ACTION SHEET 26

The United States Department of Energy(DOE)
and
The Power Reactor and Nuclear Fuel Development Corporation of Japan(PNC)
for
Joint Development of a Nondestructive Assay System for Leached Hulls

1.Introduction

Under Article II (Area of Cooperation) of the Agreement between PNC and DOE for Cooperation in Research and Development Concerning Nuclear Material Contorl and Acccounting Measures for Safeguards and Nonproliferation (herein called the"Agreement"), dated September 15, 1993, DOE and PNC undertake to carry out a cooperative effort on the joint development of a nondestructive assay system for leached hulls.

2.Scope of Work

This Action Sheet provides for a two phased approach to the development of a leached hull NDA system.

In the first phase, a feasibility study will be performed to evaluate the technical approaches for monitoring plutonium content in leached hulls. Specifications and facility specific constraints will be obtained from the Tokai Reprocessing Plant and PNC will be consulted to establish measurement objectives and preferred approaches. After a joint decision is made establishing the optimum technical approach, MCNP calculations will be performed to quantify the expected performance of the NDA monitoring system. Unattended mode of operation for continuous data collection and review will be evaluated. The use of curium and plutonium concentration in the accountability tank to determine the plutonium loading in the leached hulls will be studied. The first phase will be completed by delivery of a summary report giving the results of feasibility study to PNC.

In the second phase, a detailed design of a leached hulls NDA monitor will be completed based on the results of the Phase I feasibility study. Software will be development for the TRP specific operation, addressing IAEA authentication requirements. After approval of the detailed engineering design by PNC, the NDA system will be fabricated. Test measurement will be made at LANL, and hardware and software training will be provide to PNC and the IAEA. LANL will provide assiatance with the installation at TRP and acceptance tests and calibrations will be performed.

The work performed under this Action Sheet shall be performed at the Los Alamos National Laboratory(LANL) and PNC facilities in accordance with the terms and conditions of the Agreement.

3. Program Management

LANL is responsible for joint development of the leached hulls nondestructive assay system. Work to be done is identified in Appendix I and is limited to techniques for nuclear safeguards applications. PNC is responsible for providing design information, operating data, and other information required for completion of the joint studies. Appendix II identifies key personnel working on this project.

DOE and LANL shall work directly with PNC in planning tasks and resolving programmatic and technical questions. LANL shall start by developing and circulating separate work plans with projected milestones for each task and update the work plans with PNC concurrence as work progresses.

LANL shall prepare brief quarterly letter progress reports on each task and circulate them to PNC, DOE, and to other pertinent organizations as requested by PNC.

LANL and PNC shall prepare and present written and oral reports at meetings of the Permanent Coordinating Group(PCG).

4. Fiscal Management

PNC shall make a cash contribution with the sum of $750,000 in United States dollars to conduct the activities related to the completion of joint studies into safeguards techniques at TRP as defined in Appendix I of this Action Sheet in the following manner:

a.) A contribution of $200,000 in United States dollars shall be due and payable upon receipt of an invoice to be issued in JFY 1996(Japanese Fiscal Year) after the date of signature of the Action Sheet.

b.) A contribution of $400,000 in United States dollars shall be due and payable upon receipt of an invoice to be issued in April 1997. This payment is subject to approval and the appropriation of necessary funding by the Japanese Government for JFY 1997.

c.) A contribution of $150,000 in United States dollars shall be due and payable upon receipt of an invoice to be issued in April 1998. This payment is subject to approval and the appropriation of necessary funding by the Japanese Government for JFY 1998.

All contributions by PNC shall be due and payable within thirty days of receipt by PNC of an invoice from DOE, subject to availability of appropriated funds to PNC.

DOE shall be responsible for the budget planning and financial management and shall make best efforts to complete the PNC-funded activities in the Appendix I satisfactorily and within the cash contribution by PNC. DOE costs are determined in accordance with DOE's policy for costing work it performance of work under this Action Sheet shall not, without PNC's prior consent, exceed the contributions set forth above.

DOE shall not begin or carry out work prior to entry into force of the Agreement and Action Sheet and receipt of the required payment in advance. Work shall not be continued after funds from PNC have been depleted.

Throughout the duration of work under this Action Sheet, PNC shall provide sufficient funds in advance to reimburse DOE for causing LANL to perform the work described in this Action Sheet, and DOE shall have no obligation to perform in the absence of adequate advance funds. Payment in advance from PNC shall be sufficient to cover the expected obligation and cash requirements of the work untile a subsequent request for payment in advance can be made, collected, and recorded. In this regard, sufficient advance funds shall be provided to maintain, at a minimum, a continuous 90-days advance of funds for expected DOE fund requirements during the life of this Action Sheet. Advances shall be sufficient to cover expected termination costs that DOE would incur on behalf of PNC.

5. Duration and Termination

This Action Sheet shall enter into force upon the later date of signature and shall continue in force for a three year period or until mutually agreed by the parties that all activities under this Action Sheet are completed.

For the United States Department of Energy

Signature: _____

Printed Name: Kenneth E. Sanders

Title: Director, International Safeguards Division

Date: February 24, 1997

For the Power Reactor and Nuclear Fuel Development Corporation of Japan

Signature: _____

Printed Name: Masami Katsuragawa

Title: Director, International Division

Date: December 11, 1996

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APPENDIX I

Joint Development of a Nondestructive Assay System for Leached Hulls

1. Study Outline

This program involves the joint development of improved physics, software and nondestructive measurement systems to determine plutonium content in leached hulls. In this study, the major activities are as follows:

Phase I

1. LANL to obtain fuel specifications and facility constraints from PNC.
2. LANL to develop measurement and technical approaches.
3. LANL to perform MCNP calculations to quantify expected system performance.
4. LANL to develop specifications for unattended mode of operation.
5. LANL to study the curium association approach for plutonium verification.
6. LANL to document the results of the Phase I feasibility study in a summary report.

Phase II

1. LANL to develop the detailed engineering design of the NDA system.
2. LANL to fabricate the NDA system.
3. LANL to perform tests of the NDA system measurement performance.
4. LANL to develop software and perform integration tests for unattended mode continuous data acqisition, if necessary.
5. PNC to install the NDA system at TRP.
6. LANL to provide assistance with system installation and calibration at TRP.

7. LANL to provide hardware and software training of operators and inspectors.

8. LANL to develop required hardware and software documentation.

9. PNC to perform test operation of the system.

10. LANL and PNC jointly to evaluate the system performance.

2. Site

This work will be conducted at:

Los Alamos National Laboratory
Los Alamos, New Mexico, USA

and

Tokai Reprocessing Plant, PNC
Tokai-mura, Japan

3. Programmatic Responsibilities

A. LANL will be responsible for providing best efforts within the funding and schdule for the fundamental design work. Any tests or technical assistance shall be provided on a non-interference basis with existing LANL programs.

B. PNC will be responsible for facility specific program direction and equipment installtion interface.

As more detailed program plans are developed, specific responsibilities will be better defined and delineated.

4. Schedule*

Leached Hulls Monitor	CY 1996				CY 1997				CY 1998				CY 1999			
Phase I	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Obtain Fuel Specifications				x												
Develop Measurement Approach				x	x											
Perform MCNP Calculations				x	x											
Develop Unattended Mode Specifications					x	x										
Study Curium Association Approach					x	x										
Document Summary Report						x										
Phase II																
Develop Detailed Engineering Design							x	x								
Fabricate NDA System								x	x	x						
Perform Measurement Tests										x						
Develop Software / Perform Integration Test								x	x	x						
PNC Install the NDA System at TRP											x	x				
LANL Assists System Installation at TRP												x				
Training										x						
Develop Hardware and Software Manuals											x	x				
PNC to Perform Test Operation of System												x	x			
System Performance Evaluation													x	x		

* The Schedule will be followed on a best-effort basis commencing on receipt of funding and availability of parts.

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APPENDIX II

Joint Development of a Nondestructive Assay System forLeached Hulls

Power Reactor and Nuclear Fuel Development Corporation

1. PNC Headquarters

Tetsuo Ohtani, General Manager
Safeguards Office
Nuclear Material Control Division
Power Reactor and Nuclear Fuel Development Corporation
Sankaidoh Building
9-13, 1-Chome, Akasaka
Minato-ku, Tokyo, 107, JAPAN

Takeshi Kawamura, General Manager
International Cooperation Office
International Division
Power Reactor and Nuclear Fuel Development Corporation
Sankaidoh Building
9-13, 1-Chome, Akasaka
Minato-ku, Tokyo, 107, JAPAN

2. Tokai Reprocessing Plant

Toshihide Sugiyama, General Manager
TRP
Power Reactor and Nuclear Fuel Development Corporation
Tokai-mura, Ibaraki-ken
JAPAN Post No. 319-11

Tohru ohnishi, General Manager
Mechanical Processing Section
Processing Division
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Power Reactor and Nuclear Fuel Development Corporation
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Department of Energy

1. DOE Headquarters

Kenneth Sanders, Director
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John Cappis
International Safeguards Division
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2. DOE-Albuquerque Operations Office

James R. Anderson, Director
Science and Technology Transfer Division
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3. Los Alamos National Laboratory

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