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Department of Energy
Albuquerque Operations Office
Los Alamos Area Office
Los Alamos, New Mexico 87544

APR - 5 1996

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Benito Garcia, Chief
Hazardous and Radioactive Materials Bureau
New Mexico Environment Department
2044 Galisteo St., Bldg. A
P. O. Box 26110
Santa Fe, NM 87505

RECEIVED APR 10 1996

Dear Mr. Garcia:

Subject: Los Alamos National Laboratory (LANL) Notification of Emergency Chemical Release, March 22 through 28, 1996

The purpose of this letter is to submit the required written report for an emergency chemical release pursuant to the requirements of the LANL Hazardous Waste Facility Permit, Module II, General Facility Conditions, Paragraph II.K.2.c. Approval to perform this emergency action was provided to Alice Barr, Hazardous and Solid Waste Group (ESH-19), by Robert (Stu) Dinwiddee of your staff at approximately 1:10 p.m. on Friday, March 22, 1996, pursuant to the referenced permit. Having received permission to perform this operation, the contents of a leaking compressed gas cylinder were vented to the atmosphere beginning March 22 and lasting through March 28, 1996, in compliance with Module II of the operating permit. On March 29, 1996, Mr. Dinwiddee provided an extension until April 8, 1996, for submittal of a written report outlining the process involved in this operation. The extension was necessary due to the time required to complete chemical analyses and to safely vent the cylinder.

Personnel at the Chemistry and Metallurgy Research (CMR) facility determined that a suspect radioactive gas cylinder that was to be analyzed to determine if the contents were radioactive had a valve of questionable integrity and was potentially an emergency situation. As was discussed with Mr. Dinwiddie, LANL had performed modeling of the air quality impact of releasing the contents of the cylinder, and concurrently, to fit the cylinder with a gas pressure regulator to facilitate analysis of the contents. Personnel placed the cylinder in a chemical fume hood, removed the protective cap from the cylinder valve, and installed a gas pressure regulator. A radiological analysis was performed on the contents of the cylinder which determined that no radioactive contamination was associated with the contents of the cylinder. Based on earlier

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analyses, the chemical contents of the cylinder had been determined to be hydrogen with traces of methane (CH_4), hydrogen fluoride (HF), and either silicon tetrafluoride (SiF_4) or hydrogen chloride (HCl). Because some confusion existed regarding the presence of SiF_4 or HCl, a procedure was developed to confirm the contents of the cylinder. The procedure required sampling of the contents of the cylinder, venting approximately one-half of the pressure in the cylinder and then resampling. This process ensured sufficient knowledge of potential low vapor pressure constituents that may have gone undetected in the liquid phase. Following the second confirmatory analysis, there were no unexpected constituents indicated, and the remaining contents of the cylinder were vented. The confirmatory analysis verified the contents of the cylinder to be hydrogen as the major constituent, with traces of CH_4, HF, and HCl.

LANL Emergency Management and Response personnel determined that the condition of this cylinder represented a potentially hazardous condition due to the compromised integrity of the valve. A special work permit was prepared and the appropriate health and safety personnel notified. Air modeling was performed by LANL's Air Quality Group (ESH-17) to determine potential hazards associated with venting. SCREEN 3, an Environmental Protection Agency-approved air toxics model for point source emissions exhausted from a stack, was the model used. Modeling was performed before the venting operation and after venting was complete. A worst case scenario of release of 100 pounds (full cylinder) and a lesser release of 35 pounds were modeled. The maximum potential exposure due to venting the entire contents of the cylinder was determined to be 900 micrograms/cubic meter. The corrected 24-hour exposure was 360 micrograms/cubic meter. Based on air modeling results, even if 100 pounds of HF had been in the cylinder, it was determined that Occupational Safety and Health Administration (OSHA) exposure limits for HF would not be exceeded. The permissible occupational exposure for HF is 2,500 micrograms/cubic meter for 8 hours. The 24-hour occupational exposure is 834 micrograms/cubic meter.

Prior to venting, personnel from ESH-19, LANL, contacted the New Mexico Environment Department as discussed above, and received approval to vent the cylinder. CMR engineering personnel determined that it was acceptable to proceed with this venting without additional engineering controls to protect the building ventilation system from potential corrosion due to the presence of HF and HCl. The system is constructed of stainless steel resistant to corrosion.

The cylinder weight was 125.5 pounds at 140 p.s.i. The cylinder was vented from 140 p.s.i. to 75 p.s.i. into a chemical fume hood over a period of approximately 40 minutes. The cylinder was then allowed to equilibrate over the weekend. The cylinder was re-analyzed on Monday, March 25, 1996. The ratio of HF to hydrogen was more than twice the ratio before venting. The assumption was made that the primary constituent in the cylinder was HF in the liquid phase. The remainder of the pressure (75 p.s.i.) was then released. After all the pressure was vented, the weight of the cylinder was 125 pounds.

On Tuesday, March 26, the cylinder was opened in the fume hood so that any HF would be released as fast as the liquid boiled at room temperature. The cylinder weight in the morning on Wednesday, March 27, was 117 pounds. The cylinder was left under the hood with the valve and regulator open for another 24 hours. On Thursday, March 28, the cylinder weighed 117 pounds. This was interpreted by CMR personnel as the empty weight of the cylinder. The total amount of HF released was approximately 8 pounds. The 8-pound release was modeled using SCREEN 3 to verify that the maximum impact of 1.1 micrograms/cubic meter was below the OSHA exposure limit for HF.

In an effort to reduce the chance for recurrence of this type of situation, procedures are being developed to conduct leak tests on valve threads and safety caps prior to shipment to the CMR building for analysis. Leak tests will be conducted at LANL's Chemical and Mixed Waste Management facility (Technical Area 54, Area L). In the event a leaking cylinder is discovered at Area L, LANL's Emergency Management and Response organization will be immediately notified, and procedures for overpacking the cylinder will be initiated.

Should you have any questions, please call me at (505) 665-5042.

Sincerely,

H.L. "Jody" Plum
Office of Environment and Projects

LAAMEP:7HJP-021

cc:
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RCRA Permitting Program
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