Finding of No Significant Impact
for
Tank 241-C-103 Organic Vapor and Liquid Characterization and
Supporting Activities at the Hanford Site, Richland, Washington

Agency: U.S. Department of Energy

Action: Finding of No Significant Impact

Summary: The U.S. Department of Energy (DOE) has prepared an environmental assessment (EA), DOE/EA-0881, to assess the environmental impacts associated with organic vapor and liquid characterization for Tank 241-C-103 and activities needed to support this work at the Hanford Site, Richland, Washington.

Tank 241-C-103 is a single-shelled tank located in the 241-C tank farm in the 200 Area on the Hanford Site. Operations at the tank have been curtailed due to unresolved concerns about potential flammability and noxious or toxic vapors that might be associated with a layer of organic waste in the tank. DOE proposes to sample the vapor space and the floating organic layer in the tank to gain information needed to resolve the safety questions associated with the presence of organic wastes in the tank so that normal operation of the tank can be resumed.

Based on the analysis in the EA, DOE has determined that the proposed action would not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act (NEPA) of 1969, 42 U.S.C. 4321, et seq. Therefore, an environmental impact statement (EIS) is not required.

Addresses and Further Information:

Single copies of the EA and further information about the proposed project are available from:

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For further information regarding the DOE NEPA process, contact:

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Proposed Action: DOE needs to take action to obtain information relative to unreviewed safety questions concerning Tank 241-C-103. The information is required to assess the risk to workers and the public from uncontrolled release of noxious or toxic vapors, and releases of radionuclides that could potentially be caused by combustion of the liquid organic layer in the tank. DOE also needs to take action to ensure safe tank operating conditions.

The proposed action would involve sampling the vapor space and organic layer in Tank 241-C-103 and measuring the thickness of the organic layer to gain information needed to address the flammability and/or noxious or toxic vapor issues that might be associated with the organic material in the tank. DOE also proposes to conduct other activities to support the sampling task and to ensure safe operating conditions, including: routine tank vapor space surveillance activities; instrument calibration; preventive maintenance;

installation and removal of small scale components; breather filter testing; installation and removal of equipment for above ground facilities; installation and operation of a portable exhauster; small volume waste additions to the tank; and other activities that would not alter vapor space flammability.

All sampling activities would take place inside a HEPA filtered greenhouse. The vapor space sampling would begin by using a vacuum pump to draw tank vapors through tubes filled with compounds designed to absorb the organic materials. Further sampling would be contingent on finding that the tank's fuel loading is less than 25 percent of the lower flammability limit for the mixture of gases, vapors, and aerosols present. Vapor space sampling would continue by collecting vapor from points upstream and downstream of the tank's high efficiency particulate air (HEPA) filter using partially evacuated canisters. Finally, vapor samples would be collected through a heated sampling tube and analyzed.

The organic layer would be sampled by manually lowering a weighted and stoppered glass bottle into the organic layer and removing the stopper, allowing the bottle to fill with liquid. The bottle would be pulled to the surface by a worker wearing protective gloves, sealed with a screw on cap, and washed down with warm water inside the tank riser. The sample would then be checked for radioactivity, placed in a plastic bag and a protective container, and transported to an analytical laboratory for analysis.

The depth of the organic layer would be determined by lowering an electrode containing probe attached to a measuring tape through the air and the organic layer and into the liquid layer below. The thickness of the organic layer would be indicated by the change in electrical resistance when the probe contacts the organic layer and later enters the liquid below the organic layer. The resistance would be measured with a battery powered ohm meter. The probe would be washed down with warm water inside the tank riser before being retrieved and monitored for radioactivity to determine whether it could be reused or must be disposed of as waste.

Alternatives: No reasonable alternatives for obtaining needed information regarding safety issues and ensuring safe operating conditions for Tank 241-C-103 were identified. Intrusive methods that would involve a high energy input into the waste or methods that might affect or increase the flammability of the organic layer were rejected due to the potential for ignition.

Under the No Action alternative DOE would be unable to obtain the information needed to review safety questions and could not adequately investigate mitigation measures to minimize the risks associated with a tank fire or worker exposure to noxious or toxic vapors. Routine tank operations would be suspended indefinitely.

Environmental Impacts:

Routine Operations. Workers involved in sampling activities would wear protective clothing and breathe supplied air, and would be protected from

vapor releases and small spills. Noxious or toxic vapors would be diluted below danger levels within the 28 foot radius where workers would be required to use supplied air, and individuals outside that radius would not be adversely affected by noxious or toxic releases. Any minor radioactive spills would be filtered and dispersed by the HEPA filtered greenhouse. Resulting radiation doses to workers and the public outside the greenhouse would be extremely small. No health effects are expected to result from the conduct of the routine operations examined here.

Wastes generated by the proposed action could include sampling equipment that was introduced into the tank and possibly tools, rags, clothing, and other items used for cleanup. This waste would be disposed of at existing disposal sites.

The proposed action would not affect endangered or threatened species or cultural or historic resources.

Potential Accidents. The EA analyzed a range of reasonably foreseeable accidents, including a noxious or toxic gas release, a dip-sample bottle break outside the tank, radiation exposure from a gas sampling tube, a lightning strike that ignites organic vapors in the tank, and a vapor space fire and subsequent burn of the liquid organic layer in the tank. The accident with the highest probability of occurrence (probability of about 1 in 100,000) is the dip-sample bottle break, which would increase worker exposure to radiation, but would not be expected to result in any adverse health effects.

The noxious or toxic gas release (estimated probability of occurrence of 1 in 1,000,000) and radiation exposure from gas sampling tubes (estimated probability of occurrence of 2.5 in 1,000,000) would not result in any adverse health effects to workers due to the use of protective clothing and supplied air in the vicinity of the sampling, and would have no impact on the public.

The remaining two accident scenarios involving ignition of flammable materials in the tank each have an estimated probability of less than 1 in 10 million. DOE does not have sufficient information to quantify the consequences of these accidents since one purpose of the proposed action is to obtain the needed information. However, the consequences of these accidents would be no greater than those projected for a ferrocyanide tank explosion in the 1987 Environmental Impact Statement, Disposal of Hanford High-Level, Transuranic and Tank Wastes, (DOE/EIS-0013). The 1987 EIS projected that such an explosion would result in a short-term radiation dose of 200 millirem to the maximally exposed member of the public, and an offsite collective dose commitment of 7,000 person-rem. Such an explosion would be expected to result in 4 offsite latent cancer fatalities, the contamination of a substantial area of land, and large doses to workers. A 1990 General Accounting Office study estimated that the consequences of the ferrocyanide tank explosion could be 10 to 100 times greater than those projected in the 1987 EIS. The GAO study did not reach a conclusion regarding the probability of a tank explosion. In view of the extremely low probability of occurrence for these accidents, even if the severe consequences of a ferrocyanide tank explosion projected by the GAO are assumed, the risks posed to the environment and human health by this potential accident are small.

Cumulative Impacts. Potential impacts of the waste characterization activities in Tank 241-C-103 would not contribute substantially to the cumulative impacts at the Hanford Site. The proposed action would not increase radioactive and chemical emissions and would not have a significant cumulative effect on workers or the general public. The wastes generated by the activities would not add substantially to waste generation at Hanford.

Determination: The proposed sampling of the vapor space and organic layer in Tank 241-C-103 and measuring of the thickness of the organic layer does not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of the NEPA. This finding is based on information and analyses in the EA. Therefore, an environmental impact statement is not required for this proposed action.

Issued at Washington, D.C. this 10th day of August, 1992.

Peter N. Brush
Acting Assistant Secretary
Environment, Safety and Health