



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION III  
801 WARRENVILLE ROAD  
LISLE, ILLINOIS 60532-4351

June 18, 2003

Mr. Kurt M. Haas  
General Manager  
Big Rock Point Nuclear Plant  
Consumers Energy Company  
10269 US 31 North  
Charlevoix, MI 49720

**SUBJECT: BIG ROCK POINT INSPECTION REPORT 05000155/2003-002(DNMS) &  
INSPECTION REPORT 07200043/2003-002(DNMS)**

Dear Mr. Haas:

On May 19, 2003, the NRC completed an inspection at the Big Rock Point Nuclear Plant. The purpose of the inspection was to determine whether decommissioning activities were conducted safely and in accordance with NRC requirements. Specifically, the inspectors evaluated decommissioning support activities, spent fuel safety and radiological safety. At the conclusion of on-site inspections on March 20 and April 24, 2003, the inspectors discussed the inspection findings with you and members of your staff. An additional telephone exit interview was conducted on May 19, 2003, to discuss the results of the NRC's independent soil sample analyses.

This inspection consisted of an examination of decommissioning activities at the Big Rock Point Nuclear Plant as they relate to safety and compliance with the Commission's rules and regulations. Areas examined during the inspection are identified in the enclosed report. Within these areas, the inspection consisted of a selective examination of procedures and representative records, observations of activities in progress, and interviews with personnel.

Based on the results of this inspection, the NRC did not identify any violations. The decommissioning activities reviewed were being conducted in accordance with applicable regulations and license conditions.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

J/28

K. Haas

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We will gladly discuss any questions you may have regarding this inspection.

Sincerely,

/RA/

Christopher G. Miller  
Decommissioning Branch

Docket Nos. 05000155; 07200043  
License No. DPR-6

Enclosures: Inspection Report 05000155/2003-002(DNMS) &  
Inspection Report 07200043/2003-002(DNMS)

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K. Haas

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Sincerely,



Christopher G. Miller  
Decommissioning Branch

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION III**

**Docket No.** 05000155; 07200043  
**License No.** DPR-06

**Report Nos.** 05000155/2003-002(DNMS) &  
07200043/2003-002(DNMS)

**Licensee:** Consumers Energy Company

**Facility:** Big Rock Point Nuclear Plant

**Location:** 10269 U.S. 31 North  
Charlevoix, MI 49720

**Dates:** March 17 - May 19, 2003

**Inspector:** William Snell, Health Physics Manager  
Peter Lee, Ph.D., CHP, Radiation Specialist  
Ross Landsman, Ph.D., Project Engineer  
G. Pirtle, Physical Security Inspector

**Approved by:** Christopher G. Miller, Chief  
Decommissioning Branch  
Division of Nuclear Materials Safety

## EXECUTIVE SUMMARY

### Big Rock Point Restoration Project NRC Inspection Report 05000155/2003-002(DNMS) & Inspection Report 07200043/2003002(DNMS)

This routine decommissioning inspection involved review of the licensee's performance related to decommissioning support activities, spent fuel safety and radiological safety. During this assessment period, the licensee completed placing spent fuel into dry storage casks and moving the casks to the Independent Spent Fuel Storage Installation (ISFSI). In addition, a canister of greater than class C waste was placed on the ISFSI, and all the fuel racks were removed from the Spent Fuel Pool. Overall, the licensee's major decommissioning activities were properly monitored and controlled.

#### Decommissioning Support Activities

- The inspectors determined that Revision 19 of the Defueled Security, Suitability, Training, and Qualification Plan, submitted in accordance with 10 CFR 50.54(p) resulted in no decrease in effectiveness to the security plan. (Section 1.1)
- The licensee submitted Revision 38 to the Defueled Security Plan in accordance with 10 CFR 50.54(p). The security plan change does not relieve the licensee from complying with applicable security advisories and orders issued by the NRC. The inspectors determined that the changes to the Defueled Security Plan did not decrease the effectiveness of the plan. (Section 1.2)

#### Spent Fuel Safety

- Based on direct observations of the Horizontal Transfer System (HTS) test program and reviews of the HTS procedures, the inspectors determined that the licensee personnel could safely transfer a loaded canister between the transfer cask and a storage cask without using the containment building crane. Procedures and administrative controls had been established to ensure compliance with NRC requirements.

#### Radiological Safety

- The inspectors determined that the licensee's pre-demolition surface survey program was capable of measuring the designed radiological survey criteria of 5000 disintegrations per minute per 100 square centimeters (dpm/100 cm<sup>2</sup>). (Section 3.1)
- The bulk material assay system was designed assuming a uniform spatial distribution of contamination within a waste volume. In conjunction with the pre-demolition surface survey program, the inspectors determined the system, as designed, will meet the requirements of the licensee's waste disposal criteria of 5 picocuries per gram. (Section 3.2)
- The licensee's radioanalytical laboratory equipment, laboratory quality assurance program, and analytical procedures were adequate. The program for laboratory analyses was effectively implemented. (Section 3.3)

- Licensee personnel performed soil surface scanning and sample collection at the site of the Old Radwaste Building and its underground vault in accordance with the final status survey program specified in the Big Rock Point Restoration Project License Termination Plan (LTP), which the NRC has received for review and approval. Six of seven soil samples sent to the Oak Ridge Institute for Science and Education (ORISE) for independent analyses showed statistical agreement with the licensee's results. The ORISE personnel concluded that the statistical difference in the one sample was probably due to a small particle of elevated activity in the sample. However, in all cases the sample results were less than the Derived Concentration Guideline Levels (DCGLs). (Section 3.4)
- The inspectors did not identify any concerns regarding the licensee's activities associated with a radioactive waste shipment of contaminated concrete debris and a spent fuel rack. (Section 3.5)

## Report Details<sup>1</sup>

### **1.0 Decommissioning Support Activities**

#### **1.1 Safeguards Program Implementation (81700)**

##### **a. Inspection Scope**

The inspectors reviewed Revision 19, dated October 8, 2002, to the Defueled Security Suitability, Training, and Qualification Plan. The purpose of the review was to verify that the change did not decrease the effectiveness of the security plan. The security plan revision was submitted in accordance with 10 CFR 50.54(p).

##### **b. Observations and Findings**

The revision to the security plan was primarily administrative in nature and addressed security measures for movement of spent fuel.

##### **c. Conclusions**

The inspectors determined that Revision 19 of the Defueled Security, Suitability, Training, and Qualification Plan, submitted in accordance with 10 CFR 50.54(p) resulted in no decrease in effectiveness to the security plan.

#### **1.2 Safeguards Program Implementation (81700)**

##### **a. Inspection Scope**

The inspector reviewed Revision 38, dated March 27, 2003, to the Defueled Security Plan. The purpose of the review was to verify that the changes did not decrease the effectiveness of the security plan.

##### **b. Observations and Findings**

The revision to the security plan was primarily administrative in nature and described under what conditions the provisions of the defueled security plan would be applicable. The revision also showed changes in the security management organizational structure and reporting responsibilities.

##### **c. Conclusions**

The licensee submitted the revision to the Defueled Security Plan in accordance with 10 CFR 50.54(p). The security plan change does not relieve the licensee from complying with applicable security advisories and orders issued by the NRC. The inspectors determined that the changes to the Defueled Security Plan did not decrease the effectiveness of the plan.

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<sup>1</sup>A list of acronyms used in the report is included at the end of the Report Details.

## **2.0 Spent Fuel Safety**

### **2.1 Operation of an Independent Spent Fuel Storage Installation (ISFSI) (60855)**

#### **a. Inspection Scope**

The inspector observed various portions of the licensee's test program for the Horizontal Transfer System (HTS) to determine whether the licensee was capable of safely transferring a loaded canister between the transfer cask and a storage cask located on the ISFSI storage pad. Prior to allowing the licensee to remove the containment building crane, a successful demonstration of the licensee's capability to transfer the canister without the use of the containment building crane was required. The test program was examined to ensure that all conditions and requirements of the Certificate of Compliance, the Safety Analysis Report, Technical Specifications, and 10 CFR Part 72 requirements were met.

#### **b. Observations**

The inspectors reviewed licensee procedures and observed the implementation of those procedures, which tested the licensee's capability to safely transfer a loaded canister between the transfer cask and a storage cask. The procedures were well developed and complete. The licensee held pre-job briefings prior to the implementation of each segment of the procedure. These pre-job meetings were conducted in a professional manner, and the necessary issues to enhance safety (such as the need for three way communication, pre-staging of equipment, and teamwork among work parties) were discussed.

The inspectors observed various portions of implementing the transfer procedures. Licensee personnel exercised good safety practices during heavy lifts and completed the lifts in accordance with procedures. The inspectors observed proper work coverage by health physics and security personnel on the ISFSI storage pad during work activities. The inspector observed good communication and teamwork between licensee personnel from various work groups.

#### **c. Conclusions**

Based on direct observations of the HTS test program and reviews of the HTS procedures, the inspectors determined that the licensee personnel could safely transfer a loaded canister between the transfer cask and a storage cask without using the containment building crane. Procedures and administrative controls had been established to ensure compliance with NRC requirements.

## **3.0 Radiological Safety**

### **3.1 Pre-demolition Surface Contamination Surveys (83750)**

#### **a. Inspection Scope**

The inspectors reviewed the licensee's pre-demolition surface survey program. The review included an evaluation of analytical procedures and the survey instruments' capability to meet the specified pre-demolition minimum detectable activity criteria.



b. Observations and Findings

The inspectors interviewed the licensee's health physics technical personnel and observed calibration and sensitivity tests of the radiological survey instruments that will be used to conduct the pre-demolition final surface surveys. Prior to demolition, the surveys will verify that building surface contamination levels are less than 5000 disintegrations per minute per 100 square centimeters (dpm/100 cm<sup>2</sup>). Based on the observed verification of the instruments' capabilities, the inspectors determined the survey instruments were accurate, and would meet the specified minimum detectable activity criteria based on the planned counting times. Use of the instruments would allow the licensee to measure the designed survey criteria of 5000 dpm/100 cm<sup>2</sup>.

c. Conclusions

The inspectors determined that the licensee's pre-demolition surface survey program was capable of measuring the designed radiological survey criteria of 5000 dpm/100 cm<sup>2</sup>.

3.2 Bulk Material Assay (86750)

a. Inspection Scope

Inspectors evaluated the bulk material assay program and the technical basis for design, calibration, and operation of the bulk assay radiation detection system, to determine whether the system would meet the requirements of the licensee's waste disposal criteria of 5 picocuries per gram (5 pCi/g).

b. Observations and Findings

By cover letter dated February 5, 2002, and in accordance with the provisions of 10 CFR 20.2002, the NRC approved the licensee's proposal to dispose of demolition debris in a State of Michigan landfill. The licensee's proposal contained a commitment that all demolition debris would be monitored by a bulk assay radiation detection system with an alarm setpoint established at or below a 5 picocuries per gram (5 pCi/g) limit prior to disposal. The inspectors reviewed procedures and documents regarding the design, calibration and operation of the bulk assay radiation detection system. The monitoring facilities and equipment were inspected and observed in operation, and personnel knowledgeable of the system were interviewed.

The bulk assay radiation detection system consisted of two side by side trailers spaced just far enough apart for a truck to drive between them. The demolition debris (which was primarily concrete) was deposited into a large roll-off type container, which was positioned on the truck. The truck was driven between the trailers. A scale was located between the trailers so each load could be weighed. Four high-purity germanium detectors were located inside the trailers, and two sodium iodide plastic scintillation detectors were located on the outside of the trailers. The dimensions of the roll-off containers were 670 cm (length) x 229 cm (width) x 107 cm (height) [263 x 90 x 42 inches]. The container was assayed by positioning the roll-off container with two detectors on each side of the container, and with each detector centered to measure a quadrant of the container, 350 cm x 115 cm x 107 cm.

The inspectors found that the bulk material assay system is designed only for a uniform spatial distribution of contamination within a waste volume. To ensure the bulk material assay system functions as designed, additional steps will be required to ensure a uniform spatial distribution of contamination exists within a waste volume prior to the assay. The licensee will ensure that the concrete waste to be monitored by the bulk monitoring system is uniform and less than the 5pCi/gram limit by performing extensive surface contamination surveys of the concrete walls and exposed surfaces prior to the concrete being turned into rubble.

c. Conclusions

The bulk material assay system was designed assuming a uniform spatial distribution of contamination within a waste volume. In conjunction with the pre-demolition surface survey program, the inspectors determined the system, as designed, will meet the requirements of the licensee's waste disposal criteria of 5 pCi/g.

3.3 Quality Assurance/Quality Control (QA/QC) of Radioanalytical Laboratory (83750)

a. Inspection Scope

The inspectors evaluated the radioanalytical laboratory, including the Quality Assurance and Quality Control program and pertinent analytical procedures, to ensure that sample analyses were being performed in an acceptable manner and that the results were accurate. The inspectors also reviewed portions of the licensee's program for laboratory analyses, interviewed laboratory personnel, and reviewed gamma spectrum analyses of a selection of previously analyzed archived samples.

b. Observations and Findings

The laboratory was equipped with high purity germanium detectors for soil sample analyses. The inspectors conducted independent calibration and quality control checks. The analytical results of soil samples previously analyzed were accurate. The inspectors reviewed the results of the licensee's radiochemistry cross check program, and found the results were in agreement with the comparison.

c. Conclusions

The licensee's radioanalytical laboratory equipment, laboratory quality assurance program, and analytical procedures were adequate. The program for laboratory analyses was effectively implemented.

3.4 Soil Sampling at Site of Old Radwaste Building (83801)

a. Inspection Scope

Inspectors evaluated licensee surface surveys and soil sampling for the unrestricted release of the site where the Old Radwaste Building was located.

b. Observations and Findings

The licensee completed the demolition of the Old Radwaste Building and underground vault that was located within the building, and had removed all demolition debris from the area. Soil that been removed from around the vault during it's demolition was spread out on the ground in a layer of one meter or less in depth. The licensee had previously collected soil samples from within the hole where the vault had been located, and was collecting additional samples of the spread out dirt during the inspection. The inspectors observed the licensee performing surface scanning of the soil and collecting soil samples in accordance with the final status survey program specified in the Big Rock Point Restoration Project License Termination Plan (LTP), which the NRC had received for review and approval. After observing the licensee's surface scanning and soil collection and archiving techniques, the inspectors determined that the licensee's techniques were acceptable. The inspectors conducted independent scanning of some of the same areas as the licensee, and obtained similar results.

The NRC sent seven of the soil samples collected and analyzed by the licensee to the Oak Ridge Institute for Science and Education (ORISE) for independent analyses. In all cases but one, ORISE obtained results similar to those of the licensee. In sample #6, the radiological activity of the Cs-137 values were not within statistical agreement. Since the sample size used by ORISE to analyze the sample was smaller than the sample size used by Big Rock Point, ORISE personnel counted the remaining sample material, recombined the soil, took two samples from the recombined soil, and counted them. In none of the cases were the analytical results statistically equivalent. ORISE personnel concluded that the statistical difference was probably due to a small particle of elevated activity in the sample. However, since the results were in all cases less than the Derived Concentration Guideline Levels (DCGLs), no further review was pursued. The results of the analyses are listed in the following table.

Soil Sample Survey Results  
 Radwaste Building Demolition  
 Data in picoCuries per gram (pCi/g)

Sample #	NRC (ORISE)		Big Rock Point	
	Co-60	Cs-137	Co-60	Cs-137
1	0.02	0.09	<MDA <sup>a</sup>	0.09
2	0.09	0.04	0.06	<MDA
3	0.02	0.02	<MDA	0.06
4	0.02	0.51	<MDA	0.37
5	0.12	0.47	0.13	0.43
6	0.11	2.28	0.12	1.62
7	0.80	3.02	0.73	3.45

<sup>a</sup>Less than the minimum detectable activity (MDA).

c. Conclusions

Licensee personnel performed soil surface scanning and sample collection at the site of the Old Radwaste Building and its underground vault in accordance with the final status survey program specified in the Big Rock Point Restoration Project License Termination Plan (LTP), which the NRC has received for review and approval. Six of seven soil samples sent to the Oak Ridge Institute for Science and Education (ORISE) for independent analyses showed statistical agreement with the licensee's results. The ORISE personnel concluded that the statistical difference in the one sample was probably due to a small particle of elevated activity in the sample. However, in all cases the sample results were less than the Derived Concentration Guideline Levels (DCGLs).

3.5 Transportation (86750)

a. Inspection Scope

The inspectors reviewed the licensee's activities regarding a radioactive waste shipment.

b. Observations and Findings

The inspectors observed activities and reviewed transportation documents associated with a shipment of radioactive waste to GTS Duretek facilities in Tennessee. The shipment contained a spent fuel rack in a sea-land container and contaminated concrete debris in three B25 boxes. After reviewing all shipping documents and survey data from the four containers and truck, the inspectors determined that the documents were completed as required. The licensee informed the driver of who was to be notified in the event of an incident, and the driver signed to indicate that he had examined the truck and containers prior to departure. The inspectors did not identify any problems with the shipment.

c. Conclusions

The inspectors did not identify any concerns regarding the licensee's activities associated with a radioactive waste shipment of contaminated concrete debris and a spent fuel rack.

4.0 Exit Meetings

The inspectors presented preliminary inspection results to members of licensee management at the conclusion of onsite inspections on March 20 and April 24, 2003, and in a telephone discussion on May 19, 2003. The licensee acknowledged the findings presented. The licensee did not identify any documents or processes reviewed by the inspectors as proprietary.

**PARTIAL LIST OF PERSONS CONTACTED**

Licensee

K. Haas, Plant General Manager  
K. Pallagi, Radiation Protection & Environmental Services Manager  
W. Trubilowicz, Dry Fuel Storage Manager  
G. Withrow, Engineering, Operations & Licensing Manager  
T. Petrosky, Public Relations

**INSPECTION PROCEDURES USED**

IP 60855	Operation of an Independent Spent Fuel Storage Installation
IP 81700	Safeguards Program Implementation
IP 83750	Occupational Radiation Exposure
IP 83801	Inspection of Final Surveys
IP 86750	Solid Radioactive Waste Management and Transportation

**ITEMS OPENED, CLOSED, AND DISCUSSED**

Opened                      None

Closed                        None

Discussed                    None

**LIST OF ACRONYMS USED**

ALARA	As-Low-As-Reasonably-Achievable
BRP	Big Rock Point
DCGL	Derived Concentration Guideline Levels
HTS	Horizontal Transfer System
ISFSI	Independent Spent Fuel Storage Installation
LTP	License Termination Plan
MDA	Minimum Detectable Activity
NRC	Nuclear Regulatory Commission
ORISE	Oak Ridge Institute for Science and Education
QA	Quality Assurance
QC	Quality Control
RP	Radiation Protection

## LICENSEE DOCUMENTS REVIEWED

Licensee documents reviewed and utilized during the course of this inspection are specifically identified in the "Report Details" above.