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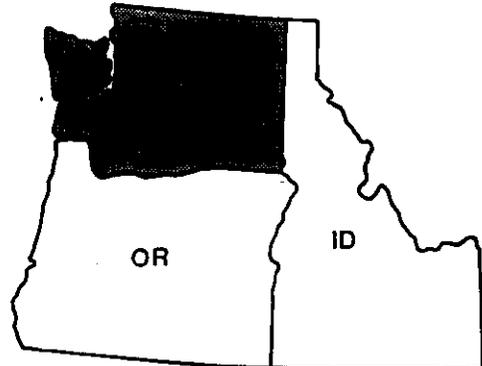
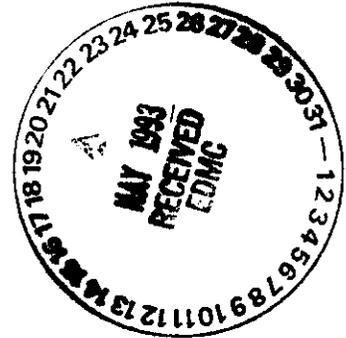
Research and Development

AERIAL PHOTOGRAPHIC ANALYSIS OF ROCKWELL HANFORD OPERATIONS AREA 1100 NW Richland, Washington



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EPA Region 10



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AERIAL PHOTOGRAPHIC ANALYSIS OF ROCKWELL HANFORD OPERATIONS
AREA 1100 NW

Richland, Washington

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NOTICE

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ABSTRACT

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This report presents the results of a historical aerial photographic analysis of the Department of Energy, Rockwell Hanford Operations Area 1100 NW disposal site located approximately 5 miles north of Richland, Washington. Disposal area 1100 NW covers approximately 461 acres and is approximately 1.5 miles west of the Columbia River. Three selected dates of photography acquired over a 26-year period (1948-1973) were used to perform the analysis. The disposal site is being investigated by the U.S. Environmental Protection Agency's Region 10 office under its CERCLA program. This report will assist field investigators in evaluating the scope of waste disposal activity at the 1100 NW site.

The 1948 photograph showed the disposal site consisted of an excavated area covering approximately 8.5 acres. A large pit containing solid waste was on the south side of the excavated area. By 1964 the excavated area had expanded to approximately 22 acres and the original disposal pit had been closed. Several smaller trenches and pits were present. The 1973 photography revealed a new, large disposal trench partially filled with solid waste, in the southwest portion of the excavated area.

The U.S. Environmental Protection Agency's Environmental Monitoring Systems Laboratory in Las Vegas, Nevada, prepared this report for the Agency's Environmental Services Division in Region 10 at Seattle, Washington and the Office of Emergency and Remedial Response in Washington, D.C.

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INTRODUCTION

This report presents the results of a historical aerial photographic analysis of the Department of Energy, Rockwell Hanford Operations Area 1100 NW disposal site located approximately 5 miles north of Richland, Washington. The Rockwell Hanford nuclear weapons production related facility consists of several, separated, operations and processing, and isolated disposal areas. The disposal area 1100 NW covers approximately 461 acres and is approximately 1.5 miles west of the Columbia River.

The report was prepared to document observed waste disposal activities and potential environmental hazards for the time period between 1948 and 1970. Three selected dates of photo coverage were used: 1948, 1964, and 1973 and are the primary source data for this report. The disposal site is being investigated by the U.S. Environmental Protection Agency's Region 10 office under its CERCLA program. This report will assist field investigators in evaluating the scope of waste disposal activity at the 1100 NW site.

Topics addressed in this report include surface water contamination, indications of leachate, drainage patterns, disposal and/or burial of solid, liquid, and/or sludge waste, and visible vegetation stress associated with facility operations.

The U.S. Environmental Protection Agency's Environmental Monitoring Systems Laboratory in Las Vegas, Nevada, prepared this report for the Agency's Environmental Services Division in Region 10 at Seattle, Washington and the Office of Emergency and Remedial Response in Washington, D.C.

METHODOLOGY

Stereoscopic pairs of historical aerial photographs are used to perform the analysis. Stereo viewing enhances the interpretation because it allows the analyst to observe the vertical as well as horizontal spatial relationships of natural and cultural features. Stereoscopy is also an aid in distinguishing between various shapes, tones, textures, and colors that can be found within the study area.

Evidence of waste burial is a prime consideration when conducting a hazardous waste analysis. Leachate or seepage resulting from burial and dumping of hazardous materials might threaten existing surface or ground-water sources. Pools of unexplained liquid are routinely noted because they can indicate seepage from buried wastes that may enter drainage channels and allow contaminants to move off the site. An excellent indicator of how well hazardous materials are being handled at a site is the presence or absence of spills, spill stains, and vegetation damage. Trees and other forms of vegetation that exhibit a marked color difference from surrounding members of the same species are labeled "dead," "stressed," or "damaged," based upon the degree of noticeable variation. Vegetation is so labeled only after consideration of the season in which the photographs were acquired.

The U.S. Environmental Protection Agency's Statement of Procedures on Floodplain Management and Wetlands Protection (Executive Orders 11988 and 11990, respectively) requires EPA to determine if removal or remedial actions at hazardous waste sites will affect wetlands or floodplains and to avoid or minimize adverse impacts on those areas. To aid in compliance with these orders, significant wetland areas located within and adjacent to the sites have been identified and delineated. However, the sites have not been visited to verify the accuracy of wetland identification.

Drainage analysis determines the direction a spill or surface runoff would follow. Direction of drainage is determined from analysis of the photographs and from U.S. Geological Survey topographic maps. Whenever they are available, 7.5-minute quadrangle maps (scale 1:24,000) are used to show site location and to provide geographic and topographic information.

Results of the analysis are shown on annotated overlays attached to the photos. The following table provides documentation of the photographs used in this report:

TABLE 1. DOCUMENTATION OF AERIAL PHOTOGRAPHY

Site name, location, and geographic coordinates	Figures	Date of acquisition	Original scale	Film type†	Photo source‡	Photo I.D.	Frames
Rockwell Hanford	3	05-24-48	1:27,000	B&W	EROS	XB	2-22
Operations	4	11-02-64	1:36,000	B&W	EROS	VBBK	1019
Area 1100 NW Richland, WA	5	04-24-73	1:24,000	B&W	EROS	SWHR	136
46°21'16"N							
119°17'36"W							
SSID# WA-97							
EPA ID# WA4890090075							

†Film type identification:

B&W: Black-and-White Panchromatic

‡Photo source identification:

EROS: U.S. Department of the Interior, Geological Survey, Earth Resources
Observation Systems Data center, Sioux Falls, South Dakota.

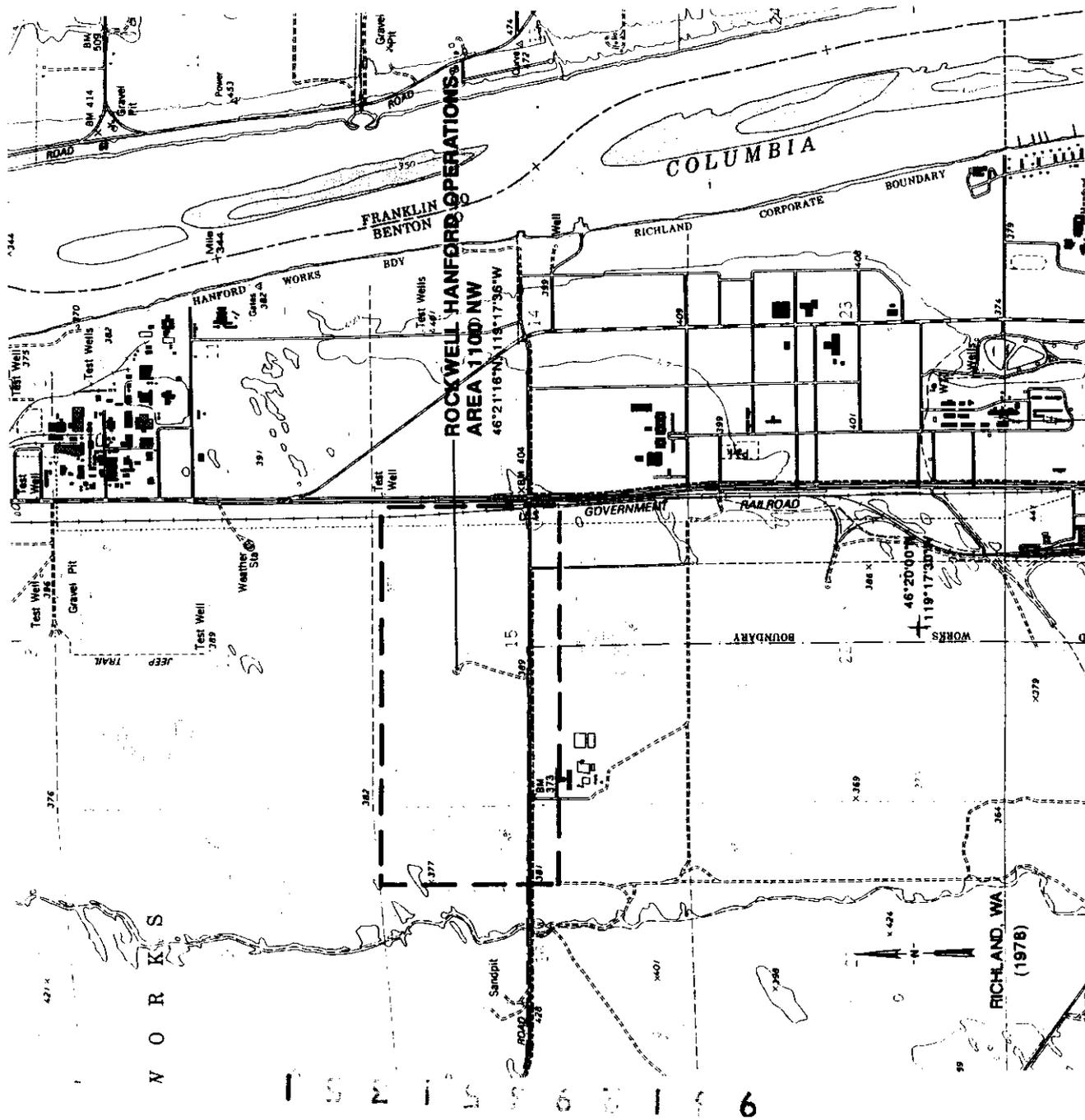


Figure 2. Local site location map, Richland, Washington. Scale 1:24,000.

ANALYSIS SUMMARY

Historical aerial photography acquired in 1948, 1964, and 1973 was used to perform this analysis of the Rockwell Hanford Operations Area 1100NW. The waste disposal study area covered approximately 461 acres but the excavated landfill area only occupied approximately 22 acres at its largest observed size on the 1973 photograph.

The 1948 photograph showed the disposal site consisted of an excavated area covering approximately 8.5 acres and a large pit containing solid waste to the south. By 1964 the excavated area had expanded to approximately 22 acres and the original disposal pit was closed. Several smaller trenches and pits were present within the excavated area. The 1973 photograph revealed a large disposal trench had been dug and was partially filled with solid waste, the smaller trenches were absent.

The Area 1100 NW is approximately 1.5 miles west of the Columbia River and approximately 30 feet higher in elevation. The study site does not appear within the 100-year flood zone of the Columbia River and is unlikely to be affected by flash flooding.

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PHOTO ANALYSIS

MAY 24, 1948 (FIGURE 3)

The 1948 photograph shows the Rockwell Hanford Operations Area 1100, northwest section. This landfill is located approximately 5 miles north of Richland, Washington at the intersection of Horn Rapids Road and the main road north of Richland (Figure 2). The rectangular study area covers approximately 0.72-square mile of undeveloped rangeland 1.5 miles west of the Columbia River.

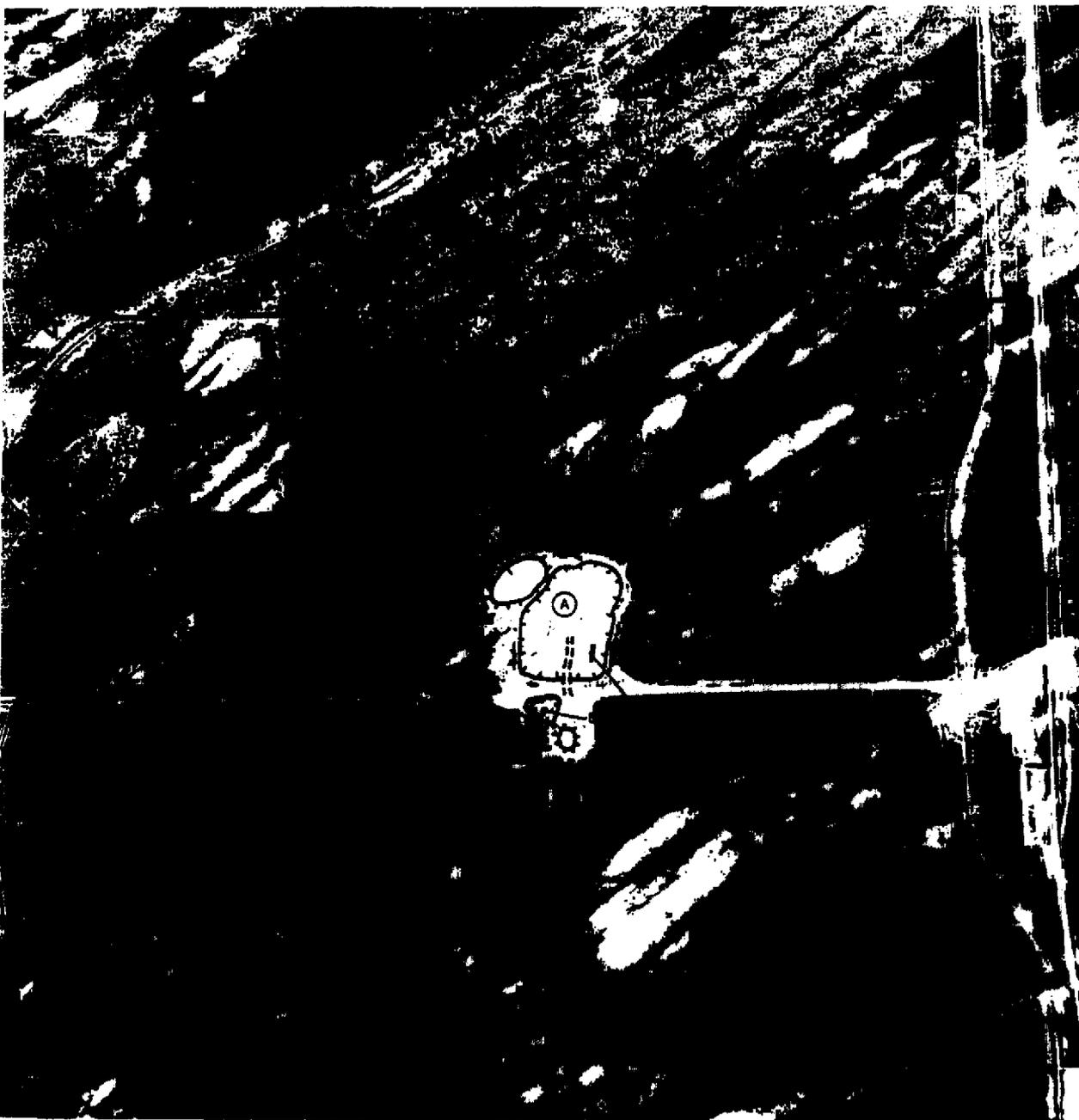
The excavated area covers approximately 8.5 acres (Annotation A). A row of parked earthmoving vehicles and trucks is noted by the southeast corner of the excavation. The floor of the excavation shows no signs of burial or dumping activity. No boxes, crates, drums, or piles of solid waste are visible in this landfill. The site does not have a discernible perimeter fence and there are no office trailers, vehicle maintenance sheds, or gate houses.

A disposal pit is along the south side of the excavated area (Annotation B). A dark tone of debris and solid waste is visible at the bottom of this pit. The composition of the solid waste in the pit could not be identified on this scale photograph.

Six, small, open trenches sprawl to the east side of the excavated area (Annotation C). There are no discernible access roads serving these trenches suggesting limited, sporadic visits. Ground scars near these open trenches suggest additional trenches have been closed in this area, causing these scars.

The general regional drainage is toward the southwest into the Yakima River which in turn empties into the Columbia River south of Richland. A small tributary of the Yakima River flows southward approximately 0.75 mile west of the study site (Annotation D). Surface runoff at the landfill is unable to exit the excavated disposal area and will remain within the study site.

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INTERPRETATION CODE

BOUNDARIES AND LIMITS

- FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- XXXXXX FENCE
- STUDY AREA

DRAINAGE

- DRAINAGE
- FLOW DIRECTION
- INDETERMINATE DRAINAGE

TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- RAILWAY

SITE FEATURES

- DIKE
- SL STANDING LIQUID
- SL STANDING LIQUID
- EXCAVATION, PIT (EXTENSIVE)
- MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WL WETLAND

Figure 3. Rockwell Hanford Operations Area 1100 NW. May 24, 1948. Approximate scale 1:9,660.

NOVEMBER 2, 1964 (FIGURE 4)

The 1964 photograph reveals continued excavation has expanded the soil borrow area/landfill to approximately 21.5 acres. The disposal pit observed in 1948 (Figure 3, Annotation B) has been closed, only a ground scar remains (Annotation A). The small trenches also observed east of the excavated area in 1948 (Figure 3, Annotation C) have also been covered or destroyed by the expanded earthmoving activity.

There are two trenches (Annotations B and C) and three pits (Annotations D, E, and F) within the excavated area. Solid waste is visible in the trench closest to Horn Rapids Road (Annotation C). Several mounds of dumped material, possibly fill or soil are in the southeast portion of the excavated area. The composition of the solid waste could not be determined, and no crates or drums were identified.

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INTERPRETATION CODE

BOUNDARIES AND LIMITS

- x---x--- FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- XXXXXX FENCE
- STUDY AREA

DRAINAGE

- DRAINAGE
- > FLOW DIRECTION
- >--- INDETERMINATE DRAINAGE

TRANSPORTATION/UTILITY

- ==== VEHICLE ACCESS
- ++++ RAILWAY

SITE FEATURES

- |||||| DIKE
- SL STANDING LIQUID
- SL STANDING LIQUID
- EXCAVATION, PIT (EXTENSIVE)
- MM MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
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- LG LAGOON
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- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WL WETLAND



Figure 4. Rockwell Hanford Operations Area 1100 NW, November 2, 1964. Approximate scale 1:8,700.

APRIL 24, 1973 (FIGURE 5)

The 1973 photograph shows the landfill remains open and receives solid waste. The size and shape of the excavated area have not changed significantly since 1964 (Figure 4). The facility does not have a discernible perimeter fence and there are no buildings. Several of the mounds and pits noted in the excavated area in 1964 (Figure 4, Annotations B, C, D, and F) are absent. There are presently two pits (Annotations A and B) and one large disposal trench (Annotation C).

The large disposal trench is approximately 60-feet by 500-feet and contains solid waste at its northern end. A bulldozer is visible along the east rim of this trench. There is no visible vehicle access road into the trench so it appears that solid waste is dumped into the trench from its rim rather than being unloaded at its floor. The solid waste contents of the trench could not be identified; no 55-gallon drums were noted, and the presence of boxes or crates could not be determined.

No waste disposal activity is noted in the two pits at this study site (Annotations A and B). No signs of liquid or sludge waste disposal are noted.

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INTERPRETATION CODE

BOUNDARIES AND LIMITS

- FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- xxxxxx FENCE
- - - - - STUDY AREA

DRAINAGE

- - - - - DRAINAGE
- FLOW DIRECTION
- - - - - INDETERMINATE DRAINAGE

TRANSPORTATION/UTILITY

- ==== VEHICLE ACCESS
- + + + + RAILWAY

SITE FEATURES

- DIKE
- SL STANDING LIQUID
- SL STANDING LIQUID
- EXCAVATION, PIT (EXTENSIVE)
- MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VI VERTICAL TANK
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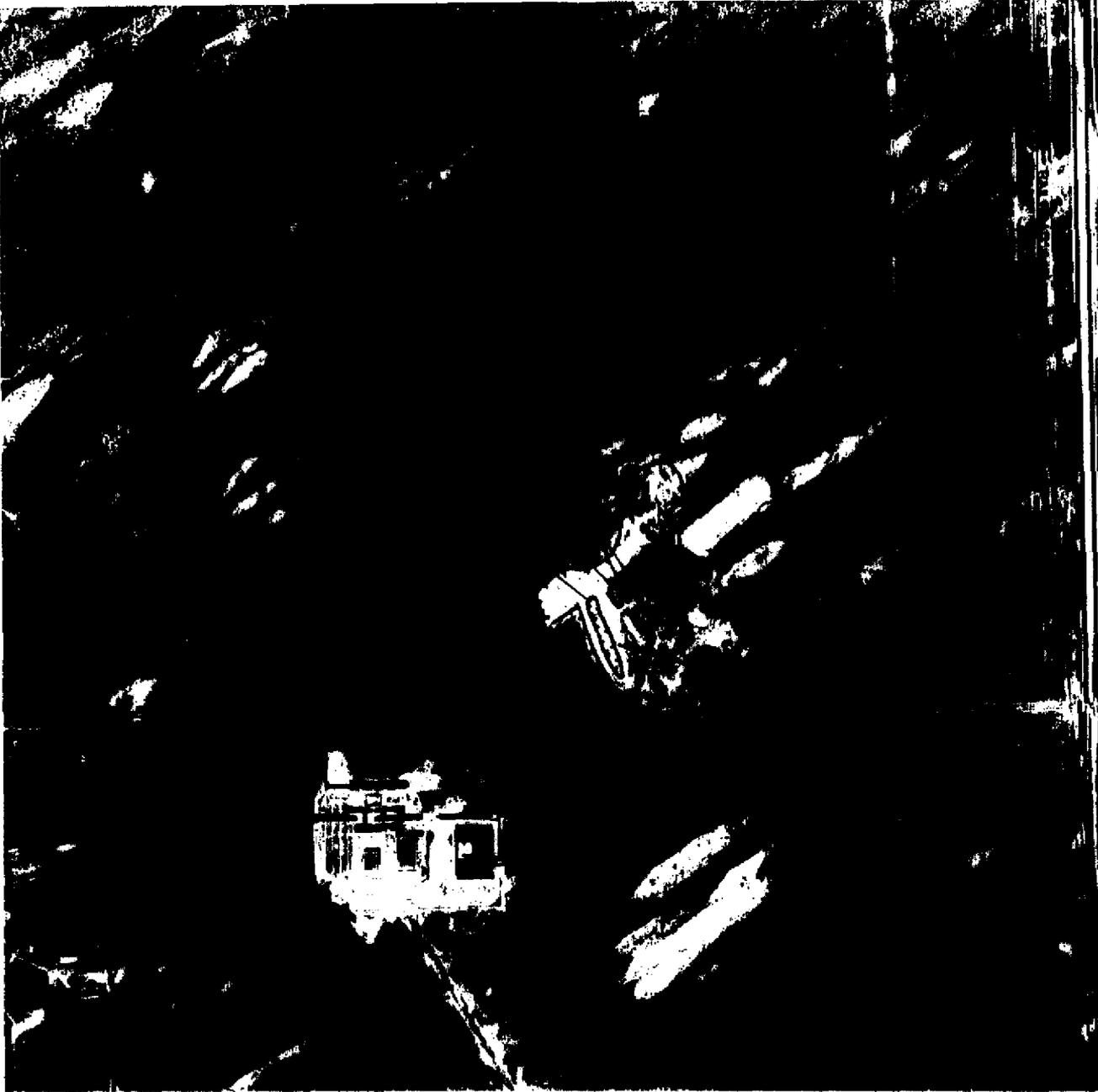


Figure 5. Rockwell Hanford Operations Area 1100 NW, April 24, 1973. Approximate scale 1:9,660.