Nuclear Operating Company

South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

August 26, 2009
U7-C-STP-NRC-090121

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

South Texas Project
Units 3 and 4
Docket Nos. 52-012 and 52-013
Response to Requests for Additional Information

Attached are responses to NRC staff questions included in Request for Additional Information (RAI) letter number 166 related to Combined License Application (COLA) Part 2, Tier 2, Sections 12.3 and 12.4. This submittal completes the response to RAI letter 166 and submits a partial response to RAI letter 180. Attachments 1, 2, and 3 contain responses to the RAI questions listed below:

12.03-12.04-3 12.03-12.04-4 12.03-12.04-5

When a change to the COLA is indicated, the change will be incorporated into the next routine revision of the COLA following NRC acceptance of the RAI response.

There are no commitments in this letter.

If you have any questions regarding these responses, please contact me at (361) 972-7136 or Bill Mookhoek at (361) 972-7274.

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

Executed on 8/26/09

Scott Head
Manager, Regulatory Affairs
South Texas Project Units 3 & 4

scs
Attachments:

1. Question 12.03-12.04-3
2. Question 12.03-12.04-4
3. Question 12.03-12.04-5

D091
NRO

STI 32525741

cc: w/o attachment except*
(paper copy)

Director, Office of New Reactors
U. S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

Regional Administrator, Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, Texas 76011-8064

Kathy C. Perkins, RN, MBA
Assistant Commissioner
Division for Regulatory Services
Texas Department of State Health Services
P. O. Box 149347
Austin, Texas 78714-9347

Alice Hamilton Rogers, P.E.
Inspection Unit Manager
Texas Department of State Health Services
P. O. Box 149347
Austin, Texas 78714-9347

C. M. Canady
City of Austin
Electric Utility Department
721 Barton Springs Road
Austin, TX 78704

*Steven P. Frantz, Esquire
A. H. Gutterman, Esquire
Morgan, Lewis & Bockius LLP
1111 Pennsylvania Ave. NW
Washington D.C. 20004

*George F. Wunder
* Michael Eudy
Two White Flint North
11545 Rockville Pike
Rockville, MD 20852

(electronic copy)

*George Wunder
*Michael Eudy
Loren R. Plisco
U. S. Nuclear Regulatory Commission

Steve Winn
Eddy Daniels
Joseph Kiwak
Nuclear Innovation North America

Jon C. Wood, Esquire
Cox Smith Matthews

J. J. Nesrsta
R. K. Temple
Kevin Pollo
L. D. Blaylock
CPS Energy

RAI 12.03-12.04-3:

QUESTION:

Background

STP 3 & 4 utilizes the certified Advanced Boiling Water Reactor (ABWR) per 10 CFR 50 Appendix A. In accordance with 10 CFR 20.1406(a), the COL applicant is responsible for documenting in the application how facility design and procedures for operation will minimize, to the extent practicable, contamination of the facility and the environment, facilitate eventual decommissioning, and minimize, to the extent practicable, the generation of radioactive waste.

The staff developed Regulatory Guide 4.21 in order to provide guidance to the industry on how to meet the requirements of 10 CFR 20.1406 with respect to minimizing, to the extent practicable, contamination of the facility and the environment, facilitating eventual decommissioning, and minimizing, to the extent practicable, the generation of radioactive waste.

Appendix A of RG 4.21 contains examples of measures that might be taken to address the requirements of 10 CFR 20.1406.

The following 9 design and operational objectives summarize the objectives contained in the Regulatory Position section of RG 4.21.

1) Minimize leaks and spills and provide containment in areas where such events may occur,
2) Provide for adequate leak detection capability to provide prompt detection of leakage for any structure, system, or component which has the potential for leakage,
3) Use leak detection methods (e.g., instrumentation, automated samplers) capable of early detection of leaks in areas where it is difficult or impossible to conduct regular inspections (such as for spent fuel pools, tanks that are in contact with the ground, and buried, embedded, or subterranean piping) to avoid release of contamination from undetected leaks and to minimize contamination of the environment,
4) Reduce the need to decontaminate equipment and structures by decreasing the probability of any release, reducing any amounts released, and decreasing the spread of the contaminant from the source,
5) Periodically review operational practices to ensure that, operating procedures are revised to reflect the installation of new or modified equipment, personnel qualification and training are kept current, and facility personnel are following the operating procedures,
6) Facilitate decommissioning by a) maintenance of records relating to facility design and construction, facility design changes, site conditions before and after construction, onsite waste disposal and contamination and results of radiological surveys, b) minimizing embedded and buried piping, and c) designing the facility to facilitate the removal of any equipment and/or components that may require removal and/or replacement during facility operation or decommissioning,
7) Minimize the generation and volume of radioactive waste both during operation and during decommissioning (by minimizing the volume of components and structures that become contaminated during plant operation),

8) Develop a conceptual site model (based on site characterization and facility design and construction) which will aid in the understanding of the interface with environmental systems and the features that will control the movement of contamination in the environment,
9) Evaluate the final site configuration after construction to assist in preventing the migration of radio-nuclides offsite via unmonitored pathways.

The above list contains a mixture of design and operational objectives. Since Chapter 12 deals with radiation protection related issues, these objectives are partially addressed in various Sections of Chapter 12 of the FSAR. The subject matter of others (e.g., item number 8 on the conceptual site model) dictates that they be addressed in detail in other sections of the COL (e.g. Chapter 2 of the FSAR).

Questions

1. Using the guidance provided in Regulatory Guide 4.21, "Minimization of Contamination and Radioactive Waste Generation: Life Cycle Planning" (June 2008), describe the specific design features, operational programs, and facility operating procedures provided to meet the requirements of 10 CFR 20.1406(a).

2. Revise the STP 3 & 4 FSAR to include a description of the specific design features, operational programs, and operating procedures in the appropriate section of the COL where the system is described and include a reference to these sections in Chapter 12.3 of the FSAR. For example, an acceptable description of a groundwater monitoring program should include implementation considerations and a description of the key components of the program such as types and periodicity of routine samples to be taken, threshold activities to be detected, actions to be taken upon detection of leakage into the groundwater, and a description of quality assurance practices to be used to ensure a reasonable assurance of prompt identification of leakage into the groundwater.

3. The information presented in Chapter 12 of FSAR Tier 2, Rev. 2 identifies several STP 3 & 4 general design features that would minimize the contamination of the facility and the environment and would minimize the generation of radioactive waste. However, this information does not address design features that are unique to system designs or their locations in the plant warranting more technical details, and does not identify issues that should be addressed in establishing operating programs, processes, and procedures. For each of the systems listed below (and for any other plant systems which may generate radioactive waste or could result in the contamination of nonradioactive systems):

   - Fuel Storage and Handling, including fuel transfer tube
   - Nuclear Steam Supply
   - Turbine Main Steam Supply
   - Process Sampling System
   - Other Features of the Steam and Power Conversion System
   - Coolant Storage and Transfer System
   - Radioactive Waste Management Systems
   - Equipment, Floor, Chemical, and Detergent Drain Systems

- Building heating, ventilating and air conditioning systems used to process radioactive process and effluent streams

(a) Describe specific design features which are incorporated into the STP 3 & 4 design to comply with the requirements of 10 CFR 20.1406.

(b) List the specific design features in the appropriate section of the COL where the system is described and include a reference to these sections in Chapter 12.3 of the FSAR that:

1) Describe any design features to detect leakage (large acute or small, long term) from the piping in the radwaste trenches.

2) Describe the criteria which govern the frequency of performing periodic visual inspections of the piping in the radwaste pipe trenches to check for leaks and of the floor/wall expansion joints in the radwaste pipe trenches to ensure that no spills or leaks on the floors enter unmonitored areas beneath the floors and foundations.

3) Verify that there are no piping runs containing contaminated fluids that will be buried in the ground and not routed through one of the radwaste trenches.

RESPONSE:

In response to questions (1) and (2) of this RAI, it is noted that 10 CFR 20.1406 was issued several months after the ABWR design certification rule in 1997. By the explicit terms of 10 CFR 20.1406(b), that regulation is not applicable to design certification applications such as the ABWR DCD issued before 20.1406 became effective. Therefore, the ABWR DCD does not address, and does not need to address, 10 CFR 20.1406.

Because the ABWR DCD has finality, the RAI is not appropriate to the extent that it requests information related to the design of structures, systems, and components that are within the scope of the DCD. Departures from the DCD for which 20.1406 is applicable are discussed below.

Question (3) of this RAI requests that STPNOC review the list of systems provided, and for each of those systems to describe specific design features which are incorporated into the STP 3 & 4 design to comply with the requirements of 10 CFR 20.1406, and to list the features. The STP 3&4 FSAR includes three specific departures to radioactive waste systems that are subject to 10 CFR 20.1406. The departures are STD DEP 11.2-1, liquid waste management system (LWMS), STD DEP 11.4-1, solid waste management system (SWMS), and STD DEP 11.3-1, gaseous waste management system (GWMS). A description of how the LWMS meets the requirements of 20.1406 is provided in FSAR Section 11.2.1.2.4. These features are also applicable to the SWMS, as noted in FSAR Section 11.4.1.2. The response to RAI 11.03-4 provides the information and proposed COLA revisions that provide the description of how the GWMS meets the requirements of 20.1406. The FSAR (and proposed changes per the response to RAI 11.03-4) describes those features that provide compliance with 20.1406, and describe design features which minimize contamination to facilitate decommissioning, and which minimize radioactive waste generation. The LWMS, SWMS, and GWMS are designed in

accordance with RG 1.143.

STP 3&4 will adopt appropriate STP site programs and procedures related to minimization of generation of radioactive waste and minimization of contamination to facilitate decommissioning to meet the intent of the programmatic requirements of 10 CFR 20.1406. NEI 08-08 provides guidance on the base operational program to supplement standard designs, including the ABWR. NEI 08-08, "Generic FSAR Template Guidance for Life-Cycle Minimization of Contamination," will be used for STP 3&4 to the extent practicable, and procedures will be developed consistent with the plan for procedures development as delineated in FSAR Section 13.5. Note that some operating programs and procedures are in use for the existing units. For example, the groundwater monitoring program for STP Units 1&2 incorporates and is in compliance with NEI 07-07, "Industry Groundwater Protection Initiative – Final Guidance Document" (August 2007). The STP groundwater monitoring program is a site program, and the appropriate implementing procedures will be modified as required to add STP Units 3&4 sample locations and hydrological model into the existing program. The modified procedure(s) will be implemented as appropriate prior to receipt of nuclear fuel at STP 3, consistent with the guidance of NEI 08-08.

For STP 3&4 all piping will be located in pipe tunnels or accessible surface trenches. FSAR Subection 11.2.1.2.4 will be revised to clarify that there is no piping buried in soils.

The following changes will be incorporated in a future COLA revision. Changes to COLA R2 are highlighted in gray shading.

11.2.1.2.4 Minimization of Contamination and Radwaste Generation

The LWMS radwaste system, including mobile units as applicable, is designed to minimize contamination of the facility and environment, facilitate decommissioning, and minimize the generation of radioactive waste, in compliance with 10 CFR 20.1406. The following radwaste system design features meet 10 CFR 20.1406 requirements:

- Pressure testing of temporary and flexible lines, system piping embedded in concrete, and effluent discharge lines ~~or piping buried in soils~~ are performed in accordance with RG 1.143 guidance.

- Corrosion resistant properties of all system piping and valves associated with transfer lines to storage tanks and discharge piping in ~~soils and~~ concrete are included. The LWMS also includes features designed for early detection of leaks and spills (e.g., leak detection sumps and wells).

RAI 12.03-12.04-4

QUESTION:

10 CFR 20.1501(b) requires licensees to ensure that the instruments and equipment used for quantitative radiation measurements are calibrated periodically for the radiation measured. RG 1.206, Part C.I.12.3.4, Area Radiation and Airborne Radioactivity Monitoring Instrumentation, states that the applicant should provide information regarding the calibration methods and frequency for the monitoring instrumentation.

ABWR DCD Section 12.3.7.2, Operational Considerations, contains a COL information item for the COL applicant to address Area Radiation and Airborne Radioactivity Monitoring Instrumentation operational considerations including monitor alarm setpoint(s) and information on calibration of fixed area and airborne radioactivity monitors. STP FSAR Tier 2, Section 12.3.7.2, Operational Considerations, states that alarm setpoints will be established based on design background radiation levels and confirmed during the Startup Test Program and that calibration and operability will be completed during the Preoperational Test Program. Section 12.3.7.2 also states that airborne radiation monitoring operational considerations, such as procedures for operation and calibration of monitors and placement of portable monitors, will be established in accordance with the Operational Radiation Protection Program described in Section 12.5S. Section 12.5S references NEI 07-03, Generic FSAR Template Guidance for Radiation Protection Program Description as the basis for the Operational radiation Protection Program for STP 3 & 4. However, NEI 07-03 does not provide any information on the calibration of fixed area and airborne monitors—only calibration of portable monitors.

In accordance with RG 1.206, provide information on the calibration methods and frequency that will be used for the STP 3 & 4 fixed area and airborne monitors. Discuss to what extent the calibration guidance described in ANSI/ANS 6.8.1, Location and Design Criteria for Area Radiation Monitoring Systems for Light Water Nuclear Reactors will be incorporated. If not, describe the specific alternative approaches used.

RESPONSE:

STP 3&4 COLA, Rev. 2, Subsection 12.3.4, Area Radiation and Airborne Radioactivity Monitoring Instrumentation provides a discussion of the ARM System, including alarms, detector location, and sensitivity. Subsection 14.2.12.1.24 discusses the Area Radiation Monitoring System Preoperational Test. This discussion is in accordance with the certified ABWR DCD and includes establishment of high radiation alarm setpoints, calibration, general test methods, and acceptance criteria. Calibration procedures for preoperational testing and calibration during operation will be in accordance with vendor instructions and follow the guidance in ANSI/ANS 6.8.1.

COLA Subsection 12.5S discusses the STP 3&4 operational radiation protection program, based on NEI 07-03, to ensure ALARA considerations are maintained. The discussion in COLA Subsection 12.3.7.2 addresses both the Area Radiation Monitoring System and the plant operational radiation protection program. Subsection 12.3.7.2 will be clarified as follows in a future revision to the COLA.

12.3.7 COLA License Information

12.3.7.2 Operational Considerations

The following site specific supplement addresses COL License Information Item 12.7.

Alarm setpoints are established based on design background radiation levels, which are then, confirmed during the Startup Test Program. The Preoperational Test Program will check for proper calibration of the detectors, and then check the proper functioning of alarms (local and remote, audible and visual) and protective features including alarm setpoints. The Preoperational Test Program will also check for proper response to various loss of power conditions.

~~Airborne~~ In addition to the Area Radiation Monitoring System, radiation monitoring operational considerations, such as procedures for placement, operation and calibration of ~~monitors and placement of~~ portable monitors, are established in accordance with the Operational Radiation Protection Program described in Section 12.5S.

RAI 12.03-12.04-5

QUESTION:

Section 12.3.1.4.4 of the COL FSAR states that a lead-loaded silicone foam or equivalent is employed whenever possible for penetrations through steam tunnel walls to reduce the available streaming area presented. However, no information, or reference to a material specification located elsewhere in the FSAR, is provided concerning the properties and radiation shielding characteristics of the materials for sealing the penetrations. In accordance with NUREG-0800 and RG-1.206, C.I.12.3.2, please provide the required radiation shielding properties of the material to be used, or a reference to the applicable section of the FSAR in which the information is located.

RESPONSE:

ABWR DCD Tier 2 Subsection 12.3.1.2, Plant Design for Maintaining Exposure (ALARA) was incorporated by reference in the STP 3&4 COLA, Rev. 2. DCD Tier 2 Subsection 12.3.1.2

(1) Penetrations states, in part:

> Where permitted, the annular region between pipe and penetration sleeves, as well as electrical penetrations, are filled with shielding material to reduce the streaming area presented by these penetrations. The shielding materials used in these applications include a lead-loaded silicone foam, with a density comparable to concrete, and a boron-loaded refractory-type material for applications requiring neutron as well as gamma shielding. There are certain penetrations where these two approaches are not feasible or are not sufficiently effective. In those cases, a shielded enclosure around the penetration as it exits in the shield wall, with a 90 degree bend of the process pipe as it exits the penetration, is employed.

No COLA revision is required as a result of this RAI response.