SPECIFIC MEMORANDUM OF AGREEMENT (SMA)
between
The United States Department of Energy (DOE)
and
The Power Reactor and Nuclear Fuel Development Corporation of Japan (PNC)
for a Joint Research and Development Study of Fissile Inventory
Verification of Reprocessing Holding Tanks Using Isotope Dilution
Techniques

1. Introduction

Under Article II of the Agreement between PNC and DOE for Cooperation in Research and Development concerning Nuclear Material Control and Accounting Measures for Safeguards (the Agreement), DOE and PNC undertake to carry out a cooperative effort in the development of a tank volume and fissile material measurement method. Such a method will involve a lutetium double spike isotope dilution mass spectrometry (IDMS) technique and conventional IDMS techniques using uranium and plutonium, respectively. This method may facilitate the application of safeguards at future chemical processing plants.

2. Program Management

The Oak Ridge National Laboratory (ORNL), which is a contractor of DOE, and PNC are both responsible for carrying out this task in the cooperation. The work to be done is identified in the Appendix I. The use of ORNL and PNC and their management and operating personnel in carrying out the work is authorized on a non-interference basis, i.e., the work performed under this SMA shall not interfere with work related to the prime mission of ORNL and PNC. DOE and ORNL and PNC shall work directly with each other in planning the task and resolving programmatic and technical questions. ORNL and PNC shall start by developing and exchanging work plans with projected milestones for the task. They shall update the work plans as the work progresses.

ORNL and PNC shall prepare brief bimonthly letter progress reports and circulate them to each other and to DOE.

ORNL and PNC shall prepare and present written and oral reports at meetings of the Permanent Coordinating Group established under Article IV of the Agreement.

No public releases (including news releases, technical publications, and advertising) relating to this SMA and the work hereunder shall be issued by either Party without prior coordination with the other Party.

As noted in Article XII of the Agreement, all information transmitted by one Party to the other under this SMA shall be appropriate and accurate to the best knowledge and belief of the Supplying and Transmitting Party.

ORNL and PNC and persons acting on their behalf shall make best efforts to assure that the use of any such information or data to be furnished does not infringe on privately owned rights.

Neither Party to this SMA is obligated to contribute more than is necessary for completion of its own responsibilities under the scope of work in Appendix I.

3. Fiscal Management

Each party shall be responsible for its cost incurred in the task identified in Appendix I to this SMA. No financial payment to the one Party by the other Party shall be made under this SMA.

4. General Terms and Provisions

The work shall be conducted in accordance with the provisions of the Agreement between PNC and DOE for Cooperation in Research and Development Concerning Nuclear Material Control and Accounting Measures for Safeguards.

5. Duration and Termination

This SMA shall enter into force upon the date when all signatures are received. It shall continue in force for a period of 1 1/4 year, or until all Parties mutually agree that all activities under this SMA are completed.

Executed on this 31st day of March, 1990.

For The United States Department of Energy

Name: W. L. Barker
William L. Barker
Acting Deputy Assistant Secretary for Security Affairs

For the Power Reactor and Nuclear Fuel Development Corporation of Japan

Name: for S. Tsukada
Shinichi Tsukada
Director, Technical Management Division

1. Study Outline

This program involves the development of chemical methods for the preparation of elemental spikes and the subsequent spiking and instrumental measurements of the tank solution and its subsamples for total volume and fissile material determination.

Phase I of this study will include an evaluation of bulk solution volume measurements from natural lutetium (Lu) (Lu-175) and spike (Lu-176) isotope ratios using mass spectrometry, and application of this Lu spiking technique to spent fuel solutions.

Phase II will extend implementation of tank solution volume measurement (i.e., calibration) using the Lu tracer method to the application of the method to plutonium product solution and examination of using mixed spikes composed of uranium-233, plutonium-242, and Lu-176 for spiking samples of the solution.

Phase III will include use of fissile material spikes to measure the contents of the spent fuel solution in an input accountability vessel in a conventional spent fuel reprocessing plant (TRP).

2. Site

This task will be conducted at The Oak Ridge National Laboratory (ORNL), Tennessee, U.S.A. and TRP, Ibaraki, Japan.

3. Programmatic Responsibilities

A. PNC shall be responsible for an evaluation of the applicability of the Lu tracer method to bulk volume measurements by PNC of spent fuel solution and the possible future implementation of the measurement method in an existing PNC facility.

B. ORNL shall be responsible for proving to PNC the natural Lu (Lu-175) and well-characterized Lu-176 spiking materials to be used under this SMA. ORNL shall be responsible for an evaluation of the possibility of an interference in the mass spectrometry measurements by PNC of Lu in the presence of gadolinium (Gd) due to the similarities in charge to mass ratios for Lu and Gd isotopes.

C. Each facility will be responsible for furnishing the spikes of fissile material used in the experiments.

D. The samples taken and prepared during the vessel solution volume measurement (Phase II and Phase III) shall be analyzed by both PNC and ORNL.

A progress report at the stage when the vessel solution volume measurement in Phase II is finished shall be prepared cooperatively by PNC and ORNL.

A final report after Phase III is finished shall be prepared cooperatively by PNC and ORNL.

Technical staff of ORNL will visit the Tokai Works for discussion of the task and technical support requirements at times when PNC advises ORNL that such visits are necessary, up to a limit of three visits per year.

4. Schedule

	1989				1990			
(PNC)	1	2	3	4	1	2	3	4
Phase I	x							
Phase II		x	x					
Phase III			x	x	x			

(ORNL)	1	2	3	4	1	2	3	4
Phase I		x						
Phase II								
Phase III			x	x	x			