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

April 22, 2002

MEMORANDUM TO: SFPO Staff Members

FROM: E. William Brach, Director ***/RA/***
Spent Fuel Project Office, NMSS

SUBJECT: ISSUANCE OF SFPO DIRECTOR'S INTERIM STAFF GUIDANCE DOCUMENT NO. 9, REVISION 1

Attached for your use and information is the Spent Fuel Project Office (SFPO) Director's Interim Staff Guidance Document No. 9 (ISG-9), Revision 1, "Storage of Components Associated with Fuel Assemblies." This interim staff guidance provides the staff's position on what components may be stored with spent reactor fuel in dry cask storage systems.

This ISG is to be used in conjunction with NUREG-1536, "Standard Review Plan for Dry Cask Storage Systems," and NUREG-1567, "Standard Review Plan for Spent Fuel Dry Storage Facilities," until such time as this ISG is incorporated into these NUREGs. This document is being provided to ensure consistent reviews by the SFPO staff.

If you have any comments or questions about the attached guidance document, please contact the person listed below.

Attachment: ISG-9, Revision 1

CONTACT: R. Karas, SFPO/NMSS
(301) 415-3711

April 22, 2002

MEMORANDUM TO: SFPO Staff Members

FROM: E. William Brach, Director *(Original Signed by:)*
Spent Fuel Project Office, NMSS

SUBJECT: ISSUANCE OF SFPO DIRECTOR'S INTERIM STAFF GUIDANCE DOCUMENT NO. 9, REVISION 1

Attached for your use and information is the Spent Fuel Project Office (SFPO) Director's Interim Staff Guidance Document No. 9 (ISG-9), Revision 1, "Storage of Components Associated with Fuel Assemblies." This interim staff guidance provides the staff's position on what components may be stored with spent reactor fuel in dry cask storage systems.

This ISG is to be used in conjunction with NUREG-1536, "Standard Review Plan for Dry Cask Storage Systems," and NUREG-1567, "Standard Review Plan for Spent Fuel Dry Storage Facilities," until such time as this ISG is incorporated into these NUREGs. This document is being provided to ensure consistent reviews by the SFPO staff.

If you have any comments or questions about the attached guidance document, please contact the person listed below.

Attachment: ISG-9, Revision 1

CONTACT: R. Karas, SFPO/NMSS
(301) 415-3711

DISTRIBUTION:
NRC File Center PUBLIC SFPO r/f NMSS r/f CSchum, OEDO
SGagner, OPA STurk, OGC NRCWEB

G:\DO\PROCEDRS\ISG9rev1.wpd ML021130346

OFFICE	SFPO	E	SFPO	E
NAME	KLathrop		WBrach	
DATE	3/8/02		4/22/02	

OFFICIAL RECORD COPY

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

April 17, 2002

MEMORANDUM TO: E. William Brach, Director
Spent Fuel Project Office, NMSS

THROUGH: Charles L. Miller, Deputy Director ***/RA/***
Licensing and Inspection Directorate
Spent Fuel Project Office, NMSS

M. Wayne Hodges, Deputy Director ***/RA/***
Technical Review Directorate
Spent Fuel Project Office, NMSS

FROM: John D. Monninger, Chief ***/RA/***
Spent Fuel Licensing Section
Licensing and Inspection Directorate
Spent Fuel Project Office, NMSS

SUBJECT: APPROVAL OF INTERIM STAFF GUIDANCE MEMORANDUM NO. 9, REVISION 1, STORAGE OF COMPONENTS ASSOCIATED WITH FUEL ASSEMBLIES

Attached is Interim Staff Guidance (ISG) No. 9, "Storage of Components Associated with Fuel Assemblies," Revision 1, for your approval. This ISG provides the staff's position on what components may be stored with spent reactor fuel, and what information should be submitted by an applicant to justify such storage. This ISG will be used in conjunction with NUREG-1536, "Standard Review Plan for Dry Cask Storage Systems," January, 1997, and NUREG-1567, "Standard Review Plan for Spent Fuel Dry Storage Facilities," March, 2000, until such time as this ISG is incorporated into these NUREGs.

This ISG has been reviewed by the Spent Fuel Project Office staff, the Technical Review, Licensing and Inspection section supervisors. All comments received have been dispositioned; therefore, we recommend that this ISG be approved.

Attachment: ISG No. 9, Rev. 1

CONTACTS: Rebecca Karas, NMSS/SFPO
301-415-3711

H. Kirke Lathrop, NMSS/SFPO
301-415-8553

April 17, 2002

MEMORANDUM TO: E. William Brach, Director
Spent Fuel Project Office, NMSS

THROUGH: Charles L. Miller, Deputy Director *(Original Signed by:)*
Licensing and Inspection Directorate
Spent Fuel Project Office, NMSS

M. Wayne Hodges, Deputy Director *(Original Signed by:)*
Technical Review Directorate
Spent Fuel Project Office, NMSS

FROM: John D. Monninger, Chief *(Original Signed by:)*
Spent Fuel Licensing Section
Licensing and Inspection Directorate
Spent Fuel Project Office, NMSS

SUBJECT: APPROVAL OF INTERIM STAFF GUIDANCE MEMORANDUM NO. 9, REVISION 1, STORAGE OF COMPONENTS ASSOCIATED WITH FUEL ASSEMBLIES

Attached is Interim Staff Guidance (ISG) No. 9, "Storage of Components Associated with Fuel Assemblies," Revision 1, for your approval. This ISG provides the staff's position on what components may be stored with spent reactor fuel, and what information should be submitted by an applicant to justify such storage. This ISG will be used in conjunction with NUREG-1536, "Standard Review Plan for Dry Cask Storage Systems," January, 1997, and NUREG-1567, "Standard Review Plan for Spent Fuel Dry Storage Facilities," March, 2000, until such time as this ISG is incorporated into these NUREGs.

This ISG has been reviewed by the Spent Fuel Project Office staff, the Technical Review, Licensing and Inspection section supervisors. All comments received have been dispositioned; therefore, we recommend that this ISG be approved.

Attachment: ISG No. 9, Rev. 1

CONTACTS: Rebecca Karas, NMSS/SFPO
301-415-3711
H. Kirke Lathrop, NMSS/SFPO
301-415-8553

DISTRIBUTION: NRC f/c SFPO r/f NMSS r/f KLathrop CBrown

G:\DO\PROCEDRS\ISG9rev1.wpd * see previous concurrence ML021130346

OFFICE	SFPO	E	SFPO	E	SFPO	E	SFPO		SFPO	
NAME	RKaras*		JMyers*		CWithee*		JMonninger		EEaston	
DATE	1/15/02		1/15/02		1/15/02		3/8/02		3/12/02	
OFFICE	SFPO		SFPO		SFPO		SFPO		SFPO	
NAME	JGuttmann		WHodges		CMiller					
DATE	4/10/02		4/16/02		4/17/02		/ /		/ /	

OFFICIAL RECORD COPY

Spent Fuel Project Office
Interim Staff Guidance - 9
Revision 1
Storage of Components Associated with Fuel Assemblies

Issue:

The purpose of this ISG is to clarify the technical criteria for types of materials that will be considered associated with the storage of spent fuel assemblies. While control rods are mentioned in the Standard Review Plan as possible contents, specific information and guidance is lacking.

Regulatory Basis:

Title 10, Code of Federal Regulations (10 CFR), Section 72.3, "Definitions," states, "*Spent Nuclear Fuel or Spent Fuel* means fuel that has been withdrawn from a nuclear reactor following irradiation, has undergone at least one year's decay since being used as a source of energy in a power reactor, and has not been chemically separated into its constituent elements by reprocessing. Spent fuel includes the special nuclear material, byproduct material, source material, and other radioactive materials associated with fuel assemblies."

Discussion:

"Other radioactive materials associated with fuel assemblies" is considered to include those materials that are positioned or operated within the envelope of the fuel assembly during reactor operation. For example, items such as PWR control assemblies are considered to operate within the envelope of the fuel assembly, since they are capable of moving in and out of the fuel assembly envelope. These components, and others that are designed to operate within the envelope of the fuel assembly and are stored within that envelope, may be approved for storage in a Dry Cask Storage System (DCSS) if the applicant submits information and the safety/technical justification for the proposed DCSS contents for staff review and approval. The staff should incorporate this information as allowed contents in the license, certificate of compliance, or technical specification.[1]

Items that are not designed to operate within the envelope of the fuel assembly are not authorized for storage in a DCSS under 10 CFR Part 72, as they are not considered to be associated with fuel assemblies. Examples of these items would be boronometer sources, which are designed to operate outside the reactor vessel, or core components such as BWR in-core instruments or control blades that operate outside the BWR fuel channel.

Unirradiated components or fresh fuel rods associated with a fuel assembly (designed to operate within the envelope of the fuel assembly during reactor operation) are allowed for storage under 10 CFR Part 72 as long as the total fraction of unirradiated items remains a small fraction of the total spent fuel assembly, such that the assembly as a whole may be considered to be spent nuclear fuel.

[1] It should be noted that if a license, certificate of compliance, or technical specification has already been issued and does not specifically allow storage of these components, relief to allow new contents may be sought via an amendment. Therefore, the applicant should seek to amend its license, certificate of compliance, or technical specification.

Technical Review Guidance:

Standard Review Plan for Dry Cask Storage Systems, NUREG-1536, Chapter 2, "Principal Design Criteria," Section IV.2.a, states, "The applicant should define the range and types of spent fuel or other radioactive materials that the DCSS [dry cask storage system] is designed to store . . . For DCSSs that will be used to store radioactive materials other than spent fuel, that is, activated components associated with a spent fuel assembly (e.g., PWR control rods, BWR fuel channels), the applicant should specify the types and amounts of radionuclides, heat generation, and the relevant source strengths and radiation energy spectra permitted for storage in the DCSS" [page 2-4].

Specifically, the technical review staff should consider the following in its review:

- The design basis source term (radiological and thermal) should be based on a saturation value for activation of cobalt impurities or on cobalt activation from a specified maximum burn-up and minimum cool time. The reviewer should consider other activation products, as appropriate. These values should be bounded by those listed in the Technical Specifications.

- The effects of gas generation on the cask internal pressure must be considered in the design pressure for the cask, including (1) the release of gas from additional components and (2) the volume occupied by additional components.

- Additional weight and length of the proposed material must be considered in the structural and stability analyses.

- The thermal analysis must consider (1) the added heat from these components and (2) the effects of heat transfer within and to/from the fuel assembly by the addition or absence of these components. This would ultimately affect the maximum predicted cladding temperature.

- In terms of a criticality evaluation, credit for any negative reactivity from residual neutron absorbing material remaining in the control components should be accepted only if: (1) the remaining absorbing material content is established through direct measurement or by calculation where a sufficient margin of safety is included commensurate with the uncertainty in the method of measurement or calculation, (2) the axial distribution of the poison depletion is adequately determined with appropriate margin for uncertainties, and (3) the adequate structural integrity and placement of the control components under accident conditions is demonstrated. When fresh water is assumed in the evaluation, a bounding analysis would assume that no control components are present. Credit for water displacement may be taken provided adequate structural integrity and placement under accident conditions is demonstrated. When borated water is assumed in the evaluation, the reviewer should consider the effects of displacing borated water.

Applicability:

This revision supercedes the previous revision 0 of ISG-9.

The guidance in this ISG is applicable to spent fuel storage under 10 CFR Part 72.

Recommendation:

The Standard Review Plans (NUREG-1536 at citation noted above, and NUREG-1567, "Standard Review Plan for Spent Fuel Dry Storage Facilities," at Section 4.4.1.1) should be revised to clearly state that the types of items allowed as discussed above may be stored in a DCSS, if evaluated appropriately, and the proposed contents are included in the license, certificate of compliance, or technical specification.

Approved ***/RA/*** *(Original Signed by)* 4/22/02

E. William Brach **Date**