1753

G-000-101.36

ACTION DESCRIPTION MEMORANDUM PROPOSED INCREASE IN THE NUMBER OF LOW-LEVEL WASTE SHIPMENTS FROM THE FEED MATERIALS PRODUCTION CENTER TO THE NEVADA TEST SITE

06/01/87

8
ATTACHMENT

[redacted]

1753

ACTION DESCRIPTION MEMORANDUM

PROPOSED INCREASE IN THE NUMBER OF LOW-LEVEL WASTE SHIPMENTS FROM THE FEED MATERIALS PRODUCTION CENTER TO THE NEVADA TEST SITE

Fernald, Ohio

June 1987

U.S. DEPARTMENT OF ENERGY

THE PROPOSED ACTION

The U.S. Department of Energy (DOE) proposes to increase the number of shipments of low-level radioactive waste from the Feed Materials Production Center (FMPC) near Fernald, Ohio to a disposal facility at the Nevada Test Site (NTS) near Las Vegas. Shipments will change from the present one per day to a maximum of five per day, or from approximately 320 to 1600 annually. The increased number of shipments will be necessary because of (1) increased production at FMPC, with a corresponding increase in the volume of low-level waste generated, (2) a backlog of low-level waste in onsite storage, and (3) an unanticipated volume of demolition waste being generated by plant improvement and renovation activities. The proposed five-fold increase in shipment rate thus stems from an increase in waste volume over that assessed previously plus an accelerated clean-up schedule for the waste storage areas at FMPC.

The environmental impacts of shipping low-level waste from FMPC to NTS at the rate of 320 shipments annually were previously examined in an environmental assessment (EA) prepared by DOE for a proposed Low-Level Waste Processing and Shipment System (LLWPSS) at FMPC (DOE/EA-0260, May 1985). The EA concluded that no significant impacts would result from shipment of low-level waste from FMPC to NTS, and a Finding of No Significant Impact (FONSI) was issued by DOE on June 10, 1985.

According to the EA, during the interim three-year period prior to completion of new processing facilities, all FMPC-generated low-level waste would be treated and compacted using existing equipment, appropriately packaged, and transported by commercial carrier (truck) for disposal at NTS. Packaging and transport would be in accordance with U.S. Department of Transportation regulations (49 CFR 173, Subpart I and 49 CFR 177). The wastes shipped to NTS would also be required to meet NTS waste acceptance criteria. As stated in Sect. 1.1 of DOE/EA-0260, because the NTS does not accept hazardous waste material as defined in 40 CFR 261, no radioactive waste mixed with hazardous waste materials will be included in the shipped materials.

Since the EA was finalized, shipments to NTS have been made as planned, but because of the increased volume of wastes being generated, more frequent shipments are expected. As a result, the impacts described in DOE/EA-0260 that would result from transportation may change.

AFFECTED ENVIRONMENT

The FMPC is located in a rural area about 32 km (20 mi) northwest of Cincinnati, Ohio (Figure 1). The low-level waste will be transported by truck from FMPC to NTS, probably using the following route: Ohio State Highway 128 south to Interstate 74, then west to the Interstate 465 Bypass around Indianapolis, then west on Interstate 70 to its terminus in Utah, preferably utilizing the bypasses around the cities of St. Louis, Kansas City, and Denver. The remaining segment consists of Interstate 15 to Las Vegas, Nevada, and U.S. Highway 95 to the federally-owned Nevada Test Site. This route is 3,273 km (2,034 mi) in length.

The actual routing of shipments may vary with weather and highway conditions. Also, some local and state restrictions pertaining to radioactive material transport may affect route selection, particularly in congested metropolitan areas. The carrier is responsible for selecting the appropriate route, and it is DOE policy that the carrier's route selection conform to applicable federal, state, and local regulations.

POTENTIAL ENVIRONMENTAL CONSEQUENCES

Although no significant impacts were predicted to result from 320 annual shipments of low-level waste from Fernald to NTS (DOE/EA-0260), and none have occurred thus far, the major area of concern was the radiation dose received by cargo handlers, truck drivers, and the general public along the transportation route. An assessment of the radiological impacts of transportation considering a fivefold increase in the number of shipments to about 1600 per year is provided below.

Before the number of shipments is increased, written approval from NTS for accepting the waste will be obtained. Acceptance of the increased FMPC

ORNL-DWG 86-12932R

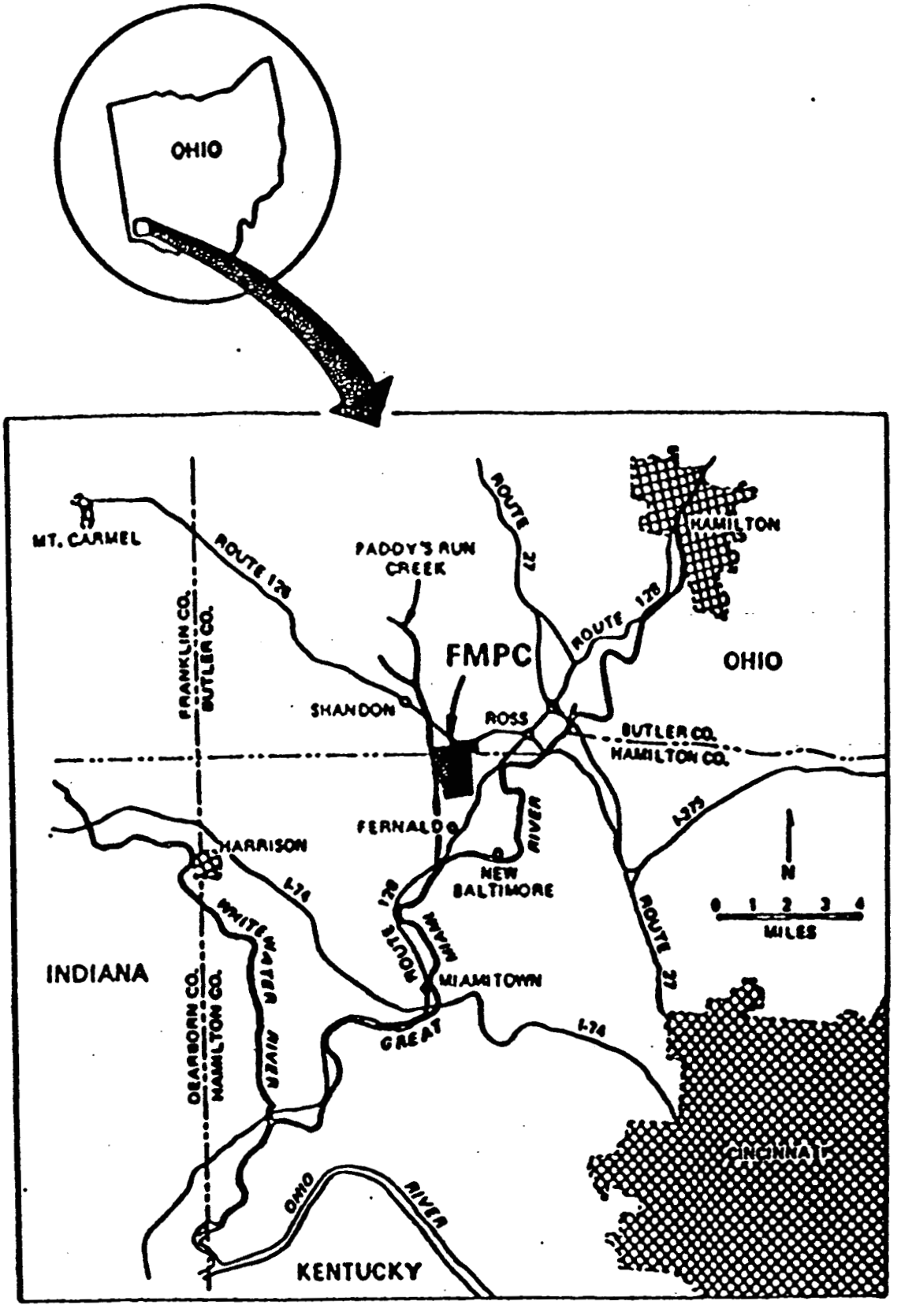

Figure 1. Regional location of the Feed Materials Production Center near Fernald, Ohio.

waste volume by NTS would indicate that the greater volume of waste can be handled as part of normal operations at the site. The environmental impacts of NTS operation are addressed in an Environmental Impact Statement (EIS) for the site (ERDA 1977).

Low-level waste transport has the potential to impact cargo handlers, truck drivers, and persons living along or travelling on highway transportation routes. During transportation, the direct radiation dose received by the handlers, the drivers, and the public is minimized as a result of Department of Transportation (DOT) regulations (49 CFR, Part 173.441). The dose to cargo handlers is minimized by a maximum permissible radiation level at the external surface of the waste containers of 200 millirem/hr. Based upon actual measurements, the FMPC waste drums and other containers have surface radiation levels of 1 to 5 millirem/hr (DOE/EA-0260). Because the trucks will be fully loaded (exclusive use) and probably locked, the containers are not expected to be handled between FMPC and NTS, and cargo handlers should not be exposed to any radiation from the containers during shipment.

The annual dose that may be received by the drivers is minimized by a DOT dose rate limit of 2 millirem/hr in the truck cab and by the low probability of a given driver making a large number of repeat trips from FMPC to NTS. In the previous assessment, the drivers were estimated to receive an annual dose of 216 millirem based on a specific carrier's evaluation that their drivers would haul only one load per month and that the dose rate in the cab would be about 0.4 mrem/hour (as measured). Impacts were found to be not significant because the estimated total annual dose to the drivers would be less than the 500 millirem/yr permitted by DOE regulations [DOE order 5480.1(a)] for unmonitored individuals in uncontrolled areas (drivers for the carrier currently used to transport waste to NTS do not wear badges for monitoring radiation exposure).

For the increased waste shipment rate, drivers could be making more frequent trips, and thus a given driver could receive a higher annual dose than that calculated previously. The dose rate is measured in the cab of each loaded truck before it leaves FMPC for NTS to ensure compliance with the

DOT dose rate limit; measurements are typically in the 0.3-0.5 mrem/hr range (C. Block, Westinghouse Materials Company of Ohio, personal communication with D. B. Hunsaker, Jr., ORNL, January 13, 1987). Each delivery to NTS from FMPC takes about 45 hours. After delivering the low-level radioactive waste to NTS, the drivers are then sent to other locations in the western U.S. to pick up commodities for shipment to the Cincinnati area (i.e., drivers do not return immediately to FMPC with an empty carrier to pick up another load of waste). Assuming that the average dose rate in the cab is 0.4 mrem/hr, that each round trip takes an average of about 2 weeks, and that there are 48 working weeks per year, the dose to each driver would be about 432 mrem/yr, which is less than, but close to, the 500 mrem/yr limit.

To ensure compliance with DOE order 5480.1(a), a simple dose tracking system will be implemented at FMPC in which a log is kept of drivers' names and dose rates measured in the cab for each of their trips. Multiplying the dose rate by an assumed trip time (e.g., 45 hrs) would produce a total dose for the trip. An annual cumulative dose could be logged for each driver by adding computed doses for each trip, which could then be compared against the 500 mrem/yr standard. Carriers could be notified when computed dose rates for the drivers are approaching the annual standard, so that the drivers would not be reassigned to this hauling.

The dose to the general population is minimized by the 200 millirem/hr dose rate at the vehicle surface and 10 millirem/hr dose rate at 2 m (6.6 ft) from the vehicle specified in the DOT regulations. The measurements at FMPC indicate that the dose rate at 2 m from the loaded trucks is about 1 millirem/hr. The dose rate at 50 m from the trucks (the probable distance of the nearest resident) would be less than 0.1 millirem/hr for a few seconds each time a truck passed. Therefore, the dose to an individual resident would be expected to be less than 1 millirem/yr as a result of 1600 trucks/yr passing a given location. Occupants of other vehicles could be near one of these trucks for several minutes, but because they are only randomly expected to be near one of the trucks, their annual dose would also be expected to be less than 1 millirem. The general population dose will increase with the increased number of waste shipments, but, from the above analysis, is

expected to be less than 1% of the dose received from natural background radiation.

During transportation of low-level waste a release of radioactive materials is possible should an accident occur. The estimated probabilities of occurrence and associated consequences are of interest. In DOE/EA-0260, the likelihood of a transportation accident with an accidental drum rupture resulting in the release of radioactive waste was estimated to occur at the rate of 0.5 accidents per year. The worst-case scenario evaluated in DOE/EA-0260 for an accident with drum rupture assumed that 10% of the contents of a truckload containing 30% depleted uranium was spilled over 100 m^2 (about 0.25 Ci released). Surface contamination would be 2.5×10^{-3} Ci/m^2 and direct radiation exposure at 1 m would be about 1.5×10^{-2} millirem/hr. Inhalation of resuspended uranium from such an accident would result in a total-body dose of 6.2 millirem and a dose-to-lungs of 180 millirem to exposed individuals. These doses are equivalent to less than two years normal background radiation exposure, and are not significant. A fivefold increase in shipments would result in an estimated accident probability of 2.5 accidents per year, but the consequences of said accident would not change from those postulated in DOE/EA-0260. Because of this low probability of truck accidents, it is considered unlikely that any individual or group of individuals would be exposed more than one time to accidental releases of these low-level radioactive materials.

REFERENCES

DOE/EA-0260. Environmental Assessment of the Proposed Low-Level Waste Processing and Shipment System, Feed Materials Production Center, Fernald, Ohio. U.S. Department of Energy, May 1985.

Final EIS, Nevada Test Site, Nye County, Nevada; ERDA1551, U.S. Energy Research and Development Administration, September 1977.