

June 20, 2001

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555**SUBJECT: BIG ROCK POINT PLANT
DOCKET 55-155/LICENSE DPR-6
REQUEST FOR APPROVAL OF PROPOSED DISPOSAL PROCEDURES
IN ACCORDANCE WITH 10 CFR 20.2002**

Gentlemen:

By letter dated May 18, 2001 Consumers Energy submitted a revised request for NRC approval of proposed procedures for disposal of demolition debris in accordance with provisions of 10 CFR 20.2002.

While performing a technical review of this submittal, the Michigan Department of Environmental Quality identified an inconsistent incorporation into Table 1 of the General Engineering Laboratory "J flag" qualifier contained in Certificates of Analysis that were included in Enclosure 2 of the submittal. In some cases, analytical results with an associated "J flag" qualifier were reported as positive results in Table 1 while in other cases they were reported as <LLD. As a result of this inconsistency, Consumers Energy would like to submit a revised Table 1 with the "J flag" qualifier treated as <LLD for all radionuclides.

Attachment 2 contains revised errata correction pages that should replace the corresponding pages in the May 18, 2001 submittal. These errata correction pages make minor revisions (indicated by the use of bold faced text) required throughout the submittal resulting from the revisions in Table 1. These changes include a 5 percent increase in the calculated transport worker and landfill worker doses and an 18 percent decrease in the calculated landfill resident / farmer dose. In all cases, the revised calculated public dose remains well below the public dose objective of 1 mrem/year. The errata correction pages also correct a mathematical error that was contained in the Total Activity column of Table 4.

Revised MicroShield and RESRAD output reports (original Enclosures 3 through 5) are not included with the errata correction pages. The revised transport worker and landfill worker doses and landfill resident / farmer dose were calculated by repeating the MicroShield and RESRAD calculations with the revised Table 4 activity concentrations as source terms. No other MicroShield or RESRAD input parameters were revised to perform these calculations.

A001

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Should you have any questions, please contact Mr. George Petitjean, Licensing Lead and point of contact for NRR at 231-547-8355.

Sincerely,



Kenneth E Pallagi
Acting Site General Manager

Attachment(s) 1. Affidavit
 2. Revised Errata Correction Pages.

CC: Administrator, Region III, USNRC
 NRC Reactor Decommissioning Inspector, Region III - BRP
 NRC/NRR Project Manager – David Wrona

ATTACHMENT 1
CONSUMERS ENERGY COMPANY

**Request for Approval of Proposed Disposal Procedures
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Affidavit

**CONSUMERS ENERGY COMPANY
LICENSE DPR-6
DOCKET 50-155**

**Request for Approval of Proposed Disposal Procedures
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CONSUMERS ENERGY COMPANY

To the best of my knowledge, information and belief, the contents of this submittal are truthful and complete.

By: *Kenneth E Pallagi*

Kenneth E Pallagi
Acting Site General Manager

Sworn and subscribed to before me this 20th day of June, 2001

Notary: *Brenda Weis*

Brenda Weis, Notary Public
Charlevoix County, Michigan

My commission expires January 16, 2006

SEAL

ATTACHMENT 2
CONSUMERS ENERGY COMPANY

**Request for Approval of Proposed Disposal Procedures
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Revised Errata Correction Pages

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concrete samples that were not contaminated by licensed radioactive materials. The results of these samples with concentration values representing the average concentration in the one-half inch thick wafer are detailed in Table 1. Copies of the General Engineering Laboratories Certificate of Analysis for these samples are included as Enclosure 2 to this submittal.

Table 1
Remediated Concrete Core Sample Results

Sample Number	Radionuclide			
	Co-60 pCi/g	Cs-137 pCi/g	Fe-55 pCi/g	H-3 pCi/g
19	<LLD	<LLD	<LLD	<LLD
31	<LLD	<LLD	<LLD	<LLD
83	<LLD	0.130 ± 0.088	<LLD	<LLD
104	<LLD	0.094 ± 0.054	<LLD	<LLD
112	0.084 ± 0.065	<LLD	<LLD	6.24 ± 2.51
123	<LLD	<LLD	<LLD	9.47 ± 2.88
128	<LLD	0.166 ± 0.062	<LLD	<LLD
7	<LLD	<LLD	<LLD	<LLD
90	<LLD	<LLD	<LLD	<LLD
149	0.458 ± 0.114	<LLD	<LLD	<LLD
117	<LLD	<LLD	<LLD	<LLD
100	<LLD	<LLD	<LLD	<LLD
119*	2.47 ± 0.739	<LLD	<LLD	<LLD
153*	0.292 ± 0.140	0.282 ± 0.128	<LLD	<LLD

*Remediated high surface contamination samples

The final two core samples listed above were taken from areas having a high potential for surface contamination and are average values of subsurface samples taken at various concrete depths. Laboratory analysis of these samples identified only **Co-60, Cs-137 and H-3**. K-40, Pb-214, U-233/234 and U-238 were also detected in these samples but at levels that were indistinguishable from naturally occurring background levels measured in plant concrete samples that were not contaminated by licensed radioactive materials.

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Table 2
 Volumetric Contamination of Remediated Surface Contaminated Concrete

Radionuclide	Concentration (pCi/g)	Total Activity (mCi)
Co-60	0.83	0.532
Cs-137	0.17	0.109
Fe-55	----	----
H-3	7.86	5.042
Total	8.85	5.683

All 42.25 million pounds of impacted concrete will be treated as potentially contaminated. The volumes of 4,320 cubic feet of shallow and 5,100 cubic feet of deep contamination as calculated from structural characterization analyses, will not be separated from impacted concrete debris. Therefore, as a conservative estimate of activity potentially present, activity concentrations from Table 2 were applied to the impacted demolition debris mass of 42.25 million pounds resulting in total activity as reported in Table 3.

Table 3
 Impacted Demolition Debris Total Activity (42.25 million pounds)

Radionuclide	Concentration (pCi/g)	Total Activity (mCi)
Co-60	0.83	16.0
Cs-137	0.17	3.3
Fe-55	----	----
H-3	7.86	152
Total	8.85	171

E. Requested Limiting Demolition Debris Concentration

To allow operational flexibility and ensure monitoring capability, Consumers Energy requests a bounding principal gamma emitter concentration limit of 5 pCi/gm for licensed radioactive materials contained as trace contamination in demolition debris for disposal in a State of Michigan licensed Type II landfill. Adjusting the total

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activity reported in Table 3 to a bounding principal gamma emitter concentration limit of 5 pCi/gm results in the bounding activity reported in Table 4.

Table 4
 Impacted Demolition Debris Bounding Activity (42.25 million pounds)

Radionuclide	Concentration (pCi/g)	Total Activity (mCi)
Co-60	4.15	80.0
Cs-137	0.85	16.5
Fe-55	----	----
H-3	39.3	760
Total	44.3	856

To ensure that the 5 pCi/gm principal gamma emitter limit is not exceeded, structural surfaces will be surveyed prior to demolition to verify that surface contamination does not exceed 5,000 dpm/100 cm² averaged over areas appropriate for the detection system utilized and all demolition debris will be monitored by a bulk assay system with an alarm setpoint established at or below the 5 pCi/gm principal gamma emitter limit prior to disposal.

Establishment of this bounding concentration limit will ensure that any uncertainties in the content of licensed radioactive material in demolition debris sent to a State of Michigan licensed landfill will not present a dose impact problem.

F. Dose Impacts

Dose impacts of the requested impacted demolition debris bounding activity were evaluated by performing calculations using the Table 4 radionuclide concentrations as source terms. These calculations are bounding because release at a principal gamma emitter limit of 5 pCi/gm is assumed for all 42.25 million pounds of impacted demolition debris. In practice, release surveys to a minimum detection limit of 5 pCi/gm of principal gamma emitters results in release of demolition debris from zero to 5 pCi/gm, or a mean of approximately 2.5 pCi/gm.

1. Transport Worker Dose Assessment

An evaluation of transport worker dose was performed using MicroShield, Version 5.03, from Grove Engineering and site-specific assumptions including bounding concentration values presented in Table 4. The transport system

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chosen for this evaluation was a roll-off container system with dimensions of 21.5 feet long, 8 feet wide and 3.5 feet high.

In addition to the above, the following assumptions were also applied to the analysis. In each case, the driver's seat is assumed to be 1 foot away from the cabin wall, which is conservatively assumed to be 0.12 inches thick, made of iron. The material hauler part of the truck is assumed to be made of iron with 0.25-inch thick sides, floor and tailgates. The distance between the hauler part and the driver's cabin is assumed to be 4 feet.

It is assumed that three truck drivers will be used for the total duration of the project and that the number of loads transported will be divided equally between each driver. Given the anticipated volumes of the impacted demolition debris (10,000 cubic yards), combined with the assumptions of standard load volumes, transport of all demolition debris within a one year period and the driving time of 2 hours per load to the landfill, each truck driver will be potentially exposed to radiation from residual radioactivity for 300 hours.

Applying the above assumptions, results in a calculated dose rate to the driver of $1.22E-03$ mrem/hour or an annual dose of 0.366 mrem to each of the truck drivers. Output from the MicroShield analysis is provided as Enclosure 3 to this submittal and an electronic file (*Rolloff.ms5*) of the analysis is included on the enclosed computer compact disk.

2. Landfill Worker Dose Assessment

An evaluation of landfill worker dose was performed using RESRAD, Version 6.0. For landfill operation, the landfill is assumed to close after placement of the demolition debris. Post-closure monitoring of the landfill is required by the State of Michigan for a 30-year period. Therefore, it is assumed that a member of the public, other than a landfill worker will not have access to a burial cell containing the demolition debris until 30 years after debris placement.

The following assumptions were made in the evaluation:

- a. The most exposed individual at the landfill is a bulldozer operator, positioning and spreading the demolition debris and placing a soil cap on it at the end of the day.
- b. The landfill most likely to receive BRP demolition debris currently has three bulldozer operators and, for purposes of this assessment, dose was assumed to be equally distributed between each bulldozer operator.

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- c. The 281,500 cubic feet (7,930 cubic meters) of impacted demolition debris are assumed to be deposited in a uniform 2-meter thick, 3,965 square meter (0.98 acre) layer.
- d. Based on the 0.98 acre surface area estimate of impacted demolition debris and a burial cell surface area of 8 acres, each landfill worker is assumed to spend 12.25 percent (0.98 acre/8 acres) of each worker's time working over or exposed to impacted demolition debris or 245 hours per occupational year of 2000 hours. This total of 245 hours equates to a RESRAD outdoor time fraction of 0.028.
- e. A 0.15 m soil cover (which is a daily cover requirement) was assumed. No credit was taken for any other engineering controls required by the State of Michigan.
- f. No credit was taken for shielding provided to the workers by the bulldozer.
- g. The bounding concentration values presented in Table 4 were used as the impacted demolition debris source terms.

The above assumptions result in a calculated annual TEDE dose of **0.290** mrem for each landfill worker. Output from the RESRAD analysis is provided as Enclosure 4 to this submittal and an electronic file (*Worker.rad*) of the analysis is included on the enclosed computer compact disk.

3. Landfill Resident / Farmer Dose Assessment

An evaluation of dose to an individual member of the public was performed using RESRAD, Version 6.0. Post-closure monitoring of the landfill is required by the State of Michigan for a 30-year period. For purposes of this evaluation, it is assumed that a residence, including a basement to the residence and a vegetable garden, is established on the burial cell containing the demolition debris 30 years after debris disposal.

The following assumptions were made in the evaluation:

- a. All RESRAD exposure pathways are active for the Resident / Farmer scenario except for the radon pathway (not regulated by the NRC).
- b. The impacted demolition debris is assumed to be soil like material with the bounding concentration values presented in Table 4 even though its density is somewhat higher than most soils. Additionally, resuspension

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requirements discussed in Section VIII, the use of default parameters will result in conservative dose estimates.

Applying the above assumptions, results in a calculated maximum annual dose of **0.009** mrem for a resident / farmer. This maximum annual dose occurs the first year of public access following the 30-year post-closure monitoring period.

Output from the RESRAD analysis is provided as Enclosure 5 to this submittal and an electronic file (*Public.rad*) of the analysis is included on the enclosed computer compact disk.

4. Dose Impact Conclusions

Assuming that all impacted demolition debris would be released for State of Michigan licensed Type II landfill disposal at a bounding principal gamma emitter concentration limit of 5 pCi/gm as trace contamination in demolition debris would result in a maximum dose impact to an individual member of the public of **0.366** mrem/year to each of three transport workers. Maximum dose to each landfill worker was calculated to be **0.290** mrem/year during impacted demolition debris disposal. Maximum calculated dose to a resident / farmer was calculated to be **0.009** mrem/year which would not occur until after completion of the required 30-year post-closure monitoring period. These maximum calculated doses are well below the public dose objective of 1 mrem/year.

Actual maximum dose impact to an individual member of the public is expected to be much less than these calculated values using a bounding principal gamma emitter concentration limit of 5 pCi/gm.

To ensure that the 5 pCi/gm principal gamma emitter limit is not exceeded, structural surfaces will be surveyed prior to demolition to verify that surface contamination does not exceed 5,000 dpm/100 cm² averaged over areas appropriate for the detection system utilized and all demolition debris will be monitored by a bulk assay system with an alarm setpoint established at or below the 5 pCi/gm principal gamma emitter limit prior to disposal.

G. Prohibition on Burial of Hazardous Waste

Hazardous waste as defined in the regulations of the Environmental Protection Agency (EPA), 40 CFR Parts 260 through 265, is not permitted to be included in the BRP demolition debris. Hazardous waste is required to be disposed of in a manner set out in EPA regulations and in accordance with applicable local and State laws