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December 1, 1982

SBN-395
T.F. B7.1.2

United States Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. George W. Knighton, Chief
Licensing Branch No. 3
Division of Licensing

References:
(a) Construction Permits CPPR-135 and CPPR-136, Docket Nos. 50-443 and 50-444
(b) USNRC Letter, dated February 12, 1982, "Request for Additional Information," F. J. Miraglia to W. C. Tallman
(c) PSNH Letter, dated March 12, 1982, "Response to 281 Series RAIs; (Chemical Engineering Branch)," J. DeVincentis to F. J. Miraglia
(d) PSNH Letter, dated February 12, 1982, "Implementation of TMI Action Plan Requirements of NUREG-0737," J. DeVincentis to F. J. Miraglia

Subject: Revised Response to RAI 281.6; Post-Accident Sampling; (Chemical Engineering Branch)

Dear Sir:

We have enclosed a revised response to the subject Request for Additional Information (RAI) which was forwarded in Reference (b).

The enclosed response provides detailed information regarding the Post-Accident Sampling System required by NUREG-0737, Item II.B.3.

The original response to RAI 281.6 was submitted in Reference (c) and essentially duplicated our position on NUREG-0737, Item II.B.3 which was submitted in Reference (d).

The enclosed information will be provided in OL Application Amendment 48.

Very truly yours,

YANKEE ATOMIC ELECTRIC COMPANY

J. DeVincentis
J. DeVincentis
Project Manager

B001

ALL/fsf

cc: Atomic Safety and Licensing Board Service List

RAI 281.6 (9.3.2, NUREG-0737, II.B.3)

Provide information that satisfies the attached proposed license conditions for post-accident sampling.

RESPONSE

The shielding and operation of the reactor coolant and containment atmosphere sampling systems has been designed to provide the capability of personnel to promptly obtain (less than 1 hour) a sample under accident conditions without incurring a radiation exposure in excess of the limits delineated for this requirement. A post-accident sampling panel has been designed to NUREG-0737.

FSAR Section 9.3.2 is being revised in Amendment 48 to address the concerns of NUREG-0737, Section II.B.3.

Procedures to obtain post-accident samples and the radiological and chemical analyses will be developed three months prior to fuel load.

9.3.2 Process Sampling System

9.3.2.1 Design Bases

The sample system provides representative liquid and gas samples for chemical and radio-chemical laboratory analysis of the water chemistry of the reactor coolant system, steam generators, secondary steam and water systems and other auxiliary systems. Table 9.3-1 lists the sample sources, analysis performed, type of sample, purpose of the analysis, and the application of the analyses to the control of the plant. Each unit has its own sample system, and there are no interconnections. [INSERT 1]

The seismic and quality group classifications of sample lines and components conform to the classification of the system to which each sampling line and component is connected. Where appropriate, classification to a lower seismic and/or quality group is justified on the basis that adequate isolation valving or flow restriction is provided. Sample lines penetrating the containment are provided with engineered safety features actuation system (ESFAS) isolation valves. Containment isolation and valve descriptions are discussed in Subsection 6.2.4.

Heat exchangers, vessels, piping, fitting and valves are designed, procured and installed in accordance with ASME Boiler and Pressure Vessel Code, Sections III, VIII, and ANSI B31.1. Safety class descriptions of the various components are indicated on the system P&IDs (see Figure 9.3-5) [(see Figures 9.3-5a, -5b, -5c)] for the reactor coolant, steam generator and other auxiliary systems sampling subsystems. The components of the secondary steam and water sampling subsystem are non-nuclear safety class (NNS).

Flow in the reactor coolant and steam generator blowdown sample lines is turbulent during purging or sampling, to ensure that any particles remain suspended. The reactor coolant sample lines are provided with a purge path to the chemical and volume control (CVCS) or boron recovery (BRS) systems. Purging of the lines prior to collecting the sample is required. Gaseous flow from the chemical and volume control tank (CVCT) and pressurizer relief tank (PRT) sample lines are directed through sample vessels and discharged to the equipment vent system. The sample lines from the residual heat removal (RHR) and demineralized water (DW) systems are directed to the sample sink for "grab" samples, and are purged by allowing the fluid to drain to the sink prior to taking the sample.

The sampling system is designed to direct the reactor coolant sample purge fluids to the chemical and volume control tank or the primary drain tank, if the chemical and volume control tank is not available. Purge flows and sample overflows from the steam generator blowdown and other auxiliary systems sampling subsystems are normally directed to the radioactive liquid waste system via the floor and equipment drains. [INSERT 2]

The steam generator blowdown sampling is continuous, and provides radiation, conductivity and sodium ion monitoring of each blowdown line. See Subsections 9.3.2.5 and 10.4.8 for discussion of steam generator blowdown high radiation signals.

The secondary steam and water sampling is, in general, continuous, and serves as an aid to preventing corrosion, inhibiting formation of scale and minimizing deposits on heat transfer surfaces and turbine blades in the secondary system.

SEE FIGURES 9.3-5a, -5b, -5c

See Figure 9.3-5 for those samples routed to a central sampling point. The locations of the sample points are shown on the appropriate system piping and instrumentation diagrams for the system to be sampled. Sample points for the secondary steam and water sampling subsystem are also shown diagramatically on Figure 9.3-6.

9.3.2.2 System Description

The sample subsystems for the reactor coolant, steam generators and other auxiliary systems provide representative gas and liquid samples for laboratory analysis, in accordance with Regulatory Guide 1.21, positions C.6 and C.7. Typical information obtained includes: reactor coolant boron, sodium ion and halogen concentrations, fission product radioactivity level, hydrogen, oxygen, and fission gas content, corrosion product concentration, and chemical additive concentration.

The sampling subsystem for secondary steam and water systems provides representative samples for measuring specific and cation conductivity, concentrations of sodium ion, dissolved oxygen, silica and hydrazine, and pH.

a. Subsystem Description

The system is divided into four subsystems: reactor coolant sampling, steam generator blowdown sampling, auxiliary system sampling, and secondary steam and water sampling.

1. Reactor Coolant Sampling Subsystem

The reactor coolant is sampled at four locations in the reactor coolant system. A steam sample is taken from the pressurizer steam space. The remaining three liquid samples are taken from the pressurizer liquid space and reactor coolant Loops 1 and 3. INSERT 3

Each of the four reactor coolant sample lines inside containment are provided with automatic ESFAS isolation valves. The three liquid sample lines are joined together in a common header before leaving the containment. This common line is provided with an automatic exterior containment isolation valve, as is the sample line used for sampling the pressurizer steam space. The sampling line connections to the reactor coolant loops are sized to meet the small leak analysis of Subsection 15.6.2.

Each reactor coolant loop sample line has a delay coil and manual flow valve to limit the flow to less than 373 lb/hr. The delay coils are provided in order to permit decay of short-lived radionuclides. The delay coils are designed

cont.

to provide a minimum 45-second delay within containment. This 45-second delay time allows the short-lived isotopes, primarily N-16 (7.4 second half-life) to decay sufficiently to minimize the hazard to personnel. Delay coils are not required for the pressurizer samples, because the pressurizer is a relatively stagnant volume and the effective half-life is great enough to decay the N-16.

INSERT 3 CONT'D

Additional shielding is provided, where necessary, to reduce potential personnel exposure, as described in Section 12.3.

Each pressurizer sample line has a capillary tube to limit the flow to less than 373 lb/hr (0.75 gpm sample rate) with all valves in the line fully open. The capillary tube also permits a small flow of 50 lb/hr to be purged constantly or intermittently to the volume control tank, thus removing non-condensible gases.

Sample heat exchangers are provided in the pressurizer steam space sample line and the common reactor coolant liquid sample line to cool the sample to 95°F. Flow is controlled in either line by adjusting the pressure reduction or the block valve in the respective line, and is then routed to the sample sink for grab samples. For operator safety, these lines are double-valved at the sink. Over-pressurization of these heat exchangers is controlled administratively by assuring that either the valve upstream or downstream is left open. This prevents fluid from being isolated in these lines. Both of these boundary valves may be closed if the process line is drained.

A ten milliliter sample vessel is provided for obtaining volume control tank and pressurizer relief tank gas samples. The vessel is made of austenitic stainless steel and is equipped with quick-disconnect couplings with poppet-type check valves and integral isolation valves at the sample sink.

2. Steam Generator Blowdown Sampling Subsystem

The flow path for each sample is typical, therefore, only one path is discussed. The steam generator blowdown (SGBD) is sampled downstream of the containment isolation valves and upstream of the blowdown system pressure-reducing valves. See Subsection 10.4.8 for discussion of blowdown isolation.

Each sample heat exchanger pair reduces the sample temperature to 109°F at 373 lb/hr flow rate. The flow is then routed through a flow regulating valve which reduces pressure to 50[redacted] psig. All instrumentation is located downstream of this valve. The radiation instrumentation provides continuous monitoring and cannot be bypassed.

INSERT 4

The instrumentation is protected against overpressurization by a relief valve venting to the floor drain on the common discharge line downstream of the radiation monitors. This could occur from high pressure in the steam generator flash tank or closure of a downstream block valve. The blowdown sampling lines are routed to one of the two sample sinks for grab samples.

The sample sink is actually two segregated basins housed in a hooded enclosure equipped with an exhaust fan to provide an air flow into the hood at all times. The sinks are stainless steel with raised edge to contain splashed liquid. They drain to the waste disposal system. One basin is for steam generator blowdown samples and the other for the remaining grab sample lines. A wall is employed to isolate the two basins.

Sample line discharges at the sink are provided with quick-disconnect adaptors such that a sample vessel may be used to collect samples.

3. Auxiliary Systems Sampling Subsystem

This subsystem consists of sampling lines which run from the plant auxiliary system to the sample sink or local component sample stations.

The sampling lines from the chemical and volume control and residual heat removal systems to the sink are provided with double valving at the sink. These lines also have bypass connections to the chemical and volume control tank and primary drain tank through the reactor coolant sampling line discharge. The following auxiliary system sample taps are provided at the sample sink:

Type Sample	System	Origin
Grab	Chemical and Volume Control System	Letdown Heat Exchanger
Grab	Chemical and Volume Control System	Cation and Mixed Bed Demineralizer
Grab	Chemical and Volume Control System	Letdown Degasifier Trim Cooler
Grab	Chemical and Volume Control System	Thermal Regeneration Demineralizer
Grab	Residual Heat Removal	Residual Heat Removal Heat Exchanger

to minimize interference of ammonia and hydrazine (added to the secondary system for corrosion control) with the sampling process.

Deviations of measured quantities from specified values are alarmed at a local panel in the turbine building.

In the event of leakage of reactor coolant into the secondary system, radioactivity may be present in the SSW samples. A high radiation alarm from the steam generator blowdown sampling subsystem radiation monitors is available at the local panel to alert the operator to manually stop all sample streams.

INSERT 5

The required analysis and frequencies are given in Chapter 16.

b. Equipment Location and Description

The system equipment is situated primarily at three locations:

1. The sample coolers, sample sink and flow control valve and local flow temperature and pressure instruments for the reactor coolant, steam generator blowdown, and other auxiliary systems sampling subsystems are located on the grade level of the primary auxiliary building.

2. The reactor coolant loop and pressurizer sample header capillary tubes and delay coils are located in the reactor containment annulus area.

INSERT 6

3. The secondary steam and water sampling subsystem equipment and components are located in the turbine building.

The equipment design parameters for the reactor coolant, steam generator blowdown and other auxiliary systems sampling subsystems are summarized in Table 9.3-2.

9.3.2.3 Safety Evaluation

The sample system has no emergency or safety function, nor is its performance required to prevent an emergency condition. No components are shared between units.

Isolation of those samples originating within the containment is accomplished by:

a. Manual valves near the sample point.

b. Electrically operated solenoid valves which automatically close on a containment isolation signal, or can be closed by remote manual switches on the main control board.

c. Manual valves at the sample sink.

DELETE

The operators are protected from high energy short lived radiation by a delay coil to allow sufficient time for decay, and supplemental shielding where required.

9.3.2.4 Tests and Inspections

Prior to initial criticality, the system will be operationally tested and samples drawn including appropriate purging from each sample point.

9.3.2.5 Instrumentation and Control

Local instrumentation for monitoring pressures, temperatures, and flows are provided in the sample sink area and at the sample panel in the turbine building to provide for safe manual operation and to verify sample flows.

The four steam generator blowdown sample lines are continuously monitored for high radiation. If a high radioactive level is detected, alarms are triggered on the local panel, the main panel (turbine building) and in the control room. In addition, the blowdown tank discharge line is automatically isolated.

Administrative overrides allow blowdown flow to continue after isolation of the system, for evaporation processing and/or sampling on an individual line basis. See Subsection 10.4.8 for additional information on blowdown system operation. The blowdown samples are physically separate from the other samples at the sample sink to prevent any radioactive cross-contamination.

The steam generator blowdown portion of the system also contains inline specific conductivity and sodium ion elements to monitor for condenser leakage. Each steam generator blowdown line is monitored separately. A high conductivity sample is alarmed at the sample room control panel and at the main control board.

Sample system lines penetrating the containment have appropriate containment isolation valves which automatically close on a "T" (Phase A containment isolation) signal and also fail closed. These valves, being safety-related, are also controlled from the main control board. See Subsections 6.2.4 and 7.3 for additional information on containment isolation.

Globe type valves are used for interior containment isolation. The interior and exterior isolation valves are equipped with operators for automatic or remote operation. The valves are actuated by a containment isolation signal or manually from the control room. See Section 6.2.4 for the types of operators used and discussion of containment isolation signal.

A digital pressure indicator, located in the sample room of the primary auxiliary building [redacted] is used to accurately measure reactor coolant system [redacted] pressure for control calibration. This instrument is inoperable during containment isolation.

Measured quantities from the secondary steam and water sampling subsystem are indicated and/or recorded at local panels in the turbine building.

TABLE 9.3-2
(Sheet 2 of 3)

Design Temperature, ^{o}F	680
Design Pressure, psig	2485
Pressure Drop	
Pressurizer (1 of 2), psi	13.1
Pressurizer (2 of 2), psi	15.3
Steam Generator, psi	13.5

2. Capillary Tubes

Pressurizer Liquid Sample Line	
Tube Length, ft.	150
Tube O.D., in.	0.25
Tube Wall Thickness, in	0.065
Pressurizer Steam Space Sample Line	
Tube Length, ft.	100
Tube I.D., in.	0.25
Tube Wall Thickness, in.	0.065
Material	Austenitic Stainless Steel
Safety Class	2
Seismic Category	I

3. Delay Coils

DELETE

Length	Such that tube length inside containment is 170-200 feet.
O.D., in	0.375
Wall Thickness, in.	0.065
Material	Austenitic Stainless Steel
Design Code	ASME III
Safety Class	2
Seismic Category	I

3. Valves, Piping and Tubing

Reactor Coolant Sample Lines	
Design Pressure, psig	2485
Design Temperature, ^{o}F	680
O.D., in.	0.375
Wall Thickness, in.	0.065
Steam Generator Blowdown Sample Lines	
Design Pressure, psig	1285
Design Temperature, ^{o}F	600
O.D., in.	0.375
Wall Thickness, in.	0.065

TABLE 9.3-2
(Sheet 3 of 3)

Chemical and Volume Control Demineralizers Sample Lines	
Design Pressure, psig	200
Design Temperature, ^{o}F	300
O.D., in.	0.375
Wall Thickness, in.	0.065
Volume Control Tank Gas Space	
Design Pressure, psig	75
Design Temperature, ^{o}F	250
O.D., in.	0.375
Wall Thickness, in.	0.065
Residual Heat Removal Sample Line	
Design Pressure, psig	600
Design Temperature, ^{o}F	400
O.D., in.	0.375
Wall Thickness, in.	0.065
Material	Austenitic Stainless Steel
Design Codes	ANSI B31.1.0, except inside containment and containment isolation which are designed to ASME III
Safety Class	2 and NNS
Seismic Category	Non-Seismic except inside containment and containment isolation which are seismic Category I

4. Sample Vessel

Volume, ml	10
Design Pressure, psig	200
Design Temperature, ^{o}F	250
Material	Austenitic Stainless Steel
Design Code	ASME VIII Div. 1
Safety Class	NNS
Seismic Category	Non-Seismic

INSERT 1 (P. 9.3-6)

The sample system provides representative liquid and gas samples for chemical and radio-chemical laboratory analysis of the water chemistry of the reactor coolant system, steam generator blowdown, secondary steam and water systems and other auxiliary systems under normal operating conditions. The sample system also provides the capability to obtain gas samples of the containment atmosphere and liquid samples from the reactor pressure vessel, containment recirculation sump, pressurizer relief tank and ECCS pump room sumps under post-accident operation. Table 9.3-1 lists the sample sources, analyses performed, type of sample, purpose of the analyses, and the application of the analyses to the control of the plant. Each unit has its own sample system and there are no interconnections.

INSERT 2 (P. 9.3-6)

The post-accident sample system is designed such that the flow through the sample lines is turbulent in order to reduce plate out. In addition, these lines can be flushed with demineralized water after a sample is taken. The post-accident sample system also allows for collection of an adequate volume of fluid which results from purging the sample lines in order to obtain representative samples. Provisions exist which enable samples to be returned to the containment, even if pressurized.

INSERT 3 (P. 9.3-7, -8)

a. Subsystem Description

The system is divided into five subsystems: reactor coolant sampling, steam generator blowdown sampling; auxiliary system sampling, secondary steam and water sampling and post accident sampling.

1. Reactor Coolant Sampling Subsystem

Reactor coolant is sampled at four locations in the reactor coolant system. Liquid samples are taken from the pressurizer liquid space and reactor coolant loops 1 and 3. The remaining sample is a steam sample and is taken from the pressurizer steam space. Provisions exist to enable sampling of reactor coolant loops 1 and 3 under post-accident conditions.

Each of the four reactor coolant system sample lines inside containment are equipped with automatic ESFAS isolation valves. The pressurizer steam and liquid sample lines are joined together in a common header before leaving the containment. This common line is provided with an automatic exterior containment isolation valve. The sample lines from reactor coolant loops 1 and 3 are also provided with automatic exterior containment isolation valves. The sample line connections to the reactor coolant loops are sized to meet the small leak analysis of Subsection 15.6.2.

Each reactor coolant loop sample line has a manual flow valve to limit the flow to less than 373 lb/hr. The length of each reactor coolant loop sample line inside containment is sufficient to permit decay of short-lived radionuclides. The length of these lines is adequate to provide a minimum 45-second delay within containment. This 45-second delay time allows the short-lived isotopes, primarily N-16 (7.4 second half-life) to decay sufficiently to minimize the hazard to personnel. The pressurizer is a relatively stagnant volume and the effective half-life is great enough to decay the N-16.

Additional shielding is provided, where necessary, to reduce potential personnel exposure, as described in Section 12.3

Each pressurizer sample line has a capillary tube to limit the flow to less than 373 lb/hr (0.75 gpm sample rate) with all valves in the line fully open. The capillary tube also permits a small flow of 50 lb/hr from the pressurizer steam space to be purged constantly or intermittently to the volume control tank, thus removing non-condensible gases.

Sample heat exchangers are provided in the common pressurizer steam and liquid space sample line and in the common line from reactor coolant loops 1 and 3. These sample heat exchangers are sized to cool the sample to 95°F.

INSERT 4 (8.9.3-9)

The instrumentation is protected against overpressurization by a relief valve venting to a floor drain in the sample room of the primary auxiliary building. Venting could occur from high pressure in the steam generator flash tank or closure of a downstream block valve. The blowdown sampling lines are routed to one of the two sample sinks for grab samples.

The sample sink is actually two segregated basins housed in a hooded enclosure equipped with an exhaust fan to provide venting from the hood at all times. The sinks are stainless steel with a raised edge to contain splashed liquid. They drain via a floor drain to the waste disposal system. One basin is for steam generator blowdown samples and the other for the remaining samples. Demineralized water is supplied to both basins. Both basins are equipped with vacuum gauges to assure correct operation of the exhaust fan. A stainless steel barrier is employed to isolate the two basins.

(3)

INSERT 5 (P. 9.3-11)

5. Post-Accident Sampling Subsystem

The post-accident sampling subsystem provides the capability to obtain liquid samples from reactor coolant loops 1 and 3, ECCS pump room sumps, the pressurizer relief tank, the containment recirculation sumps and gas samples of the containment atmosphere under post-accident conditions.

The reactor coolant sample line used during post-accident operation branches off the common line from loops 1 and 3 inside the primary auxiliary building. This line bypasses the sample heat exchangers and runs directly to the post-accident sample panel.

The configuration of the containment isolation valves on the sample lines from reactor coolant loops 1 and 3 and the power supply arrangement to these valves ensures that a reactor coolant sample can be obtained in the event of a power train failure.

The post-accident sample panel is located in the sample room on the grade level of the primary auxiliary building. The valving on the panel is operable through a shield wall behind which the panel is mounted. A water bath on the panel adequately cools the sample being taken. The panel provides the capability to extract a gaseous or diluted liquid sample with a shielded syringe for laboratory analysis. After a sample has been removed for analysis, the sample panel can be flushed with demineralized water and retained in a flush tank before being returned to the containment. This return line is provided with automatic ESFAS isolation valves.

Reactor coolant is also sampled from the liquid space of the pressurizer relief tank (PRT). The sample is pumped from the PRT, located in the containment, to the post-accident sample panel. The discharge line from this sample pump is equipped with a relief valve which vents back to the pressurizer relief tank to protect it from overpressurization. The sample line from the PRT penetrates the containment and is provided with automatic ESFAS isolation valves.

The analyses performed on reactor coolant system samples include: gross activity, boron content, chloride content, dissolved hydrogen or total gas and , gamma spectrum.

Samples from the containment recirculation sumps are taken from the recirculation lines downstream of encapsulated valves CBS-V8 and CBS-V14. In order to sample either one of the two sumps, each sample line is provided with a remotely operated solenoid valve before joining together in a common header. From this point, the sample is pumped to the post-accident sample panel.

The ECCS pump room sumps which are sampled during post-accident operation are the primary auxiliary building sump "A" and the two sumps in RHR/CBS equipment vaults 1 and 2. These sumps are sampled to detect any radioactive releases which would result from equipment leakage. Samples from these three sumps are pumped to the post-accident sample panel. The discharge lines from these sumps are all provided with relief valves which vent back to their respective sumps and provide protection from overpressurization.

Diluted samples from the containment recirculation sumps and the ECCS pump room sumps are analyzed for gross activity, boron content, chloride content, and gamma spectrum.

Gas samples of the containment atmosphere are obtained by bypassing the flow to the hydrogen analyzers through sample vessels which are equipped with quick-disconnect couplings with poppet-type check valves and integral isolation valves. Once a sample is taken, the sample vessel is removed and its contents are analyzed for hydrogen content, oxygen content and a gamma spectrum.

All electrically powered equipment (i.e., solenoid valves and sample pumps) whose operation is required to perform post-accident sampling is powered from an emergency backup power source.

INSERT 6 (P. 9.3-11)

1. The sample heat exchangers, sample sink, sample panel, post-accident sample panel, flow control valves, reach rod operated valves and local flow, temperature and pressure indicators for the reactor coolant, steam generator blowdown, post-accident and other auxiliary systems sampling subsystems are located on the grade level of the primary auxiliary building.

2. The capillary tubes on the pressurizer steam and liquid space sample lines are located inside the missile barrier in containment.

ATTACHMENT 281.6-1

NUREG-0737, II.B.3 - POST ACCIDENT SAMPLING CAPABILITY

REQUIREMENT

Provide a capability to obtain and quantitatively analyze reactor coolant and containment atmosphere samples, without radiation exposure to any individual exceeding 5 rem to the whole body or 75 rem to the extremities (GDC-19) during and following an accident in which there is core degradation. Materials to be analyzed and quantified include certain radionuclides that are indicators of severity of core damage (e.g., noble gases, iodines, cesiums and non volatile isotopes), hydrogen in the containment atmosphere and total dissolved gases or hydrogen, boron and chloride in reactor coolant samples in accordance with the requirements of NUREG-0737.

To satisfy requirements, the applicant should (1) review and modify his sampling, chemical analysis and radionuclide determination capabilities as necessary to comply with NUREG-0737, II.B.3, (2) provide the staff with information pertaining to system design, analytical capabilities and procedures in sufficient detail to demonstrate that the requirements have been met.

EVALUATION AND FINDINGS

The applicant has not provided the technical information required by NUREG-0737, Item II.B.3 for our evaluation. Implementation of the requirement is not necessary prior to low power operation because only small quantities of radionuclide inventory will exist in the reactor coolant system and therfore will not affect the health and safety of the public. Prior to exceeding 5% power operation the applicant must demonstrate the capability to promptly obtain reactor coolant samples in the event of an accident in which there is core damage consistent with the conditions stated below.

1. Demonstrate compliance with all requirements of NUREG-0737, II.B.3, for sampling, chemical and radionuclide analysis capability, under accident conditions.

2. Provide sufficient shielding to meet the requirements of GDC-19, assuming Reg. Guide 1.4 source terms.

3. Commit to meet the sampling and analysis requirements of Reg. Guide 1.97, Rev. 2.

4. Verify that all electrically powered components associated with post accident sampling are capable of being supplied with power and operated, within thirty minutes of an accident in which there is core degradation, assuming loss of off site power.

5. Verify that valves which are not accessible for repair after an accident are environmentally qualified for the conditions in which they must operate.

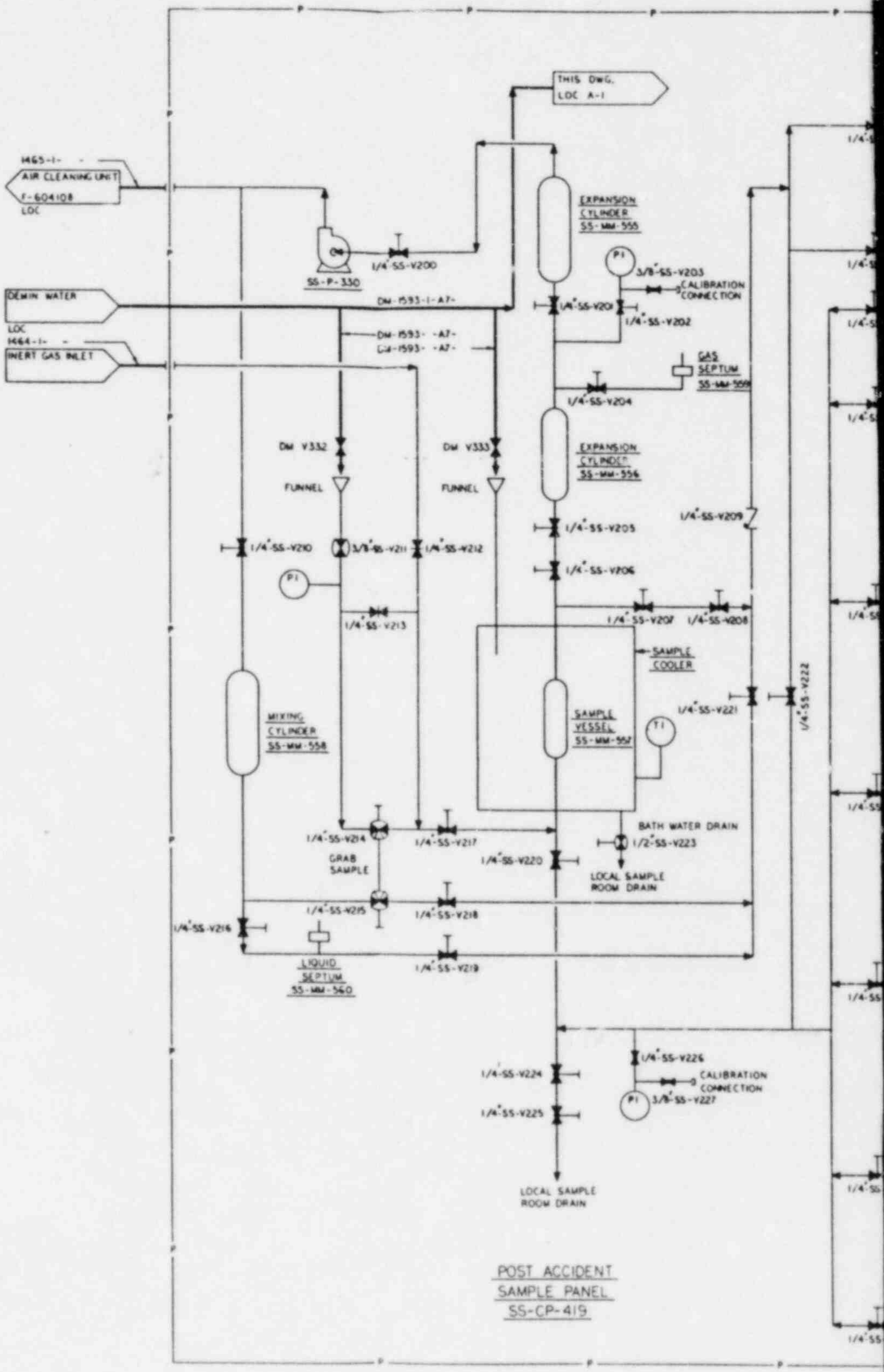
6. Provide a procedure for relating radionuclide gaseous and ionic species to estimated core damage.

7. State the design or operational provisions to prevent high pressure carrier gas from entering the reactor coolant system from on line gas analysis equipment, if it is used.

8. Provide a method for verifying that reactor coolant dissolved oxygen is at < 0.1 ppm if reactor coolant chlorides are determined to be > 0.15 ppm.

9. Provide information on (a) testing frequency and type of testing to ensure long term operability of the post-accident sampling system and (b) operator training requirements for post-accident sampling.

In addition to the above licensing conditions the staff is conducting a generic review of accuracy and sensitivity for analytical procedures and on-line instrumentation to be used for post-accident analysis. We will require that the applicant submit data supporting the applicability of each selected analytical chemistry procedure or on-line instrument along with documentation demonstrating compliance with the licensing conditions four months prior to exceeding 5% power operation, but review and approval of these procedures will not be a condition for full power operation. In the event our generic review determines a specific procedure is acceptable, we will require the applicant to make modifications as determined by generic review.



THIS DWG. LOC A-1
1465-1-
AIR CLEANING UNIT
F-604108
LOC
EXPANSION CYLINDER SS-MM-555
1/4"-SS-V200
SS-P-330
3/8"-SS-V203
CALIBRATION CONNECTION
DEMIN WATER
LOC
DM-1593-1-A7-
1/4"-SS-V201
1/4"-SS-V202
DM-1593- -A7-
1464-1-
INERT GAS INLET
GAS SEPTUM SS-MM-559
1/4"-SS-V204
DM V332
DM V333
EXPANSION CYLINDER SS-MM-556
FUNNEL
FUNNEL
1/4"-SS-V209
1/4"-SS-V205
1/4"-SS-V210
3/8"-SS-V211
1/4"-SS-V212
1/4"-SS-V206
PI
1/4"-SS-V213
1/4"-SS-V207
1/4"-SS-V208
SAMPLE COOLER
1/4"-SS-V222
MIXING CYLINDER SS-MM-558
SAMPLE VESSEL SS-MM-557
TI
1/4"-SS-V221
BATH WATER DRAIN
1/4"-SS-V214
1/4"-SS-V217
1/2"-SS-V223
GRAB SAMPLE
1/4"-SS-V220
LOCAL SAMPLE ROOM DRAIN
1/4"-SS-V215
1/4"-SS-V218
1/4"-SS-V216
LIQUID SEPTUM SS-MM-560
1/4"-SS-V219
1/4"-SS-V226
CALIBRATION CONNECTION
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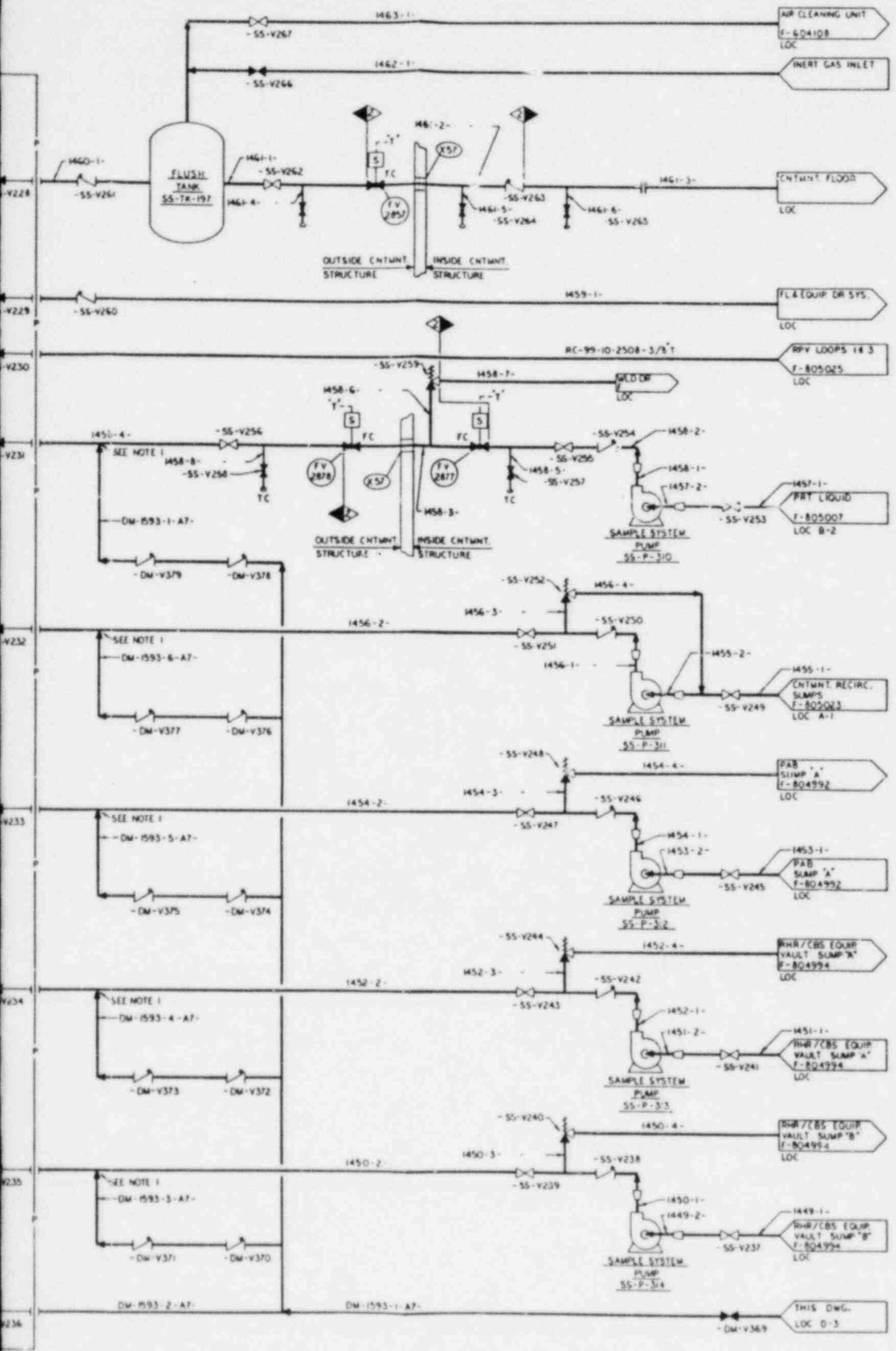
3/8"-SS-V227
1/4"-SS-V225
LOCAL SAMPLE ROOM DRAIN
POST ACCIDENT SAMPLE PANEL SS-CP-419



S.D. Nº 30

THE SYSTEM PREFIX FOR THIS DIAGRAM IS "SS" UNLESS OTHERWISE NOTED.

REFERENCE DRAWING - 9763 - F - 805025

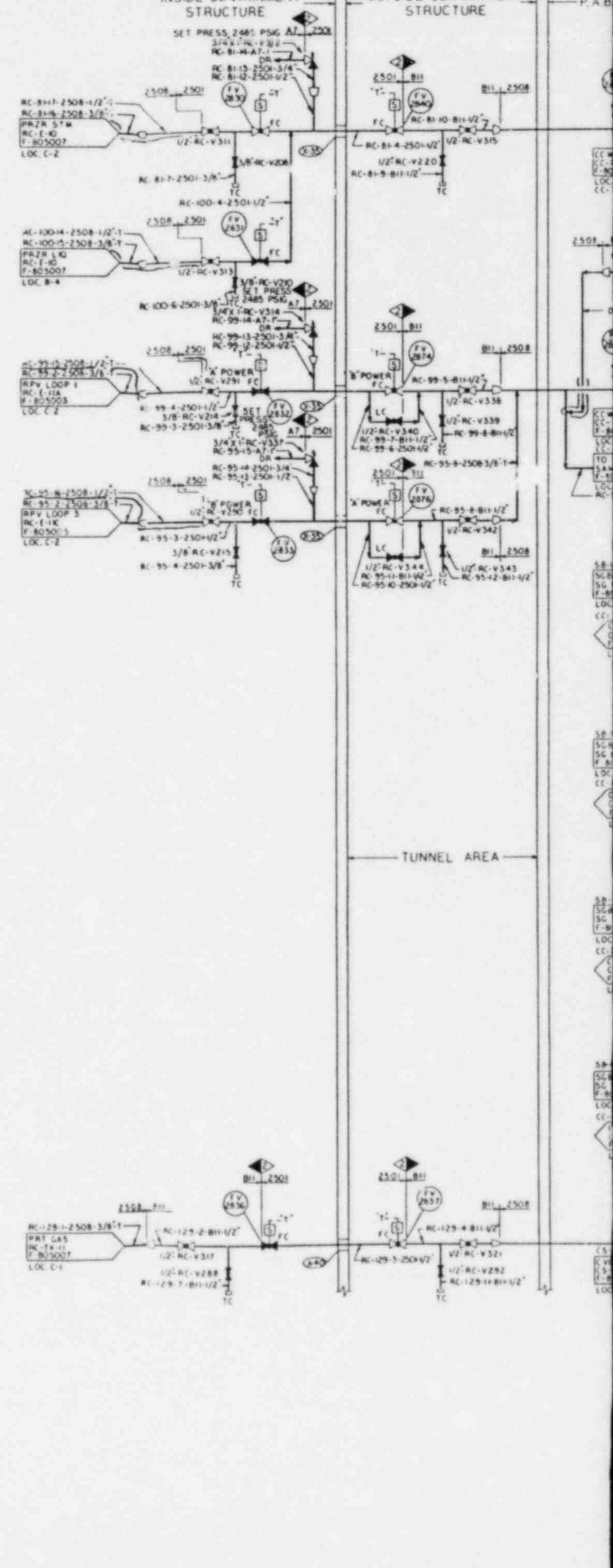
NOTE 1

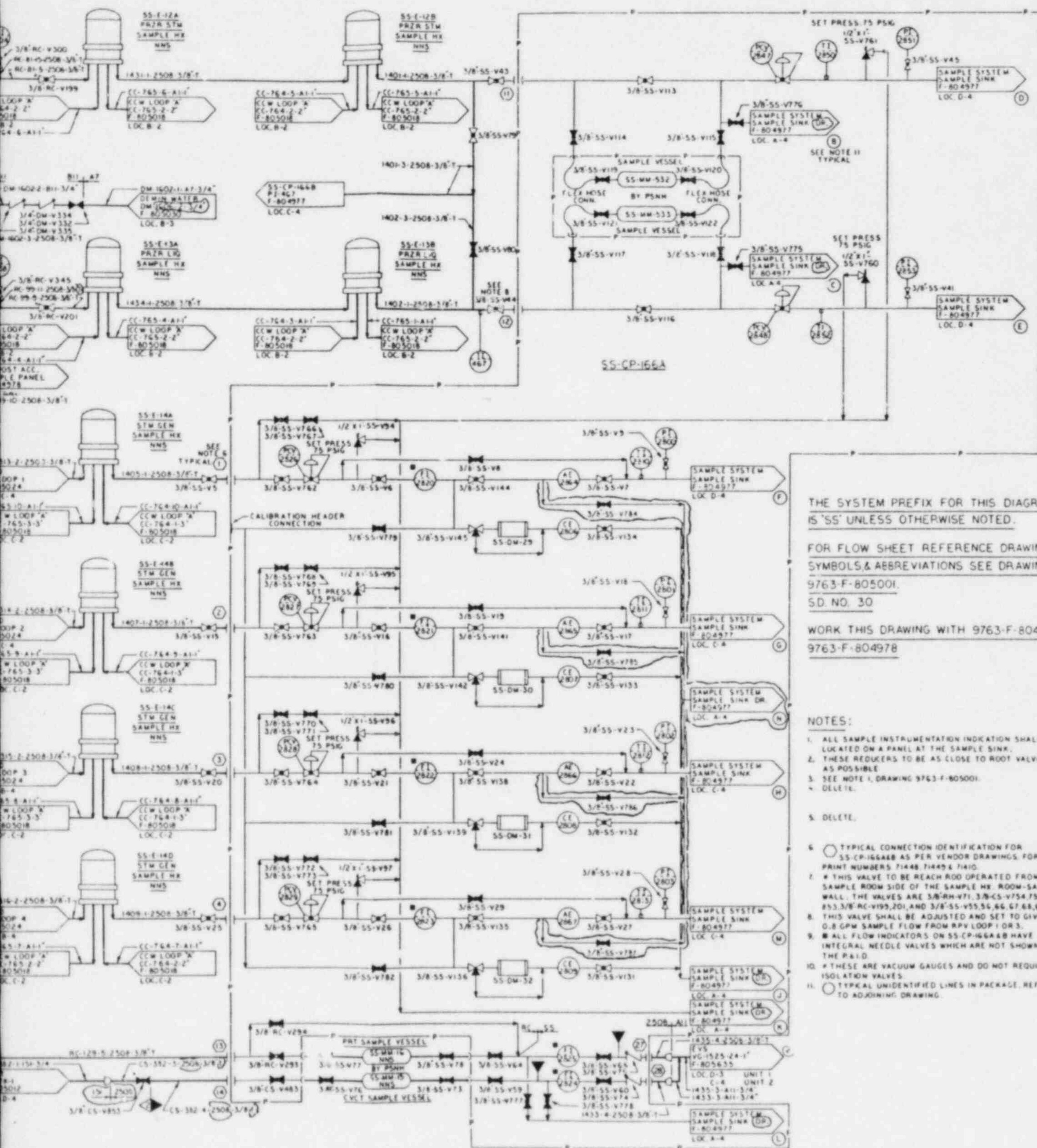
1. THIS CONNECTION IS TO BE AS CLOSE TO ITS RESPECTIVE UPSTREAM VALVE (-SS-V239, 243, 247, 251, & 256) AS POSSIBLE.

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE
SEABROOK STATION - UNITS 1 & 2
FINAL SAFETY ANALYSIS REPORT

SAMPLE SYSTEM NUCLEAR-POST ACCIDENT
P&I DIAGRAM

FIGURE 9.3-5a


INSIDE CONTAINMENT STRUCTURE
OUTSIDE CONTAINMENT STRUCTURE
TUNNEL AREA



THE SYSTEM PREFIX FOR THIS DIAGRAM IS 'SS' UNLESS OTHERWISE NOTED.

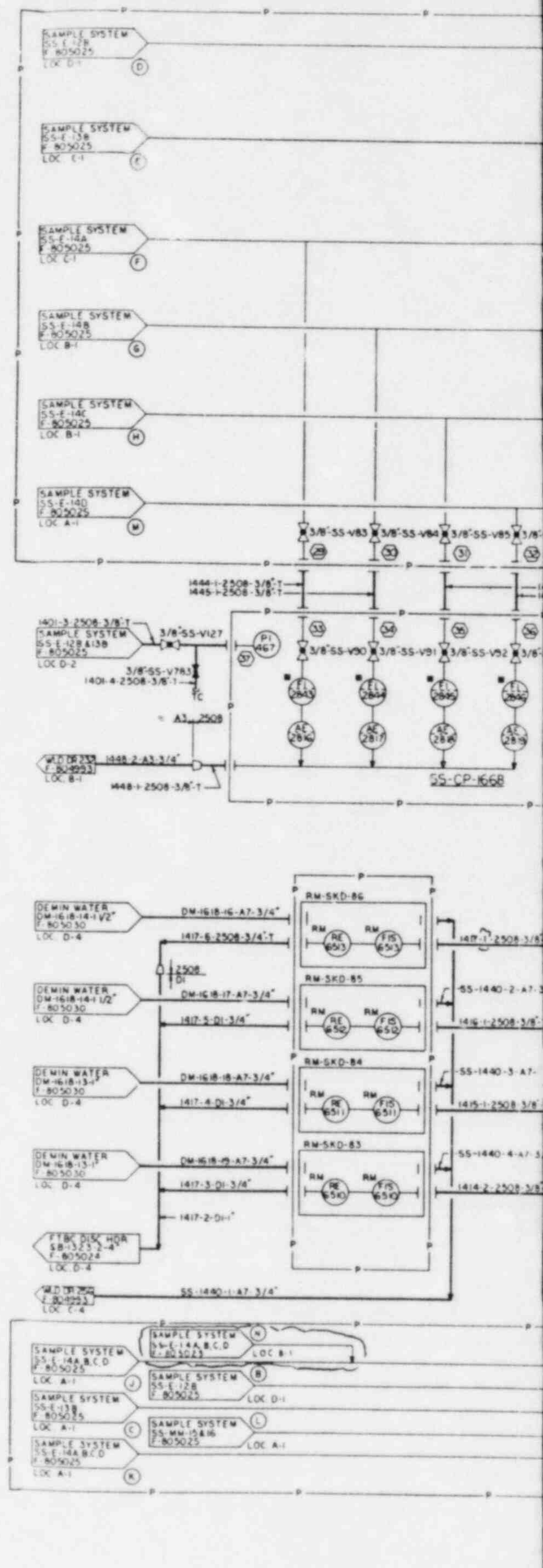
FOR FLOW SHEET REFERENCE DRAWINGS, SYMBOLS,& ABBREVIATIONS SEE DRAWING 9763-F-805001.
S.D. NO. 30

WORK THIS DRAWING WITH 9763-F-804977, 9763-F-804978

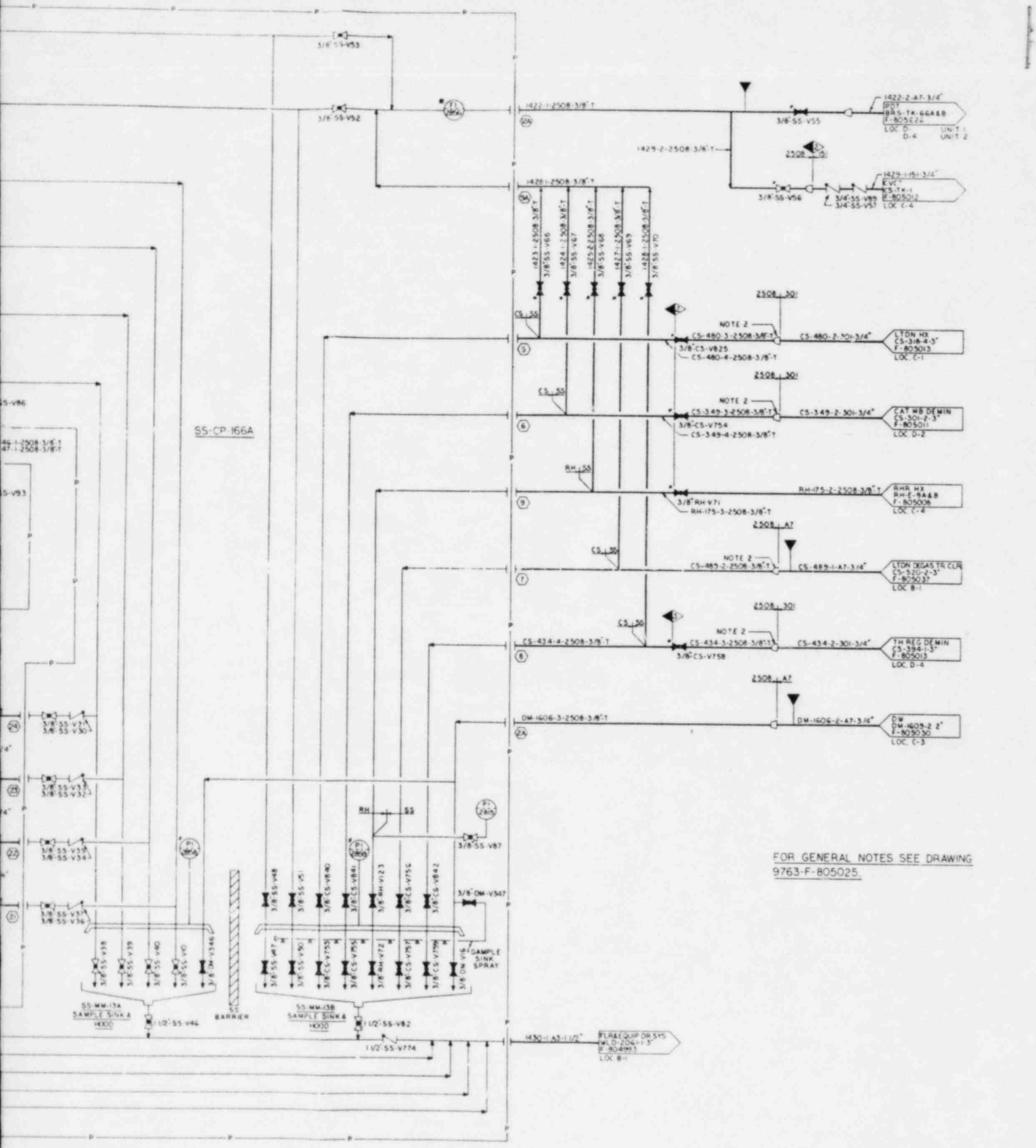
NOTES:

1. ALL SAMPLE INSTRUMENTATION INDICATION SHALL BE LOCATED ON A PANEL AT THE SAMPLE SINK.
2. THESE REDUCERS TO BE AS CLOSE TO ROOT VALVE AS POSSIBLE
3. SEE NOTE 1, DRAWING 9763-F-805001.
4. DELETE.
5. DELETE.
6. ◯ TYPICAL CONNECTION IDENTIFICATION FOR SS-CP-166A&B AS PER VENDOR DRAWINGS. FOREIGN PRINT NUMBERS 71448, 71449 & 71410.
7. # THIS VALVE TO BE REACH ROD OPERATED FROM THE SAMPLE ROOM SIDE OF THE SAMPLE HX. ROOM-SAMPLE WALL. THE VALVES ARE 3/8"-RH-V71, 3/8"-CS-V754,758,825, 853,3/8"-RC-V195,201, AND 3/8"-SS-V55,56,66,67,68,69,70.
8. THIS VALVE SHALL BE ADJUSTED AND SET TO GIVE A 0.8 GPM SAMPLE FLOW FROM RPV LOOP 1 OR 3.
9. ■ ALL FLOW INDICATORS ON SS-CP-166A&B HAVE INTEGRAL NEEDLE VALVES WHICH ARE NOT SHOWN ON THE P&I.D.
10. # THESE ARE VACUUM GAUGES AND DO NOT REQUIRE ISOLATION VALVES.
11. ◯ TYPICAL UNIDENTIFIED LINES IN PACKAGE. REFERENCE TO ADJOINING DRAWING.

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE SEABROOK STATION - UNITS 1 & 2 FINAL SAFETY ANALYSIS REPORT	SAMPLE SYSTEM NUCLEAR P&I DIAGRAM SHEET 1
	FIGURE 9.3-5b



SAMPLE SYSTEM
SS-E-12B
F-805025
LOC D-1
SAMPLE SYSTEM
SS-E-13B
F-805025
LOC C-1
SAMPLE SYSTEM
SS-E-14A
F-805025
LOC C-1
SAMPLE SYSTEM
SS-E-14B
F-805025
LOC B-1
SAMPLE SYSTEM
SS-E-14C
F-805025
LOC B-1
SAMPLE SYSTEM
SS-E-14D
F-805025
LOC A-1
SS-CP-1668
RM-SKD-86
RM-SKD-85
RM-SKD-84
RM-SKD-83
DEMIN WATER
F-805030
LOC D-4
SAMPLE SYSTEM
SS-E-14A,B,C,D
F-805025
LOC A-1
SAMPLE SYSTEM
SS-E-13B
F-805025
LOC A-1
SAMPLE SYSTEM
SS-MM-15&16
F-805025
LOC A-1



PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE
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SAMPLE SYSTEM NUCLEAR P&I DIAGRAM
SHEET 2

FIGURE 9.3-5c