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MAY 28 1980

MEMORANDUM FOR: B. Snyder, NRR
R. Weller, NRR
R. Browning, WM
T. Johnson, WM
K. Kim, SAFER

FROM: Homer Lowenberg, Assistant Director
for Operations and Technology
Division of Fuel Cycle and Material Safety

SUBJECT: REPORT OF FIRST MEETING OF TMI-2 INFORMATION AND EXAMINATION PROGRAM - GROUP 3.0, RADIOACTIVE WASTE MANAGEMENT

The first meeting of the subject group was held on May 22, 1980 at DOE offices in Germantown. The attendees are noted in Attachment 1.

Dr. G. Oertel of DOE, acting as the group Chairman, stressed several aspects of the group functions and related DOE activities as noted below.

- To the extent possible the group should avoid becoming critical path points in TMI-2 recovery operations.
- DOE activities at TMI-2 are both constrained and encouraged by Congress.
- Group should help industry to be better prepared for future incidents.
- Group should address processing wastes, not core materials.
- Group should report to overall parent organization at its next meeting in Idaho on July 31, 1980, with a program plan.
- Implementation of plans should start after August 1, 1980.

A. Millunzi of DOE further pleaded for speedy actions to assist in the TMI-2 recovery. The writer pointed out that NRC's role was to protect the public health and safety and that conflicts were possible between DOE, GPU and NRC's interests and must be understood by all and that the activities of this group were very late since certain waste management operations such as EPICOR-2 processing and SDS procurement were both already underway.

C. Negin of International Energy Associates, representing GPU, made a comprehensive presentation covering EPICOR-1, EPICOR-2, SDS and the evaporator systems. He described EPICOR-1 and 2 operations and results to about mid-April 1980. His data indicate that the effluent water from EPICOR-2 meets 10 CFR 20 MPC's for Sr-89, Cs-134 and Cs-137 and exceeds MPC's for Sr-90 and tritium, similar comparisons with EPA drinking water tolerances indicate that only Cs-134 is below

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the EPA standards. However, he noted that both NRC and EPA requirements can be achieved by use of island dilution. He indicated that no release of water from TMI-2 was planned for two years or until the NRC PEIS is completed. Two 500,000 gal. water storage tanks are being built and will be needed in the fall of 1980. Piping, pumps, and radioactive inventory limits by NRC may be limiting factors for availability by that time. EPICOR-2 resin liners will be initially stored on-site in staging modules. Plans are to build 6 modules of 60 unit capacity each. In summary, EPICOR-1 operations on TMI-1 wastes are underway; EPICOR-2 operations on TMI-2 auxiliary building wastes are underway; SDS system has been designed, procurement is underway, solidification of SDS wastes is being qualified and is planned for the reactor building fuel handling area; and the evaporator syste for handling of wash liquors is being planned.

For EPICOR-2 the commission specifically ordered to solidify spent resin.

Mr. Negin requested expeditious technology transferral from the national laboratorie assistance in solidification qualifications for EPICOR-2 and SDS and assistance in development of a high integrity container as an alternative to solidification. He provided seven draft Proposed Research Project Briefs. Dr. Oertel asked other attendees to provide similar ideas in the form of briefs by May 30, 1980. The writer noted that some TMI-2 wastes may be unsuitable for solidification and disposa at commercial burial sites and this aspect should be considered in developing gener and specific research projects. Following much discussion on this item, the EPRI representative pointed out that they had evaluated the various TMI-2 wastes last yea and had reached about the same conclusions as NRC.

Dr. Oertel established group leaders for short-term and long-term plans as follows:

W. Bixby and B. Holzworth - short-term plans
R. Brooksbank - long-term plans

These group leaders will draft plans for group consideration by June 17, 1980, based upon proposed research project briefs.

As the NRC representative on this group, the writer plans to suggest a set of coordinated proposed research project briefs using the form proposed by DOE (Attachment 2). Attached are five draft proposed briefs (Attachments 3-7) prepared by the writer. Plese provide any comments on them or any other proposals by c.o.b. May 29, so that a coordinated transmittal from NRC can be forwarded to Group 3.0.

Original Signed By:

Homer Lowenberg, Assistant Director
for Operations and Technology
Division of Fuel Cycle and Material Safety

OFFICE ➔	Enclosures: 7, as stated		FC 768			
SURNAME ➔	cc: R. Foulds		HLowenberg/jr			
DATE ➔	J. Martin		5/28/80			

ATTACHMENT 1

ATTENDEES

RADIOACTIVE WASTE MANAGEMENT R&D PLANNING GROUP 3.0

May 22, 1980

NAME	ORGANIZATION	TELEPHONE #
Willis Bixby	DOE/TMI	717/948-8485
Chuck Negin	GPU Recovery Engineering	717/948-8321
Homer Lowenberg	NRC/NMSS/FCOT	301/427-4142
Bill Dornsife	PA DER, BRP	717/787-2163
Bob Holzworth	EG&G/TID	717/782-3954
Goetz Oertel	DOE	301/353-3641
Jere Nichols	EPRI	415/855-2976
Ray Sandberg	Bechtel National	415/768-1873
Kyo S. Kim	NRC/RES	301/427-4356
Andrew C. Millunzi	DOE/NPD	301/353-5203
J. T. D'Ambrosia	DOE	301/353-4265
R. E. Brooksbank	ORNL	615/454-6927

PROPOSED PROJECT BRIEF (sample)

Title:

Purpose:

Description of Work:

Incentive:

Generic Value:

Scope/Cost:

Schedule Comments:

ATTACHMENT 3

Draft - HL-1
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Proposed Research Project Brief

Title: Develop an ion exchange system for use at LWRs where significant fuel damage has occurred and water is contaminated with fission products.

Purpose: To provide the affected utility with a rapid means for water cleanup, through either:

1. Designs and specifications of the appropriate system and components for rapid procurement and assembly, or
2. Availability of an appropriate portable system through a utility body (e.g., EPRI, NUSAC, Edison Electric Institute, etc.) so the system can be brought to the site for rapid use.

Description of Work:

1. Analyze a spectrum of reactor events involving fuel damage to estimate the composition of radionuclides that may be present in water requiring treatment and decontamination.
2. Based upon 1. Develop an appropriate process design for a system for handling of contaminated water from projected reactor incidents involving fuel damage.
3. Develop detailed designs and specifications for key process equipment items.
4. Develop detailed designs and specifications for a portable packaged process unit that could be transported to reactor sites and utilized with addition of structures or shielding, etc.
5. Fabricate at least one unit of this type and demonstrate its portability, site installation, hook-up and operation at reactor sites.
6. Utility group procure such unit(s) and have available for response to reactor incidents.

Incentives: Present LWR installations do not include provisions for the treatment of water contaminated with significant amounts of fission products. In order to be able to respond to incident conditions, the reactor operators should have available all the information to permit the rapid procurement of an appropriate water treatment system. Better still would be the availability to the industry of portable unit(s) at some central location(s) that could be transported to the site and hooked up for rapid use onsite. The availability of either a procurement package or a portable system unit could greatly alleviate the utility problems in prompt and appropriate response to such incidents.

Application: The procurement package or portable unit(s) should be applicable to as many nuclear reactors as feasible.

ATTACHMENT 4

Draft - HL-2
HLowenberg/jr
5/27/80

Cs and Sr ?

Proposed Research Project Brief

Title: Development of an ion exchange system to transfer relatively long-lived radionuclides (fission products) from organic resins or combinations of organic and inorganic media to all inorganic media.

Purpose: To provide an affected utility with a rapid means to remove relatively long-lived fission products from water cleanup organic resins to decrease the activity of the bulk of such wastes prior to shipment to commercial land burial facilities.

Description of Work:

1. Analyze the potential radionuclide contents of organic resins from such water cleanup activities.
2. Develop an appropriate process design for a system for the removal and capture of fission products from water cleanup resins.
3. Develop detailed designs and specifications for key process equipment items.
4. Develop detailed designs and specifications for a portable packaged process unit that could be transported to reactor sites and set up with the addition of structures or shielding, etc.
5. Fabricate at least one unit of this type and demonstrate its portability, site installation, hook-up and operation at reactor sites.
6. Utility group procure such unit(s) and have available for use when needed.

Incentives: When present LWRs encounter conditions involving leaking fuel from routine operations or a major incident, relatively long-lived fission products may be sorbed on normal organic ion exchange media. Disposal of such wastes at

commercial burial grounds may be limited by future state or federal regulations. The ability to remove the fission product activity from the bulk of the ion exchange media should be provided to permit the disposal of the bulk of the decontaminated resins and separate handling of the materials with the concentrated fission product wastes.

Application: Such a system should be applicable to as many reactor systems as feasible to decrease the activity of highly contaminated reactor wastes and decrease the activity of materials to be sent to commercial land burial. This could have specific application at TMI-2 in addition to generic interests.

Draft- HL-3
HLowenberg/jr
5/27/80

Potential Research Project Brief

Title: Develop a high integrity container for use in disposal of LWR wastes to be sent to commercial land disposal sites.

Purpose: To provide a design and demonstrate the use of a high integrity container that may be suitable as an alternative to solidification of wastes going to commercial land burial sites.

Description of Work:

1. Develop criteria suitable for such a high integrity container.
2. Develop designs and specifications to meet the required criteria.
3. Fabricate a number of such containers and demonstrate their use at actual reactor installations including appropriate closure under operating conditions.

Incentives: There is increased stress on improving the immobility of radioactive wastes handled at commercial burial sites. This has been reflected by requirements to minimize the liquid contents of such materials and to recuire solidification in a monolithic state prior to transportation for disposal. An acceptable alternative to such requirements may be the use of a high integrity cotainer with suitable life expectancy for decades to centuries depending on the radionuclide content of the waste.

The use of such a container might result in significant cost savings in LWR designs, operations and waste disposal while providing a suitable alternative means of assuring protection of the public health and safety.

Application: Such a container could be useful to essentially all reactors and possible other nuclear facilities. Specific containers could be of immediate use in TMI-2 recovery operations.

ATTACHMENT 6

Draft - HL-4
HLowenberg/jr
5/27/80

Potential Research Project Brief

Title: Develop containers, systems or procedures for handling ion exchange media or reactor wastes that will minimize the volume of the contained free water.

Purpose: To provide designs and demonstrate the use of containers for slightly contaminated reactor wastes that will meet the requirements established by commercial burial sites.

Description of Work:

1. Develop designs of containers or systems and procedures for handling of slightly contaminated reactor wastes that will minimize free water contents.
2. Fabricate such containers or systems and make use of them along with any required procedures at operating reactor installations to achieve the low levels of contained free water being required by commercial burial sites.

Incentive: The commercial burial sites are becoming increasingly concerned over handling of liquids at the sites. Accordingly, the limitations on contained free water are being decreased to very low levels. Standard procedures for handling reactor wastes will not likely meet such requirements and new designs, systems or procedures will be desirable and result in cost savings and improve the protection of public health and safety.

Application: Achievement of low levels of free water in reactor wastes can be helpful to all LWRs in the handling of slightly contaminated waste . This could also contribute to the TMI-2 recovery operations.

Draft- HL-5
HLowenberg/jr
5/27/80

Potential Research Project Brief

Title: Develop containers for highly contaminated reactor wastes that can easily be used consistent with overall waste processing and disposal requirements.

Purpose: To provide designs and demonstrate the use of containers for highly contaminated reactor wastes that will permit storage in spent fuel facilities and possible later processing.

Description of Work:

1. Develop designs of containers suitable for interim storage of highly contaminated reactor wastes that may have containment requirements similar to spent fuel and also permit future processing for waste management.
2. Fabricate such containers and make use of them at reactor sites. Demonstrate their containment and storage capabilities and their applicability to later use in connection with future processing of contents to more resistant forms or containers.

Incentive: In the cleanup of reactor facilities following incidents involving fuel damage, some wastes may be generated that may need handling and treatment similar to spent fuel. This could involve interim storage for as long as decades followed by processing to appropriate forms or containers for ultimate disposal. To date, the utilities have no such experience with handling of wastes and suitable designs and containers with procedures for their storage and use would be helpful and could save both money and time while adding to the protection of the public health and safety.

Application: Containers of this type and procedures for their use could be helpful to any operating LWR and also could specifically contribute to TMI-2 recovery operations.