174, FT-338 isolation	-	0
SI-V175, FT-338 isolation	-	0
FT-338	-	0
ST-V841, flush connection	-	0
FO-21, mini-flow recirc. orifice	-	0
SI-V486, mini-flow recirc. check	-	0
SI-V664, CS pump "A" mini-flow recirc.	-	0
SI-V485, CS pump "A" discharge check	-	0
SI-V402, HPSI pump "B" suction	-	0
SI-V553, test connection	-	0

Trains "A" and "B" High Pressure Safety Injection and Containment Spray Piping (Continued)

	Location of Leak	Estimated Leakage
SIB-F02, HPSI pump "B" suction strainer	0	0.5 ml/min
SI-V011, test connection	0	0.5 ml/min
SI-V983, HPSI pump "B" vent	-	0
SI-V982, HPSI pump "B" drain	-	0
SI-V953, HPSI pump "B" drain	-	0
SI-V954, HPSI pump "B" drain	-	0
HPSI pump "B" seal	-	0
HPSI pump "B" balancing line	S	1 ml/min
HPSI pump "B" cyclone filter	-	0
HPSI pump "B" casing	0	2 ml/min
SI-V967, PT-309 isolation	-	0
PT-309	-	0
FO-26, mini-flow recirc. orifice	S	0.5 ml/min
SI-V219, FO-26 bypass	0	0.5 ml/min
SI-V426, HPSI "B" mini-flow recirc. check	-	0
SIB-UV-667, HPSI "B" mini-flow recirc.	P	10 ml/min
SI-V400, HPSI "B" to SI tank fill	-	0
SI-V405, HPSI "B" discharge check	-	0
SI-V104, CS pump "B" normal suction	-	0
SI-V158, CS pump "B" suction check	-	0
SI-V185, CS pump "B" suction from SDC	-	0
SI-V120, SCAP discharge to SI	-	0
SI-V554, drain	-	0
SI-V012, test connection	-	0
SI-V961, test connection	-	0
SIB-F03, CS pump "B" suction strainer	-	0
SI-V013, test connection	-	0
SI-V978, CS pump "B" vent	0	0
CS pump "B" seal	-	0
SI-V073, drain	-	0
SI-V017, test connection	-	0
SI-V176, FT-348 isolation	-	0
SI-V177, FT-348 isolation	-	0
FT-348	-	0
SI-V843, flush connection	P	0
FO-22, mini-flow recirc. orifice	-	0
SI-V487, CS pump "B" recirc. check	-	0
SIB-UV-665, CS pump "B" mini-flow recirc.	-	0
SI-V484, CS pump "B" discharge check	-	0

High Pressure Safety Injection Discharge Piping

	Location of Leak	Estimated Leakage
SI-V404, HPSI "A" discharge check	-	0
SI-V476, HPSI discharge	-	0
SI-V028, HPSI header vent	-	0
SIA-HV-604, HPSI "A" hot leg injection	-	0
FO-23, V698 bypass orifice	-	0
SIA-HV-698, HPSI "A" to cold leg injection	-	0
SI-V032, drain	DC	1 ml/min
SI-V416, test connection	-	0
SI-V848, HPSI to RC loops vent	-	0
SI-V849, HPSI to RC loops drain	-	0
SI-V819, HPSI to RC loops vent	-	0
SI-V850, hot leg injection vent	-	0
SI-V820, hot leg injection vent	-	0
SI-V851, hot leg injection drain	-	0
SI-V821, hot leg injection to drain funnel	-	0
SI-V039, hot leg injection vent	-	0
PSV-468	-	0
SI-V839, drain	P&DC	2 ml/min
SIC-HV-321, HPSI "A" hot leg injection	-	0
SI-V859, drain	-	0
SI-V525, FT-390 isolation	-	0
SI-V526, FT-390 isolation	-	0
FT-390	-	0
Penetration U077	-	0
SI-V037, vent	-	0
PSV-417	-	0
SI-V951, drain	-	0
FO-45	-	0
SI-V833, vent	VC	4 ml/min
SI-UV-637, HPSI to loop 1A	P	1 ml/min
FO-737	-	0
SI-V835, drain	-	0
SI-V125, FT-331 isolation	-	0
SI-V126, FT-331 isolation	-	0
FT-331	-	0
Penetration U015	-	0
FO-43	-	0
SI-V836, vent	-	0
SIA-UV-647, HPSI to loop 1B	-	0
FO-747	-	0
SI-V838, drain and test	-	0
SI-V145, FT-341 isolation	-	0
SI-V146, FT-341 isolation	-	0
FT-341	-	0

High Pressure Safety Injection Discharge Piping
(Continued)

	Location of Leak	Estimated Leakage
Penetration U016	-	0
SI-V811, HPSI to drain funnel	-	0
SI-V041, HPSI to RC loop 1 vent	-	0
SI-V040, HPSI to drain funnel	P	0.5 ml/min
SI-V042, vent	P	0.5 ml/min
SI-V050, drain	-	0
FO-44	-	0
SI-V837, vent	-	0
SIB-UV-646, HPSI to RC loop 1B	P	0.5 ml/min
FO-746	-	0
FO-46	-	0
SI-V834, vent	-	0
SIB-UV-636, HPSI to RC loop 1A	-	0
FO-736	-	0
PSV-409	-	0
SI-V952, drain	-	0
FO-50	-	0
SI-V825, vent	-	0
SIB-UV-616, HPSI to RC loop 2A	-	0
FO-716	-	0
SI-V826, drain and test	-	0
SI-V115, FT-311 isolation	-	0
SI-V116, FT-311 isolation	-	0
FT-311	-	0
Penetration U013	-	0
FO-48	-	0
SI-V867, vent	-	0
SIB-UV-626, HPSI to RC loop 2B	P	0.5 ml/min
FO-726	-	0
SI-V830, drain and test	-	0
SI-V135, FT-321 isolation	-	0
SI-V136, FT-321 isolation	-	0
FT-321	-	0
Penetration U014	-	0
PSV-166, hot leg injection relief	-	0
SI-V045, vent	-	0
SI-V832, drain and test	-	0
SID-HV-331, HPSI B to hot leg injection	-	0
SI-V871, test	DC	1 ml/min
SI-V535, FT-391 isolation	-	0
SI-V536, FT-391 isolation	-	0
FT-391	-	0
Penetration U067	-	0
SI-V046, vent	-	0

High Pressure Safety Injection Discharge Piping
(Continued)

	Location of Leak	Estimated Leakage
SI-V047, drain	-	0
FO-47	-	0
SI-V866, vent	-	0
SIA-UV-627, HPSI to RC loop 2B	P	0.5 ml/min
FO-727	-	0
FO-49	-	0
SI-V824, vent	-	0
SIA-UV-617, HPSI to RC loop 2A	-	0
FO-717	-	0
SI-V894, drain	-	0
SI-V934, vent	-	0
SI-V508, chg. pumps to HPSI "A"	-	0
SI-V509, chg. pumps to HPSI "B"	-	0
SI-V852, vent	-	0
SI-V853, drain	-	0
SI-V408, test	-	0
SI-V854, vent	-	0
SI-V855, drain	-	0
FO-24	-	0
SI-V031, drain and flush	-	0
SIB-HV-699, HPSI discharge to cold legs	-	0
SIB-HV-609, HPSI "B" hot leg injection	-	0
SI-V030, vent	-	0
SI-V478, HPSI discharge	-	0
SI-V405, HPSI discharge check	-	0

Train "A" LPSI and CS Discharge Piping

	Location of Leak	Estimated Leakage
SI-V437, FT-306 isolation	-	0
SI-V438, FT-306 isolation	-	0
FT-306	-	0
PSV-439	-	0
SI-V080, vent	-	0
FO-39	-	0
SI-V908, drain and test	-	0
SIA-UV-635, LPSI to loop 1A	-	0
SI-V872, test	-	0
Penetration U019	-	0
FO-41	-	0
SI-V874, drain and test	-	0
SIA-HV-691, SDCS warmup	S	0.5 ml/min
SIA-UV-645, LPSI to loop 1B	-	0
SI-V085, vent and test	-	0
Penetration U020	-	0
SI-V083, CS header vent	-	0
SI-V084, CS header drain	DC	0.5 ml/min
SIA-UV-672, CS header isolation	-	0
SI-V500, CS header test	-	0
Penetration U021	-	0
SIA-UV-655	-	0
SI-V856, vent and flush connection	-	0
SI-V256, fuel pool cooling cross connection	-	0
SI-V909, test connection	DC	0.5 ml/min
SI-V429, sample isolation	-	0
SI-V419, shutdown purification return	-	0
SI-V018, SDC to CS pump suction vent	-	0
SI-V184, SDCS to CS pump suction	-	0
SI-V485, CS pump discharge check	-	0
SI-V071, drain	-	0
SIA-HV-684, CS pump discharge isolation	-	0
SI-V977, LPSI pump "A" vent	-	0
FO-19	-	0
SI-V451, LPSI pump "A" mini-flow recirc.	-	0
SI-UV-669, LPSI pump "A" mini-flow recirc.	P	0.5 ml/min
SI-V840, flush connection	-	0
SI-V434, LPSI discharge check	-	0
SI-V435, LPSI discharge	-	0
SI-V069, drain	DC	0.5 ml/min
SI-V433, PT-306 isolation	-	0
PT-306	0	0.5 ml/min
SIA-HV-306, SDHX bypass	-	0

Train "A" LPSI and CS Discharge Piping
(Continued)

	Location of Leak	Estimated Leakage
LPSI pump seal	-	0
LPSI pump cyclone filter	-	0
SIA-HV-683, RWT to LPSI suction	P	3 ml/min
SI-V201, LPSI suction check	-	0
SI-V550, drain and test	-	0
SI-V004, test	-	0
SI-V959, test	-	0
SIA-F01, LPSI startup strainer	-	0
SI-V005, test	-	0
SIA-HV-688, CS pump to spray header isolation	-	0
PSV-289	-	0
SIA-HV-678, CS to SDHX	P	0.5 ml/min
SIA-HV-685, LPSI to SDHX	0	0.5 ml/min
SI-V807, SDHX outlet vent	-	0
PSV-194	-	0
SI-V089, SDHX to CS header vent	VC	0.5 ml/min
SIA-HV-687, SDHX to CS header	P	0.5 ml/min
SIA-HV-686, SDHX to SDC header isolation	P,0	1 ml/min
PSV-161	-	0
SI-V460, SDHX outlet to RWT	-	0
SI-V257, test connection	-	0
SI-V458, SDHX to fuel pool cooling connect.	-	0
SI-V817, vent	-	0
SIA-HV-657, SDC to loop isolation	-	0
SI-V081, drain	-	0
SI-V421, shutdown purification isolation	-	0
SI-V088, LPSI cooler bypass vent	-	0
SI-V483, PT-303X isolation	-	0
PT-303X	-	0
SI-V260, SDHX tube side vent	-	0
SI-V262, SDHX tube side drain	-	0

Train "B" LPSI and CS Discharge Piping

	Location of Leak	Estimated Leakage
SI-V440, FT-307 isolation	-	0
SI-V441, FT-307 isolation	-	0
FT-307	-	0
PSV-449	-	0
SI-V093, vent	VC	0.5 ml/min
FO-40	-	0
SIB-HV-690, SDCS warmup	-	0
SI-V097, drain	DC	1 ml/min
SIB-UV-615, LPSI to loop 2A	P,O	3 ml/min
SI-V827, test	-	0
Penetration U017	-	0
FO-42	-	0
SI-V831, drain and test	-	0
SIB-UV-625, LPSI to loop 2B	P	2 ml/min
SI-V868, test	-	0
Penetration U018	-	0
SI-V091, vent	-	0
SI-V092, drain	-	0
SIB-UV-671, CS header isolation	-	0
SI-V501, CS header test	-	0
SI-V891, CS header vent	-	0
Penetration U022	-	0
SIB-UV-656, SDCS suction	-	0
SI-V869, test	-	0
SI-V442, fuel pool cooling cross connect.	-	0
SI-V886, flush connection	-	0
SI-V418, shutdown purification return	-	0
SI-V445, sample isolation	-	0
SI-V019, vent	-	0
SI-V185, SDCS to CS pump suction	-	0
SI-V484, CS pump discharge check	-	0
SI-V074, drain	-	0
SIB-HV-689, CS pump discharge isolation	-	0
SI-V979, LPSI pump "A" vent	-	0
FO-20	-	0
SI-V861, recirc. line vent	-	0
SI-V448, recirc. check	-	0
SIB-UV-668, LPSI pump "B" recirc.	P	2 ml/min
SI-V842, flush connection	-	0
SI-V446, LPSI discharge check	-	0
SI-V447, LPSI discharge	-	0
SI-V075, LPSI discharge drain	P	1 ml/min
SI-V436, PT-307 isolation	-	0
PT-307	-	0

Train "B" LPSI and CS Discharge Piping
(Continued)

	Location of Leak	Estimated Leakage
SIB-HV-307	-	0
LPSI pump seal	-	0
LPSI pump cyclone filter	-	0
SIB-HV-692, RWT to LPSI suction	P	1 ml/min
SI-V200, LPSI suction check	-	0
SI-V555, drain and test	-	0
SI-V014, test	-	0
SI-V962, test	-	0
SIB-F01, LPSI startup strainer	S	3 ml/min
SI-V015, test	-	0
SIB-HV-693, CS pump to spray header isol.	-	0
PSV-287	-	0
SIB-HV-679, CS to SDHX	P	2 ml/min
SIB-HV-694, LPSI to SDHX	-	0
PSV-191	-	0
SI-V090, SDHX to CS header vent	P	1 ml/min
SIB-HV-695, SDHX to CS header	P	20 ml/min
SIB-HV-696, SDHX to SDC header isol.	P	18 ml/min
PSV-193	-	0
SI-V464, SDHX outlet to RWT	P	5 ml/min
SI-V202, test connection	-	0
SI-V455, fuel pool cooling cross connect.	P	5 ml/min
SI-V910, vent	P	1 ml/min
SIB-HV-658, SDC to loop isolation	P,0	100 ml/min
SI-V814, drain	P	2 ml/min
SI-V420, shutdown purification isolation	-	0
SI-V094, LPSI cooler bypass vent	P	1 ml/min
SI-V482, PT-303Y isolation	-	0
PT-303Y	-	0
SI-V096, SDHX inlet vent	P	1 ml/min
SI-V264, SDHX tube side vent	-	0
SI-V266, SDHX tube side vent	-	0

PASS RCS Sample Leakage Monitoring

	Location of Leak	Maintenance Required (Y/N)
SS-UV-200, RCS containment isolation	-	N
RCS pipe to tube fitting	-	N
RCS-PASS bulkhead fitting	-	N
PASS-HV-1	-	N
PASS-SV-4, EDT	-	N
PASS-CV-4, EDT check valve	-	N
PASS-HV-4, EDT	-	N
PASS-EDT bulkhead fitting	-	N
EDT pipe to tube fitting	-	N
SS-V209, EDT isolation valve	-	N
PASS-HV-5, RDT	-	N
PASS-CV-5, RDT check valve	-	N
PASS-SV-5, RDT	-	N
PASS-RDT bulkhead fitting	-	N
PASS-RDT pipe to tube fitting	-	N
CH-UV-715, PASS-RDT containment isolation	-	N
CH-V085, vent	-	N
SS-AV-26, depressurized grab sampler valve	-	N
Depressurized liquid sample septum	-	N

PASS Letdown Sample Leakage Monitoring

	Location of Leak	Maintenance Required (Y/N)
PASS-AV-33, PASS letdown	-	N
PASS-HV-33, PASS letdown	-	N
PASS letdown bulkhead fitting	-	N
PASS letdown pipe to tube fitting	-	N
SS-V087, test valve	-	N
CH-UV-924, PASS letdown containment isolation	-	N
CH-V087, Drain Valve	P,DC	Y, WR209075
CH-V086, Drain Valve	DC	Y, WR209075

PASS Safety Injection "A" Train Leakage Monitoring

	Location of Leak	Maintenance Required (Y/N)
PASS-AV-2, PASS SI-A	-	N
PASS-HV-2, PASS SI-A	-	N
PASS SI-A bulkhead fitting	-	N
PASS SI-A pipe to tube fitting	-	N
PASS-AV-2A, PASS SI-A	-	N
SI-V080, vent valve	-	N
SI-UV-709, PASS isolation	-	N
SS-V092, PASS SI-A to LRS vent	-	N
SS-V210, PASS SI-A to LRS isolation	-	N

PASS Safety Injection "B" Train Leakage Monitoring

	Location of Leak	Maintenance Required (Y/N)
PASS-AV-32, PASS SI-B	-	N
PASS-HV-32, PASS SI-B	-	N
PASS SI-B bulkhead fitting	-	N
PASS SI-B pipe to tube fitting	-	N
PASS-AV-32A, PASS SI-B	-	N
SI-V081, vent valve	-	N
SI-UV-710, PASS isolation valve	-	N
SS-V091, SI-B to LRS vent valve	-	N
SS-V211, SI-B to LRS isolation	-	N

PASS Containment Radwaste Sump Sample Leakage Monitoring

	Location of Leak	Maintenance Required (Y/N)
PASS-AV-3, PASS CRWS	-	N
PASS-HV-3, PASS CRWS	-	N
PASS CRWS bulkhead fitting	-	N
PASS CRWS pipe to tube fitting	-	N
PASS-AV-3A, PASS CRWS	-	N
RD-UV-407, PASS containment isolation	-	N
RD-V083, vent valve	-	N

PASS Auxiliary Building Sump Sample Leakage Monitoring

	Location of Leak	Maintenance Required (Y/N)
PASS-AV-34, PASS ABRWS	-	N
PASS-HV-34, PASS ABRWS	-	N
PASS ABRWS bulkhead fitting	-	N
PASS ABRWS pipe to tube fitting	-	N
PASS-AV-34A, PASS ABRWS	-	N
RD-HV-409, PASS isolation	-	N

PASS (RCS) Modules Leakage Monitoring

	Location of Leak	Maintenance Required (Y/N)
HV-1, RCS manual isolation	-	N
AV-1, RCS isolation	-	N
AV-6, filter flush	-	N
F-1, filter	-	N
AV-7, flush isolation	-	N
AV-9, cooler bypass	-	N
AV-8, booster pump inlet	-	N
Cooler inlet/outlet	-	N
AV-12, PRGS isol. supply	-	N
AV-13, PRGS bypass	-	N
AV-12A, PRGS isol. return	-	N
AV-20, dual 3-way RGS transfer	-	N
HV-90, orifice valve	-	N
AV-17, orifice bypass	-	N
SV-18, depressurized grap sample supply	-	N
PCV-62, backpressure regulator	-	N
PE-57, pressure element	-	N
TE-58, temperature element	-	N
FE-56, flow element	-	N
CV-97, RGS return	-	N
A01A/B bulkhead fitting to A01C	-	N
A01A/B bulkhead fitting from A01C	-	N
CV-14, booster pump outlet	-	N
Air diversion tee	-	N
A01C bulkhead fitting from A01A/B	-	N
A01C bulkhead fitting to A01A/B	-	N
HV-41, to boronometer	-	N
AV-41, to boronometer	-	N
HV-42, from boronometer	-	N
AV-42, from boronometer	-	N
CV-20, to A01A/B	-	N
A01C bulkhead fitting from boronometer	-	N
HV-43, from boronometer drain	-	N
SV-43, from boronometer drain	-	N
AV-35, A01C to IAU low range	-	N
HV-35, A01C to IAU low range	-	N
A01C bulkhead fitting to IAU low range	-	N
AV-36, A01C from IAU low range	-	N
HV-36, A01C from IAU low range	-	N
A01C bulkhead fitting from IAU low range	-	N
AV-37, A01C to IAU mid-range	-	N

PASS (RCS) Modules Leakage Monitoring
(Continued)

	Location of Leak	Maintenance Required (Y/N)
HV-37, A01C to IAU mid-range	-	N
A01C bulkhead fitting to IAU mid-range	-	N
AV-38, A01C from IAU mid-range	-	N
HV-38, A01C from IAU mid-range	-	N
A01C bulkhead fitting from IAU mid-range	-	N
AV-39, A01C to IAU high range	-	N
HV-39, A01C to IAU high range	-	N
A01C bulkhead fitting to IAU high range	-	N
AV-40, A01C from IAU high range	-	N
HV-40, A01C from IAU high range	-	N
A01C bulkhead fitting from IAU high range	-	N
Boronometer inlet connection	-	N
Boronometer outlet connection	-	N
Boronometer drain connection	-	N
Collimator low range inlet	-	N
Collimator low range return	-	N
Collimator mid range inlet	-	N
Collimator mid range return	-	N
Collimator high range inlet	-	N
Collimator high range return	-	N
AV-20A, RGS transfer valve dual 3-way	-	N
AV-22, PRGS sample valve dual 3-way	-	N
CV-21, N2 check valve	-	N
AV-23, degas valve	-	N
Off gas sample septum	-	N
AV-24, evacuation isolation	-	N
CV-25, IA check valve	-	N

PASS Containment Air Sample Leakage Monitoring

	Location of Leak	Maintenance Required (Y/N)
A01D bulkhead fitting cont. air sample	-	N
Pipe to tube fitting cont. air sample	-	N
HV-55, containment air sample	-	N
AV-55, containment air sample	-	N
AV-56, local air sample	-	N
HV-56, local air sample	-	N
FE-52, flow element	-	N
TE-50, temperature element	-	N
PE-51, pressure element	-	N
AV-70, RGS isolation inlet	-	N
AV-70, RGS isolation outlet	-	N
AV-60, A01D from IAU Lo/Mid	-	N
HV-60, A01D from IAU Lo/Mid	-	N
A01D bulkhead fitting from IAU Lo/Mid	-	N
AV-61, A01D to IAU Lo/Mid	-	N
HV-61, A01D to IAU Lo/Mid	-	N
A01D bulkhead fitting to IAU Lo/Mid	-	N
AV-62, A01D from IAU high range	-	N
HV-62, A01D from IAU high range	-	N
A01D bulkhead fitting from IAU high range	-	N
AV-63, A01D to IAU high range	-	N
HV-63, A01D to IAU high range	-	N
A01D bulkhead fitting to IAU high range	-	N
AV-66, A01D sample recirculation	-	N
A01D bulkhead fitting to P-30 and P-30A	-	N
Cooler 2A inlet/outlet	-	N
Cooler 2B inlet/outlet	-	N
Condensate trap inlet tee (sample)	-	N
P-30 and P-30A inlet	-	N
P-30 and P-30A outlet	-	N
AV-59, CT-1 inlet	-	N
SV-73, CT-1 drain	-	N
CV-78, CT-1 N2 purge	-	N
CV-71, CT-1 DW flush	-	N
A01D bulkhead fitting N2 to CT-1	-	N
A01D bulkhead fitting DW to CT-1	-	N
A01D bulkhead fitting from P-30 and P-30A	-	N
SV-58, low point drain	-	N
PSV-66, recirculation relief	-	N
AV-67, containment air return	-	N
HV-67, containment air return	-	N
A01D bulkhead fitting to cont. air return	-	N
HP-UV-24, containment isolation	-	N
HP-UV-23, containment isolation	-	N

PASS Containment Air Sample Leakage Monitoring
(Continued)

	Location of Leak	Maintenance Required (Y/N)
SS-V084, test	-	N
SS-V086, test	-	N
Gas sample recirc. pump inlet	-	N
Gas sample recirc. pump outlet	-	N
AV-30, gas grab sampler valve	-	N