Consumers Energy

A CMS Energy Company

Big Rock Point Nuclear Plant
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March 31, 2005

10 CFR 50.82(a)(7)

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

DOCKETS 50-155 AND 72-043 – LICENSE DPR-6 – BIG ROCK POINT PLANT – POST SHUTDOWN DECOMMISSIONING ACTIVITIES REPORT (PSDAR); REVISION 4

Pursuant to 10 CFR 50.82(a)(7), Consumers Energy hereby submits Revision 4 to the Post Shutdown Decommissioning Activities Report (PSDAR) for Big Rock Point Plant. This revision incorporates a revised, detailed schedule and table of decommissioning activities. The schedule revision also updates the previous revision by indication of completed activities.

Minor revision to the "General Decommissioning Activities Relating to Removal of Radiological Components and Structures" was made to eliminate specific discussion on methods of monitoring airborne contamination. This revision was made to ensure consistency with the requirements of the Offsite Dose Calculation Manual (ODCM).

The discussion on cost estimate has also been revised, consistent with the information presented to the Michigan Public Service Commission in March 2004. The revision includes a reference to the annual Big Rock Point Plant (BRP) submittal of Financial Certification pursuant to 10 CFR 50.75(f)(1).

Revisions included update of the discussion on the total volume of radioactive waste disposed and editorial revisions on the temporary on-site storage of low-level radioactive waste and the disposal of hazardous wastes. This revision on volume has been previously reviewed and approved by the U.S. Nuclear Regulatory Commission in their Safety Evaluation Report (SER) of February 19, 2005, "Approval of Proposed Revision to Disposal Procedures in Accordance with 10 CFR 20.2002." Therefore, the environmental impacts associated with site-specific decommissioning activities continue to remain in compliance with 10 CFR 50.82(a)(6)(ii).

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This PSDAR revision (Attachment I) entirely replaces PSDAR revision 3, which was submitted on May 28, 2003. Therefore, no replacement pages are included.

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Site General Manager

cc: Administrator, Region III, USNRC
NRC Decommissioning Inspector, Big Rock Point
NRC NMSS Project Manager

ATTACHMENTS

ATTACHMENT I

Big Rock Point Plant
March 31, 2005
POST SHUTDOWN DECOMMISSIONING ACTIVITY REPORT
Revision 4

16 pages

PSDAR TABLE OF CONTENTS

BIG ROCK POINT PLANT
POST SHUTDOWN DECOMMISSIONING ACTIVITIES REPORT
REVISION 4

INTRODUCTION

Under the provisions of 10 CFR 50.82(a)(7), Consumers Energy Company hereby submits Revision 4 to the Post Shutdown Decommissioning Activities Report (PSDAR) to describe planned decommissioning activities, a schedule for their accomplishment, estimate expected costs, and provide the reasons for concluding that the environmental impacts associated with site-specific decommissioning activities will be in compliance with 10 CFR 50.82(a)(6)(ii).

BACKGROUND

When Consumers Energy Company's Big Rock Point Plant began operation in September 1962, it was the first commercial nuclear power plant constructed in Michigan and the fifth in the United States. The General Electric Boiling Water Reactor (BWR) was rated for 240 Megawatt (MW) Thermal, and was built by Bechtel Corporation. By letters dated June 18, 1997, and June 26, 1997, Consumers Energy Company notified the Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 50.82(a)(1)(i), that Big Rock Point Plant would permanently cease operation by August 30, 1997. On August 29, 1997, the reactor was permanently shutdown, ending 35 years of electric power generation as the nation's oldest and longest running nuclear plant. It was closed because its relatively small size (67MW Electric) was likely to make it too expensive to operate in an increasingly competitive environment. On September 22, 1997, another letter was forwarded to the Commission certifying that the fuel has been removed from the reactor vessel and placed in the spent fuel pool for storage.

Consumers Energy Company's goal is to immediately dismantle Big Rock Point Plant in a safe, environmentally conscious, and cost effective manner. This action will result in the timely removal of the existing nuclear plant in accordance with the DECON option found acceptable to the NRC in its Final Generic Environmental Impact Statement (FGEIS) [Reference 1]. Completion of this option is contingent upon continued access to one or more low level waste disposal sites. Currently, Consumers Energy Company has access to Chem Nuclear - Barnwell, South Carolina and Envirocare of Utah - Clive, Utah.

DESCRIPTION OF PLANNED DECOMMISSIONING ACTIVITIES

Decommissioning Activities and Planning
The activities planned for decommissioning of the Big Rock Point Plant reflect the DECON option for the site. Work plans will be completed for decommissioning activities prior to commencing the activity. Table 1 shows the major decommissioning periods and milestones for the Big Rock Point Restoration Project. This summary table begins with significant pre-shutdown milestones and highlights the major periods, phases, and milestones throughout the decommissioning process.

License Termination Plan (LTP) Chapter 3, submitted April 1, 2003, contains a Project Schedule that shows the significant decommissioning activities. The information in this submittal supplements and serves as a revision to the LTP Chapter 3 Project Schedule.

Planning Activities
Subsequent to the Consumers Energy Company June 18, 1997 notification to the NRC of plans to permanently shutdown the Big Rock Point Plant, a site organization was developed to decommission the plant. This organization became effective September 15, 1997. Revisions to the site Emergency Plan, Security Plan, Fire Protection Plan, Technical Specifications, Offsite Dose Calculation Manual, Updated Final Hazards Summary Report (UFHSR), and Quality Program Description were revised to support decommissioning and will continue to be revised and submitted to the NRC, as necessary.

Continuing planning and execution of decommissioning includes the following generalized types of tasks.

- Review all existing plant programs to assess their applicability to decommissioning and dry fuel storage on an Independent Spent Fuel Storage Installation (ISFSI),
- Review and reclassify systems important to decommissioning activities (This task has been completed),
- Revise procedures and license basis documents to reflect the plant's permanently defueled and dry fuel storage configuration,
- Complete the radiological and hazardous material characterization of the site,
- Design and procure equipment and facilities to support decommissioning and dry fuel storage activities,
- Identify all specific decommissioning and dry fuel storage activities,
- Prepare work plans for all decommissioning and dry fuel storage activities,
- Prepare dose estimates for all decommissioning activities,

- Evaluate disposition options for site components and structures,
- Develop a cost measurement and control mechanism, (This task has been completed) and
- Develop an activity schedule consistent with the overall schedule. A key step in the decommissioning planning was the completion of the selection of a project staff and establishment of an organizational structure. This step mobilized site management and staff personnel augmented with on-site specialty contractors.

Plant Dismantlement
Former industrial area decommissioning planning was based on selecting the DECON option and will result in the complete dismantlement and restoration of the area. The facilities remaining to support dry storage of the fuel will be decontaminated and/or dismantled after the U.S. Department of Energy (DOE) has received the spent fuel.

The following significant activities are anticipated to occur or have occurred during the dismantlement period:

- Perform primary system decontamination (completed),
- Establish a site construction power system (completed),
- Remove asbestos insulation and plant piping systems (activity in progress, approximately 98% complete),
- Remove turbine control oil (completed),
- Establish a new spent fuel pool cooling system (completed),
- Construct an Independent Spent Fuel Storage Installation (ISFSI) for dry cask storage (completed),
- Remove all fuel from wet storage in the spent fuel pool and store fuel on the ISFSI in the dry fuel storage casks, including greater than class C waste (completed),
- Drain the spent fuel pool (completed),
- Dismantle systems, structures and components not required for the safe storage of spent fuel on the ISFSI, including major component removal (completed),
- Conduct decontamination of facility surfaces, components and piping surfaces as required,
- Conduct soil remediation as necessary,

- Ship and properly disposition all radioactive materials,

- Perform a comprehensive final status survey to demonstrate compliance with approved site release criteria (10 CFR 20, subpart E).

The only structures and facilities remaining after plant dismantlement and former industrial site restoration will be those needed to support the dry storage of the spent fuel, and portions of the former intake line and supporting structures in Lake Michigan. All subsurface structures will be removed with the exception of the septic drainfield.

SIGNIFICANT DECOMMISSIONING ACTIVITIES

10 CFR 50.2 defines major decommissioning activities as those that result in permanent removal of major radioactive components (e.g. reactor vessel and internals, large bore reactor coolant system piping, and other large components that are radioactive to a comparable degree), permanently modify the structure of the containment, or result in dismantling components for shipment containing greater than class C waste.

The following discusses several planned (and completed) significant decommissioning activities at Big Rock Point Plant:

Reactor Vessel
The reactor vessel was fabricated from carbon steel with an internal stainless steel cladding. The entire outside of the reactor vessel was insulated with 3-inch thick metallic insulation. It was attached to the reactor vessel by banding and was supported by brackets welded to the outside surface of the reactor vessel. The reactor vessel was supported by 12 brackets attached to the exterior vessel shell. Twenty-four 2-1/2-inch diameter hanger rods attached to these brackets transfered the reactor vessel weight to supports anchored in the surrounding concrete.

During power operations, neutron irradiation from the fission process generated activation products in the stainless steel vessel liner, the carbon steel vessel shell, and metallic insulation. The radionuclide inventory for the reactor vessel as a unitized package was a Type B quantity, meeting the Low Specific Activity (LSA) material criteria. As a result, the reactor vessel as a unitized package was exempt from the requirements of 10 CFR 71.73, "Hypothetical Accident Conditions." The radionuclide content estimates were verified with a radiation survey of the reactor vessel after the internal components were removed. Detailed classification evaluations were completed as a part of detailed planning for the reactor vessel removal activity.

The reactor vessel and head were shipped to licensed low-level radioactive waste disposal facility. The reactor vessel was shipped as class B waste and the reactor head was shipped as class A waste.

Steam Drum
The steam drum was part of the Nuclear Steam Supply System and was located in the reactor building. It was a 40-foot 9-inch long by 7-foot 2-inch diameter, horizontal steel cylinder with ellipsoidal heads. The steam drum contained 60 steam separators arranged in two equal rows. The steam drum's vessel wall was 4-3/8 inches thick A-212B carbon steel with 5/32" Type 304 stainless steel cladding. The nozzles were primarily ASTM A-105 Grade II carbon steel with a 5/32-inch Type-304 stainless steel clad. Nozzles, smaller than 4 inches, were made from SB-166 Inconel material. Internal components were made from Type 304 stainless steel.

The steam drum was chemically decontaminated as part of the Nuclear Steam Supply System, and was drained and isolated until ready for dismantlement in accordance with general decommissioning activities. The steam drum was shipped to a low-level radioactive waste disposal facility.

Primary Coolant System
Primary coolant system piping connected all major components of the Nuclear Steam Supply System. The primary coolant system was chemically decontaminated, drained, and isolated for dismantlement. Large bore piping was removed from this system and was shipped to a low-level radioactive waste disposal facility.

Containment Vessel
The containment vessel is a 130-foot diameter, Hortonsphere steel vessel. The sphere extends 27 feet below grade and 103 feet above grade. The containment vessel is constructed of 3/4-inch (nominal) steel plates. The exterior columns were used during construction and were unloaded after construction and testing of the containment vessel. During the decommissioning process they will be reloaded or removed, as necessary. The foundation of the containment vessel is a reinforced concrete cradle in the shape of an inverted spherical dome segment approximately 7 feet thick.

The containment surfaces and structures will be decontaminated and dismantled in accordance with general decommissioning activities.

Spent Fuel Pool
The spent fuel pool was emptied; it was decontaminated and was dismantled in accordance with general decommissioning activities.

OTHER DECOMMISSIONING CONSIDERATIONS

The decontamination and/or dismantlement of contaminated systems, structures, and components may be accomplished by decontamination in place, dismantlement and decontamination, or dismantlement and disposal. A combination of these methods may be utilized to reduce contamination levels, worker radiation exposure, and project costs. General considerations applicable to these activities are described below.

Chemical Decontamination of the Primary Coolant System
A chemical decontamination of the primary coolant system was performed prior to conducting any major decommissioning activity. Approximately 425 Curies were removed. The chemical decontamination was a significant ALARA initiative performed to reduce personnel exposure during decommissioning work activities. This decontamination effort included the reactor vessel and steam drum, steam risers and recirculation piping, and the shutdown cooling system. The cleanup system was decontaminated in a similar manner. The reactor recirculating water pumps were used to circulate the cleaning solution throughout the primary and selected interconnected systems. Modifications were required to establish specific flow paths and isolation points. A qualified contractor, following approved site-specific controls, performed this decontamination effort.

General Decommissioning Activities Relating to Removal of Radiological Components & Structures
Components will be safely and efficiently removed using the most appropriate methods for the particular circumstance. Work packages will be prepared for activities related to the dismantlement of plant systems, structures, and components. Openings in components will typically be covered to prevent the spread of contamination. Components may be moved to a processing area for volume reduction and packaging into containers for shipment to a waste disposal site or a processing facility for decontamination.

Following are several general decontamination and dismantlement considerations that will be incorporated into the decommissioning work packages:

- Release of airborne contamination will be controlled in accordance with the Offsite Dose Calculation Manual (ODCM)

- Radioactive particulate emission will be monitored in accordance with the ODCM.

- Decommissioning activities that use liquids will ensure that the contaminated liquids will be processed, as necessary, and sampled and monitored in accordance with the ODCM prior to release.

- Non-radioactive hazardous materials and wastes will be dispositioned in accordance with Consumers Energy Company Waste Management Program. Typical materials handled and disposed of through this program include fuel oil, lubricating oil, 1,1,1-trichloroethane, laboratory chemicals, lead, mercury, paints, battery acid, and asbestos containing materials. Considerations include the following:

  - Materials containing asbestos (e.g. insulation) will be removed and processed in accordance with this program.

  - The decontamination and dismantlement methods to be used on systems, structures, and components that contained or were immersed in chromated

solutions will be evaluated and the methods selected to minimize the potential for creating a mixed waste.

- Instrumentation and control components will be evaluated, and the dismantlement method will be selected to minimize the potential for creating a hazardous waste. Switching elements that contain mercury will be removed from the instrument when practicable.

- Contaminated systems, structures, and components with significant external contamination, will be decontaminated to remove the loose external contamination, coated to stabilize the contamination, bagged to prohibit contamination spread, or otherwise controlled to prevent personnel or plant contamination during removal.

- Contaminated piping and tubing should be removed as follows:

  - Piping will be cut using methods that minimize the generation of airborne contamination. When appropriate, remote cutting systems may be used to maintain worker exposure ALARA.

  - Protective covers or plugs may be installed on ends of contaminated piping to confine internal contamination.

  - Piping penetrations will be cut as close as practicable to the containment vessel shell. The openings in the containment vessel will be covered or plugged once the piping is removed.

  - Underground piping identified for removal will be evaluated prior to cutting and removal to identify a method appropriate to the physical condition of the pipe.

- Contaminated supports will be removed in conjunction with the equipment removal activities.

- Systems and components may be removed from areas and buildings prior to the start of structural decontamination activities. Walls may be removed as required to permit removal of components.

- Embedded contaminated piping, conduits, ducts, plate, channels, anchors, sumps and sleeves may be removed or decontaminated during area and building structural decontamination activities.

- Equipment designated for asset recovery or re-use in the Consumers Energy Company system may be preserved in accordance with vendor recommendations or Consumers Energy Company practices.

- Components with paint coatings containing regulated quantities of PCBs will be identified, stored, and disposed of in accordance with federal regulations and guidance. Mixed PCB/radwaste disposal options will be addressed throughout the decommissioning process.

Special or Unusual Programs
There are no special or unusual programs planned. All procedures and processes to be applied at Big Rock Point Plant are consistent with those discussed in the Final Generic Environmental Impact Statement on Decommissioning (NUREG-0586).

Bulk Material Removal Program
U.S. Nuclear Regulatory Commission approval for disposal of demolition debris containing less than 5 pCi/gram of principle gamma emitters, pursuant to 10 CFR 20.2002, was obtained on February 5, 2002 and amended on January 19, 2005. Approximately 110 million pounds of demolition debris will be shipped to a State of Michigan Type II Licensed landfill and approximately 3 million pounds of demolition debris contaminated with polychlorobiphenyl (PCB) will be shipped to a landfill licensed by Michigan and the U. S. Environmental Protection Agency (EPA).

Low Level Radioactive Waste Removal and Handling
Low level radioactive waste will be handled in accordance with plant procedures, then shipped either to licensed offsite processors for further processing such as decontamination for free release, metal melt, incineration, or shipped for disposal at licensed facilities. No onsite incineration will be performed.

Soil Remediation
Soils, residual concrete rubble from demolition of structures, rubblized paving and other soil-like materials not disposed of in an offsite landfill will be surveyed to determine if residual radioactivity of plant origin is present, and if so, the radioactivity concentrations present. Such soils and soil-like materials will be remediated (i.e., removed, processed, and disposed of at a licensed facility) if determined to contain levels of radioactivity which would result in doses above the NRC site release guideline values of 10 CFR 20, subpart E.

Processing and Disposal Site Locations
A number of facilities are available for processing of radioactive waste materials. These facilities provide services that include, but are not limited to, decontamination, incineration, metal melt, compaction or other methods of consolidation and disposal of low-level radioactive wastes. A partial list of such facilities includes: Duratek, Oak Ridge, TN and Barnwell, SC; and Envirocare of Utah, Clive, UT.

Resource Conservation and Recovery Act and Removal of Mixed Wastes
All applicable regulations of state and federal authorities will be followed in the handling, storage and transport of hazardous and mixed wastes. Transport will only be by authorized licensed transporters and shipment will be only to licensed facilities. If technology, resources, and approved processes are available to render hazardous or mixed waste non-

hazardous, such processes may be considered to minimize the hazards of transport and disposal of the wastes.

Spent Fuel and Greater Than Class C Waste
Spent fuel was stored wet in the spent fuel pool until dry transportable storage canisters were available, and fuel had decayed sufficiently to meet license conditions of the canisters. Loading of dry fuel storage canisters was completed on March 26, 2003. An onsite Independent Spent Fuel Storage Installation (ISFSI) accommodates all spent fuel in seven storage casks. Fuel is expected to be retained until U.S. Department of Energy (DOE) fulfills their obligation to receive the fuel.

Greater than Class C (GTCC) wastes are comprised of reactor internals exposed to many years of neutron flux. GTCC waste generated from the operation of the reactor was cut into dimensions suitable for storage within a dry storage canister. Loading of the GTCC storage canister was completed on May 2, 2003. This GTCC canister is stored on the onsite ISFSI. It will be transferred to DOE as GTCC waste. This option is allowed by storage canister design. The Big Rock Point Staff will continue to monitor industry efforts and progress towards GTCC shipment to DOE.

SITE RESTORATION

During the process of dismantlement and decontamination to greenfield (DECON) status, plant materials will be surveyed to determine whether such materials:

1) Are uncontaminated and may be free released,
2) Are controlled by the Bulk Material Removal Program approved by the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 20.2002.
3) Retain traces of detectable radioactivity, but at levels below NRC site release criteria, in which case the materials either will:
    a) Remain on site,
    b) Be decontaminated for free release, or
    c) Be shipped to licensed vendor facilities for offsite processing such as metal melt, incineration, or further decontamination, or
4) Retain significant levels of radioactivity, in which case these materials will be shipped to licensed facilities for processing or disposal.

A final survey to confirm that the site (with the exception of approximately a thirty acre ISFSI Owner-Controlled Area) meets NRC release criteria will be performed on the greenfield site prior to application of topsoil and vegetative plantings while original soil and any residual rubblized materials are readily accessible at and near the surface for *In Situ* gamma spectral analysis. Successful completion of the final survey will allow license termination with the formal industrial site released for unrestricted use. A similar process will be performed on the ISFSI site following final shipment of fuel to DOE at a later date.

ENVIRONMENTAL IMPACTS

Big Rock Point Plant has performed a review of the site and evaluated the potential impacts of the proposed decommissioning activities. The review concludes that impacts due to decommissioning of Big Rock Point Plant will be in compliance with 10 CFR 50.82(a)(6)(ii). This conclusion is reached on the basis of the following:

- The DECON method of decommissioning currently chosen for Big Rock Point Plant, as well as the SAFSTOR option which has also been thoroughly studied for this site, are fully addressed by the FGEIS.

- There are no unique aspects of the decommissioning techniques to be utilized that would invalidate the conclusions reached in the FGEIS.

- Big Rock Point Plant is significantly smaller and contains a radioactive source term that is only on the order of 10% that of the standard BWR addressed by the FGEIS. As such, Big Rock Point Plant provides lower impacts for potential radiological accidents.

- Worker doses projected for the decommissioning of Big Rock Point Plant have been compared on a task-by-task basis with the FGEIS. Due to smaller size and lower radioactivity source term, doses are projected to be well under the 1845 person-rem identified for the reference BWR by the FGEIS.

- Doses to the public will not exceed those estimated by the FGEIS for the reference BWR.

- No site-specific factors at Big Rock Point Plant would alter the conclusions of the FGEIS.

The total occupational radiation exposure expected for the decommissioning interval has been initially estimated at 700 person-rem. This is a goal based on techniques of maintaining plant doses as low as reasonably achievable (ALARA). This number may change and will be updated as detailed plans for each activity is developed over the course of decommissioning. However, in no event is dose expected to exceed the value of 1845 person-rem estimate of the FGEIS.

No significant environmental impacts are expected from the disposal of demolition debris with trace concentrations of licensed radioactive materials in a State of Michigan licensed landfill or alternate licensed PCB landfill. Total volume of landfill waste projected for BRP decommissioning is 1.34 million cubic feet including 142,000 cubic feet of radioactive waste and 1.2 million cubic feet of demolition debris. In comparison, NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, " (FGEIS) lists a radioactive waste volume for the reference boiling water reactor (BWR) of 18,975 cubic meters (670,096 cubic feet), including disposable containers.

Radiation dose due to transportation of radioactive waste will be well below (on the order of 10 to 20% based on waste volume and activity ratios) the 110 person-rem for transport workers and 10 person-rem for the public presented by the FGEIS. Number of shipments (and therefore, doses as well as accident probabilities) also will be less than 20% of that the larger reference plant, based on waste volume ratios. In addition, plant experience shows that transport vehicle dose rates seldom approach the levels assumed by the FGEIS analysis in the calculation of transport worker and public doses.

Radiation exposure to offsite individuals due to postulated accidents are bounded by the FGEIS analysis for non-fuel related events, and by EPA Protective Action Guides [Reference 3] for these, as well as fuel related events. Effluents release levels, and public dose due to effluents have decreased below the low levels observed during plant operation, due to lack of radionuclide production with the reactor defueled, and decay of the radionuclide inventory over time.

Disposal of low-level radioactive wastes at licensed disposal facilities is expected to be possible in a timely manner. However, should temporary storage be required, adequate onsite storage space is available in a suitability facility. No significant environmental impacts are anticipated due to temporary onsite storage. Such storage will be in compliance with all applicable federal and state regulations.

Disposal of hazardous waste is in a timely manner. Hazardous wastes, mixed radioactive hazardous wastes and PCB wastes are stored and disposed of in compliance with all applicable federal and state regulations.

Non-radiological environmental impacts from decommissioning the Big Rock Point Plant will be minor short-term increases in noise, dust and truck traffic flow in the immediate vicinity of the plant site during dismantlement. An increased risk of industrial health issues and accidents is recognized. Additional safety professionals have been added to the decommissioning staff, and safety programs are receiving added emphasis in acknowledgement of this risk. The only significant socioeconomic impacts identified are those of local job loss and lowered tax base. No detrimental impacts to local culture, terrestrial or aquatic resources have been identified. Although future uses of the plant site has not yet been determined, the property provides potential for a wide variety of beneficial uses. The chosen greenfield (DECON) option, coupled with unrestricted release compliance, will ensure that future uses are not limited by final site condition.

TABLE 1
SCHEDULE FOR DECOMMISSIONING

Decommissioning Plan and Preparation for Shutdown
- Decommissioning Team formed – 10/10/1993
- Original Decommissioning Plan – 2/27/1995
- Plant Shutdown – 8/29/1997

Hazard Reduction
- Core Off-Load - 9/20/1997
- Spent Fuel Pool Cleanout - Non-SNM and GTCC materials - 3/10/2000
- Chemical Decontamination of the Primary System - 1/21/1998
- Phase 1 of Decommissioning Power – 3/11/1998
- Phase 2 of Decommissioning Power – 2/12/1999
- Removal of hazardous waste - i.e., asbestos (in progress)
- Decontamination of structures, systems, and components (in progress)

Mobilization
- High Efficiency Particulate Air Filters –1/21/1998
- Monitoring Station - 2/12/1999
- Spent Fuel Pool Cooling Skid - 5/5/1999
- General Licensee under 10 CFR Part 72 - 2/15/2001
- Construction of the ISFSI - 6/30/2001
- Containment Building Crane Installation - 10/30/2001
- All fuel in Dry Storage Casks on the ISFSI - 3/26/2003
- Greater Than Class C (GTCC) Waste Canister on the ISFSI –5/2/2003
- ISFSI Operation (in progress)

Decommissioning Work Packages - System & Component Removal
- Complete 3/17/2005

Removal of Major Components
- Spent Fuel Pool Fuel Racks - 4/28/2003
- Reactor Vessel - 10/22/2003
- Steam Drum -11/19/2003
- Spent Fuel Pool Liner - 12/18/2003
- Irradiated Concrete Removal – 2/16/2005

Demolition of Structures

- ASD Building Removal - 4/26/2001
- Solid Radwaste Building - 3/5/2003
- Administrative Building - 9/8/2004
- Screenhouse - 11/19/2004
- Stack - 3/31/2005
- Turbine Building - 3/31/2005
- Liquid Radwaste Vaults (3rd Quarter 2005)
- Containment Building (1st Quarter 2006)
- Buried Piping and Building Foundations (2nd Quarter 2006)

License Termination

- Develop and Submit Plan - 4/1/2003
- Public Meetings on the LTP - 8/10/2003
- NRC Plan Approval - 3/24/2005
- Final Site Survey (FSS) - Non-ISFSI area (4th Quarter 2006)
- Regulatory Review FSS - Non-ISFSI (4th Quarter 2006)
- Partial Release of 10 CFR 50 Site (2007)
- Shipment of Fuel to Department of Energy (2012)
- FSS of the ISFSI (2012)
- Regulatory Review FSS (2012)
- Termination of Part 50 License (2012)

ESTIMATE OF EXPECTED DECOMMISSIONING COSTS

The estimated cost to decommission the Big Rock Point Nuclear Plant (BRP) based on a site-specific decommissioning study prepared by TLG Services, Inc. in 2003 and filed with the Michigan Public Service Commission (MPSC) in March 2004, is $439.4 million in year of expenditure dollars. The site-specific study includes all costs necessary to restore the BRP site to a Greenfield condition by 2006, operate the ISFSI until the Department of Energy takes possession of the spent nuclear fuel, and ultimately decommission the ISFSI assumed to be completed by November 2012. Included in the study are $333.9 million of NRC radiological decommissioning costs, $30.3 million of site restoration or Greenfield costs, $73.6 million of spent nuclear fuel storage costs, and $1.6 million of post 9-11 incremental security costs.

Consumers Energy provides financial assurance in the amount of $333.9 million for NRC radiological decommissioning costs through the use of an external sinking fund that was funded by rates that were established by cost of service ratemaking regulation under the jurisdiction of the MPSC. Based on an order issued by the MPSC in Case No. U-11662 on March 22, 1999, Consumers Energy discontinued funding collection effective December 31, 2000 and is relying on the funds in the MPSC-jurisdictional external sinking fund and fund earnings to cover the remaining amount of decommissioning expenditures. A small portion of the remaining radiological decommissioning expenditures (approximately $2.0 million at year-end 2004) will be funded through a Federal Energy Regulatory Commission (FERC)-jurisdictional reserve balance.

Of the $333.9 million of NRC radiological decommissioning costs, $279.1 million has been withdrawn from the MPSC-jurisdictional external sinking fund as of December 31, 2004 and an additional $7.7 million has been funded from the FERC-jurisdictional reserve, leaving a remaining cost of $47.1 million. Financial assurance for the $47.1 million of remaining NRC radiological decommissioning costs has been provided for through funds in the external sinking fund and assumed fund earnings. At the end of 2004, the balance in the external sinking fund was $51.4 million, based on State Street Bank and Trust, December 31, 2004 Annual Reports. The year-end balance reflects withdrawals of $279.1 million to cover NRC radiological decommissioning expenditures incurred through December 31, 2004.

Annually, BRP submits Certification of Financial Assurance pursuant to 10CFR50.75(f)(1). Up-to-date information on decommissioning fund status may be found in those submittals.

REFERENCES

1. NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities", August 1988.

2. Consumers Energy Company, "Updated Final Hazards Summary Report (UFHSR), Big Rock Point Plant", Revision 6, October 7, 1996.

3. EPA 402-R-92-001, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents", May 1992.

4. Letter from Big Rock Point to the Nuclear Regulatory Commission dated March 27, 2002, Certification of Financial Assurance for Decommissioning Pursuant to 10CFR50.75(f)(1).

5. Letter from Big Rock Point to the Nuclear Regulatory Commission dated April 1, 2003, Certification of Financial Assurance for Decommissioning pursuant to 10CFR50.75(f)(1).

6. Letter from Big Rock Point to the Nuclear Regulatory Commission dated May 28, 2003, Post Shutdown Decommissioning Activities Report (PSDAR), Revision 3

7. Letter from Big Rock Point to the Nuclear Regulatory Commission dated September 15, 2004, Request for Approval of Proposed Disposal Procedures in Accordance with 10 CFR 20.2002.

8. Letter from Big Rock Point to the Nuclear Regulatory Commission dated March 31, 2005, Certification of Financial Assurance for Decommissioning pursuant to 10CFR50.75(f)(1).

ATTACHMENT II

Big Rock Point Plant
March 31, 2005

POST SHUTDOWN DECOMMISSIONING ACTIVITY REPORT
Marked Copy of Revision 3 – Showing Changes for Revision 4

17 pages

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BIG ROCK POINT PLANT
~~POST SHUTDOWN~~ DECOMMISSIONING ACTIVITIES REPORT
REVISION ~~3~~4

INTRODUCTION

Under the provisions of 10 CFR 50.82(a)(7), Consumers Energy Company hereby submits Revision ~~3~~4 to the Post Shutdown Decommissioning Activities Report (PSDAR) to describe planned decommissioning activities, a schedule for their accomplishment, estimate expected costs, and provide the reasons for concluding that the environmental impacts associated with site-specific decommissioning activities will be in compliance with 10 CFR 50.82(a)(6)(ii).

BACKGROUND

When Consumers Energy Company's Big Rock Point Plant began operation in September 1962, it was the first commercial nuclear power plant constructed in Michigan and the fifth in the United States. The General Electric Boiling Water Reactor (BWR) was rated for 240 Megawatt (MW) Thermal, and was built by Bechtel Corporation. By letters dated June 18, 1997, and June 26, 1997, Consumers Energy Company notified the Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 50.82(a)(1)(i), that Big Rock Point Plant would permanently cease operation by August 30, 1997. On August 29, 1997, the reactor was permanently shutdown, ending 35 years of electric power generation as the nation's oldest and longest running nuclear plant. It was closed because its relatively small size (67MW Electric) was likely to make it too expensive to operate in an increasingly competitive environment. On September 22, 1997, another letter was forwarded to the Commission certifying that the fuel has been removed from the reactor vessel and placed in the spent fuel pool for storage.

Consumers Energy Company's goal is to immediately dismantle Big Rock Point Plant in a safe, environmentally conscious, and cost effective manner. This action will result in the timely removal of the existing nuclear plant in accordance with the DECON option found acceptable to the NRC in its Final Generic Environmental Impact Statement (FGEIS) [Reference 1]. Completion of this option is contingent upon continued access to one or more low level waste disposal sites. Currently, Consumers Energy Company has access to Chem Nuclear - Barnwell, South Carolina and Envirocare of Utah - Clive, Utah.

DESCRIPTION OF PLANNED DECOMMISSIONING ACTIVITIES

Decommissioning Activities and Planning
The activities planned for decommissioning of the Big Rock Point Plant reflect the DECON option for the site. Work plans will be completed for decommissioning activities prior to commencing the activity. Table 1 shows the major decommissioning periods and milestones for the Big Rock Point Restoration Project. This summary table begins with significant pre-shutdown milestones and highlights the major periods, phases, and milestones throughout the decommissioning process.

License Termination Plan (LTP) Chapter 3, submitted April 1, 2003, contains a Project Schedule that shows the significant decommissioning activities. The information in this submittal supplements and serves as a revision to the LTP Chapter 3 Project Schedule.

Planning Activities
Subsequent to the Consumers Energy Company June 18, 1997 notification to the NRC of plans to permanently shutdown the Big Rock Point Plant, a site organization was developed to decommission the plant. This organization became effective September 15, 1997. Revisions to the site Emergency Plan, Security Plan, Fire Protection Plan, Technical Specifications, Offsite Dose Calculation Manual, Updated Final Hazards Summary Report (UFHSR), and Quality Program Description are in various stages of development and continue to be submitted to the NRC, as necessary.

Continuing planning and preparation for decommissioning includes the following generalized types of tasks.

- Review all existing plant programs to assess their applicability to decommissioning and dry fuel storage on an Independent Spent Fuel Storage Installation (ISFSI),
- Review and reclassify systems important to decommissioning activities (This task has been completed),
- Revise procedures and license basis documents to reflect the plant's permanently defueled and dry fuel storage configuration,
- Complete the radiological and hazardous material characterization of the site,
- Design and procure equipment and facilities to support decommissioning and dry fuel storage activities,
- Identify all specific decommissioning and dry fuel storage activities,
- Prepare work plans for all decommissioning and dry fuel storage activities,
- Prepare dose estimates for all decommissioning activities,

- Evaluate disposition options for site components and structures,
- Develop a cost measurement and control mechanism, (This task has been completed) and
- Develop an activity schedule consistent with the overall schedule. A key step in the decommissioning planning was the completion of the selection of a project staff and establishment of an organizational structure. This step mobilized site management and staff personnel augmented with on-site specialty contractors.

Plant Dismantlement
Former industrial area decommissioning planning was based on selecting the DECON option and will result in the complete dismantlement and restoration of the area. The facilities remaining to support dry storage of the fuel will be decontaminated and/or dismantled after the U.S. Department of Energy (DOE) has received the spent fuel.

The following significant activities are anticipated to occur or have occurred during the dismantlement period:

- Perform primary system decontamination (completed),
- Establish a site construction power system (completed),
- Remove asbestos insulation and plant piping systems (activity in progress, approximately ~~90~~98% complete),
- Remove turbine control oil (completed),
- Establish a new spent fuel pool cooling system (completed),
- Construct an Independent Spent Fuel Storage Installation (ISFSI) for dry cask storage (completed),
- Remove all fuel from wet storage in the spent fuel pool and store fuel on the ISFSI in the dry fuel storage casks, including greater than class C waste (completed),
- Drain the spent fuel pool (completed),
- Dismantle systems, structures and components not required for the safe storage of spent fuel on the ISFSI, including major component removal (completed),
- Conduct decontamination of facility surfaces, components and piping surfaces as required,
- Conduct soil remediation as necessary,
- Ship and properly disposition all radioactive materials,

- Perform a comprehensive final status survey to demonstrate compliance with approved site release criteria (10 CFR 20, subpart E).

The only structures and facilities remaining after plant dismantlement and former industrial site restoration will be those needed to support the dry storage of the spent fuel, and portions of the former intake line and supporting structures in Lake Michigan.

SIGNIFICANT DECOMMISSIONING ACTIVITIES

10 CFR 50.2 defines major decommissioning activities as those that result in permanent removal of major radioactive components (e.g. reactor vessel and internals, large bore reactor coolant system piping, and other large components that are radioactive to a comparable degree), permanently modify the structure of the containment, or result in dismantling components for shipment containing greater than class C waste.

The following discusses several planned (and completed) significant decommissioning activities at Big Rock Point Plant:

Reactor Vessel

The reactor vessel was fabricated from carbon steel with an internal stainless steel cladding. The entire outside of the reactor vessel ~~is~~ was insulated with 3-inch thick metallic insulation. It ~~is~~ was attached to the reactor vessel by banding and ~~is~~ was supported by brackets welded to the outside surface of the reactor vessel. The reactor vessel ~~is~~ was supported by 12 brackets attached to the exterior vessel shell. Twenty-four 2-1/2-inch diameter hanger rods attached to these brackets transfered the reactor vessel weight to supports anchored in the surrounding concrete.

During power operations, neutron irradiation from the fission process generated activation products in the stainless steel vessel liner, the carbon steel vessel shell, and metallic insulation. The radionuclide inventory for the reactor vessel as a unitized package ~~is expected to be~~was a Type B quantity, meeting the Low Specific Activity (LSA) material criteria. As a result, the reactor vessel as a unitized package ~~would be~~ was exempt from the requirements of 10 CFR 71.73, "Hypothetical Accident Conditions." The radionuclide content estimates were verified with a radiation survey of the reactor vessel after the internal components were removed. Detailed classification evaluations were completed as a part of detailed planning for the reactor vessel removal activity ~~and continue as part of the work planning process~~.

~~An engineering evaluation was performed to investigate potential reactor vessel removal alternatives. The evaluation identified two technically feasible alternatives: intact vessel removal and segmented vessel removal. The intact vessel removal alternative proposed that the~~The reactor vessel and head ~~be~~ were shipped to a licensed low-level radioactive waste disposal facility~~ies~~. ~~The segmented vessel removal option proposed removal in separate pieces and then shipment to a low level radioactive waste disposal facility. The evaluation concluded that no segmentation was the best alternative and will be pursued by the Big Rock Point Restoration Project Staff.~~The reactor vessel ~~will be~~was shipped as class B waste and the reactor head ~~will be~~was shipped as class A waste.

Steam Drum
The steam drum was part of the Nuclear Steam Supply System and ~~is~~ was located in the reactor building. It ~~is~~ was a 40-foot 9-inch long by 7-foot 2-inch diameter, horizontal steel cylinder with ellipsoidal heads. The steam drum ~~contains~~ contained 60 steam separators arranged in two equal rows. The steam drum's vessel wall ~~is~~ was 4-3/8 inches thick A-212B carbon steel with 5/32" Type 304 stainless steel cladding. The nozzles ~~are~~ were primarily ASTM A-105 Grade II carbon steel with a 5/32-inch Type-304 stainless steel clad. Nozzles, smaller than 4 inches, ~~are~~ were made from SB-166 Inconel material. Internal components ~~are~~ were made from Type 304 stainless steel.

The steam drum was chemically decontaminated as part of the Nuclear Steam Supply System, and was drained and isolated until ready for dismantlement in accordance with general decommissioning activities. The steam drum ~~will be~~ was shipped to a low-level radioactive waste disposal facility.

Primary Coolant System
Primary coolant system piping connected all major components of the Nuclear Steam Supply System. The primary coolant system ~~has been~~ was chemically decontaminated, drained, and isolated for dismantlement. Large bore piping ~~has been~~ was removed from this system and was shipped to a low-level radioactive waste disposal facility.

Containment Vessel
The containment vessel is a 130-foot diameter, Hortonsphere steel vessel. The sphere extends 27 feet below grade and 103 feet above grade. The containment vessel is constructed of 3/4-inch (nominal) steel plates. The exterior columns were used during construction and were unloaded after construction and testing of the containment vessel. During the decommissioning process they will be reloaded or removed, as necessary. The foundation of the containment vessel is a reinforced concrete cradle in the shape of an inverted spherical dome segment approximately 7 feet thick.

The containment surfaces and structures will be decontaminated and dismantled in accordance with general decommissioning activities.

Spent Fuel Pool
The spent fuel pool ~~is empty~~ was emptied; it ~~will be~~ was decontaminated and was dismantled in accordance with general decommissioning activities.

OTHER DECOMMISSIONING CONSIDERATIONS

The decontamination and/or dismantlement of contaminated systems, structures, and components may be accomplished by decontamination in place, dismantlement and decontamination, or dismantlement and disposal. A combination of these methods may be utilized to reduce contamination levels, worker radiation exposure, and project costs. General considerations applicable to these activities are described below.

Chemical Decontamination of the Primary Coolant System
A chemical decontamination of the primary coolant system was performed prior to conducting any major decommissioning activity. Approximately 425 Curies were removed. The chemical decontamination was a significant ALARA initiative performed to reduce personnel exposure during decommissioning work activities. This decontamination effort included the reactor vessel and steam drum, steam risers and recirculation piping, and the shutdown cooling system. The cleanup system was decontaminated in a similar manner. The reactor recirculating water pumps were used to circulate the cleaning solution throughout the primary and selected interconnected systems. Modifications were required to establish specific flow paths and isolation points. A qualified contractor, following approved site-specific controls, performed this decontamination effort.

General Decommissioning Activities Relating to Removal of Radiological Components & Structures
Components will be safely and efficiently removed using the most appropriate methods for the particular circumstance. Work packages will be prepared for activities related to the dismantlement of plant systems, structures, and components. Openings in components will typically be covered to prevent the spread of contamination. Components may be moved to a processing area for volume reduction and packaging into containers for shipment to a waste disposal site or a processing facility for decontamination.

Following are several general decontamination and dismantlement considerations that will be incorporated into the decommissioning work packages:

- ~~The capability to control air flow to the environment through monitored pathways will be provided when activities in these areas have the potential to create airborne radioactivity release. Pressure retention capability is not required. This consideration should not preclude removal of existing penetrations or making temporary penetrations providing that the opening can be closed in a timely manner.~~Release of airborne contamination will be controlled in accordance with the Offsite Dose Calculation Manual (ODCM).

- Radioactive particulate emission will be monitored in accordance with the ~~Offsite Dose Calculation Manual (~~ODCM~~)~~.

- Decommissioning activities that use liquids will ensure that the contaminated liquids will be processed, as necessary, and sampled and monitored in accordance with the ~~Offsite Dose Calculation Manual (~~ODCM~~)~~ prior to release.

- Non-radioactive hazardous materials and wastes will be dispositioned in accordance with Consumers Energy Company Waste Management Program. Typical materials handled and disposed of through this program include fuel oil, lubricating oil, 1,1,1-trichloroethane, laboratory chemicals, lead, mercury, paints, battery acid, and asbestos containing materials. Considerations include the following:

- Materials containing asbestos (e.g. insulation) will be removed and processed in accordance with this program.

- The decontamination and dismantlement methods to be used on systems, structures, and components that contained or were immersed in chromated solutions will be evaluated and the methods selected to minimize the potential for creating a mixed waste.

- Instrumentation and control components will be evaluated, and the dismantlement method will be selected to minimize the potential for creating a hazardous waste. Switching elements that contain mercury will be removed from the instrument when practicable.

- Contaminated systems, structures, and components with significant external contamination, will be decontaminated to remove the loose external contamination, coated to stabilize the contamination, bagged to prohibit contamination spread, or otherwise controlled to prevent personnel or plant contamination during removal.

- Contaminated piping and tubing should be removed as follows:

  - Piping will be cut using methods that minimize the generation of airborne contamination. When appropriate, remote cutting systems may be used to maintain worker exposure ALARA.

  - Protective covers or plugs may be installed on ends of contaminated piping to confine internal contamination.

  - Piping penetrations will be cut as close as practicable to the containment vessel shell. The openings in the containment vessel will be covered or plugged once the piping is removed.

  - Underground piping identified for removal will be evaluated prior to cutting and removal to identify a method appropriate to the physical condition of the pipe.

- Contaminated supports will be removed in conjunction with the equipment removal activities.

- Systems and components may be removed from areas and buildings prior to the start of structural decontamination activities. Walls may be removed as required to permit removal of components.

- Embedded contaminated piping, conduits, ducts, plate, channels, anchors, sumps and sleeves may be removed or decontaminated during area and building structural decontamination activities.

- Equipment designated for asset recovery or re-use in the Consumers Energy Company system may be preserved in accordance with vendor recommendations or Consumers Energy Company practices.

- Components with paint coatings containing regulated quantities of PCBs will be identified, stored, and disposed of in accordance with federal regulations and guidance. Mixed PCB/radwaste disposal options will be addressed throughout the decommissioning process.

Special or Unusual Programs
There are no special or unusual programs planned. All procedures and processes to be applied at Big Rock Point Plant are consistent with those discussed in the Final Generic Environmental Impact Statement on Decommissioning (NUREG-0586).

Bulk Material Removal Program
U.S. Nuclear Regulatory Commission approval for disposal of demolition debris containing less than 5pCi/gram of principle gamma emitters, pursuant to 10 CFR 20.2002, was obtained on February 5, 2002 and amended on January 19, 2005. Approximately 110 million pounds of demolition debris will be shipped to a State of Michigan Type II Licensed landfill and approximately 3 million pounds of demolition debris contaminated with polychlorobiphenyl (PCB) will be shipped to a landfill licensed by the State of Michigan and the U.S. Environmental Protection Agency (EPA).

Low Level Radioactive Waste Removal and Handling
Low level radioactive waste will be handled in accordance with plant procedures, then shipped either to licensed offsite processors for further processing such as decontamination for free release, metal melt, incineration, or shipped for disposal at licensed facilities. No onsite incineration will be performed.

Soil Remediation
Soils, residual concrete rubble from demolition of structures, rubblized paving and other soil-like materials not disposed of in an offsite landfill will be surveyed to determine if residual radioactivity of plant origin is present, and if so, the radioactivity concentrations present. Such soils and soil-like materials will be remediated (i.e., removed, processed, and disposed of at a licensed facility) if determined to contain levels of radioactivity which would result in doses above the NRC site release guideline values of 10 CFR 20, subpart E.

Processing and Disposal Site Locations
A number of facilities are available for processing of radioactive waste materials. These facilities provide services that include, but are not limited to, decontamination, incineration, metal melt, compaction or other methods of consolidation and disposal of low-level radioactive wastes. A partial list of such facilities includes: Duratek, Oak Ridge, TN and ~~Chem. Nuclear,~~ Barnwell, SC; and Envirocare of Utah, Clive, UT~~; and Duratek, Oak Ridge, TN~~.

Resource Conservation and Recovery Act and Removal of Mixed Wastes

All applicable regulations of state and federal authorities will be followed in the handling, storage and transport of mixed wastes. Transport will only be by authorized licensed transporters and shipment will be only to licensed facilities. If technology, resources, and approved processes are available to render mixed waste non-hazardous, such processes may be considered to minimize the hazards of transport and disposal of the wastes.

Spent Fuel and Greater Than Class C Waste

Spent fuel was stored wet in the spent fuel pool until dry transportable storage canisters were available, and fuel had decayed sufficiently to meet license conditions of the canisters. Loading of dry fuel storage canisters was completed on March 26, 2003. An onsite Independent Spent Fuel Storage Installation (ISFSI) accommodates all ~~current~~ spent fuel in seven storage casks. Fuel is expected to be retained until U.S. Department of Energy (DOE) fulfills their obligation to receive the fuel.

Greater than Class C (GTCC) wastes are comprised of reactor internals exposed to many years of neutron flux. GTCC waste generated from the operation of the reactor was cut into dimensions suitable for storage within a dry storage canister. Loading of the GTCC storage canister was completed on May 2, 2003. This GTCC canister is stored on the onsite ISFSI. It will be transferred to DOE as GTCC waste. This option is allowed by storage canister design. The Big Rock Point Staff will continue to monitor industry efforts and progress towards GTCC shipment to DOE.

SITE RESTORATION

During the process of dismantlement and decontamination to greenfield (DECON) status, plant materials will be surveyed to determine whether such materials:

1) Are uncontaminated and may be free released,
2) ~~Potentially have traces of undetectable radioactivity but are authorized for State of Michigan licensed landfill disposal under 20~~Are controlled by the Bulk Material Removal Program approved by the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 20.2002.
3) Retain traces of detectable radioactivity, but at levels below NRC site release criteria, in which case the materials either will:
   a) Remain on site,
   b) Be decontaminated for free release, or
   c) Be shipped to licensed vendor facilities for offsite processing such as metal melt, incineration, or further decontamination, or
4) Retain significant levels of radioactivity, in which case these materials will be shipped to licensed facilities for processing or disposal.

A final survey to confirm that the site (with the exception of approximately a thirty acre ~~dry~~ ISFSI Owner-Controlled Area) meets NRC release criteria will be performed on the greenfield

site prior to application of topsoil and vegetative plantings while original soil and any residual rubblized materials are readily accessible at and near the surface for *In Situ* gamma spectral analysis. Successful completion of the final survey will allow license termination with the formal industrial site released for unrestricted use. A similar process will be performed on the ISFSI site following final shipment of fuel to DOE at a later date.

ENVIRONMENTAL IMPACTS

Big Rock Point Plant has performed a review of the site and evaluated the potential impacts of the proposed decommissioning activities. The review concludes that impacts due to decommissioning of Big Rock Point Plant will be in compliance with 10 CFR 50.82(a)(6)(ii). This conclusion is reached on the basis of the following:

- The DECON method of decommissioning currently chosen for Big Rock Point Plant, as well as the SAFSTOR option which has also been thoroughly studied for this site, are fully addressed by the FGEIS.

- There are no unique aspects of the decommissioning techniques to be utilized that would invalidate the conclusions reached in the FGEIS.

- Big Rock Point Plant is significantly smaller and contains a radioactive source term that is only on the order of 10% that of the standard BWR addressed by the FGEIS. As such, Big Rock Point Plant provides lower impacts for potential radiological accidents.

- Worker doses projected for the decommissioning of Big Rock Point Plant have been compared on a task-by-task basis with the FGEIS. Due to smaller size and lower radioactivity source term, doses are projected to be well under the 1845 person-rem identified for the reference BWR by the FGEIS.

- Doses to the public will not exceed those estimated by the FGEIS for the reference BWR.

- No site-specific factors at Big Rock Point Plant would alter the conclusions of the FGEIS.

The total occupational radiation exposure expected for the decommissioning interval has been initially estimated at 700 person-rem. This is a goal based on techniques of maintaining plant doses as low as reasonably achievable (ALARA). This number may change and will be updated as detailed plans for each activity is developed over the course of decommissioning. However, in no event is dose expected to exceed the value of 1845 person-rem estimate of the FGEIS.

No significant environmental impacts are expected from the disposal of demolition debris with trace concentrations of licensed radioactive materials in a State of Michigan licensed landfill or alternate licensed PCB landfill. Total volume of landfill waste projected for BRP decommissioning is 1.34 million cubic feet including 142,000 cubic feet of radioactive waste and 1.2 million cubic feet of demolition debris. In comparison, NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, " (FGEIS) lists a radioactive waste volume for the reference boiling water reactor (BWR) of 18,975 cubic meters (670,096 cubic feet), including disposable containers.~~No significant impacts are expected from the disposal of radioactive waste. Total volume of waste projected for Big Rock Point Plant decommissioning is 72,100 cubic feet, in comparison to the FGEIS volume for the reference BWR of 662,500 cubic feet, including disposable containers.~~

Radiation dose due to transportation of radioactive waste will be well below (on the order of 10 to 20% based on waste volume and activity ratios) the 110 person-rem for transport workers and 10 person-rem for the public presented by the FGEIS. Number of shipments (and therefore, doses as well as accident probabilities) also will be less than 20% of that the larger reference plant, based on waste volume ratios. In addition, plant experience shows that transport vehicle dose rates seldom approach the levels assumed by the FGEIS analysis in the calculation of transport worker and public doses.

Radiation exposure to offsite individuals due to postulated accidents are bounded by the FGEIS analysis for non-fuel related events, and by EPA Protective Action Guides [Reference 3] for these, as well as fuel related events. Effluents release levels, and public dose due to effluents have decreased below the low levels observed during plant operation, due to lack of radionuclide production with the reactor defueled, and decay of the radionuclide inventory over time.

Disposal of low-level radioactive wastes at licensed disposal facilities is expected to be possible in a timely manner. However, should temporary storage be required, adequate onsite storage space is available in ~~one or more, or a combination of the Big Rock Point Plant radioactive waste facility, the turbine and containment buildings, and an onsite contaminated materials warehouse~~a suitable facility. No significant environmental impacts are anticipated due to temporary onsite storage. Such storage will be in compliance with all applicable federal and state regulations.

Disposal of hazardous waste is ~~also expected to be possible~~ in a timely manner. Hazardous wastes, mixed radioactive hazardous wastes and PCB wastes ~~will be required to be stored onsite until such time when a disposal/treatment method is approved. All storage of such waste will be~~are stored and disposed of in compliance with all applicable federal and state regulations.

Non-radiological environmental impacts from decommissioning the Big Rock Point Plant will be minor short-term increases in noise, dust and truck traffic flow in the immediate vicinity of the plant site during dismantlement. An increased risk of industrial health issues and accidents is recognized. Additional safety professionals have been added to the decommissioning staff, and safety programs are receiving added emphasis in acknowledgement of this risk. The only significant socioeconomic impacts identified are those of local job loss and lowered tax base. No detrimental impacts to local culture, terrestrial or aquatic resources have been identified. Although future uses of the plant site has not yet been determined, the property provides

potential for a wide variety of beneficial uses. The chosen greenfield (DECON) option, coupled with unrestricted release compliance, will ensure that future uses are not limited by final site condition.

TABLE 1
SCHEDULE FOR DECOMMISSIONING

Decommissioning Plan and Preparation for Shutdown

- Decommissioning Team formed - ~~October 10, 1993~~10/10/1993
- Original Decommissioning Plan - ~~February 27, 1995~~2/27/1995
- Plant Shutdown - ~~August 29, 1997~~8/29/1997

Hazard Reduction

- Core Off-Load - 9/20/1997
- Spent Fuel Pool Cleanout - Non-SNM and GTCC materials - 3/10/2000
- Chemical Decontamination of the Primary System - 1/21/1998
- Phase 1 of Decommissioning Power – 3/11/1998
- Phase 2 of Decommissioning Power – 2/12/1999
- Removal of hazardous waste - i.e., asbestos (in progress)
- Decontamination of ~~Structures~~structures, systems, and ~~Components~~ components (in progress)

Mobilization

- High Efficiency Particulate Air Filters –1/21/1998
- Monitoring Station - 2/12/1999
- Spent Fuel Pool Cooling Skid – 5/5/1999
- General Licensee under 10 CFR Part 72 - 2/15/2001
- Construction of the ISFSI - 6/30/2001

~~-~~Containment Building Crane Installation - 10/30/2001

~~-~~

All fuel in Dry Storage Casks on the ISFSI – 3/26/2003

- Greater Than Class C (GTCC) Waste Cask on the ISFSI – 5/2/2003

~~9 Relocation of Fuel to the ISFSI (April 2003)~~

~~9~~

- ISFSI Operation (in progress)

Decommissioning Work Packages - System & Component Removal (

- ~~in progress)~~Complete 3/17/2005

Removal of Major Components

~~-~~Steam Drum (~~4th Quarter 2003~~)

- Spent Fuel Pool Fuel Racks (~~2nd Quarter 2003~~) 4/28/2003
- Reactor Vessel (~~4th Quarter 2003~~) - 10/22/2003
- Steam Drum – 11/19/2003
- Spent Fuel Pool Liner (~~1st Quarter 2004~~) 12/18/2004
- Irradiated Concrete Removal (~~3rd Quarter 2004~~) 2/16/2005

Demolition of Structures

- ASD Building Removal - 4/26/2001
- Solid Radwaste Building ~~(1st Quarter 2003)~~ 3/5/2003
- Administrative Building ~~(1st Quarter 2004)~~ 9/8/2004
- Screenhouse - 11/19/2004
- Stack – 3/31/2005
- Turbine Building ~~(3rd Quarter 2004)~~ - 3/31/2005
- Liquid Radwaste Vaults (3rd Quarter ~~2004~~2005)

~~Screenhouse (4th Quarter 2004)~~

~~Stack (4th Quarter 2004)~~

- Containment Building (1st Quarter ~~2005~~2006)
- Buried Piping and Building Foundations (~~1st~~ 2nd Quarter ~~2005~~2006)

License Termination

- Develop and Submit Plan ~~(1st Quarter 2003)~~ 4/1/2003
- Public Meetings on the LTP ~~(2nd Quarter 2003)~~ 8/10/2003
- NRC Plan Approval ~~(4th Quarter 2004)~~ 3/24/2005
- Final Site Survey (FSS) - Non-ISFSI area (4th Quarter ~~2005~~2006)
- Regulatory Review FSS - Non-ISFSI (4th Quarter ~~2005~~2006)
- Partial Release of 10 CFR 50 Site (~~2005~~2007)
- Shipment of Fuel to Department of Energy (2012)
- FSS of the ISFSI (2012)
- Regulatory Review FSS (2012)
- Termination of Part 50 License (2012)

ESTIMATE OF EXPECTED DECOMMISSIONING COSTS

The estimated cost to decommission the Big Rock Point Nuclear Plant (BRP), based on ~~an update to~~ a site-specific decommissioning study prepared by TLG Services, Inc. in 2003 and filed with the Michigan Public Service Commission (MPSC) in ~~2000~~March 2004, is ~~$395.3~~439.4 million in ~~2002~~ year of expenditure dollars ~~after adjusting the original study for contingencies that are not expected to be spent~~. The site-specific study includes all costs necessary to restore the BRP site to a greenfield condition by ~~2005~~2006, operate the ISFSI until the Department of Energy takes possession of the spent nuclear fuel, and ultimately decommission the ISFSI assumed to be completed by November 2012. Included in the study are ~~$299.4~~333.9 million of NRC radiological decommissioning costs, ~~$27.3~~30.3 million of site restoration or ~~greenfield~~ Greenfield costs, and ~~$68.6~~73.6 million of spent fuel storage costs, and $1.6 million of post 9-11 incremental security costs.

Consumers Energy provides financial assurance in the amount of ~~$299.4~~333.9 million for NRC radiological decommissioning costs through the use of an external sinking fund, funded by rates that are established by cost of service ratemaking regulation under the jurisdiction of the ~~Michigan Public Service Commission (~~MPSC~~)~~. Based on an Order issued by the MPSC in Case No. U-11662 on March 22, 1999, Consumers Energy discontinued ~~decommissioning~~ funding collection effective December 31, 2000 and is relying on the funds in the MPSC-jurisdictional external sinking fund and fund earnings to cover the remaining amount of decommissioning expenditures. A small portion of remaining radiological decommissioning expenditures (approximately ~~$3.9~~2.0 million at year-end ~~2002~~2004) will be funded through a Federal Energy Regulatory Commission (FERC)-jurisdictional reserve balance.

Of the ~~$299.4~~333.9 million of NRC radiological decommissioning costs, ~~$208.8~~279.1 million has been withdrawn from the MPSC-jurisdictional external sinking fund as of December 31, ~~2002~~ 2004 and an additional ~~$5.7~~7.7 million has been funded from the FERC-jurisdictional reserve, leaving a remaining cost ~~in year 2002 dollars~~ of ~~$84.9~~47.1 million. Financial assurance for the ~~$84.9~~47.1 million of NRC radiological decommissioning costs has been provided for through funds in the MPSC-jurisdictional external sinking fund and assumed fund earnings. At the end of ~~2002~~2004, the balance in the external sinking fund was ~~$110.3~~51.4 million, based on State Street Bank and Trust, December 31, ~~2002~~ 2004 Annual Reports. The year-end balance reflects withdrawals of ~~$208.8~~279.1 million to cover NRC radiological decommissioning expenditures incurred through December 31, ~~2002~~2004.

Annually, BRP submits Certification of Financial Assurance pursuant to 10CFR50.75(f)(1). Up-to-date information on decommissioning fund estimates may be found in those submittals.

REFERENCES

1. NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities", August 1988.

2. Consumers Energy Company, "Updated Final Hazards Summary Report (UFHSR), Big Rock Point Plant", Revision 6, October 7, 1996.

3. EPA 402-R-92-001, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents", May 1992.

4. Letter from Big Rock Point to the Nuclear Regulatory Commission dated March 27, 2002, Certification of Financial Assurance for Decommissioning Pursuant to 10CFR50.75(f)(1).

~~6.~~5. Letter from Big Rock Point to the Nuclear Regulatory Commission dated April 1, 2003, Certification of Financial Assurance for Decommissioning pursuant to 10CFR50.75(f)(1).

6. Letter from Big Rock Point to the Nuclear Regulatory Commission dated May 28, 2003, Post Shutdown Decommissioning Activities Report (PSDAR); Revision 3.

7. Letter from Big Rock Point to the Nuclear Regulatory Commission dated September 15, 2004, Request for Approval of Proposed Disposal Procedures in Accordance with 10 CFR 20.2002.

8. Letter from Big Rock Point to the Nuclear Regulatory Commission dated March 31, 2005, Certification of Financial Assurance for Decommissioning Pursuant to 10CFR50.75(f)(1).