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October 16, 1946

Commanding Officer

Col. A. W. Betts

Contaminated Wastes

1730 14 00

There is forwarded herewith a brief study on the disposal of contaminated wastes which was prepared in answer to the attached District Bulletin of 24 September, 1946.

If you feel that this information is pertinent to the Board of Officers appointed by the District, it is assumed you may want to sent it forward to Oak Ridge.

FOR THE DIRECTOR:

A. W. Betts,
Associate Director

Incls. (2)
District Bulletin, dtd 24 Sept.
Memo fr GLW to RCH dtd 11 Oct.

cc: File
G. Williams

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October 11, 1946

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Disposal of Contaminated Wastes at The Los Alamos Laboratory

The problem involved in the disposal of contaminated wastes at Los Alamos may be divided into three sections, both in subject matter and in physical disposal.

1. Disposal of Liquid Wastes from Chemical Processes and from Laboratory Work

A. The main bulk of the chemical waste disposal from the main Technical Area takes place through the so-called "acid sewer" which picks up laboratory drains from approximately two-thirds of the laboratory buildings in the Technical Area. It discharges this liquid, without treatment, into Pueblo Canyon just north of the school buildings. Other minor laboratory wastes are discharged into the sanitary sewer leading north and east out of the Technical Area near Building S, and several small waste lines discharge into Los Alamos Canyon. None of these latter are of much consequence at the present time, but cumulatively could become so at a later date. Preliminary discussions have been held with Dr. Jette and Mr. Graham of CMR Division and with Mr. Highleyman of Black and Veatch. The general features of a solution to this problem outlined by these talks involve the gathering of all chemical wastes from operations of the Technical Area into the existing acid sewer, although in some cases the use of pumps will be required, and the treatment of this chemical waste in a small treatment plant to be located near the rim of Pueblo Canyon near the present acid sewer line.

This plant would provide neutralization, coagulation, and filtration processes necessary to remove radioactive components from the flow down to some tolerance yet to be determined. The coagulated matter might be dried for reclamation, or if this is not practical because of the small percentage content, for disposal along the lines to be mentioned later in connection with solid matter. If it proves impossible to eliminate the radio active matter completely enough from the flow, it may be necessary to evaporate the liquid completely and discharge the resulting vapors from a high stack.

B. The chemical drains at DP Site are similar in nature to those from the Technical Area and will have to be treated in a similar manner if they are not to continue to drain into Los Alamos Canyon. It will require about a mile and a half of pipe plus a small pumping station if these wastes are to be combined with those from the Technical Area, and for this reason, it seems more practical to treat them at the Site.

C. The DP Site laundry constitutes a special problem because of the relatively large volume of soapy solution which it discharges each day. This solution, when discharged, is usually contaminated from the laboratory clothing which has been washed in it. It may be practical to include this liquid in the same disposal lines and plant used for the rest of the Site, but because of the soapy nature of the liquid, a separate small disposal plant may prove to be advisable and preliminary plans along this line are not being worked on.

D. At the other outlying Sites, the problem of chemical waste disposal has been avoided entirely thus far and is actually of less importance because of the relatively small volumes involved. If a through job is to be done, it may well be necessary to provide a tank truck for chemical waste transportation and actually truck the liquid from

the various sites (principally P Site and Bayo Canyon) to the main disposal plant. Chemical waste at the other outlying sites is principally contaminated with high explosive and is dangerous for that reason alone. No means has yet been developed for the treatment of such wastes except through evaporation of the liquid in shallow areas set behind earth barricades where the dried explosive may be burned safely after the carrier liquid has been evaporated by the sun.

2. Disposal of Contaminated Gases and Atmospheres.

The problem of disposing of air combustion products and other gases resulting from laboratory work cannot safely be handled by exhaust blowers alone; yet because of the rushed construction and frequent building additions in the Los Alamos Laboratories, this is generally the case. Only the main buildings at DP Site have been provided with planned exhaust treatment involving the use of large precipitron units in special exhaust filter buildings through which all exhaust air from the operating buildings passes before being discharged through fifty-foot stacks into air currents which the prevailing wind carries toward an uninhabited area. The roofs of other laboratory buildings are liberally sprinkled with exhaust blowers, most of them individual units connected to individual hodds, many of which are devoted to various phases of radiochemistry or other techniques involving exhaust of radioactive dust, gas, or vapors in small quantities. It is quite possible, however, that cumulatively, on still days, the combined output of these exhaust blowers might well provide enough concentration to be of some hazard in certain regions of the Technical Area. Our rebuilding program for the laboratory will provide for an electrostatic filter exhaust treatment for all laboratory buildings of whatever kind. Depending upon the strength of the dust collection from these electrostatic precipitators, they will either be returned to the chemists for recovery processes or will be taken to the acid sewer treatment plant for disposal.

3. Disposal of Contaminated Solid Material.

Up to the present time the only solutions which have been advanced here for the disposal of contaminated solid materials such as laboratory clothing, vessels and glassware, wood or other building material from wrecked laboratories, laboratory notebooks, and similar objects have been:

a. To bury the contaminated objects in fenced areas.

b. To seal the contaminated objects in steel containers and from time to time send these containers by truck to the seaboard, there to be put aboard ship and dumped into the ocean far from shore.

The first solution is obviously a temporary expedient because it offers only the prospect of larger and larger fenced areas containing within them a variety of exceedingly long-lived radio active elements that may be easily leached away by sub-surface water seepage, and such areas are, of course, useless henceforth for any other purpose. The second solution is more practical, and yet as laboratories and plants utilizing and working with radioactive materials multiply all over the country, the net problem of disposal will grow accordingly and the system will become both cumbersome and annoying.

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Disposal of Contaminated Wastes at the Los Alamos Laboratory

For this reason we are currently working on the preliminary design of a destructor which will include a receiving and crushing vessel or room, a gas or oil-fired incinerator and a two stage filter through which the flue gases must travel on their way to the high stack which will be necessary. The destructors will be capable of handling all except metal objects. It will burn, severely char, or decompose into small pieces any contaminated objects of paper, cloth, wood, plastic, or building board which may from time to time be placed within it. The ashes and the precipitated flue dust will be fed by a screw drive into a mixing chamber where cement and small aggregate will be added to make a concrete block of some desired size. Quite conceivably, the dried coagulant from the contaminated liquid treatment plants might well be added to the mix before the cement is added. These blocks could from time to time be encased in steel containers and disposed of at sea as mentioned above. Because of the reduction process employed, there will perhaps be only two or three percent of the number which would have had to be disposed of had the material not first been burned.

Submitted_____

G. L. Williams