NRC Inspector General Report Findings

Concerns Pertaining to Gas Transmission Lines at the Indian Point Nuclear Power Plant (Case No. 16-024)

Basis and Scope: The Office of the Inspector General (OIG), U.S. Nuclear Regulatory Commission (NRC), initiated this event inquiry in response to concerns, communicated to OIG, from a citizen stakeholder [Paul Blanch, a nuclear engineer from CT who has been challenging the NRC analysis for seven years] pertaining to NRC's oversight of a 42-inch natural gas pipeline that was, at the time, proposed to traverse Indian Point Energy Center (IPEC) property. This pipeline, now in operation, was part of the Algonquin Incremental Market (AIM) Project, which proposed to replace certain portions of the existing pipeline and install new pipeline in the northeast United States. NRC's role was to support the Federal Energy Regulatory Commission's (FERC) decision to approve or disapprove the project by providing information to the FERC on the impacts of the AIM Project on IPEC. NRC's findings were documented in its Third-Quarter Integrated Inspection Report issued to Entergy, IPEC's license holder, on November 7, 2014.

In a publicly available Title 10 of the *Code of Federal Regulations* Section 2.206 (10 CFR) petition, dated October 15, 2014, and a letter to NRC dated July 27, 2015, the stakeholder questioned the adequacy and completeness of the licensee's (Entergy) site hazards analysis and NRC's independent and follow-up analyses prepared to determine the safety impact on IPEC plant components due to the potential rupture of the proposed high pressure 42-inch gas pipeline. The stakeholder also questioned whether:

(1) NRC misled FERC and the public by claiming to FERC that there was no additional risk associated with the proposed 42-inch gas pipeline, thereby putting at risk 20 million people near IPEC;
(2) NRC was aware of material false statements made by Entergy to NRC with respect to the 42-inch gas pipeline;
(3) NRC violated its procedures and regulations when analyzing the potential safety impacts from the 42-inch gas pipeline; and
(4) NRC is allowing IPEC to operate in an unanalyzed condition.

OIG's event inquiry examined NRC's inspection report and underlying analysis used to determine that Entergy appropriately concluded the 42-inch gas pipeline would not introduce significant risk to safety-related systems, structures, and components; and systems, structures, and components important-to-safety at IPEC. On March 3, 2015, FERC issued an order formally approving the AIM Project. On January 7, 2017, the pipeline went into use. As part of this event inquiry, OIG also examined NRC's response to the stakeholder's concerns over the 42-inch gas pipeline.

Findings

Finding 1: While FERC's approval of the AIM Project pipeline relied in part on NRC's assessment of Entergy's site hazards analysis and NRC's independent analysis of the impact of a potential rupture of the portion of the pipeline that traversed IPEC property, OIG found:

(1) NRC's independent analysis was incorrectly portrayed in FERC's approval document as significantly more conservative than it actually was;
(2) NRC's inspection report contained inaccuracies suggesting additional analysis had been conducted, when this was not the case; and
(3) **NRC's underlying independent analysis was conducted using a computer program that the National Oceanic and Atmospheric Administration (NOAA), which developed the program, said it was not designed for.**

Moreover, the majority of NRC's independent analysis described the impact of a potential rupture on an above ground point on IPEC property that NRC believed presented the most credible risk due to its exposure; however, ultimately the as-built 42-inch pipeline does not come above ground anywhere on IPEC property but does traverse the IPEC property.

OIG also found that NRC decision-makers had differing understandings of the assumptions and factors driving the analysis conducted by an NRC Physical Scientist, who NRC considered a subject matter expert and who was responsible for conducting, documenting, and communicating his results. **While the Physical Scientist attributed his analysis assumptions to OIG as engineering judgment, he did not have a basis for it and did not document a basis or a methodology in his report.** When OIG briefed NRC managers on the issues OIG identified in the Physical Scientist's analysis, one noted that because the Physical Scientist conducted multiple calculations with increasing credit for pipeline enhancements, it appeared to **be backwards engineering to get a desired result**. A n NRC senior manager said the Physical Scientist's use of credit for enhanced piping was inappropriate in part because the pipeline enhancements were not intended to mitigate the impact of a blast, but rather to reduce the chances of a rupture in the first place. Several NRC senior managers said that based on issues identified in this event inquiry pertaining to the Physical Scientist's analysis, it may be prudent to redo the analysis.

Finding 2: OIG found that through the stakeholder's 2.206 petition and associated concerns – which were relevant and on point – NRC was presented an opportunity to reevaluate and confirm work previously conducted that supported the agency's conclusion that Entergy's hazards analysis was reliable**. However, NRC failed to thoroughly reexamine the underlying premises of its analyses and did not accurately communicate its analytical work performed.**

First, in response to the stakeholder's assertion that it would take longer than 3 minutes for the pipeline operators in Houston, Texas, to close the valves, thereby stopping the flow of gas, **NRC misrepresented the assumptions used in the follow-up bounding analysis that was conducted to assess the impact of 60 minutes of gas released.** While NRC's response to the stakeholder described having conducted an assessment that assumed an infinite source of natural gas with the pipeline valves open for an hour,

OIG's investigation found that NRC assessed only 1 minute of gas released. Moreover, NRC never confirmed the validity of the licensee's assumption that the valves could be closed in 3 minutes. OIG contacted the pipeline operator who estimated it would take at least 6 minutes after detection of a leak to close the valves. While the Physical Scientist told OIG he used 1 minute of gas released in his calculations, NRC managers had inconsistent understandings of the amount of mass the Physical Scientist used.

Second, in response to the stakeholder's question of whether NRC performed a validation and verification of NOAA's computer program to ascertain its adequacy for this purpose, NRC stated there was no need for NRC to perform a validation and verification of the computer program. However, **OIG contacted NOAA, which confirmed the program is not designed for this purpose.**

Third, NRC's response to the stakeholder stated that NRC used the methodology and equations of Regulatory Guide 1.91, NRC's guidance for evaluating postulated explosions near nuclear power plants, "without deviation"; however, **OIG found that NRC used a draft regulatory guide in lieu of the final, approved version (which had been issued approximately 2 years prior) and deviated from the approved version in a manner that was less conservative and had an impact on the analysis outcome.**

Fourth, the stakeholder asked whether NRC had any quality assurance requirements/procedures for conducting safety related calculations**. NRC responded that they do not perform safety related calculations and do not have a quality assurance program for these calculations**, but they said a peer review by a qualified NRC engineer was performed on NRC's independent analysis and follow-up analysis. **OIG's investigation revealed that the assigned engineer, who felt there were more qualified people in NRC to do this, performed a limited review that focused mainly on the licensee's hazards analysis and not NRC's analyses.**

An NRC senior manager conveyed to OIG that NRC decision makers rely on accurate information from the staff to support decisions and communicate accurately to stakeholders and, in this case, another Federal agency. **However, NRC managers confirmed they do not have a quality assurance process or a formal peer review process to review this type of assessment**.