September 13, 2010

Mr. Scott Head, Manager
Regulatory Affairs
STP Nuclear Operating Company
P. O. Box 289
Wadsworth, TX 77483

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 364 RELATED TO SRP SECTION 06.02.02 FOR THE SOUTH TEXAS PROJECT COMBINED LICENSE APPLICATION

Dear Mr. Head:

By letter dated September 20, 2007, STP Nuclear Operating Company (STP) submitted for approval a combined license application pursuant to 10 CFR Part 52. The U. S. Nuclear Regulatory Commission (NRC) staff is performing a detailed review of this application to enable the staff to reach a conclusion on the safety of the proposed application.

The NRC staff has identified that additional information is needed to continue portions of the review. The staff's request for additional information (RAI) is contained in the enclosure to this letter.

To support the review schedule, you are requested to respond within **30** days of the date of this letter. If changes are needed to the safety analysis report, the staff requests that the RAI response include the proposed wording changes.

If you have any questions or comments concerning this matter, I can be reached at 301-415-2849 or by e-mail at Stacy.Joseph@nrc.gov or you may contact George Wunder at 301-415-1494 or George.Wunder@nrc.gov.

Sincerely,

/RA/

Stacy Joseph, Project Manager
BWR Projects Branch
Division of New Reactor Licensing
Office of New Reactors

Docket Nos. 52-012
52-013

eRAI Tracking No. 5064

Enclosures:
Request for Additional Information

cc: William Mookhoek
James Tomkins

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DATE	8/31/2010	9/7/2010	9/7/2010	9/7/2010	9/13/2010

***Approval captured electronically in the electronic RAI system.**
OFFICIAL RECORD COPY

Request for Additional Information No. 5064 Revision 3
South Texas Project Units 3 and 4
South Texas Project Nuclear Operating Co
Docket No. 52-012 and 52-013
SRP Section: 06.02.02 - Containment Heat Removal Systems
Application Section: 6.2

QUESTIONS for Component Integrity, Performance, and Testing Branch 2 (ESBWR/ABWR Projects) (CIB2)

06.02.02-28

The June 10, 2010, response, to RAI 06.02.02-27 states that the sodium pentaborate from the Standby Liquid Control (SLC) System will be initiated during a LOCA in order to control the suppression pool pH. Please provide the calculated post-LOCA 30-day pH profile and describe the administrative controls that will be in place to ensure initiation of the SLC System injection.

06.02.02-29

The June 10, 2010, response, to RAI 06.02.02-27 states that the corrosion products from zinc are expected to be particulate, and that no new type of chemical precipitate would result from zinc (i.e, a type of precipitate different than the particulate evaluated for the reference Japanese ABWR). Please provide the technical basis for stating there will be no new type of precipitate, such as a gel-like precipitate. The next paragraph provides background information from the staff and is part of the basis for the need for additional information from the applicant.

It appears that the zinc in inorganic zinc (IOZ) coatings may corrode in a post-LOCA environment, but there is limited information about the rate and the form of the corrosion product. For example, the report from the Erlangen Tank Test Station (ML083510156) described pressure loss from an accumulation of zinc corrosion products in a mineral wool bed. The source of the zinc in that test was galvanized steel, but the zinc in IOZ coatings may also be subject to dissolution (corrosion) depending on water chemistry and temperature (e.g., NUREG-6873 and NUREG-6988). WCAP-16530-NP included a pH- and temperature-dependent corrosion-rate equation for zinc based on the test results for galvanized steel, but the amount was considered negligible for operating PWRs and not included in the chemical model. The Utility Resolution Guidance recommendation of 47 pounds of particles from IOZ coatings did not consider chemical dissolution (corrosion) of the zinc and subsequent precipitation in another form. The staff notes one source showing the solubility of amorphous and crystalline zinc hydroxide phases decreases by about four orders of magnitude when the pH increases from 7 to 9 at 25°C (Marcel Pourbaix, “Atlas of Electrochemical Equilibria in Aqueous Solutions,” National Association of Corrosion Engineers, 1974).

06.02.02-30

The July 21, 2010, response, to RAI 06.02.02-27 described laboratory testing performed for South Texas Project 3 & 4 to determine if sodium aluminum silicate would precipitate in the postulated post-LOCA environment. Please provide the following additional information about this testing:

a) Describe the basis for performing a test designed to measure dissolution of an existing solid rather than a test designed to detect the formation of the precipitate from solution.

b) Explain how the sodium aluminum silicate used in the South Texas Project 3 & 4 benchtop testing is equivalent to the sodium aluminum silicate precipitate ($NaAlSi_3O_8$) modeled in WCAP-16530-NP. The chemical used in the STP 3 & 4 solubility tests is described in the Sigma-Aldrich Material Safety Data Sheet as "aluminum silicate" and "silicic acid, aluminum sodium salt." The highly hydrated $NaAlSi_3O_8$ precipitate generated according to WCAP-16530-NP is prepared from aluminum nitrate and sodium silicate. It is not clear to the staff that the two aluminum solids are identical, or at least equivalent in terms of their dissolution/precipitation characteristics.

c) Describe how the experimental procedure accounts for precipitates less than the 0.45 micrometer (μm) filter size. It is not clear to the staff that the measured cation concentrations accurately or conservatively represent the concentrations at the test conditions. Prior testing under the GSI-191 program has concluded that aluminum-based precipitates may be less than 0.2 μm in size and cause high head losses in laboratory testing.

06.02.02-31

Please provide an assessment of the potential for chemical effects from concrete debris generated by erosion from a LOCA jet. The response to RAI 06.06.02-27 concluded that sodium aluminum silicate would not precipitate based on solubility, but it is not clear to the staff that the 302 ft^2 of flat surface area assumed in the analysis (based on the assumption that coatings are removed) is bounding for STP 3 & 4. Please include one or more illustrations to show the locations of coatings and concrete considered in the analysis.