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

January 26, 1983

MEMORANDUM TO: Robert B. Minogue, Director, RES

FROM: D. F. Ross, Deputy Director, RES

SUBJECT: FOREIGN TRAVEL REPORT: JAPAN, TAIWAN, SOUTH KOREA

Summary

I visited the subject countries during the time period January 8-22, 1983. In Japan I discussed various research agreements with JAERI. With MITI I furthered our seismic exchange process. I paid a courtesy call on STA.

In Taiwan, I spent the first day giving presentations on Long Range Plan, Severe Accident Research Plan, SASA (including plant analyzer) and our new source term. I also discussed Taiwan's possible entry into SFD. On the second day I toured the Kuosheng BWR-6 reactor facility. Agreement was reached on exchange of startup test data from Kuosheng.

In South Korea I gave presentations on the RES Long Range Research Program and the Severe Accident Research Plan, and also discussed the possible participation of South Korea in our SFD program.

D. F. Ross, Deputy Director
Office of Nuclear Regulatory Research

Attachment:
Details of Trip Report

cc: w/atts.
JLafleur, IP
OBassett, RES
PBernero, RES
Security
HSullivan,RES
FArsenault, RES
~~RMattson,~~ NRR
EDO

DETAILS OF

FOREIGN TRAVEL REPORT

JAPAN, TAIWAN, SOUTH KOREA

Japan Discussion

The agenda for the two-day visit at JAERI (Tokai facilities) is shown on Table 1. At the end of the two-day meeting we agreed on a summary list of action items or agreement items; this is shown on Table 2. (Table 2 also serves as a summary record.) Some points that deserve additional emphasis are:

PBF

I informed JAERI that we would be making a "final" decision on SFD experiments in late March this year. I surmised that a meeting might be held around March 21 to consult with our partners; hence, the agreement in item 3.

Also, JAERI wishes to exchange information on future worth of NSRR experiments in SFD. To this end they will be sending more information, as noted in point 4. I brought back the NSRR SFD plan (Appendix A) and a tentative program of NSRR experiments (Appendix B).

ROSA-IV

I left with Katsuragi a copy of the ROSA-IV agreement (Appendix C) which we believe conforms to JAERI's modifications. I also presented a funding proposal (Table 3) which would have JAERI spending up to $2M US. JAERI indicated no interest in this (see item 6 of Table 2). Immediate action is needed to refine scope; the test schedule (Table 4) shows tests by 9-84, whereas some of our furnished spool pieces take nearly 2 years to make.

TABLE 1

AGENDA FOR JAERI VISIT

January 10, Monday 1983

9:30-9:25	Meet with Dr. H. Ishikawa, Director, Tokai Establishment	
9:30-12:00	Severe Fuel Damage Research Program	Dr. M. Nozawa Dr. S. Katsuragi Dr. M. Ishikawa
13:15-15:00	ROSA-IV Program	
15:00-15:15	Coffee Break	
15:15-16:00	LOFT L2-6 Experiment Planning	
16:00-17:00	2D/3D Program	
17:00-17:30	Miscellaneous Discussion	Dr. M. Nozawa Dr. S. Katsuragi Dr. M. Ishikawa

January 11, Tuesday 1983

9:30-12:00	Waste Management Research Program Dr. K. Imai, Head, Div. Environmental Safety Research Dr. K. Araki, Deputy Head ditto Dr. S. Tashiro, Chief, WASTEF	
13:15-14:00	Seismic Problem	Dr. T. Uga Dr. T. Tobioka
14:00-15:00	Summary Discussion	Dr. M. Nozawa Dr. S. Katsuragi Dr. M. Ishikawa Dr. M. Hirata Dr. K. Sato Dr. K. Araki Dr. K. Imai

TABLE 2

Items of Agreement and Action Items Resulting

from

Meetings with JAERI

(M. Nozawa, and others) and

D. F. Ross, Research Office of USNRC

on

January 10-11, 1983

1. JAERI wishes to send a resident engineer to Sandia to follow developements in ACRR.

   Ross agreed that it was within terms of draft agreement.

   Action: Ross will instruct Silberberg to send confirmatory TWX upon his return.

2. JAERI noted possible inconsistencies and unclearness in draft SFD agreement.

   Points included: (A) resident at Sandia

   (B) NSRR should not be included (see item 4, also)

   Action: Silberberg and Katsuragi should exchange TWX to refine language.

3. Ross noted that specific plans for SFD tests involving PBF, Phase II, NRU, and ACRR will be defined in late March 1983. We noted a tentative meeting in Idaho Falls the week of March 21-25 to discuss with JAERI preferences.

   Action: Ross will confirm meeting time and place by TWX to Katsuragi. JAERI will send coordination team (one or more).

4. NSRR: JAERI will provide to NRC its test program in NSRR and JAERI-SFD long-term program (see Enclosures A and B). Both JAERI and NRC will consider whether to incorporate the NSRR program into the SFD agreement.

5. ESSOR-Super Sara

   JAERI asked for our policy on Super Sara.

   Action: Ross will send to Nozawa copies of its correspondence to M. de Kergolay of EC. JAERI will send NRC its policy.

6. ROSA-IV

   Ross gave draft of appendix of possible agreement to Katsuragi, which incorporates the points covered in his November 1982 TWX to NRC. Scope of instrumentation and analyses was discussed, but no final agreement was reached.

   NRC should refine its proposal (spool pieces, etc). Possibly we should start design now. Equipment is needed by Aug. 1984.

   Action: H. Sullivan needs to refine the proposal and coordinate w/Shiba. JAERI & NRC may need to meet in March.

   Ross agreed to confirm by telex to Katsuragi by 1-28-83 on meeting to refine the NRC table. This meeting could be at the same time and place as the SFD meeting (March 21-25, Idaho).

7. ROSA-IV, STA

   Ross will meet with Tamura, STA, on Wednesday January 12, along with Ishikawa of JAERI.

8. Ross will try to arrange for R. Bernero, Director of Division of Risk Assessment in NRC-Research to visit Tokai in the next few months. Bernero would discuss risk assessment in general, and seismic risk

assessment in general, and seismic risk methods in particular. This might assist JAERI in formulating some seismic risk proposals.

9. Ross will send Araki the latest version of 10 CFR 60, as well as the EPA standard, and also EIS.

10. JAERI would like the up-to-date version of SWIFT.

11. Ross will send to Nozawa (~ February 1, 1983) the latest version of NRC Long Range Research Program.

12. Tashiro would like details of A 1266, A 3237, B 3040, B6330, and B 6352; Ross will send.

13. Ross will send Araki an NRC report concerning off-site effect of routine operation; this answers to so-called "Heidelberg report" (from ERG).

14. Ross will send latest version of part 20 to Araki; also RG 1.97, Mod. 3.

15. JAERI indicated interest in specific NRC programs in Siting and Environments, LL Waste, and HL Waste. Ross indicated by tables of question (retyped herein as Table 10) interest in JAERI program. These would be the agenda for future detailed meetings.

16. Agreement

    a. NRC (Ross) will send to Nozawa a draft general agreement along path c* of the Lafleur memo, in 1-2 months.

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*Path c = Developing a separate program cooperation agreement to cover the area of waste disposal research, similar to those already existing between NRC (RES) and JAERI for the LOFT and PBF programs. (This would be the vehicle of choice for cooperation involving a major commitment of resources by both parties. Our initial impression of the JAERI "feeler" is that this step would be premature at this time.)

b. NRC will send a team (NRC, BCL, Sandia) about May to discuss details of specific agreement along the lines of the Kim memo of 1-5-83 and the areas of the Araki presentation.

c. Both NRC and JAERI will exchange information before May. JAERI will send a team to BCL, Sandia, PNL.

Environmental Safety

The discussion on environmental safety went well. The most significant item in Table 2 is item 16. Although the programs cut across several of our divisions, it appears DHSWM should assume the action responsibility.

Specific interests of JAERI in our HLW, LLW, Site & Environment programs are shown in Table 5-6-7.

On Wednesday, January 12, I met with MITI officials (Taniguchi, et al). I gave Taniguchi the proposed outline for a detailed workshop, US & Japan, on seismic issues. He gave a preliminary approval to the idea. Fujitomi said April 1983 was too early to meet, as our questions to them were unexpectedly detailed. He suggested that when Lafleur is in Japan in March (to JAIF) that a firm date be set with him. I mentioned that our LRRP would be available soon, with further details. I also noted that soon we would have a Seismic Analysis Program Plan.

Taniguchi showed me a draft of 7 questions on our programs. Many are outside the seismic area, and some are already given to Japan under Sec agreement. Their 7 questions are reprinted here as Table 9.

I then met with STA (Kurihara, et al) accompanied by Ishikawa of JAERI. We mostly talked ROSA-IV as it relates to an international workshop. I agreed to try to get the US to alter its stance, and classify ROSA-IV as a project suitable for international agreement; (subsequently, that evening I discussed this matter by telephone with J. Lafleur).

Taiwan

The specific agenda for the two-day visit is in Table 8. The first day consisted mostly of presentations by me on LRRP, SARP, SASA, and the new source term. The audience consisted of about 80 people, both from the AEC and from Taipower. At the end of the day I discussed with Victor Cheng the possibility of Taiwan's participation in SFD. Unfortunately we just missed the deadline for their budget year which starts July 1984. Hence, even if an agreement could be reached, July 1985 is the earliest money could flow. Mr. Cheng suggested that perhaps Taiwan could participate by in-kind services (they make a lot of electronics). We should look into this; for example, could they do part of UPTF DAS?

(Also, I believe a careful reading of the risk agreement on Kuosheng could indicate that they would get new source term codes, at least the advanced MARCH-CORRAL family.)

On the second day I toured the 2-unit Kuosheng BWR-6 station. The Unit 1 was nearly at full power. Since Unit 2 was down for turbine repair, the tour focussed on Unit 2. The common control room was very quiet and orderly. Ten operators were on duty. Control room procedures and computer alarms, etc. are in English. Two TV sets focussed on control room panels, for use in superintendent's office. We toured the reactor building.

I noted that the RCIC turbine was a Terry. Pump cubicles were separate, each with its own cooling unit. Doors were bulkhead type, sealing, and with "open" alarm circuits. The RCIC room door had a movable radiation shield. There is a dilution system that can mix the air from wetwell to reactor building, for H_2 dilution.

In the afternoon we returned to Taipei to the AEC office to discuss Kuosheng operating experience.

After listening to the discussions by the Taipower engineers on Kousheng startup tests, I handed out the following proposal:

> "The NRC develops thermal-hydraulic models for analysis of BWR plant transients including: (1) load rejection, (2) turbine trip, (3) loss of feedwater heater and (4) ATWS events.
>
> "The computer codes used include RELAPS, and, at BNL (Long Island, New York) the RAMONA code.
>
> "Detailed plant transient data, such as accumulated during startup tests at Kuosheng, would be of benefit to the NRC in that the NRC codes would be better verified through actual data.
>
> "The NRC would therefore be interested in obtaining full access to all of the plant data for simulated transient. It might also be beneficial to us to accumulate data from the future full-load rejection test on Unit 2.
>
> "In return, perhaps AEC (or Taipower) would want either greater familiarity with NRC code, or perhaps would wish a sequence of calculations done by us for Kuosheng plant."

Taipower agreed to this exchange, as did Mr. Cheng on behalf of AEC. Mr. Cheng authorized us to deal directly with Taipower, namely:

P. C. Liu
Director
Atomic Power Dept.
TPC

/NOTE: The next action, agreed to by TPC, would be for someone in DAE (H. Sullivan et al) to make a specific proposal by telex. Then we would go over with our code, help them, and come back with plant model and startup data, including such things, as reactor response to full load rejection tests./

The TPC engineers gave a full briefing on their startup experience. Their briefing slides are too numerous to reproduce. Some of the salient points are:

1. They have two 40 MWe gas turbines on-site, to augment offsite power. Each unit has 3 diesel generators, and they are not cross-connected. Perceived unreliability per DG startup $\leq .05$. Some difficulty in complying with our latest RG for diesel testing was noted. A bearing failure on a generator was experienced.

2. Appendix K does not limit plant operation; rather it is MCPR.

3. They are familiar with our current status on ATWS, and have an FSAR commitment to comply with ultimate US policy. /In general, they follow our regulatory policy./

4. They do not use igniters for H_2 control. On demand, they can mix the air volumes between drywell and containment building. They have not done an ultimate strength calculation for the containment building. They are partners ($180,000 US) in the EPRI H_2 experiments at NTS (as we are). They ultimately may use igniters.

5. The RCIC (A Terry Turbine) start reliability has been reported to INPO (TPC is a member of INPO/NSAC).

6. They are going to building an Emergency Reponse facility somewhat like TVA policy.

7. Taiwan AEC would like to be an observer at the peer review of the new Grand Gulf source term (I agreed).

8. To date Unit 1 has had 22 unplanned trips, with feedwater control (8) being the leader.

9. They may use symptom-oriented procedures in the future.

10. No fuel failures yet; they follow GE PCIOMRs.

11. A design deficiency has lead to vibration and damage to TIP/LPRM system whenever LPCI was on. Until a baffle can be installed (at first refueling), they won't use LPCI (except in emergency). /Presumably the US BWR-6 design is fixed./

12. No vibration of LPRM guide tube was evidenced.

13. They use ODYN as the plant transient code; that is, GE used it in FSAR, but TPC does not have.

14. Their relief valves (Crosby) have not stuck open, although they have leaked.

15. Unit 2 startup report will be sent to AEC this Spring. /We should get./

16. They now use a BWR simulator like Brown's Ferry (for Kuosheng) but are buying a BWR-6 simulator.

South Korea

On Wednesday, January 19, I met with the following officials of KAERI:

Dr. John Cha, President
Dr. Dong Kim, Director, Nuclear Safety Center
Dr. Sang Lee, Manager, Standards Dev.
Dr. Chang Rim, Manager, Nuclear Fuels Div.

I also met with Dr. Bak Kwang Kang of the Atomic Energy Bureau of the Ministry of Science and Technology.

The purpose of the day was for me to describe the NRC process for developing our Long Range Research Plan. I gave a presentation that lasted about 1-1/2 hours. I also discussed our 1983 Accident Source Term Revisions. In a separate meeting I gave Dr. Kim our draft proposal for KAERI's participation in our SFD program. After the lecture there were two requests for information:

1. Chi Se Hwan, of the KAERI Mechanics and Materials Source Division, wanted a copy of our latest policy on PTS, including the Commission instructions.

2. Won Hyo Yoon, of the Nuclear Safety Standards Dept, NSC, KAERI, is in charge of interpreting TMI-requirements for Korean reactors. He needs the following:

   a. Latest version of 10 CFR, with special attention to paragraph 50.34(f)

   b. Rev. 3 of RG 1.97

   c. Implementation policy on SECY-82-111B

   d. NUREG-0611 (Vols 1 & 2)

   e. Commission policy on liquid level meters for PWRs, with technical bases

   f. Latest SRP

   g. NUREG-0718

   h. Any recent scheduling policy with respect to NUREG-0737 items

On Thursday, January 20, I visited the DaeDuk Fuel Center, and gave a detailed presentation on the NRC Severe Accident Research Plan.

($K)

	FY 1983	FY 1984	FY 1985	FY 1986	Total
Resident Engineer	300	350	350	400	1400
Instrumentation	600	2400	700	0	3700
Analysis	0	200	400	500	1100
RELAP5 Model Improvement		(100)	(100)	(200)	
ROSA-IV Analysis		(100)	(300)	(300)	
Total	900	2950	1450	900	6200
NRC Funding	600	1700	1050	800	4150
JAERI Funding	300	1250	400	100	2050

TABLE 3

Suggested Proposal

NRC Fund: (1) Resident engineer.

(2) One-half cost of instrumentation.

(3) One-half RELAP5 model improvement.

(4) All ROSA-IV analysis.

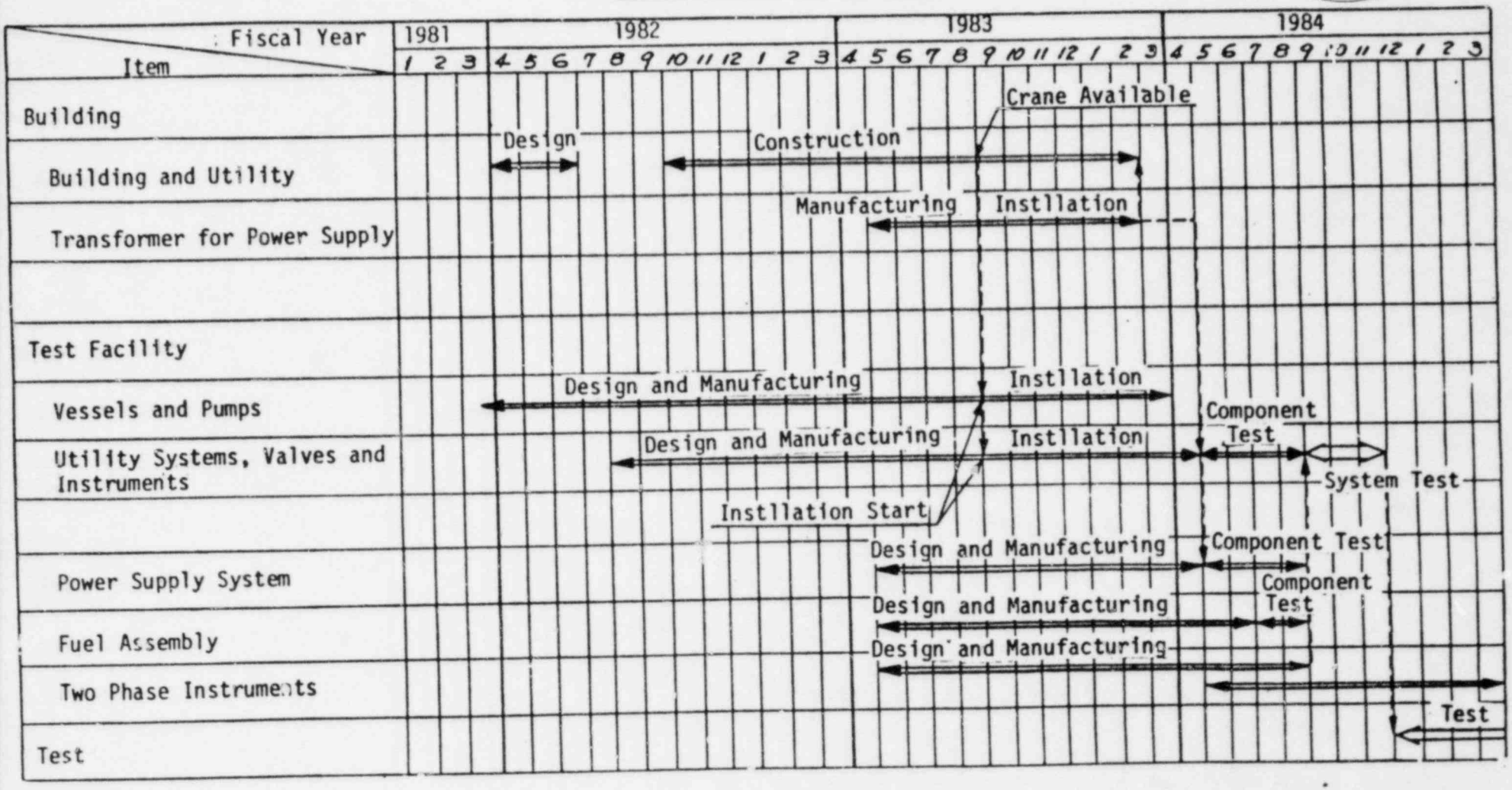
JAERI Fund: (1) Half instrumentation.

(2) Half RELAP5 model improvement

TABLE 4

1-10-83 white ow JAERI

LSTF Project Schedule



April-83
Mar 84

LSTF Budget Plan

Unit : $\times 10^6$ dollar
¥247/$

Item \ Fiscal Year	Component	1981	1982	1983	1984	Total
Test Facility I	Vessel	0.243	0.972	0	1.215	2.430
Test Facility II	Utilities Valves Suports Piping Instruments Embeded in Components		2.834	2.162	2.696	7.692
Test Facility III	Power Supply System Fuel Assembly Two Phase Instrument I Control System Data Acquisition System			0.573	5.160	5.733
Test Facility IV	Two Phase Instrument II Miscellaneous Instruments				3.441	3.441
Building I	Building and Utility		0.918	2.143		3.061
Building II	Transformer for Power Supply			0.256	0.598	0.854
Total		0.243	4.724	5.134	13.110	23.211

TABLE 5

High-Level Waste

Item	JAERI	NRC	Notice
Characterization of glass form	1) Surface properties 2) Leaching in rock mass 3) Long-term performance of glass 4) Physical properties	1) Surface Properties and Performance Prediction of High Level Nuclear Waste Encapsulants 2) QA/QC of Waste Form and Container 3) Laboratory Analog of Waste Leaching and Migration	
Containment by package and engineered components	1) Modification of engineered components under repository condition 2) Durability test of materials	1) Long-Term Performance of Materials Used for High Level Waste Packaging 2) Modification of Backfill Materials Under Repository Conditions 3) Container Assessment 4) Monitoring Waste Package Condition 5) Sealing Rock Mass	
Retardation in nuclide migration by rock mass	1) Kd values to rocks and weathered minerals 2) Geochemical interaction 3) Field test : rock mass heating, migration and permeability	1) Geochemical Assessment of Nuclear Waste Isolation 2) Valence Effects on Adsorption 3) Radionuclide Migration Around Uranium Ore Body 4) Natural Chemical Complex of Actinide 5) Fracturing and Geomechanics of Jointed Rock 6) Monitoring Changes in Rock and Ground Water Conditions	
Performance assessment	1) Nuclide migration code 2) Assess predictive methods for natural event	6 Performance Assessment 1) Waste Isolation Methodology 2) Pre-Implacement Risk Methodology 3) Risk Methodology--Other than Bedded Salt 4) Geochemical Performance Assessment 5) Uncertainties in Long-Term Performance and Review Panel 6) Pre-Closure Risk Methodology Site Suitability 1) Geotechnical, Environmental and Radiation 2) Field Measurement System Evaluation--HLW 3) Ground Water Transport 4) Confirmatory Research on Dating Ground Water 5) Assess Predictive Methods for Natural Events 6) Unsaturated Flow and Transport Through Fractured Rock	
Others	1) Alternative waste form development 2) Safety Evaluation of HLW storage facility 3) Study on Partitioning and Transmutation		

JAERI Interest

	(3) Field tests at existing commercial shallow land burial facilities (~FY1984) (4) Testing predictive models and identifying characteristics of sites and their environs (~FY1988) (5) Research on shallow land burial and geological alternatives to shallow land burial (~FY1988) (6) Research on the effectiveness of geo-, technical, radiological and environmental measurement systems used to characterize and monitor LLW sites (~FY1984) (7) Research on methods to assess risks to the public and the environment from LLW facilities (~FY1986) (8) Development of standards, regulatory guides and technical directives for licensing and regulating engineered LLW facilities (FY1984~1988)	(3) Simulation test for environmental radionuclide migration (FY1983~1987) (4) Safety evaluation of engineered and natural barriers (FY1983~) (5) Modeling on safety assessment for shallow land disposal (FY1982~1987)	See attached sheet.

JAERI has an interest in the following subjects being conducted by NRC:

(i) Treatment & Conditioning
- (3) Studies on properties of volume-reduced wastes such as incineration ash and acid digestion.

(ii) Disposal
- (4) Testing predictive models and identifying characteristics of sites and their environs.
- (5) Research on shallow land burial and geological alternatives to shallow land burial.

TABLE 1

LOW-LEVEL WASTE

Item	NRC	JAERI	Notice
Treatment & Conditioning	(1) Leaching and compressive strength tests of solidified wastes generated from PWR and BWR (2) Characterizing tests of volume-reduced wastes produced by DOE and industry (3) Studies on properties of volume-reduced wastes such as incineration ash and acid digestion (~FY1987) (4) Evaluating the effectiveness of proposed standard tests of waste forms (5) Assessing the characteristics of solidified wastes arising from reactor accident cleanup operation and from the routine decontamination (including an assessment of the effects of chelating agents)	(1) Development of acid digestion process for the treatment of combustible radwastes(~FY1985) (2) Volume reduction of non-combustible waste by melting (FY1982~1985) (3) Research and development of polyethylene solidification of wastes (4) Leaching and integrity tests on small size solidified products — cement, bitumen, plastics	See attached sheet.
Container	(1) Testing the proposed high-integrity containers (~FY1984) (2) Evaluation of the long-term confinement capability of containers	(1) Corrosion tests of steel drum under disposal conditions (FY1978~1983) (2) Leaching and integrity tests of multi-stage package under high hydrostatic pressure (FY1982~1984)	
Disposal	1. Sea dumping 2. Shallow land disposal (1) Testing the effectiveness of improved trench-cap (~FY1983) (2) Testing the effectiveness of proposed engineered barriers (FY1984~1988)	1. Sea dumping (1) Leaching and integrity tests under high hydrostatic pressure on full size solidified products — cement, bitumen, plastics (2) Integrity tests of cement package in deep sea (3) Long-term leaching tests on real waste forms (FY1984~1986) 2. Shallow land disposal (1) Measurements of radionuclide distribution coefficients with batch and column methods (~FY1983) (2) Radionuclide migration experiments by means of aerated and aquifer zone model apparatus (~FY1983)	

TABLE 7

Items	NRC	JAERI	Notice
Siting and Environment Impact	1. Development of Assessment Model and Measurements Methods to Characterize Environment Impacts 2. Development of a Quality Assurance Program for Radiation measurements in the Environment 3. Reexamination of the NRC Environmental Monitoring Requirement and the Data Provided by Licensees with these Requirements	Measurements and Analytical Evaluation of Environmental Radiation 1. Development of Measurement Methods and Instruments (1) Development on spectrum-dose converrion method that derives the dose directly from a pulse height spectrum (2) Development and application of a DBM (Discrimination Bias Modulation) type high sensitive exposure rate meter (3) Development of a wide range gamma ray monitor covering the range from less than 1μR/h up to 10 R/h (4) Development of methods for stabilization of gain variation of NaI(Tl) detector output caused by temperature change (5) Monte Carlo calculation of accurate responce functions of NaI(Tl) scitillation detector for gamma ray (6) Development of technical base of environmental monitoring and survey	

Items	NRC	JAERI	Notice
	4. Improvement in Dose Assessment 5. Test of Remote-Sensing Technique Using Aerial and Satellite Reconnaissance for Utility in Environmental Monitoring 6. Analysis at NRC Post Accident Environmental Monitoring Requirements	2. Study on Dose Evaluation of Environmental Radiation (1) Experimental investigation and data accumulation of environmental radiation characteristics (2) Theoretical evaluation and analysis by Monte Carlo calculation of gamma ray transport in the environment 3. Research and Development of Emergency Monitoring and Prediction Code System for Accidental Release from Nuclear Power Plants (1) Development of aerial gamma radiation survey system (2) Development of code system to predict environmental impacts of accidental release	See attached sheet Q

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Items	NRC	JAERI	Notice
Earth Sciences	1. Field Experiment in a River Valley-Rolling Terrain Environment and in a Sea Coast Environment	Experimental and Numerical Study of Atmospheric Dispersion 1. Field Experiment (1) Local tracer tests to evaluate the dispersion mechanism in the condition of internal boundary layer in the coastal zone (2) Development of measurement method and observation of trajectry with non-lift balloon	
	2. Verification and Evaluation of Atmospheric Dispersion and Transport Code with Experimental Data 3. Selection of Particular Model for Use in Emergency Planning 4. Analysis of Structure's Safety in the Severe Natural Phenomena 5. Investigation of Design Basis Tornado for Nuclear Power Plant	2. Development of Simulation Code of Atmospheric Dispersion (1) Development of three-dimensional mass-consistent wind field model for accurate simulation in emergency (2) Development of three-dimensional time-dependent concentration model for accurate simulation under various conditions in emergency	See attached sheet 6

Items	NRC	JAERI	Notice
Earth Sciences	6. Site evaluation studies of groundwater transport potential for a variety of geologic and hydrologic conditions.	Measurements and Evaluation of Radionuclides in Natural Environment 1. Evaluation of behavior of radionuclides in natural environment	See attached sheet C
Health Effects	1. Development of information bases and dosimetric methodologies for assessing individual and population doses and consequent health risks resulting from environmental, occupational, and medical exposures to radioactive material.	2. Study of migration of radionuclides in natural environment and evaluation of internal doses to public	

JAERI has an interest in the following subjects being conducted by NRC:

Siting and Environment Impact	(2) Development of a Quality Assurance Program for Radiation Measurements in the Environment
	(5) Test of Remote-Sensing Technique Using Aerial and Satellite Reconnaissance for Utility in Environmental Monitoring
	(6) Analysis at NRC Post Accident Environmental Monitoring Requirements
Earth Sciences	(1) Field Experiment in a River Valley-Rolling Terrain Environment and in a Sea Coast Environment
	(2) Verification and Evaluation of Atmospheric Dispersion and Transport Code with Experimental Data
	(3) Selection of Particular Model for Use in Emergency Planning

TABLE 8

ITINERARY

for the Visit of

Dr. Denwood F. Poss

to

the Republic of China

Thursday, January 13, 1983

20:05 Arrive at C.K.S. International Airport by flight NW3

Friday, January 14, 1983

09:20 Call on Mr. Cheng-Hwa Cheng, Secretary General of AEC

09:30 Presentation on NRC Long Term Research Program

10:40 Presentation on NRC Severe Accident Research Plan

13:50 Presentation on Methods and Results for Severe Accident Sequence Analysis

15:30 Presentation on Proposed Revisions in the Radioactive Source Term for Reactor Accidents

Monday, January 17, 1983

08:30 Leave Grand Hotel for Kuosheng

09:30 Visit Kuosheng Plant

15:00 Briefing given by Taiwan Power Company on Specific Kuosheng Issues at AEC Headquarters

15:50 General Discussion

Tuesday, January 18, 1983

Leave Grand Hotel for C.K.S. International Airport

TABLE 9

Tentative Japanese Questionnaire, handed out by Mr. Taniguchi, MITI, at meeting on 1-12-83.

1. Which organizations are involved to develop the TRAP-MELT codes, and how is the present status of the developmental efforts?

2. We understand that NRC are going to extend the FLECHT-SEASET test into on in which blocked coolant condition shall be studied.
   Is this understanding correct?

3. What is basic idea of NRC on the time when NRC opens generally the CONTAIN code that is now under efforts to complete the final version?

4. Relating with the SASA project, the following two specialized works are planning at NRC according to Long Range Research Plan (NUREG-0784),
   (1) Radionuclide Transport in Severe Accidents,
   and
   (2) Characterization of Plant Behavior Under Complex Transient Condition in Conjunction with Multiple Failures.
   We would like to know the detailed plans for these two topics if any, because these two theme look similar to ours, although the methods and the data base may be different from each other.

5. NRC's research effort about fission products release and transport encourages us too. Among them, such works as "Fission Product Release from Irradiated LWR Fuel" and "Iodine Chemistry in Water" at ORNL are specially noteworthy for us.
   This is because we are doing works to have the method to determine the fission product source term in a realistic basis for accidents with high likelihood.

We appreciate it if you transmit the data in advance to the final official reporting. Give us NRC's rough idea about this possibility.

6. In order to understand SSMRP in more detail, we expect to receive the reports (Vol. 1-9) for the eight projects in the first stage.

7. Are there any available reports on which explain research programs for the following items?

(1) Piping:

Stiffness vs. Flexibility (L.L.L.)

Pipe Damping (I.N.E.L.)

Independent Support (B.N.L.)

(2) Equipment Qualifications: (I.N.E.L.)

Mechanical Equipment under environmental and seismic lead

Electrical Equipment under seismic load

(3) Containment Integrity

Model Tests (S.N.L.)

Seismic Dynamic Tests

Electrical Penetrations

Large Penetration

Vent Valves (6-48")

Leak Test

(4) Other Structures (L.A.N.L.)

Seismic Category I Structure

Concrete Shear Wall Models

Some Masonry Wall Structures

TABLE 10

Questions Regarding the JAERI's WASTEF Capabilities

1. What types of solid state and surface examination equipment are available? (e.g., SEM, TEM, SIMS, Optical Microscope, Metallography, etc.)

2. What types of radiochemistry analysis techniques are available for leach tests?

3. What types of equipment are available for radioactive sample preparation?

4. What is the maximum radiation field that will be available at the facility?

5. Is the facility capable of performing long-term (1 or 2 years) integrated chemical and mechanical durability tests involving a scale-size waste package?

Questions Regarding Radionuclide Transport Code

1. Does the JAERI want to compile the NRC's SWIFT/NWFT codes in the JAERI's computer system? Is the JAERI capable of establishing input data file?

2. If the SWIFT/NWFT needs some modification for application of the Japanese waste management system, will the JAERI consider a joint project with NRC/Sandia to accomplish this?

3. How is the JAERI's Monte Carlo code benchmarked, and what is the result?

4. What is the advantage and disadvantage of the JAERI's Monte Carlo code compared to FEM or FDM codes?

Questions Regarding JAERI's LLW Program

1. Waste Form and Container

   a. What experimental procedures does the JAERI use for leachability and corrosion tests? (e.g. ANS 16.1, ASTM, etc)

   b. How will the test results be correlated with actual performance of waste forms and containers?

2. Geochemical Retardation

   a. What parameters are controlled and how in the JAERI's Aerated Zone Model apparatus and Aquifer Zone Model apparatus?

   b. Is the JAERI doing any basic science research to predict radionuclide transport behavior in various media using the above apparatus?