UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

ENVIRONMENTAL ASSESSMENT

OF DISPOSAL OF VERY LOW LEVEL RADIOACTIVE WASTES

FROM HUMBOLDT BAY POWER PLANT

DOCKET NO. 50.133

The Pacific Gas and Electric Company (the licensee) has applied under the provisions of 10 CFR Part 20, section 20.302(a) for the approval of disposal of 5000 cubic feet of very low level radioactive wastes from Humboldt Bay Power Plant (HBPP). Two kinds of wastes are included: sludge from the wastewater treatment ponds and deposits from fossil fuel boiler fireboxes. These wastes have been classified as chemically hazardous wastes due to their metals concentrations. The licensee proposes to contract IT Corporation (ITC) to dispose of the wastes in ITC's disposal site in Benicia, California. The application and information on the disposal procedure were submitted to the staff in a letter dated April 25, 1985.

The three primary generating units at HBPP, Eureka, California, are the two fossil-fueled (oil and natural gas burning) Units 1 and 2, and the boiling-water nuclear reactor Unit 3. Unit 3 has been shut down since July 1976, and the licensee has applied for approval of a decommissioning plan under which components and spent fuel for Unit 3 would be stored onsite for up to 30 years, followed by removal of fuel and residual radioactivity.

The HBPP has two hypalon-lined concrete wastewater treatment ponds servicing fossil-fueled Units 1 and 2. The ponds were designed to process liquid wastes from boiler blowdown, metal cleaning, evaporator blowdown, and other low volume sources. Wastewater accumulated in the ponds is processed prior to discharge. Suspended solids settle out on the bottom of the ponds and form sludge. Due to the heavy metals concentrations in the sludge, the sludge is classified as hazardous waste following the guidelines prescribed in 40 CFR 261.24 and applicable sections of Title 22 of the California Administrative Code.

The licensee presents that the primary source of the radioactive contamination in the wastewater treatment pond sludge is a residual from the HBPP oily water separator (OWS) system. The sludge in the separator beds was found to have traces of radioactive contamination. The separator beds have been contaminated by the accumulation of low levels of radioactivity over a 20-year period. During normal operation, OWS effluent flows directly into the discharge canal. However, as sludge levels in the separator beds increase, carryover of solids occurs, occasionally exceeding National Pollution Discharge Elimination System (NPDES) limits. On such occasions of carryover, the OWS effluent was rerouted to the wastewater treatment pond.

In February 1984, the licensee applied for NRC approval to dispose of the OWS sludge at a hazardous waste Class I disposal site; the NRC found the disposal plan acceptable on May 7, 1984 and disposal was carried out in September 1984.

In July 1984, in preparation for wastewater treatment pond sludge disposal, the sludge from the smaller of the two ponds was transferred to the large pond and a composite sample was collected. The radiochemical analyses showed a slight radioactive contamination of the sludge.

The second type of waste included in the licensee's application is deposits in the fireboxes of Units 1 and 2, found contaminated with trace amounts of radioactivity. The licensee assumes that the radioactivity in the boiler fireside deposits is the result from many years of operation of a slow accumulation of very low level radioactive contaminants drawn in with the air supply for the fossil fuel combustion.

After transportation by tank truck to ITC's facilities, the sludge will be placed in evaporation ponds and evaporated to a suitable dryness. The resulting dried materials will be buried in ITC's Benicia hazardous waste landfill, as will the firebox deposits. Final coverage of the landfill will consist of a multi-layered, impervious, soil cover at least 30 inches thick.

The NRC staff has reviewed the potential pathways for radiation exposure to members of the general public from the radionuclides in the disposed sludge. These pathways include: (1) inhalation of contaminated dust, (2) ingestion of food grown on the disposal site, and (3) external exposure from standing on the ground above the disposal site. The dose to a member of the public resulting from exposure to radiation via these pathways is

estimated to be minimal due to the low concentrations of radionuclides in the sludge and access control at the site by means of fences and key card gate. These controls should prevent any significant exposure of the general public to radioactive materials from routine operations at the disposal site. In a similar manner, the dose to workers from inhalation of radionuclides, and from external exposure from standing on the ground above the uncovered dried sludge bottoms (see Table 1) is estimated to be a very small fraction of 1 year's exposure to natural background radiation (about 100 millirems for the State of California). After the 30 inches of soil is placed over the sludge, the annual dose would be an even smaller fraction of exposure to background radiation.

With regard to the nonradiological environmental impacts of the proposed procedure, the alternative of disposing of the material in a facility licensed for the disposal of low-level radioactive wastes would involve roughly equivalent impacts, i.e., transportation to the disposal facility and occupying a small fraction of the facility's capacity. It is judged that the difference in environmental impacts is insignificant.

Based on review of the licensee's submittal on the proposed waste disposal, the staff concludes that:

(1) the doses to members of the public as a result of exposure to radiation from the disposed waste are estimated to be well below

regulatory limits, and very small in comparison to doses members of the public receive each year from exposure to natural background radiation.

(2) the doses to the workers involved in the sludge disposal are estimated to be small compared to exposure to natural background radiation.

(3) The nonradiological environmental impacts of the proposed procedure are minor and are not extraordinary in any characteristic.

Table 1. Estimated Doses to Workers from Uncovered Dry Wastes

Nuclide	Concentration in pCi/g WTPS[c]	FD[c]	Total Activity (mCi)	Doses in mrem External[a]	Inhalation[b]
Co-60	1.1	0.52	0.051	0.34	1.1×10^{-4}
Cs-134	0.13	0.03	0.0043	0.03	2.1×10^{-7}
Cs-137	6.1	0.39	0.15	0.41	7.9×10^{-6}
U-233, U-234	1.2	1.2	0.094	-	9.3×10^{-3}
U-238	0.94	1.3	0.092	-	8.0×10^{-3}
Pu-238	0.008	0.009	0.0007	-	2.2×10^{-4}
Pu-239, Pu-240	0.024	0.009	0.001	-	5.6×10^{-4}
Total				0.8	<0.1

a. Radiation dose to the total body of a person standing 100 hours per year in a large area contaminated with these concentrations. After the cover materials are placed over the waste, the dose rate would be reduced by a factor of about 100 based on the approximate attenuation coefficient of 0.06 cm^2/g (Radiological Health Handbook, Jan. 1970, p. 139).

b. Committed lung dose from inhaling for 100 hours per year dust-laden air containing 1 mg/m^3 respirable particles with the higher radionuclide concentrations of the two waste types.

c. WTPS = waste treatment pond sludge.

FD = Firebox deposits.