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

October 27, 2010
U7-C-STP-NRC-100189

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 Request for Additional Information

Attached is the STP Nuclear Operating Company (STPNOC) response to the NRC staff question in Request for Additional Information (RAI) letter number 408, related to Combined License Application (COLA) Part 2, Tier 2, Section 12.02. The attachment completes the response to letter 408.

The indicated changes to the COLA will be incorporated in the next routine revision submitted following NRC acceptance of the response.

There are no commitments in this letter.

If you have any questions regarding this response, 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 10/27/10

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

scs

Attachment:
Question 12.02-21 Response

D091
NRO

STI 32719977

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

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RAI 12.02-21

QUESTION:

In response to RAI 12.02-18 (Letter U7-C-STP-NRC-100111, ADAMS Document Number ML101390226), STP provided additional information concerning the Condensate Storage Tanks (CST). In this response, STP also contends that this additional information on the CST will not be described further in the STP 3 &4 COLA FSAR since the description of the CST is incorporated by reference from ABWR DCD Section 9.2.9. This response is similar to previous RAI responses, in which STP provided the requested information but did not include the information in the FSAR. However, it is the staff's opinion that STP has not provided adequate information in the COL FSAR to satisfy the following:

1. COL License Information Item 12.3 (Section 12.1.4.3 of the ABWR DCD) states that, "COL applicants will provide, to the level of detail provided in Regulatory Guide 1.70, the criteria and/or conditions under which various operating procedures and techniques shall be provided to ensure that occupational radiation exposures ALARA are implemented." Section 12.1.3 of Regulatory Guide 1.70 states "In the FSAR, provide the criteria and/or conditions under which various operating procedures and techniques for ensuring that occupational radiation exposures are ALARA are implemented for all systems that contain, collect, store, or transport radioactive liquids, gases, and solids". Since NRC staff cannot identify any operating procedures or techniques associated with the CST, for ensuring that occupational radiation exposures are ALARA, described in the STP 3&4 FSAR, the staff does not believe that COL License Information Item 12.3 has been adequately addressed in the STP 3&4 FSAR. In addition, Regulatory Guide 1.70 also states that sources of radiation should be described, and that the description should tabulate sources by isotopic composition or gamma ray energy groups, source strength, and geometry, as well as provide the basis for the values. Therefore, in accordance with Regulatory Guide 1.70, the COL applicant should include information on CST source composition, geometry, strength, and any controls for access, in the FSAR. Most of this information was previously provided (but not incorporated into the FSAR) in prior RAI responses.

2. Regulatory Guide 1.206, Section C.I.12.2.1, which is based on Regulatory Guide 1.70, states that COL applicants should describe any additional radiation sources that were not previously identified in the DCD. However, STP has not identified the CST as a radiation source in the FSAR. Please update the STP 3&4 FSAR Tables 12.2-5a, 12.2-5b, and 12.2-5c to include information identifying the CST as a radiation source, in accordance with Regulatory Guide 1.206.

RESPONSE:

A response to each question is provided below.

1. Section 12.2 of the DCD does not contain any information on the CST. In order to incorporate the CST source term information, supplementary information is added to the COLA. Since the CST is located outside and is primarily designed to provide makeup water to the condensate system, the supplementary information is added to DCD Section 12.2.1.3 Turbine Building Sources.

   The CST is not located inside a building, but is completely enclosed in a reinforced cement area so that no activity can be released to grade level areas outside the enclosure. The activity in the tank is expected to be low enough so that radiological controls will not be necessary. However, the enclosure is constructed so that radiological controls can be implemented if necessary. Routine monitoring of the tank is described in COLA FSAR Section 11.5. Because of the special design features, there are no additional radiation protection control requirements for this tank.

2. Changes to Table 12.2-5a, 12.2-5b and 12.2-5c to add the CST are provided in the COLA markup below. Note that there is no shielding recommended for the CST. A dike surrounds the CST to ensure the CST contents are contained in the event of a CST failure, however no credit was taken for the shielding that this enclosure could provide. A new Table 12.2-33 is added to document the design CST activity. Note that the activity in this table is different from the activity presented in the response to RAI 11.02-7. The activity in Table 12.2-33 includes the consideration of the recycle rate back to the CST and therefore incorporates the effects of decay. The activities in this table are less than those included with RAI 11.02-7.

The following pages contain updates to the COLA to incorporate the information described above.

12.2.1.3 Turbine Building Sources

The following site specific supplement provides information concerning the design of the Condensate Storage Tank (CST).

The CST has a capacity of 2110 m^3 and is located outside in the yard at STP 3&4. Specifically, it is located adjacent to and just north of the Radwaste Building and to the west of the Turbine Building (see Figure 1.2-37 – Plot Plan). It is a right cylinder with a radius of approximately seven meters and a height of approximately 14 meters. It is located inside an enclosed open top reinforced concrete structure of approximately 19 meters square and 11 meters in height designed to contain the entire contents of the CST. The structure encompasses the CST as depicted on Figure 1.2-37. Outside wall thickness of the concrete structure is approximately 0.3 meters on all four sides. The structure is equipped with a metal cover to preclude rainwater entry, and with a controlled access door.

Normal operational CST contamination levels are expected to yield a contact dose rate of approximately 0.1 mrem/hr, however, the CST will be surveyed by Health Physics personnel periodically and after abnormal operational occurrences (AOO) in accordance with plant procedures to ensure occupational dose remains ALARA. Should an AOO occur which required controlling access to the CST such access would be controlled in accordance with plant Radiation Protection procedures, as described in Section 12.5.

In order to maintain the quality of the CST water, the inputs to the CST are limited. The CST's primary makeup water is purified water from the Makeup Water Purified (MUWP) System. In addition to makeup water from the MUWP System, which contains no radioactive contamination, there are three inputs to the CST that are potentially contaminated. Recycled water from the CRD System is routed back to the CST. The design of the CRD System ensures that the recycle water is not contaminated by other water systems so that the recycled water is the same quality as the CST water. Condensate reject is sent back to the CST to compensate for the clean gland seal steam injection and the thermal expansion of the feed and condensate systems during plant start-up. The point at which condensate is transferred to the CST is located downstream of the condensate filters and demineralizers so that the water that is rejected to the CST has the same quality as the condensate demineralizer effluent. In order to minimize liquid releases from the plant, treated water from the LWMS may also be recycled to the CST.

To establish a design source term, the weighted average of the activity concentrations for each isotope for the condensate reject and the LWMS recycle were cycled through the CST to calculate an equilibrium activity. The condensate reject activity concentration was estimated by taking the reactor water source terms in DCD Section 11.1, except for noble gas and N-16, and adjusting them by the main steam carryover fractions and the condensate filter removal factor of 99% for insoluble nuclides and condensate demineralizer removal parameters from DCD Table 11.1-7. The LWMS recycle activity in the CST is estimated by transferring the activity in the Low Conductivity Waste (LCW) Sample Tanks in COLA Table 12.2-13d to the CST at a rate of 55 m^3/day, which is the normal LCW System influent rate from COLA Table 11.2-2. The transfer was continued for a period of time long enough to ensure that equilibrium concentrations were reached in the 2110 m^3 CST. Tritium activity was assumed to be 3.7E-04 MBq/g in accordance with DCD Section 11.1.2.3. This is conservative because it does not account for the dilution due to the makeup from the MUWP System. The resulting activity concentrations were then multiplied by the volume of the CST, 2110 m^3, to obtain the total activity in the CST. The design source term activity by isotope is shown in Table 12.2-33. The dose rate at 30 cm from the CST containing this activity is less than 0.001 mSv/hr, and is small enough that no radiation shielding is required.

The CST is provided with design features to prevent environmental releases and the spread of contamination. As stated above, the CST is surrounded by a reinforced concrete enclosure that is sufficient to hold the entire contents of the CST. The drain from the enclosure is routed to the LWMS for processing, if required. The CST is provided with high level alarms in the control room and the Radwaste Building in order to prevent overflow. Any overflow that does occur is routed to the LWMS. The MUWC System contains lines that are used to transfer condensate quality water between the CST and systems in the Radwaste Building, Turbine Building and Reactor Building. All of the piping is routed in trenches or tunnels (not buried pipe). These trenches and tunnels provide the capability to identify and collect any leakage from the lines handling CST water and to transfer this water to the LWMS for processing.

Table 12.2-5a Radiation Sources – Radiation Sources

Source Table	For	Drawing		Approximate Geometry
12.2-33	Condensate Storage Tank			Rt cylndr (r=7m, l=14m)

Table 12.2-5b Radiation Sources – Source Geometry

Component	Assumed Shielding Source Geometry
Condensate Storage Tank	Homogeneous source over volume of tank

Table 12.2-5c Radiation Sources – Shielding Geometry in Meters

Component	Room Dimensions			Wall Thickness in Meters					
	Length	Width	Height	East	West	North	South	Floor	Ceiling
Condensate Storage Tank	NA	NA	NA	NA	NA	NA	NA	Ground	Air

Table 12.2-33 Activity in the Condensate Storage Tank[1]

Source Volume = **2110 m^3**

Total MBq = **8.08E+03**

Halogens		**Soluble Fission Products**		**Insoluble Fission Products**		**Activation Products**	
Isotope	**MBq**	**Isotope**	**MBq**	**Isotope**	**MBq**	**Isotope**	**MBq**
I 131	1.31E+03	Rb 89	7.16E+01	Y 91	3.95E+01	Na 24	5.11E+01
I 132	5.51E+02	Sr 89	8.23E+00	Y 92	1.15E+01	P 32	6.87E+00
I 133	3.05E+03	Sr 90	5.38E-01	Y 93	2.00E+00	Cr 51	2.62E+02
I 134	3.61E+02	Y 90	4.58E-01	Zr 95	7.68E+00	Mn 54	3.86E+00
I 135	1.61E+03	Sr 91	1.40E+01	Nb 95	7.95E+00	Mn 56	2.77E+01
		Sr 92	1.17E+01	Ru 103	1.77E+01	Co 58	8.20E+00
		Mo 99	2.93E+01	Rh 103m	1.78E+01	Co 60	2.50E+01
		Tc 99m	2.83E+01	Ru 106	3.74E+00	Fe 55	1.48E+01
		Te 129m	1.73E+00	Rh 106	3.74E+00	Fe 59	7.88E-01
		Te 131m	8.14E-01	La 140	1.08E+02	Ni 63	7.62E-02
		Te 132	4.41E-01	Ce 141	2.56E+01	Cu 64	1.27E+02
		Cs 134	6.18E+00	Ce 144	3.66E+00	Zn 65	1.31E+01
		Cs 136	1.81E+00	Pr 144	3.66E+00	Ag 110m	4.27E-02
		Cs 137	1.91E+01			W 187	2.07E-01
		Ba 137m	1.78E+01				
		Cs 138	5.93E+01				
		Ba 140	1.32E+01				
		Np 239	1.08E+02				
Total	**6.89E+03**	**Total**	**3.93E+02**	**Total**	**2.52E+02**	**Total**	**5.42E+02**

Note:
1) The H-3 source term value is 7.77E+05 MBq.