PRIORITY 1

(ACCELERATED RIDS PROCESSING)

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9509010002 DOC.DATE: 95/08/27 NOTARIZED: NO DOCKET #
FACIL:50-335 St. Lucie Plant, Unit 1, Florida Power & Light Co. 05000335
AUTH.NAME AUTHOR AFFILIATION
MADDEN,G.R. Florida Power & Light Co.
SAGER,D.A. Florida Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 95-007-00:on 950817,inadvertent containment spray via 1A low pressure SI pump while venting ECCS during startup due to inadequate procedure.Operators stopped 1A LPSI pump & isolated SDC HX to stop spray.W/950827 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 10
TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD2-1 PD	1	1	NORRIS,J	1	1
INTERNAL:	ACRS	1	1	AEOD/SPD/RAB	2	2
	AEOD/SPD/RRAB	1	1	FILE CENTER	1	1
	NRR/DE/ECGB	1	1	NRR/DE/EELB	1	1
	NRR/DE/EMEB	1	1	NRR/DISP/PIPB	1	1
	NRR/DRCH/HHFB	1	1	NRR/DRCH/HICB	1	1
	NRR/DRCH/HOLB	1	1	NRR/DRPM/PECB	1	1
	NRR/DSSA/SPLB	1	1	NRR/DSSA/SPSB/B	1	1
	NRR/DSSA/SRXB	1	1	RES/DSIR/EIB	1	1
	RGN2 FILE 01	1	1			
EXTERNAL:	L ST LOBBY WARD	1	1	LITCO BRYCE,J H	2	2
	NOAC MURPHY,G.A	1	1	NOAC POORE,W.	1	1
	NRC PDR	1	1	NUDOCS FULL TXT	1	1

PRIORITY 1 DOCUMENT

NOTE TO ALL "RIDS" RECIPIENTS:
PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK, ROOM OWFN 5D8 (415-2083) TO ELIMINATE YOUR NAME FROM DISTRIBUTION LISTS FOR DOCUMENTS YOU DON'T NEED!

FULL TEXT CONVERSION REQUIRED
TOTAL NUMBER OF COPIES REQUIRED: LTTR 27 ENCL 27

Florida Power & Light Company, P.O. Box 128, Fort Pierce, FL 34954-0128

August 27, 1995

L-95-242
10 CFR 50.73

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Re: St. Lucie Unit 1
Docket No. 50-335
Reportable Event: 95-007
Date of Event: August 17, 1995
Inadvertent Containment Spray via 1A Low Pressure Safety Injection Pump while Venting the Emergency Core Cooling System During Startup due to Inadequate Procedure

The attached Licensee Event Report is being submitted for information to provide industry notification of the subject event.

Very truly yours,

D. A. Sager
Vice President
St. Lucie Plant

DAS/GRM

Attachment

cc: Stewart D. Ebneter, Regional Administrator, USNRC Region II
Senior Resident Inspector, USNRC, St. Lucie Plant

IE22

NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
St Lucie Unit 1	05000335	1 OF 9

TITLE (4)

Inadvertent Containment Spray via 1A Low Pressure Safety Injection Pump while Venting the Emergency Core Cooling System During Startup Due to Inadequate Procedure

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
08	17	95	95	-- 007 --	0	08	27	95	N/A	05000
									FACILITY NAME: N/A	DOCKET NUMBER: 05000

		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
OPERATING MODE (9)	3		20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
POWER LEVEL (10)	000		20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)
			20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
			20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)	X	OTHER
			20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
GEORGE R. MADDEN, Principal Engineer - Plant Licensing	407-468-4298

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
C	IC	DET	H260	N						
C	BP	FSV	V030	N						

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

At approximately 1800 on August 17, 1995, Unit 1 was shutdown in Mode 3, the reactor coolant system was at 532 degrees and 1550 psia. The Unit was making preparations for startup following an unscheduled outage that began on August 1, 1995, due to a precautionary shutdown for Hurricane Erin. While venting the low pressure safety injection system (LPSI)/shutdown cooling (SDC) system piping, approximately 10,000 gallons of borated water was inadvertently sprayed into the containment through the 'A' containment spray (CS) header with the 1A LPSI pump.

The root cause of the event was a procedural deficiency in that the emergency core cooling system (ECCS) venting procedure did not state the plant conditions required to perform the procedure. Contributing factors were the decision to defer repair of the CS flow control valve and operators not recognizing, that with the CS flow control valve tagged in the safeguards position(OPEN), aligning flow to the SDC heat exchanger (HX) would result in flow to the CS header.

Corrective actions for this event:

The operators stopped the 1A LPSI pump and isolated the SDC HX to stop the spray. The venting procedure is being revised. The effects of the containment spray event were evaluated and containment components are being inspected. Additional administrative controls are being implemented for initial use of procedures and operation with an operator work around in place.

BACKGROUND

St. Lucie Unit 1 shutdown on August 1, 1995. On August 11, 1995, the train 'A' containment spray (CS) (EIS:BE) header flow control valve, FCV-07-1A, failed its stroke test. The valve passed its previous stroke test on May 10, 1995. FCV-07-1A was declared out of service. Maintenance investigation revealed that the valve would take significant time to repair. An alternative to repair was implemented which placed the valve in its safeguards position (open). The valve repair was delayed until the next refueling outage. FPL Engineering performed an evaluation that demonstrated operation with the valve open would not constitute an unreviewed safety question. Administrative controls were implemented on the 1A CS pump to ensure it would not be inadvertently started, resulting in flow to the 'A' CS header.

The corrective actions of a previous LPSI system problem included the preparation of an emergency core cooling system (ECCS) venting procedure. The venting procedure was to ensure the system was filled and vented following SDC operations. On August 13, 1995, the reactor coolant system (RCS) (EIS:AB) heatup procedure was changed to perform the ECCS venting procedure following isolation of SDC. The ECCS venting procedure ensured that the LPSI system was isolated from the RCS, but did not address the CS system alignment. The ECCS venting procedure initially vented the system without LPSI pump operation. The procedure then directed that the 1A LPSI pump be started and refueling water tank (RWT) water circulated through a series of LPSI flow paths, including a path through the SDC HX.

DESCRIPTION OF THE EVENT

On August 16, 1995, a Unit 1 RCS heatup was commenced in accordance with the RCS heatup procedure. At 1100, SDC was secured. Maintenance on the LPSI system delayed performance of the ECCS venting procedure. A decision was made by operations to continue the RCS heatup and conduct the ECCS venting procedure after the LPSI maintenance was completed. The RCS heatup continued with the reactor coolant pumps and at 1407 Mode 3 was entered. At 0215 on August 17, 1995, the CS system was aligned for automatic actuation.

With the RCS at 532 degrees and 1550 psia, LPSI maintenance was completed, and the ECCS venting procedure for the LPSI system was started. At 1756, the utility licensed operator started the 1A LPSI Pump and the initial circulation through the SDC warmup line was completed. The SDC HX inlet and outlet valves were opened at approximately 1803 to establish a flow path through the SDC HX. These actions provided a direct flow path from the RWT to the 'A' containment spray header. At 1806, the control room received high reactor cavity leakage annunciators and multiple containment fire alarms. Reactor cavity sump flow recorder, FR-07-03, indicated rapidly increasing flow, and the operators entered the off-normal operating procedure for excessive RCS leakage. The CS pumps were verified to be stopped and the RCS and chemical and volume control system (CVCS) (EIS:CB) parameters were verified to be stable and normal. (Figure 1 is a simplified system diagram and highlights the flow path)

DESCRIPTION OF THE EVENT (Continued)

The 1A LPSI Pump was stopped and the flow path from the 1A LPSI pump to the 'A' containment spray header through the 1A SDC HX isolation valves and the open CS header flow control valve (FCV-07-1A) was identified. The SDC HX isolation valves were closed and the venting procedure was exited.

Containment temperature dropped from 109 degrees to 103 degrees. Narrow range containment sump level rose from -6.0 to -1.8 feet. Containment pressure initially dropped from 0.6 psig to 0.4 psig, but quickly increased to 0.9 psig due to the increased humidity in containment. No increase in containment radiation level was detected. Based on the drop in RWT level (35.5 to 34.8 feet) and the amount of water pumped from containment, it was estimated that 10,000 gallons of borated water was sprayed into containment.

At 1843, All Safety Functions were met and the RCS excessive leakage off-normal procedure was exited. No personnel were in containment at the time of the event. Notable equipment malfunctions were the containment fire detection system, where 90% of the containment smoke detectors alarmed or faulted, and an electrical ground on the 1A2 safety injection tank (SIT) sample valve. Initial radiation surveys found contamination levels up to 1.0E6 DPM/100cm^2 in some areas of containment.

CAUSE OF THE EVENT

The root cause of the event was procedural deficiency in that the ECCS venting procedure did not state the plant conditions required to successfully vent the ECCS but relied upon the RCS heatup procedure to set plant conditions. Specifically, the venting procedure did not require operators to verify that the proper containment spray header isolation valves were closed prior to recirculating the water in the SDC system.

A contributing factor to this event was that the operations personnel performing the ECCS venting procedure did not recognize that the existing plant conditions would result in flow to the 'A' containment spray header when flow was aligned through the SDC HX.

A second contributing cause of this event was that FCV-07-1A was placed in the open position because this valve had failed its ASME stroke time test. Plant management made the decision to defer the valve repair and position this normally closed valve to its engineered safeguards open position in lieu of repairing the valve prior to startup.

ANALYSIS OF THE EVENT

This event is a voluntary event report.

Approximately 10,000 gallons of 2200 ppm borated water was sprayed into the containment building via the 1A LPSI pump and the 'A' containment spray header. This header is one of two CS system headers, each of which supply four ring headers located concentrically at the top of the containment building. The concentric headers are uniformly spaced such that the entire radial cross section of containment was sprayed. The area most susceptible to effects from the spray is the 62 foot elevation and above. Effects on structures, systems, and components (SSCs) below 62 foot elevation should be reduced since these SSCs are sheltered from direct impingement of the spray.

Equipment important to safety installed in containment is capable of withstanding the effects of a spray down event without suffering significant damage. Much of the equipment is specifically designed for such an event. Engineering evaluated the possible consequences of the event. The results of the evaluation are summarized below.

Corrosion

The injection of containment spray into the reactor containment building (RCB) initially raised the concerns of boric acid corrosion on all components in the RCB. The released volume of boric acid solution (10,000 gallons) contained approximately 180 pounds of boric acid. The majority of this flowed in solution directly to the containment sump. Conservatively, it will be assumed that less than 1,000 gallons was distributed throughout containment and remained in place due to a drying action. The approximate exposed surface area of the containment components is 470,000 square feet. Assuming a uniform deposition of the boric acid, this would result in a dried boric acid surface concentration of less than 4.0E-5 pounds per square foot on the components. If one conservatively assumes that the boric acid completely dissociates and is available for reaction, the maximum weight ratio of metal consumed to boric acid is <1.6 for all the materials in question. This results in maximum losses of 6.24E-5 pounds per square foot which translates to metal losses of <1.0E-7 inches for all three classes of materials.

While the preceding does not account for possible puddling effects of the boric acid solution within structural shapes or other equipment cavities, standing pools of boric acid have been removed from equipment as part of the planned corrective actions. Additionally, systems and equipment have been rinsed down using low chloride water to further reduce boric acid surface concentrations.

ANALYSIS OF THE EVENT(Continued)

Mechanical Components

A review of equipment installed inside containment has been performed. This review identified those components that are potentially susceptible to damage by the spray down and thus require an inspection and/or other actions. The components considered were piping, lagging, insulation, valves, bolting, component supports, and ventilation components. The evaluation showed that if standing water was removed and the components inspected/tested, the event would not have any long term effect.

Flooding

Approximately 10,000 gallons of water was discharged from the containment spray 'A' header into containment. The containment sump is designed to provide a structure into which all parts of containment drain. There are various drainage systems within the RCB that collect water and direct it to the sump. Visual inspection during the initial walkdowns following the event, confirmed these drainage systems to be effective in directing and conducting the water to the containment sump.

Based on the Updated Final Safety Analysis Report (UFSAR), the highest postulated containment water level of 26.025 feet assumes the entire RWT volume of 500,000 gallons is injected into the containment after a loss-of-coolant-accident (LOCA). The UFSAR assumes a CS injection rate of 5400 gpm. For the subject event, one LPSI pump was aligned to a single containment spray header providing an average flow rate of approximately 3000 gpm. Due to the smaller injection rate and smaller total volume injected, no internal flooding concerns are to be expected. The initial walkdowns found no indication of internal flooding and drainage systems operated properly to prevent significant volumes of standing water.

One area of water retention was identified in the lower cavity at the 18 foot elevation, where an elevated floor drain and sloping floor profile resulted in 3 to 6 inches of water retention on the floor. As this area would normally be completely flooded in an accident situation, the water retention has no safety significance. An indication of how well the drainage systems did perform was the identification in the initial walkdown report of a single puddle in the electrical tunnel that was approximately one-half inch deep and 3 feet wide.

Instrumentation and Electrical Components

Environmentally Qualified (EQ) Components - EQ equipment inside containment is designed to operate in a harsh environment (10CFR50.49) which includes chemical spray conditions. This is accomplished in one of two ways: either the equipment is sealed against the intrusion of moisture (e.g., Rosemount Transmitters and Namco limit switches) or it has been shown by test that the spray does not adversely affect the equipment (e.g., cable). Therefore, the inadvertent spray down of containment would have no effect on EQ equipment.

ANALYSIS OF THE EVENT(Continued)

Non-EQ Components - A review of Non-EQ equipment installed inside containment has been performed. The engineering evaluation identified those components that are potentially susceptible to damage by the spray down and thus require an inspection and/or testing.

Snubbers

It is anticipated that those snubbers which may have been exposed to the borated water spray will show water spotting and will, in general, be dry when visually inspected. Scheduled surveillance of snubbers under Technical Specification guidelines fall within the realm of ASME Section XI components. Section XI, Subsection IWA-5250 (b) ("Corrective Measures") states in part that "if boric acid residues are detected on components ... the areas of general corrosion shall be located. Components with local areas of general corrosion ... shall be evaluated to determine whether the component may be acceptable for continued service." The Code implies that substantial corrosion had occurred over a period of time. Corrosion of this severity would not be anticipated as a result of this event as discussed previously. The snubber inspection and cleaning did not identify any adverse effects on these components.

Coatings

The coatings inside containment are qualified for Service Level I use inside the RCB per engineering specification SPEC-C-010. The coatings are designed to resist the effects of design basis accident conditions, which includes exposure to boric acid, without failure.

Contamination

Equipment important to safety is also designed to operate in radiation areas. The containment spray water source was the RWT. At the time in the power cycle that the inadvertent spray occurred, the RWT activity levels were significantly lower than those expected immediately following a normal refueling outage. The general radiation levels inside containment have not significantly changed. There is no impact on the materials inside containment due to radiation and there is minimal effect on the personnel exposure. Personnel exposure to radiation effects is closely monitored by plant procedures while inside containment. A procedure was written to provide controls associated with the containment decontamination/clean-up.

ANALYSIS OF THE EVENT(Continued)

Conclusion

No release resulted from this event. Equipment important to safety installed in containment is capable of withstanding the effects of a spray down event without suffering significant damage. The health and safety of the public was not effected by this event.

In addition an independent NRC review and evaluation of 18 industry inadvertent spray down events, the NRC has formulated a staff position. The NRC has concluded that "...continued reactor operation following inadvertent containment spray events is acceptable provided that specific circumstances of the event do not warrant immediate reactor shutdown."

CORRECTIVE ACTIONS

1. Operators secured the 1A LPSI pump and isolated the 1A SDC HX from the LPSI system and drained the reactor cavity sump to the Aerated Waste Storage Tank.

2. The Plant Technical Department is revising OP 1-0420060, "Venting of the Emergency Core Cooling and Containment Spray Systems", to provide limitations on plant conditions during venting.

3. The personnel involved in the preparation, review, and approval of the ECCS venting procedure have been counseled.

4. Plant management stopped all nonessential work at the site and directed that Unit 1 be maintained in a stable configuration until the cause for this, and other recent events, could be determined. Meetings were held with site personnel to discuss these events and emphasize management's expectations regarding operator work arounds, developing a questioning attitude for any abnormal evolution or configuration, and attention to detail especially regarding first time use of procedures.

5. Plant management will increase the administrative controls for first time procedure use. New procedures will receive technical subcommittee review or be implemented under the guidance of the infrequent evolutions administrative controls.

6. The plant has prepared a list of deficiencies which are considered operator work arounds. Operationally significant items are being corrected prior to returning Unit 1 to service.

7. Additional administrative controls were established on a corresponding Unit 2 valve.

8. The Operations Supervisor is reviewing this event with all operations crews for lessons learned.

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
St. Lucie Unit 1	05000335	95	-- 007 --	0	8 OF 9

TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

CORRECTIVE ACTIONS (Continued)

9. The Maintenance Department established a team composed of plant staff and engineering personnel, to determine the root cause for the CS header isolation valve repeat failures and determine corrective actions to eliminate this operator work around. FCV-07-1A has been repaired.

10. The reactor containment building has been cleaned to reduce the boric acid residue and contamination levels.

11. Engineering evaluated the event's impact on plant equipment due to the borated water spray in the containment and provided a list components that are being inspected, cleaned and/or repaired prior to returning to power.

12. The containment ionization smoke detectors inside containment were inspected, cleaned, and repaired or replaced.

13. The 1A2 SIT sample valve was inspected and repaired.

14. The Training Department will include this event in periodic training.

ADDITIONAL INFORMATION

Failed Component Identification

Manufacturer: Honeywell
Model number: TC 805 Ionization
Device: Containment Smoke Detectors

Manufacturer: Valcor Engineering Company
Model number: V52600-515-1 (3/8 inch)
Device: FCV-03-1B

Previous similar Events

LER 335/78-041

A similar event occurred on Unit 1 in November, 1978. While on SDC in Mode 5, maintenance on FCV-07-1A was completed and the clearance released. The clearance release instructions incorrectly had the spray header isolation valves open for restoration. This allowed 2000 gallons of RCS to spray down containment. No equipment was damaged, but personnel contamination did occur on some of the thirty personnel inside containment during the event.

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
St Lucie Unit 1	05000335	95	-- 007	-- 0	9 OF 9

TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

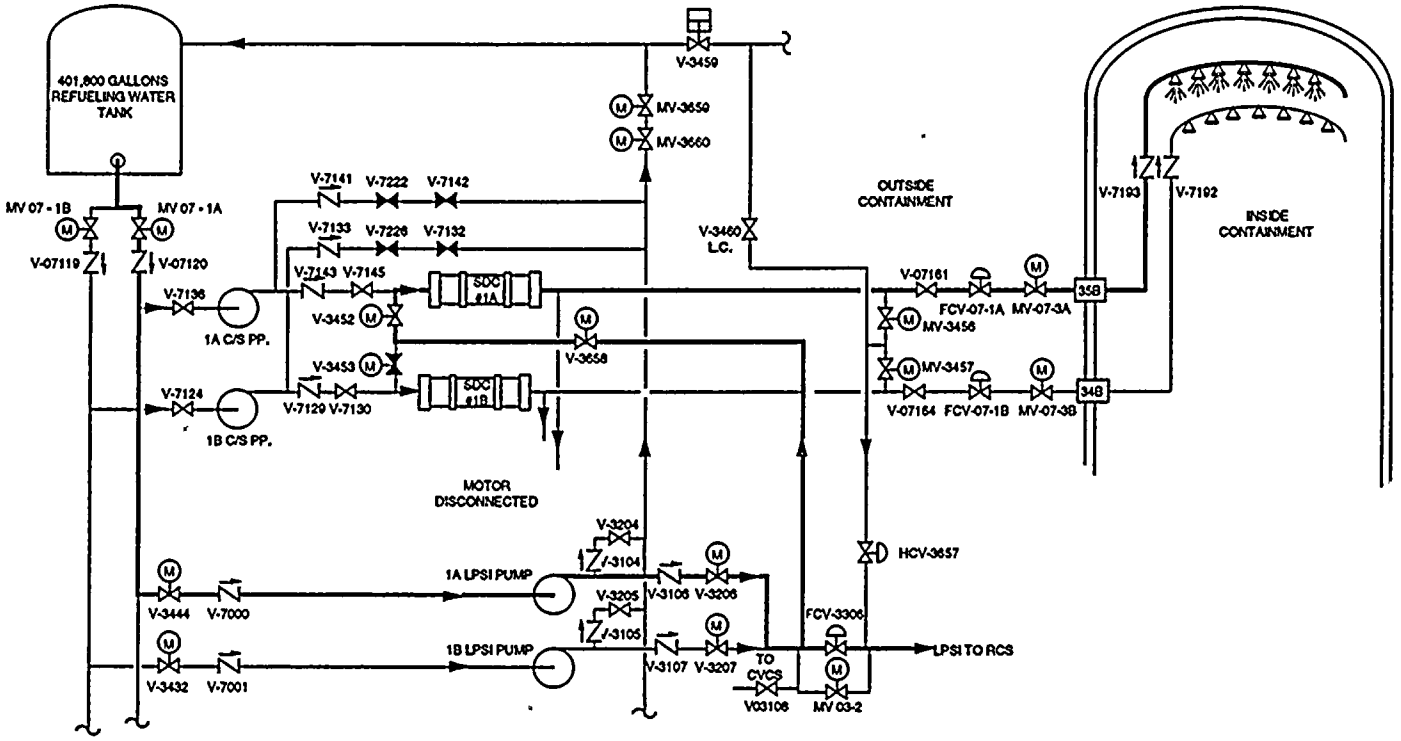

FIGURE 1 - CONTAINMENT SPRAY SYSTEM