

Indiana Michigan
Power Company
500 Circle Drive
Buchanan, MI 49107 1395



January 19, 2004

AEP:NRC:4049
10 CFR 50.4

Docket No.: 50-315

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop O-P1-17
Washington, DC 20555-0001

Donald C. Cook Nuclear Plant, Unit 1
DEPARTMENT OF TRANSPORTATION EXEMPTION REQUEST

Reference: "Donald C. Cook Nuclear Plant, Unit 1, Department of Transportation Exemption Request," letter AEP:NRC:3049, dated December 17, 2003.

The attached request for exemption from the requirements of 49 CFR 173.403 and 49 CFR 173.427(b)(1) is being forwarded for the Nuclear Regulatory Commission's information and supercedes the referenced letter whose attachment was revised per a Department of Transportation (DOT) request for single-sided rather than double-sided pages. The exemption request is being transmitted to the DOT to support the disposal of the Donald C. Cook Nuclear Plant Unit 1 steam generators. The steam generators were removed from service in 1997. The exemption request will allow the steam generators to be shipped unpackaged as it can be demonstrated that the disposal item itself can provide equivalent packaging.

This letter contains no new commitments. Should you have any questions, please contact Mr. Brian D. Mann, Acting Director of Regulatory Affairs, at (269) 697-5806.

Sincerely,

A handwritten signature in black ink, appearing to read 'John A. Zwolinski', is written over the word 'Sincerely,'.

John A. Zwolinski
Director of Design Engineering and Regulatory Affairs

RV/rdw

Attachment

APOI

c: J. L. Caldwell, NRC Region III
K. D. Curry, Ft. Wayne AEP, w/o attachment
J. T. King, MPSC, w/o attachment
MDEQ – WHMD/HWRPS, w/o attachment
NRC Resident Inspector
J. F. Stang, Jr., NRC Washington, DC

Attachment to AEP:NRC:4049

Department of Transportation
Exemption Request



January 19, 2004

Associate Administrator for Hazardous Materials Safety
Research and Special Programs Administration
U. S. Department of Transportation
400 7th St., S.W.
Washington, DC 20590-0001

Attention: Exemptions, DHM-31

Donald C. Cook Nuclear Plant Units 1 and 2
EXEMPTION REQUEST FROM THE SURFACE CONTAMINATED
OBJECT DEMONSTRATION REQUIREMENTS OF 49 CFR 173.403 AND
THE PACKAGING REQUIREMENTS OF 49 CFR 173.427(b)(1) FOR THE
SHIPMENT OF FOUR STEAM GENERATOR LOWER ASSEMBLIES
FROM DONALD C. COOK NUCLEAR PLANT

By letter dated December 17, 2003, Indiana Michigan Power Company (I&M) requested an exemption from the subject regulations for the shipment of four steam generator lower assemblies (SGLAs) from the Donald C. Cook Nuclear Plant (CNP) to the Chem-Nuclear Systems (CNS) low-level radioactive waste management facility in Barnwell, South Carolina. Per a request from Department of Transportation personnel, this letter submits the exemption request in a single-sided, rather than double-sided, page format.

This one-time shipment will be performed in a controlled manner as described in the information provided as attachments to this letter. The transportation of the SGLAs is expected to begin on or after May 1, 2004, and be completed within one year. This Application for Exemption is being prepared in accordance with the requirements of 49 CFR Part 107⁽¹⁾ and the guidance provided in the Nuclear Regulatory Commission (NRC) Generic Letter 96-07⁽²⁾. A similar set of four SGLAs from Unit 2 was shipped from CNP to the CNS facility in 1999 under DOT E-12190.

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- (1) Hazardous Material Program Procedures, Part 107, Title 49, United States Code of Federal Regulations, October 1, 1999.
- (2) NRC Generic Letter 96-07: Interim Guidance on Transportation of Steam Generators, United States Nuclear Regulatory Commission, December 5, 1996.

Accompanying this letter is a series of attachments that provide supporting information for this exemption request. The attachments include the compliance matrix that addresses the requirements of 49 CFR 107 for an exemption request, detailed engineering analyses, drawings, and operational plans and procedures supporting the SGLA transportation effort. None of the attached information is proprietary.

Consistent with the guidance of the NRC Generic Letter, I&M requests that the Department of Transportation grant the following exemptions from the surface contaminated object (SCO) shipping and classification requirements:

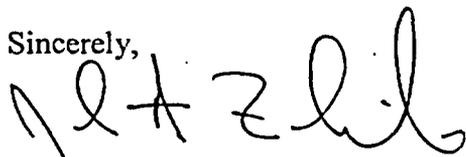
- An exemption from the packaging requirements of 49 CFR 173.427(b)(1) for SCO material, and
- An exemption from the demonstration of contamination levels for SCO materials of 49 CFR 173.403.

As described fully in Attachment 1, justification for I&M's request is based on the relatively low total activity levels, integrity of each SGLA outer shell, and comprehensive transportation system controls.

In all other aspects, the shipment of the four CNP SGLAs will meet the requirements of 49 CFR Part 173 and NRC Generic Letter 96-07. Both the compliance matrix and the transportation system controls demonstrate the transport of the SGLAs can be performed safely. Additional supporting information is provided in the attached documents.

If you have any questions concerning this request, please contact Mr. Brian D. Mann, Acting Manager of Regulatory Affairs at (269) 697-5806.

Sincerely,



John A. Zwolinski
Director of Design Engineering and Regulatory Affairs

Attachments:

1. Compliance Matrix
2. Structural Package Evaluation
3. SGLA General Arrangement and Closure Drawings
4. Transportation System General Arrangements Drawings
5. SGLA Characterization
6. Transportation and Emergency Response Plan
7. Evaluation of Residual Water in Plugged Tubes

**ATTACHMENT 1
COMPLIANCE MATRIX**

**ATTACHMENT I
COMPLIANCE MATRIX**

EXEMPTION REQUEST FROM THE SURFACE CONTAMINATION DEMONSTRATION REQUIREMENTS OF 49 CFR 173.403 AND THE PACKAGING REQUIREMENTS OF 49 CFR 173.427(b)(1) FOR THE SHIPMENT OF FOUR STEAM GENERATOR LOWER ASSEMBLIES FROM THE DONALD C. COOK NUCLEAR PLANT

This document provides the basis of the exemption request for the transportation of the Unit 1 Donald C. Cook Nuclear Plant (CNP) steam generator lower assemblies (SGLAs). In the following text, the regulation concerning the exemption request is cited in bold, and the applicant's response is provided following the respective regulation. Supporting information is provided in other documents also included as an attachment to this exemption submittal.

TITLE 49--TRANSPORTATION

CHAPTER I--RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION, DEPARTMENT OF TRANSPORTATION

Subpart B--Exemptions

Source: Amdt. 107-38, 61 FR 21095, May 9, 1996, unless otherwise noted.

Sec. 107.101 Purpose and scope.

This subpart prescribes procedures for the issuance, modification and termination of exemptions from requirements of this subchapter, subchapter C of this chapter, or regulations issued under chapter 51 of 49 U.S.C.

Sec. 107.105 Application for exemption.

(a) General. Each application for an exemption or modification of an exemption must--

(1) Be submitted for timely consideration, at least 120 days before the requested effective date to: Associate Administrator for Hazardous Materials Safety, (Attention: Exemptions), DHM-31), Research and Special Programs Administration, U.S. Department of Transportation, 400 7th Street, SW, Washington, DC 20590-0001.

This application is being submitted on or before December 17, 2003, approximately 120 days prior to the desired issuance date of April 15, 2004. Two copies are provided to the address as stated.

(2) State the name, street and mailing addresses, e-mail address optional, and telephone number of the applicant; if the applicant is not an individual, state the name, street and mailing addresses, e-mail address optional, and telephone number of an individual designated as an agent of the applicant for all purposes related to the application;

Applicant:

Indiana Michigan Power Company (I&M)
Donald C. Cook Nuclear Plant

Agent:

Mr. Walter T. MacRae
American Electric Power, Nuclear Generating Group
500 Circle Dr.
Buchanan, MI 49107
(269) 697-5633

(3) If the applicant is not a resident of the United States, a designation of agent for service in accordance with Sec. 105.40 of this part; and

The applicant is a United States corporation and the agent is a resident of the United States.

(4) For a manufacturing exemption, a statement of the name and street address of each facility where manufacturing under the exemption will occur.

Not applicable. A manufacturing exemption is not requested.

(b) Confidential treatment. To request confidential treatment for information contained in the application, the applicant shall comply with Sec. 105.30(a).

Not applicable. No confidential treatment is requested.

(c) Description of exemption proposal. The application must include the following information that is relevant to the exemption proposal:

(1) A citation of the specific regulation from which the applicant seeks relief;

Regulatory Requirements:

49 CFR 173.403 – Definitions

For purposes of this subpart—

... Surface Contaminated Object (SCO) means a solid object which is not itself radioactive but which has Class 7 (radioactive) material distributed on any of its surfaces. SCO must be in one of two groups with surface activity not exceeding the following limits:

SCO-I Not applicable to CNP

SCO-II: A solid object on which the limits for SCO-I are exceeded and on which:

- (i) The non-fixed contamination on the accessible surface averaged over 300 cm² (or the area of the surface if less than 300 cm²) does not exceed 400 Bq/cm² (10⁻² microcurie/cm²) for beta and gamma and low toxicity

alpha emitters or 40 Bq/cm^2 (10^{-3} microcuries/cm²) for all other alpha emitters;

(ii) The fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed $8 \times 10^5 \text{ Bq/cm}^2$ for beta and gamma and low toxicity alpha emitters, or $8 \times 10^4 \text{ Bq/cm}^2$ ($2 \text{ microcuries/cm}^2$) for all other alpha emitters; and

(iii) The non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed $8 \times 10^5 \text{ Bq/cm}^2$ ($20 \text{ microcuries/cm}^2$) for beta and gamma and low toxicity alpha emitters, or $8 \times 10^4 \text{ Bq/cm}^2$ ($2 \text{ microcuries/cm}^2$) for all other alpha emitters.

49 CFR 173.427 – Transport requirements for low specific activity (LSA) Class 7 (radioactive) materials and surface contaminated objects (SCO).

(b) Except as provided in paragraph (c) of this section, LSA material and SCO must be packaged as follows:

(1) In an industrial package (IP-1, IP-2 or IP-3; Sec. 173.411), subject to the limitations of Table 8.

(2) Specification of the proposed mode or modes of transportation;

The SGLAs will be transported by two primary modes, rail and heavy-haul motor vehicle. The SGLAs will be transported via rail from CNP to the Duratek Consolidation and Services Facility (DCSF). The SGLAs will be transported via road from the DCSF to the Chem-Nuclear Systems Barnwell, South Carolina Facility. Details of the transportation are included in the transportation plan of Attachment 6.

(3) A detailed description of the proposed exemption (e.g., alternative packaging, test, procedure or activity) including, as appropriate, written descriptions, drawings, flow charts, plans and other supporting documents;

Exemption Request:

Nuclear Regulatory Commission (NRC) Generic Letter 96-07, "Interim Guidance on Transportation of Steam Generators," provides NRC and Department of Transportation (DOT) guidance on the application of existing radioactive material transportation requirements to the transportation of steam generators. The generic letter indicates that the Unit 1 SGLAs are best characterized within the scope of the regulations as SCO, as they are solid, non-radioactive objects with radioactive material distributed on its surfaces. As such, SCO material is required to be transported in packaging meeting DOT's industrial packaging definitions in 49 CFR 173.411.

The generic letter goes on to state that it is impractical to measure the contamination level over all contaminated surfaces as required to demonstrate compliance with the SCO definition. Furthermore, the letter states that, if the shipper desires to ship the

steam generators without first packaging them, an exemption should be requested from the packaging requirements for SCO material.

As a result of this guidance, I&M hereby request exemptions from 1) demonstrating compliance with the SCO definition and 2) from the packaging requirements for SCO material. Supporting information is provided in the form of attachments accompanying this request that demonstrate equivalent safety to that specified for the transportation of SCO material per existing regulations.

Characterization of radioactive content

The primary side surfaces of the SGLAs are coated with radioactive materials deposited from reactor coolant water during the course of normal operation. The characterization of this radioactive content is provided in Attachment 5. The characterization shows that the average contamination levels are well within the limits of 49 CFR 173.403. It is assumed that the radioactive content of water potentially trapped in plugged tubes is negligible. The assessment of water remaining in plugged tubes is provided in Attachment 7. Furthermore, it is assumed that the secondary side surfaces of the SGLA contain negligible quantities of radioactive material.

The CNP Unit 1 steam generators were removed from service in 1997. During a 1999/2000 steam generator replacement project, the steam domes were removed for reuse, leaving the lower assemblies, which were placed in storage at CNP. To prevent the release of the radioactive contents, 3-inch thick steel plates were welded across the opening left by removal of the dome and across the primary coolant inlet and outlet nozzles. Steel plugs were inserted and then welded into smaller diameter penetrations. These welded closures also provide shielding of the radioactive material inside. The SGLAs as prepared for transport are structurally evaluated in Attachment 2. Sketches depicting the orientation of the SGLA and supporting transportation equipment are provided in Attachments 3 and 4.

Alternative Packaging of the CNP SGLAs:

The steam generator lower assemblies will be transported as unpackaged radioactive material. Drawings of the SGLAs are provided in Attachment 3. The SGLAs are approximately 516 inches long, 172 inches in maximum diameter, and weigh approximately 240 tons. The steam generator, constructed of carbon steel, was manufactured with a minimum shell thickness of 2.82 inches. The steam generators are designed for an operating pressure of more than 1000 pounds per square inch.

In order to meet dimensional limits set forth by the railroads, the maximum width of the SGLAs in their shipping orientation on the railcar must not exceed 14 feet. In order to meet this requirement, a small, localized area of the conical section of SGLA shell measuring approximately 170 in² will be removed at the two widest locations (90° and 270°) prior to transport. In this localized area the shell thickness will vary from 3.86 inches to 2.0 inches.

Based on the engineering evaluations performed for the alternatively packaged SGLAs, it is concluded that the SGLAs as described herein, along with the transportation plans

and procedures, provide a level of safety appropriate for this material consistent with DOT regulations.

- (4) A specification of the proposed duration or schedule of events for which the exemption is sought;**

The current project schedule includes an early start date for transportation activities of May 1, 2004. Each SGLA will be loaded and secured to a separate rail car with all four SGLAs transported in a single shipment in Special (dedicated) Train Service by the railroads. The rail shipment duration is estimated at 14 days. Based on this schedule of events, and the uncertainties inherent in such a project, we request that the exemption be issued by April 15, 2004, and that the exemptions be effective for a period of one year.

- (5) A statement outlining the applicant's basis for seeking relief from compliance with the specified regulations and, if the exemption is requested for a fixed period, a description of how compliance will be achieved at the end of that period;**

This exemption request is submitted in accordance with the information provided in NRC Generic Letter 96-07, "Interim Guidance on Transportation of Steam Generators." This generic letter is a joint effort between NRC and DOT, and provides a basis for this request. In addition, the request for the exemption from the conveyance limit is made in recognition of the controls that will be in place during transport and the integrity of the SGLA shell that will prevent loss of radioactive material content and exposure of the public. Since the transportation of each SGLA will be a one-time-only event, it is not necessary to demonstrate compliance at the end of the exemption period.

- (6) If the applicant seeks emergency processing specified in Sec. 107.117, a statement of supporting facts and reasons;**

Emergency processing of this exemption application is not requested.

- (7) Identification and description of the hazardous materials planned for transportation under the exemption;**

The SGLAs are to be transported as surface contaminated objects with SCO-II levels of Class 7 (radioactive) material. The Class 7 material is present as solid metal oxides deposited on those interior metal surfaces of the SGLAs, which were in contact with primary coolant during plant operation.

As presented in Attachment 5, the estimated contained quantities of Class 7 material on the date of shipment are:

SGLA	Activity (Ci)	Quantity (A ₂)
No. 11	29.706	5.4
No. 12	39.154	7.2
No. 13	35.157	6.4
No. 14	35.248	6.5

The estimates are based on dose rate surveys performed on the SGLA in the storage building. The contained activity will be reevaluated once the SGLAs are removed from storage. If, upon reevaluation, the contained activity is greater than the levels reported, the revised activity levels will be provided to the DOT. Since dose rates measured in the storage facility are influenced by the adjacent SGLAs, the final survey results, and thus the characterization activities, are expected to be less than those estimated in Attachment 5.

- (8) Description of each packaging, including specification or exemption number, as applicable, to be used in conjunction with the requested exemption;**

As previously stated, this exemption request is for the transportation of four SGLAs from CNP. Each SGLA will be prepared as described in response to 49 CFR 173.107(c)(3) above.

- (9) For alternative packagings, documentation of quality assurance controls, package design, manufacture, performance test criteria, in-service performance and service-life limitations;**

I&M and its contractor, Duratek, will perform all SGLA preparation and transportation activities in accordance with their NRC-approved quality assurance (QA) programs. Additionally, a project specific QA plan has been developed that covers all activities performed in support of the project.

- (10) A certification that the applicant is in compliance with transportation security laws and regulations. When a Class 1 material is forbidden for transportation by air except under an exemption (see Columns 9A and 9B in the table in 49 CFR 172.101), an applicant for exemption to transport such Class 1 material on passenger-carrying or cargo-only aircraft must also certify that no persons within the categories listed in 18 U.S.C. 842(i) will participate in the transportation of the Class 1 material. (68 FR 23832, May 5, 2003)**

As the applicant offering the one-time shipment of the CNP SGLAs, I&M certifies that it will be in compliance with the transportation security laws and regulations in effect at the time of shipment. In addition, I&M will ensure that the rail and highway carriers involved in this shipment will also be in compliance with the transportation security laws and regulations in effect at the time of shipment.

This exemption request does not involve the transportation of Class 1 material.

- (d) Justification of exemption proposal. The application must demonstrate that an exemption achieves a level of safety at least equal to that required by regulation, or if a required safety level does not exist, is consistent with the public interest. At a minimum, the application must provide the following:**

- (1) Information describing all relevant shipping and incident experience of which the applicant is aware that relates to the application;**

I&M's contractor for this transportation project, Duratek, has been involved in several previous steam generator transportation projects, e.g., Maine Yankee, Salem, St. Lucie,

the previous CNP shipments, Kewaunee, and Memphis Large Components. Each of these projects involved the transportation of multiple steam generators by various transport modes. Duratek was involved in operational and engineering activities for each of the projects and is intimately familiar with the issues important to safety.

Of these shipping campaigns, the Memphis Large Component project was completed most recently, and was performed under a DOT exemption similar to that being requested in this application. All shipments were completed without incident.

- (2) A statement identifying any increased risk to safety or property that may result if the exemption is granted, and a description of the measures to be taken to address that risk; and**

No increased risk is identified as a result of this request. Prior to rule changes in 1996 that gave DOT full regulatory responsibility for radioactive material such as steam generators, the NRC reviewed and approved applications for transportation of steam generators without packaging. The structural shell of the SGLAs is more than 2.8 inches thick over 99% of the components surface area. The openings of the SGLAs are closed with specially designed caps that make the unpackaged SGLAs a robust unitized body that can be safely transported under normal transport conditions.

- (3) Either—**

(i) Substantiation, with applicable analyses, data or test results, that the proposed alternative will achieve a level of safety that is at least equal to that required by the regulation from which the exemption is sought; or

Structural analyses are provided in Attachment 2 that demonstrate the ability of the steam generators to be transported as alternative packagings. The transportation plan provided in Attachment 6 details the special steps and operational controls that are performed that serve to provide additional safety over a typical, uncontrolled shipment of radioactive material.

(ii) If the regulations do not establish a level of safety, an analysis that identifies each hazard, potential failure mode and the probability of its occurrence, and how the risks associated with each hazard and failure mode are controlled for the duration of an activity or life-cycle of a packaging.

Not applicable. This application provides a basis for equivalent safety of the alternative packaging.