Indian Point Nuclear Generating Unit No. 3

Pre-Application Meeting

Relief Request No. IP3-ISI-RR-16

Code Case N-513-4 Periodic Inspection Frequency Extension

Entergy®

Introduction and Meeting Purpose

Present information on a planned ISI Relief Request Relief for Indian Point Unit 3 (IP3)

- Relief is being requested to extend the first and only periodic inspection required by ASME Code Case N-513-4, paragraph 2(e) from 90 days to 150 days.
- This relaxation would eliminate the need to remove the currently installed leak mitigation clamp and performing the follow up periodic inspections.

Background

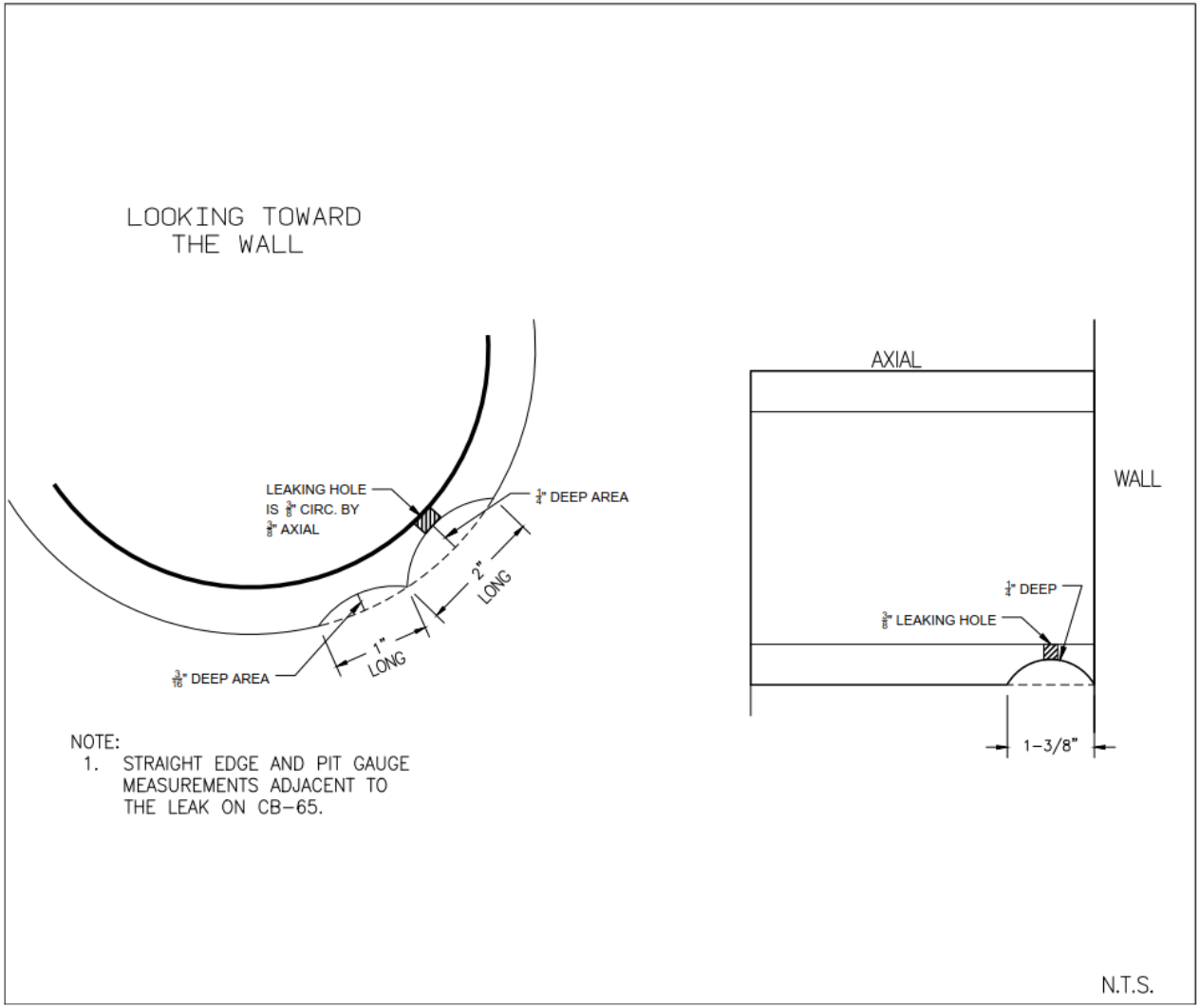
- During normal operator rounds on December 10, 2020, a through-wall leak was identified in Service Water (SW) Line 1093.
- At the time, the leak was estimated to be approximately 15 gallons per minute (GPM).
- Line 1093 is a 10" carbon steel pipe, which supplies cooling water from the Hudson River to the Emergency Diesel Generators (EDGs) Jacket Water (JW) and Lube Oil (LO) coolers. It also supplies cooling water to the Central Control Room Air Conditioning (CCRAC) Units.
- Line 1093 is one of two independent headers which supply the above cooling loads.
- At the time of leak discovery, an Operability Evaluation was developed based on the methodology provided in the ASME Code Case N-513-4.
- A leak mitigation clamp was also installed to minimize leakage from the pipe.

Background (cont.)

- The degraded area was characterized as an area approximately 3" in the circumferential direction by 1.375" in the axial direction.
    - See Figure 1 on next slide.
- The leaking defect was characterized as a through wall hole approximately 3/8" in diameter located within the degraded area.
- The degraded area is located at approximately the 5 o'clock position on the horizontal pipe.
- An investigation indicated that the cause of the degradation was external surface corrosion caused by periodic leakage from an adjacent vacuum breaker valve.
- External and internal visual examinations and well as UT examinations of the surrounding area did not indicate the presence of any active internal degradation.

Background (cont.)

Figure 1



Reason for Relief Request

- At the time of the leak discovery, an Ultrasonic Test (UT) of the surrounding area was performed, as well as physical measurements of the degraded area immediately surrounding the leak, as required by paragraph 2(a) of Code Case N-513-4.
- There were challenges in completing the original examinations and physical measurements which could increase during future inspections.
- Extension is being requested to the 90-day periodic inspection frequency provided in paragraph 2(e) of Code Case N-513-4 to no more than 150 days.
- Activities required for performing additional examinations may further degrade the condition, increasing the likelihood of a plant shutdown required for repair.
- Approval of this request would allow continued operation of IP3 through the end of its licensed life (i.e., no later than April 30, 2021) without removing the existing leak mitigation clamp and performing the periodic inspections.

Expected Inspection Challenges

- Surface preparation was required prior to the original inspections to facilitate UT. Since the area has been encapsulated by the leak mitigation clamp, additional surface preparation is likely to be required during future inspections. This surface preparation could increase the size of the hole and increase the leak rate.

- Since the 15 GPM leak initiated from the area to be inspected, measures had to be implemented to reduce the spraying on the inspection personnel as well as on the NDE equipment. Since the leakage is likely to have increased since the original inspection, it is expected that future periodic inspections will be challenging.

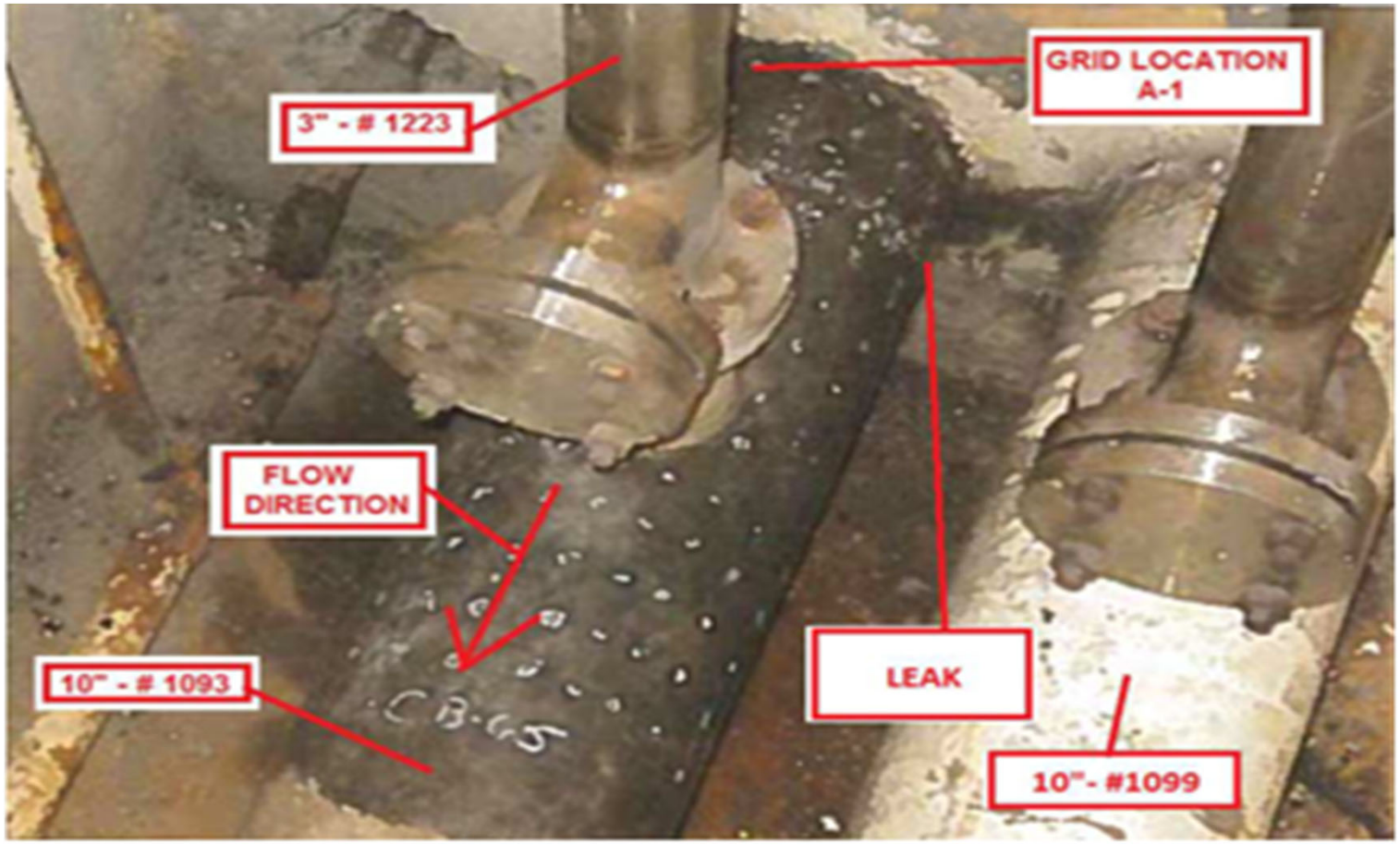
Expected Inspection Challenges (cont.)

- Since the temperature of the water has decreased from approximately 50 degrees Fahrenheit (ºF) during the original examination to approximately 33ºF currently, the anticipated higher leakage and lower temperatures will present a safety concern for the NDE personnel, as well as potentially impact the performance of the NDE equipment.

- The degraded area from where the leakage is originating is located at the bottom of the horizontal pipe, approximately 6" from the floor, adjacent to the wall which the pipe penetrates. In addition, there is another SW pipe in close proximity to line 1093, resulting in limited accessibility to the inspection area (see Figure 2 below). These interferences, coupled with the higher leakage of colder water, will increase the degree of difficulty of the inspection.

Expected Inspection Challenges (cont.)

Figure 2



Basis for Relief

- The required periodic inspections have no impact on the structural capability of the pipe but are simply intended to confirm the accuracy of the assumptions and inputs used in the Code Case evaluations.
- The original inspection identified wall thinning from corrosion measuring approximately 3" in the circumferential direction and approximately 1.375" in the axial direction. Note that the degraded area still had significant remaining thickness, with the exception of the 3/8" diameter leaking hole.
- A Finite Element Analysis (FEA) evaluated a bounding defect/hole (i.e., no remaining wall thickness) measuring approximately 4.4" in the circumferential direction by 3" in the axial direction. In addition, a corrosion rate of 0.012" per year (i.e., based on IP3 operating experience) was assumed to occur through the remainder of the plant operating life. The results from this FEA indicated that the limiting stress ratio (i.e., the ratio of the calculated stress over the allowable stress) was 69%.
- Since there is significant margin between the measured and the allowable flaw sizes, the additional 60 days requested beyond the ASME Code Case N-513-4 due date is considered acceptable.

Basis for Relief (cont.)

- The effects of leakage from the through-wall defect on system operability and plant flooding were also evaluated. A hydraulic analysis of the SW system indicated that the system would remain capable of performing its intended cooling function under limiting design bases conditions with a leak up to 200 GPM.
- The current approximate 1.5 GPM leakage with the leak mitigation clamp installed, as well as the estimated 15 GPM leakage prior to installing the clamp, are significantly less than the calculated/allowable 200 GPM. This assures significant margin between the estimated leakage and the amount of leakage which could impact the ability of the system to perform its design basis functions.
- The effects of flooding and system spray were also evaluated. Entergy concluded that based on the location of the leak (i.e., no sensitive equipment in the area) and the available floor drainage, neither spray nor flooding will adversely impact the ability of the SW system to perform its design basis function.

Basis for Relief (cont.)

- Entergy also assesses leakage in the degraded SW piping on a daily basis to comply with paragraph 2(f) of Code Case N-513-4 through operator rounds.
- These inspections ensure that the observed leakage remains low and the rate of change remains stable. If a visible step change is identified, the change is documented in the corrective action program and evaluated to ensure that it is not an indication of unstable defect growth.

Proposed Schedule

- The next periodic inspection is due no later than March 10, 2021, based on the current Code Case N-513-4 frequency requirement.
- As a result, Entergy requests a response to this relief request by February 28, 2021.
- This date will allow for adequate time to prepare for initiation of follow-up contingency actions, including removal of the leak limiting clamp and attempting to perform the required inspections if the request is not approved.
- This date will also allow for other potential requests to be considered, should the inspection be required but impractical
- This date will also allow for preparing the plant for a cold shutdown no later than March 10, 2021, should the inspection be impractical or should a repair be required.

Summary

- As stated above, Entergy believes that performance of periodic inspections required by Code Case N-513-4 would result in a safety concern for the NDE personnel, potentially impact the performance of the NDE equipment, and potentially challenge the continued operation of IP3.
- The affected pipe remains structurally capable of performing its intended design functions based on the ASME Code Case N-513-4 evaluations. These evaluations have confirmed that additional margin exists beyond those margins required by the Code Case, through the end of the plant Licensed life.
- Activities required for performing additional examinations may further degrade the condition, increasing the likelihood of a plant shutdown required for repair prior to the permanent plant shutdown on April 30, 2021.
- A response is requested by February 28, 2021.