PROJECT AGREEMENT
BETWEEN
THE DEPARTMENT OF ENERGY OF THE UNITED STATES OF AMERICA AND THE FEDERAL INSTITUTE FOR MATERIAL RESEARCH AND TESTING OF THE FEDERAL REPUBLIC OF GERMANY: TECHNICAL EXCHANGE AND COOPERATION ON TRANSPORTATION REQUIREMENTS IN THE FIELD OF MANAGEMENT OF RADIOACTIVE WASTE

WHEREAS:

The Department of Energy of the United States of America and the Federal Institute for Material Research and Testing of the Federal Republic of Germany, hereinafter referred to as the Participants, in furtherance of their countries' mutual interest in increasing the effectiveness of their respective program of energy research, science and technology, and development and technical demonstration in the field of management of radioactive waste:

In pursuing related cooperation under the terms of the Agreement on Cooperation in Energy Research, Science and Technology, and Development between the Department of Energy of the United States of America and the Federal Ministry for Education, Science, Research and Technology of the Federal Republic of Germany, hereinafter referred to as the Agreement, on February 20, 1998; and

The Participants wish to cooperate on transportation requirements in the field of management of radioactive waste within the framework established by the Agreement:

The Participants hereby agree as follows:

ARTICLE I
OBJECTIVES

The objective of this Project Agreement is to establish a framework for cooperation and technical assistance related to activities on transportation requirements in the field of management of radioactive waste. Activities carried out under this Project Agreement are subject to, and shall be consistent with, the Agreement.

ARTICLE II
FORMS OF COOPERATION

The forms of activities carried out under this Project Agreement are described in Article III of the Agreement, which is incorporated in its entirety as an integral part of this Project Agreement.

ARTICLE III
TECHNICAL **SCOPE**

The Technical Scope of this Project Agreement is provided as Appendix A.

ARTICLE IV
MANAGEMENT AND PARTICIPATION

The Department of Energy of the United States of America has identified Sandia National Laboratories as being a technical organization that will participate in activities specified under this Project Agreement. Technical principals are:

A. For the Department of Energy of the United States of America:

Ashok Kapoor
Safety Engineer, NTPA
National Transportation Program-AL
USDOE Albuquerque Operations Office
Albuquerque, NM 87185-5800

Kelvin Kelkenberg
Acting Director
Office of Transportation
and Emergency Management,EM-76
US DOE
Washington DC 20585

B. For the Department of Energy's Sandia National Laboratories:

H. R. Yoshimura
Manager
Transportation Systems Department,
Sandia National Laboratories Albuquerque
Albuquerque, NM 87185

C. For the Federal Institute for Material Research and Testing of the Federal Republic of Germany:

Dr. Bernhard Droste
Director and Professor
Division of Safety of Transport and Storage Containers
Federal Bureau for Materials Research and Testing
Berlin, Federal Republic of Germany

ARTICLE V
INTELLECTUAL PROPERTY RIGHTS

The Participants shall undertake cooperation as specified under Article IX of the Agreement, hereby incorporated in its entirety as an integral part of this Project Agreement.

ARTICLE VI
FUNDING

Except when otherwise agreed in writing, all costs resulting from cooperation under this Project Agreement will be borne by the Participant that incurs them. It is understood that the ability of each Participant to carry out its obligations under this Project Agreement is subject to the availability of appropriate funds.

ARTICLE VII
GENERAL PROVISIONS

Collaboration under this Project Agreement shall be in accordance with the applicable laws and regulations of the United States of America and the Federal Republic of Germany. All questions related to this Project Agreement arising during its term will be settled by mutual agreement of Sandia National Labs, as a technical representative for the Department of Energy of the United States, or by the mutual agreement of the Participants.

ARTICLE VIII
EFFECTIVE DATE AND TERMINATION

This Project Agreement enters into effect on the date of signature and remains in force for three (3) years unless the Agreement is terminated. This Project Agreement shall expire upon termination of the Agreement. This Project Agreement may be amended or extended by mutual written agreement, and may be terminated at any time by either Participant upon six (6) months written notice to the other Participant.

Signed in the English language, this 12 th day of May, 1998, at Paris, France.

FOR THE DEPARTMENT OF ENERGY
UNITED STATES OF AMERICA:

Kelvin Kelkenberg
Acting Director
National Transportation Program
Office of Transportation and Emergency Management
Office of Site Operations
Office of Environmental Management

FOR THE FEDERAL INSTITUTE FOR **MATERIAL RESEARCH AND** TESTING OF **THE FEDERAL** REPUBLIC **OF GERMANY:**

i.A.

Dr. **Bernhard Droste**
Director and Professor
Federal Institute **for Material Research And Testing of The Federal Republic of Germany**

APPENDIX A
TECHNICAL SCOPE

The technical scope of this Project Agreement may include the following:

I. **Fracture Mechanics Design Methodology Development**

Fracture mechanics design methodology development applies scientifically defensible criteria for the design and material selection of radioactive material packages. The benefits of the use of fracture mechanics design methodology could result in the use of less costly but as safe materials for containment boundaries of packagings. Collaborative activities may include:

a. Monitoring and participating in revisions to the International Atomic Energy Agency (IAEA) "Guidelines for Safe Design of Shipping Packages Against Brittle Fracture" section of the *Regulations for the Safe Transport of Radioactive Material Safety Standards Series No. ST-2.*

b. Participating with American Society for Mechanical Engineering (ASME) NUPACK to revise the Code to incorporate fracture mechanics design methodology developed internationally.

c. Participating with ASME and other standards organizations to draft Code Cases and specifications related to international fracture mechanics design methodology.

d. Testing programs to determine fracture toughness properties of candidate ferritic radioactive material package materials.

e. Evaluating ferritic material containment boundary designs.

f. Evaluating materials for non-containment and containment-cask-component applications (i.e., baskets, bolts, etc.).

g. Conducting cost/benefit analyses for ferritic materials for use in containment boundaries.

h. Evaluating stress corrosion cracking susceptibility of vitrified high-level waste (VHLW) canister materials.

II, **Seals**

The characterization of seal response in different environments is important to the design of packaging systems, safety studies, and risk assessments because it helps quantify package response for the evaluation of operating, regulatory and beyond-regulatory environments. The United States has performed a number of studies to evaluate the response of different seal materials within thermal, radiation, and chemical environments. Interim storage performance of seals is of great interest for the design of storage and transport systems. Also, collaborative activities may examine the use of brazing for sealing and resealing of containers designed for storage and transport of high value materials and evaluate the use of soldering techniques for similar closure operations.

III. Lessons Learned

Applications of Lessons Learned for US/German Safety Studies. Collaborative efforts may include coordinating the number of safety and environmental studies being conducted regarding radioactive material transports: and exchanging techniques used, data developed, and lessons learned to assist with developing risk-based international transportation regulations.

IV. Decontamination and Decommissioning of Nuclear Facilities

The United States and Germany are in the process of decontaminating and decommissioning excess and obsolete facilities. The US is in the process of cleaning up its former production facilities. Germany is decommissioning its Grefswald VVR-440 reactors and working on decontaminating former production facilities in eastern Germany. There is a potential for large volumes of contaminated structural materials that must be disposed of in low-level or high-level waste facilities. Germany has done much work in the recycling of contaminated scrap materials for use in radioactive transport, storage and disposal packages. Collaborative activities may include the exchange of analysis and testing data and storage experience, including on concrete storage casks, to: a) examine the beneficial uses of German technology to US contaminated scrap materials: b) assist with the study of the economics of beneficial use of recycled materials; c) evaluate potential designs for packages using recycled materials; and d) evaluate material acceptance specifications for recycled scrap materials.

V. Enqineerinq Analysis

The field of structural and thermal analysis has been rapidly advancing through the years. Many new structural and thermal analysis tools have been developed in both countries which are very useful in analyzing radioactive materials packagings in transport and accident environments.

In the thermal analysis area, collaborative activities may include: a) benchmarking of new codes through exchange of fire testing data that could lead to better understanding of fire environments; and b) evaluation of the severity of thermal accidents at sea, relative to international regulations.

In the structural analysis area, collaborative activities may include: a) use of nonlinear and dynamic analysis techniques; b) classification of stresses in non-circular package designs:
c) analysis of cask impacts onto yielding targets such as concrete pads: d) benchmarking of computer codes using existing test data: and e) analysis of cask impacts in containment boundaries.