LOS ALAMOS SCIENTIFIC LABORATORY
UNIVERSITY OF CALIFORNIA
LOS ALAMOS, NEW MEXICO 87544

OFFICE MEMORANDUM

TO : File

DATE: November 18, 1974

FROM : John L. Warren, H-8

SUBJECT : AREAS OF CONCERN AT TA-35 TO WASTE MANAGEMENT

SYMBOL : H8-WM-336

1487
TA 35

On 11/8/74 a meeting was held for the purpose of obtaining information on and discussing possible solutions to several WMT related problems at TA-35. Specific topics discussed included the buried Na-tanks, the LAMPRE-1 reactor, and the buried LAPRE reactor shell. Attending were the following people:

John Warren, H-8
Merl Wheeler, H-8
Margaret Anne Rogers, H-8
Art Tegtmeier, ENG-4
Tony Garcia, H-1
John Gallimore, H-1
Al Valentine, H-1
Earl Swickard, L-1
C.W. Christenson, H-7
Dean Meyer, consultant
Ken Sierecki, H-3

The following information was obtained.

LAMPRE-1 REACTOR

LAMPRE-1, located in the basement of TA-35-2, was a Na-cooled Pu-fueled reactor which was operated until about 1964. Piping for the Na-coolant was stainless steel. During operations, two of the Pu-fuel capsules ruptured, thus allowing the molten Na-coolant to contact the Pu. Studies carried out showed Pu-solubility in molten Na to be < 1 ppm. There is some possibility, however, that some Pu-oxide particulate became dispersed in the sodium.

In about 1964 the reactor was deactivated and the Na-coolant was removed and placed into the buried "Na-tanks" at TA-35. The reactor shell structure remains in place, however. This consists of a tank type structure approximately 10' - 12' long by~2' diameter, surrounded by a large number of carbon rods approximately 6' long by 4" diameter. Radiation levels range from about 5 R/hr at the top of the reactor around the graphite rods, to about 100 mR/hr or more near the floor opening above the reactor. Upon visiting the site, people were observed routinely working near this area.

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It is estimated that between 10 and 200 g of Pu are in the bottom of the reactor, along with some small amount of sodium. The estimated cost to remove, cleanup, and properly dispose of the reactor and associated hardware is $80K. The walls of the reactor room likely are contaminated (neutron activation) to some as yet unknown level. Associated with the reactor clean-up would have to be removal of pipes and cables extending into adjacent rooms.

Na-Tanks

Near the canyon edge below a small structure (TA-35-43) in each of two burie "tanks" is about 30-40 gallons of sodium that was drained from the LAMPRE reactor. To construct the "tanks", two approximately 120' deep well casings were drilled, about 2'-3' apart. This depth corresponds approximately to the floor of the adjacent canyon. The wells are cased with ~ 8" ID mild steel pipe. There is not a sealed bottom to the wells.

The Na-tanks are suspended inside the cased wells. These consist of ~ 5" OD thin wall stainless steel (probably 304SS) pipes. Inside of this 5" pipe, and extending almost to its bottom, runs a ~ 1" SS tube that was used for the transport of the sodium. This pipe was heated.

Contaminants in the sodium include the following: ^{239}Pu - probably < 1 ppm, but possibly including some particulate Pu-oxide; ^{22}Na ($t_{1/2}$ = 2.6 years - only 5-10% of original remaining); ^{60}Co ($t_{1/2}$ = 5.26 years - approximately 1/2 remaining; $^{59}Ni/^{63}Ni$ - very small amounts. Radiation levels measurable at the tops of these tanks are about 10 mR/hr. (Note: Dean Meyer indicated that he thought there were γ-spectra available for the sodium; several other people questioned this. H-1's records were to be looked through.)

The two tanks were each filled about 1/2 full with the sodium. Prior to the filling they were He-leak tested; after filling the remaining space was backfilled with N_2 under positive pressure.

It was felt that the spaces between the well casings and the SS - Na-tanks could and should be checked for the presence of any significant amounts of water. This could be done using a "conductivity probe;" it was not decided who would do this, or when. It was also mentioned that considerable amounts of clean sodium are buried - under sand - in shafts at Area C.

The general consensus at the meeting was that the sodium should be left in place; the LAMPRE reactor shell itself presents a much more serious concern. The structure over the tanks should possibly be replaced, however, with a more permanent facility. Access to the tanks should be maintained in the event removal is deemed necessary at some future time. It was felt that removal of the sodium should not be attempted unless some means of reacting or inerting the material is available.

The area in and around the tank structure was to be completely cleaned, and an ENG-3 lock was to be put on the structure door. Earl Swickard was to see if he could find the original drawings for the tank construction.

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LAPRE-II Reactor

Located approximately south of Bldg. 2, buried below an asphalt pad, is the shell of the former LAPRE-II reactor. The reactor core was ^{235}U fueled, the fuel having been removed. The "core" vessel is about 2' in diameter, and is located inside of an ~ 8' heavy wall SS vessel. When buried, the space around the "core" inside of the outer vessel, was filled with sand. The top of the outer vessel was capped, and the entire vessel then buried in place, about 8' below ground level. An asphalt covering was then placed over the area. The reactor is still considered to be "very hot." Inside of the reactor still is ~ 50 kg of gold, used originally as a corrosion resistant lining of internal parts. The gold still is very highly radioactively contaminated.

Associated with LAPRE-II and buried some short distance away is a fuel "reservoir." This is a Cu-lined SS tank approximately 1' in diameter by 14' long. This tank would not be activated, but is contaminated with residual fuel and associated contamination. A pipe connecting the reservoir to the reactor still is in place.

Earl Swickard indicated that he would find original Engineering drawings of these facilities.

Also in this area is another "shallow pit" used to dispose of some noncontaminated materials and equipment. Another small structure is the LAPRE-II "pump pit" (TA-35-28). This is not contaminated.

JLW:jc