ENCLOSURE 1

UPGRADE PLANS TO ADDRESS SEP TOPIC II-1.C, OFFSITE HAZARDS AND TMI ACTION PLAN ITEM III D.3.4, CONTROL ROOM HABITABILITY

SAN ONOFRE UNIT 1

DOCKET NO. 50-206

SOUTHERN CALIFORNIA EDISON COMPANY

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I. EXECUTIVE SUMMARY

San Onofre Unit 1 was constructed in the 1960's in accordance with the standard practice of the time, including SMACNA (Sheet Metal and Air-Conditioning Contractors National Association) standards. These practices included provisions for control room HVAC and emergency filtration.

Through the succeeding years, a number of requirements for the control room HVAC system in new plants evolved. After the accident at TMI Unit 2, and in accordance with the NUREG-0737 TMI Task Action Plan item III.D.3.4, licensees have been asked to assure that the nuclear power plant can be safely operated and shut down under design basis accident conditions and that control room operators will be adequately protected against potential hazards including the effects of accidental release of toxic and radioactive gases.

The review of potential upgrades to the control room HVAC system has been completed. The review indicates that none of the considered major modifications which are designed to make the control room HVAC system comply with current regulatory design standards are warranted. The conclusion is based on a probabilistic risk evaluation of the loss of control room habitability for the existing design, and a value impact assessment of possible upgrades to the control room HVAC system to reduce the probability of loss of habitability. The existing control room HVAC system and available backups, while not designed to current standards, are nevertheless a reliable system capable of protecting the operators from probable hazards. Manually initiated backup control room ventilation and cooling capabilities are available to the operators to ensure the control room environment remains habitable in the event of failure of the control room HVAC system.

In accordance with our November 14, 1984 letter, SCE has reviewed potential modifications to upgrade the reliability of the control room habitability systems. The modifications that will be performed are as follows:

- Installation of redundant leak tight dampers in the normal and emergency fresh air intake ducts of the control room and TSC systems.

- Modify the control room HVAC control logic to allow a manually actuated, isolated recirculation mode of operation.

- Increasing the TSC HVAC capacity to handle the cooling loads from both the TSC and the adjacent control room, and installation of cross-connecting ducting between the TSC and control room HVAC systems to permit use of the TSC HVAC to cool the control room and TSC in the event of a loss of the control room HVAC system. This system will not be seismic or tornado qualified except where it interfaces with the primary control room HVAC system. The existing control room and TSC HVAC systems are as shown in Figures 1 and 2, respectively.

- Review and upgrade, if necessary, the structural integrity of the control room HVAC equipment and duct supports. This review and upgrade will be handled as part of the overall Long-Term Service Upgrade Program and is only stated here for completeness.

- Review the Tornado survivability and upgrade as appropriate. Based upon the results of the review, the system will be modified as approprate. The review and any upgrades will be handled as part of the resolution SEP topics III-2, Wind and Tornado loading and III-4.A, Tornado missiles.

- The onsite toxic gas sources will be modified to preclude them from consideration in the toxic gas hazard analysis.

The installation of redundant leak tight dampers in the control room and TSC HVAC system normal and emergency fresh air intake ducts significantly reduces the quantity of air inleakage into the system in the emergency mode, in the case of a radiation hazard, and the isolated mode, in the case of a toxic gas hazard. The redundancy addresses concerns about single failure of a damper to close or open.

The upgrade of the control room HVAC control logic will allow an isolated recirculation mode of operation. This upgrade will assure continued cooling in the event that the control room HVAC needs to be isolated from the outside atmosphere in order to protect the operators from an external radiological or toxic gas hazard.

The upgrade of the TSC HVAC capacity and addition of cross-connecting capability between the control room and TSC provides a fully capable backup of active components to the control room HVAC using the TSC HVAC system. The basis for the upgrade is to address a single active failure in the control room HVAC system. The TSC HVAC system does not meet all the requirements of the Standard Review Plan Section 6.4 for a redundant HVAC system. However, the upgrade does address the infrequent loss of the control room HVAC and the subsequent need for cooling.

The structural review and upgrade of the control room HVAC equipment and ducts improves the survivability of the HVAC system from an earthquake. This review and upgrade will be included as part of the overall SEP seismic program.

The review of the tornado survivability of the HVAC equipment will provide assurance that the system will survive the design basis tornando event. This review will be included as part of the overall SEP tornado related activities.

These modifications will bring the Unit 1 control room habitability systems into general compliance with the intent of Standard Review Plan (SRP) Section 6.4. It is Southern California Edison's position that all

of the specific requirements of SRP Section 6.4 should not be applied to Unit 1 due to: (1) the demonstrated low value of the potential conforming upgrades, (2) the demonstrated adequacy of the existing system after 15 years of successful operation, and (3) the commitment to install the previously discussed modifications to comply with the intent of the regulation. The discussion which follows provides additional support for these conclusions.

II. DISCUSSION OF ENHANCED REGULATORY COMPLIANCE FROM UPGRADES

The current regulatory guidance and requirements for the control room habitability system are contained in the following:

- 10CFR Part 50, Appendix A, General Design Criterion 19,
- NUREG-0737,
- Regulatory Guides 1.52, 1.78, 1.95, and
- ANSI N509-1980 and ANSI N510-1980,
- Standard Review Plan 6.4, 6.5.1, and 9.4.1

The Standard Review Plan (particularly SRP 6.4 "Habitability Systems") provides a comprehensive description of these requirements and guidance on how these requirements may be met. This section evaluates the upgraded HVAC system and identifies areas in which the NRC requirements for the HVAC system are not met. The NRC requirements (taken in the order described in SRP 6.4) are first described and the conformance of the upgraded system with respect to each requirement is discussed. Table 1 gives a point by point comparison to each of the SRP criterion.

A. Control Room Emergency Zone

1. Requirements

SRP 6.4 Section II.1 states that the control room emergency zone should be established and include those areas normally occupied and requiring occupancy by the operators. These should include the following:

- o The control room
- o The computer room, if it is used as an integral part of the emergency response plan
- o The shift supervisor's office
- o The washroom and the kitchen
- o Other spaces requiring operator occupancy

2. Conformance

San Onofre Unit 1 does not have a plant computer. The control room emergency zone at San Onofre Unit 1 includes the control room and the watch engineer's office (also served as shift supervisor's office). The washroom and the kitchen were considered to be infrequently occupied and were not included in the control room emergency zone. This may not be consistent with the intent of the establishment of an emergency zone in that under long term occupation (due to the sustained presence of radioactive or other cloud) the operators will need to exit the control room to use the kitchen and washroom facilities. The dose calculation for the control room operators following a loss-of-coolant accident accounts for occupancy of the washroom and kitchen for typical periods of time.

B. Ventilation System

1. Requirements

The SRP 6.4 Section II.3 contains the following requirements for the ventilation system:

- Dampers used to isolate the control zone from adjacent zones or the outside must be leaktight.

- A single failure of an active component should not result in loss of the system's functional performance.

- A pressurization system should be able to pressurize the control room during a radiation emergency. Periodic pressurization tests are required to determine that the rated flow (normally about 300 to 600 cfm) is sufficient to pressurize the control room to at least 1/8" water gauge.

2. Conformance

The manual transfer to filtered air makeup or to an isolated mode of control room HVAC system operation will be performed by the operators on a high radiation alarm or notification of a toxic gas event that warrants either of these modes of operation. This is an acceptable configuration due to the low contribution of the airborne dose to the total integrated accident dose and the low probability of a toxic gas event. The proposed modification will provide isolation dampers which will be redundant and leaktight. The existing control room HVAC system is a single train. Thus, a single failure of an active component may result in loss of the system. However, after the previously discussed modifications are completed, the TSC HVAC system will be available to provide backup cooling and emergency air cleanup capability to the control room. Both the

existing control room HVAC and the TSC HVAC emergency air cleanup system are capable of adequately pressurizing the control room relative to the outside atmosphere.

C. Toxic Gas Protection

1. Requirements

The SRP 6.4 Section II.4 contains the following requirements:

- Self-contained breathing apparatus for the emergency team (at least 5 men) should be on hand. A six-hour onsite bottled air supply should be available with unlimited offsite replenishment capability from nearby location(s).

2. Conformance

The current facility in the control room at San Onofre Unit 1 provides self-contained breathing apparatus with a six hour air supply for seven people. An unlimited supply of air is available offsite.

D. Emergency Standby Filters

1. Requirements

The SRP 6.4 Section II.5 states that the atmosphere cleanup systems should meet the following criteria:

- Be an engineered safety feature.

- Be designed for operation after design basis accidents (DBA) and retention of radioactive material after the DBA.

- o Be able to prefilter the air, remove moisture ahead of charcoal adsorbers, and remove particulate matter by HEPA filters before and after the charcoal adsorbers.

- o Include redundancy of filter systems with the trains physically separated so that damage to one system will not cause damage to the other system.

- o Be designated as Seismic Category I.

- o Have no individual system with a volumetric air flow rate greater than 30,000 cfm.

- o Be instrumented to signal, alarm and record pressure drop and flow rate at the control room.

- o Have an atmospheric cleanup capability automatically activated after a DBA unless (1) the atmospheric cleanup system is operating during the time the DBA occurs, or (2) the activation is the result of another ESF signal (i.e., temperature, pressure).

2. Conformance

- o The current HVAC system is operable after a DBA.

- o A prefilter and HEPA filter are provided before the charcoal filter. A moisture separator is not required for this application. A second high efficiency particulate air (HEPA) filter does not provide significant additional protection and is not provided after the charcoal filter.

- o The filtration unit is not redundant. However, the backup TSC HVAC system does include filtration unit designed, to the extent required by NUREG-0737, in accordance with the above SRP criteria, thus providing available backups, if needed, through the cross connect.

- The control room HVAC equipment supports will be reviewed and upgraded as part of the seismic reevaluation program.

- The filter system design flow is less than the 30,000 cfm maximum specified in SRP 6.5.1.

- The current filtration unit does not record pressure drop or flow rate, and does not provide an alarm indication. This does not provide significant protection over and above the surveillance required by the technical specifications.

- The emergency filter system is manually activated in the event of a DBA.

E. Relative Location of Source and Control Room

1. Requirements

SRP 6.4 Section II.5 states that the following requirements must be met:

- As a general rule, the control room ventilation inlet should be separated from the major potential radiation release points by at least 100 feet laterally and by 50 feet vertically. However, the actual minimum distances must be based on the dose analysis.

- The control room ventilation inlet must be so placed in relation to the location of potential toxic gas release points as to minimize control room contamination in the event of a release.

- Other potential sources inside the control building or adjacent connected buildings should be checked to eliminate the possibility of significant releases entering the emergency zone.

2. Conformance

- o The control room ventilation air inlet is on the west wall of the Control and Administration Building approximately 135 feet from the containment. This distance is greater than 100 feet laterally and the 50 feet vertically specified in the NRC requirement.

- o Unit 1 onsite toxic gases and offsite sources of hazardous chemicals have been reviewed. Based on this assessment, hydrocarbons, chlorine, carbon dioxide and ammonia represent offsite sources for which the current location of control room air intake presents a potential hazard. Since all these sources are located offsite, the location of the intake is not a factor. The current onsite toxic gas sources are ammonia and hydrazine used in secondary water treatment. These sources will be modified by relocation or enclosure in leak tight enclosures, to preclude their consideration as toxic gas sources.

- o The potential for contamination of the control room air from releases inside adjacent areas of the building is negligible.

F. Radioactive and Toxic Gas Hazards

1. Requirements

SRP 6.4 Section II.8 states that the following requirements must be met:

- o The calculated control room dose should be compared with the guidelines of General Design Criterion 19, Appendix A of 10 CFR Part 50. If the guidelines are exceeded, the system should be improved.

- If storage or transport of chemicals is considered a hazard, special protection provisions for toxic gases should be implemented.

2. Conformance

- Letters from Southern California Edison (SCE) to the NRC dated September 22, 1977 and October 26, 1977 previously indicated that the current control room dose does not meet the guidelines of General Design Criterion (GDC) 19, Appendix A of 10 CFR Part 50. The element of the calculated dose which exceeds the guideline is the whole body gamma dose. The calculated whole body gamma dose with a single failure (emergency pressurization fan fails to operate) is 6.6 rem. This value is 1.6 rem in excess of the guideline. The portion of the whole body gamma dose due to direct radiation from outside the control room is 6.2 rem. This is an acceptable condition since the exceedance of the GDC criteria is not a significant amount.

- A number of potential plant modifications have been evaluated to determine whether or not the cost effective enhancements can be identified. Of a number of modifications identified, it was determined that no cost effective enhancements existed. Subsequent evaluation to determine whether or not marginally cost effective enhancements might be appropriate identified several improvements for consideration. The basis for the recommendation involved a realization that non-regulatory required enhancements might be possible with the benefit of providing additional capability for reduced cost. The ability to forego compliance with all regulations associated with safety systems represented a potential cost reduction which was felt to warrant consideration.

In evaluating a number of potential modifications, the toxic gas monitoring system appeared (based upon the analysis), to represent a candidate for inclusion. The negative cost benefit was reduced by considering a single train of equipment without technical specifications and with modest reliability. This system, while still not having positive value-impact, was determined to be more beneficial than other potential modifications.

As a result of this initial favorable indication, additional information was gathered regarding the viability of cost effective toxic gas monitoring. Additional information indicated that the present state-of-the-art is not consistent with cost effective simple implementation of such a system. Operating experience includes both high cost of maintenance and high cost of calibration. In addition, there has been considerable experience with spurious alarms leading to significant management and engineering attention. This high level of maintenance and management attention represents not only a dollar cost in man hours, but a significant drain upon station resources. Considering both the actual cost of these resources and the opportunity cost in terms of unavailability to perform other tasks, it is concluded that in spite of the marginal value-impact, the incorporation of a toxic gas monitoring upgrade is not consistent with the objective of achieving significant enhancement at minimal cost. Therefore, the toxic gas monitoring system is not included as part of the recommended system upgrade.

In lieu of direct toxic gas monitoring at San Onofre Unit 1, procedures will be developed to require appropriate protective operator action upon notification of an offsite toxic gas hazard from the San Onofre Units 2

and 3 toxic gas monitors or other notification sources located both on and offsite. These measures, when considered with the low probability (e.g. $1\text{-}2X10^{-6}$ per year) of an offsite hazard, are adequate to provide reasonable protection to the operators from toxic gas hazards.

FIGURE 1

CONTROL ROOM HVAC SYSTEM SCHEMATIC DIAGRAM

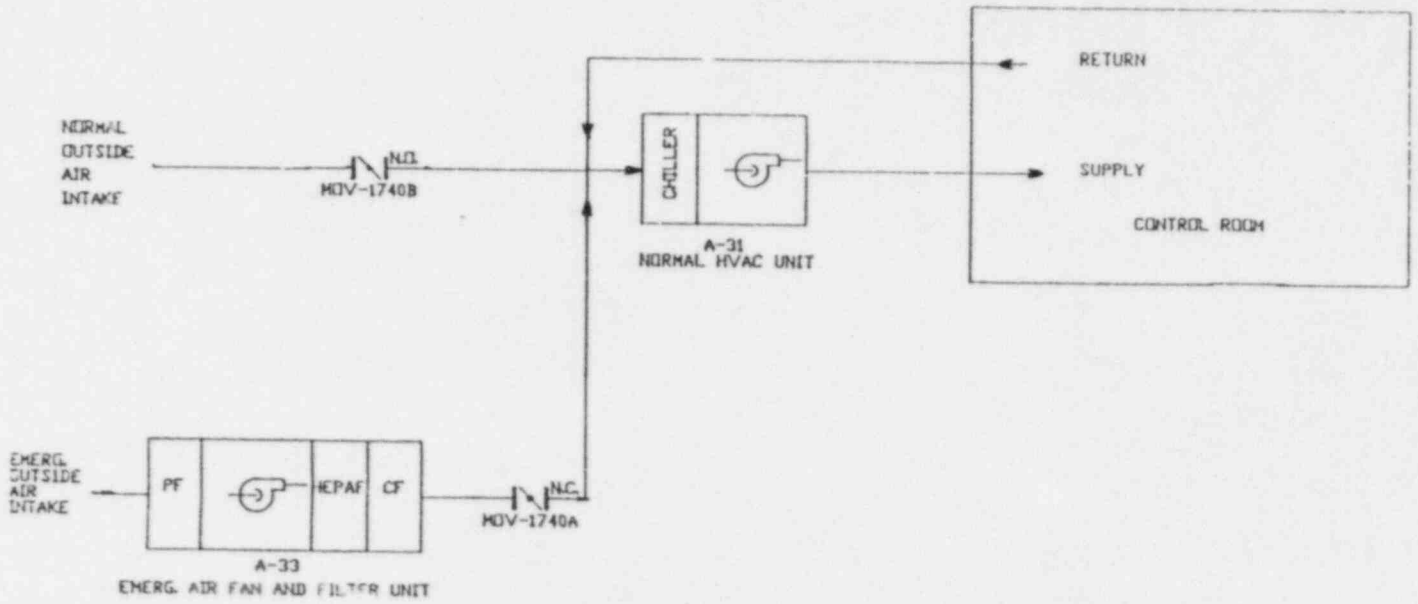

FIGURE 2

TECHNICAL SUPPORT CENTER HVAC SCHEMATIC DIAGRAM

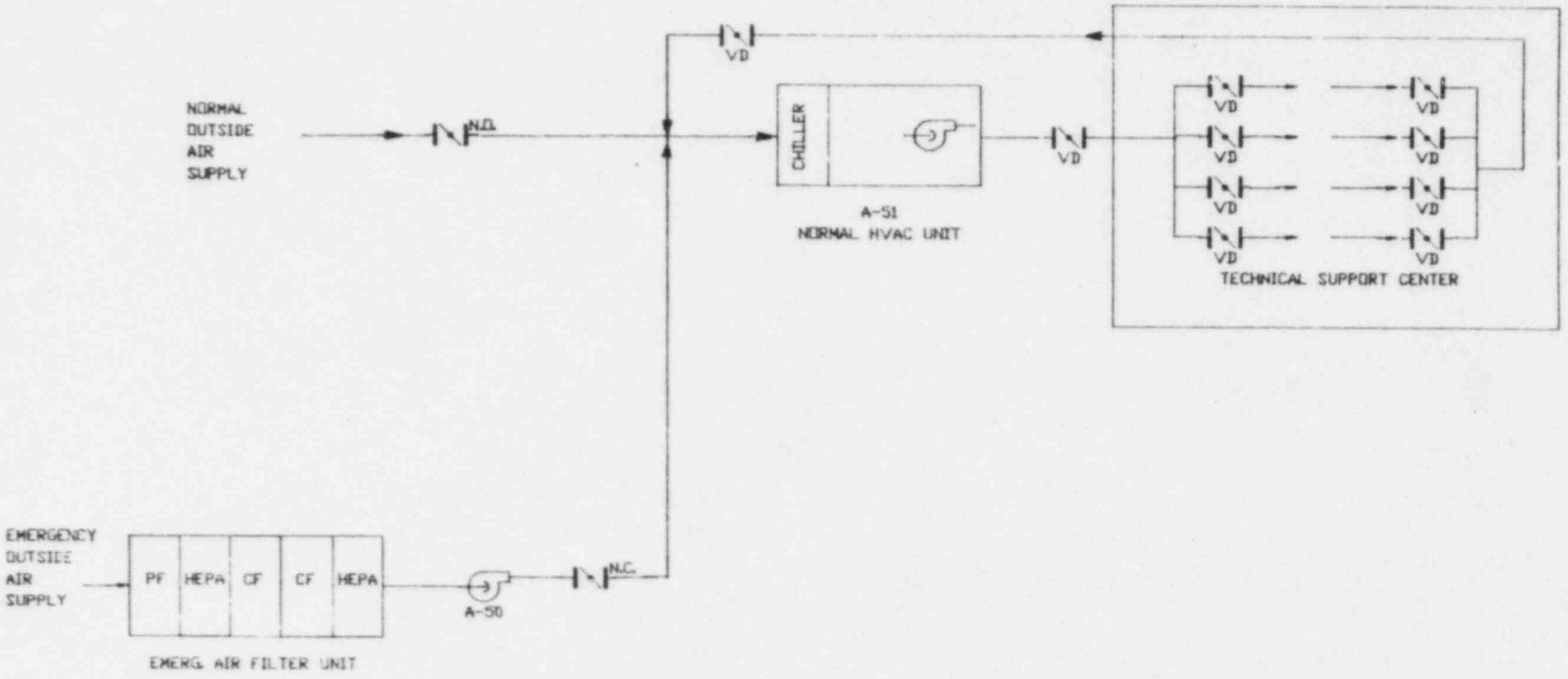

TABLE 1

REGULATORY CONFORMANCE OF EXISTING AND
UPGRADED CONTROL ROOM HABITABILITY SYSTEM

STANDARD REVIEW PLAN REQUIREMENT	EXISTING SYSTEM	UPGRADED SYSTEM
SRP 6.4 Section II.1 states that the control room emergency zone should be established and include those areas normally occupied and requiring occupancy by the operators. These should include the following:		
o The control room	Full	Full
o The computer room, if it is used as an integral part of the emergency response plan	N/A	N/A
o The shift supervisor's office	Full	Full
o The washroom and the kitchen	No[1]	No[1]
o Other spaces requiring operator occupancy	N/A	N/A
SRP 6.4 Section II.2 contains the following requirements for the ventilation system:		
o Dampers used to isolate the control zone from adjacent zones or the outside must be leaktight.	No	Full
o A single failure of an active component should not result in loss of the system's functional performance.	No[2]	Partial[3]

STANDARD REVIEW PLAN REQUIREMENT	EXISTING SYSTEM	UPGRADED SYSTEM
SRP 6.4 Section II.3 contains the following requirements for the ventilation system:		
o A pressurization system should be able to pressurize the control room during a radiation emergency.	Full[4]	Full[4]
o Periodic pressurization tests are required to determine that the rated flow (normally about 300 to 600 CFM) is sufficient to pressurize the control room to at least 1/8" water gauge.	No[4]	Intent[4]
SRP 6.4 Section II.4 requirements are addressed in SRP 6.5.1 below.		
SRP 6.4 Section II.5 states that the following requirements must be met:		
o As a general rule, the control room ventilation inlet should be separated from the major potential radiation release points by at least 100 feet laterially and by 50 feet vertically. However, the actual minimum distances must be based on the dose analysis.	Full	Full
o The control room ventilation inlet must be so place in relation to the location of potential toxic gas release points as to minimize control room contamination in the event of a release in accordance with Regulatory Guides 1.78 and 1.95.	No[5]	Full[5]

STANDARD REVIEW PLAN REQUIREMENT	EXISTING SYSTEM	UPGRADED SYSTEM
SRP 6.4 Section II.6 states that the following requirements must be met:		
o The calculated control room dose should not exceed the guidelines of General Design Criterion 19, Appendix A of 10 CFR part 50.	Partial[6]	Partial[6]
SRP 6.4 Section II.7 contains the following requirements:		
o Self-contained breathing apparatus for the emergency team (at least 5 men) should be on hand. A six-hour onsite bottled air supply should be available with unlimited offsite replenishment capability from nearby location(s).	Full	Full
SRP 9.4.1 Section II contains the following acceptance criteria:		
o General Design Criterion 2, as related to the system being capable of withstanding the effects of earthquakes. Acceptance is based on meeting the guidance of Regulatory Guide 1.20, position C.1 for safety-related portions, and position C.2 for nonsafety-related portions.	No	Intent[7]
o General Design Criterion 4, with respect to maintaining environmental conditions in the control room compatible with the design limits of essential equipment located therein during normal, transient, and accident conditions.	Full	Full
o General Design Criterion 5, as related to shared systems and components important to safety.	Full	Full

STANDARD REVIEW PLAN REQUIREMENT	EXISTING SYSTEM	UPGRADED SYSTEM
o General Design Criterion 19, as related to providing adequate protection to permit access and occupancy of the control room under accident conditions. Acceptance is based on meeting the guidance of Regulatory Guide 1.78 relating to instrumentation to detect and alarm any hazardous chemical release in the plant vicinity and relating to the systems capability to isolate the control room from such releases and the systems capability to meet the single failure criterion, positions C.3, C.7, and C.14, respectively; and Regulatory Guide 1.95 relating to the systems capability to limit the accumulation of chlorine within the control room and the systems capability to meet the single failure criterion, positions C.4a and C.4d.	No[6,8]	No[6,8]
o Regulatory Guide 1.95 relating to the systems capability to limit the accumulation of chlorine within the control room and the systems capability to meet the single failure criterion, positions C.4a and C.4d.	No	No[8]
o General Design Criterion 60, as related to the systems capability to suitably control release of gaseous radioactive effluents to the environment. Acceptance is based on meeting the guidance of Regulatory Guides 1.52 and 1.140, as related to design, testing, and maintenance criteria for atmosphere cleanup system and normal ventilation exhaust	N/A	N/A

STANDARD REVIEW PLAN REQUIREMENT	EXISTING SYSTEM	UPGRADED SYSTEM
system air filtration and adsorption units of light-water-cooled nuclear power plants, position C.2, and positions C.1 and C.2, respectively.		
SRP 6.5.1 Section II contains the following applicable criteria:		
The ESF atmosphere cleanup systems should be designed so that:		
o they can operate after a design basis accident (DBA), and	No[9]	Intent[9]
o retain radioactive material after a DBA.	N/A	N/A
The system should have provisions to:		
o prefilter air, remove moisture and meet the Regulatory Guide 1.52 requirements for charcoal adsorption.	Intent[10]	Intent[10]
The systems should be:		
o redundant,	No	Full
o designed to Seismic Category I requirements,	No	Intent[11]
o able to actuate automatically, and	No	No[12]
o limited to an air flow rate of approximately 30,000 CFM.	Full	Full
o Instrumentation for ESF atmosphere cleanup systems should meet the requirements given in Table 6.5.1-1 of this SRP section.	Partial[13]	Partial[13]

STANDARD REVIEW PLAN REQUIREMENT	EXISTING SYSTEM	UPGRADED SYSTEM
o Environmental design guidelines for acceptability are based on the conditions following a DBA. Radiation source terms should be consistent with the guidelines in Regulatory Guides 1.3, 1.4, 1.7 and 1.25.	Full	Full
o Components such as demisters, heaters, prefilters, HEPA filters, mounting frames, filter housings, adsorbent, fans, ductwork and dampers should be designed, constructed and tested in accordance with ANSI 509-1980 design and qualification testing criteria. Water drain design and the accessibility of components and ease of maintenance should be in accordance with the recommendations of ERDA 76-21 and ANSI 509 (1980).	No[14]	No[14]
o Acceptability with respect to inplace testing should include meeting the requirements of ANSI N510-1980. For laboratory testing of activated carbon adsorbent, conformance with ANSI N509-1980 will be used as an acceptability criterion.	Intent[15]	Intent[15]

Notes:

1. The washroom and kitchen are not a part of the control room proper; however, periodic occupancy of these rooms by the operators is accounted for in the control room dose calculation.

2. A single failure of the control room HVAC recirculation fan, chiller, thermostat, normal and emergency intake dampers, or filter train could disable the function of the system.

3. Both the control room HVAC and the backup TSC HVAC are powered from the same motor control center (MCC), but this MCC can be aligned to either emergency diesel generator.

Notes: (Continued)

4. Although not required by current technical specifications because dose analyses have never assumed a positive control room pressure, a test was recently conducted to determine if pressurization was possible. The test was positive. However, no periodic test is currently performed, or will be performed, to verify this capability. The TSC HVAC system, if cross-connected, is capable of providing the required pressurization due to the capacity of the TSC pressurization fan.

5. The potential impact of onsite hazardous chemicals on SONGS-1 control room habitability is under review. The review has tentatively indicated that drums of hydrazine and aqueous ammonia located approximately 100 feet from the control room HVAC intake may result in hazardous levels of toxic gas in the control room if spilled. Further review is required.

6. The whole body gamma dose for a design basis LOCA exceeds the NRC limit of 5 rem by 1.6 rem. This is mainly due to the direct dose from sources outside the containment which accounts for 6.2 rem of the 6.6 rem total dose.

7. The seismic reevaluation program provides for upgrade of the equipment anchorage.

8. Per the discussion in Enclosure 1, we will not provide toxic gas monitoring capability, but will instead rely on notification from other sources and manual operator action.

9. The control room system is not specifically designed to withstand the design basis earthquake, but per previous discussion the supports will be reviewed and upgraded, if necessary.

10. The filter train does not have the capability to remove moisture; however, no significant moisture is anticipated since the air source is outside air.

11. The filter train is not designed to Seismic Category I requirements. The seismic upgrades only affect the supports, not the components. However, the existing equipment's capability to withstand seismic motion is probabilistically higher than designed due to large margin utilized in design analysis.

12. The filtering system does not actuate automatically. The system will rely on manual operator action for radiation and toxic gas events.

13. The design requirements for monitoring instrumentation listed in Table 6.5.1-1 are not generally met.

14. Due to the vintage of the system the control room HVAC system does not generally meet the design requirements of ANSI 509-1980 or the other indicated requirements.

15. The current inplace testing does not fully meet the requirements of ANSI N510-1980 and ANSI N509-1980. However, since the design of the emergency filter system does not provide for testing of the charcoal absorbent, current practice involves replacement of the charcoal absorbent at specified intervals in lieu of testing.

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DOSE ASSESSMENT

The following is a radiological dose assessment of the Unit 1 control room following a design basis loss-of-coolant accident with the control room HVAC in its present design. The analysis is based on assumptions and methodologies identified in Standard Review Plan Section 6.4 and its associated references. Any deviations from the NRC assumptions and methods are indicated in the analysis.

The dose calculation methodology is based on standard differential equations modeling the generation, release to environment, transport to the control room intake, buildup in the control room, removal by containment spray or charcoal filters, and decay of radioactive fission products from a loss-of-coolant accident.

The assumptions utilized in the calculations are summarized in Table A1. The solutions to the differential equations describing each portion of the model are listed on Table A2. An IBM-PC basic code was written to solve the solutions to the differential equations over timesteps where the inputs remain constant. Time varying inputs include: the atmospheric dispersion factor, the containment leak rate, the operation of containment spray, the control room intake flow, the occupancy factor of the control room, wind direction factors, and wind speed factors. The dose calculation is performed for a period of 30 days following the accident.

X/Q values for radiological releases from the containment were calculated based on an analysis presented in Reference 1. These releases were assumed to be from a diffuse source (i.e., activity leaking from many points on the surface of the containment) with a point receptor (a single intake). X/Q values were calculated for time periods of 0-8 hours, 8-24 hours, 1-4 days, and 4-30 days.

For the 0-8 hour calculation, results of recent analysis of diffusion tests near buildings were utilized[1]. The results of these tests showed that for most meteorological combinations of atmospheric stability and wind speed, the model and methodology provided in Reference 6 to Standard Review Plan Section 6.4 overestimates even the maximum measured concentration, usually by one to two orders of magnitude.

Because of this large overestimation of the NRC model, the 0-8 hour X/Q was calculated based on the recommendations of Reference 2 in Reference 1. The studies provided in the reference were conducted at two dissimlar sites with containment areas differing by nearly a factor of two. Consistency between the two sets of measured concentrations was obtained by scaling the plume path length by the square root of the minimum cross sectional area of the containment. Utilizing this approach a one hour X/Q for San Onofre Unit 1 was calculated. This one hour value was conservatively assumed to apply for 0-8 hours and also reflects an upper bound envelope of measured concentrations.

The dose calculation was performed for two different cases:

- o Case 1 - Existing control room HVAC design without a single failure
- o Case 2 - Existing control room HVAC design with a single failure

The single failure impacting the control room dose the greatest is the failure of the normal fresh air damper to close upon operation of the remote manual switch in the control room. This failure results in the introduction of a maximum of 1100 cfm of unfiltered air into the control room, in addition to the 1100 cfm taken in by the emergency supply fan and filtered through the emergency filter unit.

The results of the calculations are presented below:

Case	Whole Body gamma dose (rem)	Whole Body NRC limit (rem)	Beta Skin dose (rem)	Beta skin dose NRC limit (rem)
1	6.5	5	11.2	30
2	6.6	5	12.9	30

The whole body gamma dose slightly exceeds the NRC criteria for all cases. The beta skin is less than the NRC limit for all cases.

*Note: The portion of the whole body gamma dose to the operators from sources outside the control room is equal to 6.2 rem[5].

References

1. Control Room Habitability Evaluation San Onofre Nuclear Generating Station Unit 1, NUS 3704, Rev. 1, January 30, 1981.

2. San Onofre Unit 1 Final Safety Analysis Report

3. San Onofre Unit 1 Technical Specifications

4. San Onofre Unit 1 Calculation No. 324 "Analysis of Dose Consequences in the Control Room from LOCA" February 13, 1978.

5. Letter from J.E. Dempsey of Bechtel Power Corporation to J.G. Haynes of Southern California Edison, File No. 1304 944, October 11, 1977.

6. "CRDOSEB4 - An IBM PC Based Control Room Dose Calculational Model." Nucon Inc., August 1985.

Table A1

Dose Calculation Assumptions

Parameter	Value
Power level for 1000 days prior to LOCA	1,347 MWth[2]
Containment volume	34,230 m^3[2]
Volume of containment unsprayed	4,780 m^3[1]
Volume of containment sprayed	29,450 m^3[1]
Mixing flow rate between sprayed and unsprayed region	0.472 m^3/sec[1]
Containment leak rate	0.12%/day for 0-24 hours[3] 0.064%/day for > 24 hours[3]
X/Q at control room intake	1.5×10^{-3} sec/m^3[1] 1.0×10^{-3} sec/m^3[1] 3.8×10^{-4} sec/m^3[1] 1.1×10^{-4} sec/m^3[1]

Table A1 (Continued)

Parameter	Value
Isotopes considered	
o Krypton	5[1]
o Xenon	6[1]
Fraction of total released activity released to sprayed volume	
o Noble gases	1.0[1]
Fraction of total released activity released to unsprayed volume	
o Noble gases	0.0[1]
Control room emergency fresh air intake flow	0.519 m^3/sec (1100 cfm)[1]
Control room volume	779.3 m^3[1]
Fraction of core isotopes available for release	
o Kryton	1.0[1]
o Xenon	1.0[1]
Fraction of released isotopes which remain airborne available for release	
o Noble gases	1.0[1]

Table A1 (Continued)

Parameter	Value
Time periods	
o 1	2 hours
o 2	2-8 hours
o 3	8-24 hours
o 4	24 hours-4 days
o 5	4 days-30 days
Radius of control room as hemisphere	7.2 meters
Breathing rate of control room personnel	0.000347 m^3/sec [1]
Nuclide decay constants and fission yields	[1]
Average beta and gamma energies	[1]
Isotopic gamma energies and decay fractions	[1]
Absorption coefficients for air	[1]
Leak rate from RCS water outside containment	625 cc/hr [1]

Table A1 (Continued)

Parameter	Value
Infiltration of unfiltered air into the control room in existing design	11 cfm[4]
Single failure evaluated in existing system	Normal fresh air damper fails to close
Whole body gamma dose to the operators from sources outside the control room	6.2 rem[1]

Table A2

EQUATIONS USED IN DOSE CALCULATION

Initial primary system activity for isotopes of concern:

$$A_o = 8.65 \times 10^5 \; P_o G_i F_i F_r \; (1-e^{-LrTo}) \text{ (curies)}$$

where:

A_o = Initial activity of isotope i (curies)
P_o = Power level for past 1000 days (MWth)
G_i = Fission yield (fraction)
F_i = Fraction of isotope i released which remains airborne
F_r = Fraction of isotope i released from the fuel
L_r = Radioactive decay constant for isotope i (sec-1)
T_o = Time at full power (sec)

Primary containment integrated activity:

$$A_{ci} = c_2 e^{-m2t} - c_1 e^{-m1t}$$

$$c_2 = A_{10} (L_1 - m_1) + A_{20} (L_2 - m_1)/(m_2 - m_1)$$

$$c_1 = A_{10} (L_1 - m_1) + A_{20} (L_2 - m_2)/(m_2 - m_1)$$

$$m_1 = 1/2 \; (L_1 + L_2 + Q/V_1 + Q/V_2) + 1/2 \; ((L_1 + L_2 + Q/V_1 + Q/V_2)2 - 4 \; (Q/V_2 \times L_1 + Q/V_1 \times L_1 + L_1 \times L_2))1/2$$

$$m_2 = 1/2 \; (L_1 + L_2 + Q/V_1 + Q/V_2) - 1/2 \; ((L_1 + L_2 + Q/V_1 + Q/V_2)1/2 - 4 \; (Q/V_2 \times L_1 + Q/V_1 \times L_1 + L_1 \times L_2))1/2$$

Table A2 (Continued)

$$L_1 = L + L_r + L_p + L_{sp}$$

$$L_2 = L + L_r + L_p$$

$$A_{10} = A_0 \times F$$

$$A_{20} = A_0 \times (1-F)$$

where:

A_{ci} = Primary containment integrated activity for isotope i (curies)

A_{10i} = Initial containment activity of each isotope which is in the sprayed volume for each period (curies)

A_{20i} = Initial containment activity of each isotope which is in the unsprayed volume for each period (curies)

L = Primary containment leak rate (sec^{-1})

L_r = Radiological decay constant for isotope i (sec^{-1})

L_p = Cleanup rate in the primary containment (0 for this model) (sec-1)

L_{sp} = Containment spray removal rate of isotope i (sec^{-1})

F = Fraction of activity released to sprayed volume

Q = Volumetric flow rate between containment volumes (m^3/sec)

V_1 = Volume of sprayed region of containment (m^3)

V_2 = Volume of unsprayed region of containment (m3)

t = Length of time period (seconds)

Table A2 (Continued)

Integrated release rate from the containment:

$$R_i = c_6/m_2 \times (1 - e^{-m2t}) - c_7/m_1 \times (1 - e^{-m1t})$$

$$c_6 = L_1 \times c_1$$

$$c_7 = L_1 c_2$$

Control room activity:

$$A_{ci} = c_9 \times c_6/(L_7 - m_2) \times e^{-m2t} - C_9 \times C_7/(L_7 - m_1) \times e^{-m1t} + c_{10} e^{-L7t}$$

$$c_9 = F_2 \times Q_{cc} \times (X/Q)_{cc}$$

$$L_7 = L_R + Q_{cc}/V_{cc}$$

$$c_{10} = A_{co} - c_9 \times c_6/(L_7 - m_2) + c_9 \times c_7/(L_7 - m_1)$$

where:

A_{ci} = Control room activity of isotope i (curies)

A_{co} = Initial control room activity for each period (curies)

F_2 = filter non-removal fraction for control room intake filter for isotope i

Q_{cc} = Control room intake flow rate (m^3/sec)

V_{cc} = Volume of control room (m3)

X/Q_{cc} = Atmospheric dispersion factor for each time period (sec/m3)

Table A2 (Continued)

Integrated control room activity:

$$R_{Ci} = c_9 \times c_6/((L_7 - m_2) \times m_2) \times (1 - e^{-m2t}) - c_9 \times c_7/((L_7 - m_1) \times m_1 \times (1 - e\text{-}m1t + c_{10}/L_7 \times (1 - e\text{-}L7t)$$

where:

R_{Ci} = Integrated control room activity for isotope i (curies)

Integrated beta dose:

$$D_B = 0.23/V_{cc} \times \sum_i R_{ci} \times E_{Bi}$$

where:

D_B = Integrated beta dose (rems)

E_{BI} = Average beta energy (MeV/dis)

Integrated gamma dose:

$$D_G = 0.25/V_{cc} \times \sum_i R_{ci} \sum_j E_{Gij} F_{ij} (1\text{-}e^{-muxRx} (1 + (mu_j - mu_{aj}) \times R))$$

Table A2 (Continued)

where:

D_G = Integrate gamma dose (rem)

E_{Gij} = Energy of jth gamma from ith isotope (MeV)

F_{ij} = Fraction of jth gamma released from ith isotope per disinigration

R = Equivalent radius of control room if hemisphere (meters)

mu_j = Total Energy absorption coefficient for air for gamma of energy E (m-1)

mu_{aj} = Energy absorpion coefficient for air for gamma of energy E (m-1)

BEFORE THE UNITED STATES NUCLEAR REGULATORY COMMISSION

Application of SOUTHERN CALIFORNIA EDISON COMPANY and SAN DIEGO GAS & ELECTRIC COMPANY for a Class 104(b) License to Acquire, Possess, and Use a Utilization Facility as Part of Unit No. 1 of the San Onofre Nuclear Generating Station	)	DOCKET NO. 50-206 Amendment Application No. 133

SOUTHERN CALIFORNIA EDISON COMPANY and SAN DIEGO GAS & ELECTRIC COMPANY, pursuant to 10 CFR 50.90, hereby submit Amendment Application No. 133.

This amendment consists of Proposed Change No. 158 to Provisional Operating License No. DPR-13. Proposed Change No. 158 revises Appendix A Technical Specification 3.12 and 4.11. The primary purpose of this proposed change is to incorporate into the license changes required as a result of SCE's plans to upgrade the control room HVAC system at San Onofre Unit 1.

In the event of conflict, the information in Amendment Application No. 133 supersedes the information previously submitted.

Based on the safety evaluation provided in the Description of Proposed Change No. 158 and Safety Analysis, it is concluded that (1) this proposed change does not involve an unreviewed safety question as defined in

10 CFR 50.59, nor does it present significant hazards considerations not described or implicit in the Final Safety Analysis, and (2) there is reasonable assurance that the health and safety of the public will not be endangered by the proposed change.

Pursuant to 10 CFR 170.12, a fee of $150.00 is enclosed.

LB:5687F

Subscribed on this 28th day of March, 1986

Respectfully submitted,
SOUTHERN CALIFORNIA EDISON COMPANY

By /S/ Lawrence T. Papay
Lawrence T. Papay
Senior Vice President

Subscribed and sworn to before me this
28th day of March, 1986.

/S/ Agnes Crabtree
Notary Public in and for the County of
Los Angeles, State of California

Charles R. Kocher
James A. Beoletto
Attorneys for Southern
California Edison Company

By /S/ Charles R. Kocher
Charles R. Kocher

Subscribed on this 27th day of March, 1986.

Respectfully submitted,
SAN DIEGO GAS & ELECTRIC COMPANY

By /S/ J. C. Holcombe
J. C. Holcombe, Vice President
Fuel and Power Contract

Subscribed and sworn to before me this
27th day of March, 1986.

/S/ Jill Quigley
Notary Public in and for the County of
San Diego, State of California

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Attorneys for San Diego
Gas & Electric Company

By /S/ David R. Pigott
David R. Pigott

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of SOUTHERN CALIFORNIA EDISON COMPANY and SAN DIEGO GAS & ELECTRIC COMPANY (San Onofre Nuclear Generating Station Unit No. 1	)	Docket No. 50-206

CERTIFICATE OF SERVICE

I hereby certify that a copy of Amendment Application No. 133 was served on the following by deposit in the United States Mail, postage prepaid, on the 28th day of March, 1986.

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DESCRIPTION OF PROPOSED CHANGE AND SAFETY ANALYSIS OF
PROPOSED CHANGE NO. 158 TO THE TECHNICAL SPECIFICATIONS
PROVISIONAL OPERATING LICENSE DPR-13

This is a request to revise Sections 3.12, "Control Room Emergency Air Treatment System" and 4.11, "Control Room Emergency Air Treatment System" of the Appendix A Technical Specifications for San Onofre Nuclear Generating Station, Unit 1.

DESCRIPTION

Technical Specifications 3.12 and 4.11 are the Limiting Condition for Operation (LCO) and Surveillance Requirements for the control room emergency air treatment system at San Onofre Unit 1. The proposed revisions will update these technical specifications to conform with a proposed upgrade plan to the control room HVAC system. The proposed revisions are consistent, to the extent practical, with NUREG-0462, Revision 4, Standard Technical Specifications (STS) for Westinghouse Pressurized Water Reactors.

The new portion of 3.12 deals with the use of the technical support center emergency air treatment system as a non-safety related backup to the existing control room emergency air treatment system. This change is made to take credit for the upgrade that will allow this HVAC operation configuration. The applicability of Specification 3.12 is also extended to provide additional requirements in Modes 3, 4, 5 and 6. The basis of 3.12 is revised to be consistent with the new ACTION requirements.

The general revision to 4.11 brings the specification into conformance to the format and content of the STS and makes the specification applicable to the technical support center emergency air treatment system. The only new testing requirements relate to the control room maximum temperature and the containment isolation signal to the emergency air treatement systems. The remainder of the tests are already generally required by the existing specification. A revision to the adsorbent testing recognizes that complete replacement of the adsorbent may be substituted in lieu of the laboratory test. The basis of 4.11 is revised to be consistent with the revised and new testing requirements.

EXISTING TECHNICAL SPECIFICATIONS

See Attachment 1

PROPOSED TECHNICAL SPECIFICATIONS

See Attachment 2

SAFETY EVALUATION

The proposed change discussed above shall be deemed to constitute a significant hazard consideration if positive findings are made in any of the following areas:

1. Will operation of the facility in accordance with this proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No

   This proposed change modifies the technical specifications to recognize the implementation of modifications to upgrade the control room HVAC systems. The new LCO and surveillance requirements will provide greater assurance that the control room operators and control room instrumentation are provided with an appropriate and safe environment. Therefore, it is concluded that the operation of the facility in accordance with this proposed change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Will operation of the facility in accordance with this proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No

   This proposed change involves the LCO and surveillance requirements for an upgrade that provides a system redundant to the one already assumed in previously evaluated accidents. Since the operation of the existing control room HVAC system was not assumed to cause a kind of accident that was new or different from any accident previously evaluated, it is concluded that the same applies to the upgraded system. Therefore, it is concluded that operation of the facility in accordance with this proposed change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Will operation of the facility in accordance with this proposed change involve a significant reduction in a margin of safety?

   Response: No

   The proposed change will require greater operability of systems associated with maintaining the control room habitable in the event of an accident or transient at San Onofre Unit 1. These systems provide protection for the operators and the control room instrumentation that control the plant systems. Therefore, it is concluded that operation of the facility in accordance with this proposed change will not involve a significant reduction in a margin of safety.

The Commission has provided guidance concerning the application of the standards for determining whether a significant hazards consideration exists by providing certain examples (48 FR 14870) of amendments that are considered not likely to involve significant hazards considerations. The proposed changes to the contents of the specifications are most similar to example (ii) related to a change to make a license that constitutes an additional limitation, restriction or control not presently included in the technical specifications. The proposed changes to the bases are most similar to example (i) of 48 FR 14870 since it is a purely administrative change to achieve consistency throughout the Technical Specification.

SAFETY AND SIGNIFICANT HAZARDS DETERMINATION

Based on the safety evaluation, it is concluded that: (1) the proposed change does not involve a significant hazards consideration as defined by 10 CFR 50.92; and (2) there is reasonable assurance that the health and safety of the public will not be endangered by the proposed change; and (3) this action will not result in a condition which significantly alters the impact of the station on the environment as described in the NRC Environmental Statement.

Attachment 1 - Existing Specifications
Attachment 2 - Proposed Specifications

LAB:5599F

ATTACHMENT 1

3.12 CONTROL ROOM EMERGENCY AIR TREATMENT SYSTEM

Applicability: Applies to the operational status of the control room emergency air treatment system.

Objective: To identify those conditions of the control room emergency air treatment system which will ensure reliable and efficient operation, should the system be needed.

Specification: Effective upon completion of field testing to the modified filter system.

A. Except as specified in Specification 3.12.B below, the control room emergency air treatment system shall be operable whenever the reactor is to be made or maintained critical. The system will be considered operable as long as the tests and analyses specified in Specification 4.11 are satisfactorily completed at the required intervals and the system is not removed from service.

B. From and after the date that the control room air treatment system is made or found to be inoperable for any reason, reactor operation is permissible only during the succeeding seven days.

C. If the conditions in 3.12.B cannot be met, reactor shutdown shall be initiated and the reactor shall be in a cold shutdown condition with 24 hours.

Basis: The control room emergency air treatment system is designed to filter the control room intake air during control room isolation. The system is placed in operation under administrative control when conditions warrant its use.

The system utilizes a fan, a high efficiency particulate absolute (HEPA) filter, pre-filters and a charcoal absorber bed. The pre-filters are installed before the charcoal bed to prevent clogging of the iodine adsorbers. The charcoal adsorbers reduce the potential intake of radioiodine to the control room.

The operability requirements of this Specification in conjunction with the surveillance requirement of Specification 4.11 provide reasonable assurance that the system will operate, if needed, at a degree of efficiency equal to or better than that assumed in the Final Safety Analysis.

If the system is found to be inoperable, there is no immediate threat to the control room and reactor operation may continue for a limited time while repairs are made. If the system cannot be repaired within seven days, the reactor is shut down and brought to cold shutdown within 24 hours.

4.11 CONTROL ROOM EMERGENCY AIR TREATMENT SYSTEM

APPLICABILITY: Applies to the testing and surveillance of the control room air treatment system.

OBJECTIVE: To ensure that the control room emergency air treatment system will operate effectively if required.

SPECIFICATION: Effective upon completion of field testing of the modified filter system.

A. At least once per refueling cycle, the pressure drop across the combined HEPA filters and charcoal adsorbers shall be demonstrated to be less than 6 inches of water for flow conditions equal to or greater than design flow rate.

B. The tests indicated below shall be performed at least once per year for standby service or after every 720 hours of system operation and following significant painting, fire, or chemical release in any ventilation zone communicating with the system.

(1) The results of in-place cold DOP and halogenated hydrocarbon tests at design flows on HEPA filters and charcoal adsorbers shall show $\geq$99% DOP removal and $\geq$99% halogenated hydrocarbon removal when tested in accordance with ANSI N510-1975.

(2) The results of laboratory carbon sample analysis shall show $\geq$90% radioactive methyl iodide removal when tested in accordance with ANSI N510-1975 (130°C, 95% R.H.).

(3) Fans shall be shown to operate within $\pm$ 10% of design flow when tested in accordance with ANSI N510-1975.

C. The circuit shall be operated at least 1 hour every month.

D. Cold DOP testing shall be performed after each complete or partial replacement of the HEPA filter bank or after any structural maintenance on the system housing. The halogenated hydrocarbon testing shall be performed after each complete or partial replacement of the charcoal adsorbers or after any structural maintenance on the system housing.

E. At least once per refueling cycle automatic closure of the fresh air intake to the control room shall be demonstrated.

BASIS:

Pressure drop across the combined HEPA filters and charcoal adsorbers of less than six inches of water at flow rates near design levels indicates that the filters and adsorbers are not clogged by excessive amounts of foreign matter. Pressure drop is determined once per refueling cycle to verify system performance capability.

The frequency of tests and sample analysis are necessary to show that the HEPA filters and charcoal adsorbers can perform as evaluated. The removal efficiencies stipulated are consistent with criteria established in the Final Safety Analysis. If laboratory carbon test results are unacceptable, all adsorbent in the system should be replaced with an adsorbent meeting the physical property requirements of Regulatory Guide 1.52. Any HEPA filters found defective should be replaced with filters qualified pursuant to Regulatory Position C.3.d. of Regulatory Guide 1.52.

Operation of the system for one hour every month will demonstrate operability of the system and serve to remove excessive moisture build-up on the adsorber.

Contaminants can be generated by painting, fire or chemical release. The fumes, chemicals or foreign materials produced could contaminate the filters or adsorbent if the release occurs in an area communicating with the system. Conducting the same tests as required at refueling intervals following a significant release of contaminants in a communicating area assures that system performance is not degraded.

ATTACHMENT 2

3.12 CONTROL ROOM EMERGENCY AIR TREATMENT SYSTEM

OBJECTIVE: To identify those conditions under which the control room emergency air treatment system is required.

APPLICABILITY: ALL MODES

SPECIFICATION: The control room and the technical support center emergency air treatment systems shall be OPERABLE.

ACTION: MODES 1, 2, 3 and 4:

With one of the emergency air treatment systems inoperable, restore the inoperable emergency air treatment system 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 and 6:

a. With one emergency air treatment system inoperable, restore the inoperable system to OPERABLE status within 7 days or initiate and maintain operation of the remaining OPERABLE system in the recirculation mode.

b. With both the control room and technical support center emergency air treatment systems inoperable or with the OPERABLE system required to be in 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.

BASIS: The control room and technical support center emergency air treatment systems are designed to filter the control room intake air during control room isolation. The systems are placed in operation under administrative control when conditions warrant their use.

Each system utilizes a fan, a high efficiency particulate absolute (HEPA) filter, pre-filters and a charcoal absorber bed. The pre-filters are installed before the charcoal bed to prevent clogging of the iodine adsorbers. The charcoal adsorbers reduce the potential intake of radioiodine into the control room.

The operability requirements of this Specification in conjunction with the surveillance requirement of Specification 4.11 provide reasonable assurance that a control room emergency air treatment system will operate, if needed, at a degree of efficiency equal to or better than that assumed in the Final Safety Analysis.

If either control room emergency air treatment system is found to be inoperable, there is no immediate threat to the control room and, when a backup is available, reactor operation may continue for a limited time while repairs are made.

4.11 CONTROL ROOM EMERGENCY AIR TREATMENT SYSTEM

OBJECTIVE: To define the testing and surveillance of the control room and technical support center emergency air treatment systems that must be performed. This specification provides assurance that a control room emergency air treatment system will operate effectively if required.

APPLICABILITY: ALL MODES

SPECIFICATION: The control room and technical support center emergency air treatment systems shall be demonstrated OPERABLE:

A. At least once per 12 hours by verifying that the control room air temperature is less than or equal to 100°F.

B. At least once per 31 days on a STAGGERED TEST BASIS by initiating, from the control room, flow through the emergency filter system and verifying that the system operates for at least 10 hours.

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 cleanup system satisfies the in-place testing acceptance criteria and uses the test procedures of Regulatory Positions C.5.a, C.5.c and C.5.d of Regulatory Guide 1.52, Revision 2, March 1978, and the system flow rate is ± 10% of design flow.

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. In lieu of this test, the adsorbent may be replaced with an adsorbent that meets the physical property requirements of Regulatory Guide 1.52, Revision 2, 1978.

3. Verifying a system flow rate of ± 10% of design flow during system operation when tested in accordance with ANSI N510-1975.

D. After 720 hours of emergency filter 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. In lieu of this test, the adsorbent may be replaced with an adsorbent that meets the physical property requirements of Regulatory Guide 1.52, Revision 2, 1978.

E. 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 ± 10% of the design flow rate.

2. Verifying that on a containment isolation test signal, the system automatically switches into a recirculation mode of operation with flow through the HEPA filters and charcoal adsorber banks.

F. After each complete or partial replacement of HEPA filter bank by verifying that the HEPA filter banks remove greater than or equal to 99% of the DOP when they are tested in-place in accordance with ANSI N510-1975 while operating the system at ± 10% of design flow rate.

F. After each complete or partial replacement of a charcoal adsorber bank by verifying that the charcoal adsorbers remove greater than or equal to 99% of a halogenated hydrocarbon refrigerant test gas when they are tested in-place in accordance with ANSI N510-1975 while operating the system at ± 10% of design flow rate.

BASIS:

Pressure drop across the combined HEPA filters and charcoal adsorbers of less than six inches of water at flow rates near design levels indicates that the filters and adsorbers are not clogged by excessive amounts of foreign matter. Pressure drop is determined once per refueling cycle to verify system performance capability.

The frequency of tests and sample analysis are necessary to show that the HEPA filters and charcoal adsorbers can perform as evaluated. The removal efficiencies stipulated are consistent with criteria established in the Final Safety Analysis. If laboratory carbon test results are unacceptable or the option of not performing the test is chosen, all adsorbent in the system should be replaced with an adsorbent meeting the physical property requirements of Regulatory Guide 1.52, Revision 2, March 1978. Any HEPA filters found defective should be replaced with filters qualified pursuant to Regulatory Position C.3.d of Regulatory Guide 1.52, Revision 2, March 1978.

Operation of the systems for ten hours every month will demonstrate operability of the system and serve to remove excessive moisture build-up on the adsorber. The verification of control room ambient air temperature will ensure that it does not exceed an acceptable temperature for continuous operation of the equipment located in the control room.

Contaminants can be generated by painting, fire or chemical release. The fumes, chemicals or foreign materials produced could contaminate the filters or adsorbent if the release occurs in an area communicating with the system. Conducting the same tests as required at refueling intervals following a significant release of contaminants in a communicating area assures that system performance is not degraded.