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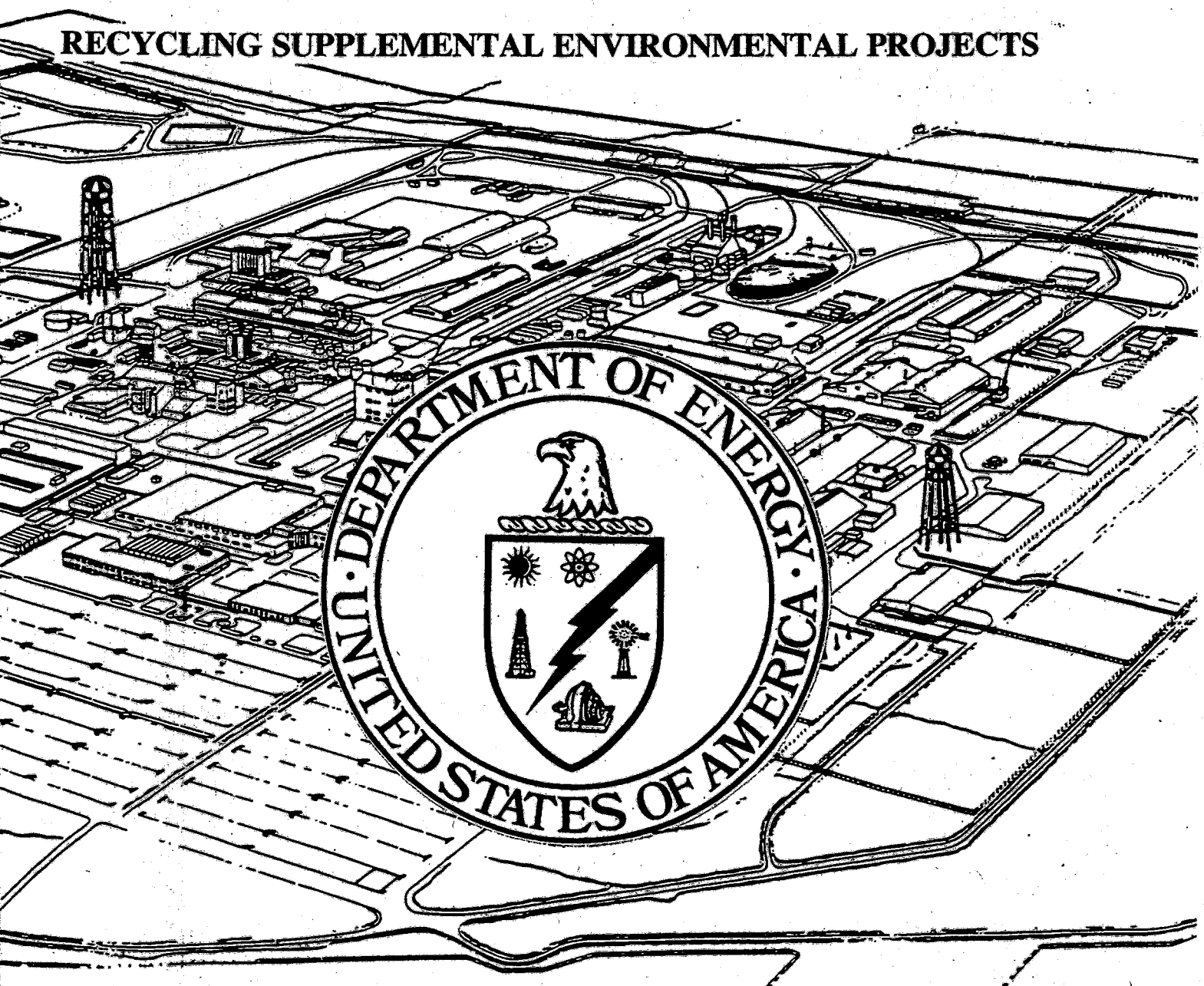
PROJECT COMPLETION REPORT

RECYCLING SUPPLEMENTAL ENVIRONMENTAL PROJECTS



APRIL 1999

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

U. S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

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DOCUMENT CONTROL NO. 31748-RP-0001 (REV. 0)

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RECYCLING SUPPLEMENTAL ENVIRONMENTAL PROJECTS (RSEP) PROJECT COMPLETION REPORT

TABLE OF CONTENTS

TABLES

ATTACHMENTS

1.0 INTRODUCTION

The Recycling Supplemental Environmental Projects (RSEP) activity was performed successfully in accordance with the requirements specified by the Work Plan Draft Final Document (DOE 1997). This report serves as the project completion report as required by the work plan.

Materials evaluated during project design for restricted and unrestricted release were based on process knowledge, Operable Unit 3 (OU3) remedial investigation sampling data and current radiological surveys. Further evaluation was conducted in the field to certify eligibility for unrestricted release per the criteria and testing established in the Certification Program for Release of Materials from the Fernald Environmental Management Project (FEMP).

Surfaces of the metal were surveyed using standard survey techniques applying the surface contamination release limits of DOE Order 5400.5 as shown in Table 1-1. Inaccessible areas of the metal to be released were evaluated on a case-by-case basis using available process knowledge and sampling data. Inaccessible areas that were potentially contaminated were assumed to exceed the limits for unrestricted release (unless the metal was disassembled to allow access for surveying) which supported the rationale that contamination of the inaccessible areas did not exceed the surface contamination release limits of DOE Order 5400.5.

1.1 METAL PROCESSING ACTIVITIES

Metal processing activities described in the Work Plan included decontamination of metal surfaces for recycling and or reuse of 600 to 1,000 tons of metal from the FEMP. This amount included several metal streams such as steel rail (including associated spike plates and spikes), shredded copper, metal pallets and miscellaneous items (e.g., containers and two propane tanks). The two primary methods used to decontaminate and release/reuse metal were the FEMP Material Release Facility (MRF) (vacuum grit blaster) and off-site recycling vendors under a basic ordering agreement (BOA). The various processing activities incorporated for recycling/reuse are described in the following subsections:

1.1.1 Material Release Facility - Steel Rail

One location used for steel rail decontamination and release of metal was the on-site MRF. The MRF utilized a vacuum grit blasting process to decontaminate the rail. Contamination levels on the rail were predominately in the 8-15K dpm fixed range, with the highest reading around 30K dpm. A total of 110 tons of steel rail was decontaminated using the site MRF system. Attachment 1 illustrates the process for decontamination of rail at the MRF.

TABLE 1-1 Surface Contamination Guidelines

Radionuclides[2]	Allowable Total Residual Surface Contamination (dpm/100 cm²)[1]		
	Average[3][4]	Maximum[4][5]	Removable[4][6]
Transuranics, I-125, I-129, Ra-226, Ac-227, Ra-228, Th-228, Th-230, Pa-231	Reserved	Reserved	Reserved
Th-Natural, Sr-90, I-126, I-131, I-133, 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

Footnotes for Table 1-1 (Surface Contamination Guidelines):

(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 subject.

(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.

(6) The amount of removable material per 100 cm2 of surface area should be determined by wiping an area of that size with dry filter or soft absorbent paper, applying moderate pressure and measuring the amount of radioactive material on the wiping with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. It is not necessaryto use wiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination levels are within the limits for removable contamination.

(7) This category of radionuclides includes mixed fission products, including the SR-90 which is present in them. It does not apply to SR-90 which has been separated from the other fission products or mixtures where the SR-90 has been enriched.

1.1.2 Off-Site Vendor - Steel Rail, Spike Plates & Spikes and Containers

Another location used for decontamination and release of steel rail along with spike plates, spikes and containers, involved an off-site recycling vendor. Prior to the recycling activity, vendors were prequalified by DOE using a BOA. The 277 tons of steel rail, 74 tons of spike plates, 6 tons of spikes and 10 tons of containers were shipped to the off-site vendor's facility for decontamination. A total of 367 tons of metal was decontaminated by the off-site vendor

and sold as scrap metal. Additionally, 262 galvanized steel pallets (which held the rail) were sent to the off-site vendor; these pallets are discussed in Section 1.1.4. Attachment 2 illustrates steel rail processing by the off-site vendor.

1.1.3 Shredded Copper

The off-site vendor shipped 199 steel drums of granulated copper, which were over-packed in 29 steel boxes, to their facility for recycling. The 29 steel boxes were emptied, surveyed and returned to the FEMP. The off-site vendor confirmed that the copper was not asbestos containing material via sampling. The off-site vendor conducted radiological surveys of the copper and the emptied drums for unrestricted use. A gross weight of 223,690 pounds of material was received (containers and copper), of which 191,618 pounds was the granulated copper. All of the copper weight received was successfully released for unrestricted use and recycled by the off-site vendor on the scrap copper metal market. Nearly half of the empty drums (88) had internal contamination in excess of the off-site vendor's release criteria (apparently from prior use) and were deemed tertiary waste. These drums were crushed and packaged for disposal as the off-site vendor's radioactive waste. The remaining 111 empty drums were released for unrestricted use. Attachment 3 illustrates the shredded copper processed by the off-site vendor.

1.1.4 Metal Pallets

In addition to the 262 pallets that accompanied the steel rail, another 1,002 galvanized steel pallets were shipped to an off-site vendor's facility. The galvanized steel pallets weigh approximately 280 pounds each for a total of 177 tons. Attachment 4 illustrates the metal pallets to be processed.

1.1.5 Miscellaneous Metals

Metal generated from the demolition of two propane storage tanks was to be included with the shipments to the off-site vendor. Initial radiological surveys conducted on the tanks prior to demolition indicated the tanks were within the free release limits for disposition. However, radiological surveys conducted on the metal debris after demolition indicated the free release limits for disposition could not be achieved. As a result, the debris from the propane tanks will be placed in the On-Site Disposal Facility (OSDF). Attachment 5 illustrates the processing of miscellaneous metals.

1.2 METALS IDENTIFICATION

A total of 750 tons of metal was recycled and released under the scope of the RSEP. Quantities of the metal streams which were recycled and released for unrestricted reuse are included in Table1-2.

TABLE 1-2 Metal Streams Identification

Material Description	Weight (lbs)	Weight (tons)	Disposition
Steel Rail (FEMP)	220,000	110	Unrestricted Reuse
Steel Rail (Off-site vendor)	714,000	357	Off-site vendor
Shredded Copper	191,618	96	Off-site vendor
Metal Pallets (qty:1264)	353,920	177	Off-site vendor
Containers (qty: 25)	19,625	10	Off-site vendor
Total	1,499,163	750	N/A

1.3 SECONDARY WASTES GENERATED

Secondary waste included a combination of steel grit blast and low level radiological rust from the MRF grit blasting process. A total of nine, thirty-gallon drums of residue were generated from the grit blasting of 110 tons of rail. The average drum weight is 623 pounds. Pending results of waste characterization, the secondary waste disposal location is anticipated to be the Nevada Test Site (NTS).

1.4 COST ANALYSIS

Table 1-3 lists the project cost breakdown for the RSEP. Costs for items included in the FEMP Baseline were specifically charged to the baseline and are not included below.

1.5 ALTERNATIVE TECHNOLOGIES

Laser Induced Fluorescence Imaging (LIFI) is an alternative technology which was evaluated during this project. The LIFI process involves directing a laser beam at a potentially contaminated piece of material. Any uranium contamination present on the material will fluoresce, or give off light at specific wavelengths when struck by the laser beam. The light is measured using a system of photomultipliers and photodetectors. The purpose of the LIFI evaluation was to determine if these light measurement data could be gathered and converted into an accepted measurement of contamination levels.

The advantage of this system over traditional measurement systems, was speed of operation. LIFI could effectively monitor pieces of material for free release many times faster than traditional GM detectors. The result would be significant cost savings for the project as a whole since radiological monitoring accounted for nearly half of the operating budget.

TABLE 1-3 Project Costs

Activity/Material	Quantity (tons)	Contract Cost	Labor Cost	Material Cost	Cost per Pound
Planning and Work Plan Development	N/A	N/A	$19,272	N/A	N/A
Upgrade MRF Compressor	N/A	N/A	N/A	$65,247	N/A
Steel Rail (FEMP)	110	N/A	$187,858	$26,138	.97
Steel Rail including containers (Off-site vendor)	367	$300,139	$238,375	$61,764	.41
Shredded Copper	96	$51, 840	N/A	N/A	.27
Metal Pallets	177	$21,600	+N/A	N/A	.08
Secondary Waste Treatment and Disposal	N/A	N/A	#$6,955	#$1,550	#$8,505
Project Closeout	N/A	N/A	$15,000 (estimated)	N/A	N/A
Total	**750**	**$373,579**	**$467,460**	**$154,699**	**.66**

costs reflect secondary waste disposal to the NTS
+ preparatory costs for shredded copper and metal pallets were changed to a baseline account

However, the LIFI system was not utilized because, tests at Fernald indicated it could not detect some oxidation states of uranium which existed at that time, especially when masked by the thin layer of rust on the nails. As a result, there were no alternative technologies used during this project.

1.6 FERNALD MATERIAL DISPOSITION ALTERNATIVES

The Decision Methodology for Fernald Material Disposition Alternatives is a procedural evaluation relating to disposition of waste material from the site. Alternatives for waste disposal include placement in the OSDF, off-site shipment to the NTS, off-site shipment to Envirocare, on-site recycle or off-site vendor recycle. Since this project was driven specifically by dollar amount rather than actual scope of work, the cost factor limited disposition choices to either on-site MRF or off-site vendor recycle. In the case of the RSEP, both methods of disposition were used.

2.0 CHRONOLOGY

December 9, 1997	Draft Final Work Plan document for Recycling Supplemental Environmental Projects is submitted to U.S. EPA and Ohio EPA.
January 15, 1998	Draft Final Work Plan document for Recycling Supplemental Environmental Projects is approved by the Ohio EPA.
January 22, 1998	Draft Final Work Plan document for Recycling Supplemental Environmental Projects is approved by the U.S. EPA.
March 30, 1998	Standard start-up review along with test run of actual rail grit blasting operation at FEMP MRF begins.
April 9, 1998	Standard start-up review of the grit blasting operation is completed.
April 13, 1998	Full production of grit blasting at the FEMP MRF is initiated.
August 11, 1998	The rail grit blasting task at the FEMP MRF is completed.
August 18, 1998	Shredded copper shipments to off-site vendor begins.
August 21, 1998	Shredded copper shipments to off-site vendor completed.
November 30, 1998	Off-site Vendor Final Report for shredded copper is issued.
January 25, 1999	Metal shipments to off-site vendor begins.
February 26, 1999	Final metal shipment is received at off-site vendor.

3.0 CONCLUSIONS

Completion of this recycling task satisfies the requirements of the Draft Final Work Plan for Recycling Supplemental Environmental Projects (December 1997).

4.0 REFERENCES

Draft Final Work Plan for Recycling Supplemental Environmental Projects, dated December 1997.

PHOTO 1: Material Release Facility - Steel Rail
#6868-D50

PHOTO 2: Off-Site Vendor - Steel Rail
#6868-D67

Attachment 2

PHOTO 3: Shredded Copper
#6780-1

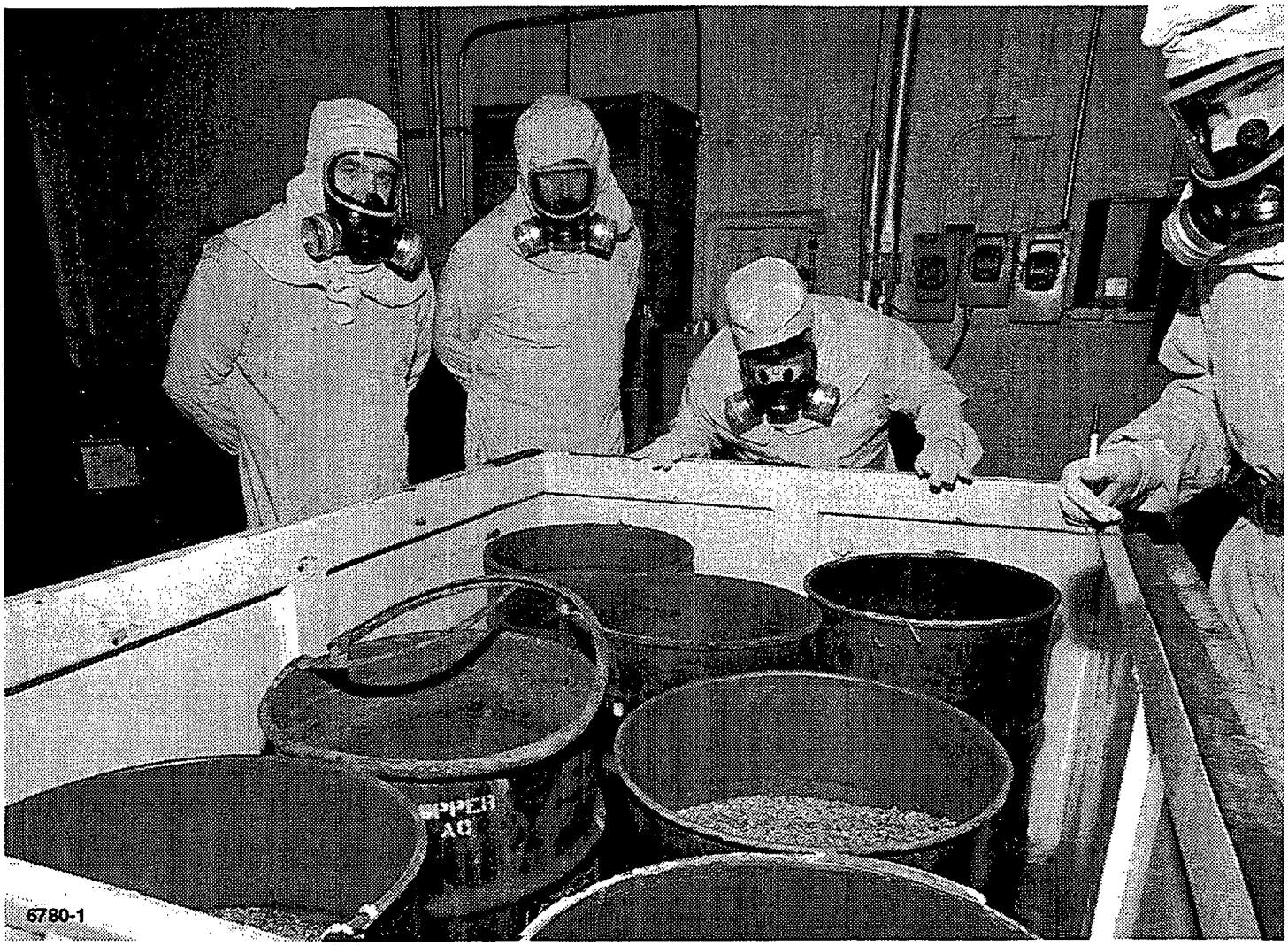

PHOTO 4: Metal Pallets
#7087-D3

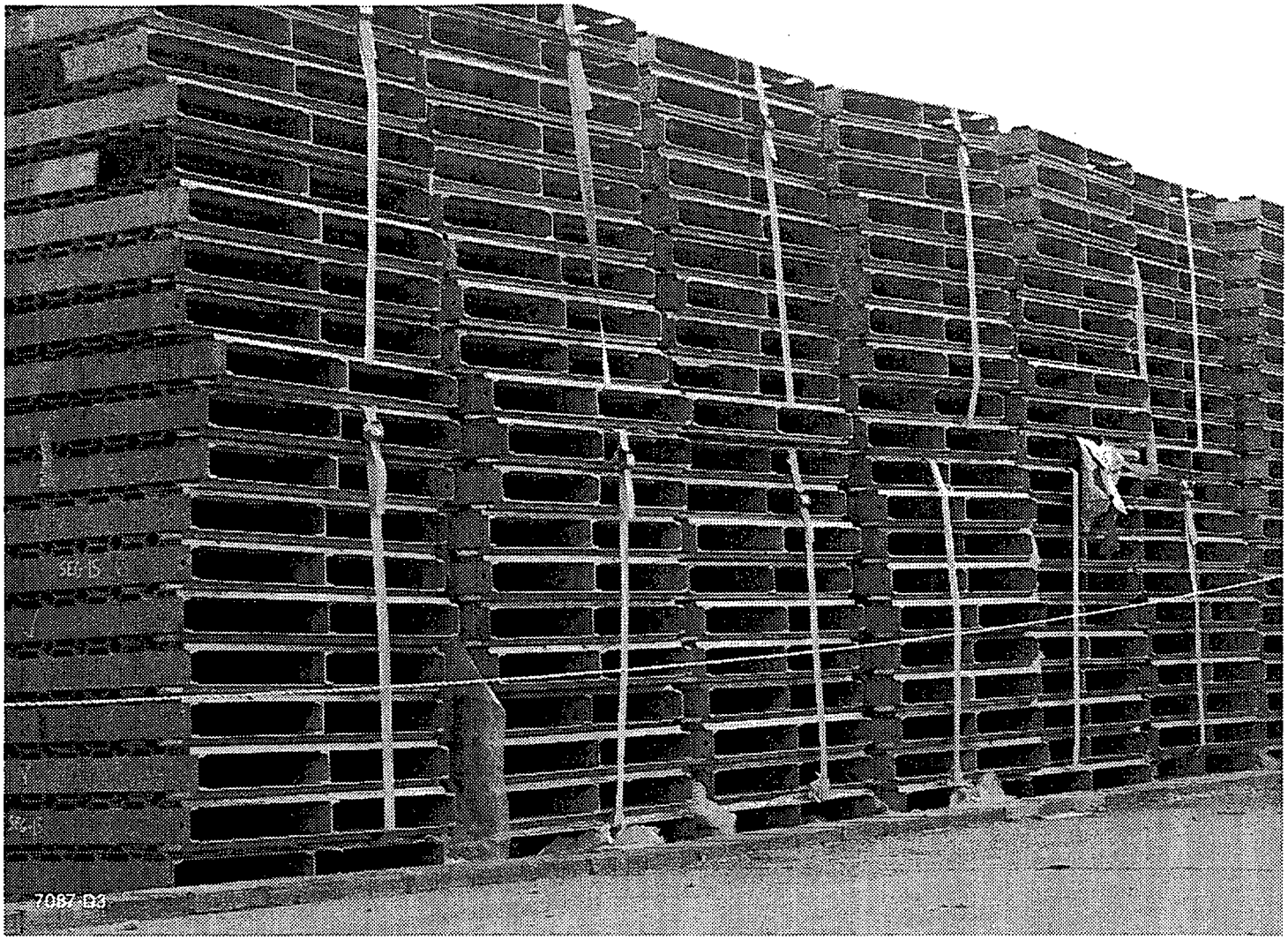

PHOTO 5: Miscellaneous Metals - Propane Tanks
#6950-54