ANALYSIS OF EXISTING FACILITIES

MASTER PLAN

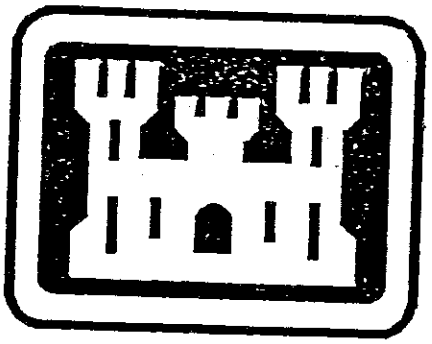
BASIC INFORMATION MAPS

HIRO AMMUNITION DEPOT

HIROSHIMA, JAPAN

CONTRACT DOCUMENTS

DEC.27.1985



U.S. ARMY ENGINEER DISTRICT

CORPS OF ENGINEERS

JAPAN

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CHAPTER I
INTRODUCTION

A. OBJECTIVE

This report accompanies the Basic Information Maps of Hiro Ammunition Depot, Japan dated 9 October 1985, and has been prepared in accordance with AR 210-20, dated 26 January 1976, and effective 15 March 1976.

The objective of this report is to summarize the quality, character, and the extent of existing facilities so that the present conditions will be described in general narrative form with sketches to supplement the graphic presentation of the folder of Basic Information Maps. While taking full account of all environmental and historical concerns, this report examines all aspects of the post and provides an analysis of the adequacy of existing facilities to perform the assigned mission. The resultant analysis and conclusion stated herein provide broad planning guidance for further development programs. The information will also generalize on the suitability of various facilities for continued use, alternate use, or disposition to serve the military mission of Hiro Ammunition Depot.

The folder of Basic Information Maps, includes the following:

Title	DRAWING NO.	SHEET NO.
Regional Map	18-02-05	1
Reservation Land Use Map	18-02-05	2
Site Map	18-02-05	3
Water Map	18-02-05	4
Sanitary Sewer Map	18-02-05	5
Electrical Map	18-02-05	6
Lighting Map	18-02-05	7
Telecommunication Map	18-02-05	8
Storm Drainage Map	18-02-05	9

B. METHODOLOGY

The methodology developed for preparing a master plan includes the following steps as outlined in Figure 1.

1. Data Collection

Data collection consisted of the accummulation of information about the activity and surrounding area, including the existing documents, maps, environmental data base and other pertinent data. Historical data, information about land use constraints and man-made considerations, such as existing adjacent land uses, were also collected. Existing population data were also obtained. Foregoing informations were supplemented by discussions with appropriate personnel at the activity and the chain of command.

2. Evaluation and Analysis

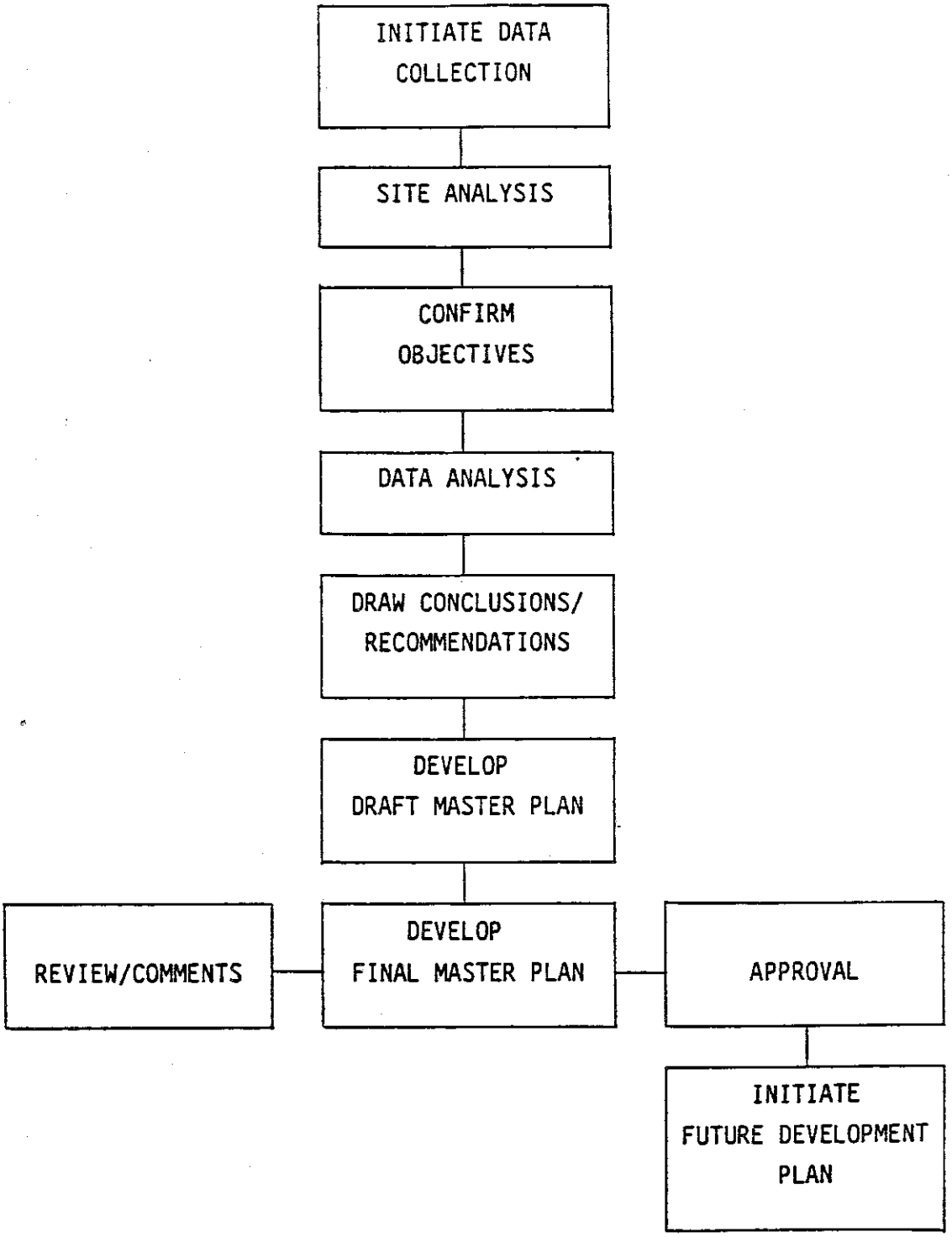
An on-site evaluation of existing conditions was made with JED and Garrison personnel. Problem areas were reviewed and alternative solutions were discussed. Analyses were made of the data gathered from existing documents, from the on-site visit and from discussions with activity personnel. The suitability of various facilities for continued use, alternate use, or disposition to serve the military mission of Hiro Ammunition Depot was evaluated.

3. Conclusions/Recommendations

Conclusions/recommendations were developed to support the activity mission, giving priority consideration to environmental and fiscal constraints.

4. Final Report

Reviews and comments on the draft reports were incorporated into the plan and the final Master Plan was developed. Upon approval by the command of the U. S. Army Garrison, Honshu, Future Development Plans will be developed, based on this Master Plan.



METHODOLOGY CHART

Figure 1

CHAPTER II
SUMMARY OF ACTIVITIES - MISSION

A. U. S. ARMY AMMUNITION DEPOT, AKIZUKI

Hiro Ammunition Depot is apart of the U. S. Army Ammunition Depot, Akizuki (USAADA) headquartered at Akizuki, Japan, and is under the command of the U. S. Army Garrison, Honshu (refer to Figure 2, Chain of Command).

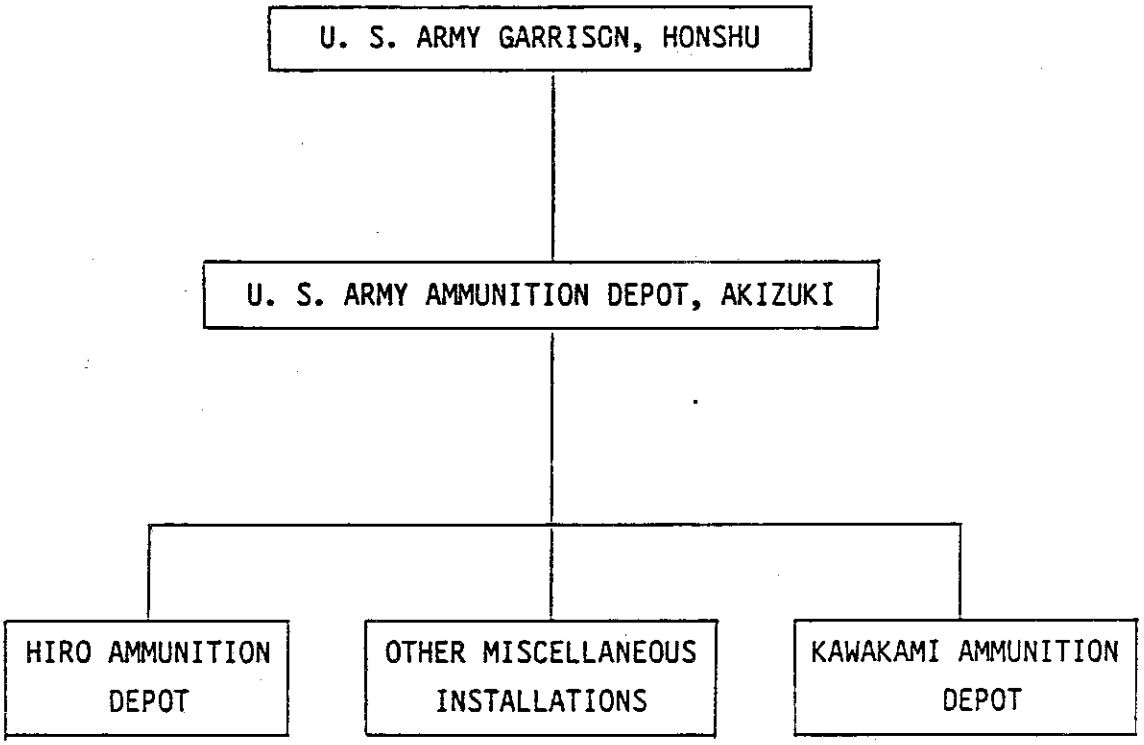
The priority mission of the U. S. Army Ammunition Depot, Akizuki is to:

1. Perform supply, storage, maintenance, renovation, quality assurance, surveillance and ammunition safety activities for all ammunition operations of U. S. Army Garrison, Honshu.

2. Serve as the major off-shore ammunition storage location in West PAC.

3. Provide technical advice, plans, and policies for conventional ammunition storage.

4. Perform ammunition operations, as directed by AMCCOM through the Central Ammunition Management Office, Pacific.



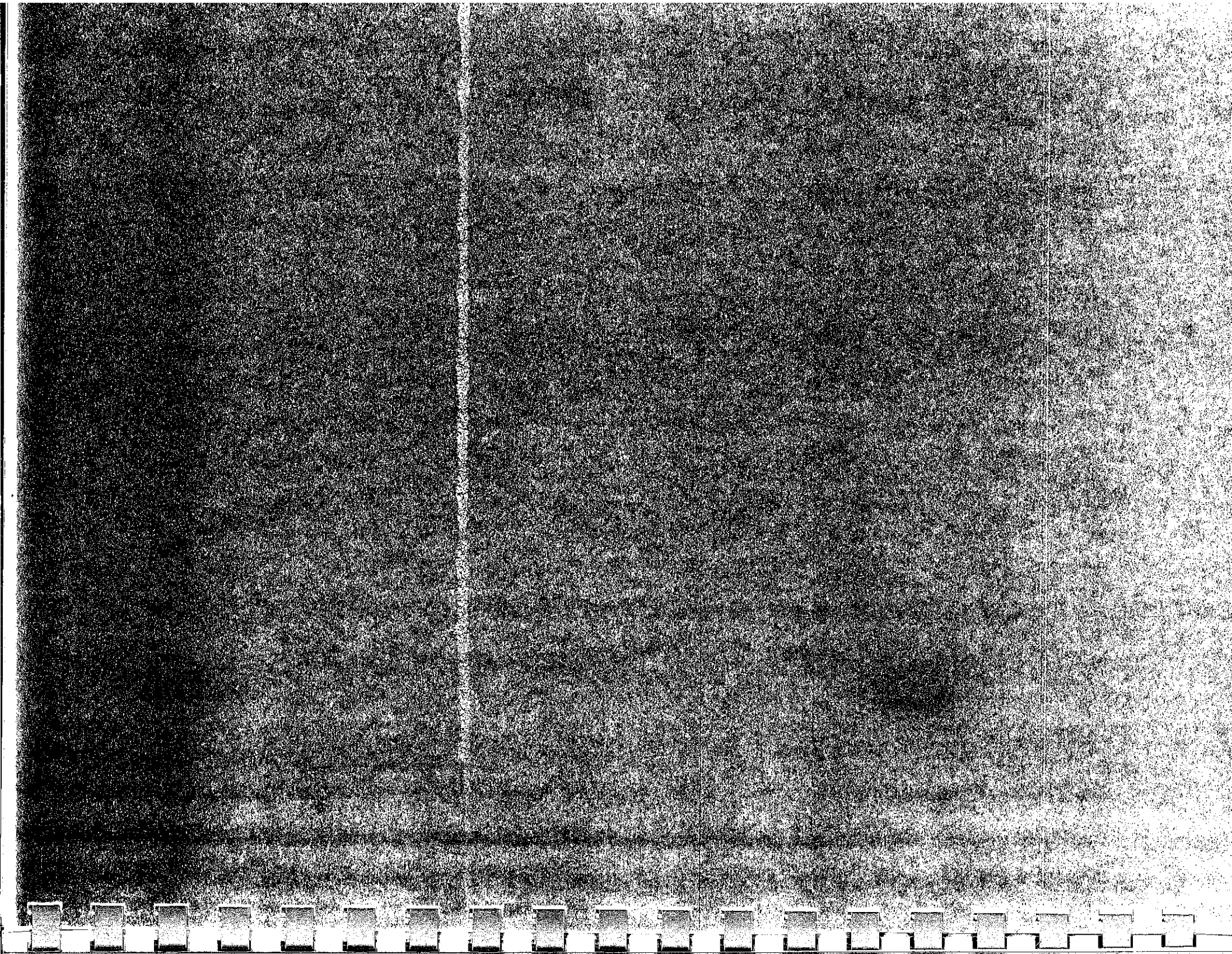
CHAIN OF COMMAND

Figure 2

B. HIRO AMMUNITION DEPOT

Hiro Ammunition Depot is one of the three ammunition storage/receiving/processing installations of the U. S. Army Ammunition Depot Akizuki Command. Hiro Ammunition Depot is also missioned to temporarily store ammunitions, which are destined for Kawakami Ammunition Depot, a major inland ammunition storage facility. To carry out its mission as an ammunition depot, the installation is equipped with a pier, LCM ramp, hardstand, storage facilities, ammunition surveillance facility, administrative facility, fire station, guard station, network of roads, water supply, storm drainage system, communications, and electrical system.

The listed work force as of October 1984 includes all personnel assigned to Hiro Ammunition Depot. The work force is as follows:



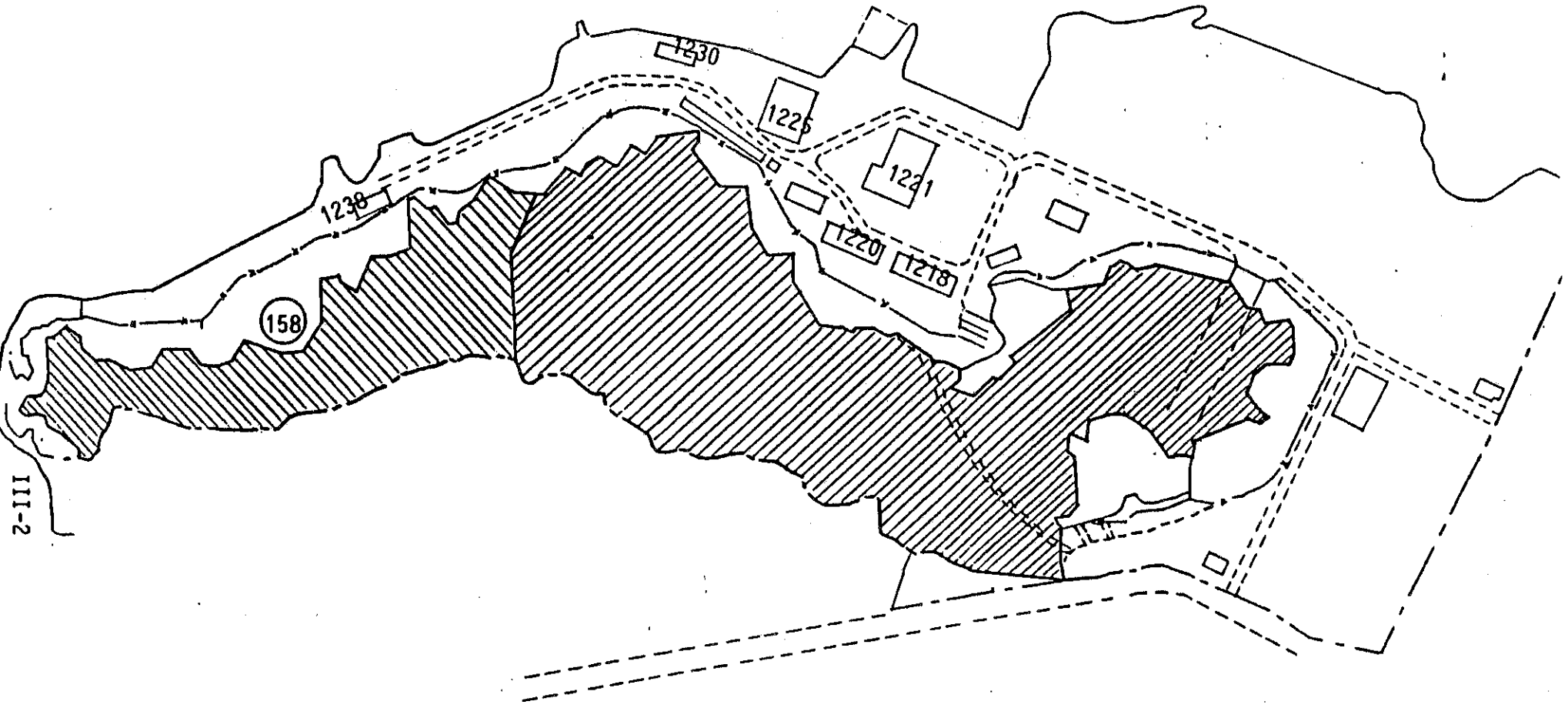
CHAPTER III
ENVIRONMENTAL SETTING

A. LOCATION/PHYSIOGRAPHIC FEATURES

Hiro Ammunition Depot is located in southern Japan, about 7 miles east of the city of Kure and less than 20 miles southeast of the City of Hiroshima, Hiroshima Prefecture, Japan (consult Regional Map).

The depot is situated on Hiroshima Bay on the inland sea of Japan (Seto Naikai), approximately 10 feet above mean sea level, and consists of 88.4 acres of land and 22 acres of restricted water area.

Of the 88.4 acres held by the U. S. Army, 55.2 acres are owned by the Japanese Government and 33.2 acres are privately owned lands (Figure 3). The government land is relatively flat, while the privately owned acreage is situated on a steep hill, approximately 164 feet above mean sea level, and consists of agricultural lots and wooded areas. Approximately, thirty-seven (37) percent of the entire site is wooded slopes.



Privately owned land portion (Cultivated land)

Government owned land portion (Cultivated land)

Government owned land portion

LAND OWNERSHIP
BOUNDARY LINE PLAN

Figure 3

1. Soils

The soils within the Hiro Ammunition Depot are mainly biotite granites of Hiroshima granitic rock classification, formed during the latest geologic period (Cretaceous) of the Mesozaic era (Figure 4).

Generally known as the "Mikage Ishi" among the Japanese, granites are of acidity plutonic rock classification with a large amount of silicates. Their main elements are quartz, feldspar, mica, or hornblende, pyroxene, etc; sub-elements are pyrites, tourmaline, and apatite.

The color tone of granites are mostly quartz color of white, black, and pink.

The characteristics of granites are uniform in organization. Granites are hard, durable, strong, and very appealing. But their weak point is that they are susceptible to heat.

The physical property of granites is as shown below. Note that according to the amount and type of mineral involved, their properties may vary tremendously.

Table 1

Physical/Mechanical Properties of Granites

Specific Gravity	Linear Expansion Coefficient $10^{-5}/^{o}C$	Specific Heat Cal/C.gr	Heat Conduction Coefficient 10^{-3} Cal/ cm.sec.^{o}C	Strength (kg/cm^2)			Young's Modulus (kg/cm^2)
				Compression	Bend	Tension	
2.5-3.0	0.342-1.190	0.19	5.3	631-3040	90-200	24-94	430,000-610,000

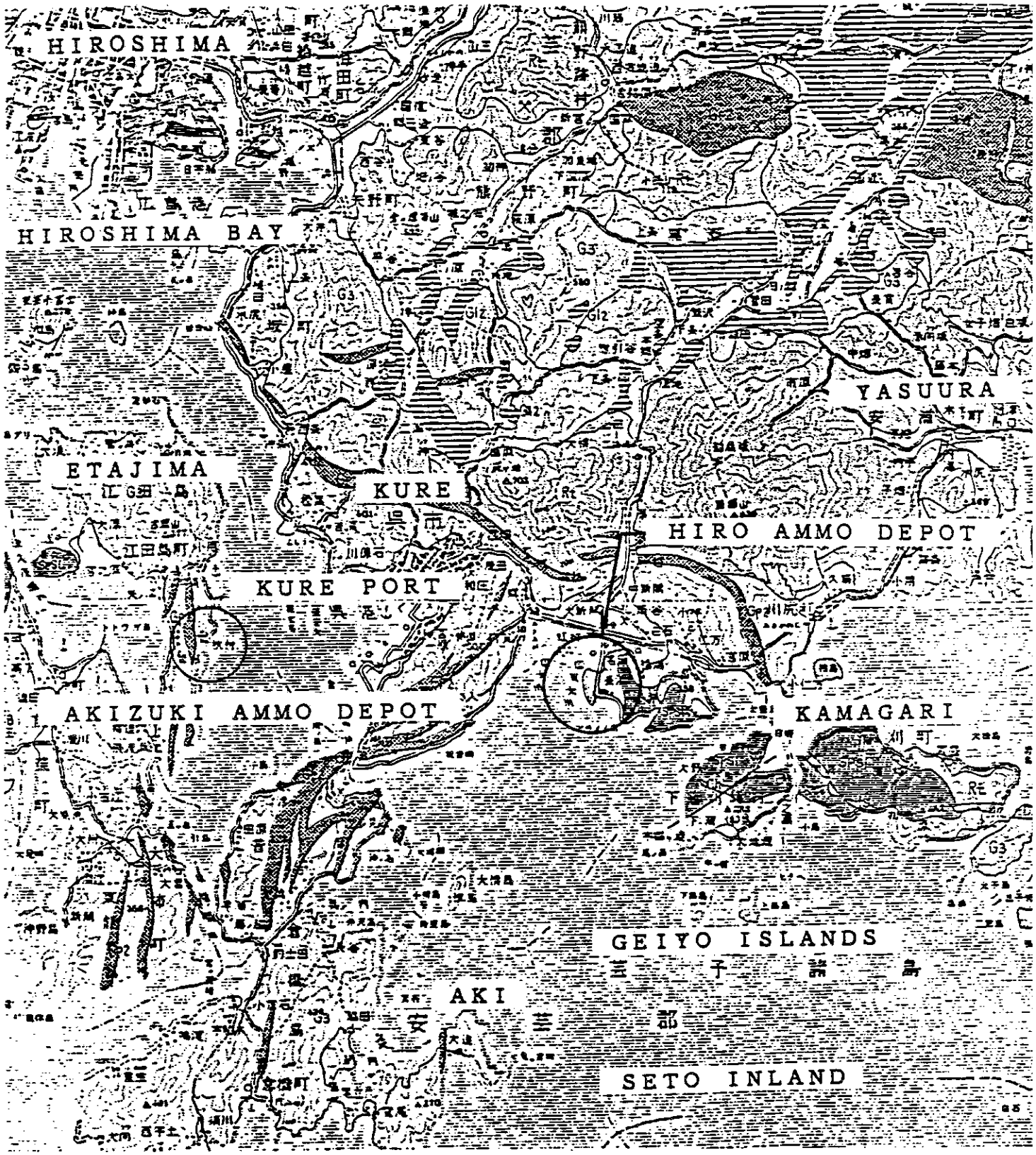

HIROSHIMA
HIROSHIMA BAY
ETAJIMA
KURE
KURE PORT
HIRO AMMO DEPOT
YASUURA
AKIZUKI AMMO DEPOT
KAMAGARI
GEIYO ISLANDS
AKI
SETO INLAND
Quaternary
Recent—Alluvium
Granitic rocks undivided
Pleistocene
Saijo sand and gravel beds
Cretaceous
Hiroshima granitic rocks
Takada rhyolitic rocks
Gravel, sand and clay
Hornblende-biotite granodiorite - quartz-diorite
Gravel, sand and clay (with tuff)
Biotite-granite
Granite-porphyry
Rhyolite and its tuff (with shale)

Figure 4

2. Vegetation

Essentially, there are no trees and shrubs in the depot, other than those few trees and shrubs by the sentry house and the fire station. These trees and shrubs are in proper care, but are only for aesthetic purposes (refer to Table 2). There are no other trees or shrubs which act as a shade, reduction of noise, glare and dust, control of erosion, and tempering the climate with respect to temperature, humidity, and wind.

The flatlands of the depot include approximately 20 percent of grassed area. There is an on-going mowing contract. Generally, this grassed area is considered as an improved ground.

The steep hill as previously mentioned consists of farm lots and wooded areas. Several trees in the area are of popular species. During autumn, an autumn-tinted trees cover the hill. The species of these trees are listed in Table 3.

Table 2

Trees/Shrubs on Flat Land

JAPANESE NAME	COMMON NAME	BOTANICAL NAME
Kyochikuto	*	Nerium Indioum
Kuro Matsu	Loblolly Pine	Pinus Thunbergii Parl
Hidare Yanagi	Weeping Willow	Salix Babylonica L.
Mokkoku	*	Ternstroemica Gymnanthera Spraque
Sakura	Hill Cherry	Prunus Jamasakura

Table 3

Trees/Shrubs on Steep Hill

JAPANESE NAME	COMMON NAME	BOTANICAL NAME
Moso-dake	Bamboo	Phyllostachys Heterocycla
Machiba-shii	Live Oak	Pasania Edulis Makino
Kuroganemochi	Holly	Ilex Rotunda Thumb
Ajisai	Hydrangea	Hidrangea Macrophylla Thumb
Fukuromimoku Genji	White Oak	Quecus Mysinaefolia Bl.

* Common name not known.

3. Land and Water Areas

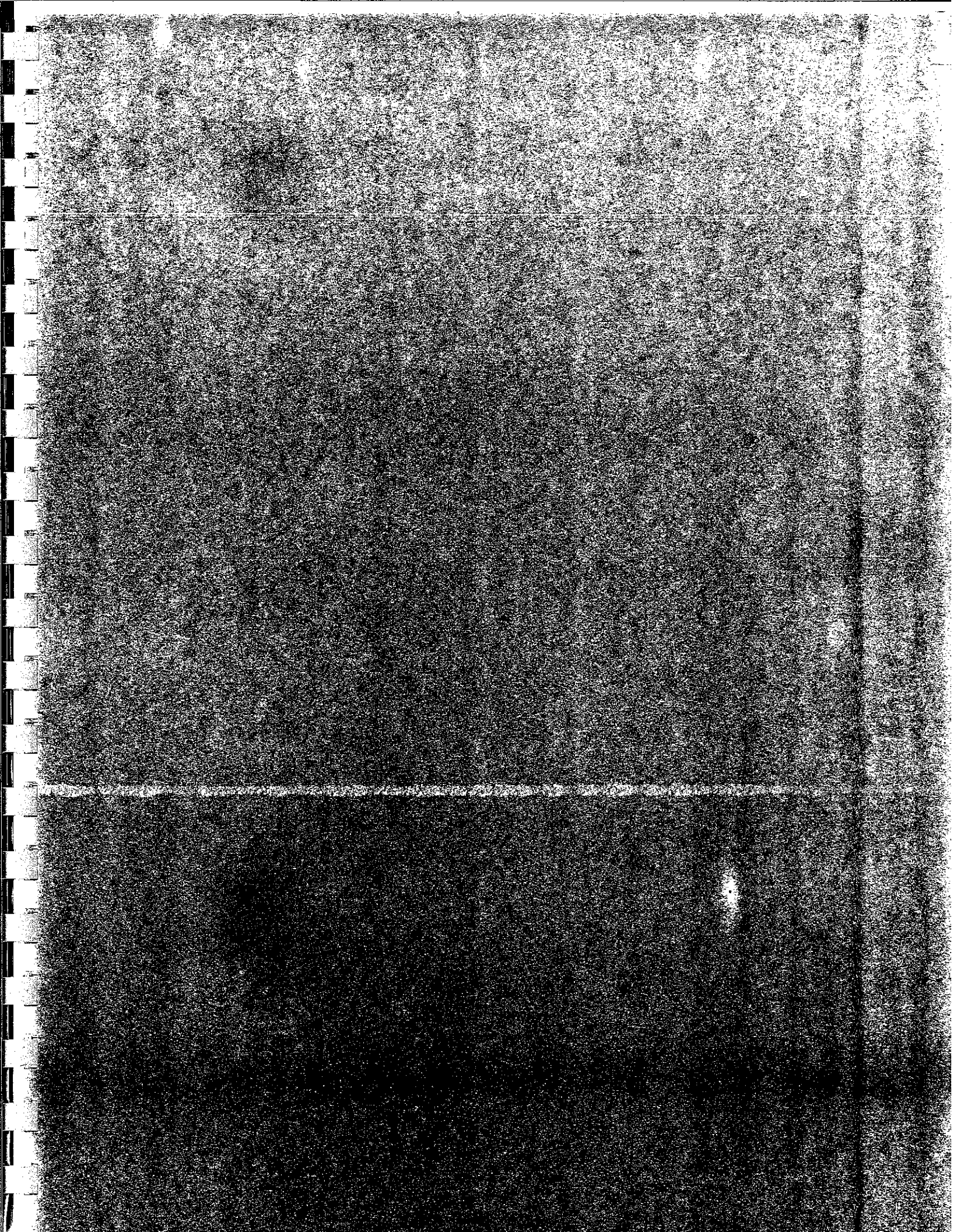
The major functional land use areas are depicted on the Reservation Map. Hiro Ammunition Depot consists of 88.4 acres of level to hilly, wooded areas and 22 acres of restricted water areas.

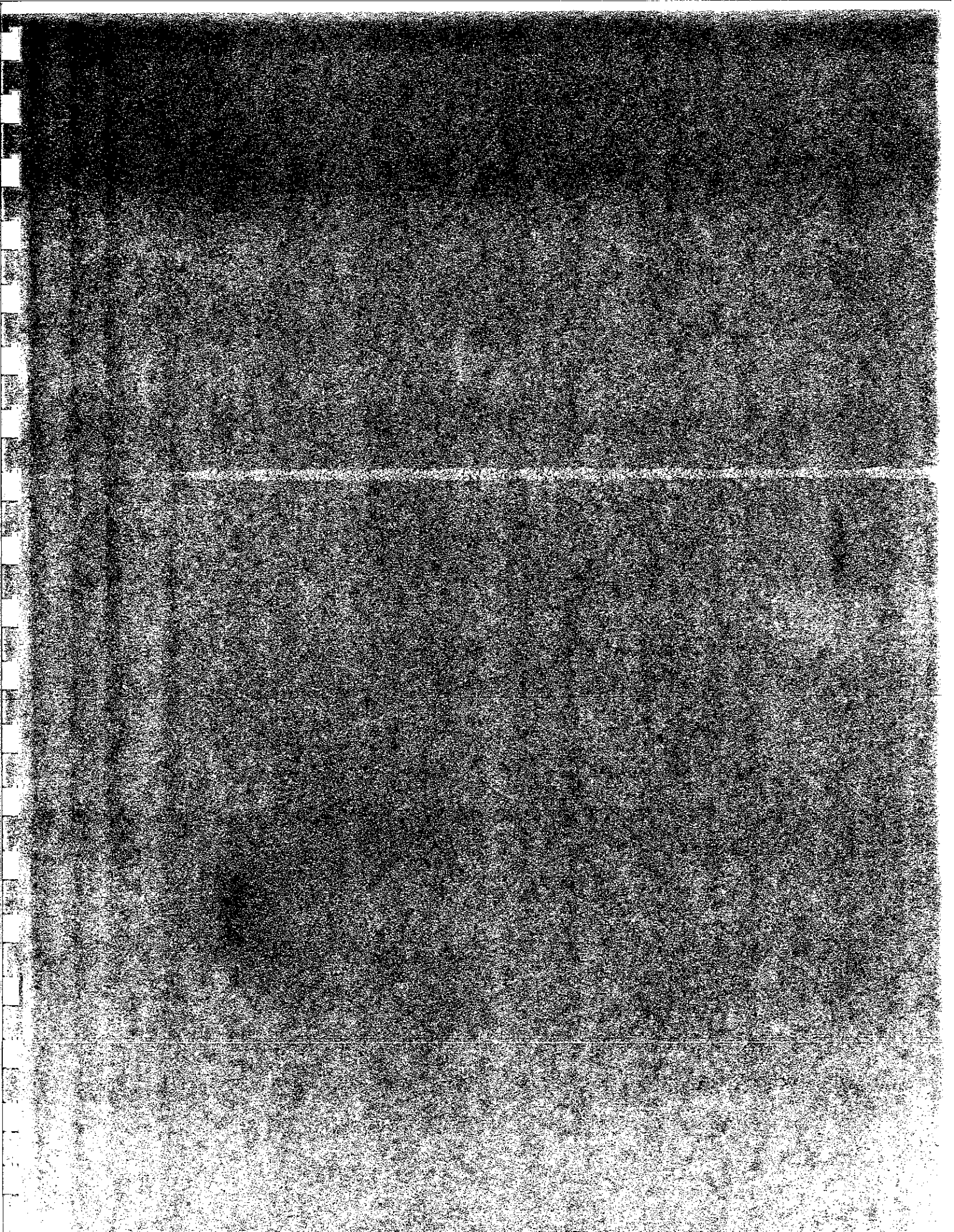
Formally a Japanese Naval Aeronautical Arsenal built before World War II, most of the facilities then were severely bombed and burned during the war. Many of the existing facilities now at the depot are those that remained after the war and were modified to satisfy user needs.

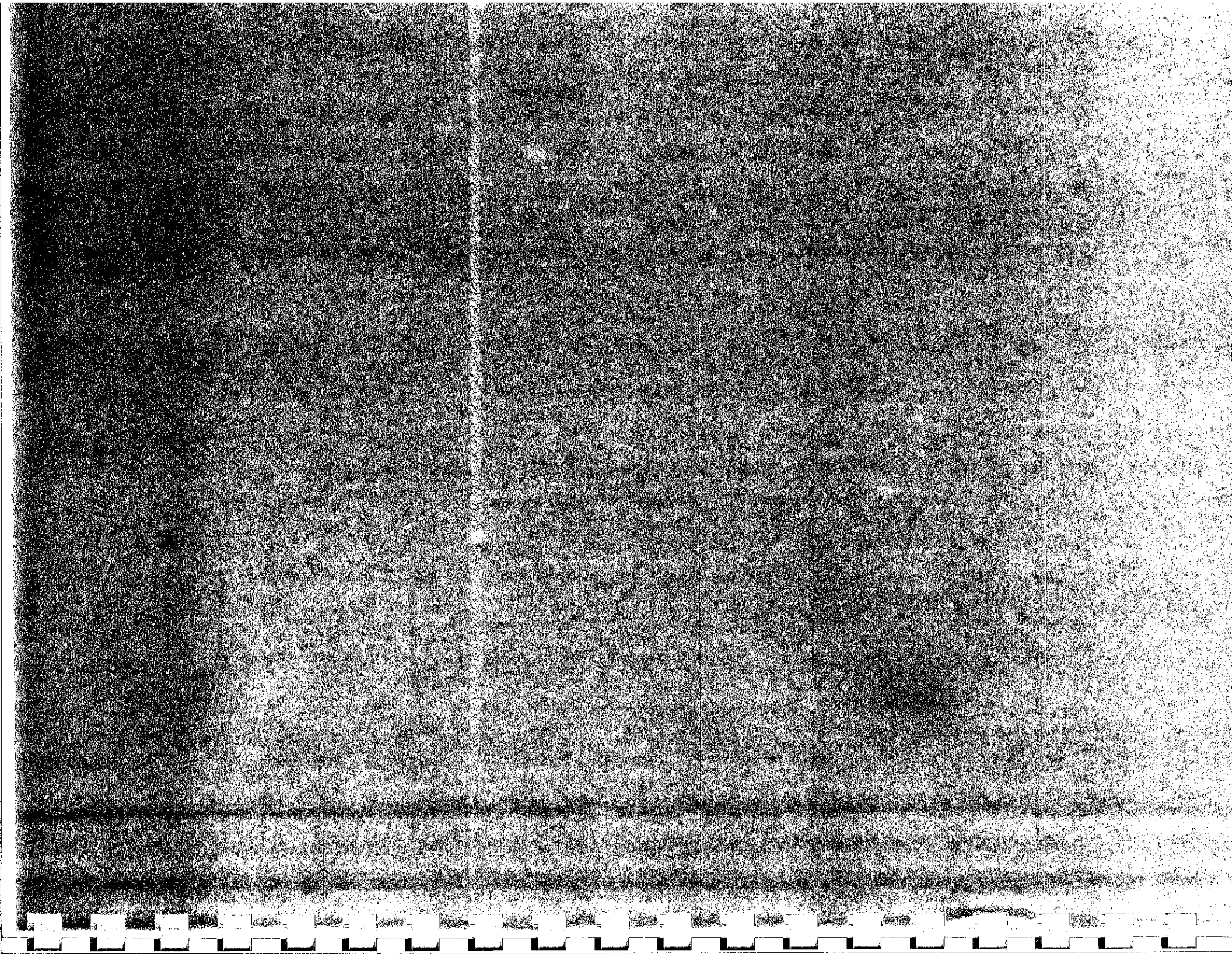
Several traces of demolished buildings, foundations still in place, abandoned utilities, etc., were apparent at the depot. It appeared also that the refuse of these demolished buildings was disposed of along the shore-line. However, this disposal method is now abolished and action is taken to clear of refuse materials.

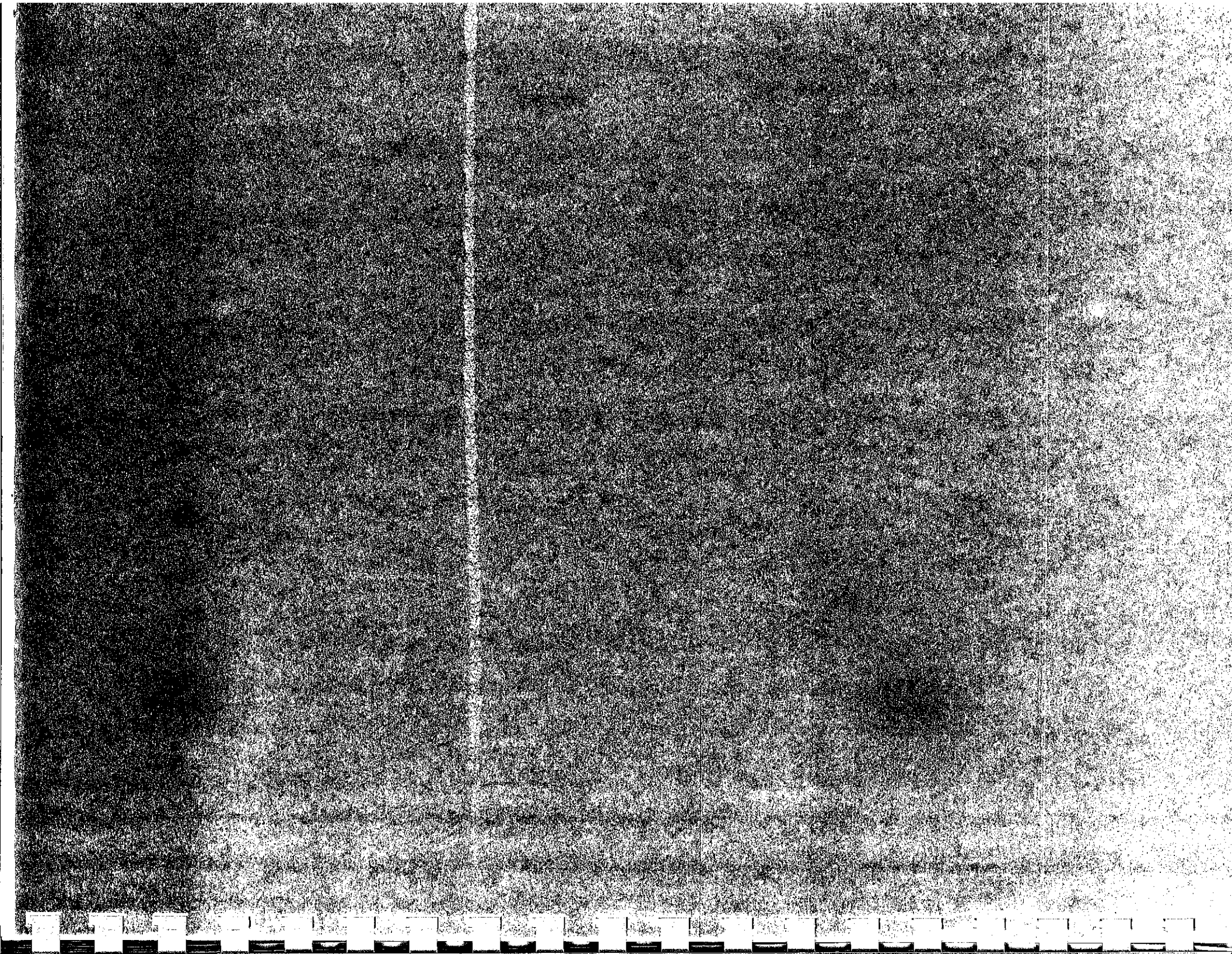
In general, most of the available land for development at the depot has been utilized.

The steep hill, as previously mentioned, consists of farm lots and wooded areas. These farm lots are numerous and small in sizes (refer to Figure 5 and 6).









4. Climate

Japan enjoys four regular and distinct seasons. Seasonal climatic changes are much greater than in other countries in the same temperature zone, particularly in temperature and amount of rainfall, since Japan is situated on the boundary between oceanic and continental climatic zones.

The Hiroshima area experiences four distinct seasons, including hot summers and cold winters. The temperature and humidity variations are influenced by the surface atmospheric circulations, i.e., equatorial southwesterly and tropical southeasterly winds during the summer, and polar air circulation over eastern Siberia during winter. The depot is located in the typhoon belt with most typhoons occurring during August and September. Based on records of the past 10 years, the summer temperatures average 32.7 degrees C (91 degrees F) and the winter temperatures average 6.8 degrees C (44 degrees F). Relative humidities are 85 percent and 30 percent, respectively. Recorded rainfall averages 78.3 inches per year with a maximum daily rainfall record of 6.6 inches. Snow occurs from late November until early April with an average accumulation of 4 inches.

B. HISTORICAL ELEMENTS

1. Post Facilities

The Hiro Ammunition Depot was built by the Japanese before World War II to serve as a Naval Aeronautical Aersenal. During the war, the installation was severely bombed and burned. Hiro Depot was occupied by the British Commonwealth Occupation Forces on 1 February 1946 and it was subsequently released to the Japanese Government on 9 January 1950. On 1 December 1950, the facility was acquired by the U. S. Army for use as an ammunition storage area and to accommodate regional Camp Kure headquarters. The total land area originally procured was 129.7 acres; 41.3 acres of this land, however, were released to the control of the Japanese Government on 28 February 1970. The released land is now used by both the Toyo Pulp Co., Ltd. and the National Technical Laboratory.

2. Historic Places/Properties

In keeping with the spirit of Executive Order 11593, Protection and Enhancement of the Cultural Environment (Inventory of Historic Places), a field investigation was conducted in identifying any significant historic places at the Hiro Ammunition Depot and its adjacent community.

In confirmation with the Hiroshima Education Association of Historic Places, no historic places or monuments on-post were registered. Field investigation indicated that one non-registered monument in memory of deceased Japanese soldiers stands on a wooded hill top of the depot, and also several private tombs. But under the definition of Executive Order 11593 and of AR 420-40, the monument and the tombs do not qualify as historical properties. Conclusively, there are no sites on Hiro which qualify as historical places/properties.

C. CULTURAL

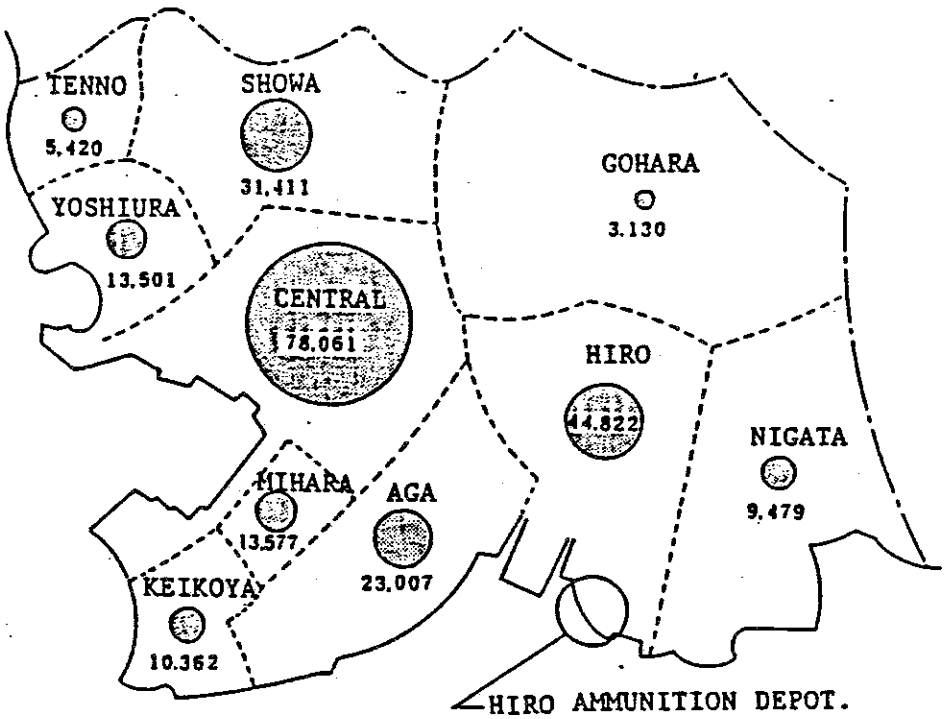
1. Population Density and Trends

Population trends in Kure city have co-existed with the port facilities and heavy industries, such as shipbuilding and steel and equipment manufacturing. Ever since its establishment in the Meiji era on 1 October 1890, Kure city co-existed with the Japanese Navy, which gave rise to the population, as well as prosperity to the city. In 1941, Kure marked the highest population figure of 420,000 people. After World War II, despite the devastation for a time being, Kure once again regained the image of port facilities and heavy industries. Today, Kure city has a population of approximately 232,770 people, of which 78,061 is concentrated in the central city, and Hiro holding the next largest population of approximately 44,822 poeple (refer to Figure 9)

Kure city occupies an area of 145 km^2 with a population density of approximately 1,605/km^2.

2. Regional Development, Socio-economic/Trends, and Community Facilities

Nagahama town, which adjoins Hiro Ammunition Depot, was formerly a fishing port, but is now a part of Kure city. The ex-Nijimura Dependent Housing Area, once a part of a U.S. Army-contolled installation, is located across the water from Hiro Ammunition Depot. The area is now designated as an industrial district by the Kure city and surrounding conditions have been changed in their entirety. Kure city has a population of approximately 232,770 people and two-thirds of the city area consists of hilly terrain. Although houses are densely packed on slopes, there is a comparatively large flat area in Hiro-machi that provides sites



POPULATION OF KURE

Figure 9

for many factories. Kure city, which was once known as one of the three greatest naval ports in Japan, was economically supported by the Japanese Navy until the termination of World War II. After the war, the city faced many social and economic problems due to the large number of unemployed people. Today Kure contains upgraded port facilities and many commercial heavy industries such as shipbuilding and steel manufacturing. Industries such as these often started their operations by taking advantage of ex-military facilities. The current trend in these industries, however, points toward marked decline. This decline is accompanied by decreasing population. A shift from a heavy industrial economic base to an economy supported primarily by service industries, commercial establishments, and tourism is beginning to take place in Hiro-machi.

3. Transportation System

a. Installation Roads

The road network consists of one primary road as follows:

(1) No. of Lanes:
Primarily 2-lane road, except for two areas with oneway traffic.

(2) Pavement Structure:
Asphalt concrete and gravel structure.

(3) Pavement Width:

Two lane AC	7 and 6 feet
One way AC	6.5 and 3.5 feet
Gravel road	4.5 feet
Shoulder	2 feet on AC pavement

A primary two-lane road initiates from the only main access gate and extends along the level shoreline area of the depot, terminating at the berthing piers at the southern end of the property.

The road curves at the entrance to the fire station and leads to a one-way traffic road. This road was recently upgraded with new asphalt concrete and stabilized shoulders and also changed to a one-way traffic for safe ammunition handling. Further to the southern end of the depot is the gravel road.

In its entirety, the roads appear to be satisfactory relative to the observed light vehicular traffic pattern. Road widths appear sufficient to handle two-way traffic. It is advisable, however, that gravel road be treated with dust palliative coatings.

Parking facilities are adequate for current employees' vehicles and existing, adjacent paved or graveled areas can accommodate any overflow of parking.

b. Regional Roads and Transportation System

The road system around Kure city is adequate to handle the current level of traffic. No severe congestion occurs on any of the major roads, except within the Kure city downtown area during peak hours.

The primary access road to Hiro Ammunition Depot is through Route 11 (Hiro-Nigata Route). This road starts from the Hiro intersection (Routes 375 and 185) and extends along the seaside and connects back to Route 185 at Nigata. The traffic volume through this road is low. The road is in very good condition.

The road that is of primary importance to the Hiro Depot is Route 375, which connects this installation with the Kawakami Ammunition Depot to the northeast. This road is generally in very good condition, as the surface was recently repaved. With increasing traffic, however, problems could arise in the future as a result of Route 375's inadequate width. The City of Kure has requested funds from the Government of Japan for the widening of this road, but none have been allocated yet. Road projects in the Kure area are not influenced by the U.S. installations. Ammunition transports that utilize Route 375 have not yet generated any major problems.

From Hiroshima city, Kure/Hiro can be reached through Route 31, which extends along the seaside. This road is a two lane traffic road, except that it becomes four lane at few locations. The road is narrow and cannot accommodate the traffic volume, for it is the only primary road leading to Kure/Hiro cities. During the peak hours, in the morning and

afternoon, traffic congestion is frequently seen. To overcome this inconvenience, the Government has initiated a construction of an expressway from Hiroshima city to Kure city. Only a small part of this project is completed and is presently held in abeyance due to land acquisition problem.

Average traveling time by motor vehicle to Hiro Ammunition Depot is as follows:

Kure	30 min →	Hiro Ammo Depot
Kawakami	60 min →	Hiro Ammo Depot
Akizuki	60 min →	Hiro Ammo Depot
Hiroshima	90 min →	Hiro Ammo Depot

D. HEALTH

1. Air Quality

The primary causes of air pollution are the factories, smoke generated from the industries, and fume from the motor vehicles. With these in consideration, Hiro Ammunition Depot is only equipped with two oil-fired heating furnaces as a source of air pollution. Their emissions do not have a significant effect on the air quality in the area.

The two oil-fired heating furnaces are equipped in the sentry house, S-1287 and in the fire station, S-1292. The capacities are both 84,000 BTU/HR, respectively, and the source of fuel consumption is diesel fuel (DF). The emission from these two oil-fired heating furnace is insignificant. Considering the magnitude of smoke emissions from the nearby industrial plants, the depot can be classified as an essentially non-air polluting installation.

The primary concern is the smoke emissions from the adjoining Toyo Pulp Co., Ltd. and other industrial plants in the vicinity of Hiro Ammunition Depot. These smoke emissions were a source of air pollution and created an environmental problem in Kure city. However, with the recent completion of anti-pollution facilities, air contamination has been solved to a great degree.

In accordance with the results of 1982 environmental assessment survey held at Kure, sulfur dioxide (refer to Figure 10) has increased slightly since 1981, but in its entirety has remained in the same level since 1978. Nitrogen dioxide (Figure 10) is in the tendency of declining since 1980. Suspended material particles (particulates) and carbon monoxide contained in the fumes from motor vehicles (Figure 11) have not considerably varied since

1980. Lastly, no complaint has been received with respect to photochemical oxidant.

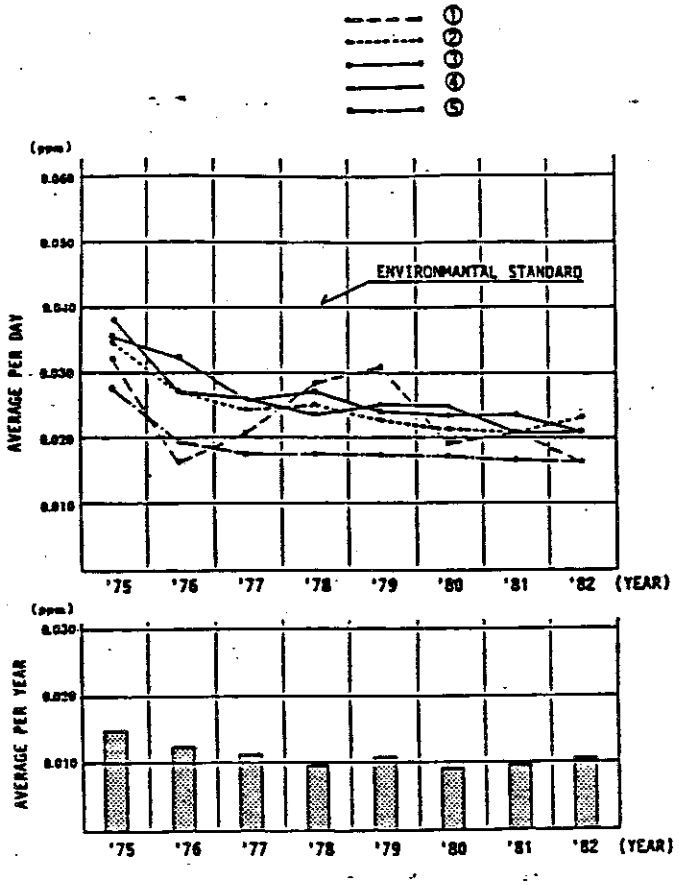
The results of environmental assessment survey have been based on the Environmental Standard for Air Quality established by Kure City as indicated below.

Table 4

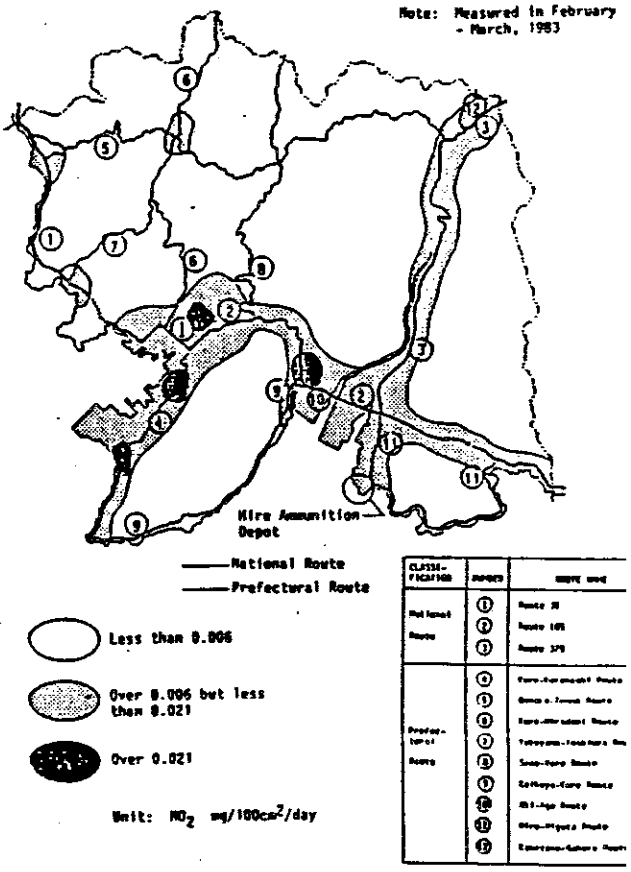
ENVIRONMENTAL STANDARD FOR AIR QUALITY

ELEMENTS	ENVIRONMENTAL STANDARDS	REMARKS
Sulfer Dioxide (SO_2)	1 hour reading per average day msut indicate less than 0.04 ppm. In addition, 1 hour reading must indicate less than 0.1 ppm.	1. Suspended material particle is defined as those particulates of less than 10 micron and that rise in the air. 2. Kure City is within the zone area of 0.04 ppm to 0.06 ppm per average day of nitrogen dioxide, and have maintained the water standard since 1977.
Carbon Monoxide (CO)	1 hour reading per average day must indicate less than 10 ppm. In addition, 1 hour reading per average of 8 hours must indicate less than 20 ppm.	
Suspended Material Particles (Particulates)	1 hour reading per average day must indicate less than 0.10 mg/m3. In addition, 1 hour reading must indicate less than 0.20 mg/m3.	
Nitrogen Dioxide (NO_2)	1 hour reading per average day must be within 0.04 ppm to 0.06 ppm zone, or less than the above figures.	
Photochemical Oxidant (Ox)	1 hour reading must indicate less than 0.06 ppm.	

RATE OF SULFUR DIOXIDE IN KURE



RATE OF NITROGEN DIOXIDE IN KURE



RATE OF NITROGEN DIOXIDE IN KURE

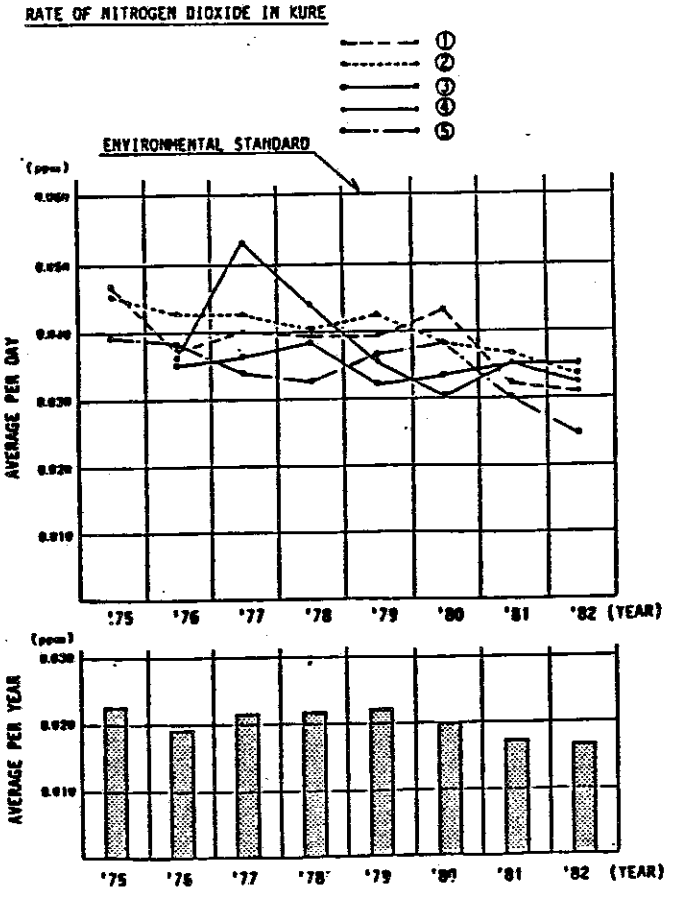
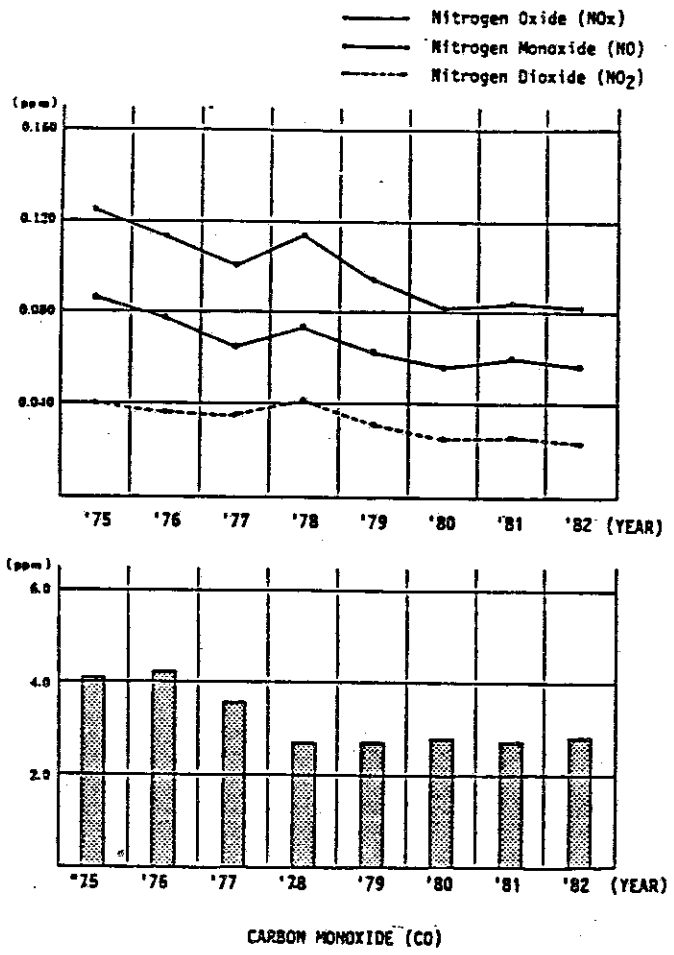


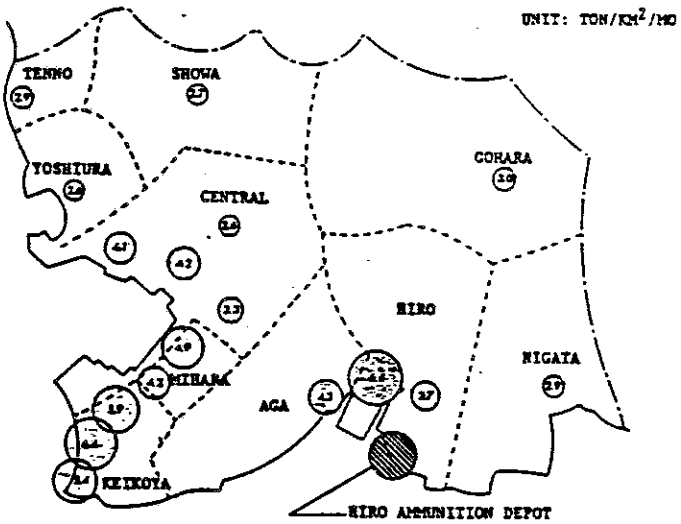
Figure 10

RATE OF FUME FROM MOTOR VEHICLES



CARBON MONOXIDE (CO)

SUSPENDED MATERIAL PARTICLES IN KURE



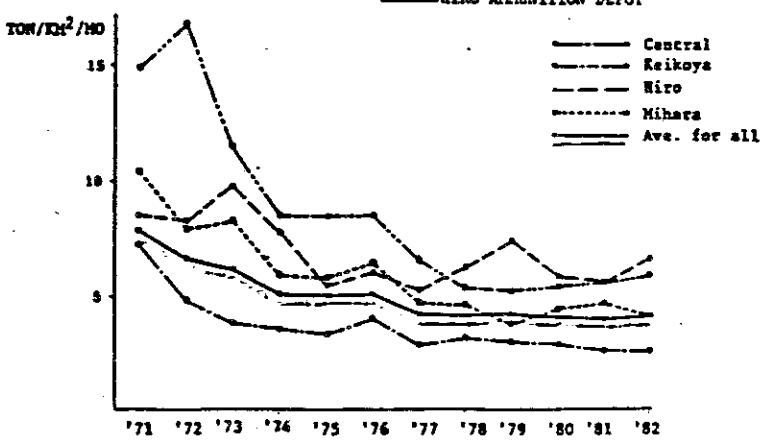


Figure 11

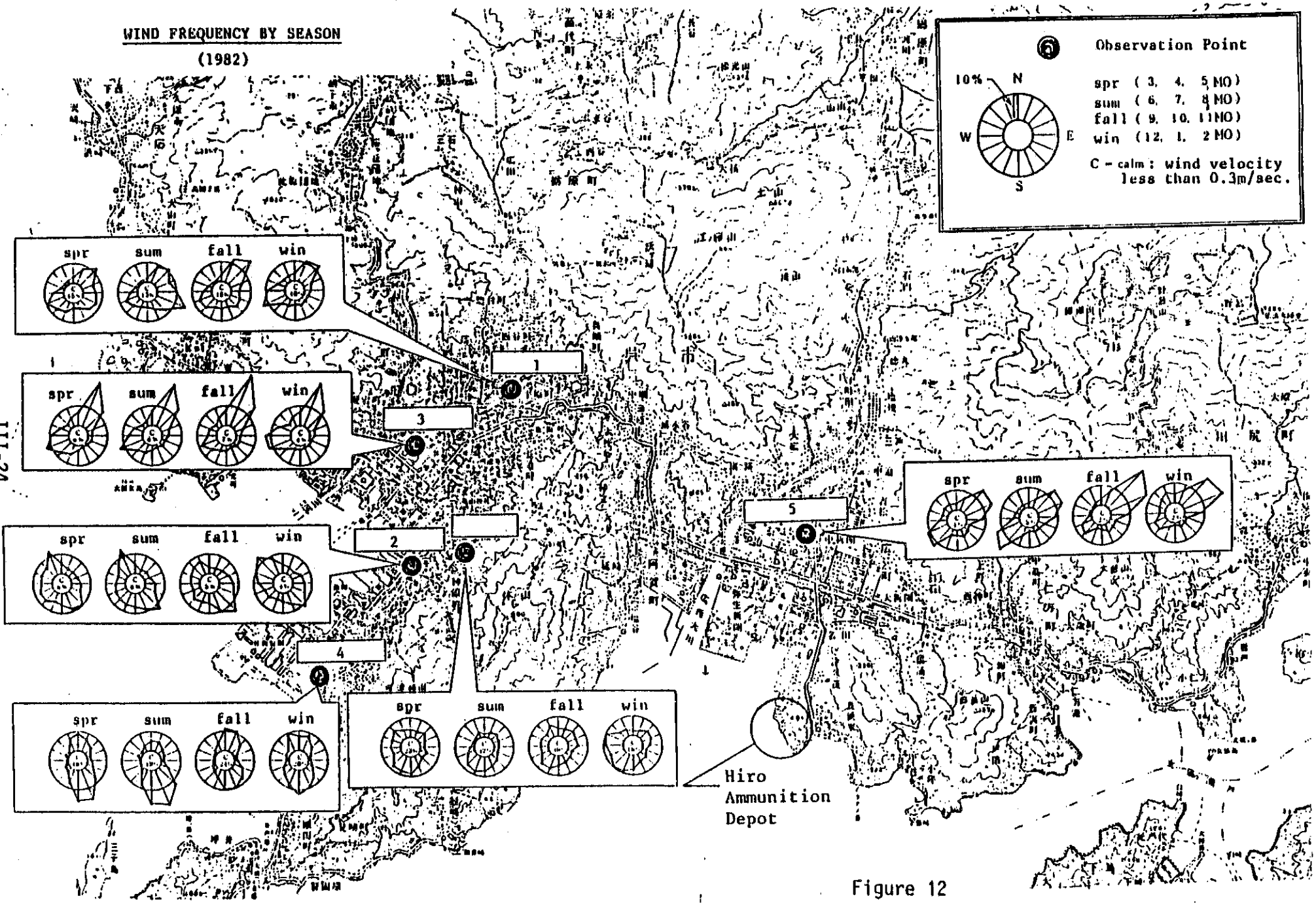

WIND FREQUENCY BY SEASON
(1982)
Observation Point
10%
N
W
E
S
spr (3, 4, 5 MO)
sum (6, 7, 8 MO)
fall (9, 10, 11 MO)
win (12, 1, 2 MO)
C - calm : wind velocity less than 0.3m/sec.
spr
sum
fall
win
1
2
3
4
5
Hiro Ammunition Depot

Figure 12

2. Water Quality

Additional explanation of potable water system is presented in Chapter V.

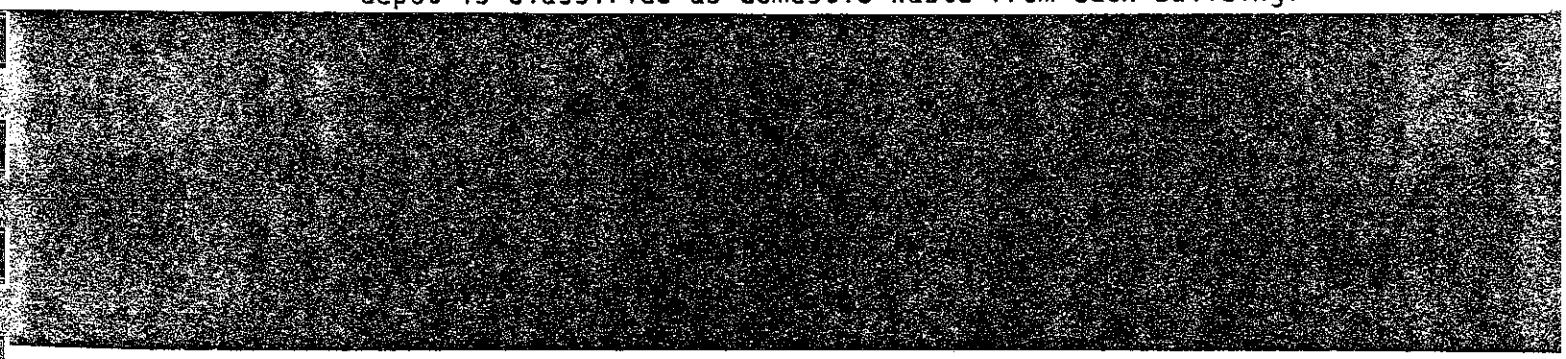
The physical and chemical contents of the potable water from Kure City in accordance with the GOJ standards.

3. Sewage and Wastewater Disposal

Water pollution can be generally divided into industrial waste and domestic sewage.

Up to now, water pollution problems were primarily attributable to pollution generated from industrial waste. But recently, both the industrial waste and domestic sewage are being accounted for the problem. In addition, studies are in progress attributing the red tides to public use water area pollution generated from phosphorus, nitrogen, etc. carrying wastes.

With respect to Hiro Ammunition Depot, there is no industrial waste generating facility, nor is there a central sewage treatment facility in the area. The only wastewater generated from the depot is classified as domestic waste from each building:



These buildings with wastewater plumbing have an individual septic tank and a chlorination device. The effluent is disposed of in the inland sea. The disposal of wastewater is either direct or through the storm drainage system that drains into the sea. The physical and chemical analysis of effluent from the building septic tanks are as follows:

Septic Tank #	pH	COD	SS	n-Hex
1288	7.0	29.2 ppm	24.0 ppm	3.3 ppm
1293	7.3	1.9 ppm	7.0 ppm	0.5 ppm
1295	7.4	2.9 ppm	5.5 ppm	1.5 ppm

Foregoing analysis were obtained from utility engineer's section at USAADA. The date, time, and type of sample taken are specified in pages III-29, III-30, and III-31.

In accordance with the Pollution Control Ordinance of Hiroshima Prefectural Government, dated 13 July 1961, following discharge standards are applicable to Hiro Ammunition Depot:

pH	5.0 - 9.0
COD	130 mg/l (Daily average 100 mg/l)
SS	200 mg/l (Daily average 150 mg/l)
n-Hexane extract materials	Total 35 mg/l (5 mineral oils, 30 vegetable and animal fats)

In accordance with the discharge standards, the effluent from the septic tanks meets the the standards. However, the existing method and the resulting level of treatment/disposal, satisfactory at the time it was designed, is not in keeping with current U.S. EPA and GOJ Environmental Agency regulations.

Discussions with GOJ should result in an acceptable solution in providing a new waste collection, treatment and disposal system for facilities within the leased area, meeting or exceeding current standards.

PHYSICAL AND CHEMICAL ANALYSIS OF WATER

SAMPLE NO. S - 128

FROM: (Station or unit) (Include ZIP Code)
W & CTL, Util Div, DFE, USAGH, APO 96343

DATE: 13 Sep 84

TO: (Name and location of laboratory) (Include ZIP Code)
Akizuki Sub Fac Engr, USAGH, FPO 98764

SAMPLE FROM (Location of sampling point)
Septic tank # 1288, Hiro

COLLECTED BY	DATE	HOUR	SOURCE (Designate ground, surface, raw, treated)
Mr. Kadokawa	12 Sep 84	13:00	Drain water

REASON FOR EXAMINATION: Pollution Survey

EXAMINATION REQUESTED BY: LAWRENCE F. HARDING, Akizuki Sub Fac Engr

NOTE: All results reported in parts per million unless otherwise noted except for pH, temperature, and specific conductance. One liter of potable water is assumed to weigh one kilogram.

I. FIELD ANALYSIS

1. pH	TEMPERATURE °F	TEMPERATURE °C
7.0		27

ITEM	PPM
2. CARBON DIOXIDE (CO_2)	
3. DISSOLVED OXYGEN (O_2)	
4. HYDROGEN SULFIDE (H_2S)	
5. CHLORINE DEMAND (Cl_2)	

FIELD ANALYSIS BY

DATE OF ANALYSIS

II. SPECIAL LABORATORY ANALYSES

Check (X) individual items to be included in the Special Analyses. Request determination only of those substances suspected of being present in significant amounts.

(X)	ITEM	PPM
	1. As	
	2. Se	
	3. Pb	
	4. B	
	5. Cu	
	6. Zn	
	7. Cr (Hexavalent)	
	8. PO	
	9. Cd	
	10. CN	
	11. Phenolic Compounds (PPB)	
	12. Others (Specify)	
X	13. COD	29.2
X	14. SS	24.0
X	15. n-Hexane	3.3
	16.	

III. ROUTINE LABORATORY ANALYSIS

(CHECK ONE)

X REQUESTED | | NOT REQUESTED

ITEM	
1. COLOR	
2. TURBIDITY	
3. ALKALINITY ($CaCO_3$)	
P	MO
4. TOTAL HARDNESS ($CaCO_3$)	
5. NON-CARBONATE HARDNESS ($CaCO_3$) (By Computation)	
6. CARBONATE HARDNESS ($CaCO_3$) (By Computation)	
7. TOTAL DISSOLVED SOLIDS	
8. SPECIFIC CONDUCTANCE (Micromhos)	

ITEM	PPM
9. CALCIUM (Ca)	
10. MAGNESIUM (Mg)	
11. SODIUM (Na) AND POTASSIUM (K)	
12. HYDROXIDE (OH)*	
13. BICARBONATE (HCO_3)*	
14. CARBONATE (CO_3)*	
15. SULFATE (SO_4)	
16. CHLORIDE (Cl)	
17. NITRATE (NO_3)	
18. IRON (Fe) TOTAL	
19. MANGANESE (Mn)	
20. SILICA (SiO_2)	
21. FLUORIDE (F)	

*State whether determined or computed from P and MO alkalinity.

REMARKS (Such as unusual appearance, taste, odor, etc.)

LABORATORY ANALYSIS BY: [signature]

DATE OF ANALYSIS: 3 Oct 84

PHYSICAL AND CHEMICAL ANALYSIS OF WATER

SAMPLE NO. S - 129

FROM: (Station or unit) (Include ZIP Code)
W & CTL, Util Div, DFE, USAGH, APO 96343

DATE: 13 Sep 84

TO: (Name and location of laboratory) (Include ZIP Code)
Akizuki Sub Fac Engr, USAGH, FPO 98764

SAMPLE FROM (Location of sampling point)
Septic tank # 1293, Hiro

COLLECTED BY	DATE	HOUR	SOURCE (Designate ground, surface, raw, treated)
Mr. Kadokawa	12 Sep 84	13:30	Drain water

REASON FOR EXAMINATION: Pollution Survey

EXAMINATION REQUESTED BY: LAWRENCE F. HARDING, Akizuki Sub Fac Engr

NOTE: *All results reported in parts per million unless otherwise noted except for pH, temperature, and specific conductance. One liter of potable water is assumed to weigh one kilogram.*

I. FIELD ANALYSIS

1. pH	TEMPERATURE °F	TEMPERATURE °C
7.3		27

ITEM	PPM
2. CARBON DIOXIDE (CO_2)	
3. DISSOLVED OXYGEN (O_2)	
4. HYDROGEN SULFIDE (H_2S)	
5. CHLORINE DEMAND (Cl_2)	

FIELD ANALYSIS BY

DATE OF ANALYSIS

II. SPECIAL LABORATORY ANALYSES

Check (X) individual items to be included in the Special Analyses. Request determination only of those substances suspected of being present in significant amounts.

(X)	ITEM	PPM
	1. As	
	2. Se	
	3. Pb	
	4. B	
	5. Cu	
	6. Zn	
	7. Cr (Hexavalent)	
	8. PO	
	9. Cd	
	10. CN	
	11. Phenolic Compounds (PPB)	
	12. Others (Specify)	
X	13. COD	1.9
X	14. SS	7.0
X	15. n-Hexane	0.5
	16.	

III. ROUTINE LABORATORY ANALYSIS

(CHECK ONE)

X	REQUESTED		NOT REQUESTED

ITEM		PPM
1. COLOR		
2. TURBIDITY		
3. ALKALINITY ($CaCO_3$)	P	MO
4. TOTAL HARDNESS ($CaCO_3$)		
5. NON-CARBONATE HARDNESS ($CaCO_3$) (By Computation)		
6. CARBONATE HARDNESS ($CaCO_3$) (By Computation)		
7. TOTAL DISSOLVED SOLIDS		
8. SPECIFIC CONDUCTANCE (Micromhos)		
9. CALCIUM (Ca)		
10. MAGNESIUM (Mg)		
11. SODIUM (Na) AND POTASSIUM (K)		
12. HYDROXIDE (OH)*		
13. BICARBONATE (HCO_3)*		
14. CARBONATE (CO_3)*		
15. SULFATE (SO_4)		
16. CHLORIDE (Cl)		
17. NITRATE (NO_3)		
18. IRON (Fe) TOTAL		
19. MANGANESE (Mn)		
20. SILICA (SiO_2)		
21. FLUORIDE (F)		

*State whether determined or computed from P and MO alkalinity.

REMARKS (Such as unusual appearance, taste, odor, etc.)

LABORATORY ANALYSIS BY

DATE OF ANALYSIS: 3 Oct 84

PHYSICAL AND CHEMICAL ANALYSIS OF WATER

SAMPLE NO. S - 130

FROM: (Station or unit) (Include ZIP Code)
W & CTL, Util Div, DPE, USAGH, APO 96343

DATE: 13 Sep 84

TO: (Name and location of laboratory) (Include ZIP Code)
Akizuki Sub Fac Engr, USAGH, APO 96764

SAMPLE FROM (Location of sampling point)
Septic tank # 1295, Hiro

COLLECTED BY	DATE	HOUR	SOURCE (Designate ground, surface, raw, treated)
Mr. Kadokawa	12 Sep 84	13:10	Drain water

REASON FOR EXAMINATION: Pollution Survey

EXAMINATION REQUESTED BY: LAWRENCE F. HARDING, Akizuki Sub Fac Engr

NOTE: All results reported in parts per million unless otherwise noted except for pH, temperature, and specific conductance. One liter of potable water is assumed to weigh one kilogram.

I. FIELD ANALYSIS

1. pH	TEMPERATURE °F	TEMPERATURE °C
7.4		27

ITEM	PPM
2. CARBON DIOXIDE (CO_2)	
3. DISSOLVED OXYGEN (O_2)	
4. HYDROGEN SULFIDE (H_2S)	
5. CHLORINE DEMAND (Cl_2)	

FIELD ANALYSIS BY

DATE OF ANALYSIS

II. SPECIAL LABORATORY ANALYSES

Check (X) individual items to be included in the Special Analyses. Request determination only of those substances suspected of being present in significant amounts.

(X)	ITEM	PPM
	1. As	
	2. Se	
	3. Pb	
	4. B	
	5. Cu	
	6. Zn	
	7. Cr (Hexavalent)	
	8. PO	
	9. Cd	
	10. CN	
	11. Phenolic Compounds (PPB)	
	12. Others (Specify)	
X	13. COD	2.9
X	14. SS	5.5
X	15. n-Hexane	1.5
	16.	

III. ROUTINE LABORATORY ANALYSIS

(CHECK ONE)

X REQUESTED | | NOT REQUESTED

ITEM	PPM
1. COLOR	
2. TURBIDITY	
3. ALKALINITY ($CaCO_3$) P	MO
4. TOTAL HARDNESS ($CaCO_3$)	
5. NON-CARBONATE HARDNESS ($CaCO_3$) (By Computation)	
6. CARBONATE HARDNESS ($CaCO_3$) (By Computation)	
7. TOTAL DISSOLVED SOLIDS	
8. SPECIFIC CONDUCTANCE (Micromhos)	
9. CALCIUM (Ca)	
10. MAGNESIUM (Mg)	
11. SODIUM (Na) AND POTASSIUM (K)	
12. HYDROXIDE (OH)*	
13. BICARBONATE (HCO_3)*	
14. CARBONATE (CO_3)*	
15. SULFATE (SO_4)	
16. CHLORIDE (Cl)	
17. NITRATE (NO_3)	
18. IRON (Fe) TOTAL	
19. MANGANESE (Mn)	
20. SILICA (SiO_2)	
21. FLUORIDE (F)	

*State whether determined or computed from P and MO alkalinity.

REMARKS (Such as unusual appearance, taste, odor, etc.)

LABORATORY ANALYSIS BY

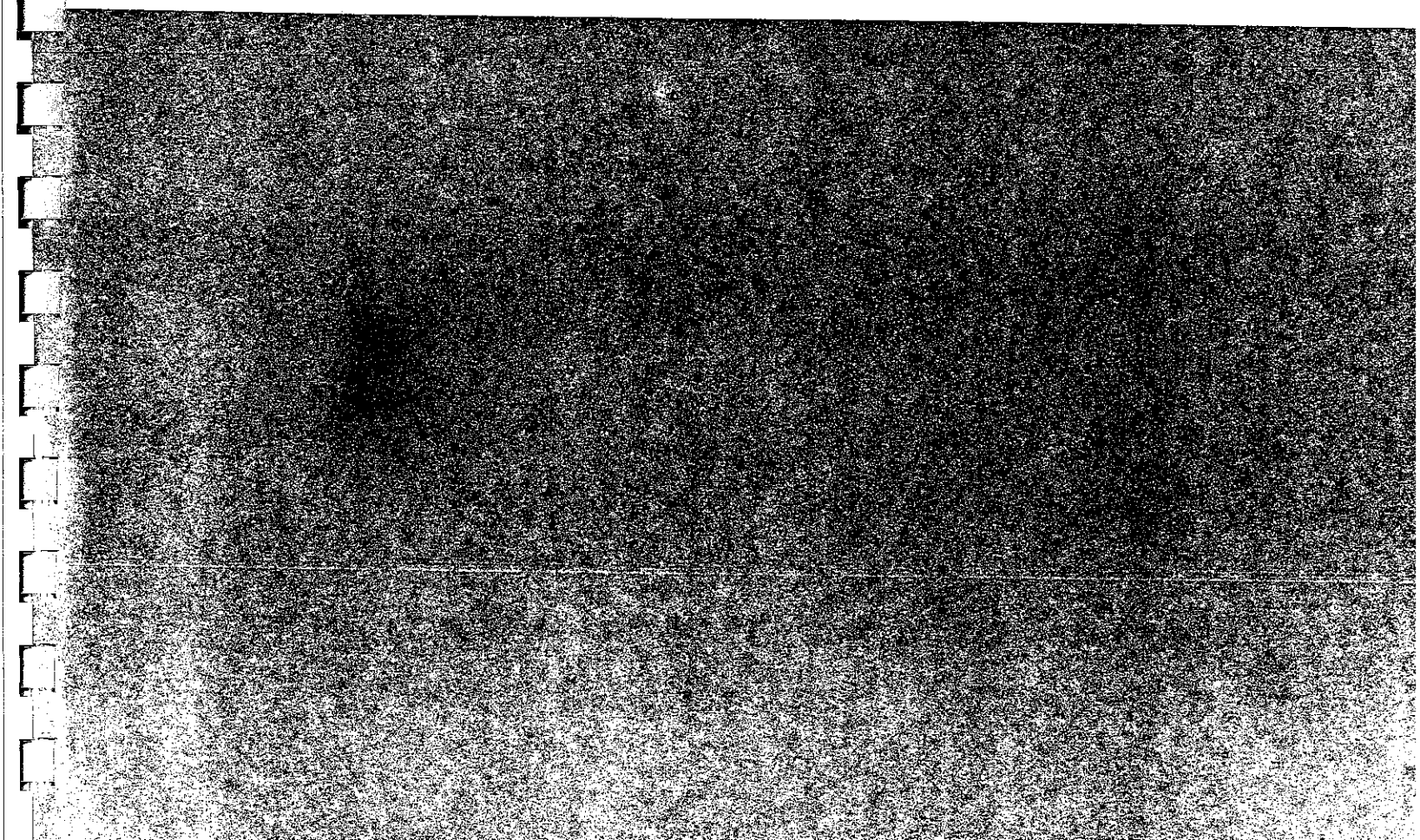
DATE OF ANALYSIS: 3 Oct 84

4. Solid Waste Disposal

All solid waste generated at the depot is collected on an individual basis, by the fire station or the security personnel. The trash is transported to an on-site "burning pit" for incineration. The estimated volume of trash that is generated and incinerated in the "burning pit" is minor.

5. Pest Management Program

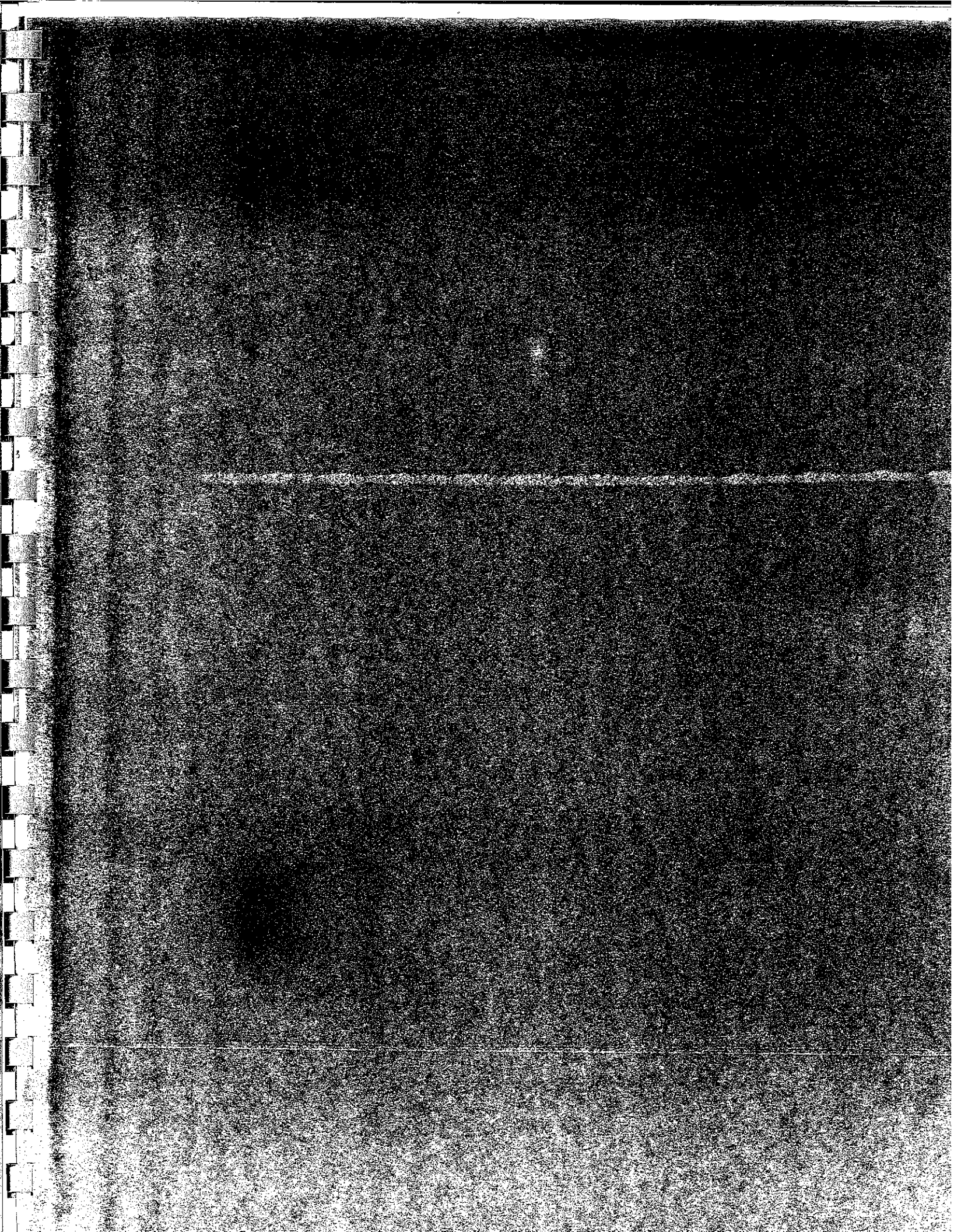
According to Facilities Engineers at Akizuki, there is an on-going pest management program. Pest control work is being performed at Hiro to control nematodes, aphids, beetles, and spider mites. Insecticides and rodenticides are used and termite surveillance is conducted and wooden structures treated if infestation is found. There is an on-going mowing contract which precludes the use of herbicides at Hiro.

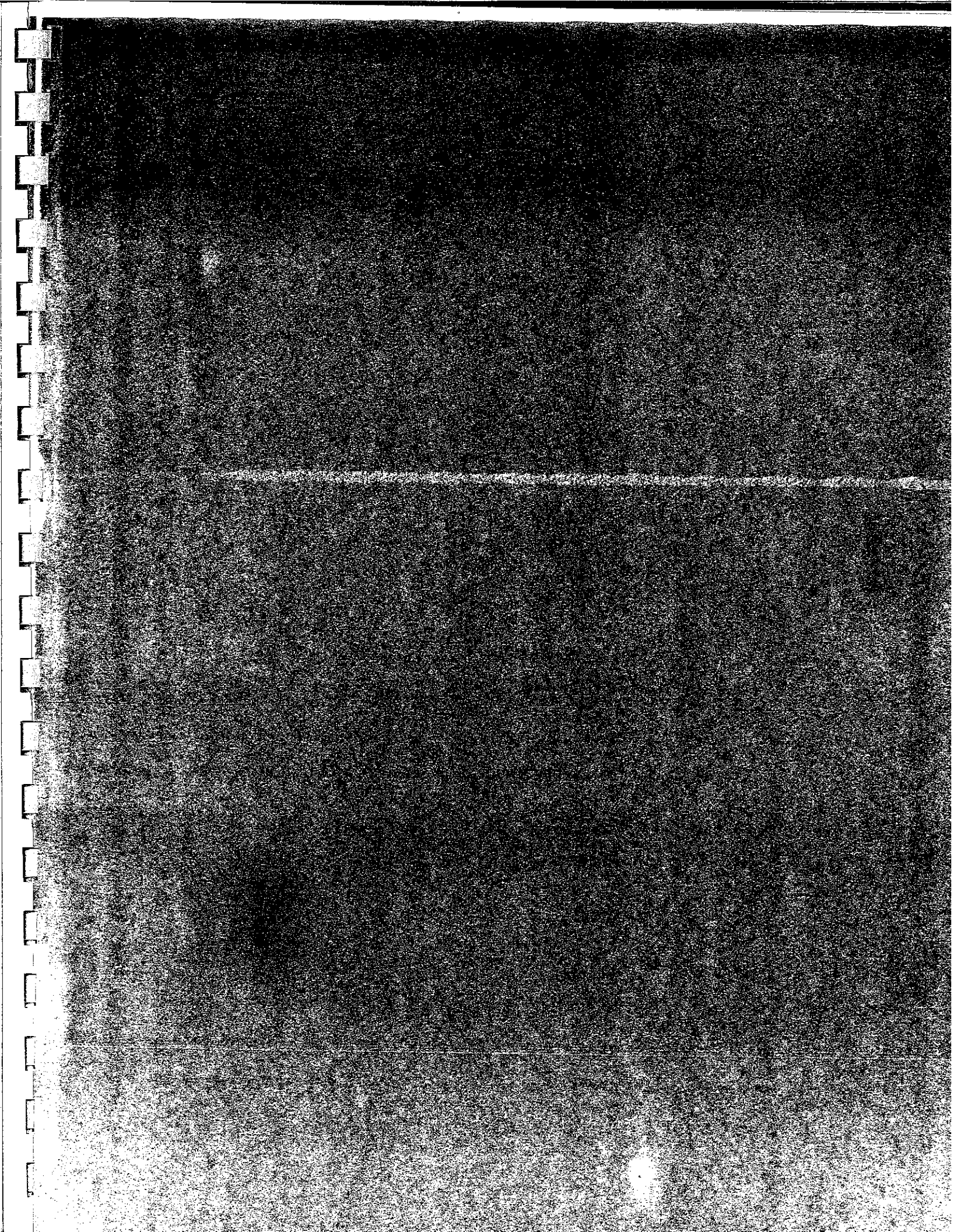


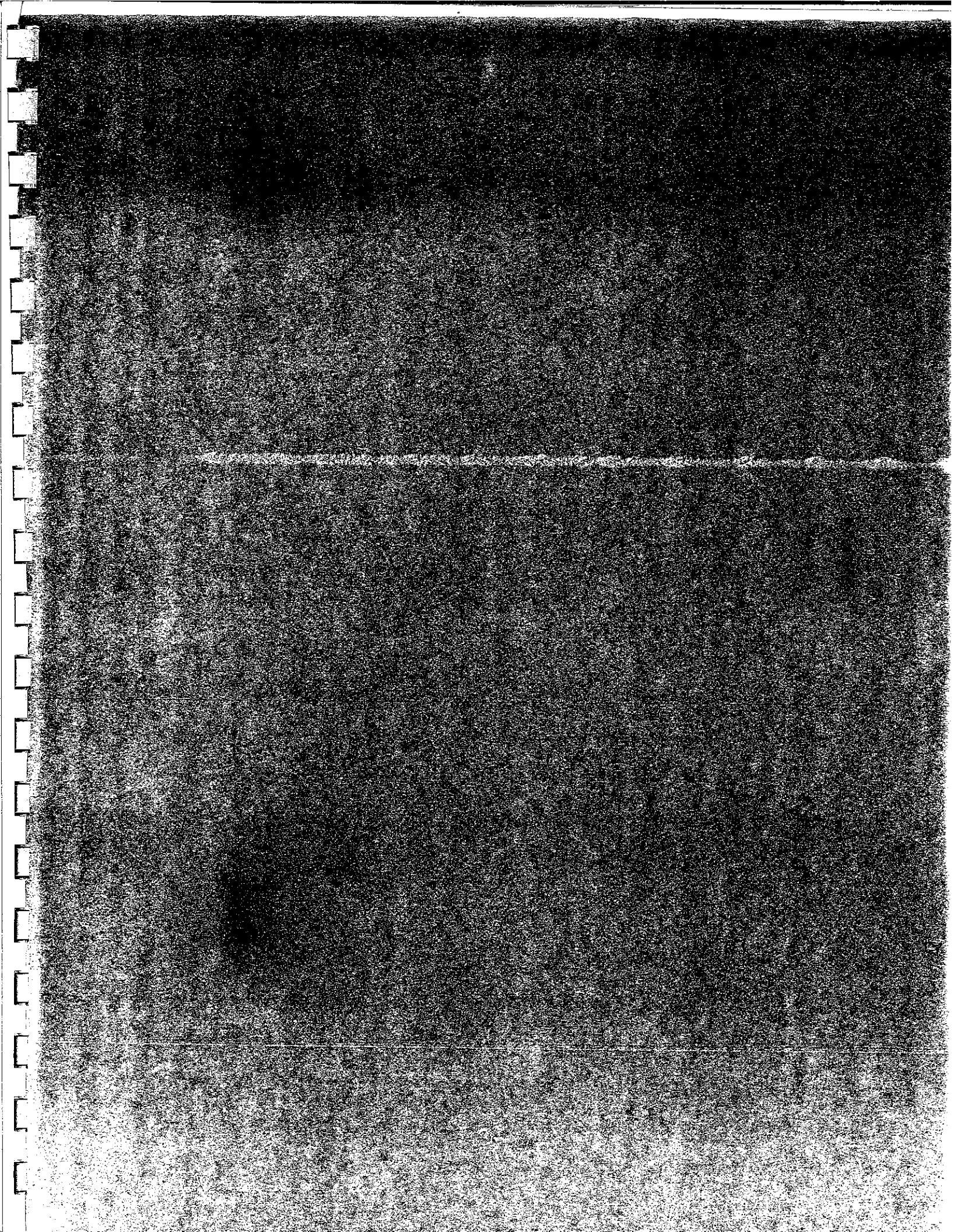
E. SAFETY

1. Aircraft Operations

The existing helipad is located in an open, paved area away from buildings and operations. It is infrequently used except for administrative transportation of select personnel. Approach to the pad is over a hill bordering the depot, with departure over the ocean. With the current level of usage, the approach is acceptable. The amount of level lands within the depot is limited and the current location is within the widest open, unencumbered area.







F. VISUAL SURROUNDINGS

1. Topography

A brief topographical features were mentioned in Section III-A, Location/Physiographic Features. In addition, the topographical surroundings of the depot is as stated below.

Kure city is composed of several seashore and high-land cities, divided by mountains with many steep slopes. Of the 145 km^2 of the area, 2/3 is covered with mountains with very few leveled area. These mountains, which are mostly to the northern area of the depot, has a peak elevation of 839 meters (2,754 feet) at the highest point. The steep slopes are about 30 degrees. Regardless of the steepness, houses are densely packed on these slopes.

To the south of the depot is the Seto Inland Sea with a view of Nasakejima and the Kurahashijima Islands.

2. Tree and Vegetative Cover

A detail description of tree and vegetative cover is as discussed in Section III-A.2, Vegetation and Section III-I.3, Trees; hence, no particular mention will be made here.

3. Streams

In the vicinity of Hiro Ammunition Depot, there are four major rivers, namely, Kurosegawa, Hiro-okawa, Hirohigashi-okawa, and Hironishi-okawa.

River Kurosegawa initiates from the Kurose town, approximately 15 km north of the depot and flows south. At the point of dam, approximately 11 km north of the depot, the river turns into River Hiro-okawa, and flows further south until it splits into two

rivers, Hirohigashi-okawa and Hironishi-okawa. Both river eventually flow out to Seto Inland Sea.

4. Lakes

There are no significant lakes in the vicinity of the depot, except for several small ponds which are too numerous to list.

5. Mountains

With Seto Inland to the south of the depot and mountain to the north and east, a very aesthetic .scenery surrounds the Hiro Ammunition Depot.

To the northeast of the depot is the Mt. Norosan Piedmont with a peak elevation of 839 meters (2,754 feet). This mountain is a National Park of Seto Inland Sea.

To the north is the Mt. Tsuchi with a peak elevation of 607 meters (1,992 feet and the Mt. Haigamine with a peak elevation of 703 meters (2,307 feet) to the northeast.

To the east of the depot is the Mt. Yasumiyama with a peak elevation of 501 meters (1,642 feet). This mountain is also known as the National Park of Seto Inland Sea.

6. Undesirable Elements

There are no major undesirable elements in the surrounding area of the depot.

G. NOISE

1. Aircraft Operations

The depot is equipped with a helipad, for administrative transportation of select personnel. But since it is infrequently used, the operation of helipad is not a major contributor to noise at the depot.

2. Others

There are no other sources of noise contributor at the depot, other than minor noise created by monthly exercise of fire trucks, which is insignificant compared to the noise generated by Route 185.

H. ODORIFEROUS OPERATION

1. Paper Mills

There are approximately 21 paper processing and manufacturing industrial plants in Kure city. Among the plants, Toyo Pulp is the largest paper mill industry and is located adjacent to Hiro Ammunition Depot as discussed earlier. Detail discussion on Toyo Pulp is discussed in Section III-D, Health.

2. Sewage Disposal

There is no specific sewage disposal considered odoriferous operation in Kure or Hiro.

3. Land Fill

None in immediate vicinity.

4. Abattoir Operations

There is no abattoir operation at Hiro, or at Kure city.

5. Stock yards

None.

6. Farm Operation

There are several livestock farming at Kure city, but these are not in the immediate vicinity of Hiro Ammunition Depot.

7. Stagnant Water

None.

I. LIFE FORMS

There are no rare or exotic animal life at Hiro Ammunition Depot. However, there are several life forms which are of symbolic image of Hiroshima Prefecture and, which need to be aware of and protected.

1. Birds

Bird life is abundant at Hiro Ammunition Depot. This bird life is mostly present at the woody hill, away from the active area of the installation and protected in their natural habitant.

The symbolic bird of Hiroshima is Abi, which is an aquatic sea bird with a wing span of 27-30 cm, gray head and neck, dark brown back with dotted small white front body. Abi breeds in the arctic region and also migrates to Japan. This sea bird is famous for detecting a shoal of fish for the fishermen.

2. Fish - Other Aquatic Forms

In the vicinity water of Hiro Ammunition Depot, there are oyster and laver farming as indicated in Fig. 15. But since the farming is not within the restricted water area of Hiro Ammunition Depot, there is no impact to the mission or vice versa.

3. Trees

Forests and fields of Hiroshima prefecture represents 640,000 hectares, which is approximately 70% of the total area. Forests and fields consist of predominantly Japanese red pine.

The symbolic tree of Hiroshima is an evergreen oak tree (Kashi); symbolic flower is camellia (Tsubaki), a Japanese rose.

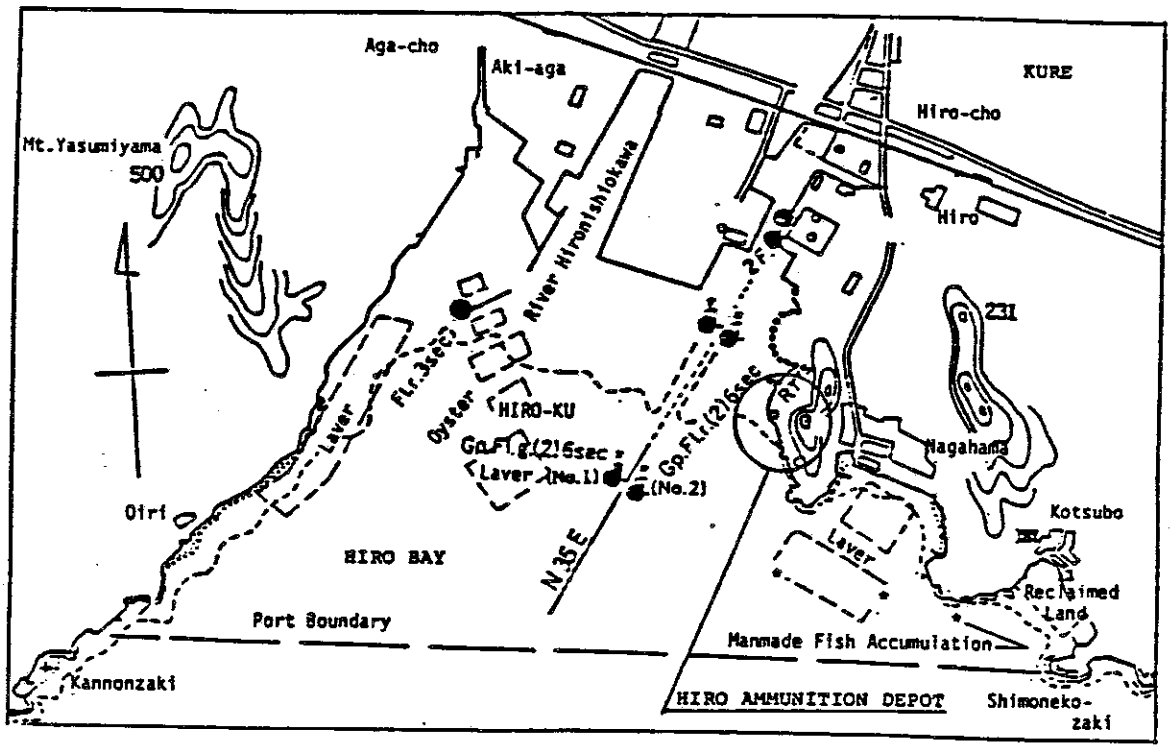
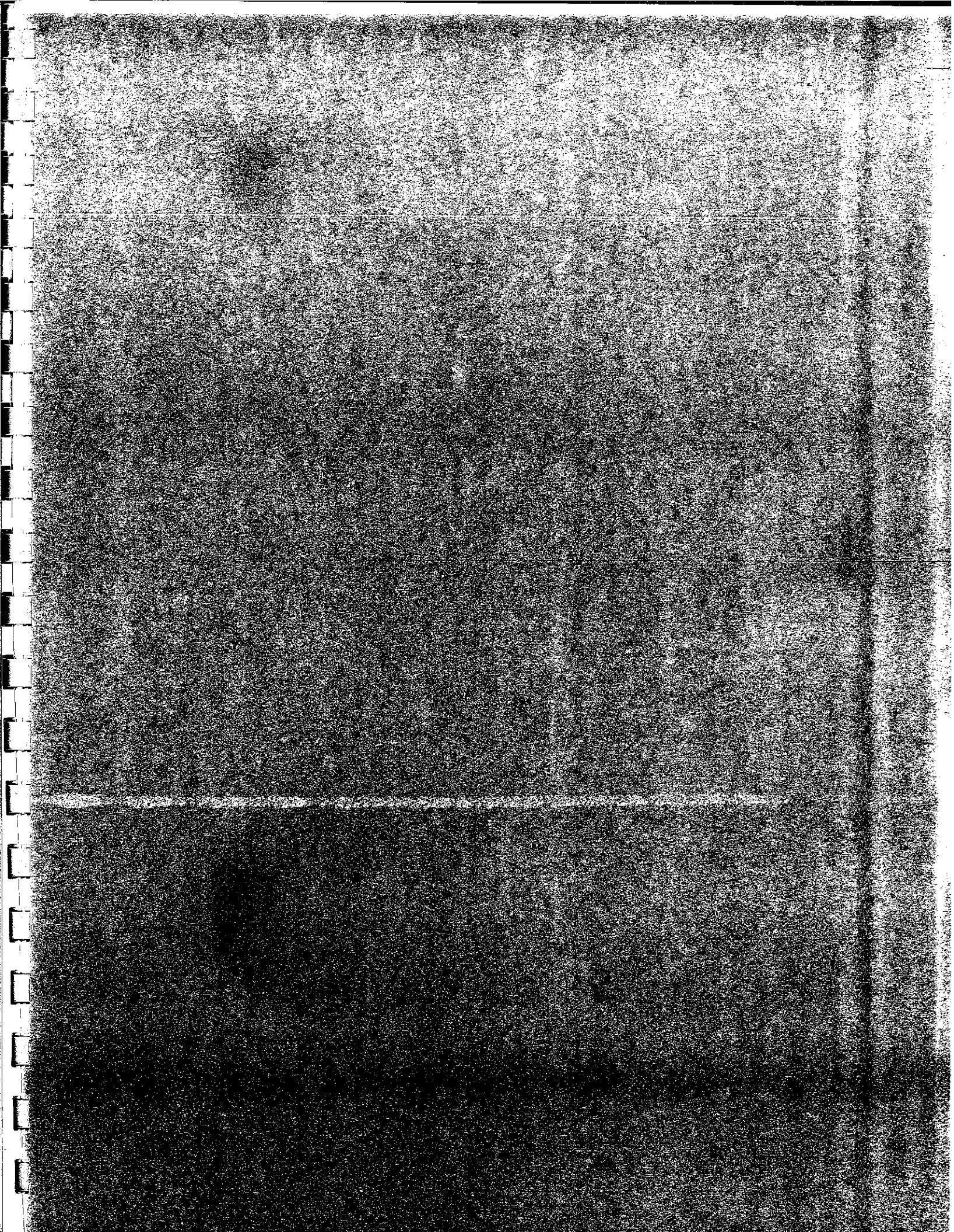

Aga-cho
Aki-aga
KURE
Hiro-cho
Mt.Yasumiyama
500
River Hironishiokawa
Hiro
231
Oyster Layer
Fl.3sec
HIRO-KU
Gp.Fl.g(2)6sec
Layer (No.1)
(No.2)
Gp.Fl.(2)6sec
Nagahama
Oiri
HIRO BAY
N.35E
Layer
Kotsubo
Reclaimed Land
Port Boundary
Manmade Fish Accumulation
Kannonzaki
HIRO AMMUNITION DEPOT
Shimoneko-zaki

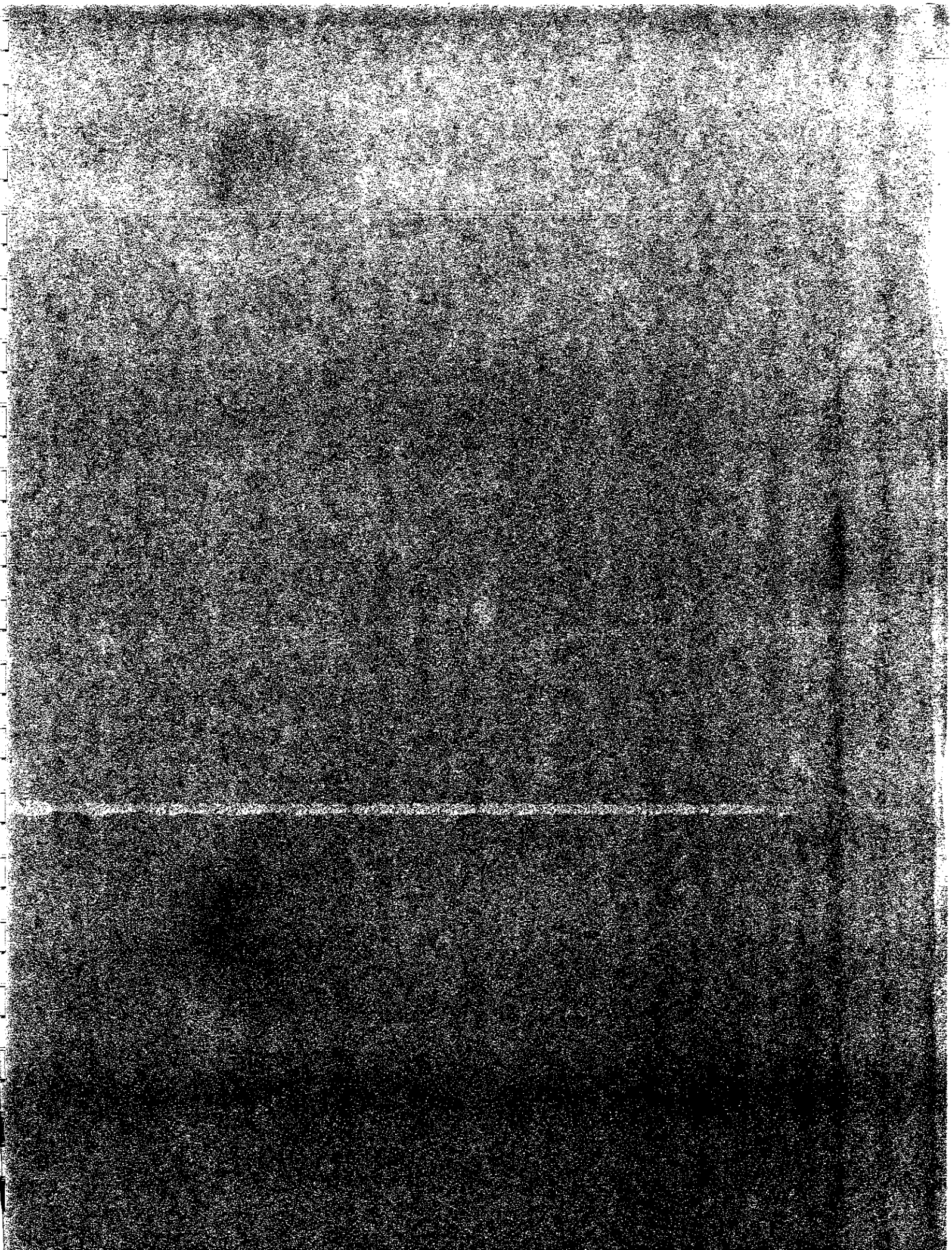
Figure 15

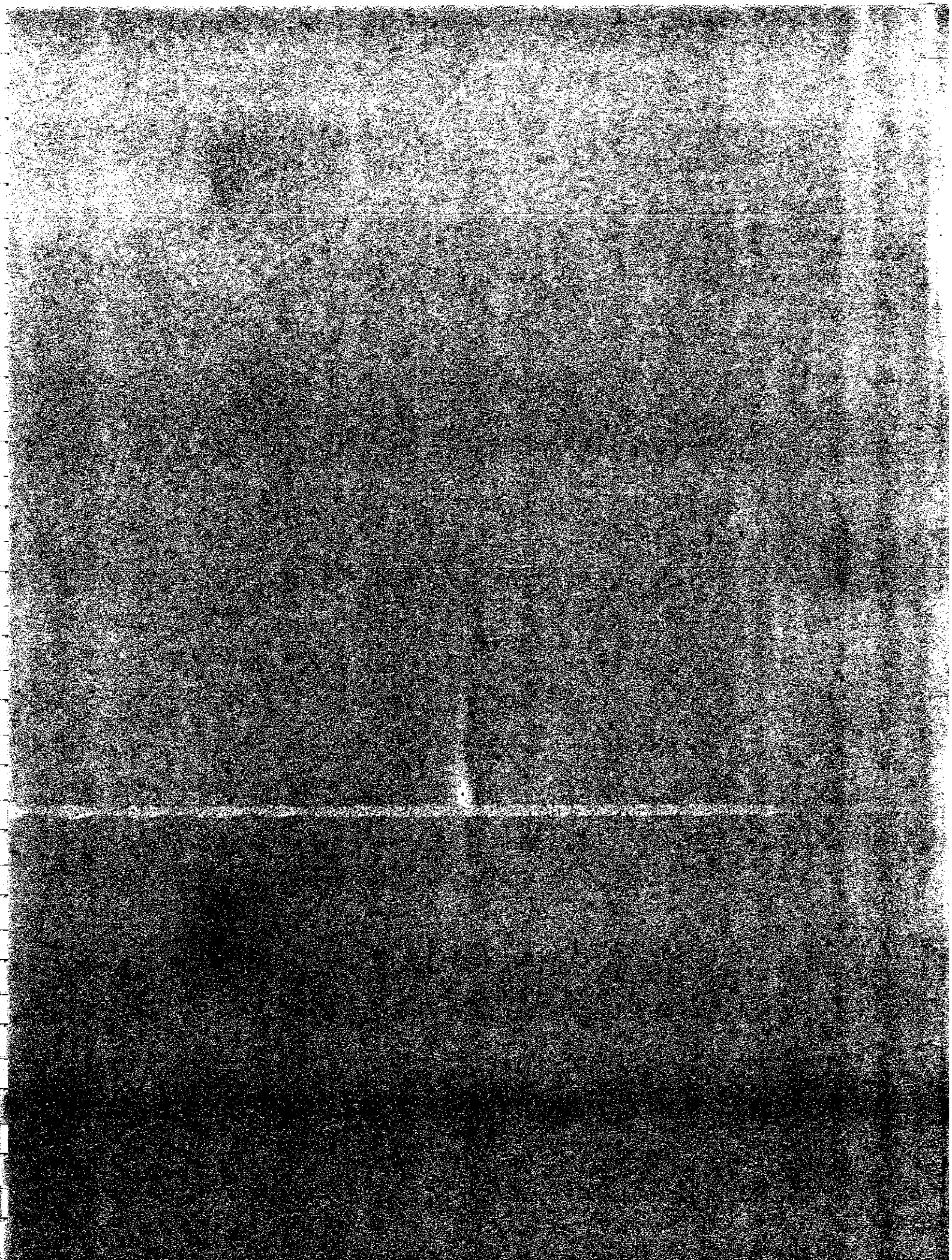
CHAPTER IV
BUILDINGS AND OTHER INSTALLATION FACILITIES

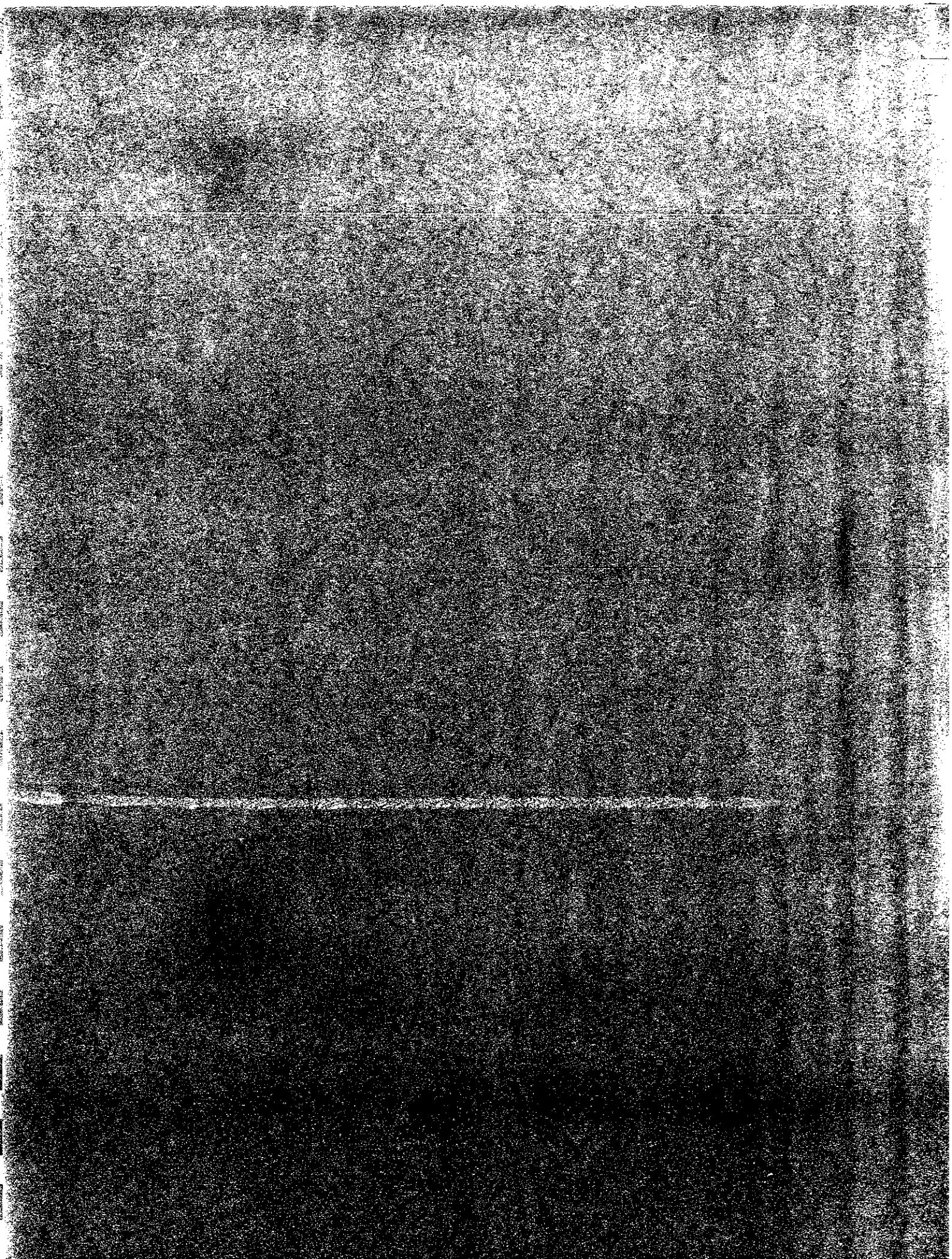
A. INTRODUCTION

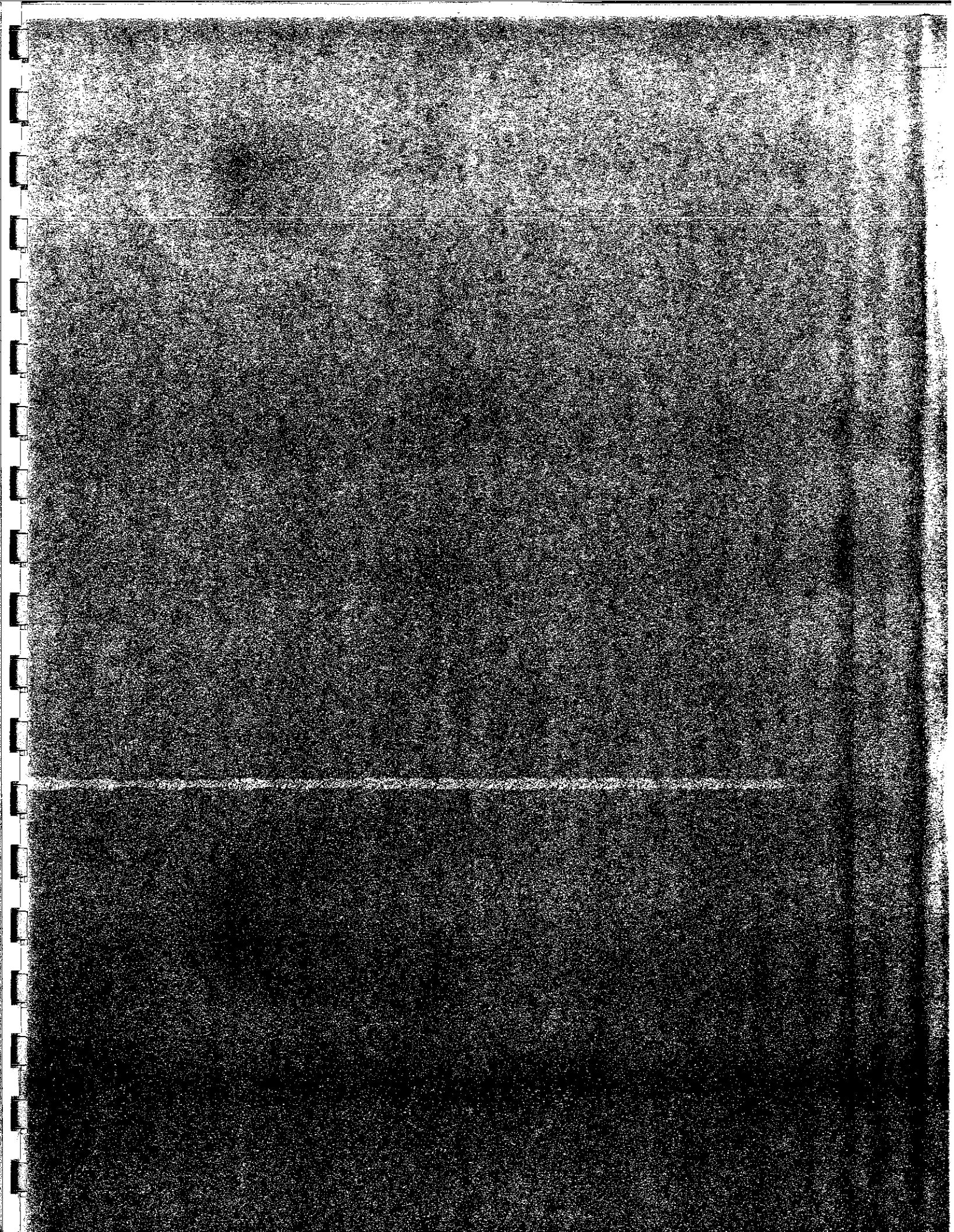
Chapter IV describes buildings and related facilities within Hi[illegible] Ammunition Depot.

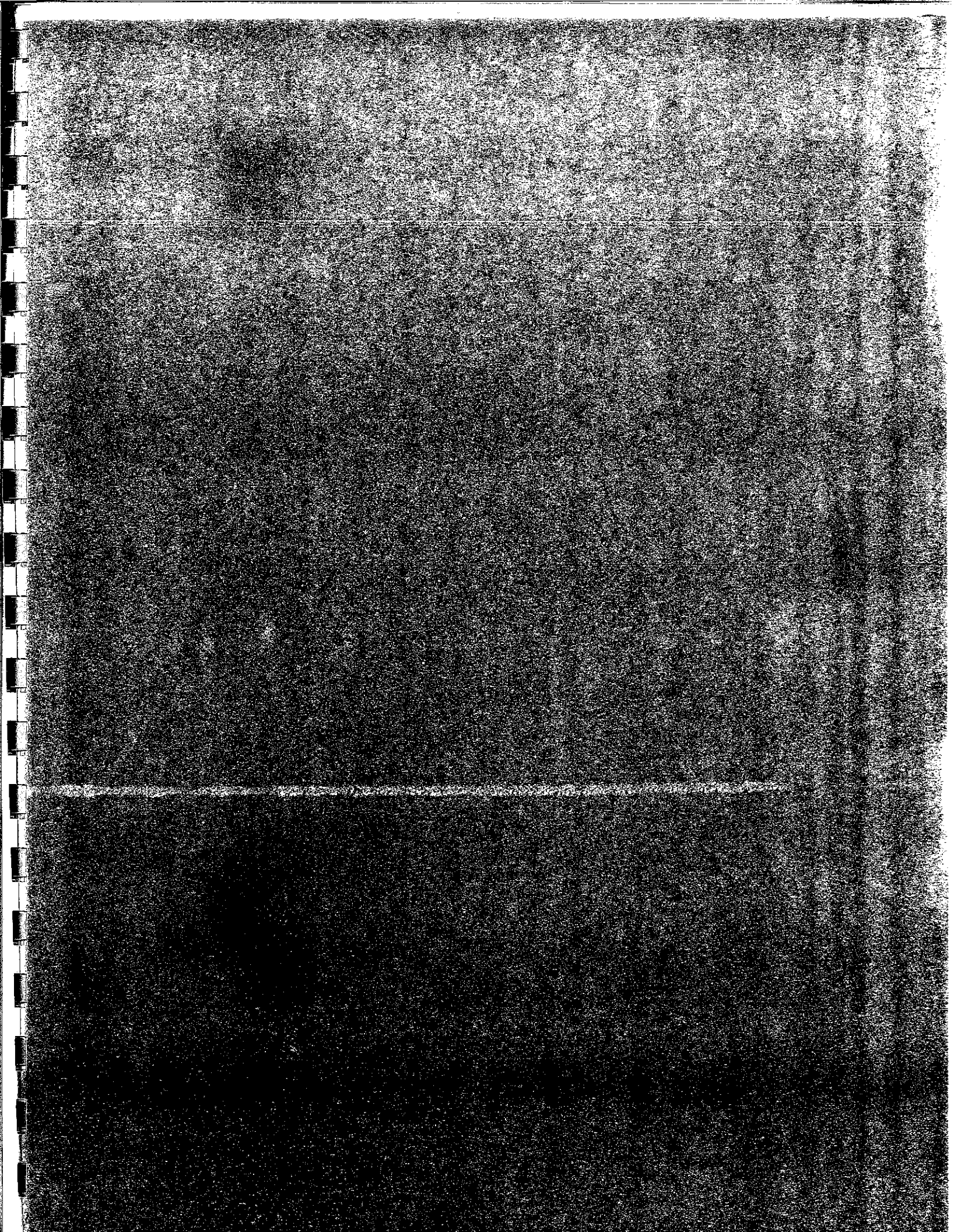






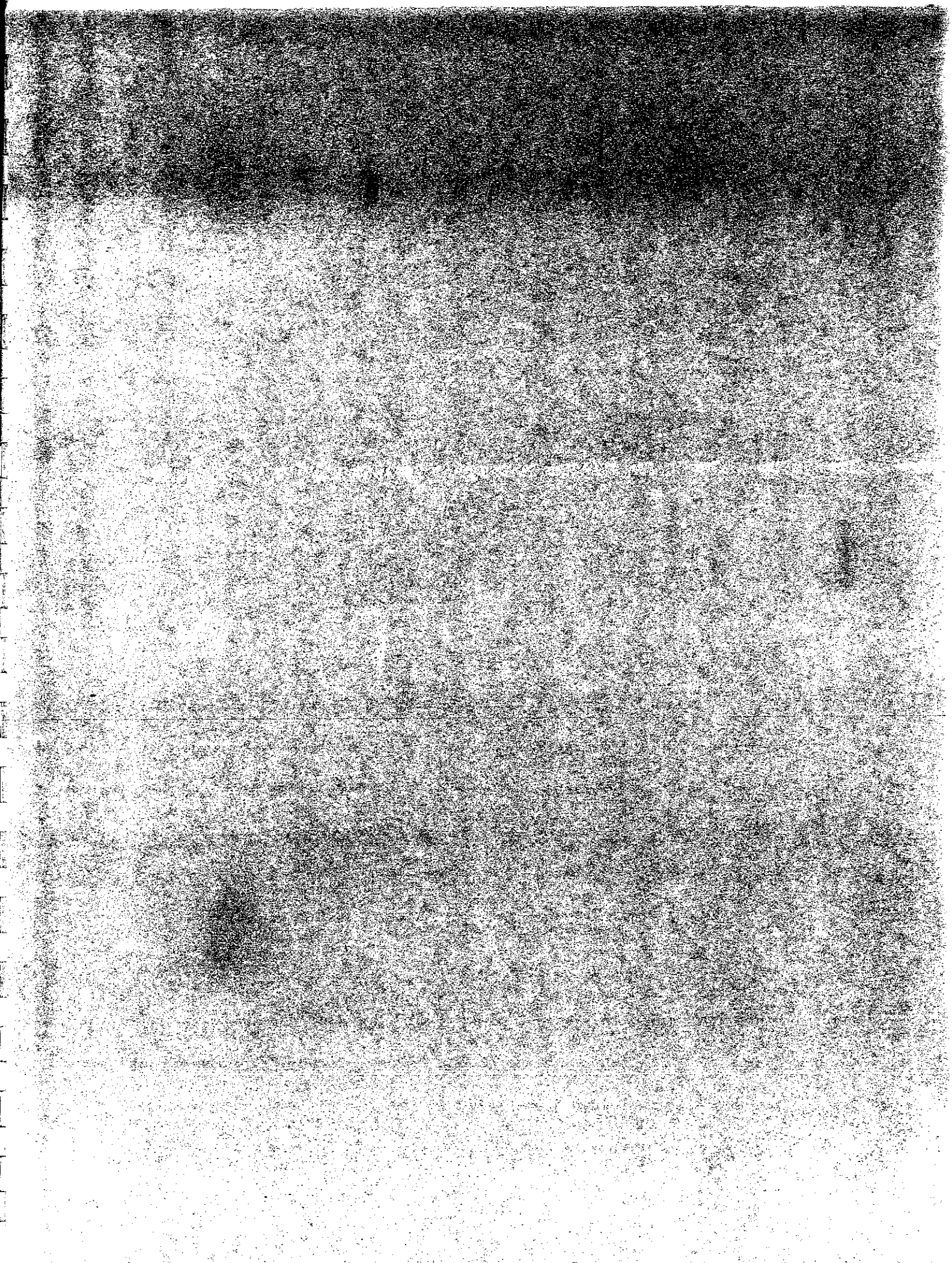


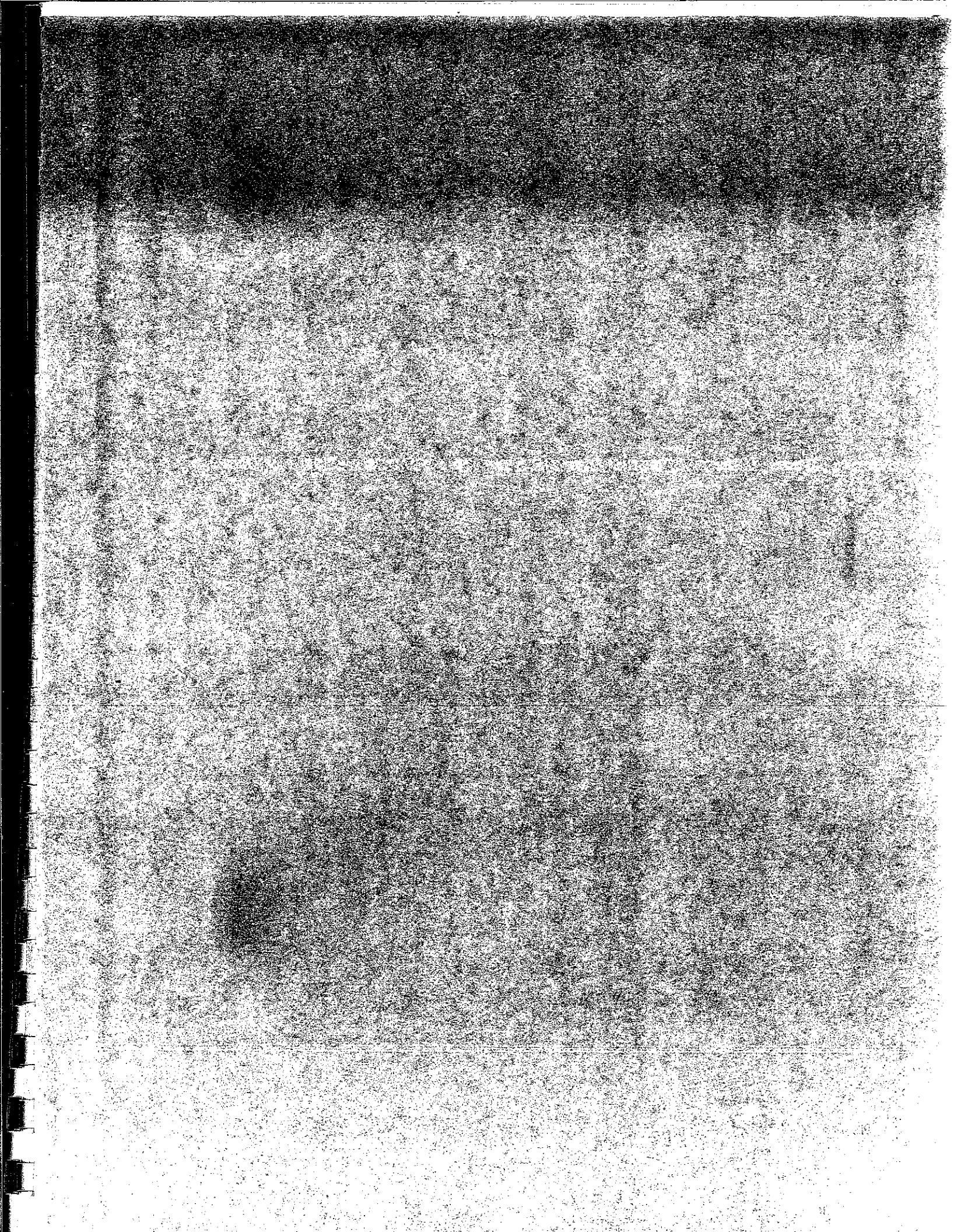


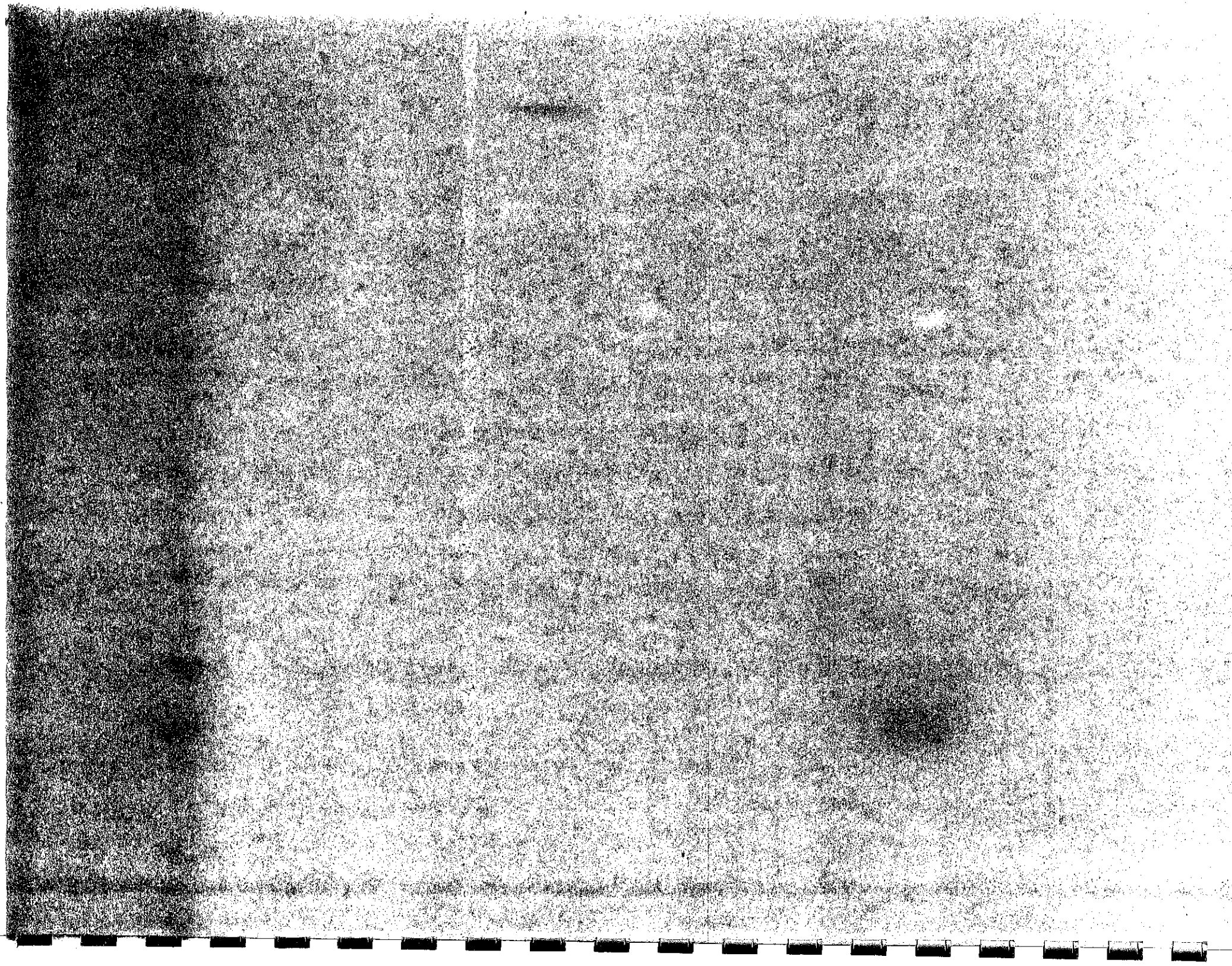


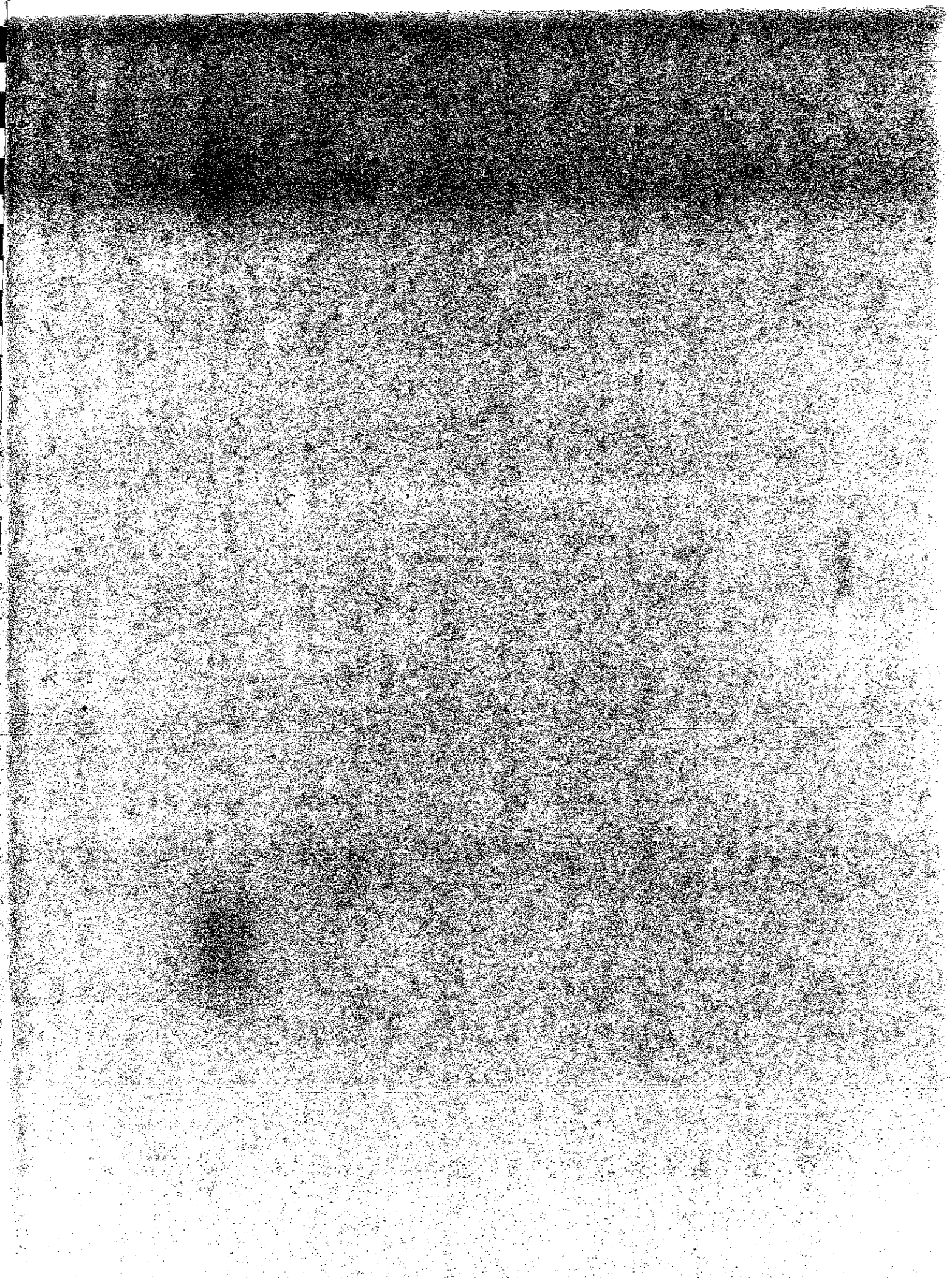
D. CODE 300: RESEARCH AND TEST FACILITIES

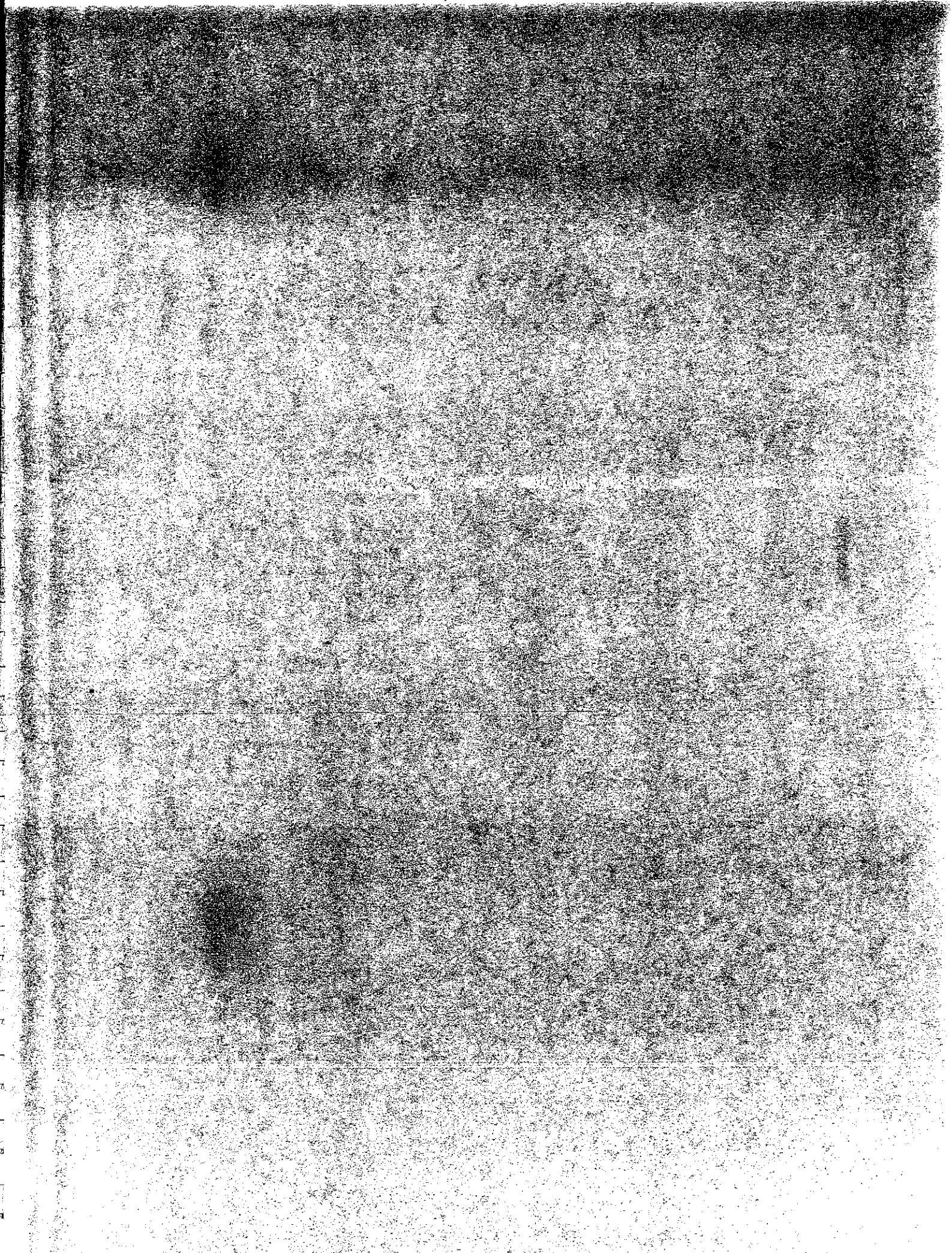
No buildings in this category exist at Hiro Ammunition Depot.

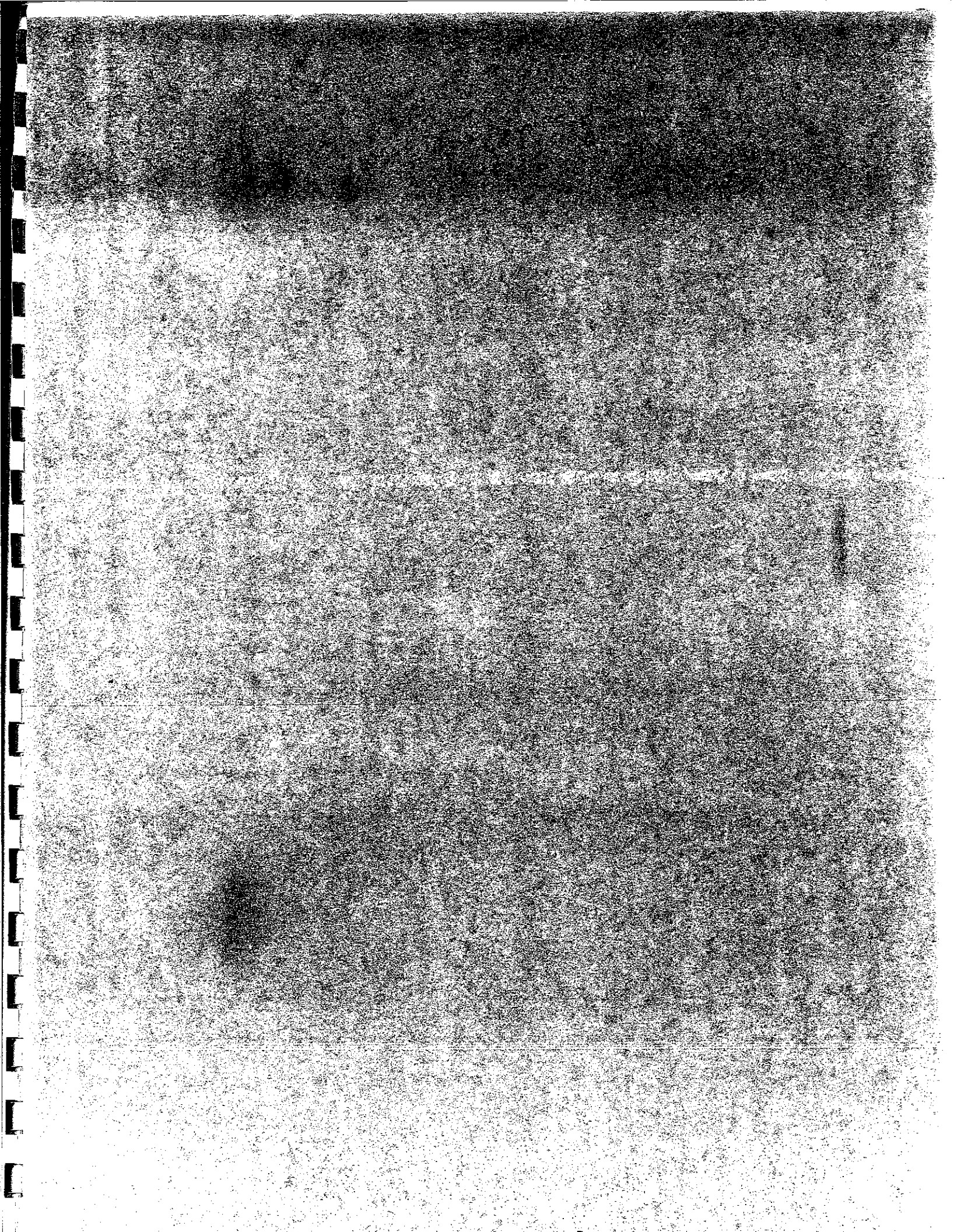


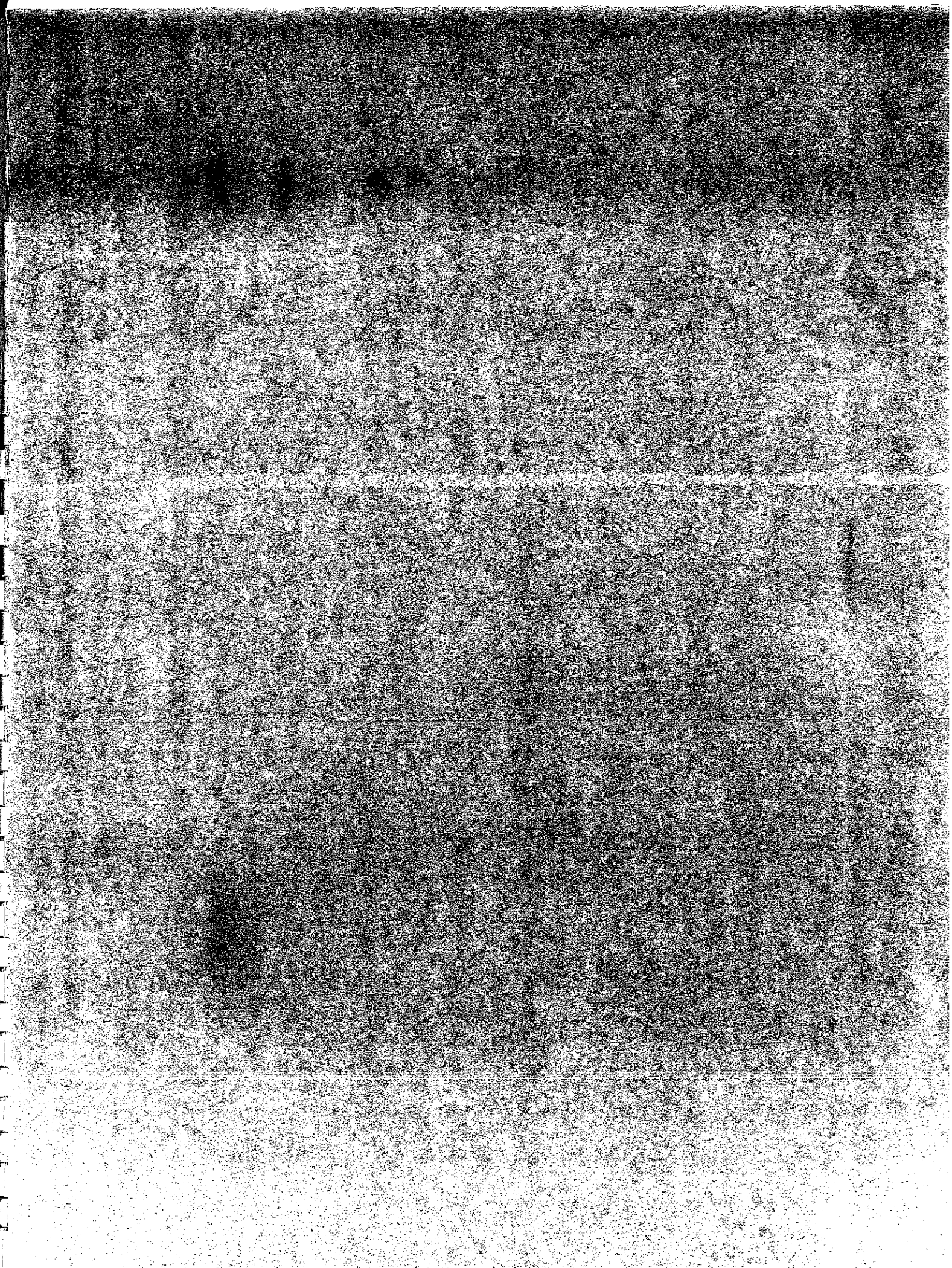












H. CODE 700: COMMUNITY FACILITIES

1. Community Facilities - Personnel Support

a. Fire Station

Using Agency : Directorate, Facilities Engineer
Status : Active
Deficiency : None

The Hiro Ammunition Depot Fire Station, building #S-1292, is located at the end of the main entry road to the installation. It is a signle-story, steel- and wood-frame structure containing 6,030 square feet of usable floor area and housing two fire-fighting vehicles. It is staffed by a company of ten fire fighters. The next nearest fire department is 1.6 miles away in Hiro Town. The depot fire station is connected to water, sewer, electric power, and telephone services, and heating is provided by oil-fired space heaters.

2. Morale and Welfare Community Facilities

Using Agency : USAADA
Status : Active
Deficiency : None

Buildings #S-1212 and #T-1239 are two lunchrooms serving the depot. They are both wood-frame structures with a combined usable floor area of 1,110 square feet. Water, sewer, and electrical utilities are connected to both buildings, which are in fair condition. Buildings #S-1275 is also used as a lunchroom and is heated by an oil-fired space heater.

CHAPTER V
UTILITIES AND STORM DRAINAGE

This section of the report describes the primary utilities and the storm drainage system. Reference is made to the respective Basic Information Maps.

A. POTABLE WATER SYSTEM

The water is potable and the volume consumed is metered at the point of entry to the site. The volume of water consumed varies but the estimated average consumption is 0.10 million gallons per month at a static pressure of 100 psi.

Water supply system within Hiro Ammunition Depot is a non-looped closed system with 6-inch or 8-inch water mains.

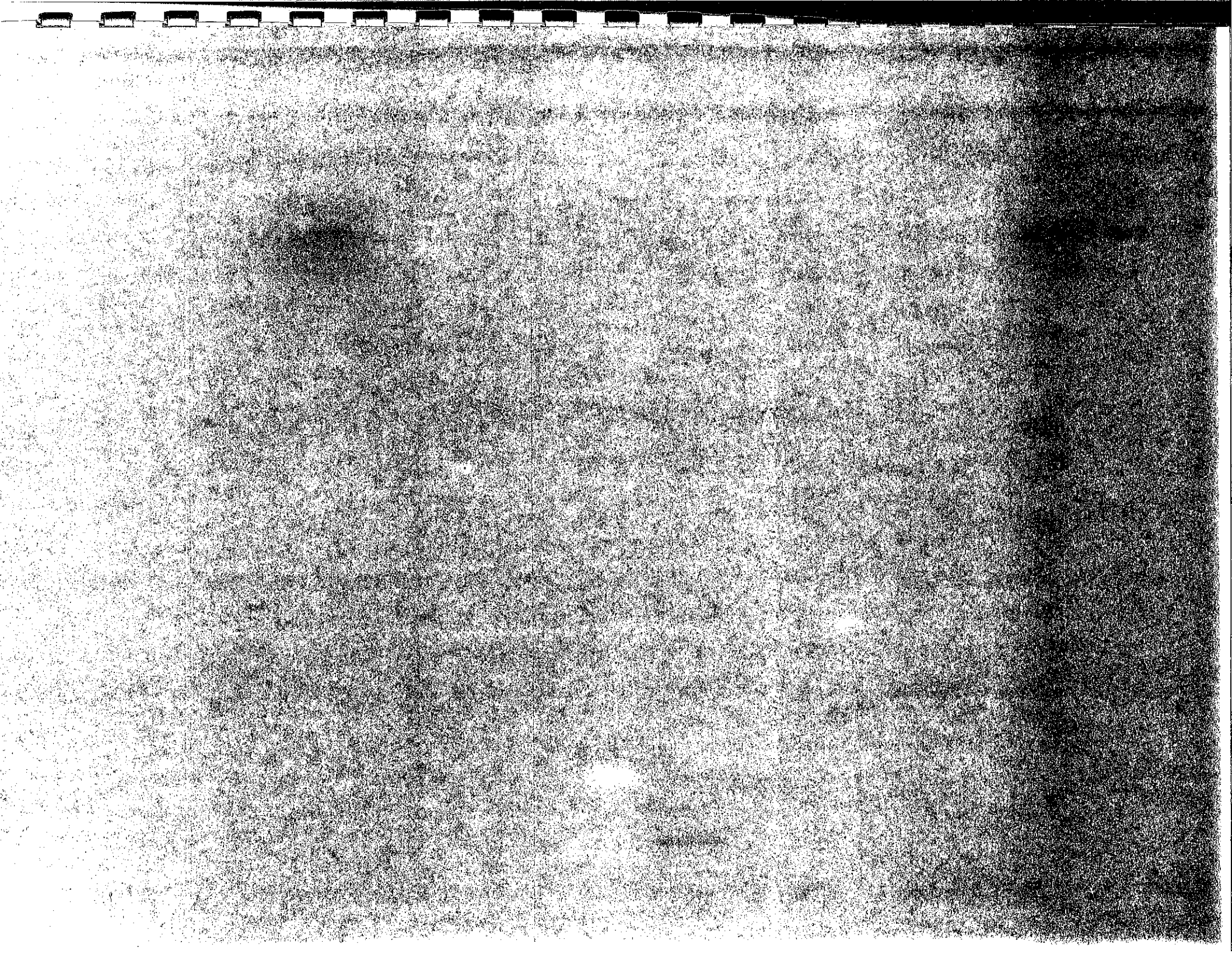
One problem is associated with the water supply system at Hiro. Because of relatively small population and consumption rate, a problem of water stagnation could be associated with the system. This problem is also attributable to the closed water supply system of Hiro. A future plan should consider an installation of blow-off valve in order to attain water circulation.

B. SANITARY SEWAGE SYSTEM

All sanitary sewage at the depot is collected through underground pipes and treated using septic tanks. There are eight septic tanks that treat sanitary flows from individual buildings. Four of the tanks drain the treated effluent directly into the sea while the other three drain into covered drain lines (not drain pipes) that eventually empty into the sea. All septic tanks are fitted with a chlorine tablet tube device at the outlet pipe. In concept, the tablets dissolve as they contact the treated waste. The ability to stack tablets in the tube assures reasonably long-term service between refills.

No flow measurements have been made due to the diversity and scattering of the system. The best estimates indicate that flows are very small, about 840 gallons per day based on reported environment-related facility data. No formal schedule for disposing of accumulated sludge within the tanks has been established. Pumping is done on an as-needed basis using private contractors. The system appears satisfactory because of small number of employees (28, all non-resident).

streetlights have exposed ballast, they are susceptible to salt corrosion, short life lighting fixtures, and insulation failures.



TABULATION OF
EXISTING AND REQUIRED FACILITIES

MASTER PLAN
FUTURE DEVELOPMENT PLAN

HIRO AMMUNITION DEPOT
HIROSHIMA PREFECTURE, JAPAN

ACE CORPORATION
ARCHITECTURE / CONSULTING ENGINEERING
2-8-14 AKASAKA, MINATO-KU, TOKYO, JAPAN

US Army Corps
of Engineers
Japan Engineer District