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VARGA,S.A. Operating Reactors Branch 1

SUBJECT: Responds to 821991 ltr re util 801231 response to NUREG-0737,Item III.D.3.4, "Control Room Habitability." Control room HVAC sys modified to reduce unfiltered leakage. Evaluations & recommendations re NUS-3696 encl.

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Carolina Power & Light Company

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JUN 02 1983

Director of Nuclear Reactor Regulation
Attention: Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
Division of Licensing
United States Nuclear Regulatory Commission
Washington, DC 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
NUREG-0737 ITEM NO. III.D.3.4
CONTROL ROOM HABITABILITY

Dear Mr. Varga:

Carolina Power & Light Company (CP&L) has received your letter dated October 1, 1982 regarding our December 31, 1980 response to NUREG-0737 Item III.D.3.4, Control Room Habitability, for the H. B. Robinson Steam Electric Plant Unit No. 2 (HBR2). We have reviewed your request and have contracted the original vendor to review and resolve each of the findings described in the "Control Room Habitability Evaluation - H. B. Robinson Steam Electric Generating Plant, Report Number NUS-3696," enclosed in our letter of December 31, 1980. Each of the findings identified in the NUS-3696 report has been compared with the guidance in Standard Review Plan (SRP) 6.4, 9.4.1, and paragraphs II.5 and II.6 of SRP 6.5.1, and is addressed in the attached Table A-1 with actions recommended by our contractor.

The vendor report, NUS-3696, identified areas of variance with current industry practices and regulatory design requirements for Control Room Habitability Systems. These findings fall into three major categories: (1) Operator dose during post accident conditions resulting from Control Room infiltration, (2) Redundancy of components to meet the single-failure criteria, and (3) Protection against toxic chemicals. Carolina Power & Light Company has evaluated these three areas and commits to the following improvements:

(1) Modifications will be made to the Control Room HVAC System to reduce the unfiltered inleakage.

(2) A new redundant air-handling and cooling unit will be added to the existing HVAC System for single failure protection.

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(3) The previous vendor report, NUS-3696, revealed that there were no large quantities of toxic chemicals stored on or near the site, or transported to and from the site, that would endanger occupants of the Control Room. On that basis, it was deemed unnecessary to provide gas detectors at the Control Room. However, as a result of additional reviews, it has been determined that trucks on nearby Route 151 could potentially carry toxic chemicals. Therefore, a survey of chemicals trucked over Route 151 will be performed. If any toxic chemicals are identified, a probabilistic risk assessment (PRA) will be performed to determine the relative benefit of installing gas detectors. If the PRA indicates the need to install toxic gas detectors, a schedule for installation will be developed and implemented. The survey and evaluation of toxic chemicals is scheduled to be completed by the end of 1984.

While CP&L believes that the review and resulting actions proposed are correct and provide effective resolution of the findings in the NUS-3696 report, we are continuing to review the above commitments. Should we discover more effective solutions or any design problems with the proposed modifications, we will notify your staff.

Carolina Power & Light Company has evaluated the scope of the modifications described in Items 1 and 2 above, and has arrived at the following implementation schedule. This implementation schedule takes into consideration other commitments scheduled for completion during upcoming outages, including current Generic Letter 82-33 commitments which are described in our April 15, 1983 submittal entitled "Requirements for Emergency Response Capability." A large portion of the Generic Letter 82-33 work is scheduled for outage #12 and will take place in the same physical locations as the Control Room Habitability upgrades (Control Room, Hagan Room, and Computer Room); consequently, the Control Room upgrades need to be scheduled in series with the Generic Letter 82-33 work. Carolina Power & Light Company, therefore, plans to implement the modifications described in Items 1 and 2 above prior to the end of the first refueling outage (#13) after completion of the Generic Letter 82-33 work (refueling outage #12).

Should you have any questions, please contact a member of our staff.

Yours very truly,

L. W. Eury
Senior Vice President
Power Supply

ONH/ccc (6983ONH)

Attachment

cc: Mr. J. P. O'Reilly (NRC-RII)
Mr. G. Requa (NRC)
Mr. Steve Weise (NRC-HBR)

TABLE A-1
Evaluations and Recommendations of Findings Contained in NUS 3696
"Control Room Habitability Evaluation H. B. Robinson Steam Electric Generating Plant"

Description of Finding in NUS 3696	Current Evaluation	Recommended Action
A.1 COMPARISON WITH STANDARD REVIEW PLAN 6.4		
A.1.1 Control Room Emergency Zone		
The control room emergency zone includes the control panels and consoles for the fossil-fueled Unit 1 as well as the control station for Unit 2.	The control room now has been cleared of the control panels for the fossil-fueled Unit 1. The space occupied by the Unit 1 control panels has been converted to storage and office area.	No additions or modifications are necessary.
a. The control room safe shutdown controls are within the control room emergency zone.	The safe shutdown controls are within the control room emergency zone.	No modifications are necessary.
b. Robinson does not have a computer room and therefore it is not part of the emergency ventilation system. The Robinson plant computer is not relied upon for safe operation of the plant.	The Robinson plant computer need not be used or accessed for safe shutdown of the plant. Therefore, it does not have to be in the emergency ventilation zone.	No modifications are necessary.
c. Robinson does not have a shift supervisor's office; the shift supervisor operates directly from the control room.	The present control room arrangement has an office to serve as the shift supervisor's office.	No modifications are necessary.
d. The washroom, the kitchen, and a small storage closet are included within the emergency zone and are accesible at all times.	The washroom, kitchen, bathroom, and small storage room have been painted and refurnished. They are accessible at all times within the control room emergency zone.	No modifications are necessary.
e. It is necessary for the operator to leave the emergency ventilation zone to enter the cable rooms and the relay rooms.	The Robinson Unit 2 cable spreading room, which also contains the computer and relay racks, is located one floor below the control room and is not accessible from the control room without going outdoors. To enable the control room occupants to gain access to the cable spreading room, the operator may don self contained breathing air systems stored within the control room emergency zone. The Hagan Room is adjacent to the Control Room and after modifying the ventilation system to include the Hagan Room in the Control Room Emergency Zone, access to the Hagan Room is possible without requiring the breathing mask.	No modification to the structure or arrangement are necessary but a simple modification to HVA-2 and its air intake duct are recommended not only to gain access to the Hagan Room but also to reduce the control room operators calculated dose.
A.1.2 Control Room Personnel Capacity		
The control room at the Robinson plant houses the personnel for the fossil-fueled Unit 1 as well as for Unit 2. Control room manning requirements are as given in the technical specifications. There are no specific storage facilities for food, blankets, and cots for the normal occupancy for 5 days.	The control room at Robinson no longer houses the Unit 1 personnel. This change reduces the number of personnel and reduces the storage space required. Food and liquid beverages are already stored in the plant and could be replenished on short notice.	No further modifications are necessary.

TABLE A-1
Evaluations and Recommendations of Findings Contained in NUS 3696
"Control Room Habitability Evaluation H. B. Robinson Steam Electric Generating Plant"
(continued)

Description of Finding in NUS 3696	Current Evaluation	Recommended Action
A.1.3 Ventilation System Layout and Functional Design		
The system description is provided in Section 4.1 of this report. Isolation is effected automatically on high radiation. During isolation, the fresh air intake closes, the exhaust fan stops, and the exhaust damper closes. The system is not designed to pressurize the emergency zone to prevent infiltration.	The present control room ventilation system is not designed to pressurize the control room emergency zone during isolation. The leakage through the isolation dampers will not exceed the control room infiltration and exfiltration through ductwork and other leak paths. The damper leakage is filtered through the charcoal filter along with the recirculated flow from the control room. The recommended modification to change the air inlet of HVA-2 and increase the size of the Control Room emergency zone will also reduce the volume of unfiltered infiltration and reduce the calculated dose.	Modify the air intake duct of HVA-2.
a. The isolation dampers are of standard commercial quality without resilient seals.	The commercial isolation dampers in the air intake have a large leakage rate but the entering air is filtered before distribution to the control room. The isolation dampers on the filter and bypass allow air to bypass the filter and/or flow through the filter normally to degrade the filter.	Therefore, the isolation dampers on the filter and bypass must be upgraded with low leakage dampers but the isolation damper on the intake may remain as is.
b. The isolation dampers, emergency filter, and filter fan HVE-19, and the air-conditioning unit are not redundant components.	Redundancy of the control room emergency zone ventilation equipment are discussed in Section A.2.1.	
c. The system is not designed to pressurize the control room. The leakage rates calculated for dampers, doors, and penetrations will provide an air-change rate of 2.8 air changes per hour.	Since NUS Report 3696 was prepared, CP&L has repaired the ductwork leaks and sealed the penetrations. Further improvement in damper leakage by replacing the present dampers or by adding low leakage dampers will reduce the unfiltered air infiltration to the extent that the full flow filter will be able to maintain a habitable environment in the control room.	Revise the HVA-2 intake and enlarge the emergency zone.
A.1.4 Toxic Gas Protection		
Two self-contained breathing apparatuses are available in the control room. No special protection against toxic gas intrusion and no toxic gas detectors are provided in the design of the Robinson control room.	There are now 2 self contained breathing air apparatuses inside the control room. Additional breathing air equipment and charged air cylinders are stored in the breathing air compressor house less than 100 feet away. Although there are no toxic gas detectors in the air intake or control room, there is no danger of harmful exposure to toxic chemicals from the plant or vicinity and there is no known threat of toxic chemicals from nearby transportation routes.	See Item A.1.6,b.

TABLE A-1
Evaluations and Recommendations of Findings Contained in NUS 3696
"Control Room Habitability Evaluation H. B. Robinson Steam Electric Generating Plant"
(continued)

Description of Finding in NUS 3696	Current Evaluation	Recommended Action
A.1.5 Emergency Standby Filters		
See Section A.3 below.		
A.1.6 Relative Location of Source and Control Room		
a. Air Inlets. The control room ventilation air inlet, as well as other auxiliary building air inlets, are on the east wall approximately 35 meters from the containment.	The control room ventilation air inlet is 26 feet (8M) above grade and 118 feet (35M) from the containment. The existing air inlet is located as far away as possible from the containment building. Any alternate air inlet must be located nearer to the containment and hence lose the advantage of the distance.	No action necessary.
b. Toxic Gases. As discussed in Section 4.0, there are no significant quantities of toxic gases stored at the site. The offsite sources of hazardous chemicals are discussed in Sections 2.0 and 6.0 of this report.	There are no significant quantities of toxic gases stored at the site. The offsite sources of harzardous chemicals that may be trucked along the nearby highway 151 are unknown. There are three courses of action to resolve the problem of the unknown chemicals.	
	1. Perform a survey of chemicals trucked over Route 151. Previous surveys did not receive adequate support from nearby chemical companies and a new survey with CP&L participation is necessary.	Perform survey.
	2. Once the chemicals have been identified, a probabalistic risk assessment (PRA) may be performed and it may not be necessary to install toxic gas detectors because of the low risk.	Perform PRA.
	3. If the PRA indicates that there is still a probable hazard, toxic gas detectors must be installed.	Install appropriate gas detectors.

TABLE A-1
Evaluations and Recommendations of Findings Contained in NUS 3696
"Control Room Habitability Evaluation H. B. Robinson Steam Electric Generating Plant"
(continued)

Description of Finding in NUS 3696	Current Evaluation	Recommended Action
c. Confined Area Releases. The potential for contamination of the control room air from releases inside adjacent areas of the auxiliary building is discussed in Sections 4.0 and 5.0 of this report.	There was no potential for contamination of the control room air from releases inside adjacent areas of the Auxiliary Building and the recommended system changes to the Control Room emergency zone can only improve the present system. The Control Room emergency zone is separated from adjacent areas by heavy poured concrete walls and sealed penetrations. The immediately adjacent areas are electrical cable spreading rooms and the relay room which do not contain any stored chemicals. These spaces are ventilated by separate ventilation systems taking air from outdoors. The door to the Relay Room (Hagan Room) opens into the control room. Radioactive gas from outdoors could fill the Relay Room but be excluded from the control room by the closed door. Leakage through the doorway was included in the previous Control Room calculations. The new dose calculation for the larger Control Room emergency zone did not include the leakage from the Hagan Room or the Cable Spreading Room.	No action is necessary for this item, but the ventilation system change will give further improvement.
A.1.7 Radiation Shielding		
Shielding is discussed in Section 5.0 and in CP&L's submittal to the NRC in December 1979 in response to NUREG-0578 Item 2.1.6.b.		No action is necessary.
A.1.8 Radioactive and Toxic Gas Hazards		
These are discussed in Sections 5.0 and 6.0, respectively, of this report.	The radioactive gas hazard from the design basis accident is too high at present but can be reduced to a safe condition by the modifications described in Section A3.3 paragraph k which will increase the volume of the control room emergency zone, reduce unfiltered inleakage, and improve the control of direction of air flow Toxic Gas Hazards were discussed in Sections A.1.4 and A.1.6.	Make minor modifications to achieve larger Control Room emergency zone and reduce unfiltered infiltration to the Control Room. Appropriate action per Section A.1.6

TABLE A-1
Evaluations and Recommendations of Findings Contained in NUS 3696
"Control Room Habitability Evaluation H. B. Robinson Steam Electric Generating Plant"
(continued)

Description of Finding in NUS 3696	Current Evaluation	Recommended Action
A.2 COMPARISON WITH STANDARD REVIEW PLAN 9.4.1		
A.2.1 Single Failure Analysis		
The control room ventilation equipment is not redundant or backed up by standby equipment, although there are two refrigerant condensing units for the control room cooling system. Therefore, any single active failure could result in a loss of, or reduction of, the system functional performance capability.	The control room ventilation equipment is arranged so that the filter booster fan (HVE-19) can provide backup for the air supply fan HVA-1. The control room cooling coils (two) are served by two condensing units. The Cable Spreading Room and Hagan Room ventilation equipment (HVA-2) also has two cooling coils served by two condensing units.	Add a new 100% capacity condensing unit.
The consequences of key failures are given below:		
a. Failure of single dampers will affect the system functional performance as shown in Table A-1.	Failure of the single dampers will affect the system functional performance.	Add a fail closed damper in series with the damper in the filter bypass duct.
b. Failure of the air-conditioner fan HVA-1 will cause a loss of cooling in the control room.	Failure of the air conditioner fan HVA-1 will result in a slightly warmer Control Room depending upon the condition of the filter assembly. The reason is that the filter booster fan, in series with HVA-1 during the isolation mode has more capacity and pressure than required by the charcoal and HEPA filters. When the filter is clean, the air flow will decrease to 3620 CFM. When the filter is dirty the air flow will decrease to 3100 CFM and the room temperature will increase to almost $90^{o}F$.	No action required.
c. Failure of the refrigerant condensers ACC-1A and ACC-1B will cause a loss of cooling in the control room.	Failure of either condenser ACC-1A or ACC-1B will cause a loss of cooling in the control room. The temperature in the room will rise to $106^{o}F$.	A standby condenser should be provided.

TABLE A-1
Evaluations and Recommendations of Findings Contained in NUS 3696
"Control Room Habitability Evaluation H. B. Robinson Steam Electric Generating Plant"
(continued)

Description of Finding in NUS 3696	Current Evaluation	Recommended Action
d. Failure of the recirculation fan HVE-19 will cause a reduction of the filtered volume and could result in an increase in the radioactivity or gas concentration during a postulated accident. An alarm will sound on low flow, but there is no alternative standby equipment.	Failure of the recirculation fan HVE-19, also referred to as the filter booster fan, will cause a reduction in the air flow and a slight increase in radioactivity and higher temperatures in the control room. The reduction in air flow will cause a room temperature of approximately 90°F based upon a dirty filter. The reduced filter capacity will cause the integrated thyroid dose to reach 31 rem in 30 days.	No action is required.
e. The loss of the instrument air supply will start the condensing units ACC-1A and ACC-1B when cooling may not be required and heating may be required.	The loss of instrument air will isolate the control room putting the filter in the recirculation mode without starting the recirculation fan HVE-19 or shutting down the toilet exhaust fan HVE-16. Both condensers ACC-1A and ACC-1B will be started. This will result in cooling with a reduced air flow and perhaps frost will form on the cooling coils to plug the coils and reduce the air flow further. The operator could manually cycle the condensers to clear the frost.	No action required.
f. The loss of instrument air supply will automatically put the system into the recirculation mode with no control on the air flow. The increase in air flow will cause a proportionate increase in differential pressure, but no damage or loss of function by the filters.	The loss of instrument air will align the dampers for recirculation but there will be no control on the air flow. Also, the fan HVE-19 will not be started with a resultant reduction in air flow. See item g below.	
	If the recirculation mode is initiated in the control room and fan HVE-19 is started, the uncontrolled air flow will be slightly more than the design value. The excess flow and resultant differential pressure on the filters will not cause damage. The increased air flow will prevent the formation of frost on the cooling coils but the temperature of the Control Room will gradually drop to stop at a temperature determined by the condenser suction pressure to be approximately 45°F minimum.	No action required.

TABLE A-1
Evaluations and Recommendations of Findings Contained in NUS 3696
"Control Room Habitability Evaluation H. B. Robinson Steam Electric Generating Plant"
(continued)

Description of Finding in NUS 3696	Current Evaluation	Recommended Action
g. Failure of exhaust fan HVE-16 to operate would have little effect on the performance of the ventilation system in an accident, because HVE-16 is shut down when the control room is isolated. Failure of HVE-16 to stop when it should could increase the infiltration of outside air into the control room during isolation.	The failure of the toilet exhaust fan HVE-16 to operate would have little effect on the performance of the ventilation system in an accident because HVE-16 is shut down when the Control Room is isolated. Failure of HVE-16 to stop when the system is in the isolation mode would increase the infiltration of outside air into the Control Room emergency zone by approximately 40 cfm an acceptable increase.	No action required.
h. Loss of ventilation to the HVAC equipment room will have little effect on the control room system performance.	Loss of ventilation air from the Auxiliary Building air supply fan to the HVAC Equipment Room as now exists will have no effect on the two air handling units HVA-1 and HVA-2 because the fan motors are in the cool air stream. The filter booster or recirculation fan HVE-19 however is outside of the air stream and after several hours of operation could overheat.	No action required.
	The recommended modification to include the HVAC Equipment Room in the Control Room emergency zone will remove the dependence for cooling from the Auxiliary Building ventilation system and failure of the Auxiliary Building ventilation fan HVS-1 will have no effect on the Control Room ventilation system.	Revise the air intake for HVA-2.
A.2.2 Separation Analysis		
None of the control room ventilation equipment is redundant and the equipment in the HVAC equipment room is arranged so that missiles generated by one piece of equipment will not strike another.		No action necessary.
The refrigerant condensers located outdoors are both exposed to the same hazards (e.g., both condensers are exposed to potential tornado missles and potential seismic debris from the nonseismic turbine deck).	Each condenser serves one evaporative coil and the coils are in parallel. Thus, if one coil or condenser fails, only half the air will be cooled, and the Control Room temperature will increase to 106°F.	Provide a redundant condensing unit.
A.2.3 Analysis of Failure of Nonseismic Equipment		
Nonseismic equipment hanging beneath the turbine deck, postulated in a seismic event to fall on the condenser or refrigerant piping, could impair their operation. Loss of control room cooling would cause the control room temperature to rise at approximately 6°F per minute and to stabilize at a high temperature.	Each condenser serves one evaporative coil and the coils are in parallel. Thus, if one coil or condenser fails, only half the air will be cooled and the Control Room temperature will increase to 106°F.	The redundant condenser must be protected from tornado missiles and seismic debris.

TABLE A-1
Evaluations and Recommendations of Findings Contained in NUS 3696
"Control Room Habitability Evaluation H. B. Robinson Steam Electric Generating Plant"
(continued)

Description of Finding in NUS 3696	Current Evaluation	Recommended Action
A.2.4 Adequacy to Maintain Suitable Environment		
Ten years of operating experience indicate that the system design is adequate to maintain a suitable environment for personnel and for machines.	The Control Room air conditioning equipment was sized to adequately cool the Control Room when it contained the control panels for both Units 1 and 2. At the present, only the Unit 2 control panels are in the room. The Unit 1 control panel space has been converted to an office with a much smaller cooling load. The ten years of operating experience prove the adequacy of the existing air conditioning equipment.	No increase in capacity is necessary.
A.2.5 Ability to Detect, Filter, and Discharge Airborne Contaminants in the Control Room		
There are no radiation monitors or gas detectors on the air intake to the control room. There is a radiation monitor, R-1, located in a corner of the control room behind the control panel.	The recent toxic chemical survey of the Robinson site including nearby sources indicated that there was no danger from the toxic chemicals because of the small quantities of the chemicals or because of their distance from the Control Room.	See Item A.1.6,b.
It automatically will place the system on the emergency recirculation mode if the radioactivity exceeds the setpoint of 2.5 millirem per hour.	The radiation monitor R-1 located in the control room will sense and alarm if the radioactivity exceeds 2.5 mrem per hour. The radiation from the containment will exceed this setting and will automatically isolate the Control Room. Before the radiation monitor R-1 can sense the radioactivity, there will be a direct signal to isolate from the high containment pressure or high radiation monitors in the containment.	
The normal design ventilation rate of 600 cfm is adequate to clear the control room of smoke and fumes within approximately 30 minutes, if the control room was sealed and tight. At the calculated infiltration rate, less than 30 minutes would be needed.	The normal design ventilation rate of 600 CFM is adequate to clear the Control Room in less than 30 minutes with or without the larger emergency zone volume. Therefore, the existing supply and exhaust system are adequate for smoke purging.	No action necessary.

TABLE A-1
Evaluations and Recommendations of Findings Contained in NUS 3696
"Control Room Habitability Evaluation H. B. Robinson Steam Electric Generating Plant"
(continued)

Description of Finding in NUS 3696	Current Evaluation	Recommended Action
A.2.6 Provisions to Detect and Isolate Portions of System in Fires, Failures, and Malfunctions		
Fire dampers on the control room supply and return ducts are provided and each has a position switch to alarm the closed position. Because the system serves no other area, it is not necessary to isolate a portion of the system.	Fire dampers are installed in the control room supply and return ducts at the HVAC equipment wall and at the top of the chase in the Control Room to prevent a fire in the HVAC Equipment Room from migrating to the Control Room and making it untenable because of smoke or heat. Closure of either fire damper will close a position switch on the damper to operate an alarm in the Control Room. The fire dampers were originally installed to isolate the Control Room from a fire in the Unit 1 Cable Spreading Room which is no longer used for that purpose. The fire dampers may now be removed because the duct no longer need pass through a different fire zone if the Unit 1 Cable Spread Room is assigned to the same zone as the HVAC Equipment Room.	No action necessary.
A.3 COMPARISON WITH STANDARD REVIEW PLAN 6.5.1		
A.3.1 The System was Designed to Operate After a Design Basis Accident by Manual Control from the Control Room	The system is arranged to be manually controlled from the Control Room. All the isolation dampers are pneumatically operated to fail in the isolation and recirculation mode on the failure of either instrument air or electrical control power.	No action necessary.
A.3.2 Comparison with Paragraph II.2 of Standard Review Plan 6.5.1		
a. A high-efficiency filter (HEPA) is not provided after the charcoal filter; a prefilter and HEPA are provided. A moisture separator is not required in this application.	A high efficiency filter downstream of the charcoal filter was not required when the Robinson plant was licensed. The later requirement for a downstream HEPA filter was to prevent radioactive charcoal fines from being carried by the air stream through the ductwork system. Since the filter is on stream only during the isolation and recirculation mode, very little radioactivity will be accumulated by the charcoal during this brief exposure. Also, because an iodine reduction factor less than 10 is required, the specific acceptance criteria for the filter are decreased per SRP 11.3, Criterion 5 and RG 1.140. Under these permissible exceptions, a downstream HEPA will not be required. The present arrangement and available space in the HVAC Equipment Room will not provide the space required to add the downstream filter.	No action necessary.

TABLE A-1
Evaluations and Recommendations of Findings Contained in NUS 3696
"Control Room Habitability Evaluation H. B. Robinson Steam Electric Generating Plant"
(continued)

	Description of Finding in NUS 3696	Current Evaluation	Recommended Action
b.	No redundancy of the filter system is provided and no separation of redundant components is needed.	The single filter train is normally on standby and is passive except for the isolation dampers which tend to fail safe. Missiles generated by the booster fan will be thrown away from the filter and can strike only the supply air duct which is under positive pressure and no inleakage would occur. Therefore, damage from missiles internally will have little or no effect.	Add redundant bypass damper.
c.	The filter system design flow is less than the 30,000 cfm maximum defined in Standard Review Plan 6.5.1.	The filter system is designed for 6000 cfm which is well below the maximum filter size of 30,000 cfm. The 30,000 cfm limitation on size is to permit filter changes expeditiously and to permit removal of the entire assembly if necessary. No modifications are necessary.	No action necessary.
d.	An investigation of the original seismic design of the control room ventilation system is being conducted.	The ductwork has been determined to be seismic Class I.	No action necessary.
e.	The single-filter system is instrumented to signal and alarm on low flow; it does not record pressure drop or flow rate.	The single-filter system is on line during the isolation and recirculation mode. If the pressure drop exceeds the design pressure drop, the flow will decrease and alarm in the Control Room. The flow rate also is not recorded but is monitored and alarmed when the flow rate is insufficient to cool the Control Room. During periodic testing, the pressure drop is indicated on the control panel in the HVAC Equipment Room and the filters replaced when necessary to maintain their readyness for emergency service.	No action necessary.
f.	The emergency filter system is activated automatically by a high-radiation signal from the control room radiation monitor or by a containment isolation signal. The control room radiation monitor is located behind the control panel in the southwest corner of the control room.	The emergency filter system and control room isolation are activated automatically by the radiation monitor within the Control Room or a containment isolation signal. The radiation monitor will pick up radiation streaming directly from the containment. Either isolation signal will provide an earlier warning than will a radiation monitor in the Control Room make up air inlet. Therefore, additional radiation monitors are not required.	No action necessary.

TABLE A-1
Evaluations and Recommendations of Findings Contained in NUS 3696
"Control Room Habitability Evaluation H. B. Robinson Steam Electric Generating Plant"
(continued)

Description of Finding in NUS 3696	Current Evaluation	Recommended Action
A.3.3 Comparison with Paragraph II.4 of Standard Review Plan 6.5.1		
a. The filter design predated NSI N509-1976 and is not constructed for and does not have provisions for the testing described in Section 5.4 of ANSI N509-1976.	Although the filter design predated ANSI N-509 and does not have provisions for conveniently testing the filter as described in Section 5.4, the filters have been tested and exceed requirements. Therefore, the addition of new provisions for testing are not required.	No action necessary.
b. Moisture removal equipment is not required to ensure a relative humidity less than 70 percent.	The air within the control room is normally at approximately 50 to 60% relative humidity. Mixture of this air with the relatively small flow of 600 cfm saturated outdoor air assures that the mixture will be less than 70% relative humidity. Therefore, additional moisture removal equipment is not necessary.	No action necessary.
c. Although not required by the original plant design, prefilters were recently added to the HEPA filters. There are no provisions for testing them separately.	The recent addition of prefilters was intended to extend the useful life of the HEPA filters. Normally, prefilters are changed because they appear dirty and expended rather than because the differential pressure drop has increased. The pressure drop on a dirty prefilter is less than 1/2 inch WG and is only a small portion of the 2 inch pressure drop through the charcoal and HEPA filter. Therefore, the practice of changing the prefilter periodically or when the filter appears dirty is adequate to assure that the system flow is maintained. No additional provision for testing the prefilter is deemed necessary.	No action necessary.
d. The HEPA filters are DOP-tested once per operating cycle, per technical specifications.	The HEPA filters are DOP-tested on a periodical schedule and the test results are recorded. No change in equipment or procedure is required.	No action necessary.
e. Filter and adsorber mounting frames have proven satisfactory, but were not in accordance with current practice and ANSI N509-1976. For example, they do not include quick-release clamps.	The filter and adsorber mounting frames have bolt and nut holddowns which require more time for filter media changes than quick release clamps which are currently used on newer filter assemblies. The bolt and nut holddowns are functionally adequate as proven by the satisfactory test results. The major disadvantage is that more time is required for filter media changes and when the media is changed after an emergency there may be high levels of radioactivity on and around the filters. On the basis that the existing hold downs are adequate, there is no need to modify the holddowns or change the filter assembly.	No action necessary.

TABLE A-1
Evaluations and Recommendations of Findings Contained in NUS 3696
"Control Room Habitability Evaluation H. B. Robinson Steam Electric Generating Plant"
(continued)

Description of Finding in NUS 3696	Current Evaluation	Recommended Action
f. Filter housings including floors and doors are not in accordance with ANSI N509-1976. Lights and viewing ports are not provided. Fire protection for the charcoal filter is not provided based on the results of the fire protection review.	The existing filter housings are not in accordance with ANSI N-509 requirements to have lights, viewing ports, and fire protection for the charcoal filter. The Robinson Control Room filter assembly is only 4'-6" wide. When the access door is open, there is adequate light by which to change media or clean the inside of the housing. A light would interfere with operations inside the presently constructed housing. Viewing ports would not be useful unless there were lights inside the housing. The floors and doors are not as assuredly rigid and tight as current designs but the filter leakage tests performed on the unit prove that the existing housing is adequate for the purpose and equivalent to its performance when new. Therefore, because its functional performance is satisfactory, there is no need to replace the filter assembly housing. The control room fire detectors will detect smoke and gas carried into the control room in the event of a fire. The control room personnel would locate the source of smoke so that the fire could be extinguished. The existing housing cannot be flooded with water more than 1/3 of the filter face. Even though a water sprinkler is most effective in extinguishing a charcoal fire, the application of water must continue for a long time before the charcoal would be wet all the way through and the fire be cooled and extinguished. The application of water to the filter would best be done manually by opening the access door and applying water to the hot spot. This would maximize the effectiveness of fire extinguishment and minimize the volume of water used. The water could be potentially contaminated and would require special means of removal.	No modification to equipment is necessary
g. Water drains were not provided because no sprinkler system was provided.	Water drains were not provided on the original equipment because no water was anticipated. If a water drain were to be provided now, it must be valved to prevent air leakage and by itself, the drain would not solve completely the problem of water removal after a fire. Therefore, rather than compromise the design of the housing, a drain should not be added.	No action necessary.

TABLE A-1
Evaluations and Recommendations of Findings Contained in NUS 3696
"Control Room Habitability Evaluation H. B. Robinson Steam Electric Generating Plant"
(continued)

Description of Finding in NUS 3696	Current Evaluation	Recommended Action
h. The adsorbent is acceptable for adsorbing gaseous iodides.		No action necessary.
i. The adsorption unit maximum loading of total iodine is as given in Regulatory Guide 1.52.	The charcoal filter section media has been tested and is still acceptable for iodine adsorption efficiency. The total iodine adsorption capacity of the filter is approximately 115 lbs.	No action necessary.
j. No provisions were included to inhibit off-design temperatures in the adsorber section.	There are no provisions to monitor the charcoal filter section temperature. At present the charcoal will remain cool by the flow leaking through the filter inlet damper. A thermometer would continually indicate the return air temperature from the Control Room.	No action necessary.
k. The ductwork was designed to SMACNA low-pressure duct construction standards and is not in accordance with ANSI N509-1976.	The ductwork which was designed to SMACNA Low Pressure Duct Construction Standards allowed a relatively large leak rate. All leakage into the return duct where it passes through the Unit 1 Cable Spread Room and the HVAC Equipment Room was essentially the same as outdoor air. This air was then filtered with the recirculated air flow and only a portion (10%) bypassed the filter through the bypass isolation damper. Although the ductwork has been repaired and this inleakage substantially reduced, in time, the mastic and tape will leak again. A recommended solution is to enlarge the Control Room emergency zone to include the HVAC Equipment Room and the Cable Spreading Rooms so that any duct inleakage will be clean filtered air. This can be accomplished by sealing the air supply to these rooms from the Auxiliary Building ventilation system and the outdoor air inlet for HVA-2 and cooling these rooms with the Control Room unit HVA-1.	Make minor revisions to the ventilation ductwork as described in A.2.1.h.

TABLE A-1
Evaluations and Recommendations of Findings Contained in NUS 3696
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(continued)

Description of Finding in NUS 3696	Current Evaluation	Recommended Action
1. The dampers are not low-leakage dampers.	The isolation dampers are standard commercial type dampers which reportedly will leak approximately 10% of the design flow rate when fully closed. Since the toxic chemical and radiological dose calculations were based on this flow of outdoor air and the existing filter bypass, the results indicate that the leakage is intolerable with a large infiltration of outdoor air because of the leakage flow bypassing the filter. The modification to enlarge the emergency zone will reduce the total unfiltered air flow to acceptable levels but the system will not be habitable if the filter bypass damper fails to close.	Add a redundant damper to the filter bypass duct.
A.3.4 Comparison with Paragraphs II.5 and II.6 of Standard Review Plan 6.5.1		
The space between mounting frames and the provisions for testing each filter stage do not meet the criteria of these paragraphs. The HEPA and charcoal filter efficiencies can be verified by separate tests. Complete visual inspections necessitate removal of the prefilters.	The HEPA and charcoal filter efficiencies have been verified by tests and are acceptable. Visual inspection of the HEPA necessitates the removal of the prefilters. Since the prefilters are replaced with new prefilters after each test of the HEPA filters, a test of the prefilters is not necessary. The existing filter assembly satisfies the intent of SRP 6.5.1 as proven by the test results.	No modifications are necessary.
A.3.5 Equipment Environment		
The control room HVAC equipment is located in the heating and ventilation equipment room and is designed to meet the conditioned environment of that room. The filters are not shielded and could become a radiation source after a postulated design basis accident.	The Control Room HVAC Equipment Room is ventilated and cooled by the Auxiliary Building HVAC system which supplies air at the outdoor temperature. The air flow rate is sufficient to prevent the room temperature from exceeding 104°F (40°C). The electrical equipment, motors, solenoids, etc., are normally rated at 40°C. The pneumatic controls are not qualified by specific tests as were the electrical equipment but the pneumatic control devices do not generate heat and can tolerate much higher ambient temperatures. Modifications to the HVAC Equipment Room ventilation system are not required for the equipment environment but it is recommended that the system be revised to include the equipment room in the emergency zone to relieve its dependency on the single Auxiliary Building air supply fan.	Make the ductwork revisions described in A.3.3.k.
	The filter is within a room with 18" poured concrete walls and ceiling. An analysis of the radioactive source at the filter indicates that there is very little effect on the control room operator dose. There is no need for additional shielding.	There is no need for additional shielding.

TABLE A-1
Evaluations and Recommendations of Findings Contained in NUS 3696
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(continued)

Description of Finding in NUS 3696	Current Evaluation	Recommended Action
A.3.6 Component Design and Qualification Testing		
a. The design standards of the filter system are not in accordance with current practice and do not incorporate the recommendations of ANSI N509-1976.	The design standards of the filter system are not in accordance with current practice as recommended in ANSI N-509. However, the functional performance of the filter is as specified and meets the performance requirements of reducing the radioactive iodine to an acceptable level to maintain a habitable control room.	No action required.
b. No protection is provided against charcoal fires and none is needed, based on the results of the fire protection review program.	No protection is needed against a charcoal fire because the fire would be confined within the filter housing and bypass dampers and would not pose a threat to control room personnel.	No action necessary.
A.3.7 In-Place Testing		
Both the HEPA and charcoal filter systems have been tested. From the test results, the filter performance is acceptably above the minimum efficiencies.	The filter assembly is not fitted with lights, inspection windows, DOP injection and freon injection distribution headers but the housing does have access upstream and downstream of each filter stage except the prefilters. The HEPA filter bank and charcoal filter bank have been leak tested while in operation and the test results were satisfactory.	No additional provisions are necessary.