ATTACHMENT 1 TO ELV-03308

REVISED FSAR DESCRIPTION

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4. C.5.c Fuel handling post accident filter satisfies 99.0 percent retention of DOP on HEPA filters instead of 99.95 percent.

5. C.5.d Fuel handling post accident filter satisfies 99.0 percent retention of gaseous halogenated hydrocarbon refrigerant on the adsorber instead of 99.95 percent.

6. C.6.b Carbon samples taken for laboratory tests shall meet the FOLLOWING acceptance criteria ~~of greater than or equal to 99.8 percent when tested with methyl iodide at 30°C and 70 percent relative humidity~~ as specified in the VEGP Technical Specifications.

(INSERT 'A')

Wherever ANSI N509-1976 is referenced in the regulatory guide, conformance is with ANSI N509-1976 or ANSI N509-1980 depending on the date of the applicable purchase order. Conformance may be with ANSI N509-1980 when specifically called out in the corresponding specification.

Wherever ANSI N510-1975 is referenced in the regulatory guide, conformance is with ANSI N510-1975 or ANSI N510-1980 depending on the date of the applicable purchase order. Conformance may be with ANSI N510-1980 when specifically called out in the corresponding specification.

1.9.53 REGULATORY GUIDE 1.53, JUNE 1973, APPLICATION OF THE SINGLE-FAILURE CRITERION TO NUCLEAR POWER PLANT PROTECTION SYSTEMS

1.9.53.1 Regulatory Guide 1.53 Position

The guidance in trial-use IEEE Std. 379-1972 for applying the single-failure criterion to the design and analysis of nuclear power plant protection systems is generally acceptable and provides an adequate interim basis for complying with Section 4.2 of IEEE Std. 279-1971, subject to the qualifications identified in the guide.

1.9.53.2 VEGP Position

Conform. Refer to paragraph 7.1.2.6 and subsection 15.0.8.

FSAR Section 1.9.52.2 (6)
Insert "A"

a. <u>Control Room Emergency Filtration System</u>

99.8 percent when tested with methyl iodide at 30 C and 70 percent relative humidity

b. <u>Piping Penetration Area filtration and Exhaust System, and Fuel Handling Building Post Accident Ventilation System</u>

90.0 percent when tested with methyl iodide at 30 C and 95 percent relative humidity

B. The piping penetration filter exhaust system is designed to maintain the filtration unit rooms at - 1/4 in. WG with respect to atmosphere which ensures that the piping penetration areas are maintained at a negative pressure with respect to adjacent areas to prevent uncontrolled exfiltration of potentially contaminated air and to minimize release of airborne radioactivity to the outside atmosphere resulting from containment and penetration area leakage under accident conditions. The piping penetration filter exhaust system ensures that the offsite radiation exposures resulting from the postulated post-LOCA leakage in recirculation piping, as discussed in subsection 15.6.5, are within the guideline values of 10 CFR 100. It also ensures that the emergency core cooling system and containment spray pump rooms can be purged to allow access for repair and maintenance of the equipment.

FILTER PROVIDES DEFENSE-IN-DEPTH TO HELP

C. The fuel handling building post-accident exhaust system is designed to maintain a slightly negative pressure within the fuel handling building following a fuel handling accident to minimize release of airborne radioactivity to the outside atmosphere. The post-accident exhaust system ensures that the offsite radiation exposures and exposures to operating personnel in the control room resulting from a postulated fuel handling accident in the fuel handling building, ~~as discussed in subsection 15.7.4,~~ are within the guideline values of 10 CFR 100 and 10 CFR 50, Appendix A, GDC 19, respectively.

D. The failure of any active component in a filtration system, assuming loss of offsite power, cannot impair the ability of the system to perform its safety function.

E. The ESF filter systems are designed to remain intact and functional in the event of a safe shutdown earthquake.

AS DISCUSSED IN SUBSECTION 15.7.4, NO CREDIT IS TAKEN FOR FILTER OPERATION.

F. The ESF filter systems are designed to be consistent with the recommendations of Regulatory Guide 1.52, as discussed in section 1.9.

The design bases for sizing the filters, fans, and associated ductwork are discussed in subsections 9.4.1, 9.4.2, 9.4.3, and 9.4.5.

6.5.1.2 System Design

6.5.1.2.1 General System Description

The control room emergency ventilation and air-conditioning system is described in section 6.4 and subsection 9.4.1. The piping penetration filter exhaust system is described in subsection 9.4.3. The fuel handling building post-accident cleanup system is described in subsection 9.4.2. Flow diagrams for each system are shown in the appropriate subsections.

6.5.1.2.2 Component Description

Each ESF filter train consists of a moisture separator, a heating coil, an upstream high-efficiency particulate air (HEPA) filter, a charcoal adsorber with fire detection temperature sensors, and a downstream HEPA filter. The filtration trains are connected to fans with direct drive motors, associated ductwork, and controls. Specific component design parameters are provided in table 6.5.1-1.

The filter housing design provides adequate space for filter maintenance and inspection. The housing is fitted with the necessary ports for testing. Pipe, cable, and conduit penetrations are sealed to minimize leakage. Access doors are marine-type, bulkhead doors with gas-tight seals and double-pin hinges.

The charcoal adsorber portion of each filter train is provided with a fire detection system and a water spray system to allow flooding of the charcoal bed to prevent bed ignition from radioactivity-induced heat. Fire protection systems for the carbon adsorbers are discussed in subsection 9.5.1.

IN THE CONTROL ROOM EMERGENCY VENTILATION AND AIR CONDITIONING SYSTEM

The electric heaters provided ~~for~~ air filtration units are designed to reduce the relative humidity of the entering air stream mixture to 70 percent from as high as 100 percent. Relative humidity is maintained by use of a moisture controller which, as relative humidity approaches 70 percent, modulates the electric heater to gradually raise the air temperature, thus lowering the relative humidity.

¶ INSERT 'B'

FSAR Section 6.5.1.2.2
Insert "B"

The electric heaters in the piping penetration filter exhaust system and the fuel handling building post-accident exhaust system provide defense-in-depth by reducing relative humidity and thereby improving adsorber efficiency. However, the heaters are not required to maintain the relative humidity of the entering air stream mixture to less than 70 percent. Although a moisture controller is provided to modulate the electric heaters as relative humidity approaches 70 percent, no credit is taken for humidity control in these systems.

TABLE 6.5.1-1 (SHEET 2 OF 3)

Water entering temperature (°F)	44
Water exiting temperature (°F)	56
Piping Penetration Filter System	
Quantity	2 (one on standby)
Capacity (ft³/min)	15,500
HEPA Filters	
Number of stages	2 (one upstream and one downstream of charcoal filter)
Cell size	24 in. x 24 in. x 12 in.
Pressure drop	
Clean (in. WG)	1.0
Loaded (in. WG)	2.0
Efficiency	99.97% for 0.3-µm particles
Charcoal Filter	
Bed depth (in.)	4
Face velocity (ft/min)	40
Average residence time (s)	0.25 per 2-in. bed depth
Filter media	Impregnated coconut shell
Decontamination efficiency	~~90% at 70% relative humidity (for elemental and organic iodines)~~ 90% ELEMENTAL IODINE, 30% ORGANIC IODINE, AT 95% RELATIVE HUMIDITY
Filter capacity	2.5 mg of total iodine per gram of activated carbon
Moisture Eliminator	
Eliminator media	Spun glass fiber
Maximum pressure drop (in. WG)	1.0
Efficiency	99.7% for 2-µm and larger particles
Heating Coil	
Heating capacity (kW)	80
Heating element	Finned tubular
Heating material	80% Ni/20% Cr
Fan	
Quantity	1
Type	Vane axial
Static pressure (in. WG)	16
Motor (hp)	75
Fuel Handling Building Post-Accident Filter System (shared by both units)	
Quantity	2 (one on standby)

TABLE 6.5.1-1 (SHEET 3 OF 3)

Capacity (ft^3/min)	5000
HEPA Filters	
Number of stages	2 (one upstream and one downstream of charcoal filter)
Cell size	24 in. x 24 in. x 12 in.
Resistance	
Clean (in. WG)	1.0
Loaded (in. WG)	2.0
Efficiency	99.97% for 0.3-μm particles
Charcoal Filters	
Bed depth (in.)	4.0
Face velocity (ft/min)	40
Average residence time (s)	0.25 per 2-in. bed depth
Filter media	Impregnated coconut shell
Decontamination efficiency	~~99% at 70% relative humidity (for elemental and organic iodines)~~ 90% ELEMENTAL IODINE, 30% ORGANIC IODINE, AT 95% RELATIVE HUMIDITY
Filter capacity	2.5 mg of total iodine per gram of activated carbon
Moisture Eliminator	
Eliminator media	Spun glass fiber
Maximum pressure drop (in. WG)	1.0
Efficiency	99.7% for 2-μm and larger particles
Heating Coil	
Heating capacity (kW)	20
Heating element	Finned tubular
Heating coil material	80% Ni, 20% Cr
Fan	
Quantity	1
Type	Vane axial
Static pressure (in. WG)	14
Motor (hp)	40

Air infiltration into the FHB is the supply air for this mode of operation, and the building is maintained under a negative pressure to minimize release of radioactivity to the atmosphere.

~~A heating coil is provided to keep the relative humidity of the air entering the charcoal below 70 percent.~~

A MOISTURE CONTROLLER IS PROVIDED TO ACTUATE AN ELECTRIC HEATING COIL LOCATED UPSTREAM OF THE CHARCOAL ADSORBER TO REDUCE THE RELATIVE HUMIDITY OF THE AIR THROUGH THE ADSORBER AS DISCUSSED IN SUBSECTION 6.5.1.2.2.

9.4.2.2.3 Safety Evaluation

A. The post-accident FHB ventilation subsystem prevents exfiltration of contaminated air by imposing a negative pressure on the building. Two 100-per-cent-capacity exhaust units are provided so that a single failure will not nullify the negative pressure and thus allow an uncontrolled release of radioactivity. The normal ventilation subsystem supply and exhaust ducts are provided with redundant isolation dampers, so the area is isolated from the normal ventilation system after an accident. Table 9.4.2-2 presents the results of a failure modes and effects analysis. THOUGH NO CREDIT IS TAKEN IN DOSE CALCULATIONS,

The contaminated air is filtered through HEPA and charcoal filters to remove airborne radioactive contamination before release to the plant stack. The filters ~~limit~~ PROVIDE DEFENSE-IN-DEPTH AND AID IN LIMITING THE radiological consequences of a fuel handling accident to less than 10 CFR 100 limits.

B. The exhaust units are each rated at 5000 ft^3/min. This is sufficiently in excess of the possible infiltration into the building to ensure that the building will be under negative pressure.

C. Each train of the FHB post-accident ventilation system is connected to a separate Unit 1 Class 1E power supply.

D. The safety-related portions of the post-accident FHB ventilation system are located in the FHB, which is designed to withstand the effects of earthquakes, tornadoes, hurricanes, floods, external missiles, and other appropriate natural phenomena. The ESF fans are designed and constructed as Seismic Category 1 to ensure that they will function during and after an SSE. Sections 3.3, 3.4, 3.5, 3.7, and 3.8 provide the basis for the adequacy of the structural design of the FHB. Section 3.6 discusses protection from pipe break effects.

TABLE 9.4.2-2 (SHEET 2 OF 4)

Item No.	Description of Component	Safety Function	Plant Operating Mode	Failure Mode(s)	Method of Failure Detection	Failure Effect on System Safety Function Capability	Go to Item No.
8	No. 10 breaker on 1ABA 480-V; 1E bus; train A; NC	Provides continuity and protection to heater, item 9	A	Inadvertent opening	MCC alarm Moisture alarm (high) Temperature indicator	None; loss of train A; train B available	9
9	A-1542-N7-001-H01 heater	Reduces relative humidity	A	No heating	Moisture alarm high Temperature indicator	None; NO CREDIT IS TAKEN FOR THE HEATER; loss of train A; train B available	10
10	No. 8 breaker on 1BBA 480-V; 1E bus; NC; train B	Provides continuity and protection to fan motor, item 12	A	Inadvertent opening	MCC alarm Motor indicating light Flow alarm low	None; loss of train B; train A available	11
11	No. 8 starter on 1BBA 480-V; 1E bus; NO; train B	Provides continuity to fan motor, item 12	A	Fails to close	Motor indicating light Flow alarm low	None; loss of train B; train A available	12
12	A-1542-N7-002-M01, fan and motor; NO; train B	Provides motive power to circulate air	A	Fails to start and operate	Motor indicating light Flow alarm low	None; loss of train B; train A available	13
13	No. 30 breaker on 1BYC1 120-V; 1E bus; NC; train B	Provides continuity and protection to HV 12513, item 14	A	Inadvertent opening	Flow alarm low Position indicating light	None; loss of train B; train A available	14
14	HV 12513, motor-operated, open-close louver; NC; train B	Enables discharge air from post-accident filter unit to stack	A	Fails to open	Position indicating light Flow alarm low	None; loss of train B; train A available	15

TABLE 9.4.2-2 (SHEET 3 OF 4)

Item No.	Description of Component	Safety Function	Plant Operating Mode	Failure Mode(s)	Method of Failure Detection	Failure Effect on System Safety Function Capability	Go to Item No.
15	No. 30 breaker on 1BYC1; 120-V; 1E bus; train B; NC	Provides continuity and protection to HV 12511, item 16	A	Inadvertent opening	Flow alarm low Position indicating light	None; loss of train B; train A available	16
16	HV 12511, motor-operated, open-close louver; NC; train B	Enables air from FHB corridor to post-accident filter unit	A	Fails to open	Position indicating light Flow alarm low	None; loss of train B; train A available	17
17	No. 10 breaker on 1BBA bus; 480-V; 1E bus; NC; train B	Provides continuity and protection to heater, item 18	A	Inadvertent opening	MCC alarm Moisture alarm (high) Temperature indicator	None; loss of train B; train A available	18
18	A-1542-N7-002-H01, heater	Reduces relative humidity	A	No heating	Moisture alarm (high) Temperature indicator	None; NO CREDIT IS TAKEN FOR THE HEATER; loss of train B; train A available	19
19	HV 2535, on-off, air-operated damper; NO/FC (fail close)	Isolates safety system from nonsafety normal ac system Enables FHB to maintain negative pressure	A	Fails to close	Position indicating light	None; redundant damper available; item 20	20
20	HV 2534, on-off, air-operated damper; NO/FC	Isolates safety system from nonsafety normal ac system Enables FHB to maintain negative pressure	A	Fails to close	Position indicating light	None; redundant damper available; item 19	21
21	HV 2529, on-off, air-operated damper; NO/FC	Isolates safety system from nonsafety normal ac system Enables FHB to maintain negative pressure	A	Fails to close	Position indicating light	None; redundant damper available; item 22	22

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TABLE 9.4.2-2 (SHEET 4 OF 4)

Item No.	Description of Component	Safety Function	Plant Operating Mode	Failure Mode(s)	Method of Failure Detection	Failure Effect on System Safety Function Capability	Go to Item No.
22	HV 2528, on-off, air-operated damper; NO/FC	Isolates safety system from nonsafety normal AC system Enables FHB to maintain negative pressure	A	Fails to close	Position indicating light	None; redundant damper available; item 21	23
23	HV 12482, on-off, air-operated damper; NO/FC	Prevents flow to stack	A	Fails to close	Position indicating light	None; redundant damper available; item 24	24
24	HV 12481, on-off, air-operated damper; NO/FC	Prevents flow to stack	A	Fails to close	Position indicating light	None; redundant damper available; item 23	25
25	HV 12479, on-off, air-operated damper; NO/FO	Normally open fail close	A	Fails to close	Position indicating light	None; redundant damper available; item 26	26
26	HV 12480, on-off, air-operated damper; NO/FO	Normally open fail close	A	Fails to close	Position indicating light	None; redundant damper available; item 25	27
27	fan, filters, valves, dampers; 1-1542-N7-001-000	Provides circulation, filtration, and volume control of air	A	Mechanical failure	Flow alarm low Pressure differential alarm - high Temperature alarm - high	None; loss of train A; train B available	28
28	fan, filters, valves, and dampers; 1-1542-N7-002-000	Provides circulation, filtration, and volume control of air	A	Mechanical failure	Flow alarm low Pressure differential - high Temperature alarm - high	None; loss of train B; train A available	

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a. A - Accident mode trains A and B exhaust filtration systems are started automatically by the FHBI signal and maintain negative pressure within the FHB, HOWEVER NO CREDIT IS TAKEN FOR OPERATION OF THE FILTERS.

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heating coil located upstream of the charcoal adsorber to reduce the relative humidity of the air through the adsorber (AS DISCUSSED IN SUBSECTION 6.5.1.2.2).

The HVAC system operates on 100-percent recirculation with provisions for controlled exhaust to the plant vent to compensate for the building air inleakage as a result of the building negative pressure. Figure 9.4.3-4 shows the HVAC system for the piping penetration areas.

The ESF equipment rooms are provided with dedicated recirculating fan-coil units. Each fan-coil unit is capable of being started manually from the control room, automatically by the safety injection system signal or upon initiation of its respective ESF pump. Train-oriented cooling coils are provided.

9.4.3.2.3 Safety Evaluations

A. The system is designed with ample cooling capacity to maintain temperatures in the equipment rooms within the required limits.

B. Each equipment room is cooled by a unit whose power and chilled water come from the same safety features train as that associated with the equipment in the room. Thus, a failure of one train will not prevent cooling of redundant equipment in the other train. The failure modes and effects analysis is presented in table 9.4.3-4.

C. The system is designed and constructed as Seismic Category 1 to ensure that it will remain functional during and after an SSE. The system is located in the auxiliary building, which is designed to withstand the effects of earthquakes, tornadoes, hurricanes, floods, external missiles, and other appropriate natural phenomena. Sections 3.3, 3.4, 3.5, 3.7, and 3.8 provide the basis for the adequacy of the structural design of the auxiliary building. Section 3.6 discusses the protection against pipe break effects.

D. Two redundant, 100-percent-capacity filter exhaust units are provided; therefore, no single failure can cause loss of any ESF function. Table 9.4.3-5 presents the results of a failure modes and effects analysis.

E. The normal exhaust and supply ducts are provided with isolation dampers so that the area is isolated from the normal ventilation system upon a CVI signal.

TABLE 9.4.3-5 (SHEET 3 OF 6)

Item No.	Description of Component	Safety Function	Plant Operating Mode	Failure Mode(s)	Method of Failure Detection	Failure Effect on System Safety Function Capability	Go to Item No.
14	1-1561-N7-001-H01, piping penetration room filtration and exhaust unit electric heater; train A; NO	Provide heat to extract moisture	A	Fail to operate	Moisture alarm Temperature indicator	None; NO CREDIT IS TAKEN FOR OPERATION OF THE HEATER; loss of train A; train B available	15
15	No. 14 breaker on 1BB16; 480-V switchgear; 1E bus; train B; NO	Provide continuity and protect motor, item 16	A	Fail to close	Switchgear alarm Motor indicating lights	None; loss of train B; train A available	16
16	1-1561-N7-002-M01, piping penetration room filtration and exhaust unit motor and fan; train B; NO	Provide motive power to circulate air	A	Fail to start and operate	Motor indicating lights B; Flow alarm low	None; loss of train train A available	17
17	No. 28 breaker on panel (120/240-V); 1BBB MCC 480-V; train B, NC	Provide continuity and protect motor, item 19	A	Inadvertent open	Position indicating lights	None; no loss of train B. Item 19 is an NO/FO damper; thus it does not block air passage.	18
18	Electric contact to energize item 19; NO	Provide continuity for item 19; NO; remain open	A	Inadvertent closure	Flow alarm low Position indicating lights	None; loss of train B; train A available	19
19	PV2551A, electric/hydraulic modulating damper; NO/FO; train B; NO; remain open	Maintain negative pressure inside AB	A	Inadvertent closure	Pressure differential alarm Flow alarm low Position indicating light	None; loss of train B; train A available	20

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TABLE 9.4.3-5 (SHEET 5 OF 6)

Item No.	Description of Component	Safety Function	Plant Operating Mode	Failure Mode(s)	Method of Failure Detection	Failure Effect on System Safety Function Capability	Go to Item No.
26	HV12616, on-off damper; train B; NC/FC	Allow return air to item 16	A	Fail to open	Flow alarm low Position indicating lights	None; loss of train B; train A available	27
27	No. 04 breaker on 1BB16; 480-V switchgear 1E bus; train B, NO	Provide continuity and protect heater, item 28	A	Fail to close	Switchgear alarm Moisture alarm Temperature indicator	None; loss of train B; train A available	28
28	1-1561-N7-001-H02, piping penetration room filtration and exhaust unit electric heater; train B; NO	Provide heat to extract moisture	A	Fail to operate	Moisture alarm Temperature indicator	None; NO CREDIT IS TAKEN FOR OPERATION OF THE HEATER; loss of train B; train A available	29
29	HV12605, air-operated, on-off damper; NO/FC	Isolate normal air supply to piping penetration rooms	A	Fail to close	Position indicator lights	None; redundant damper HV12606 (item 30) available	30
30	HV12606, air-operated, on-off damper; NO/FC	Isolate normal air supply to piping penetration rooms	A	Fail to close	Position indicator lights	None; redundant damper HV12605 (item 29) available	31
31	HV12604, air-operated, on-off damper; NO/FC	Isolate normal air exhaust from piping penetration rooms	A	Fail to close	Position indicator lights	None; redundant damper HV12607 (item 32) available	32
[illegible]	HV12607; air-operated, on-off damper; NO/FC	Isolate normal air exhaust from piping penetration tion rooms	A	Fail to close	Position indicator lights	None; redundant damper HV12604 (item 31) available	33
33	1-1561-N7-001-000, fan, filter, valve, and damper	Provide circulation, filtration, and control of air	A	Mechanical failure	Flow alarm low Pressure differential alarm high Temperature alarm high	None; loss of train A; train B available	

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TABLE 9.4.3-5 (SHEET 6 OF 6)

Item No.	Description of Component	Safety Function	Plant Operating Mode	Failure Mode(s)	Method of Failure Detection	Failure Effect on System Safety Function Capability	Go to Item No.
34	1-1561-N7-002-000, fan, filter, valve, and damper	Provide circulation, filtration, and volume of air	A	Mechanical failure	Flow alarm low Pressure differential alarm high	None; loss of train B; train A available	
35	1-1561-E7-001-000, cooling coil	Provide cooling	A	Leakage in cooling coil	Temperature alarm high Water flow alarm low	None; loss of train A; train B available	
36	1-1561-E7-002-000, cooling coil	Provide cooling	A	Leakage in cooling coil	Water flow alarm low Temperature alarm high	None; loss of train B; train A available	

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a. A - Accident mode, both trains A and B automatically start and operate on containment vent isolation signal; HOWEVER NO CREDIT IS TAKEN FOR HUMIDITY CONTROL PROVIDED BY THE HEATERS.

TABLE 15.6.5-4 (SHEET 3 OF 4)

Reactor coolant activity airborne in the containment (%)

Noble gas	100
Iodine	100

Activity released to the containment atmosphere from the reactor coolant

Isotope	Curies
I-131	1.05×10^4
I-132	1.05×10^4
I-133	1.58×10^4
I-134	2.69×10^3
I-135	8.56×10^3
Xe-131m	5.05×10^2
Xe-133m	3.91×10^3
Xe-133	6.21×10^4
Xe-135m	1.09×10^2
Xe-135	1.66×10^3
Xe-138	1.49×10^2
Kr-85m	4.60×10^2
Kr-85	1.68×10^3
Kr-87	2.98×10^2
Kr-88	8.29×10^2

Recirculation Leakage Outside Containment

Leak rate (gal/min, measured at 70°F)	~~50~~ ②
Temperature of recirculating fluid (°F)	
0 to 0.5 h	No recirculation
0.5 to 2.0 h	240
2.0 to 720 h	<212
Mass of water in the containment sump (lb)	6.77×10^6

Activity in the sump solution at time = 0

TABLE 15.6.5-4 (SHEET 4 OF 4)

Isotope	Curies
I-131	4.9×10^7
I-132	7.2×10^7
I-133	1.0×10^8
I-134	1.1×10^8
I-135	9.4×10^7

Volume of building served by the auxiliary building emergency ventilation system (ft^3)	525,000

Auxiliary building emergency ventilation system parameters (for each of two trains)

Recirculation flow (ft^3/min)	13,950
Discharge flow (ft^3/min)	2970
Filter iodine removal efficiency (%)	~~99~~
ELEMENTAL	90

TABLE 15.6.5-6 (SHEET 1 OF 2)

DOSES RESULTING FROM A
LOSS-OF-COOLANT ACCIDENT(a)

<u>Site Boundary Dose (0 to 2 h)</u>	
Containment leakage	
Thyroid (rem)	50.6
Gamma body (rem)	1.5
Beta skin (rem)	0.7
Containment purge	
Thyroid (rem)	0.32
Gamma body (rem)	5.6×10^{-1}
Beta skin (rem)	5.1×10^{-1}
Recirculation leakage	
Thyroid (rem)	~~2.4~~ 1.0
Total	
Thyroid (rem)	~~53.3~~ 51.9
Gamma body (rem)	1.5
Beta skin (rem)	0.7
<u>Low Population Zone (0 to 30 days)</u>	
Containment leakage	
Thyroid (rem)	57.2
Gamma body (rem)	1.0
Beta skin (rem)	0.6
Containment purge	
Thyroid (rem)	0.13
Gamma body (rem)	2.3×10^{-3}
Beta skin (rem)	2.0×10^{-1}
Recirculation leakage	
Thyroid (rem)	~~2.0~~ 1.5
Total	
Thyroid (rem)	~~60.2~~ 58.8
Gamma body (rem)	1.0
Beta skin (rem)	0.6

TABLE 15.6.5-6 (SHEET 2 OF 2)

Control Room (0 to 30 days)	
Containment leakage	
Thyroid (rem)	26.0
Gamma body (rem)	4.9
Beta skin (rem)	66.4(a)
Containment purge	
Thyroid (rem)	0.01
Gamma body (rem)	4.2×10^{-5}
Beta skin (rem)	8.8×10^{-4}
Recirculation leakage	
Thyroid (rem)	~~0.6~~ 0.3
Total	
Thyroid (rem)	~~26.6~~ 26.3
Gamma body (rem)	4.9
Beta skin (rem)	66.4(a)

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a. The operator will take appropriate action to ensure that the resultant doses are within the limits established by General Design Criterion 19.

TABLE 15.6.5-7 (SHEET 1 OF 2)

ACTIVITY RELEASES TO THE ENVIRONMENT DUE TO A LOSS-OF-COOLANT ACCIDENT

0 to 2 h (Ci)

Isotope	Containment Leakage	Containment Purge	Recirculation Leakage	Total
I-131	3.76×10^2	1.6	7.8 ~~1.8×10^1~~	~~3.96~~ 3.85 $\times 10^2$
I-132	4.73×10^2	1.6	7.6 ~~1.8×10^1~~	~~4.93~~ 4.82 $\times 10^2$
I-133	7.54×10^2	2.4	1.5 ~~3.6~~ $\times 10^1$	~~7.92~~ 7.72 $\times 10^2$
I-134	5.94×10^2	0.4	6.1 ~~1.5×10^1~~	~~6.09~~ 6.01 $\times 10^2$
I-135	6.82×10^2	1.3	1.3 ~~3.1~~ $\times 10^1$	~~7.14~~ 6.96 $\times 10^2$
Kr-85m	3.87×10^3	0.1	NA	3.87×10^3
Kr-85	1.11×10^2	0.3	NA	1.11×10^2
Kr-87	4.96×10^3	5×10^{-4}	NA	4.96×10^3
Kr-88	9.21×10^3	1.0×10^{-4}	NA	9.21×10^3
Xe-131m	1.17×10^2	1.0×10^{-1}	NA	1.17×10^2
Xe-133m	4.77×10^3	6.0×10^{-1}	NA	4.77×10^3
Xe-133	3.15×10^4	9.4	NA	3.15×10^4
Xe-135m	1.24×10^3	1.0×10^{-2}	NA	1.24×10^3
Xe-135	6.51×10^3	2.5×10^{-1}	NA	6.51×10^3
Xe-138	5.40×10^3	2.0×10^{-2}	NA	5.40×10^3

TABLE 15.6.5-7 (SHEET 2 OF 2)

2 to 720 h (Ci)

Isotope	Containment Leakage	Recirculation Leakage	Total
I-131	1.18×10^4	4.16 ~~5.20~~ $\times 10^2$	1.22 ~~1.23~~ $\times 10^4$
I-132	2.38×10^2	5.7 ~~1.2 x 10¹~~	2.44 ~~2.51~~ $\times 10^2$
I-133	3.79×10^3	1.0 ~~2.08~~ $\times 10^2$	3.89 ~~4.0~~ $\times 10^3$
I-134	6.2×10^1	1.6 ~~3.6~~	6.4 ~~6.6~~ $\times 10^1$
I-135	1.25×10^3	2.8 ~~6.2~~ $\times 10^1$	1.28 ~~1.31~~ $\times 10^3$
Kr-85m	1.02×10^4	NA	1.02×10^4
Kr-85	2.02×10^4	NA	2.02×10^4
Kr-87	2.50×10^3	NA	2.50×10^3
Kr-88	4.32×10^3	NA	4.32×10^3
Xe-131m	1.03×10^4	NA	1.03×10^4
Xe-133m	1.14×10^5	NA	1.14×10^5
Xe-133	1.55×10^6	NA	1.55×10^6
Xe-135m	6.0	NA	6.0
Xe-135	3.62×10^4	NA	3.62×10^4
Xe-138	4.05×10^1	NA	4.0×10^1

temperature of the fuel. It is conservatively assumed that the core has been operating at 100 percent for the entire burnup period. The gap inventories are listed in table 15A-3. The noble gas and iodine inventories released as a result of a fuel handling accident are listed in table 15A-4.

C. Iodine removal from the released fission product gas takes place as the gas rises to the pool surface through the body of liquid in the spent fuel pool. The extent of iodine removal is determined by mass transfer from the gas phase to the surrounding liquid and is controlled by the bubble diameter and contact time of the bubble in the solution. The values used in the analysis result in a release of activity approximately a factor of 5 greater than anticipated. The release of activity from the pool to the containment atmosphere is time dependent, and, consequently, there would be sufficient time for this activity to mix homogeneously in a significantly greater percent of the containment volume than assumed in the analysis.

D. ~~The ESF~~ FUEL HANDLING BUILDING emergency filtration system charcoal filters are ~~known to operate with at least a 90 percent efficiency.~~ PROVIDED, HOWEVER NO CREDIT HAS BEEN TAKEN FOR THEIR CAPABILITY. This means a reduction in the iodine concentrations and thus a reduction in the thyroid doses at the exclusion area boundary and the outer boundary of the low population zone.

E. The containment purge exhaust system has charcoal adsorber units which filter any containment purge release. However, no credit has been taken for its capability (90-percent efficiency, minimum) since these units are not specifically designed to Seismic Category 1 criteria. It is expected that for any event which would produce a catastrophic failure of the charcoal adsorber unit to the extent that its filtering capability would be negated would also result in the purge exhaust fan becoming inoperable. Therefore, failure within the purge exhaust system would terminate any high-volume release from the containment. In fact, the purge exhaust fan is considerably more likely to be inoperable following any postulated event than the failure of a passive charcoal adsorber unit. Thus, although no credit in the analysis has been given for the normal purge exhaust filters, any release prior to containment isolation would be filtered, reducing the calculated releases by another factor of 10.

ATTACHMENT 2 TO ELV-03308

REVISED PAGES FOR ENCLOSURE 3 OF ELV-03182

ENCLOSURE 3

VOGTLE ELECTRIC GENERATING PLANT
REVISION TO TECHNICAL SPECIFICATIONS
4.7.6, 4.7.7, AND 4.9.12

INSTRUCTIONS FOR INCORPORATION

The proposed changes to the VEGP Technical Specifications would be incorporated as follows:

Remove Page	Insert Page
3/4 7-15* and 3/4 7-16	3/4 7-15* and 3/4 7-16
3/4 7-17* and 3/4 7-18	3/4 7-17* and 3/4 7-18
3/4 9-15 and 3/4 9-16	3/4 9-15 and 3/4 9-16
B 3/4 7-4	B 3/4 7-4
B 3/4 9-3	B 3/4 9-3

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* Overleaf page containing no change

b. At least once per 31 days on a STAGGERED TEST BASIS by initiating, from the control room, flow (FI-12191, FI-12192) through the HEPA filters and charcoal adsorbers and verifying that the system operates for at least 10 continuous hours with the heater control circuit energized.

c. At least once per 18 months or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housings, or (2) following painting, fire, or chemical release in any ventilation zone communicating with the system by:

   1) Verifying that the filtration system satisfies the in-place testing acceptance criteria of greater than or equal to 99.95% filter retention while operating the system at a flow rate of 19,000 cfm ±10% and performing the following tests:

      (a) A visual inspection of the control room emergency filtration system shall be made before each DOP test or activated carbon adsorber section leak test in accordance with Section 5 of ANSI N510-1980.

      (b) An in-place DOP test for the HEPA filters shall be performed in accordance with Section 10 of ANSI N510-1980.

      (c) A charcoal adsorber section leak test with a gaseous halogenated hydrocarbon refrigerant shall be performed in accordance with Section 12 of ANSI N510-1980.

   2) Verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Section 13 of ANSI N510-1980 meets the laboratory testing criterion of greater than or equal to 99.8% when tested with methyl iodide at 30°C and 70% relative humidity IN ACCORDANCE WITH ASTM D3803-89.

   3) Verifying a system flow rate of 19,000 cfm ± 10% during system operation when tested in accordance with Section 8 of ANSI N510-1980.

d. After every 720 hours of charcoal adsorber operation, by verifying, within 31 days after removal, that a laboratory analysis of a representative carbon sample obtained in accordance with Section 13 of ANSI N510-1980 meets the laboratory testing criterion of greater than or equal to 99.8% when tested with methyl iodide at 30°C and 70% relative humidity IN ACCORDANCE WITH ASTM D3803-89.

e. At least once per 18 months by:

   1) Verifying that the pressure drop across the combined HEPA filters, charcoal adsorber banks and cooling coil is less than 7.1 inches Water Gauge while operating the system at a flow rate of 19,000 cfm ± 10%;

   2) Verifying that on a Control Room Isolation Test Signal, the system automatically switches into an emergency mode of operation with flow through the HEPA filters and charcoal adsorber banks;

2) Verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Section 13 of ANSI N510-1980 meets the laboratory testing criterion of greater than or equal to ~~99.0%~~ 90.0% when tested with methyl iodide at 30°C and ~~70%~~ 95% relative humidity.

3) Verifying a system flow rate of 15,500 cfm ± 10% during system operation when tested in accordance with Section 8 of ANSI N510-1980.

IN ACCORDANCE WITH ASTM D3803-89

c. After every 720 hours of charcoal adsorber operation, by verifying, within 31 days after removal, that a laboratory analysis of a representative carbon sample obtained in accordance with Section 13 of ANSI N510-1980 meets the laboratory testing criteria of greater than or equal to ~~99.0%~~ 90.0% when tested with methyl iodide at 30°C and ~~70%~~ 95% relative humidity;

d. At least once per 18 months by:

1) Verifying that the pressure drop across the combined HEPA filters and charcoal adsorber banks is less than 6 inches Water Gauge while operating the system at a flow rate of 15,500 cfm ± 10%.

2) Verifying that the system starts on a Containment Ventilation Isolation test signal,

3) Verifying that the system maintains the Piping Penetration Filtration Exhaust Unit Room at a negative pressure of greater than or equal to 1/4 inch Water Gauge relative to the outside atmosphere (PDI-2550, PDI-2551), and

4) Verifying that the heaters dissipate ~~80 ± 4 kW~~ A MINIMUM OF 65 KW when tested in accordance with Section 14 of ANSI N510-1980.~~*~~ e

e. After each complete or partial replacement of a HEPA filter bank by verifying that the HEPA filter banks remove greater than or equal to 99.95% of the DOP when they are tested in-place in accordance with Section 10 of ANSI N510-1980 while operating the system at a flow rate of 15,500 cfm ± 10%.

~~*Until restart following the fourth refueling outage of Unit 1 and until restart following the second refueling outage of Unit 2 this specification shall read as follows: The surveillance may be conducted by verifying that heater capacity is sufficient to maintain the relative humidity of the airstream through the filters at 70 percent or less under design basis accident conditions when tested in accordance with section 14 of ANSI N510-1980.~~

1) Verifying that the cleanup system satisfies the in-place testing acceptance criteria of greater than or equal to 99.0% filter retention while operating the system at a flow rate of 5000 cfm ± 10%, (FI-12551, FI-12552) and performing the following tests;

   (a) A visual inspection of the Fuel Handling Building Post Accident Ventilation System shall be made before each DOP test or activated carbon adsorber section leak test in accordance with Section 5 of ANSI N510-1980.

   (b) An in-place DOP test for the HEPA filters shall be performed in accordance with Section 10 of ANSI N510-1980.

   (c) A charcoal adsorber section leak test with a gaseous halogenated hydrocarbon refrigerant shall be performed in accordance with Section 12 of ANSI N510-1980.

2) Verifying, within 31 days after removal, that a laboratory analysis of a representative carbon sample obtained in accordance with Section 13 of ANSI N510-1980, meets the laboratory testing criteria of greater than or equal to ~~99.0%~~ 90.0% when tested with methyl iodide at 30°C and ~~70%~~ 95% relative humidity IN ACCORDANCE WITH ASTM D3803-89; and

3) Verifying a system flow rate of 5000 cfm ± 10% during system operation when tested in accordance with Section 8 of ANSI N510-1980.

c. After every 720 hours of charcoal adsorber operation by verifying, within 31 days after removal, that a laboratory analysis of a representative carbon sample obtained in accordance with Section 13 of ANSI N510-1980 meets the laboratory testing criteria of greater than or equal to ~~99.0%~~ 90.0% when tested with methyl iodide at 30°C and ~~70%~~ 95% relative humidity IN ACCORDANCE WITH ASTM D3803-89.

d. At least once per 18 months by:

1) Verifying that the pressure drop across the combined HEPA filters and charcoal adsorber banks is less than 6 inches Water Gauge while operating the system at a flow rate of 5000 cfm ± 10%,

2) Verifying that on a High Radiation test signal, the system automatically starts (unless already operating) and directs its exhaust flow through the HEPA filters and charcoal adsorber banks,

Heaters are provided to ensure that the relative humidity of the airstream entering the adsorbers does not exceed 70 percent. Verification of heater power dissipation (KW) for surveillance testing is referenced to 460 volts.

CONTROL ROOM EMERGENCY FILTRATION SYSTEM (Continued)

moisture on the adsorbers and HEPA filters. The OPERABILITY of this system in conjunction with control room design provisions is based on limiting the radiation exposure to personnel occupying the control room to 5 rems or less whole body, or its equivalent. This limitation is consistent with the requirements of General Design Criterion 19 of Appendix A, 10 CFR Part 50. ANSI N510-1980 will be used as a procedural guide for surveillance testing.

AND ASTM D3803-89

3/4.7.7 PIPING PENETRATION AREA FILTRATION AND EXHAUST SYSTEM

The OPERABILITY of the Piping Penetration Area Filtration and Exhaust System ensures that radioactive materials leaking from the containment mechanical penetration rooms and ECCS equipment within the pump room following a LOCA are filtered prior to reaching the environment. Operation of the system with the heater control circuit energized for at least 10 continuous hours in a 31-day period is sufficient to reduce the buildup of moisture on the adsorbers and HEPA filters. The operation of this system and the resultant effect on offsite dosage calculations was assumed in the safety analyses. ANSI N510-1980 will be used as a procedural guide for surveillance testing.

AND ASTM D3803-89

Heaters are not required for controlling the relative humidity of the airstream through the adsorbers following a LOCA since no credit is taken for heaters in the dose analyses. However, the heaters are available during accident conditions as defense-in-depth. Verification of heater power dissipation (KW) for surveillance testing is referenced to 460 volts.

Adsorber testing is based on methyl iodide penetration, and safety analysis credited decontamination efficiency used for dose analyses is based on no humidity controls (i.e. inside containment) consistent with Regulatory Guide 1.52.

3/4.9.9 CONTAINMENT VENTILATION ISOLATION SYSTEM

The OPERABILITY of this system ensures that the containment vent and purge penetrations will be automatically isolated upon detection of high radiation levels within the containment. The OPERABILITY of this system is required to restrict the release of radioactive material from the containment atmosphere to the environment.

3/4.9.10 and 3/4.9.11 WATER LEVEL - REACTOR VESSEL and STORAGE POOL

The restrictions on minimum water level ensure that sufficient water depth is available to remove 99% of the assumed 10% iodine gap activity released from the rupture of an irradiated fuel assembly. The minimum water depth is consistent with the assumptions of the safety analysis.

3/4.9.12 FUEL HANDLING BUILDING POST ACCIDENT VENTILATION SYSTEM

The operability requirements on the Fuel Handling Building Post-Accident Ventilation Systems are intended to ensure that this equipment will be available in the event that a fuel handling accident results in the release of radioactive material from an irradiated fuel assembly. Although no credit is taken for the operation of this equipment in the safety analyses, its availability will serve as defense-in-depth in the event of a fuel handling accident in the fuel handling building. ANSI N510-1980 will be used as a procedural guide for surveillance testing.

AND ASTM D3803-89

Verification of heater power dissipation (KW) for surveillance testing is referenced to 460 volts.