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RADIOACTIVE AND HAZARDOUS CONSTITUENTS
SCREENING PLAN FOR
INDUSTRIAL WASTE LANDFILL IV

Waste Management/
Decontamination and Decommissioning Division
Waste Transportation, Storage, and Disposal
Operations Department

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TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES	1
I. INTRODUCTION	1
II. CONTROLS	2
A. General	2
B. Access Control	2
C. Radioactive Constituent Screening	2
D. Hazardous Constituent Screening	4
E. As-Delivered Inspections	6

LIST OF FIGURES

<u>Table</u>	<u>Page</u>
1. HP Instrument Information for Radiological Surface Screening	3
2. Surface Contamination Guidelines	5

I. INTRODUCTION

Industrial Waste Landfill IV (IWLF IV) is permitted (Registration Number IDL 011030075) to accept nonhazardous, nonradioactive industrial waste as detailed in the "DESIGN AND OPERATING PROCEDURES FOR THE Y-12 INDUSTRIAL WASTE LANDFILL IV," Y/TS-399 and by Tennessee Department of Environment and Conservation (TDEC) special waste approval. Both are approved by the TDEC.

II. CONTROLS

A. GENERAL

Several controls have been established and will be used to prevent the disposal of non-permitted wastes. Specific conditions for controlling access, screening incoming wastes, and inspecting wastes are summarized below. The generator is responsible for the characterization and identification of any material being discarded as waste. This information is documented on a waste disposal request form. The information is reviewed by designated personnel, including the generator's environmental officer who provides his/her signature of approval on the form.

B. Access Control

IWLF IV is located in a secured area of the Y-12 Plant. Access is controlled by a 10-foot-high chain link fence topped with three strands of barbed wire. Access is provided through locked entrance gates controlled by the Y-12 Safeguards and Security. Only authorized personnel are allowed access to perform tasks associated with environmental monitoring, operation, maintenance, and inspection of IWLF IV.

C. Radioactive Constituent Screening

NOTE: Coal flyash shall not be subject to radioactive constituent screening since this material comes from non-radiological areas. This material was approved by TDEC on a minimal disposal basis to extend the life of Sanitary Landfill II until a replacement landfill is established. Alternative disposals in Y-12 Construction/Demolition Landfill VI and public landfills have been used. Flyash disposals in IWLF IV have been avoided.

Non-Radioactive Waste shall be waste which meets one of the following:

- Where applicable, process knowledge will be utilized to establish that wastes are not radioactive.
- Waste meeting the surface contamination guidelines established in the Department of Energy Order 5400.5, "Radiation Protection of the Public and the Environment."

- Waste having volumetric contamination of less than 35 picocuries per gram of total uranium. Reference: Letter to Tom Tiesler, Director, Division of Solid Waste Management, from Michael H. Mobley dated August 9, 1989, "Oak Ridge Drying Bed Sludge".

The generator evaluates all available information (i.e. administrative controls, historical process applications, and prior health physics evaluations) in determining the potential for radioactive contamination of waste. If contamination is suspected HP screening will be performed.

Two types of hand-held, portable radiation detection instruments are utilized by Health Physics (HP) personnel for the detection and measurement of surface contamination. The appropriate instrument for detecting alpha, beta, or gamma ionizing radiation is described in Table 1. In addition to physical measurements, HP personnel may perform material and process examinations to evaluate the potential for contamination and the adequacy of screening measurements.

Table 1
HP Instrument Information for Radiological Surface Screening¹

	ALPHA	BETA/GAMMA
Meter/Probe Combinations	ZnS Scintillator	GM Pancake
Direct Reading²	CPM	CPM
Range (DPM/100 CM²)³	250-1,000,000	600-15,000,000

¹These are the instruments most frequently used in the performance of HP screening on the Oak Ridge Reservation.

²Conversion factors are used to convert CPM to the contamination release limits which are in DPM/100 CM².

³This is a nominal range for Y-12 instrumentation. The actual range for an individual instrument may vary slightly.

DPM = Disintegrations per minute

GM = Geiger-Mueller

CPM = Counts per minute

ZnS = Zinc Sulfide

Surface contamination guidelines are provided in DOE Order 5400.5 (See Table 2). For off-site release, the Y-12 Plant utilizes the 5,000 dpm/100cm² (above background) average for "fixed plus removable" alpha contamination and 1,000

dpm/100cm² (above background) for "removable" alpha contamination as the acceptable limits for surface contamination. The limits for beta-gamma contamination are the same as for alpha.

In addition to the above controls, dumpsters and B-25 boxes are periodically run through the Trash Monitoring Station (TMS). The TMS employs sodium iodide gamma scintillation detectors to make a determination of depleted uranium contamination in waste. Currently, the limits of detection are calibrated at 120 plus or minus 70 grams of depleted uranium in a 12 cubic yard dumpster full of combustible trash.

Based upon the results of a pathways analysis to develop "below regulatory concern" (BRC) guidelines for "low-level waste development, demonstration, and disposal" (LLWDDD) projects, a mass of 900 grams of depleted uranium contained in a 12-cubic-yard dumpster would yield a maximum dose rate of 4 millirems per year in the disposal facility. These 900 grams, as compared to the 120 $\pm$ 70 grams being used for the limits of detection, demonstrate a significant degree or factor of safety. [Reference: "The Impact of Below Regulatory Concern (BRC) on the Low-Level Waste Development, Demonstration, and Disposal (LLWDDD) Strategy," D. W. Lee, presented to the Waste Management Advisory Committee, March 15, 1987, Chattanooga, Tennessee.]

D. Hazardous Constituent Screening

The identification of a material as being hazardous or nonhazardous is established by one or any combination of three methods available for the characterization of hazardous wastes. This is guidance disseminated to all generators by RCRA Compliance personnel.

- (1) Process Knowledge (PK): The waste generator may have a good working knowledge of the type of waste that he/she is generating and hazardous constituents associated with this waste. Process knowledge should be documented to the fullest extent possible for future reference.
- (2) Material Safety Data Sheet (MSDS): MSDSs provide information on chemical composition or characteristics such as flash point, Ph, and reactivity.
- (3) Laboratory Analysis: If process knowledge and/or the MSDS does not provide enough information upon which to base the characterization, a sample can be taken and analyzed. Analysis can include: flash point, Ph, Toxicity Characteristic Leaching Procedure (TCLP) analysis, or analysis for specific suspected chemical constituents.

Process knowledge or "process evaluation" is the predominant method of characterization; this can be supplemented with analytical data and/or MSDSs. Analytical data is a result of the performance of the TCLP. On September 25, 1990, the Extraction Procedure Toxicity test was replaced with the TCLP by the Environmental Protection Agency. For certain materials TCLP analysis is inappropriate and inconclusive, as they are homogeneous and have no compositional similarities with the TCLP compound list. These materials are characterized based on PK and/or MSDS.

Table 2
Surface Contamination Guidelines

<u>Radionuclides^{1/}</u>	<u>Allowable Total Residual Surface Contamination</u> (dpm/100 cm ²) ^{2/}		
	<u>Average^{3/·4/}</u>	<u>Maximum^{4/·5/}</u>	<u>Removable^{4/·6/}</u>
Transuranics, I-125, I-129, Ra-226, Ac-227, Ra-228, Th-228, Th-230, Pa-231.	300	900	20
Th-Natural, Sr-90, I-126, I-131, I-133, Ra-223, Ra-224, U-232, Th-232.	1,000	3,000	200
U-Natural, U-235, U-238, and associated decay product, alpha emitters.	5,000	15,000	1,000
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above. ^{7/}	5,000	15,000	1,000

- ^{1/} As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute measured by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.
- ^{2/} Where surface contamination by both alpha- and beta-gamma-emitting radionuclides exists, the limits established for alpha- and beta-gamma-emitting radionuclides should apply independently.
- ^{3/} Measurements of average contamination should not be averaged over an area of more than 1 m². For objects of less surface area, the average should be derived for each such object.
- ^{4/} The average and maximum dose rates associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at 1 cm.
- ^{5/} The maximum contamination level applies to an area of not more than 100 cm².

NOTE: The limits for transuranic radionuclides are not from 5400.5, but are approved for use at Oak Ridge National Laboratory.

E. Inspections Of Waste

Prior to approving waste for pick up and disposal, a facility technician will inspect waste that is not containerized. Containerized waste is periodically inspected prior to closure of the container. Wastes are visually inspected for free liquids, putrescible garbage, radioactive and hazardous waste identification tags and labels, or other unacceptable or unexpected items. Suspect waste will be segregated from acceptable waste and stored until adequate characterization information can be achieved. Based on positive identification, the waste will be managed accordingly.

Nonconforming items will be returned to the generator; the generator is responsible for identifying and implementing the corrective action necessary to resolve the nonconformance.