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To: "Christian Araguas" <CJA2@nrc.gov>,"Stephen Raul Monarque" <SRM2@nrc.gov>
Date: 12/15/2006 5:21:28 PM
Subject: Hazards Analysis & QA Letter's
cc: "James T. Davis" <JTDAVIS@southernco.com>

<<AR-06-2720 Safe Rev Audt Hazards Needs.pdf>> <<AR-06-2677 RAI Resp (QA).pdf>>

Merry Christmas!

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AR-06-2720 Safe Rev Audt Hazards Needs.pdf	81240	3/22/2007 5:14:51 PM
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None

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Security: Standard

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Energy to Serve Your World℠

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AR-06-2720

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

Southern Nuclear Operating Company
Vogtle Early Site Permit Application
Safety Review Audit Site Hazard Analysis Information Needs

Ladies and Gentlemen:

On November 1-3, 2006, the U.S. Nuclear Regulatory Commission (NRC) performed a safety review audit of the Vogtle Electric Generating Plant (VEGP) site as part of their overall technical review of the Southern Nuclear Operating Company (SNC) Vogtle Early Site Permit (ESP) Application. During the audit, the NRC provided SNC with a list of information needs, identified as part of the audit, that are required to support the NRC's technical review of the Vogtle ESP application. The list of NRC information needs covered the areas of site hazard analysis and physical security. SNC provided the NRC with responses to the physical security information needs in a letter dated November 16, 2006. Responses to the site hazard analysis information needs are provided in the enclosure to this letter.

The SNC licensing contact for this information needs letter is J. T. Davis at (205) 992-7692.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

J. A. Miller

Joseph A. (Buzz) Miller

Sworn to and subscripted before me this 15th *day of* December, *2006*

Gloria H. Bruce

Notary Public

JAM/BJS/dmw

Enclosure: SNC Responses to NRC Site Hazard Analysis Information Needs from November 2006 Safety Review Site Audit for Vogtle ESP Application

cc: Southern Nuclear Operating Company
Mr. J. B. Beasley, Jr., President and CEO (w/o enclosure)
Mr. J. T. Gasser, Executive Vice President, Nuclear Operations (w/o enclosure)
Mr. D. E. Grissette, Vice President, Plant Vogtle (w/o enclosure)
Mr. D. M. Lloyd, Vogtle Deployment Director
Mr. C. R. Pierce, Vogtle Development Licensing Manager
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Nuclear Regulatory Commission
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Mr. C. J. Araguas, Project Manager of New Reactors
Mr. M. D. Notich, Environmental Project Manager
Mr. G. J. McCoy, Senior Resident Inspector of VEGP

Georgia Power Company
Mr. O. C. Harper, Vice President, Resource Planning and Nuclear Development (w/o enclosure)

Oglethorpe Power Corporation
Mr. M. W. Price, Chief Operating Officer (w/o enclosure)

Municipal Electric Authority of Georgia
Mr. C. B. Manning, Senior Vice President and Chief Operating Officer (w/o enclosure)

Dalton Utilities
Mr. D. Cope, President and Chief Executive Officer (w/o enclosure)

bc: Bechtel Power Corporation
Mr. J. S. Prebula, Project Engineer
Mr. R. W. Prunty, Licensing Engineer

Southern Nuclear Operating Company

AR-06-2720

Enclosure

SNC Responses to

NRC Site Hazard Analysis Information Needs

from

November 2006 Safety Review Site Audit

for the

Vogtle ESP Application

AR-06-2720
Enclosure
Information Needs Responses

Information Needs from the November 2006 Safety Review Site Audit

The following responses to the Hazards Analysis audit information needs are discussed below. Where answers change facts and conclusions presented in the ESP application, it will be revised. Responses that provide clarification detail will also be considered for inclusion in the next revision as appropriate.

1. SSAR Section 2.2.3.1.1

   Provide clarification on how the six chemicals identified in the analysis of truck traffic were selected.

   Response:

   The six chemicals identified in the analysis of truck traffic were obtained from the original design basis analysis for Units 1 and 2 and were based on a 1975 study performed by the Georgia Institute of Technology for Georgia Power Company. The original study is no longer available.

   SNC has obtained the EPA Tier II reports for Burke and Richmond Counties in Georgia, identifying those facilities in the vicinity of the plant which have permits for storing hazardous materials. These reports will be used to confirm and/or update the list of chemicals for analysis. If any additional chemicals which require analysis are identified, SNC will assume that these materials are transported by truck on the state roads, past the plant, to the permitted facility and will include the results of this analysis in the ESP application. This analysis will be completed by January 31, 2007.

2. SSAR Section 2.2.3.1.1

   In order for the staff to perform a confirmatory analysis, provide the wind speed and stability class used for the analysis

   Response:

   For the analysis of the truck borne hazards described in section 2.2.3.1.1, the wind speed assumed was 0.5 m/s and the stability class was G. For the evaluation of the gasoline truck, which is in process, the wind speed assumed is 1 m/s and the stability class is F.

3. SSAR Section 2.2.3.1.1

   Provide a description of the method used to evaluate the potential formation of flammable vapor clouds from truck accidents

   Response:

   For most of the chemicals evaluated, the Bechtel Standard Computer Program TOXDISP was used to calculate the vapor concentration as a function of distance from the spill. TOXDISP is based on the methodology provided in NUREG-0570, November 1994. The gasoline truck analysis, which is currently being performed, uses the industry standard program DEGADIS to calculate the vapor concentration of the gasoline as a function of distance from the site of the spill and to obtain the flammable mass within the vapor plume. The concentrations are compared to the lower flammability limits for the respective chemicals to determine the maximum distance for the flammable vapor cloud.

4. SSAR Section 2.2.3.1.1

   In order for the staff to perform a confirmatory analysis, provide the resultant concentrations generated from the vapor cloud analysis

   Response:

   The concentrations at the control room air intake were:

   #2 Diesel Fuel - 0.057 ppm

   Chlorine - 2.9 ppm (2 minutes after odor detection)

   Ammonia - 69 ppm (2 minutes after odor detection)

   Phosphoric Acid - 6.5 E-5 ppm

   Nitric Acid - 4.9 ppm

   Gasoline - 36.1 ppm (preliminary – calculation complete, under review)

   All concentrations are below their respective toxicity limit. The only other chemical listed in the original study by the Georgia Institute of Technology as being transported by truck in the vicinity of the plant was liquid nitrogen. This was not evaluated because it is not reactive and it is not flammable. Nitrogen is considered toxic only as an asphyxiant. It rapidly vaporizes and dissipates in the atmosphere.

5. SSAR Section 2.2.3.1.3

   Provide clarification on the use of No. 2 diesel fuel oil stored at Plant Wilson as a bounding analysis for waterway traffic.

   Response:

   For explosion and flammable vapor cloud, Plant Wilson is bounding due to the permanent storage and size. However, the concentration inside any of the three 3-million-gallon fuel tanks is lower than the Lower Flammability Limit (LFL) of #2 diesel fuel, thus the vapor in the storage tank will not burn. Similarly the storage tank is not capable of exploding.

   For vapor cloud toxicity, the fuel barge is limiting. A calculation has been done utilizing TOXGAS, with a wind speed of 0.25m/s and stability class G. TOXGAS is a Bechtel Standard Computer Program that, like TOXDISP, is based on the methodology provided in NUREG-0570, November 1994, and it calculates the vapor concentration as a function of distance from the spill. The resultant concentration generated from the vapor cloud analysis of Plant Wilson was 5.95 ppm at 1350 meters. The resultant concentration generated from the vapor cloud analysis of a barge was 41 ppm at 1050 meters.

6. SSAR Section 2.2.3.1.4

   Provide the percentage breakdown of the railroad chemical shipments that were listed on page 2.2-11 to confirm that these are the major shipments by rail.

   Response:

   Per communications with CSX, the percent of total 2005 bulk shipments that contained a qualified DOT hazardous waste were;

   64% - Cyclohexane;

   9% - anhydrous ammonia;

   3% - carbon monoxide;

   3% - Elevated Temperature Materials Liquid (ETML)

7. SSAR Section 2.2.3.1.4

   Provide the basis for the selection of cyclohexane and ammonia for the detailed analysis

   Response:

   Per communications with CSX , Cyclohexane, which was not previously considered during the Unit 1& 2 analysis, is a hazardous chemical which is frequently shipped by rail past the site. Cyclohexane use is tied almost exclusively to nylon. Over 90% of cyclohexane is used in the manufacture of nylon fiber and nylon molding resin. The remaining 10% of cyclohexane ends up as solvents for paint, resins, varnish and oils, or in plasticisers. Cyclohexane is both flammable and toxic.

   Also per communication with CSX, ammonia is frequently shipped by rail past the site. Ammonia is toxic and has the potential for a long transport distance. This chemical was previously evaluated in the Unit 1 & 2 analysis.

8. SSAR Section 2.2.3.1.4

   In order for the staff to perform a confirmatory analysis, provide the wind speed and stability class used for the analysis.

   Response:

   The TOXGAS model was utilized for the ammonia calculation, with a G class stability and a 1m/s wind speed. The vapor cloud produced a concentration of 112 ppm.

   The TOXDISP model was utilized for Cyclohexane, with an F class stability and a 1m/s wind speed. The vapor cloud produced a concentration of 34.3 ppm.

9. SSAR Section 2.2.3.1.4

   Provide a description of the method used to evaluate the potential formation of flammable vapor clouds from railroad accidents.

   Response:

   The TOXDISP model, based on guidance provided in NUREG-0570, "Toxic Vapor Concentration in the Control Room Following a Postulated Accidental Release," was used in the evaluation of flammable vapor clouds. The vapor concentrations, calculated by TOXDISP as a function of distance from the spill, were compared to the flammability limits for the respective chemicals to estimate flammable mass, and the lower flammable limit was used to determine the maximum distance for the flammable vapor cloud.

10. SSAR Section 2.2.3.1.4

    In order for the staff to perform a confirmatory analysis, provide the resultant concentrations generated from the vapor cloud analysis

    Response:

    The resultant concentrations of Ammonia produced a vapor cloud concentration of 112 ppm.

    The resultant concentrations of Cyclohexane produced a vapor cloud concentration of 34.3 ppm.

    Both of these chemical concentrations are below their respective toxicity limits.

11. SSAR Section 2.2.3.2.1

    For the toxic hazards analysis relating to truck accidents, provide the basis for the selection of gasoline, ammonia, and chlorine as discussed on page 2.2-13.

    Response:

    Though not previously analyzed for Units 1 & 2, gasoline, a flammable and explosive material, is being evaluated, since it is assumed to very likely be transported near the site.

    Chlorine and Ammonia are toxic chemicals that were identified in the previously referenced 1975 study performed by the Georgia Institute of Technology for Georgia Power Company. That study was referenced in the original design basis analyses for Units 1 and 2. These two chemicals were specifically selected for evaluation because they are toxic and they have the potential for long transport in the event of an accidental release.

12. SSAR Section 2.2.3.2.1

    For the toxic hazards analysis relating to truck traffic, provide the concentration of gasoline

    Response:

    At a distance of 7620 meters, utilizing a wind speed of 1 m/s with a stability class of F, the concentration of gasoline from a truck is 36.1 ppm (preliminary – calculation complete, under review). This is well below the toxicity limit.

13. SSAR Section 2.2.3.2.1

    Clarify the discussion of fuel oil concentration due to the rupture of a barge along the Savannah River as discussed on page 2.2-13.

    Response:

    Discussions in the ESP will be revised to remove comparisons to gasoline on a barge since, according to IWR 2004, gasoline is no longer barged on the Savannah River.

    For explosion and vapor cloud, Plant Wilson is bounding due to the permanent storage and size. However, the vapor concentration inside the any of the three 3-million-gallon fuel tanks is lower than the Lower Flammability Limit (LFL) of #2 diesel fuel, thus the vapor in the storage tank will not burn. Similarly the storage tank is not capable of exploding. Based upon the same reason as stated for #2 Fuel Oil stored at Plant Wilson, no explosion or flammable vapor cloud is postulated due to a barge accident.

    For the evaluation of toxicity, a calculation has been done utilizing the Bechtel Standard Computer Program TOXGAS with a wind speed of 0.25m/s and G stability class. The resultant concentrations generated from the vapor cloud from a tank rupture at Plant Wilson (1350 meters distant) was 5.95 ppm. The resultant concentrations generated from the vapor cloud from a barge accident (1050 meters distant) was 41 ppm.

14. SSAR Section 2.2.3.2.2

    In order for the staff to perform a confirmatory analysis, provide the resultant concentrations of fuel oil for the toxicity analysis at the control room.

    Response:

    The resultant concentration generated from the vapor cloud analysis from Plant Wilson is 5.95 ppm at a distance of 1350 meters.

15. SSAR Section 2.2.3.2.2

    Provide the basis for only having selected chlorine and ammonia as potential chemicals stored at SRS.

    Response:

    The original analysis (performed for Units 1 & 2) had determined that SRS had the potential to utilize chlorine and ammonia at the D-Area, which is approximately 4.5 miles distant from Units 1 & 2. The proposed Units 3 & 4 are at about the same distance from the D-Area. However, recent discussions with SRS personnel, and the 2004 Tier II EPA report for this site, have indicated that ammonia and chlorine are no longer in use at D-Area. The area has been remediated and nearly all the facilities have been removed.

    Basically, all that is left in D-Area is the powerhouse. The site uses water from the Savannah River for the powerhouse. The only chemicals used at the site, according to the recent Tier II report, are chlorine softeners and biocide, which are used in the waste treatment process to eliminate the bacteria in the water. There were no chemicals identified which would be hazardous to the Vogtle site or would require further evaluation.

16. SSAR Section 2.2.3.2.3

    Provide the quantities, stability class, wind speed, and distance to the control room for use in the analysis for hydrazine and methoxypropylamine

    Response:

    For the analysis of hydrazine, the quantity was 6644 gallons, the wind speed was 0.25 m/s and the stability class was assumed to be G. The distance used in the analysis was 122 meters.

    For the analysis of methoxypropylamine (MPA), the quantity was 400 gallons, the wind speed was 2.5 m/s, and the stability class was assumed to be G. The distance used in the analysis was 59 meters.

17. SSAR Section 2.2.3.2.3

Provide the results of the analysis for hydrazine, methoxypropylamine, and phosphoric acid

Response:

For hydrazine, the concentration 2 minutes after odor detection was calculated to be 12.9 ppm.

For methoxypropylamine (MPA), the concentration at the control room air intake was calculated to be 1.5 ppm.

For the 5050 gallons of phosphoric acid, the concentration at the control room air intake was calculated to be $0.094 mg/m^3$.

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AR-06-2677

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

Southern Nuclear Operating Company
Vogtle Early Site Permit Application
Response to Requests for Additional Information on Quality Assurance

Ladies and Gentlemen:

By letter dated November 27, 2006, the U.S. Nuclear Regulatory Commission (NRC) provided requests for additional information (RAIs) following the review of the Site Safety Analysis Report (SSAR) portion of Southern Nuclear Operating Company's (SNC's) Vogtle Early Site Permit (ESP) application. The RAIs involve ESP application Part 2 (SSAR), Section 2.4 (Hydrologic Engineering) and Section 17.1 (ESP Quality Assurance). The responses to the RAIs involving Quality Assurance are provided in the enclosure to this letter. SNC's response to the Hydrology RAIs will be submitted separately within the requested 30-day time frame.

The SNC contact for this RAI response letter is J. T. Davis at (205) 992-7692.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

Joseph A. (Buzz) Miller

Sworn to and subscripted before me this 15th *day of* December, *2006*

Notary Public

JAM/BJS/dmw

Enclosure: Response to November 27, 2006 Request for Additional Information on Vogtle ESP Application Quality Assurance

cc: Southern Nuclear Operating Company
Mr. J. B. Beasley, Jr., President and CEO
Mr. J. T. Gasser, Executive Vice President, Nuclear Operations
Mr. D. E. Grissette, Vice President, Plant Vogtle
Mr. D. M. Lloyd, Vogtle Deployment Director
Mr. C. R. Pierce, Vogtle Development Licensing Manager
Mr. J. M. Giddens, Jr., QA Project Engineer
Document Services RTYPE: AR01
File AR.01.01.06

Nuclear Regulatory Commission
Mr. J. E. Dyer, Director of Office of Nuclear Regulation
Mr. W. D. Travers, Region II Administrator
Mr. D. B. Matthews, Director of New Reactors
Ms. S. M. Coffin, AP1000 Manager of New Reactors
Mr. C. J. Araguas, Project Manager of New Reactors
Mr. M. D. Notich, Environmental Project Manager
Mr. G. J. McCoy, Senior Resident Inspector of VEGP

Georgia Power Company
Mr. O. C. Harper, Vice President, Resource Planning and Nuclear Development

Oglethorpe Power Corporation
Mr. M. W. Price, Chief Operating Officer

Municipal Electric Authority of Georgia
Mr. C. B. Manning, Senior Vice President and Chief Operating Officer

Dalton Utilities
Mr. D. Cope, President and Chief Executive Officer

Bechtel Power Corporation
Mr. J. S. Prebula, Project Engineer
Mr. R. W. Prunty, Licensing Engineer

Southern Nuclear Operating Company

AR-06-2677

Enclosure

Response to November 27, 2006

Request for Additional Information

On

Vogtle ESP Application

Quality Assurance

AR-06-2677
Enclosure
RAI Responses

Response to ESP Quality Assurance Request for Additional Information

The following responses to the Quality Assurance audit information needs are discussed below. Where answers change facts and conclusions presented in the ESP application, it will be revised. Responses that provide clarification detail will also be considered for inclusion in the next revision as appropriate.

1. SSAR Section 17.1-1

Identify the organizations that will perform QA activities.

SSAR NDQAM Part II, Section 1 – Organization

Section 17.1.1 of RS-002, paragraph 1.A., states that the organization description and charts of the lines, interrelationships, and areas of responsibility and authority for all organizations performing quality-related activities, including the applicant's organization and principal contractors, are provided. Section 1 of the NDQAM describes the organizations that will be responsible for the development of information that will support the ESP application. The plan explains the specific tasks that organizations and individuals will be performing that relate to ESP activities, and also states that "certain common elements, procedures, and organizations described in this NDQAM exist for currently operating SNC nuclear plants." However, the section does not clearly describe the interface between existing organizations that will perform QA activities in support of the ESP application who also perform QA activities under existing QA programs. Identify the organizations that will perform QA activities under the NDQAM, the existing operations QA program, or under both QA programs.

Response:

As stated in Part I, Section 1 of the NDQAM, certain common program elements, procedures and organizations described in the NDQAM also exist for currently operating SNC nuclear plants. These organizations perform common activities described in both QA program documents. These organizations which support the fleet QA program and the Nuclear Development QA program ultimately report to the same CEO.

Part II, Section 1 of the NDQAM describes the reporting relationships, functional responsibilities and authorities for organizational implementation for organizations implementing and supporting the Nuclear Development QA program.

2. SSAR Section 17.4-1

Clarify if the proposed quality assurance review of procurement documents is still performed.

SSAR NDQAM Part II, Section 4 – Procurement Document Control

Section 17.1.1 of RS-002, paragraph 4.B., states that provisions exist for review and approval of procurement documents for ESP activities that would affect SSCs important to safety. Section 4.2 of the NDQAM establishes a commitment to NQA-1-1994, Basic Requirement 4 and Supplement 4S-1, and includes clarifications and exceptions to these requirements. As an exception, SNC proposes that "the quality assurance review of procurement documents is satisfied through review of the applicable procurement specification, including the technical and quality procurement requirements, prior to bid or award of contract." This exception does not specify if procurement documents as well as changes to procurement documents will be part of the proposed quality assurance review. Clarify if the proposed quality assurance review of procurement documents is still performed.

Response:

As stated in Part II, Section 4.2, procurement documents are required to be reviewed prior to bid or award of contract. The quality assurance review of procurement documents is satisfied through review of the applicable procurement specification, including the technical and quality procurement requirements, prior to bid or award of contract.

The following text will be added to the third bullet under NQA-1-1994, Supplement 4S-1 to provided clarification:

> "Procurement document changes (e.g., scope, technical or quality requirements) will be part of the quality assurance review."

3. SSAR Section 17.6-1

Discuss how SNC plans to control the distribution of new and revised documents.

SSAR NDQAM Part II, Section 6 – Document Control

Section 17.1.1 of RS-002, paragraph 6, states that provisions exist to ensure that documents related to ESP activities that would affect SSCs important to safety, including changes, are reviewed for adequacy, approved for release by authorized personnel, and distributed and used at the location where the prescribed activity is performed. Section 6 of the NDQAM does not provide guidance for controlling the distribution of new and revised documents, including superseded documents, to preclude the possibility or use of inappropriate documents. Discuss how SNC plans to control the distribution of new and revised documents consistent with Section 17.1.1 of RS-002.

SNC Response:

Part II, Section 6 items (a)-(c) will be revised to include items (a)-(f) below:

(a) identification of documents to be controlled and their specified distribution;

(b) a method to identify the correct document (including revision) to be used and control of superseded documents;

(c) identification of assignment of responsibility for preparing, reviewing, approving, and issuing documents;

(d) review of documents for adequacy, completeness, and correctness prior to approval and issuance.

(e) a method for providing feedback from users to continually improve procedures and work instructions.

(f) coordinating and controlling interface documents and procedures.

The following text will also be added at the end of Section 6.1:

> "Prior to issuance or use, documents including revisions thereto, shall be approved by the designated authority. A listing of all controlled documents identifying the current approved revision, or date, is maintained so personnel can readily determine the appropriate document for use."