CONFIDENTIAL

Purpose: CERCLA Screening Site Inspection

Site: Kerr-McGee Chemical Corporation
Lake Mead Drive
Henderson, Nevada
Clark County

CONFIDENTIAL

Site EPA ID Number: NVD008290330

TDD Number: F9-8907-038

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1. SITE DESCRIPTION

Pursuant to Technical Directive Document F9-8907-038, Ecology and Environment, Inc.'s Field Investigation Team (FIT) conducted a Screening Site Inspection at Kerr-McGee Chemical Corporation (KMCC), near Henderson, Nevada. This report summarizes FIT's investigative efforts and draws conclusions regarding the site's eligibility for inclusion on the U.S. Environmental Protection Agency's (EPA) National Priorities List.

1.1 SITE HISTORY AND OWNERSHIP

KMCC is one of six industrial companies that are housed in the Basic Management, Inc. (BMI) industrial complex located in Clark County, Nevada. Immediately east-southeast of the complex is the city of Henderson. Las Vegas is approximately 10 miles northwest of the complex. A site location map, which outlines the study area, is presented in Figure 1-1.

The 850-acre BMI complex was constructed and operated by the U.S. government as a magnesium extraction facility during World War II. After the war, the federal government leased and sold portions of the facility to several private sector corporations. Presently, the property is managed by BMI, which is not an industrial manufacturer, but is simply a management firm established by the owner companies to coordinate leases and maintain common facilities (1).

The primary operations at the BMI complex traditionally have been the manufacturing of a variety of organic and inorganic chemicals and metal alloys. The following industries are currently operating at the complex:

- KMCC
- Chemstar Incorporated (formerly Flintkote Lime Co.)
- Pioneer Chemical Company (formerly Stauffer Chemical Co.)

SOURCE : Jacobs Engineering Group Inc.

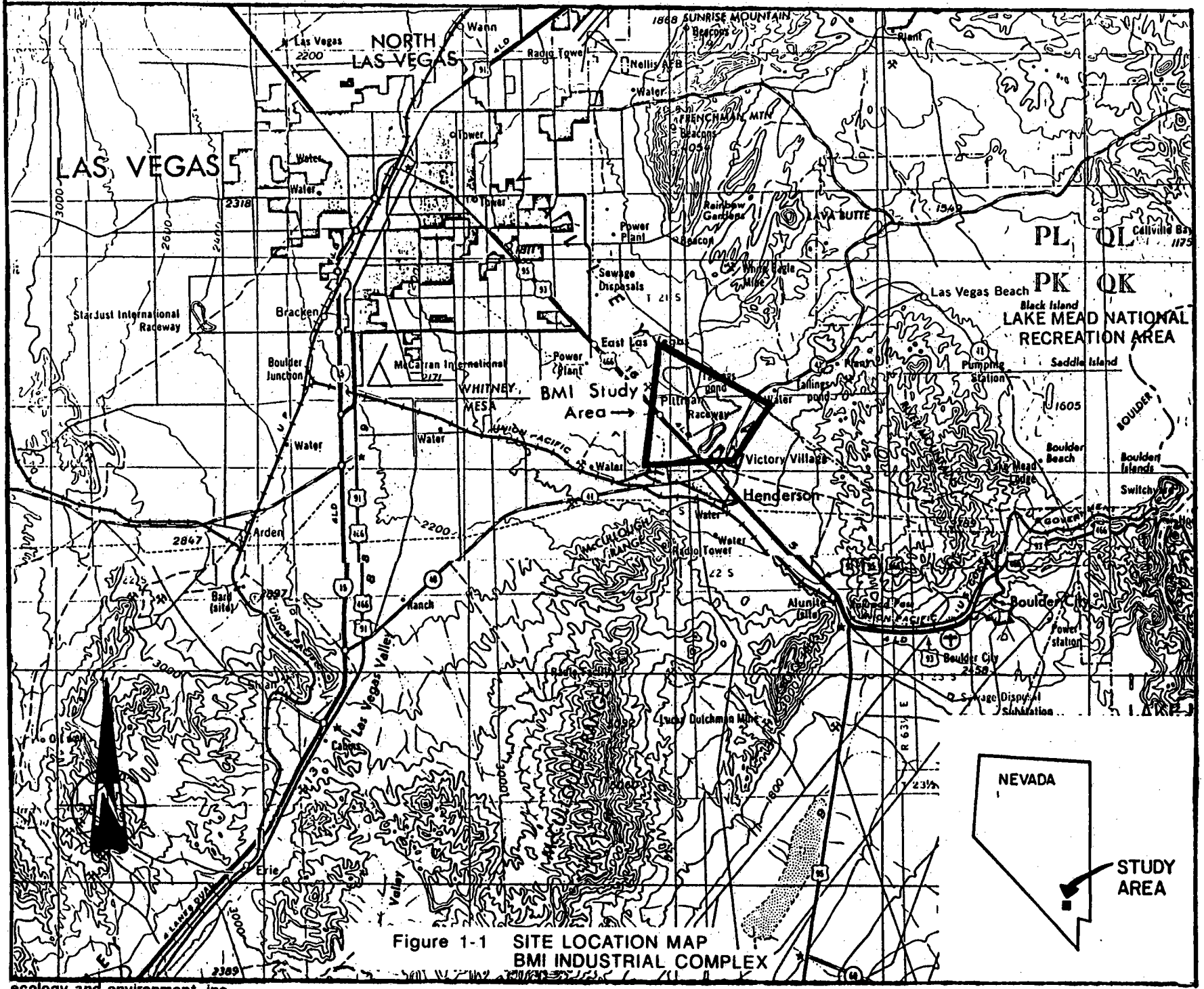

Figure 1-1 SITE LOCATION MAP
BMI INDUSTRIAL COMPLEX

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- o Jones Chemicals, Incorporated
- o Nu Bulk Trucking

KMCC, Chemstar, Pioneer, and TIMET are the co-owners of the BMI property. Jones Chemicals and Nu Bulk Trucking are lessees (2). Figure 1-2 is a site index map.

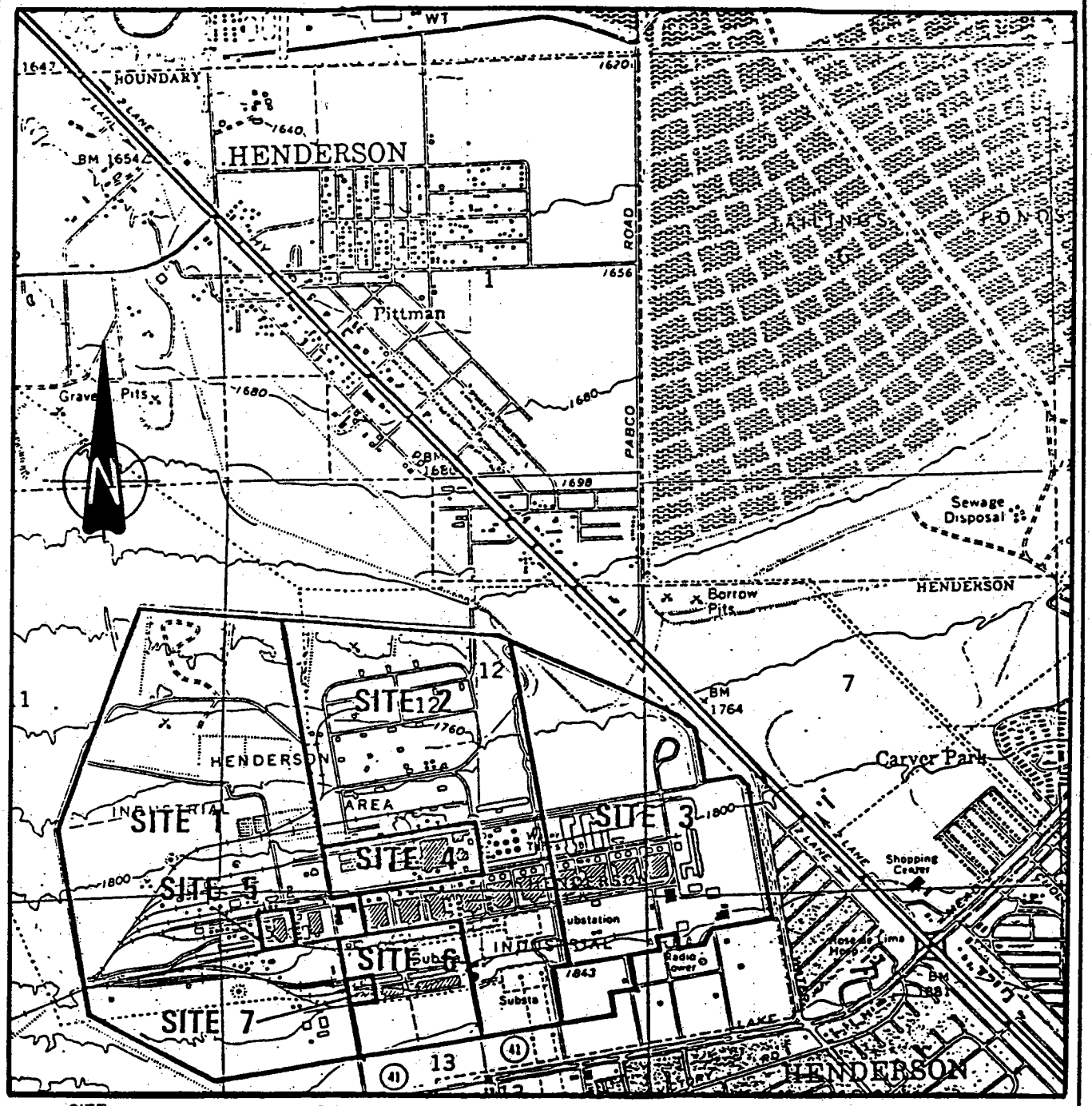
Besides the complex itself, BMI also owns two inactive waste disposal areas: a tailings pond area and a dumping area. Located 1 mile northeast of the BMI complex are the 1.5 square-mile BMI tailings ponds. These ponds received hazardous materials produced at the BMI complex until the mid-1970s. At the northeast portion of the BMI complex is the BMI dump. Operations at the BMI complex used the dump for disposal of hazardous materials until 1980 (1). Information on the size of the BMI dump was unavailable to FIT at the time this report was written.

The 200-acre portion of the complex currently owned by KMCC was originally purchased by Western Electrochemical Company in 1945. Western Electrochemical merged with American Potash and Chemical Corporation (APCC) and gained control of the plant in 1955. KMCC eventually merged with APCC and gained control of plant operations in 1967 (3,4,6).

For the purposes of this report, the KMCC site includes the following: the 200-acre portion of the BMI complex that is owned by KMCC, the BMI tailings ponds, and the BMI dump. Figure 1-3 is a site location map identifying these areas.

1.2 FACILITY PROCESSES

Companies operating at the KMCC facility have essentially produced the same three products over the site's history. The major processes include the production of the following: 1) sodium chlorate, 2) perchlorates, and 3) manganese dioxide. The only documented change came in the early



SITE	FACILITY
1	PIONEER CHEMICAL COMPANY
2	KERR-McGEE CORPORATION
3	TITANIUM METALS CORPORATION (TIMET)
4	CHEMSTAR, INC.
5	MONTROSE CHEMICAL CORPORATION OF CALIFORNIA (NO LONGER ON-SITE)
6	STATE INDUSTRIES (NO LONGER ON-SITE)
7	JONES CHEMICAL COMPANY

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Figure 1-2 SITE INDEX
BMI INDUSTRIAL COMPLEX

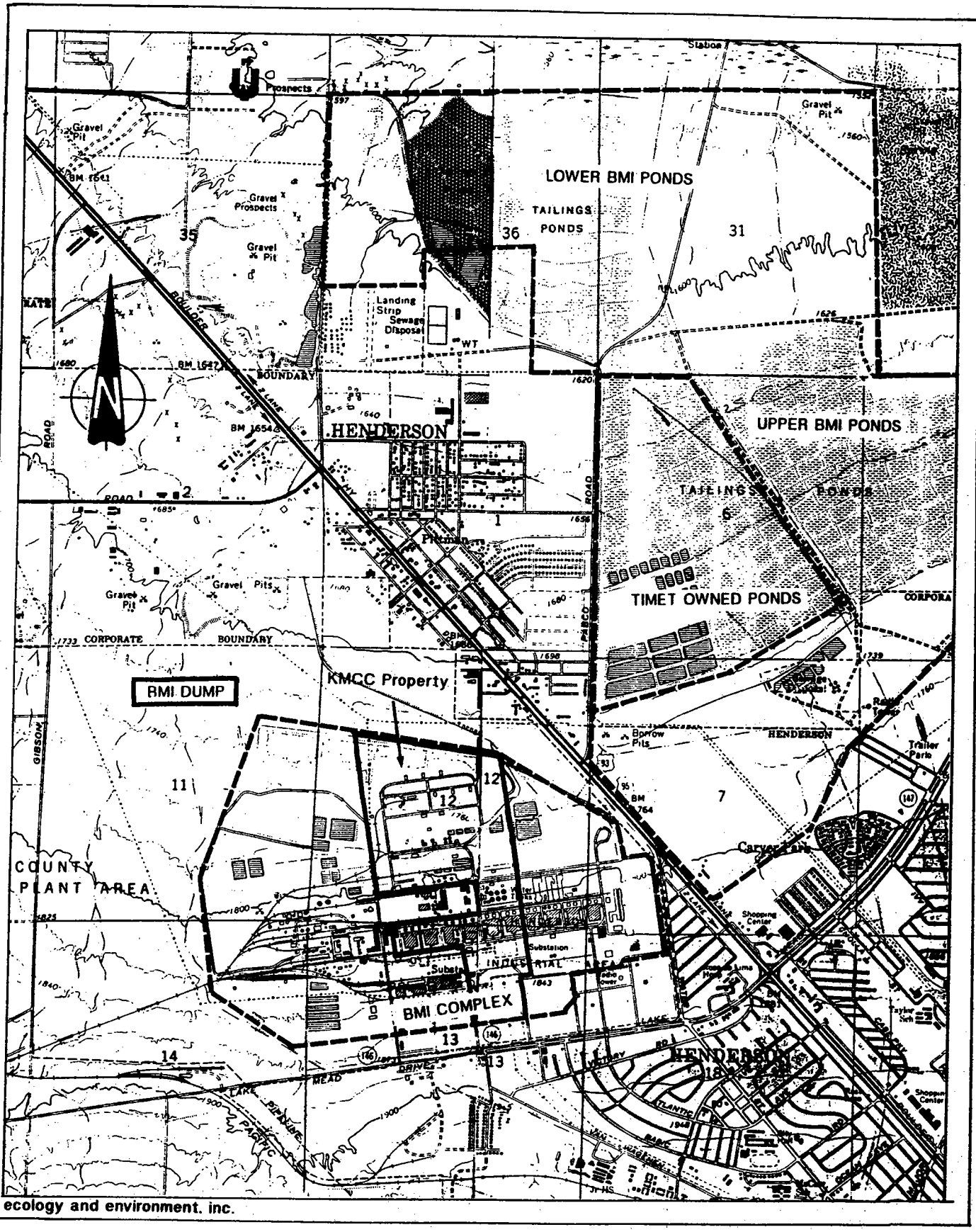

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Figure 1-3 SITE LOCATION MAP
KERR-MCGEE CHEMICAL CORPORATION

1970s when KMCC initiated the production of boron compounds (3). Table 1-1 is a list of products manufactured at the KMCC facility. Table 1-2 is a list of raw materials used in their production.

Sodium Chlorate Production

Sodium chlorate is produced in an electrolytic process from raw materials of sodium chloride and water. Sodium dichromate is added in concentrations up to 4-5 grams per liter to the sodium chlorate process cell liquor as a pH buffer and corrosion inhibitor (5). Sodium chlorate is used as a bleach in the production of paper pulp and as an intermediate in the production of perchlorates. Wastes from the sodium chlorate production consist of a filter cake containing impurities from the raw materials and filter aid, including hexavalent chromium (3).

The wastes produced by the sodium chlorate process, which included 0.05% hexavalent chromium, were sluiced to the BMI tailings ponds until their closure in the mid-1970s. After closure of the ponds, KMCC disposed of the sodium chlorate wastes to the BMI dump. In 1980, when the dump was closed, KMCC dumped the sodium chlorate wastes to an on site waste landfill (3,6). The landfill was closed in 1983 and is currently receiving groundwater monitoring, as required in the Nevada Division of Environmental Protection (NDEP) Closure/Post Closure Plan, April 16, 1985 (1). Since closure of the landfill in 1983, KMCC has been trucking 64 to 74 tons per month of sodium chlorate waste off site to the U.S. Ecology Treatment, Storage, and Disposal facility in Beatty, Nevada (EPA ID# NVT33001000) (8,9,10).

Perchlorate Production

KMCC produces ammonium perchlorate which is used in the manufacturing of rocket fuels. In addition, potassium perchlorate was produced on site until 1982. These perchlorates are derived by electrolytically converting a solution of sodium chlorate to sodium perchlorate. The sodium perchlorate is then combined with salts of either ammonia or potassium to form the respective perchlorate. Wastes from the ammonium

Table 1-1

LIST OF PRODUCTS AND YEARS OF PRODUCTION

Product	Years of Production
Sodium chlorate	1945 - present
Sodium perchlorate	1968 - present
Potassium chlorate	1945 - 1974
Potassium perchlorate	1945 - 1982
Ammonium perchlorate	1951 - present
Manganese dioxide	1955 - present
Magnesium perchlorate	1969 - 1974
Boron trichloride	1973 - present
Elemental boron	1972 - present
Tumbleaf defoliant	1975 - 1979

Source: Letter from KMCC to EPA (6).

Table 1-2

RAW MATERIALS USED AT KMCC

PRODUCT	RAW MATERIALS
Sodium chlorate	Sodium chloride and water
Sodium perchlorate	Sodium chlorate and water
Potassium chlorate	Sodium chlorate and potassium chloride
Potassium perchlorate	Sodium perchlorate and potassium chloride
Ammonium perchlorate	Sodium perchlorate and ammonia and hydrochloric acid
Magnesium perchlorate	Magnesium carbonate and ammonium perchlorate
Manganese dioxide	Manganese ore and sulfuric acid
Boron trichloride	Boron carbide and chlorine
Boron tribromide	Boron carbide and bromine
Elemental boron	Boric oxide and magnesium
Tumbleaf defoliant	Sodium chlorate, borax, sodium carbonate, and surfactant

Source: Letter from KMCC to EPA (6).

perchlorate process include a filter cake with calcium carbonate, calcium sulfate, and chromic hydroxide. Wastes from the potassium perchlorate process include sodium chloride, potassium chloride, and potassium perchlorate (3,6).

The wastes produced during the perchlorate processes were discharged to the BMI tailings ponds before their closure in the mid-1970s. By the time the tailings ponds were closed, KMCC had constructed on its property nine ponds lined with PVC, polyethylene, and/or polypropylene. Perchlorate wastes were discharged to these KMCC ponds after closure of the BMI tailings ponds. In the early 1980s, two of these ponds were considered Resource Conservation and Recovery Act (RCRA) hazardous waste units under Interim Status. These two ponds were closed in 1985 under direction of NDEP. The remaining ponds in operation at KMCC are not considered RCRA hazardous waste units and are not under RCRA regulation (3).

Manganese Dioxide Production

KMCC is also involved in the production of manganese dioxide, which is sold for use in the high-performance dry cells used in batteries. This product is derived by roasting crushed low-grade manganese ore and then combining it with sulfuric acid. The resulting manganese sulfate is then converted to manganese dioxide by electrolysis. This process produces a solid waste containing silica, alumina, iron, and heavy metals, which is filtered from the roasted ore after it has been combined with sulfuric acid. A minor waste stream of sodium phosphate solution, used for cleaning electrolytic cell electrodes, is also generated (3).

Since the beginning of the manganese dioxide process on site in 1951, solid manganese tailings wastes, including manganese ore, heavy metal sulfides, diatomaceous earth, and paraffin wax, have been discharged in various dumps located on KMCC property. Prior to 1974, portions of these tailings were slurried in water and discharged to on-site leach beds (3). Presently, all manganese tailings wastes are dumped in a tailings pile located on KMCC property (6).

Boron Compounds Production

The most recent process initiated at KMCC is the production of elemental boron, boron trichloride, and boron tribromide. Boron trichloride is used in the manufacture of boron filament for aircraft structures. Boron tribromide is used in semiconductor doping, and elemental boron is used in pyrotechnics production. Waste streams from the production of boron chemicals include a liquid stream containing manganese sulfate and a wet scrubber stream (3).

Wastes produced in the production of boron compounds were discharged to the BMI tailings ponds before they were closed. After closure of the tailings ponds, these wastes were discharged to the lined ponds on KMCC property (3).

1.3 CURRENT WASTE MANAGEMENT PRACTICES

Presently there are 11 waste and/or recovery ponds at KMCC which are both single- and double-lined. The total volume of these ponds is approximately 37 million gallons. A description of these ponds is located in Appendix C (7). KMCC operates a manganese tailings pile under the approval of NDEP (3). In March 1985, the Desert Research Institute analyzed the tailings and determined the materials to be nonhazardous in accordance with RCRA EP toxicity tests (3). KMCC transports 64-75 tons per month of chlorate recovery mud off site to the Beatty, Nevada landfill (8,9,10). In addition, KMCC has authorization, under National Pollutant Discharge Elimination System (NPDES) permit No. NV0000078, to discharge noncontact cooling water and stormwater run-off to the Las Vegas Wash (11).

2. APPARENT PROBLEM

The KMCC site was entered into the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) on September 1, 1979.

Apparent problems that exist on the site include the potential for release of chromium to surface water and air from the BMI tailings ponds. In addition, a potential for on-site exposure exists due to chromium in the BMI tailings ponds and in soils of easily accessible areas. Chromium contamination in the BMI dump may pose a potential threat to human health and the environment. However, one factor which impacts the overall evaluation of the site is the lack of information on waste containment in the BMI dump.

Two apparent problems on KMCC property are currently receiving attention. Cleanup of chromium-contaminated groundwater at the site is taking place by KMCC under the guidance of NDEP. Also, the KMCC hazardous waste landfill, closed on January 28, 1983, is currently receiving groundwater monitoring as required in the NDEP approved Closure/Post Closure Plan.

There appears to be only one source of chromium at the KMCC facility. Sodium dichromate is added in concentrations up to 4-5 grams per liter to the sodium chlorate process as a pH buffer and corrosion inhibitor (5). The majority of the sodium dichromate remains in the recycled process liquor. However, a small portion of the sodium dichromate is entrained with graphite in the filtering process. A filter cake waste material is produced which contains approximately 0.05% hexavalent chromium. Filter cake waste from the sodium chlorate process averages about 1.5 to 2 tons per day (12,13).

Dumping of the sodium chlorate filter cake can be traced to four different areas. Prior to 1975, all of the filter cake waste material was sluiced to the BMI tailings ponds via open, unlined drainage channels. After closure of the tailings ponds in 1975, KMCC disposed of the filter cake waste into the BMI dump. The BMI dump closed in 1980,

and KMCC began dumping filter cake in the KMCC hazardous waste landfill. The KMCC landfill stopped receiving waste in January 1983. Since 1983, the sodium chlorate filter cake has been shipped off site to the Beatty, Nevada, hazardous waste dump (3,6,12).

According to KMCC records, 391,000 cubic feet of solid chlorate wastes were sluiced to the BMI tailings ponds prior to 1975 (12). The main route for this discharge was the unlined drainage channel running through the KMCC property to an underground siphon and then to the upper BMI ponds (see Figure 2-1). From time to time, these discharges were rerouted to the lower BMI ponds. KMCC maintains that such discharges to the lower ponds were small and infrequent (12).

The main drainage channel running through KMCC property also carried aqueous waste streams produced from operations at neighboring BMI plants. These waste streams were commingled by the time they reached the tailings ponds (12).

Two separate sampling events, requested by the EPA, have detected high levels of total chromium in the surface soils of the upper and lower BMI ponds. Hexavalent chromium was not specifically sampled for in these sampling events. Data collected by JRB Associates, Inc. (JRB) in 1980 showed total chromium at levels up to 2,200 parts per million (ppm) in the soil of the upper ponds. JRB sampling data showed 37 ppm of total chromium in the soil of the lower ponds. No background soil samples were collected during this sampling event (1).

Soil sampling data from the June 1985 Ecology and Environment, Inc. (E & E) Phase IIB sampling of the BMI tailings ponds showed similar results. Chromium was detected at a level of 1,430 ppm in the upper ponds and at a level of 64 ppm in the lower ponds. Higher levels of chromium were detected in the soil at both locations, but the values obtained from these samples are considered estimated and usable for limited purposes due to analytical problems. The values obtained for the background surface soil samples taken during the E & E Phase IIB sampling are also considered estimated and usable for limited purposes due to

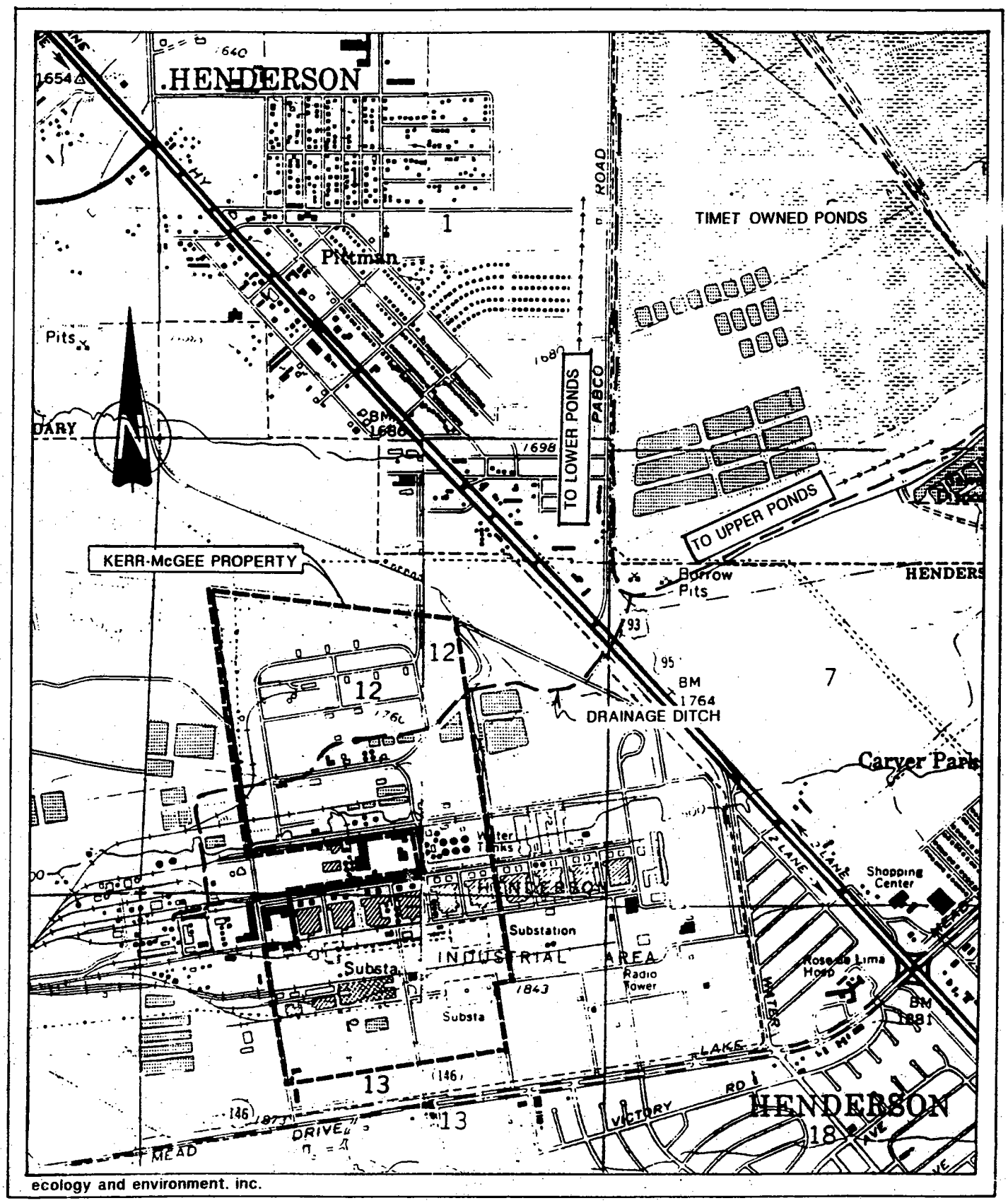

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Figure 2-1 DRAINAGE CHANNEL FROM BMI INDUSTRIAL COMPLEX TO THE BMI TAILING PONDS

laboratory analytical problems. However, a background sample taken during the 1985 E & E Phase IIA sampling in the same proximity of the Phase IIB background samples showed chromium in the surface soil at 8 ppm (14,15).

Between 1976 and 1980, KMCC disposed of 90,000 cubic feet of the sodium chlorate filter cake waste in the BMI dump. Prior to 1980, all facilities located on the BMI complex discharged wastes to this dump (6). Sampling data from E & E's Phase IIB sampling showed levels of chromium in the soils at a depth of 30 feet. The concentrations reported for the samples from the dump are considered estimates and usable for limited purposes only due to laboratory analytical problems (14). According to BMI, the dump is currently fenced off from the public. Little else is known about waste containment at the BMI dump (16).

After 1980, KMCC disposed of all sodium chlorate filter cake waste to an on-site hazardous waste landfill (see Figure 2-2). The landfill was considered hazardous by NDEP, due to the presence of hexavalent chromium. On January 23, 1983, the landfill was closed and subsequently capped with a multilayered cover system which consists of a low permeability (less than 10-7 centimeter/second) layer of 1.5 feet of clay, 40-millimeter polyethylene membrane, and another 6-inch layer of clay. (1). Quarterly groundwater monitoring of the closed landfill was initially required under the NDEP approved 1985 Closure/Post Closure Plan (3). Monitoring of the landfill failed to detect chromium leaking to the groundwater. Therefore, in December 1988, NDEP approved the reduction of the frequency of groundwater monitoring to sampling on an annual basis (18). Since January 1983, all sodium chlorate filter cake waste has been dumped at the Beatty, Nevada, landfill.

Elevated concentrations of hexavalent chromium were found in upgradient and downgradient wells located around the two closed RCRA-regulated surface impoundments (see Figure 2-2). An additional 15 groundwater monitoring wells were installed in an effort to determine the source of contamination. The source of contamination was traced to the basements of building units 4 and 5 of KMCC (see Figure 2-2) (3,5). These

basements held the electrolytic cells that were used in the sodium chlorate process. Frequently, the cells would clog and the process liquor would spill onto the basement floor. The spilled process liquor would then be pumped back into the sodium chlorate process. However, through the years, deterioration and cracking of the basements occurred, which apparently allowed leakage of the process liquor into the soil and into the groundwater (5,13).

Hexavalent chromium had initially been detected in the groundwater wells near the closed surface impoundments in 1982. KMCC continued to use the basements as sumps for the sodium chlorate process until March 1984. At that time, an Administrative Order was issued to KMCC by NDEP (March 21, 1984) to immediately cease and desist the use of the basement areas for the storage of chlorate process liquor (3).

NDEP finalized a Consent Order on September 9, 1986 for the cleanup of chromium contaminated groundwater (3). The plan, approved by NDEP, calls for pumping water out of a number of groundwater wells that intercept the chromium contaminated groundwater plume. The groundwater is treated by an electrochemical heavy metal removal system. The removal system reduces the hexavalent chromium in the feed water to trivalent chromium. The resulting effluent is then recharged back into the ground just beyond the intersecting wells. A chromic hydroxide sludge is generated from the process. The sludge is disposed of at the Beatty landfill. In accordance with the cleanup plan, KMCC issues a quarterly performance report to NDEP. Cleanup of the groundwater began in late 1987 and is scheduled to continue until 2017 (3,17).

At the site, the groundwater gradient is toward the Las Vegas Wash to the north. Groundwater emerges and becomes surface water in this wash. Las Vegas Wash flows 11 miles downstream into Lake Mead. JRB Associates sampled in and around the wash. Chromium was detected at levels up to 0.096 ppm in the groundwater and at levels up to 0.11 ppm in the surface water. No chromium was detected in the background samples. The samples in which chromium was detected are located down-gradient from the BMI

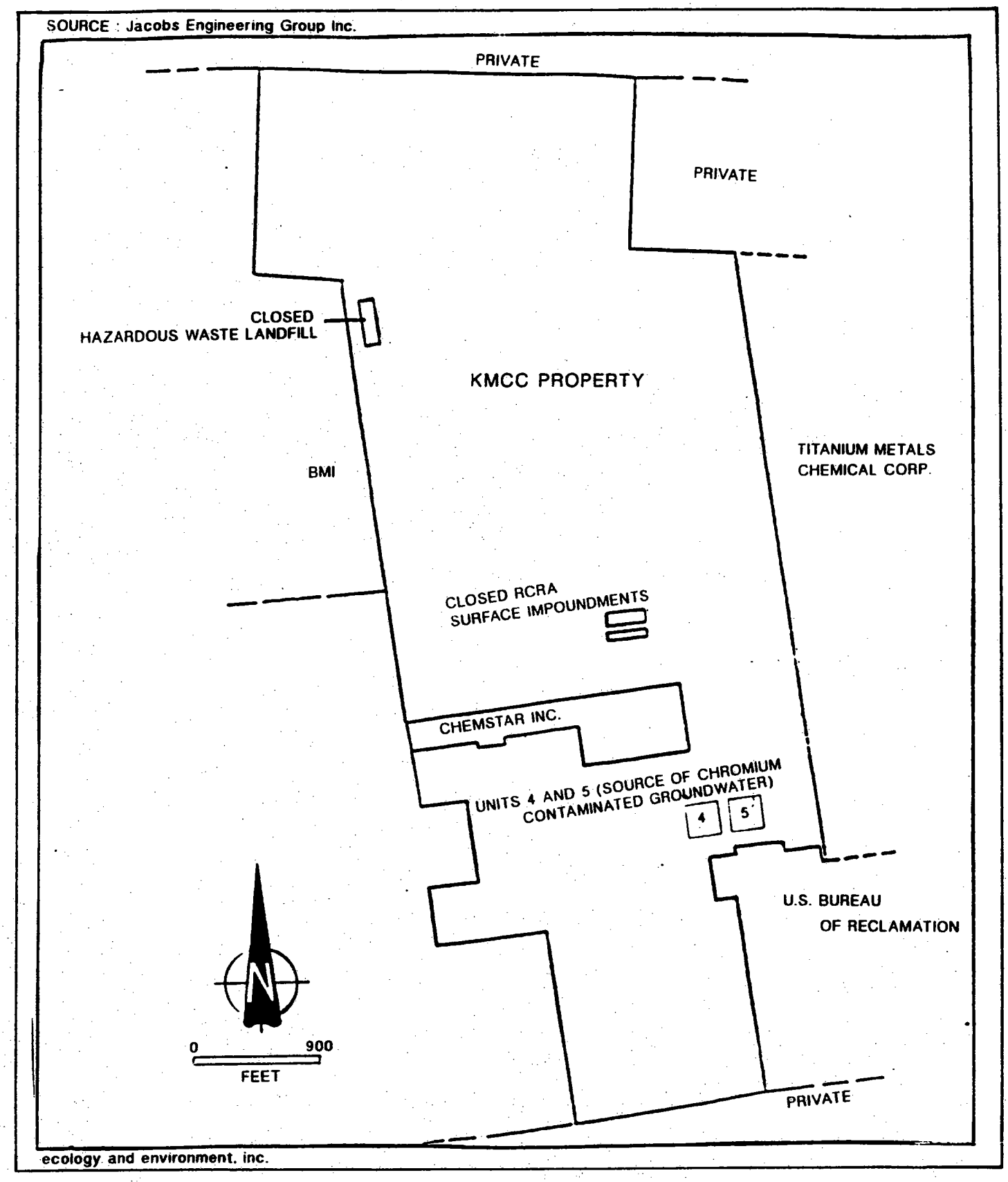

Figure 2-2 PAST ON-SITE HAZARDOUS WASTE DISPOSAL AREAS

tailings ponds. Chromium migrating from the tailings ponds is the probably source of the chromium detected in these samples. Background samples were taken upstream from the tailings ponds (1).

E & E's Phase IIA Sampling Plan included the collection of soil samples around the perimeter of the BMI complex. Chromium was detected in three off-site samples: two soil samples northeast of KMCC property had levels of total chromium up to 17 ppm, and one soil sample southwest of the KMCC property had 13 ppm of total chromium. Analysis of the background sample for the Phase IIA sampling showed 8 ppm of total chromium in the surface soil. Soil samples were taken approximately 0.5 miles northeast of KMCC, at a location adjacent to Boulder Highway, a 4-lane road connecting the town of Henderson to Las Vegas. The sample approximately 0.25 miles southwest of KMCC was taken from the soil adjacent to Lake Mead Drive, an east-west road intersecting the town of Henderson (14,15). Both areas where chromium was detected in the soil are easily accessible to the public (17).

A May 2, 1980 waste disposal report written by KMCC for the EPA indicated that, prior to 1976, liquid waste discharged to the BMI tailings ponds contained a number of metals. Lead, copper, cobalt, nickel, and zinc were all constituents of this waste (6). Sampling data showed levels of these metals in the BMI ponds significantly above background (1,14). FIT conducted a phone interview with KMCC to determine the process origin of these metals. According to KMCC, the only process on the KMCC property that creates a waste stream with these metals is the manufacturing of manganese dioxide. Furthermore, KMCC indicates that all manganese dioxide wastes were dumped on site. Allegedly, no manganese dioxide waste was ever purposely discharged to the BMI tailings ponds. However, there have been small spills that were flushed down the storm sewers, which, in the past, led to the BMI ponds. It is likely, due to commingling of wastes, that the aforementioned metals detected in the ponds may be attributed to waste streams from BMI facilities other than KMCC (19).

3. HRS FACTORS

3.1 WASTE TYPE AND QUANTITY

The filter cake waste, created during sodium chlorate production, contains 0.05% hexavalent chromium. Hexavalent chromium is considered a human inhalation carcinogen by the National Institute for Occupational Safety and Health (NIOSH) (20). Over the 45-year history of operations at the KMCC facility, a large amount of this filter cake waste was produced and dumped at the BMI facility.

For 30 years prior to 1976, an estimated 391,000 cubic feet of sodium chlorate filter cake waste, containing an estimated 19,550 cubic feet of hexavalent chromium, was sluiced to the BMI tailings ponds. The exact location of discharge in the tailings ponds is unknown (6,12). Between 1976 and 1980, KMCC disposed an estimated 90,000 cubic feet of filter cake waste to the BMI dump (6). From 1980 to 1983, KMCC dumped an unknown quantity of filter cake in the on-site hazardous waste landfill (6). Since the closure of the on-site landfill in January 1983, all sodium chlorate filter cake wastes have been trucked to the hazardous waste landfill in Beatty, Nevada (17).

The filter cake waste warrants the most attention due to the extreme toxicity and persistence of the entrained hexavalent chromium and the large quantities of it that were dumped into the BMI tailings ponds (6,21). Also of concern are the large amounts of waste produced from other processes at KMCC.

Sampling of both the upper and lower BMI tailings ponds by E & E (Phase IIB) and JRB Associates has revealed chromium contamination in the surface soils at levels up to 2,200 ppm (see Table 3-1). Higher levels were detected in the soils at both locations, but the concentrations reported for these samples are considered estimated and usable for limited purposes due to analytical problems. A map identifying sample locations is included in Appendix D (1,13).

Table 3-1

LEVELS OF CHROMIUM DETECTED IN SURFACE SOILS AT THE BMI TAILINGS PONDS (DATA COLLECTED BY E & E, PHASE IIB, AND JRB ASSOCIATES)

Sample Locations			Level of Concentration
Lower ponds	E & E:	P2-1	64
		P2-2	(466), (98)
	JRB:	CS001	37
Upper ponds	E & E:	P1-1	(3,630)
		P1-2	(1,430)
	JRB:	CS003	1,300
		CS003	2,200
Background	E & E:	HB-1	(19)
		HB-2	(24)
		HB-3	(25)
		HB-4	(24)

Footnotes:

- All values measure total chromium detected in sample.
- ( ) - value is considered estimated and usable for limited purposes due to analytical problems encountered at the lab.
- Composite Sample correlates to Discrete Samples

Composite Sample	Discrete Samples
CS001	DS001 - DS006
CS002	DS007 - DS012
CS003	DS013 - DS018

Presently there is an 8 million cubic foot manganese tailings pile on site (6,17). An additional amount exceeding 1.5 million cubic feet of solid waste and 330 million gallons of liquid waste from the manganese dioxide process has been discharged, in the past, to leach beds and tailings piles on the KMCC property (6). The years of use and locations of all dumping areas are unknown to FIT. The manganese dioxide wastes were determined to be a RCRA nonhazardous waste even though they contain manganese ore (acid insoluble) and heavy metal sulfides (3,6). An unknown amount of sodium phosphate, which is used for cleaning electrolytic cells in the manganese dioxide process, has been discharged since 1976 to on-site ponds which are double-lined with polyproplyene and polyethylene (1). Sodium phosphate is a CERCLA hazardous substance.

It appears that no hazardous wastes were created from the perchlorate processes. However, a waste stream containing sodium hexametaphosphate and sulfuric acid is produced in the boron processes. An amount exceeding 1.75 million gallons has been discharged since the start of the boron processes in 1972 to on-site ponds which are single-lined with polypropylene (1). Sulfuric acid is a CERCLA hazardous substance.

3.2 GROUNDWATER

The BMI complex is located in the south-central portion of the Las Vegas Valley (see Figure 1-1). Groundwater in the Las Vegas Valley occurs mainly in the unconsolidated sediments of the valley fill. The aquifers of concern are contained in the Muddy Creek Formation and the overlying alluvial fan deposits. The thickness of the alluvial fan deposits range from 30-60 feet; the lower 10-20 feet are saturated. The alluvial sediments consist primarily of sand and gravel (with lesser amounts of salts and clay). The alluvial deposits are poorly sorted and able to transmit relatively large quantities of groundwater. The Muddy Creek Formation contains a lower confined aquifer whose uneven clay surface forms an impermeable base on which flows the alluvial fan deposits groundwater (3). The Muddy Creek Formation stores and yields lesser quantities of water because it contains massive low-permeability clay beds. The net annual precipitation is 0.3 inches (26,27).

The depth to the upper aquifer beneath the site is from 20-90 feet below ground surface. The unsaturated zone consists of deposits that range from silty sands to coarse sediments, including boulders. There has been an observed release of chromium to the upper alluvial aquifer beneath the KMCC facility. A KMCC study traced the source of the chromium contamination to the basements of building units 4 and 5 (3). Cleanup of the chromium-contaminated groundwater is currently taking place by KMCC under the guidance of NDEP. The water quality of the contaminated upper aquifer is naturally saline, and the groundwater is not used for any purpose. No well within 4 miles of the site draws groundwater from this aquifer (22).

Groundwater in the Henderson area flows to the north-northeast and discharges into Las Vegas Wash (5). Las Vegas Wash flows into Lake Mead, the drinking water source for Clark County (23). JRB Associates sampled surface water and groundwater in the vicinity of Las Vegas Wash and detected total chromium at levels up to more than 20 times background (see Table 3-2) (3). The surface and groundwater samples were taken down-gradient from the BMI tailings ponds. A sample location map is included in Appendix D. It appears that the source of chromium detected in these samples is the BMI tailings ponds. It is possible that chromium in the tailings ponds is migrating to the nearby Las Vegas Wash via the groundwater.

3.3 SURFACE WATER

Las Vegas Wash is located 3 miles north of the BMI complex and less than 0.5 mile north of the lower BMI tailings ponds. Consisting mainly of secondary sewage effluent (98%) from Las Vegas and Henderson, the wash flows approximately 11 miles down stream into Lake Mead, a popular recreation area 15-20 miles, by road, east of Henderson. The average flow of the wash, 144 cubic feet per second (cfs), makes up only a fraction of the 12,400 cfs daily average that flows out of Lake Mead. The majority of water flowing into Lake Mead comes from the Colorado River (24,25).

Table 3-2

CHROMIUM CONTAMINATION IN THE SURFACE WATER AND GROUNDWATER (DATA COLLECTED BY JRB ASSOCIATES)

Sample Location		Level of Concentration (ppm)
Surface water:	SW005	0.012
	SW006	0.023
	SW007	0.096
Groundwater:	GW002	0.11
	GW003	0.012
	GW004	0.014
	GW006	0.035
Background:	SW008	ND (0.005)
	SW010	ND (0.005)
	GW008	ND (0.005)

Footnotes:

- All values measure total chromium.
- ND - none detected, detection levels are in parentheses.

The lower BMI tailings ponds are located on an alluvial plain cut by numerous ephemeral streams that flow into Las Vegas Wash. The closest intermittent stream runs along the western border of the lower ponds. The lower BMI ponds lie in a 100-year flood plain. The BMI complex itself lies outside the 500-year flood plain (28). No mention of flood containment associated with the BMI complex or tailings ponds was ever discovered. The regional soil types have a moderate infiltration rate when thoroughly wetted and consist chiefly of moderately deep to deep, moderately well-drained to well-drained soils with moderately fine to moderately coarse texture (29). The 2-year, 24-hour rainfall for Henderson is 1 inch (30).

There has been an observed release of chromium from the site to Las Vegas Wash. While it is possible that the chromium contamination has reached Las Vegas Wash through contaminated groundwater, it is also possible that contamination has migrated overland to the wash through surface water runoff from the tailings ponds. Surface water samples taken by JRB Associates in 1980 revealed chromium in the wash approximately 1 mile northeast of the lower BMI ponds. Three downstream surface water samples contained total chromium between 0.012 ppm and 0.096 ppm. Chromium was not detected above the 0.005 ppm detection limit in background samples (see Table 3-2) (1).

Approximately 15-16 miles downstream from the location where chromium was detected in the surface water is a drinking water intake. The intake is located on the east side of Saddle Island and serves a Clark County population of 463,087 (23). Lake Mead is located within the 1,500,000-acre Lake Mead National Recreation Area. The lake itself is about 500,000 acres (31). Recreational fishing on Lake Mead nets 1,800,000 pounds of fish per year. The razorback fish, present in Lake Mead, is a proposed federal endangered species (32).

The population within 125 miles of Lake Mead is concentrated in Clark County. The population of Clark County is 463,087 persons. Boulder City, located within 10 miles of Lake Mead has a population of 9,590 persons. Henderson City has a population of 24,363. Las Vegas, within

40 miles of Lake Mead, has a population of 207,413 persons. The unincorporated regions of Clark County have a population of 221,721 persons (33).

3.4 AIR

There is no documentation of an observed release of on-site contaminants to the air pathway. However, there is a potential for contaminants to be released to the air pathway from the BMI tailings ponds. The tailings ponds, which are dry, uncovered, and contaminated with waste constituents at the surface, are located adjacent to parts of the town of Henderson. The lower BMI ponds are approximately 0.5 mile north of the Pittman residential area and the upper BMI ponds are less than 1 mile north of the Carver Park area (34,35). Chromium has been detected in surface soil samples in both the lower and upper pond areas (see Table 3-1 in Section 3.1) (1,13).

The City of Henderson Waste Water Treatment Facility is located about 0.25 mile south of the lower BMI ponds. The sewage treatment plant is the nearest occupied building, with a total of 10 daytime employees (36). There is no on-site population associated with the tailings ponds. The population within 1 mile of areas with known chromium contamination is approximately 6,680. Another 44,500 persons live within 4 miles of this area (33).

Land use within 0.25 mile of the tailings ponds is industrial. Land use greater than 0.5 mile from the site is single-family residential (17). Sensitive animal and plant species within 4 miles of the ponds, as designated by the Nevada National Heritage Program, include the Gila monster, desert tortoise, Acctomecon California, and the Penateman Bicolor. Information on the exact location of these plant and animal species is currently unavailable (37).

It appears that little potential exists for contaminants to be released to the air pathway from the KMCC property itself. Chromium wastes in the on-site landfill appear adequately contained due to sufficient capping of the landfill.

3.5 ON-SITE

Chromium contaminated surface soils have been documented adjacent to residential areas. However, there has been no known documented contamination within the property boundary of a residence, school, or daycare center that can be attributed to processes on KMCC property.

Soil sampling data collected during E & E's Phase IIA sampling showed elevated levels of total chromium in three off-site soil samples collected around the perimeter of the BMI complex. Total chromium was detected at levels up to 17 ppm in these samples. Analysis of the background sample for the Phase IIA sampling showed 8 ppm of total chromium in surface soil (see Table 3-3) (14). The areas where chromium was detected in surface soil are within 0.5 miles of residential neighborhoods. In addition, these areas are easily accessible to the public (14,17). A sample location map is included in Appendix D.

The BMI tailings ponds, already shown to be contaminated with chromium, pose a potential threat to on-site exposure. The total area of contamination in the ponds is unknown; however, the potential area of contamination is large due to the method of waste disposal used by KMCC. KMCC mixed wastes produced on site with water and sluiced it, via a drainage ditch, to the BMI tailings ponds. Because the waste was discharged as a liquid, it is possible that the chromium waste was spread over a large area of the ponds. No further information on waste disposal methods or locations were available to FIT at the time of this report (3,6). The total area of the tailings ponds exceed 1.5 square miles (34,35). The estimated quantity of chromium contaminated waste disposed of in the ponds is 391,000 cubic feet (6).

Table 3-3

LEVELS OF CHROMIUM DETECTED IN SOILS AROUND THE PERIMETER OF THE BMI COMPLEX (DATA COLLECTED BY E & E, PHASE IIA)

Sample Location		Level of Concentration (ppm)
Northwest:	1-5	12
	1-7	17
South:	2-5	13
Background:	8-1	8

Footnotes:

- o All values measure total chromium detected in sample.

FIT conducted a drive-by reconnaissance of the BMI ponds. In portions of the ponds, it appeared that there was no continuous barrier to entry. Paths leading to the ponds were observed from the road. FIT also observed off-road vehicles in the vicinity of the lower ponds (17).

The population within 1 mile of where chromium was detected in the upper and lower BMI ponds and around the perimeter of the BMI complex is approximately 6,680 persons (33). It appears that the potential for on-site exposure to chromium in the BMI ponds and around the perimeter of the BMI complex is high due to easy access to these areas and a moderately high nearby population.

The potential for on-site exposure within the KMCC property itself is minimal since access to the property is limited to employees. The KMCC property is sufficiently fenced with an 8-foot cyclone/barbed wire fence. The property is patrolled by security guards on a 24-hour basis. The hazardous waste landfill is capped and warning signs are posted marking its presence (17). The two closed surface impoundments were approved closed by NDEP under RCRA Interim Status on October 22, 1985 (1).

4. SUMMARY OF FIT ACTIVITIES

EPA, with FIT concurrence, determined that sampling was not needed at KMCC because sufficient analytical data are available to assess the site.

A CERCLA Site Inspection of the KMCC site was conducted on September 14, 1989 by FIT members Peter Towle, Landon Gates, and Linda Stone. The inspection began at 7:30 a.m. at KMCC with a safety meeting given by Greg B. Cowley, Safety Engineer, KMCC. This was followed by a meeting between FIT members and Alan Gaddy, Senior Process Engineer, KMCC, Russell Jones, Environmental and Health Division, KMCC, and Greg Cowley. FIT members also performed a drive-by of the BMI tailings ponds. Some of the information obtained from the meeting, subsequent site visit and drive-by included:

- Residential neighbors appear to be within 0.5 miles of the BMI tailings ponds.
- Numerous trails allowing access to entry of the BMI ponds exist.
- FIT members saw a number of off-road vehicles in the vicinity of the ponds.

5. EMERGENCY REMOVAL CONSIDERATIONS

The KMCC property is totally enclosed by a cyclone fence. Security guards patrol the area extensively. Processes at the KMCC facility include the production of explosive materials. Unauthorized contact with these materials is unlikely due to adequate security. Security and process operations have been under close scrutiny by the U.S. government in recent years for national security reasons. KMCC is the sole U.S. producer of rocket fuel for the space shuttle (17). Based upon the extensive safety measures taken to prevent public access to the KMCC facility, FIT does not consider emergency removal necessary at the facility.

It appears that the upper and lower BMI ponds are not protected from entry by the public, however. The Community of Pittman and other parts of the City of Henderson are adjacent to the ponds. The approximate population within 1 mile of the tailings ponds is 6,680 persons (33). Since the ponds are neither fenced nor covered, they pose a potential for exposure via the on-site exposure pathway and may require emergency response.

6. CONCLUSION

Kerr-McGee Chemical Corporation is one of six companies located at the BMI complex near Henderson, Nevada. For 30 years prior to 1976, the companies at BMI discharged in excess of 5 million tons of liquid wastes to the BMI-owned tailings ponds. During this time, Kerr-McGee used these ponds to discharge a large amount of chromium wastes produced on site. On two separate sampling occasions, elevated levels of chromium have been detected in soil samples taken from the tailings ponds.

Chromium-contaminated wastes produced at the Kerr-McGee facility were also disposed of to a BMI-owned dump. Little information regarding the present condition of the dump was available to FIT at the time of this report. Kerr-McGee also disposed of chromium wastes to a landfill on the company facility. This landfill was closed under guidance of the Nevada Division of Environmental Protection.

FIT believes that the areas of most concern associated with the Kerr-McGee site are the tailings ponds. The BMI dump also warrants some concern due to lack of information on waste containment. It appears that little threat to human health or the environment currently exists on the Kerr-McGee facility property.

The Kerr-McGee Chemical Corporation site in Henderson, Nevada appears eligible for inclusion on the National Priorities List due to the following factors:

- Large quantity and high toxicity of waste discharged to the BMI ponds;
- Large area of contaminated soil accessible to nearby residents;
- Potential for release of contaminants to surface water and high human food chain targets associated with surface water; and
- Potential for release of contaminants through the air, and moderate-sized air target population.

7. EPA RECOMMENDATION

	Initial	Date
No Further Remedial Action Planned	_____	_____
Listing Site Inspection	_____	_____

Notes:

8. REFERENCES

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37. Clemmer, Glen, zoologist, Nevada Natural Heritage Program, and Kathy Zavitz, E & E FIT, telephone conversation, December 28, 1989.

APPENDIX A

Contact Log and Reports

APPENDIX B

Photodocumentation

APPENDIX C

Description of KMCC Waste and Recovery Ponds

SUMMARY DESCRIPTION OF PROCESS/WASTEWATER PONDS

Single Liner Systems

Pond C-1

Liner	: PVC Bottom, reinforced butyl side
Surface Area	: 69,000 ft.^{2}
Volume	: 3,125,000 gallons
Process Waste	: Boiler Plant Blow Down Boiler Plant Wash Down MnO_2 Cathode Wash Solution Boron Neutralization Waste (Evaporation)

Pond AP-2

Liner	: PVC Bottom, reinforced butyl side
Surface Area	: 14,000 ft.^{2}
Volume	: 400,000 gallons
Process Waste	: Sodium Perchlorate purification and Ammonium Perchlorate process purification filter wash liquor. Total recycle.

Pond P-3

Liner	: Reinforced butyl rubber
Surface Area	: 12,000 ft.
Volume	: 390,000 gallons
Process Waste	: Sodium Chlorate solution due to wash down, storm water collection and excess above that the process vessels can handle. Total recycle.

Double Liner Systems

Pond AP-1

Liner	: Bottom liner - 40 mm HDPE (high-density polyethylene). Side underliner - geo-textile polypropylene 400 gm/m^2. Top liner - 60 mil HDPE.
Surface Area	: 14,000 ft.^{2}
Volume	: 370,000 gallons
Process Waste	: Sodium Perchlorate purification and Ammonium Perchlorate process purification filter wash liquor. Total recycle.

pt/kmcc/ssi

SUMMARY DESCRIPTION OF PROCESS/WASTEWATER PONDS (CONTINUED)

Pond AP-3

Liner	: Bottom liner - 40 mm HDPE Side underliner - geotextile polypropylene 400 gm/m^2 Top liner - 60 mil HDPE
Surface Area	: 2,000 $ft.^2$
Volume	: 65,000 gallons
Process Waste	: Sodium Perchlorate purification and Ammonium Perchlorate process purification filter wash liquor. Total recycle. This pond is used as a pump basin for AP-1.

Pond AP-4

Liner	: Bottom liner - 40 mm HDPE side underliner - geotextile polypropylene 400 gm/m^2 Top liner - 60 mm HDPE
Surface Area	: 20,000 $ft.^2$
Volume	: 720,000 gallons
Process Waste	: Ammonium Perchlorate cooling tower waste; salt crystalizer washout

Pond AP-5

Liner	: Bottom liner - 40 mm HDPE side underliner - geotextile polypropylene 400 gm/m^2 Top liner - 60 mm HDPE
Surface Area	: 35,000 $ft.^2$
Volume	: 1,817,000 gallons
Process Waste	: Ammonium Perchlorate cooling tower waste

SUMMARY DESCRIPTION OF PROCESS/WASTEWATER PONDS (CONTINUED)

Pond P-2

Liner	: Bottom liner - 30 mil PVC unreinforced Side underliner - geotextile polypropylene Top liner - two layers; first - 36 mil Hypalon polyester reinforced, second - 60 mil HDPE
Surface Area	: 13,000 $ft.^2$
Volume	: 675,000 gallons
Process Waste	: Sodium Chlorate solution due to wash down, storm water collection and excess above that the process vessels can handle. Total recycle.

Pond Mn-1

Liner	: Bottom - 4" - 6" compacted bentonite clay 10^{-8} cm/sec. permeability Side underliner - geotextile polypropylene 400 gm/m Top liner - 60 mm HDPE
Surface Area	: 53,000 $ft.^2$
Volume	: 3,500,000 gallons
Process Waste	: MnO_2 cell feed filter waste, potassium phosphate cathode wash solution

Pond WC-2

Liner	: Bottom liner - 40 HDPE Side liner - 105 geotextile polypropylene - HDPE netting - 40 HDPE Top liner - 60 HDPE UV Protective liner - 40 HDPE

SUMMARY DESCRIPTION OF PROCESS/WASTEWATER PONDS (CONTINUED)

Surface Area	: 74,600 ft.^{2}
Volume	: 13,018,00 gallons
	: Unit 3 and Unit 5 cooling tower blowdown, steam generation blowdown, process water softeners, MnO_2, wash solution, and process seal water/filter flush. Solution from this pond will be processed through a Vapor Recompression Unit to produce clean water for cooling and process uses.

Pond WC-1

Liner	: Bottom liner - 40 HDPE Side liner - 105 mil geotextile polypropylene - HDPE netting - 40 HDPE Top liner - 60 HDPE UV Protective liner - 40 HDPE
Surface Area	: 74,600 ft.^{2}
Volume	: 13,018,00 gallons
	: Unit 3 and Unit 5 cooling tower blowdown, steam generation blowdown, process water softeners, MnO_2, wash solution, and process seal water/filter flush. Solution from this pond will be processed through a Vapor Recompression Unit to produce clean water for cooling and process uses.

APPENDIX D

Description of Past Sampling Locations

APPENDIX A

Contact Log and Reports

CONTACT LOG

Facility Name: Montrose
Facility ID: NVD008237489

Name	Affiliation	Phone #	Date	Information
Don Wrock	BMI	702/565-6485	8/28/89 10/3/89	See Contact Report.
Alan Gaddy	Kerr-McGee	702/565-8901	10/2/89	See Contact Report.
Dick Wooletts	Kerr-McGee	702/565-8901	10/10/89	See Contact Report.
Joe Monscvitz	Las Vegas Water District	702/486-6741	8/30/89	See Contact Report.
Dave Prudic	USGS - Nevada	702/887-7611	8/31/89	See Contact Report.
Bruce Williams	Bureau of Reclamation	702/293-8525	10/5/89	See Contact Report.
Robin Hourie	Lake Mead Recreational Area	702/293-8907	9/11/89 10/5/89	See Contact Report.
David Buck	State of Nevada	702/486-5127	9/1/89	See Contact Report.
Janie Nihipali	Henderson City Public Works	702/565-2140	8/31/89 10/5/89	See Contact Report.
Virginia Swipas	Henderson Waste Water Treatment Facility	702/565-2048	10/13/89	See Contact Report.
Alan Gaddy, Russell Jones	Kerr-McGee	702/565-8901	10/14/89	See Contact Report.
Glen Clemmer	Nevada Natural Heritage Program	702/885-4370	12/28/89	See Contact Report.

CONTACT REPORT

AGENCY/AFFILIATION: Basic Management, Incorporated (BMI)		
DEPARTMENT:		
ADDRESS/CITY: BMI Complex, Henderson		
COUNTY/STATE/ZIP: Clark County, Nevada		
CONTACT(S)	**TITLE**	**PHONE**
1. Mr. Don Wrock	General Manager	702/565-6485
2.		
E & E PERSON MAKING CONTACT: Peter Towle		**DATE:** 8/28/89 10/3/89
SUBJECT: BMI Complex - Henderson		
SITE NAME: Kerr-McGee Chemical Corporation		**EPA ID#:** NVD008290330

1) The following companies are owners of their own properties and their share of the BMI complex that is leased out:

   - o Chemster Incorporated (formerly Flintkote Lime Company)
   - o Kerr-McGee Chemical Corporation
   - o Pioneer Chemical Company (formerly Stauffer Chemical Co.)
   - o Titanium Metals Corporation of America (TIMET)

2) Jones Chemicals, Inc. is a lessee of TIMET property Nu Bulk Trucking leases BMI complex land.

3) Montrose Chemical Corporation of California and State Industries, Inc. are no longer lessees of BMI property.

pt/kmcc/cl-cr

4) Total population of BMI complex is 1,166 persons and is broken up as follows:

o Chemster	64
o Kerr-McGee	292
o Pioneer	152
o TIMET (including Jones Chemical Co.)	642
o Basic Management, Inc.	11
o Nu Bulk	5
	1,116

10/3/89

- o The BMI dump was closed in the late '70s, early '80s.
- o It is currently fenced.
- o Mr. Wrock is not sure if there is a clay cover on the dump.

pt/kmcc/cl-cr

CONTACT REPORT

AGENCY/AFFILIATION: Kerr-McGee Chemical Corporation		
DEPARTMENT:		
ADDRESS/CITY: Henderson		
COUNTY/STATE/ZIP: Nevada		
CONTACT(S)	**TITLE**	**PHONE**
1. Alan Gaddy	Environmental Engineer	702/565-8901
2.		
E & E PERSON MAKING CONTACT: Peter Towle		**DATE:** 10/2/89
SUBJECT: Source of Chromium in the Sodium Chlorate Process		
SITE NAME: Kerr-McGee		**EPA ID#:** NVD008290330

10/2/89 Conversation with A. Gaddy $H_2O + NaCl \text{ --- } NaClO_3 + H_2O$

- Sodium dichromate is used as an electrolytic buffer in the process of changing NaCl (sodium chloride) to $NaClO_3$ (sodium chlorate).
- Small amounts of sodium dichromate are added to the recycled H_2O in this process to keep it at a level of 4 grams per liter.
- H_2O and NaCl makes brine. The brine is filtered after going through the electrolytic process. The filter cake contains .05% of chromium.
- The H_2O is constantly reused in the process.
- This H_2O contains sodium dichromate. Trace amounts are absorbed in the $NaClO_3$, in addition to the small amounts trapped into the filter cake.
- The chromium groundwater contamination came from leakage of this process liquor from the basements of units 4 or 5.
- After the sodium chlorate process, no chromium compound is added in the process to make ammonium perchlorate.
- Filter cake which contains platinum and very slight traces of chromium is produced when sodium chlorate liquor is processed after being transferred into sodium perchlorate.
- This filter cake, containing platinum, is sold to recyclers.

pt/kmcc/cl-cr

CONTACT REPORT

AGENCY/AFFILIATION: Kerr-McGee Chemical Corporation		
DEPARTMENT:		
ADDRESS/CITY: Henderson		
COUNTY/STATE/ZIP: Nevada		
CONTACT(S)	**TITLE**	**PHONE**
1. Dick Wooletts	Staff Process Engineer	702/565-8901
2.		
E & E PERSON MAKING CONTACT: Peter Towle		**DATE:** 10/10/89
SUBJECT: Source of heavy metals in liquid waste effluent		
SITE NAME: Kerr-McGee		**EPA ID#:** NVD008290330

- In the May 2, 1980 report addressed to Clyde Eller of the United States EPA, it stated that as part of liquid effluent discharged to the tailings ponds prior to 1976, zinc, nickel, lead, copper, and cobalt were all constituents.

- Mr. Wooletts said that the only source of these metals on KMCC were from the MnO_2 process. However, no MnO_2 wastes were supposedly discharged to the tailings ponds. He thought that there must have been some sort of mix up in data when the reports were made. He had remembered helping make the reports.

- Prior to changing MnO_2 wastes to solid only, liquid MnO_2 wastes were dumped in leach bed located were the MnO_2 tailings pile is located now.

pt/kmcc/cl-cr

CONTACT REPORT

AGENCY/AFFILIATION: Las Vegas Valley Water District		
DEPARTMENT: Southern Nevada Water Board		
ADDRESS/CITY: Boulder City		
COUNTY/STATE/ZIP: Nevada		
CONTACT(S)	**TITLE**	**PHONE**
1. Joe Monscvitz	Dir. Treatment & Transmission	702/486-6741
2.		
E & E PERSON MAKING CONTACT: Rob Balas		**DATE:** 8/31/89
SUBJECT: Water Intakes Out of Lake Mead		
SITE NAME: Montrose		**EPA ID#:** NVD008237489

One intake - east side of Saddle Island
160 ft. below surface
110 ins. in diameter

Serves all of Clark County population of 463,087.

pt/kmcc/cl-cr

CONTACT REPORT

AGENCY/AFFILIATION: United States Geological Survey		
DEPARTMENT:		
ADDRESS/CITY: Carson City		
COUNTY/STATE/ZIP: Nevada		
CONTACT(S)	**TITLE**	**PHONE**
1. Dave Prudic		702/887-7611
2.		
E & E PERSON MAKING CONTACT: Peter Towle		**DATE:** 8/31/89
SUBJECT: Various River Discharge Flow Into Lake Mead		
SITE NAME: Kerr-McGee		**EPA ID#:** NVD008290330

1) Virgin River (metered near Littlefield)	- 262 cubic feet per second (cfs) avg. annual	1988 figure
2) Las Vegas Wash (metered near Henderson)	- 144 cfs 98% sewage treatment effluent avg. annual	1988 figure
3) Muddy River (near Overton)	- 40 cfs	1988 figure

pt/kmcc/cl-cr

CONTACT REPORT

AGENCY/AFFILIATION: Bureau of Reclamation		
DEPARTMENT: River Operations and Policy		
ADDRESS/CITY: Boulder City		
COUNTY/STATE/ZIP: Clark County, Nevada		
CONTACT(S)	**TITLE**	**PHONE**
1. Bruce Williams	Hydraulic Engineer	702/293-8525
2.		
E & E PERSON MAKING CONTACT: Peter Towle		**DATE:** 10/5/89
SUBJECT: Average Water Flow Out of Lake Mead		
SITE NAME: Kerr-McGee		**EPA ID#:** NVD008290330

The 1989 average flow, per day, out of Lake Mead into the Colorado River is 12,400 (cfs).

pt/kmcc/cl-cr

CONTACT REPORT

AGENCY/AFFILIATION: Lake Mead National Recreation Area		
DEPARTMENT: Visitors Information		
ADDRESS/CITY: Boulder City		
COUNTY/STATE/ZIP: Nevada		
CONTACT(S)	**TITLE**	**PHONE**
1. Robin Hourie	Secretary	702/293-8907
2.		
E & E PERSON MAKING CONTACT: Peter Towle		**DATE:** 9/11/89 10/5/89
SUBJECT: Lake Mead		
SITE NAME: Kerr-McGee		**EPA ID#:** NVD008290330

- Lake Mead is a National Recreation area. The lake itself is greater than 500 acres in area.

- Lake Mead is used for recreational fishing only.

10/5/89

- Surface area of Lake Mead: 500,000 acres.

pt/kmcc/cl-cr

CONTACT REPORT

AGENCY/AFFILIATION: State of Nevada		
DEPARTMENT: Welfare		
ADDRESS/CITY: Las Vegas		
COUNTY/STATE/ZIP: Nevada		
CONTACT(S)	**TITLE**	**PHONE**
1. David Buck	Supervising Biologist for Southern Nevada	702/986-5127
2.		
E & E PERSON MAKING CONTACT: Rob Balas		**DATE:** 9/1/89
SUBJECT: Total Poundage Taken Out of Lake Mead		
SITE NAME: Montrose		**EPA ID#:** NVD008237489

Total poundage - 1,804,720 pounds

Number of fish - 902,360

Average weight of fish - 2 pounds

Razorbacks proposed federal endangered species

pt/kmcc/cl-cr

CONTACT REPORT

AGENCY/AFFILIATION: Henderson City Public Works		
DEPARTMENT: Flood Control Board		
ADDRESS/CITY: Henderson		
COUNTY/STATE/ZIP: Clark County, Nevada		
CONTACT(S)	**TITLE**	**PHONE**
1. Janie Nihipali	Secretary	702/565-2140
2.		
E & E PERSON MAKING CONTACT: Peter Towle		**DATE:** 8/31/89 10/5/89
SUBJECT: Flood Plain and Drainage Area of BMI Complex		
SITE NAME: Kerr-McGee		**EPA ID#:** NVD008290330

8/31/89

To the best of Ms. Nihipali's knowledge, the BMI complex lies in a flood Zone C. Flood Zone C is considered a minimal flood hazard (less than 500 year frequency).

10/5/89

Pabco Road is intersected by a Zone A flood zone.

pt/kmcc/cl-cr

CONTACT REPORT

AGENCY/AFFILIATION: City of Henderson Waste Water Treatment Facility		
DEPARTMENT:		
ADDRESS/CITY: Henderson		
COUNTY/STATE/ZIP: Nevada		
CONTACT(S)	**TITLE**	**PHONE**
1. Virginia Swipas	Chemist	702/565-2048
2.		
E & E PERSON MAKING CONTACT: Peter Towle		**DATE:** 10/13/89
SUBJECT: Location and Number of Employees at Facility		
SITE NAME: Kerr-McGee		**EPA ID#:** NVD008290330

- The new waste water facility is located in the Pittman area. The old facility is located north of the Carver Park area.
- The new facility has 10 daytime employees.
- Ponds on the old facility are used for a water storage location. These ponds are checked daily.

pt/kmcc/cl-cr

CONTACT REPORT

AGENCY/AFFILIATION: Kerr-McGee Chemical Corporation		
DEPARTMENT:		
ADDRESS/CITY: Lake Mead Drive, Henderson		
COUNTY/STATE/ZIP: Clark County, Nevada		
CONTACT(S)	**TITLE**	**PHONE**
1. Alan Gaddy	Senior Process Engineer	702-565-8901
2. Russell Jones	Environmental and Health Div.	702-565-8901
E & E PERSON MAKING CONTACT: Peter Towle		**DATE:** 10-14-89
SUBJECT: Site Reconnaissance		
SITE NAME: Kerr-McGee Chemical Corporation		**EPA ID#:** NVD008290330

Information obtained during site visit to KMCC included:

- Since the closure of the on-site landfill in January 1983, all sodium chlorate filter cake wastes have been trucked to the U.S. Ecology Hazardous Waste Landfill in Beatty, Nevada.
- The hazardous waste landfill is capped and warning signs are posted marking its presence.
- 285 persons work at the KMCC facility.
- There is a chlorine gas pipeline that runs across the KMCC property. The pipeline is used by Pioneer Chemical Company.
- Three ammonia tanks are stored on site and used in the perchlorate process.
- A hydrogen sulfide tank trailer is also stored on site.
- KMCC is a zero-discharge facility. No wastes are discharged off site via drainage channels. All discharges that do leave the plant, i.e., storm runoff, are tested. All discharges are reported to NDEP.
- A new sodium chlorate process will be put on-line in early 1990.
- The old electrolytic cells used in the sodium chlorate process are being removed.

pt/kmcc/cl-cr

- The old electrolytic cells were decommissioned in November 1988.

- The basements of units 4 and 5 have been repaired. According to KMCC employees, NDEP has allowed them to use the basements as sumps again; however, KMCC does not.

- Cleanup of chromium-contaminated groundwater began in late 1987 and is scheduled to continue until 2017.

- The drainage channel that runs through KMCC property is called the Beta Ditch. The Beta Ditch discharges into a hard pipe near Boulder Highway. The hard pipe leads to Las Vegas Wash.

- The Bureau of Reclamation installed this hard pipe in 1983.

- Manganese process wastes are disposed of on site to the manganese tailings pile. The pile has been tested and deemed non hazardous in accordance with RCRA standards.

- The manganese tailings pile is 500′ x 300′ x 40′.

- KMCC is the sole U.S. producer of rocket fuel for the space shuttle.

  Because of this, KMCC security and process operations have been under close scrutiny by the U.S. Government in recent years for national security reasons.

CONTACT REPORT

AGENCY/AFFILIATION: Nevada Natural Heritage Program		
DEPARTMENT:		
ADDRESS/CITY: 201 S. Fall Street, Carson City		
COUNTY/STATE/ZIP: Nevada, 89710		
CONTACT(S)	**TITLE**	**PHONE**
1. Glen Clemmer	Zoologist	702/885-4370
2.		
E & E PERSON MAKING CONTACT: K. Zavitz		**DATE:** 12/28/89
SUBJECT: Endangered Species Habitats		
SITE NAME: State Industries	**EPA ID#:**	

The following sensitive animal and plant species, as designated by the Nevada National Heritage Program, may be found in the Henderson area:

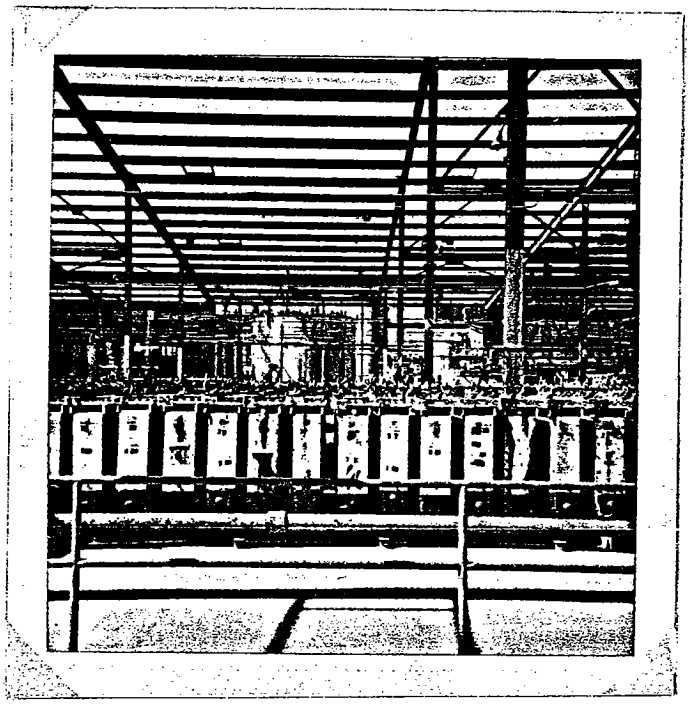
- Gile Monster
- Desert tortoise
- Arctomecon California, and the
- Penstemon bicolor

pt/kmcc/cl-cr

APPENDIX B

Photodocumentation

FIELD PHOTOGRAPHY LOG SHEET



DATE: 9/14/89

TIME: 11:35 AM

DIRECTION:

N/A

WEATHER: Clear and hot

PHOTOGRAPHED BY:

Alan Gaddy-KMCC

DESCRIPTION:

Decommissioned electrolytic cells from unit 5. Beneath cells is the basement where the chromium contamination was traced to.

DATE: 9/14/89

TIME: 11:50 AM

DIRECTION:

West

WEATHER: Clear and hot

PHOTOGRAPHED BY:

Alan Gaddy-KMCC

DESCRIPTION:

Closed surface impoundment P-1.

d/pt/kerrmcgee/fpls

FIELD PHOTOGRAPHY LOG SHEET

DATE: 9/14/89

TIME: 11:50 AM

DIRECTION:

West

WEATHER: Clear

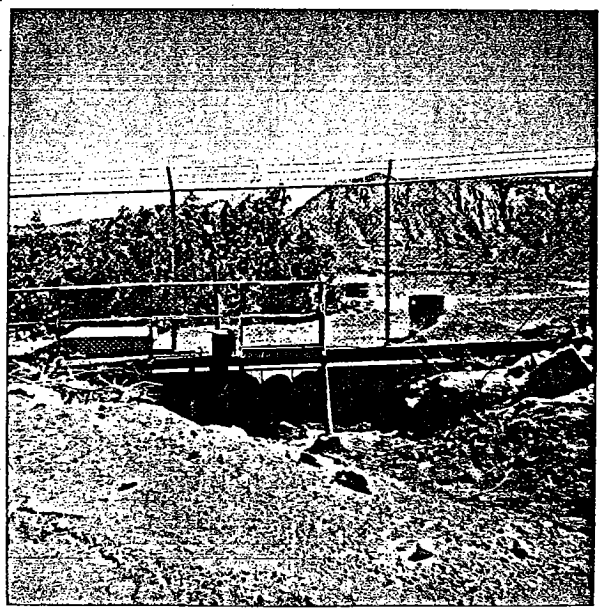
and hot

PHOTOGRAPHED BY:

Alan Gaddy-KMCC

DESCRIPTION:

Closed surface impoundment S-1.



DATE: 9/14/89

TIME: 12:05 PM

DIRECTION:

East

WEATHER: Clear

and hot

PHOTOGRAPHED BY:

Alan Gaddy-KMCC

DESCRIPTION:

Drainage ditch at TIMET property line border.

d/pt/kerrmcgee/fpls

FIELD PHOTOGRAPHY LOG SHEET

DATE: 9/14/89

TIME: 1:30 PM

DIRECTION:

North

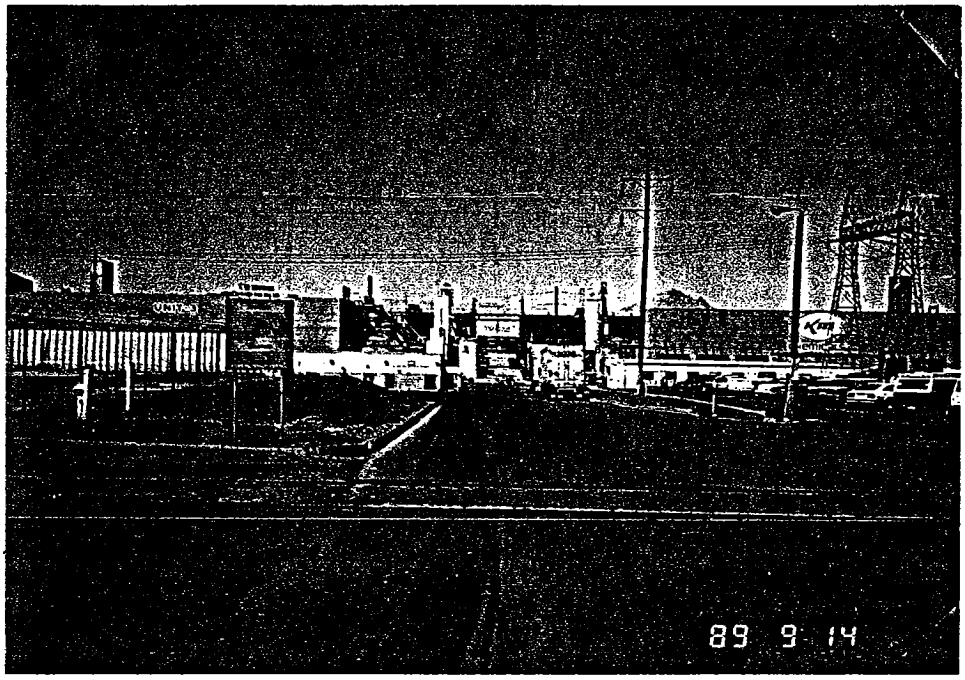
WEATHER: Clear

and hot

PHOTOGRAPHED BY:

Peter Towle

DESCRIPTION:



Entrance to the KMCC plant - taken off-site.

DATE: 9/14/89

TIME: 1:30 PM

DIRECTION:

North

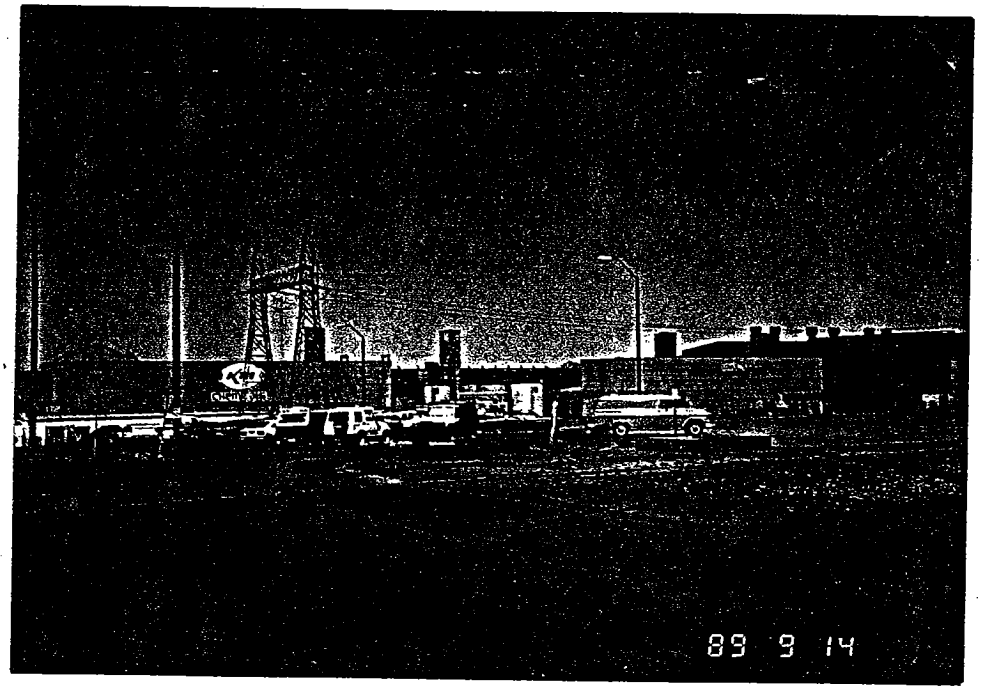
WEATHER: Clear

and hot

PHOTOGRAPHED BY:

Peter Towle

DESCRIPTION:



Unit 4 and 5 buildings - taken off-site.

d/pt/kerrmcgee/fpls

APPENDIX C

Description of KMCC Waste and Recovery Ponds

SUMMARY DESCRIPTION OF PROCESS/WASTEWATER PONDS

Single Liner Systems

Pond C-1

Liner	: PVC Bottom, reinforced butyl side
Surface Area	: 69,000 ft.^{2}
Volume	: 3,125,000 gallons
Process Waste	: Boiler Plant Blow Down Boiler Plant Wash Down MnO_2 Cathode Wash Solution Boron Neutralization Waste (Evaporation)

Pond AP-2

Liner	: PVC Bottom, reinforced butyl side
Surface Area	: 14,000 ft.^{2}
Volume	: 400,000 gallons
Process Waste	: Sodium Perchlorate purification and Ammonium Perchlorate process purification filter wash liquor. Total recycle.

Pond P-3

Liner	: Reinforced butyl rubber
Surface Area	: 12,000 ft.
Volume	: 390,000 gallons
Process Waste	: Sodium Chlorate solution due to wash down, storm water collection and excess above that the process vessels can handle. Total recycle.

Double Liner Systems

Pond AP-1

Liner	: Bottom liner - 40 mm HDPE (high-density polyethylene). Side underliner - geo-textile polypropylene 400 gm/m^2. Top liner - 60 mil HDPE.
Surface Area	: 14,000 ft.^{2}
Volume	: 370,000 gallons
Process Waste	: Sodium Perchlorate purification and Ammonium Perchlorate process purification filter wash liquor. Total recycle.

SUMMARY DESCRIPTION OF PROCESS/WASTEWATER PONDS (CONTINUED)

Pond AP-3

Liner	: Bottom liner - 40 mm HDPE Side underliner - geotextile polypropylene 400 gm/m^2 Top liner - 60 mil HDPE
Surface Area	: 2,000 $ft.^2$
Volume	: 65,000 gallons
Process Waste	: Sodium Perchlorate purification and Ammonium Perchlorate process purification filter wash liquor. Total recycle. This pond is used as a pump basin for AP-1.

Pond AP-4

Liner	: Bottom liner - 40 mm HDPE side underliner - geotextile polypropylene 400 gm/m^2 Top liner - 60 mm HDPE
Surface Area	: 20,000 $ft.^2$
Volume	: 720,000 gallons
Process Waste	: Ammonium Perchlorate cooling tower waste; salt crystalizer washout

Pond AP-5

Liner	: Bottom liner - 40 mm HDPE side underliner - geotextile polypropylene 400 gm/m^2 Top liner - 60 mm HDPE
Surface Area	: 35,000 $ft.^2$
Volume	: 1,817,000 gallons
Process Waste	: Ammonium Perchlorate cooling tower waste

SUMMARY DESCRIPTION OF PROCESS/WASTEWATER PONDS (CONTINUED)

Pond P-2

Liner	: Bottom liner - 30 mil PVC unreinforced Side underliner - geotextile polypropylene Top liner - two layers; first - 36 mil Hypalon polyester reinforced, second - 60 mil HDPE
Surface Area	: 13,000 $ft.^2$
Volume	: 675,000 gallons
Process Waste	: Sodium Chlorate solution due to wash down, storm water collection and excess above that the process vessels can handle. Total recycle.

Pond Mn-1

Liner	: Bottom - 4" - 6" compacted bentonite clay 10^{-8} cm/sec. permeability Side underliner - geotextile polypropylene 400 gm/m Top liner - 60 mm HDPE
Surface Area	: 53,000 $ft.^2$
Volume	: 3,500,000 gallons
Process Waste	: MnO_2 cell feed filter waste, potassium phosphate cathode wash solution

Pond WC-2

Liner	: Bottom liner - 40 HDPE Side liner - 105 geotextile polypropylene - HDPE netting - 40 HDPE Top liner - 60 HDPE UV Protective liner - 40 HDPE

SUMMARY DESCRIPTION OF PROCESS/WASTEWATER PONDS (CONTINUED)

Surface Area	: 74,600 ft.^{2}
Volume	: 13,018,00 gallons
	: Unit 3 and Unit 5 cooling tower blowdown, steam generation blowdown, process water softeners, MnO_2, wash solution, and process seal water/filter flush. Solution from this pond will be processed through a Vapor Recompression Unit to produce clean water for cooling and process uses.

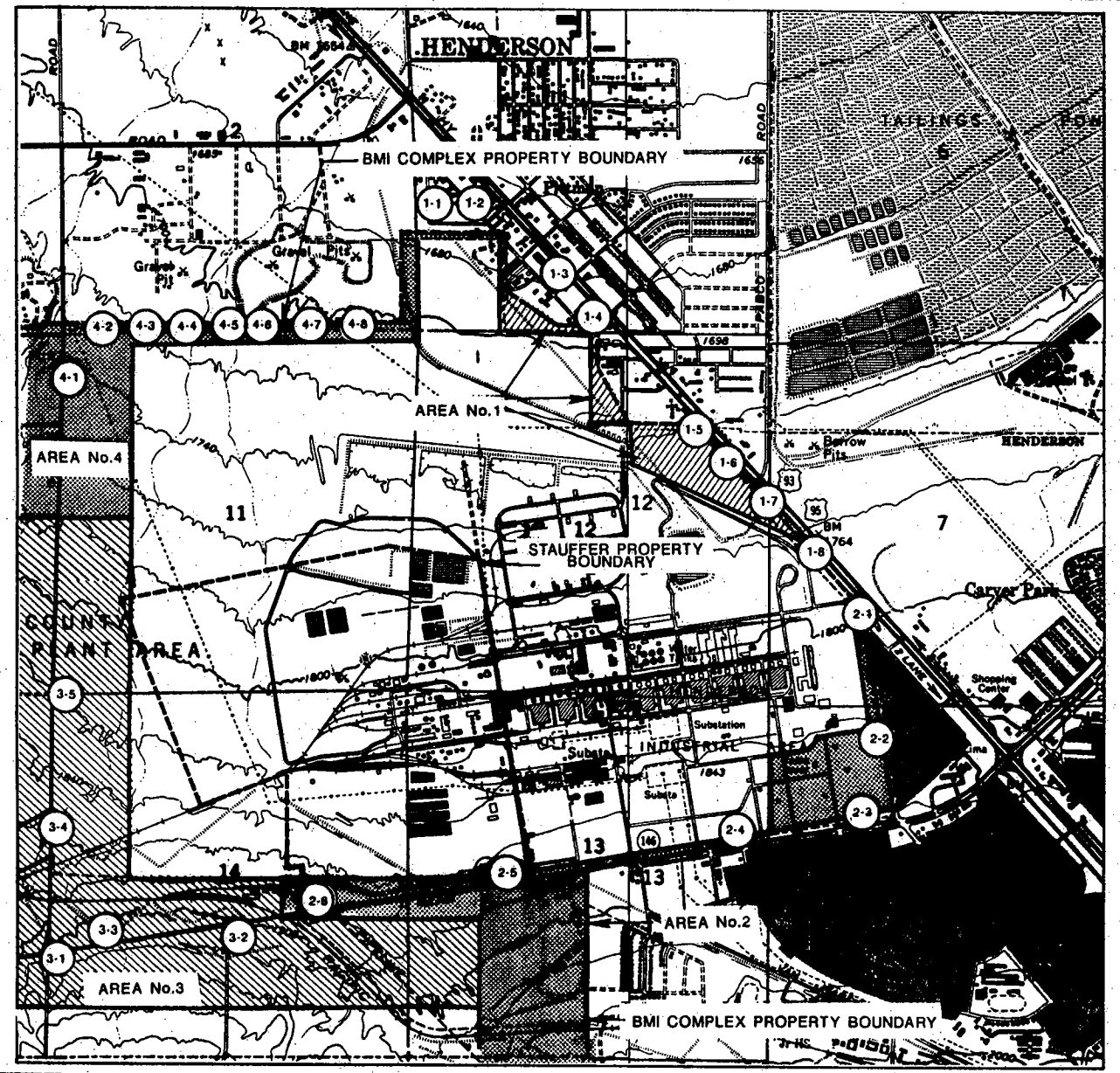
Pond WC-1

Liner	: Bottom liner - 40 HDPE Side liner - 105 mil geotextile polypropylene - HDPE netting - 40 HDPE Top liner - 60 HDPE UV Protective liner - 40 HDPE
Surface Area	: 74,600 ft.^{2}
Volume	: 13,018,00 gallons
	: Unit 3 and Unit 5 cooling tower blowdown, steam generation blowdown, process water softeners, MnO_2, wash solution, and process seal water/filter flush. Solution from this pond will be processed through a Vapor Recompression Unit to produce clean water for cooling and process uses.

APPENDIX D

Description of Past Sampling Locations

SOURCE : Base from Las Vegas SE and Henderson, Nevada Quadrangles



0 1000 2000

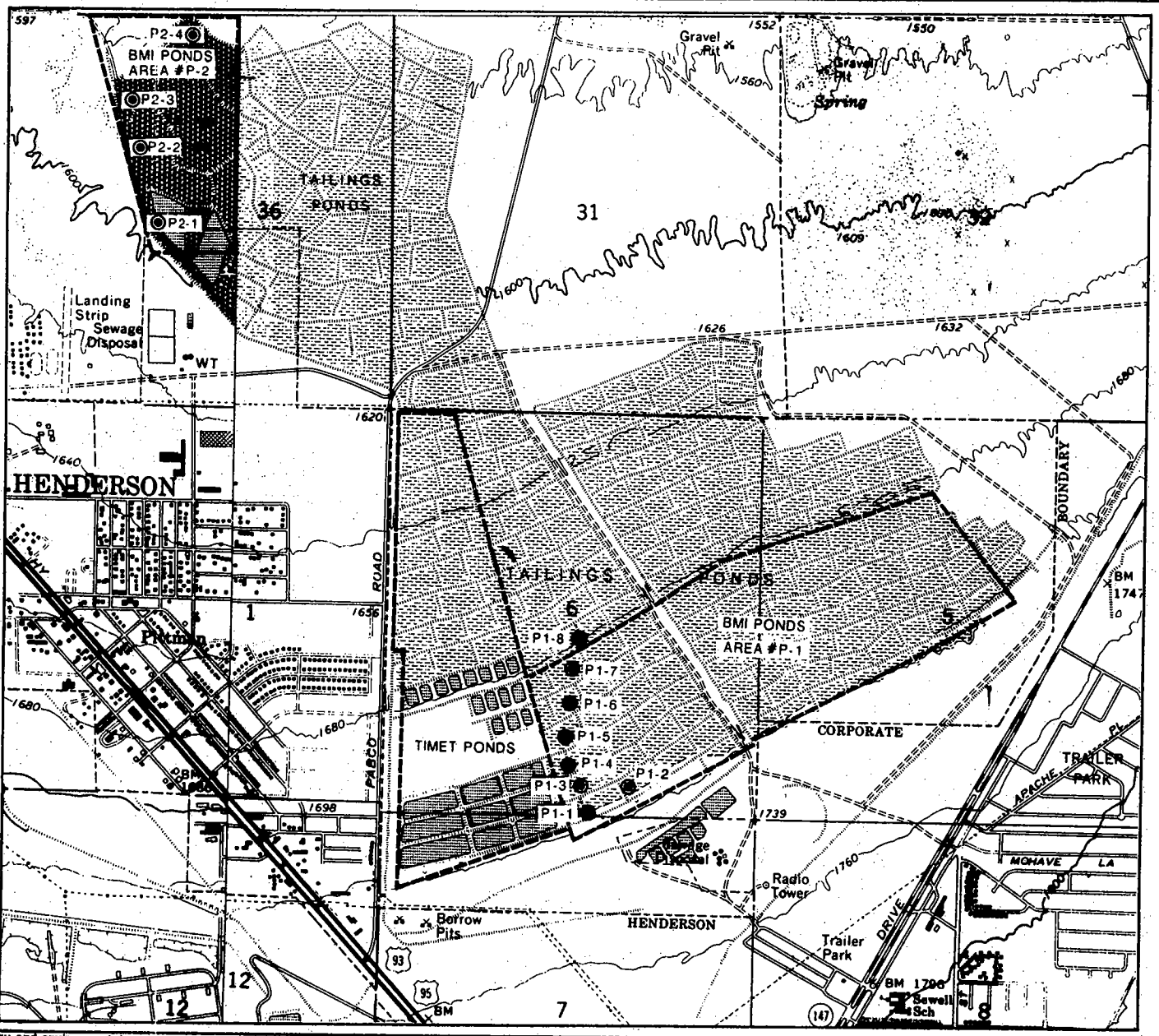
SCALE IN FEET

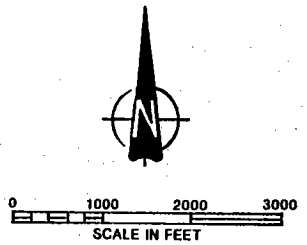
PHASE IIA SAMPLING LOCATIONS - MAY 1985

BMI INDUSTRIAL COMPLEX
HENDERSON, NEVADA

ecology and environment, inc.

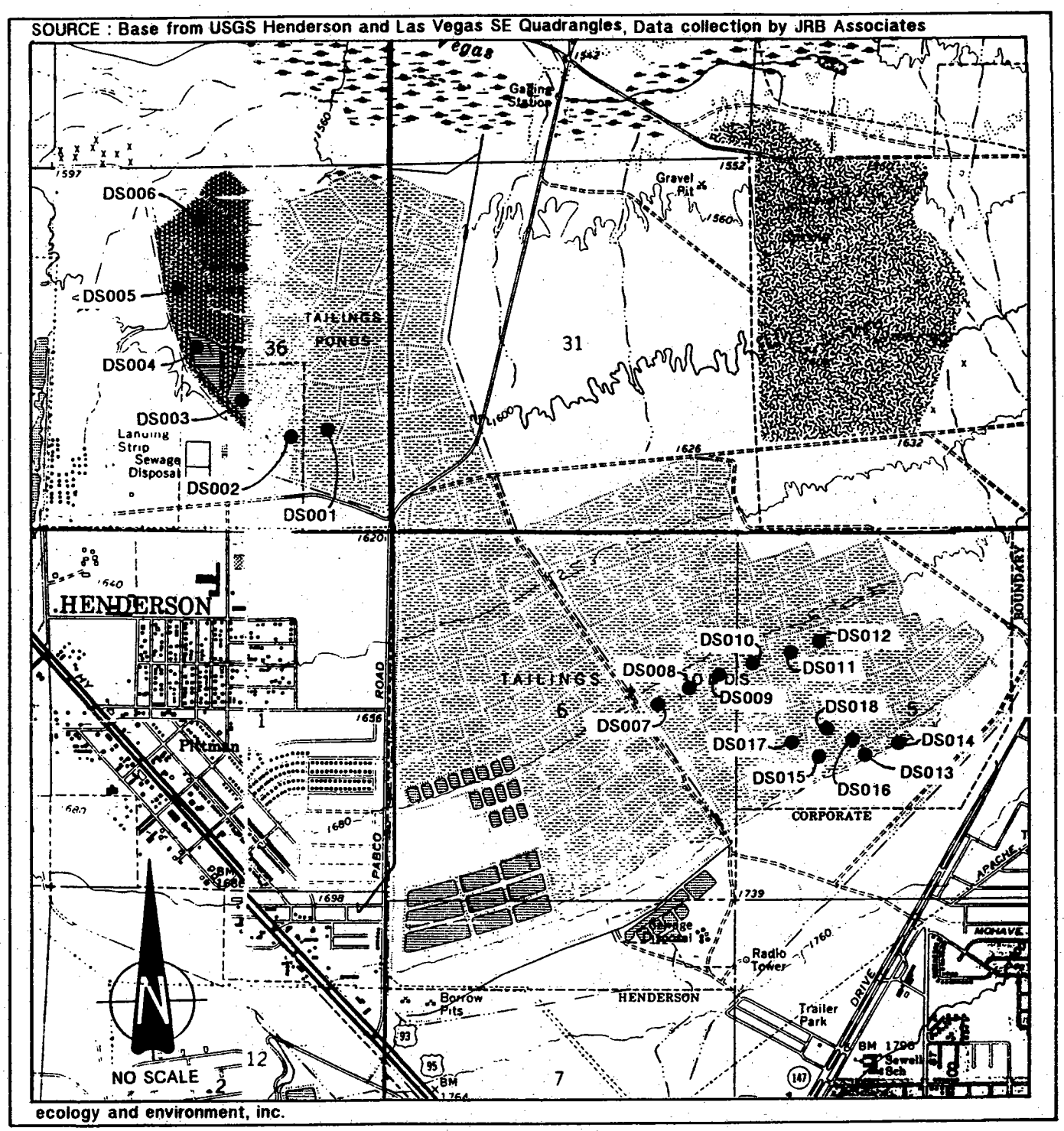
SOURCE : Base from USGS Henderson, Nevada Quadrangle





PHASE IIB SAMPLING LOCATIONS
BMI PONDS - JUNE 1985
BMI INDUSTRIAL COMPLEX
HENDERSON, NEVADA

ecology and environment, inc.



JRB ASSOCIATES SAMPLING LOCATIONS
BMI PONDS - JANUARY 1980
BMI INDUSTRIAL COMPLEX
HENDERSON, NEVADA