Congressional Staff Briefing: Monday July 13, 2009, 3:30 pm, Room 2108 Rayburn Bldg.

Topic: Follow-up Questions regarding Chairman's June 17, 2009 Response Regarding a IP2 Buried Pipe Leak

Key Messages (John Lubinski)

- NRC regulatory requirements and independent inspection program focus on plant safety and security. The agency focuses our inspection efforts on systems, structures and components that are important to safe plant operation.

- NRC regulatory requirements apply to all pipes that are important to safety. Our independent inspections focus on piping that is important to safety. For those pipes containing reactor coolant the NRC requires licensees meet very stringent design and in-service inspection standards. NRC regulatory requirements for pipes important to safety that do not contain reactor coolant and operate at lower temperatures and pressures are significantly different than regulatory requirements for pipes that operate at high pressures and temperatures. Piping that is neither reactor coolant boundary or important to safety is built to applicable standards.

- Independent onsite NRC inspections focus on pipe systems that are important to safe plant operation.

- The particular section of the IP2 pipe that leaked is a return line to a tank. This pipe is important to safety and the NRC requires the licensee to effectively address and correct the problem. The leak did not affect the tank's ability to supply water. Nonetheless, the NRC staff requires the licensee to understand and correct the extent of the problem because the tank supply piping is of similar design and could be affected by similar degradation mechanisms.

- The staff takes seriously issues that involve leaks in pipes that potentially impact plant safety. When these issues occur, our internal processes consider whether regulatory requirements need revision and/or NRC independent inspections enhanced.

- The nuclear industry has developed recommendations for a program to monitor buried piping (Reference EPRI document 1016456). Entergy is implementing this program at Indian Point.

B/29

Topics of Interest to Congressional Staff

ASME Code - Emphasis on more safety significant piping (Keith Hoffman)

- Design (Class 1, 2 & 3) higher safety factors on Class 1
- In-service Inspection - more examinations on Class 1
- Repairs/Replacement requirements

Inspection Requirements Current license vs. Period Extended (Keith Hoffman/Dave Pelton)
Operation under LR (Keith Hoffman/Dave Pelton)

- Code- Pressure Testing 3 times/ 10 years
- GALL- Inspections

NRC Ongoing Onsite Inspections of Licensee's Activities (Mel Gray/Harold Gray)

- Inspection Procedures- more emphasis on risk significant systems
- Corrective Actions- suitability, root cause, extent of condition, schedule of activities
- Update on Licensees IP2 pipe leak evaluation and planned corrective actions and in-process NRC reviews

NRC Reviews Operating Experiences from all Plants (Keith Hoffman)
Technical Review Groups

- Need for Generic Communications
- Review Regulatory Requirements adequacy
- Review Code Requirements adequacy

Ongoing Activities (Keith Hoffman/Dave Pelton)
ASME Code activities
Industry Buried Piping Integrity Group activities
GALL Updates

Specific Questions in the Congressional Press Release:

1. *The Indian Point safety system which suffered a major leak was "capable of fulfilling its safety function" even though it was declared "inoperable" by the power plant operator;* (Mel Gray)

   Our on-site NRC resident inspectors and supporting technical staff independently assessed power plant operator conclusions that the CST continued to be able to provide adequate water to the AFW pumps. The NRC staff concluded that the safety function of the CST to provide a source of AFW water was maintained, with sufficient margin, despite the flaw that was identified on the CST return pipe. Therefore the TS related to the AFW system was not entered and the AFW safety function was not affected.

   The NRC staff concluded that the safety function of the CST was maintained, with sufficient margin, based on the following information:

   - CST level was maintained well above minimum design level of 360,000 gallons
   - Plant personnel were not challenged to maintain the CST level due to the small size of the leak;
   - Leak was on CST return pipe and not the CST supply pipe to AFW pumps;
   - Estimated leak rate, industry experience and CST water at room temp and low pressure likely represented a small round leak hole and not a crack. This was affirmed by the licensee when the pipe was unearthed.
   - CST design features ensured if the leak increased the tank level would be maintained above minimum design level w/o operator action.

   Our on-site NRC resident inspectors independently concluded plant operators entered the TS action statement appropriate for this condition. This is TS 3.7.6, Condensate Storage Tank. The CST is not intended to leak, and the pipe attached to the tank had no intervening valve to isolate the leak. Therefore the condition represented a tank integrity issue.

   The NRC requires CST problems to be repaired in 7 days. Plant personnel completed the repair within the 7-day timeframe allowed by TS 3.7.6. The 7-day completion time for restoration of the CST is reasonable based on a redundant, alternate backup water supply being available and the low probability of an event occurring during this time period requiring the CST.

   TS systems (like the CST) are designed and operated, as described in the current licensing basis, with design margins and engineering margins of safety to ensure that some loss of quality, like a small leak, does not result in immediate failure to meet a specified safety function.

   <u>Background Information:</u>

   Safety Function of CST to Support AFW system – provide 360,000 gallons of water (passive drain system) to the AFW pumps for 24 hrs of decay removal in hot standby following a plant trip.

   - low pressure (~40# at AFW pump suction due to static head),
   - low temperature (maintained ~60 degrees winter; ~80 degrees summer) provides minimum 360,000 gallons of water (passive drain system)

- 12" supply; 8" return – carbon steel schedule 40
- Safety-related – ASME Class III; seismically qualified

The leak was determined to be in the 8" return line to the CST. Design features, including an elevated return line with anti-siphon features within the CST would prevent a leak (or complete shear) in the return line from draining the CST below the minimum TS required capacity of 360,000 gallons. Additionally, the 12" line that supplies water to the feed system was not affected by this leak.

- The CST overflow line enters/exits the CST at the same elevation as the 8" return line, (i.e. 115'5" pipe centerline)
- The 8" return line is equipped with a ¾" siphon breaker hole drilled at the top of the pipe inside the tank, the volume loss in the CST is effectively limited to the volume of water present in the return and overflow lines. This siphon breaker ensures that the CST water level remains at a minimum of 34.01' from the tank bottom which in turn ensures approximately ~600,000 gallons is maintained in the tank.
- Entergy estimated a leakage of 15gpm would have amounted to an estimated volume loss from the CST for a 24-hour period of about 22,000 gallons.
- Overall structural integrity of the return piping was later confirmed to be maintained.

Definition of Operability -A system, subsystem, train, component, or device is operable when it is capable of performing its specified safety functions, and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication and other auxiliary equipment that are required are also capable of performing their related support function(s).

2. *That notwithstanding the major buried piping leak at Indian Point, buried piping has only suffered "minor problems";(Harold Gray)*

Mel Gray with Harold Gray support in discussing buried pipe leaks have been of very low safety impact to date.

Regulatory requirements require licensees to identify and correct such conditions and consider the extent of the problem.

Internal agency operating experience processes will continue to assess whether generic communication is needed and whether current requirements are sufficient. Emphasize "minor" refers to safety impact.

3. *That the corrosion monitoring program at Indian Point "includes periodic inspections and assessment of underground service water piping" in compliance with the recommendations of NRC's Generic Letter 89-13, even though Entergy's License Renewal Application for the plant says only that "buried components are inspected when excavated for maintenance." Additionally, the Indian Point response to Generic Letter 89-13 states that "the existing program does not routinely include underground pipe as part of its random selection process" for inspection; and(Mel Gray/Harold Gray)*

Buried safety-related pipe at all nuclear plants is periodically tested per the ASME Code, which is required by NRC regulations. Buried safety-related pipe is tested periodically (about once every 3 years) using either a flow test or a pressure-drop test per the ASME code.

The focus of NRC's GL 89-13 is not buried piping. Rather, the emphasis of GL 89-13 and its supplement is the internal conditions of piping containing raw (service) water and the related heat exchangers due to their potential for operational degradation from the active nature of service water primarily focused on internal corrosion.

Therefore, safety-related service water pipe at Indian Point receives additional inspections, which resulted from NRC Generic Letter 89-13. As part of the licensee's service water inspection program, larger buried SW pipes are inspected by the licensee using internal inspections with robotic cameras.

The Congressional press release quoted Indian Point's response to GL 89-13. This response was made in the early 1990's, and is outdated information because the service water inspection program at Indian Point has evolved over the years based on plant and industry experience.

The Congressional press release also quoted from Indian Point's license renewal application, but this section of the application was describing additional inspections for aging management, not describing all current programs for buried pipe. In the application, the licensee also committed that if trending within the corrective action program finds susceptible locations for corrosion of buried pipe, the areas with a history of corrosion problems are evaluated for the need for additional inspection.

4. *A list of causes of the leak at Indian Point including failure of the protective external coating, the placement of soil backfill around the pipe during original construction, and the placement of the pipe in proximity to the water table, but no indication whether or not these same factors could be degrading other buried pipe at the plant.(Harold Gray)*

The NRC regulations require periodic testing of safety-related buried piping, and require that licensees take corrective action for degraded conditions. In the case of significant degraded conditions, NRC regulations also require that the licensee take corrective action to preclude the reoccurrence of the condition. NRC inspectors routinely inspect the licensees' programs including the licensees' in-service inspection programs as part of the baseline inspections in the Reactor Oversight Process and verify that licensees have taken appropriate corrective actions. The NRC continues to closely monitor any degradation in safety-related systems at nuclear power reactors

The NRC's independent review and assessment of Entergy's identification of the causes is on-going. The licensee's evaluation identified that the through-wall defect in the CST return line was caused by pipe coating degradation at a location which allowed external corrosion, accelerated by local soil conditions, to initiate and penetrate into a through-wall hole over time. Additionally, based on the materials unearthed during Entergy's excavation efforts, the protective coating was likely damage by rocks present in the backfill material used during initial construction.

NRC continues its on-site review of Entergy's corrective actions including a focus on Entergy's implementation of a comprehensive inspection plan to identify other locations that are similarly susceptible to corrosion like the CST return pipe. These initial Entergy inspections are expected to be completed by October 2009. These results would provide additional information on Entergy's prioritization and pace of its future inspections with respect to buried piping.

At this time, the NRC has concluded that Entergy's pace and scope of corrective actions to identify and inspect other similar susceptible locations is appropriate and commensurate with the low (safety function and radiological) impact that would be expected or has typically resulted when leakage of this nature has occurred in the nuclear industry. However, the NRC will continue to assess the pace and scope of Entergy's actions based on inspection results Entergy obtains in October 2009.

Background Information:

Extent of condition inspections by Entergy by October 2009

- IP2 8" Condensate Return Line in the excavated area in the FRV Room.
- IP2 12" Condensate Supply Line in the excavated area in the FRV Room.
- IP2 24" SW Line 408 in the Transformer Yard outside the PAB where it exits the ground.
- IP3 12" Condensate Supply Line outside the Auxiliary Feedwater Pump Building where it goes underground.
- IP3 8" Condensate Return Line outside the Auxiliary Feedwater Pump Building where it exits the ground.
- IP3 24" Line 408 in the backup pump valve pit.

Scope of similar piping: City water, CST, EDG Fuel Oil, SW, Aux Steam (U3), S/G Blowdown (U3)

No Class 1 buried piping

Class 2 piping buried limited to Stainless Steel supply/return piping (RWST) – stainless steel is not susceptible like carbon steel

Each unit has approximately 5000 feet of buried piping of which approximately 3000 feet is safety related.

Of the 3000 feet that is safety-related, ~2200 feet is service water, which is cement lined pipe that is inspected internally using robotic cameras and personnel crawl throughs.

Of the remaining 800 feet of safety-related buried piping, IPEC has ~ 400 feet that remains to be examined based on Entergy's record reviews of inspection and testing data. Entergy has prioritized remaining inspections this year to include this pipe.

The following questions came from previous discussions Amy Powell has had with the staffers:

5. *They hope to understand NRC's use of ASME code and how/if our findings in the field inform ASME code (i.e. do we have a feedback loop to give input to ASME as their codes are reviewed/revised?)(Keith Hoffman)*

6. *When inspections are "periodic" and when they are reactive (all)*

7. *How an inoperable system can be "not safety related" (all)*