Briefing for Hatch Tritium Meeting August 9, 2006

Hatch Management has requested a meeting to discuss their overall tritium monitoring program. Although the details of the licensee's meeting with us have not been made clear, the licensee has recently met informally with local counties to discuss historical and potential future monitoring and Hatch management considered that it would be prudent to meet with the NRC to discuss their plans. We believe that Hatch's recent actions may be an effort to establish an enhanced monitoring program including more accurate underground plume monitoring and projections. We are aware that the Farley site may not have maintained historical sampling well locations as they are actively looking for these locations at the site.

Historical site tritium issues at Hatch

On December 3, 1986, Hatch released an estimated 141,500 gallons of water from the SFP to a gap between the two reactor buildings and subsequently to other onsite buildings and the surrounding environs. Operational/configurational control errors resulted in the deflation of SFP seals and the resultant release. Based on estimates of recovery activities, approximately 124, 000 gallons of liquid containing 0.20 curies (Ci) of tritium and 0.373 Ci of mixed fission products were released to a swamp located within the owner controlled area but which ultimately drained to the Altamaha River. Results of initial environmental surveys conducted by the licensee staff and independently by the State of Ga, Department of Natural Resources verified that both the tritium and fission products released to the swamp and subsequently to the river posed no immediate danger to downstream water users or to nearby residents. The long-term onsite and offsite radiological impacts are assessed entirely through continuing monitoring of the contaminated area and adjacent off-site pathways. The licensee maintains an augmented environmental monitoring program. Periodic reports submitted to the NRC indicate a general reduction in activity in the swamp area resulting from radioactive decay and weathering and the potential erosion and migration of the radionuclides within the originally contaminated area.

In August 2005, Hatch discovered an increase in the tritium levels in some of their monitoring wells inside the protected area. The source of the tritium was later discovered to be leaks in the Unit 1 Condensate transfer system, originating from leaking pump seals and transfer pipe junctions. Upon discovery, the licensee initiated repair activities to correct the leaks and began monitoring sample wells and outfalls on an increased basis. Final repairs were completed in June 2006 and additional wells are being considered for more accurate sampling and analysis.

Expected licensee attendees:

Mr. Mike Stinson (Site VP), Dennis Madison (General Manager), Ray Baker (Corp. Licensing), and a Southern Co. OPA representative

Expected external stakeholders via Telecon:

Sara Barczak, SACE	Kay Drey, Nuclear Information and Resource Service
Jim Hardeman, Ga DNR	Kathleen Yhip, SONGS
Dave Lochbaum, UCS	Frank Crane, Local area citizen
Deann Raleigh, Scientech	Mary Lampert, Molly Bartlett, Pilgrim Watch
Mark Fallon, APS	Deborah Sheppard, Altamaha Riverkeeper

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Recent Tritium Findings

Region II has become aware of the detection of tritium in "non-radiological" areas of nuclear power plant sites. The source of the tritium appears to be from the normal releases of radioactive materials to the environment that is allowed under NRC regulations (i.e., 10 CFR Part 20). Typically, the radioactivity is released as particles, gases, and vapors from plant buildings and stacks. Our atmospheric modeling and dose assessments are based on the dispersion of the material in the downwind direction. For licensees that have tall release stacks, the material generally moves sufficiently offsite and becomes well diluted before depositing. However, licensees that have releases at lower elevations (building vents, etc.) are observing some residual material being deposited in plant areas, primarily tritium. In either case, rain may cause the material to deposit onsite. In addition, some licensees are identifying that a number of onsite mechanical processes may have also circumvented the typical dispersion patterns.

The dispersion of the releases appears to have been affected by devices that condense water vapor from the air, such as air conditioners, de-humidifiers, and refrigeration units. These devices are very effective in trapping water vapor. In the case of the freezer units, the frost may represent a long-tem integrated average concentration in air at that location. Not unexpectedly, licensees have recently begun sampling and analyzing the condensate and frost that accumulates in these units and have detected tritium. Licensees have measured tritium in the frost that surrounds the freezer compartments in small office-type refrigerators located onsite, including NRC refrigerators in some resident inspectors offices. The levels of tritium found in the frost have varied, but have generally been very low; ranging from about 2,000 to 100,000 picocuries per liter. At one NRC resident office, the licensee measured about 3,000 picocuries per litter of tritium in the frost within the refrigerator. However, licensees have not detected any tritium from the food products that have been stored in any of these units.

Background

Tritium is a naturally occurring radioactive form of hydrogen that is produced in the atmosphere when cosmic rays collide with air molecules. Like normal hydrogen, tritium can bond with oxygen to form water. Consequently, it is found in very small or trace amounts in groundwater throughout the world and in the earth's atmosphere. Of course, tritium is also produced in a nuclear reactor as a byproduct of the fission process (absorption of neutrons by a chemical known as boron). In terms of radioactive elements, tritium is one of the weakest forms of radiation. When it decays, it releases a very low energy beta particle (similar to an electron) and a helium atom. The radioactive half-life for tritium is 12.3 years, which means that after 12.3 years, one-half of the original levels are remaining. The scientific community generally accepts that after about 7 to 10 half-lives have passed (e.g., 86.1 to 123 years for tritium), the original quantity may be considered no longer present. Based on the very low levels of tritium that have been measured in the environment from nuclear power plant releases, one would not be able to detect any remaining tritium after just a few half-lives. Tritium is almost always found as a liquid, and it primarily enters the body when people eat or drink food or water containing tritium or absorb it through the skin. Once tritium enters the body, it disperses quickly and is uniformly distributed throughout the soft tissues. The body eliminates half of the tritium within about 10 days after an ingestion or exposure. Everyone is exposed to small amounts of tritium every day, because it occurs naturally in the environment and the foods we eat.

Potential Impacts

Licensees are continuing to evaluate the potential impact from the tritium found in the frost in the onsite refrigeration units. To date, the levels that have been detected range from about 2,000 to 100,000 picocuries per liter of tritium in the frost. Based on these low levels, it is difficult to develop a reasonable scenario that could potentially result in a radiation exposure beyond a very small fraction of one millirem from the tritium. For example, if an individual was to drink about 1 liter of the 100,000 picocurie per liter frost, the individual would receive an exposure of about 0.007 millirem. Although it may be somewhat unreasonable, if one was to continue to drink one liter of frost each day over the course of the year, the person's annual exposure would be about 2.5 millirem. In comparison, our exposure to natural background radiation results in an exposure of about 300 millirem per year, which includes normal chest x-rays which are about 5 to 10 millirem or a set of dental x-rays which are about 2 to 4 millirem. To further put these levels into comparison, we have provided the following limits and standards:

- The EPA's safe drinking water standard has been established at 20,000 picocuries per liter. That level is based on an individual consuming 2 liters of the water each day over the course of the year (or about 730 liters). The standard is based on limiting public exposures to about 4 millirem per year.

- Part 20 to 10 CFR sets the NRC's annual limit for public exposure to 100 millirem per year. However, the NRC also requires licensees to maintain doses As-Low-As-Is-Reasonably-Achievable (ALARA). The NRC's ALARA objectives (for reactor licensees) establish annual levels of 3 millirem to the whole body from liquids and 10 millirad (gamma radiation) and 20 millirad (beta radiation) from gaseous releases.

- NRC Management Directive 10.131 provides an occupational limit of 5000 milirem total effective dose equivalent per year for NRC employees, which is consistent with the NRC's occupational dose limits for licensees (10 CFR 20.1201). Additionally, the Management Directive emphasizes the need to maintain doses ALARA.

While we recognize that many people may have questions regarding the licensees' findings, we want to ensure our staff that Region II Management is committed to protecting and ensuring our safety. We understand that while some may question the potential for foods to be stored near radioactive materials, we also should be mindful that there is radioactivity in all aspects of our lives – both man-made and from natural background. The NRC's radiation safety program (NRC Management Directive 10.131) stresses the practice of ensuring that the exposure to ionizing radiation remains ALARA. Despite the negligible risk for personnel exposures, some licensees have restricted the use of non-frost-free refrigerators in the protected area. Region II has also made the decision to replace all non-frost-free refrigerators in NRC resident inspector offices with acceptable frost-free units, and DRMA staff will be coordinating the replacement with NRC resident office staffs. While some minimal amounts of frost may still form in the newer frost-free units, the cooling coils are automatically defrosted on a frequent basis to prevent any notable frost buildup are typically separated from the food compartments, unlike the older office units.

If you have any questions regarding these issues, please feel free to contact your supervisor or Chris Christensen 404.562.4501

Briefing for Hatch Site V.P. RII drop-in by M. Stinson - September 20, 2006

Plant Performance - All PI's have been green, and will remain green under the MSPI. Unit 1 had a Main Transformer fire in October 2005. A Unit 2 trip in May 2006 resulted in a Special Inspection. A White EP finding was issued in 2005 for failure to maintain EP facilities.

Recent Management Changes - L. Sumner and M. Stinson have recently changed sites. Mr. Stinson now is the Site VP for Hatch. He has previously been associated with Plant Farley for a majority of his career. Dennis Madison was promoted from AGM to GM this year when George Frederick retired. Mark Ajluni came from Farley to become the AGM - Engineering Support, and Steve Douglas came from Vogtle to become the AGM - Operations.

Special Nuclear Material - Plant Hatch could not reconcile a total of about 17 inches of fuel rod after a search of the SFP. An NRC team inspection final report is due in early October 2006. The most likely end result will be a SLII violation with a possible CP.

Dry Cask Storage - Hatch has completed three of four Multi-Purpose Canister loads this year for storage at the onsite Independent Spent Fuel Storage Facility. The Hatch fuel pool goal is to maintain their current dual-unit offload capability.

Tritium - The licensee discovered tritium in the onsite groundwater sample wells late 2005. An additional 14 sampling wells are being drilled to a depth of 25 feet around the site to provide for additional sampling data. Preliminary models show the tritium plume to be slightly migrating to the southwest, although the river hydrology is to the northwest. The licensee has also determined tritium from the reactor building stacks is being scrubbed by rainfall, and deposited into the storm sewer system. In July 2006, a public meeting was held in the RII office with the licensee to discuss their tritium monitoring program.

Main Control Room Habitability - The licensee received approval for the interim use of KI for operator dose reduction as part of an overall strategy to address main control room habitability. Credit for KI was authorized for 4 years, sufficient time for the NRC staff to complete its review of the licensee's application to implement an alternate source term (which renders the need for KI moot), or to modify the plant in such a manner that the need for KI is no longer needed (if the AST amendment could not be agreed to). The staff is currently reviewing the licensee's AST amendment.

Equipment Reliability and Work Management: Hatch Unit 1 was placed in operation in 1975 and Unit 2 in 1979. Both units have been given a license extension. Current problems include:

• Recirculating Pump Motor Generator Sets - As the control system is obsolete and there are no new parts available, both units experience random, step speed increases when the units are operated in known speed bands. Replacement is scheduled for 2009 and 2010 with digital inverter units.

• Core Shroud Tie-down Bolts on Unit 1 - Inspections during the previous outage in March 2006 showed cracks in the tie-down bolt upper assemblies. One assembly was replaced, and another evaluated to be acceptable until the March 2008 outage.

INPO Evaluations (Assessment November 2004): December 2004, final INPO report was issued with a rating of 1, up from the previous rating of 2.

Briefing for Hatch RII drop-in by SNC Senior Management - January 9, 2007

Current Plant Status
Unit 1 100%. Hatch Unit 1's next refueling outage is scheduled to start February 2008.
Unit 2 100%. Hatch Unit 2's next refueling outage is scheduled to start February 2009.

Plant Performance - Unit 1 is in the Licensee Response column of the Action Matrix. Unit 2 is in the Regulatory Response column due to a White high pressure injection system MSPI PI. Unit 2 trip August 2007 during relay calibration of non-vital 4kv bus.

Recent Management Changes - SNC has moved to a site VP structure. In addition, a shift of approximately 20 design engineers from Birmingham to the site is in progress.

Tritium - The licensee discovered tritium in the onsite (Protected Area) groundwater sample wells late 2005. Additional sampling wells have been drilled around the site to provide additional data. The licensee has also determined tritium from the reactor building stacks is being scrubbed by rainfall, and deposited into the storm sewer system. In July 2006, a public meeting was held in the RII office with the licensee to discuss their tritium monitoring program.

Main Control Room Habitability - GL 2003-01, "Control Room Habitability," addressed control room (CR) licensing and design issues. The previous HNP licensing basis did not assume any unfiltered inleakage through the CR envelope boundary for radiological exposures to CR operators. A license amendment issued on May 25, 2006, allows interim credit until May 31, 2010, for the administration of potassium iodide (KI) to enable SNC to remain within its licensing basis. This was intended to provide time for SNC to implement appropriate design-basis changes to address the impact of any unfiltered inleakage. SNC submitted a license amendment application on August 29, 2006, to address this issue. The application relies on alternative source term methodology and also relies on certain nonsafety-grade structures, systems and components to an extent that may be precedent setting in some respects. If the alternate source term (AST) application is approved, it would render the need for KI moot. The alternate is that, if the AST application is not approved, the licensee must make an alternate proposal, possibly one that involves modification to the plant design.

Equipment Reliability and Work Management: Hatch Unit 1 was placed in operation in 1975 and Unit 2 in 1979. Both units have been given a license extension. Current problems include:

- One White MSPI for Unit-2 HPCI due to functional failures. A 95001 was scheduled for January 2008, this will be deferred due to a subsequent 1/6/07 HPCI failure.

- The 1A RHR Pump vibrates excessively when operated in parallel with the 1C RHR Pump in certain flow ranges. The licensee is reviewing the installation of supports to shift the resonance frequency and/or changing the operating philosophy of RHR to single pump operation.

INPO Evaluations (Assessment November 2006): April 2007, final INPO report was issued with a rating of 2, down from the previous rating of 1.

License Renewal Activities

The operating licenses for both units were renewed on January 15, 2002.
Renewed License DPR-57 for Hatch Unit 1, expires on August 6, 2034.
Renewed License NPF-5 for Hatch Unit 2, expires on June 13, 2038.

Regional Administrator Drop-in Briefing Sheet

Date: April, 23, 2008

Current Plant Performance

- Unit-1 is in the Licensee Response Column with no greater than Green inspection findings or performance indicators. Cornerstone objectives have been met.
- Unit-2 is in the Regulatory Response Column with one white MSPI HPIS PI (HPCI water intrusion events). Cornerstone objectives have been met.
  - 95001 inspection was completed in March with satisfactory results (1 NCV).
  - Unit-2 is vulnerable to moving up in the Action Matrix. The white MSPI will be carried until the spring of 2010
  - Expect a discussion of Farley 95002/95003 implications for Hatch and how the Action Matrix deals with White MSPI issues. The primary concern is the licensee can not stop that transition in the Action Matrix regardless of corrective actions taken.
- No substantive cross-cutting issue(s)

Key Messages of Themes

- Thoroughness Of Evaluations
  - Inboard MSIVs not seating properly - In 2005 the licensee came to the conclusion the inboard MSIVs unseated during a plant cooldown and this resulted in as-found LLRT failures. Subsequently and as a result of extensive NRC questioning including a TIA, the licensee concluded other factors including seat wear and testing methodology caused the as-found LLRT failures.

  - 1C RHR Pump discharge check valve not seating properly - Multiple attempts were required to get the check valve to seat properly. This resulted in unplanned unavailability of a mitigating system.

  - Unit-2 HPCI response to water intrusion (white MSPI) - Two water intrusion events and inadequate water removal efforts resulted in corrosion of the turbine control system.

- Tritium Management and Monitoring
  Tritiated subsurface water is migrating via a french drain to the Altamaha River. The licensee has permitted the french drain release point and is in compliance with the release permit. Tritium levels at this release point have been consistently above the EPA limit for drinking water. **Recent samples show a downward trend.**

Items of Interest

1) Organizational Issues

- Sonny Bargeron transferred from Farley to Hatch as the Plant Manager
- Engineering Design group has been formed on-site
- License class throughput and exam standards

2) Plant equipment issues

- MSIV as-found LLRT failures - The licensee has established a program to optimize the internal dimensions of the valves. This has been completed on both units. The spring 2009 Unit-2 outage will reveal if the effort was successful
- SRV leakage and lift setpoint drift - Corrosion bonding of the pilot valve is a generic industry concern. Unit-1 SRVs have added Stellite-21 to the pilot valve seats. Hatch is

RA Drop-in Briefing Sheet - Hatch

Date: August, 20, 2008

Current Plant Performance

- Unit-1 is in the Licensee Response Column with no greater than Green inspection findings or performance indicators. Cornerstone objectives have been met.
- Unit-2 is in the Regulatory Response Column with one white HPCI MSPI. Cornerstone objectives have been met.
- No substantive cross-cutting issue(s):
- Unit-2 is vulnerable to moving up in the Action Matrix. The white MSPI will be carried until the spring of 2010.

Key Messages of Themes

- Thoroughness Of Evaluations

  Inboard MSIVs not seating properly

  In 2005 the licensee came to the conclusion the inboard MSIVs unseated during a plant cooldown and this resulted in as-found LLRT failures. Subsequently and as a result of extensive NRC questioning including a TIA, the licensee concluded other factors including seat wear and testing methodology caused the as-found LLRT failures.

  1C RHR Pump discharge check valve not seating properly

  Multiple attempts were required to get the check valve to seat properly. This resulted in unplanned unavailability of a mitigating system. (Criterion III – Green NCV)

  Unit-2 HPCI response to water intrusion (directly resulted in white MSPI)

  Two water intrusion events and inadequate water removal efforts resulted in corrosion of the turbine control system. (Criterion XVI -Green Finding)

  Recent root causes show improvement

- Tritium Management and Monitoring

  Tritiated subsurface water is migrating via a french drain to the Altamaha River. The licensee has permitted the french drain release point and is in compliance with the release permit. Tritium levels at this release point have been consistently above the EPA limit for drinking water. **Recent samples show improved trend.**

1. Organizational issues
   None
2. Plant equipment issues

- EDG engine to generator coupling failure and degradation due to component age

  SIT exited with a URI, a potential performance deficiency for poor implementation of the coupling inspection requirement. Coupling cracks have been visible for many years but no evaluation or replacement was performed. Significance is potentially greater than green depending on exposure time. The last 24 hour run was June 2006; the last rapid start was June 2008. The residents are developing the basis for which surveillance should determine the starting point for the exposure time. The

RA Drop-in, introduction to Jim Miller, New President and CEO, Southern Nuclear
Briefing Sheet - Hatch

September 10, 2008

Current Plant Performance

- Unit-1 is in the Licensee Response Column with no greater than Green inspection findings or performance indicators. Cornerstone objectives have been met.
- Unit-2 is in the Regulatory Response Column with one white HPCI MSPI. Cornerstone objectives have been met.
- No substantive cross-cutting issue(s):
- Unit-2 is vulnerable to moving up in the Action Matrix. The white MSPI will be carried until the spring of 2010.

Key Messages of Themes

- Thoroughness Of Evaluations

  Inboard MSIVs not seating properly

  In 2005 the licensee came to the conclusion the inboard MSIVs unseated during a plant cooldown and this resulted in as-found LLRT failures. Subsequently and as a result of extensive NRC questioning including a TIA, the licensee concluded other factors including seat wear and testing methodology caused the as-found LLRT failures.

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1. Organizational issues
   None
2. Plant equipment issues

- EDG engine to generator coupling failure and degradation due to component age

  SIT exited with a URI, a potential performance deficiency for poor implementation of the coupling inspection requirement. Coupling cracks have been visible for many years but no evaluation or replacement was performed. Significance is potentially greater than green depending on exposure time. The last 24 hour run was June 2006; the last rapid start was June 2008. The residents are developing the basis for

RA Drop-in, Dennis Madison Site Vice President, Hatch
Briefing Sheet - Hatch

September 23, 2009

Current Plant Performance

- Unit 1 and Unit 2 are within the Regulatory Response column of the Action Matrix based upon a White inspection finding in the Mitigating Systems Cornerstone which was issued first quarter 2009 for the 1B EDG coupling failure.
- No substantive cross-cutting issue(s)
- Unit 1 and Unit-2 Unplanned Scrams Performance Indicator's are each one scram away from crossing the PI Green-White threshold.

Planned Supplemental Inspections

NRC will conduct a Supplemental Inspection Procedure 95001 for the White finding involving the 1B EDG coupling failure. This inspection will be performed by Vogtle Resident, Tim Chandler, and is scheduled for Nov 16 -20, 2009.

Key Messages of Themes

- Tritium Management and Monitoring

  Tritiated subsurface water is migrating via a french drain to the Altamaha River. The licensee has permitted the french drain release point, is in compliance with the release permit, and is actively trending with their new monitoring plan.

1. Organizational issues

   Training Manager, John Hammonds, retired on 9/30/09. He was replaced by Steve Grantham.

2. Plant equipment issues

- River Level

  The Altamaha river level has dropped faster and earlier this year than in the previous several years. Current level is 63.9' with a TS limit of 60.7'. The Altamaha is fed from the Ocmulgee and Oconee rivers which are supplied by two Georgia Power dams. Supplemental water can be released to maintain river level; transit time is between 4 and 7 days. The licensee does river level projections weekly. The most recent projection does not forecast a need for supplemental water for greater than 30 days. Last week the licensee successfully completed a river dredging evolution near the plant intake to remove sandbar buildup.

- Unit 2 Core flow operated > than allowed flow rate due to electronics failure (square-root converter) which caused indicated flow to be less than actual.

  The licensee identified that Unit 2 operated with actual core flow at 107%, which is outside the allowed maximum flow rate per the operating Power/Flow Map. The cause of indicated flow being less than actual flow was attributed to a failed square-root converter. The licensee replaced the failed component to resolve the discrepancy. The licensee is contracting GE to perform an analysis of the plant with core flow at 107% to determine if operating with this core flow constitutes the power plant being in an unanalyzed condition that significantly degraded plant safety.