

FEEDER COVER PAGE TEMPLATE

****Items listed in purple are to be completed by the DRS Admin Staff****

Date: October 30, 2014

Inspection Report No.: 05000247/2014**004** and 05000286/2014**004**

Licensee and Plant: Entergy Nuclear Operations, Inc., Indian Point Nuclear Generating Units 2 and 3

Inspection: Plant Modifications, IP 71111.18

On-Site Dates: September 22 – 23, 2014

Cover Letter Input: No input.

Inspection Summary Input: None

Other comments: None

DRS Inspection Tracking Entered/Updated: (Y/GC)

*This feeder represents the completion of one (1) inspection procedure sample for IP 71111.18. The RPS database **has not been** updated to reflect the completion of this sample and the completion status of the associated procedures.*

DRS Tracking System Updated (Y/GC)

Inspector: S. McCarver, PE/ **SCM** **October 30, 2014**
Physical Security Inspector

SRA Review: N/A

BC Approval: P Krohn/ **PGK** **October 30 , 2014**
A Dimitriadis/ **AD** **October 30, 2014**

SUNSI Review Complete **PGK** (Reviewer's Initials)
Non-Public Designation Category: MD 3.4 Non-Public B.1

File: G:\DRS\Plant Support Branch 1\IPEC 3Q Report FeederR1 - Pipeline Blast Analysis Rev11.docx

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REPORT DETAILS

1. REACTOR SAFETY

1R18 Plant Modifications (71111.18 – 1 sample)

Permanent Modifications

a. Inspection Scope

On February 28, 2014, Spectra Energy submitted an application before the Federal Energy Regulatory Commission (FERC) for a certificate to build a new natural gas pipeline near the Indian Point Energy Center (IPEC) about one-quarter mile from the Unit 2 and Unit 3 reactors. Because the proposed pipeline would intersect with a small portion of the licensee's owner-controlled property, Entergy personnel performed a 10 CFR Part 50.59 review and, on August 21, 2014, submitted the safety evaluation and supporting analysis to the NRC for information. Briefly stated, a 50.59 review is a technical evaluation performed by a licensee to determine if a proposed change to the facility represents a modification to the plant design as described in the Final Safety Analysis Report and, hence, requires NRC approval prior to implementation. The Entergy review concluded that the change in the design basis external hazards analysis associated with the installation of the proposed new natural gas pipeline across a portion of the Indian Point site does not require prior NRC review and approval.

Entergy's evaluation analyzed the effects of a pipeline rupture with a subsequent jet flame, cloud fire, detonation of a vapor cloud, and/or missile generation to structures, systems, and components (SSCs) important to safety. The licensee's analysis of potentially hazardous events precipitated by a pipeline rupture demonstrates that the threshold for damage to safety-related or important-to-safety SSCs within the Security Owner Controlled Area (SOCA) will not be exceeded because of the distance between the SOCA and the new pipeline. However, a portion of the proposed pipeline would be located near SSCs important-to-safety outside the SOCA. Due to the potential impact to these components they were also evaluated to determine if any further reductions in safety margins would occur should the pipeline rupture. The original proposal was to put the new gas pipeline in the same trench as two existing pipelines. However, the proposal was subsequently revised to place the new pipeline further away from the Unit 2 and 3 reactors, and to retire one of the two existing pipelines in-place. The Entergy analysis concluded that there would be no additional reduction in safety margins from these components and, therefore, the new pipeline poses minimal or no increased risk to the safe operation of Units 2 and 3.

NRC inspectors and staff reviewed the 50.59 safety evaluation and supporting hazard analysis, conducted a walk-down of the proposed pipeline routing, and performed an independent analysis of the potential hazards associated with failure of the proposed pipeline. NRC staff also reviewed the qualifications of Entergy's subject matter expert (SME) who performed the licensee's analysis to ensure that the individual possessed the requisite knowledge, experience, and abilities to conduct the hazards analysis for the new pipeline. Additionally, the NRC staff reviewed the requirements of 10 CFR Part 50, Appendix B, Criterion I, "Organization," to assess whether the SME's activities were adequately controlled under the licensee's quality assurance program.

b. Findings, Observations, and Independent NRC Analysis

No findings were identified.

Based on the review of Entergy's hazards analysis and the NRC's independent calculation results using conservative assumptions and rationale, the NRC staff concluded that safety-related SSCs inside the SOCA would not be exposed to conditions exceeding the threshold for damage. However, SSCs important-to-safety outside the SOCA would be affected, because the calculated minimum safe distances to the impacts are not satisfied. The staff determined that the impacts to the SSCs important-to-safety outside the SOCA from the proposed new pipeline are bounded by the impacts from low probability events of extreme natural phenomena (including seismic activity, tornado winds, and hurricanes) which have been previously assessed and are addressed in the Indian Point Units 2 and 3 Updated Final Safety Analysis Report (UFSAR), and Indian Point Units 2 and 3 would still be able to achieve safe shutdown conditions. Furthermore, owing to methane being buoyant, the plume rises aloft quickly, and burns rapidly in seconds far above the ground. Therefore, a cloud flash fire may occur without challenging the structures and components; and the existing margin of safety is not expected to be reduced due to a potential rupture of the proposed pipeline near IPEC. In performing the analysis for the new pipeline, the staff also noted that the proposed pipeline is located at greater distances from safety-related SSCs than two currently operating gas pipelines. Finally, the staff determined that Entergy's conclusions involving the potential rupture of the proposed pipeline near IPEC poses no threat to safe operation of the plant or safe shutdown of the plant, are reasonable and acceptable, and are also comparable with the staff's conclusions.

The staff's hazards analysis was performed by a physical scientist in the Office of New Reactors/Division of Site Safety and Environmental Analysis/Radiation Protection and Accident Analysis Branch with more than eight years of experience at the NRC performing power plant siting evaluations, and assessing external man-made hazards from nearby facilities at proposed new nuclear power plant sites. In addition, the physical scientist has 32 years of diversified experience in the areas of environmental assessments, environmental impact statements, and safety analysis reports for the NRC, Department of Energy, and the Environmental Protection Agency. The NRC's physical scientist performed an independent analysis of the hazards associated with the proposed pipeline. The analysis was performed based on the following conditions and hypothetical scenarios: rupture of the proposed pipeline located near IPEC resulting in an unconfined explosion or jet flame at the source; delayed vapor cloud fire or vapor cloud explosion; and accompanying missile generation. For the assessment of an unconfined explosion, Regulatory Guide (RG) 1.91, "Evaluations of Explosions Postulated to Occur at Nearby Facilities and on Transportation Routes Near Nuclear Power Plants," Revision 2, methodology was used to calculate the minimum safe distance. For the jet flame, cloud fire, and vapor cloud explosion, the "Areal Locations of Hazardous Atmospheres" (ALOHA) chemical release modeling computer software was used to determine the hazard impact distances which were compared with the actual distances at IPEC to safety-related SSCs or SSCs important-to-safety. In order to assess the impact potential, ALOHA software was employed using the appropriate source term (amount of methane released) for the scenario considered, using conservative meteorological conditions and open country ground roughness condition modeling assumptions.

In addition, NRC staff reviewed the qualifications and resume of Entergy's SME who performed the licensee's analysis. The NRC staff determined that the individual possessed the requisite knowledge, experience, and abilities to conduct the pipeline hazards analysis and that the analysis had been conducted in accordance with IPEC procedures (EN-DC-149 and EN-LI-101). Specifically, the SME possessed a Ph.D. and Masters of Engineering Degree in Chemical Engineering and was a licensed Professional Engineer. In addition, the SME had performed similar analyses for several industrial applications, including commercial nuclear stations.

Regarding Entergy's oversight of the SME, the NRC staff determined that the licensee's controls were in accordance with the requirements of 10 CFR Part 50, Appendix, B, Criterion 1 which states, in part, that "licensees may delegate to others, such as contractors or consultants, the work of establishing and executing the Quality Assurance (QA) program, or any part thereof, but shall retain the responsibility for the QA program." Based on a review of the SME's qualifications and Entergy's 10 CFR 50.59 review which accepted the SME's work under the QA program (EN-DC-149; Steps 1.2, 1.6, 5.3.2.a, 5.3.2.c, and Attachment 9.1 dated August 20, 2014), the NRC staff determined that the SME was not required to be listed on the station's qualified vendor list.

As a result of the above inspection activities and independent analysis, the staff determined Entergy had appropriately concluded that the proposed pipeline does not introduce significant additional risk to safety-related SSCs and SSCs important-to-safety at Indian Point Units 2 and 3, and therefore, the change in the design bases external hazards analysis associated with the proposed pipeline does not require prior NRC review and approval.

40A6 Meetings, including Exit

.1 Exit Meeting Summary:

The inspectors presented the inspection results to Mr. R. Walpole, Manager, Regulatory Assurance at the conclusion of the inspection on September 23, 2014. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT
SUPPLEMENTARY INFORMATION
KEY POINTS OF CONTACT

Licensee Personnel

S. Pressman, Licensing Engineer
J. Skonieczny, Engineer
R. Walpole, Manager, Regulatory Assurance

LIST OF DOCUMENTS REVIEWED

Section 1R18: Plant Modifications (71111.18)

Drawings:

S7-A-2100, Algonquin Incremental Market Project Stony Point Discharge Proposed 42”
M/L, Revision B
S7-A-2114 through S7-A-2124, Algonquin Incremental Market Project Stony Point Discharge
Proposed 42” M/L, Revision D

Procedures:

EN-LI-101, 10 CFR 50.59 Evaluations, Revision 12
EN-DC-149, Acceptance of Vendor Documents, Revision 9

Other Documents:

NL-14-106, 10 C. F. R. 50.59 Safety Evaluation and Supporting Analyses Prepared in
Response to the Algonquin Incremental Market Natural Gas Project Indian Point Nuclear
Generating Units 2 & 3, dated August 21, 2014
Spectra Energy Memorandum: Entergy Pipeline Enhancement Measures dated 7/29/14
Report 14-126, Puncture Assessment for Algonquin Pipeline, dated August 27, 2014
IP-RPT-14-00010, Report of Liquefaction Potential Assessment
NRC Memorandum, Review of Natural Gas Hazards, Indian Point Nuclear Generating Unit
Nos. 2 and 3, dated April 25, 2003
Regulatory Guide 1.91, Evaluations of Explosions Postulated To Occur on Transportation
Routes Near Nuclear Power Plants, Revision 2
NUREG-0800, Standard Review Plan for the Review of Safety Analysis Reports for
Nuclear Power Plants: LWR Edition
GRI-00/0189, A Model For Sizing High Consequence Areas Associated With Natural Gas
Pipelines, October 2000
OPS TTO13, Potential Impact Radius Formulae for Flammable Gases Other Than Natural Gas,
June 2005
US Nuclear Regulatory Commission, Regulatory Guide 1.91, “Evaluations of Explosions
Postulated to Occur at nearby Facilities and on Transportation Routes Near Nuclear Power
Plants,” Revision 2, April 2013.
US EPA, NOAA, “ALOHA User’s Manual,” February 2007
FEMA, US DOT, US EPA, “Handbook of Chemical Hazard Analysis Procedures.”