



Serial: NPD-NRC-2011-061
July 14, 2011

10CFR52.79

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

**LEVY NUCLEAR PLANT, UNITS 1 AND 2
DOCKET NOS. 52-029 AND 52-030
VOLUNTARY SUBMITTAL RELATED TO THE PIPELINE HAZARDS ANALYSIS DESCRIBED
IN CHAPTER 2 OF THE FINAL SAFETY ANALYSIS REPORT**

Ladies and Gentlemen:

Progress Energy Florida, Inc. (PEF) hereby submits additional information concerning natural gas pipeline hazards analysis described in Chapter 2 of the Final Safety Analysis Report for the Levy Nuclear Plant Units 1 and 2 (LNP). This information is provided to update the analysis results based on completion of the Florida Gas Transmission Phase III Expansion project in the vicinity of the plant.

The additional information is provided in the enclosure. The enclosure also identifies changes that will be made in a future revision of the LNP application.

If you have any further questions, or need additional information, please contact Bob Kitchen at (919) 546-6992, or me at (727) 820-4481.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on July 14, 2011.

Sincerely,

A handwritten signature in black ink, appearing to read 'John Elnitsky', written over the printed name and title.

John Elnitsky
Vice President
New Generation Programs & Projects

Enclosure/Attachments

cc : U.S. NRC Region II, Regional Administrator
Mr. Brian C. Anderson, U.S. NRC Project Manager

DO94
NR0

NRC Review of Final Safety Analysis Report

PGN RAI ID #: L-0951

PGN Voluntary Response:

During the preparation of the Levy Nuclear Plant (LNP) COL Application in early 2008, Progress Energy Florida, Inc. (PEF) obtained information from Florida Gas Transmission Company (FGT) regarding underground natural gas pipelines running parallel to U.S. Highway 19, approximately 5803 ft. to the west-northwest of the LNP site. Preliminary information regarding construction of a planned loop extending along the eastern side of the existing pipeline was provided to PEF by FGT, but detailed information on the planned loop was not available and thus it was not addressed in the impact analysis for a postulated pipeline rupture.

A subsequent review of the relevant information contained in the FSAR was conducted to determine the status of the planned loop by FGT. PEF determined that the loop near the Levy site had been constructed and placed into operation on April 1, 2011, and consisted of a 36-inch pipeline with a maximum allowable operating pressure of 1333 psig. A revised pipeline accident analysis has been performed to take into account the new pipeline and update the information contained in the FSAR.

Associated LNP COL Application Revisions:

The following changes will be made to the LNP FSAR in a future revision:

The text in subsection 2.2.2.3, Description of Pipelines, will be revised from:

Based on information from the EDR, no petroleum pipelines are present within the 8-km (5-mi.) radius of the LNP site ([Reference 2.2-208](#)). Underground natural gas pipelines are located on the north side of U.S. Highway 19 alongside the remaining rail bed from the abandoned railroad track. The pipelines run parallel to U.S. Highway 19, approximately 1769 m (5803 ft.) to the west-northwest of the LNP site. Florida Gas Transmission Company (FGT) plans to construct a 24.5-km (15.2-mi.) loop, which would extend approximately 24 km (15 mi.) along the eastern side of the existing pipeline.

The 20.3-centimeter (cm) (8-inch [in.]) and 76.2-cm (30-in.) natural gas pipelines are owned by FGT. The 20.3-cm (8-in.) pipeline is buried to a minimum of 0.9 meters (m) (3 feet [ft.]) below ground surface (bgs), and is 2123 m (6966 ft.) west of the LNP site. The pipeline has a maximum pressure of 912 pounds per square inch (psi). The 76.2-cm (30-in.) pipeline is buried a minimum of 0.9 m (3 ft.) bgs. The pipeline has a maximum pressure of 1200 psi and is located 1769 m (5803 ft.) west of the LNP site. There are no plans to carry any other product in the pipeline except for natural gas. The locations of the 20.3-cm (8-in.) and 76.2-cm (30-in.) pipelines with respect to the safety-related structures of the LNP are shown in [Figure 2.2.2-202](#).

to:

Based on information from the EDR, no petroleum pipelines are present within the 8-km (5-mi.) radius of the LNP site ([Reference 2.2-208](#)). Three underground natural gas pipelines are located on the eastern side of U.S. Highway 19 alongside the remaining rail bed from the abandoned railroad track. The pipelines run parallel to U.S. Highway 19, approximately 1769 m (5803 ft.) to the west-northwest of the LNP site.

The three natural gas pipelines consist of 20.3-centimeter (cm) (8-inch [in.]), 76.2-centimeter (cm) (30-inch [in.]) and 91.4-cm (36-in.) diameter pipe, which are owned by FGT. The 20.3-cm (8-in.) pipeline is buried to a minimum of 0.9 meters (m) (3 feet [ft.]) below ground surface (bgs), and is 2123 m (6966 ft.) west of the LNP site. The pipeline has a maximum pressure of 912 pounds per square inch (psi). The 76.2-cm (30-in.) pipeline is buried a minimum of 0.9 m (3 ft.) bgs. The pipeline has a maximum pressure of 1200 psi and is located 1769 m (5803 ft.) west-northwest of the LNP site. The 91.4-cm (36-in.) pipeline is buried a minimum of 0.9 m (3 ft.) bgs. The pipeline has a maximum pressure of 1333 psi and is located 1757 m (5763 ft.) west-northwest of the LNP site. There are no plans to carry any other product in the pipelines except for natural gas. The locations of the 20.3-cm (8-in.), 76.2-cm (30-in.) and 91.4-cm (36-in.) pipelines with respect to the safety-related structures of the LNP are shown in [Figure 2.2.2-202](#).

The text in subsection 2.2.3.2.3, Nearby Gas Pipeline, will be revised from:

There are two natural gas pipelines in the area of LNP as shown on [Figure 2.2.2-202](#). There is a 20.3-cm (8-in.) pipeline that splits from a 76.2-cm (30-in.) pipeline 2123 m (6966 ft.) northwest of LNP and runs to the north-northeast from LNP. It normally operates at or below 912 psi. Because the 20.3-cm (8-in.) pipeline is smaller and a greater distance from the plant, the accident analysis for this pipeline is considered to be bounded by the accident analysis for the 76.2-cm (30-in.) pipeline described below and does not require additional consideration.

The 76.2-cm (30-in.) pipeline is located to the west of the site and runs from the south-southwest to the north-northeast. It is 1769 m (5803 ft.) from the nearest location of the LNP safety-related structures at its closest approach northwest of the site as shown on [Figure 2.2.2-201](#), and has a maximum operating pressure of 1200 psi. There are a total of 73.9 km (45.9 mi.) of pipe within the 8-km (5-mi.) radius of the site. The distance between compressor stations is 104.9 km (65.2 mi.) and the distance between isolation valves is 14.3 km (8.9 mi.) (first section), 31.2 km (19.4 mi.) (second section), 29.6 km (18.4 mi.) (third section), and 18.4 km (11.4 mi.) (fourth section). The impact of a postulated rupture of this pipeline was evaluated with respect to LNP. The analysis includes the following assumptions:

- Unconfined vapor explosions of natural gas are not considered credible events. Therefore, deflagration of a natural gas/air mixture is taken as the limiting case. In terms of plant safety, this is considered as assuring that a mixture within the flammable limits is not present near the safety-related structures.
- The release rate due to a double-ended circumferential rupture of the 76.2-cm (30-in.) line is conservatively taken as a constant rate of 14,280 lb. per second from each side of the break. This value assumes that all of the released natural gas is vapor and exits the failed pipeline at sonic velocity.
- The postulated breach is modeled as a continuous plume release with Gaussian dispersion characteristics. The evaluation considered Pasquill stability categories C through G and wind speeds from 1 to 15 m per second (3.3 to 49.2 ft. per second). Pasquill stability categories are described in Regulatory Guide 1.23, Revision 1.
- Credit was taken for plume rise in accordance with Regulatory Guide 1.194.

Based on these assumptions, the maximum downwind concentration was determined to be 1.16 percent at LNP. This is well below the lower flammability limit (LFL) for natural gas of

4.8 percent in air. The downwind concentration was estimated as a function of stability classes C, D, F and G and wind speeds varying from 1 to 15 m per second (3.3 to 49.2 ft. per second). The results demonstrate that the maximum distance of the frontal boundary of flammable concentration (4.8 percent) from the pipeline is 640 m (2100 ft.) for stability category C and a wind speed of 15 m per second (49.2 ft. per second). The majority of flammable portion of the gas cloud will be even closer to the pipeline and, therefore, farther from the LNP site. This results in minimum separation distance from the leading edge of a potentially flammable cloud to the site critical structures of 1129 m (3703 ft.).

The heat intensity for a sustained jet fire at the break location was determined to be no more than 300 Btu/hr/ft² (equivalent to solar heat flux on the ground) at a distance of 886 m (2907 ft.) from the 76.2-cm (30-in.) pipeline. As noted above, the minimum separation distance from the leading edge of a potentially flammable cloud to the site critical structures is 1129 m (3703 ft.).

The potential overpressure from the deflagration of the vapor cloud at the closest point of approach (1129 m [3703 ft.] from the site critical structures) is considered negligible (less than 1 psi).

Therefore, there are no adverse effects due to the unlikely rupture of the gas pipelines at their closest location to LNP.

to:

There are three natural gas pipelines in the area of LNP as shown on [Figure 2.2.2-202](#). There is a 20.3-cm (8-in.) pipeline lateral that splits from a 76.2-cm (30-in.) pipeline 2123 m (6966 ft.) northwest of LNP and runs to the north-northeast from LNP. It normally operates at or below 912 psi. Because the 20.3-cm (8-in.) pipeline is smaller and a greater distance from the plant, the accident analysis for this pipeline is considered to be bounded by the accident analysis for the 91.4-cm (36-in.) pipeline described below and does not require additional consideration.

The 76.2-cm (30-in.) pipeline is located to the west of the site and runs from the south-southwest to the north-northeast. It is 1769 m (5803 ft.) from the nearest location of the LNP safety-related structures at its closest approach west-northwest of the site as shown on [Figure 2.2.2-201](#), and has a maximum operating pressure of 1200 psi.

The 91.4-cm (36-in.) pipeline runs parallel to the 76.2-cm (30-in.) pipeline, is located to the west of the site and runs from the south-southwest to the north-northeast. It is 1757 m (5763 ft.) from the nearest location of the LNP safety-related structures at its closest approach west-northwest of the site as shown on [Figure 2.2.2-201](#), and has a maximum operating pressure of 1333 psi.

The distance between compressor stations for the 6.2-cm (30-in.) and 91.4-cm (36-in.) lines is 104.9 km (65.2 mi.) and the distance between isolation valves is 14.3 km (8.9 mi.) (first section), 31.2 km (19.4 mi.) (second section), 29.6 km (18.4 mi.) (third section), and 18.4 km (11.4 mi.) (fourth section). The impact of a postulated rupture of the two larger pipelines was evaluated with respect to LNP. The analysis includes the following assumptions:

- Unconfined vapor explosions of natural gas are not considered credible events. Therefore, deflagration of a natural gas/air mixture is taken as the limiting case. In terms of plant safety, this is considered as assuring that a mixture within the flammable limits is not present near the safety-related structures.

- The release rate due to a double-ended circumferential rupture of the 76.2-cm (30-in.) line is conservatively taken as a constant rate of 14,280 lb. per second from each side of the break. The release rate due to a double-ended circumferential rupture of the 91.4-cm (36-in.) line is conservatively taken as a constant rate of 23,726 lb. per second from each side of the break. These values assume that all of the released natural gas is vapor and exits the failed pipeline at sonic velocity.
- The postulated breach is modeled as a continuous plume release with Gaussian dispersion characteristics. The evaluation considered Pasquill stability categories C through G and wind speeds from 1 to 15 m per second (3.3 to 49.2 ft. per second). Pasquill stability categories are described in Regulatory Guide 1.23, Revision 1.
- Credit was taken for plume rise in accordance with Regulatory Guide 1.194.

Based on these assumptions, the maximum downwind concentration was determined to be less than 1 percent at LNP. This is well below the lower flammability limit (LFL) for natural gas of 4.8 percent in air. The downwind concentration was estimated as a function of stability classes C, D, F and G and wind speeds varying from 1 to 15 m per second (3.3 to 49.2 ft. per second). The results demonstrate that the maximum distance of the frontal boundary of flammable concentration (4.8 percent) from the pipeline is 1400 m (4594 ft.) for stability category D and a wind speed of 15 m per second (49.2 ft. per second). The majority of the flammable portion of the gas cloud will be even closer to the pipeline and, therefore, farther from the LNP site. This results in minimum separation distance from the leading edge of a potentially flammable cloud to the site critical structures of 356 m (1169 ft.).

The heat intensity for a sustained jet fire at the break location was determined to be no more than 300 Btu/hr/ft² (equivalent to solar heat flux on the ground) at a distance of 1120 m (3677 ft.) from the 91.4-cm (36-in.) pipeline.

The potential overpressure from the deflagration of the vapor cloud at the closest point of approach (356 m [1169 ft.] from the site critical structures) is considered negligible (less than 1 psi).

Therefore, there are no adverse effects due to the unlikely rupture of the gas pipelines at their closest location to LNP.

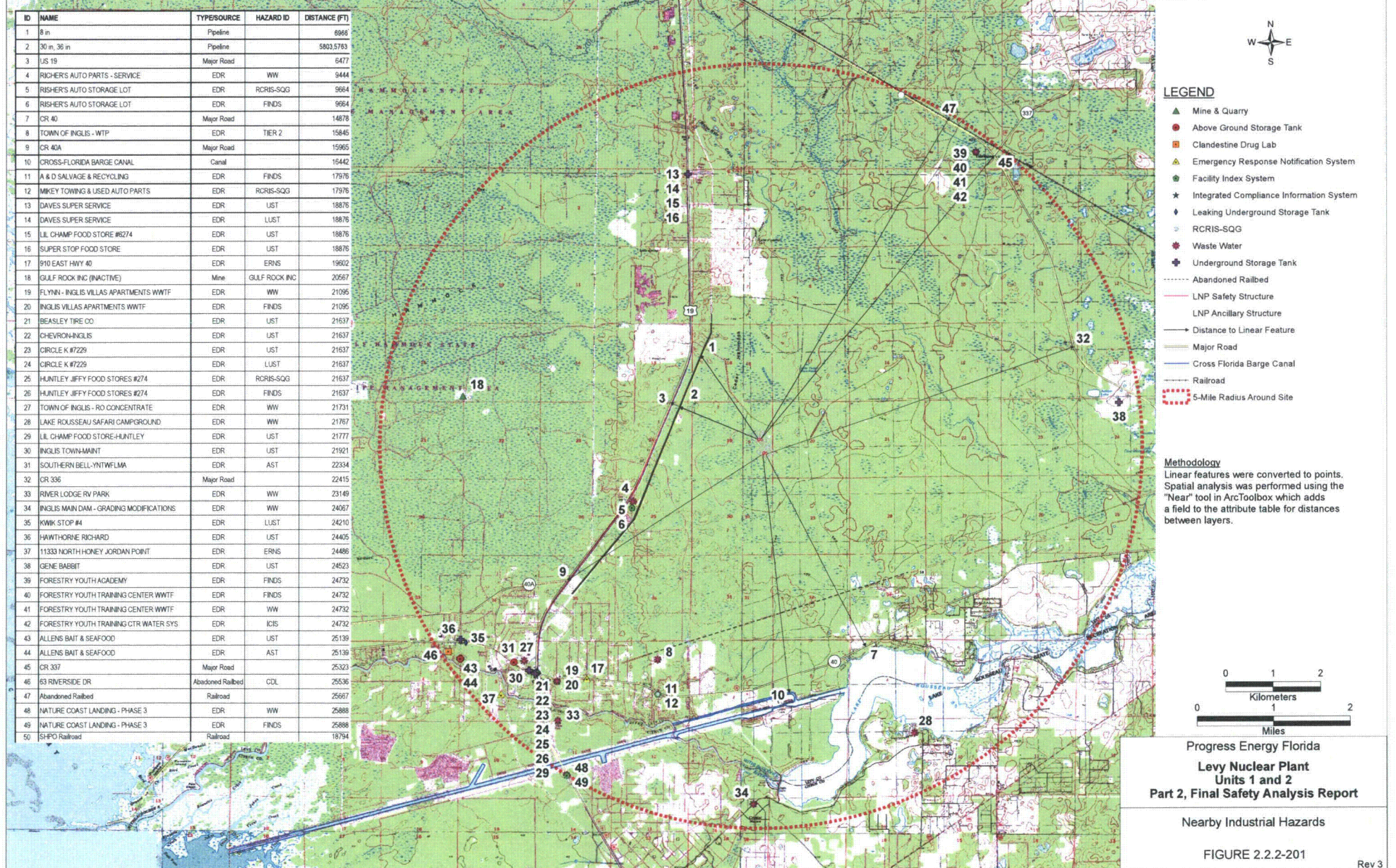
Attachments:

FSAR Figure 2.2.2-201, Revision 3, Nearby Industrial Hazards.

FSAR Figure 2.2.2-202, Revision 3, Distance to FGT Pipelines.





Attachments to NPD-NRC-2011-061
(3 pages, including this page)

LNP COL 2.2-1



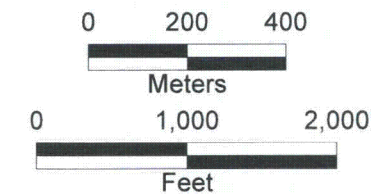


LEGEND

-  LNP Ancillary Structure
-  LNP Safety Structure
-  FGT Natural Gas Pipeline
-  Shortest Distance from Pipeline to Safety-Related Structure

Methodology

Safety related structures and pipeline data were converted to points. Spatial analysis was performed using the Point Nearest tool in ArcToolbox to identify the shortest distance.



Progress Energy Florida

Levy Nuclear Plant Units 1 and 2 Part 2, Final Safety Analysis Report

Distance to FGT Pipelines

FIGURE 2.2.2-202