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October 21, 2010

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

BELL BEND NUCLEAR POWER PLANT
PARTIAL RESPONSE AND EXTENSION
REQUEST FOR RAI No. 36 FOR
FSAR CHAPTER 8
BNP-2010-254 Docket No. 52-039

References:
1) M. Canova (NRC) to R. Sgarro (PPL Bell Bend, LLC), Bell Bend COLA – Request for Information No. 36 (RAI No. 36) – EEB - 2745, email dated July 27, 2009 (ML092090441)

2) R. R. Sgarro (PPL Bell Bend, LLC) to U.S. Nuclear Regulatory Commission, BNP-2009-385, "Response to RAI No. 36," dated December 9, 2009 (ML093480071)

3) R. R. Sgarro (PPL Bell Bend, LLC) to U.S. Nuclear Regulatory Commission, BNP-2010-128, "Request for Extension for RAI No. 36," dated June 1, 2010 (ML101550509)

The purpose of this letter is to respond to the request for additional information (RAI) identified in the NRC correspondence to PPL Bell Bend, LLC (PPL) (Reference 1). This RAI addresses the Offsite Power System, as discussed in Section 8.2 of the Final Safety Analysis Report (FSAR), as submitted in Part 2 of the Bell Bend Nuclear Power Plant Combined License Application (COLA).

In References 2 and 3, PPL informed the NRC that the responses to Questions 08.02-4 and 08.02-8 would be provided at a later date and by November 1, 2010. The response to Question 08.02-8 is included in the enclosure. This response contains revised COLA content and the BBNPP COLA will be updated in a future revision to incorporate these changes. Question 08.02-4 requested information concerning responsibilities for switchyard maintenance, modifications and operations. Final agreements for ownership and control of switchyard equipment, testing and maintenance procedures require completion and review. PPL will provide the response to Question 08.02-4 by April 1, 2011.

The only new regulatory commitments contained in the letter are to update the BBNPP COLA in a future revision and provide the response to RAI No. 36, Question 08.02-4, by April 1, 2011.

Should you have questions or need additional information, please contact the undersigned at 570.802.8102.

D702
NRO

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

Executed on October 21, 2010

Respectfully,

Rocco R. Sgarro

RRS/kw

Enclosure: As stated

cc: (w/o Enclosures)

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Enclosure

Response to NRC Request for Additional Information No. 36
Question 08.02-8
Bell Bend Nuclear Power Plant

Question 08.02-8:

500 KV Gas Insulated Switchyard Inspection and Testing:

FSAR Section 8.2.2.5, Compliance with GDC 18, provided site-specific information for the station switchyard equipment inspection and testing plan. However, specific inspection and testing requirements for GIS switchyard components and equipment are not identified in this section. Provide operational experience data for GIS equipment and components that describe any specific periodic inspection and testing requirements. Confirm that a site-specific periodic testing and maintenance procedure for GIS will be provided (e.g., gas handling and leakage detection). In addition, address the site-specific initial testing program under Chapter 14.2.12.10.1 of U.S. EPR FSAR for GIS.

Response:

Based on GIS manufacturers, GIS equipment has been in operation in the U.S. for more than 40 years. Since 1968, there have been more than 10,000 bays installed in over 1,500 substations (over 140,000 bay-years of operation), with 700 bays at the 500kV voltage level (10,000 bay-years of operation).

GIS equipment is free from external influences such as airborne contaminants, etc. As a result, these external factors do not contribute to maintenance requirements for the GIS and the intervals between maintenance events tend to be longer for the GIS than for a comparable air insulated substation. Because of the good arc-quenching and insulating characteristics of SF_6 gas, the lifetime of contactors and other parts inside of the GIS is expected to be longer. Components having an operating mechanism inside the SF_6 are subject to inspection and testing based on the number of operations. Components having an operating mechanism outside the SF_6 are subject to periodic inspection and testing. Table 1 represents a compilation of typical periodic inspection and testing information received from several GIS manufacturers. Specific information may vary among GIS vendors.

Other parts within the gas chamber are virtually maintenance free. SF_6 gas density is to be checked periodically, weekly or biweekly.

The BBNPP site-specific initial and periodic testing and maintenance procedures for the GIS equipment will be provided by the GIS equipment supplier. Testing procedures will address the

a) functionality of the GIS system,
b) commissioning of the GIS System and associated GIS components per instruction of the GIS Supplier, and
c) periodic operations and maintenance of the GIS system and the associated components.

Additionally, testing procedures will address monitoring and control of the SF_6 (e.g., gas handling and leakage detection, etc.) and testing and inspecting operating components inside the SF_6 gas chamber. The site-specific initial and periodic testing and maintenance requirements for the GIS equipment are vendor-specific and are generally in accordance with the codes and standards included in the BBNPP FSAR Section 8.2.3.

The following BBNPP site-specific GIS initial testing program supplements the initial testing program included in U.S. EPR FSAR Section 14.2.12.10.1. The testing will performed to demonstrate:

a) functionality of GIS System

b) commissioning of GIS System and the associated GIS components per instructions of the BBNPP GIS Supplier

c) testing and handling of SF_6 (e.g., leakage detection, gas density, etc.) per instructions of BBNPP GIS Supplier

d) testing and inspecting operating components inside the SF_6 gas chamber per instructions of the BBNPP GIS Supplier.

Table 1
GIS Substations
Periodic Inspection and Testing Requirements
(Typical)
Page 1 of 4

Inspection / Testing Point	Frequency					
	Visual Inspection (Every Year)	Minor Examination (Every 4 to 6 Years)	Major Examination (Every 12 to 18 Years or After 3000 Circuit Breaker Operations)	Circuit Breaker Contacts and Operating Mechanism Examination (Every 5000 Operations)	Other	Number of Close-Open Operations Before Next Overhaul
SF_6 Pressure with Permanent Manometer (if applicable)	X					
Circuit Breaker Oil Level in Tank (hydraulically operated circuit breaker)	X					
Circuit Breaker hydraulic Circuits Tightness	X					
Number of Surge Arrester Discharges (if arrester is inside GIS) - Discharge Counter Reading	X					
Oil Level in Circuit Breaker damping Device (for circuit breaker with spring operating mechanism)	X					
Check of any Cubicle Heaters	X					
Check of Operation Counters	X					
SF_6 Pressure with Tool		X				
SF_6 Moisture Content (if gas compartment is not provided with adsorber)		X				
Percentage of SF_6 Gas in Compartment		X				
Operation of SF_6 Density Switch		X				
Location of SF_6 Leaks (if more than 1 alarm per year)		X				
Measurement of SO_2 Content (if gas compartment is not provided with adsorber)		X				
Check of Circuit Breaker Operating Time (main and auxiliary contacts)		X				

Table 1 Continued
GIS Substations
Periodic Inspection and Testing Requirements
(Typical)
Page 2 of 4

Inspection / Testing Point	Frequency					
	Visual Inspection (Every Year)	Minor Examination (Every 4 to 6 Years)	Major Examination (Every 12 to 18 Years or After 3000 Circuit Breaker Operations)	Circuit Breaker Contacts and Operating Mechanism Examination (Every 5000 Operations)	Other	Number of Close-Open Operations Before Next Overhaul
Hydraulic Mechanism Pre-Inflating Pressure Check		X				
Hydraulic Mechanism Pressure Switch Check		X				
Disconnect Switch Mechanical Functions (stroke, overtravel, auxiliary contacts, etc.)		X				
Grounding Switch Mechanical Functions (stroke, overtravel, auxiliary contacts, etc.)		X				
Optical Indicators		X				
Labeling of Operating Mechanisms and SF6 Filling Valves		X				
Wiring Connections		X				
Operating and Alarm Functions		X				
Securing of Circuit Breaker Poles and Mechanism		X				
Maintenance of SF_6 Gas Handling Device (gas inspection, filter replacement, tightness and operating conditions, inspection of hoses, etc.)		X				
SF_6 Moisture Content			X			
Circuit Breaker Hydraulic Mechanism:						
Replacement of Pressure Switch and Pilot Block			X			
Replacement of the Filter			X			
Replacement of the Oil			X			
Maintenance of the Rams and the Hydraulic Mechanism			X			
Recording Travel Curves (opening and closing)			X			
Disconnect Switch Lubrication (if applicable)			X			
Ground Switch Lubrication (if applicable)			X			
Ground Switch Insulation			X			

Table 1 Continued
GIS Substations
Periodic Inspection and Testing Requirements
(Typical)
Page 3 of 4

Inspection / Testing Point	Frequency					
	Visual Inspection (Every Year)	Minor Examination (Every 4 to 6 Years)	Major Examination (Every 12 to 18 Years or After 3000 Circuit Breaker Operations)	Circuit Breaker Contacts and Operating Mechanism Examination (Every 5000 Operations)	Other	Number of Close-Open Operations Before Next Overhaul
Surge Arrester Leakage Current Measurement (if surge arrester is inside GIS)			X			
Circuit Breaker Linkage Adjustment (if applicable)			X			
Cubicle Tightness			X			
Circuit Breaker:						
Opening of the Circuit Breaker Pole				X		
Spring Operating Mechanism Replacement of the Springs and Pins, depending on the type of mechanism)				X		
Maintenance of the Rams and the Hydraulic Mechanism				X		
Recording Travel Curves (opening and closing)				X		
Disconnect Switch Opening of the Pole				X		
High Speed Ground Switch Contact System Check (after second closing operation into energized parts)					X	
Circuit Breaker Contact System Check (if maximum allowable number of fault current operations has been reached)					X	
Circuit Breaker:						
Extinction Contacts						5000
Insulating Nozzles						5000
Adsorbers						5000

Table 1 Continued
GIS Substations
Periodic Inspection and Testing Requirements
(Typical)
Page 4 of 4

Inspection / Testing Point	Frequency					
	Visual Inspection (Every Year)	Minor Examination (Every 4 to 6 Years)	Major Examination (Every 12 to 18 Years or After 3000 Circuit Breaker Operations)	Circuit Breaker Contacts and Operating Mechanism Examination (Every 5000 Operations)	Other	Number of Close-Open Operations Before Next Overhaul
Disconnect Switch:						
Drive						5000
Main Contacts						5000
Maintenance Grounding Switch:						
Drive						5000
Main Contacts						2000
High Speed Grounding Switch:						
Drive						1000
Main Contacts						1000

Note: This table represents a compilation of typical maintenance information received from several GIS manufacturers. Specific information may vary among GIS vendors.

COLA Impact:

The BBNPP FSAR will be updated in a future COLA revision as shown below.

8.2.2.5 Compliance with GDC 18

Multiple levels of inspection and maintenance are performed on the BBNPP and Susquehanna 500 kV switchyards and associated switchyards and substation facilities. This inspection and maintenance is as follows.

- Walk-throughs and visual inspections of each substation facility including, but not limited to, reading and recording of equipment counters and meters, site temperature and conditions, and equipment condition.
- Protective relay system testing including: visual inspection, calibration, verification of current and potential inputs, functional trip testing, and correct operation of relay communication equipment.
- Oil sampling of large power transformers. Oil samples are evaluated through the use of gas chromatography and dielectric breakdown analysis.
- Several levels of inspection and maintenance for power circuit breakers. The frequency of each is a function of the number of operations and the length of time in service. External visual inspection of all functional systems, an external test, and an internal inspection. Frequency of the various maintenance/inspection efforts is based on a combination of operating history of the type of breaker, industry practice and manufacturer's recommended maintenance requirements.
- Thermography is used periodically to identify potential thermal heating issues on buses, conductors, connectors and switches.
- Check GIS SF_6 gas density weekly or bi-weekly per instruction of BBNPP GIS Supplier.
- Inspect and test operating components inside SF_6 gas chamber per instructions of BBNPP GIS Supplier.
- The testing will performed to check:
  - a) functionality of GIS System
  - b) commissioning of GIS System and the associated GIS components per instructions of the BBNPP GIS Supplier
  - c) periodic operations and maintenance of individual GIS components per instructions of BBNPP GIS Supplier.
- Testing and handling of SF_6 (e.g., leakage detection, gas density, etc.) per instructions of BBNPP GIS Supplier.
- Testing and inspecting operating components inside the SF_6 gas chamber per instructions of the BBNPP GIS Supplier.

- Maintenance of battery systems is performed on a periodic basis, including quarterly visual inspections, verification of battery voltage, and verification of electrolyte level.}

8.2.3 REFERENCES

IEC, 2003a. High voltage switchgear and controlgear - Part 203: Gas-insulated metal-enclosed switchgear for rated voltages above 52kV, IEC 62271-203, International Electrotechnical Commission, 2003.

IEC, 2003b. Instrument transformers - Part 1: Current transformers , IEC 60044-1, Edition 1.2 International Electrotechnical Commission, 2003.

IEC, 2004. Guidelines for the checking and treatment of sulfur hexafluoride (SF_6) taken from electrical equipment and specification for its re-use, IEC 60480, Second Edition, International Electrotechnical Commission, 2004.

IEC, 2005. Specification of technical grade sulfur hexafluoride (SF6) for use in electrical equipment - Edition 2, IEC 60376, International Electrotechnical Commission, 2005.

IEC, 2006. High-voltage test techniques, IEC 60060-1 (1998), 60060-2 (1994), 60060-3 (2006), International Electrotechnical Commission, 2006.

IEC, 2007. High-voltage switchgear and controlgear - Part 1: Common specifications, IEC 62271-1, International Electrotechnical Commission, 2007.

IEC, 2008a. High-voltage switchgear and controlgear - Part 100: High-voltage alternating-current circuit breakers, IEC 62271-100, International Electrotechnical Commission, 2008.

IEC, 2008b. High-voltage switchgear and controlgear - Part 303: Use and handling of sulphur hexafluoride (SF_6), IEC TR 62271-303, Edition 1.0, International Electrotechnical Commission, 2008.

IEEE, [R2005]. IEEE Guide for Moisture Measurement and Control in SF_6 Gas-Insulated Equipment, IEEE 1125, Institute of Electrical and Electronics Engineers, 1993.

IEEE, 1995. Guide for the Application, Installation, Operation, and Maintenance of High-Voltage Air Disconnecting and Load Interrupter Switches, IEEE C37.35, Institute of Electrical and Electronics Engineers, 1995.

IEEE, 1996a. IEEE Recommended Practice for Determining the Electric Power Station Ground Potential Rise and Induced Voltage from a Power Fault, IEEE 367, Institute of Electrical and Electronics Engineers, 1996.

IEEE, 1996b. IEEE Guide for Direct Lightning Stroke Shielding of Substations, IEEE 998, Institute of Electrical and Electronics Engineers, 1996.

IEEE, 1996c. Guide to Specifications for Gas-Insulated, Electric Power Substation Equipment, IEEE C37.123, Institute of Electrical and Electronics Engineers, 1996.

IEEE, 1997. IEEE Standard Definitions and Requirements for High Voltage Air Switches, IEEE C37.30, Institute of Electrical and Electronics Engineers, 1997.

IEEE, 1999. IEEE Applications Guide for AC High Voltage Circuit Breakers on a Symmetrical Current Basis, IEEE C37.010, Institute of Electrical and Electronics Engineers, 1999.

IEEE, 2000a. IEEE Standard for AC High-Voltage Circuit Breakers on a Symmetrical Current Basis-Preferred Ratings and Related Required Capabilities, IEEE std C37.06-2000, Institute of Electrical and Electronics Engineers, 2000.

IEEE, 2000b. Performance Characteristics and Dimensions for Outdoor Apparatus Bushings, IEEE C57.19.01, Institute of Electrical and Electronics Engineers, 2000.

IEEE, 2000c. IEEE Guide for Safety in AC Substation Grounding, IEEE 80, Institute of Electrical and Electronics Engineers, 2000.

IEEE, ~~2002~~ [R2002]. IEEE Standard for Gas Insulated Substations, IEEE C37.122, Institute of Electrical and Electronics Engineers, 2002.

IEEE, 2005a. IEEE Standard for Metal Oxide Surge Arresters for AC Power Circuits (>1 kV), IEEE C62.11, Institute of Electrical and Electronics Engineers, 2005.

IEEE, 2005b. IEEE Recommended Practice for Seismic Design of Substations, IEEE 693, Institute of Electrical and Electronics Engineers, 2005.

IEEE, ~~2006~~ [R2006]. IEEE Standard Rating Structure for AC High Voltage Circuit Breakers Rated on a Symmetrical Current Basis, IEEE C37.04, Institute of Electrical and Electronics Engineers, 2006.

IEEE, ~~2007~~ [R2007]. IEEE Standard Rating Structure for AC High Voltage Circuit Breakers Rated on a Symmetrical Current Basis, IEEE C37.09, Institute of Electrical and Electronics Engineers, 2007.

IEEE, 2007. Standard of Common Requirements for High Voltage Power Switchgear Rated Above 1000 V, IEEE C37.100.1, Institute of Electrical and Electronics Engineers, 2007.

IEEE, ~~2008~~ [R2008]. IEEE Guide for Evaluating the Effect of Solar Radiation on Outdoor Metal Enclosed Switchgear, IEEE C37.24, Institute of Electrical and Electronics Engineers, 2008.

IEEE, 2008. Requirements for Instrument Transformers, IEEE C57.13, Institute of Electrical and Electronics Engineers, 2008.

IEEE, 2009. Standard test Procedure and requirements for High Voltage Alternating Current Cable Terminations, IEEE 48, Institute of Electrical and Electronics Engineers, 2009.

NEMA SG 11-2008. Guide For Handling And Maintenance Of Alternating Current Outdoor High-Voltage Circuit Breakers, NEMA SG 11-2008, National Electrical Manufacturers Association, 2009.

NRC, 1988. Station Blackout, Regulatory Guide 1.155, U.S. Nuclear Regulatory Commission, August 1988.

14.2.14.11 Switchyard and Preferred Power System

The following is provided as a supplement to the U.S. EPR FSAR:

14.2.12.10.1 Switchyard and Preferred Power System (Test #108)

1.0 OBJECTIVE

1.1 To verify the switchyard and preferred power system is capable of supplying power as designed to the unit through the preferred power circuits.

1.2 To verify the power generated by the turbine generator can be fed to grid through the switchyard.

1.3 To verify the Gas Insulated Switchyard (GIS) components function per instructions of the BBNPP GIS supplier.

2.0 PREREQUISITES

2.1 Construction activities on the switchyard and preferred power system have been completed.

2.2 Offsite power system instrumentation has been calibrated and is operating satisfactorily prior to performing the following test.

2.3 Support systems are completed and functional for operation of the switchyard and preferred power system, including testing and inspecting operating components inside the SF_6 gas chambers per instructions of the BBNPP GIS supplier.

2.4 Test instrumentation is available and calibrated.

3.0 TEST METHOD

3.1 Verify operation of the switchyard protective relaying system.

3.2 Verify operation of switchyard power circuit breakers and motor-operated disconnects from the following, as applicable:

3.2.1 PICS controls.

3.2.2 Switchyard relay house.

3.3.3 Switchyard local control cabinet.

3.3 Verify operation of the switchyard 125 Vdc auxiliary supply system and its associated controls, alarms, and dual battery supplies.

3.4 Verify the operation of the switchyard 480 Vac auxiliary power system and its associated controls, alarms, and annunciators.

3.5 Verify the GIS components containing SF_6 gas maintain proper gas density and leakage requirements as per instructions of the BBNPP GIS supplier.

4.0 DATA REQUIRED

4.1 Setpoints at which alarms and interlocks occur.
4.2 Setpoints of protective relays.
4.3 SF6 gas densities and SF6 leakage values.

5.0 ACCEPTANCE CRITERIA

5.1 The switchyard and preferred power system operates as designed (refer to U.S. EPR FSAR Section 8.2).
5.2 The GIS operates within the specifications of the GIS supplier.