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DIV. OF OIL, GAS & MINING

BARRICK MERCUR MINE
MILL SITE
HYDROCARBON IMPACTED SOIL
ASSESSMENT AND SITE CLOSURE

May 18, 1998

Prepared for:

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Figure 2 Site Map with Test Pit Locations

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1.0 INTRODUCTION

The purpose of this report is to provide background information, summarize existing data, and set forth a proposed approach for site closure related to hydrocarbon impacted soil at the Barrick Mercur Mine mill site. The specific areas at the mill site to be addressed in this approach are the aboveground storage tanks (ASTs), underground storage tanks (USTs), Used Oil Pond, and General Yard Areas.

The Mercur Mine is located in southeast Tooele County, Utah (Sections 4 & 5, T6S, R3W) (Figure 1). The Mercur Mine mill site contains administrative offices, mill, laboratory, warehouse, maintenance shops, outside storage areas, ready lines, and tanks for storage of reagents, process fluids, and petroleum products. This approach addresses with areas of hydrocarbon impacted soils that were primarily affected by handling of petroleum products during the maintenance and operation of the mobile equipment used at the mine. Figure 2 shows the mill site and the four specific areas of hydrocarbon impacted soils mentioned above.

2.0 BACKGROUND

2.1 Aboveground Storage Tanks

Diesel fuel and lubricating oils are stored in aboveground storage tanks at the tank farm located on the east side of the mill site. This facility was originally constructed with a secondary containment system consisting of earth berms and floor sized to contain more than the largest tank within the containment area. On October 7, 1991, approximately 24,366 gallons of diesel fuel were released from the overflow pipe of one of the diesel fuel tanks into the secondary containment area. The fuel soaked into the soil beneath the containment area except for about 1,000 gallons that were recovered immediately after the spill. Some of this fuel soaked the soil just outside the west berm of the tank farm. This hydrocarbon impacted soil outside of the containment was excavated, sampled, and disposed of at the direction of Barrick. Analytical results from the sampling of this soil indicated that approximately 4,200 gallons of fuel were contained in the contaminated soil. The remaining 19,166 gallons of spilled fuel apparently migrated into the vadose zone under the containment area.

In November of 1991, five shallow auger drill holes were installed in the soil and rock fill under the containment area. Based on analytical results from the soil and rock fill samples collected, Barrick estimated that 19,600 gallons of diesel were still present in the subsurface soils under the tank farm to a depth of about 6 feet. In March of 1992, a skid-mounted air rig was used to drill 31 holes that penetrated the soil and rock fill thickness within the containment area. Drilling depths varied

between 4 to 15 feet. Samples were collected from the cuttings and analyzed for petroleum hydrocarbons. Concentrations of diesel in the soil and rock samples varied from non-detect to 14,300 mg/kg with an average concentration of 1,432 mg/kg. Barrick estimated that only 1,769 gallons of fuel remained in the soil and rock fill beneath the containment. However, this number was thought to be low due to the air-lift drilling sample collection method. Biodegradation was also thought to be responsible for reducing some of the contaminant mass.

A remedial investigation report and corrective action plan for the diesel fuel release was submitted to the Utah Division of Water Quality (DWQ) on April 10, 1992. This provided the results of the site drilling, described the local hydrology and hydrogeology, discussed the lack of potential for contaminating ground water under the site, and proposed installation of the concrete containment liner as corrective action.

Following the DWQ's approval, Barrick lined the entire tank farm secondary containment with concrete to improve the capacity to contain any future petroleum spillage without impacting the underlying soils. The hydrocarbon impacted soil was left in place under the new tank farm concrete liner.

Based on the available information at that time, on March 3, 1992, the Utah Division of Oil, Gas and Mining (DOGM) amended the reclamation plan for the Mercur Mine to include a requirement that, upon final closure of the facilities, any residual petroleum impacted soils at the tank farm will be excavated and disposed of in accordance with Utah State law, as approved by the Utah Division of Water Quality.

In August of 1997, Remediation Technologies, Inc. (ReTec), Salt Lake City, Utah, excavated two test pits near the loading rack on the west side of the fuel/oils AST area. The test pits were dug to evaluate residual petroleum hydrocarbon contamination related to the 1991 diesel release. Test pits were excavated north of the concrete pad beneath the fuel dispensers and west of the concrete slab to total depths of approximately 4.5 feet below grade. Soil samples collected in these areas were analyzed for Total Petroleum Hydrocarbons (TPH), using EPA Method 8015 modified. TPH concentrations ranging from 47 to 205 mg/kg were detected in samples collected from 1.5 to 2.0 feet below grade. No TPH was detected below a depth of approximately 3.0 feet.

It is currently unknown what quantity of residual petroleum hydrocarbon may remain in the soil directly under the tank farm. Additional natural degradation of the hydrocarbon may have occurred since 1992 when it was last sampled. New samples cannot be taken until the tank farm is removed. Any remaining hydrocarbon impacted soil could be removed and disposed of, however, Barrick proposes to close this site with the risk-based closure approach which is allowed under Utah regulations, since this site was first investigated.

2.2 Repair Shop Yard and Truck Charging Stations

Over the years of operation of the Mercur mill site, there have been various small fuel, hydraulic oil, and lubricating oil spills from both mobile and small stationary equipment around the mill site. None of these spills have been significant but each resulted in a small, localized area of hydrocarbon impacted soils.

In August of 1997, ReTec excavated approximately eleven test pits in the areas of the Repair Shop Yard and Truck Charging Stations to evaluate the extent of the hydrocarbon impacted soils resulting from these small spills. All of the test pits were excavated until bedrock or large gravel fill was encountered or the trackhoe could not dig any deeper (approximately 4 to 5 feet below grade). Grab soil samples were collected from either the sides or bottoms of the test pits. According to ReTec, all of the test pits were dry and no free product was observed in any of the excavations.

Subsurface soil samples were collected from each test pit and submitted to the laboratory for Total Recoverable Petroleum Hydrocarbons (TRPH), using EPA Method 418.1. TRPH was not detected in soil samples collected from seven of the eleven test pits. TRPH near the detection limit (54 mg/kg) was identified at a depth of 4.5 feet in Test Pit TP-1, which was excavated in a low-elevation area where surface water periodically collects. Test Pit TP-8, excavated in an area of stained soil near a truck charging station, contained 4,100 mg/kg TRPH at 1.5 feet below grade. The sample also contained low concentrations of ethylbenzene and xylenes (0.518 & 1.04 mg/kg, respectively). However, TRPH was not detected in a soil sample taken from a depth of 4.0 feet in TP-8. TRPH was detected in soil obtained from Test Pits TP-12 and TP-15. The near-surface soil sample collected from TP-12 contained 344 mg/kg TRPH, however, a sample taken from a depth of 1.5 feet below ground level did not contain a detectable concentration of TRPH. Soil from Test Pit TP-15 contained 298 mg/kg of TRPH at a depth of 1.5 feet.

None of the hydrocarbon results from the test pits indicated above have the potential for significant amounts of hydrocarbon impacted soils in the Repair Shop Yard and Truck Charging Stations areas. All of the TRPH concentrations encountered were below Utah RBCA Tier I levels.

2.3 Former Used Oil Pond

From 1983 to about 1988, water and used oil from the truck shop wash bay oil/water separator was routed to the former Used Oil Pond where the oil was removed and recycled off-site while the water evaporated. The pond was originally lined with hypalon and later with HDPE. The pond was taken out of service and replaced with two above ground storage tanks with secondary containment that provide the necessary oil/water separation and storage once provided by the former truck shop oil/water separator and the Used Oil Pond. Used oil from these tanks is removed and recycled off-site while the water is routed to the tailings pond. When the Used Oil Pond was closed, all free liquids and some solids were removed and recycled and the exposed liner was folded over the remaining hydrocarbon impacted solids. Clean fill material was then placed over the folded liner.

The site was then used as the site for the existing used oil tanks and is anticipated to be addressed during the final closure of the mine.

In August of 1997, ReTec excavated Test Pit TP-16 in the Used Oil Pond area. The test pit penetrated the upper (folded over portion) and lower HDPE and hypalon liners. The lower liner was encountered at a depth of approximately 6.5 below ground surface. According to ReTec, black, oily sand was encountered between the liners and ranging in depth from approximately 4.5 to 6.5 feet below surface grade. Gravel fill material below the bottom liner, from about 6.5 to 8.0 feet, did not contain any noticeable staining. The black oily sand was analyzed for TRPH and contained 24,900 kg/kg. In addition, xylenes, tetrachloroethene, and some metals were detected in the sample. The sample collected from below the lower liner did not contain any detectable concentration of TRPH. In October of 1997, ReTec collected five additional samples from the Used Oil Pond material. A continuous trench, designated OP-97-A - D, and a separate trench, designated OP-97-E, were excavated to evaluate Former Used Oil Pond material. The five samples were collected from depths ranging from 2.5 to 6.0 feet below grade. ReTec did not analyze the five samples for TRPH, TPH or total metals. The five samples did contain some xylenes, ethylbenzene, and toluene. Additionally, the samples contained tetrachloroethene ranging in concentrations from 0.775 to 7.12 mg/kg. ReTec also submitted to the laboratory a composite sample from all five grab samples that was TCLP extracted and analyzed for physical parameters, metals, semivolatiles, herbicides, pesticides, and D-List Volatile Organics. Only arsenic and barium were detected in the sample at 0.768 mg/L and 0.906 mg/L, respectively. This sample would not be classified as a RCRA hazardous material by characteristics. No free liquids were detected in the individual samples.

ReTec also hand-excavated three test pits (TP-18, 19 & 20) in the area of a vent in the buried used oil pipe between the truck shop and the used oil tanks. This vent was the site of a hydrocarbon release in 1991. Each sample was analyzed for TRPH and a composite sample was analyzed for total metals and F and D List organic compounds. TRPH was not detected in any of the samples. In addition, no volatile organic compounds were detected in the composite sample. Arsenic, barium, chromium, mercury, and lead where detected in concentrations of 83 mg/kg, 50.5 mg/kg, 11.3 mg/kg, 0.4 mg/kg, and 28 mg/kg, respectively.

2.4 Underground Storage Tanks

Prior to 1990, used oil from the oil/water separator in the truck shop was collected in a 500-gallon underground storage tank. Used oil from this UST was pumped to an adjacent used oil AST. This UST/AST system has not been used since 1990 when the two used oil tanks were installed in place of the Used Oil Pond. The used oil UST was temporarily closed in 1995 by removing all oil and partially filling it with soil. The used oil UST was placed in Temporary Closure status by the DERR on April 23, 1997. A 12,000 gallon gasoline UST was also located west of the administration building and east of the Pipeline Vent Area (Figure 2).

Both USTs were tested for tank tightness in 1992 and passed. Both tanks were tested for cathodic protection in April, 1997 and were found to be cathodically protected at that time. The gasoline UST was also tested for tightness in December, 1997 and passed.

In August of 1997, ReTec excavated two test pits in the area of the 500-gallon used oil UST. One test pit was located adjacent to the concrete near the northwest corner of the Repair Shop. Soil samples were collected from the fill material adjacent to the underground piping for the tank. TRPH was not detected in the fill material. The other test pit was excavated about five feet east of the used oil UST. According to ReTec, bedrock was encountered at a depth of 4.5 feet below grade. The soil sample collected at 4.0 feet contained 519 mg/kg TRPH. Apparently, the rock fill material in the area did not contain any visible oil staining.

Both of these USTs were removed from the ground at the end of April, 1998. There was evidence of hydrocarbon impacted soils around the used oil UST and none around the gasoline UST. Both USTs appeared to be in good condition when they were removed so the hydrocarbon around the used oil UST is likely due to overfills or surface spills of used oil in this area. Analytical data from the Closure Report are not available at this time.

3.0 CLOSURE OBJECTIVES

Barrick is seeking a unified approach for interacting with the State of Utah regulatory agencies for this project. The Division of Oil, Gas and Mining (DOGM) has primary regulatory authority over the mill site closure and reclamation, including disposal of all facilities and wastes. The Division of Water Quality (DWQ) has authority over the protection of surface and ground water quality. The Division of Environmental Response and Remediation (DERR) has authority over the closure of the USTs and has extensive experience in regulating hydrocarbon impacted soils, particularly soils impacted by used oil. Because all of the four primary sources of hydrocarbon contamination at the Mercur mill site are in close proximity to each other, and at least the USTs are directly under the DERR's authority, Barrick's proposal is to have the DERR regulate all hydrocarbon impacted soils at the site related to the USTs, ASTs, Repair Shop Yard, Used Oil Pond, and other minor areas of potential hydrocarbon contamination.

Barrick's objective for this project is to use a Risk Based Corrective Action (RBCA) approach to close all areas of soil contamination. The RBCA process set forth in DERR guidelines requires an assessment of the risk the contamination presents to public health and the environment to make corrective action decisions. Barrick believes the closure of the Mercur mill site should be possible under the RBCA Tier I process for the following reasons:

1) The hydrogeological conditions of the site are well documented from previous studies related to the nearby beneficiation facilities and these show that ground water is over 900 feet below grade at the site.

2) All disturbed surfaces at the site will be covered with topsoil and revegetated.

3) All surface water runoff from these areas will be contained on the Mercur property.

4) The nearest use of ground water is miles from the site and hydrogeologically separated from the hydrocarbon impacted soils by natural stratigraphy.

4.0 EVALUATION OF AREAS OF HYDROCARBON IMPACTED SOIL

Barrick is proposing to conduct the following activities related to the four areas of hydrocarbon impacted soil in order to achieve approval a risk-based site closure from the DERR.

4.1 Aboveground Storage Tanks

Barrick will evaluate analytical data from previous investigations and determine if additional soil samples should be collected to verify the extent of any remaining soil contamination related to the 1991 release under the tank farm. The ASTs are going to be removed from the site in late 1998. Once the ASTs are removed, the soils can be further evaluated for the presence of hydrocarbon impacts. A RBCA Site Classification will then be conducted for this area that will evaluate the current and potential degree and severity of hazards to human and environmental health. Following site classification, a Tier 1 Worksheet will be completed for this area to evaluate potential receptors, exposure pathways, and contaminant concentrations.

4.2 Repair Shop Yard, Truck Charging Stations, and Miscellaneous Sites

Total recoverable petroleum hydrocarbons were detected in 4 of the 15 soil samples that were submitted to the laboratory by ReTec in this area. These samples were collected in areas of minor spills and staining. The TRPH concentrations ranged from 54 mg/kg to 4,100 mg/kg, which are below the Tier 1 screening levels. Barrick will complete a Tier 1 Worksheet for this area to evaluate the potential receptors and exposure pathways. Barrick does not propose any additional sampling will occur in this area.

4.3 Former Used Oil Pond

Barrick will evaluate analytical data from previous investigations and determine if additional samples should be collected of the material between the liners of the former pond to verify the extent and concentrations of hydrocarbons. The oily sand and grit material in this pond is enclosed in a HDPE liner and field evidence indicates that no hydrocarbon has been released from the pond into the environment. Based on the samples collected by ReTec, some TRPH-contaminated solids in the pond do exceed Tier 1 screening levels. In addition, tetrachloroethene was detected in six samples

at concentrations ranging from 1.27 to 7.12 mg/kg. However, no tetrachloroethene was detected using the RCRA TCLP extraction method. Therefore, this material would not be hazardous waste.

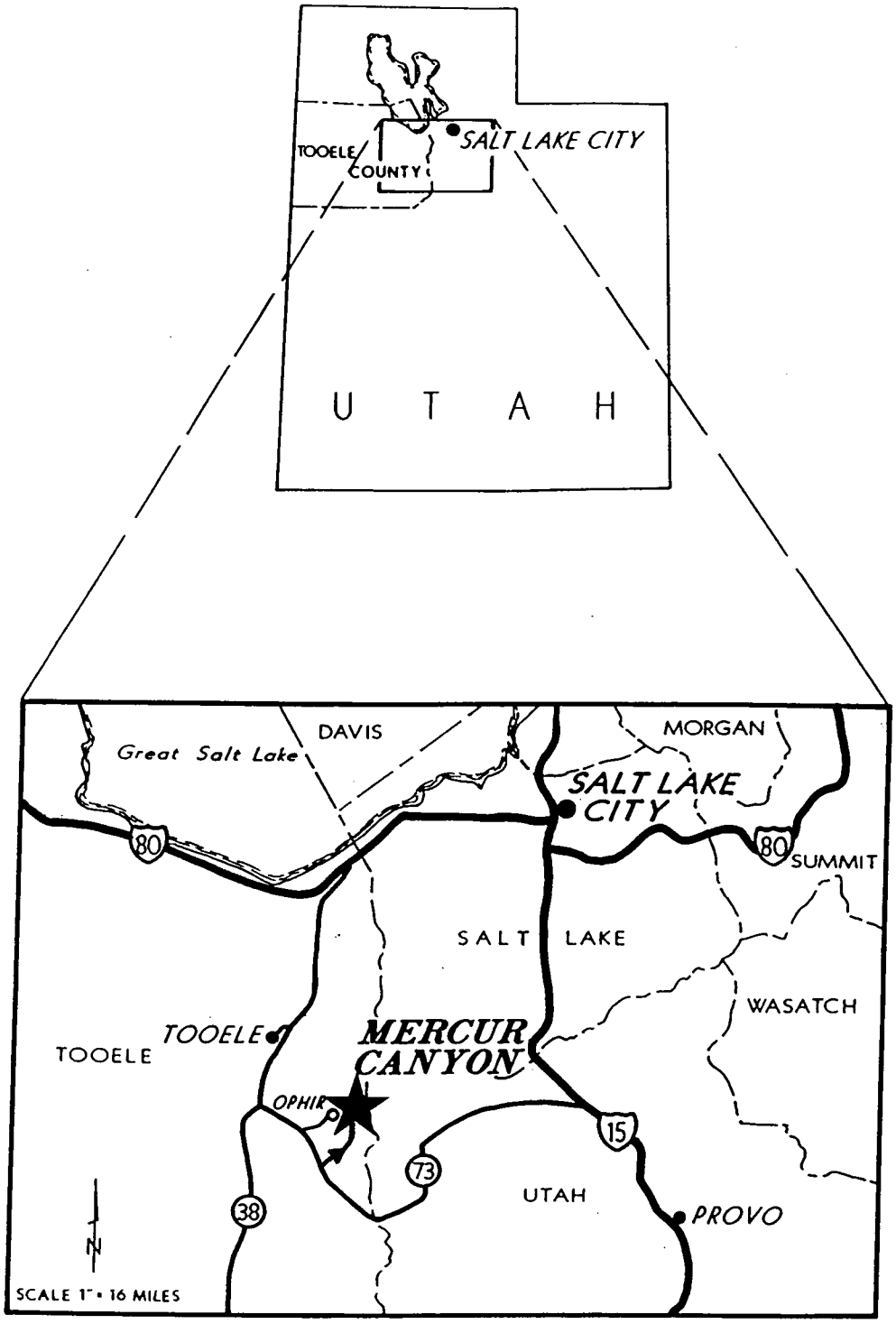
A RBCA Site Classification will be completed for this area. Following the site classification and any potential sampling, a Tier 1 Worksheet will completed.

4.4 Underground Storage Tanks

The 500-gallon used oil UST and the 12,000 gallon gasoline UST were removed at the end of April, 1998. A Closure Plan was prepared for these tanks and submitted to the DERR. The DERR facility number for this site is 8000007. Analytical results from the closure samples are not available at this time. However, based on the presence of visual contamination under the 500 gallon used oil tank, Barrick did report a release to the DERR. Barrick will complete a site classification and Tier 1 worksheet for the used oil UST site. In addition, based on the analytical results of the closure samples, additional soil samples could be collected.

5.0 REPORT PREPARATION

One final Risk Based Closure Report will be prepared after all data have been evaluated for the four primary areas of concern and miscellaneous other sites. The report will include a description of all site characterization data, the site classifications and Tier 1 evaluations and recommended site closure actions for all four areas.



BARRICK RESOURCES (USA) INC.
MERCUR CANYON BASELINE STUDY

FIGURE 1
LOCATION MAP

jbr environmental consultants, inc.
Salt Lake City, Utah Cedar City, Utah Reno, Nevada Elko, Nevada

DESIGN BY	DRAWN BY	CH'D BY	SCALE	DATE DRAWN	REVISION
JMJ	CLP		NONE	10/30/96	

5.18.98 Barrick / DERR / DOGM / DWQ

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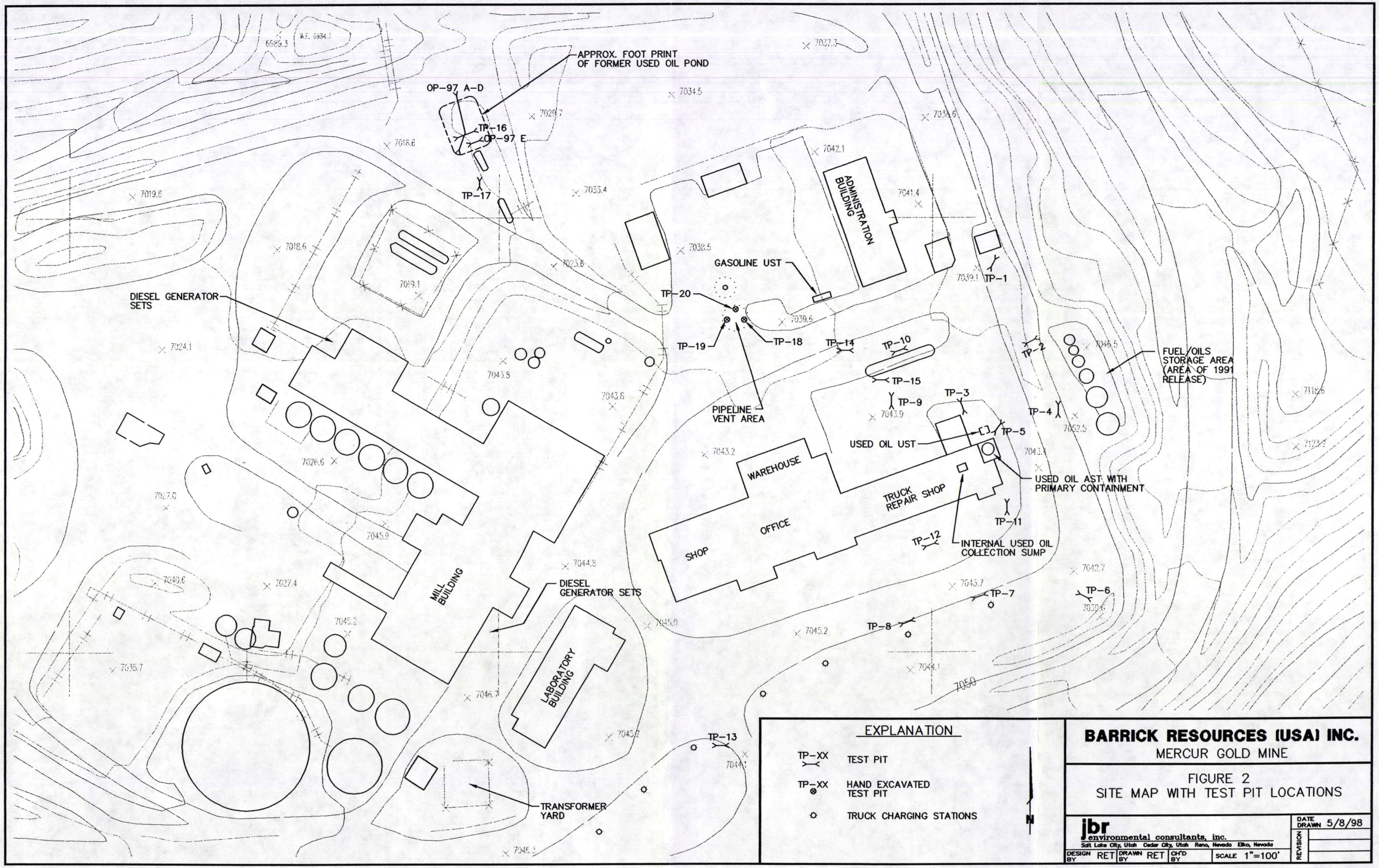
APPROX. FOOT PRINT OF FORMER USED OIL POND
OP-97 A-D
TP-16
OP-97 E
TP-17
ADMINISTRATION BUILDING
GASOLINE UST
TP-20
TP-19
TP-18
TP-14
TP-10
TP-15
TP-9
TP-3
TP-5
TP-4
TP-2
TP-1
FUEL/OILS STORAGE AREA (AREA OF 1991 RELEASE)
PIPELINE VENT AREA
USED OIL UST
USED OIL AST WITH PRIMARY CONTAINMENT
WAREHOUSE
TRUCK REPAIR SHOP
OFFICE
SHOP
TP-11
TP-12
INTERNAL USED OIL COLLECTION SUMP
TP-7
TP-6
TP-8
TP-13
DIESEL GENERATOR SETS
MILL BUILDING
DIESEL GENERATOR SETS
LABORATORY BUILDING
TRANSFORMER YARD
7050
EXPLANATION
TP-XX TEST PIT
TP-XX HAND EXCAVATED TEST PIT
TRUCK CHARGING STATIONS
N
BARRICK RESOURCES (USA) INC.
MERCUR GOLD MINE
FIGURE 2
SITE MAP WITH TEST PIT LOCATIONS
jbr environmental consultants, inc.
Salt Lake City, Utah Cedar City, Utah Reno, Nevada Elko, Nevada
DESIGN BY RET
DRAWN BY RET
CH'D BY
SCALE 1"=100'
DATE DRAWN 5/8/98
REVISION
BM02-01A