LAWRENCE LIVERMORE LABORATORY

NUCLEAR SYSTEMS SAFETY PROGRAM

Lee

TF80-241

September 23, 1980

Dr. T. Lee
Analysis Development Branch
Division of Reactor Safety Research
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Technical Evaluation of Containment Research Data

Reference:
1. U.S. NRC/LLNL Liaison to Foreign Containment Research, FIN #A0116
2. Telecon (conf.), S. Fabic, T. Lee, G. Holman, E. McCauley, 22 September 1980

Dear Dr. Lee:

As requested in the referenced telecon we are enclosing evaluations of both GKSS-PSS data and JAERI-CRT data extracted from our current Progress Report draft:

GKSS -
- Details of the condensation oscillation process
- Amplitude ranking and correlation of chug pressure peaks
- Effects of data sampling time

This work is based on the first original PCM data tapes (test M1) received from GKSS staff.

JAERI -
- Discussion of expanded-time chug detail plots (tests 2101, 3101, & 3102)
- Correlation of mass flow data and onset of the chugging process (water-break tests)

This work is based on plots and tables supplied by JAERI staff. No original data base is available.

We believe the following information will be useful to place our present activities in context:

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1. Liaison has been firmly established by LLNL at JAERI & GKSS. As a result, NRC has an ongoing understanding of the respective test program objectives and progress as well as a direct collegeal access to these foreign program's management and staff.

2. This Liaison has established a complete original-data transfer from the GKSS-PSS program and its detail study is in progress. Due to separately initiated NRC requirements, preliminary but sequential data evaluation has occupied the JAERI-CRT staff from December, 1979 through the present. None of this information has been available to this Liaison except for limited results of the U.S. Owner's Group request. It is fully expected that completion of this latter evaluation work will free the CRT staff for consideration of Liaison data requests; Japan government restrictions, to date, prevent CRT staff from supplying original data tapes to this Liaison.

3. Because of the importance of these foreign research programs to confirmatory needs of the NRC, primary importance has been placed by the Liaison on the adequacy of the separate facilities and their associated measurement systems to produce the intended data. Possible basic limitations and improvements suggested by this Liaison have been uniformly well received and acted upon by the separate research staffs to strengthen their work for their and NRC's benefit. For example, JAERI will increase their PCM data acquisition rate by a factor of four and have begun a separate pressure transducer evaluation study; GKSS has completely revised their wetwell boundary pressure measurements system to provide true boundary response, a complete instrumented hammer modal study is nearly completed, and a uniform characteristic data set is developed for quick look of each main test.

4. The FY80 Liaison work was planned by LLNL to include substantial application of these data for confirmatory licensing application. As a result, however, of funding revisions the FY80 work was cut in half; by RSR direction the evaluation and correlation portion was severely limited (ref. section 19b, paragraph 3 of the FY80 Work Statement). As the substantial Liaison work associated with assessment of the measurement systems, original data transfer, and establishment of the data handling procedures, including software development, have been completed, the amount of data evaluation has increased as evidenced by the enclosures. During this year of activity, substantially below that originally planned, this Liaison has been successful in developing a more fundamental understanding of the overall phenomena associated with both the condensation oscillation and chugging phases of the LOCA. As a primary result, differentiation between facility dependent and true processes independent of the facility can be made. We believe this will provide substantial simplification in future containment codes modeling such processes. Further, our detailed data evaluations made a year ago (September, 1979) clarified the crucial role that the data sampling rate plays in delivering unbiased data for future assessment and evaluation.

5. With funding at the level specified in the Program Proposal for FY81 (dated April 7, 1980) a full data evaluation activity for GKSS and JAERI data is expected. The actual details and focus of this evaluation work are expected to be mutually defined in an ongoing manner between RSR and this Liaison, to ensure its usefulness to NRC.

6. A FY80-Supplement of $100,000 to FIN #A-0116 was received in August, 1980. It is our understanding that this money is primarily intended for application during FY81 to the recently established informal Liaison with TPC/Taiwan; as required, limited funds will be applied to FY80 expenditures in this area. A supplement to our FY81 Program Proposal is in preparation to define the work of this new Liaison activity.

We sincerely hope that this information will be effective for your purposes. We look forward to continuing good relations in support of your confirmatory needs for foreign containment research data.

Sincerely,

E. W. McCauley

Edward W. McCauley, P.E., Ph.D.
Thermo Fluid Mechanics Group
Nuclear Test Engineering Division

EWM:lgd

8009.23/1289u

cc: G. Cummings (LLNL)

LAWRENCE LIVERMORE LABORATORY

TF80-234

September 16, 1980

Dr. T. Lee
Analysis Development Branch
Division of Reactor Safety Research
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

DRAFT

Subject: Monthly Management Letter #11
NRC FIN #A0116
Foreign Liaison for Containment Systems Research

Executive Activities Summary - 1 August through 31 August 1980

- FY80 supplement of $100K received from U.S. NRC (RSR) to add informal liaison with Taiwan Power Co. for Mark III SRV discharge tests at Kuosheng nuclear power plant, 20 August.
- Travel by E. McCauley to Taipei, Taiwan to observe installation of instrumentation for Kuosheng SRV discharge tests, 23 - 27 August.
- Copy of preliminary data evaluation by JAERI for U.S. Mark II Owners Group received 15 August.
- Procedure developed for removing voids beneath CRT facility floor developed and submitted to JAERI, 20 August.
- Procedure developed for resolving vent pipe lateral forces from strain data and submitted to JAERI, 1 August.
- Meeting with M. Kolb (GKSS) at LLNL on 4 August regarding modal studies of DAS wetwell.
- First shipment of pressure transducers to GKSS by Gould, Inc., 26 August.
- Draft GKSS/JAERI progress report completed, including first technical evaluation of GKSS PCM data using LLNL data acquisition software.

An Equal Opportunity Employer University of California P.O. Box 808 Livermore, California 94550 Telephone (415) 422-1100 Twx 910-386-8339 UCLLL LVMR

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1. Program Objective and Description

The purpose of this program is to provide the U.S. NRC with the results of confirmatory research applicable to the validation of advanced containment codes and the licensing of U.S. Mark II BWR power plants. These results are provided through a continuing technical liaison with the

- o full scale, multivent, Mark II steam condensation tests performed at the JAERI-CRT Facility in Japan (Tokai-Mura).
- o full scale, multivent, steam condensation tests performed at the Forschungszentrum-Geesthacht DAS facility in West Germany (Geesthacht).
- o in-plant Mark III SRV discharge tests to be performed at the Kuosheng nuclear power plant in Taiwan (Taipei), Taiwan Power Co. (TPC).

2. GKSS-DAS Program (Geesthacht, West Germany)

(a) Facility Trip

None. Next trip planned for second week in September and will include participation in ICHMT Seminar in Dubrovnik, Yugoslavia, September 1 - 5, 1980.

(b) Data Received

28 August, from GKSS:

(1) PCM data tape LLLM2D, Test M2

(c) Data Dispersed

11 August, to U.S. NRC:

(1) 16mm high speed film and video cassette from Test M4

(d) Translations (German to English, text only)

Requested - None

Received - None

(e) TV Film Conversion (PAL to NTSC Std.)

Requested - None

Received - Test M4

(f) High Speed Film Copying

Requested - None

Received - Test M4

(g) Other

(1) Seven new Statham pressure transducers shipped by Gould to GKSS, 26 August.

2B. JAERI-CRT Program (Tokai-Mura, Japan)

(a) Facility Trip - None

(b) Data Received

15 August 1980

(1) Copy of preliminary data evaluation by JAERI for Mark II Owners Group, from M. Davis (GE, San Jose).

(c) Data Dispersed

1 August, 1980, to JAERI

(1) Procedure to develop vent pipe lateral forces from strain gauge data.

20 August, 1980, to JAERI

(1) Procedure for removal of voids beneath CRT facility floor plates.

(2) Rocketdyne report (NAA-TR-63-1) on effect of tubing on dynamic pressure transducer response.

(d) Translations (text only)

Requested - None

Received - None

2C. TPC SRV Discharge Tests (Taipei, Taiwan)

(a) Facility Trip

23 - 27 August, by E. McCauley

(b) Data Received

20 August, from U.S. NRC

(1) TPC SRV Test Plan (Nutech Report ZTP-06-065, Rev. 0)

(2) TPC SRV Test Procedure (Nutech Report ZTP-06-102, Rev. A)

(c) Data Dispersed

(1) None

(d) Translations (Chinese to English, text only)

Requested - None

Received - None

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3. Funding and Dollars obligated

FY80 - Total Available: $380K ($280K + $100K supplement)

Cost: $247.4K Liens: $-0- Total Obligations: $247.4K

4. List of Subcontractors, Consultants

(a) AD-EX Translation Service
3220 Alpine Road
Portola Valley, CA 94025

(b) Image Transforms, Inc.
4142 Lankershim Blvd.
N. Hollywood, CA 91602

5. Meetings

(a) M. Kolb (GKSS Institut fuer Physik) at LLNL regarding modal tests of GKSS wetwell, 4 August 1980.

6. Reports

(a) E. McCauley and E. Aust, et al., "Description of Steam Condensation Phenomena During the Loss of Coolant Accident," summary submitted to SMiRT-6 Conference, Paris, France, 17 - 21 August, 1981.

(b) E. McCauley and K. Namatame, et al., "The Effect of Non-Heterogeneous Wetwell Boundaries on Pressure Suppression System Wetwell Response," summary submitted to SMiRT-6 Conference, Paris France, 17 - 21 August, 1981.

(c) GKSS/JAERI progress report draft completed, including first technical evaluation of GKSS PCM data using LLNL data acquisition software.

(d) Detailed report on LLNL software for accessing GKSS data in preparation.

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Principal Investigator

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