DESCRIPTION, ASSESSMENT AND REFERENCES

DESCRIPTION AND ASSESSMENT

I. Background

Comanche Peak Steam Electric Station (CPSES) employs a design consisting of a Control Room Air Conditioning and Emergency Filtration/Pressurization System for the common control room shared by both CPSES Units 1 and 2. This system is required to be operable during all modes of operation, except when operating within a Limiting Condition for Operation (LCO) Action statement. The current LCO Allowed Outage Times (AOTs) restrict the ability of CPSES to perform scheduled preventive maintenance and normally occurring corrective maintenance. The result could be the simultaneous shutdown of CPSES Units 1 and 2 due to the loss of one out of four air conditioning units.

CPSES's design is similar to the Westinghouse plant design on which NUREG-1431, Standard Technical Specifications Westinghouse Plants, is based. As such, CPSES desires to utilize the AOTs for the control room air conditioning portion of the system as allowed by NUREG-1431. In conjunction, CPSES is adopting the content of these Standard Technical Specifications for the Control Room Emergency Filtration/Pressurization System and the Control Room Air Conditioning System.

The CPSES design consists of two independent trains of control room air conditioning, filtration and pressurization. Each train is capable of performing 100% of the control room environmental controls in conjunction with a loss of the other train. Additionally, the air conditioning portion of each train is further divided into two equivalent 50% capacity units. This plant specific design benefit provides an increased flexibility in maintaining the control room temperature within the design limits during the postulated accident scenarios.

II. Description of Technical Specification Change Request

The affected Technical Specifications are 3/4.7.7.1 and 3/4.7.7.2, Control Room HVAC System. The changes which are being proposed will replace the existing Technical Specifications with their respective counterparts for the Control Room Emergency Filtration/Pressurization System and Control Room Air Conditioning System (CRACS) from NUREG-1431.

The essential changes to the existing CPSES Technical Specifications (TS) are as noted below:

(a) In the present TS, the requirements for the Control Room HVAC System are divided in two Technical Specifications, based on unit operating MODE. In MODES 1, 2, 3 and 4, Technical Specification 3.7.7.1 applies. In MODES 5 and 6, Technical Specification 3.7.7.2 applies.

In the proposed specifications, the requirements are divided by system function. For the emergency filtration and pressurization functions, Technical Specification 3.7.7.1 will apply and for the heating and cooling of recirculated air, Technical Specification 3.7.7.2 will apply.

(b) The applicable MODES in the present TS are 1, 2, 3, 4, 5 and 6. The proposed specifications expand the applicability to include during movement of irradiated fuel assemblies.

(c) The action requirement while in MODES 1, 2, 3 and 4 remains unchanged for the emergency filtration and pressurization functions. For the heating and cooling of recirculated air, the existing action statement is changed (from an allowed outage time (AOT) of 7 days to an AOT of 30 days) and a new plant specific action statement is added. The new action statement provides the requirements and AOT (30 days) when each train is capable of 50% of its capacity but neither is capable of providing 100% of the required heating and cooling.

(d) The action requirement while in MODES 5 and 6 for the emergency filtration and pressurization function with one train inoperable is changed to add a new alternate action which may be taken following the AOT. The new alternate action is to suspend CORE ALTERATIONS and the movement of irradiated fuel assemblies. The other action statement applies if two trains are inoperable or if one train is inoperable and the second train is not capable of being powered by an operable emergency power source. The revised action statement only applies if both trains are inoperable. The requirement to suspend positive reactivity changes is replaced with the requirement to suspend movement of irradiated fuel assemblies.

(e) In the action requirements while in MODES 5 and 6 for the heating and cooling recirculated air function for one train inoperable, the AOT is changed to 30 days and an alternate action to suspend CORE ALTERATIONS and movement of irradiated fuel assemblies following the AOT is added. The new plant specific action statement provides the requirements and AOT (30 days) when each train is capable of providing 50% of its normal capacity but neither is capable of providing 100% of the required heating and cooling. For both trains inoperable and either only one or neither train capable of providing 50% of its normal capacity, the action requirement to suspend all positive reactivity change has been replaced with the requirement to suspend the movement of irradiated fuel assemblies. The previous requirements concerning the capability to power a train in the emergency recirculation mode by an operable emergency power source are not included in the revised specification.

(f) The surveillance requirements (SR) for the emergency filtration and pressurization function are revised as noted below:

o The SR on the unit heaters is less prescriptive and is no longer on a staggered test basis, and

o The SR to test automatic actuation is satisfied by an actual actuation signal as well as a test signal.

(g) Previously no SR existed for the heating and cooling of recirculated air function. A SR is added to confirm the system's capability every 18 months.

(h) The BASES are expanded to describe the functional split being proposed for the Control Room HVAC System.

The proposed Technical Specification (3/4.7.7.1) for the Control Room Emergency Filtration/Pressurization System is equivalent to Technical Specification 3.7.10 contained in NUREG-1431, with the following changes:

(a) The Technical Specification is reformatted from that contained in NUREG-1431, to the nominal format contained within the CPSES Technical Specifications. This change is for human factor considerations for the licensed reactor operators.

(b) Surveillance Requirement 3.7.10.2 in NUREG-1431 specifies that filter testing is to be performed in accordance with the Ventilation Filter Testing Program. CPSES does not have a separate Ventilation Filter Testing Program so the existing surveillance in NUREG-1468 has been brought forward to the new Technical Specification.

(c) The values and actions contained within brackets are changed to reflect the CPSES current licensing and design basis.

(d) The frequency of SR 3.7.10.4 is changed to a more conservative frequency of each train, once every 18 months.

(e) The system's name is changed to "Control Room Emergency Filtration/Pressurization System" to be consistent with existing CPSES terminology.

The proposed Technical Specification (3/4.7.7.2) for the CRACS is equivalent to Technical Specification 3.7.11 contained in NUREG-1431, with the following changes:

(a) The Technical Specification is reformatted from that contained in NUREG-1431, to the nominal format contained within the CPSES Technical Specifications. This change is for human factor considerations for the licensed reactor operators.

(b) Additional plant specific ACTION statements are included for continued operation within the AOT with both CRACS trains degraded to 50% capacity.

(c) The system's name is changed to "Control Room Air Conditioning System (CRACS)" to be consistent with existing CPSES terminology.

The BASES section is revised to describe the Control Room Emergency Filtration/Pressurization System and the CRACS.

In summary, the changes reorganize the requirements based on function rather than unit operating mode, adopt the 30 day AOT for the heating and cooling functions per NUREG-1431, add an action statement to address a plant specific condition in which each heating and cooling train has only one functional air conditioning unit, and make other detailed changes to make the specification consistent with the equivalent specifications in NUREG-1431, the latest standard technical specifications for Westinghouse plants.

III. Analysis

The system description and safety analysis for the control room area ventilation are provided in Sections 6.4 and 9.4.1 of the CPSES Final Safety Analysis Report. The area ventilation serves two basic functions: (1) to protect the control room environment from external airborne concerns (e.g., radioactive gases or particulate, etc.) and (2) to maintain the temperature in the control room within a range needed to allow the operators and the control room equipment to perform properly.

The first function, protecting the control room environment from external airborne problems, depends heavily on the Control Room Emergency Filtration/Pressurization System. By ensuring proper filtration and proper pressurization, in-leakage into the control room is controlled as is the quality of the control room air. Calculations are performed based on the availability of this system to ensure that the post-event atmosphere will allow the operators to safely function in the control room.

Controlling the temperature in the control room is achieved primarily by the Control Room Air Conditioning System. This system is conservatively sized to handle the worst heat load condition postulated based on normal conditions, accident conditions and conservative meteorology. The actual load can vary greatly. Temperature changes in the control room are gradual even under degraded conditions. Time is available to find alternate solutions to cool or heat the control room. If needed, the Remote Shutdown Panel is available.

As was recognized during the development of NUREG-1431, these different functions and systems warrant different Technical Specification requirements. In the past, these functions were combined and addressed in a single specification which established the most conservative requirements on the control room area ventilation systems. Dealing with these systems separately and establishing individual specification requirements for each system is appropriate.

The existing specification requirements are essentially transferred to the Control Room Emergency Filtration/Pressurization System. The requirements are modified to be consistent with NUREG-1431. Expanding the applicability to include during the movement of irradiated fuel assemblies and revising the appropriate action statements to include the suspension of CORE ALTERATIONS and the movement of irradiated fuel assemblies, enhances the units ability to cope with a fuel handling accident. Suspending the movement of irradiated fuel assemblies is a more appropriate requirement than suspending all operations involving positive reactivity changes when both Control Room Emergency Filtration/Pressurization trains are lost while in MODES 5 or 6. The event that the system is specifically designed to mitigate in these modes is the fuel handling accident. Suspending all operations involving positive reactivity changes implies a decreased capability to prevent or mitigate a criticality event. The loss of these ventilation trains does not create such a reduced capability. Adding the alternate action (to suspend CORE ALTERATIONS and the movement of irradiated fuel assemblies), following the AOT when one train is inoperable, allows the same action as if both trains were inoperable.

The application of the second action statement (actions must be taken with no allowed outage time specified), is appropriate for two trains inoperable but not for one train inoperable and the second train not capable of being powered in the emergency recirculation mode by an operable emergency power source. The emergency power source application came from a previous version of the standard technical specifications but is not included in NUREG-1431. Thus, it is recognized generically that this application is not needed. The application implies an expectation that without an operable emergency power source, the unit will not be able to adequately mitigate a fuel handling accident. However, the high reliability of the offsite power sources, the fact that a power problem is not expected to initiate a fuel handling accident and vice versa, and the capability to power these ventilation trains from the opposite CPSES unit, all support the conclusion that the unit will be capable of mitigating a fuel handling accident without being capable of powering the emergency recirculation mode from an operable emergency power source.

Removing the STAGGERED TEST BASIS required for the unit heaters surveillance makes the CPSES requirement consistent with NUREG-1431 and eliminates a complicating requirement. Performing the test on opposite trains every two weeks conflicted with the surveillance and maintenance philosophies of working opposite trains every other week. This philosophy is successful in controlling work and in minimizing inadvertent actuations and trips. The heater surveillance operated the

heaters for 10 hours to assure that the charcoal remained dry and therefore, able to perform as designed. Performing the SR every 31 days on each train is sufficient to verify operability while performing the SR on a STAGGFRED TEST BASIS offered little, if any, safety improvement.

Crediting actual actuation signals, in addition to test signals, is clearly acceptable for the automatic actuation surveillance. No special readings are required and the plant staff can clearly identify that the system performed properly. Crediting the actual signals may eliminate some unnecessary duplicate testing.

The new requirements for the CRACS are consistent with its safety function. A 30 day allowed outage time is reasonable for a system whose full capability may not be required at certain times of the year for any postulated design basis accident, whose partial failure may have no impact at all, whose complete failure will not have an immediate, irreversible impact and whose function can possibly be restored or mitigated by plant staff actions. As with the Control Room Emergency Filtration/Pressurization System, expanding the applicability to include during the movement of irradiated fuel and revising the appropriate action statements to include the requirement to suspend CORE ALTERATIONS and the movement of irradiated fuel assemblies, enhance the ability to cope with fuel handling accidents.

The new action statements for the CRACS address the plant specific design of CPSES. Each CRACS train has two 50% air conditioning (AC) units. Each unit can be supported (cooling water and electrical power) from either CPSES Unit 1 or CPSES Unit 2. Thus, one functional AC unit in each train is essentially equivalent to one operable train with two functional units. The new action statements, in recognition of this equivalence, are written for only one functional AC unit in each train and the action statements are essentially equivalent to the action statements for only one functional train. The two new action statements maintain the same level of safety as provided by the existing action statements.

The new surveillance for the CRACS is intended to periodically confirm the capability of the system. The operating level of each AC unit as a percent of its capacity can be determined from direct reading off the unit. Based on the actual load at the time of the surveillance, the operating level of the AC unit at the postulated peak load can be projected and can be confirmed to be less than or equal to 100% capacity. This new surveillance does not create a significant adverse impact on plant operations and helps to detect any long term degradation in the system.

In summary, the new LCOs, which are essentially unchanged, maintain the plant status needed to support the plant's safety analyses. The action statements have been revised to appropriately address the significance of the two systems which were previously addressed together and to address the plant specific AC unit design. The expanded applicability of the specifications and revised surveillance requirements, when taken together, enhance confidence in the systems' abilities to perform as desired. These new specifications provide the proper requirements for

the control room ventilation systems needed to assure the desired level of safety.

IV. Significant Hazards Consideration Analysis

1) Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

The proposed changes have no impact on the probability of an accident. The control room ventilation systems are support systems which have a role in the detection and mitigation of accidents but do not contribute to the initiation of any accident previously evaluated.

The administrative changes (e.g., reorganizing the Technical Specifications by function) have no impact on the course of any accidents previously evaluated. Expanding the applicability to include movement of irradiated fuel assemblies and adding action requirements to suspend CORE ALTERATIONS and the movement of irradiated fuel assemblies are changes which improve the ability to mitigate fuel handling accidents.

Removing the action requirement in MODES 5 and 6 when one train is inoperable and the second cannot be powered from an operable emergency power source represents a slight decrease in the potential availability of the Control Room Emergency Filtration/Pressurization System. However, due to the high reliability of the offsite power sources, the lack of any direct relationship between loss of offsite power and a fuel handling accident, and the capability of powering these systems from the other CPSES unit, the slight decrease in availability is not considered significant.

Specifying an allowed outage time (AOT) of 30 days for the heating and cooling of recirculated air while one train is inoperable and while each train is capable of 50% of load requirements (but not 100%), is based on the significance of the heating and cooling function but does represent an increase in AOT (from 7 days) and thus an increase in the probability that the functions could be unavailable. This increase is not considered significant based on several factors including: the design is based on the worst postulated meteorological conditions; generally, less than design cooling is required and a partial failure in the system may have no impact; an unavailability failure does not create an immediate irreversible impact (i.e., temperature will increase slowly over a period of time); the system could very possibly be restored or its loss mitigated without any impact on the course of whatever accident is being considered; and the extended AOT would allow more opportunity to perform major required maintenance and thus may provide an overall improvement in equipment reliability.

The new surveillance requirement to test the performance of the heating and cooling functions tends to improve the ability to detect long term degradation. Deleting the STAGGERED TEST BASIS for the heater surveillance and using actual actuation signals to test the automatic actual logic are expected to have little or no impact on system availability.

Overall, some of the proposed changes may increase the system's availability during an accident and others may decrease the system's availability. The net effect is not significant and, as a result, does not involve a significant increase in the consequences of an accident previously evaluated.

2) Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

The changes do not involve any hardware or setpoint changes. System operation has not been changed to create new system configurations not previously allowed. As a result, even though the changes could have a minor impact on system availability and thus accident mitigation, the changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

3) Does the proposed change involve a significant reduction in a margin of safety?

None of the changes being proposed alters the environmental conditions which are to be maintained in the control room during normal operations and following an accident. As a result, the margin of safety for these functions remains the same. The only potential impact is the system's postulated availability, as discussed in the response to question 1 above. As noted in that response, there is no significant impact on the accident analyses. Thus, even if system availability issues were considered an aspect of margin of safety, the proposed changes do not involve a significant reduction in margin of safety.

Based on the above evaluations, TU Electric concludes that the activities associated with the proposed changes satisfy the no significant hazards consideration standards of 10CFR50.92(c) and, accordingly, a no significant hazards consideration finding is justified.

V. Environmental Evaluation

TU Electric has evaluated the proposed changes and has determined that the changes do not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amount of any effluents that may be released off-site, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed changes meet the eligibility criterion for categorical exclusion set forth in 10CFR51.22(c). Therefore, pursuant to 10CFR51.22(b), an environmental assessment of the proposed changes is not required.

VI. References

1. NUREG-1431, Standard Technical Specifications Westinghouse Plants, Rev. 0, September 28, 1992.

2. FSAR Sections 9.4.1 and 6.4.

CONTROL ROOM AIR-CONDITIONING SYSTEM

TECHNICAL SPECIFICATIONS (3.4.7.7)

CONTROL ROOM AIR-CONDITIONING SYSTEM

TECHNICAL SPECIFICATIONS (3.4.7.7)

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

PLANT SYSTEMS

3/4.7.7 CONTROL ROOM HVAC SYSTEM

OPERATING

LIMITING CONDITION FOR OPERATION

3.7.7.1 Two independent control room HVAC trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4

ACTION:

With one control room HVAC train inoperable, restore the inoperable train to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.7.7.1 Each control room HVAC train shall be demonstrated OPERABLE:

a. At least once per 31 days on a STAGGERED TEST BASIS by initiating, from the control room, flow through the HEPA filters and charcoal adsorbers and verifying that the train operates for at least 10 continuous hours with the emergency pressurization unit heaters operating;

SEE INSERT "A"

PLANT SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

b. 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 unit satisfies the in-place penetration and bypass leakage testing acceptance criteria of less than 0.05% by using the test procedure guidance in Regulatory Position C.5.a, C.5.c, and C.5.d of Regulatory Guide 1.52, Revision 2, March 1978*, and the emergency filtration unit flow rate is 8000 cfm ± 10%, and the emergency pressurization unit flow rate is 800 cfm ± 10%;

2) Verifying, within 31 days after removal, that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978*, meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 2, March 1978*, for a methyl iodide penetration of less than 0.2%; and

3) Verifying an emergency filtration unit flow rate of 8000 cfm ± 10% and an emergency pressurization unit flow rate of 800 cfm ± 10% during system operation when tested in accordance with 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 Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978*, meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 2, March 1978*, for a methyl iodide penetration of less than 0.2%;

SEE INSERT "A"

*ANSI N510-1980 and ANSI N509-1980 shall be used in place of ANSI N510-1975 and ANSI N509-1976, respectively.

PLANT SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

d. At least once per 18 months by:

1) Verifying that the total pressure drop across the combined HEPA filters and charcoal adsorber banks is less than 8.0 inches water gauge while operating the emergency filtration unit at a flow rate of 8000 cfm ± 10%, and is less than 9.5 inches water gauge while operating the emergency pressurization unit at a flow rate of 800 cfm ± 10%;

2) Verifying that on a Safety Injection, Loss-of-Offsite Power, or Intake Vent-High Radiation test signal, the train automatically switches into the emergency recirculation mode of operation with flow through the HEPA filters and charcoal adsorber banks;

3) Verifying that the emergency pressurization unit maintains the control room at a positive pressure of greater than or equal to 1/8 inch water gauge relative to the adjacent areas, including the outside atmosphere, at a flow rate of less than or equal to 800 cfm during system operation; and

4) Verifying that the heaters in the emergency pressurization units dissipate 10 ± 1 kW when tested in accordance with ANSI N510-1980;

e. After each complete or partial replacement of a HEPA filter bank in the emergency filtration unit(s), by verifying that the unit satisfies the in-place penetration and bypass leakage testing acceptance criteria of less than 0.05% in accordance with ANSI N510-1980 for a DOP test aerosol while operating the unit at a flow rate of 8000 cfm ± 10%;

f. After each complete or partial replacement of a charcoal adsorber bank in the emergency filtration unit(s), by verifying that the unit satisfies the in-place penetration and bypass leakage testing acceptance criteria of less than 0.05% in accordance with ANSI N510-1980 for a halogenated hydrocarbon refrigerant test gas while operating the unit at a flow rate of 8000 cfm ± 10%;

SEE INSERT "A"

g. After each complete or partial replacement of a HEPA filter bank in the emergency pressurization unit(s), by verifying that the unit satisfies the in-place penetration and bypass leakage testing acceptance criteria of less than 0.05% in accordance with ANSI N510-1980 for a DOP test aerosol while operating the unit at a flow rate of 800 cfm ± 10%; and

h. After each complete or partial replacement of a charcoal adsorber bank in the emergency pressurization unit(s), by verifying that the unit satisfies the in-place penetration and bypass leakage testing acceptance criteria of less than 0.05% in accordance with ANSI N510-1980 for a halogenated hydrocarbon refrigerant test gas while operating the unit at a flow rate of 800 cfm ± 10%.

PLANT SYSTEMS

CONTROL ROOM HVAC SYSTEM

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.7.7.2 Two independent control room HVAC trains shall be OPERABLE.

APPLICABILITY: MODES 5 and 6.

ACTION:

a. With one control room HVAC train inoperable, restore the inoperable train to OPERABLE status within 7 days or initiate and maintain operation of the remaining OPERABLE control room HVAC train in the emergency recirculation mode.

b. With both control room HVAC trains inoperable, or with the OPERABLE control room HVAC train required to be in the emergency recirculation mode by ACTION a., not capable of being powered by an OPERABLE emergency power source, suspend all operations involving CORE ALTERATIONS or positive reactivity changes.

SURVEILLANCE REQUIREMENTS

4.7.7.2 Each control room HVAC train shall be demonstrated OPERABLE by the performance of Surveillance Requirement 4.7.7.1.

SEE INSERT "A"

PLANT SYSTEMS

3/4.7.7 CONTROL ROOM HVAC SYSTEM

INSERT "A"

CONTROL ROOM EMERGENCY FILTRATION/PRESSURIZATION SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.7.1 Two Control Room Emergency Filtration/Pressurization System trains shall be OPERABLE. DRAFT

APPLICABILITY: MODES 1, 2, 3, 4, 5, 6, and during movement of irradiated fuel assemblies.

ACTION:

MODES 1, 2, 3, and 4:

With one Control Room Emergency Filtration/Pressurization System train inoperable, restore the inoperable train to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

MODES 5, 6 and during movement of irradiated fuel assemblies:

a. With one Control Room Emergency Filtration/Pressurization System train inoperable, restore the inoperable train to OPERABLE status within 7 days or place the OPERABLE Control Room Emergency Filtration/Pressurization System train in the emergency recirculation mode or suspend CORE ALTERATIONS and movement of irradiated fuel assemblies.

b. With two Control Room Emergency Filtration/Pressurization System trains inoperable suspend CORE ALTERATIONS and movement of irradiated fuel assemblies.

SURVEILLANCE REQUIREMENTS

4.7.7.1 Each Control Room Emergency Filtration/Pressurization System train shall be demonstrated OPERABLE:

a. At least once per 31 days by operating each Control Room Emergency Filtration/Pressurization System train for $\geq$ 10 continuous hours with the heaters operating.

b. 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:

INSERT "A"

CONTROL ROOM EMERGENCY FILTRATION/PRESSURIZATION SYSTEM (Continued)

LIMITING CONDITION FOR OPERATION

DRAFT

1) Verifying that the filtration unit satisfies the in-place penetration and bypass leakage testing acceptance criteria of less than 0.05% by using the test procedure guidance in Regulatory Position C.5.a, C.5.c and C.5.d of Regulatory Guide 1.52, Revision 2, March 1978*, and the emergency filtration unit flow rate is 8000 cfm ± 10%, and the emergency pressurization unit flow rate is 800 cfm ± 10%;

2) Verifying within 31 days after removal, that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978*, meets the laboratory testing criteria of Regulatory Position C.6.a Regulatory Guide 1.52, Revision 2, March 1978*, for a methyl iodide penetration of less than 0.2%; and

3) Verifying an emergency filtration unit flow rate of 8000 cfm ± 10% and an emergency pressurization unit flow rate of 800 cfm ± 10% during system operation when tested in accordance with 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 Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978*, meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 2, March 1978*, for a methyl iodide penetration of less than 0.2%;

*ANSI N510-1980 and ANSI N509-1980 shall be used in place of ANSI N510-1975 and ANSI N509-1976, respectively.

PLANT SYSTEMS

INSERT "A"

SURVEILLANCE REQUIREMENTS (Continued)

DRAFT

d. At least once per 18 months by:

   1) Verifying that the total pressure drop across the combined HEPA filters and charcoal adsorber banks is less than 8.0 inches water gauge while operating the emergency filtration unit at a flow rate of 8000 cfm ± 10%, and is less than 9.5 inches water gauge while operating the emergency pressurization unit at a flow rate of 800 cfm ± 10%; and

   2) Verifying that the heaters in the emergency pressurization units dissipate 10 ± 1 kW when tested in accordance with ANSI N510-1980;

e. After each complete or partial replacement of a HEPA filter bank in the emergency filtration unit(s), by verifying that the unit satisfies the in-place penetration and bypass leakage testing acceptance criteria of less than 0.05% in accordance with ANSI N510-1980 for a DOP test aerosol while operating the unit at a flow rate of 8000 cfm ± 10%;

f. After each complete or partial replacement of a charcoal adsorber bank in the emergency filtration unit(s), by verifying that the unit satisfies the in-place penetration and bypass leakage testing acceptance criteria of less than 0.05% in accordance with ANSI N510-1980 for a halogenated hydrocarbon refrigerant test gas while operating the unit at a flow rate of 8000 cfm ± 10%;

g. After each complete or partial replacement of a HEPA filter bank in the emergency pressurization unit(s), by verifying that the unit satisfies the in-place penetration and bypass leakage testing acceptance criteria of less than 0.05% in accordance with ANSI N510-1980 for a DOP test aerosol while operating the unit at a flow rate of 800 cfm ± 10%;

h. After each complete or partial replacement of a charcoal adsorber bank in the emergency pressurization unit(s), by verifying that the unit satisfies the in-place penetration and bypass leakage testing acceptance criteria of less than 0.05% in accordance with ANSI N510-1980 for a halogenated hydrocarbon refrigerant test gas while operating the unit at a flow rate of 800 cfm ± 10%;

INSERT "A"

SURVEILLANCE REQUIREMENTS (Continued)

i. At least once per 18 months by verifying that each Control Room Emergency Filtration/Pressurization System train actuates on an actual or simulated Safety Injection, Loss-of-Offsite Power, or Intake Vent-High Radiation Signal; and

j. At least once per 18 months by verifying that each Control Room Emergency Filtration/Pressurization System train can maintain a positive pressure of ≥ 0.125 inches water gauge, relative to the adjacent areas during the pressurization mode of operation at a makeup flow rate of ≤ 800 cfm.

DRAFT

PLANT SYSTEMS

CONTROL ROOM HVAC SYSTEM

INSERT "A"

CONTROL ROOM AIR CONDITIONING SYSTEM (CRACS)

LIMITING CONDITION FOR OPERATION

3.7.7.2 Two CRACS trains shall be OPERABLE. DRAFT

APPLICABILITY: MODES 1, 2, 3, 4, 5, 6, and during movement of irradiated fuel assemblies.

ACTION:

MODES 1, 2, 3 and 4:

a. With one CRACS train inoperable, restore the inoperable train to OPERABLE status within 30 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With two CRACS trains inoperable, but each capable of supplying 50% of their nominal capacity, restore the inoperable trains to OPERABLE status within 30 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

MODES 5, 6 and during movement of irradiated fuel assemblies:

a. With one CRACS train inoperable, restore the inoperable train to OPERABLE status within 30 days or place the OPERABLE CRACS train in operation or suspend CORE ALTERATIONS and movement of irradiated fuel assemblies.

b. With two CRACS trains inoperable, but each capable of supplying 50% of their nominal capacity, restore the inoperable trains to OPERABLE status within 30 days or suspend CORE ALTERATIONS and movement of irradiated fuel assemblies.

c. With two CRACS trains inoperable and with b. above not applicable, suspend CORE ALTERATIONS and movement of irradiated fuel assmblies

SURVEILLANCE REQUIREMENTS

4.7.7.2 At least once per 18 months verify each CRACS train has the capability to remove the assumed heat load.

PLANT SYSTEMS

BASES

3/4.7.5 ULTIMATE HEAT SINK

The limitations on the ultimate heat sink level and temperature ensure that sufficient cooling capacity is available to either: (1) provide normal cooldown of the facility or (2) mitigate the effects of accident conditions within acceptable limits.

The limitations on minimum water level is based on providing a 30-day cooling water supply to safety-related equipment without exceeding its design basis temperature and is consistent with the recommendations of Regulatory Guide 1.27, "Ultimate Heat Sink for Nuclear Plants," Rev. 2 (January 1976). The limitation on maximum temperature is based on the maximum allowable component temperatures in the Service Water and Component Cooling Water Systems, and the requirements for cooldown. The limitation on average sediment depth is based on the possible excessive sediment buildup in the service water intake channel.

3/4.7.6 FLOOD PROTECTION

The limitation of flood protection ensures that facility protective actions will be taken in the event of flood conditions. The only credible flood condition that endangers safety related equipment is from water entry into the turbine building via the circulating water system from Squaw Creek Reservoir and then only if the level is above 778 feet Mean Sea Level. This corresponds to the elevation at which water could enter the electrical and control building endangering the safety chilled water system. The surveillance requirements are designed to implement level monitoring of Squaw Creek Reservoir should it reach an abnormally high level above 776 feet. The Limiting Condition for Operation is designed to implement flood protection, by ensuring no open flow path via the Circulating Water System exists, prior to reaching the postulated flood level.

3/4.7.7 CONTROL ROOM HVAC SYSTEM

SEE INSERT "B"

The OPERABILITY of the Control Room HVAC System ensures that: (1) the control room ambient air temperature does not exceed the allowable temperature per 3/4.7.1[illegible] for continuous-duty rating for the equipment and instrumentation cooled by this system, and (2) the control room will remain habitable including temperature for operations personnel during and following all credible accident conditions. Operation of the system with the heaters operating to maintain low humidity using automatic control 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 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 10 CFR 50 Appendix A. ANSI N510-1980 and ANSI N509-1980 will be used as a procedural guide for surveillance testing.

(MOVE TO) SEE INSERT "C"

INSERT "B"

The control room emergency filtration/pressurization system consists of two independent, redundant trains that recirculate and filter the control room air, and two independent, redundant trains that pressurize the control room. DRAFT

INSERT "C"

The control room air conditioning system consists of two independent and redundant trains that provide cooling and heating of recirculated control room air. Each train includes two heating and cooling units, instrumentation and controls to provide for control room temperature control. DRAFT

NUREG-1431

STANDARD TECHNICAL SPECIFICATIONS WESTINGHOUSE PLANTS

SPECIFICATIONS 3.7.10 AND 3.7.11

(Pages 3.7-23 through 3.7-27)

3.7 PLANT SYSTEMS

3.7.10 Control Room Emergency Filtration System (CREFS)

LCO 3.7.10 Two CREFS trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, 4, [5, and 6,]
During movement of irradiated fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CREFS train inoperable.	A.1 Restore CREFS train to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, 3, or 4.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours
C. Required Action and associated Completion Time of Condition A not met [in MODE 5 or 6, or] during movement of irradiated fuel assemblies.	C.1 [--------NOTE-------- Place in toxic gas protection mode if automatic transfer to toxic gas protection mode is inoperable. ------------------] Place OPERABLE CREFS train in emergency mode. OR	 Immediately (continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	[C.2.1 Suspend CORE ALTERATIONS. AND C.2.[2] Suspend movement of irradiated fuel assemblies.	Immediately] Immediately
D. Two CREFS trains inoperable in MODE 1, 2, 3, or 4.	D.1 Enter LCO 3.0.3.	Immediately
E. Two CREFS trains inoperable [in MODE 5 or 6, or] during movement of irradiated fuel assemblies.	[E.1 Suspend CORE ALTERATIONS. AND E.[2] Suspend movement of irradiated fuel assemblies.	Immediately] Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.10.1	Operate each CREFS train for [≥ 10 continuous hours with the heaters operating or (for systems without heaters) ≥ 15 minutes].	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.7.10.2	Perform required CREFS filter testing in accordance with the [Ventilation Filter Testing Program (VFTP)].	In accordance with [VFTP]
SR 3.7.10.3	Verify each CREFS train actuates on an actual or simulated actuation signal.	[18] months
SR 3.7.10.4	Verify one CREFS train can maintain a positive pressure of ≥ [0.125] inches water gauge, relative to the adjacent [turbine building] during the pressurization mode of operation at a makeup flow rate of ≤ [3000] cfm.	[18] months on a STAGGERED TEST BASIS

3.7 PLANT SYSTEMS

3.7.11 Control Room Emergency Air Temperature Control System (CREATCS)

LCO 3.7.11 Two CREATCS trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, 4, [5, and 6,]
During movement of irradiated fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CREATCS train inoperable.	A.1 Restore CREATCS train to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, 3, or 4.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours
C. Required Action and associated Completion Time of Condition A not met [in MODE 5 or 6, or] during movement of irradiated fuel assemblies.	C.1 Place OPERABLE CREATCS train in operation. OR [C.2.1 Suspend CORE ALTERATIONS. AND] C.2.[2] Suspend movement of irradiated fuel assemblies.	Immediately [Immediately] Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. Two CREATCS trains inoperable in MODE 1, 2, 3, or 4.	D.1	Enter LCO 3.0.3.	Immediately
E. Two CREATCS trains inoperable [in MODE 5 or 6, or] during movement of irradiated fuel assemblies.	[E.1	Suspend CORE ALTERATIONS.	Immediately]
	AND		
	E.[2]	Suspend movement of irradiated fuel assemblies.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.11.1	Verify each CREATCS train has the capability to remove the assumed heat load.	[18] months

CPSES FSAR

SECTION 6.4
(Sheets 6.4-1 through 6.4-15)

SECTION 9.4.1
(Pages 9.4-1 through 9.4-13)

FIGURE 9.4-1
(Sheets 1 through 5)

6.4 HABITABILITY SYSTEMS

6.4.1 DESIGN BASES

6.4.1.1 Control Room Envelope

The Control Room pressurized envelope, as defined in Section 6.4.2.1, 78
includes the Control Room and all areas adjacent to the Control Room on elevation 831′ 6" of Electrical and Control Building containing plant information and equipment that may be needed during an emergency including kitchen, sanitary facilities, and computer rooms.

Control Room design is based upon the safe occupation of the Control Room envelope during normal operation and for a period of not less than 30 days after a loss-of-coolant accident (LOCA). Habitability 66
systems ensure that the personnel occupying the Control Room during these times will not be exposed to radiation doses exceeding 5 rem whole body gamma dose, 30 rem thyroid dose, and 30 rem beta skin dose. The allowable unprotected beta skin dose may be increased to 75 66
rem when special protective clothing and eye protection is used. The Control Room is designed in accordance with NRC General Design Criterion (GDC) 19 [1]. The Control Room envelope contains adequate medical supplies and the necessary kitchen and sanitary facilities to sustain plant personnel for a period of 30 days following a DBA. The necessary food and water for five plant personnel for five days will be permanently stored in the Control Room.

6.4.1.2 Radiation and Toxic Gas Protection

Control Room shielding is designed to limit the dose from external sources to a level compatible with the dose criteria given in Subsection 6.4.1.1 based on the source strengths given in Table 6.4-1.

The Control Room HVAC system is designed to maintain a positive pressure with respect to the environs during normal and emergency modes of operation.

68 Airborne radioiodine is limited to levels compatible with the dose
criteria given in Subsection 6.4.1.1, based on the radioiodine
releases given in Table 6.5-6, and a Containment leak rate of 0.1-
percent for the first 24 hr following an accident and one-half this
value for the balance of the accident. Refer to Subsection 15.6.5.4
for an analysis of the inhalation dose to the Control Room operators.
76 In the event of a toxic gas release, the control room may be manually
isolated from the outside environment, by entering a complete
recirculation mode of operation. For CPSES, the probability of
68 simultaneous occurrence of a toxic gas release and radiological
release caused by a loss of coolant accident (LOCA) is assumed to be
extremely low. Therefore, the event of concurrent releases is not
76 considered in the design basis. See Section 2.2.3 for a discussion of
toxic gas releases and analyses.

Airborne radioactive material in the Control Room atmosphere is controlled after an accident by the emergency recirculation filtration units and emergency pressurization filtration units. These atmosphere cleanup units are used in the event of a release of airborne radioactive material. The Control Room Ventilation System is described in detail in Section 9.4. The limitations of the Control Room environment following a LOCA are listed in Table 6.4-3.

6.4.1.3 Respiratory, Eye, and Skin Protection for Emergencies

Portable self-contained breathing apparatus and protective clothing are provided in the Control Room envelope for use by the plant personnel required to leave this controlled zone during the emergency recirculation mode of operation. There will be an adequate supply of air to sustain the five-man emergency team for a six-hr period. At least one portable self-contained breathing apparatus will be provided for each member of the emergency team. Replenishment capability for the breathing apparatus is also located offsite.

Further air supplies will be replenished as needed by the emergency organization.

6.4.1.4 Habitability System Operation During Emergencies

A detailed description of the Control Room Air-Conditioning System emergency modes of operation is presented in Section 9.4.

6.4.1.5 Emergency Monitors and Control Equipment

Radiation monitors used to switch the Control Room Air-Conditioning 68
System into the emergency recirculation mode are located in the
Control Room outside-air intakes. The outside-air intake monitors,
located at opposite sides of the Control Building, are used to sample 46
makeup and pressurization air flows introduced into the Control Room
envelope. Ionizing smoke detectors are provided in the control room 76
air intakes to provide alarms and indication to the operator of the
presence of smoke. Upon detection of smoke in the control room, the
operator may manually initiate the isolation mode of the control room
ventilation system.

6.4.1.6 Fire Protection Criteria

The Fire Protection System is designed to safeguard equipment and
personnel. Combustible materials are excluded as far as practical
from the Control Room to lessen the possibility of a fire. The fire
stops serve a dual function. Fire stops are incorporated on all
cables entering the Control Room to prevent the entry of a fire
originating outside the Control Room. They also form a leak boundary 46
which limits exfiltration of air from the Control Room envelope.
Because any fire in the control panels would be very limited, due to
the amount of combustible materials present, Control Room evacuation
is not considered a necessity; however, remote shutdown capability is
available as described in Section 7.4. Codes and guides used in the
design of the Fire Protection System are given in Subsection 9.5.1.

6.4.2 SYSTEM DESIGN

6.4.2.1 Definition of Control Room Envelope

71 The Control Room pressurized envelope consists of the following areas where continuous or frequent operator or technical support personnel occupancy may be required during emergency operation:

	Space	Elevation
68	East Control Room	830'-0"
68	West Control Room	830'-0"
68	Console and Control Room Unit 1	830'-0"
68	Console and Control Room Unit 2	830'-0"
68	Instrument Room Unit 1	830'-0"
68	Instrument Room Unit 2	830'-0"
68	Computer Room Unit 1	830'-0"
68	Computer Room Unit 2	830'-0"
68	File Room	830'-0"
68	Production Supervisor's Office	830'-0"
68	Corridor	830'-0"
68	Toilet	830'-0"
68	Locker Room	830'-0"
68	Kitchen and Janitor Closet	830'-0"
68	Charts and Supplies Storage Room	830'-0"
71	Technical Support Center (Office and Corridor)	840'-6"
68	Offices (2)	840'-6"
68	Electrical Equipment Corridors (2)	840'-6"
71		

78 The Control Room envelope also includes the Control Room Air
Conditioning System (CRACS) mechanical equipment rooms, Trains A and
B, located in the Control Building above the Control Room complex at
elevation 854 ft 4 in. These rooms are pressurized and may require
infrequent access by a Control Room operator during an emergency
condition. The components located in the CRACS mechanical equipment
68 rooms are described in detail in Section 9.4.

6.4.2.2 Ventilation System Design

The Control Room Air-Conditioning and Ventilation System is a recirculation system during post-LOCA operation. The system is designed to control the level of airborne contamination in the Control Room atmosphere and to control the temperature and humidity for
personnel safety and comfort. The flow diagrams of the system are 68
shown on Figure 9.4-1. These diagrams include equipment, dampers, instrumentation, and flow paths for normal and emergency operation.
Redundant atmosphere cleanup units (emergency filtration units) are 68
used to remove particulate matter and other contaminants from the Control Room air. The design of emergency filtration units is in accordance with NRC Regulatory Guide 1.52 [3]. Each filtering unit consists of a particulate, HEPA, iodine adsorber, and HEPA filters, and a booster fan to draw the air through the unit. See Section 9.4 for design parameters and capacities of the filters and related equipment. See Figure 6.4-1 for filtration unit drawing.

The system operation is discussed in Section 9.4. The performance objectives of the Control Room Air Conditioning and Ventilation System and the associated design basis necessary to ensure habitability during and after a LOCA are given in Table 6.4-3.

76
Redundant emergency pressurization units are used to pressurize the 76
Control Room envelope during emergency recirculation.

The emergency pressurization units supply outside air filtered through
a particulate, HEPA, iodine adsorber, and HEPA filters to the supply
header of the emergency filtration units. A booster fan, demister,
and heater are used to circulate the air and maintain the humidity of
the incoming outside air below 70 percent. See Figure 6.4-2 for
46 pressurization unit drawing. Seismic classifications for the system
are listed by component in Appendix 17A. Layout drawings of the
1 equipment for this area, including doors, corridors, stairwells, and
shielding walls, are shown on Figures 1.2-33 and 1.2-34. A detail of
the Control Room air inlet is shown on Figure 6.4-3. A description of
the instrumentation and controls for the Control Room Air-
Conditioning System is given in Section 9.4. Radiation detectors are
76 provided to control ventilation system operation. The redundant train
oriented radiation detectors monitor the Control Room ventilation
outside-air intakes. A complete description of the emergency
filtration and pressurization filter trains is given in Section 6.5.

The Control Room air-conditioning and filtration units, fans, dampers,
ductwork, and associated equipment essential to the operation of the
Control Room HVAC and Filtration System are located within a missile-
46 protected structure. The Control Room HVAC and filtration air intakes
and exhausts are also protected against the damaging effects of a
tornado-generated missile.
76

6.4.2.3 Leaktightness

78 During the Emergency Recirculation mode, the Control Room envelope is
maintained at an overpressure of 0.125-in. water gauge (wg) to
prevent infiltration of unfiltered and unmonitored air from the
adjacent areas. Any differential greater than 0.125-in. wg causes
difficulties in opening and closing doors leading to the area served
78 by the Control Room Air-Conditioning System. During normal operating
mode, the Control Room is maintained at a nominal positive pressure of
0.125 in. wg with respect to the outdoor environment to minimize dust
infiltration. During this mode of operation, other areas in the

Control Room envelope are maintained at a slightly positive pressure. 78
This overpressure is maintained by modulating exhaust dampers during
normal plant operations and by emergency pressurization units during
accident conditions. The boundaries of the Control Room envelope
consist of concrete walls and floors which exhibit low leakage
characteristics.

21
78

To minimize this leakage all joints and penetrations are sealed; all 60
doors are gasketed and provided with metal interlocks. All doors are
designed to swing inward except the missile resistant door which is
airtight and opens outward. The maximum flow rate of the
pressurization unit for emergency operation is 800 ft3/min which is 27
sufficient to pressurize the Control Room envelope to 0.125-in. wg as
indicated in Table 6.4-4. However, leakage is expected to be less. 46
Periodic testing of the Control Room envelope is performed to verify
this value and to ensure that adequate pressurization is maintained.
(See Subsection 6.4.5.) For an analysis of the dose received by 27
Control Room occupants in the unlikely event of a LOCA, see Subsection
15.6.5.4.

Q312.27
The infiltration rate when the control room is isolated will be much 64
less than the exfiltration rate when pressurized to 0.125 inch water
gauge since infiltration is due to wind loadings and much less than
half the leakage paths in Table 6.4-4 are exposed to wind loadings.

6.4.2.4 Interaction With Other Zones and Pressure-Containing Equipment

The Control Room envelope is isolated and maintained pressurized during an accident involving the release of radioactive gases in surrounding zones. The Control Room Air-Conditioning System is operated in the emergency recirculation mode, with outside filtered

76 air used to maintain Control Room pressurization. Doors are designed to open against positive pressure to ensure closure at all times. The use of fire extinguishers located in the Control Room envelope will not yield a hazardous concentration of toxic gas. All piping not connected or related to Control Room equipment is routed outside the pressurized boundary. In the unlikely event of a large release of toxic gas to the outside ambient or surrounding zones, portable self-contained breathing apparatus are readily available for use by the plant operators.

6.4.2.5 Shielding Design

The shielding design for the Control Room is based on the requirements
69 specified in 10 CFR Part 50, Appendix A, GDC 19. The Control Room is
designed to provide radiation protection for personnel occupancy under accident conditions so that no individual will receive exposures in excess of 5-rem whole-body gamma dose, 30-rem thyroid dose and 75-rem unprotected beta skin dose (with special protective clothing and eye protection). To achieve this goal, the shielding design of the Control Room considers airborne contaminants within the Control Room and other DBA sources of radiation. Specifically, these other sources are fission products released to the reactor Containment atmosphere, airborne radioactive contaminants surrounding the Control Room, and sources of radiation caused by potentially contaminated equipment in the vicinity of the Control Room. They are considered to be dominant sources of radiation, and they are among the principal parameters for the shielding design of the Control Room.

Shield thicknesses of structural concrete provided for the Control Room are shown on Figure 12.3-14. The 2 ft-0 in. structural shielding walls surrounding the Control Room, combined with the roof and floor slabs above the Control Room, provide more radiation protection for personnel in the Control Room. In addition to shield thicknesses, distances that separate dominant radiation sources from the Control Room are included on the scaled layout and arrangement drawings of the facility in Section 1.2. Radioactive decay for each isotope of the DBA source is taken into consideration in the analysis of the dose to Control Room occupants shown in Subsection 15.6.5.4. A layout drawing of the Control Room and associated structures is presented on Figure 1.2-33.

DBA sources of radiation surrounding the Control Room and shielding related considerations are presented in Section 12.2, Section 12.3, and Subsection 15.6.5.4. A plan view drawing of the Control Room and associated structures identifying distances and shield thicknesses is shown in Figure 12.3-14.

6.4.3 SYSTEM OPERATIONAL PROCEDURES

The following modes of operation characterize the Control Room Air-Conditioning System:

1. Normal operation

2. Emergency recirculation

3. Emergency ventilation

4. Isolation (emergency recirculation without pressurization) | 46

The Control Room Air-Conditioning System is automatically switched to the emergency recirculation mode upon receipt of signals as outlined in Section 9.4. In addition, the system may be manually switched to | 76
the emergency ventilation mode of operation by the operator from

the Control Room ventilation panels. This feature enables the removal of traces of smoke that remain in the atmosphere even after the Control Room has been exhausted. The smoke exhaustion from the Control Room and the sequence of automatic events for switching modes are described in Section 9.4.

52 The Control Room Air-Conditioning System is switched automatically when going from normal operation to the emergency recirculation mode of operation. The sequence of events for switching to emergency recirculation is described in Section 9.4.1.2. The emergency recirculation mode is considered the optimum emergency mode. During this mode of operation, the Control Room envelope is isolated and pressurized to ensure a safe environment for the operators under shutdown conditions. Switching to the emergency ventilation mode can only be done manually, and only from the emergency recirculation mode.

52

52 The Control Room Air Conditioning System can also be automatically switched to the isolation mode from any of the other operating modes.

The Control Room Air-Conditioning System components are laid out to allow access by Control Room personnel for manual operation of the equipment, particularly dampers. The manual operation of the equipment would be abnormal and it is unlikely that it would have to be utilized.

6.4.4 DESIGN EVALUATIONS

6.4.4.1 Radiological Protection

An evaluation of radiological exposures to plant operators in the event of a DBA is discussed in Subsection 15.6.5.4.

6.4.4.2 Toxic Gas Protection

A hazards analysis for each toxic material was performed as recommended in NRC Regulatory Guide 1.78 [4] and is presented in Section 2.2. The habitability of the Control Room envelope was evaluated to determine if a site-related accident involving a release of hazardous chemicals exceeds the toxicity limits as specified in NRC Regulatory Guide 1.78. For additional information pertaining to this evaluation, see Section 2.2.3. 76

The Computer Rooms for Unit 1 and Unit 2 and the Technical Support Center, which are located inside the Control Room pressure boundary, employ ten non-seismic non-safety related supplementary cooling units. These areas do not contain safety related equipment and are not needed for continuous occupancy. An analysis based on Reference 10 has been performed to demonstrate that refrigerant concentrations in these areas due to the release of the total refrigerant inventory associated with these units after a seismic event (DBE) will be within the limits specified in ANSI/ASHRAE 15-78 [10]. 68

6.4.4.3 Evaluation of Heating, Ventilation, Air-Conditioning, and Filtration System

The HVAC and Filtration System readiness is ensured by the periodic testing program described in Section 6.4.5. Safe operation is ensured by having redundant equipment for the Control Room HVAC and Filtration System. A complete safety evaluation is given in Section 9.4.

6.4.5 TESTING AND INSPECTION

Preoperational tests are conducted on the Control Room HVAC and Filtration System to ensure that all equipment satisfies the design criteria during all modes of operation. Tests are also performed, as described in Section 9.4, to ensure overall system performance. The leakage tests will be conducted by closing all the access points to the Control Room.

Control Room pressure will be established by controlling the outside air intake flow of the emergency pressurization units until the design pressure is achieved. Should the outside makeup airflow through the emergency pressurization unit exceed the maximum allowable flow of approximately 800 scfm, a survey shall be conducted to locate points of excessive leakage and attempt to seal them. Tests shall be repeated as often as necessary until the above criteria are established.

55 | Control Room pressure is measured by the permanently installed
| differential pressure transmitters.

The result of the Control Room leak test is considered acceptable if
the emergency pressurization airflow does not exceed 800 scfm with the
21 | Control Room envelope being maintained at 0.125-in. wg.

Planned leakage tests will be performed to verify that adequate 78
pressurization of the Control Room envelope is maintained during
Emergency Recirculation mode. Points of significant outleakage will
be located during the tests. The Control Room envelope will be 21
maintained at 0.125-in. wg positive pressure relative to the outside
atmosphere with a maximum makeup airflow of approximately 800 scfm.

In-place testing of air cleaning components will be performed in accordance with test methods and acceptance criteria described in ANSI N510 [7].

Control Room equipment will also be tested in accordance with the methods described in ANSI N509 [6].

Testing requirements, acceptability and frequencies for ESF components 40
are established in the Technical Specifications.

6.4.6 INSTRUMENTATION REQUIREMENTS

Sufficient indications are provided in the Control Room for the 56
operator to monitor HVAC system performance. Annunciators indicate
HVAC system or component malfunctions. See Sections 7.3 and 9.4 for
more detailed discussions of the instrumentation.

Fire protection and alarm devices are annunciated in the Control Room 76
as described in Subsection 9.5.1.

76 Ionization and radiation sensors detect smoke and unsafe levels of radiation in the incoming air. The system automatically switches to emergency recirculation if a radiation detector fails. Subsequent to automatic initiation of the emergency recirculation mode, the operator can regain manual control over the system from the Control Room ventilation panels. A Control Room vertical panel mounted selector switch allows the operator to select normal operation or emergency ventilation modes as required for the operation conditions.

REFERENCES

1. 10 CFR Part 50, Appendix A, General Design Criterion 19, Control Room.

2. NRC Regulatory Guide 1.4, Assumptions Used for Evaluating the Potential Radiological Consequences of a Loss of Coolant Accident for Pressurized Water Reactors. Revision 2, June 1974, United States Nuclear Regulatory Commission.

3. NRC Regulatory Guide 1.52, Design, Testing, and Maintenance Criteria for Engineered-Safety-Feature Atmosphere Cleanup System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants, Revision 1, July 1976, United States Nuclear Regulatory Commission.

4. NRC Regulatory Guide 1.78, Assumptions for Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release, June 1974, United States Nuclear Regulatory Commission.

5. Deleted. | 76

6. ANSI N509, Nuclear Power Plant Air Cleaning Units and Components.

7. ANSI N510, Field Testing of Nuclear Air Cleaning Systems.

8. Leakage Characteristics of Openings for Reactor Housing Components, NAA-SR-MEMO-5137, Atomics International, Div. of North American Aviation, Inc., June 20, 1960.

9. Deleted. | 76

10. ANSI/ASHRAE 15-78, Safety Code for Mechanical Refrigeration. | 68

9.4 AIR CONDITIONING, HEATING, COOLING, AND VENTILATION SYSTEMS

9.4.1 CONTROL ROOM AREA VENTILATION SYSTEM

9.4.1.1 Design Bases

The Control Room HVAC and filtration systems are designed to maintain suitable and safe ambient conditions for operating personnel and equipment during all modes of operation including post-DBA conditions, in the following areas of the Control Building.

Areas on floor elevation 830 ft 0 in.:

East Control Room | 68
West Control Room | 68
Console and Control Room Unit 1 | 68
Console and Control Room Unit 2 | 68
Instrument Room Unit 1 | 68
Instrument Room Unit 2 | 68
Computer Room Unit 1 | 68
Computer Room Unit 2 | 68
File Room | 68
Production Supervisor's Office | 68
Corridor | 68
Toilet | 68
Locker Room | 68
Kitchen and Janitor Closet | 68
Charts and Supplies Storage Room | 68

Areas on floor elevation 840 ft 6 in.:

71 Technical Support Center (Office and Corridor)

71 Offices (2)

68 Electrical Equipment Corridor

Areas on floor elevation 854 ft 4 in.:

68 Control Room Air Conditioning System mechanical equipment rooms, trains A and B.

66 The Control Room, located on elevation 830 ft 0 in, is maintained at 75°F ($\pm 5^{\circ}$F) and 35-50 percent relative humidity. The Control Room HVAC and filtration equipment rooms are maintained between 40°F and 104°F. Miscellaneous areas on elevations 830 ft and 840 ft are also maintained between 40°F and 104°F. Other system design parameters are presented in Tables 9.4-1 and 9.4-2

As described in the following paragraphs, the system is provided with sufficient redundancy in equipment and power supplies to enable the system to sustain a single failure of an active component without loss of function.

1. The system is equipped with four modular air-conditioning units. Each unit is rated at 50 percent of the Control Room HVAC and filtration systems capacity. Each pair of air-conditioning units is powered from an independent Class 1E bus and is physically separated by a dividing fire wall in the Control Room HVAC and filtration mechanical equipment room.

2. The Control Room makeup air supply fans, Control Room exhaust fans, Control Room complex kitchen and toilet exhaust fans, emergency pressurization air supply filtration units and fans, and emergency filtration units and fans are 100-percent redundant. 4

3. The system is equipped with ten non-safety related local air-conditioning units that provide supplementary cooling to areas which do not contain safety related equipment and are not needed for continued occupancy. 66

4. The redundant fans and filtration units are powered from independent Class 1E buses. (See Section 8.3.)

5. Redundant outside air intake dampers CPX-VADPOU-14 and CPX-VADPOU-15 (Figure 9.4-1, Sheet 1 of 3) are provided to supply air during normal operation and to allow air for pressurization during emergency conditions. 78

6. All dampers are set to fail in the safe position or are provided with separate, bottled air supplies for emergency operation. (See Section 9.3.1) 76

7. All exhaust fans are equipped with isolation dampers CPX-VADPMU-05,06 and CPX-VADPOU-27,28 (Figure 9.4-1, Sheet 1 of 3). 78

8. Dampers CPX-VADPOU-41 and CPX-VADPOU-42 are provided for the isolation of the emergency filtration units.

9. The condensers for each pair of air-conditioning units have an independent cooling water source.

10. All control valves and dampers are equipped with manual operators at accessible locations to facilitate their operation in the event of power or instrument air failures, or both.

System components and ductwork are of seismic Category I and ANS Safety Class 3 design to ensure system availability for safe shutdown of the reactor following DBAs.

4 Failure modes for isolation valves and dampers are set so that their failure does not render the system inoperative.

Radiation protection (see Sections 11.5 and 12.3.3) is provided to permit access and occupancy of the Control Room during normal plant operation and following DBAs without personnel receiving radiation exposures in excess of five rem whole body, or its equivalent, to any part of the body for the duration of the accident, which is in accordance with GDC 19 of 10 CFR Part 50, Appendix A.

78 Surveillance of activity levels at the fresh air intake ducts to the Control Room is provided by seismically qualified process radiation monitors which are shown on Figure 9.4-1, Sheet 1 of 3. (See Section 11.5 for design criteria.) The activity level at each intake duct is monitored and indicated in the Control Room; high levels are annunciated on the radiation monitoring system CRT display console.

78 Continuous surveillance of radiation dose levels in the Control Room is also provided by redundant area radiation monitors which are shown on Figure 9.4-1, Sheet 1 of 3. (See Section 12.3.4 for design
41 criteria. Radiation dose level is continuously monitored, and indicated in the Control Room and annunciated on the radiation monitoring CRT display console.

76

9.4.1.2 System Description

The Control Room design shown in Section 1.2, Figure 1.2-33, provides for a single Control Room serving both units. The Control Room HVAC system is designed to serve this area as well as the computer rooms and offices located at the same elevation and at elevation 840 ft 6 in. The Control Room HVAC system is designed to remove all heat generated by the equipment, computers, lighting, personnel, and so forth and to provide a safe operating condition for personnel.

Two modular air-conditioning units provide the cool air required, with two units of the same size on standby to address the single failure criterion. Each modular air-conditioning unit contains a roughing filter, cooling coil, heating element, humidity control equipment, fan, and associated instrumentation controls.

The cooling coils are the direct-expansion, refrigerant type and suitable for refrigerant R-12. The coils of each modular air-conditioning unit are connected to separate and independent compressors and water-cooled condensers.

66 During normal operation, the air is recirculated through the air-conditioning unit with about six percent outdoor air (3000 ft^3/min fresh air) added to provide for oxygen depletion, odor control, and leakage through toilet exhaust fans, doors, and the room exhaust. Makeup air is supplied by one of two redundant fans.

Two redundant emergency filtration units are provided for use following DBAs. Each unit comprises a roughing filter, two high-efficiency particulate absorption (HEPA) filters, and iodine adsorbers and booster fans.

Exhaust air from the toilet, locker, and kitchen areas is discharged directly to the atmosphere through one of the two 100-percent-capacity toilet exhaust fans.

78 The Control Room is pressurized with respect to the environment to
prevent infiltration of unfiltered and unmonitored air and to account
for leakages, as specified in Section 6.4. The overpressure is
considered sufficient to prevent infiltration because the Control Room
building structure is completely airtight, with few penetrations, and
designed to withstand the tornado loads and tornado-generated missiles
described in Section 3.3.2. This overpressure is maintained by
9 modulating exhaust damper CPX-VADPMU-05 or CPX-VADPMU-06 during normal
operation and emergency pressurization damper CPX-VADPOU-22 or CPX-
78 VADPOU-23 during emergency recirculation and ventilation modes. See
Section 6.4.

76

Overpressure during the emergency recirculation mode is accomplished by introducing up to 800 ft^3/min of filtered air into the Control Room. This air is supplied through a 100-percent-redundant air-cleanup unit consisting of a fan, a mist eliminator, a heater, a roughing filter, two HEPA filters, and an iodine adsorber. | 27

Section 6.4.2 and Table 6.4-4 describe the potential leak paths and leakage characteristics. | 27

The orientation of the Control Room doors to swing inward is necessary to reduce the exfiltration rate from the Control Room and to prevent a possible depressurization of the Control Room caused by a door being left ajar. Provision of a positive pressure against an inward-opening, gasketed door results in a significant decrease in leakage over an outward-opening door. Consequently, a reduced emergency pressurization flow rate is required during possible post-LOCA operation. The lower outside air intake rate results in a Control Room operator dose well below the allowable limits of GDC 19, 10 CFR Part 50 Appendix A. For an analysis of the dose received by the Control Room occupants in the unlikely event of a LOCA, see Section 15.6.5.4

Operation of the Control Room HVAC system comprises the following modes:

1. Normal operation

2. Emergency recirculation

3. Emergency ventilation

4. Isolation

| 46

The four modes of operation are shown on Figure 9.4-1. | 46

During normal operation, one makeup air supply and one main exhaust fan are operating, and their associated dampers are open. The emergency filtration system is isolated, and its bypass damper is open. One kitchen and toilet exhaust fan also operates.

The Control Room HVAC system automatically switches to emergency recirculation when any one of the conditions outlined in Subsection 9.4.1.3 are detected. The procedure is as follows:

1. The makeup air supply fan and all exhaust fans stop.

46 2. All exhaust dampers close.

11 3. The isolation and bypass dampers of the emergency filtration units are positioned such that approximately 16 percent (8000 ft^3/min) of the recirculated air flow is directed through each of the filters and booster fans.

11 4. Both emergency filtration unit fans start.

76 5. Both emergency pressurization supply unit fans start. The
11 dampers are positioned such that the air is directed through the pressurization air cleanup units to the emergency filtration unit.

66 In cases 4 and 5 above, the operator, within one (1) hour, stops one pressurization and one filtration unit fan.

The operation of the emergency ventilation mode is required to replenish the oxygen content in the Control Room atmosphere during the
76 emergency recirculation mode. For brief intervals the makeup fan is operated, supplying filtered outside air (3800 ft^3/min) to the Control Room complex. The main and toilet and kitchen exhaust fans are also operated simultaneously.

Subsequent to the automatic initiation of the emergency recirculation mode, the operator can regain manual control over the system from the Control Room ventilation panels.

The operator may take manual action to transfer the control room ventilation system from the normal mode to the isolation mode following control room annunciation of smoke at either of the two outside air intakes (see section 6.4). The return to the normal operation mode also requires manual action. 76

Design temperatures and relative humidity in the Control Room complex are maintained within the limits shown in Table 9.4-2 by the Control Room air-conditioning units during all modes of operation, except during emergency conditions where the relative humidity is 50% max. 70 Each Control Room air-conditioning unit is an independent, seismic Category I package unit with a component cooling water cooled condenser. Electric reheat coils are provided for the computer rooms, the production supervisors office, and the main console areas and are powered by the non-safety-related electrical bus. Flow measurement instrumentation is provided downstream of the emergency filtration units to balance flow through the carbon filters, during surveillance testing.

9.4.1.3 Safety Evaluation

The Control Room atmosphere cleanup units (integrated into the HVAC system design) conform to the criteria established in NRC Regulatory Guide 1.52, Reference [10], which is shown in Section 6.5, Table 6.5-1.

The Control Room HVAC system is provided with instrumentation and controls which continuously monitor system performance. In addition, area radiation and fire detection monitors are provided to ensure safe operating conditions for equipment and personnel during all modes of operation.

53 An ionization detector is located in each fresh air intake to detect smoke in the incoming air. If smoke is detected, the respective inlet and outlet Control Room air duct dampers may be closed and air recirculated in the Control Room. Switching to the normal or emergency ventilation modes of operation is accomplished manually by the operator by means of a Control Room vertical panel-mounted selector switch.

Any contaminants that have entered the Control Room prior to full closure of the dampers are removed by the emergency filtration unit. Removal of heavy concentrations of contaminants caused by a fire in the Control Room is accomplished by portable smoke ejectors.

Audible and visual alarms are provided in the Control Room to alert the operator in the event of system malfunction or unsafe conditions.

53 The Control Room air-conditioning system is designed to automatically
switch to the emergency recirculation mode of operation described in
Subsection 9.4.1.2 should the offsite power fail (for operator
86 convenience only). The system also automatically switches to this
mode of operation upon receiving a Control Room ventilation high-
radiation signal or a safety injection signal from either Unit 1 or
Unit 2. The radiation signal originates from radiation monitors
68 which sample the Control Room intake air vents. Radiation detectors
31 of this type are discussed in Section 11.5.

76 The iodine absorbers are manufactured from impregnated activated carbon and are used for radioiodine compound removal.

59 The iodine adsorbers construction and efficiencies comply with NRC
66 Regulatory Guide 1.52 (See Appendix 1A(B)). Additional data
concerning iodine adsorbers is presented in Table 9.4-6.

Anticipated efficiencies of filters are in accordance with Table 9.4-4. | 66

An analysis of postaccident dose levels in the Control Room is presented in Section 15.6.5.4. | 68

Sufficient redundancy in equipment and power supplies enables the system to sustain a single failure without total loss of function. The emergency pressurization and recirculation filter trains, plus supply and exhaust fans and the associated dampers, are completely redundant. Four parallel air-conditioning units are used to provide a 100 percent (two air conditioners) standby feature.

The probability of an electrical fire in the Control Room is low because of the low-voltage and flame-retardant cables used. Fire dampers automatically isolate the affected areas to prevent spreading of the fire and shut off the oxygen supply. The charcoal adsorbers are also provided with a fire protection water deluge system which operates automatically upon receipt of a high- temperature signal from an adsorber bed. Actuation of the system also activates an alarm in the Control Room. A failure mode and effects analysis is presented in Table 9.4-8.

Alarms in the Control Room alert the operator to any system malfunction so that he can manually actuate the necessary standby units. The maximum operational temperature limit for Control Room instrumentation is 120^{o}F. This temperature is not reached during the short periods of system malfunction prior to the actuation of the standby units.

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13 The Control Room HVAC equipment is located in a seismic Category I structure above the Control Room at elevation 854 feet 4 inches, as shown in Section 1.2, Figure 1.2-6. The Control Room HVAC system is seismic Category I and ANS Safety Class 3. Outside air enters through intake louvers located in the north and south walls of this structure. Concrete walls and slabs, behind the primary wall, are located so as to prevent postulated missiles from entering further into the building. Refer to Figure 6.4-3. Air flow into the building is provided through an opening in one of the tornado missile enclosure walls; the opening is so located that no postulated missile can pass through into the building, thereby protecting the outside air intake ducts and mechanical equipment from tornado-related missiles described in Section 3.3.2. Any damage to an intake louver will not impair the functioning of the air intake.

78 All safety-related Control Room HVAC equipment required for operation during a loss of offsite power or following a LOCA is powered from the redundant Class 1E buses.

9.4.1.4 <u>Inspection and Testing Requirements</u>

Shop inspection and testing are performed for all equipment, including heating and cooling coils and controls.

The system is initially tested and adjusted for proper flow paths, flow capacities, heating and cooling capacities, mechanical operability, and filter efficiency.

Fans are rated and tested in accordance with the standards of the Air Moving and Conditioning Association (AMCA).

40 The HEPA filters and iodine adsorbers are tested periodically during plant operation, in accordance with NRC Regulatory Guide 1.52, (see Appendix 1A(B)). Filter units are arranged to facilitate cell replacement.

Heating and cooling coils are tested in accordance with manufacturer's standards. Ductwork and filter are tested in accordance with ANSI N510 and industry standards.

Redundant standby equipment is operated on a cyclic basis to ensure the availability of the equipment.

9.4.2 SPENT FUEL POOL AREA VENTILATION SYSTEM

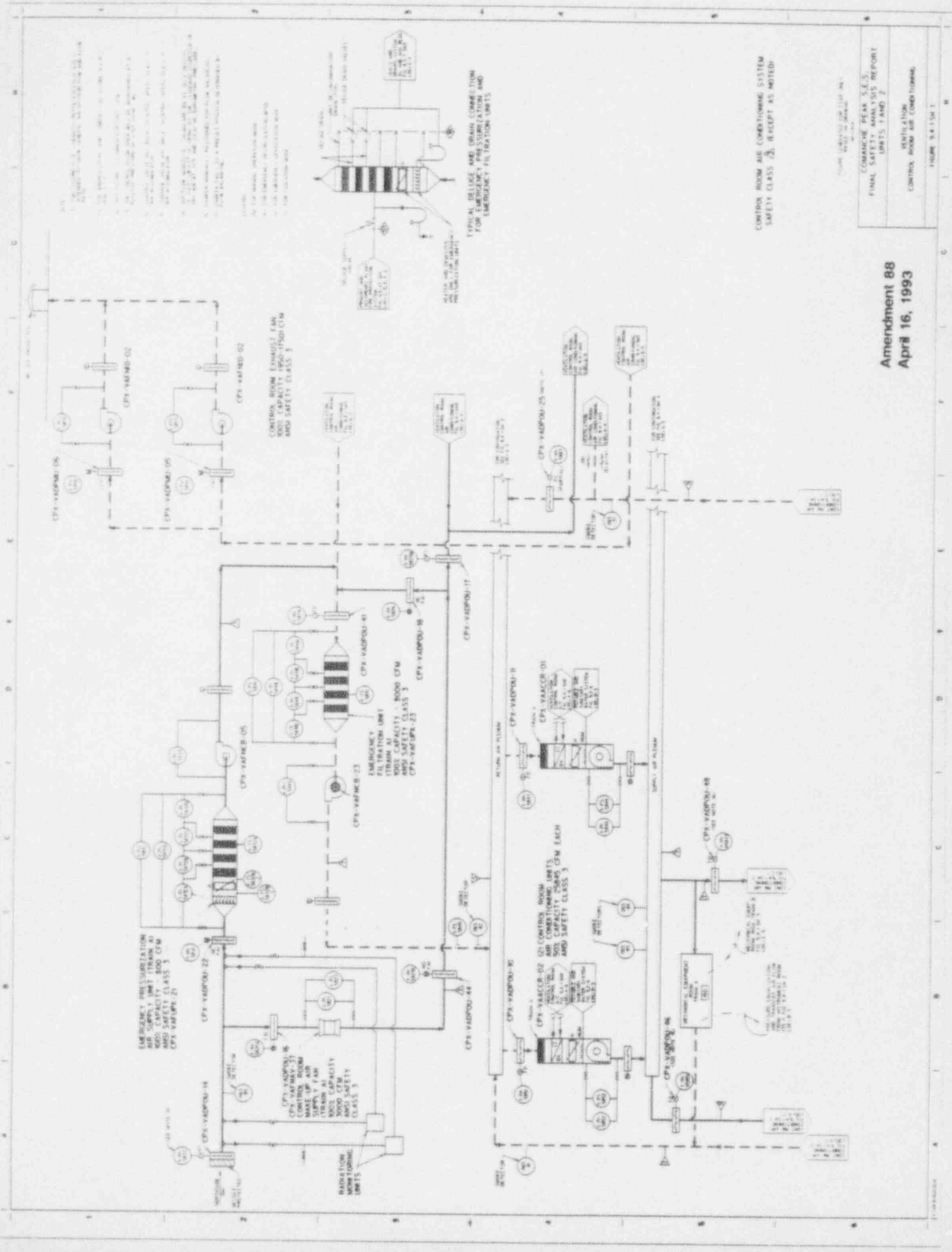
The spent fuel pool area ventilation system is incorporated in the Fuel Building ventilation system and the Primary Plant Ventilation System. 41

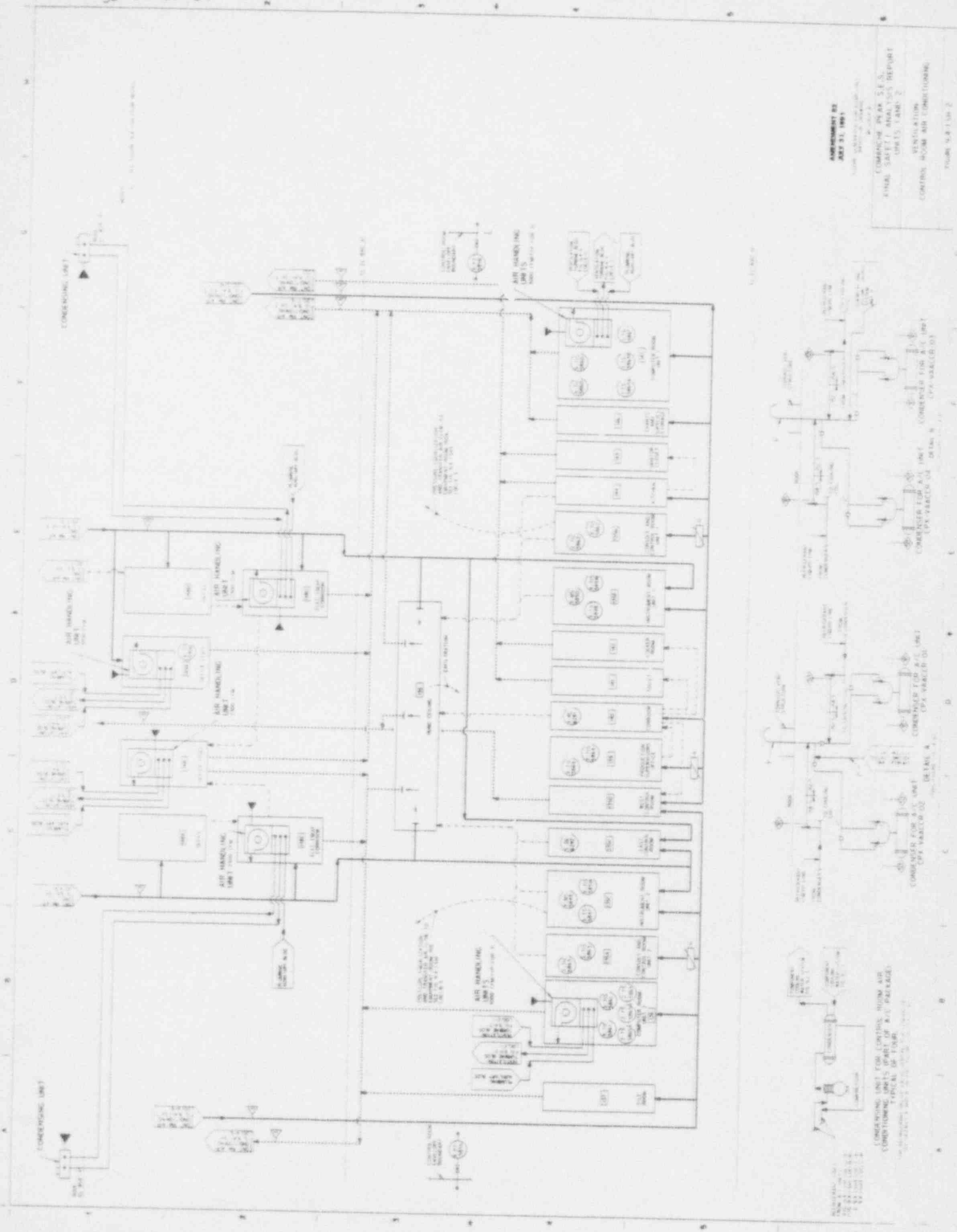
9.4.2.1 Design Bases

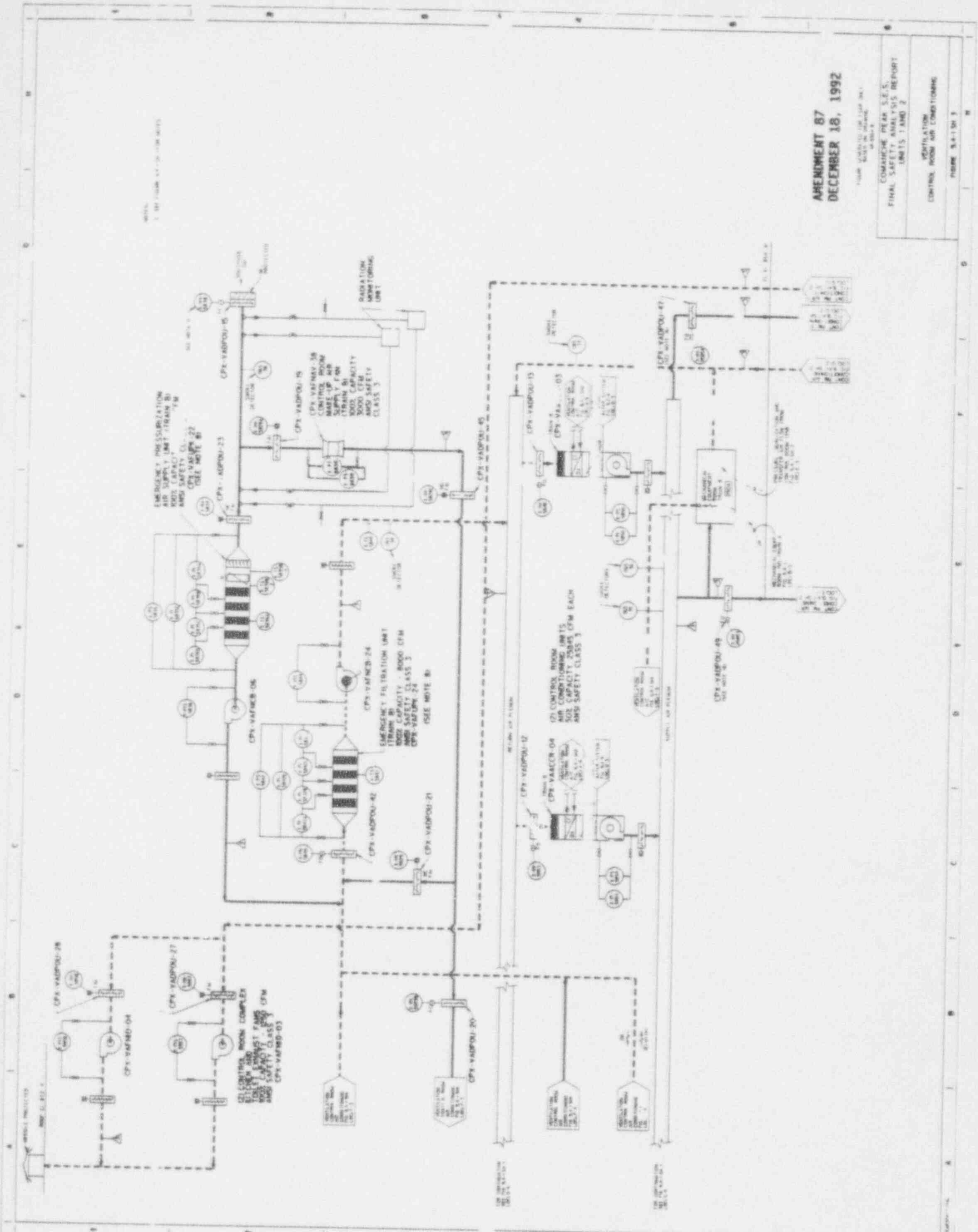
The Fuel Building ventilation system is designed to maintain suitable ambient conditions for personnel and equipment during normal plant operations and scheduled shutdowns. Ambient temperature throughout 76
the building is normally maintained as shown in Table 9.4-2. During emergency conditions (LOCA with a loss-of-offsite power) the ambient temperature in the spent fuel pool heat exchanger and pump rooms shall be maintained below 122°F, though the temperature may rise to 129°F for a short duration. System design parameters are shown in Table 9.4-1. 66

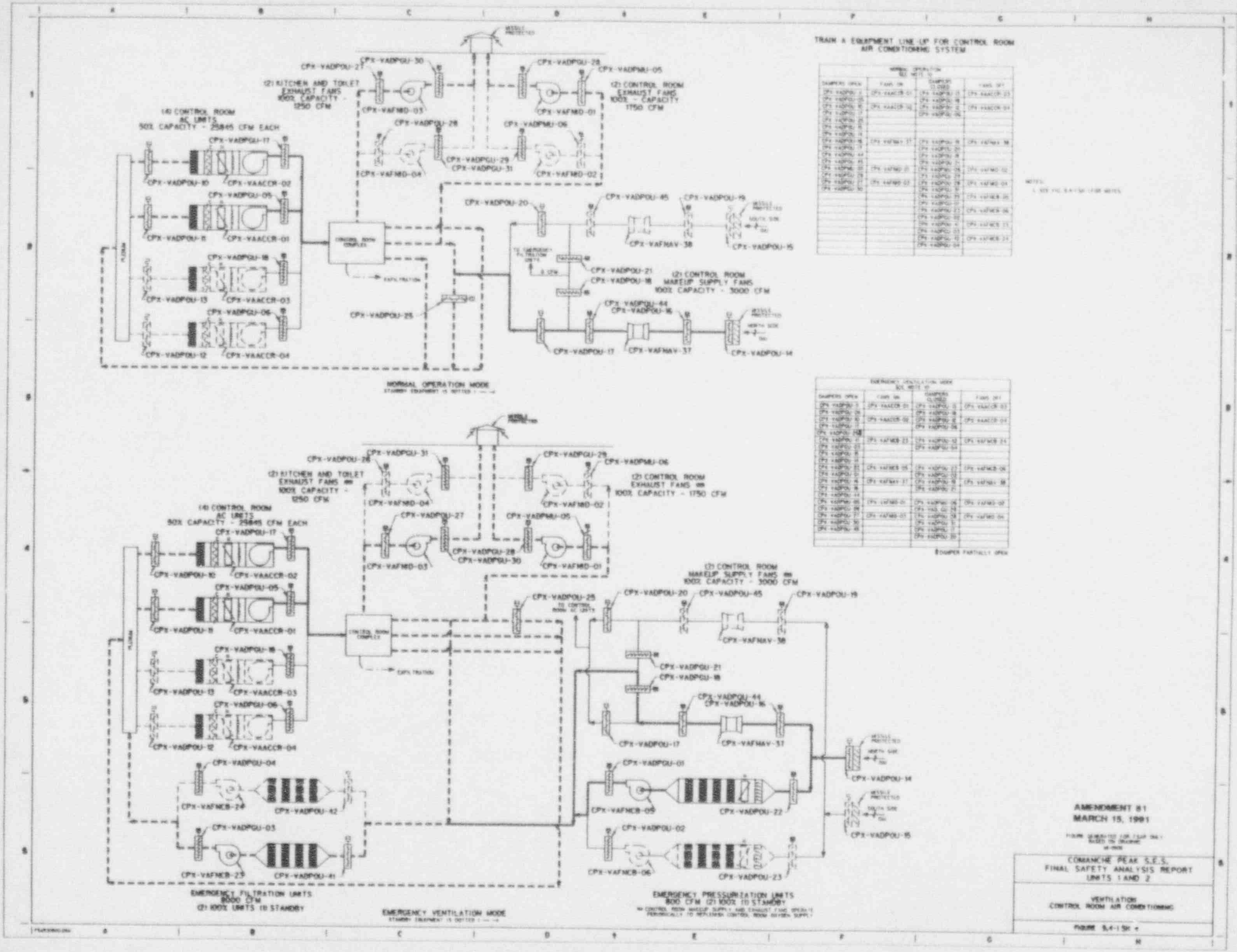
In addition, a slight negative pressure is maintained during normal 56
operation and during a fuel handling accident to prevent the outflow of unfiltered, contaminated air to the environment. Operating the primary plant ventilation exhaust filter trains minimizes the release of radioactive particulate effluents and radioiodine to the environment. 56

The dissipation of heat from the spent fuel pool cooling pumps during 56
loss of offsite power is accomplished by using emergency fan coil units, which maintain the safety-related pump rooms below the maximum ambient temperature allowed by the equipment design. The emergency


EMERGENCY PRESSURIZATION AIR SUPPLY UNIT
EMERGENCY FILTRATION UNIT
CONTROL ROOM EXHAUST FAN
RADIATION MONITORING UNITS
TYPICAL DELUGE AND DRAIN CONNECTION FOR EMERGENCY PRESSURIZATION AND EMERGENCY FILTRATION UNITS
CONTROL ROOM AIR CONDITIONING SYSTEM
SAFETY CLASS 3, EXCEPT AS NOTED
COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 AND 2
Amendment 88
April 16, 1993


CONDENSING UNIT
AIR HANDLING UNIT
COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
CONDENSER FOR A/C UNIT


AMENDMENT 87
DECEMBER 18, 1992
COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 AND 2
VENTILATION
CONTROL ROOM AIR CONDITIONING
EMERGENCY PRESSURIZATION AIR SUPPLY UNIT (TRAIN B)
EMERGENCY FILTRATION UNIT (TRAIN B) 100% CAPACITY - 8000 CFM ANSI SAFETY CLASS 3
(2) CONTROL ROOM AIR CONDITIONING UNITS 50% CAPACITY 25845 CFM EACH ANSI SAFETY CLASS 3
RADIATION MONITORING UNIT


TRAIN A EQUIPMENT LINE-UP FOR CONTROL ROOM AIR CONDITIONING SYSTEM
(4) CONTROL ROOM AC UNITS 50% CAPACITY - 25845 CFM EACH
(2) KITCHEN AND TOILET EXHAUST FANS 100% CAPACITY - 1250 CFM
(2) CONTROL ROOM EXHAUST FANS 100% CAPACITY 1750 CFM
(2) CONTROL ROOM MAKEUP SUPPLY FANS 100% CAPACITY - 3000 CFM
NORMAL OPERATION MODE
EMERGENCY FILTRATION UNITS 8000 CFM (2) 100% UNITS (1 STANDBY)
EMERGENCY VENTILATION MODE
EMERGENCY PRESSURIZATION UNITS 800 CFM (2) 100% (1 STANDBY)
AMENDMENT 81
MARCH 15, 1991
COMANCHE PEAK S.E.S.
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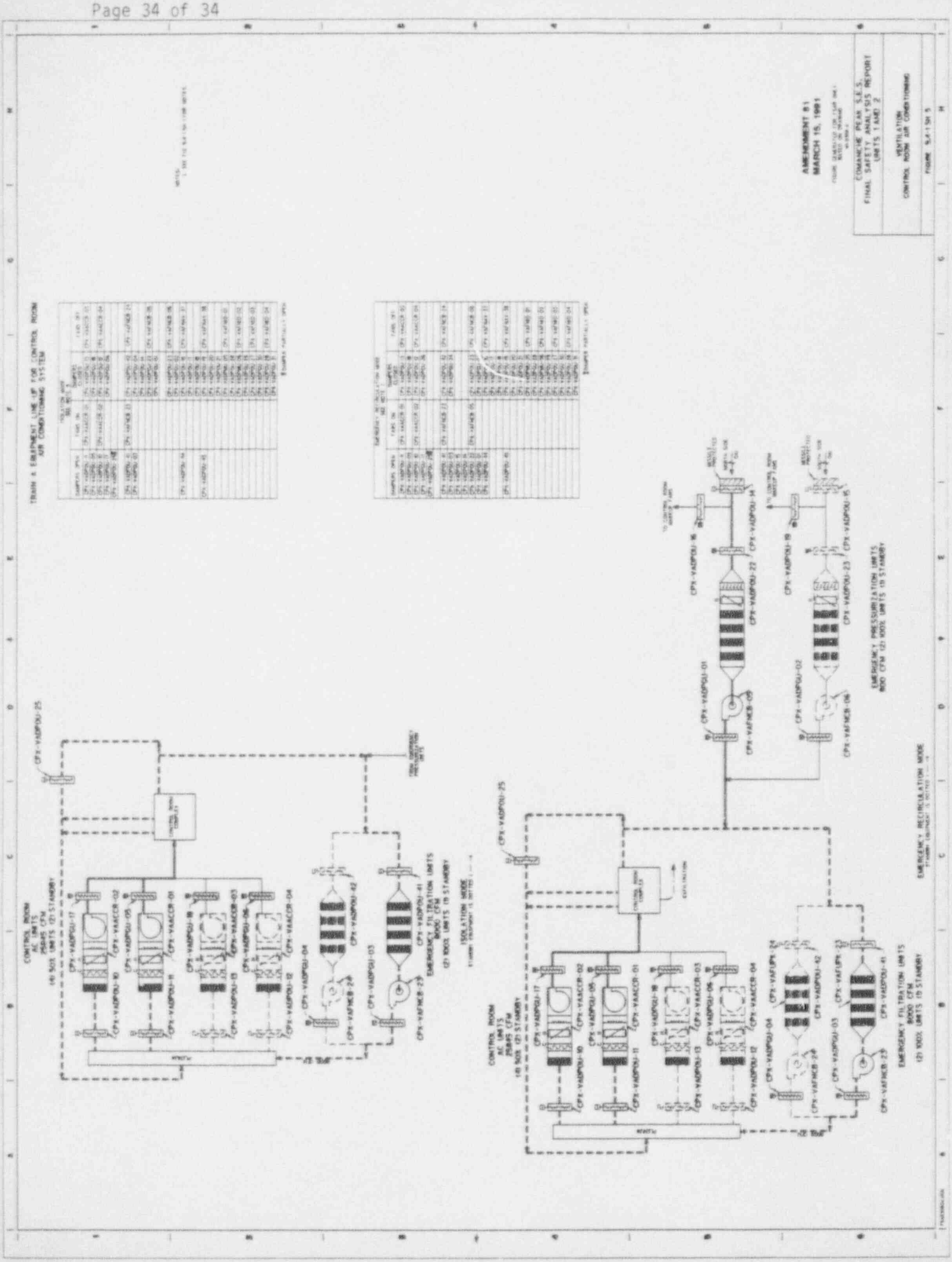
UNITS 1 AND 2
VENTILATION
CONTROL ROOM AIR CONDITIONING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FINAL SAFETY ANALYSIS REPORT
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TRAIN A EQUIPMENT LINE-UP FOR CONTROL ROOM AIR CONDITIONING SYSTEM
CONTROL ROOM AC UNITS 25845 CFM
EMERGENCY FILTRATION UNITS 8000 CFM
ISOLATION MODE
EMERGENCY PRESSURIZATION UNITS
EMERGENCY RECIRCULATION MODE