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50-316 Donald C. Cook Nuclear Power Plant, Unit 2, Indiana M 05000316
AUTH. NAME AUTHOR AFFILIATION
POWERS, R.P. Indiana Michigan Power Co.
RECIP. NAME RECIPIENT AFFILIATION
 Records Management Branch (Document Control Desk)

SUBJECT: Forwards rev 1 to licensee ltr sent to DOT re exemption request to support disposal of DC Cook, Unit 2 generators removed in 1988. Rev 1 to ER-98-009, "Preliminary Waste Characterization of DC Cook SG Lower Assemblies," encl.

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Indiana Michigan
Power Company
500 Circle Drive
Buchanan, MI 49107 1373



February 18, 1999

AEP:NRC:1305A

Docket Nos: 50-315
50-316

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

Gentlemen:

Donald C. Cook Nuclear Plant Units 1 and 2
DOT Exemption Request

On October 8, 1998, Indiana Michigan Power forwarded to the U. S. Nuclear Regulatory Commission in letter AEP:NRC:1305 an exemption request sent to the U. S. Department of Transportation (DOT). The request is to support the disposal of the Donald C. Cook Nuclear Plant's unit 2 generators removed in 1988. The attached Revision 1 to the exemption request has been sent to the DOT removing the request for an exemption from the conveyance limit. The other parts of our exemption request would remain the same.

Sincerely,

R. P. Powers
Vice President

/jmc

Attachment

c: J. A. Abramson
J. E. Dyer, w/attachment
MDEQ - DW & RPD
NRC Resident Inspector, w/attachment
J. R. Sampson, w/attachment

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ADD 1/1

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PDR ADOCK 05000315
P PDR

bc: T. P. Beilman, w/attachment
J. J. Euto
FOLIO - w/attachment
B. J. Hickle
G. Honma
D. F. Kunsemiller/G. P. Arent/M. J. Gumns
M. W. Rencheck/E. R. Eckstein/D. J. Garner
J. F. Stang, Jr., NRC - Washington, D.C. - w/attachment

Attachment to AEP:NRC:1305A

DOT EXEMPTION REQUEST





February 18, 1998

Associate Administrator for Hazardous Materials Safety
Research and Special Programs Administration
U.S. Department of Transportation
400 7th Street, SW
Washington, D.C. 20590-0001

Attention: Exemptions, DHM-31

Gentlemen:

Donald C. Cook Nuclear Plant Units 1 and 2
EXEMPTION REQUEST FROM THE SURFACE CONTAMINATED OBJECT
DEMONSTRATION REQUIREMENTS OF 49 CFR 173.403, THE MAXIMUM
RADIOACTIVITY CONTENT PER SINGLE CONVEYANCE OF 49 CFR
173.427(a)(2), 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
Revision 1

On October 8, 1998, Indiana Michigan Power (I&M) submitted an exemption request from the surface contaminated object demonstration requirements of 49 CFR 173.403, the maximum radioactivity content per single conveyance of 49 CFR 173.427(a)(2), 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. The exemption request on the conveyance limit was based on the best data available from the original project that removed the generators from service in 1988. In our October 8th exemption request, we stated that we would complete the sampling and analysis of the radioactivity in the generators in late 1998 and modify our exemption request if needed. As a result of the analysis completed in November, we are submitting Revision 1 to our exemption request to remove the exemption for the maximum radioactivity content per single conveyance of 49 CFR 173.427(a)(2). The other parts of our exemption request would remain the same.

The initial exemption request has been revised to reflect the results of samples taken from the interior of one of the steam generators in August 1998. The analysis completed in November showed that the isotopic distribution of these samples results in a reduced activity in the generators. With the reduced activity, the conveyance limit of 100 A₂ will not be exceeded. Thus, no exemption from this limit is needed. The request is revised to delete the request for exemption from the conveyance limit.

Attached to this letter are a revised version of the compliance matrix and the updated calculation of the waste characterization. These were Attachments 1 and 6, respectively in our October 8, 1998, submittal. The other attachments from the October 8, 1998, submittal remain the same and are not included in this letter.

U. S. Department of Transportation
Page 2

If you have any questions concerning this request, please contact
Mr. Walter T. MacRae at (616) 697-5067.

Sincerely,

A handwritten signature in cursive script, appearing to read "R. P. Powers", with a horizontal line extending from the end of the signature.

R. P. Powers
Vice President

/jmc

Attachments

U. S. Department of Transportation
Page 3

bc: J. A. Bender, Chem-Nuclear Systems
R. W. Boyle - DOT, w/attachments (2 copies)
W. T. MacRae, w/attachments
H. N. Shamkhani, Chem-Nuclear Systems
M. S. Whittaker, Chem-Nuclear Systems

INDIANA MICHIGAN POWER
DONALD C. COOK NUCLEAR PLANT

STEAM GENERATOR DISPOSAL EXEMPTION REQUEST

ATTACHMENT 1
COMPLIANCE MATRIX
REVISION 1

ATTACHMENT 1 - COMPLIANCE MATRIX - Revision 1

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 (SGLAs) FROM DONALD C. COOK NUCLEAR PLANT.

This document provides the basis of the exemption request for the transportation of the Cook Nuclear Plant 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 in duplicate and, for timely consideration, at least 120 days before the requested effective date to: Associate Administrator for Hazardous Materials Safety, Research and Special Programs Administration, U.S. Department of Transportation, 400 7th Street, SW, Washington, DC 20590-0001. Attention: Exemptions, DHM-31;

The initial application was submitted on or before October 8, 1998, approximately 120 days prior to the original desired issuance date of February 9, 1999. With the changes in Revision 1, a new issuance date of March 15, 1999, is requested. Two copies are provided to the address as stated.

(2) State the name, street and mailing addresses, and telephone number of the applicant; if the applicant is not an

individual, state the name, street and mailing addresses, and telephone number of an individual designated as an agent of the applicant for all purposes related to the application;

Applicant
Indiana Michigan Power
Donald C. Cook Nuclear Plant
Agent
Mr. Walter T. MacRae
American Electric Power, Nuclear Generation Group
500 Circle Dr.
Buchanan, MI 49107
(616) 697-5067

(3) If the applicant is not a resident of the United States, a designation of agent for service in accordance with Sec. 107.7 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. 107.5(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.

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:

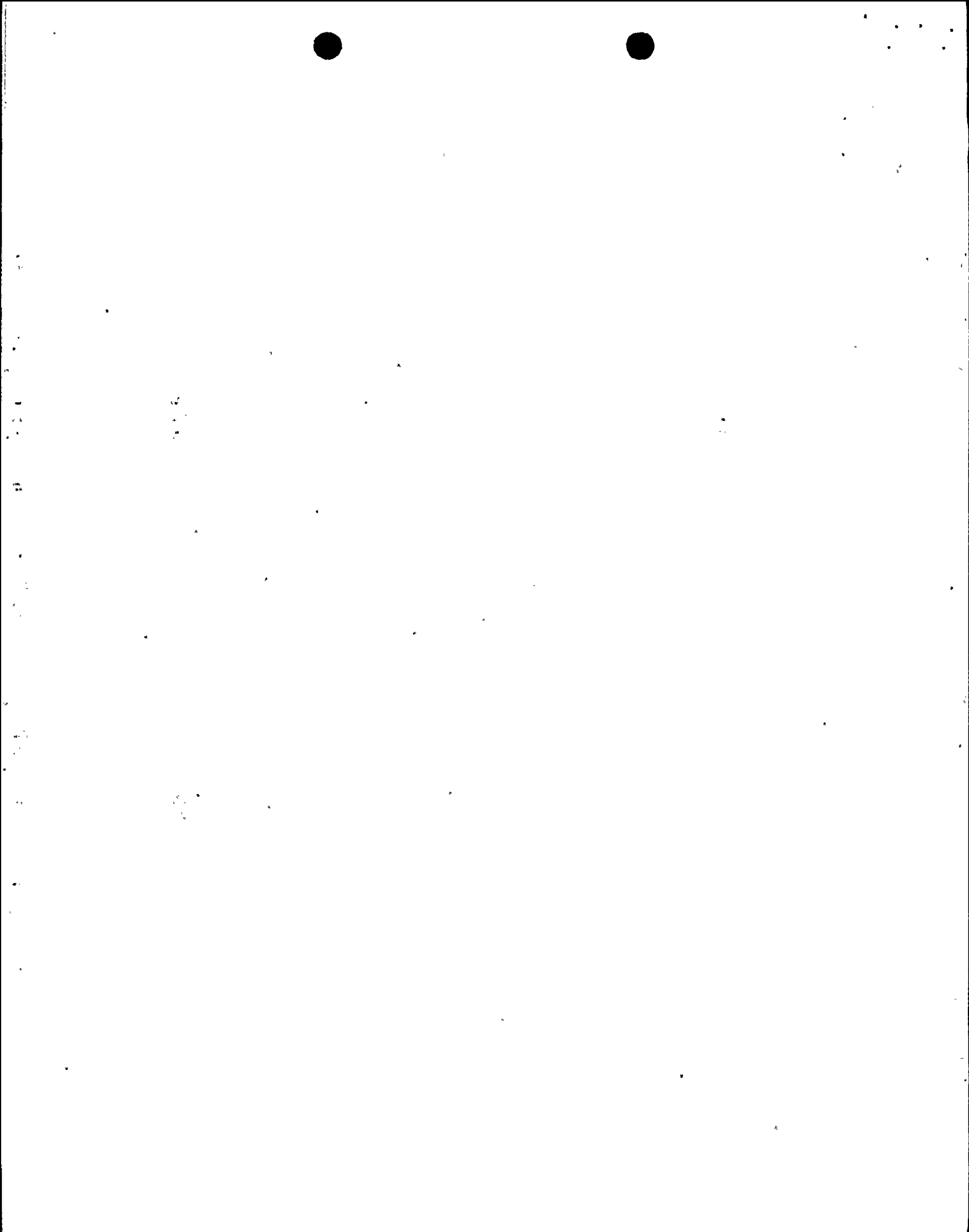
(1) In an industrial package (IP-1, IP-2 or IP-3; Sec. 173.411), subject to the limitations of Table 8;

Exemption Request:

NRC generic letter (GL) 96-07, "Interim Guidance on Transportation of Steam Generators," provides NRC and DOT guidance on the application of existing radioactive material transportation requirements to the transportation of steam generators. GL 96-07 states: "steam generators are best characterized as (SCOs)." As such, SCO material is required to be transported in packaging meeting DOT's industrial packaging definitions in 49 CFR 173.411.

The GL goes on to state: "It is impractical to measure the contamination level on each 300 cm² (46.5 in²) of the steam generator internals; therefore reasonable arguments and calculations should be used." Furthermore, the GL states: "Shippers wishing to ship an unpackaged steam generator as an SCO would, therefore, need to request that DOT grant them relief from the regulatory requirements to package SCO, given the special nature and practical considerations for steam generator shipments."

As a result of this guidance, we hereby request exemptions from the SCO demonstration requirements and 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.



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

Two primary modes, rail and heavy-haul motor vehicle transportation will transport the SGLAs. The SGLAs will be transported via rail from Cook Nuclear Plant to the Chem-Nuclear Systems consolidation facility (CNCF) in Barnwell County, South Carolina. The SGLAs will be transported via land from the CNCF to the Barnwell Disposal Facility in Barnwell County, South Carolina. Details of the transportation are included in the transportation plan in attachment 2.

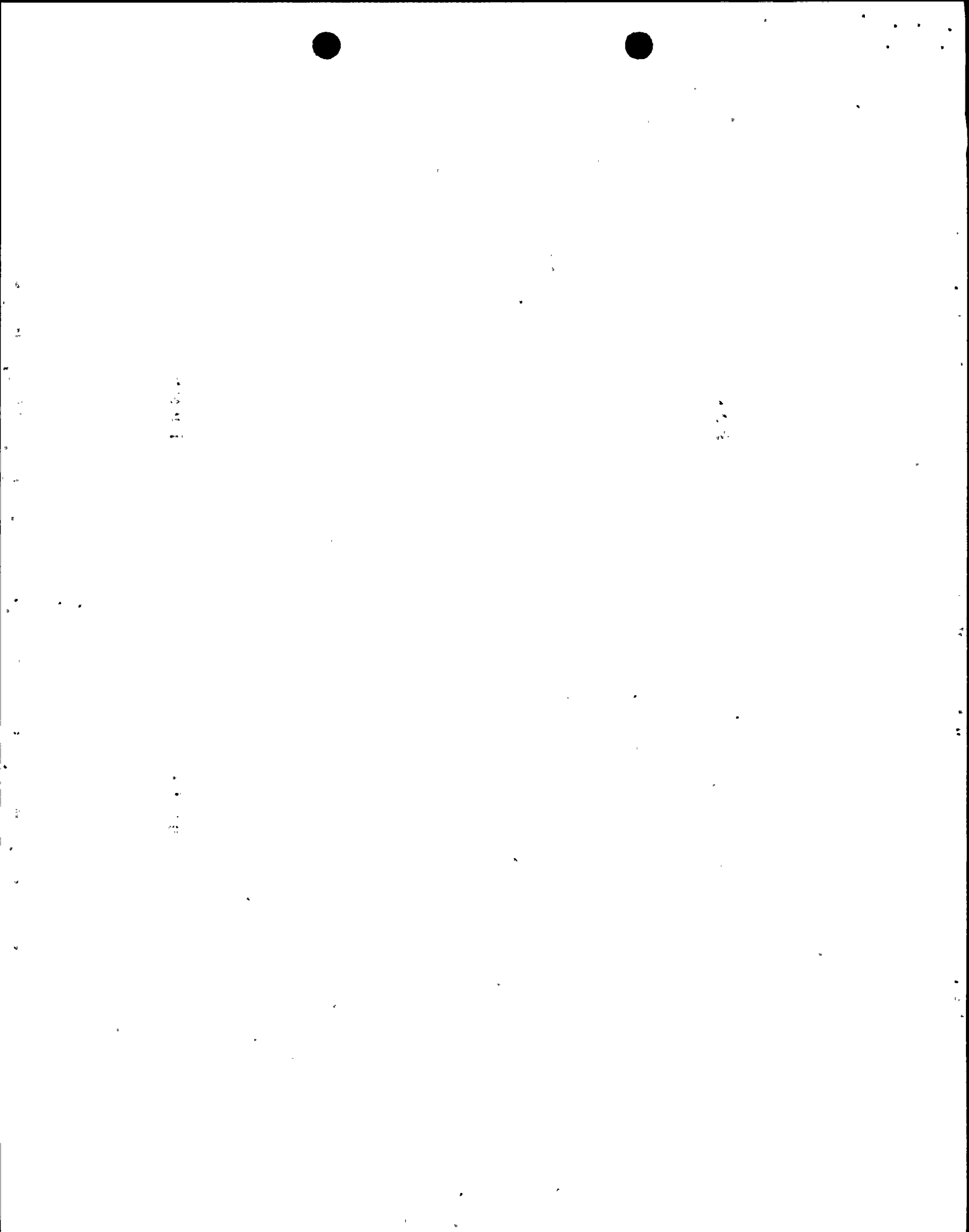
(3) A detailed description of the proposed exemption (e.g., alternative packaging, test, procedure or activity) including, as appropriate, written descriptions, drawings, flow charts, plans and other supporting documents;

Alternative Packaging of the Cook Nuclear Plant SGLAs:

The SGLAs will be transported as unpackaged radioactive material. Drawings of the SGLAs are provided in attachment 5. The steam generators are approximately 533 inches long, 176 inches in maximum diameter, and weigh approximately 238 tons. The steam generator shell is constructed of carbon steel, and is 2.82 inches thick. The steam generators are designed for an operating pressure of more than 1000 pounds per square inch.

The Cook Nuclear Plant Unit 2 steam generators were removed from service in 1988. At that time, the steam domes were removed for reuse, leaving the lower assemblies. A 3-inch steel plate was welded across the opening left by removal of the dome and closures were welded over inlet and outlet nozzles and penetrations to prevent release of the radioactive contents. These welded closures also provide shielding of the radioactive material inside. Specially designed caps that are welded to the SGLA body cover the welded and bolted closures of the SGLAs. The SGLAs were placed in storage at Cook Nuclear Plant in 1988. The SGLAs as prepared for transport are structurally evaluated in attachment 3. The conclusion of attachment 3 states:

"It has been shown in this report that all the closures of the SGLA have adequate strength to react to the load normally expected during its handling and transportation. The stress allowables based on the AISC criteria are satisfied by all the components of the closure assembly with a large margin of safety. The SGLAs will be, therefore, completely sealed and behave like



a unitized body for which exemption from packaging may be requested from DOT."

Sketches depicting the orientation of the SGLA and supporting equipment are provided in attachments 3 and 4.

The primary side surfaces (the inside of the tubes) 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 6. Each steam generator contains approximately 30 curies of radioactive material and on average, is much less than the SCO-III limit of 20 $\mu\text{Ci}/\text{cm}^2$. The radioactive content of water potentially trapped in plugged tubes is negligible. The source of the water in the tubes comes from the radioactively-clean secondary side of the steam generator tubes. The assessment of water remaining in plugged tubes is provided in attachment 7. The generators were conservatively shown to contain between 58 to 213 gallons of water. The secondary side surfaces of the steam generator contain negligible quantities of radioactive material.

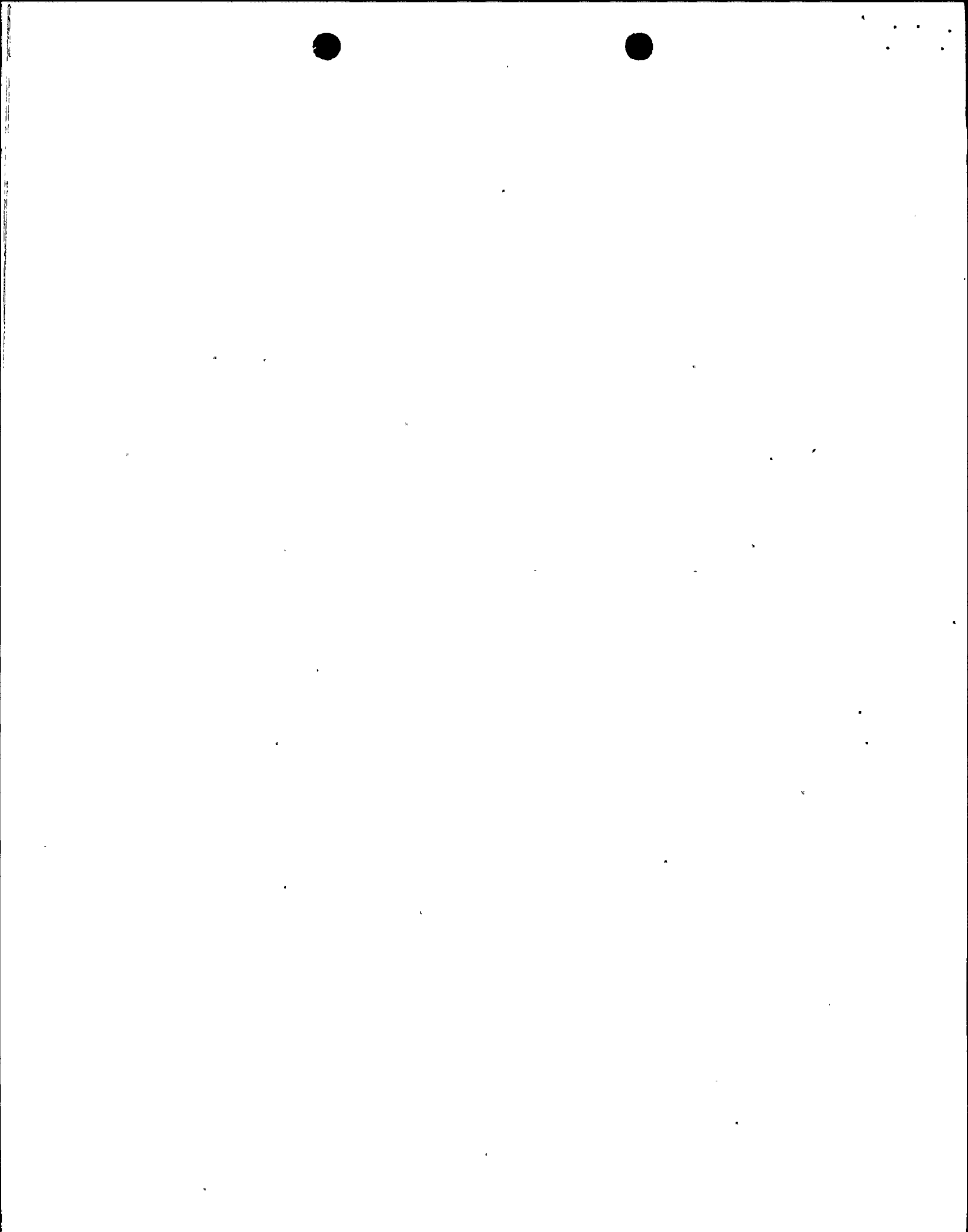
Based on the engineering evaluations performed for the alternatively packaged steam generators, it is concluded that the steam generators as described herein, along with the transportation plans and procedures, provide a level of safety appropriate for this material consistent with DOT regulations.

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

The current shipping plan provides for an early start date for transportation activities of April 1, 1999. Each SGLA will be transported on a separate rail car with two SGLAs transported in a single train. The conclusion of the transport of the second pair of SGLAs is also scheduled for the second quarter of 1999. Based on this schedule of events, and the uncertainties inherent in such a project, we request that the exemption be issued by March 15, 1999, and for a period of one year. There is a contractual requirement to receive the SGLAs at the Barnwell Facility before June 30, 1999.

(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 GL 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. Under the requested exemption, the transportation of the unit 2 SGLAs will be a one-time event. Compliance with the exemption will be demonstrated during transportation. When the transportation of the generators is complete, continued demonstration of compliance will not be applicable.

(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;

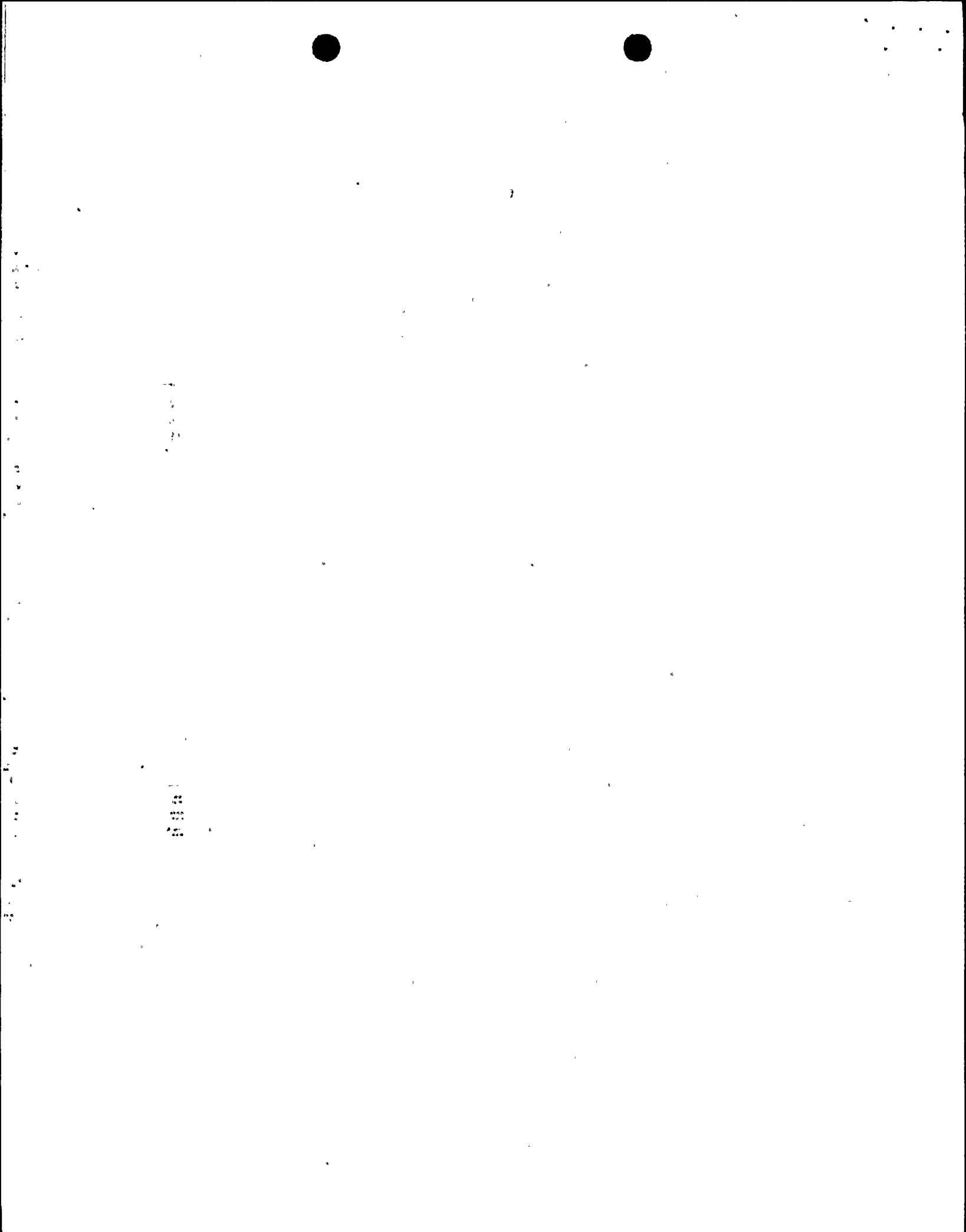
The characterization of the radioactive waste material contained inside the steam generators is provided in attachment 6. This characterization is preliminary because the SGLA storage configuration prevents a dose rate survey of each SGLA without interference by the other SGLAs. However, as is discussed in the preliminary characterization report, the contribution from the adjacent SGLA can be assessed to allow confident use of the measured dose rates. The isotopic distribution of radionuclides has been verified by direct sampling. These results have been incorporated in Revision 1 of the preliminary report. The characterization document provides evidence that the final characterization of the generators is not likely to differ significantly from the preliminary evaluation. A final evaluation of the radioactive materials within the steam generators will be performed prior to transportation to comply with all DOT regulatory requirements prior to shipment of the generators.

(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 Cook Nuclear Plant. 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;

Indiana Michigan Power and its contractor, Chem-Nuclear Systems, will perform all steam generator transportation activities in accordance with their NRC-approved QA programs. Additionally, a project



specific QA plan has been developed that covers all activities performed in support of the project.

(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;

Indiana Michigan Power's contractor for this transportation project, Chem-Nuclear Systems, has been involved in several previous steam generator transportation projects, e.g., Millstone, Yankee Rowe, Salem, and St. Lucie. Each of these projects involved the transportation of multiple steam generators by barge, rail, and road transport modes. Chem-Nuclear Systems 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 St. Lucie project was completed most recently, and was performed under a DOT exemption similar to that being requested in this application. The previous steam generator transportation efforts have been completed without incident.

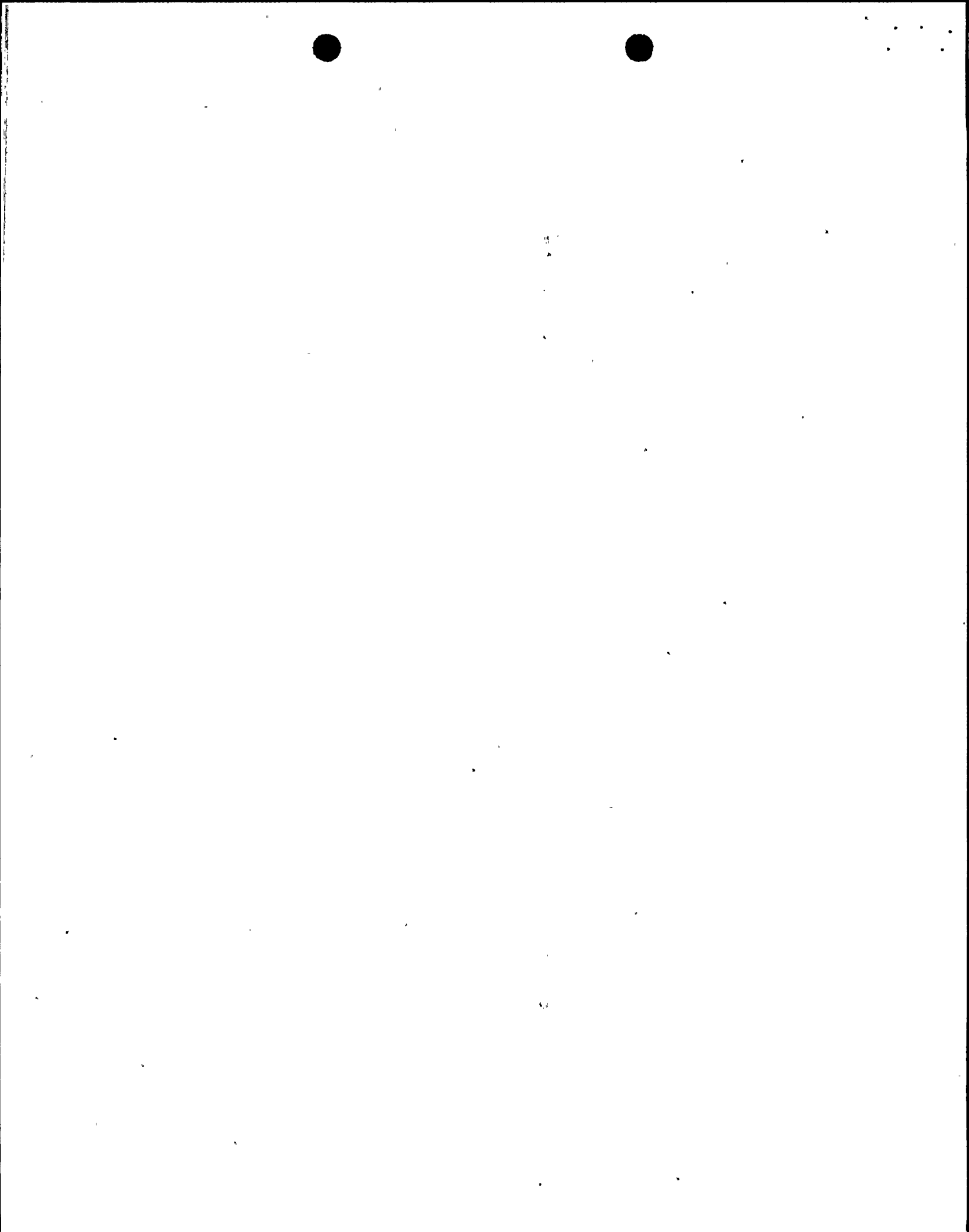
(2) A statement identifying any increased risk to safety or property that may result if the exemption is granted, and a description of the measures to be taken to address that risk; and

No increased risk is identified as a result of this request. The structural shells of SGLAs are 2.82 inches (minimum) thick. 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 3 that demonstrate the ability of the steam generators to be transported as alternative packagings. The transportation plan provided in attachment 2 details the special steps and operational controls that are performed 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.

INDIANA MICHIGAN POWER
DONALD C. COOK NUCLEAR PLANT

STEAM GENERATOR DISPOSAL EXEMPTION REQUEST

ATTACHMENT 6
PRELIMINARY WASTE CHARACTERIZATION
REVISION 1

