

March 22, 2000

Mr. K. P. Powers
Plant General Manager
Big Rock Point Nuclear Plant
Consumers Energy Company
10269 US 31 North
Charlevoix, MI 49720

SUBJECT: NRC INSPECTION REPORT 50-155/2000001(DNMS)

Dear Mr. Powers:

On March 9, 2000, the NRC completed an inspection at your Big Rock Point Nuclear Plant Restoration Project which examined decommissioning activities. The enclosed report presents the results of that inspection.

Areas examined during this inspection included facility management and control; decommissioning support; spent fuel safety; and, radiological safety, with focus on transportation of low level radioactive material. No safety issues or enforcement items were identified during this inspection.

Overall, reactor decommissioning activities were being performed satisfactorily. Management was effectively monitoring, assessing, and controlling the conduct, cost, and radiological aspects of decommissioning. Work on the Spent Fuel Pool Clean Out Project was completed, and good worker performance was observed in and around the spent fuel pool during this project. Radiation exposures received during processing material, and during loading and handling the shipping cask, were well controlled, resulting in a significant reduction in per-cask exposure. Shipments of radioactive materials met NRC and Department of Transportation requirements.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room.

Sincerely,

/s/ B. L. Jorgensen

Bruce L. Jorgensen, Chief
Decommissioning Branch

Docket No. 50-155
License No. DPR-6

Enclosure: Inspection Report 50-155/2000001(DNMS)

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REGION III

Docket No: 50-155
License No: DPR-06

Report No: 50-155/2000001(DNMS)

Licensee: Consumers Energy Company

Facility: Big Rock Point Nuclear Power Plant

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

Dates: February 14-17 and March 6-9, 2000

Inspectors: R. J. Leemon, Reactor Decommissioning Inspector
R. B. Landsman, Project Engineer
P. W. Harris, License Project Manager
E. L. Kulzer, Radiation Specialist

Approved By: Bruce L. Jorgensen, Chief
Decommissioning Branch
Division of Nuclear Materials Safety

EXECUTIVE SUMMARY

Big Rock Point Restoration Project NRC Inspection Report 50-155/2000001(DNMS)

This routine decommissioning inspection covered aspects of facility management and control, decommissioning support activities, spent fuel safety, and radiological safety.

The spent fuel pool (SFP) clean out project, involving removal of significant quantities of radioactive material, was completed. Several shipping casks, each loaded with crushed fuel channels and other reactor vessel components, were successfully loaded and shipped to a licensed burial site. There was good worker performance around the fuel pool and notable as-low-as-reasonably-achievable (ALARA) success in achieving decreasing per-cask doses.

Facility Management and Control

- The material integrity of systems, structures, and components necessary for the safe storage of spent fuel and conduct of safe decommissioning was being maintained. Housekeeping and control of combustible materials were good, and fire equipment was being properly maintained.

Decommissioning Support Activities

- The SFP cleanout project was completed, including removal of a fuel channel rack, with good communication and good teamwork among all the groups involved. An event involving a dropped storage can resulted in no damage and was followed by appropriate corrective and preventive actions.

Spent Fuel Safety

- The safety of the fuel in the SFP was being maintained, with the SFP temperature being maintained about 10°F above the temperature of Lake Michigan.
- During a loss of site power, proper actions were taken according to procedures and support personnel were enlisted in the response.

Radiological Safety

- ALARA planning and radiation work permit briefings for job tasks were effective, and remote TV monitoring of SFP activities was provided as a good ALARA practice.
- The loading of a shipping cask onto a transport carrier and its subsequent shipment to a licensed burial site were observed to be carried out as required, with associated documentation and record keeping completed as specified by procedure. No problems were identified with the activities surrounding the shipment.

Report Details

Summary of Plant Activities

During the inspection period, equipment not necessary for the safe storage of spent fuel and potentially hazardous components and materials were removed from the facility. The Spent Fuel Pool (SFP) Clean Out Project, involving removal of significant quantities of radioactive materials, was completed.

1.0 Facility Management and Control

1.1 General

The inspector conducted frequent reviews of ongoing plant activities and attended licensee meetings and reviews addressing these activities, in order to assess overall facility management and control. Specific events and findings are detailed in the sections below.

1.2 Organization, Management, and Cost Controls at Permanently Shut Down Reactors (36801)

The inspector selectively reviewed the licensee's activities involving overall management and control of the decommissioning process. The effectiveness of the licensee's review of regulatory information applicable to the facility was selectively examined. No problems were identified in these areas.

1.3 Monitored Decommissioning Activities

The inspector attended licensee meetings where the planning, reviewing, assessing, and scheduling of decommissioning activities were observed. The inspector ascertained that activities were in accordance with licensed requirements and that docketed commitments as stated in the Code of Federal Regulations (10 CFR), Defueled Technical Specifications (DTS), Updated Final Hazards Summary Report (FHRSR), Post-Shutdown Decommissioning Activities Report (PSDAR), and Defueled Emergency Plan (DEP). Decommissioning activities monitored by the inspector were as described in the following sections.

1.4 Decommissioning Performance and Status Review at Permanently Shut Down Reactors (71801)

The performance of the licensee and contracted workforce in conducting decommissioning activities was evaluated to determine if these activities were completed in accordance with licensed requirements and commitments. Control and conduct of facility decommissioning activities were examined to verify the requirements of the license and DTS and to ensure the requirements and commitments described in the Updated Final Hazard Summary Report, PSDAR, and DEP, were followed. Specific events and findings are detailed in the section below.

1.4.1 Plant Tours to Evaluate Material Conditions, Housekeeping, and Fire Protection

a. Inspection Scope

The inspector conducted plant tours to evaluate the material integrity of systems/structures/components (SSCs) necessary for the safe storage of spent fuel and conduct of safe decommissioning, to observe and assess the status of facility housekeeping, and to evaluate fire protection issues such as control of combustibles, condition of fire fighting equipment and presence of the plant fire brigade.

b. Observations and Findings

Observations from plant tours showed that the material integrity of SSCs important to safe storage of spent fuel (ISSSF) was being maintained. The inspector discussed tour observations with plant management. The inspector also observed that plant management was actively monitoring plant material conditions.

Housekeeping observations focused on the areas adjacent to and containing equipment for the safe storage of spent fuel, or for radiation protection and monitoring. The inspector determined that most areas of the plant were kept clean and free of the accumulation of dismantlement debris. One stairwell was observed to contain combustible materials (plastic trash can, laundry bins, a metal file cabinet full of paper and plastic material, wood handles, and plastic piping) which did not appear to be within the fire loading limits for transient combustibles and combustible materials were accumulating in this stairwell. Plant management was informed and the situation was corrected.

The fire fighting equipment and stations were properly maintained and ready for use. The installed fire detection and suppression systems were effectively maintained, surveillance tests were performed, and the equipment was capable of performing the intended functions.

Active dismantlement activities which included cutting and grinding were performed with the proper fire protection in place. No fires were started during these activities.

c. Conclusion

Material integrity of SSC's important to safe storage of spent fuel and safety in decommissioning was being maintained. With one minor exception, housekeeping, control of combustible materials and operation of fire equipment were well maintained.

2.0 Decommissioning Support Activities

2.1 Maintenance and Surveillance at Permanently Shut Down Reactors (62801)

The inspector evaluated maintenance and surveillance on SSCs potentially affecting the safe storage of spent fuel and reliable operation of radiation monitoring and effluent control equipment. Direct observations, reviews, and interviews of licensee personnel were conducted to evaluate the proper implementation of DTS, and 10 CFR 50, Appendix B requirements.

2.2 Spent Fuel Pool Clean Out Project Activities (62801)

a. Inspection Scope

The SFP clean out project involved the removal of all non-fuel bearing components from the SFP, with the reactor vessel being used as a water shielded processing tank. The inspector observed workers performing various of these activities in and around the SFP and the reactor cavity. The inspector also attended planning meetings, daily briefings and reviewed the SFP clean out project contingency plans.

b. Observations and Findings

The SFP project meetings were well organized, describing the daily plans, including possible "fill in" work, and relaying work experiences from the previous day. Contingency measures for unexpected radiological conditions were provided, along with discussion of the overall as-low-as-reasonably-achievable (ALARA) plan for the project. ALARA results are discussed in Paragraph 4.3 below.

Daily work activities were performed well on the reactor deck. When problems were encountered, the supervisors were notified and the activity was stopped. The correct contingency plan was generated and executed or repairs were made to processing equipment. Appropriate condition reports were written so the problems could be evaluated by management.

The inspectors reviewed one problem which occurred on March 8 when a one hundred thirty two pound can dropped a distance of approximately 27 feet into the southeast corner of the SFP, while workers were removing these cans. The can that fell had a bayonet type lid which came loose while the power washer was decontaminating it. The lid was brought up, but the can body fell in. The SFP area in which they were working had a 0.75 inch steel plate to reinforce the concrete pad. There was no damage to the floor.

There were a total of four cans that were being removed. The first two cans were brought out without a problem. The third can was dropped. All work was stopped and a brief was held to discuss the problem, the can retrieval, and how to collect the last (fourth) can.

The brief discussed the problem and resolved the issue by lassoing the body of the third can and bringing it to the surface. The fourth and last can was brought up by both lassoing the body and hooking the lid handle. The licensee wrote Condition Report No. C-BRP-00-059, to document the event and corrective and preventive actions.

The removal of the Channel Rack from the SFP took 5 days to complete using a 2000 psi power washer and a tri-nuke vacuum. The Channel Rack was deconned to the vendor's limits of 1800 mr/hr, with two hot spots (7R and 70R) greater than the vendor's limits. The project also used up twenty two 1 micron filters to clean up the SFP. The Channel Rack was then placed in a shielded sea-land container to be shipped to the vendor's facility for processing

The SFP clean out project was completed with the shipment of the last Fort St. Vrain cask on Friday, March 10. The SFP now contains 441 fuel assemblies, some filters, two stainless steel fuel channels, and a few miscellaneous items.

c. Conclusions

The SFP cleanout project was completed, including removal of a fuel channel rack, with good communication and good teamwork among all the groups involved. An event involving a dropped storage can resulted in no damage and was followed by appropriate corrective and preventive actions.

3.0 Spent Fuel Safety

a. Inspection Scope (60801)

The inspector evaluated factors relating to spent fuel and fuel pool safety, including: SFP heatup rate; SFP instrumentation, alarms, and leakage detection; SFP chemistry and cleanliness control; criticality controls; and SFP operation and power supply. The inspector reviewed station logs, interviewed licensee personnel and inspected valve lineups during plant tours. In addition, a loss of site electrical power on March 3, 2000, was reviewed.

b. Observations and Findings

The inspector reviewed the Auxiliary Operator logs containing SFP parameters and locally monitored SFP level and temperature. The inspector verified the criticality monitor was functioning. The inspector also observed that foreign material controls were being used in and around the SFP.

On March 3, 2000, at 4:28 p.m., Big Rock Point lost site power when an off-site construction bulldozer knocked over a power pole one mile from the plant. This caused a 'Z' phase to ground electrical fault which opened the breaker in the sub station feeding the site and the city of Charlevoix. It took the electric company until 9:40 p.m., to repair the power line and restore power. The power was off for about 5 hours.

During the loss of power, spent fuel safety was maintained. The SFP cooling was shut down as required for loss of power, and SFP temperature remained at 71 °F for the duration of the power loss. The SFP heat up rate at the time was such that it would take 17 days to heat the SFP to its limit of 140°F.

The loss of site power did not require any emergency notifications. However, the shift supervisor called in the site emergency director and other support personnel to assist with the loss of power. Also, two certified fuel handlers from the SFP clean out project supplemented the shift crew in carrying out the immediate actions of the off normal procedure for loss of site power.

The immediate actions were as follows:

- The security generator was verified to have started and assumed the security loads and lighting in the monitor station.

- Since power to the monitor station computers were lost as expected, the operator locally verified SFP temperature and level. SFP general area radiation was monitored with a portable radiation monitor because the SFP area radiation monitors were also lost.

When power was restored to the site the main diesel generator was unloaded.

The inspectors discussed the event with the shift operators and reviewed the station logs. The logs were very detailed and contained all the actions taken during the loss of site power. The inspectors determined that no notifications were required for the loss of site power, and no notifications were made to the NRC staff. Also, this loss of site power did not require entry into the site emergency plan.

Condition Report C-BRP-00-0057, "Loss of Site Power," was written to capture the event and determine if any of the procedures needed enhancement.

c. Conclusion

During the loss of site power, proper actions were taken according to procedures and support personnel were enlisted in the response. The safety of the fuel in the SFP was being maintained. Also, the SFP temperature is being maintained about 10°F above the temperature of Lake Michigan.

4.0 Radiological Safety

4.1 General

The inspector conducted reviews of ongoing activities in order to assess the overall RP program. Specific findings are detailed in the sections below.

4.2 Occupational Radiation Exposure (83750 and 83726)

Numerous aspects of licensee processes to minimize occupational radiation exposure were selectively examined in order to evaluate overall radiation safety and to provide for early identification of potential problems. Areas examined included: control of radioactive materials and contamination; surveys and monitoring; and, maintaining occupational exposure ALARA.

The NRC inspector also reviewed the calibration and maintenance of field instruments. The instruments used to count air samples and smears were all observed to have been source checked daily and were within calibration. The inspector observed the actual calibration of instruments and reviewed the weekly and monthly lists of instruments due for calibration. The inspector found no problems in these areas.

4.3 Processing and Removal of Materials from the SFP

a. Inspection Scope (83750, 83728)

The inspector reviewed the licensee's program for planning, processing and removal of materials from the SFP. During the inspection the inspector reviewed the following radiation work permits (RWPs):

RWP B99002	Operation personnel performing rounds, inspections, tagging and training activities.
RWP B99004	Tours, inspections, evaluations and job planning, security functions except coverage of specific RWPs.
RWP B993025	Rigging/loading/handling/inspection and mockup of shipping cask.
RWP B993029	Repair of underwater equipment.
RWP B993033	Processing Control Rod Blades and incore detectors in SFP/Reactor Vessel for shipping and disposal.
RWP B003035	Decommissioning Activities in the RCP Room and Steam Drum.

The inspector attended the pre-job, RWP, and ALARA briefings for jobs requiring the use of these RWPs.

b. Observations and Findings

The ALARA and the RWP briefings addressed the anticipated radiological conditions, access control, and contamination control and hot particle issues. The licensee also generated specific dose goals for each RWP which were job task evaluated. For ALARA purposes (keeping unnecessary personnel off the reactor deck area during the SFP clean out project) RWP B2000004 was rewritten to remove the reactor deck from the general tour RWP. Several different RWPs were written to utilize the different ALARA considerations related to various tasks for the SFP clean out project. This was a good ALARA practice. Briefings improved as experience was gained, and the assignments of workers to the job tasks, and the communication of the work scope to the ALARA planners also improved.

TV monitoring of the SFP Clean Out Project activities was continued from the computer room outside the controlled area. This was an ALARA item which allowed management oversight of the project without entering the controlled area. Two zoom, pan and tilt cameras allowed viewing activities in the SFP, in the reactor vessel and on the reactor deck.

Performing work efficiently, incorporating lessons learned, paying attention to details, and keeping ALARA principles in mind, resulted in a notable per-cask dose reduction while performing this work.

c. Conclusions

ALARA planning, and RWP briefings for job tasks were going well, and remote TV monitoring of SFP activities was provided. Also, the increase in the team's proficiency resulted in reduction in exposure received by members of the team, when processing material to be loaded into a shipping cask, and a reduction in the exposure received when loading and transferring a shipping cask.

4.4 Solid Radwaste Management and Transportation of Radioactive Materials (86750)

4.4.1 General

The inspection included an evaluation to determine whether the licensee properly processed, packaged, stored, and shipped radioactive materials, in order to assess the potential for safety problems resulting from these activities and from the transportation of radioactive materials. During the month of February 2000, there were three sea-land containers and six B25 boxes that were shipped from the facility.

No problems were noted in the evaluation of this area. Radiological control activities in the areas of effluents and solid radwaste were being conducted safely and in compliance with applicable requirements.

4.4.2 Packing and Shipping the Shipping Cask (86740, 86750)

a. Inspection Scope (86740, 86750)

The inspector evaluated licensee compliance with NRC and Department of Transportation (DOT) regulations for packaging and shipment of radioactive materials. Specifically, the inspection focused on the shipment of a significant quantity of licensed material inside a Type B shipping cask. Areas examined included: 1) shipping documentation; 2) loading of the cask within the reactor vessel; 3) closure of the cask for transport; 4) daily RWP briefings; and 5) Radiation Survey Techniques.

b. Observations and Findings

This inspection covered one of nine planned shipments of reactor components for low level radioactive waste disposal. The licensee is using a cask provided by General Atomics to transport the components for disposal. The cask is designated FSV-1 (designed and used in Fort St. Vrain decommissioning) and it is a Type B shipping cask with Certificate of Conformance (CoC) No. USA/9277. The licensee contracted with NUKEM to manage the loading of the cask and to assist the licensee's waste management group for the shipment of the waste. Waste Management Group (WVG) was contracted to characterize the cask contents. Information provided to WVG included dose profiles, metallurgic analysis of the components and estimated time and conditions while the components were being irradiated within the reactor vessel. The characterization is used in the completion of documents for the disposal of the waste and includes nuclides present, activities of each nuclide and characterization of the waste class. The licensee appeared to have adequately monitored the interaction between the above contractors to ensure compliance with NRC and DOT regulations.

c. Conclusions

The loading of a FSV shipping cask onto a transport carrier and subsequent shipment to Barnwell in South Carolina was observed to be carried out as required, and with associated documentation and recordkeeping completed as required by procedure. No problems were identified with the activities surrounding the shipment.

5.0 Exit Meeting Summary

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on March 9, 2000. The licensee acknowledged the findings presented. The inspectors reviewed no proprietary information during this inspection period. The licensee did not identify any documents or processes reviewed by the inspectors as proprietary.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

M. Bourassa, Licensing Supervisor
L. Darrah, Technical Support and Assessment Superintendent (RP&ES)
S. Guthrie, Dry Fuel Storage Project
M. Lesinski, Radiation Protection and Environmental Services Manager (RP&ES)
H. Linsinbigler Jr., Dismantlement, Maintenance and Planning
R. McCaleb, Nuclear Performance Assessment, Site Lead (NPAD)
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M. VanAlst, Security Manager
R. Wills, Radwaste Superintendent
G. Withrow, Engineering and Licensing Manager
E. Zienert, Human Resources and Administrative Department Manager

INSPECTION PROCEDURES USED

IP 36801:	Organization, Management, and Cost Controls at Permanently Shut Down Reactors
IP 37801:	Safety Review, Design Changes, and Modifications at Permanently Shut Down Reactors
IP 60801:	Spent Fuel Pool Safety at Permanently Shut Down Reactors
IP 62801:	Maintenance and Surveillance at Permanently Shut Down Reactors
IP 71801:	Decommissioning Performance and Status Review at Permanently Shut Down Reactors
IP 83726	Control of Radioactive Materials, Contamination, Surveys, and Monitoring
IP 83750:	Occupational Radiation Exposure
IP 84750:	Radwaste Treatment, Effluent and Environmental Monitoring
IP 86740:	Inspection of Transportation Activities
IP 86750:	Solid Radwaste Management and Transportation of Radioactive Materials

LIST OF ACRONYMS USED

ALARA	As-Low-As-Reasonably-Achievable
CoC	Certificate of Compliance
CFR	Code of Federal Regulations
DEP	Defueled Emergency Plan
DOT	Department of Transportation
DTS	Defueled Technical Specifications
FHSR	Final Hazards Summary Report
FSV	Fort Saint Vrain (Shipping Cask)
ISSSF	Important to Safe Storage of Spent Fuel
MIS	Maintenance Information System
NRC	Nuclear Regulatory Commission
PSDAR	Post-Shutdown Decommissioning Activities Report
RWP	Radiation Work Permit
SFP	Spent Fuel Pool
SSCs	Systems, Structures and Components
WMG	Waste Management Group

LICENSEE DOCUMENTS REVIEWED

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