RAIO-0218-58699

February 15, 2018

Docket No. 52-048

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

SUBJECT: NuScale Power, LLC Response to NRC Request for Additional Information No. 307 (eRAI No. 9226) on the NuScale Design Certification Application

REFERENCE: U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 307 (eRAI No. 9226)," dated December 19, 2017

The purpose of this letter is to provide the NuScale Power, LLC (NuScale) response to the referenced NRC Request for Additional Information (RAI).

The Enclosure to this letter contains NuScale's response to the following RAI Questions from NRC eRAI No. 9226:

- 09.05.01-7
- 09.05.01-8

This letter and the enclosed response make no new regulatory commitments and no revisions to any existing regulatory commitments.

If you have any questions on this response, please contact Carrie Fosaaen at 541-452-7126 or at cfosaaen@nuscalepower.com.

Sincerely,

Zackary W. Rad
Director, Regulatory Affairs
NuScale Power, LLC

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Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 9226

Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 9226

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Response to Request for Additional Information
Docket No. 52-048

eRAI No.: 9226
Date of RAI Issue: 12/19/2017

NRC Question No.: 09.05.01-7

10 CFR 50, Appendix A, GDC 3, “Fire protection,” states in part:

> “Fire detection and fighting systems of appropriate capacity and capability shall be provided and designed to minimize the adverse effects of fires on structures, systems, and components important to safety. Firefighting systems shall be designed to assure that their rupture or inadvertent operation does not significantly impair the safety capability of these structures, systems, and components.”

Due to a formatting error in Regulatory Guide 1.189, “Fire Protection for Power Plants,” Revision 2, Section 3.2.1, “Fire Protection Water Supply,” guidance concerning the ability to supply water to at least two standpipes and hose connections for manual firefighting in areas containing equipment required for safe plant shutdown in the event of a safe shutdown earthquake only applies when the fire protection system and the ultimate heat sink share a common water supply.

Since the NuScale fire protection system and ultimate heat sink do not share a common water supply, the applicant is requested to:

1. indicate if, in the event of a safe shutdown earthquake, the fire protection system is capable of providing flow to at least two standpipes and hose connections for manual firefighting in areas containing equipment required for safe plant shutdown.

2. describe in the FSAR how item (1) above is accomplished.

NuScale Response:

Flow is provided to the Fire Protection (FP) system by the diesel fire pumps. The diesel fire pump design is based on guidance from section 3.2.2, *Fire Pumps, from* Regulatory Guide (RG) 1.189 which references National Fire Protection Association (NFPA) 20, *Standard for Installation of Stationary Pumps for Fire Protection*. Additional seismic design criteria for the diesel fire pump is specified in accordance with American Society of Civil Engineers (ASCE)

43-05, *Seismic Design Criteria for Structures, Systems, and Components in Nuclear Facilities*, SDC-1, limit state C. The yard mains used to provide flow to the standpipes and hose connections used for manual fire fighting in areas containing safe shutdown equipment are designed to the requirements of American Society of Mechanical Engineers (ASME) B31.1, *Power Piping*, for system pressure integrity.

The diesel fire pumps are located in the fire water pump house which is designed, as a minimum to the requirements of the International Building Code and ASCE 7. The Seismic Design Category is based on American Nuclear Society (ANS) 2.26, *Categorization of Nuclear Facility Structures, Systems, and Components for Seismic Design*, categorization guidance as required per ASCE 43-05.

The NuScale FP system is designed to conform to section 8.2 of RG 1.189 which ensures safe shutdown is achieved, even in the case of an unmitigated fire, because redundant safe shutdown equipment is separated by at least three hour rated fire barriers. The fire suppression system is not credited to ensure safe shutdown at any time including after a safe shutdown earthquake.

FSAR section 9.5.1.2.6 b), "Fire Pumps," has been updated with revised requirements for the diesel fire pump to be designed in accordance with ASCE 43-05, SDC-1 limit state C. FSAR section 9.5.1.2.6 c), "Fire Mains," has been updated with revised requirements for specified fire supply piping to be designed to the requirements of ASME B31.1. Table 9.5.1-2, "Compliance Table versus RG 1.189," has been updated to address the revised guidance of Regulatory Guide 1.189, “Fire Protection for Power Plants,” Revision 2, Section 3.2.1, “Fire Protection Water Supply” based on NRC memorandum entitled, "Periodic Review of Regulatory Guide 1.189," dated November 27, 2017. (ML17321A047 and ML17321A048).

See the enclosed markups to the FSAR for specific changes.

Impact on DCA:

FSAR Section 9.5.1.2.6 and Table 9.5.1-2 have been been revised as described in the response above and as shown in the markup provided in this response.

fire distribution system. The fire pumps are two 100% percent capacity fire pumps, one electric and one diesel.

2) Individual fire pump connections to the yard fire main loop are separated with sectionalizing valves between connections.

3) Each fire pump and its driver and controls are separated from remaining fire pumps, drivers and controls by a fire barrier having a minimum 3-hour fire rating.

4) Diesel fire pump fuel is separated from equipment with safety-related or risk-significant functions.

5) Indication for the fire pumps identifying pump running, driver availability, failure to start, and low fire main pressure is provided in the control room.

6) The over current protection device for motor controllers are rated to carry indefinitely the sum of the locked rotor current of the largest pump motor and the full-load current of all of the other pump motors and accessory equipment.

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7) For the purpose of providing fire water flow to the seismically analyzed standpipes located in the RXB, the diesel fire pumps including appurtenances required for operation (start batteries, fuel day tank, start and run instrumentation, etc.) are designed in accordance with ASCE 43-05, SDC-1 limit state C. The diesel fire pump is housed in the Firewater Building, which is seismically designed based on its seismic classification in Table 3.2-1.

c) Fire Mains

An underground yard fire main loop is installed in accordance with NFPA 24 and appropriate referenced codes and standards. The following criteria is utilized per RG 1.189:

1) Means are provided for flushing and inspecting the fire main.

2) Sectional isolation valves are visually indicating such as post indicating type.

3) Control and sectionalizing valves in fire mains and water-based fire suppression systems are electrically supervised or administratively controlled. Administrative control is accomplished using locked valves with key control or tamper proof seals. Electrical supervision indicates in the control room.

4) The fire main system piping is separate from service or sanitary water system piping.

5) Sectional control valves are provided to permit isolation of portions of the fire main for maintenance and repair without affecting the water supply to primary and backup fire suppression systems serving areas that contain or expose equipment with safety-related or risk-significant functions.

6) Isolation valves are provided to isolate outside fire hydrants from the fire main.

7) Sprinkler systems (primary) and manual hose station standpipes (backup) have connections to the yard main system, so that a single active failure or a line break cannot impair both the primary and backup fire suppression systems.

RAI 09.05.01-8

Alternatively, headers inside buildings and fed from each end are used to supply both sprinklers and standpipe systems. Where these headers supply sprinklers and the seismically analyzed standpipes in the reactor ~~or control~~ building~~s~~, steel piping and fittings meeting the requirements of ASME B31.1, "Power Piping", are used for the headers, up to and including the first valve supplying the sprinkler systems.

RAI 09.05.01-7

8) For the purpose of supplying fire water to the seismically analyzed standpipes, the piping system serving the reactor building from the fire water storage tanks to the diesel fire pump, then from the diesel fire pump to the reactor building's seismically analyzed piping up to and including sectional isolation valves supplying buildings and systems other than the reactor building, are designed to the requirements of ASME B31.1.

d) Automatic Fire Suppression

Automatic fire suppression systems are designed to detect fires and provide the capability to extinguish them using fixed automatic suppression systems.

Automatic fire suppression systems are used where necessary to protect redundant systems or components required for safe shutdown and SSC with safety-related or risk-significant functions. The fire protection analysis provided in Appendix 9A determines the suppression systems provided for the fire areas.

Plant areas that have an automatic suppression system also have manual backup fire suppression capability. Manual fire suppression capabilities include the yard main fire hydrants and hose stations.

Automatic fixed water suppression protection over the fire area is provided for equipment identified by the fire hazard analysis as containing a sufficient quantity of combustible material to warrant an automatic fire suppression system.

Water-Based Systems

RAI 09.05.01-3, RAI 09.05.01-7

Table 9.5.1-2: Compliance Table versus RG 1.189

RG Position Number	Regulatory Guide 1.189, Rev. 2, Regulatory Position (1)	Conformance (2)	Comment
1.	**Fire Protection Program** In accordance with 10 CFR 50.48, each operating nuclear power plant must have a fire protection plan. The plan should establish the fire protection policy for the protection of SSCs important to safety at each plant and the procedures, equipment, and personnel required to implement the program at the plant site.	Conform	COL Applicant will be required to develop and maintain the site-specific elements of the fire protection program. Note: NFPA 805 as referenced by 10 CFR 50.48(c) is not utilized in the development of the FPP.
1.1	**Organization, Staffing, and Responsibilities** The FPP should describe the organizational structure and responsibilities for its establishment and implementation. These responsibilities include FPP policy; program management (including program development, maintenance, updating, and compliance verification); fire protection staffing and qualifications; engineering and modification; inspection, testing, and maintenance of fire protection systems, features, and equipment; fire prevention; emergency response (e.g., fire brigades and offsite mutual aid); and general employee, operator, and fire brigade training.	Conform	COL Applicant
1.2	**Fire Hazards Analysis** A fire hazards analysis should be performed to demonstrate that the plant will maintain the ability to perform safe-shutdown functions and minimize radioactive material releases to the environment in the event of a fire. This analysis should be revised as necessary to reflect plant design and operational changes. The fire hazards analysis has the following objectives:	Conform	COL Applicant FHA is completed~~/~~ and maintained to reflect the as-built configuration of the plant.

Table 9.5.1-2: Compliance Table versus RG 1.189 (Continued)

RG Position Number	Regulatory Guide 1.189, Rev. 2, Regulatory Position [1]	Conformance [2]	Comment
3.2.1, c	If tanks are used for water supply, two 100-percent system capacity tanks (minimum of 1,136,000 L (300,000 gal) each) should be installed. They should be interconnected to allow pumps to take suction from either or both. However, a failure in one tank or its piping should not cause both tanks to drain. Water supply capacity should be capable of refilling either tank in 8 hours or less.	Conform	
3.2.1, d	Common water supply tanks are acceptable for fire and sanitary or service water storage. When they are used, however, minimum fire-water storage requirements should be dedicated by passive means; for example, use of a vertical standpipe for other water services. Administrative controls, including locks for tank outlet valves, are unacceptable as the only means to ensure minimum water volume.	N/A	The NuScale plant's FPS uses two 100-percent system capacity tanks that are independent of other water systems.
3.2.1, e	Freshwater lakes or ponds of sufficient size may qualify as the sole source of water for fire protection but require separate redundant suctions in one or more intake structures. These supplies should be separated, so that a failure of one supply will not result in a failure of the other supply.	N/A	The NuScale plant's FPS uses two 100-percent system capacity tanks.
3.2.1, f	When a common water supply is permitted for fire protection and the ultimate heat sink, the following conditions should also be satisfied:	N/A	The NuScale plant's FPS is not connected to the ultimate heat sink, therefore 3.2.1, f, i and ii do not apply.
3.2.1, f, i	The additional fire protection water requirements are designed into the total storage capacity.	N/A	No connection to the UHS exists.
3.2.1, f, ii	Failure of the fire protection system should not degrade the function of the ultimate heat sink.	N/A	No connection to the UHS exists.
3.2.1, g [3]	Other water systems that may be used as one of the two fire-water supplies should be permanently connected to the fire main system and should be capable of automatic alignment to the fire main system. Pumps, controls, and power supplies in these systems should satisfy the requirements for the main fire pumps. The use of other water systems for fire protection should be compatible with their safe-shutdown functions. Failure of the other system should not degrade the fire main system.	N/A	The NuScale plant's FPS uses two 100-percent system capacity tanks that are aligned to the fire main system. No other water systems are design to be used as fire water supplies.

Table 9.5.1-2: Compliance Table versus RG 1.189 (Continued)

RG Position Number	Regulatory Guide 1.189, Rev. 2, Regulatory Position [1]	Conformance [2]	Comment
3.2.1, h[3]	For multiunit nuclear power plant sites with a common yard fire main loop, common water supplies may be used.	N/A	The NuScale FPS is designed for a standalone plant that uses two 100-percent capacity tanks. If the NuScale plant was located on a site with a fire main loop that was common to other nuclear power plants, the NuScale power plant FP design does not prohibit connection to a common loop.
3.2.1, i[3]	Fire-water supplies should be filtered and treated as necessary to prevent or control biofouling or microbiologically induced corrosion of fire-water systems. If the supply is raw service water, fire-water piping runs should be periodically flushed and flow-tested.	Conform	
3.2.1, j[3]	Provisions should be made to supply water to at least two standpipes and hose connections for manual firefighting in areas containing equipment required for safe plant shutdown in the event of a safe-shutdown earthquake. The piping system serving such hose stations should be analyzed for safe-shutdown earthquake loading and should be provided with supports to ensure system pressure integrity. The piping and valves for the portion of the hose standpipe system affected by this functional requirement should, at a minimum, satisfy ASME B31.1, "Power Piping". The water supply for this condition may be obtained by manual operator actuation of valves in a connection to the hose standpipe header from a normal seismic Category I water system, such as the essential service water system. The cross-connection should be (1) capable of providing flow to at least two hose stations (approximately 284 L/min (75 gal/min) per hose station), and (2) designed to the same standards as the seismic Category I water system (i.e., it should not degrade the performance of the seismic Category I water system).	Alternate Conformance	The fire water storage tanks are designed in accordance with AWWA D100-205, as referenced by NFPA-22. The fire water yard piping is designed in accordance with ASME B31.1.
3.2.2	**Fire Pumps** Fire pump installations should conform to NFPA 20, "Standard for the Installation of Stationary Pumps for Fire Protection," and should meet the following criteria:	Conform	
3.2.2, a	If fire pumps are required to meet system pressure or flow requirements, a sufficient number of pumps is provided to ensure that 100-percent capacity will be available, assuming failure of the largest pump or loss of offsite power (e.g., three 50-percent pumps or two 100-percent pumps). This can be accomplished, for example, by providing either electric-motor-driven fire pumps and diesel-driven fire pumps or two or more seismic Category I Class 1E electric-motor-driven fire pumps connected to redundant Class 1E emergency power buses.	Conform	

Table 9.5.1-2: Compliance Table versus RG 1.189 (Continued)

RG Position Number	Regulatory Guide 1.189, Rev. 2, Regulatory Position (1)	Conformance (2)	Comment
3.2.2, b	Individual fire pump connections to the yard fire main loop are separated with sectionalizing valves between connections. Each pump and its driver and controls are located in a room separated from the remaining fire pumps by a fire wall with a minimum rating of 3 hours.	Conform	
3.2.2, c	The fuel for the diesel fire pumps is separated so that it does not provide a fire source that exposes equipment important to safety.	Conform	
3.2.2, d	The control room contains alarms or annunciators to indicate pump running, driver availability, failure to start, and low fire main pressure.	Conform	
3.2.3	**Fire Mains** An underground yard fire main loop should be installed to furnish anticipated water requirements. NFPA 24 provides appropriate guidance for such an installation. NFPA 24 references other design codes and standards developed by such organizations as ANSI and the American Water Works Association.	Conform	

Table 9.5.1-2: Compliance Table versus RG 1.189 (Continued)

RG Position Number	Regulatory Guide 1.189, Rev. 2, Regulatory Position (1)	Conformance (2)	Comment
4.2.3.1	**Electrical Raceway Fire Barrier Systems** Redundant cable systems important to safety should be separated from each other and from potential fire exposure hazards in accordance with the separation means of Regulatory Position 5.3.1.1.a, b, and c of this guide. In areas where electrical circuits important to postfire safe shutdown cannot be separated by means of rated structural fire barriers, cable protection assemblies should be applied to conduit and cable trays to meet 1-hour and 3-hour separation requirements, as required. Where 1-hour fire-resistive barriers are applied, automatic fire detection and suppression should also be installed. The design of fire barriers for horizontal and vertical cable trays should meet the requirements of ASTM E119, including a hose stream test. Regulatory Position 4.3 of this guide discusses the acceptance criteria for raceway fire barriers.	Conform	
4.2.3.2	**Fire-Rated Cables** Pre-1979 licensees should request an exemption when relying on fire-rated cables to meet NRC requirements for protection of safe-shutdown systems or components from the effects of fire. Post-1979 licensees relying on fire-rated cables should perform an evaluation to demonstrate that the use of fire-rated cables does not adversely affect safe shutdown in accordance with their license condition and submit a license amendment if required. (See Regulatory Position 1.8 of this guide.)	N/A	
4.3	**Testing and Qualification of Electrical Raceway Fire Barrier Systems** Fire barriers relied on to protect postfire shutdown-related systems and to meet the separation means discussed in Regulatory Position 5.3 should have a fire rating of either 1 or 3 hours. Fire rating is defined as the endurance period of a fire barrier or structure, which relates to the period of resistance to a standard fire exposure before the first critical point in behavior is observed. Fire endurance ratings of building construction and materials are demonstrated by testing fire barrier assemblies in accordance with the provisions of the applicable sections of NFPA 251 and ASTM E119. Assemblies that pass specified acceptance criteria (e.g., standard time-temperature fire endurance exposure, unexposed side temperature rise, hose stream impingement) are considered to have a specific fire-resistance rating. The basic premise of the fire-resistance criteria is that those fire barriers that do not exceed 163 degrees C (325 degrees F) cold-side temperature~~9~~ and pass the hose stream test provide reasonable assurance that the shutdown capability is protected without further analyses. If the temperature criterion is exceeded, sufficient additional information is needed to permit an engineering evaluation to demonstrate that the shutdown capability is protected. Appendix C to this guide provides detailed guidance for the testing and qualification of electrical raceway fire barrier systems.	Conform	COL Applicant

Table 9.5.1-2: Compliance Table versus RG 1.189 (Continued)

RG Position Number	Regulatory Guide 1.189, Rev. 2, Regulatory Position (1)	Conformance (2)	Comment
8.7	**Fire Protection for Nonpower Operation** The guidance for fire prevention in Regulatory Position 2 of this guide applies to all modes of plant operation, including shutdown. License applications for new reactors should also address any special provisions to ensure that, in the event of a fire during a nonpower mode of operation, the plant can be maintained in safe shutdown.	Conform	COL Applicant (programmatic administrative controls)
9.	**Fire Protection for License Renewal** Licensees may apply for a license renewal to permit continued plant operation beyond the original operating license period of operation, in accordance with the provisions of 10 CFR Part 54. The fire protection licensing and design basis under license renewal should not differ significantly from that in effect before renewal, with the exception that fire protection SSCs must be included in an aging management program as appropriate.	Conform	COL Applicant (future option)

1. The restatement of the Regulatory Positions presented in this table may be abbreviated for brevity.
2. The design conforms to the regulatory positions delineated in RG 1.189 "Fire Protection for Nuclear Power Plants" as indicated by the following terms:
   - COL Applicant - The COL Applicant/Licensee will (also) address the subject regulatory Position
   - Conforms - The design conforms, or supports conformance, with the subject regulatory position.
   - N/A - (Not Applicable): The subject regulatory position is not applicable to the design
   - Alternate Conformance - The design conforms to the subject regulatory position by alternate means or methods.
   - Non-Conformance - The design does not conform with the subject regulatory position or intent of the subject regulatory position. The justification for the position is provided in the "Comments" column.
3. RG 1.189 numbering changed based on NRC memorandum entitled, "Periodic Review of Regulatory Guide 1.189," dated November 27, 2017. (ML17321A047 and ML17321A048)

Response to Request for Additional Information
Docket No. 52-048

eRAI No.: 9226
Date of RAI Issue: 12/19/2017

NRC Question No.: 09.05.01-8

10 CFR 50, Appendix A, GDC 3 – Fire protection states in part:

> "Fire detection and fighting systems of appropriate capacity and capability shall be provided and designed to minimize the adverse effects of fires on structures, systems, and components important to safety. Firefighting systems shall be designed to assure that their rupture or inadvertent operation does not significantly impair the safety capability of these structures, systems, and components."

In DCD Tier 2, Section 9.5.1.1, "Design Basis," the applicant states:

> "The hardware associated with the FPP is not safety-related. Consistent with GDC 2, however, the capability for manual fire fighting of safe shutdown equipment following a seismic event is provided in the reactor building and the control building via seismically analyzed hose standpipes."

The staff reviewed DCD Tier 2, Appendix 9A, "Fire Hazards Analysis," and noted that only the reactor building has standpipes listed as "SSE fire hose installation conforming to NFPA 14." The hose standpipes in the control building are not indicated to be SSE complaint.

The applicant is requested to reconcile this discrepancy.

NuScale Response:

The NuScale control building does not contain equipment required for safe shutdown following an internal fire event. Therefore, FSAR sections 9.5.1.1 and 9.5.1.2.6 have been updated to indicate that the control building does not require seismically analyzed hose standpipes.

See the attached markup to FSAR sections 9.5.1.1 and 9.5.1.2.6 for further details.

Impact on DCA:

FSAR sections 9.5.1.1 and 9.5.1.2.6 have been revised as described in the response above and as shown in the markup provided in this response.

9.5.1.1 Design Basis

This section identifies the FPP required or credited functions, the regulatory requirements that govern the performance of those functions, and the controlling parameters and associated values that ensure that the functions are fulfilled. Together, this information represents the design bases, defined in 10 CFR 50.2, as required by 10 CFR 52.47(a) and (a)(3)(ii).

The hardware associated with the FPP is not safety related. Consistent with GDC 1, and as indicated in Section 3.2, the hardware does not have a Quality Classification and is Seismic Class III.

RAI 09.05.01-8

The hardware associated with the FPS~~P~~ is not safety-related. Consistent with GDC 2, however, the capability for manual fire fighting of safe shutdown equipment following a seismic event is provided in the reactor building ~~and the control building~~ via seismically analyzed hose standpipes. ~~In addition, hardware associated with the FPP is designed Seismic Category II in accordance with RG 1.29 when safety related equipment or occupants of the control room could be damaged or injured by falling FPP hardware during a seismic event.~~ Fire Protection system components are seismically designed as described in Section 3.2.1.2 including the guidance of RG 1.29.

As required by 10 CFR 50.48(a)(1), a Fire Protection Program has been developed that conforms to GDC 3 in minimizing the probability and effect of fires and explosions. Noncombustible and heat resistant materials are used to the extent practical. The reactor building (RXB), control building (CRB), and radioactive waste building (RWB) floors, walls and ceilings are constructed almost entirely of reinforced concrete. The FPS, through detection and suppression, minimizes adverse effects of fires on structures, systems, and components. Rupture or inadvertent operation of firefighting systems is considered in the design to assure it does not significantly impair the safety capability of structures, systems, and components.

GDC 5 was considered in the design of the FPS. The modules are ~~all~~ located in the RXB which is serviced by a common, shared fire protection system. Redundant divisions of safe shutdown equipment for the modules are located in separate fire areas where practicable so that fires or a spurious discharge or a failure of the FPS can only affect one division of safe shutdown equipment per module. There are fire areas in the RXB where one fire could affect multiple modules although only one division per module would be affected leaving an alternative division intact. With one success path of safe shutdown equipment available for each module, safe shutdown functions can still be performed for all modules and therefore the effectiveness of the FPS is not compromised by the sharing.

Consistent with GDC 19 the FPS provides control room fire protection with manual suppression and automatic detection. The FPS protects the control building which houses the control room; therefore, isolating the control room from fire. By protecting the building, the FPS protects the cables, switching and transmitting type equipment, and display components from fire damage allowing the control room to function. In the reactor building, the FPS protects sensing, switching and transmitting type

5) Sectional control valves are provided to permit isolation of portions of the fire main for maintenance and repair without affecting the water supply to primary and backup fire suppression systems serving areas that contain or expose equipment with safety-related or risk-significant functions.

6) Isolation valves are provided to isolate outside fire hydrants from the fire main.

7) Sprinkler systems (primary) and manual hose station standpipes (backup) have connections to the yard main system, so that a single active failure or a line break cannot impair both the primary and backup fire suppression systems.

RAI 09.05.01-8

Alternatively, headers inside buildings and fed from each end are used to supply both sprinklers and standpipe systems. Where these headers supply sprinklers and the seismically analyzed standpipes in the reactor ~~or control~~ building~~s~~, steel piping and fittings meeting the requirements of ASME B31.1, "Power Piping", are used for the headers, up to and including the first valve supplying the sprinkler systems.

d) Automatic Fire Suppression

Automatic fire suppression systems are designed to detect fires and provide the capability to extinguish them using fixed automatic suppression systems.

Automatic fire suppression systems are used where necessary to protect redundant systems or components required for safe shutdown and SSC with safety-related or risk-significant functions. The fire protection analysis provided in Appendix 9A determines the suppression systems provided for the fire areas.

Plant areas that have an automatic suppression system also have manual backup fire suppression capability. Manual fire suppression capabilities include the yard main fire hydrants and hose stations.

Automatic fixed water suppression protection over the fire area is provided for equipment identified by the fire hazard analysis as containing a sufficient quantity of combustible material to warrant an automatic fire suppression system.

Water-Based Systems

Where water-based systems are used, adequate drainage and shielding is provided to prevent damage to equipment with safety-related or risk-significant functions in the event of accidental discharge or rupture of the fire suppression system piping.

Sprinkler and Water Spray Systems