BROWNFIELD REDEVELOPMENT ASSESSMENT REPORT

for

Tamarack City Stamp Mill
M-26 Highway
Hubbell, Michigan

MIB000000084

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EXECUTIVE SUMMARY

The Michigan Department of Environmental Quality (MDEQ) Pre-Remedial Group has a cooperative agreement with the United States Environmental Protection Agency (EPA) to conduct Brownfield Redevelopment Assessments (BFRAs). A BFRA of the Tamarack City Stamp Mill (TCSM) was conducted June 4 and 5, 2002. The field sampling event included the collection of 25 surficial soil, 10 soil boring, and 7 temporary geoprobe monitoring well samples, as well as x-ray fluorescence readings at 71 locations. It also included the collection of photographs and Global Positioning System data, and the completion of an elevation survey of the temporary monitoring wells.

Analysis of the samples detected the presence of contaminants at concentrations greater than the Generic Residential Cleanup Criteria of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Part 201). These included the following: 19 inorganics (arsenic, barium, beryllium, chromium, cobalt, copper, cyanide, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, strontium, thallium, vanadium and zinc); and 5 semi-volatile compounds (benzo(a)pyrene, carbazole, fluoranthene, naphthalene, and phenanthrene). Part 201 drinking water criteria are not applicable because a local ordinance prohibits the use of groundwater for drinking purposes at the TCSM. The MDEQ has determined that the property meets the definition of a facility as defined in Part 201.

Based on the findings of the TCSM BFRA, several issues should be addressed before, or during, the redevelopment of the TCSM property. These include: the mitigation of direct contact risks in shallow soils and on some hard surfaces; an evaluation of the existing local ordinance that prohibits the drinking of groundwater at the TCSM; taking appropriate measures to address trip and fall safety concerns; and taking actions to minimize further impacts to the groundwater that may exacerbate environmental effects in Torch Lake. In addition, any responsibilities that may be present under Part 201, such as due care (Section 20107a), should be considered. Further details of these issues are noted in the Discussion section at the end of this report.

INTRODUCTION

The MDEQ Pre-Remedial Group was contracted via a cooperative agreement with the EPA to conduct BFRAs. A brownfield is a property, or a portion thereof, that has actual or perceived contamination and an active potential for redevelopment or reuse.

BFRAs are intended to provide information on abandoned properties where potential environmental contamination may be acting as an impediment to future redevelopment activities. MDEQ Pre-Remedial Group staff conduct environmental investigations to determine the types and locations of past and present industrial activities, potential environmental migration pathways of concern, types and concentrations of potential contaminants, and the need for remedial and/or removal actions on the property.

The MDEQ conducted a BFRA of the Tamarack City Stamp Mill (TCSM) property in accordance with the cooperative agreement with the EPA. The BFRA included file and information searches, a reconnaissance inspection of the property, the collection of surficial soil, soil boring and groundwater samples, and obtaining x-ray fluorescence (XRF) readings of surface materials.

PROPERTY BACKGROUND

Property Description

The TCSM property is located along the northwest side of Torch Lake, about eight miles northeast of the City of Hancock, in Houghton County, along M-26. More specifically, it is in the northern half of Section 13, Osceola Township, Town 55 North, Range 33 West. In the Village of Hubbell, it is between Fourth and Sixth Streets, on the southeast side of M-26. It is surrounded by residential properties and has a scenic view of Torch Lake towards the southeast. Dover Creek flows along Fourth St. towards Torch Lake. Large stamp sand deposits can be found south and southeast of the property closer to Torch Lake. The TCSM property is located adjacent to the Torch Lake Superfund site, but is not a part of the site. See Figure 1 — Property Location map. Figure 2 – Property Features map, shows some of the surrounding features. Appendix A – BFRA Property Photographs, pp. 1-5, will show some of the major features of the TCSM property and surrounding areas.

Property History

The property was used as a stamp mill for processing copper-containing ores from about 1906 to possibly 1968 (Chaput 1969, Molloy 2001, Benedict 1955, Hermanson 1995). The Ahmeek Mining Company installed eight steam-powered stamp units on top of large concrete foundations. These were used to crush stone from mines to yield copper to be sent to refineries. A large

superstructure covered the stamps, as seen in a photograph in Molloy (2001). The photo also shows a smokestack that appears to have been present in the south-central area of the property. This is consistent with what some residents of the area have told the MDEQ (Anonymous 2002a, 2002b). A video that MDEQ obtained in 2001 at a store in Calumet, Houghton County, mentions that ground up rock, or stamp sands, along with copper, were mixed with oil to help separate the rock from the copper. These sands were then deposited "in a lake" (Hermanson, 1995). The same video mentions that something called "bone black" was added to the copper during processing. Torch Lake was used as a supply of process water for the stamps, and also a depository for waste tailings. This can be seen in aerial photographs of the property (MSUCRS, 2002).

The property is owned by Osceola Township, which plans to redevelop the TCSM into part of the Keweenaw National Historic Park (MDEQ, 2002). Township officials hope this will boost the local economy through increased tourism.

A BFRA of the Tamarack City Stamp Mill (TCSM) property was requested in 2001 by the Marquette District office of the MDEQ.

PROCEDURES AND RESULTS

Reconnaissance Inspections Observations

A BFRA property reconnaissance was conducted at the TCSM property on October 19, 2001. Its purpose was to determine the type, location and quantity of observable areas of contamination and to gather information to be used in development of the BFRA sampling plan.

The reconnaissance involved a three-person investigative team consisting of three MDEQ Pre-Remedial project managers. The team documented the structure(s) and debris types located throughout the property and identified the environmental concerns associated with each area of concern on the property. See Figure 2, Property Features and Surrounding Area. A number of photographs were taken. These can be seen in Appendix A.

Possible areas of concern included the following:
-Stamp sands along the south and southeast sides of the property.
-Debris piles near the 16 large concrete structures.
-Some mounded areas along the west/southwest.
-Stained areas on soils and concrete slabs.
-Devegetated areas scattered about the property.

Sampling Procedures and Results

MDEQ staff: collected soil and water samples in order to accomplish the objectives noted below; packed the samples in iced coolers; shipped the coolers to approved laboratories; took XRF readings of suspect materials; and later received and processed data from the XRF unit and the laboratories. Results are summarized in the following subsections.

On June 4 and 5, 2002, the MDEQ investigation team collected 25 surficial soil, 10 soil boring, and 7 temporary monitoring well (including 1 duplicate) samples, as well as x-ray florescence readings at 71 locations. These were collected from suspected areas of contamination. One sample from each media type was selected as a designated background sample. Also, 1 field blank and 1 pump blank were collected. Standard MDEQ collection and decontamination procedures, as outlined in the work plan, were adhered to during the collection of all samples.

These samples and data were collected in order to:

- determine the concentrations of EPA Target Compound List organic compounds and Target Analyte List inorganic compound analytes which may be present at the property;
- characterize potential contamination in shallow and subsurface soils, groundwater, and on the surfaces of structures that remain from the stamping operation;
- ascertain potential contaminant migration from possible source areas;
- evaluate health and safety concerns, including threats posed to nearby residential populations, future workers or natural resources associated with the different sample media; and
- decide whether the TCSM property is a facility in accordance with the definition found in Part 201, Section 20101(o).

After sample collection, all soil and water samples were packaged and shipped in accordance with EPA and MDEQ required procedures. All EPA and MDEQ quality assurance/quality control procedures were followed. Samples were shipped via UPS overnight delivery: 1) to EPA Contract Laboratory Program (CLP) laboratories chosen by EPA Region 5 before the start of field work; and 2) to a MDEQ overflow laboratory (volatile analysis for soils only).

Sample results were acquired from the laboratories noted above and from the hand-held XRF unit used in the field. Laboratory results were mailed to MDEQ Pre-Remedial Group staff. Data from the XRF unit were downloaded to a desktop computer at MDEQ offices in Lansing after returning from field work. Laboratory analytical data are provided in Appendix B, and XRF data are shown in Appendix C.

Sample contaminants exceeding the Generic Cleanup Criteria (Criteria) promulgated pursuant to Part 201 (MDEQ 2000) will be described in the sections below. Drinking water criteria will not be considered applicable, because a local ordinance prohibits the use of groundwater for drinking purposes at the TCSM. The current Criteria are provided in Appendix D. Any sample concentrations above Criteria but equal to or below statewide default background levels are not considered exceedances of Criteria in this report.

Surficial Soil Samples

Twenty-five (25) surficial soil samples were collected and analyzed. All were collected using stainless steel trowels according to the procedures outlined in the work plan. See Figure 3 for a map showing sample locations. For a description of the sample locations and the sample characteristics, refer to Table 1. Table 2 gives a summary of the sample analytical results, showing statewide default soil background concentrations for comparison. Sample analytical results indicated that no sample was deemed appropriate as a background sample. The last column lists the Part 201 Criteria exceedances.

Several semi-volatile organic compounds exceeded Residential Criteria at five sample locations. These included benzo(a)pyrene, carbazole, fluoranthene, naphthalene and phenanthrene. Five of the compounds were found at SS-2; three at SS-1 and SS-18, and only carbazole at SS-3 and benzo(a)pyrene at SS-9. None of these exceeded Industrial Criteria.

Thirteen inorganics exceeded Criteria. Arsenic, barium, chromium, cobalt, copper, cyanide, lead, manganese, mercury, nickel, selenium, silver, and zinc exceeded Residential Criteria. Some of these were found at all the locations sampled, except at SS-21 and SS-22. Only arsenic and lead exceeded Industrial Criteria, and only at SS-1, SS-4, and SS-13.

No volatile organic compounds, pesticides or polychlorinated biphenyls (PCBs) were found to exceed Criteria.

XRF Sample Readings

XRF readings were taken at 71 locations. The Niton hand-held unit was placed directly on the surface of the material tested. The unit used two radioactive sources in testing the material: americium or cadmium. Often, two separate readings were taken at one location, using both sources. But sometimes, only one source was used, usually cadmium. The XRF unit can only detect inorganic elements, and at particular detection limits (see Appendix C). Some readings were taken in association with surficial soil samples, while others were independent readings of concrete and other hard surfaces. See Figure 4 for a map of sample locations. A description of sample locations and characteristics can be found in Table 3. Table 4 gives a summary of sample results, showing statewide default soil background concentrations for comparison. Where multiple readings were taken in association with a surficial soil sample, only the highest concentration is listed. The last column lists the Part 201 Criteria exceedances. XRF results were compared to soil Criteria, even though some of the materials tested were not soils. In cases where the material was not soil, the Criteria applied might be considered as screening levels.

Thirteen inorganics exceeded Criteria. Arsenic, barium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, strontium, and zinc exceeded residential Criteria. Six metals also exceeded commercial/industrial Criteria: arsenic, chromium, copper, lead, manganese and nickel.

Soil Boring Samples

Ten (10) soil boring samples were collected from 10 soil boring locations. All were collected utilizing a Geoprobe rig according to the procedures outlined in the work plan. All samples were collected from the 4-8 ft. core. See Figure 5 for a map showing sample locations. A description of the soil boring sample locations and the sample characteristics can be found in Table 5. Table 6 gives a summary of the sample analytical results, with comparisons to the designated background sample, SB-1. Sample concentrations were compared to Part 201 Criteria, and the exceedances listed in the last column.

Eight sample locations exceeded Residential Criteria for inorganic compounds. These include chromium, cobalt, copper, mercury, selenium, silver, thallium, and zinc. No industrial Criteria were exceeded. The most contaminated sample appears to be SB-3.

No volatile or semi-volatile compounds, pesticides or PCBs were found to exceed Criteria.

Temporary Geoprobe Monitoring Well Samples

Seven (7) groundwater samples were collected from six (6) temporary monitoring well locations. One sample was a duplicate. All temporary monitoring well samples were collected utilizing teflon tubing and a peristaltic pump from temporary Geoprobe wells according to the procedures outlined in the work plan. See Figure 6 for a map showing the Geoprobe well sample locations. Table 7 shows the well characteristics and measurements relative to ground level. A description of the temporary Geoprobe well sample locations and the sample characteristics can be found in Table 8. Table 9 gives a summary of the temporary Geoprobe well sample analytical results, with comparisons to the designated upgradient background sample, TMW-1. Concentrations were compared to Part 201 Criteria, and exceedances shown in the last column.

Eight inorganics were found to exceed Residential Criteria. These included barium, beryllium, copper, lead, manganese, mercury, selenium and vanadium. TMW-6 contained the most exceedances of inorganics. TMW-5 exceeded Criteria for copper and selenium, while the rest of the locations only exceeded Criteria for copper. No industrial Criteria were exceeded.

No volatile or semi-volatile compounds, pesticides or PCBs were found to exceed Criteria in groundwater sampled.

Well Survey

MDEQ staff completed a survey of the temporary monitoring wells installed at the TCSM. This was completed in order to determine the relative elevations of the groundwater surface. A field level, measuring rod and static water level meter were used for this purpose. An arbitrary elevation of 100.00 feet was established at a water hydrant on Spruce Street. Relative elevations

were established at the tops of well casings and on the ground surface next to each well. The water level meter was then used to measure down to the water surface and the well bottom. The results of the survey were then used to determine groundwater flow direction. All measurements were recorded in a field notebook. The data resulting from this survey are summarized in Table 10.

The survey determined that groundwater is flowing south-southeast, towards Torch Lake. See Figure 6 for a map showing relative groundwater elevations. The highest elevation was found to be at TMW-1, the designated upgradient background well.

DISCUSSION

Contaminants of concern at concentrations greater than Residential Criteria were found to be present in the surficial soil, soil boring, and temporary monitoring well samples collected and noted above. These were predominantly inorganics: arsenic, barium, beryllium, chromium, cobalt, copper, cyanide, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, strontium, thallium, vanadium and zinc. Only the surficial soil samples contained exceedances of semi-volatile organic compounds, and at only five of the 25 locations sampled. These contaminants included: benzo(a)pyrene, carbazole, fluoranthene, naphthalene, and phenanthrene. Contaminants exceeded Criteria in the following four exposure pathways, listed in order of most to least in occurrence: Groundwater to Surface Water Interface (GSI), Direct Contact (DC), Particulate Soil Inhalation Criteria (PSIC), and Groundwater Contact Protection (GCP). Although the concentrations of a number of contaminants exceeded Drinking Water Criteria, these are not included in sample summaries because this pathway is considered not to be applicable. This is due the presence of a local ordinance prohibiting the drinking of groundwater at the TCSM and in all other localities in Osceola Township where a public water supply is available. Because the contaminants shown above were detected at concentrations exceeding Residential Criteria, the TCSM property qualifies as a facility under Part 201.

Some of the inorganic contaminants also exceeded Industrial/Commercial Criteria. These included the following: arsenic, chromium, copper, lead, manganese, and nickel. No organic compounds were found to exceed these Criteria.

The GSI pathway is the predominant one of the four. A cursory examination of the last column in the sample summary tables shows the predominance of the number 12 for soils and XRF readings and the number 3 for groundwater. The soil/XRF samples indicate exceedances of the GSI Protection (GSIP) Criteria. Such exceedances suggest likely impacts to groundwater that would probably adversely impact nearby surface waters, such as Dover Creek and Torch Lake, if such groundwater vents to these water bodies. An examination of the groundwater sample summary shows only GSI exceedances, and suggests that the primary contaminant of concern is copper, and possibly selenium. The wells closer to Torch Lake only contain these two inorganic

contaminants in excess of GSI Criteria. The most contaminated well, TMW-6, contains other inorganics in excess of GSI Criteria, but these do not appear to be migrating to lower elevations at levels of concern for the GSI pathway. This has not been sufficiently confirmed, however.

The DC pathway is of concern in select locations near the ground surface and on concrete or other structures at the TCSM. DC Criteria (#19, 27, 28,29) were exceeded in 10 of the 25 surficial soil sample locations. These were due to the semi-volatile compound benzo(a)pyrene, and the inorganics arsenic and lead. DC Criteria were exceeded in 17 of the 53 locations where XRF readings were taken. These were due to arsenic, chromium, cobalt, copper, iron and lead. Some of these exceedances occurred on materials other than soil, for example the 100 percent copper measured at X-33. During redevelopment activities, however, some of these materials found on concrete or other structures could become part of the soil, where soil Criteria would then apply. No DC Criteria exceedances were found in subsurface soils.

The next pathway of concern is the PSIC. This Criteria (#18, 26) was exceeded in 23 of the 53 locations where XRF readings were taken. These were due most often to manganese, but also to arsenic, chromium, copper, and nickel. Shallow and subsurface soil samples did not indicate any exceedances of PSIC Criteria. During redevelopment, increased mechanical disturbance of these contaminants near the ground surface could cause this pathway to be of elevated concern.

The GCP pathway is also of some potential concern. The Criteria for this pathway (#13) was shown to be exceeded only in XRF results, and only at 3 of the 53 locations where readings were taken. Namely, at SS-4X, SS-13X and at X-33. This was due only to copper and mercury. The first two were soils, where mercury caused the exceedances. The last one was near the east-most corner, where the copper reading was 100%. Exceedances of Criteria for this pathway suggest the likelihood of soil concentrations affecting groundwater at concentrations exceeding the Groundwater Contact (GC) Criteria (#6). However, groundwater samples did not exceed the GC Criteria, and therefore, the soil does not appear to be leaching copper and mercury at high enough concentrations to be of concern for this pathway. But, this can not be ruled out at this time.

Based on the findings of the BFRA investigation, the following issues should be addressed before or during the redevelopment of the TCSM property:

1. Precautions should be taken not to exacerbate the flushing of groundwater towards Torch Lake or Dover Creek. This is needed to protect further degradation of the aquatic environment in Torch Lake.
2. Direct contact risks will need to be mitigated. This can be accomplished by removing areas where soils or other materials exceed DC Criteria, or by the appropriate use of clean fill materials over affected areas.
3. Particulate soil inhalation risks should be eliminated or minimized. This can be done before or during redevelopment by removing areas where soil concentrations exceed

PSIC Criteria, by covering with clean fill, or by appropriate dust control measures such as keeping the ground cover moist with water.

4. Groundwater contact risks may be minimal, but this possibility should be kept in mind during any subsurface construction at depth where groundwater may be encountered.

5. The contaminants of concern should be considered with respect to responsibilities that may exist under Part 201 of the NREPA. The nature of any response activity that may be required is dependent on the intended use of the property and the party's liability under Part 201 of the NREPA. A person who is liable for the contamination is required to achieve cleanup of the property consistent with the cleanup criteria. The relevant criteria are a function of the intended property use, such as residential, commercial, or industrial. A non-liable developer is not required to implement a cleanup to achieve the appropriate cleanup criteria. However, a non-liable party must comply with the "due care" provisions specified in section 7a obligations of Part 201 of the NREPA. These obligations include not exacerbating the existing contamination, exercising due care to assure there are not unacceptable exposures, and taking reasonable precautions against the reasonable foreseeable activities of third parties.

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TABLES

TABLE 1

SURFICIAL SOIL SAMPLE DESCRIPTIONS

SAMPLE #	LOCATION	DEPTH, INCHES	DESCRIPTION	COMMENTS
SS-1	Western corner of property, near old foundation.	0 - 6	Moist dark brown medium sand.	Surface: grass, wild carrot, roots, rocks, moss.
SS-2	West central area of property, just off the west side of access drive.	0 - 7	Moist dark brown medium sand, with a horizon of dark red at 5-6 inches. Sample collected from 6-7 inches.	Surface: grass. White powdery substance just below the surface.
SS-3	Southwestern portion of property, east of access drive and SS2, in a hole next to concrete slab and foundation.	0 - 1/2 1/2 - 4	Roots, wood chips. Moist, dark brown medium sand; also wood chips, large rocks, some glass.	Surface: grass. Could not get any deeper because of rocks and wood pieces.
SS-4	Southwestern portion property, where access roads come together.	0 - 6	Moist stamp sand.	Surface: stamp sand, debris (brick, wood, buckets, glass, blankets).
SS-5	South side of property, southwest of access drive where it bends.	0 - 1/2 1/2 - 4	Root zone, some debris, leaf litter. Moist, dark brown medium sand, with roots and some coarse sand, rocks, sticks.	Surface: grass, rocks, hay.
SS-6	In east-most of southern corners of property.	0 - 1/2 1/2 - 5	Moist, red, medium sand, with coarse stamp sand. Moist, dark brown medium sand.	Surface: gravel.
SS-7	Near SS5, slightly to the north-northeast.	0 - 6	Moist, dark brown, medium sand, with some ashes, coarse sand and fine gravel.	Surface: rocky. Area appears to have been recently bulldozed, with burnt wood pieces.
SS-8	Near small debris pile in southern part of property.	0 - 1/2 1/2 - 5	Root zone: moist, dark brown, roots, grass. Moist, dark brown, medium sand, with red and brown wood, rocks.	Surface: grass, rocks.

TABLE 1

SURFICIAL SOIL SAMPLE DESCRIPTIONS

SAMPLE #	LOCATION	DEPTH, INCHES	DESCRIPTION	COMMENTS
SS-9	East corner of property, adjacent to former smokestack platform.	0 - 3	Moist, dark brown medium sand, with fine to medium gravel.	Surface: rocks. Concrete below 3 inches of soil.
SS-10	East side of property, west side of former smokestack.	0 - 1/2 1/2 - 4	Root zone: moist, dark brown. Moist, dark brown, medium sand, with red fine gravel.	Surface: grass, rock.
SS-11	East side of property, opposite 6th St. and Spruce corner, near debris pile.	0 - 1/2 1/2 - 4 4 - 5	Moist root zone. Dry, dark brown, medium sand. Dry, dark red, medium sand, some fine gravel.	Surface: grass, rock.
SS-12	East side of property, near C10, in elevated area between concrete pillars.	0 - 3	Moist, brown and red stamp sand, with medium sand and some fine gravel.	Surface: gravel.
SS-13	East-central part of property, between C5 and C12, in/near rock piles, debris.	0 – 4	Moist, dark red, medium sand, with fine gravel, some wood, cement chunks, coal or black rocks.	Surface: rocky.
SS-14	Along eastern property line, northwest of SS-11.	0- 1½ 1½ - 5	Moist, dark brown, medium sand, with fine gravel, some red osier roots. Dry, dark gray-brown, medium sand, with some fine gravel.	Surface: rocks, shrubs.
SS-15	Northern corner of property.	0 – 2 2 – 5	Very moist, dark red, medium sand. Very moist, dark brown, medium sand.	Surface: mostly bare sand, some vegetation.

TABLE 1

SURFICIAL SOIL SAMPLE DESCRIPTIONS

SAMPLE #	LOCATION	DEPTH, INCHES	DESCRIPTION	COMMENTS
SS-16	Near north corner of property, between SS-14 and SS-15.	0 – 3	Moist, dark brown, medium sand, with areas of dark red, medium sand, with lots of fine gravel and a few roots.	Surface: grass, rock.
SS-17	North area of property, just north of C16.	0 - 1/2 1/2 - 5	Root zone. Moist, dark brown, medium sand, with roots, some small red rocks.	Surface: grass.
SS-18	Northern part of property, just west of C16.	0 - 1/2 1/2 - 4	Moss, a little grass, and large rocks. Moist, dark brown, medium sand, with some rocks and roots.	Surface: some moss, but mostly bare.
SS-19	Northern part of property, between C1 and C16.	0 - 1 1 - 6	Root zone. Moist, dark brown, medium sand, with roots chunks of glass, a few rocks.	Surface: grass.
SS-20	Northern half of property, northwest of C1.	0 - 1/2 1/2 - 2 2 - 5	Root zone. Dry, dark brown, medium sand, with many roots, few small rocks. Moist, light brown, medium sand, with some small rocks.	Surface: grass.
SS-21	In center of property, between C6 and C17.	0 - 1/2 1/2 - 6	Root zone, grass. Medium to light red, medium sand, with some fine to medium gravel, streaks of bright yellow.	Surface: grass.
SS-22	Just east of C18.	0 - 1/2 1/2 - 6	Moss, roots. Dark red, medium sand, with roots.	Surface: grass.
SS-23	Southwest of C2.	0 - 1/2 1/2 - 3	Moss, rock. Moist, dark red, medium sand, with lots of fine gravel, some small pockets of tan sand.	Surface: moss, rock and sand.

TABLE 1

SURFICIAL SOIL SAMPLE DESCRIPTIONS

SAMPLE #	LOCATION	DEPTH, INCHES	DESCRIPTION	COMMENTS
SS-24	Just north of C17, in the central part of the property.	0 - 1/2 1/2 - 2 2 - 4	Moss, rock cover, some roots. Dark red, medium sand, with 30% gravel. Dark brown, medium sand, with 30% gravel.	Surface: moss, rock.
SS-25	Southern part of property, just southwest of C7.	0 - 6	Dark red, with 50% being gravel, some rock 2-3 inches diameter, no roots or vegetation.	Surface: gravel.

All samples were shallow grab samples, collected 6/4/2002.

For map of sample locations, see Figure 3.

TABLE 2

SURFICIAL SOIL SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
SS-1	*Semi-volatiles*	*(ug/kg)*	*(ug/kg)*	*Criteria*[a]
	Benzo(a)pyrene	3,600J	not applicable	19
	Fluoranthene	7,000	not applicable	12
	Phenanthrene	2,800J	not applicable	12
	Inorganics	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Arsenic	77	5.8	12, 19, 27, 29
	Barium	170	75	12
	Chromium	27	18	12
	Cobalt	9.2	6.8	12
	Copper	1,200	32	12
	Lead	870J	21	12, 19, 26, 28, 29
	Mercury	0.23	0.13	12
	Selenium	6.8	0.41	12
	Zinc	360	47	12
SS-2	*Semi-volatiles*	*(ug/kg)*	*(ug/kg)*	*Criteria*[a]
	Benzo(a)pyrene	3,600J	not applicable	19
	Carbazole	1,400J	not applicable	12
	Fluoranthene	9,000	not applicable	12
	Naphthalene	1,300J	not applicable	12
	Phenanthrene	9,000	not applicable	12
	Inorganics	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Cobalt	7.5	6.8	12
	Copper	1,200J	32	12
	Mercury	0.28	0.13	12
	Selenium	0.59	0.41	12
	Zinc	9.3	47	12

TABLE 2

SURFICIAL SOIL SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
SS-3	*Semi-volatiles*	*(ug/kg)*	*(ug/kg)*	*Criteria*[a]
	Carbazole	2,100U	not applicable	12
	Inorganics	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Cobalt	8.3	6.8	12
	Copper	680J	32	12
	Mercury	0.17	0.13	12
	Silver	1.4	1.0	12
	Zinc	96	47	12
SS-4	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Barium	150	75	12
	Chromium	41	18	12
	Cobalt	18	6.8	12
	Copper	1,100J	32	12
	Lead	580J	21	19, 28, 29
	Nickel	3.2	20	12
	Zinc	200	47	12
SS-5	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Arsenic	61	5.8	19
	Cobalt	11	6.8	12
	Copper	16,000J	32	12
	Mercury	0.64	0.13	12
	Selenium	1.6	0.41	12
	Silver	3.2	1.0	12
	Zinc	150	47	12
SS-6	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Cobalt	7.2	6.8	12
	Copper	1,700J	32	12
	Selenium	0.92	0.41	12
	Zinc	75	47	12

TABLE 2

SURFICIAL SOIL SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
SS-7	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Arsenic	10	5.8	19
	Cobalt	8.2	6.8	12
	Copper	3,300J	32	12
	Mercury	0.18	0.13	12
	Selenium	1.7	0.41	12
	Zinc	120	47	12
SS-8	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Arsenic	15	6,900	19
	Cobalt	8.9	6.8	12
	Copper	2,100J	32	12
	Mercury	0.31	0.13	12
	Selenium	1.8	0.41	12
	Zinc	120	47	12
SS-9	*Semi-volatiles*	*(ug/kg)*	*(ug/kg)*	*Criteria*[a]
	Benzo(a)pyrene	2400	not applicable	19
	Inorganics	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Arsenic	14	5.8	19
	Chromium	54	18	12
	Cobalt	14	6.8	12
	Copper	8,900J	32	12
	Mercury	0.17	0.13	12
	Nickel	72	20	12
	Selenium	1	0.41	12
	Silver	3.3	1.0	12
	Zinc	160	47	12
SS-10	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Cobalt	7.7	6.8	12
	Copper	1,300J	32	12

TABLE 2

SURFICIAL SOIL SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
SS-11	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Aluminum	7,400	6,900	12
	Chromium	24	18	12
	Cobalt	9.4	6.8	12
	Copper	620J	32	12
	Selenium	0.59	0.41	12
	Zinc	95	47	12
SS-12	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Chromium	25	18	12
	Cobalt	18	6.8	12
	Copper	3,300J	32	12
	Selenium	0.48	0.41	12
	Zinc	97	47	12
SS-13	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Arsenic	16	5.8	19
	Barium	160	75	12
	Chromium	89	18	12
	Cobalt	19	6.8	12
	Copper	9,300J	32	12
	Lead	880J	21	12, 19, 28, 29
	Manganese	1,000J	440	12
	Mercury	0.22	0.13	12
	Nickel	74	20	12
	Selenium	2.4	0.41	12
	Silver	2.4	1.0	12
	Zinc	370	47	12
SS-14	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Cobalt	10	6.8	12
	Copper	720J	32	12
	Selenium	1.3	0.41	12
	Zinc	94	47	12

TABLE 2

SURFICIAL SOIL SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
SS-15	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Chromium	21	18	12
	Cobalt	8.8	6.8	12
	Copper	600J	32	12
	Selenium	1.6	0.41	12
SS-16	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	480J	32	12
SS-17	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Arsenic	15	5.8	19
	Chromium	22	18	12
	Cobalt	9.3	6.8	12
	Copper	1,000J	32	12
	Selenium	2.6	0.41	12
	Zinc	110	47	12
SS-18	*Semi-volatiles*	*(ug/kg)*	*(ug/kg)*	*Criteria*[a]
	Benzo(a)pyrene	4,100	not applicable	19
	Fluoranthene	9,800	not applicable	12
	Phenanthrene	7,400	not applicable	12
	Inorganics	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Arsenic	12	5.8	19
	Chromium	48	18	12
	Cobalt	15	6.8	12
	Copper	5,000J	32	12
	Manganese	900J	440	12
	Mercury	0.39	0.13	12
	Nickel	48	20	12
	Selenium	1.7	0.41	12
	Silver	1.1	1.0	12
	Zinc	190	47	12

TABLE 2

SURFICIAL SOIL SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
SS-19	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Cyanide	7.6	0.39	12
	Selenium	1.2	0.41	12
	Zinc	170	47	12
SS-20	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Cobalt	7.4	6.8	12
	Copper	790J	32	12
	Selenium	0.83J	0.41	12
SS-21	*No exceedances found.*			
SS-22	*No exceedances found.*			
SS-23	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Cobalt	7.1	6.8	12
SS-24	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Cobalt	9.1	6.8	12
	Selenium	0.69	0.41	12

TABLE 2

SURFICIAL SOIL SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
SS-25	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Cobalt	9.7	6.8	12
	Manganese	670	440	12

(ug/kg) = microgram/kilogram (parts per billion (ppb)).
(mg/kg) = milligram/kilogram (parts per million (ppm)).

[a] The numbers in the criteria column refer to the Guidesheet Numbers of the respective Part 201 generic cleanup criteria or screening levels. These criteria and levels can be found in table form in Appendix D. These tables are the most current values for the criteria as of the date of this report. The following list gives the Guidesheet Number followed by the corresponding cleanup criterion for those criteria exceeded in this table.

Residential and Commercial I Soil Criteria
12: Groundwater Surface Water Interface Protection Criteria
19: Direct Contact Criteria

Industrial and Commercial II, III, and IV Soil Criteria
26: Particulate Soil Inhalation Criteria
27: Industrial and Commercial II Direct Contact
28: Commercial III Direct Contact
29: Commercial IV Direct Contact

J = The analyte was positively identified; the associated numerical value is an approximate concentration of analyte in the sample.

A total of 25 surficial soil samples were collected on 6/4/2002.

Each sample was a shallow grab sample.

[b] The background values are statewide default values (MDEQ 2000). No sample was found to be a suitable background.
NA = not available.

All concentration values are rounded to 2 significant digits.

TABLE 3

XRF SAMPLE DESCRIPTIONS

SAMPLE #	LOCATION	DESCRIPTION
SS-4X	Near SS-4.	Stamp sand.
SS-9X	Near SS-9.	Sand and gravel.
SS-10X	Near SS-10.	Sand, gravel and roots.
SS-11X	Near SS-11.	Sand, gravel and roots.
SS-12X	Near SS-12.	Sand, gravel and stamp sand.
SS-13X	Near SS-13.	Sand, gravel, wood, concrete.
SS-14X	Near SS-14.	Sand, gravel and roots.
SS-15X	Near SS-15.	Sand.
SS-16X	Near SS-16.	Sand and gravel.
X-1	Southwestern part of property.	White material on concrete foundation wall.
X-2	Near M-26, western part of property.	Topsoil.
X-3	Near TMW-6, western corner of property.	Topsoil.
X-4	Near edge of concrete rubble pile, next to concrete foundation, southern part of property.	Soil.
X-5	Near X-4.	Reddish surface of 5 ft. chunk of concrete in rubble pile.
X-5A	Inside C9.	Concrete, on floor.
X-5B	Same as X-5A.	White paint on concrete wall.
X-5C	Same as X-5A.	Concrete wall, no paint.
X-6	Outside C9.	
X-7	Outside C12, near TMW-2.	Greenish material on concrete.
X-8	At base of C14.	Soil.
X-8A	Near drain opening at C14.	Concrete surface.
X-9	Between C14 and C15.	In ditch/drain.
X-10	Near C15.	Concrete slab.
X-11	Outside wall of C16.	Concrete.
X-12	C15.	

TABLE 3

XRF SAMPLE DESCRIPTIONS

SAMPLE #	LOCATION	DESCRIPTION
X-13	C14.	
X-14	Between C14 and C15.	Concrete slab.
X-15	At C14.	Concrete.
X-16	Between C13 and C14.	Concrete slab.
X-17	Between C13 and C14.	Grayish-red concrete.
X-18	Outside of C13.	Paint on concrete wall.
X-19	East-northeast of C13.	Concrete slab.
X-20	East-northeast of C13.	Concrete slab.
X-21	Between C4 and C13.	Concrete.
X-22	Between C4 and C13.	In track leading from C4 to C13.
X-23	At C13.	White flaky material on exterior concrete wall.
X-24	At C12.	Concrete wall.
X-25	East of C11.	Concrete slab.
X-26	East of C11.	Concrete slab.
X-27	West exterior wall of C10.	Concrete.
X-28	Near old RR tracks, between C9 and C10.	Chipped concrete.
X-29	At old RR tracks, between C9 and C10.	Concrete slab.
X-30	Between the 2 RR tracks near X-28 and X-29.	
X-31	At old chimney foundation.	
X-32	At remaining chimney structure.	
X-33	At center of chimney structure.	Gray-green, burnt-looking material.
X-34	West exterior of C8.	Concrete, no paint.
X-35	West exterior of C7.	Concrete, no paint.
X-36	North exterior of C6.	Concrete, no paint.

TABLE 3

XRF SAMPLE DESCRIPTIONS

SAMPLE #	LOCATION	DESCRIPTION
X-37	West exterior of C5.	White paint on concrete wall.
X-38	Octagonal structure, C17, near center of property.	Concrete.
X-39	West exterior of C4.	White paint on concrete wall.
X-40	North exterior of C3.	Olive drab-colored material on concrete wall.
X-41	South exterior of C2.	Streaky, rusty-colored material on concrete.
X-42	North exterior of C1, west side.	White paint on concrete wall.
X-43	North exterior of C1, east side.	Plain concrete, no paint.
X-44	Concrete structure, C18, in northwest part of property.	

All sample data was collected using a Niton 700 Series XRF spectrum analyzer multi-element hand-held unit. Each day it was used, it was first calibrated. Materials were tested using the cadmium source or the americium source or both. Data was obtained by holding the unit for at least 20 seconds on the surface of the material to be tested .

Sample data for samples ending with X were obtained 6/4/02.
Sample data for samples beginning with X were obtained 6/5/02.

For more detailed locations, see Figure 4.

TABLE 4

XRF SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION[c]	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
SS-4X	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Barium	920	75	12
	Copper	2,400	32	12
	Lead	2,100	21	12, 19, 27, 28, 29
	Mercury	70	0.13	12, 13
	Strontium	96	NA	12
	Zinc	760	47	12
SS-9X	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	29,000	32	12, 19
	Lead	400*	21	19, 28, 29
	Strontium	190	NA	12
	Zinc	750	47	12
SS-10X	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Barium	300	75	12
	Copper	2,700	32	12
	Manganese	1,500*	440	12, 26
	Strontium	98	NA	12
SS-11X	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Barium	380	75	12
	Copper	620	32	12
	Strontium	82	NA	12
	Zinc	280	47	12
SS-12X	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Barium	210	75	12
	Copper	2,000	32	12
	Manganese	3,000	440	12, 26
	Molybdenum	35	NA	12
	Strontium	190	NA	12
	Zinc	330	47	12

TABLE 4

XRF SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION[c]	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
SS-13X	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Barium	250	75	12
	Copper	6,200	32	12
	Lead	1,000	21	12, 19, 27, 28, 29
	Mercury	250	0.13	12, 13
	Strontium	120	NA	12
	Zinc	730	47	12
SS-14X	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Barium	280	75	12
	Copper	780	32	12
	Strontium	170	NA	12
	Zinc	240	47	12
SS-15X	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Barium	290	75	12
	Copper	1,500	32	12
	Manganese	2,600	440	12, 26
	Strontium	93	NA	12
	Zinc	200	47	12
SS-16X	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Barium	390	75	12
	Copper	480	32	12
	Strontium	86	NA	12
	Zinc	91	47	12
X-1	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Barium	280	75	12
	Strontium	3,200	NA	12
X-2	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Barium	280	75	12
	Copper	960	32	12
	Strontium	110	NA	12

TABLE 4

XRF SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION[c]	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
X-3	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Barium	170	75	12
	Copper	960	32	12
	Strontium	81	NA	12
	Zinc	240	47	12
X-4	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Barium	340	75	12
	Copper	1,100	32	12
	Strontium	110	NA	12
X-5	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Barium	390	75	12
	Copper	1,500	32	12
	Manganese	1,800	440	12, 26
	Strontium	190	NA	12
	Zinc	150	47	12
X-5A	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Barium	110	75	12
	Copper	8,900	32	12
	Lead	1,300	21	12, 19, 27, 28, 29
	Strontium	390	NA	12
	Zinc	430	47	12
X-5B	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Arsenic	1,100	5.8	12, 18, 19, 26, 27, 28, 29
	Barium	780	75	12
	Lead	7,700	21	12, 19, 27, 28, 29
	Strontium	600	NA	12
	Zinc	14,000	47	12
X-5C	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	800	32	12
	Manganese	2,000	440	12, 26
	Strontium	160	NA	12
	Zinc	780	47	12

TABLE 4

XRF SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION[c]	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
X-6	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Barium	140	75	12
	Strontium	580	NA	12
X-7	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	480,000	32	12, 18, 19, 26, 27, 28, 29
	Nickel	9,300	20	12
	Strontium	120	NA	12
X-8	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Arsenic	160	5.8	12, 19, 27, 28, 29
	Copper	260,000	32	12, 18, 19, 26, 27, 28, 29
	Strontium	86	NA	12
	Zinc	3,400	47	12
X-8A	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	280,000	32	12, 18, 19, 26, 27, 28, 29
	Strontium	110	NA	12
	Zinc	2,900	47	12
X-9	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	6,500	32	12
	Lead	1,900	21	12, 19, 27, 28, 29
	Strontium	41	NA	12
	Zinc	680	47	12
X-10	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	6,100	32	12
	Molybdenum	37	NA	12
	Strontium	410	NA	12
	Zinc	540	47	12
X-11	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	1,600	32	12
	Manganese	1,800	440	12, 26
	Strontium	200	NA	12
	Zinc	230	47	12

TABLE 4

XRF SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION[c]	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
X-12	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	820	32	12
	Manganese	1,800	440	12, 26
	Strontium	150	NA	12
X-13	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	4,700	32	12
	Strontium	290	NA	12
X-14	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	1,800	32	12
	Manganese	2,700	440	12, 26
	Strontium	220	NA	12
	Zinc	1,100	47	12
X-15	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	4,100	32	12
	Strontium	320	NA	12
	Zinc	280	47	12
X-16	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	4,100	32	12
	Strontium	320	NA	12
	Zinc	280	47	12
X-17	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	3,900	32	12
	Molybdenum	26	NA	12
	Strontium	340	NA	12
	Zinc	280	47	12
X-18	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	5,100	32	12
	Manganese	3,900	440	12, 18, 26
	Strontium	160	NA	12

TABLE 4

XRF SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION[c]	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
X-19	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	900	32	12
	Strontium	200	NA	12
X-20	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	3,300	32	12
	Strontium	440	NA	12
X-21	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	2,000	32	12
	Manganese	2,500	440	12, 26
	Molybdenum	31	NA	12
	Strontium	170	NA	12
X-22	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	1,300	32	12
	Strontium	250	NA	12
X-23	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	960	32	12
	Nickel	530	20	12
X-24	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Strontium	190	NA	12
X-25	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	2,700	32	12
	Manganese	2,800	440	12, 26
	Strontium	190	NA	12
X-26	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	1,700	32	12
	Manganese	2,700	440	12, 26
	Strontium	120	NA	12
	Zinc	260	47	12

TABLE 4

XRF SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION[c]	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
X-27	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	3,300	32	12
	Manganese	1,700	440	12, 26
	Strontium	160	NA	12
X-28	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Arsenic	420	5.8	12, 19, 27, 28, 29
	Cobalt	4,800	6.8	12, 19
	Copper	250,000	32	12, 18, 19, 26, 27, 28, 29
	Iron	220,000	12,000	19
	Lead	400*	21	19, 28, 29
	Strontium	190	NA	12
	Zinc	3,200	47	12
X-29	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	5,600	32	12
	Iron	41,000	12,000	19
	Strontium	140	NA	12
X-30	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Arsenic	410	5.8	12, 19, 27, 28, 29
	Copper	41,000	32	12, 19
	Strontium	170	NA	12
X-31	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	1,800	32	12
	Manganese	2,700	440	12, 26
	Strontium	250	NA	12
X-32	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Arsenic	210	5.8	12, 19, 27, 28, 29
	Copper	86,000	32	12, 19, 26
	Manganese	2,700	440	12, 26
	Nickel	2,400	20	12
	Strontium	170	NA	12

TABLE 4

XRF SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION[c]	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
X-33	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	1,000,000	32	12, 13, 18, 19, 26, 27, 28, 29
	Nickel	22,000	20	12, 18, 26
	Strontium	92*	NA	12
X-34	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	920	32	12
	Strontium	550	NA	12
X-35	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Manganese	5,500	440	12, 18, 26
	Molybdenum	27	NA	12
	Strontium	430	NA	12
	Zinc	200	47	12
X-36	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	1,200	32	12
	Strontium	350	NA	12
X-37	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Lead	3,900	21	12, 19, 27, 28, 29
	Strontium	210	NA	12
	Zinc	3,100	47	12
X-38	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	1,300	32	12
	Manganese	2,200	440	12, 26
	Strontium	670	NA	12
X-39	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	1,000	32	12
	Strontium	600	NA	12

TABLE 4

XRF SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION[c]	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
X-40	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	300	32	12
	Strontium	1,100	NA	12
	Zinc	460	47	12
X-41	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	1,200	32	12
	Strontium	2,000	NA	12
X-42	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Chromium	4,400	18	12, 18, 19, 26
	Cobalt	520	6.8	12
	Selenium	180	0.41	12
	Strontium	1,900	NA	12
	Zinc	32,000	47	12
X-43	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	1,600	32	12
	Strontium	550	NA	12
	Zinc	3,000	47	12

TABLE 4

XRF SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION[c]	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
X-44	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Arsenic	92	5.8	12, 19, 27, 28, 29
	Copper	600	32	12
	Lead	420	21	19, 28, 29
	Manganese	1,500*	440	12, 26
	Strontium	310	NA	12
	Zinc	560	47	12

mg/kg = milligrams/kilogram (parts per million (ppm)).

[a]The numbers in the criteria column refer to the Guidesheet Numbers of the respective Part 201 generic cleanup criteria or screening levels. These criteria and levels can be found in table form in Appendix D. These tables are the most current values for the criteria as of the date of this report. Many of the materials tested were not soils, and thus the criteria do not apply. But, since later demolition could cause such materials to become part of the soil, the results are evaluated as for soils. The following list gives the Guidesheet Number followed by the corresponding cleanup criterion for those criteria exceeded in this table.

Residential and Commercial I Soil Criteria

12: Groundwater Surface Water Interface Protection Criteria
13: Groundwater Contact Protection Criteria
18: Particulate Soil Inhalation Criteria
19: Direct Contact Criteria

Industrial and Commercial II, III, and IV Soil Criteria

26: Particulate Soil Inhalation Criteria
27: Industrial and Commercial II Direct Contact
28: Commercial III Direct Contact
29: Commercial IV Direct Contact

[b]The background values are statewide default values (MDEQ 2000). No sample was found to be a suitable background. NA = not available.

[c]Concentrations do not include the precision factors shown in Appendix C. Samples with the SS prefix (soils) represent the higher of multiple readings. Values with an asterisk (*) are equal to one or more of the criteria in the last column, but if you add in the precision factor, they exceed the criteria.

Data for samples beginning with SS were obtained 6/4/2002.
Data for samples beginning with X were obtained 6/5/2002.

All concentration values are rounded to 2 significant digits.

TABLE 5

SOIL BORING LITHOLOGY AND SAMPLE LOG

BORING NUMBER	LOCATION	SPOON INTERVAL	RECOVERY	UNIT THICKNESS	LITHOLOGICAL DESCRIPTION	*PID READING	COMMENTS
SB-1	Western corner of property.	0-4 ft.	41 in.	0-9 in.	Moist, dark gray, silty sand & gravel.	0.0	
				9-41 in.	Moist, reddish brown silty fine sand with trace fine gravel and occasional rusty brown lenses.	0.0	VOA collected at 36 in. of 4-8 ft. bore.
		4-8 ft.	45 in.	0-11 in.	Same as above	0.0	
				11-19 in.	Moist, reddish brown fine sand with some silt.	0.0	
				19-38 in.	Moist, reddish brown fine to medium sand with trace gravel.	0.0	Remainder taken from 12-38 in. of the same.
				38-45 in.	Very moist to wet, mixed reddish brown/brown/tan fine to medium sand w/ some gravel	0.0	
		5-12 ft.	48 in.	0-4 in.	Same as above.	0.0	
				4-8 in.	Very moist layered dark gray/reddish brown silty fine sand to sandy silt.	0.0	
				8-19 in.	Very moist, brown sandy silt.	0.0	
				19-22 in.	Moist, black organic silt.	0.0	
				22-27 in.	Very moist, reddish brown fine sand & silt.	0.0	
				27-48 in.	Wet, reddish brown fine sand with some silt.	0.0	

TABLE 5 (cont.)

SOIL BORING LITHOLOGY AND SAMPLE LOG

BORING NUMBER	LOCATION	SPOON INTERVAL	RECOVERY	UNIT THICKNESS	LITHOLOGICAL DESCRIPTION	*PID READING	COMMENTS
SB-2	Southwest corner of open concrete structure, East side of access drive near remaining foundation.	0-4 ft.	38 in.	0-5 in.	Moist, dark brown silty fine sand with some organic matter.	0.0	
				5-9 in.	Moist, reddish brown silty fine sand.	0.0	
				9-12 in.	Broken concrete.	0.0	
				12-22 in.	Moist, dark brown silty fine sand.	0.0	
				22-38 in.	Moist, dark reddish brown silty fine sand with some trace gravel.	0.0	VOA collected at 6 in. of 4-8 ft bore. Remainder taken from 6-30 in. of the same.
		4-8 ft.	37 in.	0-3 in.	Same as above.	0.0	
				3-15 in.	Wet, dark brown silty fine sand.	0.0	
				15-21 in.	Wet, orange brown silty fine to medium sand.	0.0	
				21-35 in.	Very moist, dark brown silty fine sand.	0.0	
				35-37 in.	Wet, brown fine to medium sand.	0.0	

TAL _ 5 (cont.)

SOIL BORING LITHOLOGY AND SAMPLE LOG

BORING NUMBER	LOCATION	SPOON INTERVAL	RECOVERY	UNIT THICKNESS	LITHOLOGICAL DESCRIPTION	*PID READING	COMMENTS
SB-3	Northwest corner of stamp mill, southwest of second concrete pillar.	0-4 ft.	39 in.	0-6 in. 6-31 in.	Moist, brown silty fine sand. Moist, reddish brown silty fine sand & gravel.	0.0	VOA collected at 15 in. of
				31-39 in.	Moist, black slag & sand with some wood debris.	0.0	4-8 ft. bore. Remainder
		4-8 ft.	30 in.	0-30 in.	Moist, purplish gray stamp sands.	0.0	taken from 0-30 in. of the same.
SB-4	Northwest corner of stamp mill, near first concrete pillar.	0-4 ft.	24 in.	0-4 in. 4-8 in. 8-24 in.	Moist, brown silty topsoil. Broken rock Moist, brown silty fine to medium sand & gravel with some glass debris.	0.0 0.0	VOA collected at 22 in. of 4-8 ft. bore. Remainder
		4-8 ft.	30 in.	0-23 in. 23-30 in.	Same as above. Moist, brown silty fine to medium sand.	0.0 0.0	taken from 0-30 in. of the same.

TA[illegible] 5 (cont.)

SOIL BORING LITHOLOGY AND SAMPLE LOG

BORING NUMBER	LOCATION	SPOON INTERVAL	RECOVERY	UNIT THICKNESS	LITHOLOGICAL DESCRIPTION	*PID READING	COMMENTS
SB-5	Northeast side of stamp mill, between road & tree line/debris pile.	0-4 in.	44 in.	0-6 in.	Moist, dark brown sandy topsoil.	0.0	VOA collected at 30 in. of 4-8 ft. bore.
				6-44 in.	Moist, purplish gray silty sand & gravel.	0.0	
		4-8 ft.	42 in.	0-3 in.	Same as above.	0.0	
				3-35 in.	Moist, reddish brown silty fine sand with occasional brown silty lenses & black organic lenses.		Remainder taken from 12-36 in. of the same.
				35-40 in.	Moist, reddish brown silt with some fine sand.	0.0	
				40-42 in.	Moist, yellowish brown silty fine sand.	0.0	

TAL 5 (cont.)

SOIL BORING LITHOLOGY AND SAMPLE LOG

BORING NUMBER	LOCATION	SPOON INTERVAL	RECOVERY	UNIT THICKNESS	LITHOLOGICAL DESCRIPTION	*PID READING	COMMENTS
SB-6	Southeast corner of stamp mill in recessed area.	0-4 ft.	48 in.	0-12 in.	Moist, dark brown sand, gravel & debris.	0.0	
				12-48 in.	Cored through concrete & rock.	0.0	
	Between debris piles in paved area north of smokestack.	4-8 ft.	40 in.	0-7 in.	Moist, grayish brown silty fine sand with occasional black organic layers with wood.		VOA collected at 6 in. of 4-8 ft. bore.
				7-16 in.	Moist, slightly reddish brown silty fine sand.	0.0	
				16-28 in.	Moist, brown silty fine sand with some clay.	0.0	Remainder taken from 0-28 in. of the same.
				28-34 in.	Wet, brown fine sand with trace silt & some wood chips.	0.0	
				34-40 in.	Very moist, black organic silt with lots of wood chunks.	0.0	
		8-12 ft.	48 in.	0-15 in.	Wet, dark reddish brown fine sand with trace silt.	0.0	
				15-40 in.	Wet, reddish brown fine to medium sand & gravel.	0.0	
				40-48 in.	Wet, brown fine to medium sand & gravel with some green streaking.	0.0	

TAL 5 (cont.)

SOIL BORING LITHOLOGY AND SAMPLE LOG

BORING NUMBER	LOCATION	SPOON INTERVAL	RECOVERY	UNIT THICKNESS	LITHOLOGICAL DESCRIPTION	*PID READING	COMMENTS
SB-7	Southeast corner of property, near smokestack.	0-4 ft.	24 in.	0-6 in.	Moist, brown stamp sand & gravel.	0.0	VOA collected @ 12 in. from 4-8 ft. Remainder taken from 0-24 in. of the same.
				6-14 in.	Concrete	0.0	
				14-20 in.	Stamp sand		
				20-24 in.	Moist, brown silty fine sand.	0.0	
		4-8 ft.	38 in.	0-20 in.	Same as above.		
				20-38 in.	Wet, brown silty fine sand.	0.0	
SB-8	Southern area of property, near small debris pile.	0-4 ft.	39 in.	0-27 in.	Moist, dark brown fine to medium sand & gravel with large rock chunks @ 15" & wood chunks @ 26".	0.0	
				27-32 in.	Moist, reddish brown medium sand.	0.0	
				32-39 in.	Moist, brown medium sand & gravel.	0.0	
		4-8 ft.	37 in.	0-3 in.	Same as above.	0.0	VOA collected @ 20 in. of 4-8 ft. bore. Remainder taken from 12-36 in. of the same.
				3-11 in.	Wet, reddish brown silty fine sand.		
				11-15 in.	Very moist, yellow silty/clayey fine sand.	0.0	
				15-37 in.	Very moist, to wet, mixed layers of reddish brown silty fine sand, black wood & brown fine sand with trace silt.	0.0	

TABLE 5 (cont.)

SOIL BORING LITHOLOGY AND SAMPLE LOG

BORING NUMBER	LOCATION	SPOON INTERVAL	RECOVERY	UNIT THICKNESS	LITHOLOGICAL DESCRIPTION	*PID READING	COMMENTS
SB-9	Southern corner of property, near bend in fence line.	0-4 ft.	39 in.	0-4 in.	Moist, dark reddish brown silty fine sand.	0.0	
				4-11 in.	Moist, reddish brown silty fine sand.	0.0	
				11-14 in.	Moist, reddish brown silty clay.	0.0	
				14-34 in.	Moist, reddish brown silty fine to medium sand.		VOA collected @
				34-39 in.	Moist, brown fine to medium gravel.	0.0	28 in. of 4-8 ft. bore.
		4-8 ft.	40 in.	0-7 in.	Same as above.	0.0	
				7-30 in.	Moist, reddish brown fine to medium sand with trace silt.		Remainder taken from
				30-40 in.	Wet, reddish brown fine to medium sand with trace silt.	0.0	12-30 in. of the same.

TABLE 5 (cont.)

SOIL BORING LITHOLOGY AND SAMPLE LOG

BORING NUMBER	LOCATION	SPOON INTERVAL	RECOVERY	UNIT THICKNESS	LITHOLOGICAL DESCRIPTION	*PID READING	COMMENTS
SB-10	Southwest corner of property.	0-4 ft.	43 in.	0-10 in.	Moist, dark gray silty sand & gravel with trace root material.	0.0	
				10-16 in.	Moist, grayish brown medium to coarse sand with trace silt.	0.0	
				16-21 in.	Moist, brown fine to medium sand with trace silt.	0.0	
				21-36 in.	Moist, reddish brown fine to medium sand with trace silt & dark brown lenses @ 28".	0.0	
				36-43 in.	Moist, dark brown silty fine sand.	0.0	
		4-8 ft.	44 in.	0-12 in.	Same as above.		VOA collected @ 17 in. from 4-8 ft. bore.
				12-15 in.	Moist, reddish brown fine to medium sand with trace silt.	0.0	
				15-19 in.	Moist, reddish brown sandy silt with some black streaking.	0.0	
				19-31 in.	Moist, reddish brown fine to medium sand with trace silt.	0.0	Remainder taken from 12-31 in. of the same.
				31-44 in.	Moist, reddish brown fine to medium sand & gravel.	0.0	
		8-12 ft.	48 in.	0-15 in.	Same as above.	0.0	
				15-48 in.	Wet, reddish brown fine to medium sand with trace silt & occasional silty sand lenses.		

*** PID reading units are parts per million (ppm).**

TABLE 6

SOIL BORING SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
SB-1	*Designated background sample.*			
SB-2	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	170J	32J	12
	Mercury	0.25	0.05U	12
	Selenium	0.67	0.64	12
SB-3	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Chromium	22	8.5	12
	Cobalt	16	5.3	12
	Copper	3,600J	32J	12
	Silver	1.9	0.11U	12
	Thallium	4.6	0.49U	12
	Zinc	67J	21J	12
SB-4	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	1,400J	32J	12
	Zinc	72J	21J	12
SB-5	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Cobalt	7.6	5.3	12
	Copper	70J	32J	12
SB-6	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Cobalt	7.7	5.3	12
	Copper	440J	32J	12
	Selenium	0.66	0.64	12
SB-7	*No exceedances found.*			
SB-8	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	60J	32J	12

TABLE 6

SOIL BORING SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
SB-9	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	170J	32J	12
SB-10	*Inorganics*	*(mg/kg)*	*(mg/kg)*	*Criteria*[a]
	Copper	34J	32J	12
	Selenium	0.70J	0.64	12

mg/kg = milligram/kilogram (parts per million (ppm)).

[a] The numbers in the criteria column refer to the Guidesheet Numbers of the respective Part 201 generic cleanup criteria or screening levels. These criteria and levels can be found in table form in Appendix D. These tables are the most current values for the criteria as of the date of this report. The following list gives the Guidesheet Number followed by the corresponding cleanup criterion for those criteria exceeded in this table.

Residential and Commercial I Soil Criteria
12: Groundwater Surface Water Interface Protection Criteria

J = The analyte was positively identified; the associated numerical value is an approximate concentration of analyte in the sample.

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

A total of ten (10) samples were collected from ten (10) soil borings on 6/4/2002.
Each sample was a deep grab sample.

[b] The background values are taken from the designated background sample, SB-1.

All concentration values are rounded to 2 significant digits.

TABLE 7

TEMPORARY MONITORING WELL TYPES AND MEASUREMENTS RELATIVE TO GROUND LEVEL

LOCATION	WELL TYPE	SCREEN LENGTH	WELL CASING STICK-UP	WATER DEPTH	APPROXIMATE DEPTH TO TOP OF SCREEN*	DEPTH TO WELL BOTTOM	HEIGHTH OF WATER COLUMN
TMW-1	1 in. PVC	5 ft.	3.26	5.34	6.36	11.36	6.02
TMW-2	1 in. PVC	5 ft.	1.26	7.97	8.32	13.32	5.35
TMW-3	1 in. PVC	5 ft.	2.51	8.78	11.49	16.49	7.71
TMW-4	1 in. PVC	5 ft.	1.78	8.50	12.67	17.67	9.17
TMW-5	1 in. PVC	5 ft.	1.61	9.86	12.39	17.39	7.53
TMW-6	1 in. PVC	5 ft.	1.31	7.16	13.16	18.16	11.00

All measurements are in feet, unless otherwise noted.

*Some sedimentation in the well bottom may make this measurement approximate. Value is based on depth to well bottom - 5 feet.

TABLE 8

TEMPORARY MONITORING WELL SAMPLE DESCRIPTIONS

SAMPLE #	LOCATION	DESCRIPTION	C, COND. (µs/cm) pH T, TEMP. (°C)	COMMENTS
TMW-1	Near north corner of property, near corner of 6th & Tamarack Streets.	Clear	C = 738.0 pH = 7.12 T = 7.3	Started silty, not muddy like TMW6.
TMW-2	East side of property in recessed area, between debris piles in paved area.	Few fines	C = 658.5 pH = 11.25 T = 8.1	Sheen on 1st volume of water, changed purge bucket.
TMW-3	Near east corner of property, close to open pit.	Few fines	C = 442.2 pH = 10.07 T = 6.7	pH rose; not sure if unit is failing or water is changing.
TMW-4	Southeast side of property.	Turbid	C = 375.8 pH = 9.10 T = 7.3	Very muddy, turned down pump rate. It cleared a bit but still silty red/brown.
TMW-5	South side of property, same as SB10.	Cloudy	C = 434.1 pH = 8.42 T = 7.7	Started very muddy, plugged with sand. Lowered flow rate, started to clear.
TMW-6	West corner of property, in grassy area.	Turbid	C = 374.8 pH = 6.10 T = 8.1	Water started very muddy, never cleared but became cloudy.

All sample were subsurface grab samples, collected 6/4/2002.

TABLE 9

TEMPORARY MONITORING WELL SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
TMW-1	*Designated upgradient groundwater sample.*			
TMW-2	*Inorganics*	*(ug/l)*	*(ug/l)*	*Criteria*[a]
	Copper	22	5.9	3
TMW-2D	*Inorganics*	*(ug/l)*	*(ug/l)*	*Criteria*[a]
	Copper	18	5.9	3
TMW-3	*Inorganics*	*(ug/l)*	*(ug/l)*	*Criteria*[a]
	Copper	7.8	5.9	3
TMW-4	*Inorganics*	*(ug/l)*	*(ug/l)*	*Criteria*[a]
	Copper	6.3	5.9	3
TMW-5	*Inorganics*	*(ug/l)*	*(ug/l)*	*Criteria*[a]
	Copper	59	5.9	3
	Selenium	5.8J	2.2U	3

TABLE 9

TEMPORARY MONITORING WELL SAMPLE SUMMARY

SAMPLE #	CONTAMINANT	SAMPLE CONCENTRATION	BACKGROUND CONCENTRATION[b]	PART 201 GENERIC CLEANUP CRITERIA & SCREENING LEVEL EXCEEDANCES
TMW-6	*Inorganics*	*(ug/l)*	*(ug/l)*	*Criteria*[a]
	Barium	260	110	3
	Beryllium	0.56J	0.23J	3
	Copper	360	5.9	3
	Lead	6.3	1.3U	3
	Manganese	340	230	3
	Mercury	0.14	0.10U	3
	Vanadium	35	2.7J	3

ug/l = micrograms/liter (parts per billion (ppb)).

[a]The numbers in the criteria column refer to the Guidesheet Numbers of the respective Part 201 generic cleanup criteria or screening levels. These criteria and levels can be found in table form in Appendix D. These tables are the most current values for the criteria as of the date of this report. The following list gives the Guidesheet Number followed by the corresponding cleanup criterion for those criteria exceeded in this table.

3: Groundwater Surface Water Interface Criteria

J = The analyte was positively identified; the associated numerical value is an approximate concentration of analyte in the sample.

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

A total of seven (7) groundwater samples were collected from six (6) temporary monitoring wells on 6/4/2002. Each sample was a deep grab sample.

[b] The background values are taken from the designated upgradient background sample, TMW-1.

All concentration values are rounded to 2 significant digits.

TABLE 10

RELATIVE WELL AND WATER ELEVATIONS AT TEMPORARY MONITORING WELLS

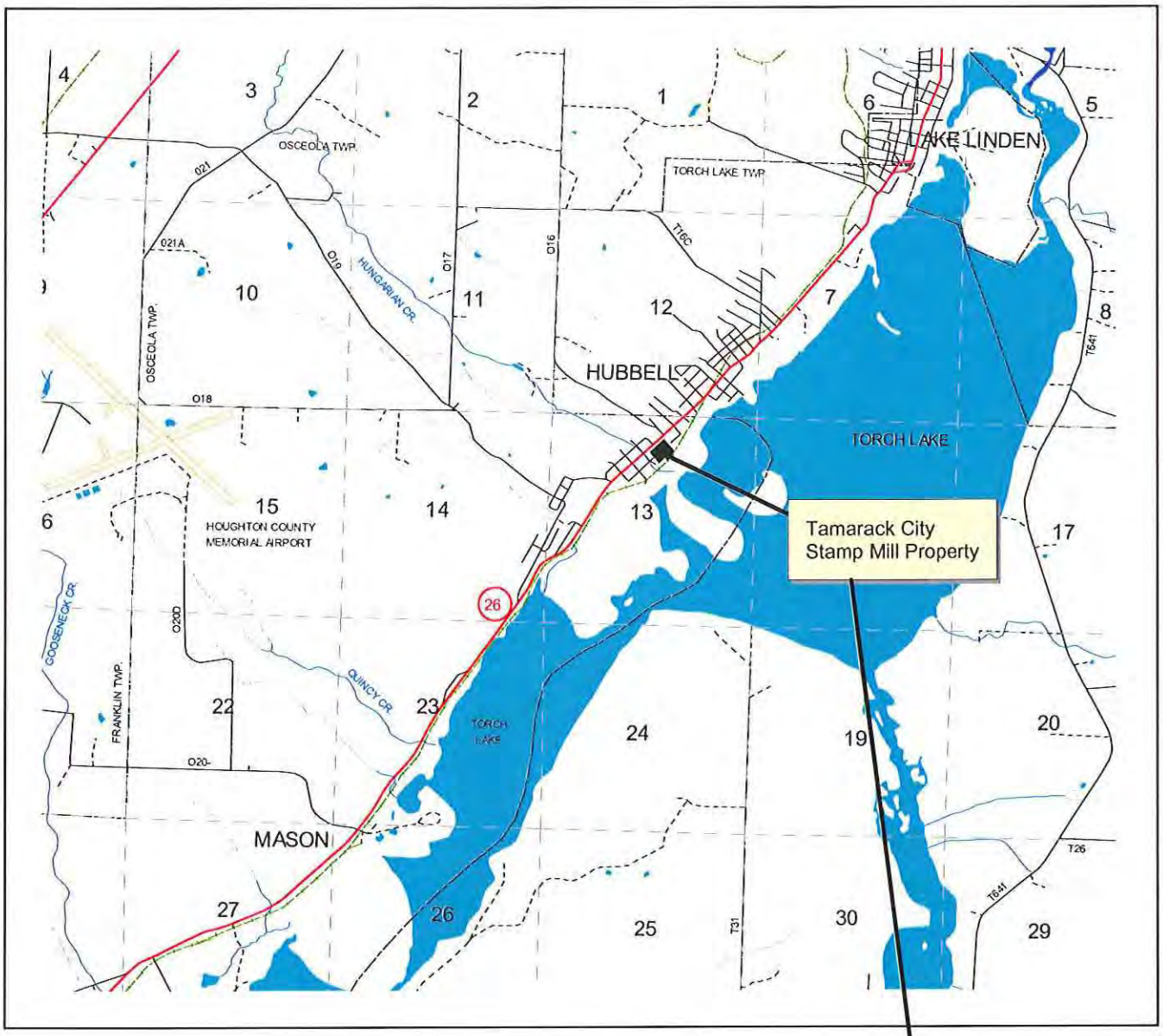
LOCATION	TOP-OF-CASING ELEVATION	GROUND ELEVATION	DEPTH TO STATIC WATER LEVEL	WATER LEVEL ELEVATION	DEPTH TO WELL BOTTOM	WELL BOTTOM ELEVATION	HEIGHTH OF WATER COLUMN
TMW-1	108.88	105.62	8.60	100.28	14.62	94.26	6.02
TMW-2	98.57	97.31	9.23	89.34	14.58	83.99	5.35
TMW-3	98.92	96.41	11.29	87.63	19.00	79.92	7.71
TMW-4	98.03	96.25	10.28	87.75	19.45	78.58	9.17
TMW-5	99.76	98.15	11.47	88.29	19.00	80.76	7.53
TMW-6	105.04	103.73	8.47	96.57	19.47	85.57	11.00

All elevations are in feet, unless otherwise noted, and are referenced to an arbitrary elevation of 100.00 feet.

Measurements are from the top of the casing.

FIGURES

FIGURE 1
PROPERTY LOCATION



1 0 1 Miles

N
W E
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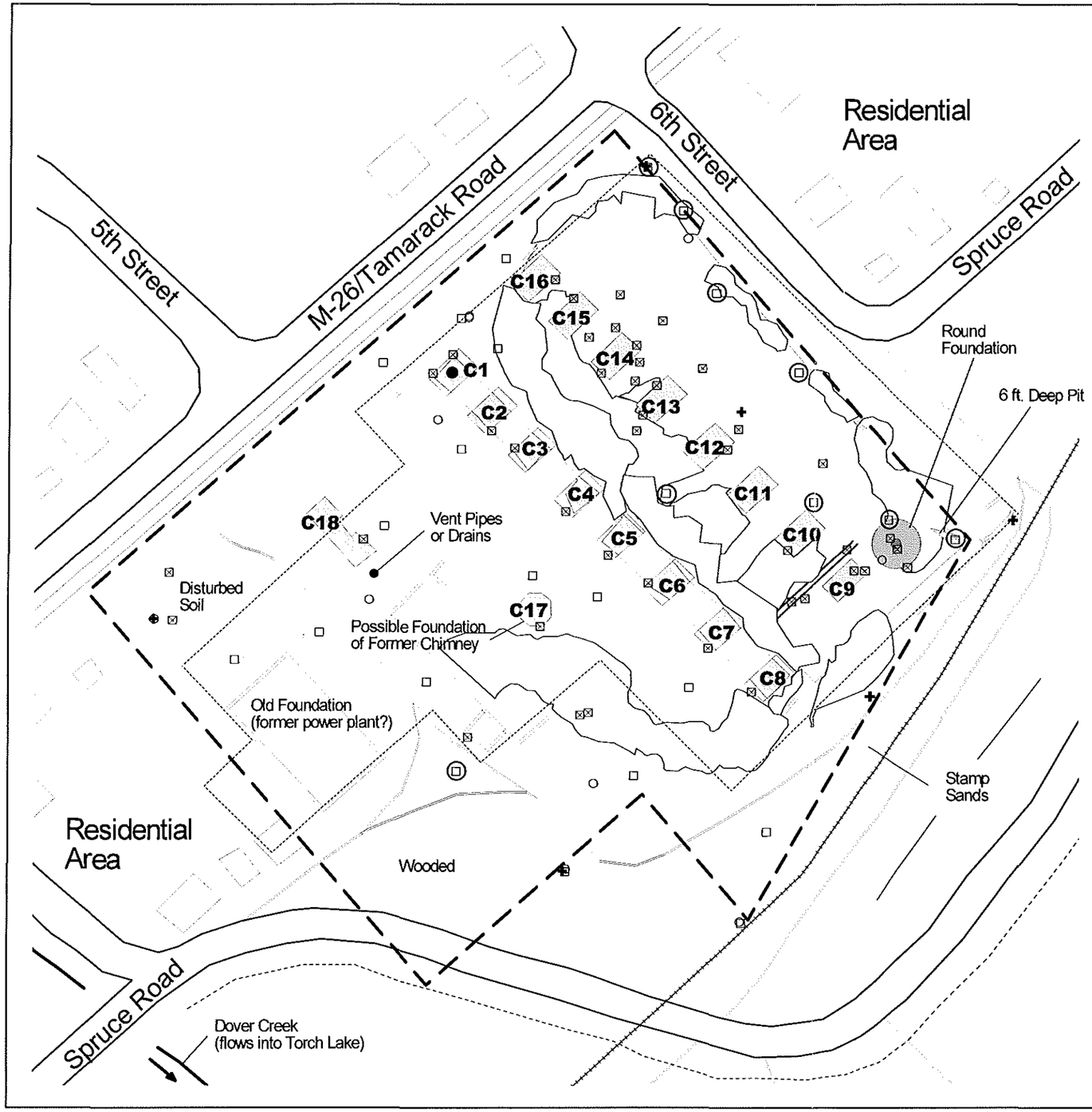
Northwest U. P. Counties

Sources:
Michigan Geographic Data Library
Parcel Map, U.P. Engineers & Architects, Inc., 11/08/01

FIGURE 2

PROPERTY FEATURES AND SURROUNDING AREA



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Legend

- Remaining Stamp Structure at C1
- Approximate Outline of Former Buildings (USGS 1948)
- Fence
- Property Boundary
- Two-track Access Roads
- Railroad Tracks
- Concrete Foundations
- Steel Tracks
- Large Concrete Structures (C1-C18)
- Houses or Shops
- Sidewalks
- Rubble Piles (concrete, rebar, etc.)
- 6 ft. Deep Pit
- Concrete Slabs

Sample Locations

- Surficial Soil
- Soil Boring
- Temporary Monitoring Well
- XRF Reading
- XRF Readings Associated with a Surficial Soil Sample

Sources:
Global Positioning System data
Field Notes
Photographs
Some Features from Aerial Images

Compiled 11/20 - 12/6/2002, JES
Michigan GeoRef - NAD83

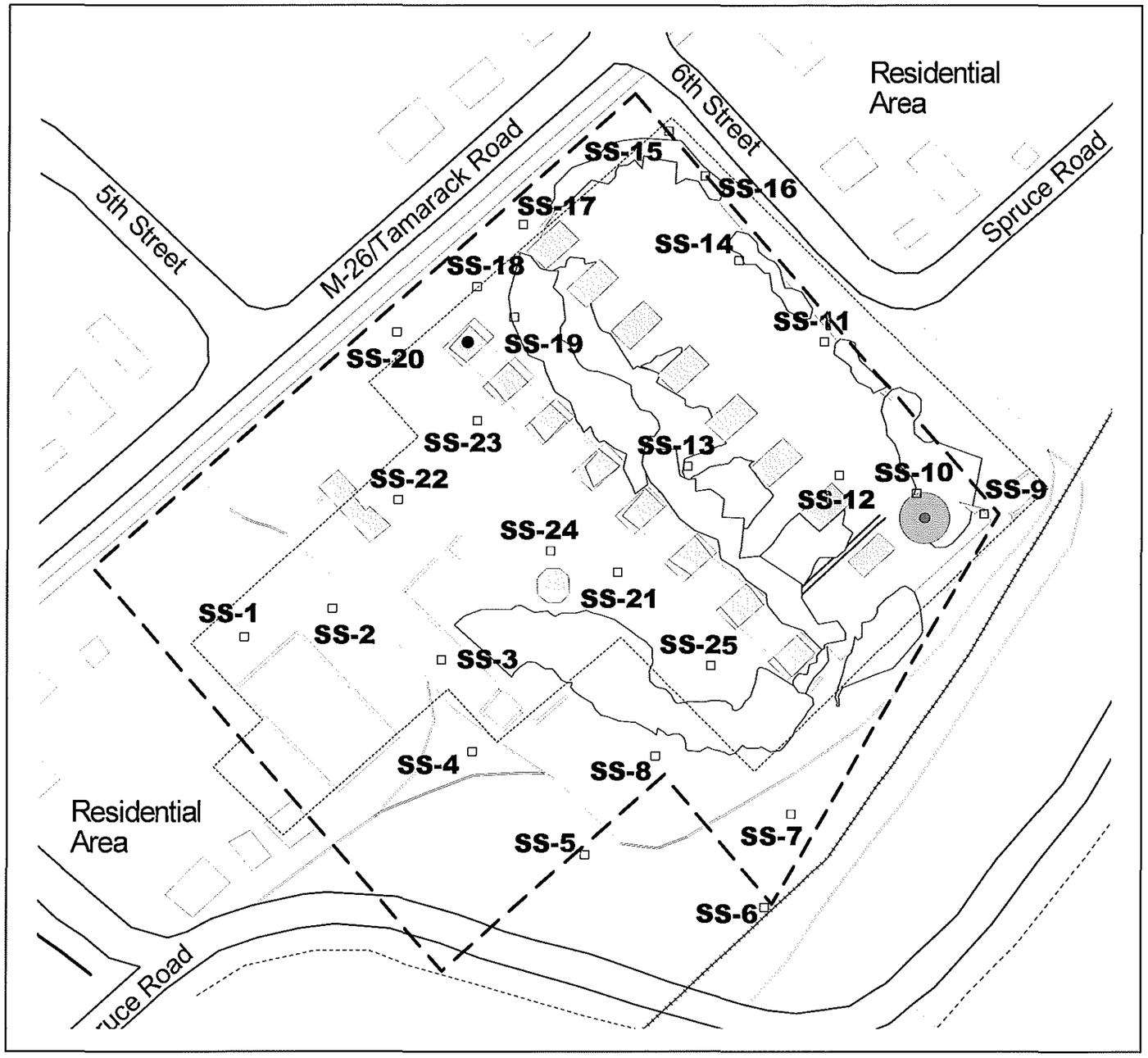
100 0 100 200 Feet

BROWNFIELD REDEVELOPMENT ASSESSMENT REPORT, DECEMBER 2002
TAMARACK CITY STAMP MILL, MIB000000084

Michigan Department of Environmental Quality
Remediation and Redevelopment Division
Superfund Section, Site Management Unit 1

FIGURE 3

SURFICIAL SOIL SAMPLE LOCATIONS



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Legend

SS-1 Surficial Soil 1

100 0 100 200 Feet

Compiled 11/21/2002, JES
Michigan GeoRef - NAD83

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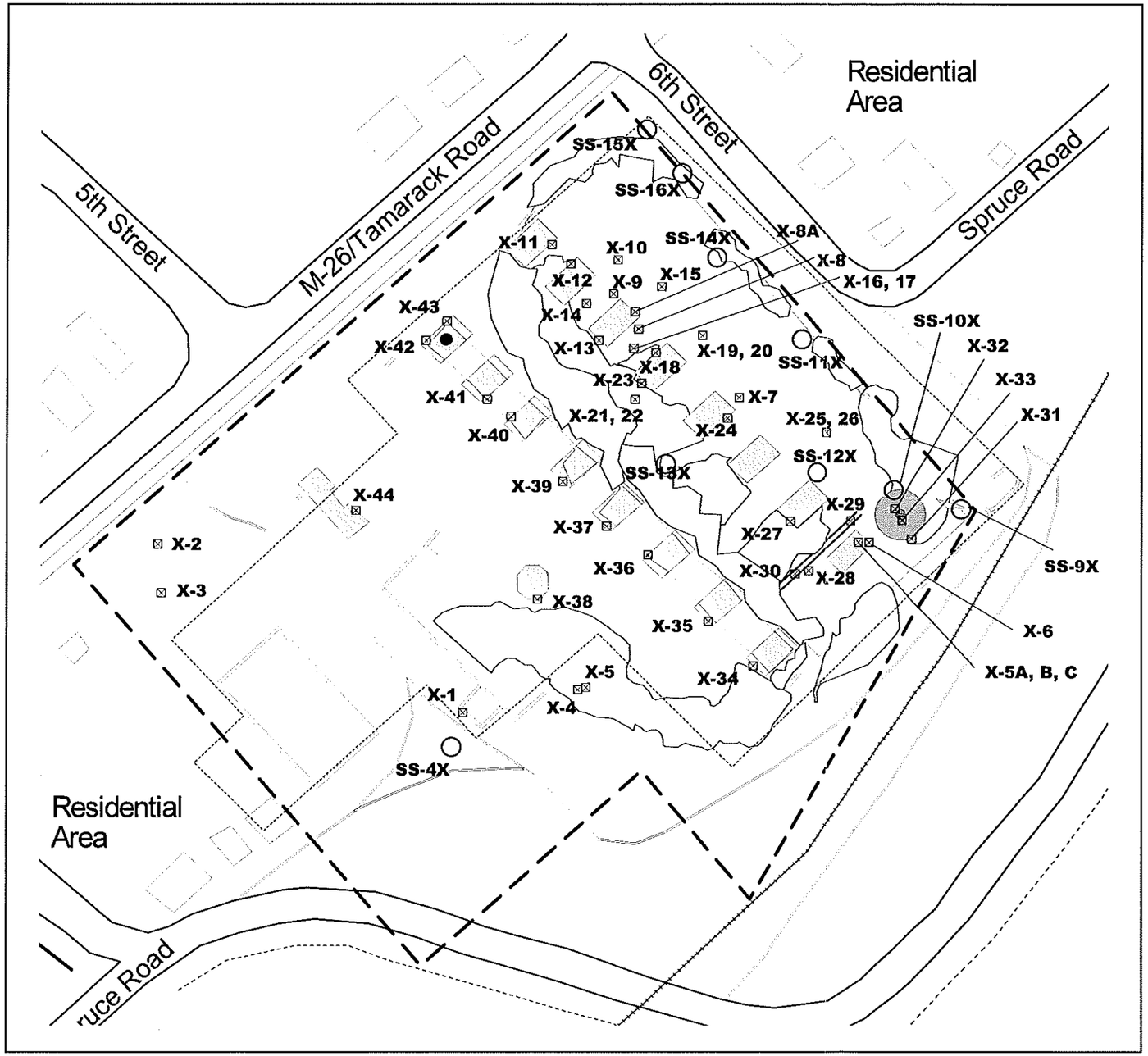
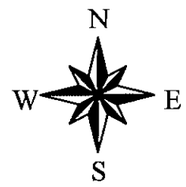
TAMARACK CITY STAMP MILL, MIB000000084

DEQ Michigan Department of Environmental Quality
Remediation and Redevelopment Division
Superfund Section, Site Management Unit 1

FIGURE 4

XRF SAMPLE LOCATIONS





Legend

- X-1 — XRF Reading 1
- SS-4X — XRF Reading Associated with Sample SS-4

Sources:
* GPS Data
* Field Notes

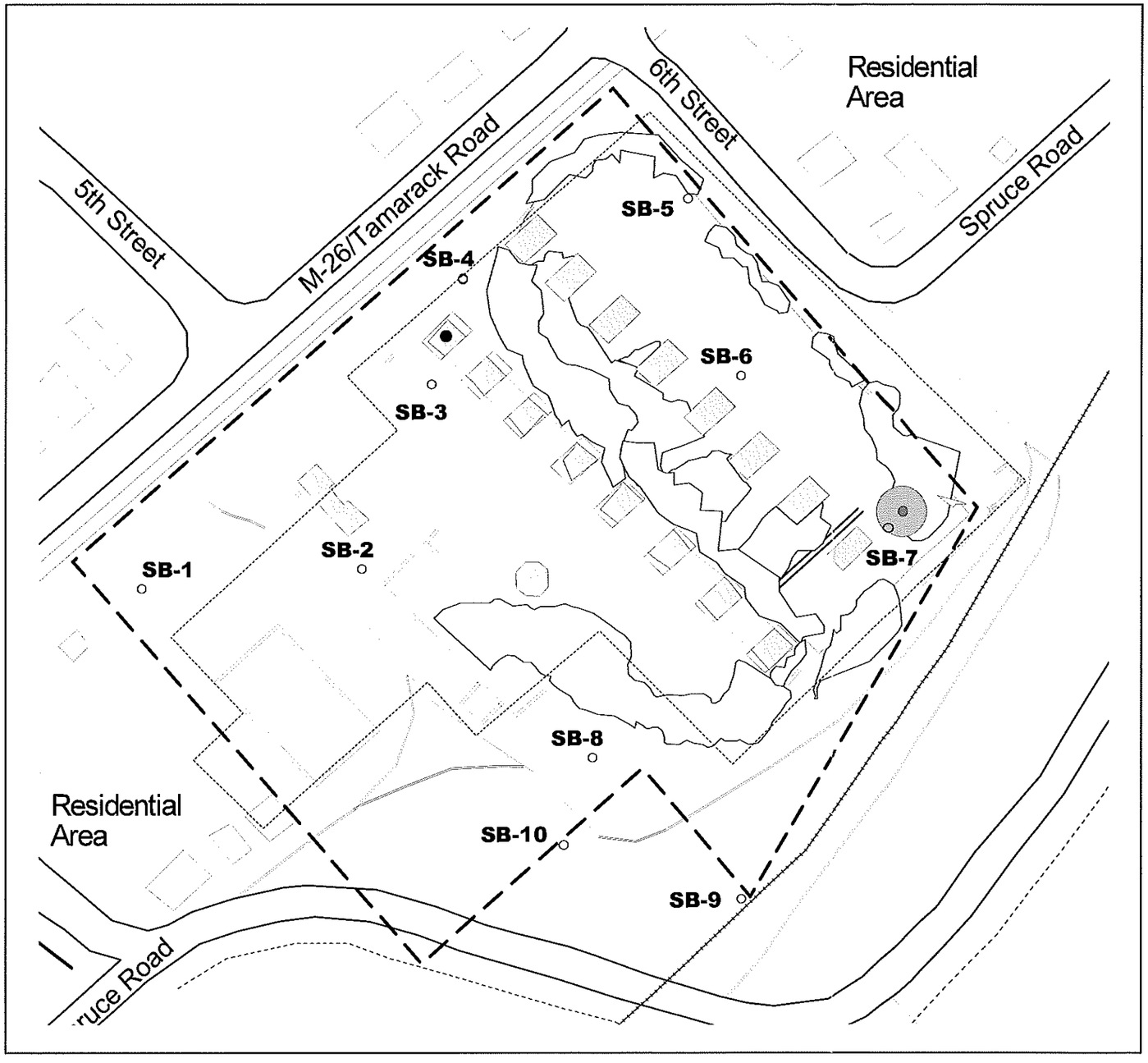
100 0 100 200 Feet

Compiled 11/21/2002, JES
Michigan GeoRef - NAD83

Michigan Department of Environmental Quality
Remediation and Redevelopment Division
Superfund Section, Site Management Unit 1

FIGURE 5

SOIL BORING SAMPLE LOCATIONS



N
W E
S

Legend

○ Soil Boring 1
SB-1

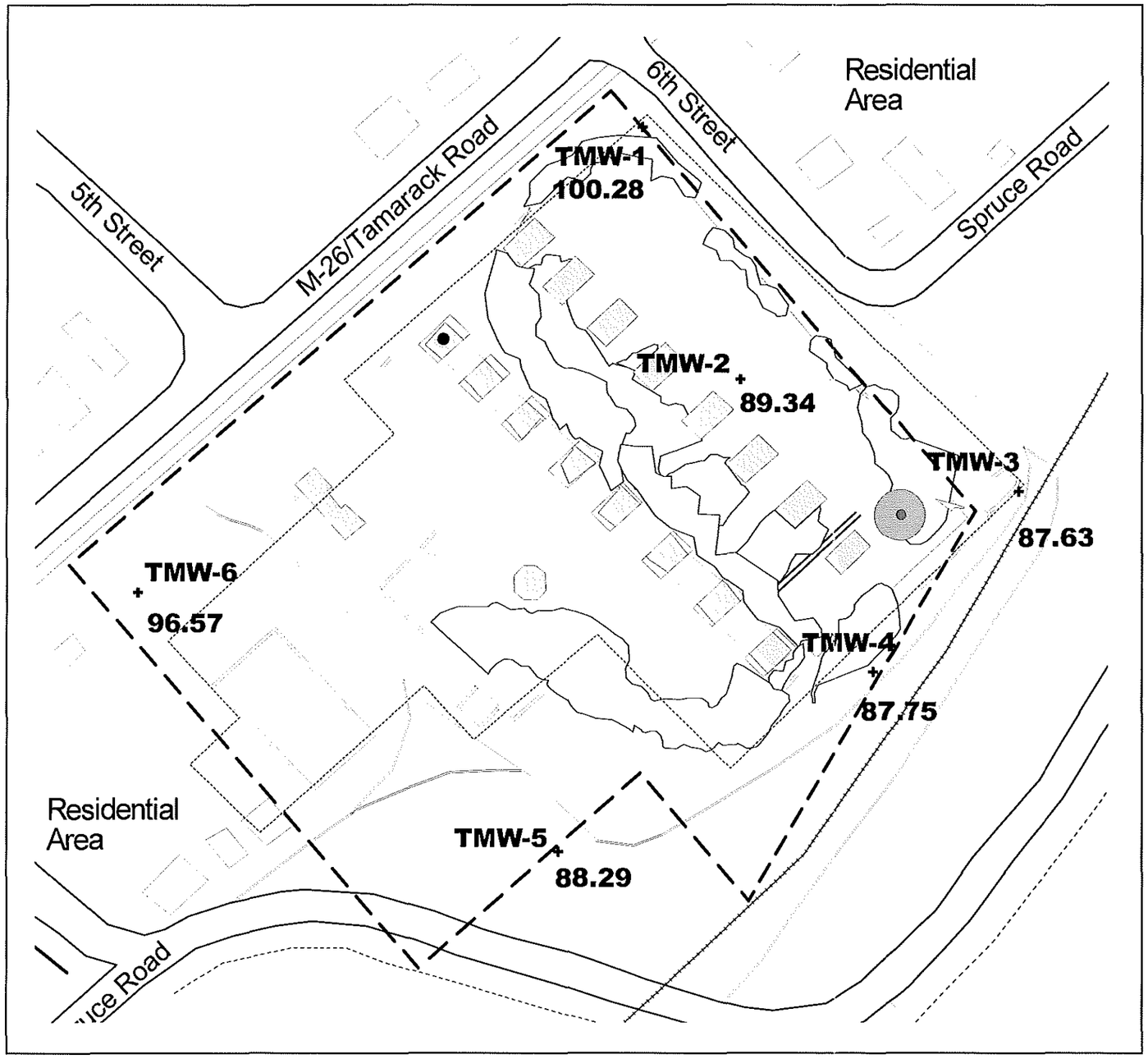
100 0 100 200 Feet

Compiled 11/21/2002, JES
Michigan GeoRef - NAD83

BROWNFIELD REDEVELOPMENT ASSESSMENT REPORT, DECEMBER 2002
TAMARACK CITY STAMP MILL, MIB000000084
Michigan Department of Environmental Quality
Remediation and Redevelopment Division
Superfund Section, Site Management Unit 1

FIGURE 6

TEMPORARY MONITORING WELL SAMPLE LOCATIONS AND RELATIVE WATER ELEVATIONS



N
W E
S

Legend

TMW-1 100.28 ⊕ Temporary Monitoring Well 1 with Relative Groundwater Elevation of 100.28 feet

100 0 100 200 Feet

Compiled 11/21/2002, JES
Michigan GeoRef - NAD83

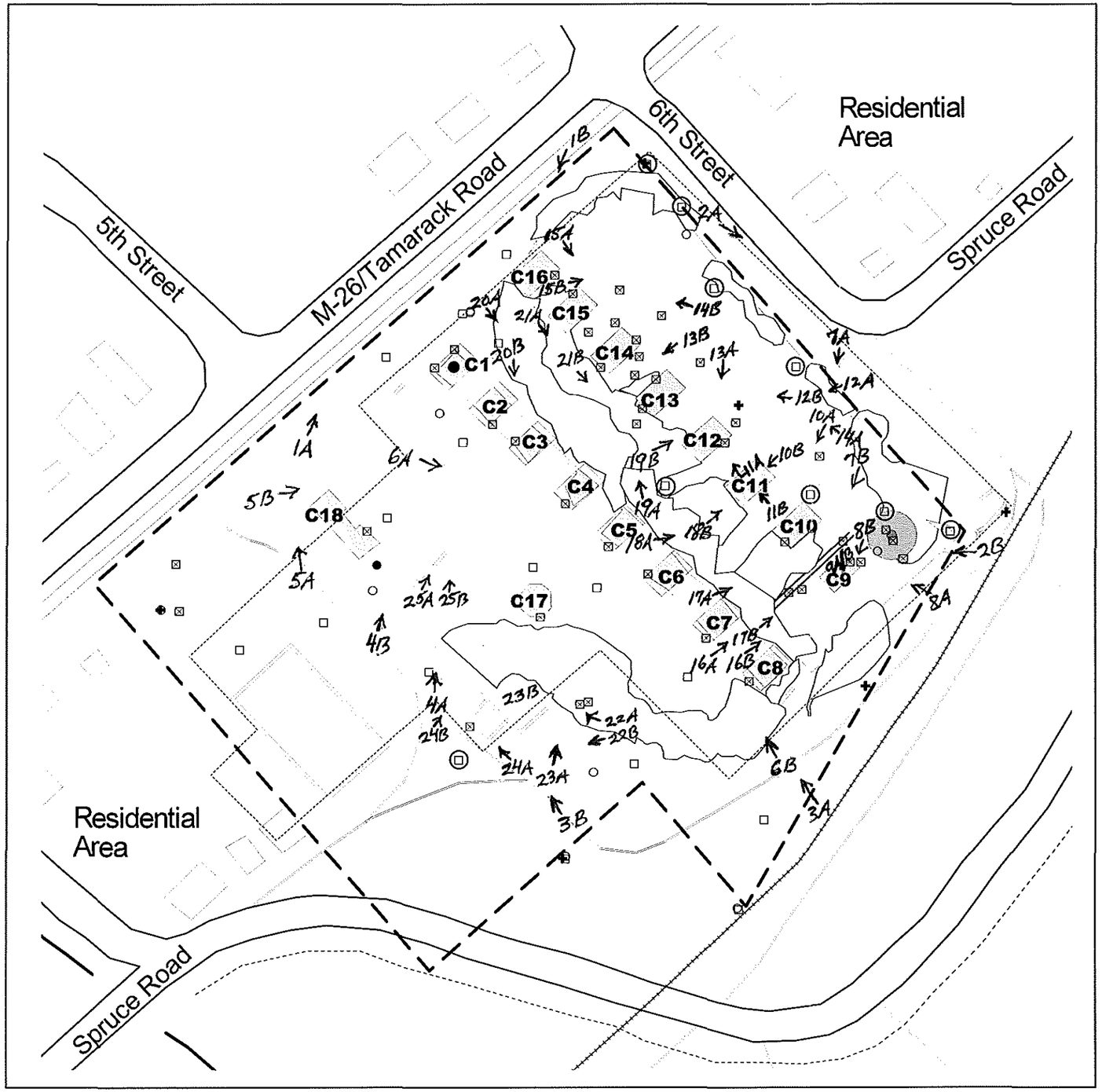
BROWNFIELD REDEVELOPMENT ASSESSMENT REPORT, DECEMBER 2002
TAMARACK CITY STAMP MILL, MIB000000084

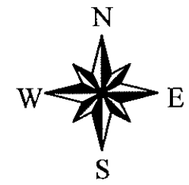
Michigan Department of Environmental Quality
Remediation and Redevelopment Division
Superfund Section, Site Management Unit 1

APPENDIX A

BFRA PROPERTY PHOTOGRAPHS

APPENDIX A - BFRA PHOTOGRAPH LOCATIONS





Legend

1A → Photo #1A, Found on Page 1 of Field Photography Log Sheet, Appendix A (arrow shows approximate direction photo was taken)

Sources:

* **Photographs, taken 10/19/2001 and 6/5/2002**
* **Field Notes**

100 0 100 200 Feet

Compiled 11/21 - 12/6/2002, JES
Michigan GeoRef - NAD83

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 1

USEPA ID#: **MIB000000084**

DATE TAKEN: 10/19/2001

PHOTOGRAPHED BY: John Spielberg/ Teresa Ducsay

PHOTO ID #: 1A

DESCRIPTON: Along northwest perimeter, along M-26/Tamarack Road. Concrete base (designated as C1) of remaining stamp structure, shown in upper right.

DATE TAKEN: 10/19/2001

PHOTOGRAPHED BY: John Spielberg/ Teresa Ducsay

PHOTO ID #: 1B

DESCRIPTON: Same, but taken from near 6th Street and looking the other way down M-26.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 2

USEPA ID#: **MIB000000084**

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 2A

DESCRIPTON: Along northeast perimeter, on 6th Street. TCSM property is to the right. Torch Lake can be seen in the background.

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 2B

DESCRIPTON: Perimeter of property, at east-most corner. Concrete structures C10 to C16 can be seen on the left. Houses along M-26 can also be seen in the background.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 3

USEPA ID#: **MIB000000084**

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
Teresa Ducsay

PHOTO ID #: 3A

DESCRIPTON: Perimeter of property, south of C8, near access road.

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
Teresa Ducsay

PHOTO ID #: 3B

DESCRIPTON: Southwest side of property, along access road.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 4

USEPA ID#: **MIB000000084**

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
Teresa Ducsay

PHOTO ID #: 4A

DESCRIPTON: Southeast side of property along access road, near old foundation.

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 4B

DESCRIPTON: Southwest side of property along access road, near old foundation. C18, C1-C5 visible in background.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 5

USEPA ID#: **MIB000000084**

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 5A

DESCRIPTON: West side of property. Concrete structure, C18, visible at right.

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 5B

DESCRIPTON: As 5A, but C1 and C2 visible through trees.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 6

USEPA ID#: **MIB000000084**

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 6A

DESCRIPTON: Higher ground in north middle of property, showing C2-C8.

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 6B

DESCRIPTON: South side of property from near C8.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 7

USEPA ID#: **MIB000000084**

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 7A

DESCRIPTON: East side of property, from the 6th Street and Spruce Road corner.

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 7B

DESCRIPTON: Same, but closer to C9 and C10.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 8

USEPA ID#: **MIB000000084**

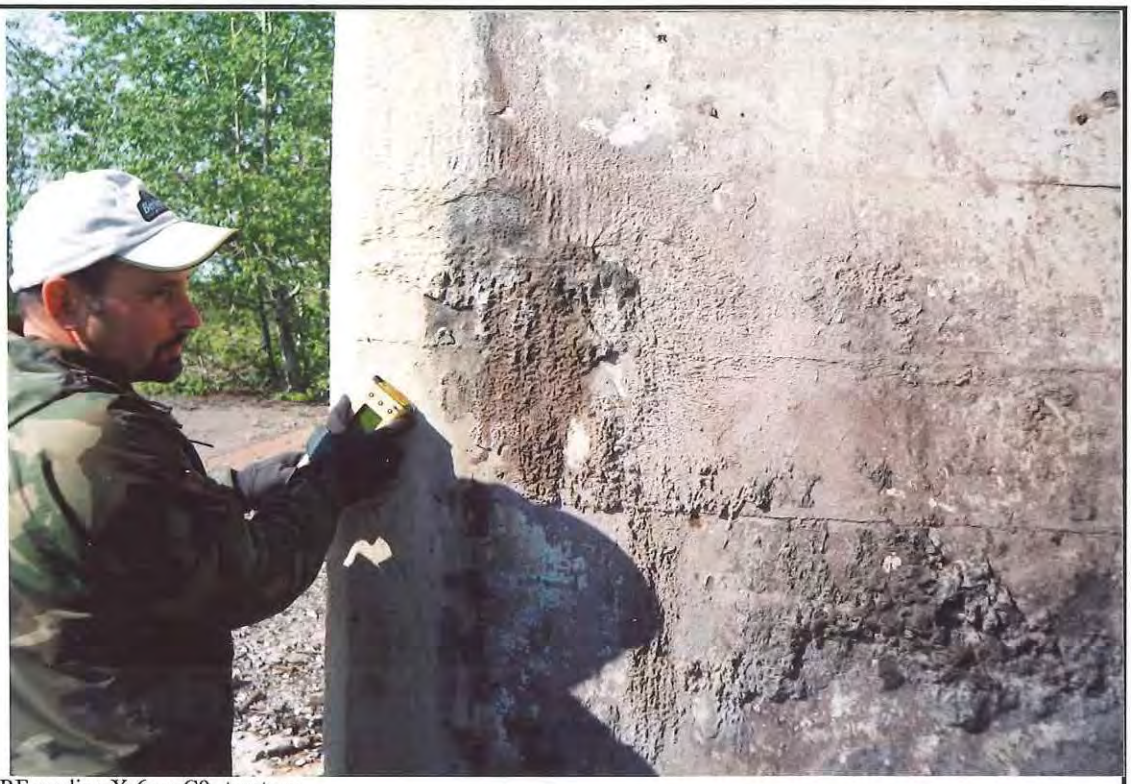
DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 8A

DESCRIPTON: East side of property, with C9 at the right.

DATE TAKEN:
6/5/2002
PHOTOGRAPHED BY:
John Spielberg/

PHOTO ID #: 8B



DESCRIPTON: Taking XRF reading X-6 on C9 structure.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 9

USEPA ID#: **MIB000000084**

DATE TAKEN:
6/5/2002
PHOTOGRAPHED BY:
John Spielberg/

PHOTO ID #: 9A

DESCRIPTON: Inside C9.

DATE TAKEN:
6/5/2002
PHOTOGRAPHED BY:
John Spielberg/

PHOTO ID #: 9B

DESCRIPTON: Inside C9.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 10

USEPA ID#: **MIB000000084**

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 10A

DESCRIPTON: East side of property, showing C10 and C11. Concrete slab with numerous asphalt patches can be seen in foreground.

DATE TAKEN:
6/5/2002
PHOTOGRAPHED BY:
John Spielberg/

PHOTO ID #: 10B

DESCRIPTON: East side of property at C11, showing white stains.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 11

USEPA ID#: **MIB000000084**

DATE TAKEN:
6/5/2002
PHOTOGRAPHED BY:
Mike Harris

PHOTO ID #: 11A

DESCRIPTON: Photo taken from inside C11 towards C12.

DATE TAKEN:
6/5/2002
PHOTOGRAPHED BY:
Mike Harris

PHOTO ID #: 11B

DESCRIPTON: Photo taken through C11 towards C12.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 12

USEPA ID#: **MIB000000084**

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 12A

DESCRIPTON: Northeast side of property, showing C12, C13 and C14, some with large stains on them.

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 12B

DESCRIPTON: Northeast side of property, showing C13 to C16.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 13

USEPA ID#: **MIB000000084**

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 13A

DESCRIPTON: C11 and C12.

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 13B

DESCRIPTON: C13 and C14.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 14

USEPA ID#: **MIB000000084**

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 14A

DESCRIPTON: Rubble pile in foreground, with C13 to C16 in background.

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 14B

DESCRIPTON: North side of property, near C14, C15 and C16.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 15

USEPA ID#: **MIB000000084**

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 15A

DESCRIPTON: Rubble near C15 and C16, north side of property.

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 15B

DESCRIPTON: Rubble near C15.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 16

USEPA ID#: **MIB000000084**

DATE TAKEN: 10/19/2001

PHOTOGRAPHED BY: John Spielberg/ Teresa Ducsay

PHOTO ID #: 16A

DESCRIPTON: East side of property, between two rows of large concrete structures, near C7, C8 and C9. Steel rail tracks can be seen by C9.

DATE TAKEN: 10/19/2001

PHOTOGRAPHED BY: John Spielberg/ Teresa Ducsay

PHOTO ID #: 16B

DESCRIPTON: As above, but only C8 and C9 can be seen.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 17

USEPA ID#: **MIB000000084**

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 17A

DESCRIPTON: East side of property, between two rows of large concrete structures, near C10 and C9.

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 17B

DESCRIPTON: Similar to 16A.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 18

USEPA ID#: **MIB000000084**

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 18A

DESCRIPTON: Rubble pile between C6 and C11.

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 18B

DESCRIPTON: Same.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 19

USEPA ID#: **MIB000000084**

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 19A

DESCRIPTON: Northern half of property, between the two rows of large concrete structures, from C12 towards C16.

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
Teresa Ducsay

PHOTO ID #: 19B

DESCRIPTON: Similar to 19A, but near C13 and C12. Much concrete rubble in this area.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 20

USEPA ID#: **MIB000000084**

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 20A

DESCRIPTON: Between the two rows of large concrete structures. Taken from near M-26, with Torch Lake in the background through the trees.

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 20B

DESCRIPTON: Similar to 20A, but taken more towards C2 to C8.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 21

USEPA ID#: **MIB000000084**

DATE TAKEN: 10/19/2001

PHOTOGRAPHED BY: John Spielberg/ Teresa Ducsay

PHOTO ID #: 21A

DESCRIPTON: Rubble piles between the two rows of concrete structures. Torch Lake can be seen in the background.

DATE TAKEN: 10/19/2001

PHOTOGRAPHED BY: John Spielberg/ Teresa Ducsay

PHOTO ID #: 21B

DESCRIPTON: Similar to 21A, but closer to C14, showing rubble/debris piles.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 22

USEPA ID#: **MIB000000084**

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 22A

DESCRIPTON: West side of property, near old foundation.

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 22B

DESCRIPTON: Same as 22A.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 23A

DESCRIPTON: West side of property, near old foundation, showing debris strewned about. C1 to C6, and likely former chimney foundation (C17) in background.

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 23B

DESCRIPTON: Debris and rubble inside old foundation basement.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 24

USEPA ID#: **MIB000000084**

DATE TAKEN: 10/19/2001
PHOTOGRAPHED BY: Teresa Ducsay

PHOTO ID #: 24A

DESCRIPTON: West side of property near old foundation, from access road.

DATE TAKEN: 10/19/2001
PHOTOGRAPHED BY: John Spielberg/ Teresa Ducsay

PHOTO ID #: 24B

DESCRIPTON: West side of property, near old foundation. Old chimney foundation can be seen just beyond the foundation, with C1 to C5 in the background.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

FIELD PHOTOGRAPHY LOG SHEET

Property Name: **Tamarack City Stamp Mill** PAGE: 25

USEPA ID#: **MIB000000084**

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 25A

DESCRIPTON: West-central part of property, near west side of old foundation.

DATE TAKEN:
10/19/2001
PHOTOGRAPHED BY:
John Spielberg/
Teresa Ducsay

PHOTO ID #: 25B

DESCRIPTON: Same, but closer view, showing broken concrete, wire and other debris.

For approximate locations and directions of photos, see the figure, Appendix A - BFRA Photograph Locations.

APPENDIX B

CHEMICAL ANALYSIS OF BFRA SAMPLES

Case #30568

Hard copy received by mail

Property Name: Tamarack City Stamp Mill
Lab Results Tally, by SDG/lab

Sample	VOA	SemiVOA	Pest/PCB	Inorganic
SS-1	Primary	EOSS1	EOSS1	MEOSS7
SS-2	ND			
SS-3	5			
SS-4				
SS-5	X,T			
SS-6	ND			
SS-7	ND	EOSS7	EOSS7	
SS-8	X,T			
SS-9				
SS-10	ND	EOSS1	EOSS1	
SS-11				
SS-12				
SS-13				
SS-14				
SS-15				
SS-16				
SS-17				
SS-18				
SS-19				
SS-20				
SS-21				SDG MEOSW1
SS-22				
SS-23				
SS-24	Tmb, X,T	EOSS7	EOSS7	
SS-25		"	"	
				MEOSW1
SB-1	ND	EOSS7	EOSS7	
SB-2		EOSW7	EOSW7	
SB-3		"	"	
SB-4		EOSS7	EOSS7	
SB-5				
SB-6				
SB-7				
SB-8				
SB-9		EOSW7	EOSW7	
SB-10		"	"	
TMW-1	EOSS7	EOSS7	EOSS7	MEOSX6
TMW-2	"			
TMW-3	EOSS7			
TMW-4	~~EOSS7~~			
TMW-5				
TMW-6				
Tmw-2D				
FB-1				
PB-1				

SDG's

EOSS1
EOSS7
EOSW7

MEOSS1
MEOSW1
MEOSX6

Complete 8/21/02

~~waiting (TMW-3)~~

date	what
8/21/02?	VOA results for TMW-3 (EOSX9), SDG EOSS7

June 21, 2002

MDEQ
Attn: Mr. John Spielberg
ERD - Superfund
Constitution Hall PO Box 30426
Lansing, MI 48909

RE: Tamarack City Stamp Mill
ERD-Superfund, Lansing
PO: 46538,31351

Dear Mr. John Spielberg:

Enclosed is a copy of your laboratory report and invoice for submittal **36024-1.** This submittal was completely received on June 6, 2002. All analyses have been validated and comply with our Quality Control program statistics unless otherwise noted.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Lisa M. Harvey
Project Chemist

Enclosure

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Individual sample results relate only to the sample tested.

36024- 1

STATEMENT OF DATA QUALIFICATIONS

Analysis: **MDEQ Plus List Volatiles**
Volatiles Purge & Trap-GC/MS
SOIL USEPA-8260B

Qualification:

Surrogate spike result(s) for this sample and analysis had a percent recovery outside the upper control limit for this method and matrix. Any positive results must be considered estimated.

Sample(s) Qualified:	307119	SS-21
	307128	SB-5

Page 1 - **End of Statement of Data Qualifications**

Note: This document is included as a part of the analytical report for the above referenced project and submittal, and should be retained as a permanent record thereof.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

MDEQ		Submittal #:	**36024-1**
Project:	Tamarack City Stamp Mill	Sampled:	06/04/02 @ 10:10
	ERD-Superfund, Lansing	Sampler:	Spielberg
Submittal:	June 4, 2002 Soils	Received:	06/06/02 @ 10:00

Sample #: **307099**
Sample ID: **SS-1**

Matrix: Soil

Parameter	Analytical Result	Quant. Limit	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	89	0.1	%	06/07/02	GEH	SW-846 3550B

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ANALYTICAL REPORT

MDEQ
Project: Tamarack City Stamp Mill
ERD-Superfund, Lansing
Submittal: June 4, 2002 Soils

Sample #: **307099**
Sample ID: **SS-1**

Matrix: Soil

Submittal #: **36024-1**
Sampled: 06/04/02 @ 10:10
Sampler: Spielberg
Received: 06/06/02 @ 10:00
Extracted:
Analyzed: 06/13/02 by DLVV
Ref. Citation: USEPA-8260B
Dilution Factor: 1.12
Analytical Batch: 187179
QC Batch: 075930-113

CAS Number	MDEQ Plus List Volatiles USEPA Method 5035/8260	Analytical Result (mg/kg dry)	Quantitation Limit (mg/kg dry)
630-20-6	1,1,1,2-Tetrachloroethane	<0.11	0.11
71-55-6	1,1,1-Trichloroethane	<0.056	0.056
79-34-5	1,1,2,2-Tetrachloroethane	<0.11	0.11
79-00-5	1,1,2-Trichloroethane	<0.056	0.056
75-34-3	1,1-Dichloroethane	<0.056	0.056
75-35-4	1,1-Dichloroethylene	<0.056	0.056
87-61-6	1,2,3-Trichlorobenzene	<0.28	0.28
96-18-4	1,2,3-Trichloropropane	<0.11	0.11
120-82-1	1,2,4-Trichlorobenzene	<0.28	0.28
95-63-6	1,2,4-Trimethylbenzene	<0.11	0.11
96-12-8	1,2-Dibromo-3-chloropropane	<0.28	0.28
106-93-4	1,2-Dibromoethane	<0.056	0.056
95-50-1	1,2-Dichlorobenzene	<0.11	0.11
107-06-2	1,2-Dichloroethane	<0.056	0.056
156-59-2	cis-1,2-Dichloroethene	<0.056	0.056
156-60-5	trans-1,2-Dichloroethene	<0.056	0.056
78-87-5	1,2-Dichloropropane	<0.056	0.056
108-67-8	1,3,5-Trimethylbenzene	<0.11	0.11
541-73-1	1,3-Dichlorobenzene	<0.11	0.11
10061-01-5	cis-1,3-Dichloropropene	<0.056	0.056
10061-02-6	trans-1,3-Dichloropropene	<0.056	0.056
110-57-6	trans-1,4-Dichloro-2-butene	<0.056	0.056
106-46-7	1,4-Dichlorobenzene	<0.11	0.11
78-93-3	Methyl Ethyl Ketone	<0.28	0.28
591-78-6	2-Hexanone	<0.28	0.28
91-57-6	2-Methylnaphthalene	<0.28	0.28
67-64-1	Acetone	<0.84	0.84
108-10-1	4-Methyl-2-Pentanone	<0.28	0.28
107-13-1	Acrylonitrile	<0.28	0.28
71-43-2	Benzene	<0.056	0.056
108-86-1	Bromobenzene	<0.11	0.11
74-97-5	Bromochloromethane	<0.11	0.11

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ANALYTICAL REPORT

MDEQ
Project: Tamarack City Stamp Mill
ERD-Superfund, Lansing
Submittal: June 4, 2002 Soils

Sample #: **307099**
Sample ID: **SS-1**

Matrix: Soil

Submittal #: **36024-1**
Sampled: 06/04/02 @ 10:10
Sampler: Spielberg
Received: 06/06/02 @ 10:00
Extracted:
Analyzed: 06/13/02 by DLVV
Ref. Citation: USEPA-8260B
Dilution Factor: 1.12
Analytical Batch: 187179
QC Batch: 075930-113

CAS Number	MDEQ Plus List Volatiles USEPA Method 5035/8260	Analytical Result (mg/kg dry)	Quantitation Limit (mg/kg dry)
75-27-4	Dichlorobromomethane	<0.11	0.11
75-25-2	Bromoform	<0.11	0.11
74-83-9	Bromomethane	<0.28	0.28
75-15-0	Carbon Disulfide	<0.28	0.28
56-23-5	Carbon Tetrachloride	<0.056	0.056
108-90-7	Chlorobenzene	<0.056	0.056
75-00-3	Chloroethane	<0.28	0.28
67-66-3	Chloroform	<0.056	0.056
74-87-3	Chloromethane	<0.28	0.28
124-48-1	Chlorodibromomethane	<0.11	0.11
74-95-3	Dibromomethane	<0.11	0.11
75-71-8	Dichlorodifluoromethane	<0.28	0.28
60-29-7	Ethyl Ether	<0.28	0.28
100-41-4	Ethylbenzene	<0.056	0.056
67-72-1	Hexachloroethane	<0.11	0.11
98-82-8	Isopropylbenzene	<0.11	0.11
136777-61-2	Xylene, Meta & Para	<0.11	0.11
74-88-4	Iodomethane	<0.11	0.11
1634-04-4	Methyl(tert)butyl Ether	<0.28	0.28
75-09-2	Methylene Chloride	<0.28	0.28
91-20-3	Naphthalene	<0.28	0.28
104-51-8	n-Butylbenzene	<0.28	0.28
103-65-1	n-Propylbenzene	<0.11	0.11
95-47-6	o-Xylene	<0.056	0.056
99-87-6	4-Isopropyltoluene	<0.28	0.28
135-98-8	sec-Butylbenzene	<0.28	0.28
100-42-5	Styrene	<0.056	0.056
98-06-6	tert-Butylbenzene	<0.28	0.28
127-18-4	Tetrachloroethene	<0.056	0.056
109-99-9	Tetrahydrofuran	<1.1	1.1
108-88-3	Toluene	<0.056	0.056
79-01-6	Trichloroethene	<0.056	0.056
75-69-4	Trichlorofluoromethane	<0.28	0.28
75-01-4	Vinyl Chloride	<0.11	0.11

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ANALYTICAL REPORT

ADEQ		Submittal #:	**36024-1**
Project:	Tamarack City Stamp Mill	Sampled:	06/04/02 @ 10:15
	ERD-Superfund, Lansing	Sampler:	Spielberg
Submittal:	June 4, 2002 Soils	Received:	06/06/02 @ 10:00

Sample #: **307100**
Sample ID: **SS-2**

Matrix: Soil

Parameter	Analytical Result	Quant. Limit	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	91	0.1	%	06/07/02	GEH	SW-846 3550B

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ANALYTICAL REPORT

MDEQ
Project: Tamarack City Stamp Mill
ERD-Superfund, Lansing
Submittal: June 4, 2002 Soils

Sample #: 307100
Sample ID: SS-2

Matrix: Soil

Submittal #: 36024-1
Sampled: 06/04/02 @ 10:15
Sampler: Spielberg
Received: 06/06/02 @ 10:00
Extracted:
Analyzed: 06/13/02 by DLVV
Ref. Citation: USEPA-8260B
Dilution Factor: 1.1
Analytical Batch: 187179
QC Batch: 075930-113

CAS Number	MDEQ Plus List Volatiles USEPA Method 5035/8260	Analytical Result (mg/kg dry)	Quantitation Limit (mg/kg dry)
630-20-6	1,1,1,2-Tetrachloroethane	<0.11	0.11
71-55-6	1,1,1-Trichloroethane	<0.055	0.055
79-34-5	1,1,2,2-Tetrachloroethane	<0.11	0.11
79-00-5	1,1,2-Trichloroethane	<0.055	0.055
75-34-3	1,1-Dichloroethane	<0.055	0.055
75-35-4	1,1-Dichloroethylene	<0.055	0.055
87-61-6	1,2,3-Trichlorobenzene	<0.28	0.28
96-18-4	1,2,3-Trichloropropane	<0.11	0.11
120-82-1	1,2,4-Trichlorobenzene	<0.28	0.28
95-63-6	1,2,4-Trimethylbenzene	<0.11	0.11
96-12-8	1,2-Dibromo-3-chloropropane	<0.28	0.28
106-93-4	1,2-Dibromoethane	<0.055	0.055
95-50-1	1,2-Dichlorobenzene	<0.11	0.11
107-06-2	1,2-Dichloroethane	<0.055	0.055
156-59-2	cis-1,2-Dichloroethene	<0.055	0.055
156-60-5	trans-1,2-Dichloroethene	<0.055	0.055
78-87-5	1,2-Dichloropropane	<0.055	0.055
108-67-8	1,3,5-Trimethylbenzene	<0.11	0.11
541-73-1	1,3-Dichlorobenzene	<0.11	0.11
10061-01-5	cis-1,3-Dichloropropene	<0.055	0.055
10061-02-6	trans-1,3-Dichloropropene	<0.055	0.055
110-57-6	trans-1,4-Dichloro-2-butene	<0.055	0.055
106-46-7	1,4-Dichlorobenzene	<0.11	0.11
78-93-3	Methyl Ethyl Ketone	<0.28	0.28
591-78-6	2-Hexanone	<0.28	0.28
91-57-6	2-Methylnaphthalene	<0.28	0.28
67-64-1	Acetone	<0.83	0.83
108-10-1	4-Methyl-2-Pentanone	<0.28	0.28
107-13-1	Acrylonitrile	<0.28	0.28
71-43-2	Benzene	<0.055	0.055
108-86-1	Bromobenzene	<0.11	0.11
74-97-5	Bromochloromethane	<0.11	0.11

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ANALYTICAL REPORT

MDEQ
Project: Tamarack City Stamp Mill
ERD-Superfund, Lansing
Submittal: June 4, 2002 Soils

Sample #: **307100**
Sample ID: **SS-2**

Matrix: Soil

Submittal #: **36024-1**
Sampled: 06/04/02 @ 10:15
Sampler: Spielberg
Received: 06/06/02 @ 10:00
Extracted:
Analyzed: 06/13/02 by DLVV
Ref. Citation: USEPA-8260B
Dilution Factor: 1.1
Analytical Batch: 187179
QC Batch: 075930-113

CAS Number	MDEQ Plus List Volatiles USEPA Method 5035/8260	Analytical Result (mg/kg dry)	Quantitation Limit (mg/kg dry)
75-27-4	Dichlorobromomethane	<0.11	0.11
75-25-2	Bromoform	<0.11	0.11
74-83-9	Bromomethane	<0.28	0.28
75-15-0	Carbon Disulfide	<0.28	0.28
56-23-5	Carbon Tetrachloride	<0.055	0.055
108-90-7	Chlorobenzene	<0.055	0.055
75-00-3	Chloroethane	<0.28	0.28
67-66-3	Chloroform	<0.055	0.055
74-87-3	Chloromethane	<0.28	0.28
124-48-1	Chlorodibromomethane	<0.11	0.11
74-95-3	Dibromomethane	<0.11	0.11
75-71-8	Dichlorodifluoromethane	<0.28	0.28
60-29-7	Ethyl Ether	<0.28	0.28
100-41-4	Ethylbenzene	<0.055	0.055
67-72-1	Hexachloroethane	<0.11	0.11
98-82-8	Isopropylbenzene	<0.11	0.11
136777-61-2	Xylene, Meta & Para	<0.11	0.11
74-88-4	Iodomethane	<0.11	0.11
1634-04-4	Methyl(tert)butyl Ether	<0.28	0.28
75-09-2	Methylene Chloride	<0.28	0.28
91-20-3	Naphthalene	<0.28	0.28
104-51-8	n-Butylbenzene	<0.28	0.28
103-65-1	n-Propylbenzene	<0.11	0.11
95-47-6	o-Xylene	<0.055	0.055
99-87-6	4-Isopropyltoluene	<0.28	0.28
135-98-8	sec-Butylbenzene	<0.28	0.28
100-42-5	Styrene	<0.055	0.055
98-06-6	tert-Butylbenzene	<0.28	0.28
127-18-4	Tetrachloroethene	<0.055	0.055
109-99-9	Tetrahydrofuran	<1.1	1.1
108-88-3	Toluene	<0.055	0.055
79-01-6	Trichloroethene	<0.055	0.055
75-69-4	Trichlorofluoromethane	<0.28	0.28
75-01-4	Vinyl Chloride	<0.11	0.11

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ANALYTICAL REPORT

MDEQ
Project: Tamarack City Stamp Mill
ERD-Superfund, Lansing
Submittal: June 4, 2002 Soils

Submittal #: **36024-1**
Sampled: 06/04/02 @ 11:45
Sampler: Spielberg
Received: 06/06/02 @ 10:00

Sample #: **307101**
Sample ID: **SS-3**

Matrix: Soil

Parameter	Analytical Result	Quant. Limit	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	52	0.1	%	06/07/02	GEH	SW-846 3550B

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ANALYTICAL REPORT

MDEQ
Project: Tamarack City Stamp Mill
ERD-Superfund, Lansing
Submittal: June 4, 2002 Soils

Sample #: 307101
Sample ID: SS-3

Matrix: Soil

Submittal #: 36024-1
Sampled: 06/04/02 @ 11:45
Sampler: Spielberg
Received: 06/06/02 @ 10:00
Extracted:
Analyzed: 06/13/02 by DLVV
Ref. Citation: USEPA-8260B
Dilution Factor: 1.83
Analytical Batch: 187179
QC Batch: 075930-113

CAS Number	MDEQ Plus List Volatiles USEPA Method 5035/8260	Analytical Result (mg/kg dry)	Quantitation Limit (mg/kg dry)
630-20-6	1,1,1,2-Tetrachloroethane	<0.18	0.18
71-55-6	1,1,1-Trichloroethane	<0.092	0.092
79-34-5	1,1,2,2-Tetrachloroethane	<0.18	0.18
79-00-5	1,1,2-Trichloroethane	<0.092	0.092
75-34-3	1,1-Dichloroethane	<0.092	0.092
75-35-4	1,1-Dichloroethylene	<0.092	0.092
87-61-6	1,2,3-Trichlorobenzene	<0.46	0.46
96-18-4	1,2,3-Trichloropropane	<0.18	0.18
120-82-1	1,2,4-Trichlorobenzene	<0.46	0.46
95-63-6	1,2,4-Trimethylbenzene	<0.18	0.18
96-12-8	1,2-Dibromo-3-chloropropane	<0.46	0.46
106-93-4	1,2-Dibromoethane	<0.092	0.092
95-50-1	1,2-Dichlorobenzene	<0.18	0.18
107-06-2	1,2-Dichloroethane	<0.092	0.092
156-59-2	cis-1,2-Dichloroethene	<0.092	0.092
156-60-5	trans-1,2-Dichloroethene	<0.092	0.092
78-87-5	1,2-Dichloropropane	<0.092	0.092
108-67-8	1,3,5-Trimethylbenzene	<0.18	0.18
541-73-1	1,3-Dichlorobenzene	<0.18	0.18
10061-01-5	cis-1,3-Dichloropropene	<0.092	0.092
10061-02-6	trans-1,3-Dichloropropene	<0.092	0.092
110-57-6	trans-1,4-Dichloro-2-butene	<0.092	0.092
106-46-7	1,4-Dichlorobenzene	<0.18	0.18
78-93-3	Methyl Ethyl Ketone	<0.46	0.46
591-78-6	2-Hexanone	<0.46	0.46
91-57-6	2-Methylnaphthalene	<0.46	0.46
67-64-1	Acetone	<1.4	1.4
108-10-1	4-Methyl-2-Pentanone	<0.46	0.46
107-13-1	Acrylonitrile	<0.46	0.46
71-43-2	Benzene	<0.092	0.092
108-86-1	Bromobenzene	<0.18	0.18
74-97-5	Bromochloromethane	<0.18	0.18

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ANALYTICAL REPORT

MDEQ
Project: Tamarack City Stamp Mill
ERD-Superfund, Lansing
Submittal: June 4, 2002 Soils

Sample #: **307101**
Sample ID: **SS-3**

Matrix: Soil

Submittal #: **36024-1**
Sampled: 06/04/02 @ 11:45
Sampler: Spielberg
Received: 06/06/02 @ 10:00
Extracted:
Analyzed: 06/13/02 by DLVV
Ref. Citation: USEPA-8260B
Dilution Factor: 1.83
Analytical Batch: 187179
QC Batch: 075930-113

CAS Number	MDEQ Plus List Volatiles USEPA Method 5035/8260	Analytical Result (mg/kg dry)	Quantitation Limit (mg/kg dry)
75-27-4	Dichlorobromomethane	<0.18	0.18
75-25-2	Bromoform	<0.18	0.18
74-83-9	Bromomethane	<0.46	0.46
75-15-0	Carbon Disulfide	<0.46	0.46
56-23-5	Carbon Tetrachloride	<0.092	0.092
108-90-7	Chlorobenzene	<0.092	0.092
75-00-3	Chloroethane	<0.46	0.46
67-66-3	Chloroform	<0.092	0.092
74-87-3	Chloromethane	<0.46	0.46
124-48-1	Chlorodibromomethane	<0.18	0.18
74-95-3	Dibromomethane	<0.18	0.18
75-71-8	Dichlorodifluoromethane	<0.46	0.46
60-29-7	Ethyl Ether	<0.46	0.46
100-41-4	Ethylbenzene	<0.092	0.092
67-72-1	Hexachloroethane	<0.18	0.18
98-82-8	Isopropylbenzene	<0.18	0.18
136777-61-2	Xylene, Meta & Para	<0.18	0.18
74-88-4	Iodomethane	<0.18	0.18
1634-04-4	Methyl(tert)butyl Ether	<0.46	0.46
75-09-2	Methylene Chloride	<0.46	0.46
91-20-3	Naphthalene	<0.46	0.46
104-51-8	n-Butylbenzene	<0.46	0.46
103-65-1	n-Propylbenzene	<0.18	0.18
95-47-6	o-Xylene	<0.092	0.092
99-87-6	4-Isopropyltoluene	<0.46	0.46
135-98-8	sec-Butylbenzene	<0.46	0.46
100-42-5	Styrene	<0.092	0.092
98-06-6	tert-Butylbenzene	<0.46	0.46
127-18-4	Tetrachloroethene	<0.092	0.092
109-99-9	Tetrahydrofuran	<1.8	1.8
108-88-3	Toluene	<0.092	0.092
79-01-6	Trichloroethene	<0.092	0.092
75-69-4	Trichlorofluoromethane	<0.46	0.46
75-01-4	Vinyl Chloride	<0.18	0.18

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