



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

November 30, 2009
U7-C-STP-NRC-090213

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
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South Texas Project
Units 3 and 4
Docket Nos. 52-012 and 52-013
Revised Response to Request for Additional Information

Reference: Letter from Scott Head to the Document Control Desk, "Response to Request for Additional Information", dated October 26, 2009, U7-C-STP-NRC-090182 (ML093030297)

Attached is a revision to the referenced response to an NRC staff question included in Request for Additional Information (RAI) letter number 223 related to Combined License Application (COLA) Part 2, Tier 2, Chapter 15.

The attachment provides the revised response to the RAI question listed below:

RAI 15.00.03-1

There are no commitments in this letter.

Where there are COLA markups provided, they will be made at the next routine COLA revision following NRC acceptance of the RAI response.

DO91
NR20

STI 32581152

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 11/30/09



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

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Attachment:

Revised Response to RAI 15.00.03-1

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

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RAI 15.00.03-1:**QUESTION:**

The regulatory basis for incorporating information by reference to the STP Units 3 and 4 COL FSAR is 10 CFR 52.79(c) which states, in part, that if a COL application references a standard design approval, then the FSAR need not contain information or analyses submitted to the Commission in connection with the design approval, provided that the FSAR must either include or incorporate by reference the standard design approval final safety analysis report and must contain, in addition to the information and analyses otherwise required, information sufficient to demonstrate that the characteristics of the site fall within the site parameters specified in the design approval.

Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants," Regulatory Position C.III.1, Section C.1.15.6.5, "Radiological Consequences," states the COL applicant should "show that site-specific short-term χ/Q values for the EAB, LPZ, and control room provided in Section 2.3.4 of the FSAR are within the χ/Q s assumed in the DCD."

The STP FSAR, Revision 2, Table 15.6.5S-1 compared the site-specific control room (CR) values with the ABWR CR χ/Q values from DCD Tier 2 Table 15.6-14 and concluded that, with two exceptions, the ABWR DCD CR χ/Q values were not exceeded. The two exceptions were in regards to (1) the calculated 0–8 hour χ/Q value for a turbine building release ($5.18 \text{ E-}04 \text{ sec/m}^3$) which exceeded the corresponding ABWR DCD χ/Q value ($5.17\text{E-}04 \text{ sec/m}^3$) and (2) the calculated 4–30 day χ/Q value for a turbine building release ($9.13\text{E-}05 \text{ sec/m}^3$) which exceeded the corresponding ABWR DCD χ/Q value ($8.53\text{E-}05 \text{ sec/m}^3$).

Provide the control room radiological consequence analyses for the design basis accidents that are relevant to the turbine building releases and demonstrate that it meets the dose acceptance criterion of 5 rem TEDE specified in GDC 19 of Appendix A to 10 CFR 50.

REVISED RESPONSE:

This response replaces the previous response in its entirety.

The STP site-specific χ/Q values have been updated and the revised values are shown in the attached markup of STP 3&4 COLA Revision 3 Tier 2 Table 15.6.5S-1. Based on these revised values, there are two instances for the control room dose calculation for which the STP site-specific χ/Q exceeds the value in the DCD:

1. the 4-30 day turbine building release ($\chi/Q = 9.15\text{E-}05$ vs. the DCD value of $8.53\text{E-}05$), and
2. the 4-30 day reactor building release ($\chi/Q = 5.59\text{E-}04$ vs. the DCD value of $5.12\text{E-}04$).

As a result of these χ/Q changes, the control room radiological consequence analyses relevant to the turbine building and reactor building releases following a LOCA have been calculated using the site-specific χ/Q values for the STP 3 & 4 Control Room air intake and the activity releases reported in DCD Tier 2 Tables 15.6-10 and 15.6-12. The results are shown in the attached markup to COLA Part 2, Tier 2, Table 15.6.5S-2. These results show that the cumulative dose values from the beginning (time zero) to the end of the period are less than the acceptance criteria of 30 rem (0.3 Sv) thyroid, 5 rem (0.05 Sv) whole body, and 75 rem (0.75 Sv) beta-skin based on use of protective clothing and eye protection.

As a result of this response, the COLA will be revised as shown in the attached markup of Part 2, Tier 2, Subsection 15.6.5S. In addition, COLA markups of Section 2.3S, which are referenced in the response to RAI 02.03.04-5, are included in the response to this RAI. Changes from COLA Revision 3 are highlighted with gray shading.

15.6.5S Site-Specific Design Basis Accident Doses

For the onsite Control Room χ/Q values, the STP site-specific χ/Q values exceed the reference ABWR DCD χ/Q values for a Turbine Building release for two one time intervals and for the Reactor Building release for one time interval. For the turbine building at the 0-8 hours, the reference ABWR DCD χ/Q value is exceeded by 0.19%, and for the 4-30 day time interval, the reference ABWR DCD χ/Q value is exceeded by 7.03-7.27%. For the Reactor Building at the 4-30 day time interval, the reference ABWR DCD χ/Q value is exceeded by 9.18%. Since the dose value is directly proportional to χ/Q , and the source term has not changed, this increase is conservatively applied to the doses in ABWR DCD Table 15.6-14 at each of the two time intervals. The doses from 0-8 hours are increased by 0.19%, and the doses from 4-30 days are increased by 7.03%. This is an extremely conservative approach, as it assumes that all of the radionuclide release to the Control Room is from the Turbine Building. Because the DCD χ/Q 's in these instances are not bounded by site-specific values, the Control Room site specific radiological consequence analysis is performed. The results for doses are shown in Table 15.6.5S-2. The Control Room doses remain well within the regulatory limits.

Table 15.6.5S-1 Site-Specific γ/Q

| Receptor Location | STP Site-Specific γ/Q (s/m ³) | ABWR DCD γ/Q (s/m ³) |
|---|--|---|
| EAB | 2.741.96E-04 | 1.37E-03 |
| LPZ | | |
| 0-8 hours | 2.452.34E-05 | 1.56E-04 |
| 8-24 hours | 1.671.64E-05 | 9.61E-05 |
| 1-4 days | 7.577.61E-06 | 3.36E-05 |
| 4-30 days | 2.592.52E-06 | 7.42E-06 |
| Control Room (Reactor Building release) | | |
| 0-8 hours | 7.49E-04 2.03E-03* | 3.10E-03 |
| 8-24 hours | 5.882.46E-04 | 1.83E-03 |
| 1-4 days | 6.292.49E-04 | 1.16E-03 |
| 4-30 days | 5.592.15E-04 | 5.12E-04 |
| Control room (Turbine Building Release) | | |
| 0-8 hours | 4.445.18E-04** | 5.17E-04 |
| 8-24 hours | 1.841.79E-04 | 3.05E-04 |
| 1-4 days | 1.181.19E-04 | 1.93E-04 |
| 4-30 days | 9.159.13E-05 | 8.53E-05 |

Notes:

* The ABWR DCD provides 0-8 hour γ/Q values. This STP site-specific value is the ARCON96 calculated 0-2 hour γ/Q value.

** This STP site-specific value is the 0-8 hour γ/Q value determined from the 0-2 and 2-8 hour ARCON96 calculated values per NUREG/CR-6331, Section 3.7.

Table 15.6.5S-2 Site Specific Control Room Dose for the LOCA from the Turbine Building

| Time | Thyroid* (Sv) | Whole Body* (Sv) | Beta* (Sv) |
|----------------|-------------------|------------------|-------------------|
| 0-8 h | 2.373.61E-02 | 3.633.51E-03 | 3.434.21E-02 |
| 0-24 8-24 h | 3.647.21E-02 | 5.549.02E-03 | 6.46E-02 1.33E-01 |
| 0-4 1-4 days | 8.65E-02 1.66E-01 | 1.091.96E-02 | 1.633.21E-01 |
| 0-30 4-30 days | 2.042.84E-01 | 1.802.72E-02 | 3.024.56E-01 |

* These values are cumulative from the beginning (time zero) to the end of the period.

The third through seventh paragraphs of STP COLA Revision 3, FSAR Section 2.3S.4.2.1.2 will be revised as shown below:

2.3S.4.2.1.2 Onsite Dispersion Estimates

As discussed in Subsection 15.6.5.5.3 of the reference ABWR DCD, the control room may be contaminated from two sources: the Reactor Building 76-meter stack base or the Turbine Building truck doors. Subsection 11.3.10 of the reference ABWR DCD also provides information on radioactive releases. The locations of the sources and receptors are provided in Figure 2.3S-23. RG 1.194 (Reference 2.3S-51) provides guidance on the use of ARCON96 for determining χ/Q s to be used in design basis evaluation of control room radiological habitability. Subsection 3.2.2 of RG 1.194 specifies that a stack release should be more than 2 1/2 times the height of the adjacent structure. Since the 76-meter stack is lower than 2 1/2 times the height of the nearby 42.7-meter turbine building, it was considered as a ground-level source in the ARCON96 modeling. The Reactor Building stack base, at 26.2 meters and the Turbine Building truck doors, located at the ground level, were also treated as a ground-level sources. For STP 3 & 4, each unit has two control room air intakes and a TSC air intake (as shown in Figure 2.3S-23). These three intakes were treated as receptors in ARCON96 modeling.

The reactor building plant stack is located close to the middle of the west side of the Reactor Building; the turbine building truck doors are located to the north-west corner of the Turbine Building. The control room air intakes are located to the north-west (designated as B in Table 2.3S-25) and north-east (designated as C in Table 2.3S-25) corners of the Control Building; the TSC air intake is located close to the middle of the Service Building conservatively assumed to be located at the southwest corner of the Service Building for Reactor Building releases and at the northwest corner of the Service Building for Turbine Building releases. Guidelines provided in RG 1.194 (Reference 2.3S-51) were followed in estimating the χ/Q values at the control room and TSC air intakes.

The 95 percentile control room and TSC χ/Q s for the 95% various time averaging periods (0 to 2 hours, 2 to 8 hours, 8 to 24 hours, 1 to 4 days and 4 to 30 days) periods obtained from the ARCON96 modeling results are summarized in Table 2.3S-25.

The results provided in Table 2.3S-25 show that the χ/Q values determined by the ARCON96 modeling analyses at the control room and TSC air intakes for Reactor Building stack releases are bounded by the corresponding χ/Q values in Tables 15.6-3, 15.6-7, 15.6-13, 15.6-14, and 15.6-18 of the reference ABWR DCD, except in two instances.

The ARCON96 modeling results show that the maximum 4-30 day χ/Q value at one of the control room air intakes due to Reactor Building stack base releases is 5.59 E-04, which is slightly greater than the maximum 4-30 day χ/Q value of 5.12E-04 from DCD Table 15.6-14.

Also, the maximum 4-30 day χ/Q value at the same intake for turbine building truck door releases is $9.13E-05$ $9.15E-05$. As discussed in a foot note for DCD Table 15.6-14, the control room χ/Q values for releases from turbine building are a factor of six less than reactor building χ/Q values. Therefore, the 4-30 day average control room χ/Q value ($5.12E-04$) due to reactor building releases (see DCD Table 15.6-14) is equivalent to a control room χ/Q value of $8.53E-05$ for turbine building releases. The ARCON96-calculated 4-30 day control room χ/Q values ($9.13E-05$ due to reactor building plant stack ($5.59E-04$) and turbine building truck door ($9.15E-05$)) releases slightly exceeds the corresponding DCD χ/Q values of $5.12E-04$ and $8.53E-05$, respectively. The maximum 4-30 days χ/Q values exceed the corresponding reference ABWR DCD χ/Q values by 7.9% and 7% , respectively. The exceedance of a χ/Q value does not result in the violation of the NRC dose limit. The ultimate factor that would affect the plant design is the radiation dose as discussed in FSAR Section 15.6.

Revise COLA Revision 3, Table 2.3S-25 as shown below:

| Table 2.3S-25 ARCON96 χ/Q Values (sec/m ³) | | | | | |
|--|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| ARCON96 χ/Q Values at the Control Room Air Intake "C" | | | | | |
| Release Point | 0 – 2 hours | 2 – 8 hours | 8 – 24 hours | 1 – 4 days | 4 – 30 days |
| Reactor Building Plant Stack | 4.52 E-04 9.14E-04 | 2.80 E-04 4.98E-04 | 1.14 E-04 2.22E-04 | 9.36 E-05 1.68E-04 | 6.47 E-05 1.16E-04 |
| DCD Control Room Limit | 3.1 E-03 [1] | NA | 1.83 E-03 | 1.16 E-03 | 5.12 E-04 |
| Turbine Building Truck Doors | 3.69 E-04 3.38E-04 | 2.75 E-04 2.43E-04 | 1.30 E-04 1.16E-04 | 6.94 E-05 6.28E-05 | 5.98 E-05 5.43E-05 |
| DCD Turbine Building Limit [2] | 5.2 E-04 | NA | 3.1 E-04 | 1.9 E-04 | 8.5 E-05 |
| ARCON96 χ/Q Values at the Control Room Air Intake "B" | | | | | |
| Release Point | 0 – 2 hours | 2 – 8 hours | 8 – 24 hours | 1 – 4 days | 4 – 30 days |
| Reactor Building Plant Stack | 7.49 E-04 2.03E-03 | 6.11 E-04 1.68E-03 | 2.46 E-04 5.88E-04 | 2.49 E-04 6.29E-04 | 2.15 E-04 5.59E-04 |
| DCD Control Room Limit | 3.1 E-03 [1] | NA | 1.83 E-03 | 1.16 E-03 | 5.12 E-04 |
| Turbine Building Truck Doors | 5.18 E-04 5.20E-04 | 4.17 E-04 4.18E-04 | 1.79 E-04 1.84E-04 | 1.19 E-04 1.18E-04 | 9.13 E-05 9.15E-05 |
| DCD Turbine Building Limit [2] | 5.2 E-04 | NA | 3.1 E-04 | 1.9 E-04 | 8.5 E-05 |
| ARCON96 χ/Q Values at the Technical Support Center Air Intake | | | | | |
| Release Point | 0 – 2 hours | 2 – 8 hours | 8 – 24 hours | 1 – 4 days | 4 – 30 days |
| Reactor Building Plant Stack | 1.94 E-04 5.89E-04 | 1.35 E-04 4.50E-04 | 5.28 E-05 1.91E-04 | 3.29 E-05 1.27E-04 | 2.59 E-05 9.39E-05 |
| DCD Control Room Limit | 3.1 E-03 [1] | NA | 1.83 E-03 | 1.16 E-03 | 5.12 E-04 |
| Turbine Building Truck Doors | 2.02 E-04 3.28E-04 | 1.40 E-04 2.26E-04 | 6.47 E-05 1.06E-04 | 3.50 E-05 5.67E-05 | 3.03 E-05 4.99E-05 |
| DCD Turbine Building Limit [2] | 5.2 E-04 | NA | 3.1 E-04 | 1.9 E-04 | 8.5 E-05 |
| Notes: NA – Not available [1] reference ABWR DCD specifies that this value is for 0-8 hour. [2] reference ABWR DCD specifies that the χ/Q values for Turbine Building release are a factor of 6 less than those from the Reactor Building release. | | | | | |