



PRELIMINARY ASSESSMENT

Murray Laundry 4200 S. State Plume
Salt Lake County, Utah
EPA ID# UT0009946260

Utah Department of Environmental Quality
Division of Environmental Response and Remediation
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1.0 INTRODUCTION

The **Murray Laundry 4200 S. State Plume, EPA ID# UT0009946260**, is located on the former **Woodhull Brothers Smelter Site, EPA ID# 988071593**, at approximately 4200 South State Street in Salt Lake City, Salt Lake County, Utah (Figure 1). In the early 1990's, the site was included in the Salt Lake Valley Smelter Study (SLVSS) conducted by the U.S. Environmental Protection Agency, Region VIII (EPA) and the Utah Department of Environmental Quality/Division of Environmental Response and Remediation (UDEQ/DERR). During the study, elevated levels of lead (2,083 mg/kg) were discovered on-site. In 1993, a Site Investigation (SI) was conducted on the Woodhull Brothers Smelter Site (Woodhull Smelter), to assess the suspected release of hazardous substances to the soils, surface water and groundwater in the area. The analytical report for the SI indicated that there were elevated levels of metals present on-site, particularly lead and arsenic. However, EPA designated the Woodhull Smelter a "No further remedial action planned" on July 9, 1993. "The pathway of concern at this site is the soil exposure pathway and the levels of inorganics found were not significant for National Priority List potential" (USEPA, 1993).

In 1999, a plume consisting of elevated levels of chlorinated solvents, were discovered by Granite Environmental, Inc. The plume was discovered during Phase I and Phase II Environmental Site Assessment activities (Discovery, 1999).

Under authority of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) of 1980, the Superfund Amendments and Reauthorization Act (SARA) of 1986, in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), and through a Cooperative Agreement with the EPA, the UDEQ/DERR conducted a Preliminary Assessment (PA) of the **Murray Laundry 4200 S. State Plume, EPA ID# UT0009946260**, located in Salt Lake City, Salt Lake County, Utah. The purpose of this PA is to provide information necessary to support a decision regarding the need for further Superfund action or cleanup of this site through some other means.

2.0 OBJECTIVES

The objectives of this PA are to:

- Identify past and present conditions and operations at the site;
- Assess the potential for contaminant migration through air, soil, surface water, and groundwater pathways;
- Identify potential target populations; and
- Determine whether further activities under CERCLA are warranted.

The scope of this assessment will include an on-site reconnaissance visit, site history, a target survey summary, and the identification and evaluation of exposure routes.

3.0 SITE DESCRIPTION

3.1 Site Location

The Murray Laundry 4200 S. State Plume is located at approximately 4200 South State Street in Salt Lake City, Salt Lake County, Utah. The site is located approximately 1.25 miles east of the Jordan River and north of Big Cottonwood Creek (Cottonwood Creek) (Figure 1). The geographic coordinates are 40°40'47.69" North Latitude and 111°53'15.92" West Longitude. The site is located in the Salt Lake Valley which is bounded by the Wasatch Range on the east, the Oquirrh Mountains on the west, the Great Salt Lake on the north, and the Traverse Range on the South. The elevation of the site is approximately 4,250 feet above mean sea level (USGS, 1963). Four other CERCLA sites are located within one mile of the site: 4800 South 150 West Plume, EPA ID# UT0008970492; Franklin or Horn Silver Smelter, EPA ID# UTD988071585; Morgan or Hanover Smelting Works, EPA ID# UTD988071619; Fireclay Battery, EPA ID# UTD988074969.

To reach the site from the UDEQ/DERR office building, turn east onto North Temple Street, then south onto Redwood Road. Exit Redwood Road by turning east onto 2100 South Street and head east toward State Street. Turn south onto State Street and head south until coming to 4200 South Street. The site is located on the west side of the road, north of 4200 South Street and Cottonwood Creek (Figure 1).

3.2 Site Description

The site is located in an area of commercial and industrial use with small residences interspersed between the commercial properties (Figure 2). The total area of the site is approximately 3.40 acres (Appendix A), and is accessible from State Street on the east and Columbia Avenue on the north. During a site visit, conducted on November 21, 2000 (Appendix E), it was observed that the entire site is bounded by a five-foot chain link fence with parts of the fence in need of repair. Cottonwood Creek flows along the southern boundary of the site, and a gate leading to the property is located along State Street. It was observed that the northwest corner of the fence located along Columbia Avenue had been pulled back, and tracks left in the snow by children were noticed entering the site toward a makeshift fort. The site is relatively flat and has ample vegetation ranging from grasses to large elm, willow, cottonwood, and poplar trees of various sizes growing throughout the site and along Cottonwood Creek (UDERR, 2000) (Figures 2 and 3).

A large concrete and steel advertising tower is the prominent feature on-site. Excavated areas were noticed throughout the site, with what appeared to be pieces of pipe protruding out of these areas. Along the southern boundary, a 15-foot high concrete retaining wall extends west for approximately 150 feet along Cottonwood Creek. The remaining southern boundary of the site (west of the retaining wall) is an exposed bank that slopes into Cottonwood Creek (Figure 2). The creek channel is approximately 15 to 20 feet wide and has an average depth of approximately 2.5 - 3.5 feet. At the time of the site visit, water was observed flowing down Cottonwood Creek (UDERR, 2000).

3.3 Site History

According to Soffe and others, the Woodhull Smelter was the first smelter in the Salt Lake Valley. The smelter was originally constructed in June 1870, and operated until sometime in 1873. It operated under the name of The Woodhull Brothers Smelter Company smelting ores of lead, silver, gold, zinc, and copper from Park City, Brighton Canyon, and the Cottonwood Canyons (Soffe, 1967). It has been stated that the Woodhull Smelter operation was the most efficient smelting furnace in the Utah Territory, treating eight tons of ore per day (Ledyard, 1931). As with most smelters of this era, it was common to dump slag on-site or in the immediate vicinity of the smelter. Between 1873 and the 1950's, it is unknown what activities occurred on-site.

The Murray Laundry building was built on the property several decades after the smelter ceased operation in 1873. Operation of the laundry began sometime during the 1950's and continued until 1977 (Polk, 1957-1979). During its years of operation, the laundry utilized several artesian water wells for its water supply (UDERR 1991). According to Mr. Boyd Henrie, a former laundry employee, perchloroethylene, also known as tetrachloroethylene (PCE), was used by the laundry during its years of operation (Granite, 1999). After demolition of the Murray Laundry building in the early 1980's, the site became a dumping ground for waste dirt, asphalt, and concrete (UDERR, 1991). Currently the site is vacant, privately owned, and for sale.

3.4 Previous Work

The site was included in the SLVSS in the early 1990's. This study was conducted throughout the Salt Lake Valley in locations where historic smelters were known to operate. As part of the study, six surface soil samples were analyzed for lead and arsenic concentrations using a field portable X-Ray Fluorescence machine. Of the six readings collected from the site, one showed a concentration of lead at 2,083 mg/kg. The other five readings were all below 1,000 mg/kg lead, with the highest being 646 mg/kg. Arsenic levels were less than the detection limit (50 mg/kg) for all six readings (UDERR, 1993).

In September 1991, a PA was conducted by UDEQ/DERR for the **Woodhull Smelter Site, EPA ID# 988071593**. The PA indicated that during the site visit, several artesian water wells were located on-site but most of the wells had been plugged. However, standing water was noticed around these wells, and a four-foot-wide by four-foot-deep trench had been dug to drain the water. A couple of 55-gallon barrels were also observed in a ditch located on the west side of the site adjacent to the fence (Figure 4). The PA also indicated that during an excavation of a drainage ditch, the soil horizon was exposed showing the concrete of the laundry parking lot underlying fill. An asphalt horizon of an earlier business was also noticed underlining the concrete, and underlying all that was the Woodhull Smelter "soil horizon" which consisted of fine-grained sand with pieces of slag and a portion of the Woodhull Smelter foundation. The conclusion reached in the PA was that there was a suspected release of hazardous substances to the soils, surface water, and groundwater in the area (UDERR, 1991).

In September 1992, a SI was conducted by UDEQ/DERR for the **Woodhull Brothers Smelter Site, EPA ID# 988071593**. The purpose of the SI was to address the suspected release of hazardous substances to soils and surface water indicated in the PA. During the SI, eleven surface soil, two sediment, and two source samples were collected from the site (Figure 5). The analytical report indicated that there were elevated levels of metals present on-site (Table 1, 2, and 3). Samples WS-SC-02 and WS-SO-03 collected from the "fort" area where children play, showed some of the most elevated lead levels (Table 1 and 3). The report also indicated that residential properties located northwest of the site (Figure 2) might have a high probability of being contaminated with metals due to stack emissions from the blast furnaces of the old smelter (UDERR, 1993). Based on the SI, EPA designated the site as "No further remedial action planned" on July 9, 1993. "The pathway of concern at this site is the soil exposure pathway and the levels of inorganics found were not significant for National Priority List potential" (USEPA, 1993).

In February 1995, a Phase I Environmental Site Assessment (EA) was conducted by SITEX Environmental, Inc. for Mr. Jason S. Nichols of Consolidated Realty Group. The purpose of the EA was to establish whether there was any evidence of the existence of recognized environmental conditions. During the EA site visit, two empty 55-gallon drums were observed in a drainage ditch located along the western property line. A pond was also observed in the northwest corner of the property with a pipe entering the pond from an unknown source (Figure 2). The EA indicated that Mr. Henrie, a former laundry employee, recalled that PCE was used by the laundry during its years of operation. Mr. Henrie mentioned that PCE was stored in an above ground storage tank in a garage located on the west end of the laundry facility. Mr. Henrie also recalled that an underground storage tank (USTs) containing heating fuel was located east of the tower (Figure 2). It was also discovered that transformers were illegally opened on-site to salvage the copper some time during 1983. It was unknown at the time what happened to the dielectric oil contained in the transformers (SITEX, 1995).

In January 1999, Granite Environmental, Inc. (Granite) formerly known as SITEX Environmental, Inc., was retained by Gretchen B. Nordlund and Norin Felton, current owners of the property, to follow up the EA with a Phase II Environmental Site Assessment (ESA). On January 29, 1999, Granite conducted a magnetic survey of the site to determine if USTs existed on-site. Granite reported that the survey was inconclusive due to metallic interference. In February 1999, Granite collected soil and groundwater samples (Figure 6) from the site and excavated a total of 20 test pits (the purpose of these test pits is unknown). During the excavation process, Granite indicated that:

- 1) demolition of the Old Murray Laundry is incomplete and concrete and asphalt remains on-site;
- 2) the western half of the site is full of demolition debris;
- 3) fill material was apparently imported onto the site;
- 4) live water lines still exist on-site;
- 5) groundwater is located at variable depths (3-12 feet and deeper) below ground surface;

- 6) there appears to be a perched water table on the north side of the property;
- 7) there were no positive signs of the smelter;
- 8) a small UST was found beneath the concrete slab just south of the water tower; and
- 9) soil heavily contaminated with PCE was found in the vicinity of the UST. The PCE appeared to be limited in area and discontinuous.

Water samples were collected at 38 feet below ground surface (bgs) at P.1, seven feet bgs at EP.8, four feet bgs at EP.9, and three to four feet bgs at EP.19. Samples were analyzed for benzene, toluene, ethyl benzene, xylene, naphthalene (BTEXN), and volatile organic compounds (VOCs). Water analytical results showed elevated levels of trichlorethene, vinyl chloride, Cis-1,2-dichloroethene, and PCE at 820, 1,000, 6,400, and 1,600 ug/L respectively (Table 4). The contents of the UST (EP-11) were also analyzed. PCE was detected at 650 ug/L. BTEXN results were below maximum contamination limits (MCLs) (Table 5).

Soil samples were collected and analyzed for total petroleum hydrocarbons (TPH), BTEX, VOCs, polychlorinated biphenols (PCBs), and metals. Analytical results for soils collected from the eastside of the above ground storage tank pad showed that BTEX was below the Utah Tier One-Risk Based Corrective Action Screening Level, except for TPH (Table 6). Soils collected from the top (0-4.50 feet bgs), middle (4.50-6.50 bgs), and bottom (>6.50 feet bgs) of the excavated test pits EP.11 and EP.12, located in the vicinity of the former dry cleaning operation were analyzed for VOCs. Sample location EP.11 (middle) showed the highest levels of TCE and PCE at 69 and 4,000 ug/kg respectively. Sample location EP.11 (top) also showed a level of PCE at 1,100 ug/kg (Table 7). Soil analytical results for metals showed very little impact (Table 8). Soil samples were also collected from the area where the transformers were believed to have been opened and analyzed for PCBs. The analytical results indicated that PCBs were not detected. Granite was unable to define the vertical and horizontal extent of contamination due to insufficient data (Granite, 1999).

4.0 POTENTIAL EXPOSURE PATHWAYS

4.1 Waste/Source Characteristics

4.1.1 Chlorinated Solvents

Chlorinated solvents present a unique problem as they are more dense and less viscous than water. As a result, they sink in water rather than float like hydrocarbons. Due to their viscosity, they may flow more readily through geologic materials that impede the flow of groundwater. As a group, chlorinated solvents are quite volatile and can partition into the gas phase and migrate great distances as vapors in the unsaturated zone. These properties indicate that they may contaminate aquifers other than the aquifer to which they are released by migrating through layers that confine groundwater, therefore, potentially resulting in rapid and widespread groundwater contamination. Chlorinated solvents are quite insoluble in water, so once they get into the groundwater system it is difficult to “wash” them from the system (Pankow and Cherry, 1996).

The first main chlorinated solvent to be produced and used through the first half of the century was carbon tetrachloride (CTET) in 1906. Trichloroethylene (TCE) and PCE production began in 1923 and became the most used solvents during post-World War II manufacturing economy. Presently, 1,2-dichloroethane (1,2-DCA), 1,1,1-trichloroethane (1,1,1-TCA), methylene chloride (DCM), chloroform, CTET, PCE, and TCE are the most commonly used chlorinated solvents with approximately 27 million drums being produced annually (Pankow and Cherry, 1996). Very little was known about the dangers of chlorinated solvents until the early 1980's. During that time it was discovered that some chlorinated solvents are carcinogens. PCE and TCE decay into vinyl chloride which is a known carcinogen (NIOSH, 1994).

4.1.2 Lead

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead does not break down, but is changed by sunlight, air, and water. When released to the air, lead can stay in the air for about ten days. Lead can stick to soil particles, does not migrate from soil to water unless the water is acidic, and can stay a long time in both soil and water (ATSDR, 1993).

Lead can affect almost every organ and system in the body, particularly the central nervous system, kidneys, and the immune system. Exposure to high levels of lead is more dangerous for children and unborn fetus. Harmful effects include premature births, lower birth weights, decreased mental ability, and reduced growth in young children. In adults, lead may decrease reaction time, cause weakness in fingers, wrists, or ankles, and possibly affect the memory. Lead may cause anemia, abortion, and damage to the male reproductive system. There is inadequate evidence to clearly determine lead's carcinogenicity in humans (ATSDR, 1993).

4.1.3 Arsenic

Arsenic is found in nature at low levels and is mostly in compounds with oxygen, chlorine, and sulfur. These are called inorganic arsenic compounds. Arsenic in plants and animals combined with carbon and hydrogen are called organic arsenic. Organic arsenic is less harmful while inorganic arsenic is a human poison. Arsenic does not break down, but can change from one form to another, with most forms dissolving in water. Arsenic does not evaporate, but can become airborne when arsenic laden materials are burned or become wind blown (ATSDR, 1993a).

High levels of inorganic arsenic, 60 parts of arsenic per million parts of food or water, can be fatal. Arsenic damages many tissues including nerves, stomach, intestines, and skin. Breathing high levels can cause a sore throat and irritate the lungs (ATSDR, 1993a).

4.2 Groundwater Pathways

4.2.1 Hydrogeologic Setting

The site is located within the Salt Lake Valley, a fault-bounded Basin and Range graben encompassing approximately 500 square miles. The hydrogeology of the Salt Lake Valley is generally accepted to have a shallow, unconfined aquifer, underlain by a confining layer of lacustrine clay. Beneath this confining layer is a confined aquifer system or principal aquifer, which is the primary water supply aquifer (Hely et al., 1971). The general groundwater flow in the Salt Lake Valley is from the mountain fronts toward the Jordan River and subsequently to the northwest toward the Great Salt Lake (Anderson et al., 1994). Locally, groundwater flow direction may be influenced by a sewer line, highway, or local watercourse.

The shallow, unconfined aquifer is composed principally of clay, silt, and fine sand. In some parts of the valley, this aquifer has a permeability only slightly greater than that of the underlying confining bed. The aerial extent of the shallow aquifer is smaller than the confined aquifer, and is underlain everywhere by the confined aquifer (Hely et al., 1971). The shallow, unconfined aquifer is recharged by leakage upward from the confined aquifer in areas where the potentiometric surface of the confined aquifer is above the confining bed. Recharge also occurs from infiltration of precipitation, canals, irrigated lands, and streams (Waddell et al., 1987). In some parts of the valley, water is less than 10 feet below the land surface. The shallow aquifer is approximately 50 feet thick and has seldom been used as a drinking water source because it yields water slowly, is of poor chemical quality (calcareous and saline-alkali), and higher quality sources are readily available (Waddell et al., 1987).

The confined aquifer consists of Quarternary deposits of clay, silt, sand, and gravel, all hydraulically interconnected (Hely et al., 1971). The confined aquifer is overlain by relatively impermeable deposits of clay, silt, and fine sand, which act as a confining bed that ranges in thickness from about 40 to 100 feet (Waddell et al., 1987). The confined aquifer becomes unconfined near the mountain front and it is in this area where the aquifer receives recharge (Marine et al., 1964). Recharge also comes from infiltration of water from streams and canals, unconsumed irrigation water, and from precipitation on the valley floor (Thiros, 1995). Beneath the deeper aquifer is a semi-consolidated to consolidated bedrock of Tertiary and pre-Tertiary age. The overall thickness of the aquifer system ranges up to 1500 feet (Hely et al., 1971).

Groundwater at the site is located at variable depths (3-12 feet and deeper) throughout the site. Groundwater was encountered at a depth of 38 feet bgs at sampling point P.1, seven feet bgs at EP.8, four feet bgs at EP.9, and three to four feet bgs at EP.19 (Figure 6) (Granite, 1999). The shallow groundwater is reportedly not used as drinking water, but has been used for industrial applications and irrigation purposes in the past. The site specific groundwater flow direction has not been determined.

4.2.2 Groundwater Targets

Sixty-four wells belonging to seven municipal water systems and two private businesses are located within four miles of the site. These systems deliver water to a combined population of 244,035 approximately (UDEQ/DERR, 2000). The nearest groundwater well in the vicinity is located 0.53 miles southeast of the site (Appendix H). An additional 7,151 points of surface and groundwater diversions (PODs) belonging to private individuals were also identified within four miles of the site (UDEQ/DERR, 2000). Due to the constant change in the area, many of these PODs are likely no longer in use, however, their exact status has not been determined for this report.

4.2.3 Likelihood of Release.

Chlorinated solvents present a unique problem as they are more dense and less viscous than water. These properties indicate that they may contaminate aquifers other than the aquifer to which they are released (Pankow and Cherry, 1996). The detection of VOCs in the groundwater (Table 4), indicates that groundwater in the area has been impacted.

The threat of metals leaching into the groundwater and subsequent consumption is also a concern. Considering no groundwater samples were collected and analyzed for metals during the SLVSS, SI, or ESA, it is difficult to determine if groundwater has or has not been impacted by metals.

4.3 Surface Water Pathways

4.3.1 Hydrologic Setting

The Salt Lake Valley is located in the Great Basin drainage system, which is a closed system with no outlets. The Jordan River and its tributaries form the main drainage for the valley and discharge into the Great Salt Lake (Hely, 1971). The Jordan River is a class 3C stream (Seasonally Flooded, Upper Perennial, Riverine) located approximately 1.25 miles east of the site and has a flow rate of approximately 300-600 cubic feet per second (cfs) (Figure 1). The discharge point for the Jordan River into the Great Salt Lake is characterized by freshwater marshes within the confines of the Farmington Bay Waterfowl Management Area. The Jordan River is not used as drinking water source.

Cottonwood Creek is a perennial stream and originates approximately ten miles to the southeast in Big Cottonwood Canyon. Cottonwood Creek flows westward from the canyon mouth, then northwest along the southern boundary of the site and enters the Jordan River approximately 1.25 miles west of the site (Figure 1). The estimated flow rate of Cottonwood Creek is approximately 60 cfs, but very large seasonal variations can be expected. Cottonwood Creek is used as a drinking water source, and water is diverted above the site (UDERR, 2000a). Food chain targets within 15 miles of the site include: white bass, catfish, carp, rainbow, brook, and brown trout.

Surface water runoff from storms are not contained on-site, therefore, runoff enters Cottonwood Creek and eventually the Jordan River. Records indicate that Cottonwood Creek is an effluent (gaining) stream receiving recharge from the local groundwater (Hely, 1971).

4.3.2 Surface Water Targets

There are no surface drinking water sources located within 15 miles downstream of the site (UDEQ/DERR, 2000). Drinking water for the area is supplied by seven municipal water systems and by water from the canyons which is stored in reservoirs near the mountain front. The main target of concern is Cottonwood Creek flowing along the southern boundary of the site. Cottonwood Creek is used as a recreational fishery by some people. The most common species caught are rainbow, brook, and brown trout. Cottonwood Creek enters the Jordan River approximately 1.25 miles west of the site (Figure 1). The Jordan River is also used as a recreational fishery. The most common species caught are white bass, catfish, carp, and rainbow trout. The average catch taken from the Jordan River is 2000 pounds per year (UDERR, 2000a). There are approximately 2000 acres of wetlands along the Jordan River from Utah Lake to the Great Salt Lake. There are no terrestrial sensitive environments in the immediate area of the site.

4.3.3 Likelihood of Release

The detection of VOCs in groundwater samples collected during the ESA (Table 4), indicates that the groundwater in the area has been impacted (Granite, 1999). This information leads one to believe that VOCs may be impacting Cottonwood Creek, considering it is an effluent stream (Hely, 1971). The threat of metals leaching into the groundwater and subsequently impacting Cottonwood Creek is also a concern. Considering no groundwater samples were collected and analyzed for metals during the SLVSS, SI, or ESA, it is difficult to determine if Cottonwood Creek has been impacted by metals.

Storm water runoff flowing across the site could erode and carry metal and solvent laden soil particles toward Cottonwood Creek. It was concluded in the SI that due to the inadequacy of the background sample, it was difficult to say that a release had or had not occurred (UDERR, 1993).

4.4 Soil Exposure Pathway

4.4.1 Soil Conditions

A soil survey of the Salt Lake Valley conducted between 1965-1966, indicated that the site consists primarily of Kidman-Parleys-Welby associated soils formed on mixed lake sediments from sedimentary and igneous rock found on intermediate terraces. The Kidman series consists of well-drained soils on low lake terraces. Slopes range from zero to six percent, and the surface layer and subsoil are noncalcareous. Below a depth of 28 inches, the profile becomes strongly calcareous. Intake of water is moderate and permeability ranges between 0.20-6.30 inches/hr. Available water holding capacity is about eight to 10 inches to a depth of five feet, organic matter content is medium, pH ranges between

7.4-9.0, salinity is none or slight, and shrink-swell potential is low (Woodward, 1974).

The Parleys series consists of well-drained soils that occur on lake terraces. Slopes range from zero to six percent, and intake of water and permeability are moderate ranging from 0.63-2.00 inches/hr. Water holding capacity is about 10 to 12 inches to a depth of five feet. Organic matter content is high, pH ranges between 7.4-9.0, salinity is none, and shrink-swell potential is low (Woodward, 1974).

The Welby series consists of well-drained soils that occur on low lake terraces. Slopes range from zero to three percent, and intake of water and permeability are moderate ranging from 0.63-2.00 inches/hr. Water holding capacity is about 10 to 12 inches to a depth of five feet. Organic matter content is medium, pH ranges between 7.4-9.0, salinity is none to slight, and shrink-swell potential is low (Woodward, 1974).

The ESA indicated that the top layers (0-4.50 feet bgs) consisted of a dark-brown loam soil, the middle layers (4.50-6.50 feet bgs) consisted of a brown clay, and the bottom layers (>6.50 feet bgs) consisted of bluish-grey clay (Granite, 1999).

4.4.2 Soil Exposure Targets

A population survey identified approximately 194,477 people living within a four mile radius of the site (UDEQ/DERR, 2000). During the site visit, it was observed that a section of fence located along Columbia Avenue was pulled back, and tracks left in the snow by children were noticed entering the site toward a makeshift fort (UDERR, 2000). Access to the site is clearly available, despite the fence. Approximately 50 daytime workers work in businesses that adjoin the site. The nearest residences are located approximately 100 feet toward the northwest (Figures 2 and 3). Several parks, schools, hospitals, and churches are located within four miles of the site (USGS, 1963).

4.4.3 Likelihood of Exposure

As a group, chlorinated solvents are quite volatile, and can partition into the gas phase and migrate great distances as vapors in the unsaturated zone. The detection of VOCs at sampling points EP.11 and EP.12 (Table 7), indicates that the soil matrix has been impacted (Granite, 1999). Since unauthorized access to the site by children has been observed, exposure to those entering the site is likely.

Soil samples collected during the SLVSS and SI investigations indicated that elevated levels of metal impacted soil did exist on-site, yet soil samples collected during the ESA showed little impact. Since the three investigations presented different results, the likelihood of exposure is unknown. Metal contamination could also be present on the surrounding properties due to stack emissions from the blast furnaces of the old smelter (UDERR, 1993).

4.5 Air Exposure Pathways

4.5.1 Meteorology/Site Conditions

The site is located in a semi-arid continental climate (Eubank, 1979). Within this climate type, the winters are fairly cold with temperatures averaging below 32 degree Fahrenheit and summers average about 77 degrees Fahrenheit (Brough, 1987). The average annual precipitation ranges from 13 to 17 inches (Woodward, 1974). The average annual snowfall ranges from 60 to 70 inches with an average annual depth of nine to 13 inches and an average duration of continuous snow cover of 29 days (Eubank, 1979). The frost free period is 130 to 190 days (Woodward, 1974). The winds are predominantly from the southwest with a mean speed of four to five miles per hour. The next most common wind direction is from the north and northwest (Ashcroft, 1992; Brough, 1987).

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4.5.3 Likelihood of Release

As a group, chlorinated solvents are quite volatile, and can partition into the gas phase and migrate great distances as vapors in the unsaturated zone. The detection of VOCs at sampling points EP.11 and EP.12, indicates that the soil matrix has been impacted (Granite, 1999). This information indicates that a release may be occurring to the air pathway.

The SI report for the Woodhull Smelter, indicated that residential properties located northwest of the site (Figure 2) might have a high probability of being contaminated with metals due to stack emissions from the blast furnaces of the old smelter (UDERR, 1993). Currently, a release to the air of metal laden particles is unlikely due to the unexposed and heavy vegetated nature of the site, unless the site is disturbed. Since it was observed that access to the site is unrestricted and that excavation activities had occurred, soil particles may have been released and transported via the air pathway.

5.0 SUMMARY AND CONCLUSIONS

The **Murray Laundry 4200 S. State Plume, EPA ID# UT0009946260**, is located on the former **Woodhull Brothers Smelter Site, EPA ID# 988071593**, at approximately 4200 South State Street in Salt Lake City, Salt Lake County, Utah (Figure 1). The site is located in an area of commercial and

industrial use with small residences interspersed between the commercial properties (Figures 2). The total area of the site is approximately 3.40 acres (Appendix A), and is accessible from State Street on the east and Columbia Avenue on the north. The entire site is bounded by a five-foot chain link fence with parts of the fence in need of repair. Big Cottonwood Creek (Cottonwood Creek) flows along the southern boundary of the site. The site is relatively flat and has ample vegetation ranging from grasses to large elm, willow, cottonwood, and poplar trees of various sizes growing throughout the site and along Cottonwood Creek (Figure 2 and 3) (UDERR, 2000).

In the early 1990's, the site was included in the Salt Lake Valley Smelter Study. As part of the study, six surface soil samples were analyzed for lead and arsenic concentrations using a field portable X-Ray Fluorescence machine. Of the six readings collected from the site, one showed a concentration of lead at 2,083 mg/kg. The other five readings were all below 1,000 mg/kg lead, with the highest being 646 mg/kg. Arsenic levels were less than the detection limit (50 mg/kg) for all six readings (UDERR, 1993).

In September 1991, a Preliminary Assessment (PA) was conducted by UDEQ/DERR for the **Woodhull Smelter Site, EPA ID# 988071593**. The PA concluded that the soils, groundwater and surface water were suspected of being contaminated with metals (UDERR, 1991).

In September 1992, a Site Investigation (SI) was conducted by UDEQ/DERR for the **Woodhull Brothers Smelter Site, EPA ID# 988071593**. The purpose of the SI was to address the suspected release of hazardous substances to soils and surface water indicated in the PA. During the SI, eleven surface soil, two sediment, and two source samples were collected from the site (Figure 5). The analytical report for the SI, showed that there were elevated levels of metals present on-site, particularly lead and arsenic (Table 1, 2, and 3), and it appeared that the soil exposure pathway was of the greatest concern. Samples WS-SC-02 and WS-SO-03, collected from the "fort" area where children play, showed some of the most elevated lead levels. The report also indicated that residential properties located northwest of the site (Figure 2) might have a high probability of being contaminated with metals due to stack emissions from the blast furnaces of the old smelter (UDERR, 1993).

In February 1995, a Phase I Environmental Assessment (EA) was conducted by SITEX Environmental, Inc. for Mr. Jason S. Nichols of Consolidated Realty Group. The purpose of the EA was to establish whether there was any evidence of the existence of recognized environmental conditions. The EA indicated that Mr. Boyd Henrie, a former laundry employee, recalled that perchloroethylene, also known as tetrachloroethylene (PCE) was used by the laundry during its years of operation (SITEX, 1995).

In January 1999, Granite Environmental, Inc. (Granite) formerly known as SITEX Environmental, Inc., was retained by Gretchen B. Nordlund and Norin Felton, current owners of the property, to follow up the EA with an Phase II Environmental Site Assessment (ESA). On January 29, 1999, Granite conducted a magnetic survey of the Murray Laundry site to determine if any USTs existed on-site. Granite reported that the survey was inconclusive due to metallic interference.

In February 1999, Granite collected soil and groundwater samples from the site and excavated up to 20 test pits (the purpose of these test pits is unknown) (Figure 6). Water samples were collected at 38 feet below ground surface (bgs) at P.1, seven feet bgs at EP.8, four feet bgs at EP.9, and three to four feet bgs at EP.19. The samples were analyzed for benzene, toluene, ethyl benzene, xylene, naphthalene (BTEXN) and volatile organic compounds (VOCs). Water analytical results showed levels of trichlorethene (TCE), vinyl chloride, Cis-1,2-dichloroethene, and PCE at 820, 1,000, 6,400, and 1,600 ug/L respectively (Table 4). The contents of the UST (EP.11) were also analyzed. PCE was detected at 650 ug/L. BTEXN results were below maximum contamination limits (MCLs) (Table 5).

Soil samples were collected and analyzed for total petroleum hydrocarbons (TPH), BTEX, VOCs, polychlorinated biphenols (PCBs), and metals. Analytical results for soils collected from the eastside of the above ground storage tank pad showed that BTEX was below the Utah Tier One-Risk Based Corrective Action Screening Level, except for TPH (Table 6). Soils collected from the top (0-4.50 feet bgs), middle (4.50-6.50 bgs), and bottom (>6.50 feet bgs) of the excavated test pits EP.11 and EP.12, located in the vicinity of the former dry cleaning operation were analyzed for VOCs. Sample location EP.11 (middle) showed the highest levels of TCE and PCE at 69 and 4,000 ug/kg respectively. Sample location EP.11 (top) also showed a level of PCE at 1,100 ug/kg (Table 7). Soil analytical results for metals showed very little impact (Table 8). Soil samples were also collected from the area where the transformers were believed to have been opened and analyzed for PCBs. The analytical results indicated that PCBs were not detected. Granite was unable to define the vertical and horizontal extent of contamination due to insufficient data (Granite, 1999). From the information presented in this PA, the soils, surface water, and groundwater on this site have been impacted and present a threat to human health and the environment.

6.0 REFERENCES

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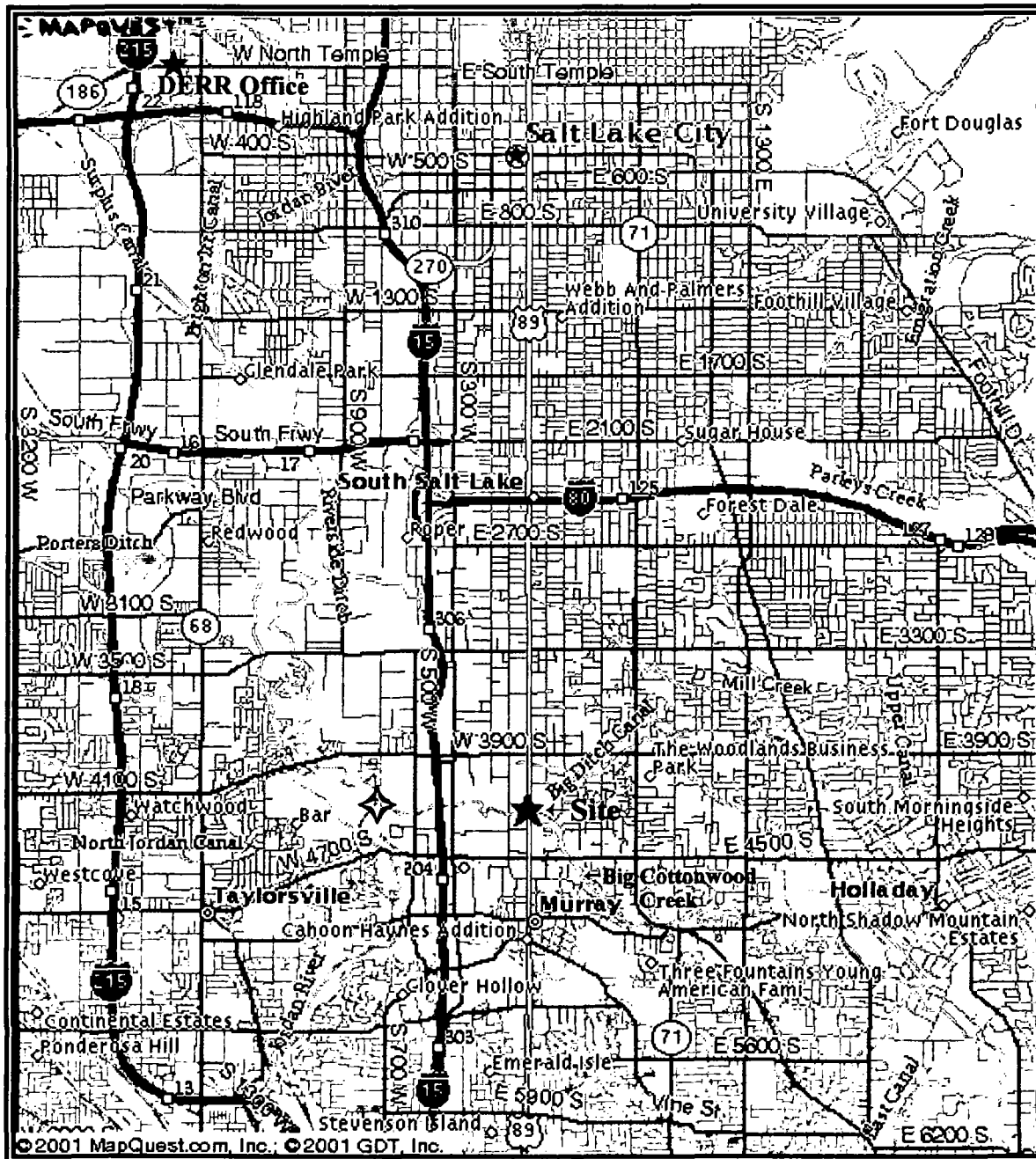
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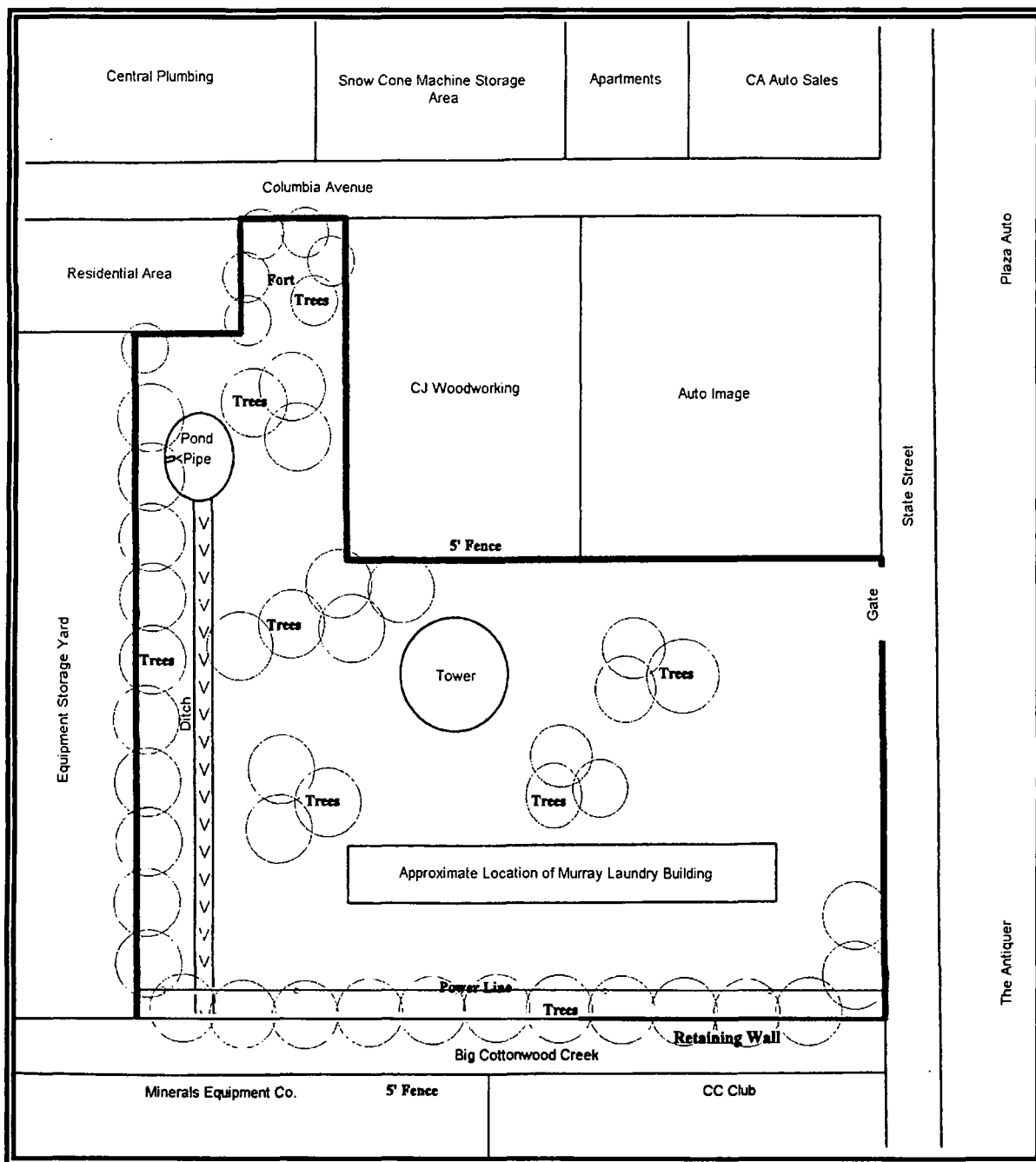
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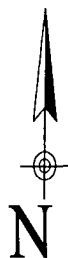
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Figures





Source: Phase II Environmental
Site Assessment
Granite Environmental Inc.



Utah Dept. of Environmental Quality
Division of Environmental Response and Remediation

Murray Laundry 4200 S. State Plume
Salt Lake City, Utah

Figure 2

Site Map

By: JSM Scale: None Date: 11/20/00



Source: US Geological Survey
Murray, Utah
04/10/97



Utah Dept. of Environmental Quality
Division of Environmental Response and Remediation

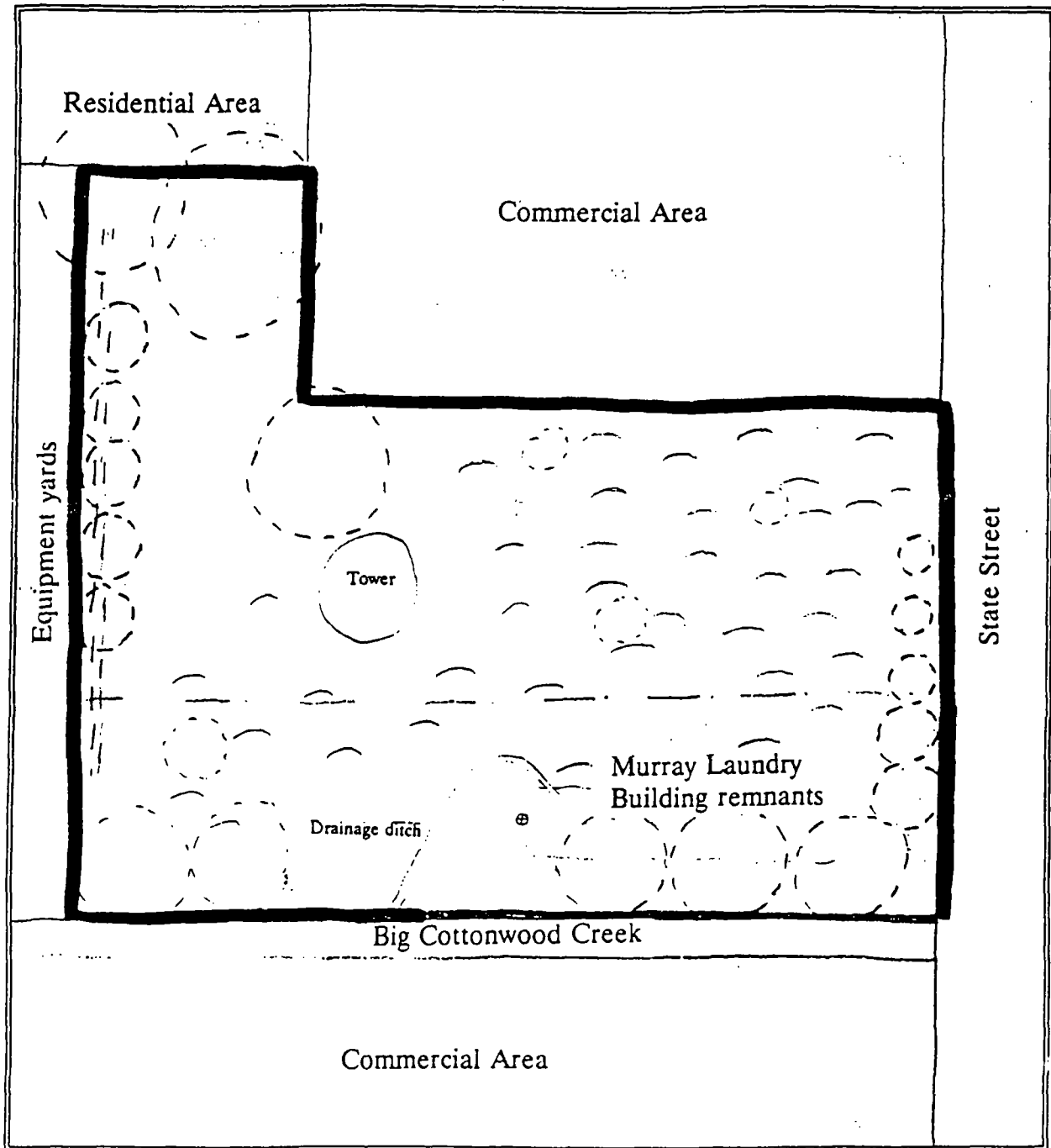
Murray Laundry 4200 S. State Plume
Salt Lake City, Utah







Figure 3

Aerial Photograph

By: JSM Scale: None Date: 11/20/00

NORTH



Site Boundary 
Dirt Piles 
Trees 
Plugged Well 
Trench 
Power Lines 

UDEQ

DIVISION OF ENVIRONMENTAL RESPONSE AND REMEDIATION

Figure 4

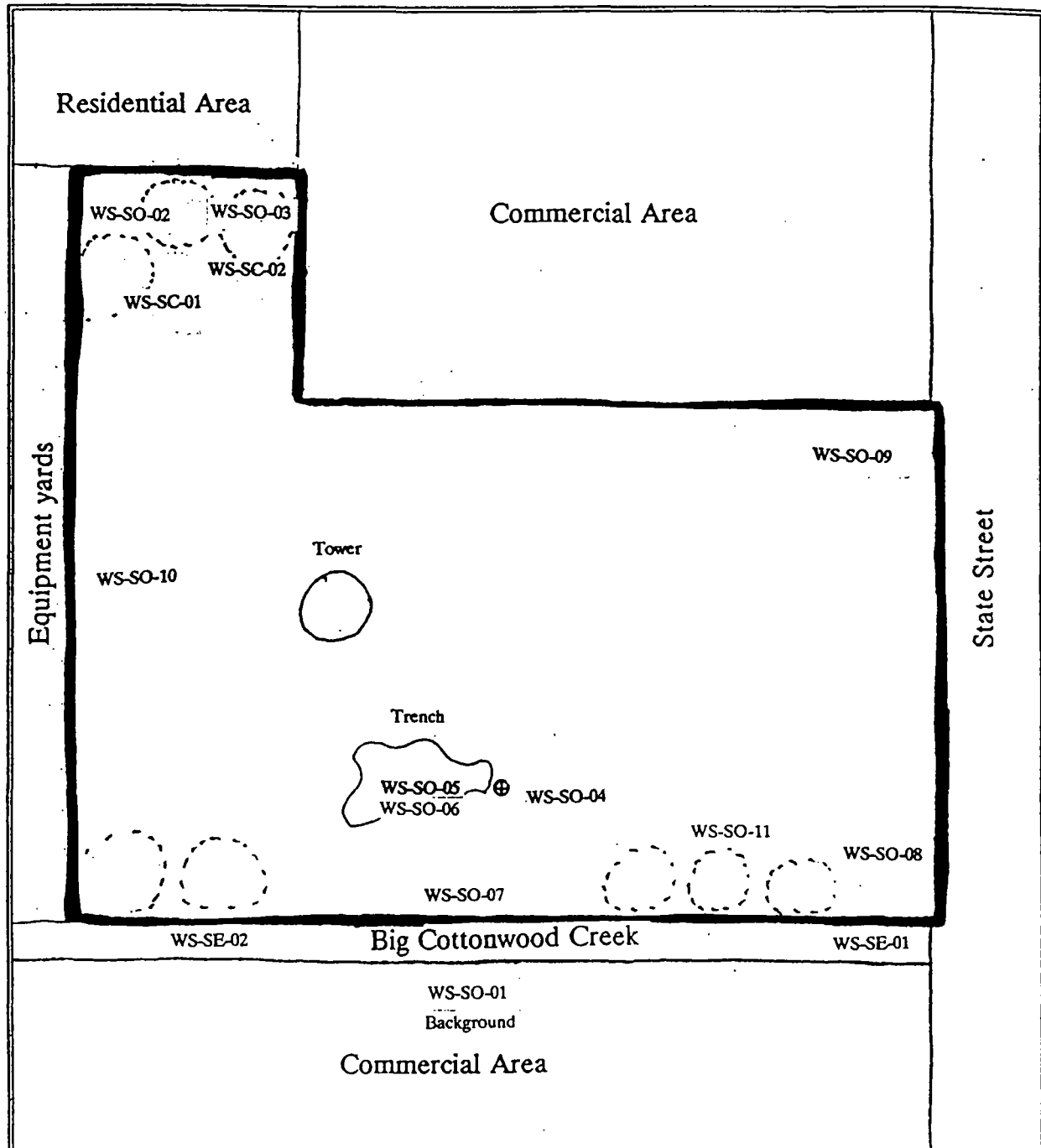
SITE SKETCH MAP
Woodhull Smelter Site
Salt Lake County, Utah


By
DWT

Date
8/16/91


Scale
unknown

NORTH



Site Boundry 

Trees 

Well head 

UDEQ

DIVISION OF ENVIRONMENTAL RESPONSE AND REMEDIATION

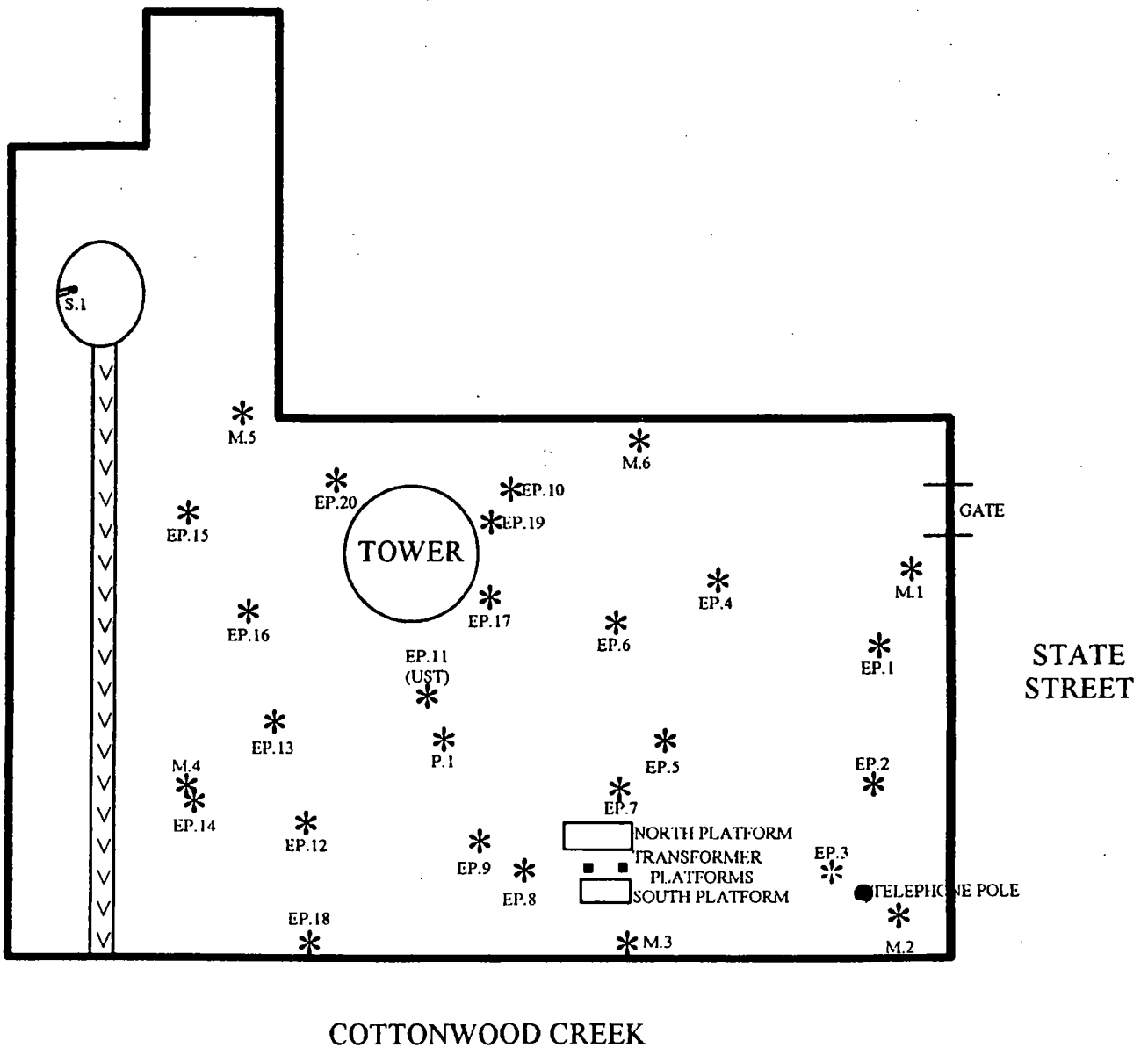
Figure 5

SAMPLE LOCATION MAP
Woodhull Smelter Site
Salt Lake County, Utah

By
TLH

Date
1/5/93

Scale
NTS



SITE SKETCH

GRANITE
ENVIRONMENTAL, INC.

OLD MURRAY LAUNDRY SITE
SAMPLING LOCATIONS
4200 SOUTH STATE STREET
MURRAY, UTAH

DRAWN BY: JLB

CHECKED BY: WCM

DATE: 02-25-99

SCALE: NO SCALE

JOB NO. 0157-001

FIGURE NO. 6

Tables

Metal Sampling Data
Utah Department of Environmental Quality
Woodhull Brothers Smelter Site, EPA ID# 988071593

TABLE 1			
Source Sample Summary (mg/kg)			
Constituent	WS-SO-01 Background	WS-SC-01	WS-SC-02
Aluminum	4,210.00	10,400.00	7,700.00
Antimony	3.10	3.60	4.50
Arsenic	5.00	70.80	52.40
Barium	48.70	516.00	436.00
Beryllium	0.07	0.88	0.54
Cadmium	0.18	2.60	1.70
Calcium	23,400.00	56,900.00	49,900.00
Chromium	8.10	14.60	15.90
Cobalt	3.50	6.80	8.10
Copper	33.80	185.00	244.00
Iron	10,100.00	21,500.00	28,000.00
Lead	76.00	827.00	1,190.00
Magnesium	6,370.00	11,500.00	10,900.00
Manganese	116.00	639.00	844.00
Mercury	0.05	0.33	0.23
Nickel	6.90	11.50	12.40
Potassium	679.00	2,410.00	2,540.00
Selenium	0.53	1.40	0.54
Silver	0.46	3.40	3.50
Sodium	95.00	1,260.00	376.00
Thallium	0.24	0.58	0.43
Vanadium	10.60	28.20	22.40
Zinc	143.00	1,240.00	2,200.00

UDERR, 1993

TABLE 2		
Sediment Sample Summary (mg/kg)		
Constituent	WS-SE-01 Upstream	WS-SE-01 Downstream
Aluminum	7,960.00	7,070.00
Antimony	8.30	5.40
Arsenic	18.00	15.00
Barium	154.00	95.50
Beryllium	0.20	0.17
Cadmium	0.49	0.64
Calcium	113,000.00	39,600.00
Chromium	16.30	14.20
Cobalt	6.10	6.70
Copper	52.20	63.00
Iron	13,100.00	13,700.00
Lead	108.00	145.00
Magnesium	12,200.00	13,700.00
Manganese	345.00	309.00
Mercury	0.12	0.13
Nickel	11.30	12.80
Potassium	2,730.00	1,480.00
Selenium	1.40	0.84
Silver	1.20	0.79
Sodium	749.00	337.00
Thallium	0.64	0.38
Vanadium	19.80	16.90
Zinc	234.00	200.00

UDERR, 1993

Metal Sampling Data
Utah Department of Environmental Quality
Woodhull Brothers Smelter Site, EPA ID# 988071593

Table 3
Soil Sample Summary (mg/kg)

Constituent	WS-SO-01 Background	WS-SO-02	WS-SO-03	WS-SO-04	WS-SO-05	WS-SO-06	WS-SO-07	WS-SO-08	WS-SO-09	WS-SO-10	WS-SO-11
Aluminum	4,210.00	6,940.00	5,970.00	8,220.00	7,520.00	9,530.00	5,930.00	6,140.00	5,980.00	6,690.00	7,500.00
Antimony	3.10	3.30	7.50	3.40	3.80	4.20	3.20	3.50	3.00	3.20	3.60
Arsenic	5.00	15.70	29.60	65.00	17.20	23.60	35.80	51.20	14.40	80.20	55.60
Barium	48.70	103.00	267.00	268.00	105.00	120.00	78.80	116.00	75.70	183.00	389.00
Beryllium	0.07	0.51	0.33	0.54	0.59	0.66	0.26	0.31	0.26	0.57	0.55
Cadmium	0.18	2.80	4.10	1.40	0.23	0.36	7.10	8.50	0.18	15.30	7.40
Calcium	23,400.00	19,100.00	25,400.00	64,600.00	65,700.00	77,400.00	14,900.00	17,200.00	28,800.00	45,600.00	46,800.00
Chromium	8.10	9.00	19.80	12.20	12.50	13.30	9.00	11.70	7.90	18.60	17.50
Cobalt	3.50	4.80	8.80	6.30	6.50	8.30	5.00	5.50	5.70	7.30	5.80
Copper	33.80	65.20	123.00	171.00	58.20	64.90	60.20	88.80	35.60	193.00	147.00
Iron	10,100.00	9,880.00	13,300.00	24,200.00	13,700.00	16,600.00	10,600.00	11,100.00	11,500.00	13,900.00	16,700.00
Lead	76.00	197.00	1,000.00	867.00	131.00	89.40	349.00	479.00	40.40	814.00	1,410.00
Magnesium	6,370.00	6,130.00	7,500.00	13,600.00	17,100.00	21,000.00	7,350.00	6,900.00	9,540.00	15,500.00	10,900.00
Manganese	116.00	293.00	347.00	431.00	334.00	441.00	247.00	336.00	351.00	400.00	372.00
Mercury	0.05	0.15	0.84	0.16	0.06	0.12	0.61	0.62	0.05	1.20	0.50
Nickel	6.90	7.70	17.60	10.50	10.40	14.90	7.40	9.20	7.90	15.70	12.10
Potassium	679.00	3,220.00	1,820.00	2,310.00	2,380.00	3,040.00	1,960.00	2,180.00	1,960.00	2,660.00	1,990.00
Selenium	0.53	0.58	3.50	0.62	0.67	0.73	1.50	0.75	0.56	0.63	1.80
Silver	0.46	0.49	0.94	1.80	0.57	0.62	0.47	0.77	0.45	3.60	1.00
Sodium	95.00	142.00	272.00	329.00	297.00	351.00	201.00	130.00	148.00	199.00	436.00
Thallium	0.24	0.29	0.49	1.00	0.30	0.33	3.30	2.80	0.25	6.10	1.80
Vanadium	10.60	13.60	31.90	22.60	19.60	23.00	14.20	24.30	18.10	40.60	30.40
Zinc	143.00	290.00	1,140.00	1,240.00	202.00	150.00	201.00	346.00	105.00	792.00	1,040.00

UDERR, 1993

Sampling Data
Granite Environmental, Inc.
Phase II Environmental Site Assessment
Murray Laundry Site 4200 South State Street Salt Lake City, Utah

Table 4
Water Sampling Results (ug/L)

Sample Location	Tetrachloroethene	Trichloroethene	Cis-1,2-Dichloroethene	Vinyl Chloride	Benzene	Toluene
EP.8	1,600.00	820.00	6,400.00	1,000.00	460.00	110.00
EP.9	14.00	11.00	30.00	non-detect	non-detect	non-detect
P.1	100.00	2.30	non-detect	non-detect	non-detect	2.10

Granite, 1999

Table 5
Water Sampling Results (ug/L)

Sample Location	Benzene	Toluene	Ethylbenzene	Xylene	Napthalene
EP.19	0.0028	0.003	non-detect	0.0025	non-detect

Granite, 1999

Table 6
Soil Sampling Results (mg/kg)

Sample Location	Benzene	Toluene	Ethylbenzene	Xylene	TPH
S.1	non-detect	non-detect	non-detect	non-detect	non-detect
Eastside of AST pad	non-detect	non-detect	non-detect	non-detect	13,000.00

Granite, 1999

Sampling Data
Granite Environmental, Inc.
Phase II Environmental Site Assessment
Murray Laundry Site 4200 South State Street Salt Lake City, Utah

Table 7
Soil Sampling Results (ug/kg)

Sample Location	Cis-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene
EP.11 Top	4.20	1,100.00	5.30
EP.11 Middle	73.00	4,000.00	69.00
EP.11 Bottom	2.60	46.00	7.40
EP.12 Top	non-detect	93.00	non-detect
EP.12 Middle	3.20	330.00	non-detect
EP.12 Bottom	222.00	81.00	160.00
S.1	non-detect	47.00	non-detect

Granite, 1999

Table 8
Soil Sampling Results (mg/kg)

Sample Location	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
M.1	7.10	73.00	0.70	12.00	38.00	non-detect	non-detect	1.30
M.2	27.00	130.00	6.60	16.00	430.00	1.30	0.60	1.90
M.3	34.00	70.00	4.90	9.50	480.00	.46	0.50	1.30
M.4	73.00	80.00	4.40	10.00	360.00	.37	0.30	2.30
M.5	13.00	310.00	1.20	14.00	250.00	1.20	non-detect	1.10
M.6	7.70	82.00	0.90	15.00	83.00	0.10	non-detect	1.70
EP.11	7.90	450.00	0.90	110.00	470.00	non-detect	non-detect	1.20
EP.17	11.00	130.00	2.60	4.30	110.00	0.38	non-detect	non-detect
EP.18	31.00	210.00	2.50	18.00	230.00	0.45	non-detect	1.30

Granite, 1999

Appendix A

Property Description

VTDI 22-06-102-017-0000 DIST 15A		TOTAL ACRES	3.40
NORDLUND. GRETCHEN B: ET AL	PRINT .P	UPDATE	REAL ESTATE 518400
		LEGAL	BUILDINGS 0
	TAX CLASS NE		MOTOR VEHIC 0
2851 E KENTUCKY AVE	EDIT 1	FACTOR BYPASS	TOTAL VALUE 518400
SALT LAKE CITY UT	84117550751		
LOC: 4220 S STATE ST	EDIT 1	BOOK 8086	PAGE 1102 DATE 09/15/1998
SUB:			TYPE UNKN PLAT

11/06/2000 PROPERTY DESCRIPTION FOR TAXATION PURPOSES ONLY

BEG IN CEN OF STATE STREET 33 FT E & S 0-04' W 119 FT FR NE
 COR OF LOT 14. BLK 9. TEN ACRE PLAT A. BIG FIELD SUR: S
 0-04' W 234.9 FT TO CEN OF BIG COTTONWOOD CREEK: S 85-56' W
 218.4 FT: N 81-53' W 219.6 FT: W 100 FT: N 0-04' E 359.3 FT:
 N 85-15' E 129.2 FT: S 138.35 FT: E 411.77 FT M OR L TO BEG.
 LESS STREET. 3.4 AC M OR L. 5297-1125. 1127. 1133.

5422-1472. 5533-846. 5615-2900 5703-2556 5844-2218 5844-2220
 5986-2049 6083-2911. 6096-1739 6097-0120 6273-1610 6274-1329
 6274-2897. 2900 6274-2903 6388-1549 6388-1551 6447-262
 6447-0264 6833-0511 6833-509 6841-1730 6971-1358 6971-1360

*** NORDLUND. GRETCHEN B: 50% INT

*** FELTON. NORIN B: 50% INT

PFKEYS: 1=VTNH 2=VTOP 4=VTAU 6=NEXT 7=RTRN VTAS 8=RXMU 10=RXBK 11=RXPN 12=PREV

Appendix B

Preliminary Assessment Worksheet

PRELIMINARY ASSESSMENT WORKSHEET

PREPARER'S NAME: Jason Murdock

SITE NAME: Murray Laundry 4200 S. State Plume

DATE: 5/29/01

MAJOR CONSIDERATIONS

- A) DOES ANY QUALITATIVE OR QUANTITATIVE INFORMATION EXIST THAT MAY INDICATE AN OBSERVED RELEASE TO AIR, GROUNDWATER, SOIL OR SURFACE WATER? Yes

Describe: In the 1990's, various investigations were conducted on the site. The Salt Lake Valley Smelter Study, a Preliminary Assessment, Site Investigation, Phase I, and Phase II. The Salt Lake Smelter Study and Site Investigation showed possible contamination by metals. The Phase II investigation collected soil and water samples which showed an impact by chlorinated solvents.

- B) IF THE ANSWER TO #1 IS YES, IS THERE EVIDENCE OF DRINKING WATER SUPPLY CONTAMINATION OR ANY OTHER TARGET CONTAMINATION (i.e. food chain, recreation areas, or sensitive environments)? Yes

Describe: Big Cottonwood Creek is an effluent stream and the groundwater in the area flows towards the creek. Considering chlorinated solvents were discovered in the groundwater on the site, these solvents maybe flowing towards the creek. The creek is used as a fishery where rainbow, brook, and brown trout are caught. The Jordan River which is also used as a recreational fishery is located approximately 1.25 miles west of the site where Big Cottonwood Creek enters the Jordan River.

- C) ARE THERE SENSITIVE ENVIRONMENTS WITHIN A 4-MILE RADIUS OR 15 DOWNSTREAM MILES OF THE SITE? No IF YES, DESCRIBE IF ANY OF THE FOLLOWING APPLY:

- 1) Multiple sensitive environments? _____
- 2) Federally designated sensitive environment(s)? _____
- 3) Sensitive environment(s) downstream on a small or slow flowing surface water body? _____

- D) IS THE SITE LOCATED IN AN AREA OF KARST TERRAIN? No

Describe: _____

- E) DOES THE WASTE SOURCE LIE FULLY OR PARTIALLY WITHIN A WELLHEAD PROTECTION AREA AS DESIGNATED ACCORDING TO SECTION 1428 OF THE SAFE DRINKING WATER ACT? Yes

Describe: Any municipal well serving a population of 10,000+ must have a 3-mile wellhead protection area. A well is located 0.53 miles southeast of the site.

- F) DOES ANY QUALITATIVE OR QUANTITATIVE INFORMATION EXIST THAT PEOPLE LIVE OR ATTEND SCHOOL ON ONSITE CONTAMINATED PROPERTY? No

Describe: There are residential houses located 100 feet northwest of the site. During the site visit in November 2000, it was noted that children had accessed the site and a fort was built on-site.

SITE INFORMATION

1. SITE NAME: Murray Laundry 4200 S. State Street Plume
ADDRESS: 4200 South State Street
CITY: Salt Lake City COUNTY: Salt Lake STATE: Utah
ZIP: 84107 EPA ID: UT0009946260 LATITUDE: 40° 40' 48.5" LONGITUDE: 111° 53' 17"
2. DIRECTIONS TO SITE (From nearest public road): To reach the site from the DERR office building, turn left onto North Temple then right onto Redwood Road heading south. Exit Redwood Road by turning left onto 2100 South and head east until coming to State Street. Turn right onto State Street and head south until coming to 4200 South. The site is located on the left side of the road.
3. SITE OWNERSHIP HISTORY (Use additional sheets, if necessary):
- A. Name of current owner: Gretchen B. Nordlund ET AL.
Address: 2851 East Kentucky Ave.
City: Salt Lake County: Salt Lake
State: Utah Zip: 84117 Dates: From Unknown To
Phone: 801-277-5855
- B. Name of previous owner:
Address:
City: County:
State: Zip: Dates: From To
Phone:
- Source of ownership data: Salt Lake County Records Office
4. TYPE OF OWNERSHIP (Check all that apply):
☒ Private ☐ State ☐ Municipal ☐ Federal ☐ County
☐ Other (describe):
5. NAME OF SITE OPERATOR: Dimension Development, LC
Address:
City: Salt Lake County: Salt Lake
State: Utah Zip: Phone: 801-557-1013

BACKGROUND/OPERATING HISTORY

6. DESCRIBE OPERATING HISTORY OF SITE: From June 1870 to 1873 the Woodhull Brothers Smelter operated on the site. Between that time and the 1950's when the Murray Laundry building was built it is unsure what occurred on-site. From the 1950's to 1977 the Murray Laundry was in operation. After 1977 the building was demolished and the site is currently vacant.

Source of information: Woodhull Smelter PA; 1991, Site visit; 2000.

7. DESCRIBE THE NATURE OF SITE OPERATIONS (property size, manufacturing, waste disposal, storage, etc.): The total area of the site is 3.40 acres. During the time the smelter was in operation, it was a common practice to deposit slag from the smelter on-site. During the time that Murray Laundry was in operation, a former employee indicated that perchloroethylene was used by the facility and stored in an above ground storage tank on-site.

Source of information: Woodhull Smelter PA;1991, Phase I Site Assessment; 1995.

8. DESCRIBE ANY EMERGENCY OR REMEDIAL ACTIONS THAT HAVE OCCURRED AT THE SITE: None

Source of information: _____

9. ARE THERE RECORDS OR KNOWLEDGE OF ACCIDENTS OR SPILLS INVOLVING SITE WASTES? No

Describe: _____

Source of information: _____

10. DISCUSS EXISTING SAMPLING DATA AND BRIEFLY SUMMARIZE DATA QUALITY (e.g., sample objective, age/comparability, analytical methods, detections limits and QA/QC): Samples collected during the Salt Lake Valley Smelter Study were screened with a XRF. Samples collected during the Woodhull Smelter SI was done in 1993 and were analyzed by a CLP lab. Samples collected for the Phase II study was done in 1999 and were analyzed using Methods 8260A, 5030A, 7060A, 6010B, 7471A, 7740, and 8021/8015 modified. The Smelter Study and SI showed the soil has been impacted with metals. The Phase II showed the soil and groundwater has been impacted with chlorinated solvents.

Source of information: Woodhull Brothers Smelter Analytical Results; 1993, Granite Environmental Inc. Phase II; 1999.

WASTE CONTAINMENT/HAZARDOUS SUBSTANCE IDENTIFICATION

11. FOR EACH SOURCE AT THE SITE, SUMMARIZE ON TABLE 1 (attached): 1) Methods of hazardous substance disposal, storage or handling; 2) size/volume/area of all features/structures that might contain hazardous waste; 3) condition/integrity of each storage disposal feature or structure; 4) types of hazardous substances handled.
12. BRIEFLY EXPLAIN HOW WASTE QUANTITY WAS ESTIMATED (e.g., historical records or manifests, permit applications, air photo measurements, etc.): Waste quantity has not been estimated.

Source of information: _____

- Source of Information: Site visit; 2000.

24. IS THE SITE LOCATED IN A FLOODPLAIN (indicate flood frequency)? Yes. Flood frequency is unknown since the majority of the water for Big Cottonwood Creek is diverted for drinking water.

25. IDENTIFY AND LOCATE (see item #35) ANY SURFACE WATER RECREATION AREA WITHIN 15 DOWNSTREAM MILES OF THE SITE: Big Cottonwood Creek, Jordan River

26. TWO YEAR 24-HOUR RAINFALL: Unknown

TARGETS

27. DISCUSS GROUND WATER USAGE WITHIN FOUR MILES OF THE SITE: Municipal, Irrigation, and Industrial.

28. SUMMARIZE THE POPULATION SERVED BY GROUND WATER ON THE TABLE BELOW:

<u>Distance (Miles)</u>	<u>Population</u>
0 - 1/4	<u>411</u>
1/4 - 1/2	<u>2,579</u>
1/2 - 1	<u>10,528</u>
1 - 2	<u>46,972</u>
2 - 3	<u>110,644</u>
3 - 4	<u>196,477</u>

Source of information: DERR GIS Information Database; 1990.

29. IDENTIFY AND LOCATE (see item #35) POPULATION SERVED BY SURFACE WATER INTAKES WITHIN 15 DOWNSTREAM MILES OF THE SITE: None

Source of information: DERR GIS Information Database; 1990.

30. DESCRIBE AND LOCATE FISHERIES WITHIN 15 DOWNSTREAM MILES OF THE SITE (i.e., provide standing crop of production and acreage, etc.): Big Cottonwood Creek and Jordan River. Standing crop production is unknown.

Source of information: Utah Department of Natural Resources; 2000

31. DETERMINE THE DISTANCE FROM THE SITE TO THE NEAREST OF EACH OF THE FOLLOWING LAND USES

<u>Description</u>	<u>Distance (Miles)</u>
Commercial/Industrial/Institutional	<u>.02</u>
Single Family Residential	<u>.02</u>
Multi-Family Residential	<u>.02</u>
Park	<u>.50</u>
Agricultural	<u>20+</u>

Source of information: Site visit; 2000.

32. SUMMARIZE THE POPULATION WITHIN A FOUR-MILE RADIUS OF THE SITE:

<u>Distance (Miles)</u>	<u>Population</u>
0 - 1/4	<u>411</u>
1/4 - 1/2	<u>2,579</u>
1/2 - 1	<u>10,528</u>
1 - 2	<u>46,972</u>
2 - 3	<u>110,644</u>
3 - 4	<u>196,477</u>

Source of information: DERR GIS Information Database; 1900

OTHER REGULATORY INVOLVEMENT

33. DISCUSS ANY PERMITS:

County: _____

State: _____

Federal: _____

Other: _____

Source of information: _____

34. SKETCH OF SITE

Include all pertinent features, e.g., wells, storage areas, underground storage tanks, waste areas, buildings, access roads, areas of ponded water, etc. Attach additional sheets with sketches of enlarged areas, if necessary.
See Figure 2 of this report.

35. SURFACE WATER FEATURES

Provide a simplified sketch of the surface runoff and surface water flow system for 15 downstream miles. Include all pertinent features, e.g., intakes, recreation areas, fisheries, gauging stations, etc. See Appendix J of this report.

TABLE 1

WASTE CONTAINMENT AND HAZARDOUS SUBSTANCE IDENTIFICATION *					
SOURCE TYPE	SIZE (Volume/Area)	ESTIMATED WASTE QUANTITY	SPECIFIC COMPOUNDS	CONTAINMENT **	SOURCE OF INFORMATION
Slag	Unknown	Unknown	Metals	None	Woodhull Brothers Smelter, AR; 1993
UST	Unknown	Unknown	Chlorinated Solvents	None	Phase II, Granite Environmental Inc.; 1999

* Use additional sheets if necessary.

** Evaluate containment of each source from the perspective of each migration pathway (e.g., ground water pathway - non-existent, natural or synthetic liner, corroding underground storage tank; surface water - inadequate freeboard, corroding bulk tanks; air - unstable slag piles, leaking drums, etc.)

TABLE 2

HYDROGEOLOGIC INFORMATION *				
STRATA NAME/ DESCRIPTION	THICKNESS (ft)	HYDRAULIC CONDUCTIVITY (cm/sec)	TYPE OF DISCONTINUITY **	SOURCE OF INFORMATION
Shallow, Unconfined Aquifer/ composed of clays, silts, & fine sands	Up to 50'	Avg. 4.43×10^{-4}	Creek, River	Hamilton Enviro. Hely et. al, 1971 Waddell et. al, 1987
Deep Principal Aquifer	Up to 1500'	Unknown		Hamilton Enviro. Hely et. al, 1971 Waddell et. al, 1987

* Use additional sheets if necessary.

** Identify the type of discontinuity within four-miles from the site (e.g., river, strata "pinches out", etc.)

Appendix C

CERCLA Eligibility Questionnaire

CERCLA ELIGIBILITY QUESTIONNAIRE

SITE NAME: Murray Laundry 4200 S. State Street Plume Alias: _____

CITY: Salt Lake City STATE: Utah

EPA ID NUMBER: UT0009946260

I. CERCLA ELIGIBILITY

Yes No

Did the facility cease operation prior to November 19, 1980?

X _____

If answer YES, STOP, facility is probably a CERCLA site.

If answer is NO, Continue to Part II.

II. RCRA ELIGIBILITY

Yes No

Did the Facility file a RCRA Part A application?

If YES:

1. Does the facility currently have interim status?

2. Did the facility withdraw its Part A application?

3. Is the facility a known or possible protective filer?
(Facility filed in error).

4. Type of facility:

Generator _____ Transporter _____ Recycler _____

TSD (Treatment/Storage/Disposal) _____

Does the facility have a RCRA operating or post closure permit?

Is the facility a late (after 11/19/80) or non-filer that has been identified by the EPA or the State? (Facility did not know it needed to file under RCRA).

If all answers to question in Part II are NO, STOP, the facility is a CERCLA eligible site.

If the answer to #2 or #3 is YES, STOP, the facility is a CERCLA eligible site.

If answer #2 and #3 are NO and any OTHER answer is YES, site is RCRA, continue to Part III.

III. RCRA SITES ELIGIBLE FOR NPL

Yes No

Has the facility owner filed for bankruptcy under federal or state laws?

Has the facility lost RCRA authorization to operate or shown probable unwillingness to carry out corrective action?

Is the facility a TSD that converted to a generator, transporter or recycler facility after November 19, 1980?

IV. EXEMPTED SUBSTANCES

Does the release involve hazardous substances other than petroleum?

The site may never reach the NPL. We need to be able to refer it to any other program in EPA or state agencies which may have jurisdiction, and thus be able to effect a cleanup. Responses should summarize available information pertaining to the question.

- 1) Is there an owner or operator?

Owners: Gretchen B. Nordlund and Norin Felton

- 2) (NPDES-CWA) Is there a discharge water containing pollutants with surface water through a point source (pipe, ditch, channel, conduit, etc.)?

Unknown

- 3) (Sec. 404-CWA) Have fill or dredged material been deposited in a wetland or on the banks of a stream? Is there evidence of heavy equipment operating in ponds, streams or wetlands?

No

- 4) (UIC-SDWA) Are fluids being disposed of to the subsurface through a well, cesspool, septic system, pit, etc.?

No

- 5) (TSCA) Is it suspected that there are PCB's on the site which came from a source with greater than 50 ppm PCB's such as oil from electrical transformers or capacitors?

No

- 6) (FIFRA) Is there a suspected release of pesticides from a pesticide storage site? Are there pesticide containers on site?

No

- 7) (RCRA - Subtitle D) Is there an owner or operator who is obligated to manage solid waste storage or disposal units under State solid waste or groundwater protection regulations?

No

- 8) (UST) Is it suspected that there is a leaking underground storage tank containing a product which is a hazardous substance or petroleum?

Yes, In 1999 Granite Environmental Inc. uncovered an UST south of the tower. The UST was sampled and the report indicated thar PCE was discovered at 650 ug/L.

Appendix D

EPA Preliminary Assessment Form

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT FORM Page 1 of 2		IDENTIFICATION	
		State: UT	CERCLIS Number: UT0009946260
		CERCLIS Discovery Date: 11/02/00	
1. GENERAL SITE INFORMATION:			
Name: Murray Laundry 4200 S. State Street Plume		Street Address: 4200 South State Street	
City: Salt Lake City		State: Utah	Zip Code: 84107
County: Salt Lake	County Code: 035	Congressional District: 02	
Latitude: <u>40</u> ° <u>40</u> ' <u>48.5</u> " Longitude: <u>111</u> ° <u>53</u> ' <u>17</u> " Approximate Area of Site: <u>3.40</u> Acres <u>148,104</u> Square Feet		Status of Site: <input type="checkbox"/> Active <input checked="" type="checkbox"/> Inactive <input type="checkbox"/> Not Specified <input type="checkbox"/> Not Applicable	
2. OWNER/OPERATOR INFORMATION			
Owner: Gretchen B. Nordlund ET AL.		Operator: Dimension Development, LC	
Street Address: 2851 East Kentucky Ave.		Street Address:	
City: Salt Lake City		City:	
State: Utah	Zip Code: 84117	State:	Zip Code:
Telephone: 801-277-5855		Telephone: 801-557-1013	
Type of Ownership: <input checked="" type="checkbox"/> Private <input type="checkbox"/> State <input type="checkbox"/> Municipal <input type="checkbox"/> Indian <input type="checkbox"/> County <input type="checkbox"/> Not Specified <input type="checkbox"/> Federal Agency <input type="checkbox"/> Other		How Initially Identified: <input type="checkbox"/> Citizen Complaint <input type="checkbox"/> RCRA/CERCLA <input type="checkbox"/> PA Petition <input type="checkbox"/> Notification <input checked="" type="checkbox"/> State/Local Program <input type="checkbox"/> Not Specified <input type="checkbox"/> Incidental <input type="checkbox"/> Other <input type="checkbox"/> Federal Program	
3. SITE EVALUATOR INFORMATION			
Name of Evaluator: Jason Murdock		Agency/Organization: UDEQ/DERR	Date: 11/30/00
Street Address: 168 North 1950 West		City: Salt Lake City	State: Utah
Name of EPA or State Agency Contact: Jason Murdock		Telephone: 801-536-4238	
Street Address: 168 North 1950 West		City: Salt Lake City	State: Utah
4. SITE DISPOSITION (for EPA use only)			
Emergency Response/Removal Assessment Recommendation: <input type="checkbox"/> Yes <input type="checkbox"/> No Date: <u> </u> / <u> </u> / <u> </u>		CERCLIS Recommendation: <input type="checkbox"/> Higher Priority SI <input type="checkbox"/> Lower Priority SI <input type="checkbox"/> NFRAP <input type="checkbox"/> RCRA <input type="checkbox"/> Other:	
		Signature: Name (typed): Position:	

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT FORM - PAGE 2 OF 2

CERCLIS Number
UT0009946260

5. GENERAL SITE CHARACTERISTICS

Predominant Land Uses Within 1 Mile of Site:

<input checked="" type="checkbox"/> Industrial	<input type="checkbox"/> Mining	<input type="checkbox"/> DOE
<input checked="" type="checkbox"/> Commercial	<input type="checkbox"/> DOD	<input type="checkbox"/> DOI
<input checked="" type="checkbox"/> Residential	<input type="checkbox"/> Other Federal Agency	
<input type="checkbox"/> Forest/Fields	<input type="checkbox"/>	
<input type="checkbox"/> Agriculture	<input type="checkbox"/> Other <input type="checkbox"/>	

Site Setting:

<input type="checkbox"/> Urban
<input checked="" type="checkbox"/> Suburban
<input type="checkbox"/> Rural

Years of Operation:

Beginning Year: ☐

Ending Year: ☐

Unknown: ☒

Type of Operations (check all that apply):

- | | |
|------------------------------------------------------------|-------------------------------------------------|
| <input type="checkbox"/> Manufacturing | <input type="checkbox"/> Retail |
| <input type="checkbox"/> Lumber and Wood Products | <input type="checkbox"/> Recycling |
| <input type="checkbox"/> Inorganic Chemicals | <input type="checkbox"/> Junk/Salvage Yard |
| <input type="checkbox"/> Plastic and/or Rubber Products | <input type="checkbox"/> Municipal Landfill |
| <input type="checkbox"/> Paints, Varnishes | <input type="checkbox"/> Other Landfill |
| <input type="checkbox"/> Industrial Organic Chemicals | <input type="checkbox"/> DOD |
| <input type="checkbox"/> Agricultural Chemicals | <input type="checkbox"/> DOE |
| (e.g. Pesticides, fertilizers) | <input type="checkbox"/> DOI |
| <input type="checkbox"/> Miscellaneous Chemical Products | <input type="checkbox"/> Other Federal Facility |
| <input type="checkbox"/> Primary Metals | <input type="checkbox"/> RCRA |
| <input type="checkbox"/> Metal Forging, Stamping | or Disposal Facility |
| <input type="checkbox"/> Fabricated Struct. Metal Products | <input type="checkbox"/> Large Quantity Gen. |
| <input type="checkbox"/> Electronic Equipment | <input type="checkbox"/> Small Quantity Gen. |
| <input type="checkbox"/> Other Manufacturing | <input type="checkbox"/> Subtitle D |
| <input type="checkbox"/> Mining | <input type="checkbox"/> Municipal |
| <input type="checkbox"/> Metals | <input type="checkbox"/> Industrial |
| <input type="checkbox"/> Coal | <input type="checkbox"/> "Converter" |
| <input type="checkbox"/> Oil and Gas | <input type="checkbox"/> "Protective Filer" |
| <input type="checkbox"/> Non-Metallic Metals | <input type="checkbox"/> "Non or Late Filer" |
| <input type="checkbox"/> Not Specified | |

☒ Other: Smelter and Dry Cleaner

Waste Generated:

- ☒ Onsite
- ☐ Offsite
- ☐ Onsite and Offsite
- ☐ Unknown

Waste Deposition
Authorized By:

- ☐ Present Owner
- ☐ Former Owner
- ☐ Present and
Former Owner
- ☐ Unauthorized
- ☐ Unknown

Waste Accessible to
the Public:

- ☒ Yes
- ☐ No

Distance to Nearest
Dwelling, School, or
Workplace:

100 Feet

6. WASTE CHARACTERISTICS INFORMATION

SOURCE TYPE:

(Check all that
apply)

SOURCE WASTE

QUANTITY
(Include Units) TIER

General Types of Waste

(Check all that Apply):

- | | | |
|-------------------------------------------------------------------------------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> Landfill | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Surface Impoundment | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Drums | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Tanks and Non-Drum
Containers | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Chemical Waste Pile | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Scrap Metal or
Junk Pile | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Tailings Pile | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Trash Pile (Open Dump) | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Land Treatment | <input type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> Contaminated Ground
Water Plume
(Unidentified Source) | <u>Unknown</u> | <input type="checkbox"/> |
| <input type="checkbox"/> Contaminated Surface
Water/Sediment
(Unidentified Source) | <input type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> Contaminated Soil | <u>Unknown</u> | <input type="checkbox"/> |
| <input type="checkbox"/> Other | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> No Sources | <input type="checkbox"/> | <input type="checkbox"/> |

- ☒ Metals
- ☒ Organics
- ☐ Inorganics
- ☒ Solvents
- ☐ Paints/Pigments
- ☐ Laboratory/Hospital Waste
- ☐ Radioactive Waste
- ☐ Oily Waste
- ☐ Pesticides/Herbicides
- ☐ Acids/Bases
- ☐ Construction/Demolition
Waste
- ☐ Municipal Waste
- ☐ Mining Waste
- ☐ Explosives
- ☐ Other: ☐

Physical State of
Waste as Deposited
(Check all that Apply):

- ☒ Solid ☐ Gas
- ☒ Liquid ☐ Powder
- ☐ Sludge

* C = Constituent, W = Wastestream,
V = Volume, A = Area

Appendix E

Site Visit Report

Site Visit Report

Murray Laundry 4200 S. State Plume

Date/Time: Tuesday, November 21, 2000/10:30-12:00 p.m.

Weather Conditions: 40⁰, sunny and clear

Participants/Affiliation: Jason Murdock, Environmental Scientist/UDEQ-DERR;
Phil Greer, Environmental Scientist/UDEQ-DERR

1. Introduction:

The purpose of the site visit was to determine the general conditions surrounding the **Murray Laundry 4200 S. Plume, EPA ID# UT0009946260**, identify possible threats of hazards to human health and the environment, produce a site sketch, and to identify businesses that surround the site. The site visit was conducted by windshield tour, walking the perimeter of the site, and viewing the site from public access areas.

2. Site Description:

The Murray Laundry 4200 S. State Plume is located at the former **Woodhull Brothers Smelter Site, EPA ID# 988071593**, at approximately 4200 South State Street in Salt Lake City, Salt Lake County, Utah. The site is located approximately 1.25 miles east of the Jordan River and north of Big Cottonwood Creek (Cottonwood Creek) (Figure 1). The geographic coordinates are 40°40'47.69" North Latitude and 111°53'15.92" West Longitude. The site is located in the Salt Lake Valley which is bounded by the Wasatch Range on the east, the Oquirrh Mountains on the west, the Great Salt Lake on the north, and the Traverse Range on the South. The elevation of the site is approximately 4,250 feet above mean sea level (USGS, 1963). Four other CERCLA sites are located within one mile of the site: 4800 South 150 West Plume, EPA ID# UT0008970492; Franklin or Horn Silver Smelter, EPA ID# UTD988071585; Morgan or Hanover Smelting Works, EPA ID# UTD988071619; and Fireclay Battery, EPA ID# UTD988074969.

The site is located in an area of commercial and industrial use with small residences interspersed between the commercial properties (Figure 2). The total area of the site is approximately 3.40 acres, and is accessible from State Street on the east and Columbia Avenue on the north. The entire site is bounded by a five-foot chain linked fence with parts of the fence in need of repair.

Cottonwood Creek flows along the southern boundary, and a gate leading to the property located along State Street was open. It was observed that the northwest corner of the fence located along Columbia Avenue had been pulled back, and tracks left in the snow by children

were noticed entering the site toward a makeshift fort. The site is relatively flat and has ample vegetation ranging from grasses to large elm, willow, cottonwood, and poplar trees of various sizes growing throughout the site and along Cottonwood Creek (Figures 2 and 3).

A large concrete and steel advertising tower is the prominent feature on-site. Excavated areas were noticed throughout the site, with what appeared to be pieces of pipe protruding out of these areas. Along the southern boundary, a 15-foot high concrete retaining wall extends west for approximately 150-feet along Cottonwood Creek. The remaining southern boundary of the site (west of the retaining wall) is an exposed bank that slopes into Cottonwood Creek (Figure 2). The creek channel is approximately 15 to 20 feet wide and has an average depth of approximately 2.5 - 3.5 feet. At the time of the site visit, water was observed flowing down Cottonwood Creek. The site is currently vacant and for sale, and the sale of the property is being handled by Dimension Development, LC.

3. Area Description:

The area is relatively flat with a gradual slope toward Cottonwood Creek. Cottonwood Creek is a perennial stream and originates approximately ten miles to the southeast in Big Cottonwood Canyon. Cottonwood Creek flows westward from the canyon mouth, then northwest along the site and enters the Jordan River approximately 1.25 miles west of the site (Figure 1). The estimated flow rate of Cottonwood Creek is approximately 60 cubic feet per second, but very large seasonal variations can be expected. Cottonwood Creek is used as a drinking water source, and water is diverted above the site (UDERR, 2000a). Food chain targets within 15 miles of the site include: white bass, catfish, carp, rainbow, brook, and brown trout.

An equipment storage yard borders the west side of the site, and is located east of Main Street. State Street borders the east side of the site, and across State Street are a variety of shops located along the east side of State Street. Mineral Equipment Co. and a private club borders Cottonwood Creek on the south, CJ Woodworking and Auto Image borders the site on the north, and a residential area borders the site on the northwest. Across Columbia Avenue is a apartment complex, CA Auto Sales, Central Plumbing, and a area where snow cone making machines are stored (Figures 2 and 3).

Appendix F

Latitude/Longitude Document Record Form

3/5/2001

Input

Horizontal: NAD 27 UTM, Zone 0012, Meters

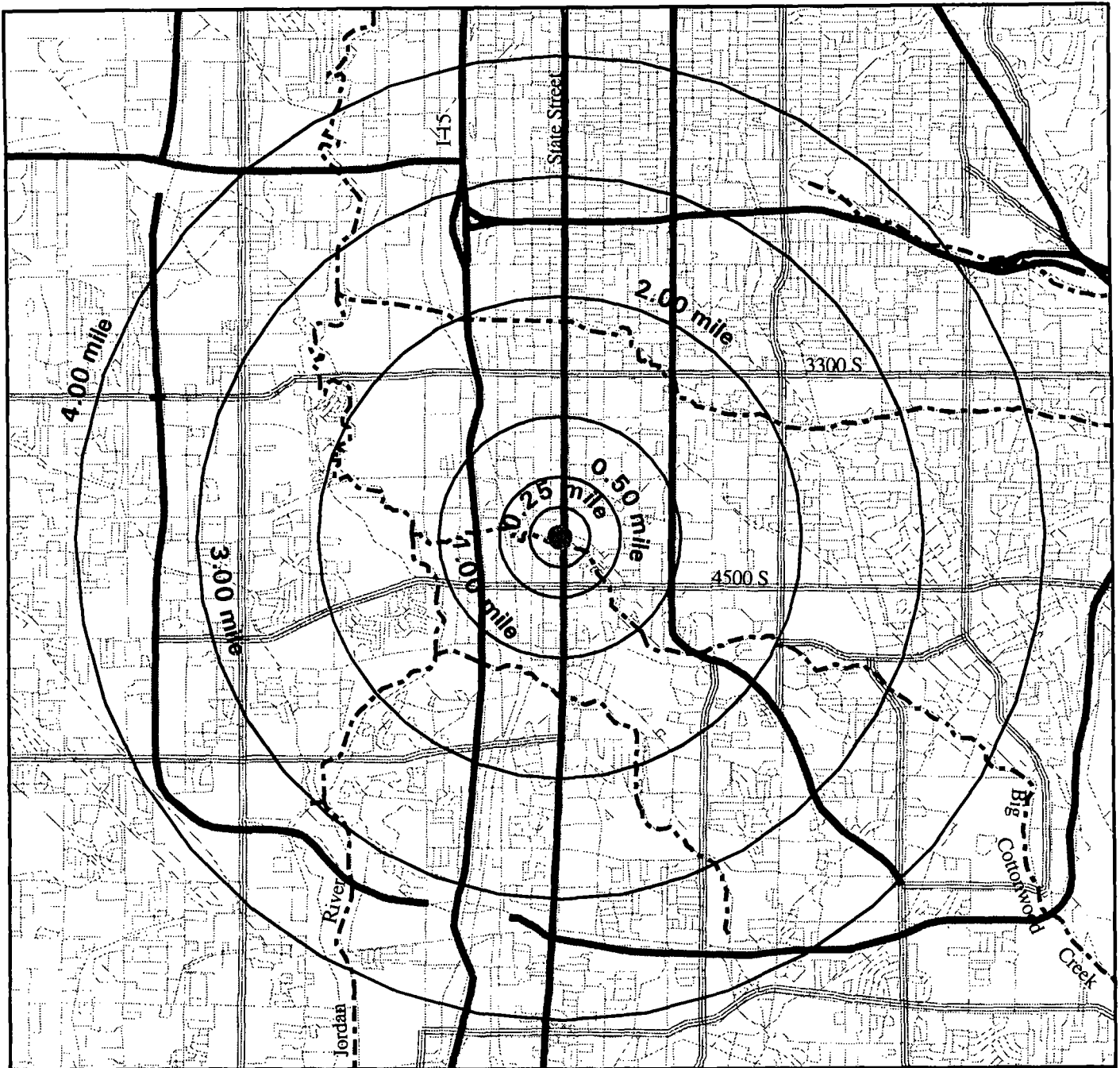
Output

Horizontal: NAD 27 Geographic

Name	Input	Output
NE Corner of Former	4503393.00000 N	40 40 47.68989 N
Building	424976.00000 E	111 53 15.91641 W
Convergence	-00 34 43.29947	
Scale Factor	0.999669279	

Appendix G

Census Data Report

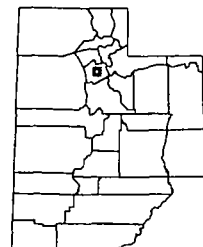


Murray Laundry 4200 S. State Plume 4 Mile Population Census

Legend

- Census Blocks
- Class 1 - Primary Route
- Class 2 - Secondary Route
- Stream or braided stream
- Site Bands
- Site

Approximate Scale
1" = 1.26 Miles



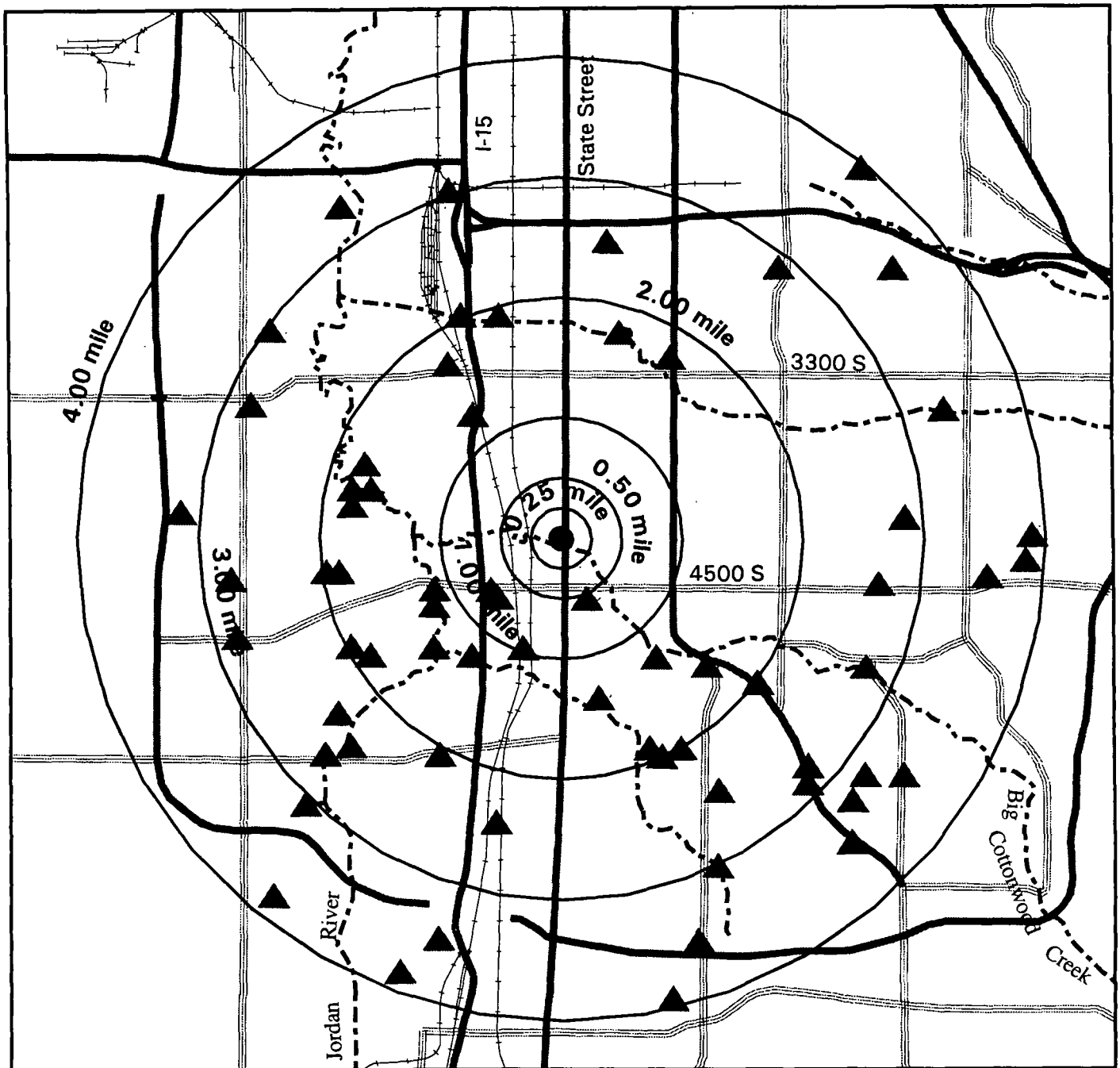
UDEQ
Division of Environmental
Response and Remediation

Population by Concetric Bands
Calculated from Census Blocks
Site Theme: cercla
Site Name: 404040404
Created By: mzucker
Created On: 11/09/00

TOTAL 0.25 MILE	411.000000
TOTAL 0.50 MILE	2,579.000000
TOTAL 1.00 MILE	10,528.000000
TOTAL 2.00 MILE	46,972.000000
TOTAL 3.00 MILE	110,644.000000
TOTAL 4.00 MILE	196,477.000000

Appendix H

4-Mile Drinking Water Sources

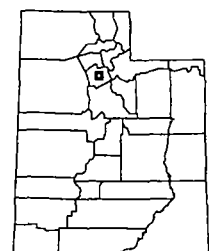


Murray Laundry 4200 S. State Plume Public Drinking Water Sources

Legend

- | | | | |
|--|---------------------------|--|------------------------|
| | Class 1 - Primary Route | | Site |
| | Class 2 - Secondary Route | | Drinking Water Sources |
| | Rail Roads | | |
| | Site Bands | | |
| | Stream or braided stream | | |

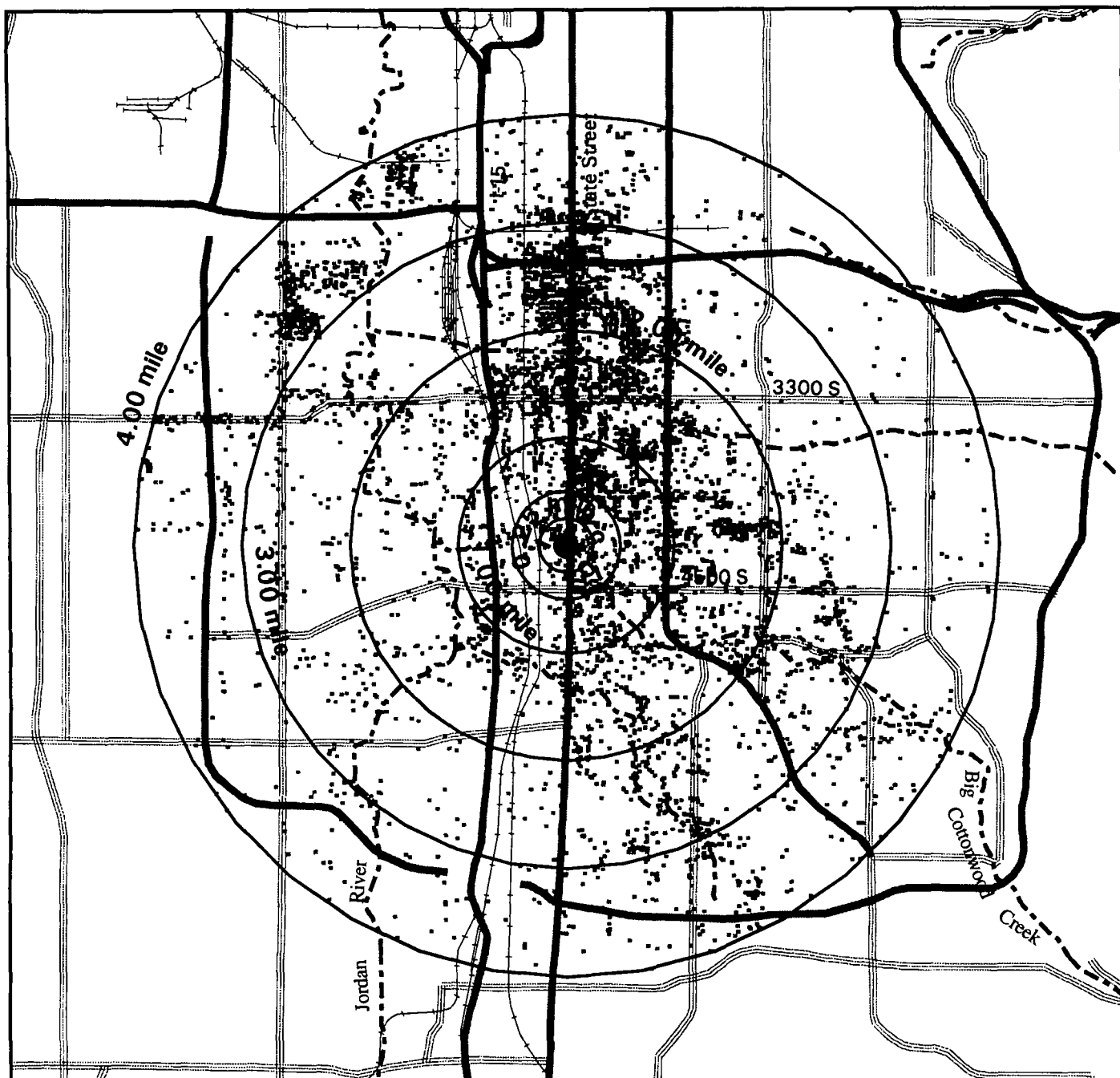
Approximate Scale
1" = 1.26 Miles



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Appendix I

4-Mile Point of Diversion

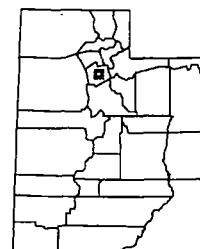


Murray Laundry 4200 S. State Street All Surface and Groundwater POD

Legend

- | | | | |
|--|--------------------------|--|---------|
| | Class 1 -Primary Route | | Site |
| | Class 2 -Secondary Route | | POD-All |
| | Rail Roads | | |
| | Site Bands | | |
| | Stream or braided stream | | |

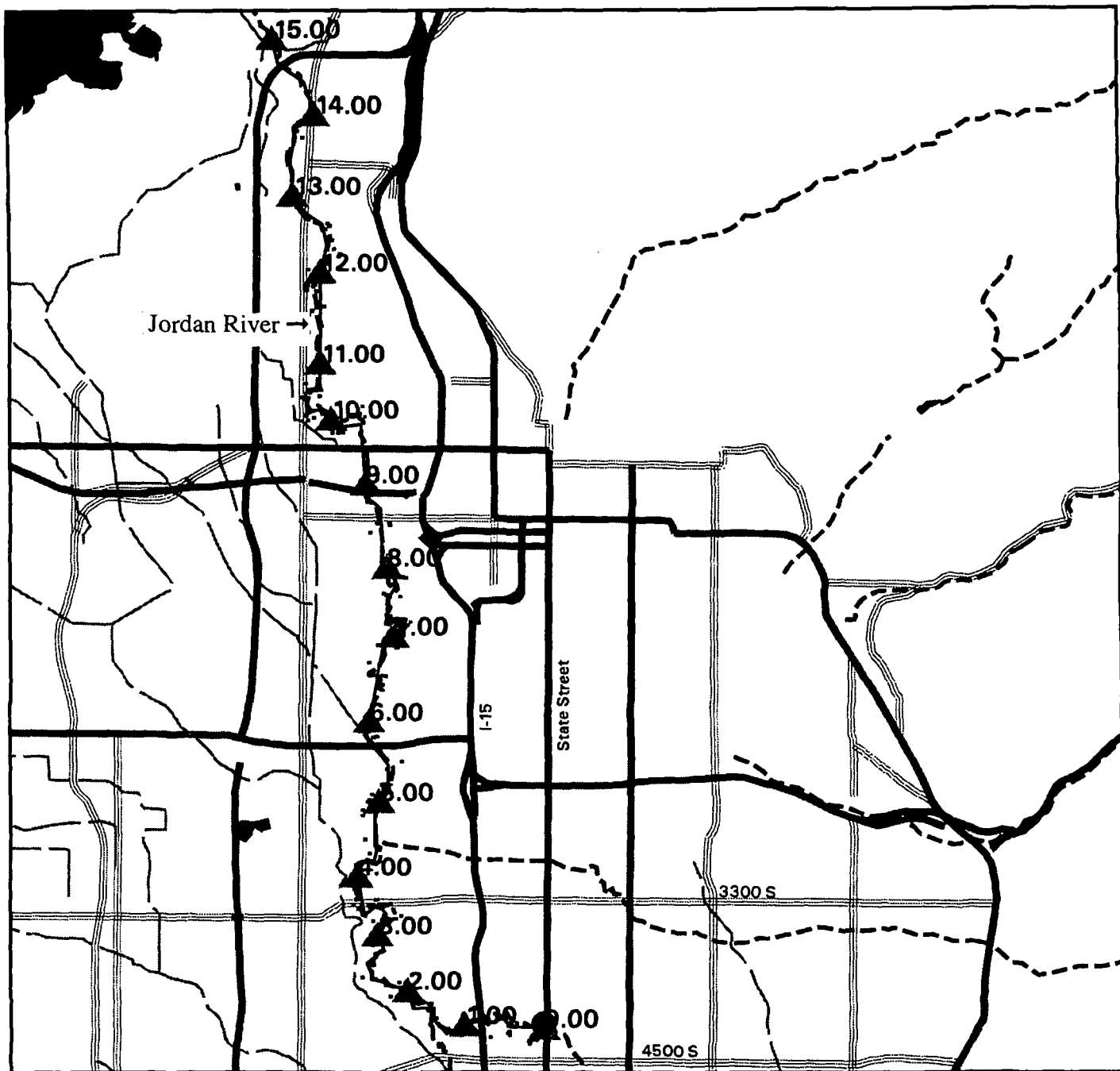
Approximate Scale
1" = 1.42 Miles



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Appendix J

15-Mile Downstream Influence

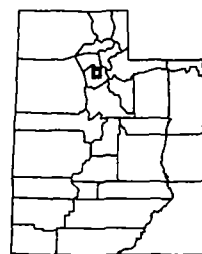


Murray Laundry 4200 S. State Street 15 Mile Downstream Influence

Legend

- | | |
|---------------------------|----------------|
| Water Bodies | Ditch or canal |
| Class 1 - Primary Route | 15M Wc |
| Class 2 - Secondary Route | 15M Nodes |
| POD-All | Site |
| Stream or braided stream | |

Approximate Scale
1" = 1.67 Miles



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