



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION II  
SAM NUNN ATLANTA FEDERAL CENTER  
61 FORSYTH STREET, SW, SUITE 23T85  
ATLANTA, GEORGIA 30303-8931

November 7, 2007

Mr. Terry L. Harpster  
GM - Site Development & Design  
759 Salem Boulevard  
Berwick, PA 18603

SUBJECT: NRC VISIT TO BERWICK SITE TO OBSERVE COMBINED LICENSE PRE-APPLICATION SUBSURFACE INVESTIGATION ACTIVITIES (PROJECT NO. 762)

Dear Mr. Harpster:

On October 16, 2007, NRC Region II inspectors conducted a site visit at the Berwick site accompanied by members of the Office of New Reactors (NRO) staff. The purpose of the site visit was to observe combined license (COL) pre-application subsurface investigation activities being conducted to obtain geotechnical/seismic data to support a COL application for a new nuclear power plant. These observations will provide background information for the NRC's future review of the expected COL application for the Berwick site.

Enclosed 1 is a summary of the site visit, that includes a list of NRC participants and persons with whom discussions were held. Enclosure 2 is a copy of a slide presentation shown to the NRC by the Berwick staff.

Sincerely,

**/RA/**

Mark S. Lesser, Chief  
Construction Inspection Branch 1  
Division of Construction Inspection

Project No. 762

Enclosures: As stated

cc w/encls: (See next page)

cc w/encls:

Mr. Richard L. Baker  
Bechtel Power Corporation  
5275 Westview Drive  
Frederick, MD 21703-8306

Ms. Michele Boyd, Legislative Director  
Energy Program  
Public Citizens Critical Mass Energy  
and Environmental Program  
215 Pennsylvania Avenue, SE  
Washington, DC 20003

Ms. Kristen A. Burger  
Maryland People's Counsel  
6 St. Paul Centre, Suite 2102  
Baltimore, MD 21202-1631

Lois Chalmers  
Institute for Energy & Environmental  
Research (IEER)  
6935 Laurel Ave., Suite 201  
Takoma Park, MD 20912

Mr. Marvin Fertel  
Senior Vice President  
and Chief Nuclear Officer  
Nuclear Energy Institute  
1776 I Street, NW, Suite 400  
Washington, DC 20006-3708

Mr. Carey Fleming, Esquire  
Senior Counsel - Nuclear Generation  
Constellation Generation Group, LLC  
750 East Pratt Street, 17th Floor  
Baltimore, MD 21202

Ray Ganthner  
AREVA, Framatome ANP, Inc.  
3315 Old Forest Road  
P.O. Box 10935  
Lynchburg, VA 24506-0935

Mr. Brian Hastings  
Public Utility Commission  
William B. Travis Building  
P.O. Box 13326  
1701 Noth Congress Avenue  
Austin, TX 78701-3326

Mr. Roy Hickok  
NRC Technical Training Center  
5700 Brainerd Road  
Chattanooga, TN 37411-4017

Arjun Makhijani  
IEER  
6935 Laurel Ave., Suite 201  
Takoma Park, MD 20912

Mr. Norris McDonald  
AAEA  
9903 Caltor Lane  
Ft. Washington, MD 20744

Charles Peterson  
Pillsbury, Winthrop, Shaw & Pittman, LLP  
2300 "N" Street, NW  
Washington, DC 20037

Vanessa E. Quinn, Acting Director  
Technological Hazards Division  
National Preparedness Directorate  
Federal Emergency Management Agency  
500 C Street S. W.  
Washington, D. C. 20472

Regional Administrator  
Region I  
U. S. Nuclear Regulatory Commission  
475 Allendale Road  
King of Prussia, PA 19406

W. Craig Conklin, Director  
Chemical and Nuclear Preparedness &  
Protection Division (CNPPD)  
Office of Infrastructure Protection  
Department of Homeland Security  
Washington, D.C. 20528

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Department of Homeland Security  
Washington, D.C. 20528

Mr. Brian Hastings  
Public Utility Commission  
William B. Travis Building  
P.O. Box 13326  
1701 Noth Congress Avenue  
Austin, TX 78701-3326

Distribution w/encl:

L. Burkhart, NRO  
R. Karas, NRO  
M. Lesser, RII  
C. Julian, RII  
T. Nazario, RII  
C. Abbott, RII  
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SIGNATURE	CAJ	CAJ	CJ via email				
NAME	CJulian	TNazario	LBurkhart				
DATE	11/07/07	11/07/07	10/31/07				
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Scott Peterson - NEI  
Mike Moran- FPL  
Michael Mariotte - NIRS  
Patricia L. Campbell - GE  
Paul Gaukler - Pillsburylaw  
Paul Gunter - Beyond Nuclear  
Paul Hinnenkamp - Entergy  
Peter Hastings - Duke-Energy  
Russell Bell - NEI  
R.K. Temple - CPS Energy  
Roberta Swain - GE  
Mr. Rod Krich - Constellation  
Ronald Hagen - EIA DOE  
Sandra Sloan - AREVA  
Stephen P. Frantz - Morgan Lewis  
Tria Kibler - Scana  
T. L. Harpster - PPIWEB  
Tyson Smith - Winston  
Bill Victor - BV  
Rosemarie E. Waraks - Westinghouse

OBSERVATION OF COMBINED LICENSE (COL) PRE-APPLICATION  
SUBSURFACE INVESTIGATION ACTIVITIES AT BERWICK SITE  
PROJECT NUMBER 762

Purpose of Site visit:

A site visit was conducted on October 16, 2007 by Nuclear Regulatory Commission (NRC) Region II and Office of New Reactors (NRO) staff. NRC inspectors observed combined license (COL) pre-application subsurface investigation activities conducted to obtain geotechnical and seismic data at the proposed location of a new nuclear power plant at the Berwick Pennsylvania site. Although this visit was not an official NRC inspection the inspectors utilized the following documents for guidance:

- NRC Inspection Manual Chapter 2502, "Construction Inspection Program: Pre-Combined License (PRE-COL) Phase"
- NRC Inspection Procedure 35004, "Pre-Docketing Early Site Permit Quality Assurance Controls Inspection"
- NRC Inspection Procedure 45051, "Geotechnical/Foundation Activities Procedure Review"

The visit served to ascertain whether adequate quality assurance controls had been established and were being implemented, and to assess whether the technical requirements for geotechnical exploration for a COL had been adequately established through specifications, drawings, and work procedures.

Principal Persons Contacted:

F. Eisenhuth, Pennsylvania Power and Light (PPL)  
A. Fabiun, Rizzo  
A. Fernandez, Rizzo  
T. Harpster, PPL  
M. Hunter, UniStar  
J. Isakson, Arreva  
J. Ostrowsky, Rizzo  
M. Pelcher, Rizzo  
T. Roberts, UniStar  
J. Schubert, Rizzo  
J. Traynor, UniStar  
G. Wrobel, UniStar  
P. Wyruas, Rizzo  
E. Zullo, Rizzo

NRC Inspectors:

C. Julian, Team Leader, Senior Project Manager, RII  
T. Nazario, Construction Inspector, RII  
C. Abbott, Construction Inspector Trainee, RII

NRC Accompanying Personnel:

A. Blame, Branch Chief, RII  
Rebeccas Karas (NRO/DSER/RGS1) (Geo - BC)  
Weijun Wang (NRO/DSER/RGS1) (Geo)  
Nebiyu Tiruneh (NRO/DSER/RHEB) (Hydro)  
Sarah Gonzalez (NRO/DSER/RGS1) (Geo)

### Background:

By letter dated September 4, 2007, PPL informed the NRC of its proposed schedule for geophysical testing intended to support a COL application for the Berwick site. A COL is a combined construction permit and operating license with conditions for a nuclear power facility pursuant to 10 CFR Part 52 Subpart C. PPL contracted UniStar to perform the site studies and UniStar delegated responsibility to Paul Rizzo & Associates, Inc. (Rizzo) to perform the site characterization work under the Rizzo quality assurance (QA) program .

### Overview of Subsurface Investigation Activities Discussed and/or Observed:

During the site visit at Berwick, PA, the inspectors were provided a briefing by UniStar representatives who were in charge of the site work. The inspectors toured the site, and reviewed a site subsurface geotechnical engineering properties investigation plan. The geotechnical engineering properties investigation plan included the distribution and depth of the borings, type of tests to be conducted, and number of samples to be tested. The plan appeared to be comprehensive.

UniStar Nuclear Energy planned to use the subsurface investigations to provide data to determine site suitability for a COL. The scope of the site characterization activities included various field tests such as: soil borings (disturbed and undisturbed samples), cone penetrometer testing, geophysical testing (down-hole logging and suspension P-S velocity logging), observation well installation, test pit installation, and permeability tests. The depths of the boreholes were up to 400 feet.

### Drilling and Sampling Observed:

Observation of work in progress included obtaining core samples, downhole shear wave survey, and the generation of logging records. The inspectors verified that work was being performed in accordance with appropriate procedures. Seven drilling rigs were operating during the site visit. Each drilling operation was controlled by a Rizzo rig geologist and each rig worked to an individual work instruction. Interviews were conducted with rig geologists and technicians. Personnel were knowledgeable of applicable quality assurance and technical requirements. Specifically, the inspectors observed in-process work activities for boring B-315 and the inspectors observed the rig geologist take a disturbed sample at 12.5 feet to 12.8 feet. The inspectors observed in-process drilling and held discussions with the rig geologist regarding work instructions, applicable ASTM specifications and other quality assurance program requirements. The inspectors reviewed the soil sample inventory sheet to confirm that the boring samples were being properly stored and logged in a controlled manner.

The work observed was in accordance with applicable ASTM standards and procedure requirements. The rig geologist field boring logs were detailed and provided a good record of boring results. Samples were collected and stored in accordance with standard practices for preserving and transporting samples. The sample storage facility was located in a locked building. The inspectors observed that the sample storage facility was adequately environmentally controlled. The inspectors visited the sampling storage facility, and reviewed core samples and logging records. During the site visit, NRC inspectors noted that the sample log sheet did not accurately reflect the Shelby tube samples being stored in the warehouse. Specifically, samples B-327 between 0'-2' and 2'-3' were logged in as one sample when they should have been logged separately. In addition, some special core samples (samples B-326 between 40.4'-41.7' and 95.8'-97') were being logged in as Shelby tube samples, when they should have been logged in as special core samples. As a result of the NRC inspectors' observations, a nonconformance report was issued to address the logging of samples in accordance with quality assurance requirements. The inspectors reviewed the corrective actions taken, and found them to be acceptable.

### Hydrogeology/Groundwater Hydrology

The geologic/hydrogeologic site characterization work included drilling boreholes, core sampling, using borehole geophysics techniques, packer tests, slug tests, and pumping tests to determine aquifer characteristics. Currently 42 monitoring wells are planned to be completed to monitor the groundwater level. The data from the wells will be used to understand groundwater flow and radionuclide transport mechanisms at the proposed site.

The major formations include unconsolidated glacial tills which are primarily composed of sand and gravel with cobbles and boulders, a thin layer of weathered shale, and the Mahatango Formation which forms the bedrock. The groundwater table is generally shallow at the site with current estimates ranging from 0 to 20 feet below the ground surface. There is lateral flow in the gravel formation that provides baseflow to the wetlands although primarily groundwater flow occurs through the fractures.

### Surface Water Hydrology

The major surface water in the area is the Susquehanna River and the site is located along the northern branch of the river. There are small streams that drain into the Susquehanna River, and the most notable streams at the site are Walker Run and one other unnamed stream. The site has small wetlands which might have a role in the groundwater - surface water interaction. The USGS has stream gages at two locations on the river and there is a long stream gage record for both stations. There are previously recorded hurricanes - induced and local intense precipitation floods. The surface water features visited included the small streams, the proposed intake location and the Susquehanna River segment at the site. There are some flood control dams upstream of the site.

### Discussions

The NRO staff discussions with the applicant were focused on developing an understanding of the general hydrology and hydrogeology of the site; general data gathering efforts; and site and safety related hydrologic and hydrogeologic topics that included the following:

- Properly understanding the governing flooding mechanisms at the site and the significance of the wetlands in flood analysis and the interaction between surface water and groundwater.
- Sufficiency of length of records for the groundwater level monitoring program.
- The methods for properly identifying alternate pathways and transport mechanisms for radionuclides.
- The methods for the development of alternate conceptual models to understand the physical, hydrologic, hydrogeologic, and geochemical processes that could have safety related implications.
- Any developmental factors in the area which have the potential to alter the hydrology of the site.

### Quality Assurance

Field work was being performed under the Rizzo QA program which consisted of a QA manual supplemented by a QA project document. A Rizzo QA representative performed surveillances and a project manager monitored the project for compliance. There was also a full time onsite UniStar representative to provide continuous oversight. Periodic surveillances were performed by Pennsylvania Power and Light, LLC. The inspectors observed appropriate quality control

and technical site characterization procedures and verified that the following attributes were adequate:

- Approved and documented instructions, procedures, and drawings were in use for site characterization activities.
- Measures were implemented for test control and control of special processes and engineering direction was readily available.
- Measures existed to identify and resolve nonconformances and conditions adverse to quality.
- For site characterization activities performed by vendors, appropriate oversight and procurement controls were implemented.

Overall, the inspectors observed that work was being performed in accordance with NQA-1 Subpart 2.20, Quality Assurance Requirements for Subsurface Investigations for Nuclear Power Plants and project specifications. The QA program implementation was also evaluated by discussing nonconformance reports (NCRs) generated to date. The inspectors determined that a low threshold for issuing NCRs was evident, indicating a robust implementation of the QA Program. Geotechnical subsurface investigation activities were being adequately controlled with an appropriate level of supervisory and quality assurance oversight and in accordance with procedural requirements and industry standards.

#### Documents Reviewed

Field Investigation Work Plan for Geotechnical and Hydrogeological Data Collection and Analysis, Susquehanna Unit 3 Nuclear Power Plant, Project # 07-3891, October 11, 2007

Control of Nonconformances, Paul C. Rizzo Associates, Inc., QP-4, Revision 1, April 2007

Corrective Action, Preventative Action and Continual Improvement, Paul C. Rizzo Associates, Inc., QP-5, Revision 1, April 2007

Audit Report Project # 06-3624.11B, Geo-Vision, Inc. P-S Suspension Seismic Velocity Logging, April 23, 2007

Audit Report Project # 07-3891.05, Drilling, Sampling, and Well Installation, October 3, 2007

Nonconformance Report (NCR)-07-3891-22, Sample book had two discrepancies, October 16, 2007

NCR Log and NCRs 07-3891 - 1 through 21 untitled

Corrective/Preventive Action Report (CPAR) 025-07 - Diesel Fuel Spill

CPAR 026-07 - Started Work Before CGD

CPAR 027-07 - Rev. 1 of Field Inventory Work Plan Not Done Right

CPAR 037-07 - Not Recording All Info On Boring Logs