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LETTER REPORT

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Author(s): P. C. Owzarski

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Responsible NRC Individual and NRC Office or Division \_\_\_\_\_

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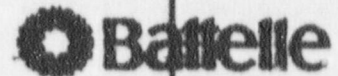
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LETTER REPORT

NRC Research and Technical  
Assistance Report

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January 16, 1981

G.S. Lewis  
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Safeguards, Fuel Cycle and Environmental Branch  
U.S. Nuclear Regulatory Commission  
Mail Stop 1130-SS  
Washington, DC 20555

Dear Lewis:

#### ACCIDENT AEROSOL CHARACTERIZATION - JANUARY MONTHLY REPORT

Through December, 31.8% or \$135.7K of the available operating funds have been spent.

#### PROJECT MANAGEMENT

FY-81 operating expenditures through December 31, 1980 were \$135.7K, which is 31.8% of the available \$427K. The corresponding working period (October 1 - December 31) was 24.7% of available time in FY-81. The expenditures since the last report were \$51.9K.

We are ahead of a linear spending rate in order to produce the deliverables expected in the first half of FY-81. There might be funding difficulties for additional requested RART experiments in FY-81.

Re: enclosed PNL SCHEDULE/PROGRESS OF DELIVERABLES - FY-81. The Accident Analysis Handbook (AAH) inputs and Literature Survey Document in Task A and the Combustion Experimental Plan in Task C are behind the original schedule as noted in the task reports below. All other deliverables are near the expected degree of completion.

#### TASK A. LITERATURE REVIEW, PROGRAM PLANNING, HANDBOOK INPUT

The Literature Review is still behind schedule by one month or more. There are now priorities within this task that are causing conflicts in terms of deliverable deadlines and available resources. The AAH outline revision efforts left the deliverables definitions somewhat vague at this point, made the deadlines less meaningful, and diluted the efforts toward furnishing the Literature Review. The budget we originally allocated for this task will not cover the efforts needed to provide the deliverables. Deficit spending on this task will probably cause other tasks to suffer. However, it is too early to state this problem quantitatively.

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With the addition of Marcel Ballinger, chemical engineer, to our team in December, the work of the AAH progressed to the point where the Anderson RFP (MOX facility) plant descriptors can be used for some sample problem fires. At least one fire scenario with radioactive release is planned to be available in January for LASL.

#### TASK 8. AEROSOL GENERATION EXPERIMENTS

With the completion of all chemical analyses, the free fall spill experiments originally planned are now complete. Writing the final report commenced this month (December). A paper on these experiments has been accepted for the American Industrial Hygiene Association meeting in Portland, Oregon on May 29, 1981.

Some nitric acid corrosion damage resulted in the RART and its sampling components during the aqueous uranyl nitrate (UNH) spills. Although the equipment is not incapacitated, considerable time was spent in cleaning the RART and its equipment. We report this to indicate that experiments involving UNH aerosols pose a hazard that could limit the scope of this type of experiment in the future.

The table below shows the results of the pressurized release experiments (using PARE - Pressurized Airborne Release Equipment) completed in the RART. Several trends are evident. With a source of 350 g TiO<sub>2</sub> the percent airborne increased as the release pressure increased until considerable material began sticking to the RART ceiling. Since the RART itself is limiting the larger releases and, since we are trying to find mechanism limiting experiments, we tried a smaller source (100 g). Two runs have showed higher percentage airborne at respective pressures. Even smaller quantities will be attempted in future runs.

#### AIRBORNE RELEASES FROM PARE USING TiO<sub>2</sub> POWDER

Source Weight g	Pressure psig	Grams Airborne	Percent Airborne
350	50	2.2	0.62
350	100	3.3	0.94
350	250	10.1	2.9
350	500	21.4	6.1
350	1000	15.9	4.5
100	50	3.6	3.6
100	1000	12.4	12.4

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TASK C. FIRE GENERATED PARTICULATE TESTS

Considerable writing has been accomplished in the area for the Literature Review Document. We anticipate that the first draft writing might be done by the end of January. Martin Chan, a chemical engineer, has been hired permanently in our Section and can devote full time to helping J. Mishima on this task. The experimental plan depends somewhat on the literature survey results and its draft necessarily follows the literature survey draft.

TASK D. FAILED COMPARTMENT TESTS

Glovebox assembly in 242-B (RART Building) commenced in December.

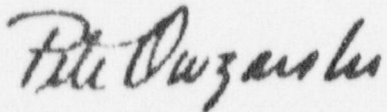
The literature survey effort here has resulted in most of literature compiled. Most of the writing remains to be done.

TASK E. ANALYTICAL MODEL VERIFICATION/SUBSTANTIATION

Since the operation of a 3-D flow and particle code is necessary to the end results of this task (as well as Task D and the AAH), some trial demonstration work has been attempted on the SOLA 3 code that had been converted for our DOE computer use. The trial work is almost complete. Also converted to our use is the CORRAL code, which will be used to provide LASL with some early particle release scenarios in the Anderson RFP.

The literature survey here relates to Task D directly. We are also compiling the fire code/fire model literature which is intended to tie in to the body of the Task D literature. Most of the fire code literature is collected.

Sincerely,



P.C. Owczarski  
Applied Meteorology & Emissions Assessment  
Atmospheric Sciences Department

PCO:dh

cc: W. Gregory/RA Martin - LASL  
HW Goddard/Ed Fredrick - ORNL

PNL SCHEDULE/PROGRESS OF DELIVERABLES - FY-81

TASK A - LITERATURE REVIEW, PROGRAM PLANNING, HANDBOOK INPUT

1. Program Plan Document - Scheduled Publication with LASL: February 1981  
Percent Complete 70
2. UHM - MOX Plant Chapters 3, 4, 5, 6, or equivalent.  
Percent Complete 15
3. Literature Survey Document - Scheduled Publication: February 1981  
Percent Complete 55

TASK B - AEROSOL GENERATION EXPERIMENTS

1. Unpressurized Release of Powders and Liquids  
Experiments done by December 1980. Percent Complete 100  
Draft Document by February 1981. Percent Complete 50
2. Pressurized Release of Powders  
Experiments done by June 1981. Percent Complete 10
3. Pressurized Release of Liquids  
Submit Experiment Plan by June 1981. Percent Complete < 5
4. Additional RART Tests  
Submit Plan by March '81 RRG Meeting. Percent Complete 50

TASK C - FIRE GENERATED PARTICULATE TESTS

1. Literature Search, see Task A.1
2. Combustion Products Experiments  
Exp. Plan by January 1981. Percent Complete 40
3. Combustion Prod. & Extraneous Particulates  
Exp. Plan by July 1981. Percent Complete < 5
4. Fire Particulates - Near Fire Behavior  
Study need - no deadline

TASK D - FAILED COMPARTMENT TESTS

1. Intact Glovebox Experiments  
Submit plan by April 1981. Percent Complete < 5
2. Failed Glovebox Experiments  
Submit plan by September 1981. Percent Complete < 5

TASK E - ANALYTICAL MODEL VERIFICATION/SUBSTANTIATION

1. Preliminary Evaluation of Faulted Container Flow & Particulate Models  
Submit with Task A.1
2. Free Fall Spills First Model  
Submit draft by July 1981. Percent Complete < 5