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January 12, 2001

Mr. Lawrence C. Ruth  
U.S. Nuclear Regulatory Commission  
NRR/DSSA/SPLB  
Mail Stop 11A1  
One White Flint North  
11555 Rockville Pike  
Rockville, MD 20852-2738

**Re: JCN J-2427, Task 8, "Engineered Safety Features Ventilation System Technical Specification Amendment Reviews" - Sub-task 2.e - Final Technical Evaluation Report (TER) - Oyster Creek Nuclear Generating Station, TAC MA7804.**

Dear Mr. Ruth:

For licensee submittals in response to Generic Letter 99-02, "Laboratory Testing of Nuclear Grade Activated Charcoal," Sub-tasks 2.a and 2.b specify that BNL review the technical specification (TS) Amendment Request for Compliance with the Actions Requested in Generic Letter 99-02. BNL is to prepare a letter with input for a request for additional information (RAI), as necessary, to support the review of the TS amendment request and submit the draft RAI input to the NRC Technical Monitor, John Segala. BNL is to then participate in telephone discussions with the NRC Technical Monitor, as necessary, to discuss the RAI input and prepare final RAI input and submit final RAI input to the Technical Monitor. Following a telephone call with licensee under Sub-task 2.c, as necessary, BNL is to prepare a draft technical evaluation report (TER) regarding review of the TS amendment request under Sub-task 2.d. (BNL is not required to provide any summary of the telephone calls. Such summaries are normally written by the NRC Project Manager for each plant). Under Sub-task 2.e, the draft TER will be accepted as the final TER if the Technical Monitor does not have any comments.

In fulfillment of Sub-task 2.e, we are enclosing a hard copy **Final TER** for the Oyster Creek Nuclear Generating Station. The Final TER package includes the TER and associated tables (Table 1 - Current TS Requirements; Table 2 - Proposed TS Requirements, both part of the TER). Table GL99-02 (Oyster Creek Nuclear Generating Station), entitled "Industry Responses to Generic Letter (GL) 99-02 on Laboratory Testing of Nuclear-Grade Activated Charcoal," which contains five sections summarizing the licensee response to Items 1 to 5 of GL 99-02, is for NRC information purposes only.

A081

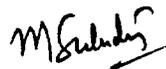
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JCN J-2427, Task 8  
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John Segala has already provided comments on the electronic draft version of this final TER sent on September 29, 2000. BNL submitted the draft RAIs to NRC on May 2, 2000. A telephone call was held between NRC and the licensee on July 19, 2000. Later discussion with NRC indicated that the licensee will provide written responses to all our RAIs. Another telephone conversation was held on September 7, 2000 and the licensee discussed all their responses during this call. The staff verbally accepted the licensee's responses. Based on this, the licensee submitted a formal written response on September 15, 2000. BNL received licensee responses to all three RAIs on September 19, 2000.

In our Final TER sent to you on October 3, 2000, the proposed test relative humidity discussed in the evaluation section is inconsistent with the values indicated in Tables 1 and 2. Therefore, we are enclosing this revised Final TER. If there are no further comments on this Final TER, we will assume that JCN J-2427, Task 8, is complete for the Oyster Creek Nuclear Generating Station. We will be most pleased to answer any questions on this matter.

Sincerely yours,



Mano Subudhi  
Engineer

MS

enclosure

c: J. Segala, NRC

w/o enclosure

D. Diamond

J. Higgins

W. Horak

**TECHNICAL EVALUATION REPORT  
BROOKHAVEN NATIONAL LABORATORY  
FOR THE OFFICE OF NUCLEAR REACTOR REGULATION  
DIVISION OF SYSTEMS SAFETY AND ANALYSIS  
PLANT SYSTEMS BRANCH  
RELATED TO AMENDMENT TO FACILITY OPERATING LICENSE NO. DPR-16  
GPU NUCLEAR, INC.  
OYSTER CREEK NUCLEAR GENERATING STATION  
DOCKET NO. 50 - 219**

## **1.0 INTRODUCTION**

By letter dated December 1, 1999 (1940-99-0558), GPU Nuclear (the licensee) submitted its response to the actions requested in Generic Letter (GL) 99-02, "Laboratory Testing of Nuclear-Grade Activated Charcoal," dated June 3, 1999, for the Oyster Creek Nuclear Generating Station (OCGNS). By the same letter dated December 1, 1999 (1940-99-0558), GPU Nuclear requested a change to the Technical Specifications (TS) Section 4.5.H.1.a.(2), for the Standby Gas Treatment System (SGTS) for OCGNS. By letter dated September 15, 2000 (2130-00-20230), AmerGen Energy Company, who currently holds the operating license of the Oyster Creek Nuclear Generating Station from GPU Nuclear, submitted additional information clarifying the charcoal bed depth and the actual face velocity for the ventilation system. The proposed changes would revise the TS surveillance testing of the safety related ventilation system charcoal to meet the requested actions of GL 99-02.

## **2.0 BACKGROUND**

Safety-related air-cleaning units used in the engineered safety features (ESF) ventilation systems of nuclear power plants reduce the potential onsite and offsite consequences of a radiological accident by filtering radioiodine. Analyses of design basis accidents assume particular safety related charcoal adsorption efficiencies when calculating offsite and control room operator doses. To ensure that the charcoal filters used in these systems will perform in a manner that is consistent with the licensing basis of a facility, licensees have requirements in their TS to periodically perform a laboratory test (in accordance with a test standard) of charcoal samples taken from these ventilation systems.

In GL 99-02, the staff alerted licensees that testing nuclear-grade activated charcoal to standards other than American Society for Testing and Materials (ASTM) D3803-1989, "Standard Test Method for Nuclear-Grade Activated Carbon," does not provide assurance for complying with their current licensing bases with respect to the dose limits of General Design Criterion (GDC) 19 of Appendix A to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR) and Subpart A of 10 CFR Part 100.

GL 99-02 requested that all licensees determine whether their TS reference ASTM D3803-1989 for charcoal filter laboratory testing. Licensees whose TS do not reference ASTM D3803-1989 were requested to either amend their TS to reference ASTM D3803-1989 or propose an alternative test protocol.

### **3.0 EVALUATION**

#### **3.1 Laboratory Charcoal Sample Testing Surveillance Requirements**

The current and proposed laboratory charcoal sample testing TS surveillance requirements for the Standby Gas Treatment System (SGTS) are shown in Table 1 and Table 2, respectively.

The proposed use of ASTM D3803-1989 is acceptable because it provides accurate and reproducible test results. The proposed test temperature of 30°C and relative humidity (RH) of 95% are acceptable because it is consistent with ASTM D3803-1989. This is consistent with the actions requested in GL 99-02.

The credited efficiency for radioactive organic iodine for the SGTS is 90%. The proposed test penetration for radioactive methyl iodide for the SGTS is  $\leq 5\%$ . The proposed test penetration was obtained by applying a safety factor of 2 to the credited efficiency. The proposed safety factor is acceptable because it ensures that the efficiency credited in the accident analysis is still valid at the end of the surveillance interval. This is consistent with the minimum safety factor of 2 specified in GL 99-02.

The August 23, 1999 errata to GL 99-02 clarified that if the maximum actual face velocity is greater than 110% of 40 fpm, then the test face velocity should be specified in the TS. By letter dated September 15, 2000, the licensee stated that the system face velocity at the charcoal adsorber sections for the SGTS is 45.72 fpm at the maximum system flow rates specified in the TS. Since this face velocity is greater than 110% of 40 fpm, the licensee has included the proposed test face velocity of 45.72 in the TS. This is acceptable because it ensures that the testing will be consistent with the operation of the ventilation system during accident conditions. This is consistent with the August 23, 1999 errata to GL 99-02.

### **4.0 CONCLUSION**

On the basis of its evaluation, BNL recommends that the NRC staff consider the proposed TS changes to be acceptable.

Principal Contributors: Anthony Fresco and Mano Subudhi

Date: January 12, 2000

## OYSTER CREEK NUCLEAR GENERATING STATION

<b>TABLE 1 - CURRENT TS REQUIREMENTS</b>											
<b>System Description</b>						<b>Current TS Requirements</b>					
TS Section	System	Bed Thickness (inches)	Actual Charcoal		Credited Efficiency (% organic iodine)	Test Penetration (% methyl iodide)	Safety Factor	Test Standard **	Test Temp (° C) **	Test RH (%) **	Test Face Velocity (fpm)
			Res. Time (sec)	Face Velocity (fpm)							
4.5.H.1.a.(2)	Standby Gas Treatment System (SGTS)	2	0.219	45.72	90	≤ 10	Not stated (1)*	ASTM D3803-1979	30	95	Not stated

\* The safety factor is calculated based on the current test penetration and the credited efficiency.

\*\* Based on the current TS.

\*\*\* Based on the requirements in accordance with ASTM D3803-1989.

<b>TABLE 2 - PROPOSED TS REQUIREMENTS</b>											
<b>System Description</b>						<b>Proposed TS Requirements</b>					
TS Section	System	Bed Thickness (inches)	Actual Charcoal		Credited Efficiency (% organic iodine)	Test Penetration (%methyl iodide)	Safety Factor	Test Standard	Test Temp (° C)	Test RH (%)	Test Face Velocity (fpm)
			Res. Time (sec)	Face Velocity (fpm)							
4.5.H.1.a.(2)	Standby Gas Treatment System (SGTS)	2	0.219	45.72	90	≤ 5	2	ASTM D3803-1989	30	95	Not stated (40)***

**TABLE GL99-02 (OYSTER CREEK NUCLEAR GENERATING STATION)  
(FOR NRC INFORMATION ONLY - 5/2/2000)**

INDUSTRY RESPONSES TO GENERIC LETTER (GL) 99-02 ON LABORATORY TESTING OF NUCLEAR-GRADE ACTIVATED CHARCOAL							
PLANT NAME	Oyster Creek Nuclear Generating Station (OCGNS)	DOCKET NUMBER(S)	50-219	UTILITY/LICENSEE	GPU Nuclear, Inc.		
REACTOR TYPE	BWR 2 Mark I Containment	TAC NUMBER(S)	MA7804	NSSS/ARCH. ENGR.	GE/Burns & Roe		
ENGINEERED SAFETY FEATURES (ESF) VENTILATION SYSTEMS							
No.	VENTILATION SYSTEM	GL GROUP (1-4)	TECH SPEC SECTIONS	CURRENT STANDARDS	ACTUAL FACE VELOCITY (FT/MIN)	COMMENTS	
1	Standby Gas Treatment System (SGTS)	2	4.5.H.1.a.(2)	ASTM D3803-1979	45.72		
GENERIC LETTER REQUESTED ACTION ITEMS							
ITEM 1: Current Tech Spec (TS) Requirements for the Laboratory Testing of Charcoal Samples (Due by November 30, 1999)					December 1, 1999		
No.	TEST PROTOCOL	TEST TEMPERATURE (°C)	TEST RELATIVE HUMIDITY (%)	TEST PENETRATION %	BED THICKNESS (INCHES)	RESIDENCE TIME/BED DEPTH (SEC)	COMMENTS
1	ASTM D3803-1979	30	95	≤10	2	0.219	
ITEM 2: Proposed TS Requirements - ASTM D3803-1989 Test Protocol (Due by November 30, 1999)					December 1, 1999		
No.	TEST TEMPERATURE (°C)	TEST RELATIVE HUMIDITY (%)	TEST PENETRATIO N (%)	TEST FACE VELOCITY (FT/MIN)	NEXT TEST SCHEDULE	COMMENTS	
1	30 °C	95%	≤5%	Not stated	December 1999		
ITEM 3: Proposed TS Requirements - Alternate Test Protocol (Due by November 30, 1999)					13 Req. Items Available		Not Applicable
TEST TEMPERATURE (°C)	TEST RELATIVE HUMIDITY (%)	TEST PENETRATIO N (%)	FACE VELOCITY (FT/MIN)	NEXT TEST SCHEDULE	COMMENTS		
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable			

**TABLE GL99-02 (OYSTER CREEK NUCLEAR GENERATING STATION)  
(FOR NRC INFORMATION ONLY - 5/2/2000)**

<b>ITEM 4: Charcoal Test Performed After August 2, 1999</b>		See Item 2 above	<b>COMMENTS</b>
TESTED IN ACCORDANCE WITH ASTM D3803-1989 ?		Yes	Oyster Creek has modified its contract with Nuclear Containment Systems, Inc. (NCS) to periodically test charcoal to the requirements of ASTM D3803-1989 rather than ASTM D3803-1979. The first test under the new criteria will be performed in December 1999.
NEW CHARCOAL PROCURED TO ASTM D3803-1989 ?		Not stated	
CHARCOAL TEST RESULTS WITHIN ACCEPTABLE LIMITS WITH A SAFETY FACTOR OF 2 ?		Yes	
<b>ITEM 5: Proposed Alternate Course of Action (Due by August 2, 1999)</b>			Not Applicable
PLANS TO PURSUE A PROPOSED ALTERNATE COURSE OF ACTION			Not Applicable
SCHEDULE FOR SUBMITTING THE PROPOSED TEST PROTOCOL FOR NRC REVIEW (Due by November 30, 1999)			Not Applicable
BASIS FOR CONTINUED OPERATION OF AFFECTED SYSTEMS AND COMPONENTS			Not Applicable
<b>ADOPTED CHARCOAL TEST PROTOCOL DATA (ASTM D3803-1989)</b>			
<b>SPECIFICATIONS :</b>	<b>PRE-EQUILIBRIUM (FIRST 16HOURS)</b>	<b>EQUILIBRIUM, CHALLENGE, &amp; ELUTION (FINAL 4 HOURS)</b>	<b>COMMENTS</b>
TEST TEMPERATURE (°C)	30.0±0.4	30.0±0.2	30°C
RELATIVE HUMIDITY (%) Without Humidity Control With Humidity Control	91.0 to 96.0 68.0 to 71.0	93.0 to 96.0 68.0 to 71.0	95%
FACE VELOCITY (M/min)	12.2±0.6	12.2±0.3	Not stated
ABSOLUTE PRESSURE (kPa)	101±5	101±5	Not stated
BED DIAMETER AND DEPTH (mm)	50±1	50±1	Not stated
ADSORBATE CONCENTRATION (mg/M <sup>3</sup> )	Not Applicable	1.75±0.25	Not stated

**TABLE GL99-02 (OYSTER CREEK NUCLEAR GENERATING STATION)  
(FOR NRC INFORMATION ONLY - 5/2/2000)**

SUMMARY OF TECHNICAL SPECIFICATION DATA (CURRENT & PROPOSED)													
No.	VENTILATION SYSTEM	TECH SPEC SECTION S	CREDITED EFFICIENCY (%)		TEST PENETRATION (%)		SAFETY FACTOR		TEST TEMPERATURE (°C)		TEST RELATIVE HUMIDITY (%)		COMMENTS
			CUR R	PROP	CUR R	PROP	CUR R	PROP	CUR R	PROP	CUR R	PROP	
1	Standby Gas Treatment System (SGTS)	4.5.H.1.a(2)	90%	90%	≤10%	≤5%	Not stated (1)*	2	30	30	95	95	
<b>CORRESPONDENCE/TELECONS WITH THE LICENSEE</b>													

**BNL REQUEST FOR ADDITIONAL INFORMATION (RAI)**  
**(5/2/2000)**

**PLANT NAME: OYSTER CREEK NUCLEAR GENERATING STATION (OCGNS)**

**TAC: MA7804**

**NRC TARGET COMPLETION DATE: 08/01/2000**

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The following questions pertain to the single ESF ventilation system identified in Technical Specification Change Request No. 270 for the Standby Gas Treatment System (SGTS):

- 1) Please refer to or provide docketed information which states the current and proposed charcoal bed depths and the residence time per bed depth. (Guidance on calculation of the residence times is available in ANSI N510-1975, Section 8.3.3, and ASME AG-1-1997, Division II, Sections FD and FE, Articles I-1000).
- 2) Please refer to or provide docketed information which states the current and proposed actual system face velocities and the test velocities.

The actual system face velocities can be calculated by dividing the worst case design-basis accident flow rates (typically the maximum technical specification flow rates, nominal +10% upper value) by the total exposed surface area of the charcoal filter media. Per GL 99-02, if this value is >110% of 40 ft/min, then the technical specification (TS) should be revised to specify that value as the test face velocity. (The guidance on calculation of the residence times in ANSI N510-1975, Section 8.3.3, and ASME AG-1-1997, Division II, Sections FD and FE, Articles I-1000 can be used to calculate the actual system face velocities).

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**CONTACT NAME/TELEPHONE:** George Ramble, Paul, Jim Frank, John  
**NRC MONITOR:** John Segala Helen Pastis  
**BNL ENGINEER:** Mano Subudhi  
**DATE:** September 7, 2000

RAI 1: 2" bed and nominal residence time is 0.25 sec.

RAI 2: Face velocity is 45.72 (max)