DISTRIBUTION
Docket File 50-400 57pp
Docket File 50-401
ETSB Reading File
ETSB Docket File
WP Gammill

JUN 25 1982

Docket Nos.: 50-400/401

MEMORANDUM FOR: F. J. Miraglia, Chief
Licensing Branch #3, DL

FROM: W. P. Gammill, Chief, ETSB
Division of Systems Integration

SUBJECT: ETSB INPUT FOR SHEARON HARRIS DRAFT SER

As promised in my April 28, 1982 memorandum to you enclosed is a draft of ETSB's input for the Shearon Harris draft SER. It should be noted that we have assumed in our draft, that the plant meets the design objective of Appendix I. This has not yet been confirmed.

We are also enclosing questions to which the applicant should respond. These questions summarize the information that is needed to complete our review as documented in the conclusion Sections of our draft SER input. The applicant's responses will hopefully result in the elimination of most of the open items by the time the October draft of the SER is issued.

If there are any questions concerning the attachment please contact J. Hayes (x27649) who is the reviewer for this plant.

ORIGINAL SIGNED

W. P. Gammill, Chief
Effluent Treatment Systems Branch
Division of Systems Integration

Enclosure
As stated

cc: R. Mattson
W. Houston
R. Capra
E. Licitra
D. Bangart
[redacted]

XA Copy Has Been Sent to PDR

8207140072 XA

OFFICE							
SURNAME							
DATE			6/25/82				

6.5.1 Engineered Safety Feature (ESF) Atmospheric Cleanup System

6.5.1.1 Summary Description

The engineered safety feature (ESF) atmospheric cleanup systems at the Shearon Harris Nuclear Power Plant (SHNPP) consist of process equipment and instrumentation necessary to control the release of radioactive iodine and particulate material following a design basis accident (DBA). At the SHNPP, there are three filtration systems designed for this purpose. These systems are:

(1) Reactor Auxiliary Building (RAB) Emergency Exhaust System;

(2) Fuel Handling Building (FHB) Emergency Exhaust System; and

(3) Control Room Emergency Filtration System.

The RAB emergency air exhaust system consists of, in order, a demister, electrical heating coil, pre-filter, HEPA, charcoal adsorber, HEPA, and decay heat cooling air connection. The purpose of this system is to limit the potential for post-accident radiological releases to contaminate portions of the RAB. These areas include the charging pump, the RHR heat exchanger, containment spray and RHR pumps rooms and the mechanical, electrical and heating and ventilation penetration areas and rooms. Upon receipt of a Safety Injection Actuation Signal (SIAS), air operated valves on the normal ventilation penetration into areas containing equipment essential for safe shutdown close and both RAB emergency exhausts are automatically energized. Either unit may then be manually de-energized from the control room and placed on standby.

6.5.1.1 By continually exhausting air a negative pressure of 1/8 inch water gauge (WG)is established. Pressure is then controlled by the airflow control system which adjusts the variable inlet vanes of the exhaust fans.

The FHB emergency air exhaust system consists of components which are identical to the RAB emergency exhaust with the exception that the charcoal adsorber section is two inches deep while that of the RAB system is 4 inches deep. The purpose of the FHB system is to maintain the fuel storage building at a negative pressure so that any radioactive iodine or particulates released to the building will be contained within the building and then filtered prior to ~~the~~ release. The actuation of the FHB is from a signal initiated by one of the four radiation monitors located around the walls of each of the fuel pools. Both trains will be actuated initially. Either train may be manually de-energized from the Control Room and placed on standby. Pressure in the FHB is maintained at 1/8 inch WG and and controlled by the airflow control system.

The control room emergency filtration system consists of two-100% capacity filtration systems. Each filtration system includes, in order, a demister, two electric heating coils arranged in series (one operating and one on standby), a HEPA filter, a charcoal adsorber, and another HEPA. The purpose of the control room emergency filtration system is to limit the amount of radioactivity introduced into the control room following an accident and filter radioactivity

6.5.1.1 already in the control room such that doses to control room operators will be within the design criterion of GDC 19 of 10 CFR Part 50, Appendix A. Upon receipt of a Safety Injection signal (SIS) or a high chlorine concentration signal at the outside air intakes, the outside intake isolation valves will be closed, the control room purge system isolation valves will be closed, one fan in each emergency filtration train will start and the respective fan valves opened. All isolation valves in the normal exhaust system will close and the exhaust fans de-energized. All of these actions will occur automatically. Upon receipt of a high radiation signal from the radiation monitor located within each air intake, the air intake on the affected side of the control building will automatically isolate and the emergency filtration system will start. Upon completion of the above automatic functions, the operator will place one of the emergency filtration trains on standby, select and open one emergency outside air intake based upon radiation and chlorine readings, and open exhaust bypass dampers for laboratory and kitchen bypass exhaust.

The control room emergency filtration system will process a mixture of control room air and a small quantity of outside air through HEPAs and adsorbers and maintain the control envelope under a positive pressure of +1/8 inch water gauge. Air is continuously drawn for the supply air subsystem, blended with outside air, processed through the adsorbers system and supplied to the control room.

6.5.1.1 Sections 6.5.1 and 9.4.1 of the Harris FSAR contain a detailed description the ESF filtration systems.

6.5.1.2 Evaluation and Findings

The staff's review included the capability of ESF filter systems to operate after a design basis accident; an evaluation of the systems design, design criteria, design objectives, components design and qualification testing; and design provisions incorporated to facilitate operation and maintenance and testing of components to ensure continued acceptable performance. The staff's review was based upon the relevant requirements of (1) GDC 19 of of Appendix A to 10 CFR Part 50 for systems designed for the habitability of the control room under accident conditions; (2) GDC 61 for the design of systems for radioactivity control under postulated accident conditions; and (3) GDC 64 for the monitoring of radioactive releases under postulated accident conditions.

The ESF filter systems were not reviewed according to SRP 6.5.1 of NUREG-0800 because the acceptance criteria of this document calls for the design, testing, and construction of components of the ESF filter system to ANSI N509-1980. These standards were not in existence at the time the SHNPP ESF filter systems were designed nor when the equipment was purchased. Therefore, the review of the ESF filter systems was conducted utilizing SRP 6.5.1, Rev.1, of NUREG-75/087, which more adequately reflects the criteria which were in effect at the time the SHNPP ESF filter system was designed.

6.5.1.2 In those instances where the equipment was purchased prior to Rev. 1, conformance with prior document criteria, whether Regulatory Guide 1.52, Rev. 1, or SRP 6.5.1, Rev. 0, was considered acceptable. As a result of this review, the following evaluations and findings have been made.

The applicant has provided a comparison of the design of the SHNPP ESF filter systems with the regulatory positions of Regulatory Guide 1.52, Rev. 2 March 1978 in a Table of the FSAR. The staff has determined that the applicant has proposed few exceptions to Regulatory Guide 1.52 and that these exceptions are trivial in nature and judged to be acceptable.

The staff,credited the applicant with 95% removal efficiency for methyl radioiodine for the FHB emergency exhaust system and 99% for all other ESF filter systems.

As a result of the staff's review of the applicant's designs, design criteria, and design bases for ESF atmospheric cleanup systems and the systems' conformance to applicable regulations, guides and industry standards, the staff has concluded that the ESF atmospheric cleanup systems include the equipment and instrumentation to control the release of radioactive materials in airborne effluents following a design basis accident. The staff finds the proposed ESF atmosphere cleanup systems acceptable and the filter efficiencies given in Table 2 of Regulatory Guide 1.52 appropriate for use in the accident analyses.

10.4.2 Main Condenser Evacuation System

10.4.2.1 Summary Description

The main condenser evacuation system (MCES) of each unit consists of two 100% capacity mechanical vacuum pumps which serve the main condenser. At startup, one or both pumps may be operated to evacuate the condenser. Once operating pressure is obtained, one pump is placed on standby. On startup, and prior to turbine operation, the non-condensible gases will be discharged directly to the atmosphere in the turbine building area without filtration. ~~Upon start of~~ With turbine operation the discharge from the mechanical vacuum pumps is directed through the condenser vacuum pump effluent treatment system (CVPETS). ¶ The non-condensible gases flow to a moisture separator where most of the water vapor is condensed. The condensed water normally drains to the industrial waste sumps but will be directed to the liquid waste processing system on a high radiation signal from the turbine building drain monitor. The airborne discharge from the mechanical vacuum pumps is monitored for radioactivity downstream of the CVPETS. Any radioactivity exceeding the monitor set point will initiate an alarm by the radiation monitors. A more detailed discussion of the MCES is presented in Section 10.4.2 of the FSAR.

10.4.2.2 <u>Evaluation Findings</u>

The staff's review included the system's capability to process radioactive gases and the design provisions incorporated to monitor

[The CVPETS consists of a demister, an electrical heating coil, HEPA filter, a 4-inch charcoal adsorber, a HEPA filter and two - 100% capacity fans in parallel.]

10.4.2.2 and control releases of radioactive materials in gaseous effluents in accordance with GDC 60 and 64 of Appendix A to 10 CFR Part 50. The quality group classification of equipment and components used to collect gaseous radioactive effluents was reviewed relative to the guidelines of Regulatory Guide 1.26. The staff reviewed the applicant's system descriptions, piping and instrumentation diagrams, and design criteria for components of the MCES with respect to the Acceptance Criteria of SRP 10.4.2 of NUREG-0800.

The MCES contains no provisions for sampling discharges from the turbine building vent during startup operations as specified in Table 1 of SRP 11.5.

The applicant has indicated that there is no potentially explosive gaseous mixture present in the MCES during normal operation but has not addressed the potential for such a mixture during shutdown and ~~startdown and~~ startup conditions as required by the Acceptance Criteria of SRP 10.4.2. If there is a potential for an explosive mixture to exist, the MCES should be designed to withstand the effects of an explosion or redundant instrumentation to detect and annunciate the build-up of potentially explosive mixtures should be provided as outlined in the Acceptance Criteria of SRP 11.3.

The applicant has indicated that the main condenser is constructed to the Heat Exchanger Institute's "Standards for Steam Surface Condensers" but has not addressed whether the MCES capacity is consistent with the guidelines given by the above industrial

10.4.2.2 standard as required by the Acceptance Criteria of SRP 10.4.2. The applicant has not addressed the quality group to which components of the MCES has been designed. With the addressing of the above items the staff will be able to judge the MCES's conformance with the acceptance criteria of SRP 10.4.2 and whether the MCES has met the requirements of GDC 60 and 64 with respect to the control and monitoring of releases of radioactive materials to the environment and whether the MCES has met the requirements of the industrial standard "Standards for Steam Surface Condensers".

10.4.3 Turbine Gland Sealing System

10.4.3.1 Summary Description

The turbine gland sealing system provides sealing steam to the main turbine generator shaft to prevent the leakage of air into the turbine casings and the potential escape of radioactive steam into the turbine building. A portion of the main steam supply is passed through the turbine gland seals and condensed in the gland steam condenser. The condensate is returned to the main condenser hotwell while non-condensible gases are discharged by two 100% capacity blowers to the environment. A more detailed discussion of the turbine gland sealing system is presented in Section 10.4.3 of the FSAR.

10.4.3.2 Evaluation and Findings

The staff has reviewed the turbine gland sealing system with respect to the Acceptance Criteria of SRP 10.4.3 of NUREG-0800. The scope

10.4.3.2 of this review included the source of sealing steam and the provisions incorporated to monitor and control releases of gaseous radioactive effluents in accordance with GDC 60 and 64 of Appendix A to 10 CFR Part 50. The staff has reviewed the applicant's system description and design criteria for the components of the turbine gland sealing system.

The applicant has not indicated the quality group classification to which the turbine gland sealing system has been designed. The design should conform to the Acceptance Criteria of SRP 10.4.3. The venting of the turbine gland seal condenser's noncondensable gases is not monitored as required by Table 1 of SRP 11.5.

~~10.4.3.2~~ The commitment by the applicant to meet the Acceptance Criteria of the above SRP will allow the staff to conclude that the turbine gland sealing system meets the requirements of GDC 60 and 64 with respect to the control and monitoring of releases of radioactive materials to the environment by providing a controlled and monitored turbine gland sealing system.

11.0 Radioactive Waste Management

11.1 Source Terms

The applicant calculated the liquid and gaseous effluents from the Shearon Harris Nuclear Power Plant (SHNPP) utilizing the PWR GALE computer program. The applicant utilized the source assumptions of Regulatory Guide 1.112, "Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Light-Water-Cooled Power Reactors", and NUREG-0017, "Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Pressurized Water Reactors (PWRs)". Gaseous effluents were calculated from such sources as offgases from the main condenser evacuation system; leakage to containment, the reactor auxiliary building, and the turbine building; noble gases stripped from the primary coolant during normal operation and at shutdown; and cover and vent gases from tanks and equipment containing radioactive material. Liquid effluents were calculated from such sources as shim bleed, leakage collected in equipment and floor drains such as found in the reactor auxiliary building, fuel handling, waste processing, and turbine buildings, contaminated liquids from anticipated plant operations such as resin sluices, filter backwash, decontamination solutions, sample station drains, and detergent wastes.

The staff has performed an independent calculation of the primary and secondary coolant concentrations and of the release rates of radioactive materials using the information supplied in the applicant's FSAR, the GALE computer program, and the methodology presented in NUREG-0017. Table 11.1-1 presents the principal

parameters which were used in this independent calculation of the
11.1 source terms. These source terms were utilized in Sections 11.2 and
11.3 to calculate individual doses in accordance with the
mathematical models and guidance contained in Regulatory Guide 1.109,
"Calculation of Annual Average Doses to Man From Routine Releases of
Reactor Effluents for the Purpose of Evaluating Compliance with
10 CFR Part 50, Appendix I".

Liquid effluents occur from the waste monitoring tanks, the treated
laundry and the hot shower storage tanks and the secondary waste
sample tanks. The sources of wastes to these tanks are discussed in
Section 11.2 of this SER. One source of waste to the waste
monitor tanks can be the boron recycle system (BRS). Distillate fror
BRS evaporators can be pumped to the waste monitor tank for discharg
offsite.

The staff's estimate of the liquid effluents was based upon the
information presented in Tables 11.1-1 and 11.1-2. The applicant
assumed that floor drain wastes would be treated by the reverse
osmosis (RO) unit of the floor drain treatment system. The staff
calculated liquid effluents assuming that the floor drains would
treated by the RO system. However, the results indicated that ov
5 curies per year per unit would be released based upon the staff
projected inputs to the floor drain treatment system. Since this
would not comply with one of the requirements of the Annex to
Appendix I of 10 CFR Part 50 which the applicant chose to use to
compliance with Section II.D of Appendix I, the staff assumed th

11.I wastes collected by the floor drain tanks would be treated by the waste evaporator in the equipment drain treatment system. The applicant had indicated in the FSAR that these evaporators would be available to treat the floor drain wastes when they contained high activity. The staff then calculated the effluents from floor drains based upon the the use of this evaporator. With it's use the effluents from the SHNPP could satisfy the criterion of Section A.2 of the Annex to Appendix I.

In its evaluation the staff determined that adequate holdup and processing time were available for the treatment of the floor drain wastes and the equipment drain wastes.

The applicant also assumed in his calculation analysis that the wastes collected by the secondary waste low conductivity holding tank would be processed by an evaporator in addition to a mixed bed demineralizer. The staff's review of the applicant's description of this system indicated that these wastes would usually be treated only by a demineralizer. The staff assumed the latter mode of treatment in their analysis.

The holdup time calculated by the staff for the treatment of the regenerative solutions from the condensate polishing system (input to secondary waste high conductivity holding tank) was calculated to be less than 2 days and, since no alternative evaporator is available for processing the contents of the high conductivity holding tank if the evaporator becomes inoperable, it was assumed that the contents of this tank were pumped to the secondary waste sampling tank for discharge.

All detergents wastes were considered by the staff to be collected, filtered, and discharged without further treatment.

Airborne effluents occur from the building ventilation systems, from the continuous and pre-entry containment purges, from the gaseous processing system (GWPS), the main condenser evacuation system. and the turbine gland steam condenser. All airborne effluents except those released from the turbine gland steam condenser and the GWPS are passed through a HEPA filter and charcoal adsorber prior to discharge. The continuous containment purge is filtered ~~only~~ by the HEPA filter and charcoal adsorber in the airborne radioactivity removal system (ARRS) inside the containment.

Additional information utilized by the staff in its estimate of airborne releases is provided in Table 11.1-1. Additional details on the liquid and gaseous radwaste systems are contained in Sections 11.2 and 11.3 of this SER.

The applicant is installing a fluidized bed dryer to process evaporator concentrates (bottoms), chemical drain solutions, and filter backwash sludges for the purpose of reducing the volume of solid radwaste shipped offsite. The operation of this volume reduction (VR) equipment will result in additional liquid and airborne effluents. Airborne effluents will result from the VR system's offgas and will be discharged on a continuous basis while the system is operating. There are no liquid effluents which will be discharged directly offsite from the VR equipment operation. However, based upon FSAR Figure 11.4.2-2, decontamination solutions, condensate from the scrubbers and leakage from pumps, pipes, etc. will result in additional quantities of wastes being treated by the floor drain treatment system. Ultimately, some of these wastes will be discharged offsite from the waste monitor tanks and some will again be treated in the VR system.

11.1.2 Evaluation and Findings

The applicant has not presented much detail on the VR system. In particular, the applicant has not addressed (1) the volume of waste to be handled by the VR system, (2) the quantity of airborne radioactive effluents released from the VR system; (3) the additional volume of wastes to be treated by the liquid waste processing system as a result of operation of the VR system; and (4) the additional radioactive liquid effluents resulting from operation of the VR system.

The staff has estimated the quantity of wastes to be treated by the VR system and the radioactivity associated with these wastes. The staff has estimated the additional amount of radioactivity released as airborne effluents from the VR system and as liquid effluents from the liquid radwaste system. These releases were included with the releases calculated using NUREG-0017 and the total quantity of effluents was presented in Section 5 of the SHNPP Draft Environmental Statement (DES). Table 11.1-1 and 11.1-2 present assumptions which were utilized in the calculation of effluents resulting from VR equipment.

The applicant has not filed with the Commission details on the VR system design and its interface with various plant systems such as process and effluent monitoring. Such information will be required required prior to approval of the plant's radwaste VR system in addition to the information outlined above.

Table 11.1-1 Principal parameters and conditions used in releases of radioactive material in liquid and gaseous effluents from Shearon Harris Nuclear Power Plant

Reactor power level (MWt)	2900
Plant capacity factor	0.80
Failed fuel	0.12%[a]
Primary system	
Mass of coolant (lb)	3.42 x 10[illegible]
Letdown rate (gal/min)	60
Shim bleed rate (gal/day)	1.44 x 10[illegible]
Leakage to secondary system (lb/day)	100
Leakage to containment building (lb/day)	b
Leakage to auxiliary building (lb/day)	160
Frequency of degassing for cold shutdowns (times/yr)	2
Let down cation demineralizer flow (gal/min)	6.0
Secondary system	
Steam flow rate (lb/hr)	1.2×10^7
Mass of liquid/steam generator (lb)	1.01 x 10[illegible]
Mass of steam/steam generator (lb)	9.00 x 10[illegible]
Secondary coolant mass (lb)	1.53 x 10[illegible]
Rate of steam leakage to turbine area (lb/hr)	1.7×10^3
Containment building volume (ft^3)	2.3×10^6
Frequency of containment purges (times/yr)	4
Containment low volume purge rate (ft^3/min)	1720
Containment atmosphere cleanup rate (ft^3/min)	~~10.0 x 10~~
Pre-purge cleanup time duration (hr)	16
Iodine partition factors (gas/liquid)	
Leakage to auxiliary building	0.0075
Leakage to turbine area	1.0
Main condenser, air ejector (volatile species)	0.15
Liquid radwaste system decontamination factors	

Material	Boron Recycle System	Equipment Drain Treatment System	Secondary Waste High Conductiv[illegible] Sub-system
Iodine	1×10^5	1×10^3	7.1 x 10[illegible]
Cesium, rubidium.	2×10^3	1×10^4	7.1 x 10[illegible]
Other	1×10^4	1×10^4	7.1 x 10[illegible]

Table 11.1-1
(continued)

	Secondary Waste Low Conductivity Subsystem	Laundry and Hot Shower R.O. Concentrate Subsystem
Material		
Iodine	1×10^{2}	1×10^{3}
Cesium, rubidium	2	1×10^{4}
Other	1×10^{2}	1×10^{4}

Liquid Waste Inputs

Steam	Flow Rate (gal/day)	Fraction of PCA	Fraction Discharged	Collection time (days)	Decay Time (days)
Shimbleed Rate (BRS)	1440	1.0	0.1	23.3	3.11
Equipment Drains (EDTS)	250	1.0	0.1	24.4	0.46
R.O. Concentrates Wastes	539	0.01	1.0	2.23	0.17
Blowdown	119000	-	0.0	0	0
Floor Drains (FDTS)	935	0.11	1.0	10.7	0.93
Regenerant Solution (SWTS)	3400	-	1.0	0.88	0.21
Detergent Wastes	450	-	1.0	-	-

Source of Volume Reduction System Wastes	Volume/Year/Unit	Total Activity
1. Evaporator Bottoms	7,800 ft^3	-
2. Chemical Drain	125 ft^3	-

Gaseous Waste Inputs

There is continuous low volume purge of volume control tank

Holdup time for xenon (days)	69.
Holdup time for Krypton (days)	69.
Fill time of decay tanks (days)	34.

[a]This value is constant and corresponds to 0.12% of the operating power product source term as given in NUREG-0017 (April 1976).

[b]1%/day of the primary coolant noble gas inventory and 0.001%/day of the primary coolant iodine inventory.

Table 11.1-2

Individual equipment decontamination factors

	All nuclides except iodine	Iodine
1. Evaporators	10[illegible]	10
Secondary Waste and Waste Recycle	10^3	10

	Anions	Cesium, rubidium	Other nuclides
2. Demineralizers			
Secondary Waste (when used by low conductivity subsystem)	10^2	2	10^2
CVCS Cation Bed	1	10	10
Recycle Evaporator Feed, Recycle Evaporator Condensate, CVCS mixed bed, Secondary Waste (when used in conjunction with secondary waste evaporator)	10	2	10

	Decontamination Factors	
Volume Reduction Equipment	Iodine	Others
1. Fluidized bed dryer or dry waste processor/gas/solids separator	2	100
2. Scrubber/Preconcentrator	3	100
3. Recycle Air stream	3	1
4. HEPA filter	1	100
5. Charcoal adsorber	100	1

11.2 Liquid Radwaste System

11.2.1 Summary Decription

The liquid waste processing system (LWPS) at the SHNPP consists of process equipment and instrumentation necessary to collect, process, monitor, and recycle and/or dispose of radioactive liquid wastes.

The LWPS is designed to collect and process wastes based on the origin of the waste in the plant and the expected levels of radioactivity. All liquid waste is processed on a batch basis to permit optimum control of releases. Before liquid waste is released, samples are analyzed to determine the types and amounts of radioactivity present. Based on the results of the analysis and the waste treatment system utilized, the waste may be recycled for eventual reuse in the plant, retained for further processing, or released to the environment under controlled conditions. A radiation monitor in the discharge line from the various discharge tanks will automatically terminate liquid waste discharges if radiation measurements exceed a predetermined level. An alarm will be simultaneously actuated in Units 1 and 2's control room, in the WPB control room and the Health Physics control room.

The LWPS at the SHNPP is composed of the following subsystems:

(1) the equipment drain treatment;

(2) the floor drain treatment;

(3) the laundry and hot shower treatment; and

(4) the secondary waste treatment.

1.2.1

The SHNPP's has been designed so that liquid wastes from the reactor coolant and its associated subsystems are separated into three main streams - recyclable reactor grade, nonrecyclable, and secondary waste. The recyclable reactor grade stream consists of tritiated wastes collected in the equipment drains. This stream is treated by the equipment drain treatment system. The nonrecyclable equipment stream consists of nonreactor grade water sources and is collected and processed through either the floor drain treatment system or the laundry and hot shower treatment system. The secondary waste stream consists of regenerant solutions from the condensate polishing system and backflush from the electromagnetic filters of the steam generator blowdown system and is collected and processed in the secondary waste treatment system.

The above systems are shared between the two units at the SHNPP. There are two floor drain treatment systems and two secondary waste treatment systems shared between the two units. All other shared systems are single systems.

All releases are monitored before discharge to the cooling tower blowdown. The discharge valve is interlocked with a process radiation monitor and will close automatically if the radioactivity in the liquid should exceed a predetermined limit or if the dilution flow afforded by the cooling tower blowdown falls below a preset value. Additional details on the liquid radwaste treatment system follow.

1.2.1

The equipment drain treatment system collects reactor grade water from equipment leaks and drains, valve leakoffs, pump seal leakoffs, tritiated water sources and tank overflows. These wastes are collected in the waste holdup tank and then processed via filtration and evaporation. After processing, these wastes are either sent to the reactor makeup water storage tanks or to the waste monitor tank for discharge or to the waste holdup tank for additional treatment.

The floor drain treatment system collects and processes water from the floor drains of the reactor auxiliary building (RAB), fuel handling building (FHB), waste processing building (WPB), tank areas (reactor makeup water storage and condensate storage tanks) and portions of the hot shop. The waste is collected in the floor drain tank and processed by filtration and treatment in the floor drain treatment system reverse osmosis (RO) unit and then collected in the waste monitor tanks. From the waste monitor tanks, the wastes may be discharged to the cooling tower blowdown line, discharged to the condensate storage tank, recycled to the waste holdup tank for treatment in the equipment drain treatment system, or pumped directly to the waste processing system (WPS) waste evaporator for treatment. The latter route will be utilized when radioactivity levels are such that filtration and reverse osmosis are insufficient to reduce the radioactivity to acceptable levels.

11.2.1 The laundry and hot shower treatment system collects, in the laundry hot shower tank, detergent waste from the WPB, the FHB and the hot shop. The applicant expects this waste to be of a quality such that treatment for removal of radioactivity will not normally be required. However, if analysis indicates that treatment is required it will be routed to the laundry and hot shower RO unit. The permeate from the RO unit will be passed through a demineralizer and then routed to the treated laundry and hot shower tank. The contents of this tank can be recycled for further treatment or discharged via cooling tower blowdown or sent to the condensate storage tank.

The secondary waste treatment system is designed to treat wastes generated from secondary systems. This water will contain radioactivity only if primary to secondary leakage occurs in the steam generators. The secondary waste treatment system consists of two subsystems - one to treat high conductivity wastes and the other to treat low conductivity wastes.

Low conductivity wastes such as the backflush from the electromagnetic filters of the steam generator blowdown system and the low conductivity wastes from the condensate polishing system are collected in the low conductivity holding tanks. These wastes are filtered and passed through a demineralizer and then collected in the secondary waste sample tanks. From the secondary waste sample tanks the water is either recycled to the condensate storage tank, discharged to the cooling tower blowdown or to the neutralization basin or recycled back to the low conductivity holding tanks.

11.2.1

The main source of high conductivity wastes is the regenerant solutions from the condensate polishing system. This waste is collected in the high conductivity holding tank, processed by an evaporator and the evaporator distillate discharged to the low conductivity system upstream of the demineralizer. From the demineralizer, treatment is the same as for the low conductivity subsystem.

Turbine building equipment drains and curbed area oil equipment and floor drains below the operating deck are collected in the industrial waste sumps of the turbine building. Drains below ground elevation are collected in a condensate pump area sump. This sump and the industrial waste sumps discharge through a radiation monitor. The contents of these sumps will normally go to a yard oil separator and then to the cooling tower blowdown. If the monitor detects high radiation in the discharge from one of these pumps, the discharge will be directed to the low conductivity holding tank for treatment.

The secondary waste system also contains a subsystem which collects 1) the wastes from the chemical drain tank which are not sent to the solid waste processing system for solidification and, 2) the concentrat wastes from the waste evaporator, the reverse osmosis units, and the secondary waste evaporator. These wastes are collected in the RO

11.2.1

concentrate evaporator. The distillate from this evaporator goes to the treated laundry and hot shower storage tank for discharge. The evaporator concentrate goes to the waste evaporator concentrate tank for solidification or for treatment in the volume reduction system. The liquid waste system consists of a number of cross-ties which allows alternative treatment schemes to those discussed above. Further detail on the liquid waste system and these treatment schemes is provided in Section 11.2 of the SHNPP FSAR.

11.2.2 Evaluation and Findings

The LWPS system was reviewed with respect to the Acceptance Criteria of Standard Review Plan 11.2, NUREG-0800. The staff's review considered the capability of the proposed LWPS to meet the anticipated demands of the plant due to anticipated operational occurrences.

The potential consequences resulting from reactor operation have also been considered and the staff has determined the concentrations of radioactive materials in liquid effluents in unrestricted areas to be a small fraction of the limits in Table II, Column 2 of Appendix B to 10 CFR Part 20.

The staff has also considered the potential consequences resulting from reactor operation with 1% of the operating fission product inventory in the core being released to the primary coolant and has determined that the concentrations of radioactive materials in liquid effluents in unrestricted areas will be a small fraction of the limits of Table 2, Column 2 of Appendix B to 10 CFR Part 20.
As discussed in Section 11.1 of this SER, the staff calculated liquid effluents using the GALE computer program based upon the treatment systems for liquid effluents described above. These source terms were presented in Appendix D of the SHNPP DES.

Sect 11.2.2

The staff calculated the doses to offsite individuals utilizing the methodology of Regulatory Guide 1.109 and the liquid dispersion parameters calculated in accordance with Regulatory Guide 1.113, "Estimating Aquatic Dispersion of Effluents from Accidental and Routine Reactor Releases for the Purpose of Implementing Appendix I". The staff has determined that the proposed liquid radwaste treatment systems are capable of maintaining releases of radioactive materials in liquid effluents such that the calculated individual doses in an unrestricted area from all pathways of exposure are less than 3 mrem to the total body and 10 mrem to any organ.

The staff has calculated, as noted in Section 11.1, the release of radioactive materials in liquid effluents exclusive of tritium and noble gases and have found it to be less than 5 Ci/yr per reactor and the annual dose to any organ of an individual in an unrestricted area to be less than 5 millirem per year total from both reactors. Therefore, in accordance with the option to Section II.D of Appendix as provided in the Annex to Appendix I of 10 CFR Part 50, the staff finds that the liquid radwaste system is capable of reducing liquid radioactive effluents to "as low as is reasonably achievable" levels in accordance with 10 CFR Part 50.34a, Appendix I to 10 CFR Part 50, and the Annex to Appendix I.

The SHNPP DES presents a comparison of the RM 50-2 and Appendix I design objective doses with the doses calculated for the liquid source terms and a comparison of the RM 50-2 curie limitation with the projected releases for the SHNPP.

Table 11.2-1 Design Parameters of principal components considered in the calculation of liquid effluents f·om SHNPP, Units 1 & 2

Component	Number	Capacity (each)	Safety Class
Boron Recycle System			
Recycle Evaporator Feed Demineralizer	2	120 gpm	3
Recycle Evaporator Feed Filter	2	35 gpm	3
Recycle Holdup Tank	2	84,000 gal	3
Recycle Evaporator Feed Pump	2	30-100 gpm	3
Recycle Package	2	15 gpm	3 & NNS
Recycle Evaporator Concentrate Filter	2	35 gpm	NNS
Recycle Evaporator Condensate Demineralizer	2	35 gpm	"
Recycle Evaporator Condensate Filter	2	-	"
Recycle Monitor Tank	2	10,800 gal	"
Recycle Monitor Tank Pump	2	-	"
Equipment Drain Treatment System			
Reactor Coolant Drain Tank	2	350 gal	"
Reactor Coolant Drain Tank Pump	4	100 gpm	"
Reactor Coolant Drain Tank Pump Heat Exchanger	2	-	"
Waste Holdup Tank	1	25,000 gal	"
Waste Evaporator Feed Pump	1	35 gpm	"
Waste Evaporator Feed Filter	1	35 gpm	"
Waste Evaporator Package	2	15 gpm	"
Waste Evaporator Condensate Demineralizer	1	-	"
Waste Evaporator Condensate Tank Filter	1	35 gpm	"
Waste Evaporator Condensate Tank	2	10,000 gal	"
Waste Evaporator Condensate Tank Pump	2	-	"
Floor Drain Treatment System			
Floor Drain Tank	2	25,000 gal	"
Floor Drain Tank Pump	2	35 gpm	"
Floor Drain Tank Filter	2	35 gpm	"
Floor Drain Reverse Osmosis Unit	1	30 gpm	"
Floor Drain Reverse Osmosis Feed Pump	2	-	"
Waste Monitor Tanks	2	25,000 gal	"
Waste Monitor Tanks Demineralizer	1	-	"
Waste Monitor Tanks Pump	2	35 gpm	"
Chemical Drain Tank	1	600 gal	"
Chemical Drain Tank Pump	1	35 gpm	"
Laundry and Hot Shower Treatment System			
Laundry and Hot Shower Tank	2	25,000 gal	"
Laundry and Hot Shower Tank Pump	2	35 gpm	"
Laundry and Hot Shower Tank Filter	2	35 gpm	"
Laundry and Hot Shower Reverse Osmosis Unit	1	30 gpm	"
Laundry and Hot Shower Reverse Osmosis Feed Pump	1	-	"
Laundry and Hot Shower Demineralizer	1	-	"
Treated Laundry and Hot Shower Tank	2	25,000 gal	"
Treated Laundry and Hot Shower Tank Pump	2	100/gpm	"
Reverse Osmosis Concentrate Tank	2	3,000 gal	"
Reverse Osmosis Concentrate Evaporator Feed Pump	2	-	"
Reverse Osmosis Concentrate Package	1	10 gpm	"
Reverse Osmosis Concentrate Evaporator Distillate Pump	2	-	"

Table 11.2-1 (continued)

Component	Number	Capacity (each)	Safety Class
Secondary Waste Treatment System			
Low Conductivity Holding Tank	3	15,000 gal	NNS
Low Conductivity Holding Tank Pump	2	100 gpm	"
Secondary Waste Filter	1	100 gpm	"
Secondary Waste Demineralizer	1	-	"
Secondary Waste Sample Tank	1	25,000 gal	"
Secondary Waste Sample Tank Pump	2	100 gpm	"
High Conductivity Holding Tank	1	15,000 gal	"
High Conductivity Holding Tank Pump	2	35 gpm	"
Secondary Waste Evaporator Package	1	15 gpm	"
Secondary Waste Evaporator Concentrate Tank	1	4,000 gal	"
Secondary Waste Evaporator Concentrate Tank Pump	1	35 gpm	"

11.3 Gaseous Waste Management System

11.3.1 Summary Description

The gaseous waste management systems at the SHNPP include systems which treat the normal ventilation exhausts; the exhaust from the main condenser mechanical vacuum pumps, and the gaseous wastes associated with degassing primary coolant, purging the volume control tank, displacing cover gases, purging of equipment, gas sampling and analysis operations, and boron recycle process operations.

Table 11.2-1 provides a listing of the various normal ventilation systems at the SHNPP and the type of treatment associated with each system. Additional details are provided in Section 9.4 of the FSAR. If a generalization can be made of the normal ventilation exhaust treatment systems at the SHNPP, it is that the exhausts usually flow through a medium efficiency filter, a HEPA filter, and a charcoal adsorber.

The RAB normal ventilation system (RABNVS) filters air from the continuous containment purge exhaust and areas from the RAB which contain equipment essential for the safe shutdown of the reactors including CVCS chiller area, 480 V auxiliary bus area, areas containing non-essential equipment etc. This system exhausts to the vent stack on the roof of the RAB.

The waste processing areas filtered exhaust system exhausts air from the contaminated areas of the WPB and discharges to a vent stack on the roof of the WPB. The WPB laboratory areas fume hood exhausts are filtered except for the perchloric acid exhaust. This exhaust is discharged unfiltered to the vent stack on the roof of the WPB.

11.3.1

The air from the contaminated spaces of the condensate polishing demineralizer area is exhausted through the condensate polishing demineralizer area filtered exhaust system. The exhaust is discharged from the vent stack located on each unit's turbine building.

The condenser vacuum pump effluent treatment system was previously discussed in Section 10.4.2 of the SER.

The containment pre-entry purge is filtered by the containment pre-entry purge system. The purge is discharged to the RAB vent stack. Additional details of the normal ventilation system are provided in Section 9.4 of the FSAR.

The gaseous waste processing system (GWPS) processes gases collected from the volume control tank and vent connections from the recycle evaporator gas stripper, the reactor coolant drain tank, the pressurizer relief tank and the recycle holdup tanks. The GWPS is shared between the two units and consists of two waste gas compressors, two catalytic hydrogen recombiners and ten waste gas decay tanks to accumulate the fission product gases. Eight gas decay tanks are used during normal operation and two are used for shutdown and startup.

Nitrogen with entrained fission gases will be continuously circulated around the GWPS by one of the two waste gas compressors. Fresh hydrogen gas is charged to volume control tank where it is mixed with fission gases which have been stripped from the reactor coolant

Section 11.3.1

into the volume control tank gas space. The contaminated hydrogen gas is continuously vented from the volume control tank into the circulating nitrogen stream to transport the fission gases into the GWPS. The hydrogen-nitrogen mixture of fission gases is pumped by the waste gas compressor to the hydrogen recombiner where the recombiner converts the hydrogen to a water vapor by oxidation. After removal of the vapor the resulting gas stream is circulated to a waste gas decay tank and then back to the compressor. Each gas decay tank is valved into the GWPS recirculation loop for one or two days.

Continued plant operation results in the buildup of pressure in the waste gas decay tank due to the accumulation of non-removable fission gases. When the pressure in the gas decay tanks reaches 25 psig the alignment of the GWPS must be changed due to the design of the recombiner. The new alignment has flow from the compressor to the gas decay tanks to the recombiner and then back to the compressor. This alignment is suitable for operation up to 100 psig.

The GWPS has analyzers to monitor oxygen concentrations between the oxygen supply and the hydrogen recombiner package and downstream of the recombiner. Hydrogen analyzers are located in the process stream entering the recombiner and in the discharge stream from the recombiner.

The applicant has indicated that the normal ventilation system complies with the criteria of Regulatory Guide 1.140 and that the GWPS conforms to the criteria of Regulatory Guide 1.143.

11.3.2 Evaluation Findings

The gaseous waste management system was reviewed with respect to the Acceptance Criteria of SRP 11.3, NUREG-0800.

At the construction permit stage the off-gas from the condenser air ejectors was untreated and the ventilations systems were only filtered by HEPA filters except for the exhaust from the WPB which was also filtered by a charcoal adsorber. The staff stated in the December 22, 1972 SER for the CP that treatment of the main condenser off-gas would be required to reduce this potential source of iodine-131 to the atmosphere to bring the offsite doses into compliance with Appendix I. The applicant had added the condenser effluent treatment system and has added charcoal adsorbers to the various ventilation systems which exhaust air from contaiminated areas. These additions decrease the quantity of iodine released from the SHNPP and are therefore acceptable when judged against dose design objectives of Appendix I to 10 CFR Part 50.

11.3.2 The staff has calculated the doses to offsite individuals utilizing the methodology of Regulatory Guide 1.109 and the atmospheric dispersion parameters calculated in accordance with Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors". The staff has determined that the proposed gaseous radwaste treatment systems are capable of maintaining releases of radioactive materials in gaseous effluents such that the calculated individual doses in an unrestricted area from all pathways of exposure are less than 5 mrem to the total body and 15 mrem to any organ from noble gases and that releases of radioiodine and radioactive material in particulate form result in doses which are less than 15 mrem to any organ.

The staff has also considered the potential effectiveness of augmenting the proposed gaseous radwaste treatment systems using items of reasonably demonstrated technology. The applicant has chosen to show compliance with Section II.D of Appendix I to 10 CFR Part 50 by complying with the Annex to Appendix I (RM 50-2). The SHNPP DES presents a comparison of the doses and releases calculated for the SHNPP with the design objectives of Appendix I and RM 50-2. The applicant's proposed design complies with the design objectives of RM 50-2. Therefore, we have determined that no further effluent treatment equipment will reduce the cumulative population doses within a 50 mile radius in a cost effective manner.

11.3.2 The staff has also considered the potential consequences resulting from reactor operation with 1% of the operating fission product inventory in the core being released to the primary coolant and has determined that the concentrations of radioactive materials in gaseous effluents in unrestricted areas will be a small fraction of the limits of Table 2, Column 1 of 10 CFR Part 20.

The capability of the proposed gaseous radwaste treatment systems to meet the anticipated demands of the plant due to operational occurrences was also considered and it was concluded that the system capacity and design flexibility is adequate to meet the anticipated needs of the station.

The applicant's quality assurance provisions for the gaseous radwaste systems, the quality group classifications used for system components, the seismic design applied to the system and the structures housing the radwaste systems were also reviewed. The design of the systems and the structures housing these systems meet the criteria set forth in Regulatory Guide 1.143 as indicated by the applicant in the FSAR.

The staff has reviewed the normal ventilation system's design, testing and maintenance of the HEPA filters and charcoal adsorbers, with respect to Regulatory Guide 1.140. The applicant has indicated in Chapter 1 of the FSAR, that the normal ventilation system meets the criteria of this guide.

Table 11.3-1

Normal Ventilation System Components at the Shearon Harris Nuclear Power Plant

	Demister	Heater	Medium Filter	HEPA	Charcoa
RAB Normal Ventilation System			X	X	X
WP Areas Filtered Exhaust System			X	X	X
WPB Laboratory Fume Hood Exhaust (except perchlorite)			X	X	
Condensate Polishing Demineralizer Area Filtered Exhaust System			X	X	X
Condenser Vacuum Effluent Treatment System	X	X	X	X	X
Continuous Containment Purge (Passes through RAB Normal Ventilation System and Airborne Radioactivity Removal System)			X	X	X
[illegible]inment Pre-entry Purge System			X	X	X

11.3.2 The proposed hydrogen and oxygen analyzers for the GWPS meet the dual analyzer requirements of SRP 11.3 for PWR systems with recombiners. However, the applicant has not indicated whether these monitors are non-sparking or whether there are rupture discs in GWPS itself and if there are liquid seals downstream of the rupture discs, and whether they are designed such that an explosion will not cau the permanent loss of the seals.

The above information is required before the GWPS can be judged to be acceptable.

11.4 Solid Waste Management Systems

11.4.1 System Description

The solid waste processing system (SWPS) is designed to process two gen types of solid wastes: "wet" solid wastes and "dry" solid wastes. Wet solid wastes consist mainly of spent filter cartridges, demineralizer resins, chemical drain solutions and evaporator bottoms which contain radioactive materials removed from liquid streams during processing. Dry solid wastes consist mainly of ventilation air filtering media (HEPA, charcoal), contaminated clothing, paper, rags, laboratory glassware, and tools.

The fines from the fluid bed dryer will be carried by the fluidizing air to the gas/solids separator where most of the fines will be removed from the gas stream. The fines will be collected with the salt from the fluid bed dryer and solidified using cement.

11.4.1 Two methods of treatment will be available for evaporator bottoms and chemical drain solutions. These wastes can be solidified in 55-gallon drums using cement or they may be treated in the volume reduction (VR) system. In the latter case, these waste are calcined in a fluid bed dryer where they are reduced in volume and increased in activity per unit volume.

The gas from the gas/solids separator of the VR system will flow to a venturi scrubber/preconcentrator and to a condenser. A portion of the gas will be recycled to the fluid bed dryer while a portion will be discharged through a HEPA, charcoal and HEPA filters, in series, prior to release to the vent stack. The various liquid feeds will be increased in solids concentration in the scrubber pre-concentrator. This liquid is pumped to the fluid bed dryer and a portion is recirculated to the venturi scrubber.

Compressible low-activity solid waste will be compacted in 55-gallon drums. The compactor is equipped with a hood, ventilation fan and HEPA filter. The displaced air will be vented through the HEPA filter.

The applicant has indicated that the SWPS has a storage area capable of storing 1020 drums. The applicant has also indicated that the SWPS meets the criteria of ETSB 11-1 Rev. 1 which is the equivalent to Regulatory Guide 1.143.

The applicant has committed that all radioactive waste will be packaged in accordance with appropriate federal and state standards for burial in accordance with 49 CFR 170-179, 10 CFR 20, and 10 CFR71. All drums will be shipped and buried in accordance with 49 CFR 173.

11.4.1 Additional information with respect to the solid radwaste system is contained in Section 11.4 of the FSAR.

11.4.2 Evaluation and Findings

The staff has reviewed the SWPS in accordance with the acceptance criteria of SRP 11.4, NUREG-0800. The scope of the review included line diagrams of the system, piping and instrumentation diagrams (P&IDs), and descriptive information for the SWPS and for those auxiliary supporting systems that are essential to the operation of the SWPS. The applicant's proposed design criteria and design bases for the SWPS, and the applicant's analysis of those criteria and bases have also been reviewed. The capability of the proposed system to process the types and volumes of wastes expected during normal operation and anticipated operational occurrences in accordance with General Design Criterion 60, and provisions for the handling of wastes relative to the requirements of 10 CFR Parts 20 and 71 and applicable DOT regulations have also been reviewed.

The staff cannot yet approve the design of the SWPS because the applicant has failed to provide information on the SWPS in sufficient detail to completely assess the system. Information which the applicant has not provided includes:

(1) P&ID's detailing the waste concentrate tank and its associated systems and the dry salt fill station;

(2) the method of disposing of activated charcoal, HEPA filters and other dry waste not normally required to be solidified or compacted;

11.4.2 (3) whether provisions will be included in the SWPS to verify the absence of free water in each container and whether the waste will be reprocessed when free water is detected;

(4) whether the radwaste shipments will meet all applicable state regulations;

(5) information on the volume reduction system with respect to to:

(a) process flow rates
(b) gaseous effluents
(c) system DF's
(d) design criteria of VR system off-gas filter system

(6) why all evaporator concentrate piping and tanks do not have heat tracing and why the vents from the spent resin storage tanks, decanting tanks, and solidification system pretreatment tanks are not vented to a HEPA filter as specified by the Acceptance Criteria of SRP 11.4

The staff has also concluded that the volume of dry waste has been underestimated based upon actual plant operating data.

Until the above information is provided no final conclusions can be reached concerning by the acceptability of the SWPS.

The applicant has not provided the Process Control Program (PCP). The PCP is not required until 6 months prior to the issuance of the Operating License. When the Radiological Effluent Technical Specifications are reviewed the PCP will be judged as to acceptability.

11.5 Process and Effluent Radiological Monitoring and Sampling Systems

11.5.1 Summary Description

The process and effluent radiological monitoring and sampling systems are designed to provide information concerning radioactivity levels in systems throughout the plant, indicate radioactive leakage between systems, monitor equipment and performance, and monitor and control radioactivity levels in plant discharges to the environs.

At the SHNPP, the airborne effluent sampling and monitoring systems are located in the plant vents of the RAB, the WPB, and the discharge line from condenser vacuum pump effluent treatment system. For liquid effluents, the effluent monitor locations are downstream of the pumps of the LWPS waste monitor, treated laundry and hot shower tank, and secondary waste sample tanks. Effluent monitors are also located downstream of the industrial waste sump pumps, the condensate transfer pumps and the containment fan coolers.

Table 11.5-1 contains a listing of both the process and effluent monitors for airborne and liquid sources. This Table also includes the type of radioactivity monitored, the type of monitor used, and the plant specific number of the monitor for ease of reference. Sections 11.5 and 12.3.4 of the FSAR present a detailed discussion of the process and effluent monitoring system.

11.5.2 Evaluation and Findings

The staff has reviewed the process and effluent monitoring system with respect to the Acceptance Criteria of SRP 11.5, NUREG-0800. As a result of this review, the following evaluation and findings have been made.

Acceptance Criteria II.C.1.a of SRP 11.5 states that the gaseous and liquid process streams and effluent release points should be monitored and sampled according to Tables 1 and 2 of SRP 11.5. Information provided in Section 11.5 of the FSAR indicated that the SHNPP did not meet these criteria in the following areas:

(1) continuous containment purge monitors do not isolate the purge on a high radiation signal;

(2) the pre-entry containment purge does not contain radiation monitors as required by Table 1 and the appropriate sampling provisions are not included;

(3) the exhaust from the mechanical vacuum pumps during startup and the turbine gland seal condenser vents are unmonitored and no provisions exist for sampling these pathways;

(4) there appears to be no provision for obtaining process grab sample for analysis of radioiodine from such systems as the RO concentrate and secondary waste evaporator vent systems and from the vents of components of the boron recycle systems (e.g. the recycle evaporator feed demineralizer and feed filter);

(5) there appears to be no provisions for sampling the service water system on a continuous or grab sample basis.

II.5.2 The applicant has not addressed the capability of its process and effluent monitoring program to meet the guidelines of Position C of Regulatory Guide 4.15 and Position C and Table 2 of Regulatory Guide 1.97.

The applicant can not assure representative samples from various radioactive process streams and tank contents because the capacity of the recirculation pumps do not meet the criteria of II.2.a of SRP 11.5. Those pumps which do not comply are the following:

(a) waste holdup tank;
(b) waste evaporator condensate tank;
(c) waste monitor tanks;
(d) laundry and hot shower;
(e) reverse osmosis concentrate tank;
(f) recycle holdup tank;
(g) recycle monitor holdup tank;

The applicant has not addressed the capability of certain noble gas, radioiodine, and particulate monitors to sample in accordance with ANSI N13.1 as specified by acceptance criteria II.2.a of SRP 11.5. Other areas of the acceptance criteria of SRP 11.5 which the applicant has not addressed or deviates from the acceptance criteria include:

(a) capability to replace or decontaminate monitors without opening the process system or losing the capability to isolate the effluent stream;

(b) the turbine building drain monitors do not fail in the closed position;

(c) the conformance of non - ESF instrumentation to the design guidance of Appendix 11.5-A of SRP 11.5 has not been addressed;

(d) incorporation of administrative controls and procedures to minimize inadvertent or accidental releases of radioactive liquids has not been addressed;

(e) the conformance of the process and effluent monitoring system to the ANSI N 13.10-1974.