

Sandia National Laboratories

Albuquerque, New Mexico 87185

April 2, 1985

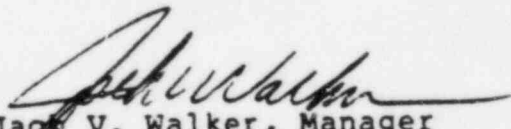
Mr. Robert Minogue, Director
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Minogue:

Enclosed is the December 1984 - January 1985 Bi-Monthly
report of work managed by the Sandia Reactor Safety Research
Department. This report covers:

| | <u>Fin No.</u> |
|--|-------------------|
| Accident Energetics | A1016/A1385/A1390 |
| Molten Fuel-Concrete Interactions | A1019 |
| Molten Core-Coolant Interactions | A1030 |
| Core Debris Behavior | A1181 |
| Debris Bed Coolability - EURATOM | A1263 |
| Debris Bed Coolability - PNC | A1264 |
| Core Melt Technology | A1218 |
| High Temperature Fission Product Chemistry | A1227 |
| Hydrogen Behavior Program | A1246 |
| LWR Debris Formation and Relocation | A1335 |
| Hydrogen Mitigative and Preventive Schemes | A1336 |
| LWR Core Debris Coolability | A1340/D1124 |
| Melt Progression Analysis (MELPROG) | A1342 |
| Quantitative Uncertainty Estimation for the Source Term | A1383 |

Sincerely yours,


Jack V. Walker, Manager
Reactor Safety Research
Department 6420

Enc: As stated

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Mr. Robert Minogue

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April 2, 1985

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and another eight experiments with 6.5 v/o hydrogen in air. These experiments include control burns without water drops.

1.6.1.4 The Effects of Aerosols on Hydrogen Combustion (L. S. Nelson, 6427; G. D. Valdez, 6427)

We began new experiments to investigate further the effects of a reduced aerosol on a lean hydrogen burn. This was prompted by the single experiment performed last October with a metallic iron aerosol in 6.5 v/o hydrogen in air; in that experiment, we measured an approximately 50 percent higher peak pressure with a faster rise time than the control experiments on those burns with oxidic aerosols present.

In the new experiments, we improved our powder disperser to obtain denser aerosols and switched to a finer iron powder than used in the single experiment in 1984.

We completed three control burns at 6.5 v/o hydrogen in air without the aerosol, and attempted one with aerosol. However, our sequencing apparatus malfunctioned, yielding a burn under unknown conditions.

1.6.1.5 Consequences of Hydrogen Combustion in the Presence of Aerosols (L. S. Nelson, 6427; G. D. Valdez, 6427)

We performed burns in the VGES chamber with the compositions 16.6, 9.0, and 29.6 v/o hydrogen in air; each burn was performed with 1 kg of 10 w/o CsI-90 w/o Al_2O_3 dispersed throughout the combustion volume. As in the three tests performed in November at 11.0, 16.7, and 6.5 v/o hydrogen in air with the same aerosol disposal, free molecular iodine was generated. Although the chemical analyses are incomplete, initial measurements indicate that as much as 75 percent of the iodide ion present in the CsI was oxidized to molecular iodine during the burn at 29.6 v/o (approximately the stoichiometric composition).

1.6.1.6 Nonpowered Hydrogen Igniters (L. R. Thorne and J. V. Volpani, 8353)

A platinum igniter has been prepared for evaluation in several static dry hydrogen-air mixtures in a 5 m³ combustion chamber.

1.6.2 Documentation, Meetings, and Presentations

On December 5, 1984, presentations were made in Albuquerque to C. W. Nilsen and P. Worthington, NRC contract managers