

50-315/316



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 10, 1994

Mr. E. E. Fitzpatrick, Vice President
Indiana Michigan Power Company
c/o American Electric Power Service Corporation
1 Riverside Plaza
Columbus, Ohio 43215

SUBJECT: DONALD C. COOK NUCLEAR PLANT, UNIT NOS. 1 AND 2 - DISPOSAL OF
LICENSED RADIOACTIVE MATERIAL PURSUANT TO 10 CFR 20.2002 AND
ISSUANCE OF EXEMPTION TO 10 CFR 20.2001 (TAC NOS. M81885 & M81886)

Dear Mr. Fitzpatrick:

By letter dated October 9, 1991, as supplemented October 23, 1991, September 3, 1993, and September 29, 1993, you requested approval for disposal of licensed material pursuant to Title 10 of the Code of Federal Regulations, Part 20, Section 302. (That section has since been renumbered 2002). We have completed our review of your request and find your proposal to leave the material in place to be acceptable. This approval is granted provided that the enclosed safety evaluation is permanently incorporated as an appendix to your Offsite Dose Calculation Manual (ODCM). Any future modifications which would challenge the information contained in this appendix to your ODCM shall be reported to the NRC.

The staff determined that the requested approval for disposal of licensed material pursuant to Title 10 of the Code of Federal Regulations, Part 20, Section 2002 necessitated an exemption to 10 CFR 20.2001. The U.S. Nuclear Regulatory Commission has granted the enclosed exemption regarding the disposal of licensed material pursuant to Title 10 of the Code of Federal Regulations, Part 20, Section 2002 for Donald C. Cook Nuclear Plant. Pursuant to 10 CFR 20.2301, the Commission has determined that granting the exemption is authorized by law and will not endanger life or property, and is otherwise in the public interest.

Pursuant to 10 CFR 51.32, the Commission has determined that granting of this approval will have no significant impact on the environment (October 31, 1994, 59 FR 54477). A copy of the environmental assessment and finding of no significant impact relating to your request is enclosed.

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DFO

A copy of the exemption is being forwarded to the Office of the Federal Register for publication.

Should you have any questions, please contact John B. Hickman at (301) 504-3017.

Sincerely,

Original signed by

Jack W. Roe, Director
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Docket Nos. 50-315
and 50-316

Enclosures:

- 1. Safety Evaluation
- 2. Exemption
- 3. Environmental Assessment

cc w/encls:

See next page

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cc: Plant Service list

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Mr. E. E. Fitzpatrick
Indiana Michigan Power Company

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO DISPOSAL OF SLIGHTLY CONTAMINATED SLUDGE

INDIANA MICHIGAN POWER COMPANY

DONALD C. COOK NUCLEAR PLANT, UNIT NOS. 1 AND 2

DOCKET NOS. 50-315 AND 50-316

1.0 INTRODUCTION

By letters dated October 9, 1991, October 23, 1991, September 3, 1993, and September 29, 1993, Indiana Michigan Power Company (I&M) requested approval pursuant to 10 CFR 20.2002 for the onsite disposal of licensed material not previously considered in the D. C. Cook Final Environmental Statement dated August 1973. Specifically, this request addresses actions taken in 1982 in which approximately 942 cubic meters of slightly contaminated sludge were removed from the turbine room sump absorption pond and pumped to the upper parking lot located within the exclusion area of the D. C. Cook Plant. The contaminated sludge was spread over an area of approximately 4.7 acres. The sludge contained a total radionuclide inventory of 8.89 millicuries (mCi) of Cesium-137, Cesium-136, Cesium-134, Cobalt-60 and Iodine-131.

In its submittal, the licensee addressed specific information requested in accordance with 10 CFR 20.2002(a), provided a detailed description of the licensed material, thoroughly analyzed and evaluated information pertinent to the impacts on the environment of the proposed disposal of licensed material, and committed to follow specific procedures to minimize the risk of unexpected exposures.

2.0 DESCRIPTION OF WASTE

The turbine room sump absorption pond is a collection place for water released from the plant's turbine room sump. The contamination was caused by a primary-to-secondary steam generator leak that entered the pond from the turbine building sump, a recognized release pathway. Sludge, consisting mainly of leaves and roots mixed with sand, built up in the pond. As a result, the licensee dredged the pond in 1982. The radioactive sludge removed by the dredging activities was pumped to a containment area located within the exclusion area. The total volume of 942 cubic meters of the radioactive sludge that was dredged from the bottom of the turbine room absorption pond was subsequently spread and made into a graveled road over the upper parking lot area of approximately 4.7 acres.

The principal radionuclides identified in the dredged material are listed below.

TABLE 1

NUCLIDE (half-life)	Activity (mCi) 1982	Activity (mCi) 1991
¹³⁶ Cs (13.2 d)	0.03	NA*
¹³⁴ Cs (2.1 y)	2.34	0.18
¹³⁷ Cs (30.2 y)	5.59	4.57
⁶⁰ Co (5.6 y)	0.90	0.27
¹³¹ I (8.04 d)	0.03	NA*
TOTAL:	8.89	5.02

*NA: not applicable due to decay

3.0 RADIOLOGICAL IMPACTS

The licensee in 1982 evaluated the following potential exposure pathways to members of the general public from the radionuclides in the sludge:

- (1) external exposure caused by groundshine from the disposal site;
- (2) internal exposure caused by inhalation of resuspended radionuclide; and
- (3) internal exposure from ingesting ground water.

The staff has reviewed the licensee's calculational methods and assumptions and finds that they are consistent with NUREG-1101, "Onsite Disposal of Radioactive Waste," Volumes 1 and 2, November 1986 and February 1987, respectively. The staff finds the assessment methodology acceptable. Table 2 lists the doses calculated by the licensee for the maximally exposed member of the public based on a total activity of 8.89 mCi disposed in that year.

TABLE 2

<u>Pathway</u>	<u>Whole Body Dose Received by Maximally Exposed Individual (mrem/year)</u>
Groundshine	0.94
Inhalation	0.94
Groundwater Ingestion	0.73

Total	2.61

On July 5, 1991, the licensee re-sampled the onsite disposal area to assure that no significant impacts and adverse effects had occurred. A counting procedure based on the appropriate environmental low-level doses was used by the licensee; however, no activity was detected during the re-sampling¹. This is consistent with the original activity of the material and the decay time. The 1991 re-sampling process used by the licensee confirms that the environmental impact of the 1982 disposal was very small. The staff finds the licensee's methodology acceptable.

4.0 ENVIRONMENTAL FINDING AND CONCLUSION

The staff has evaluated the environmental impact of the proposal to leave in place approximately 942 cubic meters of slightly contaminated sludge underneath the upper parking lot on the D. C. Cook site.

In 1982, the licensee evaluated the potential exposure to members of the general public from the radionuclides in the sludge and calculated the potential dose to the maximally exposed member of the public, based on a total activity of 8.89 mCi disposed in that year, to be 2.61 mrem/yr. The staff has reviewed the licensee's calculational methods and assumptions and found that they are consistent with NUREG-1101, "Onsite Disposal of Radioactive Waste," Volumes 1 and 2, November 1986 and February 1987, respectively. The staff finds the assessment methodology acceptable. For comparison, the radiation from the naturally occurring radionuclides in soils and rocks plus cosmic radiation gives a person in Michigan a whole-body dose rate of about 89 mrem per year outdoors. Subsequent licensee sampling in 1991 identified no detectable activity. The staff evaluated the licensee's sampling and analysis methodology and finds it acceptable. The results of the 1991 re-sampling by the licensee confirms that the environmental impact of the 1982 disposal was very small.

Based on the above the staff finds that the potential environmental impacts of leaving the contaminated sludge in place are insignificant. With regard to the nonradiological impacts, the staff has determined that leaving the soil in place represents the least impact to the environment.

5.0 CONCLUSION

Based on the staff's review of the licensee's discussion, the staff finds the licensee's proposal to retain the material in its present location as documented in this Safety Evaluation acceptable. Also, this Safety Evaluation shall be permanently incorporated as an appendix to the licensee's Offsite Dose Calculation Manual (ODCM), and any future modifications shall be reported to NRC in accordance with the applicable ODCM change protocol.

Therefore, the licensee's proposal to consider the slightly contaminated sludge disposed by retention in place in the manner described in the D. C.

¹ I&M letter from E.E. Fitzpatrick to the NRC Document Control Desk, September 29, 1993

Cook submittals dated October 9, 1991, October 23, 1991, September 3, 1993, and September 29, 1993, is acceptable.

The guidelines used by the NRC staff for onsite disposal of licensed material and the staff's evaluation of how each guideline has been satisfied are given in Table 3.

Pursuant to 10 CFR 51.32, the Commission has determined that granting of this approval will have no significant impact on the environment (October 31, 1994, 59 FR 54477).

Principal Contributor: J. Minns

Date: November 10, 1994

TABLE 3

20.2002 GUIDELINE FOR ON-SITE DISPOSAL ²	STAFF'S EVALUATION
1. The radioactive material should be disposed of in such a manner that it is unlikely that the material would be recycled.	1. Due to the nature of the disposed material, recycling to the general public is not considered likely.
2. Doses to the total body and any body organ of a maximally exposed individuals (a member of the general public or a non-occupationally exposed worker) from the probable pathways of exposure to the disposed material should be less than 1 mrem/year.	2. This guideline was addressed in Table 2. Although the 2.61 mrem/yr is greater than staff's guidelines, the staff finds it acceptable due to 9 yrs decay following analysis and the expected lack of activity detected in the 1991 survey.
3. Doses to the total body and any body organ of an inadvertent intruder from the probable pathways of exposure should be less than 5 mrem/year.	3. Because the material will be land-spread, the staff considers the maximally exposed individual scenario to also address the intruder scenario.
4. Doses to the total body and any body organ of an individual from assumed recycling of the disposed material at the time the disposal site is released from regulatory control from all likely pathways of exposure should be less than 1 mrem.	4. Even if recycling were to occur after release from regulatory control, the dose to a maximally exposed member of the public is not expected to exceed 1 mrem/year, based on exposure scenarios considered in this analysis.

² E.F. Branagan, Jr. and F.J. Congel, "Disposal of Contaminated Radioactive Wastes from Nuclear Power Plants," presented at the Health Physics Society's Mid-Year Symposium on Health Physics Consideration in Decontamination/Decommissioning, Knoxville, Tennessee, February 1986, (CONF-860203).

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)	
)	
INDIANA MICHIGAN POWER COMPANY)	Docket Nos. 50-315
)	and 50-316
(Donald C. Cook Nuclear Plant)	
Units 1 and 2))	

EXEMPTION

I.

Indiana Michigan Power Company (the licensee) is the holder of Facility Operating Licenses Nos. DPR-58 and DPR-74 which authorize operation of the Donald C. Cook Nuclear Plant, Units 1 and 2, at steady-state reactor power levels not in excess of 3250 and 3411 megawatts thermal, respectively. The Donald C. Cook facilities are pressurized water reactors located at the licensee's site in Berrien County, Michigan. These licenses provide, among other things, that they are subject to all rules, regulations, and orders of the Nuclear Regulatory Commission (the Commission) now or hereafter in effect.

II.

Pursuant to 10 CFR 20.2001, "(a) A licensee shall dispose of licensed material only-- (1) By transfer to an authorized recipient as provided in § 20.2006 or in the regulations in parts 30, 40, 60, 61, 70, or 72 of this chapter; or (2) By decay in storage; or (3) By release in effluents within the limits in § 20.1301; or (4) As authorized under §§ 20.2002, 20.2003, 20.2004, or § 20.2005."

III.

By letter dated October 9, 1991, as supplemented October 23, 1991, September 3, 1993, and September 29, 1993, the licensee requested approval for disposal of licensed material pursuant to Title 10 of the Code of Federal Regulations, Part 20, Section 302. (That section has since been renumbered 2002).

The licensee is requesting approval to leave approximately 942 cubic meters of slightly contaminated sludge in place underneath the upper parking lot on the D. C. Cook site. In 1982, approximately 942 cubic meters of slightly contaminated sludge were removed from the turbine room sump absorption pond and pumped to the upper parking lot located within the exclusion area of the D. C. Cook plant. The contaminated sludge was spread over an area approximately 4.7 acres. The sludge contained a total radionuclide inventory of 8.89 millicuries (mCi) of Cesium-137, Cesium-136, Cesium-134, Cobalt-60, and Iodine-131.

IV.

Pursuant to 10 CFR 20.2301, "The Commission may, upon application by a licensee or upon its own initiative, grant an exemption from the requirements of the regulations in this part if it determines the exemption is authorized by law and would not result in undue hazard to life or property." The staff has determined that the requested approval for disposal of licensed material pursuant to Title 10 of the Code of Federal Regulations, Part 20, Section 2002 necessitates an exemption to 10 CFR 20.2001.

The licensee in 1982 evaluated the following potential exposure pathways to members of the general public from the radionuclides in the sludge: (1) external exposure caused by groundshine from the disposal

site, (2) internal exposure caused by inhalation of resuspended radionuclide, and (3) internal exposure from ingesting ground water. The staff has reviewed the licensee's calculational methods and assumptions and finds that they are consistent with NUREG-1101, "Onsite Disposal of Radioactive Waste," Volumes 1 and 2, November 1986 and February 1987, respectively. The staff finds the assessment methodology acceptable.

The doses calculated by the licensee for the maximally exposed member of the public based on a total activity of 8.89 mCi disposed are listed below.

<u>Pathway</u>	<u>Whole Body Dose Received by</u> <u>Maximally Exposed Individual</u> <u>(mrem/yr)</u>
Groundshine	0.94
Inhalation	0.94
Groundwater Ingestion	<u>0.73</u>
Total	2.61

For perspective, the radiation from the naturally occurring radionuclides in soils and rocks plus cosmic radiation gives a person in Michigan a whole-body dose rate of about 89 mrem per year outdoors.

On July 5, 1991, the licensee re-sampled the onsite disposal area to assure that no significant impacts and adverse effects had occurred. A counting procedure based on the appropriate environmental low-level doses was used by the licensee; however, no activity was detected during the re-sampling. This is consistent with the original activity of the material and the decay time. The reduced level of radioactivity would not be detectable against background through the shielding provided by the parking lot surface. The 1991 re-sampling process used by the licensee confirms

that the radiological impact of the 1982 disposal was very small. Based on the staff's review of the licensee's discussion, the staff finds that the potential radiation exposure due to leaving the contaminated sludge in place is insignificant. Based on the staff review of the exposure potential of the original quantity of material, and the measured level of decay, the continued presence of the material poses no more radiological impact than disposal methods authorized by 10 CFR 20.2001. Therefore, the licensee's proposed action would not pose a radiological hazard to life or property and the exemption to 10 CFR 20.2001 allowing onsite storage of the radioactive material pursuant to 10 CFR 20.2002 is acceptable.

V.

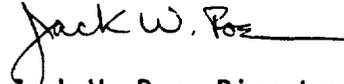
The staff has reviewed the licensee's request and concluded that issuance of this exemption will not endanger life or property and will have no significant effect on the safety of the public or the plant.

Accordingly, the Commission has determined, pursuant to 10 CFR 20.2301, that this exemption as described in Section IV is authorized by law, will not endanger life or property and is otherwise in the public interest. Therefore, the Commission hereby grants an exemption from the requirements of 10 CFR 20.2001.

Pursuant to 10 CFR 51.32, the Commission has determined that granting of this exemption will have no significant impact on the environment (October 31, 1994, 59 FR 54477).

This exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink that reads "Jack W. Roe" followed by a horizontal line.

Jack W. Roe, Director
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland
this 10th day of November, 1994

UNITED STATES NUCLEAR REGULATORY COMMISSIONINDIANA MICHIGAN POWER COMPANYDONALD C. COOK NUCLEAR POWER PLANT, UNITS 1 AND 2DOCKET NOS. 50-315 AND 50-316ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT

The U.S. Nuclear Regulatory Commission (the Commission) is considering the approval of the licensee's request to leave approximately 942 cubic meters of slightly contaminated sludge in place underneath the upper parking lot on the D. C. Cook site. This was proposed by Indiana Michigan Power Company (the licensee) for the D. C. Cook Plant, located in Berrien County, Michigan.

ENVIRONMENTAL ASSESSMENTIdentification of Proposed Action:

The proposed action by the NRC would approve the disposal of contaminated sludge by leaving it in place at the facility, as proposed by the licensee's request dated October 9, 1991, as supplemented October 23, 1991, September 3, 1993, and September 29, 1993. The request for approval is submitted pursuant to 10 CFR 20.2002. The total volume of contaminated sludge is estimated to be 942 cubic meters.

The Need for the Proposed Action:

In 1982, approximately 942 cubic meters of slightly contaminated sludge were removed from the turbine room sump absorption pond and pumped to the upper parking lot located within the exclusion area of the D. C. Cook plant. The contaminated sludge was spread over an area approximately 4.7 acres. The sludge contains a total radionuclide inventory of 8.86

millicuries (mCi) of Cesium-137, Cesium-136, Cesium-134, Cobalt-60, and Iodine-131.

Environmental Impacts of the Proposed Action:

The licensee in 1982 evaluated the following potential exposure pathways to members of the general public from the radionuclides in the sludge: (1) external exposure caused by groundshine from the disposal site, (2) internal exposure caused by inhalation of resuspended radionuclide, and (3) internal exposure from ingesting ground water. The staff has reviewed the licensee's calculational methods and assumptions and finds that they are consistent with NUREG-1101, "Onsite Disposal of Radioactive Waste," Volumes 1 and 2, November 1986 and February 1987, respectively. The staff finds the assessment methodology acceptable. The table below lists the doses calculated by the licensee for the maximally exposed member of the public based on a total activity of 8.89 mCi disposed in that year.

<u>Pathway</u>	<u>Whole Body Dose Received by Maximally Exposed Individual (mrem/yr)</u>
Groundshine	0.94
Inhalation	0.94
Groundwater Ingestion	0.73
Total	<u>2.61</u>

For perspective, the radiation from the naturally occurring radionuclides in soils and rocks plus cosmic radiation gives a person in Michigan a whole-body dose rate of about 89 mrem per year outdoors, which may be altered as much as 20 mrem per year by the type of construction of

the person's residence (e.g., wood frame or brick) and the amount of time spent in it.

On July 5, 1991, the licensee re-sampled the onsite disposal area to assure that no significant impacts and adverse effects had occurred. A counting procedure based on the appropriate environmental low limit detection was used by the licensee; however, no activity above background was detected during the re-sampling. The 1991 re-sampling process used by the licensee confirms that the environmental impact of the 1982 disposal was very small. The staff finds the licensee's methodology acceptable.

The staff has evaluated the impacts of leaving the contaminated sludge in place, and finds that the potential environmental impacts are insignificant.

With regard to the nonradiological impacts, the staff has determined that leaving the soil in place has the smallest impact when compared to the principal alternatives discussed below.

Alternatives to the Proposed Action:

The principal alternative to leaving the contaminated sludge in place would be to dig it up, package it in 55-gallon drums or other suitable containers, and ship it to a disposal facility licensed to dispose of low-level radioactive waste. This would be costly, requiring, for example, the removal of the parking surface over the disposal area, and would not provide environmental benefits in that no measurable radioactivity has been detected from the material. On the basis of the above analysis and evaluations and after weighing the environmental, technical, and other benefits against the environmental costs, the staff concludes that the action called for under NEPA and 10 CFR Part 51 is the issuance of an approval of the proposed waste disposal.

Alternative Use of Resources:

The principal result of this action does involve the use of resources beyond the scope anticipated in the Environmental Impact Statement issued August 1973, for normal plant operations; however, this additional use of land is not significant, as the area involved is located underneath the upper parking lot. This action involves no other critical materials or resources.

Agencies and Persons Consulted:

The staff consulted with the State of Michigan regarding the environmental impact of the proposed action. The State had no comments.

FINDING OF NO SIGNIFICANT IMPACT

The Commission has determined not to prepare an environmental impact statement for the proposed action. Based upon the foregoing environmental assessment, the staff concludes that the proposed action will not have a significant effect on the quality of the human environment.

For further details with respect to this proposed action, see the licensee's letters dated October 9, 1991, October 23, 1991, September 3, 1993, and September 29, 1993. These letters are available for public inspection at the Commission's Public Document Room, 2120 L Street, N.W., Washington, DC 20555 and at the local public document room located at the Maud Preston Palenske Memorial Library, 500 Market Street, St. Joseph, Michigan 49085.

Dated at Rockville, Maryland, this 24th day of October 1994.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read "John B. Hickman". The signature is written in a cursive style with a large initial "J" and "H".

John B. Hickman, Project Manager
Project Directorate III-1
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation