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SHEA,J. OPERATING REACTORS BRANCH 2

SUBJECT: SUBMITS REVISED ATTACHMENT A TO 780728 SUBMITTAL AMENDING TECH SPECS FOR CHARCOAL FILTER TESTING & IODINE REMOVAL EQUIPMENT OPERABILITY.ALSO FORWARDS ATTACHMENTS B & C TO 780728 SUBMITTAL.

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May 8, 1979

Mr. Jim Shea, Project Manager
Operating Reactors Branch No. 2
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Jim:

Enclosed is a revised Attachment A to our July 28, 1978 submittal amending Technical Specifications for charcoal filter testing and iodine removal equipment operability. The revised Attachment A incorporates changes verbally agreed to by Bill Russell and Bob Mecredy, but which were inadvertently left out of the submittal.

Attachments B and C to the July 28, 1978 submittal are also enclosed for completeness.

Sincerely yours,

Paul C. Wilkens

PCW:mkv
Enclosures

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Attachment A

Proposed Technical Specifications

1. Revise Technical Specification 3.3.2.1 and 3.3.2.2, add 3.3.5 and revise the Basis for Technical Specification 3.3 as shown on the attached pages.

2. Revise Technical Specifications 3.11.1, 4.5.2.3 and 4.11.1 and the Bases for these specifications as shown on the attached pages.

(ii) The two reactor coolant drain tank pumps shall be tested and their operability demonstrated prior to initiating repairs of the inoperable residual heat removal pump.

d. One residual heat exchanger may be out of service for a period of no more than 24 hours.

e. Any valve required for the functioning of the safety injection or residual heat removal systems may be inoperable provided repairs are completed within 12 hours. Prior to initiating repairs, all valves in the systems that provide the duplicate function shall be tested to demonstrate operability.

f. Power may be restored to any valve referenced in 3.3.1.1 g for the purposes of valve testing providing no more than one such valve has power restored and provided testing is completed and power removed within 12 hours.

3.3.1.3 Except during diesel generator load and safeguard sequence testing or when the vessel head is removed or the steam generator manway is open no more than one safety injection pump shall be operable whenever the temperature of one or more of the RCS cold legs is $\leq$ 330°F.

3.3.1.3.1 Whenever only one safety injection pump may be operable by 3.3.1.3 at least two of the three safety injection pumps shall be demonstrated inoperable a minimum of once per twelve hours by verifying that the control switches are in the pull-stop position.

3.3.2 <u>Containment Cooling and Iodine Removal</u>

3.3.2.1 The reactor shall not be made critical except for low temperature physics tests, unless the following conditions are met:

a. The spray additive tank contains not less than 4500 gallons of solution with a sodium hydroxide concentration of not less than 30% by weight.

b. At least two containment spray pumps are operable.

c. Four fan cooler units are operable.

d. At least two charcoal filter units are operable.

e. All valves and piping associated with the above components which are required to function during accident conditions are operable.

f. At least two HEPA filter units with demisters are operable.

3.3.2.2 During power operation, the requirements of 3.3.2.1 may be modified to allow one of the following components to be inoperable at any one time. If the system is not restored to meet the requirements of 3.3.2.1 within the time period specified, the reactor shall be placed in the hot shutdown condition. If the requirements of 3.3.2.1 are not satisfied within an additional 48 hours, the reactor shall be placed in the cold shutdown condition.

a. One fan cooler may be out of service for a period of no more than 7 days.

b. One containment spray pump may be out of service provided the pump is restored to operable status within 3 days. The remaining containment spray pump shall be tested to demonstrate operability before initiating maintenance on the inoperable pump.

c. Any valve in the system, required to function during accident conditions, may be inoperable provided repairs are completed within 24 hours. Prior to initiating repairs, all valves in the system that provide the duplicate function shall be tested to demonstrate operability.

PROPOSED

d. One post accident charcoal filter unit may be out of service provided the unit is restored to operable status within 7 days and provided the two containment spray pumps are demonstrated to be operable within 24 hours and daily thereafter. The two containment spray pumps shall be tested to demonstrate operability before initiating maintenance on the inoperable charcoal unit.

e. The spray additive system may be out of service for a period of no more than 3 days.

3.3.3 Component Cooling System

3.3.3.1 The reactor shall not be made critical unless the following conditions are met:

a. At least two component cooling pumps are operable.

b. At least two component cooling heat exchangers are operable.

c. All valves, interlocks and piping associated with the above components which are required to function during accident conditions are operable.

3.3.3.2 During power operation, the requirements of 3.3.3.1 may be modified to allow one of the following components to be inoperable at any one time. If the system is not restored to meet the conditions of 3.3.3.1 within the time period specified, the reactor shall be placed

in the hot shutdown condition. If the requirements of 3.3.3.1 are not satisfied within an additional 48 hours, the reactor shall be placed in the cold shutdown condition.

a. One component cooling pump may be out of service provided the pump is restored to operable status within 24 hours.

b. One heat exchanger or other passive component may be out of service provided the system may still operate at 100% capacity and repairs are completed within 24 hours.

3.3.4 Service Water System

3.3.4.1 The reactor shall not be made critical unless the following conditions are met:

a. At least two service water pumps and one loop header are operable.

b. All valves, interlocks, and piping associated with the operation of two pumps are operable.

3.3.4.2 Any time that the conditions of 3.3.4.1 above cannot be met, the reactor shall be placed in the cold shutdown condition.

3.3.5 Control Room Emergency Air Treatment System

3.3.5.1 The reactor shall not be made critical unless the control room emergency air treatment system is operable.

3.3.5.2 During power operation, the requirements of 3.3.5.1 may be modified to allow the control room emergency air treatment system to be inoperable for a period of 48 hours. If the system is not made operable within those 48 hours, the reactor shall be placed in hot shutdown condition utilizing normal operating procedures.

Basis:

The normal procedure for starting the reactor is, first to heat the

dundancy for certain ranges of break sizes.[2]

The containment cooling and iodine removal functions are provided by two independent systems: (a) fan-coolers plus post accident charcoal filters and (b) containment spray with sodium hydroxide addition. During normal power operation, only two of the four fan-coolers are required to remove heat lost from equipment and piping within containment.[3] In the event of a Design Basis Accident, any one of the following will serve to reduce airborne iodine activity and maintain doses within the values calculated in the FSAR: (1) two containment spray pumps and sodium hydroxide addition, (2) two fan-coolers and two post accident charcoal filters, or (3) one containment spray pump and sodium hydroxide addition plus one fan-cooler and one post accident charcoal filter.[4] In addition, the containment integrity analysis assumes that one containment spray pump and two fan-coolers operate to reduce containment pressure following a Design Basis Accident.[9] Because of the difficulty of access to make repairs to a fan-cooler and because of the low probability of a Design Basis Accident during that time, an additional seven days operation with an inoperable fan-cooler is permitted. The containment spray pumps and spray additive system are located outside containment and are, therefore, less difficult to repair. Therefore, three days with an inoperable containment spray pump or spray additive system is deemed acceptable.

The Component Cooling System is different from the other systems discussed above in that the components are so located in the Auxiliary Building as to be accessible for repair after a loss-of-coolant accident.[5] In addition, if during the post-accident phase the component cooling water supply is lost, core and containment cooling could be maintained

until repairs were effected.[6][7]

The facility has four service water pumps. Only one is needed during the injection phase, and two are required during the recirculation phase of a postulated loss-of-coolant accident.[8]

The control room emergency air treatment system is designed to filter the control room atmosphere during periods when the control room is isolated and to maintain radiation levels in the control room at acceptable levels following the Design Basis Accident.[9] Reactor operation may continue for a limited time while repairs are being made to the air treatment system since it is unlikely that the system would be needed.

The limits for the accumulator pressure and volume assure the required amount of water injection during an accident, and are based on values used for the accident analyses. The indicated level of 50% corresponds to 1108 cubic feet of water in the accumulator and the indicated level of 82% corrresponds to 1134 cubic feet. 16

The limitation of no more than one safety injection pump to be operable and the surveillance requirement to verify that two safety injection pumps are inoperable below 330°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single PORV.

<u>References</u>

(1) FSAR Section 9.3

(2) FSAR Section 6.2

(3) FSAR Section 6.3

(4) FSAR Section 14.3.5

(5) FSAR Section 1.2

(6) FSAR Section 9.3

(7) FSAR Section 14.3

(8) FSAR Section 9.4

(9) FSAR Section 14.3.5

e. Charcoal adsorbers shall be installed in the ventilation system exhaust from the spent fuel storage pit area and shall be operable.

3.11.2 Radiation levels in the spent fuel storage area shall be monitored continuously.

3.11.3 The trolley of the auxiliary building crane shall never be stationed or permitted to pass over storage racks containing spent fuel.

3.11.4 Fuel assemblies with less than 60 days since irradiation shall not be placed in storage positions with less spacing between them than that indicated in Figure 3.11-1 by the designation RDF.

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facility. The roughing filter protects the adsorber from becoming fouled with dirt; the adsorber removes iodine, the isotope of highest radiological significance, resulting from a fuel handling accident. The effectiveness of charcoal for removing iodine is assured by having a high throughput and a high removal efficiency. The throughput is attained by operation of the exhaust fans. The high removal efficiency is attained by minimizing the amount of iodine that bypasses the charcoal and having charcoal with a high potential for removing the iodine that does pass through the charcoal.

The minimum spacing specified for fuel assemblies with less than 60 days decay is based on maintaining the potential release of fission products that could occur should an object fall on and damage stored fuel to less than that which could have occurred with fuel stored in the original fuel storage racks.

of the spray additive valves closed, each valve will be opened and closed by operator action. This test shall be performed prior to startup if the time since the last test exceeds one month.

c. The accumulator check valves shall be checked for operability during each refueling shutdown.

4.5.2.3 Air Filtration System

4.5.2.3.1 At least once every 18 months or after every 720 hours of charcoal filtration system operation since the last test, or following painting, fire or chemical release in any ventilation zone communicating with the system, the post accident charcoal system shall have the following conditions demonstrated.

a. The pressure drop across the charcoal adsorber bank is less than 3 inches of water at design flow rate (± 10%).

b. In place Freon testing, under ambient conditions, shall show at least 99% removal.

c. The iodine removal efficiency of at least one charcoal filter cell shall be measured. The filter cell to be tested shall be selected randomly from those cells with the longest in-bank residence time. The minimum acceptable value for filter efficiency is 90% for removal of methyl iodide when tested at at least 286°F and 95% RH and at 1.5 to 2.0 mg/m^3 loading with tagged CH_3I.

4.5.2.3.2 After each replacement of a charcoal drawer or after any structural maintenance on the housing for the post accident charcoal system, the condition of Specification 4.5.2.3.1.b shall be demonstrated for the affected portion of the system.

4.5.2.3.3 At least every 18 months or following painting, fire, or chemical release in any ventilation zone communicating with the system, the containment recirculation system shall have the following conditions demonstrated.

a. The pressure drop across the HEPA filter bank is less than 3 inches of water at design flow rate (± 10%).

b. In place thermally generated DOP testing of the HEPA filters shall show at least 99% removal.

4.5.2.3.4 After each complete or partial replacement of the HEPA filter bank or after any structural maintenance on a housing for the containment recirculation system, the condition of Specification 4.5.2.3.3.b shall be demonstrated for the affected portion of the system.

4.5.2.3.5 Except during cold or refueling shutdowns the post accident charcoal filter isolation valves shall be tested at intervals not greater than one month to verify operability and proper orientation and flow shall be maintained through the system for at least 15 minutes. The test shall be performed prior to startup if the time since the last test exceeds 1 month.

4.5.2.3.6 At least once every 18 months or after every 720 hours of charcoal filtration system operation since the last test, or following painting, fire or chemical release in any ventilation zone communicating with the system, the control room emergency air treatment system shall have the following conditions demonstrated.

a. The pressure drop across the combined HEPA filters and charcoal adsorber banks is less than 6" of water at design flow rate (± 10%).

b. In place Freon testing, under ambient conditions, shall show at least 99% removal.

c. In place thermally generated DOP testing of the HEPA filters shall show at least 99% removal.

d. The results of laboratory analysis on a carbon sample shall show 90% or greater radioactive methyl iodide removal when tested at at least 125°F and 95% RH and at 1.5 to 2.0 mg/m^3 loading with tagged CH_3I.

4.5.2.3.7 After each complete or partial replacement of the HEPA filter bank or after any structural maintenance on the HEPA housing for the control room emergency air treatment system, the condition of Specification 4.5.2.3.6.c shall be demonstrated for the affected portion of the system.

4.5.2.3.8 After each replacement of a charcoal drawer or after any structural maintenance on the charcoal housing for the control room emergency air treatment system, the condition of Specification 4.5.2.3.6.b shall be demonstrated for the affected portion of the system.

4.5.2.3.9 Except during cold or refueling shutdowns the automatic initiation of the control room emergency air treatment system shall be tested at intervals not to exceed one month to verify operability and proper orientation and flow shall be maintained through the system for at least 15 minutes. The test shall be performed prior to startup if the time since the last test exceeds one month.

Basis:

The Safety Injection System and the Containment Spray System are principal plant safeguards that are normally inoperative during reactor operation.

Complete systems tests cannot be performed when the reactor is operating because a Safety Injection signal causes containment isolation and a Containment Spray System test requires the system to be temporarily disabled. The method of assuring operability of these systems is therefore to combine systems tests to be performed during annual plant shutdowns, with more frequent component tests, which can be performed during reactor operation.

The annual systems tests demonstrate proper automatic operation of the Safety Injection and Containment Spray Systems. With the pumps blocked from starting, a test signal is applied to initiate automatic action

The air filtration portion of the containment air recirculation system is a passive safeguard which is isolated from the cooling air flow during normal reactor operation. Hence the charcoal should have a long useful lifetime. The filter frames that house the charcoal are stainless steel and should also last indefinitely. The pressure drop, filter efficiency, and valve operation test frequencies will assure that the system can operate to meet its design function under accident conditions. As the adsorbing charcoal is normally isolated, the test schedule, related to hours of operation as well as elapsed time, will assure that it does not degrade below the required adsorbtion efficiency. The test conditions for charcoal sample adsorbing efficiency are those which might be encountered under an accident situation.[2]

The control room air treatment system is designed to filter the control room atmosphere (recirculation and intake air) during control room isolation conditions. HEPA filters are installed before the charcoal filters to remove particulate matter and prevent clogging of the iodine adsorbers. The charcoal filters reduce the airborne radioiodine in the control room. Bypass leakage must be at a minimum in order for these filters to perform their designed function. If the performances are as specified the calculated doses will be less than those analyzed.[3]

Retesting of the post accident charcoal system or the control room emergency air treatment system in the event of painting, fire, or chemical release is required only if the system is operating and is providing filtration for the area in which the painting, fire, or

chemical release occurs.

Testing of the air filtration systems will be, to the extent it can, given the configuration of the systems, in accordance with ANSI N510-1975, "Testing of Nuclear Air-Cleaning Systems."

References:

(1) FSAR Section 6.2

(2) FSAR Section 6.3

(3) FSAR Section 14.3.5

4.11 Spent Fuel Pit Charcoal Adsorber Testing

Applicability

Applies to testing the performance of the spent fuel pit charcoal adsorbers.

Specification

4.11.1 Within 60 days prior to each major fuel handling*, the spent fuel pit charcoal adsorber system shall have the following conditions demonstrated. After the conditions have been demonstrated, the occurrence of painting, fire, or chemical release in any ventilation zone communicating with the spent fuel pit charcoal adsorber system shall require that the following conditions be redemonstrated before major fuel handling* may continue.

a. The total air flow rate from the charcoal adsorbers shall be at least 75% of that measured with a complete set of new adsorbers.

b. In place Freon testing, under ambient conditions, shall show at least 99% removal.

c. The results of laboratory analysis on a carbon sample shall show 90% or greater radioactive methyl iodide removal when tested at at least 150°F and 95% RH and at 1.5 to 2.0 mg/m^3 loading with tagged CH_3I.

4.11.2 After each replacement of a charcoal filter drawer or after any structural maintenance on the charcoal housing for the spent fuel pit charcoal adsorber system, the condition of Specification 4.11.1. b shall be demonstrated for the affected portion of the system.

* Major fuel handling is considered as removal of 20% or more of the fuel assemblies from the reactor vessel.

Basis

The measurement of the air flow assures that air is being withdrawn from the spent fuel pit area and passed through the adsorbers. The flow is measured prior to employing the adsorbers to establish that there has been no gross change in performance since the system was last used. The Freon test provides a measure of the amount of leakage from around the charcoal adsorbent.

The ability of charcoal to adsorb iodine can deteriorate as the charcoal ages and weathers. Testing the capacity of the charcoal to adsorb iodine assures that an acceptable removal efficiency under operating conditions would be obtained. The difference between the test requirement of a removal efficiency of 90% for methyl iodine and the percentage assumed in the evaluation of the fuel handling accident provides adequate safety margin for degradation of the filter after the tests.

Retesting of the spent fuel pit charcoal adsorber system in the event of painting, fire, or chemical release is required only if the system is operating and is providing filtration for the area in which the painting, fire, or chemical release occurs.

Testing of the air filtration systems will be tested, to the extent it can given the configuration of the systems, in accordance with ANSI N510-1975, "Testing of Nuclear Air-Cleaning Systems".

Reference:

(1) Letter from E.J. Nelson, Rochester Gas and Electric Corporation to Dr. Peter A. Morris, U.S. Atomic Energy Commission, dated February 3, 1971

Attachment B

Safety Evaluation

The installation of charcoal filters in an effluent stream provides an effective means of removing iodine from the stream and thereby reduces doses due to the effluent release. Charcoal filter systems have been installed, and their effectiveness has been assumed to reduce the consequences of design basis accidents in three areas of Ginna Station. The post accident charcoal filtration system is installed in the containment to mitigate the consequences of a loss of coolant accident and other less severe accidents which may occur inside the containment. A charcoal filtration system is installed in the immediate vicinity of the spent fuel pool in the auxiliary building to mitigate the consequences of a fuel handling accident in the auxiliary building. Charcoal filtration is provided as an emergency air treatment system in the control room ventilation system to maintain doses to control room operators at acceptable levels following a design basis accident. Limiting conditions for operation have been proposed which will ensure that each of the charcoal filtration systems will be available and testing requirements have been proposed which will ensure that each of the systems will meet its assumed performance characteristics in the unlikely event it were required.

The post accident charcoal filter units are described and their assumed performance characteristics are presented in FSAR Sections 6.3 and 14.3.5. A condition for plant operation is proposed which will provide adequate equipment to reduce radioiodine concentrations to acceptable levels. Testing of the two containment spray pumps at daily intervals when one post accident filter is inoperable will assure the operability of the pumps should they be required.

The post accident charcoal filters will be tested at regular intervals to assure the capability to meet accident analysis assumptions even after prolonged periods without use. Testing after 720 hours operation will ensure that degradation due to use has not occurred. Pressure drop testing of both the charcoal and the HEPA filters at design flow rates will ensure that the filters have not become plugged with foreign matter and that design flows can be achieved. Freon testing will ensure that excessive air bypass flow does not exist. Dioctal phthalate (DOP) testing will ensure that the HEPA filters will adequately remove particulate material. The use of thermally generated DOP is proposed because this method provides for a more uniform DOP concentration for large flow systems than do other methods. Environmental test conditions for the post accident filters are the design containment temperature, 286°F, at 95% relative humidity. As the assumed iodine removal efficiencies are 70% for methyl iodide and 90% for elemental iodine, the 90% requirement for methyl iodide will assure that the assumed efficiencies are met during the test interval. An air flow distribution test specification has not been proposed. The feasibility of conducting a one-time flow distribution test during the next refueling outage and/or performing analytical work to demonstrate the effectiveness of the charcoal filters is being investigated. The NRC will be kept informed about that work.

The control room emergency air treatment system is described and its assumed performance characteristics are presented in FSAR Sections 9.9 and 14.3.5. A limiting condition for operation is proposed which will ensure the operability of the system should it be required. Brief periods for maintenance, should it be required are allowed since it is unlikely that the system would be required during the period permitted for repairs.

A test frequency for the control room emergency air treatment system will be identical to that proposed for the containment post accident filtration system. As the system is automatically initiated upon sensing of high radiation levels in the control room, the automatic initiation will be tested. As with the containment post accident system, pressure drop testing at the design flow rate, Freon testing, thermally generated DOP testing, and charcoal efficiency testing will assure the operability of the control room emergency air treatment system should it be required. The charcoal efficiency test environment of 125°F and 95% relative humidity is well above that which is likely to be encountered in the control room under normal or accident conditions.

The spent fuel pool charcoal filters are described and their assumed performance characteristics are described in a letter from Mr. E. J. Nelson, Rochester Gas and Electric Corporation, to Dr. Peter A. Morris, U. S. Atomic Energy Commission, dated February 3, 1971. As the operability of these filters has been assumed to mitigate the consequences of a fuel handling accident immediately following a reactor shutdown, the limiting condition for operation is retained.

To provide consistency with other specifications, performance requirements are moved to Section 4.11 of the Technical Specifications from Section 3.11 and are amended. The present testing frequency is maintained as it provides for regular testing of the filters. Testing for total air flow and with Freon for bypass around individual sets of filters in the bank will ensure proper air flow through the filters. DOP testing is not proposed since the spent fuel pool charcoal filters do not have HEPA filters associated with them. Charcoal efficiency will be measured at 150°F, the Technical Specification limit for the spent fuel pool water and therefore an upper limit on the air temperature, and 95% humidity and the efficiency requirement will assure that the assumed performance characteristics are met.

Technical Specification 3.3.2.1 presently requires that the reactor not be made critical, except for low temperature physics tests, unless at least three of the four fan-cooler units are operable. One additional fan-cooler may be out of service for a period of not more than 24 hours, during power operation.

A review of the design assumptions in the FSAR for these containment cooling systems, the fan-coolers and the containment spray, has revealed an apparent inconsistency between the Technical Specifications, including the Basis, and the assumptions in the FSAR analysis. It appears that meeting the present Technical Specifications may not provide all necessary equipment in the event of certain assumed single failures following a Design Basis Accident.

The equipment assumed to operate to reduce containment pressure following a Design Basis Accident is given in FSAR section 14.3.4 as one containment spray pump and two fan-coolers. The equipment assumed to operate to reduce the airborne iodine activity in containment following a Design Basis Event is given in FSAR Section 14.3.5 as any one of the following combinations:

(1) two containment spray pumps and sodium hydroxide additive,

(2) two fan-coolers and two post accident charcoal filters, or

(3) one spray pump and sodium hydroxide additive plus one fan-cooler and one post accident charcoal filter. The arrangement of equipment on the two safeguards buses is as follows:

Bus	Diesel	Fan-Cooler	Post Accident Charcoal Filter	Spray System
14	1A	1A	1A	1A
16	1B	1B		
16	1B	1C	1B	1B
14	1A	1D		

As can be seen, the most limiting single failure, assuming loss of offsite power, is the failure of one of the diesels. Should a diesel fail, the minimum requirements for containment pressure reduction of one spray pump and two fan-coolers will be met if all four fan coolers are required to be operable. The minimum requirement for iodine removal of one spray pump with sodium hydroxide addition and one fan-cooler with one post accident charcoal filter will also be met. Any other single failure, such as loss of a spray pump, fan-cooler, valve or damper is less limiting and would result in more equipment being operable than was assumed in the FSAR analysis. Thus, the proposed Technical Specification will result in the equipment being available which was assumed in the FSAR analysis.

The inoperability of a single component does not negate the ability of the system to perform its function but reduces the redundancy provided and thereby limits the ability to tolerate additional equipment failures. For this reason, and because the probability of occurrence of a Design Basis Event which would require the operation of the systems, the Technical Specifications permit a single component to be inoperable for a

short period of time to facilitate repairs without requiring the plant be shut down. Due to the difficulty of access to make repairs to the fan-coolers and to be consistent with the time permitted for inoperability of one post-accident charcoal filter, seven days is proposed as being an acceptable length of time for one fan-cooler to be inoperable. The containment spray pumps and spray additive system are located outside containment and, therefore, are more accessible for repair. As a result, 3 days is deemed an acceptable length of time for one containment spray pump or the spray additive to be inoperable.