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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Edwin I. Hatch Nuclear Plant
Response to Request for Additional Information
Concerning the Liquid and Gaseous Radwaste Systems

Ladies and Gentlemen:

On June 27, 2000, the Nuclear Regulatory Commission (NRC) issued, "Request for Additional Information Concerning the Liquid and Gaseous Radwaste System at Edwin I. Hatch Nuclear Plant, Units 1 and 2 (TAC Nos. MA8920 and MA8921)." This letter and its enclosure are SNC's response to the request.

The Request for Additional Information (RAI) is related to a May 3, 2000, Union of Concerned Scientists (UCS) petition to the NRC pursuant to 10 CFR 2.206 relative to the operation of Plant Hatch. The petition contends that the plant is operating outside of its design and licensing bases because the material condition of piping and components in the liquid and gaseous radwaste systems are not being properly inspected and maintained. The petition requested that the NRC demand information from Southern Nuclear Operating Company (SNC) relative to the condition of and maintenance programs on the associated radwaste systems.

Contrary to the contentions in the petition, SNC is operating and maintaining the Plant Hatch liquid and gaseous radwaste systems within the requirements of the design and licensing basis for those systems.

Further, the petition cites federal regulations not directly applicable to the design, operation, and maintenance of liquid and gaseous radwaste systems. In addition to answering the specific questions in the RAI, the enclosure to this letter provides a discussion of the regulatory requirements and some background on the radwaste systems.

Should you have any questions in this regard, please contact this office.

Respectfully submitted,

Lewis Sumner

H. L. Sumner, Jr.

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Enclosure: Information Relative to Maintenance and Inspection of Liquid and Gaseous Radwaste Systems

cc: Southern Nuclear Operating Company
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Enclosure

Edwin I. Hatch Nuclear Plant
Information Relative to Maintenance and Inspection of
Liquid and Gaseous Radwaste Systems

Background and Discussion

The Union of Concerned Scientists petitioned the NRC to demand information about the condition of Plant Hatch's radiological waste (radwaste) systems and the maintenance of these systems. In doing so, the petitioner referenced General Design Criteria of 10 CFR 50, Appendix A, the Hatch FSAR, and the Hatch License Renewal Application. One of the cited criteria (Criterion 4) does not apply to radwaste systems. The petition also references aging management programs in the License Renewal application addressed for safety-related systems and questions why these programs do not extend to radwaste systems. SNC would like to point out that the service conditions in the radwaste systems are such that the aging management programs are not applicable to these systems, even if they were safety-related.

As the NRC staff recognizes, the radiological waste systems at Plant Hatch are "support" systems for the safety-related structures, systems and components. The safety-related components are designed to perform their intended functions either during normal operations or off-normal incidents, i.e., provide reasonable assurance that the licensed facility can be operated without undue risk to the health and safety of the public. The radwaste systems, in contrast, perform their functions incidental to the primary safety-related systems. In other words, radwaste systems are not required to function to prevent or mitigate an accident. The NRC's regulations recognize this distinction in the relative importance of the different types of systems. For example, radwaste systems may be removed from service for repair or maintenance without affecting the ability of the plant to safely operate or maintain a safe shutdown condition.

10 CFR 50, Appendix A, entitled "General Design Criteria" contains several principal design criteria for licensed nuclear power plants. The first five of these Criteria apply on a plant-wide basis to safety-related structures, systems and components, and other Criteria apply on to specific plant systems. The petition states, in part, that General Design Criterion 4 "requires the liquid radwaste system to be designed for environmental conditions encountered during normal operation." This criterion does not apply to radwaste systems (ref. Regulatory Guide 1.143), and may reflect a basis that underpins the petitioner's concerns. Actually, Criterion 4 addresses "environmental conditions and dynamic effects design basis" and applies only to the principal safety-related structures, systems and components. Although the liquid radwaste system, like any system at the plant, was carefully designed and constructed and is adequately maintained for its intended purpose, the system is not one of the principal safety-related systems subject to Criterion 4. The petitioner correctly cites another Criterion (60), entitled "Control of releases of radioactive materials to the environment," as applicable to the means by which a plant controls suitability of release of liquid and gaseous effluents produced during normal operation. The Plant Hatch radwaste systems are designed to fulfill this Criterion, including sufficient retention capacity.

Another concern of the petitioner is that, because of deficiencies identified in diverse types of buried piping in the past, the buried radwaste piping is suspect, e.g. "the liquid radwaste system piping is therefore at least as vulnerable to degradation mechanisms such as flow-accelerated corrosion and microbiologically influenced piping as the piping of these [other] systems," (Petition at page 4). The conditions of the different systems containing buried piping at the Plant are varied, in terms of the environment both inside the different piping and outside the different piping. For example, the radwaste systems are low-volume, low-pressure systems. Also, the liquid radwaste system is subject only to periodic use. These are not the types of high-pressure, high volume, continuous-operation systems exposed to rigorous "duty" for which complimentary inspection programs are justified. In a similar way, the quality of the fluid in the radwaste system is not aggressive to carbon or stainless steel piping systems. The fluid in the discharge piping is filtered and demineralized, generally high quality, and normally meets chemistry guidelines for use in the plant primary water systems. Thus, radwaste system piping is not susceptible to many of the aging mechanisms that many of the safety related systems are, such as flow accelerated corrosion and micro-biological induced corrosion. Thus, complimentary inspection programs applicable to piping systems with a more aggressive internal environment are not appropriate for the radwaste systems.

When constructed, buried piping was wrapped with a protective coating. In buried radwaste system piping, like safety-related system piping, select material was used to backfill around the pipe. This material does not contain abrasives or other constituents that could cause general damage to the protective coating during the life of the plant. The efficacy of this protective coating has been demonstrated by the operational history of the plant, extending over 20 years. Only two leaks from any buried carbon steel piping of a type similar to radwaste system piping have been identified. Neither failure was due to an age related failure of the coating.

With respect to the petitioner's concern of potential "excessive radiation exposure to the public" associated with a liquid radwaste piping failure (Petition at page 6), SNC notes that the consequences of a potential simultaneous failure of all radwaste tanks has been analyzed. The analysis assumes that all of the aqueous contents immediately enters the ground, even though in all likelihood most volumes would be contained in the radwaste building. Calculated doses at the plant site boundary would not exceed the limits for normal plant operation per 10 CFR Part 20. Similarly, with respect to the petitioner's concern of potential "radiation exposures to individuals in the power block to increase above negligible" (Petition at page 16), SNC notes that the consequences of potential complete rupture of the gaseous radwaste piping has been analyzed. The analysis conservatively assumes that all of the gas is immediately released to the atmosphere. Calculated doses at the plant site boundary would not exceed the limits for normal plant operation per 10 CFR Part 20. Radiation monitors would detect increased radiation due to a postulated leak in the power block. As such, a leak in the offgas system is not postulated to appreciably increase radiation exposure to individuals in the power block. Furthermore, as the NRC Staff is aware, Plant Hatch has an expansive Radiological Environmental Monitoring Program, as required by 10 CFR Part 50, Appendix I. This surveillance and monitoring system applies to various pathways that radiation might be released into the air, river water, fishes, milk and vegetation by taking periodic samples and conducting analyses. This program provides additional assurance of public health and safety relative to radwaste control.

Enclosure
Information Relative to Maintenance and Inspection of
Liquid and Gaseous Radwaste Systems

NRC QUESTIONS AND SNC RESPONSES

NRC Question 1:

What assurance exists that the external surfaces of buried and embedded piping of the liquid radwaste system are not degraded?

SNC Response:

Buried piping in the liquid radwaste system was installed the same way buried piping in safety related systems were installed, and is all welded construction. The buried piping is carbon steel and is wrapped in accordance with AWWA Standard C-203-66, "Coal-Tar Protective Coatings and Linings for Steel Water Pipelines –Enamel and Tape – Hot Applied." The backfill around the piping is sand or select soil, which does not contain abrasive aggregates that could potentially damage the coating. The surface of the piping is expected to meet design and performance requirements when the coating is intact. Past excavation of similar piping revealed that the coating remains intact. Thus, it is expected that the piping surfaces continue to meet or exceed performance requirements. Leaks that have occurred in this type of buried piping were due to localized damage to the coating, and not due to age-related failures.

The embedded liquid radwaste piping is stainless steel and is embedded in concrete. Operating history for this piping has not indicated any leaks in the embedded piping.

The petition (page 3) quotes a statement in the License Renewal Application (section 2.4.3): "...many deficiencies were written that related to component exteriors for buried piping segments." However, this section of the License Renewal Application was written for all buried piping systems, and this discussion did not characterize the deficiencies as to the specific systems, types of piping, or the environments of the various piping systems. Most of the deficiencies were due to leaks in fire protection piping, caused by external damage to the piping bolted joints, and not due to age related deterioration of the piping or coating. Only two deficiencies were identified in buried carbon steel piping, which is similar to the radwaste system. Neither deficiency was due to age related degradation of the coating.

NRC Question 2:

What assurance exists that the internal surfaces of liquid radwaste system piping are not degraded by pitting, corrosion, and other degradation mechanisms?

SNC Response:

The quality of the fluid in the radwaste system is not aggressive to carbon or stainless steel piping systems. In addition, the fluid in the discharge piping is filtered and demineralized, generally high quality, and normally meets chemistry guidelines for use in the plant primary water systems. The liquid radwaste system is a low volume, low pressure system, subject only to intermittent operation. The liquid radwaste system piping has not developed leaks. Direct visual inspection of internal surfaces of similar piping systems has indicated that the material condition continues to

meet associated design and performance criteria. The majority of the fluids in the liquid radwaste system are recycled back to the condensate system, and these fluids follow strict guidelines with respect to fluid quality. The quality of the fluid, the low flow, pressure, and intermittent operation of the radwaste system does not generally cause the types of pitting and corrosion experienced by other higher pressure, higher volume, continuously operating systems, which may contain lower quality, untreated water.

NRC Question 3:

Could a break in the liquid radwaste system piping from the sample tanks to the discharge line be detected? If so, how small a break could be detected (i.e., how much radioactive liquid could be diverted into the ground without being detected)?

SNC Response:

The majority of the liquid radwaste system piping is contained within the radwaste building. Any leakage that may occur in tanks or piping within the building would be contained by the building and would collect in building sumps. In this case, a variety of methods are available to detect leakage, including radiation monitors, sump level indicators, flow monitors, and visual observation.

One small diameter discharge pipe is routed underground and connected to a larger pipe that dilutes the radwaste flow prior to it entering the river. There is no specific instrumentation available that would detect small amounts of leakage in underground piping. However, leakage detection is not required. The radwaste system is a low pressure, low volume system, with intermittent use. Even if a leak were to occur, only a small amount of water would be postulated to enter the ground, because of the low pressure operation.

It should be noted that radwaste system piping is isolated from the outside environment most of the time. A permit process controls releases of tank contents to the river where the contents of the tank are measured, as well as the radioactivity. Flow rates are specified and monitored during each release. After each release a series of valves are closed to ensure that no leakage will occur to the environment.

As a conservative measure, Chapter 11 of the Unit 2 FSAR (applicable to both Units) has analyzed the consequences of a potential failure of all radwaste tanks. Although the radwaste building would contain most leaks, the analysis assumes that all of the water immediately enters the ground from this postulated failure. The radiological inventories assumed in the analysis are worst case inventories used in the design. In actual operation, the radiological inventories are much lower than design. Also, the inventory fraction in the sample tanks prior to release is a fraction of that assumed in the analysis, which assumes instantaneous release from all tanks. In addition, the FSAR radiological safety analysis for the liquid radioactive waste processing system indicates that a break of large size in the piping would not cause doses at the site boundary to exceed the limits for normal plant operation per 10 CFR 20.

There is no instrumentation available to specifically measure small leaks in buried piping. For reasons such as this, Plant Hatch has a Radiological Environmental Monitoring Program (REMP) as required by 10 CFR 50, Appendix I. This program monitors various pathways that radiation may be released to the environment, such as air, river water, fishes, milk, and vegetation. Any detected radiation above predetermined limits would be required to be reported. In addition, the Georgia Department of Natural Resources monitors ground water in the vicinity around the plant. In neither program has there been levels of radiation which have exceeded permitted limits.

NRC Question 4:

To what extent does the preventative maintenance program at Plant Hatch cover the liquid radwaste system piping?

SNC Response:

Preventive maintenance, such as periodic recoating, of exterior piping surfaces would be necessary in environments that would cause damage to the piping coating or piping surface. The piping surface of the majority of the radwaste piping is in the radwaste building. Visual observation indicates that this coating and the piping surfaces are in good condition, and continues to meet the associated design and performance requirements. Past excavation of similar buried piping indicates that the coating remains intact. Thus, there is no need to periodically excavate, inspect, and recoat buried piping systems.

Interior piping surfaces of the radwaste system are not coated. The quality of the fluid in the radwaste system is not aggressive to carbon or stainless steel piping systems. In addition, the fluid in the discharge piping is filtered and demineralized, generally high quality, and normally meets chemistry guidelines for use in the plant primary water systems. The radwaste system operates at low pressures and flows. Experience with similar piping systems indicates that degradation of interior piping surfaces is not a concern. Thus, there is not a specific program to periodically inspect radwaste piping interior surfaces.

Operations personnel perform daily rounds, in which systems are observed for proper performance and material condition. Should a degraded condition be identified, a condition report would be generated. The degraded condition would be evaluated and repaired as required per the plant's corrective action program. Condition reports are trended, and if an adverse trend were identified, further evaluation and appropriate corrective actions would be taken.

NRC Question 5:

To what extent is the liquid radwaste system piping covered by programs which monitor degradation (e.g., erosion/corrosion, flow accelerated corrosion, microbiologically influenced corrosion, protective coatings for embedded/buried piping, etc.)?

SNC Response:

Liquid radwaste system piping is not continuously in service, and it is a low pressure/low flow system. Thus, it does not exhibit the flow characteristics necessary for flow accelerated corrosion to exist. The water is treated and filtered, which reduces the potential for microbiological induced corrosion. The water in the piping to be discharged is not aggressive to the radwaste system piping, and meets the standards of the State of Georgia set forth in the NPDES for release to the river or the strict chemistry requirements for reuse in the plant. The piping surface of the majority of the radwaste piping is in the radwaste building. Visual observation indicates that the coating and the piping surfaces contained in the radwaste building are in good condition, and continues to meet associated design and performance requirements. Past excavation of similar buried piping indicates that the coating remains intact.

There are no specific maintenance programs in place to monitor potential degradation of buried and embedded piping. However, operations personnel perform daily rounds, in which systems are observed for proper performance. The interior surfaces of piping and components are typically checked when components are apart for maintenance. Should a degraded condition be identified, a condition report would be generated. The degraded condition would be evaluated and repaired as required per the plant's corrective action program. Condition reports are trended, and if an adverse trend were identified, further evaluation and appropriate corrective actions would be taken.

NRC Question 6:

What assurance exists that the tanks and vessels of the liquid radwaste system are not degraded?

SNC Response:

As presented in Section 11.2 of the Unit 2 FSAR (applicable to both Units) for Plant Hatch, the tanks and vessels associated with liquid radwaste processing are manufactured from carbon steel or stainless steel. The exterior surfaces of the carbon steel tanks are coated. Where appropriate, the carbon steel vessels are equipped with a corrosion-proof lining. Operations personnel perform daily rounds, in which systems are observed for proper performance and material condition. There are no tank leaks, and the surface of the tanks and the coating is in good shape. A failure of any of these tanks would be contained with the radwaste building.

If a tank or vessel were to leak, the leakage would be collected by radwaste building drains and sumps. These sumps are monitored, and any increase of water accumulation in the sumps would be investigated.

NRC Question 7:

To what extent are the tanks and vessels of the liquid radwaste system covered in the preventative maintenance program at Plant Hatch?

SNC Response:

There are no specific preventive maintenance programs for radwaste system tanks, because, based on operating history, preventive maintenance for these tanks is not warranted. An example of a preventive maintenance program might be to inspect and coat the exterior surfaces to prevent corrosion, or to perform periodic internal inspections. Visual observation of the tanks has indicated that the surfaces and coatings are in good condition, and continues to meet associated design and performance requirements. Interior surfaces of carbon steel tanks are lined with a corrosion proof lining. The quality of the fluid in the radwaste system is such that a tank inspection program is not warranted. Also, operations personnel perform daily rounds, in which systems are observed for proper performance and material condition. Should a degraded condition be identified, a condition report would be generated. The degraded condition would be evaluated and repaired as required per the plant's corrective action program.

NRC Question 8:

To what extent are the tanks and vessels of the liquid radwaste system covered by programs, which monitor degradation?

SNC Response:

Operations personnel perform daily rounds, in which systems are observed for proper performance. Should a degraded condition be identified, a condition report would be generated. The degraded condition would be evaluated and repaired as required per the plant's corrective action program. Condition reports are trended, and if an adverse trend were identified, further evaluation and appropriate corrective actions would be taken.

NRC Question 9:

What assurance exists that the liquid radwaste system valves and associated control circuits will close to terminate the release of radioactive water?

SNC Response:

Water from radwaste is not continuously released to the river. The water is collected in tanks, filtered, demineralized, sampled, and evaluated prior to release. Each release is procedurally controlled by a permit process. When water is not being released, system valves, both automatic and manual are closed and checked by procedure. If an abnormal condition occurs, such as high radiation in the system or power failure, associated discharge valves automatically close. These valves are periodically tested to ensure that they will close to perform this function. Also, flow measuring instrumentation and radiation monitors exist down stream of system valves. This instrumentation provides an independent means to verify that there is no release in progress.

Maintenance history on these valves indicates performance continues to be acceptable. These valves are tested quarterly by procedure, and any degradation would be evaluated and repaired per the plant's corrective action program.

NRC Question 10:

What is the scope, frequency, and acceptance criteria for all testing, including preventative maintenance tasks, of the valves and control circuits that must automatically close to terminate releases from the Hatch Unit 1 and Unit 2 liquid radwaste systems to the river?

SNC Response:

The valves and control circuitry are tested in accordance with the Plant Hatch Surveillance and Maintenance Programs. Proper functioning of the valves is confirmed quarterly by procedure. A Functional Test and Channel Calibration is performed for the radiation monitors in the effluent discharge line prior to each discharge of the radwaste system to the river.

NRC Question 11:

What has been the maintenance history for the valves and control circuits that must automatically close to terminate releases from the Hatch Unit 1 and Unit 2 liquid radwaste systems to the river?

SNC Response:

The maintenance history of the valves in question has not been significantly different than the history of other valves of the same radiological safety significance. Minor performance problems with the valves have been successfully remedied through maintenance or repair as the problems were identified.

NRC Question 12:

What assurance exists that the external surfaces of buried and embedded piping of the gaseous radwaste system are not degraded?

SNC Response

According to the Hatch FSARs (Unit 1 section 9.4 and Unit 2 section 11.3), "gaseous radwaste" systems include process offgas, mechanical vacuum pump discharge, gland-seal condenser discharge, and various building ventilation systems. The context of the contention, however, appears to focus only on the process offgas system. Therefore, the responses to the questions only address the offgas system, but would be generally applicable to the other gaseous radwaste systems as well.

Buried and embedded piping in the offgas system is carbon steel. Similar to the liquid radwaste system buried piping, the offgas system piping was installed in the same way the buried piping in safety related systems were installed, and is all welded construction. According to the piping specifications, underground piping was wrapped in accordance with AWWA Standard C203-66, "Coal-Tar Protective Coatings and Linings for Steel Water Pipelines –Enamel and Tape – Hot Applied", for protection of the external surfaces. The backfill around the piping is sand or select soil, which does not contain abrasive aggregates that could potentially damage the coating. The surface of the piping is expected to meet design and performance requirements when the coating is intact. Past excavation of similar piping revealed that the coating remains intact. Thus, it is expected that the piping surfaces continue to meet or exceed performance requirements. Leaks that have occurred in this type of buried piping were due to localized damage to the coating, and not due to age-related failures.

Piping embedded in concrete was sand blasted and coated with one coat of red oxide primer 2-4 mils DFT for protection of the external surfaces. These coatings provide reasonable assurance that the external surfaces of carbon steel piping are protected from degradation.

The petition (page 3) quotes a statement in the License Renewal Application (section 2.4.3): "...many deficiencies were written that related to component exteriors for buried piping segments." However, this section of the License Renewal Application was written for all buried piping systems, and this discussion did not characterize the deficiencies as to the specific systems, types of piping, or the environments of the various piping systems. Most of the deficiencies were due to leaks in fire protection piping, caused by external damage to the piping bolted joints, and not due to age related deterioration of the piping or coating. Only two deficiencies were identified in buried carbon steel piping, which is similar to the radwaste system. Neither deficiency was due to age related degradation of the coating.

NRC Question 13:

Could a break in the offgas system piping running to the main stack be detected? If so, how small a break could be detected (i.e., how much radioactive gas could escape without being detected)?

SNC Response:

Paragraphs 9.4.6.1 of the Unit 1 FSAR and 15.4.15.1.4.1.1 of the Unit 2 FSAR state that a postulated pipe rupture and depressurization of this hold-up pipe has been considered and evaluated. Normal operating pressure of the offgas system is 6 to 7 psig or less, and thus the differential pressure that could cause leakage is small (Unit 1 FSAR 9.4.6, Unit 2 FSAR 11.3.4.1). Therefore, capability to detect pipe leakage is not required.

There is no instrumentation available to specifically measure small leaks in buried piping. For reasons such as this, Plant Hatch has a Radiological Environmental Monitoring Program (REMP) as required by 10 CFR 50, Appendix I. This program monitors various pathways that radiation may be released to the environment, such as air, river water, fishes, milk, and vegetation. Any detected radiation above predetermined limits would be required to be reported. In addition, the

Georgia Department of Natural Resources monitors ground water in the vicinity around the plant. In neither program has there been levels of radiation which have exceeded permitted limits.

Any leakage in the offgas system in the plant buildings would be detected by plant radiation monitoring instrumentation.

NRC Question 14:

To what extent does the preventative maintenance program at Plant Hatch cover the offgas system piping?

SNC Response:

The offgas system is included in the preventative maintenance program. Plant procedures provide instructions for performing preventive maintenance on offgas system components such as pumps and steam traps. The corrective actions program requires that conditions adverse to quality discovered during system maintenance activities be corrected. In addition, the offgas system is included Plant Hatch's maintenance rule program that implements 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants". Plant procedures require that system engineers periodically inspect offgas system components, including piping, for material condition as part of the maintenance rule. The corrective action program corrects conditions adverse to quality.

Preventive maintenance, such as periodic recoating of exterior piping surfaces would be necessary in environments that would cause damage to the piping coating or piping surface. The piping surface of a substantial portion of the offgas piping is in the turbine and recombiner buildings (recombiner building applies to Unit 1 only). Visual observation indicates that this coating and the piping surfaces are in good condition, and continues to meet associated design and performance requirements. Past excavation of similar buried piping indicates that the coating remains intact. Thus, there is no need to periodically excavate, inspect, and recoat buried piping systems.

Interior piping surfaces of the offgas system are not coated. The offgas system operates at low pressures and flows. Experience with similar piping systems indicates that degradation of interior piping surfaces is not a concern. Thus, there is not a specific program to periodically inspect offgas piping interior.

Operations personnel perform daily rounds, in which systems are observed for proper performance and material condition. Should a degraded condition be identified, a condition report would be generated. The degraded condition would be evaluated and repaired as required per the plant's corrective action program. Condition reports are trended, and if an adverse trend were identified, further evaluation and appropriate corrective actions would be taken.

NRC Question 15:

To what extent do programs that monitor degradation cover the offgas system piping?

SNC Response:

Gaseous radwaste system piping does not exhibit the flow characteristics necessary for flow accelerated corrosion to exist. As the fluid is gaseous, the potential for microbiologically influenced corrosion is minimized. Operating experience with similar piping systems has demonstrated that piping surfaces have not generally degraded to the point that would compromise piping integrity The piping surface of a substantial portion of the offgas piping is the turbine and recombiner buildings. Visual observation indicates that the coating and the piping surfaces contained in the buildings are in good condition, and continues to meet associated design and performance requirements. Past excavation of similar buried piping indicates that the coating remains intact.

There are no specific maintenance programs in place to monitor potential degradation of buried and embedded piping. However, operations personnel perform daily rounds, in which systems are observed for proper performance. The interior surfaces of piping and components are typically checked when components are apart for maintenance Should a degraded condition be identified, a condition report would be generated. The degraded condition would be evaluated and repaired as required per the plant's corrective action program. Condition reports are trended, and if an adverse trend were identified, further evaluation and appropriate corrective actions would be taken.

NRC Question 16:

What assurance exists that the gaseous radwaste system valves will function as required to preclude hydrogen burns and detonations?

SNC Response:

No gaseous radwaste system valves are specifically required to function (i.e., throttle or isolate) to prevent hydrogen burns and detonations in the offgas system during normal system operation. Hydrogen concentration of gases from the air ejector is kept below the flammable limit by maintaining adequate process steam flow for dilution at all times. This steam flow is monitored and alarmed in the main control room. In addition, hydrogen analyzers monitor the offgas system to ensure that hydrogen concentration is maintained below the flammable limit.

Hydrogen concentration is continuously monitored in the offgas system by appropriate monitoring instrumentation. There are no automatic valve actuations required if the hydrogen concentration begins to increase. There are, however, operator actions, which require some valve manipulations to dilute the flow in the offgas system as added assurance that hydrogen concentrations are maintained below flammable limits. These valves are operated manually by the operator, or are motor operated valves. The instrumentation is included in the plant surveillance and calibration program. The motor operated valves must be cycled during each system startup, ensuring their

functionality. If the hydrogen concentration increases above predetermined limits, plant procedures require the operator to shut down the plant, eliminating the source of hydrogen. As with normal operation, if plant shutdown is required, associated valves are not required to function.

Offgas system piping and components are designed to withstand the unlikely event of a hydrogen burn or detonation.

NRC Question 17:

What is the scope, frequency, and acceptance criteria for all testing, including preventative maintenance tasks, of the gaseous radwaste system valves will function as required to preclude hydrogen burns and detonations?

SNC Response:

No gaseous system radwaste valves are required to function to prevent hydrogen burns and detonations. Although not part of a specific preventive maintenance program, valves that would be cycled to control a hydrogen concentration increase are also cycled during each plant startup. Operating history indicates that valve leakage and operating problems are readily identified during each plant startup. If a valve problem is identified, a condition report is generated, and the valve is repaired per the plant's corrective action program. Condition reports are trended, and if an adverse trend were identified, further evaluation and appropriate corrective actions would be taken, such as adding the valves to the preventive maintenance program.

NRC Question 18:

What has been the maintenance history for the gaseous radwaste system valves will function as required to preclude hydrogen burns and detonations?

SNC Response:

No gaseous system radwaste valves are specifically required to function to prevent hydrogen burns and detonations. However, maintenance history of valves requiring manipulation by the operator has not been significantly different than that of valves in similar service. A review of operating history revealed that valve operating problems, such as leakage, are readily identified during each plant startup. Any valve problems identified have been subsequently repaired. There has not been any significant degradation of the valves identified during an operating cycle that would call into question their ability to operate. Note that in the worst case, should an uncontrollable hydrogen increase occur, plant procedures require plant shutdown, and if certain conditions are present, an immediate plant SCRAM, obviating the need for valve operation.