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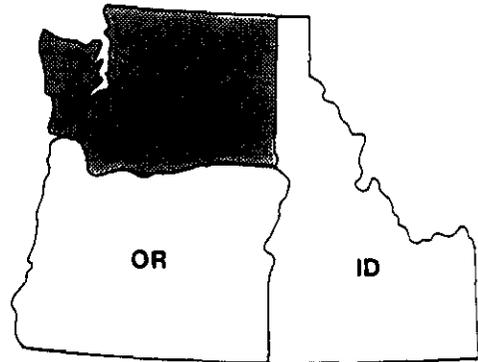
Research and Development



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

EPA Region 10

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Book # 137*



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AERIAL PHOTOGRAPHIC ANALYSIS OF ROCKWELL HANFORD  
OPERATIONS AREA 1100

Richland, Washington

by

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## INTRODUCTION

This report presents the results of an archival aerial photographic analysis of the Department of Energy, Rockwell Hanford Operations Area 1100 study site north of Richland, Washington. The nuclear weapons production related facility at Richland consists of several, separated operations and processing areas of which Area 1100 is a member. The Area 1100 facility covers approximately 65 acres.

Only three selected dates of photocoverage of this site were available. The photos span a 26-year period (1948 - 1973) and are the primary source data for the report. The Rockwell Hanford Operations Area 1100 site is under study by the U.S. Environmental Protection Agency's Region 10 Office for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This report addresses visible disposal activities and/or potential environmentally hazardous conditions over time. The analysis will assist in field investigations and potential enforcement actions.

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.

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## 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.	Frame
Rockwell Hanford Operations Area 1100	3	05-23-48	1:27,000	B&W	EROS	XB	126
Richland, WA	4	11-02-64	1:20,000	B&W	EROS	VBBK	1000
46°19'22"N	5	06-29-73	1:40,000	B&W	ASCS	VDGX	2-28
119°17'00"W							

†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.

ASCS: U.S. Department of Agriculture, Agricultural Stabilization and Conservation Service, Salt Lake City, Utah.

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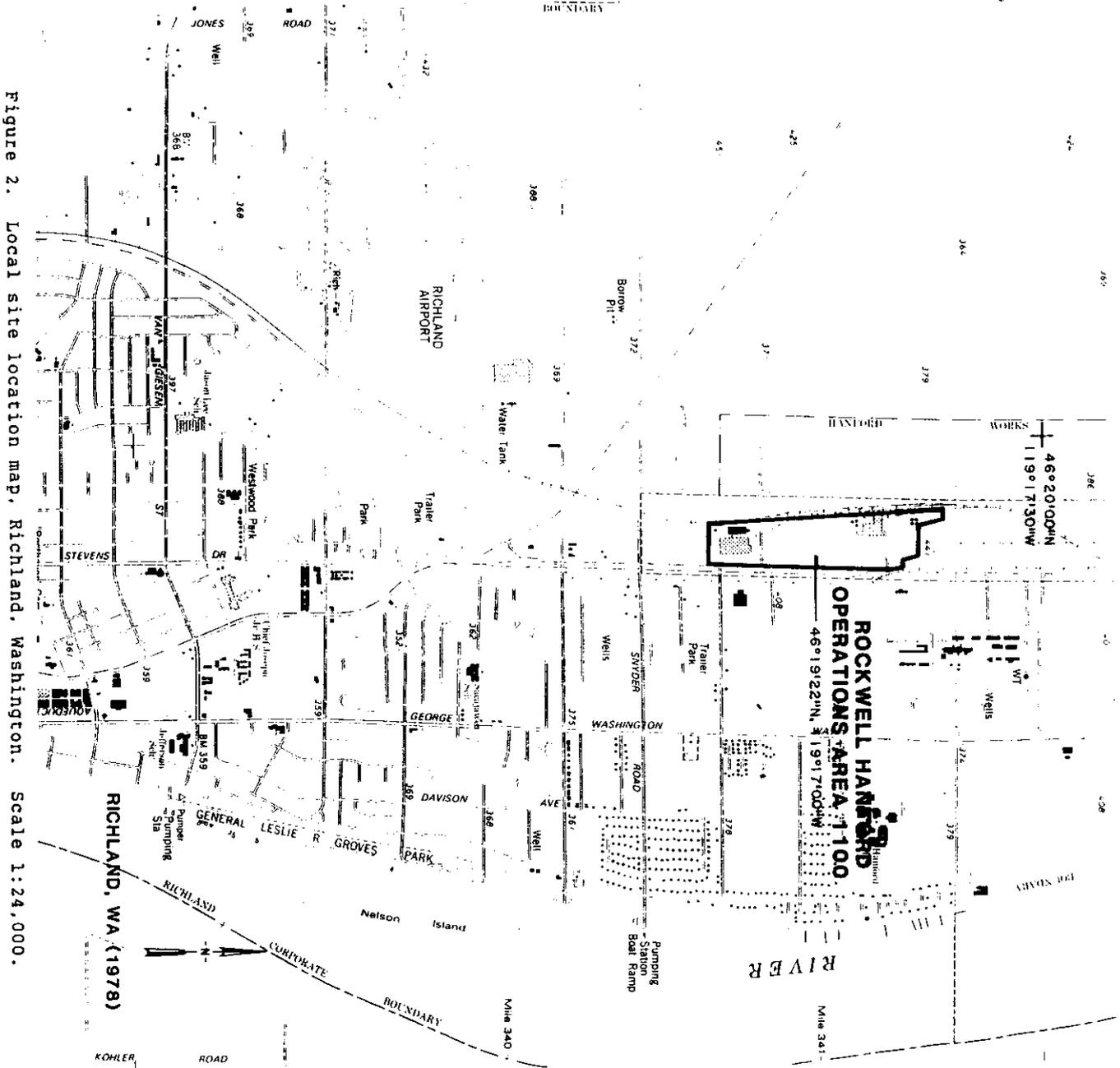


Figure 2. Local site location map, Richland, Washington. Scale 1:24,000.

ANALYSIS SUMMARY

The Rockwell Hanford Operations Area 1100 covers approximately 65 acres and is a nuclear weapons production related facility. Black-and-white photos from 1948, 1964, and 1973 were used in the analysis.

The 1948 photograph showed the condition of the study site prior to the construction of Rockwell Hanford Operations Area 1100. The region was irrigated farmland and orchards. A large trench was visible west of the study site but no waste disposal activity was noted. By 1964 Area 1100 was constructed and operational; however, no waste disposal activities were observed. The 1973 photo does not show any significant changes since 1964.

The study site is situated on a bluff approximately one mile west of the Columbia River. Surface runoff drains away from the site in a southwest direction. The site is approximately 100 feet of elevation higher than the Columbia River and is unlikely to be impacted by a 100-year flood from this river.

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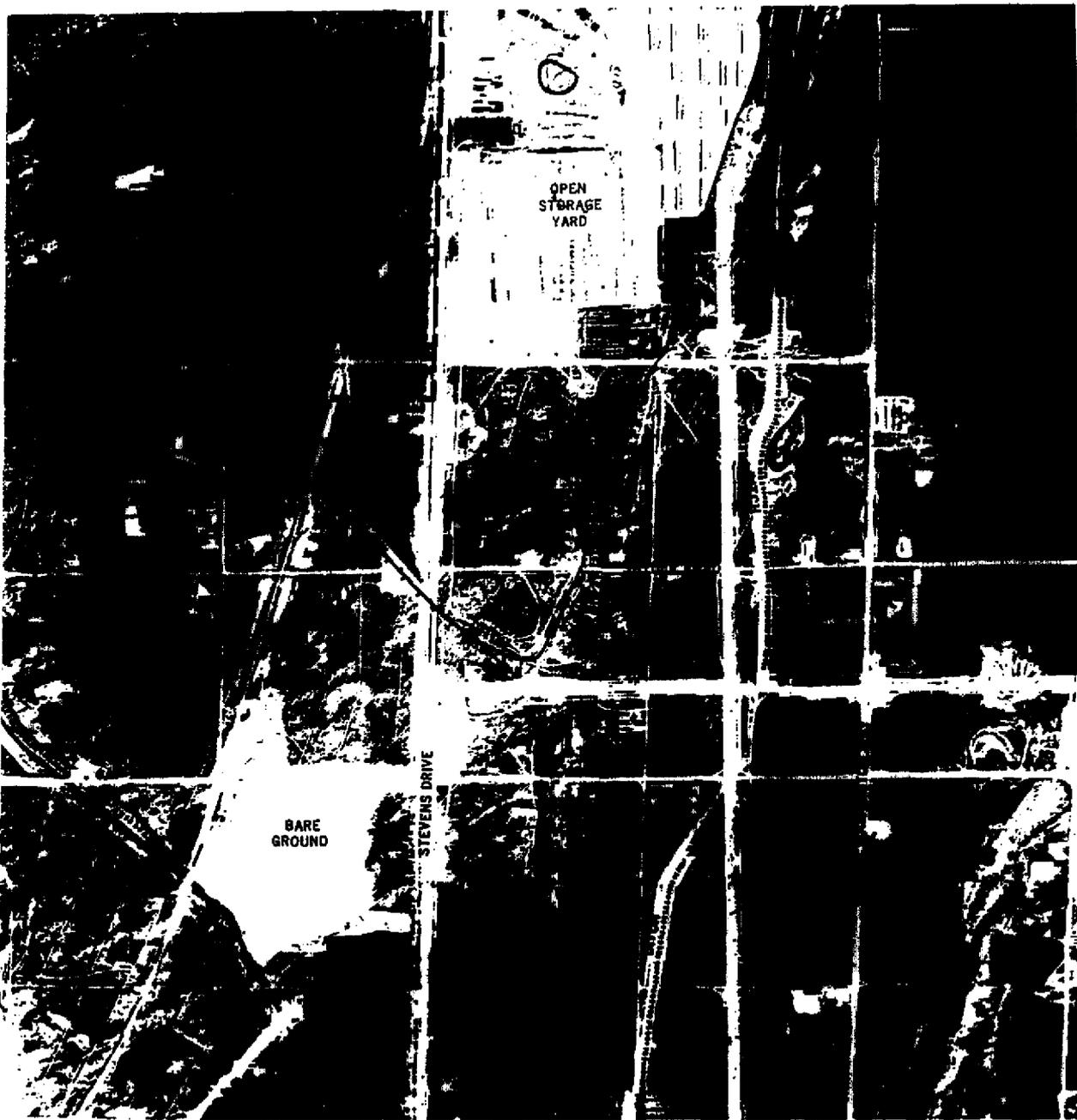
PHOTO ANALYSIS

MAY 23, 1948

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The 1948 photograph (Figure 3) shows the southern portion of the future location of the Rockwell Hanford Operations Area 1100; complete photocoverage of this area was not obtainable for this year. The study area is located on the north side of Richland, Washington on a topographic bluff approximately one mile west of the Columbia River. The region was originally farmland as revealed by cropland patterns and orchards. The region was also served by irrigation ditches. The 1948 photograph reveals widespread ground scars from new construction, new roads, and new ditches/channels. A large trench is west of the future study site; however, no waste disposal is visible.

The future study site currently consists of inactive farmland transected by several vehicle trails and unsurfaced roadways. A large open storage yard, on the east side of Stevens Drive contains numerous boxes/crates and construction materials.

Surface drainage flows southwest off the bluff west of Stevens Drive, and flows southeast off the bluff, east of Stevens Drive.



**INTERPRETATION CODE**

**BOUNDARIES AND LIMITS**

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

**DRAINAGE**

- DRAINAGE
- > FLOW DIRECTION
- INDETERMINATE DRAINAGE

**TRANSPORTATION/UTILITY**

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

**SITE FEATURES**

- ||||||| DIKE
- ~~~~~ SLANDING LIQUID
- SL SLANDING 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. Future location of Rockwell Hanford Operations Area 1100, May 23, 1948. Approximate scale 1:9,500.

NOVEMBER 2, 1964

The 1964 photograph (Figure 4) is the first to show the Rockwell Hanford Operations Area 1100 constructed and active. The site covers approximately 65 acres and is served by road and railroad.

A large operations building is at the north end of the facility (Annotation A) and is served by a railroad loading spur, a railroad marshalling yard is along the west perimeter of the site. A parking area is to the north of this building and contains four adequately revetted storage tanks. There are three irregularly shaped, dark-toned areas at Annotation B. These areas are likely being surfaced as new parking lots. Moist ground is noted on the east and south sides of the building, suggesting additional re-surfacing activity.

Another large operations building is at the south perimeter of the site (Annotation C). Numerous boxes/crates are observed in a storage yard on the west side of the building.

Two large deserted trenches are west of the facility (Annotations D and E) and do not appear to be in current use for waste burial. There are no well used roadways going to these trenches; the southern trench (Annotation E) was observed on the 1948 photo (Figure 3). No waste disposal activity is noted at this facility.

The open storage yard directly east of the study site described on the 1948 photo is no longer present. There are faint ground patterns showing abandoned roadways through this deserted storage yard (Annotation F). A mobile home park has been constructed south of the abandoned storage yard.



INTERPRETATION CODE

BOUNDARIES AND LIMITS

- X—X—X—X—X FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- X X X X X X FENCE
- STUDY AREA

DRAINAGE

- DRAINAGE
- ← FLOW DIRECTION
- INDETERMINATE DRAINAGE

TRANSPORTATION/UTILITY

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

SITE FEATURES

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- LG LAGOON
- OF OUTFALL
- 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, November 2, 1964. Approximate scale 1:8,800.

JUNE 29, 1973

The 1973 photograph (Figure 5) does not reveal any significant changes at the Rockwell Hanford Operations Area 1100 since 1964 (Figure 4). No waste disposal activities are identified at this study area.

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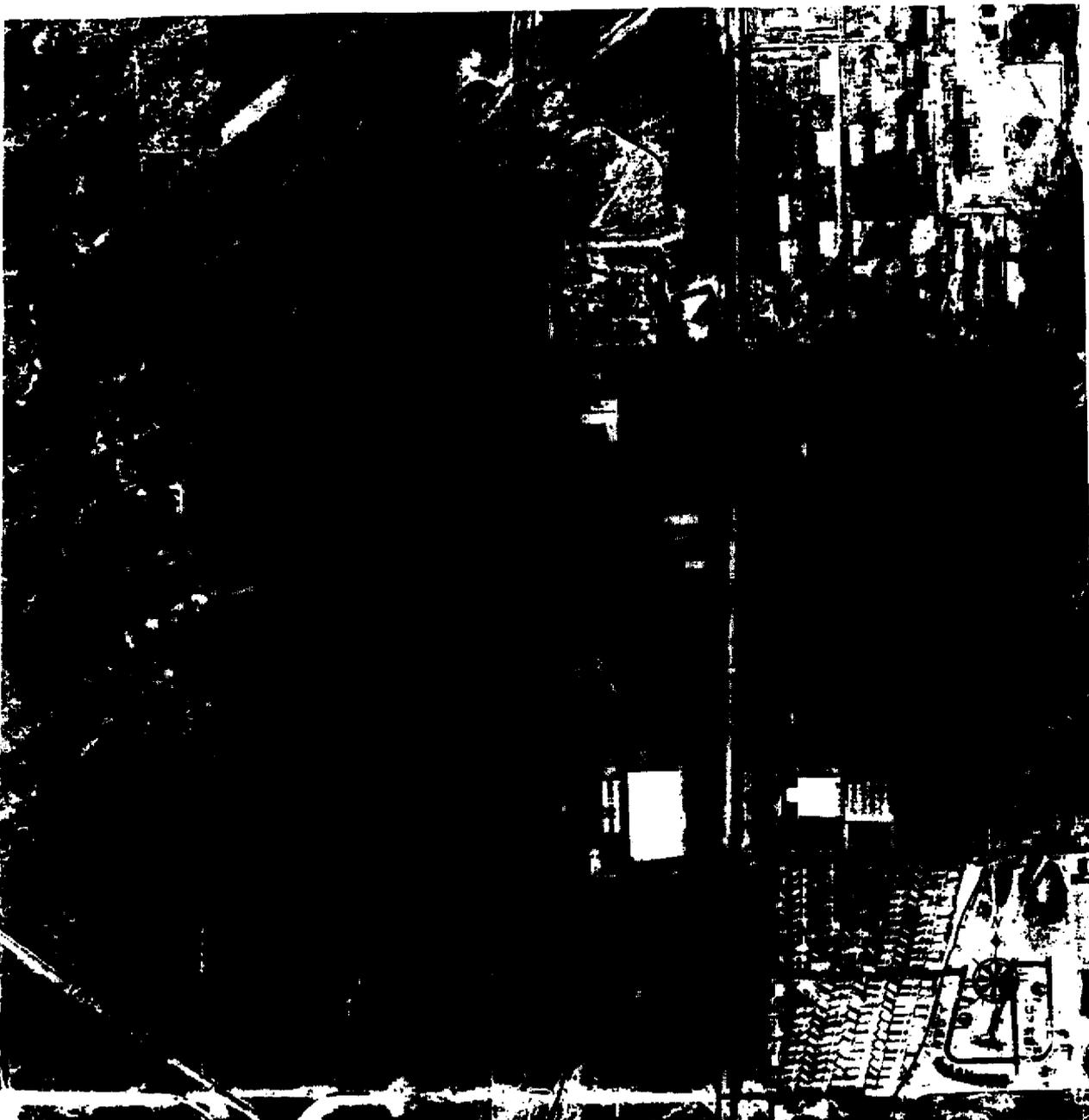


Figure 5. Rockwell Hanford Operations Area 1100, June 29, 1973. Approximate scale 1:8,400.

**INTERPRETATION CODE**

**BOUNDARIES AND LIMITS**

- X—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
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