

Health Assessment for

UTAH POWER & LIGHT/AMERICAN BARREL

SALT LAKE CITY, UTAH

CERCLIS NO. UTD980667240

MAY 20, 1990

**U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
Agency for Toxic Substances and Disease Registry**

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Public Health Service

U.S. Department of Health and Human Services

SUMMARY

The Utah Power and Light (UP&L) site, formerly known as American Barrel, is located one-half mile from downtown Salt Lake City, Utah. A creosote treatment facility operated there in the early 1900's. Later, a 55-gallon drum storage facility contaminated the soil and groundwater with polynuclear aromatic hydrocarbons (PAH's), volatile organic compounds (VOC's), pesticides, phthalates, and heavy metals. This site is of potential public health concern because humans maybe exposed to hazardous substances at concentrations that may result in adverse health effects. Contamination has spread to off-site areas and children from the nearby residential area have access to contaminated soil. In addition, transients frequently use these areas and may be exposed to the contaminants. UP&L is in the 8th update of the National Priorities List of hazardous waste sites.

BACKGROUND

A. SITE DESCRIPTION AND HISTORY

The Utah Power & Light (UP&L) site covers approximately 2 acres at the intersection of 600 West and North Temple Streets, less than one-half mile from downtown Salt Lake City, Utah (see Appendix). The Denver-Rio Grande railroad tracks lie on the east and west borders of the fenced site with ditches between the fence and tracks.

The property is owned by Utah Power & Light, which reportedly operated a pole and tie creosote treatment facility during the early 1900's. No records of this operation exist. American Barrel leased the property from 1945 through 1987 and operated a 55-gallon drum storage facility on-site. An estimated 30,000 to 50,000 drums were stored on-site in piles up to 20 feet high. Many of the drums were not empty, and evidence of leakage from a number of drums was noted during site visits by Utah State Health Department and U.S. Environmental Protection Agency (EPA) personnel. American Barrel, at the request of UP&L, instituted a removal operation, and all barrels were moved from the yard by April 30, 1988.

B. SITE VISIT

A site visit was made by the Agency for Toxic Substances and Disease Registry (ATSDR), EPA, and Utah State Health Department staff on September 7, 1989. During the site visit, it was observed that site access is restricted by a new 6-foot chain link fence with a locked gate. The UP&L representative reported that the site is patrolled daily by UP&L security.

All barrels and trees have been removed from the site. A cement wall from an old structure, a decontamination pad, and the remains of the previous fence are all that remain on-site. The site is located at a railroad crossroads, between two tracks. There has been a history of transient use of the barrel yard as a source of shelter. Transients were seen walking along the railroad tracks and "camping" outside the northeast corner of the fence. Transients should no longer find the site desirable for temporary shelter, since all cover has been removed, and entry to the site is difficult.

The site is level, and no surface water was observed. Grass and other vegetation now cover the majority of the site.

C. COMMUNITY HEALTH CONCERNS

No concerns regarding the UP&L site were expressed by citizens to local, State, or Federal agencies. To prevent concerns generated by incorrect and/or the absence of information, residents should be kept informed regarding the activities occurring at UP&L.

DEMOGRAPHICS, LAND USE, AND NATURAL RESOURCE USE

There are 10,562 residents living within 1 mile of the site. The nearest residence to the site is 24 North 600 West Street, which is 225 feet west of the site. This is one of approximately 10 homes along 600 West Street that are close to the site. The closest commercial building is approximately 165 feet west of the site. Of special concern are 2,625 school children in four schools within a 1-mile radius of the site, including children living in homes near the site. In addition, the site is located in a high traffic area for transients, who are economically disadvantaged, and thus may lack a proper diet, shelter, and medical care.

The area immediately to the west of the site includes a mixture of residential, light industry and commercial properties. The areas to the east and south are heavy industry, while to the north the land is primarily residential. A plasma center, frequently visited by transients, is situated opposite the site at the corner of 600 West and North Temple Streets.

A well survey has not been completed. According to records received, one municipal well and one private well are within 1 mile north of the site. In addition, two municipal wells are located east of the site and within 3 miles. None of the four wells are downgradient from the site.

No gardens were observed at the residences near the site, and no hunting or fishing takes place at or near the site. There is little vegetation outside the site area except in the residential yards.

ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

A. ON-SITE CONTAMINATION

On-site groundwater, surface soil, subsurface soil, and air were tested for the presence of contaminants. No surface water was available for analysis. Air measurements yielded no detectable levels of VOC's or other contaminants. Table 1 lists some of the contaminants found on-site. A large number of polyaromatic hydrocarbons (PAH's), phthalates, and other contaminants were found in the soil. Only those compounds with highest concentrations at levels of human health concern are listed.

TABLE 1

CONTAMINANT	SAMPLE	MAXIMUM CONCENTRATION (ppm)
Benzene	Groundwater	4.5
	Soil	0.7
Di(2-ethylhexyl) phthalate	Soil	5.4
Chlordane	Soil	71.0
DDD	Soil	10.7
DDE	Soil	101.0
DDT	Soil	32.8
Heptachlor	Soil	1.9
Styrene	Groundwater	1.6
	Soil	3.2
Toluene	Groundwater	3.0
Total Xylenes	Groundwater	5.0
PAH's		
Benzo[a]anthracene	Soil	130.0
Benzo[a]pyrene	Soil	159.0
Benzo[b]fluoranthene	Soil	130.0
Chrysene	Soil	140.0
Fluoranthene	Soil	240.0
Phenanthrene	Soil	150.0
Cadium	Soil	36.0
Lead	Soil	3,020.0

ppm - parts per million

Soil data from February 1988

Groundwater data from June 1987

Data from Utah Power & Light site, Salt Lake City, Utah

B. OFF-SITE CONTAMINATION

Off-site groundwater and air has not been sampled. Soil samples were taken from the railroad property surrounding the site and from residential properties northwest of the site. As with on-site soil, a large number of PAH's and other compounds were found. However, only those compounds with concentrations at levels of human health concern are listed in Table 2.

TABLE 2

	CONTAMINATION	MAXIMUM SAMPLE CONCENTRATION (ppm)
Aroclor	Res. Soil	17.40
	R.R. Soil	3.27j
Chlordane	Res. Soil	2.80
	Res. Soil	1.17
DDT	Res. Soil	1.85
Lead	Res. Soil	2,260.0
	R.R. Soil	13,600.0

ppm - parts per million

j - estimated value because quality control criteria were not met

Res. - residential property

R.R. - railroad property

Data from February, 1988

Data from Utah Power & Light site, Salt Lake City, Utah

The contaminants chlordane, DDE, and DDT are apparently from the site, because on-site soil concentrations far exceed the concentrations of these compounds in the residential soil. Most of the lead found at the residential property seems to originate on the railroad property, since the concentrations on railroad property far exceed on-site lead concentrations. The source of the aroclor is not apparent from the sampling data received to date.

C. QUALITY ASSURANCE QUALITY CONTROL

In preparing this Preliminary Health Assessment, ATSDR relies on information provided in the referenced documents and assumes that adequate quality assurance and quality control measures were followed with regards to chain-of-custody, laboratory procedures, and data reporting. The validity of the analysis and subsequent conclusions drawn for this Preliminary Health Assessment is determined by the availability and reliability of the referenced information.

D. PHYSICAL AND OTHER HAZARDS

There is presently no concern regarding physical hazards associated with this site, since access is restricted.

PATHWAYS ANALYSES

A. ENVIRONMENTAL PATHWAYS (FATE AND TRANSPORT)

Groundwater is an environmental pathway of potential concern for this site. Groundwater in the site area occurs in a shallow unconfined aquifer 15 feet below the surface and a confined (artesian) sand gravel aquifer 90 feet below the surface. These aquifers are separated by a clay layer that is thought to be continuous throughout a 2-mile radius of the site. Both aquifers are thought to flow towards the west.

The artesian aquifer is currently the primary source of potable water in the valley. At this time, groundwater samples have only been taken from the shallow unconfined aquifer. The analytical results of these samples indicate that the shallow unconfined aquifer has been contaminated with site-related compounds (see Table 1). These contaminants could migrate into the confined aquifer.

No wells are known to be downgradient of the site. The extent of the contaminant plume is unknown since monitoring wells have not been constructed beyond the site boundaries.

The majority of the on-site contamination is found in the surface and subsurface soils. Hazardous substances have been detected in soil samples at depths of 16 feet below the ground surface. Pesticides, PAH's, and phthalates have low water solubilities and tend to adsorb strongly to the soil particles, making these compounds quite persistent in the soil. Pesticides may volatilize from the surface soil slowly over time. All of these compounds have a tendency to bioaccumulate in animal tissues, and DDT in particular can be accumulated by plants.

Benzene, styrene, toluene, and the xylenes are quite mobile in the soil/groundwater system since they have a relatively high water solubility. These compounds are highly volatile and will evaporate quickly from water when exposed to the air. These VOC's do not bioaccumulate to the extent that PAH's and pesticides do, and exposure through the food chain is generally not considered a route of primary concern for these compounds.

An annual evaporation rate greater than the amount of annual rainfall, gives a negative net precipitation rate of 27 inches. This reduces the potential for contaminants to leach from the surface soils into the water table. Most of the compounds found in the soil are highly persistent, even in areas of higher precipitation.

No surface water exists on-site; however, sufficient rainfall could erode contaminated soil and accumulate in the ditches surrounding the site. The site resides in a 100-year flood

plain. There are no records of past flooding.

The vegetative cover on-site reduces the potential for production of reentrained dust. Lack of vegetation on the contaminated areas surrounding the site provides potential for the production of reentrained dust. Winds are strong and often blow towards the residential areas to the north.

No large game animals would be expected to exist in the area surrounding the site. Rabbits, squirrels, rodents, and birds may have bioaccumulated contaminants found in the soil.

B. HUMAN EXPOSURE PATHWAYS

Groundwater use downgradient of the site is not known. If the groundwater is being used, and/or future groundwater use allows for the migration of contaminants to the lower aquifer, then the following human exposure pathways for groundwater may exist:

- direct ingestion
- dermal contact
- inhalation secondary to household use

Exposure through surface water can occur when there is sufficient rainfall to cause accumulation in the ditches along the railroad tracks. The potential route of human exposure to this water would be dermal contact. However, it is remotely possible that this water might be used by transients for drinking or cooking purposes.

On-site soil contamination does not appear to be of public health concern. Access to the site is restricted and the vegetative cover prevents an appreciable occurrence of reentrained dust. Off-site soil is of potential human health concern because it is accessible to children living nearby and transients who frequently use the area around the site. Following are the human exposure pathways for soil:

- direct ingestion (primarily by young children)
- dermal absorption
- inhalation of reentrained dust
- ingestion of inhaled contaminants removed from the lungs via the mucociliary tract

Acute exposure due to inhalation of chemicals volatilized from the soil would not be an expected exposure pathway for the general population since most detected soil contaminants have low volatility. Inhalation exposure to benzene and styrene may occur during site remediation.

It is possible that transients in the area may consume rodents and other animals as food sources. These organisms may have

bioaccumulated the lipid soluble contaminants.

PUBLIC HEALTH IMPLICATIONS

Since access to the site is restricted, exposure to on-site soil contaminants is unlikely for the general population. Workers involved with removal of the contaminated soil could potentially be exposed. Since site access is limited to workers who should be wearing appropriate protective clothing, discussion of the potential human health effects of on-site contaminants will be brief. The focus of this section will be on the potential human health effects of the contaminants found in the groundwater and off-site surface soil.

Potential exposures cannot be estimated with the information available. The frequency of contact and the habits of children and transients on the contaminated areas are unknown.

In general, the compounds discussed below cannot cause cancer unless exposure occurs over a long period of time--usually 10 to 20 years. Being exposed for short periods or infrequently usually will not result in a significant increase in cancer risk. The health effects of concern for short-term or infrequent exposures are the acute effects.

Although exposure through the groundwater does not appear to be occurring, there is a potential for future exposures. Benzene is the contaminant of primary concern in the groundwater. Benzene is genotoxic and is classified by the EPA as a human carcinogen based upon evidence from animal studies and human epidemiological studies. Benzene acts on the bone marrow and lymphoid system, causing hematotoxicity, leukemia, and immunosuppression or sensitization. Acute effects would not be expected from exposure to the levels of benzene found in the soil or groundwater.

Styrene, toluene, and the xylenes are unlikely to produce acute effects at the levels detected. All act on the central nervous system (CNS), and chronic exposure to styrene and the xylenes can cause liver or kidney damage. Styrene is categorized by EPA as a possible human carcinogen based on limited evidence in animal studies. Direct evidence of carcinogenicity in humans has not been demonstrated.

Chlordane, DDT and DDE are pesticides that can be rapidly absorbed through the skin. All of these compounds will bioaccumulate in tissue. Chlordane exposure produces CNS and gastrointestinal tract effects and is classified as a probable human carcinogen based on animal studies. Chlordane has caused liver cancer in mice. Acute effects from DDD and DDE would not be expected at the concentrations found. Animal studies have shown that DDT can produce liver tumors. Like chlordane, DDT is classified as a probable human carcinogen. Direct evidence of

carcinogenicity in man has not been demonstrated for either compound.

Exposure to high levels of lead can cause a wide variety of health effects. Evidence suggests that at lower chronic exposures, lead can cause neurobehavioral effects, including IQ loss in children. Children are the group with the highest potential for exposure to lead at this site, because lead is in the soil and children ingest greater quantities of soil than do adults. Lead adversely affects the kidney, and studies have shown that lead causes cancer in the kidneys of animals. Direct evidence of the carcinogenicity of lead in man has not been demonstrated. Acute exposure to lead can cause neurobehavioral effects in adults.

At the concentrations seen, aroclor would not be expected to produce acute effects. Aroclor has the ability to bioaccumulate. Chronic exposure to aroclor can produce chloracne and liver injury. Aroclor has been shown to cause cancer in the liver of animals, however, direct evidence has not been demonstrated in humans.

The contaminants with the highest concentrations on-site are the PAH's. The toxic effects of PAH's are not well known. Evidence from animal studies suggest that a number of these compounds may be carcinogenic in humans, although direct evidence is unavailable for individual compounds. There are well documented carcinogenic effects from human exposure to complex mixtures of PAH's, such as cigarette smoke and occupational exposure to roofing tar emissions. However, it is difficult to separate out the effects of one compound from such a mixture.

Benzo[a]pyrene (B[a]P) is a well studied and well established animal carcinogen. Benzo[a]anthracene, benzo[a]fluoranthene, and chrysene show limited evidence of carcinogenicity in animals, and are weak in comparison to B[a]P. There is little data on the adverse health effects of fluoranthene and phenanthrene.

PAH's are activated metabolically, and any compound that increases metabolism is likely to increase the potential of adverse health effects.

A special population of concern are the children living near the site. This is primarily due to their increased consumption rates for soil and the fact that they are still developing. Another population of concern is the transients who use the area with a high frequency. Because of their economic status, it is likely that these people have a greater susceptibility to the effects of the contaminants to which they may be exposed.

CONCLUSIONS

On the basis of the information reviewed, ATSDR has concluded that this site is of potential public health concern because humans may be exposed to hazardous substances at concentrations that may result in adverse human health effects. As noted in the above sections, human exposure to lead, pesticides, and PAH's may be occurring and may have occurred in the past via dermal contact, ingestion, or the inhalation of reentrained dust.

Since access to on-site soil is restricted, exposures will be primarily to contaminants found off-site in the soil .

Off-site groundwater sampling has not been done to determine the extent of the groundwater plume.

A complete well survey downgradient from the site has not been completed to determine the possibility of present and future exposure.

Children and transients are populations of special concern associated with this site.

There are a large number of compounds at the site that are, or have potential to be, carcinogenic in humans. The possibility for additive and synergistic interactions among these chemicals must be considered.

RECOMMENDATIONS

1. Lead in residential soil was 2260 ppm. This should be reduced to an acceptable level as soon as possible.
2. Additional sampling is needed to more fully determine the extent of off-site contamination. Sampling of off-site groundwater is needed to determine the extent and direction of the contamination plume. Nearby residential soil should be sampled to further define the types and extent of contamination around the homes, especially at residences where children live. Efforts should be made to trace the source of aroclor found in the residential soil.
3. A well survey should be done downgradient of the site to determine if the potential exists for present or future exposure to contaminated groundwater.
4. Residents should be cautioned against allowing their children to play in areas of soil contamination in and around the site. Similarly, steps should be taken to discourage transients from using these same areas.
5. Workers performing remedial activities should wear

appropriate protective clothing.

6. When indicated by public health needs, and as resources permit, the evaluation of additional relevant health outcome data and community health concerns, if available, is recommended.

In accordance with CERCLA as amended, the Utah Power and Light site (formerly American Barrel), at Salt Lake City, UT, has been evaluated for appropriate follow-up with respect to health effects studies. Since human exposure to on-site and off-site contaminants may currently be occurring and may have occurred in the past, this site is being considered for follow-up health effects studies. After consultation with Regional EPA staff and State and local health and environmental officials, the Division of Health Studies, ATSDR, will determine if follow-up public health actions or studies are appropriate for this site.

PREPARERS OF REPORT

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ATSDR REGIONAL REPRESENTATIVE

Regional Representative:

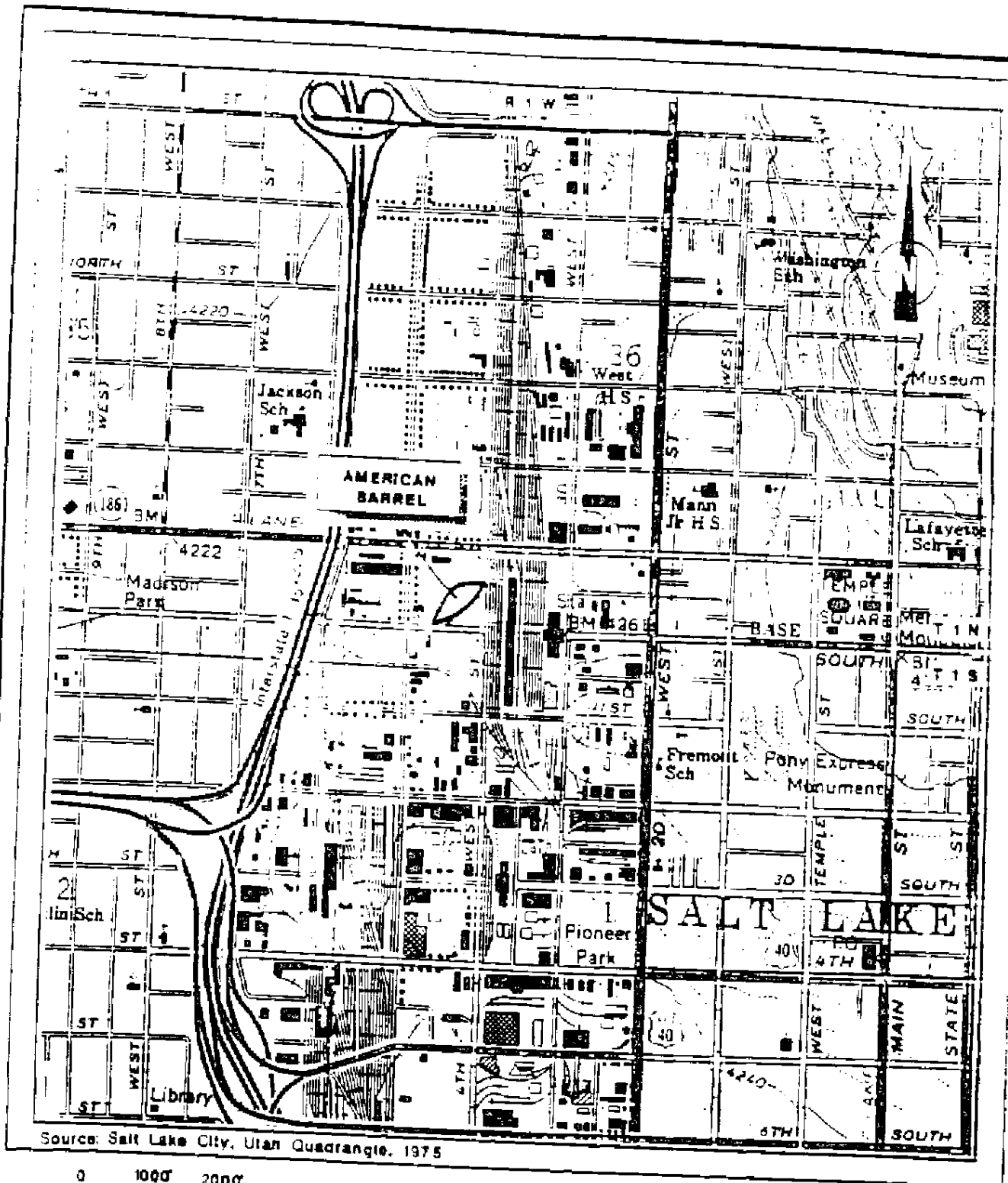
Tamara J. Kicera

Region VIII

REFERENCES

1. Agency for Toxic Substances and Disease Registry, Toxicological Profile for Benzene. Oak Ridge National Laboratory, 1989.
2. Agency for Toxic Substances and Disease Registry, Toxicological Profile for Benzo[a]pyrene. Oak Ridge National Laboratory, 1989.
3. Agency for Toxic Substances and Disease Registry, Toxicological Profile for Chlordane. Oak Ridge National Laboratory, 1989.
5. Agency for Toxic Substances and Disease Registry, Toxicological Profile for DDT, DDD, DDE. Oak Ridge National Laboratory, 1989.
6. Agency for Toxic Substances and Disease Registry, Toxicological Profile for Lead. Oak Ridge National Laboratory, 1989.
7. Harry G. Armstrong Aerospace Medical Research Laboratory. The Installation Restoration Program Toxicology Guide, Vol. I-III. 1985.
8. PA/SI and HRS documents for Utah Power & Light/American Barrel.

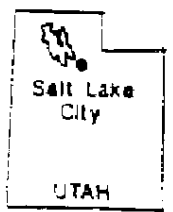
Appendix




Source: Salt Lake City, Utah Quadrangle, 1975

0 1000' 2000'
Scale: 1" = 2000'

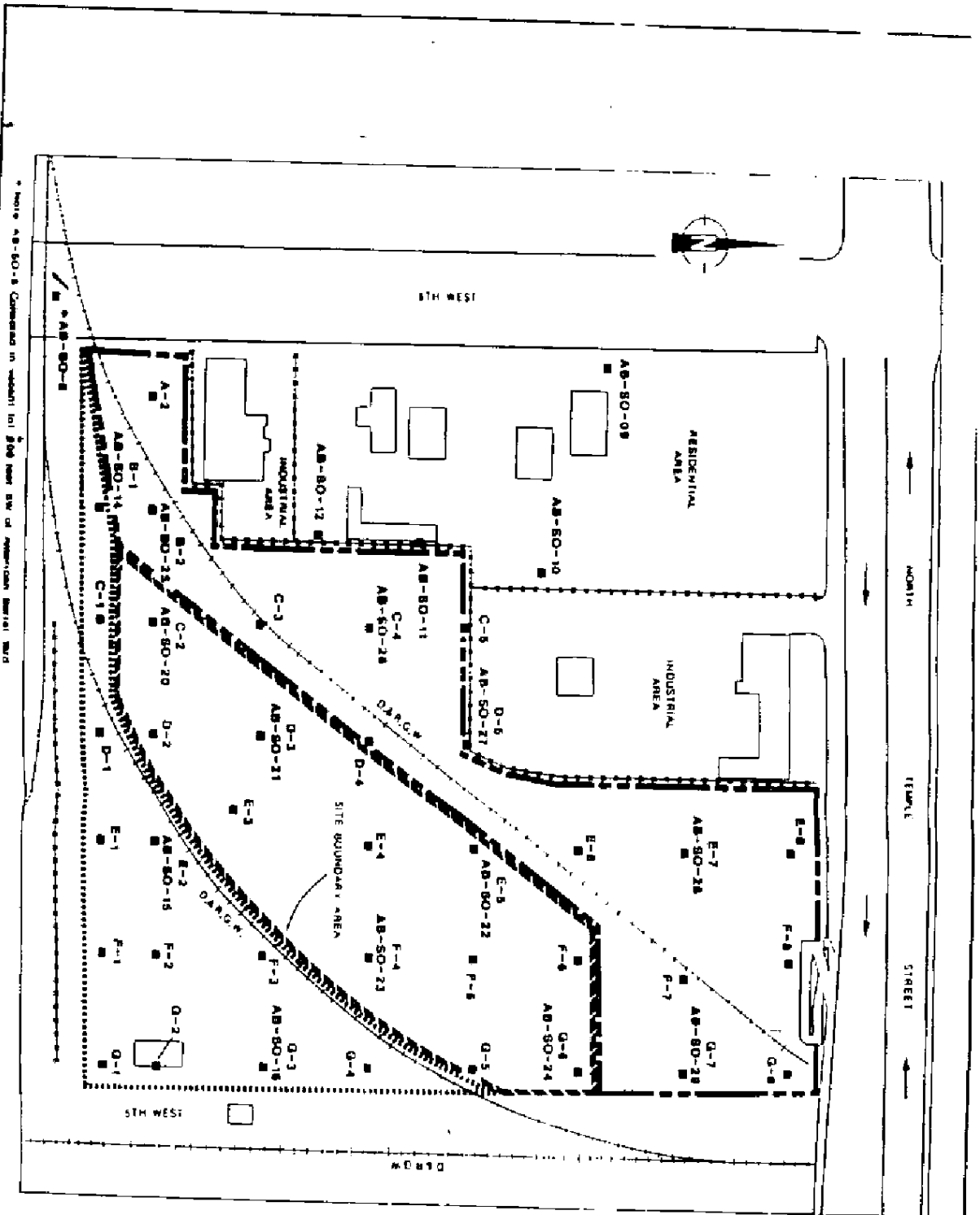
LOCATION MAP



LEGEND

 Site Location

FIELD INVESTIGATIONS OF UNCONTROLLED HAZARDOUS WASTE SITES TASK REPORT TO THE E.P.A.	
TITLE: AMERICAN BARREL Salt Lake City, Utah SITE LOCATION MAP	
T.O.D. F08-8802-09	
ecology & environment, inc. DENVER, COLORADO	FIG. 1
Date: 07/87 Drawn by: RSM Scale:	



*Note AB-SO-8 Compared in volume to 200 near SW of American Street Blvd

FIELD INVESTIGATIONS OF UNIDENTIFIED HAZARDOUS WASTE SITES
 FROM REPORT TO THE EPA

DATE: AUGUST 1988
 BY: JAMES W. HARRIS, JR.
 AND: LARRY D. HARRIS, JR.

SCALE: 1" = 50'

PROJECT: 88-001

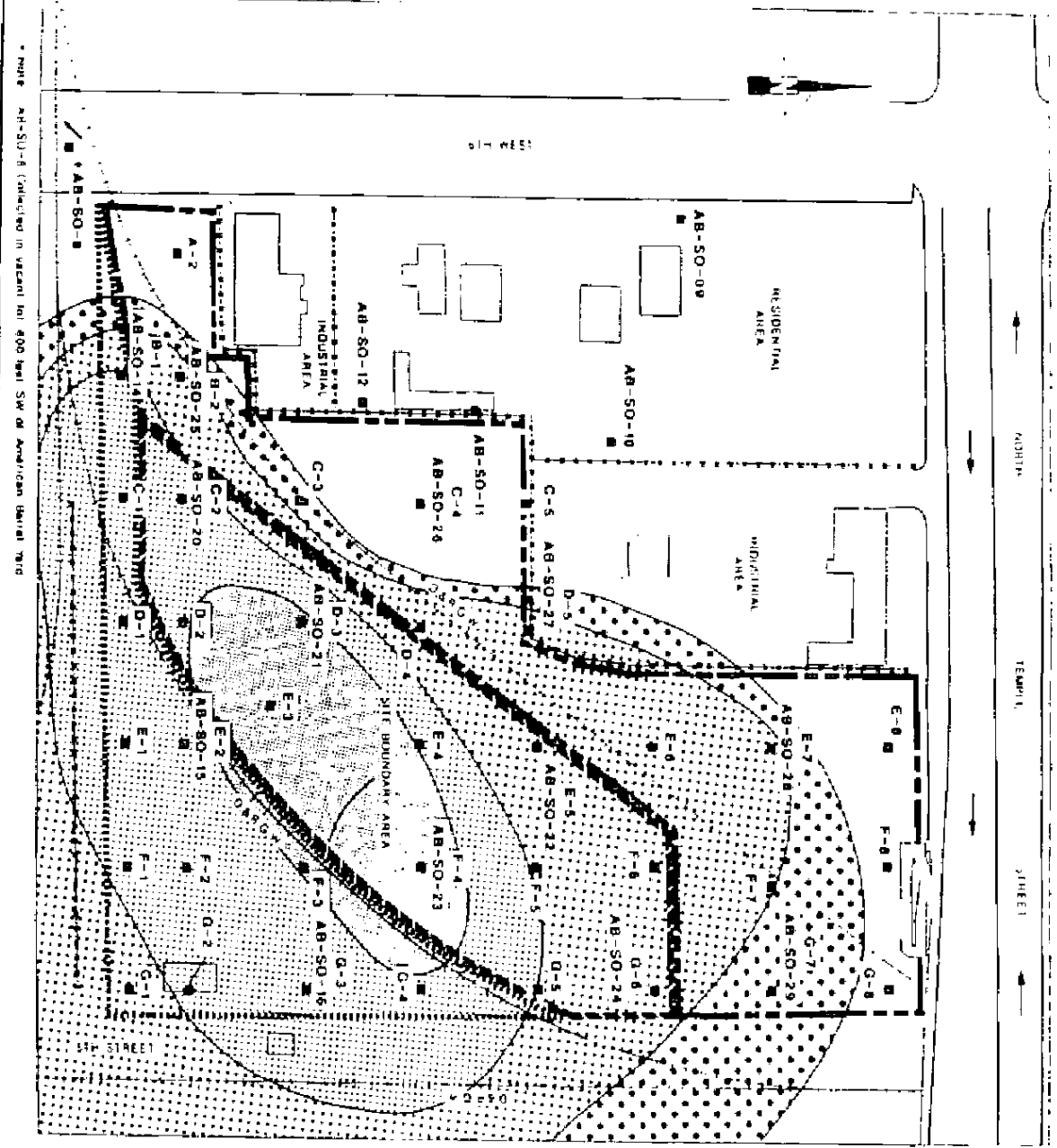
DATE: 8/18/88

SCALE: 1" = 50'

PROJECT: 88-001

DATE: 8/18/88

NOTE: All SO-6 collected in vicinity for 400 feet SW of American Barrel Yard



FIELD INVESTIGATIONS OF UNIDENTIFIED HAZARDOUS WASTE SITES	DATE REPORT TO THE EPA
AMERICAN BARREL	SALT LAKE CITY, UTAH
POLYNUCLEAR AROMATIC HYDROCARBON	EXTENT OF CONTAMINATION
100 108-2802-09	ecology & environment, inc
DENVER, COLORADO	100 3
DATE: 11/28/88	BY: KSW

- LEGEND
- Site boundary area
 - 3.0 ft. x 10 ft. Pit
 - 100 ft. x 100 ft. Pit
 - Soil Sample
 - TOTAL PAW 6
 - 1000 ft. x 1000 ft. Pit
 - 2x Background
 - 5x Background
 - 10x Background
 - 17900 ft. x 100 ft. Background
 - 1000 ft. x 1000 ft. Background

11/29