

November 24, 2006 (7:50am)

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the matter of)	
)	
SYSTEM ENERGY RESOURCES, INC.)	Docket No. 52-009-ESP
)	
(Early Site Permit for Grand Gulf ESP Site))	ASLBP No. 04-823-03-ESP

**PRE-FILED TESTIMONY OF MARVIN MORRIS AND JOHN CESARE ON BEHALF
OF APPLICANT CONCERNING HEARING ISSUE I
(RADIOLOGICAL REVIEWS AND CONFIRMATORY ANALYSES)**

Q1. Please state your name, current position, and by whom you are employed.

A1. My name is Marvin Morris ("MM"). I am employed as a consulting engineer and analyst for ENERCON Services, Inc.

A.1 My name is John G. Cesare ("JGC"). I am employed as Lead Licensing Project Engineer for ENERCON Services, Inc.

Q2. On whose behalf are you testifying in this proceeding?

A2. (MM, JGC) We are providing testimony on behalf of the applicant in this early site permit ("ESP") proceeding, System Energy Resources, Inc. ("SERI" or the "Applicant").

Q3. Please describe your professional qualifications.

A3. (MM) I hold a B.S. degree in Mathematics from the University of Texas, Pan American, and an M.S. degree in Physics from Sam Houston State University. I have over 30 years of experience in the nuclear industry in areas of design, analysis, licensing and operations support. A full statement of my professional qualifications is contained in SERI Exhibit 1.

A3. (JGC) I hold a B.S. degree in Chemical Engineering and an M.S. degree in Nuclear Engineering from Mississippi State University. I have over 24 years of experience in the nuclear power industry, including experience in the areas of new reactor, operational and decommissioning licensing; special projects; organizational assessment; and management support. This includes ten years of supervisory and management experience at a Boiling Water Reactor (“BWR”) facility. A full statement of my professional qualifications is contained in SERI Exhibit 1.

Q4. Please describe your professional responsibilities with regard to the Grand Gulf Nuclear Station (“GGNS”) ESP application, including the basis for your familiarity with that application.

A4. (MM) As part of a larger ENERCON team, I served as a consultant to SERI and supported the development of the ESP application that seeks to demonstrate site suitability for a new commercial nuclear power plant at the GGNS site. As a senior engineer, I was responsible for analyses supporting the application in the areas of offsite hazards, atmospheric dispersion, design basis accidents, and severe accidents. My responsibilities included Sections 2.3, 3.2, and 3.3 of the SSAR and Sections 2.7, 5.4, and 7.1 of the ER.

A4. (JGC) As part of a larger ENERCON team, I served as a consultant to SERI and supported the development of the ESP application that seeks to demonstrate site suitability for a new commercial nuclear power plant at the GGNS site. As the lead licensing project engineer, I coordinated and supported the development of the safety analyses, environmental report (“ER”), and emergency planning assessment for the ESP application. I also participated in site safety and environmental visits, the development of applicant responses to Nuclear Regulatory Commission (“NRC”) Staff requests for additional information (“RAIs”), and the Advisory Committee on

Reactor Safeguards (“ACRS”) review process. My work also involved active participation in the industry ESP task force and numerous licensing-related interactions with the NRC Staff.

Q5. In its Order (Requesting Specific Summary Exhibits and Supplemental Briefs; Identifying Hearing Issues and Requesting Evidentiary Presentations on Specific Issues) of November 6, 2006, the Atomic Safety and Licensing Board (“Board”) identified a series of hearing issues on which the Board has required testimony and presentations from the NRC Staff. The Staff submitted its pre-filed testimony on November 20, 2006. *See* NRC Staff Pre-Filed Testimony Concerning Hearing Issue I: “Radiological Reviews And Confirmatory Analyses” (Nov. 20, 2006). Have you reviewed the Staff’s testimony on Hearing Issue I?

A5. (MM, JGC) Yes.

Q6. During the October 31, 2006, pre-hearing conference, the Board expressly authorized the Applicant, as appropriate, to submit supplemental pre-filed testimony for the limited purpose of clarifying and/or providing additional factual information that may inform the Board’s mandatory hearing review and decision-making process. *See* Transcript of October 31, 2006, Pre-hearing Conference at 8. Do you wish to provide any such supplemental testimony at this time?

A6. (MM, JGC) Yes. We are offering supplemental testimony with respect to Answer 3 of the Staff’s pre-filed testimony. Specifically, we have augmented the discussion of the Applicant’s and the Staff’s radiological analyses of normal gaseous and liquid effluent releases.

Q7. Please describe the Applicant’s and the Staff’s analyses with respect to gaseous radiological effluent releases.

A7. (MM, JGC) For the gaseous release pathway, SERI and the Staff calculated annual radiation exposures for the population within a 80-km (50-mi) radius of the site and for hypothetical individuals of various ages, by using the GASPARI code and assuming the following pathways:

- direct radiation from immersion in the gaseous effluent cloud and from particulates deposited on the ground;
- inhalation of gases and particulates;
- ingestion of milk contaminated through the grass-cow-milk pathway;
- ingestion of vegetables contaminated by particulates; and
- ingestion of meat from animals grazing on contaminated pasture.

The methodology contained in the GASPARI program, which is described in NUREG/CR-4653, "GASPARI – Technical Reference and User Guide" (Mar. 1987), was used to determine the gaseous pathway doses. This program implements the radiological exposure models described in Regulatory Guide 1.109, Revision 1, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 C.F.R. Part 50, Appendix I" (Oct. 1977) for radioactivity releases in gaseous effluents.

Three types of doses were calculated by the Staff and compared with SERI's calculations.

Those doses include:

- doses to an individual located at the exclusion area boundary of 0.93 km (0.58 mi) north of the site as a result of gamma air dose, beta air dose, total body dose and skin dose;
- doses to hypothetical individuals (maximally exposed individual) of various ages that are exposed to gaseous radioactive effluents via the pathways listed above; and
- doses to the population residing within an 80-km (50-mi) radius of the site.

The input data for the dose analysis are summarized in the table below.

Input Description	Location of Data (SSAR)	Data Source
Source Term	Table 1.3-2	Composite release
Population Data	Section 2.1	Projected population at the end of plant life – i.e., 2070
Meteorological Data	Section 2.3	GGNS site data
Consumption Factors	Table 3.2-2	Regulatory Guide 1.109, Table E-5.
Milk Production within 5 miles	Table 3.2-6	Land use survey
Meat Production within 5 miles	Table 3.2-7	Land use survey
Vegetable Production within 5 miles	Table 3.2-8	Land use survey

For parameters that are not site-specific, the Applicant used default values from Regulatory Guide 1.109

The results of the Applicant’s dose analysis are provided in Site Safety Analysis Report (“SSAR”) Table 3.2-3A, “ANNUAL DOSE TO A MAXIMALLY EXPOSED INDIVIDUAL FROM GASEOUS EFFLUENTS (Per Unit)”, and SSAR Table 3.2-4, “ANNUAL POPULATION DOSES - GASEOUS PATHWAY.” These results are within the regulatory design objectives. The Staff concluded that there would be no observable health impacts due to normal gaseous releases from a new nuclear plant and, therefore, that the health impacts would be SMALL. *See* FEIS at 5-58.

Q8. Please describe the Applicant’s and the Staff’s evaluations with respect to liquid radiological effluent releases.

A8. The release of small amounts of radioactive liquid effluents currently is permitted at GGNS, and would be expected to be permitted for the new facility at the GGNS ESP Site, as

long as releases comply with the requirements specified in 10 C.F.R. Part 20. The important exposure pathways include:

- internal exposure from ingestion of water or contaminated food chain components;
- external exposure from the surface of contaminated water or from shoreline sediment; and
- external exposure from immersion in contaminated water.

The LADTAP II computer program, as described in NUREG/CR-4013, "LADTAP II—Technical Reference and User Guide" (Apr. 1986), and the liquid pathway parameters presented in ER Table 5.4-1, were used by the Staff and SERI to calculate the maximally exposed individual dose from this pathway. The LADTAP II program implements the radiological exposure models described in Regulatory Guide 1.109, Revision 1, for radioactivity releases in liquid effluents. The input parameters used are listed below:

LIQUID PATHWAY PARAMETERS⁴

Description	Parameter
Effluent Discharge ¹	12,800 gpm
Source Term ²	Isotope Maximum Composite Release
Commercial Fish Catch ³	446,467 kg
Invertebrate Harvest ³	3,511 kg

NOTES:

1. ER Table 3.0-1.
2. ER Table 3.0-8.
3. GGNS Unit 1 FER.
4. ER Table 5.4-1.

Consumption Factors were obtained from NRC Regulatory Guide 1.109, Table E-5.

The results of this analysis are given in ER Table 5.4-8, "Liquid Pathway Comparison of Maximum Individual Dose to 10 Cfr 50, Appendix I Criteria" and ER Table 5.4-10, "Estimated Population Dose from Liquid Effluents via the Aquatic Food Pathway." These results are within the regulatory design objectives. The Staff concluded that there would be no observable health impacts due to normal liquid releases from a new nuclear plant and therefore the health impacts would be SMALL. See FEIS at 5-58.

Q9. Does this conclude your prefiled testimony on Hearing Issue I?

A9. (MM, JGC) Yes.

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CERTIFICATE OF SERVICE

I hereby certify that copies of System Energy Resources Inc. Prefiled Testimony Concerning Hearing Issue [A Through I], with associated exhibits, in the above captioned proceeding have been served as shown below by deposit in the United States Mail, first class, this 22nd day of November, 2006. Additional service has also been made this same day by electronic mail as shown below.

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