

New Mexico Health and Environment Department

MEMORANDUM

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TO: Richard Mitzelfelt
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FROM: A. Elizabeth Gordon, Ph.D.
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Hazardous Waste Program

DATE: November 8, 1989

SUBJECT: Summary of issues regarding the operating permit for hazardous waste units at Los Alamos National Laboratory

History of the permitting process:

Los Alamos National Laboratory submitted the Part B of its permit application for an operating permit to handle hazardous waste units on March 27, 1986. The permit application was revised on November 13, 1989 and November 25, 1987 and supplemented on November 8, 1988 and there were numerous technical discussions. The proposed draft permit was submitted public comment on May 10, 1989. The public comment period ended August 24, 1989 and a formal public hearing was held during July 18-20, 1989.

Hazardous waste units and wastes handled at LANL:

The draft permit is for the following hazardous waste units: storage in containers; storage and treatment in tanks and treatment by incineration. There are six container storage units in Technical Area 54, Area L and seven in Technical Area 50. The process capacity for containers is 237,990 gallons. The batch waste treatment unit is Technical Area 50 in a totally enclosed pressure tank; the four tanks in Area L are open-top tanks. The process capacity of storage in tanks is 6,600 gallons and for treatment in tanks is 7,680 gallons per day. The two incinerators are the controlled air incinerator (CAI) in Technical Area 50 and the industrial incinerator in Technical Area 16. The process capacity for incineration is 0.56 tons per hour.



15024

Richard Mitzelfelt, Director
November 8, 1989
Page 2

The hazardous wastes handled at LANL are indicated in the table below:

Table 1. Number of Hazardous Wastes by Category Managed at LANL

PROCESS	WASTE TYPE			
	Characteristic (D)	Non-Specific Source (F)	Acutely Hazardous (P)	Toxic (U)
Container Storage	13	14	107	238
Tank Storage	1	4	0	0
Treatment in Tanks	10	4	14	3
Incineration	3	6	80	218

Additionally the incinerator is burning mixed wastes under interim status and is permitted to burn strictly radioactive wastes and PCBs.

Changes to the draft permit:

After review of the draft permit by EID, three changes were made in the content of the draft permit. The first was the removal of references to generator requirements in permit paragraphs I.A., and the deletion of II.A.3. and II.A.4. because a reading of HWMR-5, Part IX, 40 CFR section 270.4.(a) indicated that generator activities are not subject to the permit. Permit paragraph II.E.2. was revised to add metals, more sampling sites and more frequent sampling at Mortendad Canyon. The land ban requirements for storage were added as permit paragraph III.B.3. for container storage and IV.B.5. for storage in tanks.

There were four changes made in response to comments from LANL. Permit paragraph II.E.2.f. was added to address the dry well situation. All attempts to drill wells that do not yield working wells are to be documented. Permit paragraph IV.D.1.c. was redesignated IV.D.1.d. and rewritten to specifically authorize some discharges to the industrial wastewater system. Treatment residues that qualify for an exclusion in accordance with the waste analysis plan may be discharged to the industrial wastewater system. In paragraph A.5. of Permit Attachment A: Waste Analysis Plan the percentage of verification analysis

Richard Mitzelfelt, Director
November 8, 1989
Page 3

required was increased to 1%. Updated figures and Permit Attachment D: Contingency Plan replaced the outdated ones.

Three changes were made in response to the comments from EPA, Region VI. The descriptions of the secondary containment systems for the tanks were added to permit paragraphs IV.C.1. and 2. and Figure 7 was added to the permit. Permit paragraphs V.C.1. and V.F.1. were revised to indicate the methods of determining the chlorine and heat content of the wastes. Those of V.F.6.b. and V.F.7.c. were revised to indicate a tolerance limit of plus or minus 3% for actual instrument accuracy.

Four changes were made in response to comments from the public and all of them are to the incinerator requirements. Restrictions have been placed on metal-bearing wastes. Any metal-bearing hazardous waste cannot have its waste feed rate exceed that dictated by the emissions screening limits designated in the EPA "Guidance on Metals and Hydrogen Chloride Controls for Hazardous Waste Incinerators, Vol. IV, March 1989." These rates result in a metal concentration that is low and reduces the possibility of metals being emitted. Permit paragraph V.G.I. was modified to require that the ash from the burn of a listed hazardous waste be cemented and sent to an approved disposal facility. If the ash from the incineration of a characteristic waste tests as characteristic, it must also be cemented and sent to an approved disposal facility.

A majority of people were concerned that the number of parameters being monitored were too low and that radioactivity was not being monitored. The monitoring requirements have been increased so that the waste feed must be monitored for radioactivity (permit paragraph V.C.3) and the exhaust at the stack must be monitored for radioactivity and total hydrocarbons (permit paragraphs V.E.9. and 10.). Lastly, the requirement that the DRE must be reverified if the EID determines that new information requires further testing was added to permit paragraph V.I.5.

Concerns regarding incineration

No comments were received on the container storage units and the industrial incinerator and only two comments on the storage and treatment units. The concern lies with the controlled air incinerator.

The major concerns in incineration are products of incomplete combustion (PICs), gaseous and particulate emissions, metals and the energy in the system if there is a failure. PIC's are "new" organic compounds and among the toxic PIC's known to be formed

Richard Mitzelfelt, Director
November 8, 1989
Page 4

are dioxin and dibenzofurans. PIC formation must be minimized by keeping the original wastes at high enough temperature for a sufficient time period. Additionally, PIC's should be destroyed by the high temperatures in the second combustion chamber. Hydrogen chloride is a gaseous emission particular to the incineration of hazardous wastes because many hazardous waste contain chlorinated organic compounds. For these reasons, RCRA incinerators must have control devices that limit the emission of hydrogen chloride. Particulates are of concern because of their ability to carry inorganic materials, such as metals, which are not destroyed by incineration.

A major concern is that the very small particulates will entrain metals (and radionuclides) and carry them for considerable distances. The other issue in regards to metals is the ash. Incineration does leave a residue that is more concentrated in inorganic components than the original waste.

The LANL controlled air incinerator (CAI) has many of the features required by EPA to address these concerns. The CAI has been modified during the last two years. These modification and the effect they have had upon the CAI's efficiency in removing these gases and particulates are discussed below. This information has been taken from the "Final Report, Lab. Job No. LJ 10309-50/KA-035, Controlled Air Incinerator Upgrade, TA-50, Kaiser Engineers, Inc."

First, the combustion chambers were not modified; all changes were to the air pollution control system. The quench tower, which preconditions the hot exhaust gas, had the fiberglass quench unit and spray nozzles replaced with components made of Hastelloy C-22 alloy and with gaskets made of teflon which increases the tower's resistance to corrosion and thermal shock. The weir assembly was replaced with a spray system that ensures a more uniform water distribution in the tower and this in turn improves the towers ability to cool and humidify the gas stream.

The main function of the venturi scrubber is to remove large particles. The thermal and corrosion resistance of this unit was increased by replacing fiberglass materials with Hastelloy C-22 alloy and the hypalon material with Viton. Also, the nozzle opening was increased from 1/4 inch to 3/8 inch. The larger opening allows for a higher liquid flow rate and this, in turn, results in a larger number of droplets that can collide with and remove particles.

The absorption column is the main component for the removal of hydrogen chloride, and it was modified by increasing the column

Richard Mitzelfelt, Director
November 8, 1989
Page 5

diameter and replacing the original polypropylene packing with Hastelloy C-276 packing. The increase in column diameter decreases the velocity of the exhaust gas with the result that there is a longer contact time between the gas and the liquid in the column so that more hydrogen chloride is removed. The new Hastelloy packing increases the contact area between the exhaust gas and the liquid which also increases the removal of acidic gases.

The HEPA filter system provides a high degree of removal of very fine particles and guards against the release of radionuclides. The modification to this system was the installation of a second set of filters. With a second set of filters, the incinerator can continue operating while one set of filters is being replaced.

The temperature in the primary chamber is greater than 1,400 F and in the secondary chamber greater than 2,000 F with the result at the DRE for dioxins and dibenzofurans is the required 99.99999%.

As indicated above, there have been two changes made to the draft permit in response to the public concern over metals. First, LANL is required to maintain a feed rate for metal-bearing wastes that will keep the concentration of any metal sufficiently low so that the emission of any metal will be minimal. Also, any ash that is characteristic for any EP toxic metal must be cemented and disposed of in any approved disposal facility.

The last major concern is incinerator failure or malfunction. The incinerator is monitored for the following operating parameters: pressure drop across the venturi scrubber; pressure drop across the HEPA filter banks; operating temperatures; flow rate and pH of the effluent control system solution; the flow rate and carbon monoxide and oxygen concentrations in the combustion air; total hydrocarbons in exhaust gas; radioactivity of the exhaust gas. If the incinerator cannot maintain any one of these parameters at the required level, the incinerator automatically shuts down.

Attributes of Incineration

The two major advantages of incineration are that it does destroy organic hazardous waste and results in considerable volume reduction. Additionally, it leaves a residue that is more stable than the original waste. This is particularly important for a future issue of mixed wastes. The incineration of organic

Richard Mitzelfelt, Director
November 8, 1989
Page 6

mixed wastes results in a more stable residue that is less likely to release gases.

Supercompaction is frequently suggested as the most viable alternative to incineration. Supercompaction results in a volume reduction of 7 to 1; incineration in 100 to 1. Supercompaction does not destroy an organic hazardous waste; incineration does. Supercompaction is not feasible with liquid wastes and a good portion of LANL's hazardous wastes are liquid.

Concerns regarding LANL and DOE

The comments received have indicated grave public concerns not only with incineration, but with LANL and DOE. Most people think, given the recent revelations on the extent of cleanup required at DOE facilities and the resulting cost, that the permit, without oversight by an independent body, is useless. An annual inspection by EID does not count.

Recently received or not-yet-received information

The 1972 environmental impact statement (EIS) on the incinerator and its succeeding 1973 document (see response 20) were received Friday, November 3, 1989. A quick review indicated that all the information on the incinerator pre-dated its construction. The information contained in the permit application superceded these documents.

Mr. Troy Wade, Acting Assistant Secretary for Defense Programs, DOE, has not yet responded to the EID's letter requesting clarification regarding DOE's future plans for the CAI and any copy of any EIS or equivalent document done since 1980. Ms. Constance Soden, Chief, Environmental Programs Branch has indicated in phone conversations that the letter has been prepared, but not yet signed off by all involved. LANL has indicated in a letter dated August 18, 1989 that the recent draft assessment on the CAI is in house, but it will not be released until final. It is doubtful that there is information that would impact negatively on the CAI, but it is still outstanding information.