APPENDIX AA:

Illegal Dumping Information

Keweenaw Bay Indian Community
Natural Resources Department

Summary of Open Dump Cleanup on the Keweenaw Bay Indian Community L'Anse Reservation

Administrative Report

Date: October 2007

Prepared By:

KBIC Natural Resources Department
Director: Todd Warner
Environmental Specialist: Char Beesley
Environmental Response Program Specialist: Katherine Kruse
Brownfield Assessment Coordinator: Jennifer Romstad

Cleanup Contractor:

Tribal Construction Company, Inc.
Manager: Michael LaFernier, Sr.

1.0 Executive Summary

The Keweenaw Bay Indian Community (KBIC) takes great pride in stewardship of our natural resources. A strong cultural relationship between the Ojibwa people and the land has resulted in spiritual, medicinal, hunting, gathering, and fishing practices which are especially susceptible to activities that adversely impact the environment. A 2003 survey of Tribal members indicates that open dumping is viewed as a major problem by those residing on the Reservation. Peninsula Sanitation maintains the nearest designated landfill, the K&W Landfill, located in Greenland, MI, approximately 30 miles west of the Reservation. The nearest transfer station, operated by Waste Management, Inc., is located approximately 30 miles to the north in Houghton, MI. Curbside service is not available for the Reservation, except for those residing within the Villages of L'Anse and Baraga. Residents outside the Villages of L'Anse and Baraga must haul their own solid waste to designated dumpster areas, and pay a fee per bag for disposal.

In 2005, the KBIC Solid Waste Management Plan (SWMP) was reviewed and approved by the KBIC Tribal Council. The SWMP was developed in 2004 utilizing funding provided by the EPA Tribal Solid Waste Management Program, which provides guidance for solid waste management decision-making and practices for KBIC as well as makes recommendations regarding alternatives to disposal. The SWMP identified that improvements in solid waste management practices are needed in rural areas, where a lack of service has resulted in illegal dumping.

Open dumps are considered improperly disposed solid waste material found any place aside from a sanitary landfill or facility designed for disposal of solid or hazardous waste. Open dumps typically lack proper controls, such as regular application of cover, controlled access to the site, and other environmental controls. Materials present in open dumps often pose a threat to human health and the environment. For example, improperly disposed-of automobile fluids, household chemicals, and harmful chemicals from large appliances, can contaminate the soil and groundwater, as well as present explosive or direct contact exposure hazards. Open dump sites also serve as vectors for disease-carrying insects and rodents. A considerable amount of open dumping occurs in rural areas, along back roads, and in areas with little or no lighting. Dumping activity is found to occur along roadsides, streams, and in open areas. Open dump sites devalue property and are costly to clean up. According to the EPA's Office of Solid Waste and Emergency Response,

> "the Indian Health Service (IHS) reported about 1,100 open dump sites on Indian lands, with 142 considered "high threat" according to a 1998 report to Congress. This number does not take into consideration the open dumps in Indian Country that have not yet officially been counted. If left

unchecked, the sites could cause health problems for Native Americans living near these pollution sources. They also pose risks to the environment itself. To clean up or upgrade all the sites, IHS estimates it could cost $126 million." (Environmental Protection Agency. May 2003. *Open Dump Cleanup Project Helps Tribes Fight Waste*. Retrieved July 10, 2007, from www.epa.gov/epaoswer/non-hw/tribal/pdftxt/opendump.pdf)

Open dumping is a problem for the KBIC and surrounding area. The Keweenaw Bay Indian Community Natural Resources Department (KBICNRD) has identified open dumps sites ranging in size from large areas with historical use and community-scale dumping (such as the Tailor Road Dump Site), to small scattered sites (such as the Vuk Road Dump Site). In 2004, KBIC was awarded funds from the National Interagency Solid Waste Workgroup's Tribal Solid Waste Management Program (formerly the Open Dump Cleanup Program) in the amount of $35,000. These funds were provided to KBIC through the US Environmental Protection Agency (EPA) Indian Environmental – KBIC -General Assistance Program (GAP) Cooperative Agreement. In the proposal, the KBICNRD identified open dump sites of priority and/or concern on the L'Anse Reservation and were classified as either Open Dump Priority Areas or Small Active Dump Areas.

KBICNRD staff conducted preliminary assessments to characterize each site, by assessing the size and type of materials present. KBICNRD contracted Tribal Construction Company, Inc. to perform cleanup activities. Preliminary site visits were conducted with Tribal Construction Company, Inc. in the fall of 2005 and again in the spring of 2006 to identify the sites to be cleaned up. Cleanup of the sites began in the fall of 2005, and continued through late summer of 2006, at the Assinins, Beartown Road (#1), Herman Road, Indian Cemetery Road, Indian Road Camp, Rat Patrol, and Tailor Road (#1) open dump sites. Cleanup work included demolition of any existing structures on the site, collection of waste and loading into a dump truck by front-end loader, and hauling the waste to the K & W Landfill, operated by Waste Management, Inc., in Ontonagon, MI. After cleanup was complete, KBICNRD staff conducted post-cleanup visits at the sites to assess the cleanup, and to identify any new or active dumping. Follow-up visits were conducted in September 2006 and April through May 2007. Preventative measures taken included berming or gating the sites after cleanup, as well as patrol of the areas by KBIC Police Department and Conservation Officers. Costs incurred by the contractor for cleanup included labor wages, use of machinery (front-end loader and dump truck), and landfill charges for disposal of waste.

2.0 Open Dump Cleanup Sites

A total of seven open dump sites on the L'Anse Reservation were selected for cleanup. These sites include the Assinins, Beartown Road Area (#1), Herman Road, Indian Cemetery Roadside, Indian Road Camp, Rat Patrol, and Tailor Road (#1) sites (Figure 1). The sites are discussed below, in Sections 2.1 through 2.7.

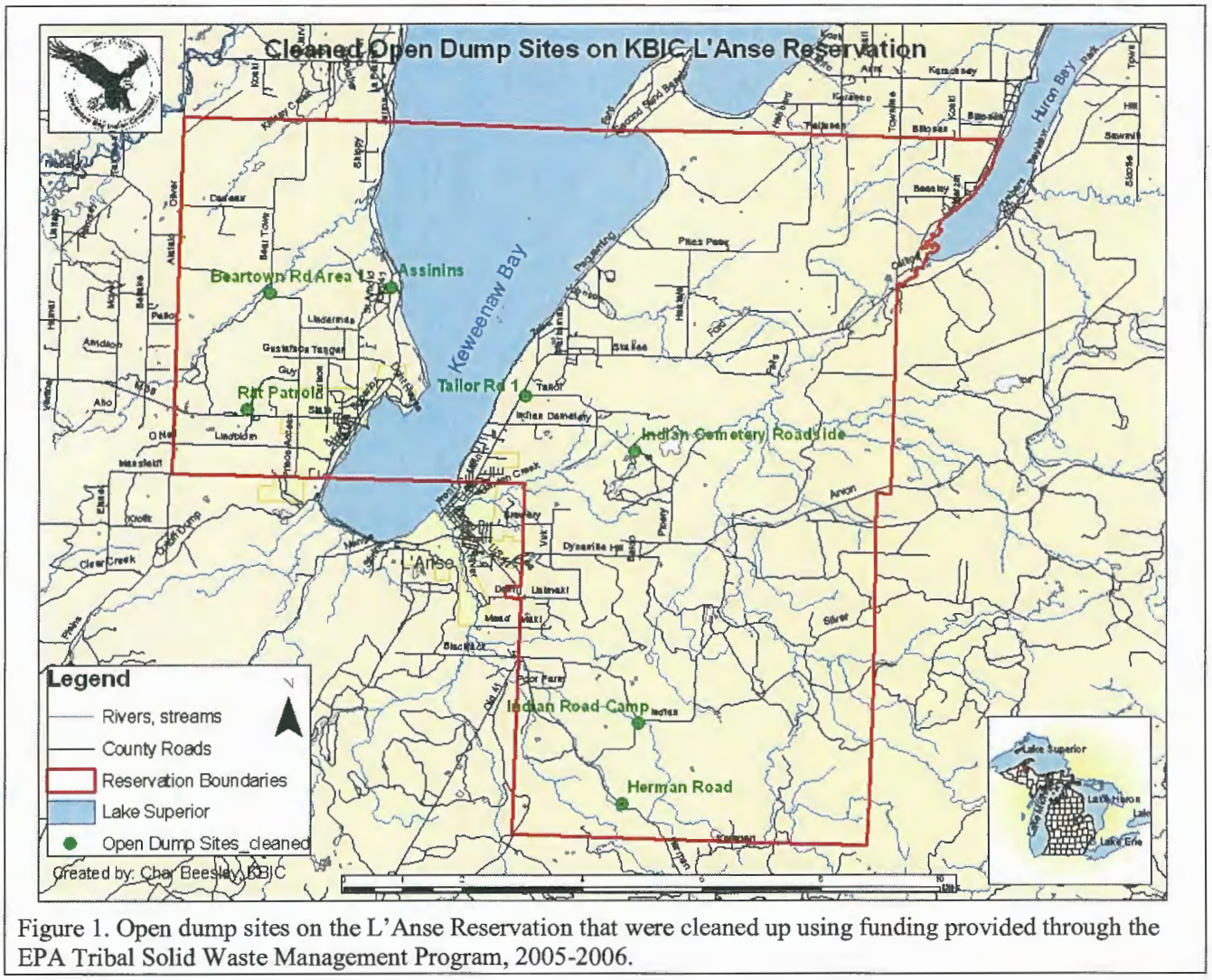


Figure 1. Open dump sites on the L'Anse Reservation that were cleaned up using funding provided through the EPA Tribal Solid Waste Management Program, 2005-2006.

2.1 Assinins

Site Location and Information

SW ¼, SE ¼, Section 15, T51N, R33W, Baraga Township, Baraga County, Michigan
(46.77320662, -88.38894733)

The site is located on Tribally-owned land near the baseball field along Assinins Road, in the community known as Assinins, north of Baraga. Most of the waste included discarded scrap tires, as well as some construction and demolition debris, and scrap metal (See Photo 2.1.1.).

Cleanup

Cleanup was conducted at this site on July 18 and July 19, 2006. The clean-up contractor removed and disposed of approximately 50 scrap tires, as well as approximately 3 tons of waste and scrap metal.

Post-Cleanup

A follow up site visit was conducted on April 26, 2007, and concluded that cleanup at the site was complete (See Photo 2.1.2.). The former KBIC Tribal Center building site, which is located west across the street from the Assinins open dump site, still remains.

Photo 2.1.1. Assinins open dump site, before

Photo 2.1.2. Assinins open dump site, after cleanup

2.2 Beartown Road

Site Location and Information

SE ¼, SW ¼, Section 17, T51N, R33W, Baraga Township, Baraga County, Michigan
(46.80928225, -88.51965792)

This open dump was located along Beartown Road, near the crossing of Little Carp Creek. The site is one of multiple dumping areas along the unpaved Beartown Road, collectively known as the Beartown Road Area dump sites. This site contained the largest concentration of waste in a small clearing along the west side of Beartown Road. An unimproved dirt road provides access to this area and extends beyond the dump. Waste present at this site included white goods, automobile parts, and household waste (See Photo 2.2.1.). The other Beartown Road Area dump sites are located north, including a medium sized historic dump near the Kelsey Creek crossing. Other smaller historic dumps are present on both sides of the roadside and contain old glass bottles, tin cans, and metal containers.

Cleanup Activities

Cleanup was conducted on July 18, 19, and 25, 2006, and the dirt access road was bermed. Approximately 5.15 tons of waste was removed by the contractor and hauled away for proper disposal.

Post Cleanup

A follow-up visit was conducted on April 24, 2007 and concluded that while most of the waste was removed (See Photo 2.2.2.), some scattered materials along near the Little Carp Creek streambed still remain. A newly identified dump site across from the main area, along the east side of Beartown Road, along Little Carp Creek was also noted during the follow-up visit. Waste identified in this area included white goods, automotive fluid containers, household waste, and discarded animal carcasses (See Photo 2.2.3.).

Photo 2.2.1. Dump site along Beartown Road before cleanup

Photo2.2.2. Dump site after cleanup

Photo 2.2.3. One of multiple existing dump sites along Beartown Road

2.3 Herman Road

Site Location and Information

SE ¼, NE ¼, Section 35, T50N, R33W, L'Anse Township, Baraga County, Michigan
(46.68737861, -88.38990287)

This open dump was located on Tribal-owned, lease land along Herman Road. The site contained an abandoned mobile home trailer, which was significantly deteriorated and damaged. The waste included construction and demolition waste, white goods, and household waste (See Photo 2.3.1).

Cleanup Activities

Demolition and cleanup began on August 16, 2006. Approximately 18 tons of waste was removed on August 28 and 29, 2006.

Post Cleanup

A follow-up site visit was conducted on May 29, 2007. All waste has been removed from the site, except for small debris visible amongst the soil (See Photos 2.3.2.). The piping for water and sewer facilities is still present.

Photo 2.3.1. Abandoned house trailer

Photo 2.3.2. Trailer site after cleanup

2.4 Indian Cemetery

Site Location and Information

SW ¼, NE ¼, Section 32, T51N, R32W, L'Anse Township, Baraga County, Michigan (46.77320662, -88.38894733)

This open dump was located along Indian Cemetery Road, north of L'Anse, near the Indian Cemetery. The waste was scattered along the roadside for approximately 1/8 mile. The material present at this site included household waste and white goods (See Photo 2.4.1.).

Cleanup

Cleanup was conducted on July 12 and July 25, 2006. Approximately 2.5 tons of waste was removed from this site, and hauled for disposal.

Post Cleanup

A follow up site visit was conducted on May 1, 2007, and concluded that cleanup is complete (See Photo 2.4.2.). However, several other open dump sites exist within 2 miles of the site.

Photo 2.4.1. Scattered waste along the Indian Cemetery roadside

Photo 2.4.2. Roadside after cleanup

2.5 Indian Road Camp

Site Location and Information

NW ¼, NW ¼, Section 25, T50N, R33W, Township, Baraga County, Michigan
(46.70734758, -88.38478806)

This open dump was located near a seasonal camp, on Tribal- owned, lease property along Indian Road. The materials present included white goods, construction and demolition waste, household hazardous waste, and household waste (See Photo 2.5.1.).

Cleanup Activities

Cleanup activities were conducted from August 22 through August 31, 2006. Approximately 7 tons of waste was removed.

Post-Cleanup

A follow-up site visit was conducted on May 30, 2007. All waste has been removed. Some smaller debris is present in the soil (See Photos 2.5.2.).

Photo 2.5.1. Indian Road dump site

Photo 2.5.2. Dump site after cleanup

2.6 Rat Patrol

Site Location and Information

SW ¼, SW ¼, Section 29, Baraga Township, Baraga County, Michigan
(46.78072602, -88.52639076)

This dump was located near the Tribally-owned sand pit, near the Ojibwa Industrial Park, north of Highway M-38. The material present included household trash, hazardous waste, white goods (appliances), and solid waste such as cardboard boxes, books, magazines, mattresses (See Photo 2.6.1.).

Cleanup Activities

Approximately 150 tons of waste was removed during cleanup activities conducted in August 2006.

Post Cleanup Activities

Follow-up visits conducted at this site have concluded that all illegally disposed of material has been removed. The entrance along Highway M-38 has been gated and is locked.

Photo 2.6.1. Illegally dumped material at the Rat Patrol site

Photo 2.6.2_Rat Patrol open dump site after cleanup

2.7 Tailor Road

Site Location and Information

NE¼ SE¼, Section 25 T51N R33W, L'Anse Twp., Baraga County, MI.
(46.78589992, -88.42811664)

This open dump was located within a large cleared area of Tribal trust-allotted land along Tailor Road, north of L'Anse, within the L'Anse Reservation. The area is accessible by two unimproved dirt roads along Tailor Road. Several dirt roads transect the property. The site was identified by KBIC as a priority area due to the large quantities of material disposed of there, which included household waste, heavy equipment, automobiles, boats, discarded tires, and automotive parts (See Photo 27.1.). Automobiles, household items, and discarded tires have been historically dumped at the site. Along one of the dirt roads south of this site, is a smaller area of open dumping (Tailor Road #2). This site was also accessible off of Skanee Road.

Cleanup Activities

The cleanup contractor began cleanup at this site on June 19 and continued through July 25, 2006. Approximately 56.1 tons of waste was removed from the large area, and was hauled to Waste Management for disposal.

Follow-up visits

Follow-up visits were conducted in October 2006 and April 2007. The follow-up visits concluded that while the most significant waste has been removed from the site, smaller waste and debris still remains south of the site and scattered along the dirt access roads (See Photos 2.7.2.). There is also evidence of soil staining and areas of sparse vegetation. The two dirt access roads off Tailor Road, as well as Skanee Road have been bermed and posted with 'No Dumping' signs. Waste present at the smaller site (Tailor Road #2) includes demolition debris, white goods, tires, gasoline cans, and drums (See Photo 2.6.3.).

Photo 2.7.1. Tailor Rd #1 dump site before cleanup

Photo 2.7.2. Main dump area after cleanup

Photo 2.7.3. Smaller dump area (Tailor Rd #2) south of Tailor Rd #1 dump site.

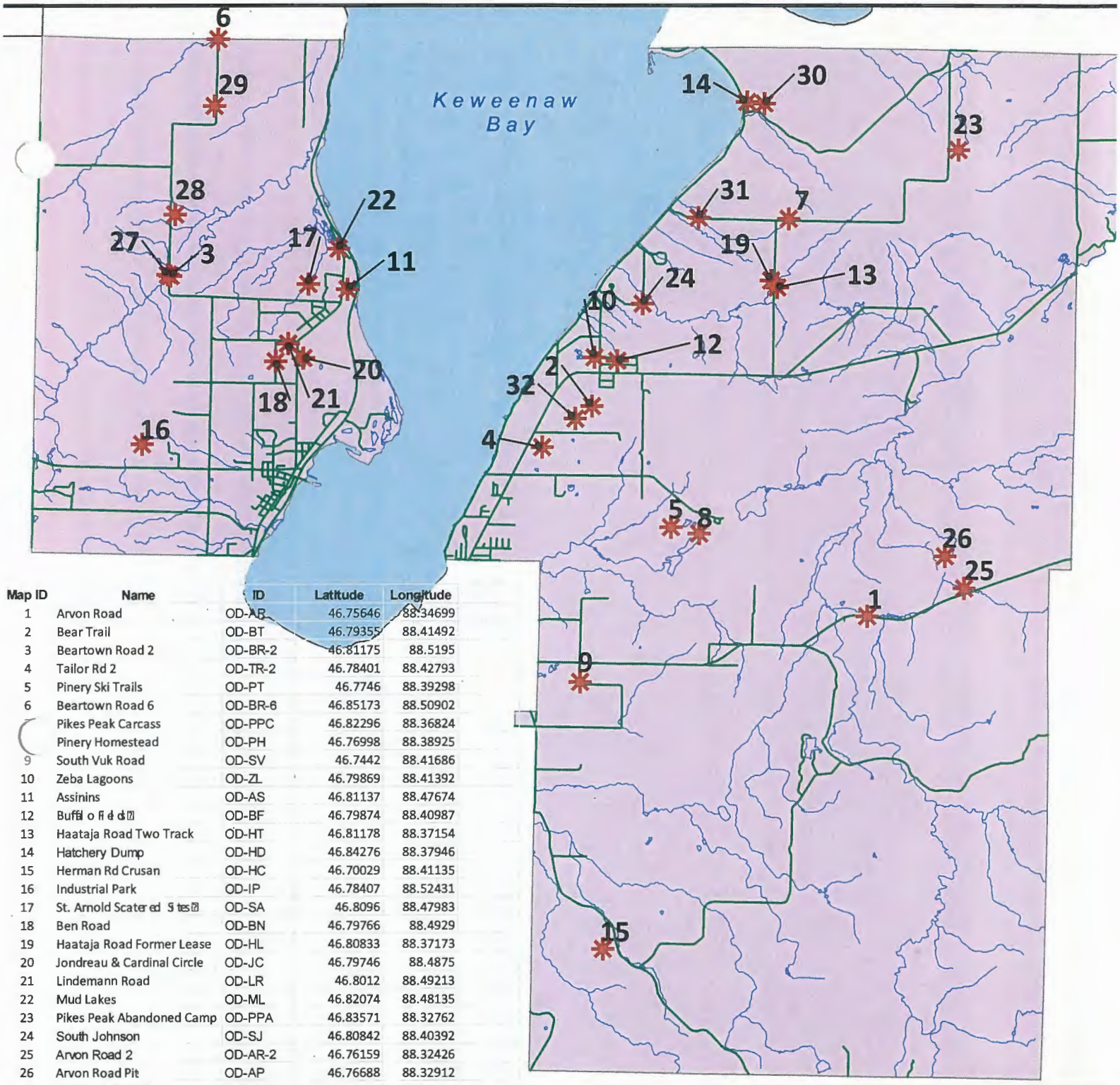
3.0 Summary and Conclusions

In summary, a total of 241 tons of illegally dumped waste was removed from the seven open dump sites on the L'Anse Reservation. The cleanup activities have resulted in a reduced threat to human health and the environment. However, other open dump sites still exist on the L'Anse Reservation. Cleanup of these areas has not yet been possible due to lack of resources. Open dump sites continue to be discovered, sometimes in close proximity to a recently closed or cleaned site. The practice of open dumping continues to be a problem, most likely due to the lack of viable disposal options for the L'Anse Reservation and Baraga County, especially in outlying rural areas, as well as lack of awareness of the potential negative impact to human health and the environment that open dumping creates.

Works Cited

Environmental Protection Agency. May 2003. *Open Dump Cleanup Project Helps Tribes Fight Waste.* Retrieved July 10, 2007, from www.epa.gov/epaoswer/non-hw/tribal/pdftxt/opendump.pdf)

Environmental Protection Agency. November 2003. *Tribal Decision-maker's Guide to Solid Waste Management.* EPA530-R-03-013.



Map ID	Name	ID	Latitude	Longitude
1	Arvon Road	OD-AR	46.75646	88.34699
2	Bear Trail	OD-BT	46.79355	88.41492
3	Beartown Road 2	OD-BR-2	46.81175	88.5195
4	Tailor Rd 2	OD-TR-2	46.78401	88.42793
5	Pinery Ski Trails	OD-PT	46.7746	88.39298
6	Beartown Road 6	OD-BR-6	46.85173	88.50902
7	Pikes Peak Carcass	OD-PPC	46.82296	88.36824
8	Pinery Homestead	OD-PH	46.76998	88.38925
9	South Vuk Road	OD-SV	46.7442	88.41686
10	Zeba Lagoons	OD-ZL	46.79869	88.41392
11	Assinins	OD-AS	46.81137	88.47674
12	Buffalo Field	OD-BF	46.79874	88.40987
13	Haataja Road Two Track	OD-HT	46.81178	88.37154
14	Hatchery Dump	OD-HD	46.84276	88.37946
15	Herman Rd Crusan	OD-HC	46.70029	88.41135
16	Industrial Park	OD-IP	46.78407	88.52431
17	St. Arnold Scattered Sites	OD-SA	46.8096	88.47983
18	Ben Road	OD-BN	46.79766	88.4929
19	Haataja Road Former Lease	OD-HL	46.80833	88.37173
20	Jondreau & Cardinal Circle	OD-JC	46.79746	88.4875
21	Lindemann Road	OD-LR	46.8012	88.49213
22	Mud Lakes	OD-ML	46.82074	88.48135
23	Pikes Peak Abandoned Camp	OD-PPA	46.83571	88.32762
24	South Johnson	OD-SJ	46.80842	88.40392
25	Arvon Road 2	OD-AR-2	46.76159	88.32426
26	Arvon Road Pit	OD-AP	46.76688	88.32912
27	Beartown Road 3	OD-BR-3	46.81213	88.51997
28	Beartown Road 4	OD-BR-4	46.82203	88.51852
29	Beartown Road 5	OD-BR-5	46.8405	88.50956
30	Former L'Anse Township Dum	OD-LTD	46.84193	88.37608
31	Pikes Peak Ravine	OD-PPR	46.82281	88.39068
32	R. Oakes Dump	OD-RO	46.78889	88.41998

N

Keweenaw Bay Indian Community
Open Dump Inventory

Created by: Char Spruce. 201

APPENDIX BB:

Site Visit Memoranda

Record of Site Visit

Site Visited: EJ's Scrapyard

Date of Visit: 8/18/03

KBIC Employee: Todd Warner, Mike Sladewski

Purpose of Visit: Cursory visit to see scrapyard operation and meet Ed Thomas (EJ)

Tasks Completed: Same plus Mike S. took a few photos.

Observations and Comments:
EJ has been in jail for five years and only recently got out on parole. He said feel free to look around, and walked around with us. He complained about how mixed up the materials were and the types of materials people had thrown in the piles. He said this condition was because he had been gone for five years and there had been no regular yard attendant. He had recently had a compactor on site and had numerous loads of scrap hauled out. We only looked around main open area of scrapyard. Yard looked typical for this sort of operation. Not too organized, but not horribly disorganized either. A full inventory of materials was not taken. Materials of concern that were noted included refrigerators, gas tanks, containers (55-gallon, gas tanks, oil storage tanks (20-300 gal), 5-gallon metal containers, radiators), automobiles, electronics, air conditioners, tires, and batteries. All of these were seen mixed in with the main piles of scrap, and not segregated. Some segregation was evident, as there were two noticeable piles of auto gas tanks, and a pile of batteries in one metal shed (former oil storage tank converted). Most tires were present in separate piles. General segregation of materials is also evident, such as lots of aluminum in one area, steel in another, cars off to one end of the yard.

After talking with EJ, it seems as if petroleum product wastes collected are burned off. No evidence was seen of oil or gasoline collection or storage. EJ mentioned burning off used gasoline. He complained nobody would take gas tanks. Sometimes he could get rid of them if he emptied them, let them breathe for a while (or season), and then crushed them with the front end loader. Not sure where waste oils go. A strong diesel, or fuel oil smell was noticeable in places. No obvious source was evident. A small patch of surface soil had noticeable heavy grease mixed in (about a 1x2 foot section). Other than that, no noticeable sheen or staining was noted in surface soils. Electronics were also a problem for him. He said recyclers didn't like microwaves (evident in his piles) due to the microwave generator unit. Refrigerators and air conditioners were mixed in with other wastes, and there was no evidence of a collection system for CFC's. EJ said he typically calls a guy in Houghton after he gets 10 or 12 refrigerators, and he comes down and empties them of coolant. EJ said he does take refrigerators with cut lines, and they don't need certification tags. EJ said he has been inspected numerous times by the State of Michigan, who has on occasion taken soil samples from his property. He specifically mentioned the names Skip Harvey, and Byron Taylor.

Record of Site Visit

Site Visited: Lahti's Junkyard

Date of Visit: 10/8/2003

KBIC Employee: Todd Warner, Mike Sladewski

Purpose of Visit: Inventory materials present and take photographs

Activities Completed: Same + collect GPS data

Location and Directions

The junkyard is located in Township 50 North, Range 33 West, in the northeast ¼ of the southeast ¼ of the northwest ¼ of section 24. GPS location is

To reach the junkyard, take US41 southeast out of L'anse, and turn east (left) onto Unimaki Road. Follow Unimaki Road east until pavement ends, and turn south (right) onto a two-track dirt road (road is in decent condition). Follow the two track for approximately ¼ mile south to the junkyard (junkyard is obvious).

Ownership

The junkyard location is found on page 24 of the Baraga County Platbook. The property size is apparently 10 acres, and is owned by Paul J. Lahti. It is not known if Mr. Lahti is a tribal member.

Observations and Comments

Although the size of the junkyard has not been measured, it appears to cover an area of approximately 500 feet (west to east) by 1000 feet (north to south).

Materials noted included cars, busses, one bulldozer, large county plow blades, tires, miscellaneous car parts, doors, hoods, motors, engine blocks, house doors, chairs, tables, tools, tire rims, scrap aluminum, pickup truck toppers, cans, fencing, bed frames, motorcycle frames, vacuum cleaners, refrigerators, washers, dryers, wood stoves, burn barrels, cam shafts, window fans, duct work, industrial fans, bicycles, mufflers, sinks, toilets, metal pipe, concrete, corrugated culverts, highway guard rails, sewing machines, hot water heaters, barbecues, electronic equipment, wiring, snowmobiles, metal shelving, swing sets, baby buggies, plastic buckets, mirrors, lawnmowers, and lots of automobile glass.

The above materials were all frequently noted as present throughout the junkyard unless otherwise noted. It is estimated that between 500 and 750 junked cars are present. Quantities of other materials were not estimated. Materials also present but in apparently more minor quantities included mattresses (few), scrap wood, shingles, and wall board.

The small proportion or absence of general household garbage (garbage bags, clothing, mattresses, etc), and construction debris (shingles, scrap wood, wall board etc) is noticeable. Most materials present within the junkyard are larger items, such as are typically collected at a scrapyard.

Problem materials noted included the following:

1) Oil filters (dozens)
2) Oil containers
3) Transmission fluid (uncontained) and containers
4) Spray cans (dozens; paint, starter fluid, gumout, WD-40, refrigerant, carburetor cleaners, others unlabeled)
5) Car batteries (couple dozen noted loose; plus one per car?)
6) Automobile gas tanks (> 50)
7) Small pumps and motors (some appeared to be oil containing types)
8) Large fuel oil tanks (at least seven with greater than 5000 gallon capacity)
9) Domestic fuel oil tanks (several with approximately 100-300 gallon capacity)
10) Paint cans (>50, some leaking paint)
11) Wood treating containers (a few noted, some leaking)
12) Burn barrels (about 10-20 noted with ash evident)
13) 5-gallon plastic containers (>20 with contents unknown, both with lids and without)
14) 55-gallon drums (a few piles that appeared to originally have product).
15) Five gallon grease buckets, with some grease remaining

Approximately twenty-three 55-gallon drums were noted as possibly currently or originally containing product. Four are located in a group, and have lids (one lid with stopper out). Two of these are labeled ("Gunk" and "SAE-30"). One (lid w/o stopper) appears to contain oil. Another drum grouping consists of approximately 18 drums. These drums are rusted, some with holes, and some are crushed.

Keweenaw Bay Indian Community Environmental Map

Lake Superior
Keweenaw Bay

Huron Bay

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Village of Baraga

Village of L'Anse

41

Legend

- Underground Storage Tank
- Former UST Sites
- Former Suspected UST Sites
- Closed UST Sites
- Closed LUST Sites
- Brownfield Sites

0 0.5 1 2
Miles

Dec.17, 1936
Keweenaw Bay Indian Community

Source: KBIC, Baraga County
Created by: KBIC's GIS Office

APPENDIX CC:

Underground Storage Tank and Brownfield Information

Storage Tank Information Database

Storage Tank Facilities List

SID-DEQ

Facility and Tank Details

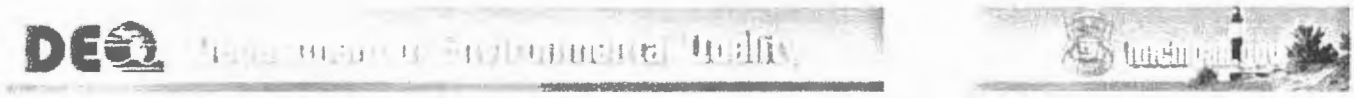
Facility Information:
Facility ID:00037339
Northern Oil I. Inc
150 US 41 SOUTH, BARAGA, MI 49908
Phone# : (906) 353-6185

Owner Information:
Northern Oil Co Inc
150 US-41 South, Baraga, MI 49908
Phone# : (906) 353-6185

Tank ID	Tank Status	Capacity (in gallons)	Installation Date	Substance Stored	Tank Release Detection	Piping Release Detection	Piping Material	Piping Type	Construction Material	Impressed Device
1	Currently In Use	10000	11/1/1991 12:00:00 AM	Gasoline	Automatic Tank Gauging		Fiberglass reinforced plastic	Pressure	Fiberglass Reinforced plastic	No
2	Currently In Use	10000	11/1/1991 12:00:00 AM	FUEL OIL	Automatic Tank Gauging		Fiberglass reinforced plastic	Pressure	Fiberglass Reinforced plastic	No
3	Currently In Use	4000	11/1/1991 12:00:00 AM	Gasoline	Automatic Tank Gauging		Fiberglass reinforced plastic	Pressure	Fiberglass Reinforced plastic	No
4	Currently In Use	4000	11/1/1991 12:00:00 AM	Gasoline	Automatic Tank Gauging		Fiberglass reinforced plastic	Pressure	Fiberglass Reinforced plastic	No
5	Currently In Use	4000	11/1/1991 12:00:00 AM	FUEL OIL	Automatic Tank Gauging		Fiberglass reinforced plastic	Pressure	Fiberglass Reinforced plastic	No

Release Information

Leak ID	LUST Site Name	Discovery Date	Substance Released	Release Status	Closed Date	Evaluation	Land Use Restrictions



Storage Tank Information Database

Storage Tank Facilities List

SID-DEQ

Facility and Tank Details

Facility Information:
Facility ID:00009346
Lute's Corner Store Inc
801 N Main St, L'Anse, MI 49946
Phone# : (906) 524-6262

Owner Information:
Lutes' Lot LLC
801 N Main St, Lanse, MI 49946
Phone# : (906) 524-6262

Tank ID	Tank Status	Capacity (in gallons)	Installation Date	Substance Stored	Tank Release Detection	Piping Release Detection	Piping Material	Piping Type	Construction Material	Impressed Device
1	Removed from Ground	2000	11/1/1980 12:00:00 AM	Gasoline	Automatic Tank Gauging,Inventory Control,Tank Tightness Testing,Vapor Monitoring	GroundWater Monitoring	Galvanized Steel		Asphalt Coated or Bare Steel	No
2	Removed from Ground	1000	10/1/1980 12:00:00 AM	Gasoline	Automatic Tank Gauging,Groundwater Monitoring,Inventory Control,Tank Tightness Testing,Vapor Monitoring		Cathodically Protected	Suction: Valve at Tank	Asphalt Coated or Bare Steel	No
3	Currently In Use	6000	11/1/1990 12:00:00 AM	Gasoline	Automatic Tank Gauging,Inventory Control,Tank Tightness Testing,Vapor Monitoring	GroundWater Monitoring	Cathodically Protected	Suction: No Valve At Tank	Fiberglass Reinforced plastic	No
4	Currently In Use	2000	11/1/1990 12:00:00 AM	Gasoline	Automatic Tank Gauging,Groundwater Monitoring,Inventory Control,Tank Tightness Testing,Vapor Monitoring		Cathodically Protected	Suction: No Valve At Tank	Fiberglass Reinforced plastic	No

Release Information

Leak ID	LUST Site Name	Discovery Date	Substance Released	Release Status	Closed Date	Evaluation	Land Use Restrictions
C-0907-91	Lute's Corner Store, Inc.	05/08/1991		Open			
C-0863-92	Lute's Corner Store, Inc.	05/27/1992	Gasoline	Open			

Storage Tank Information Database

Storage Tank Facilities List

SID-DEQ

Facility and Tank Details

Facility Information:
Facility ID:00013050
Bay Shore BP
201 US 41 South, Baraga, MI 49908
Phone# : (906) 353-6569

Owner Information:
Lawrence J Denomie
201 US-41 South, Baraga, MI 49908
Phone# : (906) 353-6608

Tank ID	Tank Status	Capacity (in gallons)	Installation Date	Substance Stored	Tank Release Detection	Piping Release Detection	Piping Material	Piping Type	Construction Material	Impressed Device
1	Removed from Ground	2000	5/6/1978 12:00:00 AM	Gasoline			Galvanized Steel		Asphalt Coated or Bare Steel	No
2	Removed from Ground	2000	5/6/1956 12:00:00 AM	Gasoline			Galvanized Steel		Asphalt Coated or Bare Steel	No
3	Removed from Ground	1000	5/6/1961 12:00:00 AM	FUEL OIL			Galvanized Steel		Asphalt Coated or Bare Steel	No
4	Removed from Ground	4000	5/6/1986 12:00:00 AM	Gasoline			Fiberglass reinforced plastic		Cathodically Protected Steel	No
5	Removed from Ground	4000	5/6/1986 12:00:00 AM	Gasoline			Fiberglass reinforced plastic		Cathodically Protected Steel	No
6	Removed from Ground	4000	5/6/1986 12:00:00 AM	Gasoline			Fiberglass reinforced plastic		Cathodically Protected Steel	No
7	Currently In Use	8000	10/1/1996 12:00:00 AM	Gasoline	Automatic Tank Gauging,Inter Monitoring Double Walled Tank,Inter Monitoring/Second Containment,Inventory Control	Automatic Line Leak Detectors,Interstitial Monitoring Double Walled Piping,Interstitial Monitoring/Second Containment	Double Walled,FLEXABLE,Secondary Containment	Pressure	Composite(Steel w/Fiberglass),Double Walled	No
8	Currently In Use	12000	10/1/1996 12:00:00 AM	Gasoline	Inter Monitoring Double Walled Tank,Inter Monitoring/Second Containment	Automatic Line Leak Detectors,Interstitial Monitoring Double Walled Piping,Interstitial Monitoring/Second Containment	Double Walled,FLEXABLE,Secondary Containment	Pressure	Composite(Steel w/Fiberglass),Double Walled	No
9	Currently In Use	12000	10/1/1996 12:00:00 AM	Diesel	Automatic Tank Gauging,Inter Monitoring Double Walled Tank,Inter Monitoring/Second Containment,Inventory Control	Automatic Line Leak Detectors,Interstitial Monitoring Double Walled Piping,Interstitial Monitoring/Second Containment	Double Walled,FLEXABLE,Secondary Containment	Pressure	Composite(Steel w/Fiberglass),Double Walled	No
10	Currently In Use	12000	10/1/1996 12:00:00 AM	Diesel	Automatic Tank Gauging,Inter Monitoring Double Walled Tank,Inter Monitoring/Second Containment,Inventory Control	Automatic Line Leak Detectors,Interstitial Monitoring Double Walled Piping,Interstitial Monitoring/Second Containment	Double Walled,FLEXABLE,Secondary Containment	Pressure	Composite(Steel w/Fiberglass),Double Walled	No
11	Currently In Use	12000	11/1/2006 12:00:00 AM	Gasoline	Automatic Tank Gauging	Automatic Line Leak Detectors, Interstitial Monitoring Double Walled Piping	Fiberglass Reinforced Plastic	Suction: No Valve At Tank	Fiberglass Reinforced Plastic, Double Walled	No

Release Information

Leak ID	LUST Site Name	Discovery Date	Substance Released	Release Status	Closed Date	Evaluation	Land Use Restrictions
C-0875-96	Baraga Mobil Mart	10/29/1996	Gasoline	Open			

Storage Tank Information Database

Storage Tank Facilities List

SID-DEQ

Facility and Tank Details

Facility Information:
Facility ID:00012712
Baraga Armory
US-41 A, Baraga, MI 49908
Phone# : (906) 353-6158

Owner Information:
MDMVA - Department of Military & Veterans Affairs
2500 S Washington, Lansing, MI 48913
Phone# : (517) 483-5627

Tank ID	Tank Status	Capacity (in gallons)	Installation Date	Substance Stored	Tank Release Detection	Piping Release Detection	Piping Material	Piping Type	Construction Material	Impressed Device
2	Exempt from Fees	10000	4/7/1956 12:00:00 AM	Heating Oil			Unknown		Asphalt Coated or Bare Steel	No
DMA200	Removed from Ground	550	4/7/1958 12:00:00 AM	Diesel	Manual Tank Gauging		X		Asphalt Coated or Bare Steel	No

Release Information

Leak ID	LUST Site Name	Discovery Date	Substance Released	Release Status	Closed Date	Evaluation	Land Use Restrictions
C-1753-92	Baraga Armory	10/08/1992	Gasoline	Closed	03/09/1994	Type B Evaluation	NONE

Storage Tank Information Database

Storage Tank Facilities List

SID-DEQ

Facility and Tank Details

Facility Information:
Facility ID:00001624
U.p. Plastic Co Inc
INDUSTRIAL PARK, BARAGA, MI 49908
Phone# : (906) 353-6185

Owner Information:
Paul Martin Oil Co Inc
BOX 320 SUPERIOR AVE, BARAGA, MI 49908
Phone# : (906) 353-6348

Tank ID	Tank Status	Capacity (in gallons)	Installation Date	Substance Stored	Tank Release Detection	Piping Release Detection	Piping Material	Piping Type	Construction Material	Impressed Device
1	Removed from Ground	300	3/26/1981 12:00:00 AM	Gasoline			Unknown		Asphalt Coated or Bare Steel	No

Release Information

Leak ID	LUST Site Name	Discovery Date	Substance Released	Release Status	Closed Date	Evaluation	Land Use Restrictions

Storage Tank Information Database

Storage Tank Facilities List

SID-DEQ

Facility and Tank Details

Facility Information:
Facility ID:00015652
Ken's Service
821 SUPERIOR AVE, BARAGA, MI 49908
Phone# : (906) 353-6507

Owner Information:
Ken'S Service
821 SUPERIOR AVE, BARAGA, MI 49908
Phone# : (906) 353-6507

Tank ID	Tank Status	Capacity (in gallons)	Installation Date	Substance Stored	Tank Release Detection	Piping Release Detection	Piping Material	Piping Type	Construction Material	Impressed Device
1	Removed from Ground	1000	4/9/1966 12:00:00 AM	Gasoline			Galvanized Steel	Suction: Valve at Tank	Asphalt Coated or Bare Steel	No
2	Removed from Ground	550	4/9/1966 12:00:00 AM	Gasoline			Galvanized Steel	Suction: Valve at Tank	Asphalt Coated or Bare Steel	No
3	Removed from Ground	550	4/9/1980 12:00:00 AM	Diesel			Galvanized Steel	Suction: Valve at Tank	Asphalt Coated or Bare Steel	No

Release Information

Leak ID	LUST Site Name	Discovery Date	Substance Released	Release Status	Closed Date	Evaluation	Land Use Restrictions

Storage Tank Information Database

Storage Tank Facilities List

SID-DEQ

Facility and Tank Details

Facility Information:
Facility ID:00039915
Keeweenaw Bay Katie Mart
ROUTE-1 BOX 232-A, BARAGA, MI 49908
Phone# : (906) 353-6256

Owner Information:
Doug Engle
RR 1 Box 53, Baraga, MI 49908
Phone# : (906) 353-6256

Tank ID	Tank Status	Capacity (in gallons)	Installation Date	Substance Stored	Tank Release Detection	Piping Release Detection	Piping Material	Piping Type	Construction Material	Impressed Device
1	Removed from Ground	8000	6/28/1988 12:00:00 AM	Gasoline			Cathodically Protected,Galvanized Steel		Cathodically Protected Steel	No
2	Removed from Ground	6000	6/28/1988 12:00:00 AM	Gasoline			Cathodically Protected,Galvanized Steel		Cathodically Protected Steel	No

Release Information

Leak ID	LUST Site Name	Discovery Date	Substance Released	Release Status	Closed Date	Evaluation	Land Use Restrictions

Storage Tank Information Database

Storage Tank Facilities List

SID-DEQ

Facility and Tank Details

Facility Information:
Facility ID:00001127
Baraga Area Schools
LYONS ST, BARAGA, MI 49908
Phone# : (906) 353-6664

Owner Information:
Baraga Area Schools
LYONS ST, BARAGA, MI 49908
Phone# : (906) 353-6664

Tank ID	Tank Status	Capacity (in gallons)	Installation Date	Substance Stored	Tank Release Detection	Piping Release Detection	Piping Material	Piping Type	Construction Material	Impressed Device
1	Removed from Ground	8500	2/21/1980 12:00:00 AM	Diesel			Galvanized Steel		Asphalt Coated or Bare Steel	No
2	Removed from Ground	300	2/20/1961 12:00:00 AM	Gasoline			Galvanized Steel		Asphalt Coated or Bare Steel	No
3	Removed from Ground	300	2/20/1961 12:00:00 AM	Gasoline			Galvanized Steel		Asphalt Coated or Bare Steel	No

Release Information

Leak ID	LUST Site Name	Discovery Date	Substance Released	Release Status	Closed Date	Evaluation	Land Use Restrictions

Storage Tank Information Database

Storage Tank Facilities List

SID-DEQ

Facility and Tank Details

Facility Information:
Facility ID:00008746
Baraga County Concrete Co
RUSSELL CARRIERE IND PARK, BARAGA, MI 49908
Phone# : ( ) -

Owner Information:
Baraga County Concrete Co
RUSSELL CARRIERE IND PARK 417 US 41-N P O BOX 65, BARAGA, MI 49908
Phone# : (906) 353-6595

Tank ID	Tank Status	Capacity (in gallons)	Installation Date	Substance Stored	Tank Release Detection	Piping Release Detection	Piping Material	Piping Type	Construction Material	Impressed Device
1	Removed from Ground	500	4/17/1979 12:00:00 AM	Gasoline			Galvanized Steel		Asphalt Coated or Bare Steel	No
2	Removed from Ground	500	4/16/1981 12:00:00 AM	Diesel			Galvanized Steel		Asphalt Coated or Bare Steel	No

Release Information

Leak ID	LUST Site Name	Discovery Date	Substance Released	Release Status	Closed Date	Evaluation	Land Use Restrictions

Storage Tank Information Database

Storage Tank Facilities List

SID-DEQ

Facility and Tank Details

Facility Information:
Facility ID:00009346
Lute's Corner Store Inc
801 N Main St, L'Anse, MI 49946
Phone# : (906) 524-6262

Owner Information:
Lutes' Lot LLC
801 N Main St, Lanse, MI 49946
Phone# : (906) 524-6262

Tank ID	Tank Status	Capacity (in gallons)	Installation Date	Substance Stored	Tank Release Detection	Piping Release Detection	Piping Material	Piping Type	Construction Material	Impressed Device
1	Removed from Ground	2000	11/1/1980 12:00:00 AM	Gasoline	Automatic Tank Gauging,Inventory Control,Tank Tightness Testing,Vapor Monitoring	GroundWater Monitoring	Galvanized Steel		Asphalt Coated or Bare Steel	No
2	Removed from Ground	1000	10/1/1980 12:00:00 AM	Gasoline	Automatic Tank Gauging,Groundwater Monitoring,Inventory Control,Tank Tightness Testing,Vapor Monitoring		Cathodically Protected	Suction: Valve at Tank	Asphalt Coated or Bare Steel	No
3	Currently In Use	6000	11/1/1990 12:00:00 AM	Gasoline	Automatic Tank Gauging,Inventory Control,Tank Tightness Testing,Vapor Monitoring	GroundWater Monitoring	Cathodically Protected	Suction: No Valve At Tank	Fiberglass Reinforced plastic	No
4	Currently In Use	2000	11/1/1990 12:00:00 AM	Gasoline	Automatic Tank Gauging,Groundwater Monitoring,Inventory Control,Tank Tightness Testing,Vapor Monitoring		Cathodically Protected	Suction: No Valve At Tank	Fiberglass Reinforced plastic	No

Release Information

Leak ID	LUST Site Name	Discovery Date	Substance Released	Release Status	Closed Date	Evaluation	Land Use Restrictions
C-0907-91	Lute's Corner Store, Inc.	05/08/1991		Open			
C-0863-92	Lute's Corner Store, Inc.	05/27/1992	Gasoline	Open			

Storage Tank Information Database

Storage Tank Facilities List

SID-DEQ

Facility and Tank Details

Facility Information:
Facility ID:00008155
Northern Oil I. Inc
302 SUPERIOR AVENUE, BARAGA, MI 49908
Phone# : (906) 353-6185

Owner Information:
Northern Oil Co Inc
150 US-41 South, Baraga, MI 49908
Phone# : (906) 353-6185

Tank ID	Tank Status	Capacity (in gallons)	Installation Date	Substance Stored	Tank Release Detection	Piping Release Detection	Piping Material	Piping Type	Construction Material	Impressed Device
1	Removed from Ground	1000	3/23/1971 12:00:00 AM	Gasoline			Galvanized Steel		Asphalt Coated or Bare Steel	No
2	Removed from Ground	1000	3/23/1971 12:00:00 AM	Gasoline			Galvanized Steel	Suction: Valve at Tank	Asphalt Coated or Bare Steel	No
3	Removed from Ground	300	3/23/1971 12:00:00 AM	Kerosene			Galvanized Steel	Suction: Valve at Tank	Asphalt Coated or Bare Steel	No
4	Removed from Ground	550	3/22/1966 12:00:00 AM	Diesel			Galvanized Steel	Suction: Valve at Tank	Asphalt Coated or Bare Steel	No

Release Information

Leak ID	LUST Site Name	Discovery Date	Substance Released	Release Status	Closed Date	Evaluation	Land Use Restrictions
C-0477-97	Northern Oil I. Inc	06/21/1997	Unknown	Open			

Storage Tank Information Database

Storage Tank Facilities List

SID-DEQ

Facility and Tank Details

Facility Information:
Facility ID:00036987
Cfi, Baraga Mill Site
ROUTE 1 BOX 284, BARAGA, MI 49908
Phone# : (906) 353-7193

Owner Information:
Connor Forest Ind Inc
855 Puumala Rd, Wakefield, MI 49968
Phone# : (906) 229-5135

Tank ID	Tank Status	Capacity (in gallons)	Installation Date	Substance Stored	Tank Release Detection	Piping Release Detection	Piping Material	Piping Type	Construction Material	Impressed Device
1	Removed from Ground	10000	1/1/1987 12:00:00 AM	Diesel	Inventory Control,Manual Tank Gauging		Galvanized Steel	Suction: Valve at Tank	Epoxy Coated Steel	No

Release Information

Leak ID	LUST Site Name	Discovery Date	Substance Released	Release Status	Closed Date	Evaluation	Land Use Restrictions
C-0672-96	CFI, Baraga Mill Site	09/18/1996	Diesel,Unknown	Closed	02/12/1997	Tier I Evaluation	NONE

Storage Tank Information Database

Storage Tank Facilities List

SID-DEQ

Facility and Tank Details

Facility Information:
Facility ID:00020142
Baraga Field Office
BOX 440 (US 41 NORTH), BARAGA, MI 49908
Phone# : (906) 353-6651

Owner Information:
MDNR - Department of Natural Resources
BOX 440 US-41 NORTH, BARAGA, MI 49908
Phone# : (906) 353-6651

Tank ID	Tank Status	Capacity (in gallons)	Installation Date	Substance Stored	Tank Release Detection	Piping Release Detection	Piping Material	Piping Type	Construction Material	Impressed Device
1	Removed from Ground	1000	2/25/1965 12:00:00 AM	#2 FUEL			Unknown		Asphalt Coated or Bare Steel	No
2	Removed from Ground	1000	2/25/1982 12:00:00 AM	Gasoline			Bare Steel		Asphalt Coated or Bare Steel	No
3	Removed from Ground	1000	2/25/1982 12:00:00 AM	Gasoline			Bare Steel		Asphalt Coated or Bare Steel	No
4	Removed from Ground	500	2/25/1982 12:00:00 AM	Diesel			Bare Steel		Asphalt Coated or Bare Steel	No

Release Information

Leak ID	LUST Site Name	Discovery Date	Substance Released	Release Status	Closed Date	Evaluation	Land Use Restrictions
C-2068-90	Baraga District Office - DNR	10/16/1990		Closed	05/21/2001	Tier I Evaluation	Deed Restrictions

Storage Tank Information Database

Storage Tank Facilities List

SID-DEQ

Facility and Tank Details

Facility Information:
Facility ID:00012712
Baraga Armory
US-41 A, Baraga, MI 49908
Phone# : (906) 353-6158

Owner Information:
MDMVA - Department of Military & Veterans Affairs
2500 S Washington, Lansing, MI 48913
Phone# : (517) 483-5627

Tank ID	Tank Status	Capacity (in gallons)	Installation Date	Substance Stored	Tank Release Detection	Piping Release Detection	Piping Material	Piping Type	Construction Material	Impressed Device
2	Exempt from Fees	10000	4/7/1956 12:00:00 AM	Heating Oil			Unknown		Asphalt Coated or Bare Steel	No
DMA200	Removed from Ground	550	4/7/1958 12:00:00 AM	Diesel	Manual Tank Gauging		X		Asphalt Coated or Bare Steel	No

Release Information

Leak ID	LUST Site Name	Discovery Date	Substance Released	Release Status	Closed Date	Evaluation	Land Use Restrictions
C-1753-92	Baraga Armory	10/08/1992	Gasoline	Closed	03/09/1994	Type B Evaluation	NONE

Storage Tank Information Database

Storage Tank Facilities List

SID-DEQ

Facility and Tank Details

Facility Information:
Facility ID:50001195
Petty One Mich. Corporation
SUPERIOR AVENUE, BARAGA, MI 99999
Phone# : ( ) -

Owner Information:
Nrt Owner
Unknown, Unknown, MI 99999
Phone# :

Tank ID	Tank Status	Capacity (in gallons)	Installation Date	Substance Stored	Tank Release Detection	Piping Release Detection	Piping Material	Piping Type	Construction Material	Impressed Device
1	Non-Registered Tank									No

Release Information

Leak ID	LUST Site Name	Discovery Date	Substance Released	Release Status	Closed Date	Evaluation	Land Use Restrictions
C-0961-89	Pettibone Assembly Plant	11/27/1989		Closed	01/26/1998	Tier I Evaluation	NONE

APPENDIX DD:

Michigan DEQ Budget/Personnel Deficit News Articles

Michigan DEQ Cleanup Programs Face Funding Shortage

Posted on November 28, 2007 | Author: edcutlip |

Tuesday at the Women's City Club in downtown Grand Rapids, local environmental and progressive groups–Clean Water Action, the Dwight Lydell Chapter of the Izaak Walton League, the West Michigan Sierra Club, Republicans for Environmental Protection, and Progressive and Friends of North Kent County–sponsored a presentation by the Michigan Department of Environmental Quality (DEQ). The DEQ's presentation was titled "Outta Sight!–Outta Mind!–Outta Money! Trouble Brewing Underground as Funding Levels Dwindle for Michigan's Cleanup Program" and addressed the lack of funding for the DEQ's cleanup programs.

The presentation consisted primarily of a PowerPoint presentation by Sharon Goble, who is a Part 213 Program Specialist in the Remediation and Redevelopment Division. Goble began by telling the audience that Michigan is second to the bottom for conservation spending per capita in the United States at $25. Not surprisingly, the DEQ will soon be out of money for cleanup projects and "Brownfield" development (previously developed sites that appear contaminated), despite the fact that nearly half of Michigan's population lives within half a mile of a contaminated site. Much of this contamination is due to Michigan's industrial legacy–a legacy that has left tens of thousands of contaminated sites with hundreds discovered each year.

According to Goble, her division of the DEQ is a "safety net" for contamination not covered elsewhere. Her division's work is split into two areas–"remediation" and "redevelopment." Remediation includes drum removals, tank removals, abating imminent fire/vapor/explosion hazards, emergency spill response, demolition, and alternate water provisions. The redevelopment portion of her work includes facilitating redevelopment of Brownfield sites in order to build a stronger economy. This work is spread across five program areas–the Michigan Contaminated Site Cleanup Program, the Leaking Underground Storage Tank Program, the Federal Superfund Program, a Brownfield redevelopment program, and the State Owned Sites Cleanup program. Through her division's work, there have been 12,000 leaking tanks closed, $32 million spent from state funds used to conduct cleanup operations at 59 Superfund sites, and $95 awarded to 228 Brownfield redevelopment projects.

Despite what she termed the "successes" of the DEQ's work, her division might lose the majority of its funding. To maintain the current level of work $95 million is needed annually (excluding the tank program, which needs an additional $177 million). With current funding levels and sources, by the beginning of the 2008 Fiscal Year (September 2008), her division will have a substantial shortfall. One-time funding and grants for her division have been depleted and other sources–including the 7/8ths of a cent Refined Petroleum Fund Fee on gasoline purchases–will only account for $14 million in continued funding. If the money is not somehow appropriated, the immediate consequences will be that no new projects will be undertaken, they will be unable to address emergency needs, and existing projects will be scaled back.

The $95 million cited by Goble includes $60 million for projects focused on sites that are critical threats to public health or natural resources, $25 million for staffing, and $10 million for Brownfield grants and loans. Her division's tank program will required an additional $177 million per year with $140 million going towards newly reported releases, $25 million towards cleaning up orphaned sites where there is no liable party (ex: an abandoned gas station), and $12 million for program administration. Goble argued that this $177 million is urgently needed as Michigan has 21,000 confirmed releases (leaks) with

9,000 that have gone unaddressed. Because of its history with the auto industry, Michigan is third in the nation for the number of unaddressed releases. The top three states–Michigan, Florida, and California account for one third of all unaddressed sites in the United States. This includes 835 in the nine county that constitutes the DEQ's Grand Rapids District.

Susan Erickson of the DEQ's Environmental Stewardship Grants and Loans Unit argued that her area–slated to receive $10 million under the amount proposed by Goble–will otherwise run out of grant funding within a year and loan funding within two years. Her program offers low-interest grants and loans for the development of Brownfield sites with grants up to $1 million and loans up to $1 million (with no payment or interest for the first five years, and two percent each year after on the 15 year loan). Erickson said that the program discourages sprawl by encouraging development at sites already connected to the transportation and utility infrastructure, spurs private investment, and has created 12,000 permanent jobs.

Michigan DEQ slashes wetland inspection, pollution spill response programs

By Anne Holcomb | Special to the Kalamazoo Gazette
on September 16, 2008 at 7:57 AM, updated September 16, 2008 at 8:09 AM Email | Print

WHITEHALL -- A cash-strapped Michigan Department of Environmental Quality is making unprecedented cuts in programs designed to protect the state's surface waters and wetlands from environmental abuse.

DEQ Director Steven Chester said several years of budget cuts, in the face of rising inflation and other expenses, have left the department unable to fully do its job.
"We simply don't have the kind of funding we need to adequately implement the laws we're required to implement," Chester told local officials last Thursday at a water-quality preservation workshop.
The DEQ has dropped on-site inspections of wetlands that developers and others want to fill with dirt or otherwise alter. Agency officials are reviewing those proposals from their desks, relying on photographs submitted by permit applicants.

"Historically, we've always done a site visit for wetlands permits," Chester said. "We will no longer be doing that -- we'll be doing a desk review."

The DEQ also is slashing its pollution spill response program and will ignore "minor complaints" about individuals or businesses illegally filling in wetlands. Chester said the DEQ will defer to the U.S. Army Corps of Engineers on wetland-alteration permits sought for sites along the Great Lakes and connecting waters.

The agency also will issue surface water discharge permits, which allow companies to pump limited amounts of pollutants into lakes and streams, to "minor facilities" without first conducting an on-site inspection.

"The bottom line is we simply don't have the resources to get out and inspect all of these facilities. ... In some cases, we'll have to rely on people's honesty and integrity," Chester said.

Environmental advocate Tanya Cabala said the cuts will jeopardize Michigan's environment. She said areas like West Michigan, where surface waters and wetlands are abundant, will suffer more than drier areas of the state.

"There's no question there will be an impact to the environment," Cabala said. "It may not be readily apparent in the short term, but one of the things that concerns me is that this will create a climate that leads to more violations" of environmental laws.
Chester's comments were a prelude to his pitch for increased funding of the DEQ and an environmental cleanup bond the agency hopes to put before voters in November 2010.

The DEQ's retreat on environmental protection programs is one of many symptoms of the state's prolonged fiscal crisis. Chester said the DEQ's general fund budget has been cut by 60 percent over the past six years; the agency has recouped some of those losses by charging companies more for permits to alter wetlands or discharge pollutants to the air and water.

DEQ officials had hoped to put a $1.3 billion environmental bond -- the funds from which would clean up hundreds of pollution sites and bolster Great Lakes restoration efforts -- on this November's ballot.

Chester said there wasn't enough support in the Legislature to put the environmental bond before voters this year.

Michigan lags in natural resource spending

By Alex Nixon | Kalamazoo Gazette
on December 10, 2007 at 9:11 AM, updated December 14, 2007 at 5:01 PM Print

The Price of Poison, Part IV

KALAMAZOO -- How much does Michigan treasure its environment?

Enough to spend only 0.4 percent of the state's $8 billion General Fund budget this year to protect it.

How do we compare with other states in spending on natural resources?

We're at the bottom of the list.

How cash-strapped is the Michigan Department of Environmental Quality?

It needs to raise $17.5 million in new fees on businesses and homeowners by Jan. 15 to balance its current budget.

Chronic underfunding at the DEQ is at a crisis, the department's director, Steven Chester, told the Kalamazoo Gazette.

Without a fix for this year's funding crunch and new funding sources for an expected $80 million shortfall starting next year, Chester said the DEQ may have to:

- Reduce staff by up to 100 positions.
- Reduce inspections.
- Shut down systems that now are preventing the spread of toxic pollution to homes and businesses.

"Whatever remediation systems we're paying for now, and whatever drinking water supplies we're paying for now, the money won't be there. It will end," Chester said. "The public won't be able to look to the DEQ for assistance. We won't be there. That's the bottom line."

General Fund dollars cut
The Legislature used to provide the DEQ with more than $100 million a year from the state's General Fund budget, Chester said.

But that funding support has been cut by 68 percent since 2002 -- the same year the cleanup program stopped getting any money from the General Fund.

"To me, that's kind of an indictment on the way we've been funding these programs," Chester said. "We, as a state, need to start thinking about this, and I don't think the public has a clue" about how bad the problems are.

To address the DEQ's funding needs, Chester said all options must be on the table. Those options could range from new cleanup bonds to royalties paid on water use, according to lawmakers, environmentalists and business leaders.

Chester said he will not advocate for one funding source over another.

"We believe the General Fund needs to be a significant component of funding for DEQ," he said. "General Fund shows the level of public commitment and the fact that the public ultimately benefits from a clean environment."

Conservation spending lacking

Michigan has poorly invested in its natural resources, according to a November report from the Land Policy Institute at Michigan State University.

Author Soji Adelaja, an MSU professor and institute director, found that Michigan ranks 27th in the nation in overall spending on nonagriculture-related conservation and environmental protection efforts.

But on a spending-per-capita basis, the state ranks 47th out of the 48 contiguous states included in the study, he said. At the $25 per person Michigan spends on environmental programs, the study shows, only Georgia ranks lower at $17. And when compared to what Michigan "should" be spending on conservation by considering socioeconomic factors like income and demographics, Adelaja said Michigan ranks last in the country.

Yet the state is looking to its natural resources as the key to rebuilding its economy.

"Michigan's 'Plan B' is related to its natural resources," he said. "That's what's going to help us attract the leadership that will power the new economy."

It's going to get worse

Before future funding for the DEQ can be discussed, Chester said he needs to plug a $17.5 million hole in this year's budget.

That means raising fees on permits or creating new fees, he said. Any fee increases would have to be approved by the Legislature.

"It's not likely that we'll get the level of funding that we're seeking," Chester said. "That's the challenge we have for '08. And we haven't even begun to talk about fiscal year '09," when the department's cleanup program will be $80 million short.

The DEQ is launching a campaign to alert the public to its needs and to promote public discussion on its environmental programs. Once DEQ makes its pitch, it will be up to the public and legislators to decide whether they want to fund it, and how.

"We have a need," Chester said. "You need to help us decide whether or not these programs are valuable, how much you're going to fund them and what the source is going to be."

That funding need -- and what it means for the environment -- isn't being taking seriously by the Legislature, said Rep. Doug Bennett, D-Muskegon, who chairs the House Appropriations subcommittee for DEQ funding.

"I do think it's a problem," Bennett said. "There's all these polluted sites that need to be cleaned up and the money's gone."

Bennett said DEQ funding should be a priority to keep current problems from getting worse.

"As taxpayers, it's a lot cheaper for you and me to make sure the DEQ is funded now so we don't have to pay for it in the future," he said.

PURE SLACKING — MICHIGAN FALTERS ON CONSERVATION

Public SectorQuality of Life — 20 September 2011

Images of children frolicking on scenic beaches fill a television screen as the soothing voice of actor Tim Allen narrates the commercial promoting Michigan as the place to spend “the perfect summer.”

A line you won’t hear Allen speak: Beach closures due to bacterial pollution — contamination linked to fecal matter — have doubled in the last decade.

While the visually stunning Pure Michigan advertising campaign has bolstered the state’s battered image and attracted millions of tourists, who have pumped billons of dollars into an ailing economy, state lawmakers have gutted programs designed to protect the natural resources that the advertising campaign promotes.

The divergent trends has some conservation leaders worried that the state is jeopardizing the ecological health of lakes, beaches and natural areas that are pillars of the Pure Michigan campaign — and of Michigan.

“What’s been happening is kind of like someone putting pretty paint on a house that is structurally unstable,” said Rebecca Humphries, who was director of the Michigan Department Natural Resources and Environment from 2006-2010. “I think there is a disconnect.”

Humphries said deep cuts in conservation programs over the past decade could come back to haunt the state and undermine the Pure Michigan campaign. It may already be happening, according to government data and interviews with state officials.

Consider:

* Beach closures in Michigan have more than doubled in the past seven years.

* Michigan’s popular state parks system has a backlog of projects that totals $341 million. Even with increased funding, it could take decades to complete all of those projects.

* Michigan, once a national conservation leader, was in the bottom four states by conservation funding in a 2008 report.

* The DNR’s forest fire-fighting crew was 20 percent smaller than minimum staffing levels when a lighting strike in 2007 triggered a wildlife fire in theUpper Peninsula. Fueled by high winds, dry conditions and an understaffed crew of first responders, the Sleeper Lake fire near Newberry burned 18,000 acres of state forest and cost the DNR $7.5 million.

The state’s current forest firefighting crew of 72 is half of the optimum staffing level.

* The state knows the location of nearly 9,200 leaking underground storage tanks, but has nowhere near the sums to clean them up. Left unchecked, those sites could poison groundwater and drinking water wells with a variety of harmful toxins.

* The Lake Huron salmon fishery has vanished, the result of invasive mussels disrupting the food chain and government agencies in Michigan and Canada stocking too many fish in the lake, according to Jim Johnson, manager of the state's Alpena Fisheries Research Station.

* The number of master angler awards the DNR issues for large fish has dropped by 33 percent since 2001. Much of that decline is due to salmon in Lake Michigan shrinking after invasive quagga mussels disrupted the food chain.

Beach closures are one of the most obvious indicators of environmental quality. On that count, Michigan appears to be backsliding.

The percentage of beaches closed by bacterial pollution (linked to fecal matter) has increased from 10 percent in 2003 to 24 percent this year, according to state data. State officials blame the increase on polluted stormwater that drains off streets and parking lots and is often discharged onto beaches.

Whatever the cause, beach closures don't help efforts to promote Michigan as a pristine recreational paradise.

"Obviously, we want the beaches to be open as much as possible," said George Zimmermann, vice president of Travel Michigan. "The scenery, the quality of the experience is what Pure Michigan is about. Any challenges to that are a concern.

Tourism is credited with $17 billion in spending in Michigan in 2010, according to a survey done by the Virginia-based D.K. Shifflet & Associates. The state also points to the survey's finding that tourism accounted for 153,000 jobs in the state in 2010.

The Pure Michigan campaign, which launched in 2006, has attracted 7 million visitors to the state. The program generates $3.29 in economic benefit for every $1 spent promoting Michigan, according to state data. Zimmermann said a healthy environment is essential to the Pure Michigan campaign.

"Just look at our TV ads — it's obvious that Michigan's natural environment is a significant part of what we are promoting to attract visitors, create jobs and generate revenue for the state," Zimmerman said.

Yet, state funding for environmental protection programs has plummeted since 2001.

The state's general fund support for the DEQ has decreased by 72 percent since 2001. Total state spending on the DEQ has increased during that same period; but when adjusted for inflation, total DEQ spending has decreased by 20 percent.

The number of DEQ staffers has been reduced 18 percent since 2001, meaning there are fewer regulators to keep tabs on air and water quality, monitor construction in wetlands and sand dunes and penalize polluters.

Meanwhile, there are 9,199 leaking underground storage tanks that need to be cleaned up. While some work is under way, Michigan is a long way from meeting its own standards for remediation.

Bill Rustem, director of strategy for Gov. Rick Snyder and an environmental adviser to Gov. Bill Milliken in the 1970s, said the administration is not content with the situation. Rustem said the governor wants

to invest more in infrastructure, particularly sanitary sewer systems and green infrastructure, to reduce stormwater runoff and decrease the incidence and volume of combined sewer overflows. DEQ Director Dan Wyant said the department would do a thorough performance analysis of the leaking underground storage tank program. He said the program is not working as intended, because a large portion of the money meant for cleanups was diverted elsewhere to help balance the state budget.

General fund support for the Department of Natural Resources — which manages fish and wildlife programs — has dropped by 66 percent since 2001. Total state spending on DNR programs, when adjusted for inflation, has increased by less than 1 percent since then.

“It’s true that general fund support for the DEQ has declined and staffing levels are down significantly. But our gross funding level is up and we’re spending more as a department than we ever have,” said Wyant, who was appointed DEQ director after Gov. Rick Snyder took office in 2011.

Much of the increase in the DNR’s budget in recent years has come in the form of federal grants and permit fees that industries pay the agency. Some of that federal money will evaporate in a couple of years, said Wyant, who oversees DEQ, DNR and the Agriculture Department as part of Snyder’s Quality of Life group in the Cabinet.

The DEQ can do a better job of preserving the state’s natural resources, Wyant said, but he believes the agency must do that by becoming more efficient and developing “partnerships” with the industries it regulates.

“It doesn’t mean we’re going to give up regulations or don’t go after the bad actors,” he said. “It means we’re going to go after the 75-80 miles per hour citations instead of the 71 miles per hour citations.”

Wyant said the first priority of all state agencies is to revitalizeMichigan’s economy. “It’s true we’d like to have more resources but it’s important that we get the economy back on track first,” Wyant said. “The DEQ can be a part of that by not being a hurdle to economic growth.”

Falling behind other states

In the 1970s, Michigan was considered a national leader in conservation programs. It was the first Great Lakes state to ban phosphorus in laundry detergent, a move that helped Lake Erie recover. Michigan also was the first state to ban the insecticide DDT, which killed birds and nearly wiped out bald eagles.

Tougher state and federal regulations enacted since 1970 have brought about dramatic improvements in air quality, water quality and the health of fish and wildlife, according to government data.

But a combination of factors over the past decade — including Michigan’s economic decline, changes in legislative priorities and the expiration of bond programs that funded pollution cleanups — has hurt the state’s environmental protection and conservation programs, according to Humphries.

Michigan ranked 47th among the 50 states for conservation funding, according to a 2008 study by Michigan State University’s Land Policy Institute.

Humphries said the effects of the state's funding are evident in such programs as state forest maintenance and firefighting, where funding and personnel have been cut. The result: Small fires are more likely to become large fires that burn more land and homes built in wooded areas. A 2011 internal DNR audit found that 70 percent of DNR's firefighting equipment is past its replacement schedule.

"Our forest fire-fighting staff is well below national standards, we're always one disaster away from having to close state parks, we don't have money to maintain roads and trails in state forests and we still have contamination sites that we can monitor but we can't clean up," Humphries said. "All of these issues concern me and they should concern most people in Michigan."

During Humphries' tenure as DNR director, general fund support for the agency dropped from $31.7 million in FY2007 to $16.9 million in FY2010. Humphries blamed the deep and sustained cuts over the past decade on lawmakers and the public assigning less value to conservation programs than they did in the past.

The steady decrease in state funding for the DNR and DEQ is in sharp contrast to funding for Michigan's Strategic Fund, the economic development agency that houses the Pure Michigan campaign.

State support for the Strategic Fund has doubled over the past decade, from $65 million in 2001 to $134 million in fiscal 2012. The state will spend $25 million on the Pure Michigan campaign in FY2012. That nearly equals the amount of general fund money the Legislature allocated to the DEQ.

Almost every state agency has experienced budget cuts since 2001, but few have been hit as hard as the DEQ.

The Michigan Legislature, which controls funding for all state agencies, has suffered little during the state's budget crisis. The Legislature's general fund budget has been cut by just 6 percent since 2001, according to state data.

Republicans, conservation leaders at odds over funding

Despite the backlog of pollution cleanups, lack of maintenance of state forests and pressing infrastructure needs in state parks, one Republican lawmaker said the DNR and DEQ are adequately funded.

Ryan Mitchell, a spokesman for Sen. Mike Green — who chairs the DNR and DEQ subcommittees of the Senate Appropriations Committee — said budget cuts over the past decade have made those agencies more efficient and reduced administrative overhead.

"While we did reduce the administrative budgets and size of the two departments in general fund dollars, there are still plenty of resources available that go directly to the mission, not to sustaining bureaucracy we can't afford," Mitchell said.

Officials at the Michigan Environmental Council and Tip of the Mitt Watershed Council, however, said Gov. Snyder's 2012 budget jeopardized the Pure Michigan campaign by further reducing funding for conservation programs. The governor's budget cut DEQ funding by 15 percent and DNR funding by 13 percent.

“We’re concerned about the long-term sustainability of Pure Michigan if we continue to underfund pollution cleanups and environmental protection programs. Eventually, it will catch up to us,” said James Clift, policy director at the Michigan Environmental Council.

Michigan hasn’t had a major environmental disaster since the 1970s, when the toxic flame retardant PBB was accidentally mixed with cattle feed. The incident poisoned the state’s milk and meat supplies and became the nation’s largest case of chemical contamination.

Michigan was home to the Midwest’s largest oil spill in 2010, when a ruptured oil pipeline dumped 840,000 gallons of crude oil into the KalamazooRiver. That incident didn’t strain the DEQ or DNR budgets because federal agencies took the lead in supervising the cleanup, said Humphries, who now works for the advocacy group Ducks Unlimited.

The longtime DNR employee said she wonders what it would take for Michigan lawmakers to once again make conservation programs a priority.

“Are we going to have to have another crisis like PBB before we start investing again in conservation and environmental protection?” Humphries said. “God, I hope not.”

APPENDIX EE:

State of Michigan Part 201 and Waste Disposal System Database Information

Matching sites: 11

Site ID: 07000001
Site Name: MDOT Covington
Site Address: PO Box 167
City: Covington
Zip Code: 49919
County: Baraga
Source: General Government
Pollutant(s): Na; Salt
Score: 17 out of 48
Score Date: 2004-10-06
Township: 48N **Range:** 34W **Section:** 22
Quarter: NE **Quarter/Quarter:** SW
Status: Inactive - no actions taken to address contamination

Site ID: 07000002
Site Name: MDOT L'Anse
Site Address: 301 Winter St.
City: L'Anse
Zip Code: 48904
County: Baraga
Source: General Government
Pollutant(s): Cl; Asphalt; Gasoline
Score: 27 out of 48
Score Date: 2004-10-08
Township: 50N **Range:** 33W **Section:** 09
Quarter: NW **Quarter/Quarter:** NE
Status: Inactive - no actions taken to address contamination

Site ID: 07000004
Site Name: Grade A-1 Stop, L'Anse (213)
Site Address: 118 US-41
City: L'Anse
Zip Code: 49846
County: Baraga
Source: Gasoline Service Station
Pollutant(s): N/A
Score: 38 out of 48
Score Date: 2006-08-02
Township: N/A **Range:** N/A **Section:** N/A
Quarter: N/A **Quarter/Quarter:** N/A
Status: See Leaking Underground Storage Tank Site Database

Site ID: 07000006
Site Name: Holiday Station #168 L'Anse (213)
Site Address: 110 US Highway 41
City: L'Anse
Zip Code: 49946
County: Baraga
Source: Gasoline Service Station
Pollutant(s): N/A
Score: 39 out of 48
Score Date: 2006-07-26
Township: 50N **Range:** 33W **Section:** 9
Quarter: NW **Quarter/Quarter:** NW
Status: See Leaking Underground Storage Tank Site Database

Site ID: 07000007
Site Name: Pettibone Plating Facility
Site Address: 1100 Superior Ave.
City: Baraga
Zip Code: 49908
County: Baraga
Source: Plating & Polishing
Pollutant(s): N/A
Score: 34 out of 48
Score Date: 2004-10-12
Township: 51N **Range:** 33W **Section:** 27
Quarter: NW **Quarter/Quarter:** SW
Status: Interim Response in progress

Site ID: 07000008
Site Name: L'Anse Disposal Village of
Site Address: N/A
City: L'Anse
Zip Code: 49946
County: Baraga
Source: Refuse Systems
Pollutant(s): Leachate
Score: 13 out of 48
Score Date: 1990-09-19
Township: 50N **Range:** 34W **Section:** 12
Quarter: SW **Quarter/Quarter:** NW
Status: Contact Lead Division for current status

Site ID: 07000012
Site Name: Lute's Corner Store L'Anse (213)
Site Address: 801 North Main Street
City: L'Anse
Zip Code: 49846
County: Baraga
Source: Gasoline Service Station
Pollutant(s): N/A
Score: 36 out of 48
Score Date: 2006-11-02
Township: 51N **Range:** 33W **Section:** 36
Quarter: SW **Quarter/Quarter:** SW
Status: See Leaking Underground Storage Tank Site Database

Site ID: 07000024
Site Name: Custom Composites Arnheim
Site Address: B1900N Arnheim Road
City: Baraga
Zip Code: 49908
County: Baraga
Source: Misc Manufacturing Industries
Pollutant(s): Ethylbenzene; Styrene
Score: 31 out of 48
Score Date: 1999-08-16
Township: 52N **Range:** 33W **Section:** 3
Quarter: SE **Quarter/Quarter:** SE
Status: Interim Response in progress

Site ID: 07000025
Site Name: Ken's Service Baraga
Site Address: 821 Superior Avenue

City: Baraga
Zip Code: 49908
County: Baraga
Source: Auto Repair Services & Garage
Pollutant(s): Pb; PCE; Xylenes
Score: 32 out of 48
Score Date: 2004-10-07
Township: 51n **Range:** 33w **Section:** 33
Quarter: NE **Quarter/Quarter:** NE
Status: Interim Response in progress

Site ID: 07000037
Site Name: Former L'Anse Marathon (213)
Site Address: 910-A US-41
City: L'Anse
Zip Code: 49946
County: Baraga
Source: Gasoline Service Station
Pollutant(s): N/A
Score: 36 out of 48
Score Date: 2006-07-25
Township: 50N **Range:** 33W **Section:** 9
Quarter: NW **Quarter/Quarter:** NE
Status: See Leaking Underground Storage Tank Site Database

Site ID: 07000038
Site Name: L'Anse Bulk Plant (213)
Site Address: 13461 Winter St
City: L'Anse
Zip Code: 49946
County: Baraga
Source: Petroleum Bulk Stations & Term
Pollutant(s): N/A
Score: 33 out of 48
Score Date: 2006-11-20
Township: 50N **Range:** 33W **Section:** 9
Quarter: NW **Quarter/Quarter:** NW
Status: See Leaking Underground Storage Tank Site Database

LETTER REPORT
MDOT BOVINE YARD SITE
BOVINE, BARAGA COUNTY, MICHIGAN

Prepared for:

U.S. ENVIRONMENTAL PROTECTION AGENCY
Region 5 Emergency Response Branch
9311 Groh Road
Grosse Ile, MI 48138

TDD No.:	S05-0107-008
Date Prepared:	November 2, 2001
Contract No.:	68-W-00-129
Prepared by:	Tetra Tech EM Inc.
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Telephone No.:	(734) 692-7683

CONTENTS

FIGURES

1.0 INTRODUCTION

The Tetra Tech EM Inc. Superfund Technical Assessment and Response Team (START) prepared this report in accordance with the requirements of Technical Direction Document (TDD) No. S05-0107-008 issued by the U.S. Environmental Protection Agency (U.S. EPA). The scope of this TDD was to perform a site reconnaissance and conduct sampling activities at the Michigan Department of Transportation (MDOT) Bovine Yard (Bovine) site in Bovine, Baraga County, Michigan. START was tasked to prepare a health and safety plan; document on-site conditions through written logbook notes and photographs; and conduct soil and groundwater sampling activities. Field activities were conducted by START member Brad White. This report discusses the site background, field activities, and analytical results and provides a summary of field and sampling activities and results. The photographic log is included in the Appendix A and validated analytical results are included in Appendix B.

2.0 SITE BACKGROUND

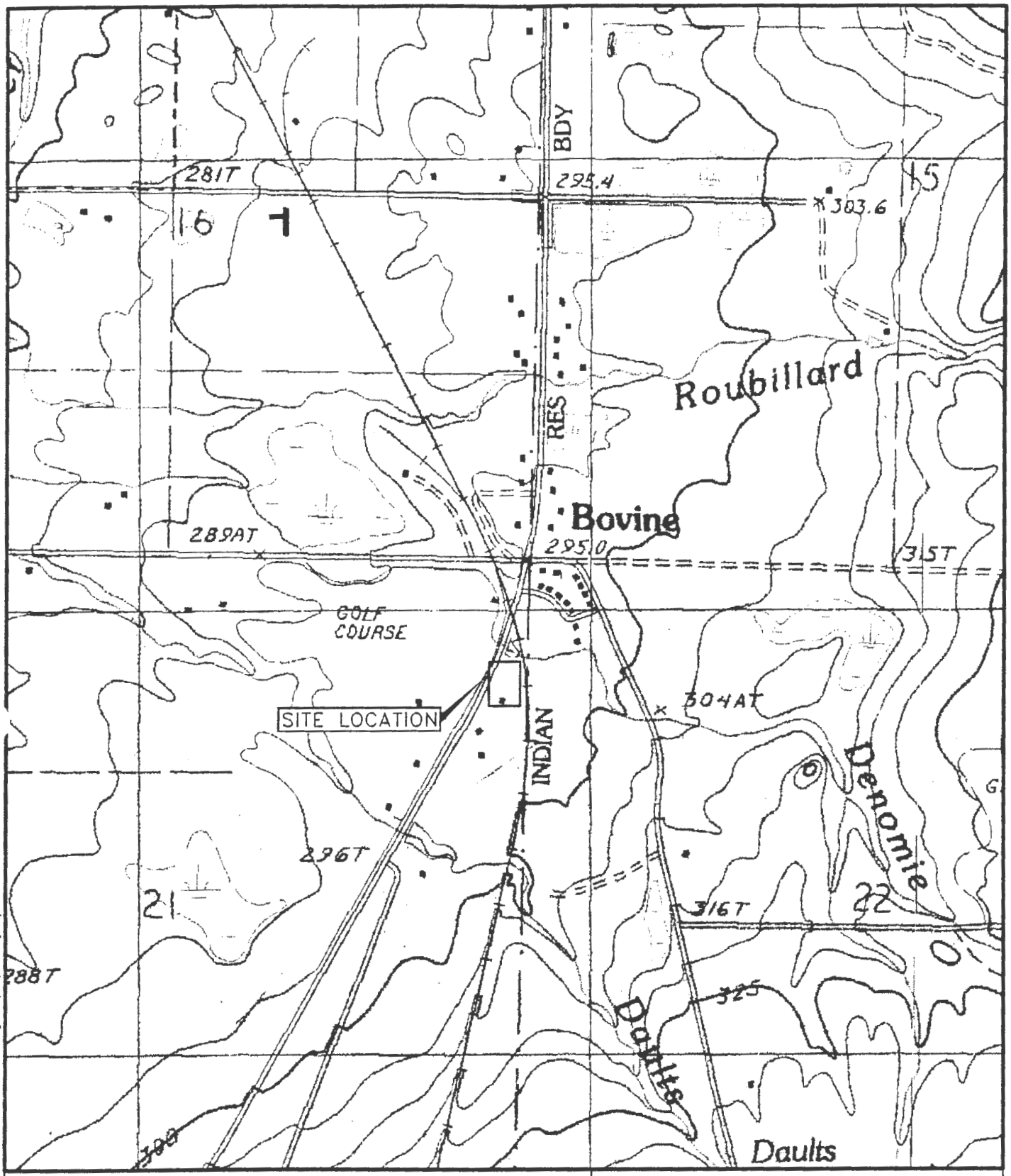
This section provides a description of the Bovine site location and history.

2.1 SITE LOCATION

The Bovine site is located in Bovine, Baraga County, Michigan. The coordinates for the site are 46°43'11" North and 88°25'44" West (see Figure 1). The site measures approximately 250 by 150 feet and is enclosed with a chain-link fence (see Figure 2). The site is bordered to the north by Wisconsin Central railroad tracks and Denomie Creek, to the west by U.S. Highway 41, to the south by a private residence, and to the east by Keweenaw Bay Indian Community (KBIC) Reservation property. The area surrounding the site contains low-density residential and commercial properties, including a golf course to the southwest. Denomie Creek is a tributary to the Falls River, which flows approximately 4 miles north to Keweenaw Bay.

2.2 SITE HISTORY

MDOT owns the Bovine site and has historically used the property as a storage and maintenance yard. Michigan Department of Environmental Quality (MDEQ) investigated the Bovine site in August 1999 in response to complaints filed with Michigan Department of Natural Resources (MDNR) regarding waste disposal practices at the facility. The complaints alleged the following substances had been dumped at the site: tar, fuel oil, hydraulic oil, lead-based paint, and two types of solvent. The complaints also alleged that MDOT paint trucks were cleaned at the site and that the subsequent paint and solvent wastes were not contained. MDEQ inspected the site and excavated several trenches. No samples were collected as part of MDEQ's 1999 inspection. In 2001, KBIC requested U.S. EPA assistance regarding possible surface and subsurface contamination at the Bovine site, and the potential for off-site migration of contaminants onto adjacent KBIC property.



0 500 1000
SCALE IN FEET

MICHIGAN
QUADRANGLE LOCATION

SOURCE: MODIFIED FROM U.S. GEOLOGICAL SURVEY, ALBERTA, MICHIGAN, QUADRANGLE, 1985

MDOT BOVINE YARD
BOVINE, BARAGA COUNTY, MICHIGAN

FIGURE 1
SITE LOCATION MAP

G:\G\900f\08-Bovine\ FIGURE 1-SITE LOCATION MAP.dwg 11/06/2001 joel.peters CH

3.0 FIELD ACTIVITIES

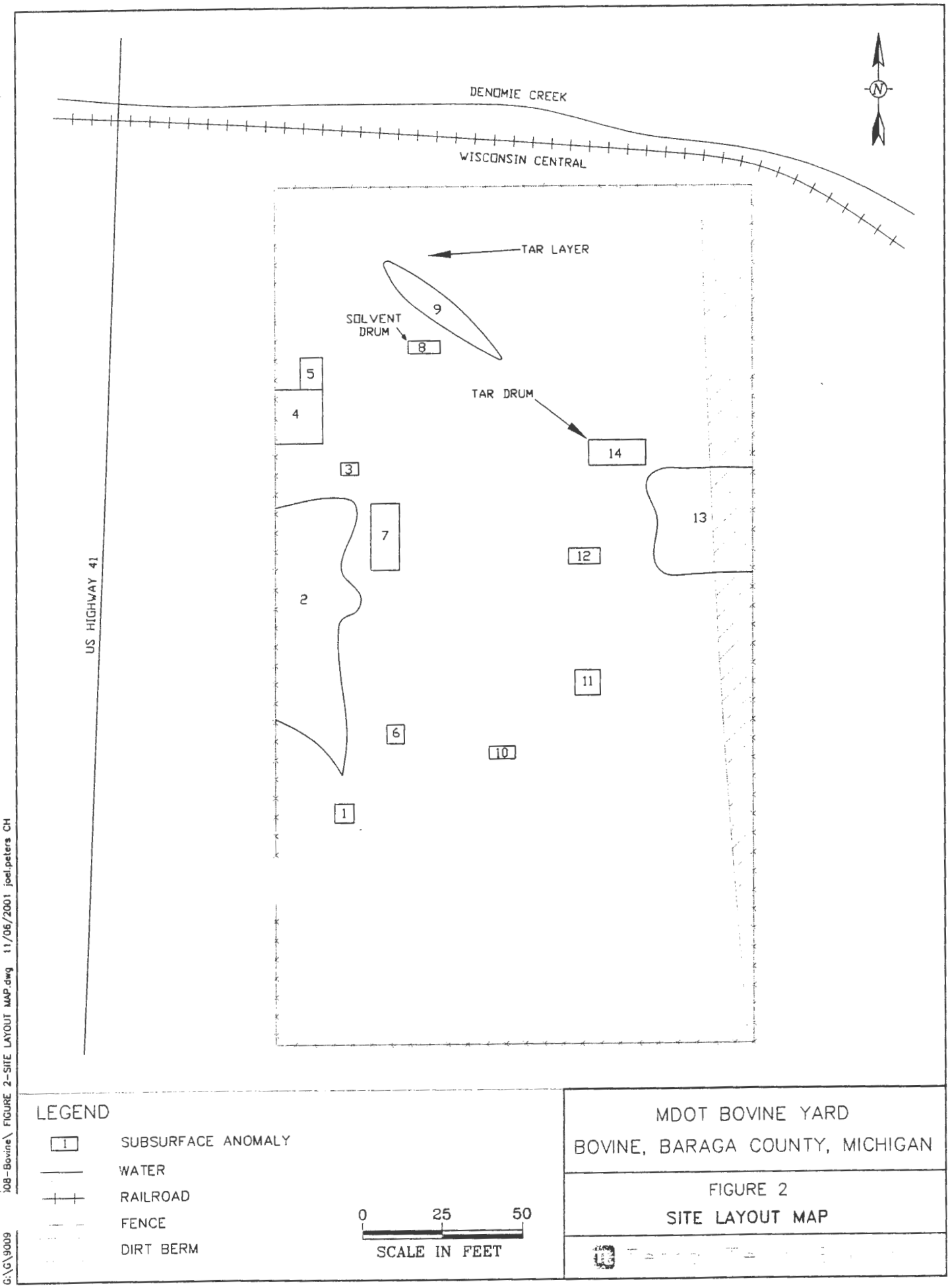
On July 31, 2001, U.S. EPA and START mobilized to the Bovine site to perform an initial site reconnaissance, geophysical investigation, and soil and groundwater sampling. Other parties present during the field activities include representatives from MDOT, MDEQ, and KBIC. This section describes START and U.S. EPA field activities at the Bovine site.

3.1 SITE RECONNAISSANCE

During the site reconnaissance, START initially documented site conditions both within and surrounding the site (see photographic log in Appendix A) . The site, which is surrounded by chain-link fence, was currently being used by MDOT to store snowplow blades, two small boats, railroad ties, fence posts and a gravel stockpile. Most of the site property was vacant and covered with sparse vegetation. The eastern edge of the site contained a dirt embankment along the fence that was covered in vegetation. The area surrounding the site was heavily vegetated, including a small wooded area to the east. START observed no obvious areas of stained soil or impacted vegetation on either the site itself or in the immediate area surrounding the site.

3.2 GEOPHYSICAL INVESTIGATION

U.S. EPA performed a geophysical survey of the site using a metal detector, magnetometer, and ground-penetrating radar (GPR) unit. The entire site, aside from the extreme eastern edge with the dirt embankment, was swept with the metal detector to search for buried objects, including buried drums. The eastern edge was not swept because it was inaccessible due to the dirt embankment. The metal detector had a subsurface penetration of 10 to 12 feet, the magnetometer had a subsurface penetration of 4 to 6 feet, and the GPR unit had a subsurface penetration of approximately 4 to 6 feet and provided a general image of the source of the anomaly. Once an anomaly was identified, it was outlined for later test pit excavation. A total of 14 subsurface anomalies were identified, all of which were located north of the entrance gate into the site (see Figure 2).



LEGEND

- [1] SUBSURFACE ANOMALY
- WATER
- RAILROAD
- FENCE
- DIRT BERM

0 25 50

SCALE IN FEET

MDOT BOVINE YARD

BOVINE, BARAGA COUNTY, MICHIGAN

FIGURE 2

SITE LAYOUT MAP

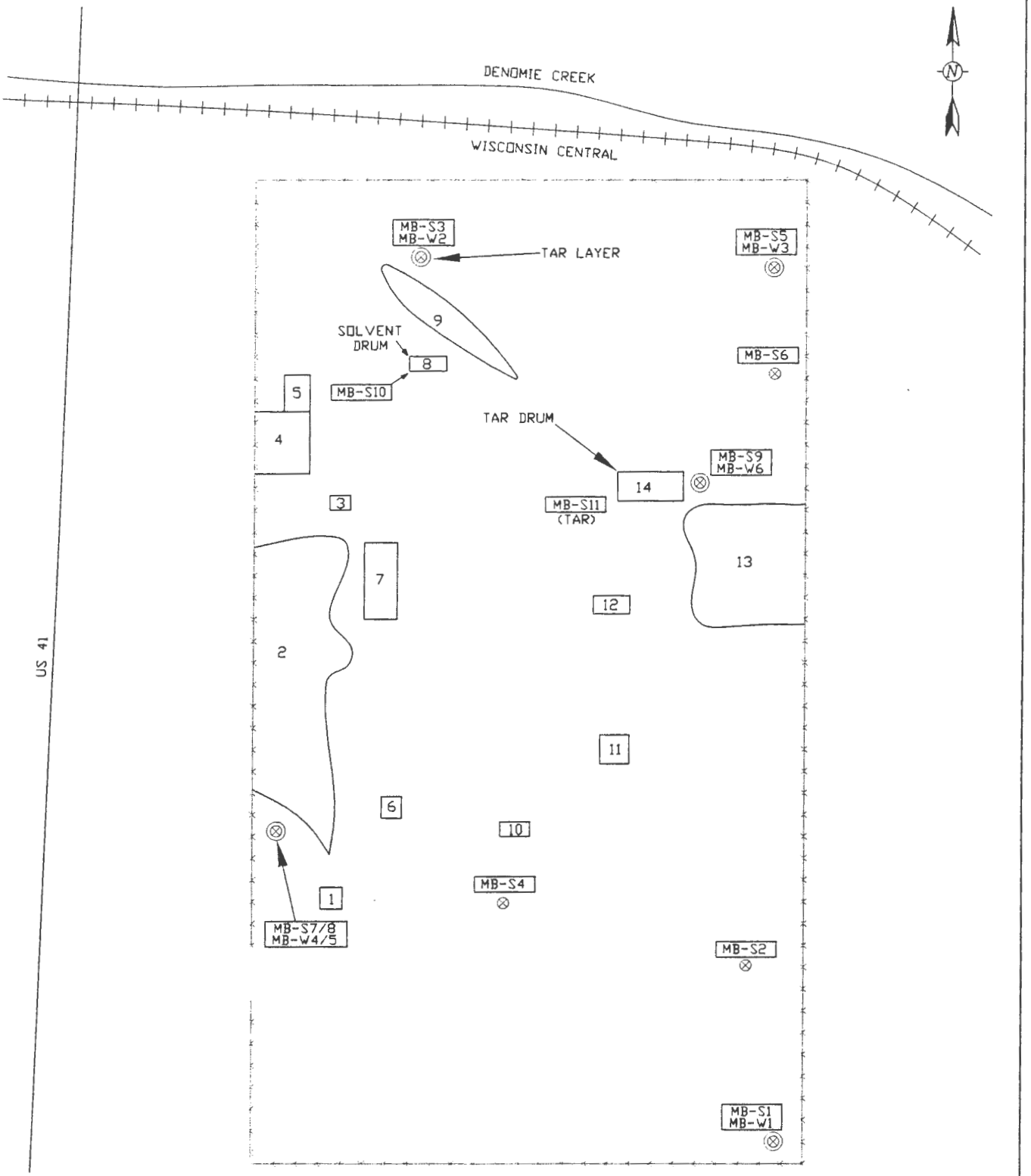
G:\G\9009\08-Bovine\ FIGURE 2-SITE LAYOUT MAP.dwg 11/06/2001 joel.peters CH

Subsurface anomalies were then further investigated using an MDOT backhoe to excavate the area. Each of the 14 areas was slowly excavated to reveal the source of the anomaly. Items found during the investigation include metal guardrails, metal culvert material, road signs, 55-gallon drum lids, and fence posts. These items were staged on site. Two 55-gallon drums and their contents were also recovered. A deteriorating drum containing a tar-like substance was recovered from Area 14 (see Figure 2). The second drum was recovered from Area 8 (see Figure 2) and was also in poor condition, with multiple holes visible. As the second drum was removed, a strong solvent odor was apparent. START recorded photoionization detector (PID) readings near one of the openings of over 2,000 parts per million (ppm); however, sustained PID readings in the breathing zone of the excavation area were below the action level specified in the health and safety plan for modifying personal protective equipment. A small volume of clear liquid spilled out of the second drum during the excavation, and the impacted soil was sampled (see Section 3.3). Both drums were then staged by MDOT in a lined vessel pending eventual disposal.

3.3 SAMPLING ACTIVITIES

The objective of U.S. EPA and START sampling activities was not to fully characterize the Bovine site, but to identify potential site-related threats to human health and the environment. In order to accomplish this, a multimedia sampling approach was employed using a Geoprobe™ for collecting subsurface soil and groundwater samples. U.S. EPA and MDOT provided Geoprobe™ samplers for the sampling event, and START monitored the event and collected all samples.

A total of eight soil borings were completed using the Geoprobe™ (see Figure 3). Soil boring locations were spaced randomly throughout the site as requested by the U.S. EPA On-Scene Coordinator (OSC). Once the geophysical work was completed, additional locations were chosen based on their proximity to the recovered drums (see Figure 3). The depth of each soil boring was determined based on either the depth to the saturated zone or to Geoprobe™ auger refusal. Subsurface soil and water samples were then collected as discussed below.



LEGEND

MB-S1	SOIL SAMPLE NO.	——	WATER
MB-W1	GROUNDWATER SAMPLE NO.	—+—	RAILROAD
1	SUBSURFACE ANOMALY		
⊗	SOIL BORING LOCATION		
○	GROUNDWATER SAMPLING LOCATION		
----	FENCE		

0 25 50

SCALE IN FEET

MDOT BOVINE YARD

BOVINE, BARAGA COUNTY, MICHIGAN

FIGURE 3

SAMPLING LOCATION MAP

G:\G\9009\L01\-Bovine\ FIGURE 3-SAMPLING LOCATION MAP.dwg 11/06/2001 joel.peters CH

Soil Sampling

After all of the 4-foot-long soil core acetate sleeves were pulled from the Geoprobe™, START opened each core and obtained PID readings in an attempt to determine the best interval for sample collection. None of the soil cores yielded PID readings above background levels; therefore, samples were collected from a 1-foot interval based on selection of a visually distinct soil horizon. For example, the soil core from boring location MB-S3 contained a 2- to 6-inch-thick layer of tar at approximately 3.5 feet below ground surface (bgs). Therefore, the MB-S3 sample was collected from this interval. A total of nine soil samples were collected, including one duplicate sample (see Figure 3). START also collected one surface soil sample at the Bovine site of soil impacted from the liquid in the drum recovered from Area 8 for laboratory analysis (see Figure 3). In addition, a sample of the tar-like product contained in the drum recovered from Area 14 (MB-S11) was also collected for laboratory analysis. The samples were collected in 16-ounce glass jars for laboratory analysis (see Section 4.0).

Groundwater Sampling

Groundwater sampling locations were collocated with the soil boring locations. Samples were collected using a peristaltic pump from approximately 1 to 2 feet below the surface of the water table. The samples were placed in 1-liter plastic jars, 1-liter amber glass jars, and 40-milliliter glass vials for various laboratory analyses. A total of six groundwater samples, including one duplicate sample, were collected (see Figure 3). Because of complications with the Geoprobe™, groundwater samples could not be collected from three soil boring locations. Section 4.0 summarizes the analytical results.

4.0 ANALYTICAL RESULTS

Soil and groundwater samples collected by START were shipped to EIS Analytical Services in Indianapolis, Indiana, for laboratory analysis. All soil and groundwater samples were analyzed for total Resource Conservation and Recovery Act (RCRA) metals, volatile organic compounds (VOC), semivolatile organic compounds (SVOC), and total petroleum hydrocarbons (TPH). All soil samples were also analyzed for percent moisture. In addition, soil samples associated with the recovered drums, MB-S10 and MB-S11, were analyzed for flashpoint. Table 1 summarizes the soil sample analytical results, and Table 2 summarizes the groundwater sample analytical results. Validated analytical results are provided in Appendix B.

TABLE 2

SUMMARY OF GROUNDWATER SAMPLE ANALYTICAL RESULTS
MDOT BOVINE YARD SITE
BOVINE, BARAGA COUNTY, MICHIGAN

Analytical Parameter	Sample No.					
	MB-W1	MB-W2	MB-W3	MB-W4[a]	MB-W5[a]	MB-W6
Inorganics[a] (mg/L)						
Arsenic	<.1	<.1	<.1	<.1	<.1	<.1
Barium	0.87	0.99	0.37	0.41	0.29	0.2
Cadmium	<0.02	0.02	<0.02	<0.02	<0.02	<0.02
Chromium (total)	0.32	0.44	0.26	0.05	<0.02	0.04
Copper	0.41	0.66	0.26	0.04	0.01	0.08
Lead	0.13	0.18	0.05	<0.05	<0.05	<0.05
Mercury	<0.0001	0.00072	0.00012	<0.0001	<0.0001	<0.0001
Nickel	0.28	0.3	0.19	<0.04	<0.04	<0.04
Selenium	<0.1	0.1	<0.1	<0.1	<0.1	<0.1
Silver	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.68	0.74	0.43	0.16	0.03	0.06

Notes:
mg/L = Milligram per liter
SVOC = Semivolatile organic compound
TPH = Total petroleum hydrocarbons
VOC = Volatile organic compound

[a] MB-W5 is a duplicate of MB-W4.
[b] Although a complete laboratory analysis of VOCs, SVOCs, inorganics, and TPH was performed, only analytes with at least one detection are shown in Table 2. Refer to Appendix B for the complete validated analytical results.

TABLE 1 (Continued)

SUMMARY OF SOIL SAMPLE ANALYTICAL RESULTS
MDOT BOVINE YARD SITE
BOVINE, BARAGA COUNTY, MICHIGAN

Analytical Parameter	Sample No.										
	MB-S1	MB-S2	MB-S3	MB-S4	MB-S5	MB-S6	MB-S7[a]	MB-S8[a]	MB-S9	MB-S10	MB-S11[b]
TPH (mg/kg)[c]											
TPH (DRO)	NA	NA	1,000	NA	NA	NA	NA	NA	NA	NA	17,800
Other											
Percent Moisture (%)	8.4	13	6.5	17	10	9.4	17	18	14	15	NA
Flashpoint (degrees F)	NA	NA	NA	NA	NA	NA	NA	NA	NA	>201	>201

Notes:

DRO = Diesel-range organics
mg/kg = Milligram per kilogram
NA = Not analyzed
ND = Analyte not detected above detection limit
SVOC = Semivolatile organic compound
TPH = Total petroleum hydrocarbons
VOC = Volatile organic compound

[a] MB-S8 is a duplicate of sample MB-S7.
[b] Sample of drum contents.
[c] Although a complete laboratory analysis of VOCs, SVOCs, inorganics, and DROs was performed, only compounds with at least one detection are shown in Table 1. Refer to Appendix B for the complete validated analytical results.

TABLE 1

SUMMARY OF SOIL SAMPLE ANALYTICAL RESULTS
MDOT BOVINE YARD SITE
BOVINE, BARAGA COUNTY, MICHIGAN

Analytical Parameter	Sample No.										
	MB-S1	MB-S2	MB-S3	MB-S4	MB-S5	MB-S6	MB-S7[a]	MB-S8[a]	MB-S9	MB-S10	MB-S11[b]
VOCs (mg/kg)[c]											
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.24	ND
Isopropyltoluene (para)	ND	ND	ND	0.28	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.5	ND
Xylenes (ortho)	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.15	ND
Xylenes (meta + para)	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.68	ND
SVOCs (mg/kg)[c]											
Di-n-butylphthalate	0.76	2.2	ND	ND	ND	ND	ND	1.2	5.9	3	ND
Inorganics (mg/kg)[c]											
Arsenic	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	NA
Barium	21.4	37.1	14.5	61	26.1	11	40.6	41.3	20.3	22.3	NA
Cadmium	1.1	1.1	1.1	1.1	<1	<1	<1	1.1	<1	1.1	NA
Chromium (total)	15.8	19	26	18.6	13.6	16.5	18.1	18.1	10.9	17.7	NA
Copper	14.4	12.7	290	28	34.7	250	68.5	41.2	10.3	66.1	NA
Lead	<5	<5	10.1	10.8	8.6	<5	22.1	25.2	<5	28.2	NA
Mercury	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NA
Nickel	10.8	8.1	18.1	11	9.3	12.4	9.1	9.3	7.3	12.4	NA
Selenium	<10	<10	<10	12.3	<10	<10	<10	<10	<10	<10	NA
Silver	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA
Zinc	27.5	33.4	34.6	25.7	27.9	26.1	59.5	59.6	19.6	48.8	NA

SITE DESCRIPTION/EXECUTIVE SUMMARY

Site Name and Location

Pettibone Plating Facility
Main Street
Baraga, Michigan 49908

County: Baraga
DNR District: Marquette
Site ID#: 070007
Site Score: 08 (screened)
Date Scored: 10-03-89

Background Information and Site History

This facility manufactures and services hydraulic cylinders and has operated at this location for approximately 30 years. The manufacturing process involves chrome plating. Parts are dipped in a bath of chromic acid, removed and sprayed with rinsewater. The spraying occurs over a metal tank placed in an opening in floor of the building. The tank is set in an oversized pit (sump) lined with concrete block. The water table at the site is very near the surface causing groundwater to infiltrate the sump where it mixes with overspray from the chrome rinsing operation. The liquids that collect in the sump are pumped up and out of the building to an aboveground, open-topped evaporating tank.

Over the 4th of July, 1989 holiday, the pump was left unmanned and a large quantity of liquid (groundwater mixed with chrome process residues) was pumped to the evaporator tank, causing an overflow. Chrome plating process waters spilled to ground surface and spread over a sizeable area. This spill was not reported to regulatory authorities until MDNR personnel noted an extensive area of dead vegetation during a routine RCRA inspection on August 24, 1989. At that time the company agreed to discontinue its chrome plating operations until the system was redesigned and replaced however; another overflow spill occurred in mid-November of 1989 when the sump-pump was inadvertently turned on. In late November of 1989, the company had samples collected to determine the extent and magnitude of soil contamination.

A "Soil Remediation Work Plan" was submitted to the MDNR in September of 1990. This report summarizes investigatory actions (soil assessment) but lacks certain essential data. The investigation has not identified the limits of contamination and the proposed response action cannot be supported as a final remedy. Additional investigation is necessary to define the full nature and extent of the environmental problems this site.

The MDNR has requested the corporation which owns this facility to undertake additional work to enable a sound remedial action plan to be developed. This notice also requested that interim response activities be undertaken to protect public health, safety and welfare and the environment. The corporation has been requested to provide a written commitment perform these activities in accordance with a specified schedule. The written commitment is due by April 15, 1991.

03/26/91

P 376 896 227

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Sent to Christopher Yunken, Pres Pettibone Michigan Corp.	
Street and No. P.O. Box 368	
P.O., State and ZIP Code Baraga, MI 49908	
Postage	$
Certified Fee	1.00
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	1.00
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STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF NATURAL RESOUR

DAVID F. HALES, Director
Regional Headquarters
1990 U.S. 41 South
Marquette, Michigan 49855

March 25, 1990

CERTIFIED MAIL
RETURN RECEIPT REQUEST

Mr. Christopher Yunken, President
Pettibone Michigan Corporation
P.O. Box 368
Baraga, Michigan 49908

SUBJECT: EVAPORATOR TANK OVERFLOW ASSESSMENT, TANGEN PLA

Dear Mr. Yunken:

The report you submitted assessing of the evaporator tank overflow ("Soil Remediation Work Plan for Pettibone Michigan Division Tangen Plant, Baraga, Michigan") has been reviewed. The report is unsatisfactory both in terms of completeness and conclusions. Specific omissions, unsupported conclusions and other concerns are detailed as follows:

OMISSIONS

The report states that "All collected data, observations, and evaluations are presented in this final report" (pg. 7). A large amount of essential information, however, is absent from the report:

Soil Boring Logs

The report indicates that fourteen (14) soil borings were performed and that all borings were advanced to bedrock which was encountered at depths ranging from nine to ten feet. No soil boring logs or other geologic information is presented nor is there a discussion of any field observations of the borings.

Several geologic questions must be answered: What does the glacial overburden at the site consist of and how is it organized? Is there sand, gravel, and/or clay present? What particle sizes were encountered and how were they sorted? Is the overburden homogeneous in terms of composition and particle size or were various strata or facies encountered? Were saturated soils encountered and if so at what depth(s)? Was the bedrock formation or rock type (sandstone, limestone, shale, etc.) identified?

The collection of such geologic information is basic to any subsurface environmental assessment. The above geologic questions must be addressed. The soil boring logs completed by the project geologist and/or the driller must also be presented. It is preferred that copies of field notes taken by project personnel be included to support the data submitted.

OMISSIONS (continued)

Soil sampling

Page 7 of the report states that "samples were collected in clean eight ounce jars and were recorded on field boring log sheets". Page 9 states that "Chain-of-custody records were kept." The referenced field boring log sheets and chain-of-custody records have not been included in the report. Records relating to sample collection (at a minimum; sample description, location, date and time of collection) and sample handling/ transportation need to be presented.

Page 9 of the report references a background chromium level of 9.4 mg/kg. Evidently this value is the result of analyzing the "background composite" sample referenced in the chart on page 11. This chart indicates the composite was collected from a depth of 0.5' - 1.5'. Where, when and how was the background sample collected? What type of material (geologic description) was collected? Was the analyzed background sample composited in the field or elsewhere and how was it composited?

The workplan for the project, as approved by this Department, stated (pg. 11, last paragraph) that "Field duplicates will be taken to check information concerning sample precision" and "Field duplicates will be collected at a frequency of 5% of all samples." Were field duplicates collected as stated? Were field blanks (such as a sample of the decon rinse water) taken?

Analytic Information

Chromium concentrations for various soil samples are presented in a tabular format on pages 11 and 12 of the report. It is assumed, although not specified, that the reported values represent the total chromium concentration of each sample. Unfortunately this data is of very limited use without copies of the laboratory analytical reports from which the information was derived. Does this table represent all of the total chromium analyses which were performed? Was U.S. EPA Method 3050 used exclusively for the samples presented in Table 1? What were the detection limits the testing laboratory was able to achieve? When were the samples analyzed? A complete copy of analytic information generated by the testing laboratory must to be provided.

No information on duplicate sample analysis is presented in the report. The workplan for this project indicated that duplicate samples would be taken to check "the closeness of repeated sample values" which would "give an indication of the reliability of the sampling plan". Were duplicate samples analyzed and if so what were the results? Were field blanks analyzed?

November 17, 1989, Evaporator Tank Overflow

The report references the July 4, 1989, overflow from the evaporator tank but does not mention another overflow incident known to have occurred. On November 17, 1989, this Department received a call from an employee at the Tangen plant who reported that the evaporator tank had again filled

OMISSIONS (continued)

November 17, 1989, Evaporator Tank Overflow (continued)

and overflowed. The caller explained that the sump pump had been inadvertently turned on while attempting to power some other equipment. The pump filled the evaporator tank which began overflowing to the ground surface before the incident was noticed and the pump shut off. This incident, and any other known spill(s), should be referenced in the report.

UNSUPPORTED CONCLUSIONS

Extent of soil contamination

The report seems to suggest that the extent of the contaminated soil has been determined. The results, however, clearly indicate that highly contaminated soil exists at the boundaries of the study area. Three of the most heavily contaminated soil samples (from borings; B-14, B-5, and B-9) are located at the periphery of the study area. Samples from all remaining borings demonstrated chromium concentrations in excess of background levels. How far beyond the study area do chromium contaminated soils extend? The limits of soil contamination must be defined.

The Executive Summary of the report states that "Physical evidence at the site indicates that the released material travelled no further than approximately 60 feet downgradient from the evaporator tank." This statement is very misrepresentative of conditions at the site. During my August 31, 1989 inspection of the spill area, "burnt" vegetation was observed surrounding the evaporator tank and continuing downslope toward a small metal drainage culvert under the loading dock driveway. The area of burnt vegetation was at least 2' wide at the point where the drainage culvert began. During the inspection it was obvious that flow from the spill had been channeled through the culvert to the other side of the driveway. Surface drainage from that point is confined by a runnel leading to the swale at the back of the property. I am not aware of any "physical evidence at the site that indicates the released material travelled no further than" 60 feet. The statement in the Executive Summary should be removed or changed to read: Visual evidence at the site indicates that the material released during the July 4, 1989 spill travelled at least 60 feet downslope of the evaporator tank.

Affected Resources

Page 17 of the report states "The only known environmental media affected by the evaporator tank overflow is soil." Is this to suggest that no other environmental media is contaminated? Page 5 of the workplan you submitted to this Department stated that an objective of the project was to "evaluate potential groundwater or surface water impact as a result of the overflow." In contrast, there is no mention of groundwater or surface water anywhere in final report.

UNSUPPORTED CONCLUSIONS (continued)

Affected resources (continued)

In my letter to you of September 19, 1989, it was stated that "The physiographic setting indicates that ground water and/or surface water may have been affected by the spill." It was also stated that "The environmental impact of the spill must be assessed" and that "the assessment should, at a minimum,"... "determine if ground water or surface water has been affected." It was pointed out that if groundwater was able to enter the plating sump, then it was plausible that plating waste waters had also leaked out and that this possibility must be investigated.

It is obvious, from what is known about the groundwater entering the sump in the building and the ponded water at the east end of the property, that a high water table exists at this site. It is difficult to believe that none of the 14 borings which were completed to bedrock (at depths ranging from nine to ten feet) penetrated the water table. Elevated chromium concentrations are reported for soils taken as far as 10' below the surface. Are these soil within the saturated zone? Has groundwater been contaminated? Groundwater quality must be assessed to determine the presence and extent of any impact.

Waste characterization

On March 26, 1990, the U.S. Environmental Protection Agency promulgated final rules on a new testing procedure to replace the Extraction Procedure Toxicity (EP-Tox) test in determining if a waste exhibits the characteristics of a hazardous waste. The new testing procedure, called the Toxicity Characteristic Leachate Procedure (TCLP), became effective on September 25, 1990. The TCLP is generally more aggressive than the EP-Tox in leaching out metals from various waste media. The net result of this change in Federal regulations is that some wastes which were previously considered non-hazardous may now be classified as characteristic hazardous wastes under TCLP requirements.

As the report explains, contaminated soil at this site was tested with the EP-Tox procedure. The purpose of this testing was to determine if the waste would be classified as hazardous under the Federal Resource Conservation and Recovery Act (RCRA) and the State Hazardous Waste Management Act. Because the EP-Tox procedure is no longer valid in establishing waste characteristics under RCRA, and because total chromium concentrations in the contaminated soil exceed the RCRA regulatory threshold by as much as 500 times; the contaminated soil will have to be retested using the TCLP before transport or disposal may occur.

OTHER CONCERNS

Contaminant Migration Pathways

The workplan for this project stated (pg. 5) that an additional objective was to "evaluate the potential for off-site migration of impact". The final report, however, gives no indication that potential migration pathways were examined or even considered. There is no evidence to suggest that the contaminants released to the environment are confined or

OTHER CONCERNS (continued)

Contaminant Migration Pathways (continued)

controlled. The "potential for off-site migration of impact" cannot be properly evaluated without knowing the extent of the contamination and the environmental media which have been effected.

Since groundwater is likely to have been (or become) effected by the evaporator tank spills, it would be prudent to determine the hydrogeologic characteristics of the aquifer. Does a single aquifer exist or are multiple aquifers present. What is the flow rate and direction of the aquifer(s)? Is a plume of contaminated groundwater emanating from the site and if so what are the contaminant concentrations within the plume and how far does it extend? Answers to these questions are fundamental to determining the potential for environmental contaminants to migrate off-site.

There is also no evidence to indicate that potential surface water impacts have been examined. It is known that the surficial soils at the downslope limits of the study area are severely contaminated (soil boring B-14 exhibited near surface chromium concentrations of 1500 mg/kg). As previously stated there is no evidence to indicate that the flow of the spill(s) was halted at this point or that subsequent runoff did not cause nearsurface contaminants to be washed into the swale at the east end of the property. These potential that surface water has, or may become, contaminated must be investigated.

Potential Direct Contact Hazards

The information provided in the report indicates that the highly contaminated surface soils are present at the site. These contaminated soils represent a potential health threat to individuals who may come into contact with this material. Access to the contaminated soils must be immediately controlled.

The proposal to remove the top two feet of soil from within the study area would help to protect against potential human exposure to the contaminated soils in that area. However, until such a surface removal is undertaken, temporary access controls need to be put in place. At a minimum, the area of highly contaminated soils should be posted with warning signs and cordoned off. It is recommended that security fencing be installed for this purpose.

Proposal to Removal Surface Soils

The proposal to remove the top two feet of soil from within the study area and install an impermeable cover at that depth is considered to be a useful interim response. As previously mentioned, these actions would provide protection against potential human exposure to the contaminated soils in that area. These actions, however, would not constitute adequate safeguards for natural resource targets as suggested on page 17 of the report. Until the nature and extent of the environmental problem is fully defined (for each resources potentially effected or at risk) there is no basis to consider the proposed surface removal as a final remedy.

OTHER CONCERNS (continued)

Evaporator Tank Remediation

Page 18 of the report indicates that the liquid remaining in the evaporator tank was found to be corrosive and E.P. Toxic for chromium. The report states that "In accordance with RCRA Subtitle C and Michigan Act 64 hazardous waste criteria, the waste is considered a characteristic hazardous waste". Both RCRA and Act 64 place strict limits on the length of time hazardous wastes may be stored at a generating facility. The report does not indicate when the waste in the evaporating tank was determined to be hazardous. When was this determination made and what has since happened to the hazardous waste?

It is imperative that the known and suspected environmental problems at the Tangen facility be resolved. Toward this end, the Department requests that:

1. Pettibone Michigan Corporation supply all information and data collected during the evaporator tank overflow assessment which has not been presented to this office. This information and data includes, but is not limited to; soil boring logs, sample collection logs, chain-of-custody logs, project field notes and complete laboratory analytical reports. A narrative and/or diagrammatic response to each of the questions raised in the OMISSIONS portion of this letter should be included with this submittal. The described information/data must be delivered to this office no later than **April 15, 1991.**

2. Pettibone Michigan Corporation undertake Interim Response activities to protect public health, safety and welfare and the environment. These activities include, but are not limited to, establishing adequate safeguards to prevent unauthorized access to contaminated media and isolating contaminated soils from precipitation and runoff. These activities should commence immediately and be completed no later than **May 1, 1991.**

3. Pettibone Michigan Corporation complete a comprehensive Remedial Investigation of this site, in accordance with Rule 511 of the Administrative Rules for 1982 P.A. 307, as amended (Michigan Environmental Response Act). A copy of these rules are enclosed. The Department requests that a comprehensive workplan for the Remedial Investigation be submitted to this office for review no later **May 1, 1991.** This workplan must include a schedule for the initiation and completion of all investigatory activities to be undertaken.

The Department may request additional actions in accordance with the Act 307 Administrative Rules before the selection of a Final Remedy.

The Department requests a written commitment from the Pettibone Michigan Corporation to perform the activities described in this letter within the specified timeframes. This written commitment must be received in this office no later than **April 15, 1991.**

Please do not hesitate to contact me should you have any questions regarding this matter.

Sincerely,

Steve Harrington

Steve Harrington
ENVIRONMENTAL RESPONSE DIVISION
906-228-6561

Enclosure (Administrative Rules
1982 PA 307, as amended)

xc: Mr. Dave Dennis, MDNR

MN FILE COPY

CONESTOGA-ROVERS & ASSOCIATES
1801 Old Highway 8, Suite 114
St. Paul, Minnesota 55112
(612) 639-0913 Fax:(612) 639-0923

December 18, 1996 Reference No. 6300

Ms. Amy Keranen
MICHIGAN DEPARTMENT
OF ENVIRONMENTAL QUALITY
427 US 41 North
Baraga, Michigan 49908

Dear Ms. Keranen:

Re: Soil Sampling Results for the Green Chain Area
Connor Forest Industries, Baraga, Michigan

On behalf of Connor Forest Industries (CFI), Conestoga-Rovers & Associates (CRA) is submitting this letter which provides a summary of the soil sampling and analytical results for the green chain investigation at the Baraga mill (Site).

Background

The investigation of the soils beneath the green chain was initiated in 1992 when three surface samples (SB7A, SB7B and SB7C) were collected and analyzed as part of a comprehensive Site assessment. In 1993, additional sampling and analysis was conducted at MW4. These locations are shown on Figure 1. To better define the area of impacted soils in the former green chain, additional sampling and analyses have been conducted during the summer and fall of 1996.

CRA provided an original work plan to MDEQ by letter dated August 7, 1996, for the sampling of soils at 10 locations in the area of the green chain at the Site. In a follow-up letter dated August 16, 1996 to MDEQ from CFI, an additional 4 sampling locations were proposed. This sampling was performed on August 21 and 22, 1996. The samples were collected to the depth of the water table (approximately seven to eight feet bgs), consistent with the August 7 work plan.

A supplemental letter dated September 12, 1996, was submitted to MDEQ providing additional proposed sampling locations. These additional samples were collected from 9 locations on September 13, 1996. These samples were collected using a manually driven split-spoon sampler and were only completed to a depth of approximately four feet below ground surface (bgs).

To complete the definition of PCP impacted soil and, in addition, provide data in an area below the concrete floor of the green chain extension, a third round of soil sampling was proposed in a letter to the MDEQ dated October 16, 1996. These samples were collected from 25 locations

on October 30 and October 31, 1996. These soil samples were collected from the surface to the depth of the water table.

In all, soil samples were collected from 48 locations from the surface to a minimum of 4 feet bgs and typically to the water table, which is approximately 6 to 8 feet bgs. Figure 1 shows the locations of the 48 soil borings.

Sampling Procedures

With the exception of SB15 through SB23, the soil borings were drilled using 4 1/4-inch hollow stem augers. Soil samples were collected continuously from the surface to the water table using 2-foot long split-spoon samplers. Samples were inspected visually and described according to the Unified Soil Classification System. Representative portions of each sample were placed in a laboratory supplied sample jar which were placed in a cooler with ice. All samples were shipped to Trace Labs under standard chain-of-custody via overnight courier. The samples from SB15 through SB23 were collected from the surface to 4 feet bgs using 2-foot long split-spoon samplers which were manually driven to the required depth. The soil boring logs are provided in Attachment 1.

Analytical samples were collected from the surface to 0.5 feet bgs, from 0.5 feet to 2.0 feet bgs and then at 2 foot intervals to the completion depths of each soil boring. Trace Labs was instructed to extract and analyze the samples collected from the top 4 feet (3 samples) and to extract and hold the deeper samples for potential future analysis. The exception is SB2, where all of the samples collected (0 feet to 8 feet, 5 samples) were analyzed. The samples were analyzed for PCP using the 8270 method. At those locations where PCP was detected in the 0 to 4 feet samples, the deeper samples were analyzed to delineate the vertical extent of PCP at each boring location. At most locations, subsequent deeper samples were analyzed until two consecutive "not detected" results were attained. Soil boring locations SB17 and SB23 had detectable concentrations in all samples collected to the completion depth of 4 feet bgs. Therefore, soil borings SB36 and SB44 were drilled and sampled immediately adjacent to those two locations to provide additional vertical delineation.

The split-spoon samplers were cleaned prior to collecting each sample by washing with Alconox and rinsing with distilled water. Clean augers were used for each boring location. Augers were cleaned using a high pressure hot water wash. All decontamination fluids were containerized in 55 gallon drums. Drill cuttings were also contained in 55 gallon drums. All drums are staged on-Site pending proper disposal. Each soil boring was backfilled with bentonite chips.

Analytical Results

Figures 2 and 3 provide the locations of the soil borings and summarize the analytical data for PCP concentrations in the soil samples. Table 1 provides a summary of the data showing the soil boring number, sample depth and PCP concentration. The laboratory reports are provided in Attachment 2.

These data show that the area and depth of PCP impacted soils beneath the former green chain building have been delineated. In general, PCP impacted soils were observed within the top three feet of an area which includes the open portion beneath the former conveyor and the southern 10 feet of the wood flooring area, extending from the former dip tank to the east wall of the building.

CFI intends to complete the remediation of these soils utilizing excavation and will be submitting a Remediation Work Plan to MDEQ.

Very Truly Yours,

CONESTOGA-ROVERS & ASSOCIATES

Jon L. Christofferson

JLC/kjs
Enc.
c.c. Clif Clark; MDEQ
Jill Schultz-Stoker; CFI
Lori Poulos; CFI
Ron Lake; CFI
Don Rosenberger; CFI
Margaret Coughlin; Dickinson, Wright
Dustin Ordway; Dickinson, Wright

CFI - BARAGA GREEN CHAIN
SOIL BORING ANALYTICAL RESULTS

Location	*Depth (ft. bgs)*	*Concentration (mg/kg)*
SB7A[1]	0.0-0.5	70
SB7B[1]	0.0-0.5	130
SB7C[1]	0.0-0.5	36
MW4[2]	0.5-1.0	70
MW4[2]	9.5-10.0	0.98
MW4[2]	19.5-20.0	ND
SB1	0.0-0.5	250
SB1	0.5-1.4	200
SB1	2.0-3.6	ND
SB1	4.0-5.4	ND
SB2	0.0-0.5	180
SB2	0.5-0.9	92
SB2	2.0-3.7	ND
SB2	4.0-5.8	ND
SB2	6.0-7.7	ND
SB3	0.0-0.5	ND
SB3	0.5-1.5	ND
SB3	2.0-3.8	ND
SB4	0.0-0.5	35
SB4	0.5-1.7	75
SB4	2.0-2.8	ND
SB4	4.0-6.0	ND
SB5	0.0-0.5	44
SB5	0.5-1.2	250
SB5	2.0-3.8	ND
SB5	4.0-5.9	ND
SB6	0.0-0.5	82
SB6	2.0-3.7	ND
SB7	0.0-0.5	18
SB7	0.5-1.3	13
SB7	2.0-3.2	8.2
SB7	4.0-5.5	ND
SB8	0.0-0.5	450
SB8	0.5-1.3	ND
SB8	2.0-3.3	ND
SB9	0.0-0.5	140
SB9	0.5-1.4	ND
SB9	2.0-3.6	ND
SB10	0.0-0.5	68
SB10	0.5-1.0	500
SB10	2.0-3.5	ND
SB10	4.0-5.8	ND
SB11	0.0-0.5	340
SB11	0.5-1.5	ND
SB11	2.0-3.8	ND
SB12	0.0-0.5	40
SB12	0.5-1.1	13
SB12	2.0-3.8	ND
SB13	0.0-0.5	200
SB13	0.5-1.2	14
SB13	2.0-3.7	ND
SB13	4.0-6.0	ND
SB14	0.0-0.5	13
SB14	0.5-1.5	57
SB14	2.0-3.7	ND
SB14	4.0-4.8	ND
SB15	0.0-0.5	ND
SB15	0.5-2.5	ND
SB15	2.5-4.0	ND
SB16	0.0-0.5	ND
SB16	0.5-2.0	29
SB16	2.0-4.0	ND
SB17	0.0-0.5	ND
SB17	0.5-2.0	2.3
SB17	2.0-2.5	15

CFI - BARAGA GREEN CHAIN
SOIL BORING ANALYTICAL RESULTS

Location	*Depth (ft. bgs)*	*Concentration (mg/kg)*
SB18	0.0-0.5	420
SB18	0.5-2.0	ND
SB18	2.0-3.5	ND
SB19	0.0-0.5	62
SB19	0.5-1.5	ND
SB19	2.0-3.7	ND
SB20	0.0-0.5	ND
SB20	0.5-1.7	22
SB20	2.0-3.8	ND
SB21	0.0-0.5	ND
SB21	0.5-1.4	ND
SB21	2.0-2.5	ND
SB22	0.0-0.5	1.8
SB22	2.0-3.2	ND
SB23	0.0-0.5	56
SB23	0.5-1.4	60
SB23	2.0-3.2	81
SB24	0.0-0.5	33
SB24	0.5-1.5	ND
SB24	2.0-3.0	ND
SB25	0.0-0.5	2.5
SB25	0.5-2.0	ND
SB25	2.0-3.1	ND
SB26	0.0-0.5	ND
SB26	0.5-1.4	ND
SB26	2.0-3.0	ND
SB27	0.0-0.5	ND
SB27	0.5-1.0	ND
SB27	2.0-2.7	ND
SB28	0.0-0.5	ND
SB28	0.5-1.7	ND
SB28	2.0-3.6	ND
SB29	0.0-0.5	ND
SB29	0.5-0.8	ND
SB29	2.0-3.5	ND
SB30	0.0-0.5	ND
SB30	0.5-1.8	ND
SB30	2.0-3.5	ND
SB31	0.0-0.5	ND
SB31	0.5-1.2	1.9
SB31	2.0-3.3	ND
SB32	0.0-0.5	ND
SB32	0.5-1.8	ND
SB32	2.0-3.5	ND
SB33	0.0-0.5	ND
SB33	0.5-2.0	ND
SB33	2.0-2.9	ND
SB34	0.0-0.5	ND
SB34	0.5-2.0	ND
SB34	2.0-3.5	ND
SB35	0.0-0.6	ND
SB35	0.5-1.7	ND
SB35	2.0-2.5	ND
SB36	0.0-0.5	ND
SB36	0.5-2.0	ND
SB36	2.0-3.7	ND
SB37	0.0-0.5	ND
SB37	0.5-1.3	ND
SB37	2.0-2.7	37
SB37	4.0-4.9	ND
SB38	0.0-0.5	ND
SB38	0.5-1.5	ND
SB38	2.0-3.3	ND

CFI - BARAGA GREEN CHAIN
SOIL BORING ANALYTICAL RESULTS

Location	*Depth (ft. bgs)*	*Concentration (mg/kg)*
SB39	0.0-0.5	ND
SB39	0.5-1.8	ND
SB39	2.0-3.7	ND
SB40	0.0-0.5	ND
SB40	0.5-1.7	ND
SB40	2.0-3.6	ND
SB41	0.0-0.5	7.6
SB41	0.5-1.7	ND
SB41	2.0-3.1	ND
SB42	0.0-0.5	ND
SB42	0.5-2.0	ND
SB42	2.0-3.5	2
SB42	4.0-5.3	ND
SB43	0.0-0.5	ND
SB43	0.5-1.8	ND
SB43	2.0-2.5	ND
SB44	0.0-0.5	64
SB44	0.5-1.2	190
SB44	2.0-3.3	350
SB44	4.0-5.5	ND
SB44	6.0-6.9	4.9
SB45	0.0-0.5	ND
SB45	0.5-1.6	ND
SB45	2.0-2.7	2.1
SB46	0.0-0.5	ND
SB46	0.5-1.6	ND
SB46	2.0-2.4	7.7
SB46	4.0-5.5	ND
SB46	6.0-6.9	ND
SB47	0.0-0.5	ND
SB47	0.5-2.0	26
SB47	3.0-4.6	ND
SB47	5.0-5.9	ND
SB48	0.0-0.5	ND
SB48	0.5-2.0	ND
SB48	2.0-3.5	ND

Note:

ND - Not detected at quantitation limit of 1.7 mg/kg

(1) Sample collected 10/7/92

(2) Sample collected 6/12/93

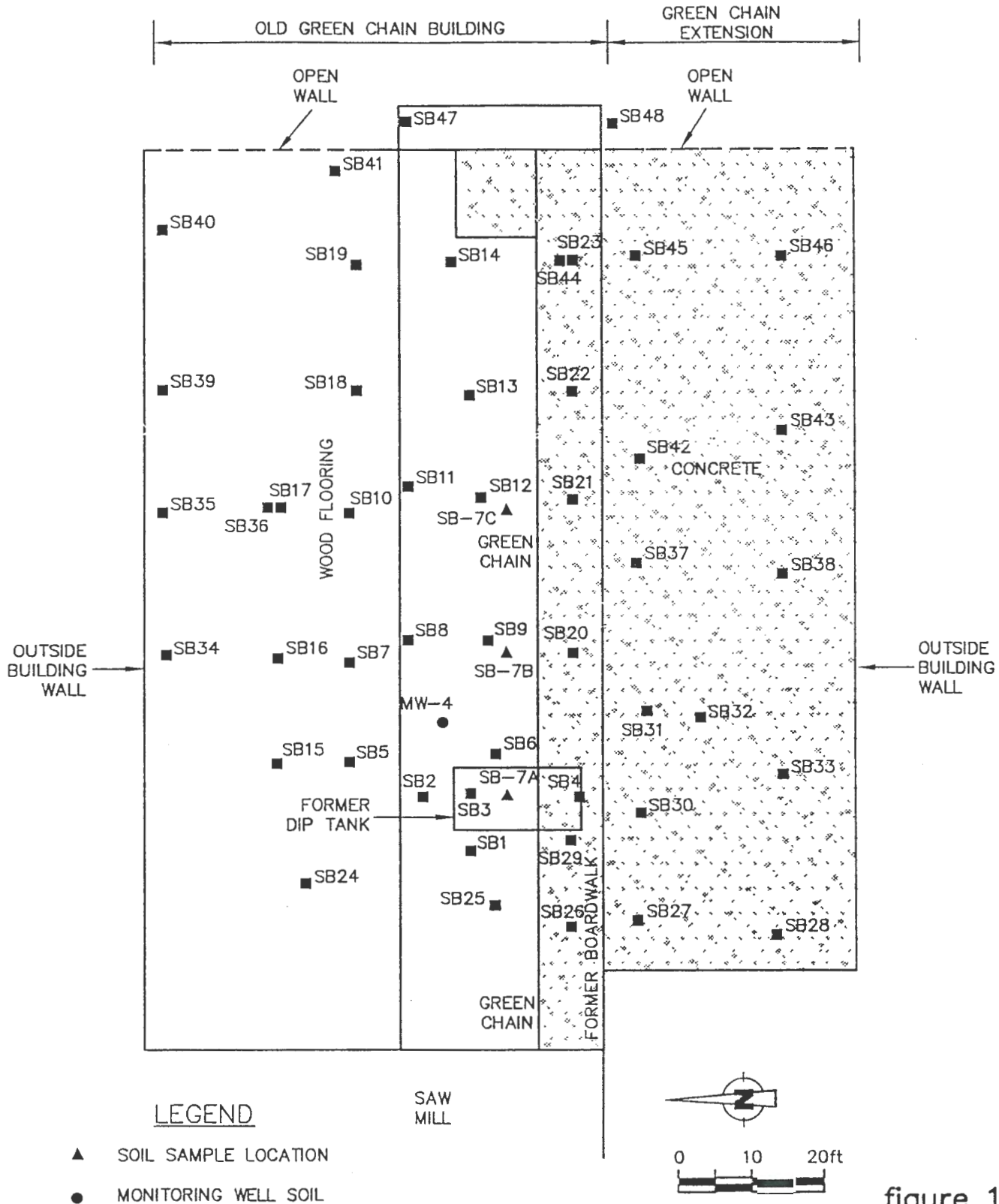


figure 1

SOIL SAMPLING LOCATIONS
GREEN CHAIN AREA
CONNOR FOREST INDUSTRIES
Baraga, Michigan

CRA

6300(L)–NOV. 5/96–REV.0 (M–17)(MN)

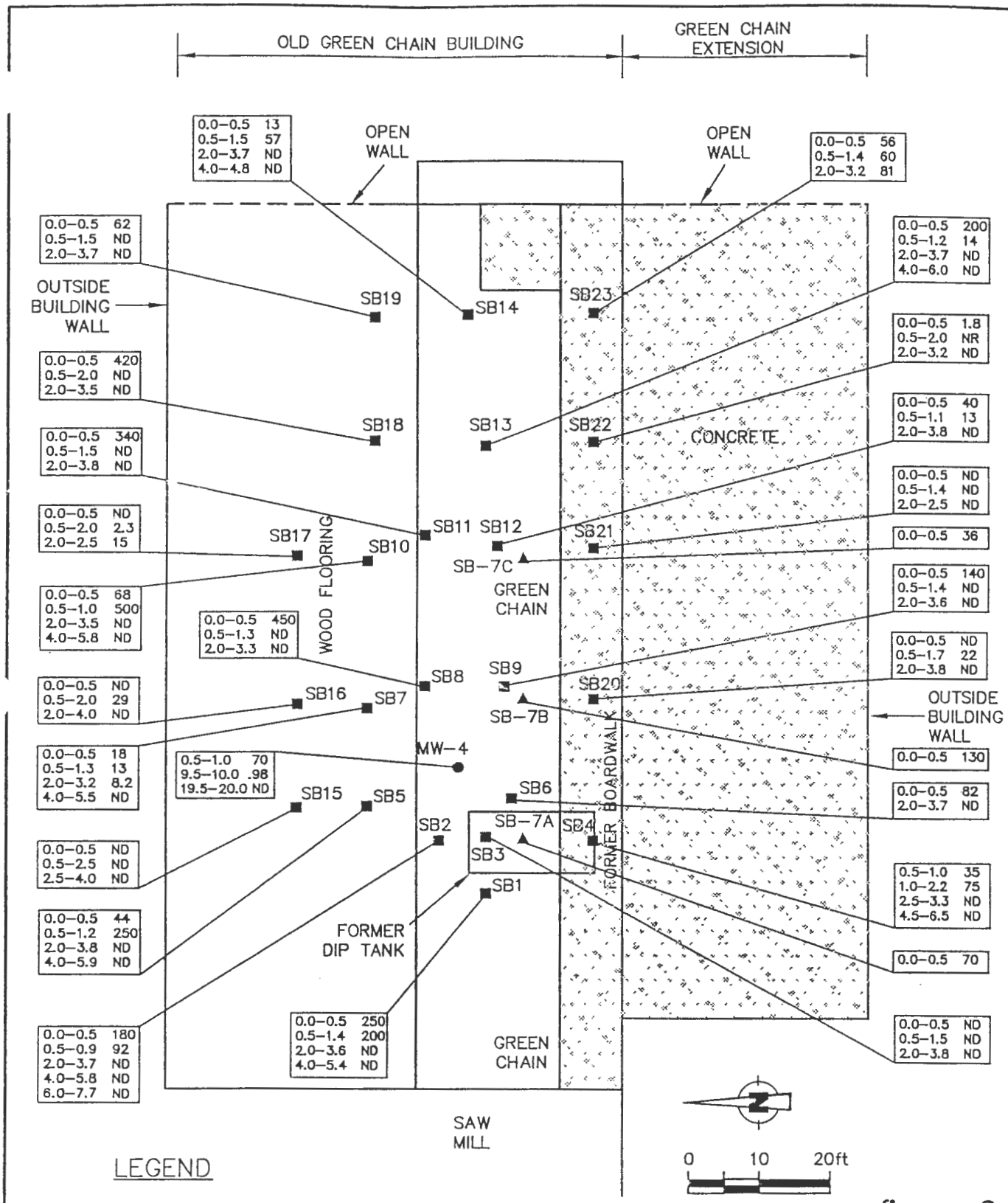


figure 2
AUGUST/SEPTEMBER
SOIL SAMPLING RESULTS
GREEN CHAIN AREA
CONNOR FOREST INDUSTRIES
Baraga, Michigan

CRA

6300(L)–SEPT. 25/96–REV.0 (M–12)(MN)

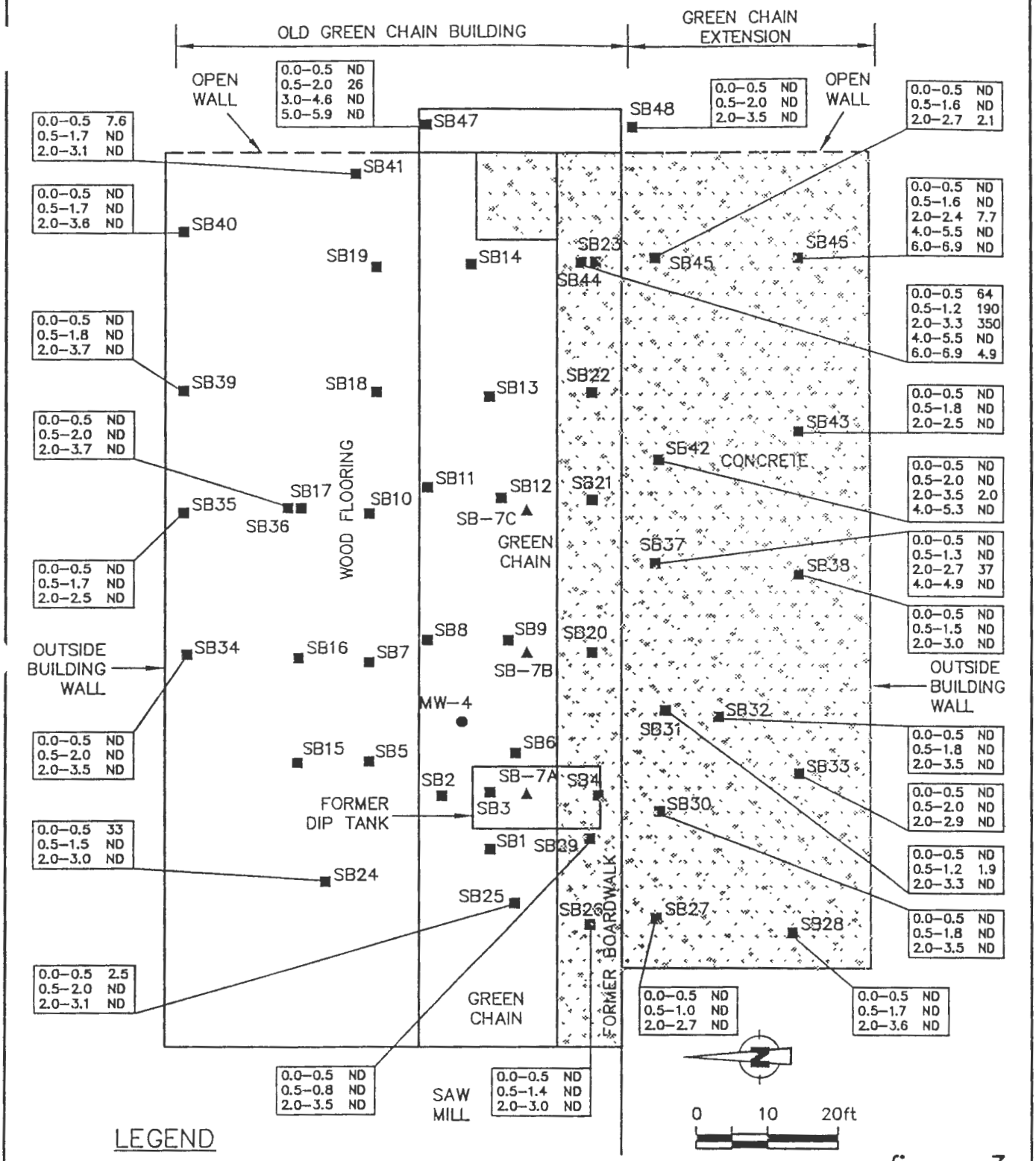


figure 3

OCTOBER SOIL SAMPLING RESULTS
GREEN CHAIN AREA
CONNOR FOREST INDUSTRIES
Baraga, Michigan

CRA

6300(L)–NOV. 18/96–REV.0 (M–18)(MN)

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY

"Better Service for a Better Environment"

HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

INTERNET: www.deq.state.mi.us

RUSSELL J. HARDING, Director

REPLY TO:

MARQUETTE DISTRICT OFFICE
1990 US HIGHWAY 41 S
MARQUETTE MI 49855

April 30, 1999

CERTIFIED MAIL – Z 159 720 025
RETURN RECEIPT REQUESTED

Mr. Vern A. Miron
Ken's Service
821 Superior Avenue
Baraga, MI 49908

SUBJECT: Request for Response Activities
Ken's Service
821 Superior Street, Baraga, Michigan
Baraga County
MDEQ Site ID No. 070025

Dear Mr. Miron:

This letter is to advise you of conditions that are present at Ken's Service (KS) which are regulated under Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA).

On Tuesday October 20, 1998, staff of the Keweenaw Bay Indian Community (KBIC) Environmental Office and the Michigan Department of Environmental Quality (MDEQ) inspected the operations at KS. During the inspection, KBIC and MDEQ staff observed that soils at KS were heavily stained by what appeared to be petroleum products.

On Tuesday, October 27, 1998, the KBIC and MDEQ staff collected four soil samples at KS. One sample was collected from surface soils at each of two stained soil locations and two samples were collected (shallow hand augured soil borings) from an area where sand and gravel fill was recently placed at the location of the former above ground tank farm. The four soil samples were submitted to the MDEQ environmental laboratory for analysis. A copy of the analytic results for these samples and a map depicting where they were collected is enclosed for your reference.

Analyses of the soil samples indicates the presence of the following hazardous substances at concentrations which exceed the applicable Part 201 cleanup criteria:

> Soil sample location S-2: xylenes were detected at 100,000 parts per billion (ppb) [Part 201 criteria protective of groundwater is 5600 ppb], 1,3,5-trimethylbenzene at 38,000 ppb [Part 201 criteria protective of groundwater is 25,000 ppb], and 1,2,4-trimethylbenzene at 67,000 ppb [Part 201 criteria protective of groundwater is 34,000 ppb].

Soil sample location S-3: tetrachloroethylene was detected at 120 ppb [Part 201 criteria protective of groundwater is 100 ppb], xylenes at 7700 ppb [Part 201 criteria protective of groundwater is 5600 ppb], and lead at 1150 parts per million (ppm) [Part 201 criteria protective of groundwater is 21 ppm, industrial and commercial I direct contact hazard criteria is 900 ppm, and the commercial I, III and IV and residential direct contact hazard criteria is 400 ppm].

Soil sample location S-4: lead was detected at 221 ppm [Part 201 criteria protective of groundwater is 21 ppm] and cadmium at 7 ppm [Part 201 criteria protective of groundwater is 6.0 ppm].

Numerous other hazardous substances were also detected in the soil samples, at concentrations below the appropriate Part 201 criteria, including toluene, ethylbenzene, isopropylbenzene, n-propylbenzene, naphthalene, 2-methylnaphthalene, chrysene, fluorene, fluoranthene, phenanthrene, pyrene and bis(2-ethylhexyl) phthalate.

The conditions observed at KS indicate that a hazardous substance in concentrations which exceed the residential cleanup requirements of Section 20120a(1)(a) or (17) of the NREPA or the cleanup criteria for unrestricted residential use under Part 213, Leaking Underground Storage Tanks, of the NREPA was released, deposited, or became located at KS. Any area, place or property where hazardous substances exceed this threshold constitutes a "facility" which is regulated under Part 201.

A person who owns or operates a facility has certain obligations under Part 201 as well as under other state and federal law. "Person" is defined as an individual, partnership, corporation, association, governmental entity, or other legal entity.

Records obtained from the Baraga County Register of Deeds (liber 27, page 700) indicate that Vern A. Miron owns the property at this facility. Additional information obtained by the MDEQ indicates that Vern Miron owns KS, which has operated at this facility since 1968.

The MDEQ believes that KS is responsible for an activity causing a release or threat of release of a hazardous substance and therefore is a person liable under Section 20126 of Part 201. Persons liable under Part 201 are responsible for all costs of response activity lawfully incurred by the state relating to the selection and implementation of response activity under Part 201, including, but not limited to, Sections 20107a, 20114, 20118, 20120a, 20120b, 20120c, and 20120d of Part 201 of the NREPA and Part 5 of the Part 201 Administrative Rules, unless an exemption or defense to liability applies.

Pursuant to Section 20114 of the NREPA, an owner or operator of property who has knowledge that the property is a facility, and who is liable under Section 20126 of the NREPA, shall:

1. Immediately stop or prevent the release at its source. Please provide documentation that improper disposal of waste oil on the property has ceased and that all future waste oil will be properly disposed.

2. Determine the nature and extent of the release at the facility.

3. Diligently pursue response activity necessary to achieve cleanup criteria specified under Part 201.

This letter serves as the MDEQ's written request for KS to voluntarily undertake response activity to remedy the environmental contamination at this facility. Pursuant to Section 20114(1)(h) of the NREPA, please take the following actions:

i. Provide a plan for and undertake interim response activities.

ii. Provide a plan for and undertake evaluation activities.

iii. Based upon the results of the evaluation activities, submit to the MDEQ a Remedial Action Plan (RAP) that when implemented will achieve the cleanup criteria specified in Part 201.

iv. Implement the approved RAP in accordance with the schedule approved by the MDEQ.

In addition, a person who owns/operates a property that he or she has knowledge is a facility, shall perform actions pursuant to Section 7a of the NREPA. These obligations include exercising due care by undertaking response activity necessary to mitigate unacceptable exposure to hazardous substances and allow for the intended use of the facility in a manner that protects the public health and safety.

Please provide your written commitment, a description of actions taken to date, and a schedule of proposed actions regarding response activities at KS to Wayne Morse of the MDEQ (address below) within 30 days of receipt of this letter.

The files used to prepare this notice are located in the MDEQ Marquette District Office. If you wish to review the files or if you have questions regarding this letter, please direct your inquiries to Wayne Morse, MDEQ, Environmental Response Division, Marquette District Office, 1990 U.S. 41 South, Marquette, MI 49855. Mr. Morse's telephone number is 906-228-6568. A copy of Part 201 of the NREPA, as amended, and a copy of the MDEQ Environmental Response Division Operational Memorandum #18 (Part 201 Generic Cleanup Criteria Tables) are enclosed for your convenience.

Sincerely,

Clifton Clark
District Supervisor
Environmental Response Division
906-228-6568

WM/ks

Enclosures

cc: Mr. William Beaver, KBIC
Mr. Daniel Schultz, MDEQ
Ms. Patricia McKay, MDEQ
Mr. Robert Schmeling II, MDEQ
Mr. Wayne Morse, MDEQ

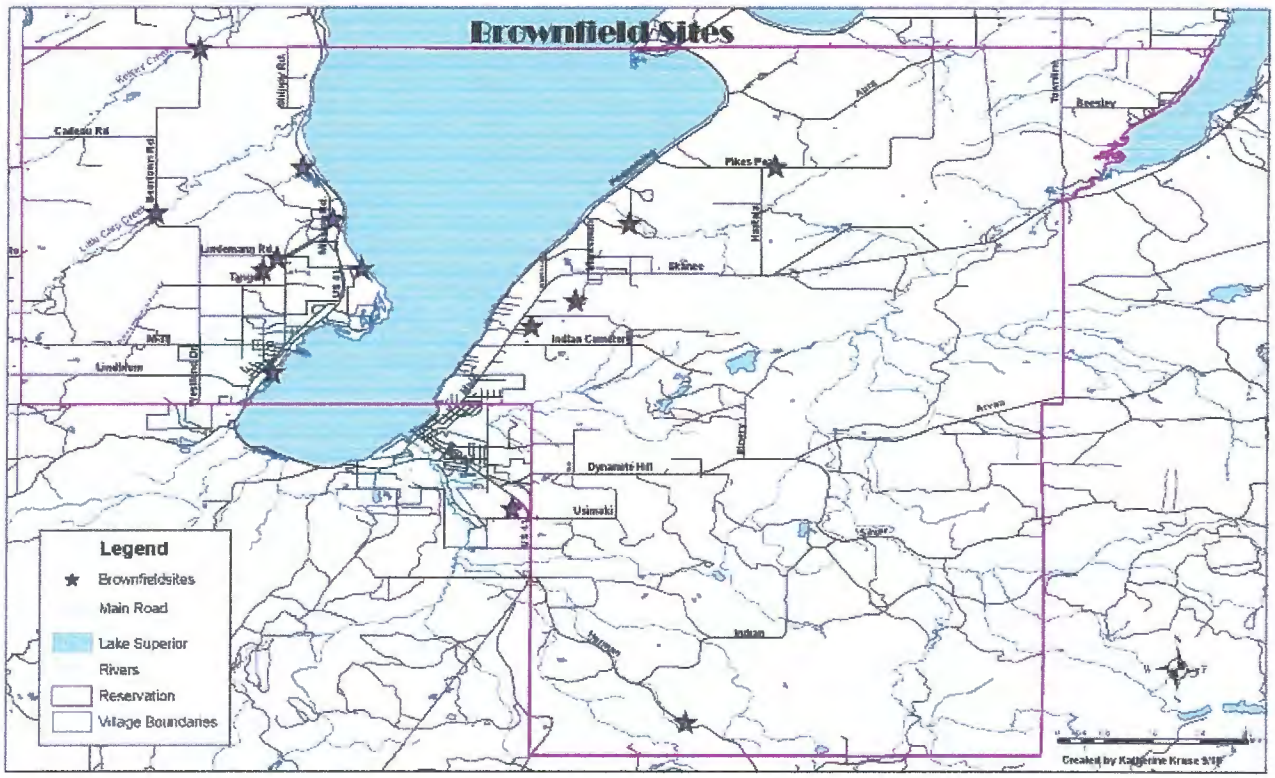
APPENDIX FF:

Brownfield Site Information

KBIC HOME
MAIN
PUBLIC RECORD
COMMUNITY INVOLVEMENT
CONTACT US

Brownfield Sites

Click on a Brownfield Site on the map for more information.



SAND POINT

The Sand Point site is KBIC Tribal Trust property, wholly owned by KBIC and located entirely within the KBIC L'Anse Reservation boundaries. Sand Point totals several hundred acres in size. The Site itself consists of an extensive beach area, approximately 45 acres in size, with approximately 2.5 miles of lakefront, located on the Keweenaw Bay of Lake Superior. This property has great potential for recreational development, but prior to cleanup consisted of a bare, sparsely vegetated wasteland.

The Sand Point site is impacted by industrial copper mining processing waste (stamp sands) from the Mass Mill, an early 20th century copper ore processing plant that was located approximately 4 miles north of Sand Point. During copper ore processing at the Mass Mill, billions of pounds of stamp sand waste was deposited into Keweenaw Bay. Lake currents have since carried these stamp sands southward and deposited them onto the 2.5 miles of the Community's property at Sand Point. Some of the problems created by the stamp sand deposits include high concentrations of heavy metals; copper, mercury, and arsenic contamination in the groundwater, surface water, and sediments; deficiencies of major nutrients and near toxic levels of copper and iron concentration exist in the plant vegetation. High concentrations of copper, mercury and arsenic have also been found in fish samples.

With help from the U.S. EPA, the Great Lakes Commission - Soil Erosion and Sediment Control Program, USDA - Natural Resource Conservation Service, and Upper Peninsula Resource Conservation and Development Council, a soil cover was constructed over approximately 35 acres of stamp sands at Sand Point, a tribally owned beach area along the western shore of Lake Superior's Keweenaw Bay. The soil cover will serve to decrease contaminant loading into Keweenaw Bay by reducing stamp sand erosion, increase biodiversity, and allow for vegetation growth on a previously barren landscape.

Before

After

Sand Point Documents:
Record of Decision for Sand Point Cleanup
Analysis of Brownfield Cleanup Alternatives
Sand Point Master Plan

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MUD LAKES

The property is a typical non-tidal marsh commonly found it the northern U.S. It is low-lying and is likely close in elevation to Lake Superior. Approximately two-thirds of the property is marsh with interconnecting bodies of open water comprising the remaining third. A small stream that enters from the southwest supplies the marshes and ponds with water and discharges to Lake Superior near the northeast border of the property adjacent to the metal fabricating shop. KBIC was involved in a Wetlands Reserve Program (administered by the Natural Resources Conservation Service) in the late 1990's that provided for the construction of a water control structure in order to stabilize water levels. There is an unpaved road on the northern portion of the Lakes that leads to a wildlife-viewing platform.

Illegal dumping has occurred along the northeastern and eastern boundaries of the property. Refuse includes petroleum products, building debris, household wastes and may include industrial wastes as well. NR staff has also observed stained soils and an oily sheen on surface waters.

Mud Lakes Documents:
Phase I Environmental Assessment

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DRAPER LAKESHORE

Following an All Appropriate Inquiry, KBIC purchased the property from the previous owners, Audrey Draper Chapman and Marion Draper Braem (the Drapers). The Drapers used the lakeside property as a lot on which they parked and resided in a RV during the summer. Standard Oil, Grand Rapids Trust Company, Rubicon Lumber Company, and numerous other private individuals have previously owned the property. According to the Drapers, a knowledgeable person, and historic air photos, a gas station was formerly located on the property.

The property is currently vacant. The portion where the former gas station is suspected to have been is gravel-covered, level, and appears to consist of fill soils. This area is slightly higher in elevation than the rest of the property. The remaining portion of the property is low lying and ranges from flat to rolling terrain covered in grasses, small shrubs, and trees ranging in various sizes. There are vehicle remnants (a car frame with engine block) partially buried and covered with vegetation, suggesting the possibility that there may be more refuse buried on the property. Two pipes that extend vertically out of the ground may indicate the presence of underground storage tanks (USTs) that remain on the premises.

Draper Lakeshore Documents:
Phase I Site Investigation/All Appropriate Inquiry

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SOUTH JOHNSON ROAD DUMP

The property is KBIC trust land. The land currently consists of vacant forestland, with the Zeba Creek running through the property and eventually emptying into Lake Superior. Illegal dumping of household wastes, white goods, automobile parts, garbage burning, and possible dumping of light industrial wastes and waste oils has occurred, potentially contaminating the property.

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POWER DAM ROAD

The property is 28 acres of mostly flat, low-lying terrain located entirely within the KBIC L'Anse Reservation at the intersection of Power Dam Road and US-41. The property is trust land restricted to tribal members for residential or business lease. Fifty percent of the site is forested while the other half is occupied with residential and businesses. Highway US-41 divides the property into east and west. One residence and two outbuildings are located to the east. Four residences with one outbuilding, junkyard, a fish shop building, self storage building, and a small fireworks stand are located to the west. The focus of a recent Phase I Environmental Assessment was the larger western portion and location of the junkyard. The junkyard covers approximately 11 acres of the property and consists of: old vehicles, storage tanks, drums and containers with unknown contents, batteries, heavy machinery, farm machinery, tires, gas tanks, oil filters, vehicle engines, miscellaneous vehicle parts, scrap metal, and some white goods.

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LINDEMANN ROAD

The property is KBIC Trust Land currently leased as residential, located a mile north of the Village of Baraga in the western portion of the Keweenaw Bay Indian Community (KBIC) L'Anse Reservation. Environmental concerns include remnants of a dilapidated trailer by the roadside and a large amount of dumped material behind the trailer. Dumped material includes cars, barrels, tires, appliances, cans, bottles and a variety of household garbage. Dumping extends beyond the ½ acre lease boundaries.

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TAILER ROAD

The property is 59 percent KBIC Trust Land and 41percent allotment land. The property is located about a mile north of the Village of L'Anse in the eastern portion of the Keweenaw Bay Indian Community (KBIC) L'Anse Reservation. Tailer Road runs east and west and borders the property on the north side. The property was used as residential at one time. The former residence burned down in 2004, at which time no one was living in it. Historically, solid waste, white goods, and other materials were dumped on a portion of the property. In 2006, KBIC cleaned up part of the site with an Open Dump Cleanup Grant. The cleanup included removing debris from the site. No environmental sampling, soil removal or fill material were used in the cleanup. The access road to the dumping location was bermed to restrict access and prevent future dumping, and "No Dumping" signs were posted. In the clearing on the eastern portion of the property remnants of the dumping that was cleaned up remain including several areas of stained soil and stressed vegetation. A vehicle track winds through the property leading to the second area of dumping in the southern portion. Environmental concerns include soil staining, stressed vegetation and areas of dumping. Dumped material at the cleaned up site included cars, tires, appliances, oil filters, gas tanks, batteries, boats, car parts, insulation, paint cans, and building material. Dumped materials at the area that has not been cleaned up include tires, appliance, barrels, gas cans, burn barrels and building debris.

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BEAR TRAIL

The property is located north of the Village of L'Anse in the eastern portion of the Keweenaw Bay Indian Community L'Anse Reservation (KBIC). The property is KBIC Trust Land (66.67%) & Allotted Land (33.33%). Remnants of a homestead are on the property. Historically, solid waste, white goods, and other materials were dumped on portions of the property. The property is currently vacant land with a mix of cleared and forested areas. A vehicle track runs through the property along which at least 5 places of dumping are located. Environmental concerns include areas of dumping, some of which are located near a residential area. Dumped material includes old cars, batteries, tires, appliances, household trash, motor oil, barrels and various other materials.

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BEN ROAD

The property is KBIC Trust Land currently leased as residential. The property is largely forested land with a small stream running east and west. Environmental concerns include dumped material such as automobile parts, barrels, tires, appliances, and gas tanks. The dumped material is scattered over the entire property extending to the residence. Before a new lease and residence is established at the site an environmental assessment should be conducted to determine the current environmental condition of the property.

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BEARTOWN ROAD #2

The Beartown Road #2 site is an approximate ½ acre portion of an 80 acre parcel of Keweenaw Bay Indian Community (KBIC) Trust land. The property is vacant forest land. The Little Carp Creek runs northeast through the property. Unregulated dumping of household garbage, tires, oil filters and appliances extends approximately ¼ acre directly adjacent to the Little Carp Creek in a ravine bordering Beartown Road.

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ASSININS

The property is KBIC Trust Land. The former Tribal Center, which housed government offices, was located on the property. The building was originally built in 1928 as part of a mission and orphanage complex. The Tribe began operating their government offices in the building on October 4, 1971 until August 2, 1995. The building was demolished in 1996. The property is currently vacant land. Some building material, white goods, barrels and other debris still remain on the property. A weather station is also located on the property.

Environmental concerns include possible asbestos and lead contamination from the old building and building material left on the property. Illegal dumping of household goods has historically occurred on this property. An underground storage tank used for heating oil was formerly present on the property and was reported to have been removed. Removal records cannot be located.

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RANTANEN-HERMAN

The property is KBIC Trust Land. The property has been held in trust since April 15, 1938 and was leased as residential in June 1982 which consisted of a little over half an acre. During the same time the owner of the residence also had a business lease for 1.7 acres (including the residential lease area) to establish a windmill at the site. Indian Health Service installed a well in October of 1983 and a septic with drain field in 1984. To the knowledge of Tribal staff a windmill was never erected on-site. The only structures included a mobile home trailer and a small storage shed. By 1995 the trailer was unoccupied, dilapidated, and falling apart. In 1997 both the business and residential leases were revoked for non-compliance. In August of 2006, KBIC removed the remnants of the trailer with an Open Dump Cleanup Grant. No environmental sampling, soil removal or fill material were used in the cleanup. Before a new lease and residence is established at the site an environmental assessment should be conducted to determine the current environmental condition of the property.

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BEARTOWN ROAD #6

The property is KBIC owned CFR land. The Tribe acquired the property in August 2003. Prior owners include Escanaba Paper Company, Mead Corporation, Upper Peninsula Land Company, Timmead Incorporated, Celotex Corporation, and Ford Motor Company. The property includes various marsh and swamp communities associated with the Kelsey Creek riverian system including but not limited to cattail marsh, open water marsh, reed canary marsh, mixed cedar and deciduous swamp, and alder swamp thickets. The property also includes forested areas.

Environmental concerns include areas of dumping extending through approximately ½ acre of the property, located near Kelsey Creek riverian area. Dumped material includes old cars, batteries, tires, appliances, household trash, motor oil, burn barrels and various other materials.
As a highly productive ecosystem, the property plays an integral role in maintaining the quality of the local watershed and wildlife ecology as well as provide habitat for many animals, including migratory waterfowl and federally protected species such as the bald eagle and grey wolf. This property and connecting properties along Kelsey Creek provide an ecological corridor for these important species. Efforts are under way to establish wild rice in the wetland area and surrounding properties along Kelsey Creek. The Tribe also would like to build Osprey nesting platforms along the creek.

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PIKES PEAK CARCASS

The property is KBIC CFR land. The property was purchased in 2001. Previous owners include the State of Michigan and several private owners. The property is currently vacant land with a mix of cleared and forested areas. A half circle drive runs directly off Pikes Peak Road on the property where the majority of the dumped material can be found. Containers of oil, stressed vegetation and soil staining are nearby in an area of low lying shrubs. Dumping in this area is an ongoing problem.

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APPENDIX GG:

Drum Removal Action Documentation and Information

Natural Resource Department - Waste Removal and Disposal

Last winter the Keweenaw Bay Indian Community Natural Resource Department (KBNRD) staff coordinated the removal and proper disposal of twenty-six 55-gallon drums of hazardous and non-hazardous waste from Tribal property. In 2005, KBNRD coordinated the removal and proper disposal of four drums of hazardous waste from another Tribal property. Waste removal and disposal in both cases was completed using funding provided by the Bureau of Indian Affairs (BIA) Environmental Management Program. In 2005, BIA funds were used to dispose of a number of 55-gallon drums of used motor oils and coolants, and approximately 900 pounds of improperly discarded lead acid batteries. These activities are part of ongoing efforts by KBNRD to identify and address environmental concerns on the Reservation, protect the quality of the environment, and help make the Reservation a healthier and safer place to live. KBNRD encourages anyone with concerns about environmental issues or situations on the Reservation to contact the Department at (906) 524-5757.

U.S. ENVIRONMENTAL PROTECTION AGENCY
POLLUTION/SITUATION REPORT
Assinins Drums - Removal Polrep

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region V

Subject: **POLREP #1**
Initial EPA Sitrep
Assinins Drums

Assinins, MI
Latitude: 46.8098413 Longitude: -88.4762371

To: Mark Durno, EPA
Jason El-zein, EPA
Jeff Kelley, EPA
jennifer manville, EPA
john maritote, EPA
jack dueweke, Houghton County
Clif Clark, MDNRE
Amy Keranen, MDNRE
william messenger, USEPA R5

From: Ralph Dollhopf, OSC
Date: 7/21/2010
Reporting Period: 07/12/2010 to 7/21/2010

1. Introduction

1.1 Background

Site Number:		**Contract Number:**	
D.O. Number:		**Action Memo Date:**	
Response Authority:		**Response Type:**	
Response Lead:	EPA	**Incident Category:**	Removal Assessment
NPL Status:		**Operable Unit:**	
Mobilization Date:	7/12/2010	**Start Date:**	7/12/2010
Demob Date:	7/12/2010	**Completion Date:**	
CERCLIS ID:		**RCRIS ID:**	
ERNS No.:		**State Notification:**	

FPN#: **Reimbursable Account #:**

1.1.1 Incident Category
Other - Abandoned Drums
1.1.2 Site Description
The Site is generally an open field along an unnamed road in Assinins, Michigan. Keweenaw Bay Indian Community (KBIC) tribal offices were historically located at the property. Buildings and similar Site structures are no longer present. A suspect underground storage tank is also believed to be located at the property as reported by KBIC Natural Resources Department personnel.
1.1.2.1 Location
The Site is located approximately one quarter mile from US 41 along an unnamed road in Assinins, Michigan.
1.1.2.2 Description of Threat
Potential release of drum contents to the environment.
1.1.3 Preliminary Removal Assessment/Removal Site Inspection Results
On 7-8-2010, the Keweenaw Bay Indian Community (KBIC) Natural Resources Department requested EPA assistance in characterizing the contents of two abandoned drums at the the Site to facilitate disposal of those drums. Initial inspection indicated that the drums were intact and contained liquids. Indication of a release from the suspect drums was not evident.

2. Current Activities

2.1 Operations Section

2.1.1 Narrative
The KBIC Natural Resources Department requested EPA assistance in characterizing the contents of two abandoned drums at the the Site to facilitate disposal of those drums.
2.1.2 Response Actions to Date
EPA START contractors mobilized to the Site on 7/12/2010. The integrity of the abandoned drums were determined and samples were collected from the drums for laboratory analysis. Limited hazard characterization was performed in the field to assess the physical properties of the liquids within the drums. The abandoned drums were placed in 85-gallon overpack drums.
2.1.3 Enforcement Activities, Identity of Potentially Responsible Parties (PRPs)

2.1.4 Progress Metrics

Waste Stream	*Medium*	*Quantity*	*Manifest #*	*Treatment*	*Disposal*

2.2 Planning Section

2.2.1 Anticipated Activities
Conduct disposal of drums upon receipt of analytical reports

2.2.1.1 Planned Response Activities
Disposal of drums

2.2.1.2 Next Steps
Issue DO to ERRS for drum

2.2.2 Issues
None.

2.3 Logistics Section
No logistics considerations

2.4 Finance Section
2.4.1 Narrative

Will issue verbal delivery order to ERRS upon receipt of drum sample analysis

2.5 Safety Officer
Nothing to report. Field activites were completed on 7/12/2010.

2.6 Liaison Officer
Nothing to report.

2.7 Information Officer

2.7.1 Public Information Officer
No current media interest.

2.7.2 Community Involvement Coordinator
Currently not relevant.

3. Participating Entities
3.1 Unified Command
Not applicable.

3.2 Cooperating and Assisting Agencies
KBIC

4. Personnel On Site

START contractors were on-site for one day and have demobilized. KBIC were on site to provide access and to observe.

5. Definition of Terms

Not applicable.

6. Additional sources of information

6.1 Internet location of additional information/reports

KBIC Natural Resources Department.

6.2 Reporting Schedule

Final sitrep to be issued at completion of removal action.

7. Situational Reference Materials

Refer to the "Documents" and "Images" links of the EPA website for additional infromation.

Sample analytical to be added upon receipt

APPENDIX HH:

Michigan CIWPIS Data and Wetland Study Information

Department of Environmental Quality

Michigan.gov

Wednesday, November 23, 2011

CIWPIS on Line

Coastal and Inland Waters Permit Information System

Notices and Hearings
New Applications

Search For:

Year: Year
Sort by: Date D

County: Baraga

Township Name:

Twn: 51n
Rng: 33w
Sec:

Waterbody:

File Number:

Applicant Name:

Search

Help:
Fill in any or all of the fields above and press the Search button. Placing your cursor over the field will display tool tips. If this site does not work correctly please let us know.

17 Records returned.
Click on Folder icon for specific information.

File No:	Name:	Status:
11-07-0011-P	Pettibone Michigan Corp LLC	Permit Issued
11-07-0008-P	Village of Baraga	Permit Issued
11-07-0007-P	Village of Baraga	Permit Issued
11-07-0003-P	Village of Baraga	Permit Issued
10-07-0046-P	Keweenaw Bay Indian Community	Closed Lack of Information
10-07-0020-P	Village of Baraga	Permit Issued
10-07-0018-P	Baraga County Road Commission	Permit Issued
09-07-0019-P	Robert V Ross	Permit Issued
08-07-0053-P	Baraga County Road Commission	Permit Issued After the Fact
08-07-0039-P	Paul Getzen	Permit Issued
07-07-0043-P	Village of Baraga	Permit Issued
07-07-0022-P	Village of Baraga	Permit Issued
07-07-0012-P	Village of Baraga	Permit Issued
07-07-0007-P	Village of L'Anse	Closed Lack of Information
06-07-0018-P	David Coponen	Denied
06-07-0012-P	Baraga County Road Commission	Permit Issued
06-07-0003-P	U.P. Timber Company	Permit Issued Modified by Staff

Department of Environmental Quality

Wednesday, November 23, 2011

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File No:	Name:	Status:
10-07-0049-P	Baraga County Road Commission	Closed Duplicate File
10-07-0048-P	Baraga County Road Commission	Permit Issued
10-07-0040-P	Plum Creek Timberlands	Permit Issued
10-07-0011-P	Plum Creek Timberlands, L.P.	Permit Issued
09-07-0009-P	Rose Mary Haataja	Permit Issued
08-07-0007-P	Plum Creek Timberlands, L.P.	Permit Issued
07-07-0023-P	Patrick Newland	Permit Issued
06-07-0024-P	Baraga County Road Commission	Permit Issued
06-07-0011-P	Baraga County Road Commission	Permit Issued
06-07-0004-P	Plum Creek	Permit Issued

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File No:	Name:	Status:
11-07-0033-P	Plum Creek	Permit Issued
11-07-0032-P	Baraga County Road Commission	Permit Issued
10-07-0037-P	Plum Creek	Permit Issued
10-07-0012-P	Plum Creek	Permit Issued
10-07-0013-P	William "Sam" Morrow	Permit Issued
09-07-0026-P	Plum Creek	Permit Issued
09-07-0027-P	Plum Creek	Permit Issued Modified by Staff
09-07-0021-P	Plum Creek	Permit Issued
09-07-0022-P	Plum Creek	Permit Issued
09-07-0023-P	Plum Creek	Permit Issued
08-07-0044-P	Plum Creek	Permit Issued
08-07-0045-P	Plum Creek	Permit Issued
08-07-0046-P	Plum Creek	Permit Issued
08-07-0047-P	Plum Creek	Permit Issued
08-07-0048-P	Plum Creek	Permit Issued
08-07-0010-P	Plum Creek Timber	Permit Issued
08-07-0011-P	Plum Creek Timber	Permit Issued
08-07-0008-P	Plum Creek	Permit Issued
08-07-0009-P	Plum Creek	Permit Issued
08-07-0005-P	American Forest Management	Permit Issued
07-07-0044-P	American Forest Management	Permit Issued
07-07-0045-P	American Forest Management	Permit Issued
07-07-0046-P	American Forest Management	Permit Issued
07-07-0038-P	Plum Creek	Permit Issued
07-07-0037-P	Plum Creek	Permit Issued
07-07-0024-P	Plum Creek	Permit Issued

06-07-0048-P	Plum Creek Timberlands, L.P.	Permit Issued
06-07-0031-P	Plum Creek Timberlands, L.P.	Permit Issued
06-07-0032-P	Plum Creek Timberlands, L.P.	Permit Issued
06-07-0033-P	Plum Creek Timberlands, L.P.	Permit Issued
06-07-0022-P	Baraga County Road Commission	Permit Issued
06-07-0016-P	All-Wood, Inc.	Permit Issued

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File No:	Name:	Status:
11-07-0034-P	L'Anse Warden Electric Company, LLC	Assigned to Field Reviewer
10-07-0035-P	L'Anse Warden Electric Co	Permit Issued
10-07-0043-P	L'Anse Warden Electric Company	Closed Duplicate File
10-07-0034-P	Baraga County Road Commission	Permit Issued
10-07-0027-P	Michigan Dept. of Transporation	Permit Issued
10-07-0024-P	CertainTeed Corporation	Permit Issued
10-07-0003-P	Michigan Dept. of Transportation	Permit Issued
10-07-0002-P	Village of L'Anse	Permit Issued
10-07-0001-P	Village of L'Anse	Permit Issued
09-07-0041-P	Semco Energy Natural Gas Company	Permit Issued
09-07-0034-P	Kahkonen Excavating, Inc.	Permit Issued
09-07-0029-P	Village of L'Anse	Permit Issued Conditional
09-07-0016-P	Baraga County Road Commission	Permit Issued
09-07-0010-P	Baraga County Memorial Hospital	Permit Issued
08-07-0052-P	Baraga County Memorial Hospital	Permit Issued
09-07-0005-P	Baraga County Road Commission	Permit Issued Revised per Applicant Request
08-07-0034-P	Michigan Dept. of Transportation	Permit Issued
08-07-0033-P	Baraga County Road Commission	Permit Issued
08-07-0028-P	Patrick T. Coady	Permit Issued
07-07-0052-P	Village of L'Anse	Permit Issued
07-07-0050-P	Baraga County Road Commission	Permit Issued After the Fact
07-07-0042-P	Certainteed Gypsum and Ceilings	Permit Issued
07-07-0041-P	L'Anse Warden Electric Company LLC	Permit Issued
06-07-0041-P	Baraga County Tourist & Rec. Assoc.	Permit Issued

06-07-0019-P	Michigan Dept. of Transportation	Permit Issued
06-07-0013-P	L'Anse Township	Permit Issued

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10-07-0011-P

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Coastal and Inland Waters Permit Information System

File No: 10-07-0011-P **Status:** Permit Issued

Name: Plum Creek Timberlands, L.P.
Address: 15800 Mead Road
L'Anse, MI 49946
Waterbody: Tributaries to Silver River
ProjectName: Mount Ervast

County: Baraga
Twn/Rng/Sec: 51N/32W/23
Government: L'Anse Township
Subdivision:
Lot:
Tax ID:

Activity: Culverts
Activity:
Activity:

MiTAPS:

Parts:	301	325	303	31	315	323	353	Sec404
	1							X

Type: Minor Project
Renewal:

Field: Sheila B. Meier
Entry:

Date Received: 4/26/2010
Date Sent to Field:
Date Extended:
Date Site Inspection:
Date Public Hearing:

Date Final Action: 5/26/2010
Date Permit Expires: 5/25/2015
Date Revised:
Date Public Notice:
Date CR Mailed:

This information is a summary of DEQ project file: 10-07-0011-P.

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EFFECTS OF SIX CHEMICAL DEICERS ON LARVAL WOOD FROGS (*RANA SYLVATICA*)

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(*Submitted* 2 *November* 2010; *Returned for Revision* 17 *December* 2010; *Accepted* 14 *March* 2011)

Abstract—Widespread and intensive application of road deicers, primarily road salt (NaCl), in North America threatens water quality and the health of freshwater ecosystems. Intensive use of NaCl can be harmful to sensitive members of freshwater ecosystems such as amphibians. Detection of negative effects of NaCl application has prompted the search for alternative chemical deicers with lower environmental impacts. We conducted a series of 96-h acute toxicity tests to determine the negative sensitivity of larval wood frogs (*Rana* [*Lithobates*] *sylvatica*) to six deicing chemicals: urea (CH_4N_2O), sodium chloride (NaCl), magnesium chloride ($MgCl_2$), potassium acetate (CH_3COOK), calcium chloride ($CaCl_2$), and calcium magnesium acetate ($C_8H_{12}CaMgO_8$). Acetates are sometimes touted as environmentally friendly alternatives to NaCl but have not been examined in enough detail to warrant this designation. When exposed to a range of environmentally realistic concentrations of these chemicals, larvae were least sensitive (i.e., had the lowest mortality rate) to CH_4N_2O, NaCl, and $MgCl_2$ and most sensitive to acetates ($C_8H_{12}CaMgO_8$, CH_3COOK) and $CaCl_2$. Our observed median lethal concentration estimates ($LC50_{96\text{-}h}$) for NaCl were over two times higher than values presented in previous studies, which suggests variability in tolerance among *R. sylvatica* populations. The deicers varied greatly in their toxicity, and further research is warranted to examine the differential effects of this suite of deicers on other species. Environ. Toxicol. Chem. 2011;30:1637–1641.

Keywords—Transportation Tadpoles *Lithobates sylvatica* Highways Ecotoxicology

INTRODUCTION

In cold climates, a myriad of chemicals may be used to remove or prevent the formation of ice on roads, highways, sidewalks, and runways. The most common deicing chemical used on roads is sodium chloride (NaCl) because of its low cost and widespread availability. In the United States, an amount of NaCl estimated at 10 million metric tons is used each year [1], ranging from 0.3 to 17.6 metric tons per lane mile across 26 states [2]. Roads in the State of Michigan receive more NaCl per lane mile (12.9 metric tons) than any other Great Lakes state [2].

The intensive and widespread application of NaCl on an annual basis over the past few decades has resulted in an increase in the salinity of ground and surface waters in North America [3–7]. Anthropogenic sources of NaCl have been shown to affect ground and surface water quality negatively [8–11]. Direct impacts of NaCl contamination in surface waters arise primarily from increased chloride concentrations, changes in water density gradients, salt-induced stratification, and salt stimulation of algal growth, leading to eutrophication [7]. Because of the threat NaCl poses to human health and the aquatic environment, Environment Canada identified road deicing chemicals as toxic [10].

Because of the known negative environmental impacts of NaCl, numerous alternatives are currently being evaluated to improve deicing operations and reduce the use of deicing chemicals. State and municipal transportation agencies are evaluating these alternatives in an effort to maintain safe winter driving conditions while avoiding the environmental degradation and potential harm to aquatic life caused by NaCl [1]. These chemicals include different inorganic salts that may be used separately or in conjunction with NaCl (e.g., $CaCl_2$, $MgCl_2$, and KCl) [10], sodium formate ($CHNaO_2$), calcium magnesium acetate ([CMA], $C_8H_{12}CaMgO_8$), magnesium acetate ($C_4H_6MgO_4$), calcium acetate ($C_4H_6CaO_4$), glycol liquids, urea (NH_4CO) [12], methanol (CH_3OH) [13], tetra potassium pyrophosphate [14], and Ice Shear™ (an equimolar mixture of sodium acetate and sodium formate) [15]. Acetate chemicals, in particular, are often viewed as an environmentally friendly alternative to inorganic salts because they do not contain chloride [7]. Furthermore, not all chemical deicers are equally effective at deicing and may require the application of greater quantities to achieve the same results [1,16]. For example, NH_4CO, $CaCl_2$, and CMA require up to 1.2 to 1.7 times as much deicer to achieve the same deicing result as NaCl [1]. This higher application rate could exacerbate negative environmental impacts of these chemicals. Because all of these chemicals differ in their chemical makeup and expected environmental concentrations (resulting from differences in application, mobility, and decomposition rates), extensive testing of their ecotoxicological effects should predate their widespread use.

Few studies have addressed the effects of NaCl on wildlife species, but limited research has shown that road salt exposure negatively affects mammals, birds, invertebrates, and amphibians that utilize roadside habitats [7]. Among these taxa, amphibians are likely to be the most affected by chemical deicer runoff. Amphibians possess highly permeable skin and have aquatic larval stages, and many use roadside wetlands for breeding [17]. Embryonic and larval amphibians exposed to salinities beyond their natural range experience substantial negative impacts. For example, high salinity may decrease development rate and increase malformations in embryonic and larval amphibians [18–21]. In addition, exposure to NaCl can increase infection rate of a lethal water mold in embryonic amphibians [22]. Furthermore, amphibians experience elevated

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levels of NaCl contamination during spring melt and runoff, and many species breed in small, ephemeral pools where NaCl runoff is likely to be concentrated [20,21]. As such, amphibians are considered indicators of ecosystem health and are model organisms for investigating the environmental effects of contamination from NaCl and other chemical deicers. The lethal and sublethal effects of NaCl contamination on amphibians have been addressed in a studies, which suggest that amphibians are negatively impacted at environmentally realistic concentrations [21,23,24]. In addition, previous research suggests that frogs and salamanders avoid salt-polluted pools and have not demonstrated local adaptation to high salinities when using roadside water bodies [21,25]. Furthermore, amphibian species may differ in their response to exposure to chemical deicers in runoff, which is predicted to influence demography and community structure [26].

Little is known about the relative population and ecosystem impacts of road salt alternatives and additives within the deicers. One study has directly compared the response of larval amphibians to exposure of NaCl and alternative deicers. Dougherty and Smith [13] compared the lethal effects of NaCl and an alternative ($MgCl_2$) on two native amphibians, green frogs (*Rana* [*Lithobates*] *clamitans*) and American toads (*Bufo* [*Anaxyrus*] *americanus*). To our knowledge, no other studies have directly compared the relative lethal effects of NaCl and a suite of commonly proposed alternative deicers on North American amphibians. The objective of the present study was to assess the direct acute toxicity of six deicing chemicals to native *R. sylvatica* larvae as a predictor of their relative toxicity in the environment.

MATERIALS AND METHODS

Experimental design

A series of 96-h acute toxicity tests using *R. sylvatica* larvae was conducted to determine the lethal effects of exposure to the following six chemical deicers: urea (pelleted fertilizer, CH_4N_2O; Garner Brothers), sodium chloride (coarse rock salt, NaCl; Morton Salt), calcium chloride (pelleted, $CaCl_2$; Peladow®, Dow Chemical), magnesium chloride (anhydrous, $MgCl_2$; Schoenburg Salt), potassium acetate (liquid, KAc, CH_3COOK; Cryotech CF7® Liquid Commercial Deicer; Crytotech Deicing Technology), and calcium magnesium acetate (pelleted, CMA, $C_8H_{12}CaMgO_8$; Cryotech CMA®; Crytotech Deicing Technology).

On May 8, 2008, nine recently deposited *R. sylvatica* egg masses were collected from a palustrine wetland adjacent to a moderately traveled road in Baraga County, Michigan (latitude 46.796 N, longitude 88.390 W). This road receives a low amount of salt (2.74 tons per lane mile for the winter of 2007–2008) during winter maintenance activities (D.J. Mills, Baraga County Road Commission, personal communication). The egg masses were transported to the laboratory and randomly assigned to one of four aerated 78-L glass aquaria containing approximately 50 L of filtered water from Portage Lake, Houghton County, Michigan. The eggs began hatching 5 d later. The tadpoles were fed ad libitum a 3:1 mixture of TetraFin flake goldfish food (Tetra Werke) and pulverized Purina rabbit chow (Purina Mills) from the time they hatched until they were placed into the test chambers. Larvae in test chambers were not fed during the experiment.

Methods for the 96-h acute toxicity tests strictly followed the protocols set forth by the American Society of Testing Materials (ASTM) [27] and the U.S. Environmental Protection Agency (U.S. EPA) [28] for static toxicity tests. The range of nominal test concentrations of chemical deicers in this experiment was chosen to encompass both known median lethal concentrations ($LC50_{96\text{-h}}$) for NaCl exposure to larval *R. sylvatica* and environmental concentrations of Cl^- in wetlands and vernal pools resulting from NaCl pollution (0.002–10.3 $g\,L^{-1}$) [10,13,20,21,24,25,29]. Test chambers consisted of 44 glass jars with loosely fitting glass lids to prevent evaporation and allow for sufficient oxygen exchange. Two liters of filtered Portage Lake water and the appropriate amount of chemical deicer were added to obtain the following 11 nominal test concentrations: 0 (negative control), 0.19, 0.32, 0.54, 0.90, 1.50, 2.40, 3.84, 6.14, 9.83, and 15.73 $g\,L^{-1}$. The 11 nominal test concentrations were replicated four times, for a total of 44 experimental units per deicer.

Deicer treatments were randomly assigned to each jar. The treatment solutions were mixed until the chemical deicer was completely dissolved in each jar. Tadpoles were pooled from all egg masses and randomly assigned tadpoles of similar size to each test chamber (experimental units). Each experimental unit contained 10 tadpoles, except for $CaCl_2$ treatments, which contained five tadpoles per replicate because of a limited supply of larvae. Test chambers were maintained in the laboratory on a 12:12-h light:dark cycle using full-spectrum lights. Water temperature averaged 20.7°C (range 19.4–21.8°C) during all trials. Larvae were checked every 24 h, with mortality recorded at each interval. Larvae that were dead or unresponsive to probing with a small net were removed from the jar and preserved in a solution of 10% formalin. After 96 h, all tadpoles remaining in the test chambers were preserved. From these data, the LC50 value was estimated using the methods described below.

Statistical analysis

Because survival data were not normally distributed, nonparametric statistics were used to examine differences in survival across test concentrations. For each chemical deicer, the proportion of larvae surviving at 96 h among treatments was analyzed using the nonparametric Kruskal–Wallis one-way analysis of variance test. To determine the lowest concentration that had significantly lower survival than in the control, we used a Kruskal–Wallis test with multiple post hoc comparisons. The trimmed Spearman–Karber program (version 1.5) was used to calculate the LC50 estimates using untransformed data for each chemical deicer at 24, 48, 72, and 96 h of exposure [30,31]. The survival data were pooled for each concentration across replicates when calculating the LC50 value. The program R: A Language and Environment for Statistical Computing was used to perform all statistical analyses with an α level of 0.05 [32].

RESULTS

Survival of *R. sylvatica* tadpoles after 96 h of exposure varied widely across deicers and concentrations (Fig. 1). Survival was 100% in all the control tanks except for the one assigned to the CH_4N_2O treatments, and in this control survival was 95%. A significant effect of concentration on survival was detected for each deicer ($p = 0.038$). Tadpole survival was significantly lower in concentrations of CH_4N_2O at 9.83 $g\,L^{-1}$ or higher compared with the control. Exposure to NaCl and $MgCl_2$ concentrations of 6.14 $g\,L^{-1}$ or above significantly reduced tadpole survival compared with the control. For CH_3COOK and $CaCl_2$, 3.84 $g\,L^{-1}$ was the lowest concentration to cause significantly lower survival than in the control.

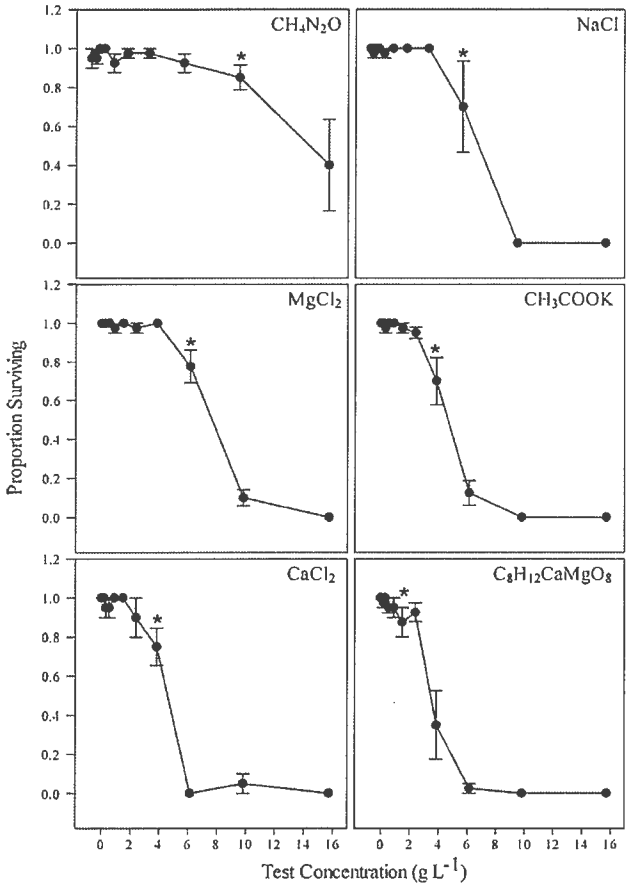

Fig. 1. Mean proportion of surviving *Rana sylvatica* tadpoles after 96 h of exposure to 10 nominal test concentrations of six chemical deicers. Error bars represent ± standard error. Asterisks indicate the lowest test concentration at which survival was significantly lower than in the control ($n = 4$ replicates per concentration).

Exposure to concentrations of $C_8H_{12}CaMgO_8$ at or above 1.50 g L^{-1} caused significantly lower survival. Survival in test concentrations below those presented above for each deicer was not significantly lower than that in the control ($p > 0.05$).

Different toxicities of the six chemical deicers suggested by tadpole mortality were supported by estimated $LC50_{96\text{-h}}$ values, which ranged from 3.23 g L^{-1} ($C_8H_{12}CaMgO_8$) to 14.63 g L^{-1} (CH_4N_2O; Table 1). The estimated $LC50_{96\text{-h}}$ values were highest for CH_4N_2O, NaCl, and $MgCl_2$ and were much lower for acetate chemicals ($C_8H_{12}CaMgO_8$, CH_3COOK) and $CaCl_2$. For each chemical, the LC50 values were highest after 24 h of exposure and decreased by 2 to 40% through time until the end of the trial.

DISCUSSION

Survival of *R. sylvatica* larvae was reduced by exposure to higher concentrations of all chemical deicers examined in this study; however, the response by larvae depended on the chemical deicer. In general, urea and several of the chloride compounds were less toxic than acetates ($C_8H_{12}CaMgO_8$, CH_3COOK) and $CaCl_2$. At each time in the test, $C_8H_{12}CaMgO_8$ exposure induced 50% mortality at the lowest concentration compared with all other chemicals. In addition, LC50 values decreased with time, indicating either that larval *R. sylvatica* were less able to tolerate or offset the physiological or toxic stress associated with these compounds as duration of exposure increased or that there was a lag in the lethal effects of initial exposure. If the duration of exposure was critical, this suggests that the effects of exposure to winter season road maintenance involving deicers depend on the type of chemical applied, the concentration that builds up in the environment, and how long the chemical persists in the environment. If there was a lag response in mortality, then possibly even short-term exposure to the contamination could have lethal effects on amphibian larvae.

We are not aware of previous studies on amphibians that have investigated the toxicity of urea in the context of its use as an alternative chemical deicer. Urea is widely used in the United States as a source of fertilizer for both agricultural and forest lands as well as an aircraft deicer. Adult amphibians avoid water bodies that receive urea runoff, even when concentrations are lower than the recommended terrestrial fertilization rates [33]. In this study, the high tolerance of *R. sylvatica* tadpoles for urea compared with the other five chemical deicers is expected given that tadpoles excrete urea as a waste product and may retain urea as an osmolyte to protect against salt stress and dehydration [19]. In addition, urea may be used a cryoprotectant by amphibians exposed to low temperatures and freeze–thaw cycles, as is likely during the early breeding cycle of *R. sylvatica* [34]. However, when exposed to high concentrations of urea in their environment, amphibians experience deleterious effects on protein structure and function [35]. Results of the present study suggest that *R. sylvatica* larvae appear to tolerate relatively high concentrations (<9.8 g L^{-1}) of urea during short-term exposure.

The $LC50_{96\text{-h}}$ values estimated in the present study are over two times greater than values reported in previous studies with *R. sylvatica* (Table 2) [23,24]. The discrepancy between this and other studies suggests that this population may be more tolerant to short-term exposure to NaCl pollution than are other populations. The larvae tested in this experiment were collected adjacent to a road that receives a small amount of NaCl, with sand as the primary winter maintenance product (4–5% NaCl; D.J. Mills, personal communication). It is possible that localized adaptation or acquired tolerance to NaCl pollution could solely explain this difference in tolerance, although this phenomenon has not been previously documented in *R. sylvatica* or spotted salamanders (*Ambystoma maculatum*) [20,25].

In addition, differences in experimental methodology and adherence to ASTM or U.S. EPA guidelines may confound comparisons between toxicity studies on chemical deicers with amphibians. The use of food-grade salt, alternative methods of statistical analysis [24], purified or deionized water [13,21,24], and plastic [21] or glass containers may affect resultant

Table 1. Median lethal concentration values (LC50, g L^{-1}) with their 95% confidence limits for larval *Rana sylvatica* at 24, 48, 72, and 96 h of exposure to six chemical deicers during acute toxicity tests ($n = 4$)

Value	CH_4N_2O	NaCl	$MgCl_2$	CH_3COOK	$CaCl_2$	$C_8H_{12}CaMgO_8$
$LC50_{24\text{-h}}$	14.63 (12.83-16.69)	9.12 (8.53-9.82)	7.37 (6.81-7.99)	7.03 (6.22-7.95)	4.85 (4.16-5.65)	3.43 (3.13-3.81)
$LC50_{48\text{-h}}$	14.37 (12.77-16.18)	7.82 (7.64-8.01)	7.28 (6.73-7.92)	5.42 (4.85-6.06)	4.72 (4.08-5.47)	3.39 (3.07-3.74)
$LC50_{72\text{-h}}$	14.37 (12.77-16.18)	7.64 (7.46-7.82)	7.24 (6.64-7.82)	4.76 (4.27-5.31)	4.18 (3.69-4.73)	3.31 (2.97-3.68)
$LC50_{96\text{-h}}$	14.29 (12.55-16.26)	7.56 (7.31-7.82)	7.11 (6.54-7.74)	4.23 (3.84-4.66)	3.98 (3.46-4.57)	3.23 (2.94-3.59)

Table 2. Median lethal concentration values ($LC50_{96\text{-h}}$, g L^{-1}) and 95% confidence limits where available for larval amphibians native to the northern and eastern United States during acute exposure to deicing chemicals

Species	Deicer	LC50
Ambystoma maculatum	NaCl	1.84 (1.42-2.39)[a]
Bufo americanus	NaCl	6.14 (5.94-6.48)[a]
	$MgCl_2$	0.105[b]
Hyla versicolor	NaCl	1.05[c]
Pseudacris crucifer	NaCl	4.43 (3.89-5.05)[a]
Rana clamitans	NaCl	0.406[b]
		4.86 (4.42-5.36)[a]
	$MgCl_2$	0.116[b]
Rana sylvatica	NaCl	2.64 (2.53-2.74)[d,*]
		2.69 (2.31-3.14)[a]
		5.11 (5.46-6.93)[d,**]
	$MgCl_2$	0.23[b]
	$Ca(CH_3CO_2)_2$	0.48[b]
	$Mg(CH_3CO_2)_2$	6.61[b]
	$Na_4Fe(CN)_6$	2.06[b]

[a] Collins and Russell [23].
[b] Dougherty and Smith [13].
[c] Brand et al. [37].
[d] Sanzo and Hecnar [24].
* Calculated using Spearman-Karber Analysis.
** Calculated using Probit Analysis.

$LC50_{96\text{-h}}$ values. Also, feeding tadpoles during exposure and conducting acute toxicity tests at a different room temperature may also influence results [24]. We expect that the use of coarse (nonpurified) rock salt in winter maintenance, a lack of food availability, and the use of glass in experimental chambers in this study (as outlined in ASTM guidelines) would have produced different $LC50_{96\text{-h}}$ values compared with previous studies. Plastic containers might have an interactive effect and interfere with estimates of toxicity endpoints if they leach additional chemicals. For example, plasticizers such as bisphenol A and dibutyl phthalate may cause adverse effects on embryonic or larval amphibians, including malformations, early mortality, and sex reversal [36]. Strict standardization of experimental protocol is recommended in future toxicity tests to facilitate comparisons between studies on different populations or species.

Magnesium chloride and $CaCl_2$ are used primarily as fugitive dust inhibitors on unpaved roadways and to a lesser degree as chemical deicers; however, they are commonly available in stores as consumer-level sidewalk deicers. As a chemical deicer, these are slightly more efficient than NaCl in removing ice. Under the same application rates as NaCl, $MgCl_2$ and $CaCl_2$ application will contribute more detrimental Cl^- into the roadside environment, further expounding the negative impacts of chemical deicer application [1]. This raises serious concerns over the choice of either of these chemicals as an alternative to NaCl. In addition, our results and those of Dougherty and Smith [13] suggest that native larval amphibians are much more sensitive to both $MgCl_2$ and $CaCl_2$ than to NaCl.

Variation in salt tolerance among North American amphibians has been described elsewhere (Table 2). Embryonic and larval *R. clamitans* tadpoles were found to be relatively insensitive to NaCl pollution, with low mortality rates [21] and moderate $LC50_{96\text{-h}}$ values [23]. However, Dougherty and Smith [13] found larval *R. clamitans* to be intolerant of NaCl pollution. Larval gray tree frogs (*Hyla versicolor*) [37] and *A. maculatum* [23] were also reported to be less tolerant of NaCl pollution than other native species. Larval *R. sylvatica* and spring peepers (*Pseudacris crucifer*) appear to be moderately tolerant of NaCl pollution, with low $LC50_{96\text{-h}}$ values [23]. *Bufo americanus* larvae were most tolerant of NaCl pollution [23] and had 100% survival in acute exposure up to 3.0 g L^{-1} [13]. This tolerance exhibited by *Bufo* may stem from past selection to tolerate extreme and rapid drought conditions that could lead to rapid rises in solute concentrations. Different salt tolerance levels among species may influence demography and community structure of native amphibians, particularly for those using roadside breeding habitats [23,26].

To our knowledge, no other studies have investigated the acute effects of the range of NaCl alternatives on native amphibians. One study has investigated the acute toxicity of NaCl and an alternative deicer on amphibians. Results of Dougherty and Smith [13] suggest that *B. americanus*, *R. clamitans*, and *R. sylvatica* are much more sensitive to $MgCl_2$ exposure than NaCl pollution, with $LC50_{96\text{-h}}$ values ranging from 0.11 to 0.23 g L^{-1} (Table 2). These estimates for $MgCl_2$ exposure are also much lower than those estimated in this study, suggesting that this population may be more tolerant of exposure than other populations. Knowledge of the $MgCl_2$ tolerance of other groups of native amphibians will help to determine the effect of this pollution source on native amphibian communities. The identification of the environmental effects of alternative chemicals to aquatic and terrestrial organisms is essential prior to implementation of these chemicals as a viable alternative to NaCl.

Knowledge of the potential and quantified environmental impacts of the other alternative deicing chemicals used in this study is limited. This is particularly important to consider for acetate chemicals, because they are generally considered an environmentally friendly alternative to NaCl [7]. The behaviour of $C_8H_{12}CaMgO_8$ and CH_3COOK in the environment raises serious concerns about potential widespread use of these chemicals as a winter maintenance tool. When CMA is used as road deicer, average highway spray and runoff concentrations of CMA would likely range from 10 to 100 mg/L, with average annual loadings of 10 tons per mile [38]. In surface water, CMA (acetate) decomposition is predicted to occur in 100 d at 2°C and much faster at higher water temperatures [38]. Acetate products may also decrease the pH of roadside soils and lead to the mobilization of heavy metals. In aquatic environments, acetate products increase oxygen demand and may decrease the biomass of algae [1,16], which is a common food resource for developing larval amphibians. These potential environmental effects of $C_8H_{12}CaMgO_8$ and CH_3COOK may have grave implications for sensitive embryonic and larval amphibians by reducing the availability of oxygen and algae necessary for proper development. Results of this study showing low $LC50_{96\text{-h}}$ values for $C_8H_{12}CaMgO_8$ (3.23 g L^{-1}) and CH_3COOK (4.23 g L^{-1}) exposure demonstrates that this alternative deicer may indeed be more harmful than road salt and other deicing chemicals to amphibian communities.

Although the median lethal estimates of chemical deicers to amphibians in this study are above environmentally realistic concentrations of residual chloride from NaCl application in roadside water bodies, we cannot assume a lack of adverse effects of these chemicals on amphibians. The U.S. EPA categorizes substances with an LC50 above 0.10 g L^{-1} to be practically nontoxic to aquatic organisms (http://www.epa.gov/espp/litstatus/effects/redleg-frog/naled/appendix-i.pdf). Similarly, Environment Canada considers prolonged exposure to Cl^- concentrations above 0.220 g L^{-1} as harmful to approximately 10% of aquatic species [10]. However, previous studies indicate NaCl concentrations as low as 0.078 g L^{-1} can cause significant sublethal effects, including decreased survival over

time, decreased number of frogs that metamorphose, and delayed time to metamorphosis in *R. sylvatica* [24]. Residual chloride concentrations in roadside water bodies range from 0.002 to 10.3 $g\,L^{-1}$ and are highest in early spring and late summer [21,23,24]. Considering that inorganic salts other than NaCl used as chemical deicers will likely contribute more Cl^- into the environment, we can expect residual chloride levels to be higher in freshwater systems adjacent to roadways receiving $MgCl_2$ and $CaCl_2$. In addition, the higher application rate required for effective winter maintenance using $C_8H_{12}CaMgO_8$ and CH_3COOK suggests that the concentrations of these chemicals in roadside water bodies will be close to or above the LC50 estimates for amphibians.

The effects of chemical deicers in the environment depend on the rate at which they are applied and their persistence in the environment. Road salt alternatives may cause greater environmental degradation, because, relative to NaCl, greater quantities have to be applied to achieve similar levels of road deicing [1,28]. Thus, the negative impacts of these chemicals on amphibian communities likely will be elevated. Future work on lessening the negative impacts of NaCl should focus on the application of reduced amounts of NaCl or nonchemical approaches instead of relying on alternative chemical deicers.

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KBIC L'Anse Reservation Water Chemistry Study Results 2009-2010

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I. Background

Pollution from road runoff often includes a wide array of chemicals, such as hydrocarbons and heavy metals from vehicles (Transportation Research Board 1991), and a separate assortment of contaminants resulting from winter road-clearing operations involving the removal and prevention of ice (Gales and VanderMeulen 1992; Paschka et al. 1999). The most commonly applied deicing and anti-icing chemical is road salt in the form of sodium chloride (NaCl). An estimated 14 million tons of road salt are annually deposited on North American roads (Transportation Research Board 1991; Environment Canada 2001), representing a significant source of environmental pollution with major implications for ecosystems and the biological life they support. Widespread contamination of freshwater habitats and groundwater sources from road salt deposition is well documented, including changes increased chloride levels, salt-induced stratification of water columns, and eutrophication (*reviewed in* Ramakrishna and Viraraghavan 2005). Elevated chloride levels are considered a major stressor to freshwater organisms and may put aquatic communities at risk within the next century (Kaushal et al. 2005; Karraker 2007). Even brief exposure to high chloride concentrations is potentially very harmful to sensitive wildlife species.

Amphibians are particularly sensitive to chemical contaminants due to their highly permeable skin, aquatic larval stages, and use of roadside wetlands for breeding (Stebbins and Cohen 1995). As such, amphibians are considered effective indicators of ecosystem health and are model organisms to investigate the effects of road salt contamination. Nonetheless, the direct effects of road salt on amphibian species have received little attention (e.g., Turtle 2000; Sanzo and Hecnar 2006; Karraker 2007). Turtle (2000) observed lower survivorship of spotted salamanders (*Ambystoma maculatum*) in roadside pools contaminated by road salt than in woodland ponds. After acute and chronic exposure to road salt, larval wood frogs (*Rana sylvatica*) experienced stress, increased mortality, and altered development (Sanzo and Hecnar 2006).

Preliminary results of our ongoing laboratory studies on the effects of acute and chronic exposure to a suite of deicers (including road salt) support published results and suggest negative implications for northern populations of wood frogs and green frogs (*Rana clamitans*; Harless et al. 2011). Karraker (2007) found that embryonic and larval stages of *A. maculatum* and *R. sylvatica* showed increased mortality and

frequency of malformations during development when exposed to concentrations of salts observed in some areas. Clearly, freshwater contamination by road salt poses a serious threat to amphibian survival, and may be contributing to widespread population declines observed in more northern latitudes. These studies identify a need to further examine the effect of chemical deicers on amphibians in an ecological context.

While the application of road salt in the local area (range: 3.2-4.6 tons per lane mile; D.J. Mills, pers. comm.) is below the state average (12.9 tons per lane mile; Transportation Research Board 1991), information concerning the salt tolerance of local amphibians is useful in understanding the effects of this pollution source on this sensitive group of organisms. This information will be useful regarding the population level responses of amphibian populations across the United States Furthermore, investigating the spatial relationship between this lower level of road salt application and the residual chloride levels in local water bodies will help to identify how this deposition is affecting amphibian habitats in cold climates.

As a part of my dissertation research project at Michigan Technological University, I initiated a broad scale survey of water chemistry data in 130 local wetlands and vernal pools in 2009. My research project focuses on the impact of road salt (NaCl) on amphibian communities. We utilize a mixture of laboratory experiments and field surveys to identify both the short and long term impacts of exposure to road salt on native amphibian larvae. Our laboratory studies help us to identify the lethal and sublethal levels of road salt exposure to amphibians whereas our field surveys allow us to identify local amphibian habitats that may be potential harmful to breeding amphibians.

This report focuses on the results of the water chemistry data collection and analysis that took place on the Keweenaw Bay Indian Community L'Anse Reservation. Below we provide the location of the wetlands sampled, the water chemistry measurements from those water bodies, and an examination of these sites in a regional context.

II. Methods

To determine the threat local amphibians face when utilizing roadside habitats for breeding, we visited 36 wetlands on the KBIC L'Anse Reservation in 2009 and 2010 (Table 1). In 2009, these wetlands were sampled as a part of a broad scale survey of 130 wetlands in Baraga, Keweenaw, and Houghton Counties. Thus, we visited wetlands at different intervals in 2009. In 2010, we focused our efforts on a strict biweekly sampling scheme of 10 wetlands and vernal pools each in Baraga and Houghton Counties.

At each visit we recorded pH, conductivity, salinity, and water temperature in each wetland or vernal pool using a YSI 63 Multimeter probe. We also collected a sample of the water for use in ion chromatography analysis for the determination of

chloride ion [Cl^-] concentration using a Dionex Ion Chromatography machine we were able to use in collaboration with the Environmental Engineering department at MTU. Chloride ions remain in surface water after road salt application and can be used to estimate the extent of recent road salt deposition (Karraker 2007*a*; Findlay and Kelly 2011). We estimated the chloride concentrations in samples from 2009. We have not yet completed the 2010 samples. To examine the spatial relationship between the location of the nearest salt treated highway and the water body, we used ArcGIS to measure the shortest distance between the sample location and the nearest state highway.

III. Results

Results suggest that water chemistry values in KBIC wetlands varied throughout the spring, summer, and fall (Figure 1). However, these differences were not significant for each of the three measurements. For pH, we observed the lowest values in early spring and late fall in 2009. In 2010, the lowest pH values occurred in early spring and mid-summer. Furthermore, mean conductivity levels did not vary significantly through the breeding season in 2009 nor 2010. These levels were variable across all months in 2009 whereas with our strict sampling regime in 2010 we observed bell shaped pattern with conductivity peaking in July and August. Trends in salinity measurements on the KBIC property mirrored those of the conductivity values as the YSI probe estimates salinity using the measured conductivity value. Henceforth, we will focus our examination of salt tolerance focusing on the conductivity measurements and ignoring these salinity values.

In examining the spatial relationship between road salt application on local managed highways and chloride concentrations across the three counties, we observed an exponential decrease in chloride concentration as distance from the road increased (Figure 2). However, this difference was not significant. The highest chloride concentrations were observed in water bodies within 1000m of a salt-treated highway. Chloride concentration estimates from the 2009 samples were variable through the breeding season and peaked in July and August (Figure 3). There was no significant trend in chloride concentrations over time in these water bodies.

Table 1. Physical attributes of study sites used in collecting water chemistry data on the KBIC L'Anse Reservation. Distance from nearest paved road and salt-treated highway were calculated using ArcGIS Software.

Site Name	*Easting*	*Northing*	*Distance to Nearest Paved Road (m)*	*Distance to Nearest Highway (m)*
Third Lake	394664	5180950	342.20	5425.68
Arvon RD S	397522	5178933	1677.32	6776.65
Arvon Road*	398041	5179044	2309.14	7358.73
Baily Lake Wetland	415208	5256695	44.43	44.43
Baraga 1	385758	5182235	67.63	477.69
Baraga 2	385425	5182369	205.09	591.42
Baraga Village	387004	5182545	8.43	170.50
Beartown Corners	384083	5185028	821.74	3184.62
Beesley Corner	401002	5189209	2.83	15547.32
Hatchery Ponds	394760	5188607	13.46	11331.63
Heltunen Road	399415	5189723	704.78	14831.20
Herman Road	393307	5171719	2.65	3767.71
Indian Rd*	392863	5172461	70.20	3087.47
Kelsey Creek	382617	5187437	1882.67	4027.87
Kelsey Creek West	382751	5187597	2065.49	3944.73
Laugh's Lake	396004	5176713	696.61	5085.48
Mud Lakes North*	386868	5186355	135.72	135.72
Mud Lakes South	387158	5185951	3.57	93.58
Pequaming Bog East*	395831	5190099	21.51	13164.84
Pequaming Bog West	394381	5189320	25.74	11838.41
Pikes Peak*	398603	5189147	151.89	13849.79
Pinery Lakes	393580	5180190	812.45	3958.64
Sand Point	388140	5182742	686.73	686.73
Sand Point NE	388187	5182636	768.22	768.22
Sand Point SW	387688	5182106	624.62	624.62
Silver Road	401817	5179998	4658.37	9106.65
Silver Road 1	401817	5179998	6160.49	11312.09
Silver Road 2	402777	5176917	7089.35	11797.14
Silver Road 3	403724	5176917	7939.35	12749.19
Skanee Marsh*	394534	5183373	50.08	6918.47
Skanee Marsh 1	394611	5183475	9.83	7006.07
US 41 L*	389313	5172360	43.09	43.09
US 41 R*	389094	5172131	36.85	36.85
US41 Dump *	385797	5178916	9.48	9.48

* = sites sampled during both 2009 and 2010.

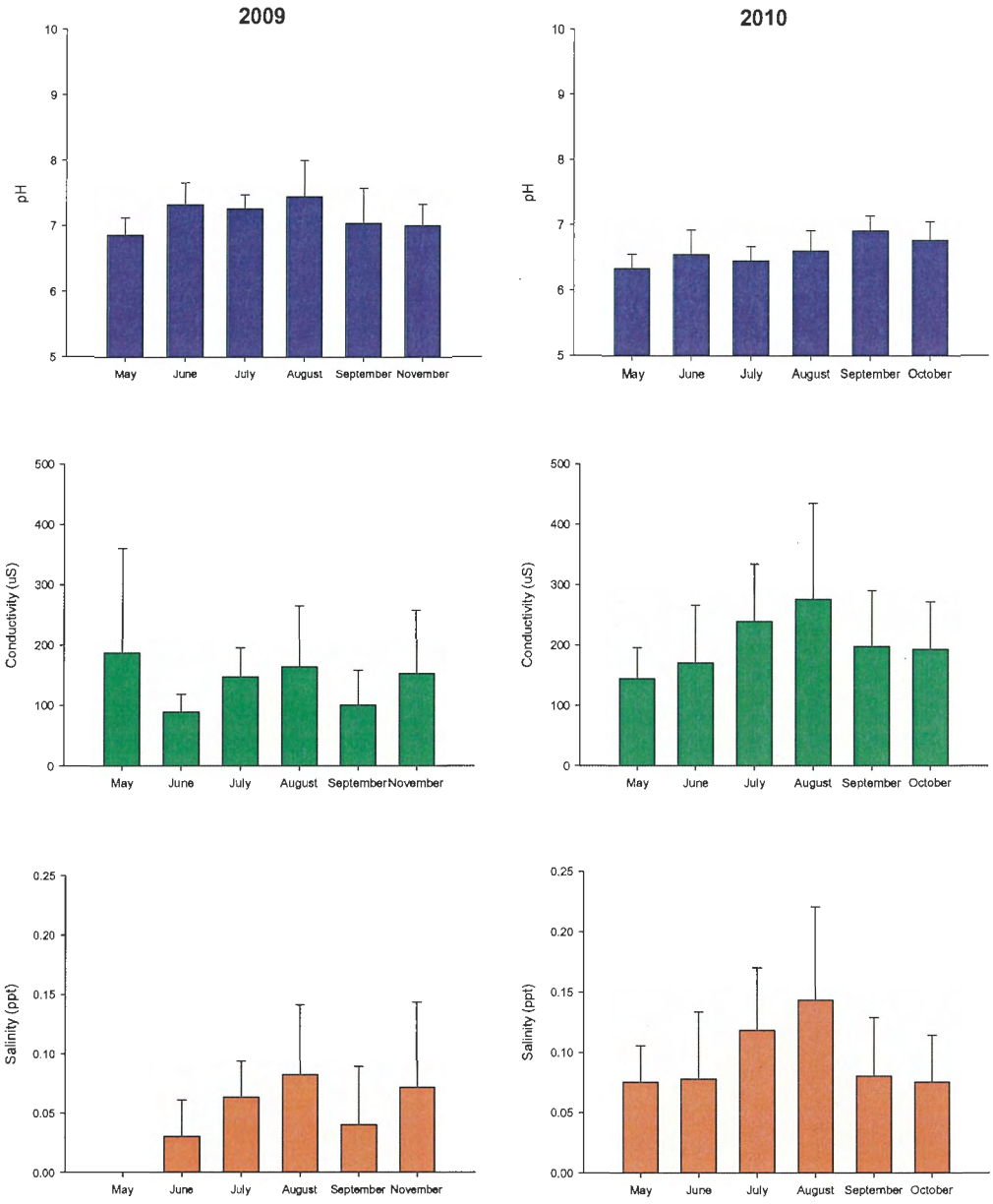

Figure 1. Mean monthly values for pH, conductivity (μS), and salinity (ppt) in KBIC wetlands and vernal pools for 2009 and 2010. Error bars represent 2 standard error.

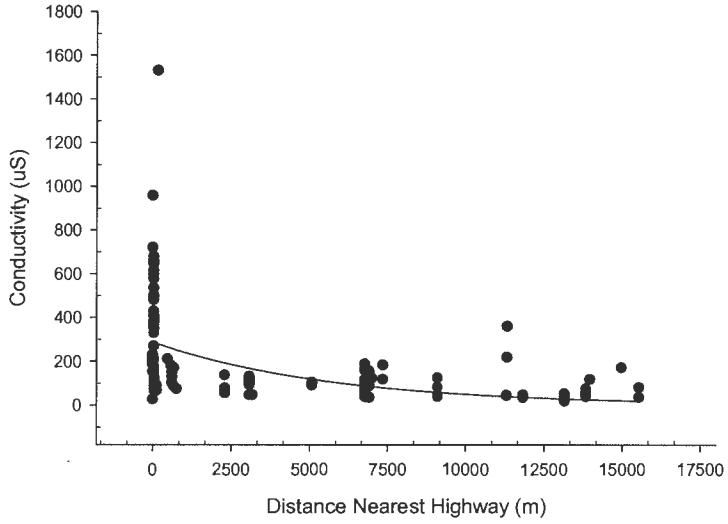

Figure 2. Relationship between conductivity (μS) and distance from the nearest road salt treated highway (m) from water samples collected from water bodies in Baraga, Houghton, and Keweenaw counties over 2009 and 2010. The trendline represents a polynomial fit curve.

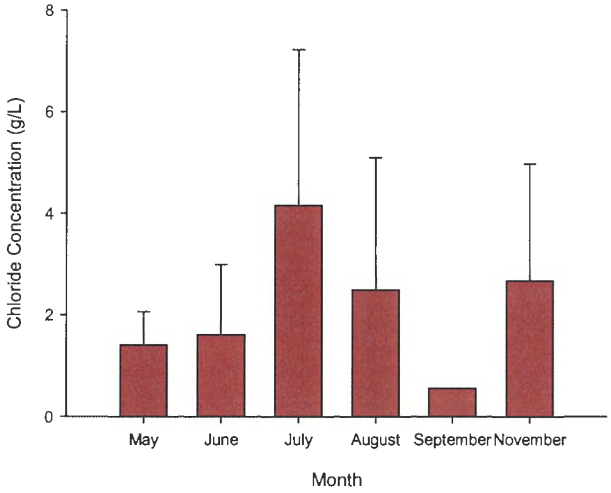

Figure 3. Mean monthly estimates of chloride concentration (gL^{-1}) from ion chromatography analysis in water samples from KBIC wetlands and vernal pools in 2009.

IV. Discussion

The variation in pH through the amphibian breeding season suggests that low pH may occur as a result of low precipitation inputs or high evaporation in local wetlands and vernal pools. Low pH values are known to have negative impacts on larval amphibians such as increasing time to metamorphosis and mortality (Glos et al. 2003). The pH values in this survey ranged from 6.2 – 8.1 over the entire breeding season, suggesting that amphibians breeding in wetlands on the KBIC were not at risk of exposure to harmful acidic habitats.

Conductivity is often used as a surrogate for salt in field studies with amphibians. Karraker (2007) observed a significant reduction in embryonic and larval survival at conductivity levels above 500 µS in *Ambystoma maculatum* and 3000 µS for *Rana sylvatica*. Additionally, high incidences of malformations in larval R. sylvatica were observed (Karraker 2007). Sanzo and Hecnar (2006) observed a significant reduction in larval survival in *R. sylvatica* above 2000 µS. Given these tolerance levels, no sites sampled on the KBIC property exceeded these values during the sampling period. This suggests that the conductivity levels in these water bodies are not harmful to local amphibian populations. In examining the conductivity measurements from the broad scale survey of three local counties over both years, only sampling sites within 50 meters of a salt treated road exceeded these conductivity thresholds (Figure 2).

Other studies have observed different trends in chloride concentration in field sampling of amphibian breeding habitat. Collins and Russell (2009) found mean chloride levels to be highest in spring (0.118 g/L; range: 0.004-0.586), while increasing from early summer (0.082 g/L; range .004-.410) to late summer (0.097 g/L; range: 0.004-0.427). These results as well as ours suggest that chloride concentration increases in late summer when evaporation is highest in wetlands and vernal pools. Sanzo and Hecnar (2006) measured a range of chloride in wetlands near road salt treated roads between 0.004 and 10.3 g/L. Karraker observed a range of chloride levels from 0.145-0.945 g/L in vernal pools. Larval amphibians present in these water bodies may be exposed to potentially lethal levels of chloride.

Other studies on multiple amphibian species suggest that LC_{50} values for chloride exposure range from 1.18 to 3.92 g/L (Sanzo and Hecnar 2006; Dougherty and Smith 2006; Collins and Russell 2009). Based on our analysis, water bodies across all months could potentially contain harmful chloride levels at these tolerance values. In addition, high chloride levels in July and August may be quite harmful to larval amphibians breeding in these wetlands on the KBIC property.

However, our preliminary data suggests that the LC_{50} estimate for NaCl exposure may be higher than previously reported for *R. sylvatica* at 7.56 g/L (Harless et al. 2011). Further research on other populations of wood frogs will help to identify the tolerance of this species. Using our LC_{50} levels, water bodies on the KBIC would

contain harmful concentrations of chloride in July and August when water levels are low. Further analysis of samples from 2010 will help to shed light on this relationship.

In summary, the water chemistry analysis of the wetlands and vernal pools on the KBIC L'Anse Reservation suggests that these water bodies pose little threat to the survival and fitness of local breeding amphibians.

V. Acknowledgements

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APPENDIX II:

Air Quality Information

EPA

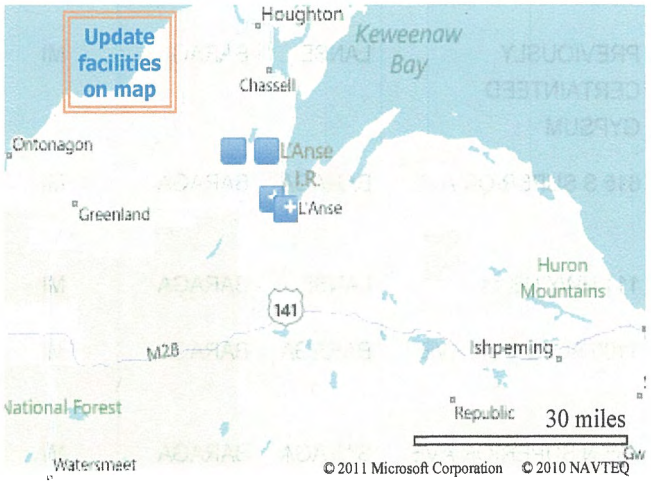
Envirofacts

Search Results

AFS

List of Facilities Reporting to AFS in Envirofacts

Information on air releases is contained in the Aerometric Information Retrieval System (AIRS), a computer-based repository for information about air pollution in the United States. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. In AIRS, these sources are known as facilities, and the part of AIRS associated with data about sources is called the AIRS Facility Subsystem, or AFS. The information in AFS is used by the states to prepare State Implementation Plans, to track the compliance status of point sources with various regulatory programs, and to report air emissions estimates for pollutants regulated under the Clean Air Act.



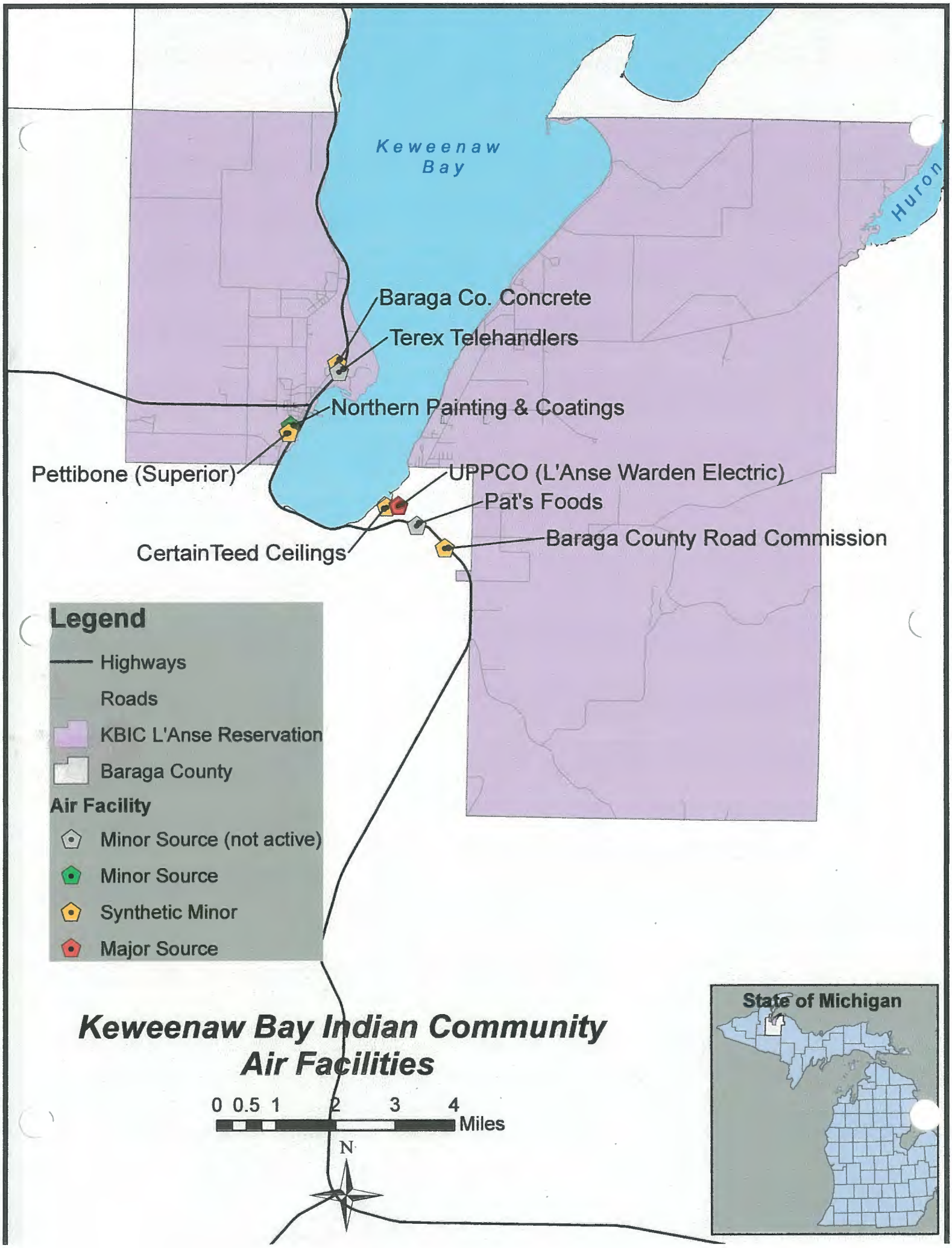
Search Results for:

Baraga County, Michigan

AFS Links

- Overview
- Search
- Model
- Law
- AFS Search User Guide
- Contact Us
- AFS Home

Report an Error


Keweenaw Bay
Huron
Baraga Co. Concrete
Terex Telehandlers
Northern Painting & Coatings
Pettibone (Superior)
UPPCO (L'Anse Warden Electric)
Pat's Foods
Baraga County Road Commission
CertainTeed Ceilings
Legend
Highways
Roads
KBIC L'Anse Reservation
Baraga County
Air Facility
Minor Source (not active)
Minor Source
Synthetic Minor
Major Source
Keweenaw Bay Indian Community
Air Facilities
0 0.5 1 2 3 4
Miles
N
State of Michigan

FINAL REPORT

The Measurement of Ambient Particulate Aerosols Within the Keweenaw Bay Indian Community

February 2000 to February 2001

02 July 2002

Gerald J. Keeler, Principal Investigator
Frank J. Marsik, Co-Principal Investigator

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109 South Observatory
Ann Arbor, Michigan 48109
Phone: 734-936-1836

Introduction

Numerous scientific studies have linked particulate matter with adverse health effects in humans. Potential health problems related to excessive particulate matter exposure include premature death, aggravated asthma, chronic bronchitis, decreased long function, and work/school absences. Those individuals who are most susceptible to the effects of particulate matter include children, the elderly and those with pre-existing respiratory problems. A number of past health effects studies have suggested that adverse health effects were associated with particulate levels well-below the current National Ambient Air Quality Standard for particulate matter as set in The Clean Air Act, last amended in 1990. As a result of such findings, in 1997 the U.S. Environmental Protection Agency proposed new particulate matter standards that included a fine particulate matter standard (particulate matter less than 2.5 microns in aerodynamic diameter, or PM2.5). A 1999 U.S. Federal Court ruling blocked the implementation of these proposed PM2.5 standards (annual arithmetic mean of 15 μg/m3 and 24-hour mean of 65 μg/m3) based upon concerns related to the validity of using the PM2.5 cutoff for use in establishing these health based standards. Despite this court action, states and local communities began to monitor PM2.5 due to its potential for resulting in adverse human health effects. Recently, the courts upheld the PM2.5 rules and found in favor of the USEPA.

Particulate matter consists of a mixture of solid particles and liquid droplets that are found in the ambient atmosphere. Particulate matter has both natural and anthropogenic sources, with the chemical and physical composition of particulate matter varying considerably from source to source. Course particles (those greater than 2.5 micrometers in diameter) come from a variety of sources, which include windblown dust, materials handling and grinding operations. Fine particles (those less than 2.5 micrometers in diameter) are typically associated with fuel combustion (motor vehicles and power generation), as well as from other industrial processes (metals processing and incineration). While course particulate matter typically deposits close to its source, fine particulate matter can be transported over long distances (greater than 100 km) and be deposited far from its source.

With respect to anthropogenic sources, the extent to which a given community is impacted by these sources (either local or distant emissions) is often dependent upon the local geography and climatological meteorological conditions. These conditions impact both the local atmospheric stability (and thus trapping or dispersion of pollutants) and the general wind patterns that are responsible for pollutant transport into/out of a region and/or community. In some instances, coastal communities may be particularly susceptible to high levels of anthropogenic pollutants due to enhanced stable atmospheric conditions resulting from their proximity to large, cold bodies of water. Such stability can often result in a trapping of pollutants near the surface for extended periods of time. For this reason, the University of Michigan Air Quality Laboratory (UMAQL), in conjunction with the Keweenaw Bay Indian Community (KBIC), sought to conduct a one-year investigation of the ambient fine-particulate levels within communities located adjacent to the Keweenaw Bay of Michigan's Upper Peninsula. The original intent of the study was to establish a community-based monitoring program that looked at the PM2.5 levels in a residential community within the KBIC. It was felt that the combined effects of wood-burning (for home heating), local industries and the unique geography of the area might

platform was approximately ten feet above the ground. As will be discussed latter in this report, the most elevated levels of both PM2.5 mass and mercury were observed with atmospheric transport from the west and northwest, thus it is our opinion that the proximity of the sampling site to the campground did not adversely impact the study results.

The sampling protocol used in this study has been described in detail within the Quality Assurance Project Plan submitted in conjunction with this project. In brief, clean sampling techniques developed by the University of Michigan Air Quality Laboratory were used in all phases of this project (sampling preparation, deployment, retrieval and analysis). Samples were collected using an "every sixth day" sampling schedule that coincides with the "every sixth day" sampling schedule used by the U.S. EPA for monitoring networks associated with total suspended particulates, lead, PM10, PM2.5 and volatile organic compounds.

Each particulate sample was collected for a period of twenty-four hours (0800 local time Day 1 to 0800 local time Day 2), using filter-based media (quartz filters for mercury and Teflon filters for mass and trace elements). Following sample collection, all samples are shipped to the University of Michigan Air Quality Laboratory in Ann Arbor, Michigan for analysis within a Class 100 clean laboratory. Field blanks were collected with the first sample day of each month, so as to characterize the sample handling and analysis procedures used in the study. All samples were collected by the staff of the KBIC Environmental Science Department, which received training from University of Michigan Air Quality Laboratory personnel prior to the start of the sampling program. Based upon the results of our analysis of the field blank filters collected during the one-year sampling period, a number of the trace metal species analyzed were blank-corrected prior to presentation.

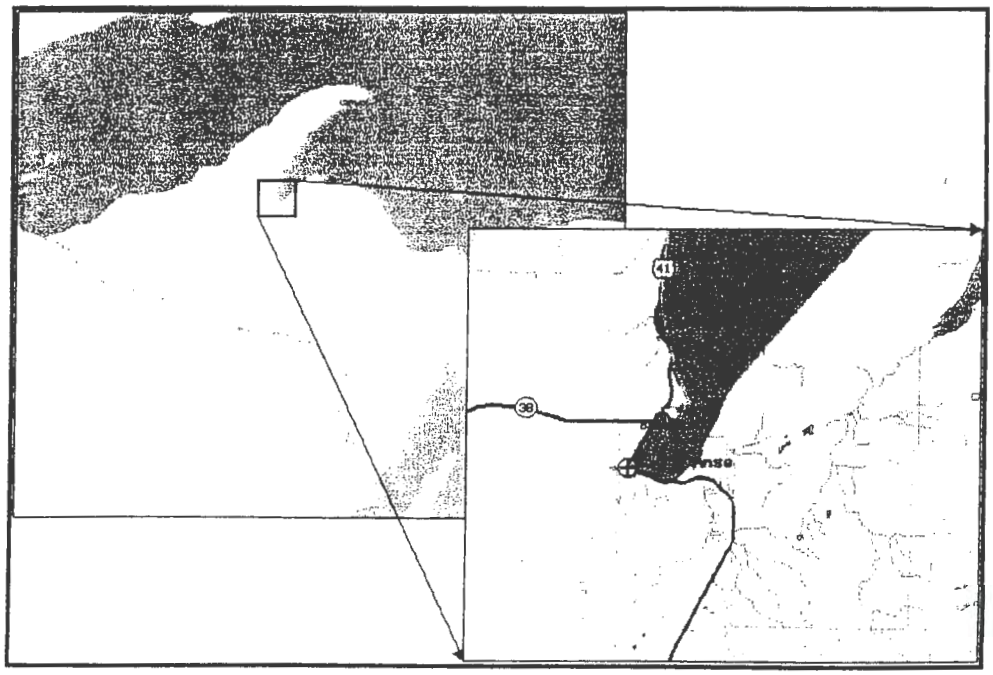


Figure 1. Location of Keweenaw Bay Indian Community PM2.5 Sampling Site

Overall, the ambient PM2.5 mercury concentrations observed at the Baraga site during the period were quite low compared to other data collected by the UMAQL at sites located within the Great Lakes. In part, these relatively low PM2.5 mercury concentrations observed at the Baraga site are likely due to the relative distance of the site from major mercury emission sources in the Lower Great Lakes region (Figures 3a and 3b). In general, the primary anthropogenic sources of mercury are: fossil fuel combustion (industrial, electric utilities and home heating) and medical and municipal waste incineration, Chlor-alkali production, cement manufacturing and lamp/mercury-switch breakage.

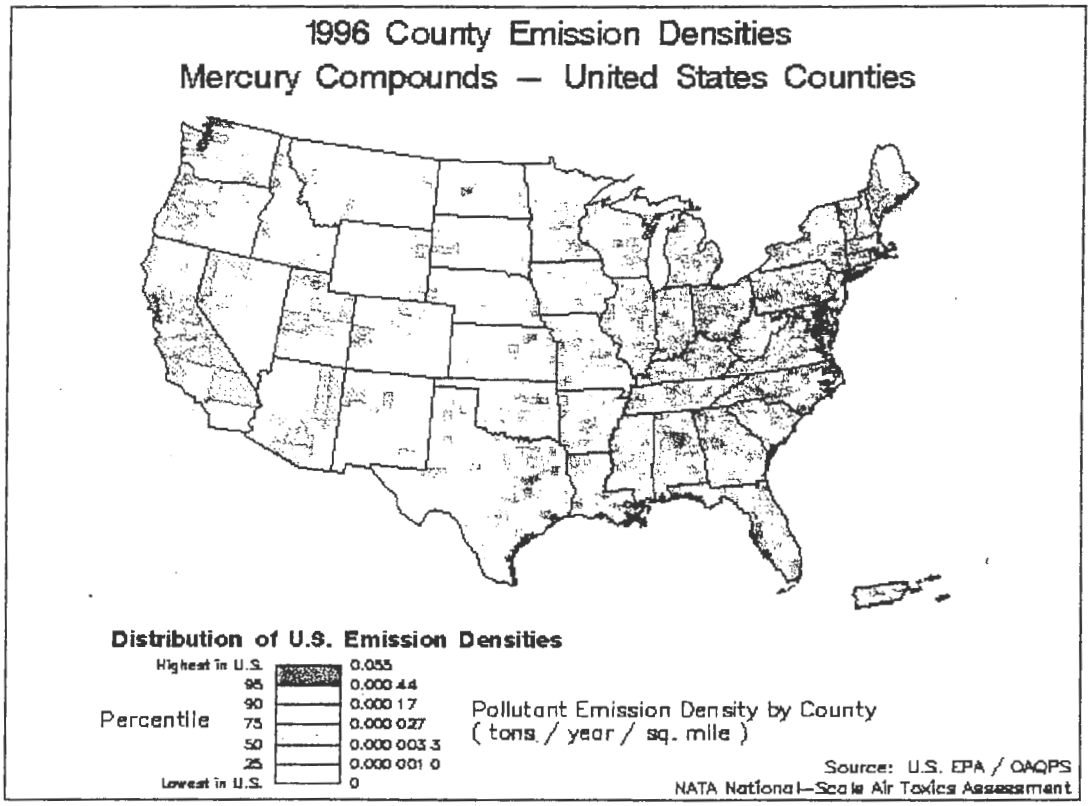


Figure 3a. 1996 USEPA County Emissions Densities for Mercury Compounds for the United States.

Ambient PM2.5 Mass Concentrations

The results for the measurement of "every sixth day" PM2.5 mass concentrations (units: micrograms per cubic meter) at the Baraga site are presented in Figure 4. The average PM2.5 mass concentration for the yearlong study period was 6.4 $\mu g/m^3$. It can be seen that the PM2.5 mass concentrations observed at the site were well below the health-based National Ambient Air Quality Standards (NAAQS) for PM2.5 of 15 $\mu g/m^3$ (annual mean) and 65 $\mu g/m^3$ (24-hour mean). Figure 4 does indicate a slight trend toward relatively higher PM2.5 mass concentrations during the Summer and Autumn seasons (see also Table 2). This seasonal trend was not unexpected and there are two likely explanations for this observation. First, during the summer and autumn seasons, a greater percentage of the atmospheric transport across the area is from the south than in the Winter season. Given the relatively large number of anthropogenic sources located in the southern Great Lakes Region, it is not surprising the atmospheric transport from the south would carry relatively polluted air from the industrialized southern Great Lakes northward into the Upper Great Lakes. Second, seasonal differences in humidity across the region are also important. During the warmer seasons of the year (Summer and Autumn), the atmosphere is able to hold more water vapor than during the colder seasons of the year (Winter and Spring). The increased humidity levels during the warm seasons mean that more water vapor available is available to adsorb onto hygroscopic particle surfaces (e.g., sulfate), allowing these particles to grow in size and mass. As a result, PM2.5 mass concentrations would be expected to be elevated during the warmer, more humid months due to the adsorption of water vapor onto the ambient particles.

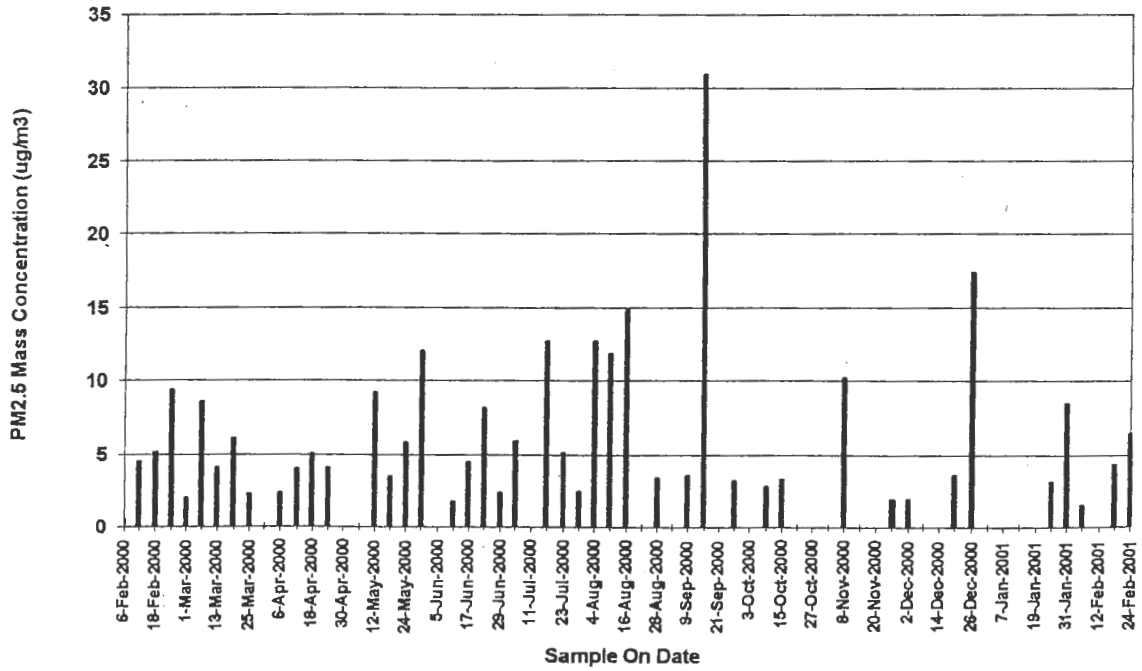


Figure 4. Figure 2. Every Sixth Day PM2.5 Mass Concentration, Keweenaw Bay Indian Community, Michigan.

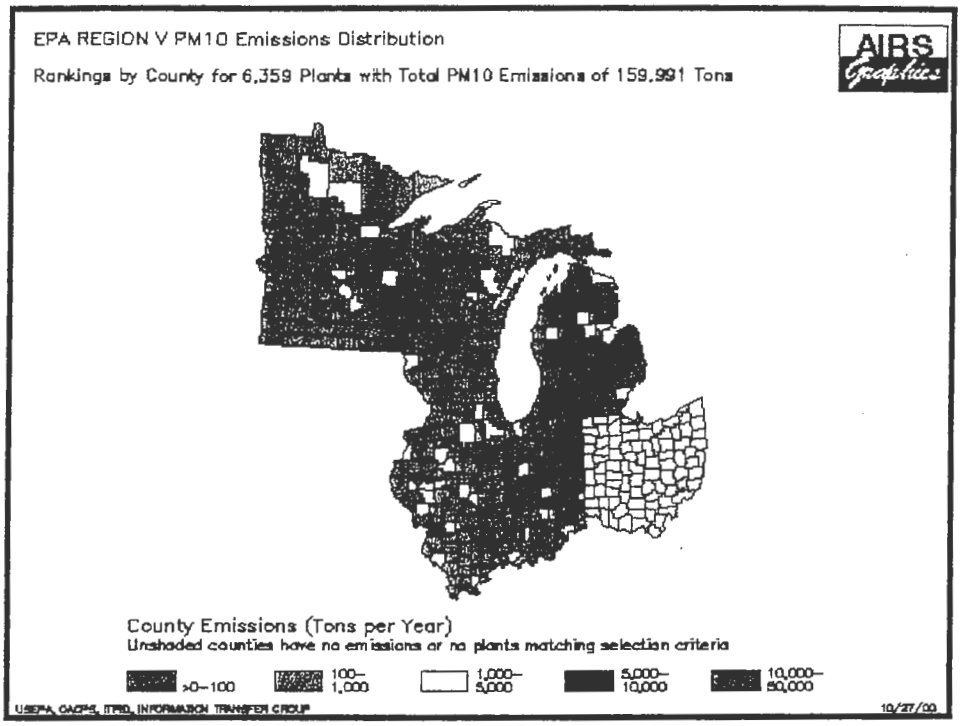


Figure 5a. PM10 Emissions Distribution for USEPA Region 5 by County.

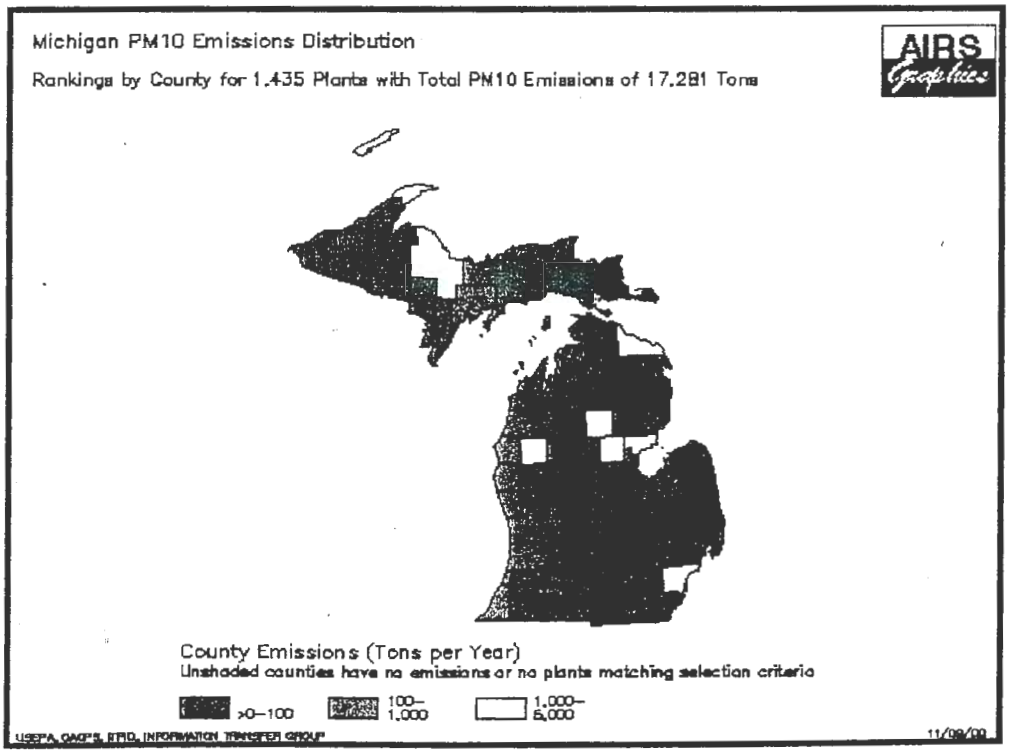


Figure5b. PM10 Emissions Distribution for the State of Michigan by County.

In an attempt to see if trends in the observed PM2.5 mercury and mass concentrations at the Baraga site could be linked to air mass transport pathway (and thus differing source regions), a "back-trajectory" analysis was performed for each of the 24-hour periods during which ambient samples were collected. This analysis was performed using the National Oceanic and Atmospheric Administration's Hybrid Single Particle Lagrangian Integrated Trajectory (HY-SPLIT) model and meteorological data from the National Center for Environmental Prediction's EDAS meteorological modeling system (Draxler and Hess 1997). For a given 24-hour sample period, the HY-SPLIT model started with a "parcel" of air that was located 500 meters above the ground at 0000 GMT (7PM Eastern Standard/8PM Eastern Daylight) at the latitude and longitude of the measurement site. This represented the approximate midpoint of the sample period. The HY-SPLIT model then used the three-dimensional wind field provided by the EDAS meteorological modeling system to track the parcel backwards for 36 hours to determine the atmospheric transport pathway history of that parcel. The results of the "back-trajectory" analysis performed for samples arriving at the Baraga site are presented in Figure 7.

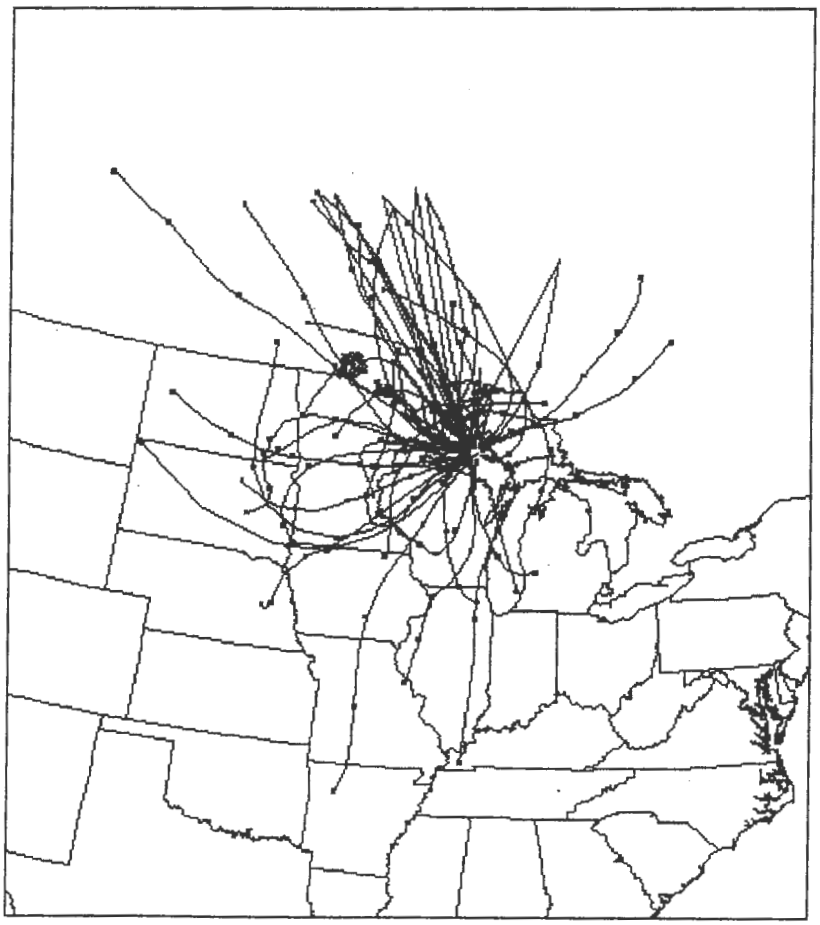


Figure 7. Thirty-six hour back-trajectories for parcels arriving in Baraga, MI at 8PM on days for which samples were collected during the period of February 2000 through February 2001.

For PM2.5 mass, elevated concentrations were observed with atmospheric transport from a variety of directions, but predominantly from the northwest. One such example is shown in Figure 9, which presents the surface meteorological conditions at 8PM on 15 September 2000, the mid-point of the 24-hour period for which the highest PM2.5 mass concentration during the one-year study period was observed (30.9 $\mu g/m^3$). During this 24-hour period, high-pressure across the eastern Great Lakes was gradually moving to the south. This resulted in an atmospheric flow pattern that would have carried the airmass impacting the Baraga site over southern Ontario and northern Minnesota. Both of these areas are known for relatively high emissions of particulate matter associated with metals processing and coal-fired utilities. Locally, there are a number of significant sources of particulate matter across the western Upper Peninsula that could have further contributed to the elevated PM2.5 concentration, as well.

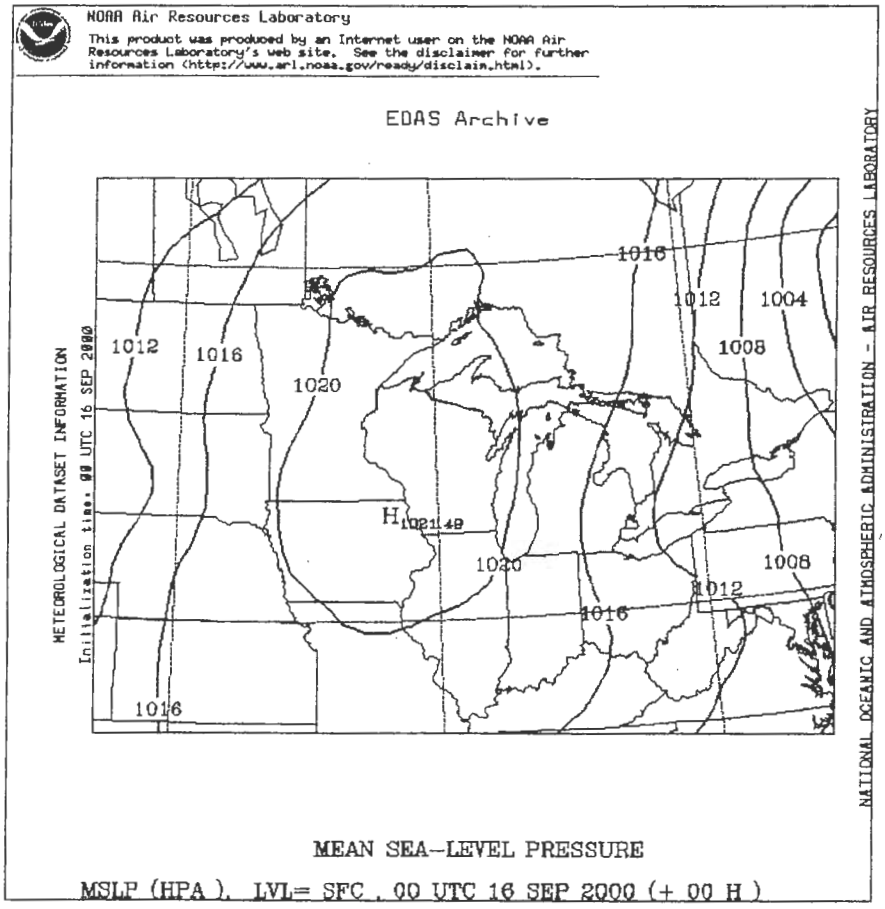


Figure 8. Surface meteorological conditions at 8PM on 15 September 2000.

Potential Contributions to PM2.5 Mercury Concentrations

Correlation coefficients (r) were determined for PM2.5 mercury, PM2.5 mass and speciated PM2.5 mass concentrations and are presented in Table 3 (below). In this table, r-values of greater than ± 0.23 are considered to be statistically significant at the 95 percent confidence level. One of the most striking features of this analysis is that while a positive correlation exists between the PM2.5 mercury and mass concentrations, the correlation was not statistically significant at the 95 percent confidence level. This suggests that the most significant sources contributing to PM2.5 mercury and PM2.5 are likely different. This would be consistent with the differences in predominant source areas suggested by the atmospheric transport analysis. Table 3 indicates that for the period studied, PM2.5 mercury was most highly correlated with lead, arsenic and strontium. These correlations were statistically significant at the 95 percent confidence level. Additional elements that had statistically significant correlations with mercury were calcium, vanadium and magnesium. These results suggest that the observed levels of ambient PM2.5 mercury at the Baraga site were likely associated with impacts from fossil-fuel combustion sources (lead, arsenic and vanadium) and metals processing (lead, arsenic and manganese) (CEPA WGAQOG 1999).

Olmez and Gordon (1985) found that by consideration of the ratio of La/Ce, it is possible to distinguish between types of fossil fuel sources contributing to a given sample. Coals used in the United States typically contain levels of lanthanum and cerium resulting in a ratio near 0.5, which is similar to that observed within the Earth's crust. As a result, emissions from U.S. coal-fired facilities typically result in La/Ce ratios near 0.5. In contrast, oil-fired utilities and oil-refineries are characterized by La/Ce ratios great than 1.0. For the period studied, the La/Ce ratios for the five-highest observed PM2.5 mercury concentrations ranged from 0.67 to 0.99 (average 0.83) suggesting that there was at least some fossil-fuel contribution from oil based sources (from either home heating, oil-based power generation and/or oil refining). The significant correlation between mercury and vanadium at the Baraga site supports this interpretation given that vanadium is typically associated with oil-based sources.

Based upon statistics obtained from the Michigan Public Service Commission (for the period November 1999 to October 2000), regional average fuel mixtures used in electric power generation are dominated by coal (71.3 percent), with only 0.8 percent of fuel attributed to oil. Local power generation, by the Upper Peninsula Power Company, is also predominantly fueled by coal (for the period October 2000 to September 2001) [Source: http://www.uppco.wpsr.com/]. Given these facts, our results suggest that the most elevated levels of mercury observed at the Baraga site were in part impacted by regional, oil-based sources of mercury. This hypothesis is supported by the fact that the atmospheric transport associated with the highest PM2.5 mercury concentrations observed during the study period was primarily from the west and southwest, where a number of oil-fueled utility stations and oil-refineries are located (in Wisconsin, Minnesota and Illinois).

Given the apparent importance of potential contributions from metals processing in the Upper Great Lakes, it is somewhat surprising that a better correlation was not found between PM2.5 mercury and copper, given the traditional abundance of the latter in the Upper Great

TABLE A2 (Continued)

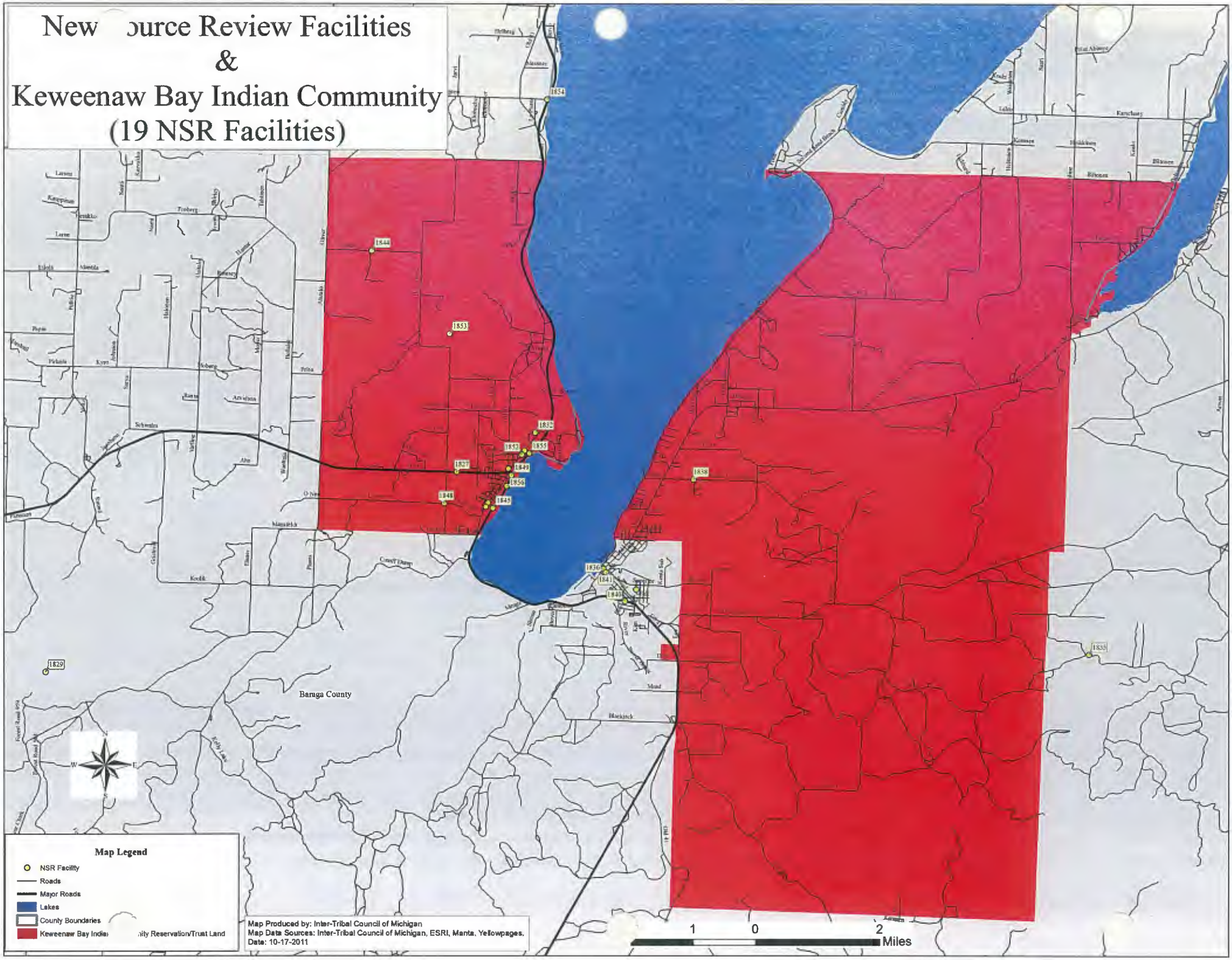
SAMPLE ID	DATE ON	Hg(p)	I2.5 Mε	Sr	Cd	Ba	La	Ce	Pb	Mg	Al	P	S	Ca	Ti	V	Mn	Fe	Cu	K	As
		pg/m3	ug/m3	pg/m3	pg/m3	ng/m3	pg/m3	pg/m3	pg/m3	ng/m3	ng/m3	ng/m3	ng/m3	ng/m3	pg/m3	pg/m3	ng/m3	ng/m3	ng/m3	ng/m3	pg/m3
BAR-31-CYQ,CYT	09/09/00	5.3	3.5	183.8	122.3	1.0	30.6	60.8	2312.2	23.3	65.7	6.9	244.1	68.5	831.7	116.0	1.9	40.1	2.5	63.7	470.7
BAR-32-CYQ,CYT	09/15/00	4.1	30.9	823.4	126.9	3.7	144.0	225.1	1839.7	102.7	181.4	17.1	801.0	419.2	2805.7	357.5	7.7	126.9	1.0	108.9	386.3
BAR-33-CYQ,CYT	09/21/00	0.7	BDL	276.8	87.1	0.7	20.1	43.1	209.9	13.2	52.0	7.0	62.0	7.1	595.6	85.7	0.7	7.2	BDL	27.4	27.2
BAR-34-CYQ,CYT	09/27/00	2.0	3.2	39.9	60.6	0.5	16.3	23.7	302.1	0.6	41.4	5.1	381.3	BDL	272.9	58.2	0.3	BDL	0.3	29.7	223.2
BAR-35-CYQ,CYT	10/09/00	2.0	2.7	200.6	47.3	0.3	9.4	12.2	234.5	10.8	7.4	2.9	120.5	31.3	207.3	25.2	BDL	3.2	0.8	10.5	55.0
BAR-36-CYQ,CYT	10/18/00	5.2	3.3	282.4	31.8	1.7	12.6	9.3	257.6	3.6	8.0	2.3	68.1	28.0	281.6	30.2	BDL	2.4	BDL	12.7	62.8
BAR-37-CYQ,CYT	10/21/00	4.3	BDL	57.0	67.4	0.2	7.8	9.5	1362.8	1.9	3.8	1.9	333.4	9.3	248.1	213.2	0.4	10.0	BDL	12.5	302.2
BAR-38-CYQ,CYT	10/27/00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
BAR-39-CYQ,CYT	11/02/00	2.4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
BAR-40-CYQ,CYT	11/08/00	1.6	10.1	194.4	62.3	0.3	15.7	21.7	619.3	14.8	4.8	2.7	615.8	29.9	217.1	110.2	0.4	8.1	BDL	16.3	138.6
BAR-41-CYQ,CYT	11/26/00	5.5	1.9	169.9	23.6	0.8	7.7	8.4	381.7	12.8	5.5	5.5	64.2	25.5	217.6	23.3	0.3	6.2	BDL	8.3	46.4
BAR-42-CYQ,CYT	12/02/00	0.7	1.9	70.9	35.8	2.9	2.9	4.5	274.3	1.6	4.3	1.2	62.7	3.1	68.5	25.8	BDL	BDL	BDL	9.8	42.8
BAR-43-CYQ,CYT	12/08/00	0.1	BDL	20.7	11.0	0.2	BDL	BDL	290.7	1.3	1.8	3.4	BDL	1.5	32.0	BDL	BDL	BDL	1.3	3.7	BDL
BAR-44-CYQ,CYT	12/14/00	0.2	BDL	2.8	9.7	0.3	BDL	BDL	30.9	1.4	2.0	1.9	BDL	BDL	18.1	4.3	BDL	BDL	BDL	4.1	12.9
BAR-45-CYQ,CYT	12/20/00	0.6	3.5	473.5	60.9	0.2	6.4	9.8	337.3	44.1	3.7	3.1	235.8	80.9	153.2	17.5	0.2	14.2	0.3	14.1	29.6
BAR-46-CYQ,CYT	12/26/00	4.7	17.3	126.8	67.1	0.5	17.5	23.3	1393.9	6.3	12.4	3.8	633.6	20.7	396.3	98.0	0.8	18.6	0.3	19.6	245.7
BAR-47-CYQ,CYT	01/25/01	0.5	3.1	69.5	29.1	0.3	5.1	7.9	135.6	2.2	5.5	3.3	172.5	5.3	139.9	36.0	0.2	3.4	0.2	10.7	33.6
BAR-48-CYQ,CYT	01/31/01	5.9	8.4	109.7	63.7	0.4	9.5	14.3	759.2	5.4	8.2	2.8	480.7	15.5	265.3	160.1	0.6	16.7	0.5	15.2	197.7
BAR-49-CYQ,CYT	02/06/01	*	1.5	25.7	26.2	0.1	BDL	BDL	142.8	2.6	2.8	1.7	74.2	4.9	109.1	23.8	BDL	2.8	BDL	6.5	BDL
BAR-50-CYQ,CYT	02/18/01	9.4	4.3	85.4	33.6	0.3	9.9	13.1	303.7	4.2	7.9	3.6	129.1	11.8	268.3	52.2	0.2	7.1	0.6	9.3	41.2
BAR-51-CYQ,CYT	02/24/01	4.8	6.4	363.6	47.4	0.1	6.7	7.3	432.3	36.2	2.4	5.5	382.8	91.5	80.7	75.3	0.2	5.1	BDL	18.7	66.6

Table B1. EPA Region 5: PM10 Emissions by County

RANK*	STATE	PLANTS	PM10 (Tons Per Year)	COUNTY NAME
1	MN	55	15412	ST LOUIS CO
2	IN	101	10787	LAKE CO
3	IL	280	10569	COOK CO
4	IL	33	6447	MADISON CO
5	MN	8	4038	SHERBURNE CO
6	IN	27	3230	PORTER CO
7	IL	53	2730	WILL CO
8	MN	124	2514	HENNEPIN CO
9	MI	155	2511	WAYNE CO
10	MN	10	2458	ITASCA CO
11	WI	20	2423	BARRON CO
12	IN	133	2084	MARION CO
13	WI	22	2061	MARINETTE CO
14	IN	14	1862	WARRICK CO
15	MN	6	1746	BELTRAMI CO
16	MN	11	1722	CARLTON CO
17	IL	18	1669	TAZEWELL CO
18	IL	16	1667	MACON CO
19	IL	3	1500	RANDOLPH CO
20	IL	2	1376	BOND CO
21	IL	31	1327	LA SALLE CO
22	MI	11	1320	MARQUETTE CO
23	MI	7	1310	PRESQUE ISLE CO
24	IL	47	1299	PEORIA CO
25	IN	12	1257	JEFFERSON CO
215	MI	5	2	HOUGHTON CO
410	MI	1	0	BARAGA CO
34	MN	87	963	MOBILE SOURCES
47	MI	85	718	MOBILE SOURCES
277	WI	60	51	MOBILE SOURCES

* Out of 423 (420 Counties and 3 Estimates of Statewide Mobile Source Emissions)

New ource Review Facilities
&
Keweenaw Bay Indian Community
(19 NSR Facilities)



Loc_name	Identifier	Company_NA	Source_TYP	Address	Score	X	Y	Match_addr	SIDE	City	State	Zip	Found_In	Tribe	Phone	Country	On_Reserva	Match_Rate	Proximity
	1827	Besse Forest Products Inc	Lumber Manufacturer	802 MICHIGAN AVENUE, ROUT	84	-88.50538103	46.77929909	802 MICHIGAN AVE, BARAGA, MI, 49908	L	Baraga	MI	49946	yellopages.com	Keweenaw Bay Indian Community		US	On Reservation/Trust Land	Good	Keweenaw Bay Indian Community
	1830	Homestead Graphics	Printing Operations	516 S Superior Ave	100	-88.49441830	46.77233833	516 S SUPERIOR AVE, BARAGA, MI, 49908	L	Baraga	MI	49908	yellopages.com	Keweenaw Bay Indian Community		US	On Reservation/Trust Land	Good	Keweenaw Bay Indian Community
	1831	Disney's Seal Coating	Coating Operations	129 Main Ave	100	-88.48781727	46.78058512	129 MAIN AVE, BARAGA, MI, 49908	R	Baraga	MI	49908	yellopages.com	Keweenaw Bay Indian Community		US	On Reservation/Trust Land	Good	Keweenaw Bay Indian Community
	1832	Peninsula Powder Coating	Coating Operations (Fabrics)	128 Hemlock St	100	-88.47912083	46.78907472	128 HEMLOCK ST, BARAGA, MI, 49908	L	Baraga	MI	49908	yellopages.com	Keweenaw Bay Indian Community	(906) 353-7234	US	On Reservation/Trust Land	Good	Keweenaw Bay Indian Community
	1833	Northern Painting & Coatings	Coating Operations	615 S Superior Ave	100	-88.49519171	46.77139404	615 S SUPERIOR AVE, BARAGA, MI, 49908	R	Baraga	MI	49908	yellopages.com	Keweenaw Bay Indian Community		US	On Reservation/Trust Land	Good	Keweenaw Bay Indian Community
	1838	J&J Repair	Auto Repair	16549 Indian Cemetary Rd	49	-88.42474782	46.77931707	INDIAN CEMETERY		Lanse	MI	49946	yellopages.com	Keweenaw Bay Indian Community		US	On Reservation/Trust Land	Fair	Keweenaw Bay Indian Community
	1843	Laser North	Laser Cutting & CNC bending	442 N Superior Ave	100	-88.48323073	46.78419140	442 N SUPERIOR AVE, BARAGA, MI, 49908	L	Baraga	MI	49908	michiganbusiness	Keweenaw Bay Indian Community		US	On Reservation/Trust Land	Good	Keweenaw Bay Indian Community
	1844	Bonnies	repellant & fertilizers	371 Cadeau Rd	53	-88.53660549	46.83008380	CADEAU		Baraga	MI	49908	manta.com	Keweenaw Bay Indian Community	(906) 353-6841	US	On Reservation/Trust Land	Fair	Keweenaw Bay Indian Community
	1845	Lakeside Auto Truck	Auto Repair	802 1/2 US Highway	100	-88.49266462	46.77117821	802 USHY 41, BARAGA, MI, 49908	L	Baraga	MI	49908	manta.com	Keweenaw Bay Indian Community	(906) 353-6056	US	On Reservation/Trust Land	Good	Keweenaw Bay Indian Community
	1846	Baraga, Inc	metal	442 N Superior Ave	100	-88.48323073	46.78419140	442 N SUPERIOR AVE, BARAGA, MI, 49908	L	Baraga	MI	49908	manta.com	Keweenaw Bay Indian Community	(906) 353-6090	US	On Reservation/Trust Land	Good	Keweenaw Bay Indian Community
	1847	Massie Mfg, Inc	metal	445 N Superior Ave	100	-88.48311382	46.78420938	445 N SUPERIOR AVE, BARAGA, MI, 49908	R	Baraga	MI	49908	manta.com	Keweenaw Bay Indian Community	(906) 353-6381	US	On Reservation/Trust Land	Good	Keweenaw Bay Indian Community
	1848	Selkey Manufacturin	metal	1317 Lindblom Rd	65	-88.50931107	46.77194263	LINDBLOM RD		Baraga	MI	49908	manta.com	Keweenaw Bay Indian Community	(906) 353-7104	US	On Reservation/Trust Land	Fair	Keweenaw Bay Indian Community
	1849	Northern Oil 1 Inc	Petroleum Bulk	150 Us Ste 41	100	-88.48678305	46.77894835	150 USHY 41, BARAGA, MI, 49908	L	Baraga	MI	49908	manta.com	Keweenaw Bay Indian Community	(906) 353-6185	US	On Reservation/Trust Land	Good	Keweenaw Bay Indian Community
	1850	Xtreme Manufacturing	Forklifts&stuff	125 Mian Ave	93	-88.48781727	46.78045921	125 MAIN AVE, BARAGA, MI, 49908	R	Baraga	MI	49908	manta.com	Keweenaw Bay Indian Community	(906) 353-8005	US	On Reservation/Trust Land	Good	Keweenaw Bay Indian Community
	1851	Baraga County Concrete Company	concrete	468 N Superior Ave	100	-88.48258322	46.78479394	468 N SUPERIOR AVE, BARAGA, MI, 49908	L	Baraga	MI	49908	manta.com	Keweenaw Bay Indian Community	(906) 353-6595	US	On Reservation/Trust Land	Good	Keweenaw Bay Indian Community
	1852	UP Plastics Inc	plastics	435 N Superior Ave	100	-88.48351851	46.78382267	435 N SUPERIOR AVE, BARAGA, MI, 49908	R	Baraga	MI	49908	manta.com	Keweenaw Bay Indian Community	(906) 353-6768	US	On Reservation/Trust Land	Good	Keweenaw Bay Indian Community
	1853	Olymic Steel	metal	16360 Ojibwa Indus Pk Rd	5	-88.50918517	46.81144985	49908		Baraga	MI	49908	manta.com	Keweenaw Bay Indian Community	(906) 353-8750	US	On Reservation/Trust Land	Poor	Keweenaw Bay Indian Community
	1855	Bay Auto Parts of Baraga Inc	Auto Repair	340 US Highway 41 N	89	-88.48094645	46.78419140	340 USHY 41, BARAGA, MI, 49908	L	Baraga	MI	49908	manta.com	Keweenaw Bay Indian Community	(906) 353-6685	US	On Reservation/Trust Land	Good	Keweenaw Bay Indian Community
	1856	Bay Auto Parts	Auto Repair	346 U S 41 S	100	-88.48829391	46.77640327	346 USHY 41 S, BARAGA, MI, 49908	L	Baraga	MI	49908	manta.com	Keweenaw Bay Indian Community	(906) 353-6685	US	On Reservation/Trust Land	Good	Keweenaw Bay Indian Community

APPENDIX JJ:

Hardrock Mining Information

Certified Product Notification Forms. Award applicants are estimated to spend an additional 20 hours on average to complete the awards application. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements which have subsequently changed; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

The ICR provides a detailed explanation of the Agency's estimate, which is only briefly summarized here:

Estimated Number of Respondents: 357 state and local government; 1,319 private sector organizations, and 668 individuals per year.

Frequency of Response: Varies.

Estimated Total Annual Hour Burden: 57,248 hours.

Estimated Total Annual Cost: $4,665,618, including $1,793,181 in operation & maintenance costs.

Are There Changes in the Estimates From the Last Approval?

The overall burden estimate for this collection is 7,167 hours higher than the burden estimated under the current ICR because the WaterSense program has been launched and expanded since the current ICR was approved. The change in burden reflects the substantial increase in the number of products certified, new partners joining and reporting, and the addition of the New Homes portion of the program. EPA also has a better understanding of how long it takes partners to complete program forms, now that the program is underway.

What Is the Next Step in the Process for This ICR?

EPA will consider the comments received and amend the ICR as appropriate. The final ICR package will then be submitted to OMB for review and approval pursuant to 5 CFR 1320.12. At that time, EPA will issue another **Federal Register** notice pursuant to 5 CFR 1320.5(a)(1)(iv) to announce the submission of the ICR to OMB and the opportunity to submit additional comments to OMB. If you have any questions about this ICR or the approval process, please contact the technical person listed under **FOR FURTHER INFORMATION CONTACT.**

Dated: July 20, 2009.

James Hanlon,

Director, Office of Wastewater Management.

[FR Doc. E9–17927 Filed 7–27–09; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[EPA–HQ–SFUND–2009–0265; FRL–8931–7]

RIN 2050–AG56

Identification of Priority Classes of Facilities for Development of CERCLA Section 108(b) Financial Responsibility Requirements

AGENCY: Environmental Protection Agency (EPA)

ACTION: Priority notice of action.

SUMMARY: Section 108(b) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, establishes certain regulatory authorities concerning financial responsibility requirements. Specifically, the statutory language addresses the promulgation of regulations that require classes of facilities to establish and maintain evidence of financial responsibility consistent with the degree and duration of risk associated with the production, transportation, treatment, storage, or disposal of hazardous substances. CERCLA Section 108(b) also requires EPA to publish a notice of the classes for which financial responsibility requirements will be first developed. To fulfill this requirement, EPA is by this notice identifying classes of facilities within the hardrock mining industry for which the Agency will first develop financial responsibility requirements under CERCLA Section 108(b). For purposes of this notice, hardrock mining facilities include those which extract, beneficiate or process metals (*e.g.*, copper, gold, iron, lead, magnesium, molybdenum, silver, uranium, and zinc) and non-metallic, non-fuel minerals (*e.g.*, asbestos, gypsum, phosphate rock, and sulfur).

FOR FURTHER INFORMATION CONTACT: For more information on this notice, contact Ben Lesser, U.S. Environmental Protection Agency, Office of Resource Conservation and Recovery, Mail Code 5302P, 1200 Pennsylvania Ave., NW., Washington, DC 20460; telephone (703) 308–0314; or (e-mail) *Lesser.Ben@epa.gov;* or Elaine Eby, U.S. Environmental Protection Agency, Office of Resource Conservation and Recovery, Mail Code 5304P,1200 Pennsylvania Ave., NW., Washington, DC 20460; telephone (703) 603–844; or (e-mail) *Eby.Elaine@epa.gov.*

SUPPLEMENTARY INFORMATION:

A. How Can I Get Copies of This Document and Other Related Information?

This **Federal Register** notice and supporting documentation are available in a docket EPA has established for this action under Docket ID No. EPA–HQ–SFUND–2009–0265. All documents in the docket are listed on the *http://www.regulations.gov* Web site. Although listed in the index, some information may not be publicly available, because for example, it may be Confidential Business Information (CBI) or other information, the disclosure of which is restricted by statute. Certain material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available either electronically through *http://www.regulations.gov* or in hard copy at the RCRA Docket, EPA/DC, EPA West, Room 3334, 1301 Constitution Avenue, NW., Washington, DC. The Docket Facility is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566–1744, and the telephone number for the Superfund Docket is (202) 566–0270. A reasonable fee may be charged for copying docket materials.

B. Table of Contents

I. Introduction

Section 108(b), 42 U.S.C. 9608 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, requires in specified circumstances that owners and operators of facilities establish evidence of financial responsibility. Specifically, it requires

the promulgation of regulations that require classes of facilities to establish and maintain evidence of financial responsibility consistent with the degree and duration of risk associated with the production, transportation, treatment, storage, or disposal of hazardous substances. The section also instructs that the President: [1]

> * * * identify those classes for which requirements will be first developed and publish notice of such identification in the **Federal Register**.[2]

EPA is publishing this notice to fulfill its obligations under CERCLA Section 108(b) to identify those classes of facilities, owners, and operators (herein referred to as classes of facilities) for which financial responsibility requirements will first be developed.

For the reasons that follow, the Agency has identified classes of facilities within the hard-rock mining industry as its priority for the development of financial responsibility requirements under CERCLA Section 108(b). For purposes of this notice only, hardrock mining is defined as the extraction, beneficiation or processing of metals (*e.g.*, copper, gold, iron, lead, magnesium, molybdenum, silver, uranium, and zinc) and non-metallic, non-fuel minerals (*e.g.*, asbestos, gypsum, phosphate rock, and sulfur).[3] (*See* Section VI of this notice for a discussion of EPA's consideration of additional classes of facilities for developing financial responsibility requirements under Section 108(b) of CERCLA.)

II. EPA's Approach for Identifying Those Classes of Facilities for Which Requirements Will Be First Developed

In accordance with CERCLA Section 108(b) EPA worked to determine which classes of facilities it should identify as its priority. CERCLA Section 108(b) directs the President to "identify those classes for which requirements will be first developed and publish notice of such identification [.]" However, this simple sentence does not spell out a particular methodology by which the identification is to be made. While EPA views this statutory ambiguity as allowing substantial discretion in making the identification, EPA looked to the rest of CERCLA Section 108(b) to inform its exercise of this discretion.

Examination of CERCLA Section 108(b) as a whole reveals repeated references to the concept of "risk." The first sentence of paragraph (b)(1) refers to "requirements * * * that classes of facilities establish and maintain evidence of financial responsibility consistent with the *degree and duration of risk*" and the last sentence states that "[p]riority in the development of such requirements shall be accorded to those classes of facilities * * * which the President determines present the *highest level of risk of injury.*" Paragraph (b)(2) also states that "[t]he level of financial responsibility shall be initially established, and, when necessary, adjusted to *protect against the level of risk* which the President in his discretion believes is appropriate * * *." Accordingly, EPA chose to look for indicators of risk and its related effects to inform its selection of classes for which it would first develop requirements under CERCLA Section 108(b). As a practical method of doing so, EPA reviewed information contained in a number of studies, reports, and analyses. This review pointed to numerous factors EPA should consider. For example, typical elements in evaluating risk to human health and the environment include: the probability of release, exposure, and toxicity.[4] While some of the considerations reflect these basic elements of risk evaluation, others relate more closely to the severity of consequences that result when those risks are realized, such as the releases' duration if not prevented or quickly controlled as a result of economic factors and the exposures that can result. Therefore, EPA has chosen to evaluate the following factors: (1) Annual amounts of hazardous substances released to the environment; (2) the number of facilities in active operation and production; (3) the physical size of the operation; (4) the extent of environmental contamination; (5) the number of sites on the CERCLA site inventory (including both National Priority List (NPL) sites and non-NPL sites); (6) government expenditures; (7) projected clean-up expenditures; and (8) corporate structure and bankruptcy potential.

Toxicity is reflected in the designation of substances as CERCLA hazardous substances. Current releases of hazardous substances, number of operating facilities, the physical size of an operation, the extent of environmental contamination, and the number of sites on the CERCLA site inventory (non-NPL sites and NPL sites) are factors that can relate to the probability of a release of a hazardous substance, as well as the potential for exposure. These are discussed in detail, in Section IV of this notice. Government expenditures, projected clean-up costs, and corporate structure and bankruptcy potential can relate to the severity of the consequences as a result of releases and exposure of hazardous substances. These are discussed in Section V of this notice.

EPA's review of all these factors, as reflected in the information presented in this notice and included in the docket, makes it readily apparent that hardrock mining facilities present the type of risk that, in light of EPA's current assessment, justifies designating such facilities as those for which EPA will first develop financial responsibility requirements pursuant to CERCLA Section 108(b).[5]

III. Identification of Classes of Facilities in Hardrock Mining

For purposes of this notice, EPA has included the following classes of facilities under the general title of hardrock mining: facilities which extract, beneficiate or process metals (*e.g.* copper, gold, iron, lead, magnesium, molybdenum, silver, uranium, and zinc) and non-metallic, non-fuel minerals (*e.g.* asbestos, gypsum, phosphate rock, and sulfur).[6] As explained below, hardrock mining facilities share common characteristics, and are thus being identified as a group. At the same time, those facilities included in the definition above differ such that "hardrock mining facilities" are properly considered to encompass multiple "classes" of facilities. The various classes in this notice's definition of hardrock mining are involved in two general activities: (1) The extraction of an ore or mineral from the earth; and (2) using various beneficiation activities and processing operations to produce a targeted material product, such as a metal ingot. The operations that comprise hardrock mining (*i.e.*, extraction, beneficiation, and then processing) are all part of a sequential process of converting

[1] Executive Order 12580 delegates this responsibility to the Administrator of the U.S. Environmental Protection Agency ("EPA" or "the Agency") for non-transportation related facilities. 52 FR 2923, 3 CFR, 1987 Comp., p. 193.

[2] 42 U.S.C. 9608 (b)(1).

[3] *See* memorandum to Jim Berlow, USEPA from Stephen Hoffman, USEPA and Shahid Mahmud, USEPA. *Re:* Mining Classes Not Included in Identified Classes of Hardrock Mining. June 2009.

[4] "Risk Assessment in the Federal Government: Managing the Process." National Research Council. National Academy Press, Washington, DC. 1983.

[5] Today's identification of hardrock mining is not itself a rule, and does not create any binding duties or obligations on any party. Additional research, outreach to stakeholders, proposed regulations, review of public comments, and finalization of those regulations are needed before hardrock mining facilities are subject to any financial assurance requirements.

[6] EPA notes that this notice does not affect the current Bevill status of extraction, beneficiation and processing wastes as codified in 40 CFR 261.4(b)(7).

material removed from the earth into marketable products, even though the intermediate and end products differ. Extraction, beneficiation or processing of ores and minerals can involve similar processes across types of mining, as discussed below.

However, hardrock mining is also properly considered to encompass multiple "classes" that represent a range of activities and marketable products. Extraction differs from beneficiation and both differ from processing, and depending upon the product sought, different types of processes are used. Extraction, also called mining, is the removal of rock and other materials that contain the target ore and/or mineral. The physical processes used to accomplish this vary, but are nonetheless often shared across different types of mining. These physical processes include surface, underground, and in-situ solution mining. Overburden and waste rock are removed during surface and underground extraction processes in order to gain access to the ore. Overburden and waste rock are disposed of in dumps near the mine. The dumps may or may not be lined or covered. In-situ mining involves the recovery of the metal from the ore by circulating solutions through the ore in its undisturbed geologic state and recovering those solutions for processing. The principal environmental protection concern with in-situ mining is the control and containment of the leach solutions.

Typically the next step after extraction, beneficiation involves separating and concentrating the target mineral from the ore. There are, however, many different ways in which beneficiation can occur. Beneficiation activities generally do not change the mineral values themselves other than by reducing (*e.g.* crushing or grinding) or enlarging (pelletizing or briquetting) particle size to facilitate processing, but can involve the introduction of water, other substances, and chemicals (including hazardous substances). A common beneficiation technique is flotation. Froth flotation involves adding forced air and chemicals to an ore slurry causing the target mineral surfaces to become hydrophobic and attach to air bubbles that carry the target minerals to the top of a floatation vessel. The surface froth containing the concentrated mineral is removed, and thus separated from the other waste minerals. The remaining waste minerals are called tailings. Leaching, another beneficiation technique, involves the addition of chemicals to ores or flotation concentrates in order to dissolute the target metal. For example, solvents, such as sulfuric acid are used to leach copper and sodium cyanide is used to leach gold. Following leaching, the leftover waste product is called spent ore (in heap leaching) or tailings (in other types of leaching). There are various other beneficiation techniques and intermediate processes that are used and not described here. However, flotation and leaching are the most common techniques used in the mining industry. Tailings from beneficiation are disposed in a variety of ways, most commonly in tailing ponds. Design of tailings ponds differ and may or may not include liners, seepage control, surface water diversions, and final covers. Regardless, many tailings ponds require long-term management of waste and the impoundment dam.

Processing is the refining of ores or mineral concentrates after beneficiation to extract the target material. As with beneficiation, there are many different ways of processing the ores or mineral concentrates. For example, mineral processing operations can use pyrometallurgical techniques (the use of higher temperatures as in smelting), to produce a metal or high grade metallic mixture. Smelting generates a waste product called slag. Slag is initially placed directly on the ground to cool, and is often subsequently managed into a wide range of construction materials (*e.g.*, road bed or foundation bedding).

Both because of the ways that the facilities covered by this notice fit together, and because of the range of activities that they cover, EPA believes hardrock mining is properly identified as a group and considered to include multiple classes of facilities.

IV. Hardrock Mining—Releases and Exposure to Hazardous Substances

As discussed above, evaluations of risk typically include considerations of the probability of a release, including its potential scale and scope, the exposure potential and toxicity. EPA research indicates that the hardrock mining industry typically operates on a large scale, with releases to the environment and, in some situations, subsequent exposure of humans, organisms, and ecosystems to hazardous substances on a similarly large scale. Indeed, EPA estimates that the hardrock mining industry is responsible for polluting 3,400 miles of streams and 440,000 acres of land.[7] The U.S. Forest Service (USFS) estimates that approximately 10,000 miles of rivers and streams may have been contaminated by acid mine drainage from the metal mining industry.[8]

The Agency examined its 2007 Toxic Release Inventory (TRI), and this data revealed that the metal mining industry[9] (*e.g.*, gold ore mining, lead ore and zinc ore mining, and copper ore and nickel ore mining) releases enormous quantities of toxic chemicals, at nearly 1.15 billion pounds or approximately 28 percent of the total releases by U.S. industry that is required to report under the TRI program.[10] [11] This overall percentage has remained relatively stable since 2003, ranging from 25 percent (1.07 billion pounds) of total releases in 2004 to 29 percent (1.26 billion pounds) of total releases in 2006. In 2007, the majority of releases of hazardous substances from the metal mining industry were to the land, with additional releases to both the air and surface waters. Additional releases of hazardous substances were reported to TRI from metal processing facilities (*e.g.*, primary smelting of copper) with significant releases to the air and land.

The potential for releases of and exposure to hazardous substances is also reflected in the number of active facilities operating in the U.S. While estimates of the number of active mining facilities vary, in 2004, EPA estimated that there were 1,000 metal and non-metal mineral mines and processing facilities in the U.S. Furthermore, many mining facilities have been in operation for decades and can exceed thousands of acres in size.[12] Since large mines may be operated for decades, this can extend the time frame for potential releases and exposure of hazardous substances. At individual facilities, hardrock mining operations

[7] U.S. EPA. 2004. "Cleaning Up the Nation's Waste Sites: Markets and Technology Trends." EPA 542–R–04–015. Accessed at: *http://www.epa.gov/tio/pubisd.htm.*

[8] U.S. EPA 2004. "Nationwide Identification of Hardrock Mining Sites." Office of Inspector General. Report No. 2004–P–00005. Accessed at: *http://epa.gov/oig/reports/2004/20040331-2004-p-00005.pdf.*

[9] Metal mining industry is defined as NAICS Code 2122 (Metal Mining).

[10] U.S. EPA 2009. Toxic Release Inventory, 2007 Updated Data Releases, as of March 19, 2009.

[11] TRI estimates include all on-site and off-site releases to the land, air and surface water, including those disposed of in RCRA Subtitle C hazardous waste land disposal units and Safe Drinking Water Act (SDWA) permitted underground injection (UIC) wells. However, less than one percent of hazardous substances are managed in this manner. Thus, the data demonstrates the enormous volume of hazardous chemical releases reported to TRI by the metal mining industry and is an indication of the high volume of hazardous substances it manages, and the industry's potential for posing health and environmental risk.

[12] National Research Council. 2005. *Superfund and Mining Megasites: Lessons from the Coeur d'Alene River Basin.* The National Academies Press, Washington, DC. Accessed at: *http://www.nap.edu/catalog.php?record_id=11359.*

may disturb thousands of acres of land and impact watersheds including, to varying degrees, effects on groundwater, surface water, aquatic biota, aquatic and terrestrial vegetation, wetlands, wildlife, soils, air, cultural resources, and humans that use these resources recreationally or for subsistence.[13]

Hardrock mining facilities also generate an enormous volume of waste, which may increase the risk of releases of hazardous substances. Annually, hardrock mining facilities generate between one to two billion tons of mine waste.[14] This waste can take a variety of forms, including mine water, waste rock, overburden, tailings, slag, and flue dust and can contain significant quantities of hazardous substances. The 2007 TRI data demonstrate that hardrock mining facilities reported large releases of many hazardous substances, including ammonia, benzene, chlorine, hydrogen cyanide, hydrogen fluoride, toluene, and xylene, as well as heavy metals and their compounds (*e.g.,* antimony, arsenic, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, vanadium and zinc).[15] Similarly, the National Research Council (NRC) has indicated that hazardous substances of particular concern include heavy metals, ammonia, nitrates, and nitrites.[16]

These releases, in some cases, have lead to ground and surface water contamination from acid mine drainage and metal leachate, and air quality issues resulting from heavy metal-contaminated dust or emissions of gaseous metals from thermal processes.[17] Acid mine drainage is the formation and movement of acidic water which dissolves and transports metals into the environment. This acidic water forms through the chemical reaction of surface water (rainwater, snowmelt, pond water) and shallow subsurface water with rocks (*e.g.,* waste rock, tailings, mine walls) that contain sulfur-bearing minerals, resulting in the production of sulfuric acid. Metals can be leached from rocks that come in contact with the acid, a process that may be substantially enhanced by bacterial action.[18] The resulting acidic and metal-contaminated fluids may be acutely or chronically toxic and, when mixed with groundwater, surface water and soil, may have harmful effects on humans, fish, animals, and plants.[19] When acid mine drainage occurs, it is extremely difficult and often expensive to control and often requires long-term management measures.[20] Air, land and water contamination may also result when waste rock dumps, tailings disposal facilities and open pits are not maintained properly and there are releases of hazardous substances to the environment.[21] Additional risks can occur with the use of cyanide in gold mining operations, including the possible release of cyanide into soil, groundwater, and/or surface waters or catastrophic cyanide spills.[22] Contaminants of concern at uranium mines include radionuclides. Due to the volume of the hazardous substances generated and released and the potential for long-term management of acid mine drainage, the cause for concern is only heightened.

Other studies and EPA's analysis of NPL data also underscores the risk of hardrock mining facilities. The NPL is a list of national priorities among the known or threatened releases of hazardous substances, pollutants or contaminants throughout the U.S. The Hazard Ranking System (HRS), the scoring system EPA uses to assess the relative threat associated with a release from a site, is the primary method used to determine whether a site should be placed on the NPL.[23] The HRS takes into account the three elements of environmental and human health risk: (1) Probability of release; (2) exposure; and (3) toxicity. EPA generally will list sites with scores of 28.50 or above. The HRS is a proven tool for evaluating and prioritizing the releases that may pose threats to human health and the environment throughout the nation. In 2005, the NRC noted that at the largest mining sites, or mega sites (*i.e.,* those with projected cleanup costs exceeding $50 million), "wastes* * * are dispersed over a large area and deposited in complex hydrogeochemical and ecologic systems that often include human communities and public natural resources." [24] For example, a molybdenum mine located near Questa, New Mexico, began operations in 1919 and some underground mining operations are still in operation today. The mine's operational capacity is reportedly 20,000 tons of ore processed at the facility per day, although it does not typically operate at capacity. The site stretches over approximately three square miles of land. Across this large area, operations include an underground mine, a milling facility, a nine-mile long tailings pipeline and a tailing disposal facility. There is also an open pit and waste rock dumps at the mine site, which were created during open-pit mining operations. Other problems at the site include subsidence areas with a surface depression from active underground operations.[25]

In 2004, EPA's Office of Inspector General (OIG) examined 156 hardrock mining sites that are part of the CERCLA site inventory and concluded that ecological and environmental risks are often substantial. For the 82 Non-NPL sites that were evaluated, 64 percent had a current high or medium ecological/environmental risk, while the percentage of sites that were found to have low risk was only 13%. Another 23% had an unknown level of risk.[26]

In support of this notice, EPA examined not only sites listed on the

[13] National Research Council. 1999. *Hardrock Mining on Federal Lands.* National Academies Press. Washington, DC.

[14] U.S. EPA 2004. "Cleaning Up the Nation's Waste Sites: Markets and Technology Trends." EPA 542–R–04–015. Accessed at: *http://www.epa.gov/tio/pubisd.htm.*

[15] *See* Memorandum to the Record: Toxic Release Inventory (TRI) Releases from Hardrock Mining Operations. June 2009.

[16] National Research Council. 1999. Hardrock Mining on Federal Lands. National Academies Press. Washington, DC. Also, EPA conducted a preliminary review of the Records of Decisions (RODs) for a selected group mining NPL sites. These substances were found to be common contaminants at these sites. Accessed at *http://books.nap.edu/catalog.php?record_id=9682.*

[17] U.S EPA. 2004. "Cleaning Up the Nation's Waste Sites: Markets and Technology Trends." EPA 542–R–04–015. Accessed at: *http://www.epa.gov/tio/pubisd.htm.*

[18] U.S. EPA. 1997. "EPA's National Hardrock Mining Framework." Accessed at: *http://www.epa.gov/owm/frame.pdf.*

[19] U.S. EPA 2009. Accessed at: *http://www.epa.gov/nps/acid_mine.html.*

[20] The conventional approach to treating contaminated ground or surface water produced through acid drainage involves an expensive, multi-step process that pumps polluted water to a treatment facility, neutralizes the contaminants in the water, and turns these neutralized wastes into sludge for disposal. U.S. EPA. Profile of the Metal Mining Industry. September 1995. *See also:* Lind, Greg. 2007. Testimony to the Subcommittee on Energy and Mineral Resources of the Committee on Natural Resources, U.S. House of Representatives, One Hundred Tenth Congress. Serial No. 110–46.

[21] U.S. EPA. 2004. "Cleaning Up the Nation's Waste Sites: Markets and Technology Trends." EPA 542–R–04–015. Accessed at: *http://www.epa.gov/tio/pubisd.htm.*

[22] U.S. EPA. 2004. "Cleaning Up the Nation's Waste Sites: Markets and Technology Trends." EPA 542–R–04–015. Accessed at: *http://www.epa.gov/tio/pubisd.htm.*

[23] U.S. EPA. 2007. "Introduction to the Hazard Ranking System (HRS)." Accessed at: *http://www.epa.gov/superfund/programs/npl_hrs/hrsint.htm.*

[24] National Research Council. 2005. *Superfund and Mining Megasites: Lessons from the Coeur d'Alene River Basin.* The National Academies Press, Washington, DC. Accessed at: *http://www.nap.edu/catalog.php?record_id=11359.*

[25] USEPA Administrative Order on Consent for Molycorp RI/FS (2001). Molycorp is proposed for listing on the NPL. More information is at *http://www.epa.gov/region6/6sf/pdffiles/0600806.pdf.*

[26] U.S. EPA 2004. "Nationwide Identification of Hardrock Mining Sites." Office of Inspector General. Report No. 2004–P–00005, Figure 4.2. Accessed at: *http://epa.gov/oig/reports/2004/20040331-2004-p-00005.pdf.*

NPL, but also sites proposed (including sites with Superfund alternative approach agreements in place) and deleted from the NPL.[27] As of April, 2009, approximately 90 hardrock mining sites have been listed on the NPL, and another 20 facilities have been proposed for inclusion on the list.[28]

V. Hardrock Mining—Severity of Consequences Resulting From Releases and Exposure to Hazardous Substances

The severity of the consequences impacting human health and the environment as a result of releases and exposure of hazardous substances is evident by analyzing a number of factors. Specifically, the past and estimated future costs associated with protecting public health and the environment through what is often extensive and long-term reclamation and remediation efforts, as well as corporate structure and bankruptcy potential. This information also plays a significant role in leading EPA to conclude that classes of facilities involved in hardrock mining should be the first for which financial assurance requirements are developed under CERCLA Section 108(b).

The severity of consequences posed by hardrock mining facilities is evident in the enormous costs associated with past and projected future actions necessary to protect public health and the environment, after releases from hardrock mining facilities occur. In other words, the documented expenditures reflect efforts to correct the realized risks from hardrock mining facilities. As noted earlier, these facilities release large quantities of hazardous substances, often over hundreds of square miles and, in some instances, have resulted in groundwater and surface water contamination that requires long-term management and treatment. Remediation of these hardrock mining facilities has therefore been historically costly. EPA's past experience with these sites leads it to conclude that hardrock mining facilities are likely to continue to present a substantial financial burden that could be met by financial responsibility requirements. These enormous expenditures have been documented in a United States Government Accountability Office (GAO) study, and EPA's own data confirm the large amounts of money spent by the Federal government alone. The GAO, in its report "Current Government Expenditures to Cleanup Hard Rock Mining Sites," reported that in total, the Federal government spent at least $2.6 billion to remediate hardrock mine sites from 1998 to 2007. EPA spent the largest amount at $2.2 billion, with the USFS, the Office of Surface Mining, and the Bureau of Land Management spending $208 million, $198 million, and $50 million, respectively.[29] EPA's expenditure data show that between 1988 and 2007, for mining sites with response actions taken under EPA removal and remedial authorities (including sites proposed, listed, and deleted from the NPL and sites with Superfund alternative approach agreements in place), approximately $2.7 billion was spent.[30] [31] Of this total, $2.4 billion was spent at the 84 sites listed as final on the NPL list at that time.[32]

Estimated costs of remediation for all hardrock mining facilities from several sources have generally been in the range of billions of dollars. EPA has estimated that the cost of remediating all hardrock mining facilities is between $20 and $54 billion. EPA's analysis showed that if the total Federal, State, and potentially responsible party outlays for remediation were to continue at existing levels ($100 to $150 million annually), no more than eight to 20 percent of all cleanup work could be completed within 30 years.[33] In another analysis based on a survey of 154 large sites, EPA's OIG projected that the potential total hardrock mining remediation costs totaled $7 to $24 billion. OIG calculated that this amount is over 12 times EPA's total annual Superfund budget of about $1.2 billion from 1999 to 2004.[34] The annual Superfund budget from 2004 through 2008 remained consistent with OIG's assessment, at approximately $1.25 billion.[35] [36]

Common corporate structures and interrelated corporate failures within the hardrock mining industry increase the likelihood of uncontrolled releases of hazardous substances being left unmanaged, increasing risks. To begin with, mine ownership is typically complex, with individual mines often separately incorporated.[37] The existence of a parent-subsidiary relationship can present several risks. First, corporate structures may allow parent

[27] A significant number of response actions have been taken by several Federal agencies at hardrock mining facilities under CERCLA removal and emergency response authorities. Those actions were not evaluated for purposes of this Notice because of the lack of immediately available data. EPA alone took non-NPL removal actions at 99 mining sites between 1988 and October 2007. Provided to GAO for GAO 2008, "Hardrock Mining: Information on Abandoned Mines and Value and Coverage of Financial Assurance on BLM Land." GAO–08–574T. Other Federal agencies also use non-NPL removal authorities to address releases from mining sites. Accessed at: *http://www.gao.gov/highlights/d08574thigh.pdf.*

[28] Provided to GAO for GAO 2008, "Hardrock Mining: Information on Abandoned Mines and Value and Coverage of Financial Assurance on BLM Land." GAO–08–574T. Accessed at: *http://www.gao.gov/new.items/d08574t.pdf.* and updated to reflect sites finalized on the NPL in 2008 and 2009. The 2008 and 2009 NPL updates can be found at: *http://www.epa.gov/superfund/sites/npl/status.htm.*

[29] U.S. Government Accountability Office. 2008. "Information on Abandoned Mines and Value and Coverage of Financial Assurance on BLM Land. GAO–08–574T. Accessed at: *http://www.gao.gov/highlights/d08574thigh.pdf.*

[30] Moreover, EPA's cost data likely underestimates true cleanup costs, because they do not include costs borne by the States and potentially responsible parties. These costs only reflect expenditures to date. To reach construction completion, many sites will require additional, substantial remediation efforts. In addition, sites with acid mine drainage may require water quality treatment in perpetuity. Lind, Greg. 2007. Testimony to the Subcommittee on Energy and Mineral Resources of the Committee on Natural Resources, U.S. House of Representatives, One Hundred Tenth Congress. Serial No. 110–46.

[31] U.S. EPA. 2007. Superfund eFacts Database. Accessed: October 24, 2007; U.S. Environmental Protection Agency. 2007 Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS). Provided to GAO for their report, GAO 2008, "Hardrock Mining: Information on Abandoned Mines and Value and Coverage of Financial Assurance on BLM Land." GAO–08–574T. Accessed at: *http://www.gao.gov/highlights/d08574thigh.pdf.*

[32] U.S. EPA. 2007. Superfund eFacts Database. Accessed: October 24, 2007; U.S. Environmental Protection Agency. 2007 Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS). Provided to GAO for their report, GAO 2008, "Hardrock Mining: Information on Abandoned Mines and Value and Coverage of Financial Assurance on BLM Land." GAO–08–574T, *http://www.gao.gov/new.items/d08574t.pdf.*

[33] U.S. EPA. 2004. "Cleaning Up the Nation's Waste Sites: Markets and Technology Trends." EPA 542–R–04–015. Accessed at: *http://www.epa.gov/tio/pubisd.htm.*

[34] U.S. EPA 2004. "Nationwide Identification of Hardrock Mining Sites." Office of Inspector General. Report No. 2004–P–00005. Accessed at: *http://epa.gov/oig/reports/2004/20040331-2004-p-00005.pdf.*

[35] Appropriation amounts reflect an average of the discretionary appropriation amounts in the President's Budget or Operating Plan between 2004 and 2008.

[36] No single source provides information on estimated future reclamation and remediation costs for hardrock mining facilities. In addition, for those estimates that do exist, remediation costs are often folded in with other reclamation activities, such as correcting safety hazards and landscaping, which leaves the amount attributable to remediation unknown. *See* U.S. EPA. 2004. "Cleaning Up the Nation's Waste Sites: Markets and Technology Trends." EPA 542–R–04–015. Accessed at: *http://www.epa.gov/tio/pubisd.htm.*

[37] For example, one mining company's 2008 SEC 10–K filing noted that its segments included "The Greens Creek unit, a 100%-owned joint venture arrangement, through our subsidiaries Hecla Alaska LLC, Hecla Greens Creek Mining Company and Hecla Juneau Mining Company. We acquired 70.3% of our ownership of Greens Creek in April 2008 from indirect subsidiaries of Rio Tinto, PLC." From this description, it appears that ownership of the mine has involved multiple subsidiaries, under both its current owner and under the previous ownership.

corporations to shield themselves from liabilities of their subsidiaries.[38] In a 2005 study, the GAO cited mining facilities as an example of businesses at risk of incurring substantial liability and transferring the most valuable assets to the parent that could not be reached for cleanup.[39]

Second, many mining interests are located outside of the U.S. According to one report, six of the top ten mining claim owners in the U.S. are multi-national corporations with headquarters outside the U.S.[40] Such multi-national corporations can be difficult to hold responsible for contamination in the U.S. because of the difficulties of locating and then obtaining jurisdiction over the ultimate parent company.

This is of particular concern since the hardrock mining industry has experienced a pattern of failed operations, which often require significant environmental responses that cannot be financed by industry.[41] The pattern of failed operations has been well documented. GAO investigated 48 hardrock mining operations on U.S. Department of Interior (DOI), Bureau of Land Management (BLM) Federal lands that had ceased operations and not been reclaimed by operators since BLM began requiring financial assurance under its regulations. Of the 48 operations, 30 cited bankruptcy as the reason for completing reclamation activities.[42] Numerous other examples exist of bankruptcies in the hardrock mining industry that resulted in or will likely require significant Federal responses, such as:

- When the owner/operator filed for bankruptcy in 1992, it left the Summitville mine in Colorado with serious cyanide contamination and acid mine drainage. In 1994, the site was listed on the NPL. In 2000, EPA estimated that the remediation cost at the mine would be $170 million.[43] As of October 2007, EPA had spent approximately $192 million in cleanup costs.[44]
- In 1999, another mining company filed for bankruptcy, leaving more than 100 million gallons of contaminated water and millions of cubic yards of waste rock at the Gilt Edge Mine in South Dakota.[45] EPA listed the site on the NPL in 2000 and estimated at that time the present value remediation costs to be $50.3 million.[46] Even this estimate, however, does not include water collection and treatment costs that will be handled under additional remediation plans. As of October 2007, EPA expenditures at this site exceeded $56.1 million.[47]
- In 1998, operators of the Zortman Landusky mine in Montana filed for bankruptcy. Numerous cyanide releases occurred during operations which have affected the community drinking water supply on a nearby Tribal reservation. Acid mine drainage has also permeated the ground and surface waters. The projected cleanup costs at the site are estimated to be approximately $85.2 million, of which only $57.8 million will be paid for by the responsible party. State and Federal authorities are projected to pay the remaining $27.4 million for cleanup.[48]
- A large mining company filed for bankruptcy in 2005. The company has estimated the total environmental claims filed against it to have been in excess of $5 billion. Recently approved settlements with the U.S. and certain State governments involving environmental clean-up claims, when combined with settlements already approved by the bankruptcy court for environmental clean-up claims, provide for allowed claims and payments in the bankruptcy in an amount in excess of $1.5 billion and involve in excess of 50 sites. EPA and DOI estimate their combined claims in the bankruptcy at the largest of these sites, an NPL site located in Idaho and Eastern Washington, to be in excess of $2 billion.[49]

Taking all this information into account, EPA concludes that classes of facilities within the hardrock mining industry are those for which EPA should first develop financial responsibility requirements under CERCLA Section 108(b), based upon those facilities' sheer size; the enormous quantities of waste and other materials exposed to the environment; the wide range of hazardous substances released to the environment; the number of active hardrock mining facilities; the extent of environmental contamination; the number of sites in the CERCLA site inventory, government expenditures, projected clean-up costs and corporate structure and bankruptcy potential.

VI. EPA's Consideration of Additional Classes of Facilities for Developing Financial Responsibility Requirements

The Agency believes classes of facilities outside of the hardrock mining industry also may warrant the development of financial responsibility requirements under CERCLA Section 108(b). Therefore, the Agency will continue to gather and analyze data on additional classes of facilities, beyond the hardrock mining industry, and will consider them for possible development of financial responsibility requirements. In determining whether to propose requirements under CERCLA Section 108(b) for such additional classes of facilities, EPA will consider the risks posed and, to do so, may take into account factors such as: (1) The amounts of hazardous substances released to the environment; (2) the toxicity of these substances; (3) the existence and proximity of potential receptors; (4) contamination historically found from facilities; (5) whether the causes of this contamination still exist; (6) experiences from Federal cleanup programs; (7) projected costs of Federal cleanup programs; and (8) corporate structures and bankruptcy potential. EPA also intends to consider whether financial responsibility requirements under CERCLA Section 108(b) will effectively reduce these risks. While the Agency recognizes that data for some of these factors may be unavailable or limited in

[38] *See U.S.* v. *Bestfoods*, 524 U.S. 51, 61 (1998) ("[i]t is a general principle of corporate law * * * that a parent corporation * * * is not liable for the acts of its subsidiaries.")

[39] U.S. Government Accountability Office. 2005. "Environmental Liabilities: EPA Should Do More to Ensure That Liable Parties Meet Their Cleanup Obligations." Report to Congressional Requesters. GAO–05–658, pp. 21–24. Accessed at: *http://www.gao.gov/highlights/d05658high.pdf.*

[40] Environmental Working Group. 2006. "Who Owns the West?" Accessed at: *http://www.ewg.org/mining/claims/index.php.*

[41] EPA notes that there are several potential explanations for these failures, such as a boom and bust cycle in the price of commodities, the finite life of a particular ore body or the possibility that closure or reclamation obligations exceed the remaining value of the operation, in addition to factors that can cause bankruptcies in other sectors. However, regardless of the cause, the fact remains a large number of bankruptcies and abandonments have occurred.

[42] U.S. Government Accountability Office. 2005. Hardrock Mining: BLM Needs to Better Manage Financial Assurances to Guarantee Coverage of Reclamation Costs. GAO–05–377. Accessed at: *http://gao.gov/products/GAO-05-377.*

[43] U.S. Environmental Protection Agency. 2000. *Liquid Assets 2000: America's Water Resources at a Turning Point.* EPA–840–B–00–001. Accessed at: *http://www.epa.gov/water/liquidassest.pdf.*

[44] U.S. Environmental Protection Agency. 2007. Superfund eFacts Database. Accessed: October 24, 2007.

[45] CDM. 2008. Final Feasibility Study Report for the Gilt Edge Superfund Site, Operable Unit 1 (OU1). Prepared for EPA, Region VIII. May 2008.

[46] U.S. EPA 2008. Record of Decision for the Gilt Edge Superfund Site Operable Unit 1 (OU1). Accessed at: *http://www.epa.gov/region8/superfund/sd/giltedge/RODGiltEdgeVolumeOne_Text.pdf.*

[47] U.S. EPA. 2007. Superfund eFacts Database. Accessed: October 24, 2007.

[48] U.S. Government Accountability Office. 2005. Hardrock Mining: BLM Needs to Better Manage Financial Assurances to Guarantee Coverage of Reclamation Costs. GAO–05–377. Accessed at: *http://gao.gov/products/GAO-05-377.*

[49] Asarco, LLC, *et al.* U.S. Bankruptcy Court Southern District of Texas. May 15, 2009, Case No. 05–21207, Docket No. 11343.

availability, it plans to consider whatever data are available.

As part of the Agency's evaluation, it plans to examine, at a minimum, the following classes of facilities: hazardous waste generators, hazardous waste recyclers, metal finishers, wood treatment facilities, and chemical manufacturers. This list may be revised as the Agency's evaluation proceeds. EPA is currently scheduled to complete and publish in the **Federal Register** a notice addressing additional classes of facilities the Agency plans to evaluate regarding financial responsibility requirements under CERCLA Section 108(b) by December 2009, and, at that time, will solicit public comment.

VII. Conclusion

Based upon the Agency's analysis and review, it concludes that hardrock mining facilities, as defined in this notice, are those classes of facilities for which EPA should identify and first develop requirements pursuant to CERCLA Section 108(b). EPA will carefully examine specific activities, processes, and/or metals and minerals in order to determine what proposed financial responsibility requirements may be appropriate. As part of this process, EPA will conduct a close examination and review of existing Federal and State authorities, policies, and practices that currently focus on hardrock mining activities.[50]

Dated: July 10, 2009.

Lisa P. Jackson,

Administrator.

[FR Doc. E9–16819 Filed 7–27–09; 8:45 am]

BILLING CODE 6560–50–P

[50] As part of developing proposed and final rules the Agency will consider whether hardrock mining facilities which have a RCRA Part B permit or are subject to interim status under RCRA Subtitle C and already are subject to RCRA financial assurance and facility-wide corrective action requirements need to also be subject to the financial responsibility requirements under Section 108(b) of CERCLA. In addition, EPA is aware and will consider in its development of proposed and final rules, that mining on Federal land triggers either the Bureau of Land Management's (BLM) Part 3809 regulations (43 CFR Part 3809) and the Forest Service's Part 228 regulations (36 CFR Part 228), both have financial responsibility requirements that cover reclamation costs. Many States also have reclamation laws.

ENVIRONMENTAL PROTECTION AGENCY

[FRL–8932–9]

Modification of the 1985 Clean Water Act Section 404(c) Final Determination for Bayou aux Carpes in Jefferson Parish, LA

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: This is a notice of EPA's Modification of the 1985 Clean Water Act Section 404(c) Final Determination for Bayou aux Carpes to allow for the discharge of dredged or fill material for the purpose of the construction of the West Closure Complex as part of the larger flood protection project for the greater New Orleans area. EPA believes that this Final Determination for modification achieves a balance between the national interest in reducing overwhelming flood risks to the people and critical infrastructure of south Louisiana while minimizing any damage to the Bayou aux Carpes CWA Section 404(c) site to the maximum degree possible in order to avoid unacceptable adverse effects.

DATES: *Effective Date:* The effective date of the Final Determination for Modification was May 28, 2009.

ADDRESSES: U.S. Environmental Protection Agency, Office of Water, Wetlands Division, Mail code 4502T, 1200 Pennsylvania Ave, NW., Washington, DC 20460. The following documents used in the Bayou aux Carpes modification are listed on the EPA Wetlands Division Web site at *http://www.epa.gov/owow/wetlands/regs/404c.html:* New Orleans District of the Corps letter dated November 4, 2008, requesting that EPA modify the Bayou aux Carpes CWA Section 404(c) designation; Public Notice of Proposed Determination to modify the Bayou aux Carpes CWA Section 404(c) designation published in the **Federal Register** on January 14, 2009; April 2, 2009, Recommended Determination (RD) for modification of the Bayou aux Carpes 404(c) action; and the May 28, 2009, Modification of the 1985 Clean Water Act Section 404(c) Final Determination for Bayou aux Carpes. Additional documents that are related to the Bayou aux Carpes modification can be located on the U.S. Army Corps of Engineers New Orleans District Web site at *http://www.nolaenvironmental.gov/projects/usace_levee/IER.aspx?IERID=12.*

Publicly available document materials are available either electronically through *http://www.regulations.gov* or in hard copy at the Water Docket, EPA/DC, EPA West, Room 3334, 1301 Constitution Ave., NW., Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566–1744, and the telephone number for the Water Docket is (202) 566–2426.

FOR FURTHER INFORMATION CONTACT: Mr. Clay Miller at (202) 566–1365 or by e-mail at *miller.clay@epa.gov.* Additional information and copies of EPA's Final Determination for Modification are available at *http://www.epa.gov/owow/wetlands/regs/404c.html* or *http://www.nolaenvironmental.gov/projects/usace_levee/IER.aspx?IERID=12.*

SUPPLEMENTARY INFORMATION: Section 404(c) of the Clean Water Act (CWA) (33 U.S.C. 1251 *et seq*) authorizes EPA to prohibit, restrict, or deny the specification of any defined area in waters of the United States (including wetlands) as a disposal site for the discharge of dredged or fill material whenever it determines, after notice and opportunity for public hearing, that such discharge into waters of the United States will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas.

Congress directed the U.S. Army Corps of Engineers (Corps) to enhance the existing Lake Pontchartrain and Vicinity Hurricane Protection project and the West Bank and Vicinity Hurricane Protection project to the 100-year level of protection. One section of this much larger project is within the Bayou aux Carpes area that is subject to a 1985 EPA CWA Section 404(c) action that prohibited the discharge of dredged or fill material in the Bayou aux Carpes site south of the New Orleans metro area. On November 4, 2008, the New Orleans District of the Corps requested a modification of the Bayou aux Carpes CWA Section 404(c) designation to accommodate discharges to the Bayou aux Carpes wetlands associated with the proposed enhanced levee system in Jefferson Parish, Louisiana.

In evaluating the Corps of Engineers proposal for modification of the 1985 Bayou aux Carpes CWA Section 404(c) Final Determination, the key elements of a Section 404(c) process were followed. These include a hearing and opportunity for the public to provide written comments, preparation and submittal of a Recommended Determination proposed by EPA Region 6 to EPA Headquarters, and a Final Determination for Modification issued by EPA Headquarters.

Background

On October 16, 1985, EPA issued a Final Determination pursuant to Section 404(c) of the Clean Water Act restricting the discharge of dredged or fill material in the Bayou aux Carpes site, Jefferson Parish, Louisiana, based on findings that the discharges of dredged or fill material into that site would have unacceptable

PROJECTS

Overview
Regional Geology
Baraga Basin
Winterfire
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BARAGA BASIN

Overview

In the Baraga Basin Project Area Prime Meridian has mineral land tenure on seven targets prospective for magmatic nickel-copper deposits associated with the Midcontinent Rift System (MRS). Three of these are drill-ready, and three of these are within a four kilometre radius of Rio Tinto's Eagle deposit, discovered in 2002. Rio Tinto has announced that Eagle contains a reserve of 5.2 million tons at a grade of 3.68% nickel, 3.06% copper, 0.1% cobalt, with platinum group and gold values. As of January 2008, Rio Tinto has received all permits needed to begin construction and mining this deposit.

Prime Meridian's current targets were defined by electromagnetic, magnetic and gravity surveys. The company plans to begin drill testing these targets beginning in early 2008. Each target has the potential to deliver a significant discovery based on geological and geophysical similarities of its targets with the example nickel-copper deposit nearby at Eagle.

Project description, location and land tenure

This Project Area is located within a 760 square kilometre region of Baraga and Marquette Counties in northern Michigan. The favorability of this part of the MRS terrane is clearly evidenced by the existence of the Eagle deposit within it. Prime Meridian is in direct competition here with Rio Tinto's subsidiary, Kennecott Exploration Company. Prime Meridian's land position at the Baraga Basin Project, totaling slightly over 4,000 mineral hectares, is the largest in the company's portfolio. Its lands are held principally by a number of 100% mineral interest leases, and in a few cases, by outright purchases of fractional mineral rights interests from various owners.

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Area Infrastructure

This Project Area is located in a sparsely populated section of Baraga and Marquette Counties in the upper peninsula of Michigan. There are no paved roads within the Project Area itself, but U. S. Highway 41/28 borders its southern and western margins and provides access via a network of unpaved logging roads. The nearest towns are L'Anse, population 2107, located on Keweenaw Bay in the western part of the Project Area, and Big Bay, population 260, located 6 miles east of the Project Area. The nearest substantial population centre is Marquette, a port city located approximately 40 road kilometres to the southeast on the shore of Lake Superior. Marquette has approximately 30,000 residents, and has been a major industrial centre for the iron mining industry for over 100 years.

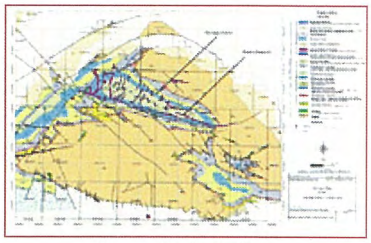
Geology

Regional Geology

Project Geology

"Baraga Basin" is an informal name that refers to a structural trough filled by Proterozoic Michigamme Formation metasediments of the Marquette Range Supergroup. Because of thick Pleistocene glacial sediment cover in the basin, there are few surface exposures of the Michigamme Formation rocks, which in outcrop are mostly black slate (often sulfide-bearing) and argillite. However, drill core obtained by the Michigan Department of Natural Resources along the southern flank of the basin indicate that conglomerate, quartzite and arkose

underlie the black slate and argillite. All of these are regionally metamorphosed to greenschist facies.


Baraga Basin Geology

Younger Keweenawan-age mafic igneous bodies intrude the Michigamme Formation. The Yellow Dog peridotite dike is the best known of these intrusions because of two outcrops that were studied by the U. S. Geological Survey (USGS) in 1979, and because the Yellow Dog peridotite is the host rock for the Eagle deposit. Its two outcrops correspond with the highest peaks of an east-west aeromagnetic anomaly that is approximately 22 kilometres long. Linear aeromagnetic anomalies of comparable magnitude parallel it just to the south; however, past drilling by Prime Meridian suggests that these other magnetic highs represent pyrrhotitic metasediments rather than intrusions.

Structural geology has been primarily interpreted from regional magnetic surveys. Northwest striking features cross-cut and horizontally displace the general west-northwest strike of the metasedimentary stratigraphy. These are cut and horizontally displaced by younger northeast-striking structures. The northeast faults also displace the Yellow Dog dike and are therefore late or post-Keweenawan in age.

History

The 1979 USGS report focused on the geology, petrology and geochemistry of the Yellow Dog intrusion. Ground geophysical surveys that included gravity, magnetics and VLF-EM were done along the postulated 22 kilometre east-west extent of the intrusion. Based on its anomalous base metal geochemistry and positive EM anomalies, the USGS report concluded that the Yellow Dog peridotite was a potential host for nickel-copper mineralization.

Kennecott recognized this potential and began an exploration program in the 1990's, focused on the Yellow Dog peridotite. In 2002, in the first hole of a second round of drilling, Kennecott intersected 84.2 meters of massive sulfide mineralization averaging 6.3% nickel and 4.0% copper. The top of the orebody that Kennecott eventually outlined by subsequent intensive drilling lies some 100 meters below the outcrop. In February 2006, Kennecott began submission of applications for mining permits; it received the last of the needed permits in January, 2008.

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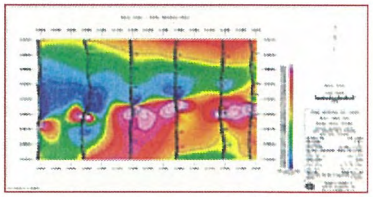
Prime Meridian's Exploration Program

In 2002 Prime Meridian conducted geological reconnaissance mapping and sampling on mineral lease areas in the Baraga Basin, and entered into a joint venture with BHP-Billiton Minerals Exploration Inc. (BHPB) to explore for magmatic intrusion-hosted nickel-copper deposits in the Baraga Basin, Bangston and Kiernan Sills Project Areas. In 2003 the joint venture partners flew electromagnetic and magnetic surveys over the joint venture areas. Drill testing was needed to evaluate and understand the survey results. Seven targets were drilled in 2003 without significant results, which established the need for additional geophysical techniques to identify and prioritize targets. In 2004 an airborne gravity survey using BHPB's proprietary Falcon system was flown over the eastern portion of the Baraga Basin Project Area. Additional surveys were flown in mid-2005, but their results did not become available until after the joint venture was terminated that year. Meantime, in late 2004, three more Prime Meridian targets were


2007 Heliborne Survey - Baraga Basin


Baraga Basin drilling (2004)

drill tested. At two of them, the core drilling successfully intersected olivine gabbro intrusive rock types. Unfortunately, economic mineralization was not found in either of these mafic bedrock bodies.



Baraga Basin, example of drill target with magnetic high and coincident conductors

Current Plans

The airborne surveys, taken together with the 2003-4 drill testing results which assisted in interpreting the geophysical responses, identified a number of new high priority targets on Prime Meridian's mineral lands. The company did confirmation ground geophysical surveying on two of these.

PMR has additional high priority targets that exhibit magnetic anomalies, in combination with one or both of gravity/EM anomalies on trend with the Eagle Deposit.

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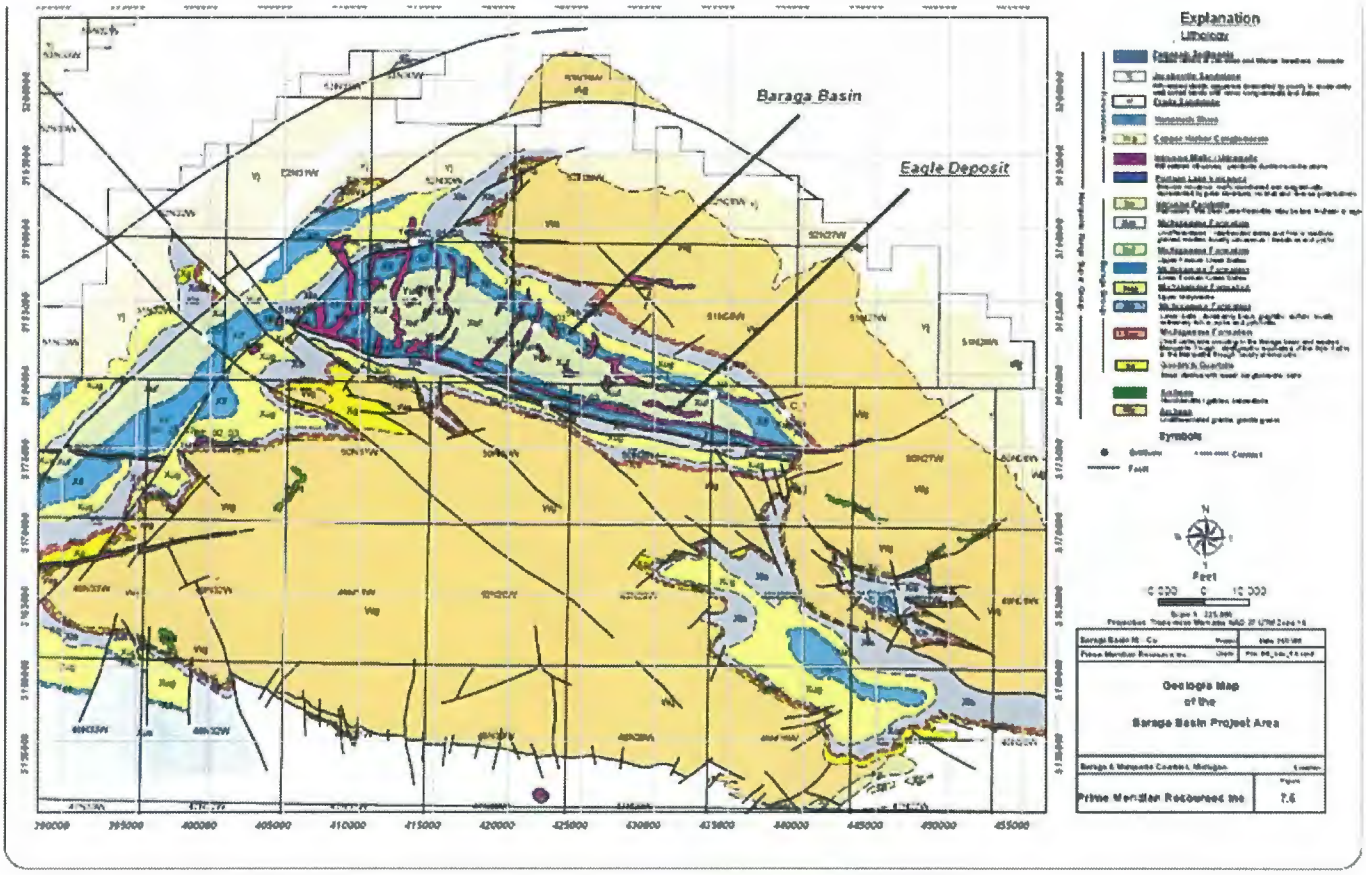
Baraga Basin
Eagle Deposit
Explanation
Lithology
Symbols
Feet
Geologic Map
of the
Baraga Basin Project Area
Prime Meridian Resources Inc

Bitterroot Resources Ltd.

Upper Peninsula, Michigan (Nickel-Copper)
Bitterroot owns 363 square miles of mineral rights in Michigan's Upper Peninsula, mainly in Ontonagon, Houghton, Baraga, and Iron Counties. The lands are subdivided into two general packages - the Voyageur Lands (257 square miles) and the Copper Range Lands (106 square miles). Bitterroot also holds mineral leases and prospecting permits covering 4,500 acres. Through its wholly-owned subsidiary, Trans Superior Resources, Inc., Bitterroot is one of the largest holders of mineral rights in the Upper Peninsula.

The Copper Range land package covers a portion of the famous Keweenawan copper district, which produced more than eight million tonnes of copper between 1845 and 1995. Bitterroot's Copper Range Lands have been subjected to limited exploration drilling since the 1960s. There are more than 100 past-producing copper mines, pits, and prospects located within or adjacent to this land package. In 2010, Bitterroot's ground-based and airborne geophysical surveys (AeroTEM) and geological mapping defined several drill targets prospective for copper and nickel. The Company has recently acquired additional leases and prospecting permits covering 2,300 acres (930 hectares) of mineral rights and is in discussions with potential joint venture partners, with the objective of drill-testing these targets later this year.

The Voyageur lands cover a diverse assemblage of Proterozoic sedimentary and volcanic rocks and have the potential to host a variety of minerals, including nickel, copper, platinum group metals and gold. Despite the extensive history of copper and iron mining in the western Upper Peninsula, the Voyageur Lands are at a relatively early stage of exploration. Within the Voyageur lands, Bitterroot has identified significant potential for platinum group metals (PGM) mineralization in the 35 square-kilometre footprint of the Echo Lake layered mafic intrusion. In 1997, Bitterroot drilled 3,270 meters (10,728 feet) in five core holes at Echo Lake. Drill hole EL-97-03 intersected ten flat-lying anomalous PGM-bearing horizons within the intrusion, with the highest-grade interval containing 1.01 grams Pt+Pd+Au/tonne over 5.42 metres (17.8 feet), within a 21.3 metre (69.8 feet) interval grading 0.52 grams Pt+Pd+Au/tonne. The Echo Lake intrusion has potential to host additional reef-type PGE mineralization along strike from the currently known mineralized zones and Ni-Cu-PGE mineralization along its contacts or within satellite intrusions and feeder dykes.

More Information

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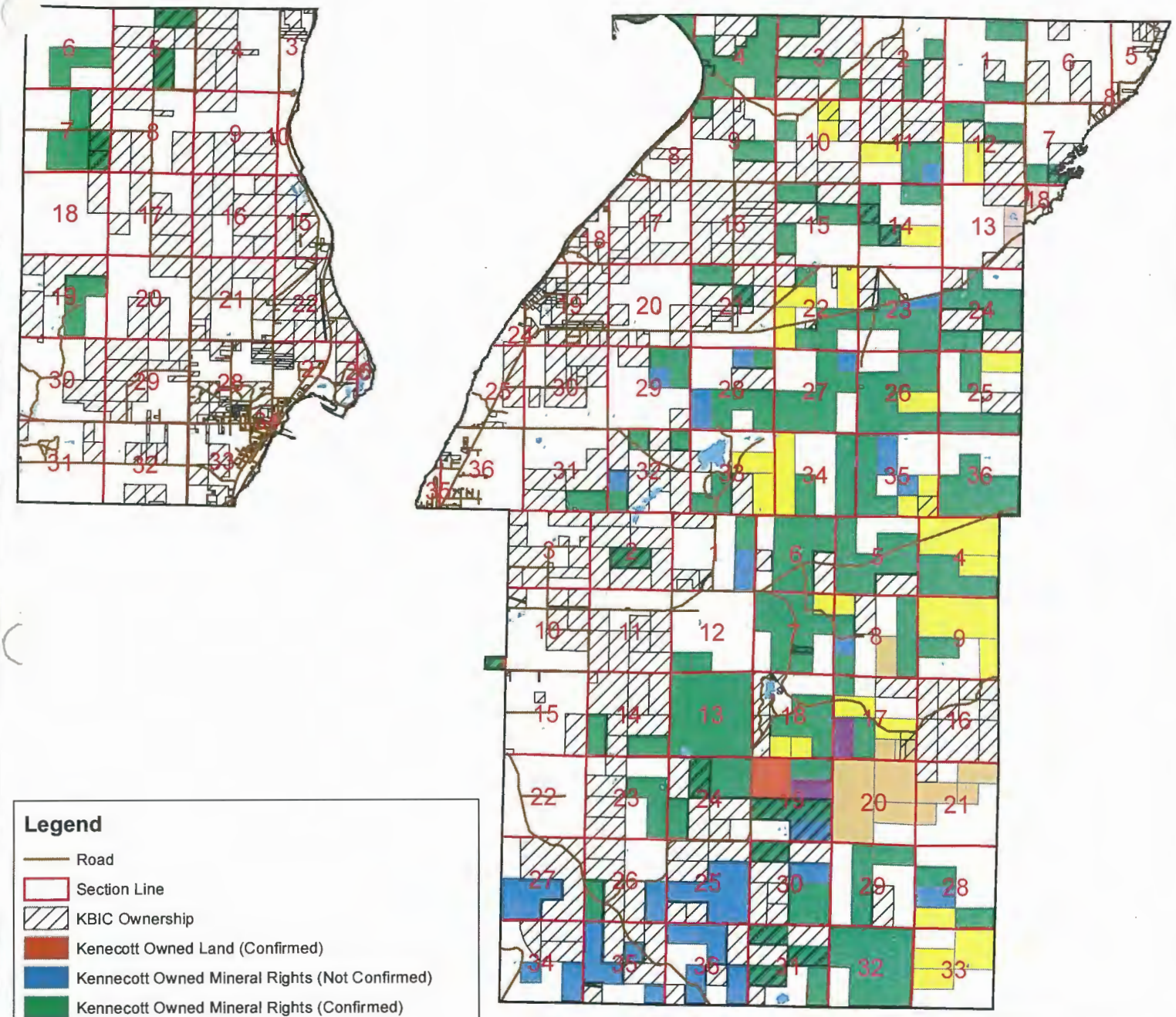


Legend

- Road
- Section Line
- KBIC Ownership
- Kenecott Owned Land (Confirmed)
- Kennecott Owned Mineral Rights (Not Confirmed)
- Kennecott Owned Mineral Rights (Confirmed)
- Kennecott leased Mineral Rights (Not Confirmed)
- Beefsteak Owned Mineral Rights (Not Confirmed)
- Prime Meridian Owned Mineral Rights (Not Confirmed)
- Prime Meridian Leased Mineral Rights (Not Confirmed)

Source: Save the UP, KBIC, Baraga County

Note: Mineral data was created by the Save the U.P. KBIC's Realty/GIS office has found errors in the data and the integrity of the data is in question. Some data has been confirmed through research at Baraga County Registry of Deeds and indicated in the legend.

Mineral Rights
KBIC's Reservation

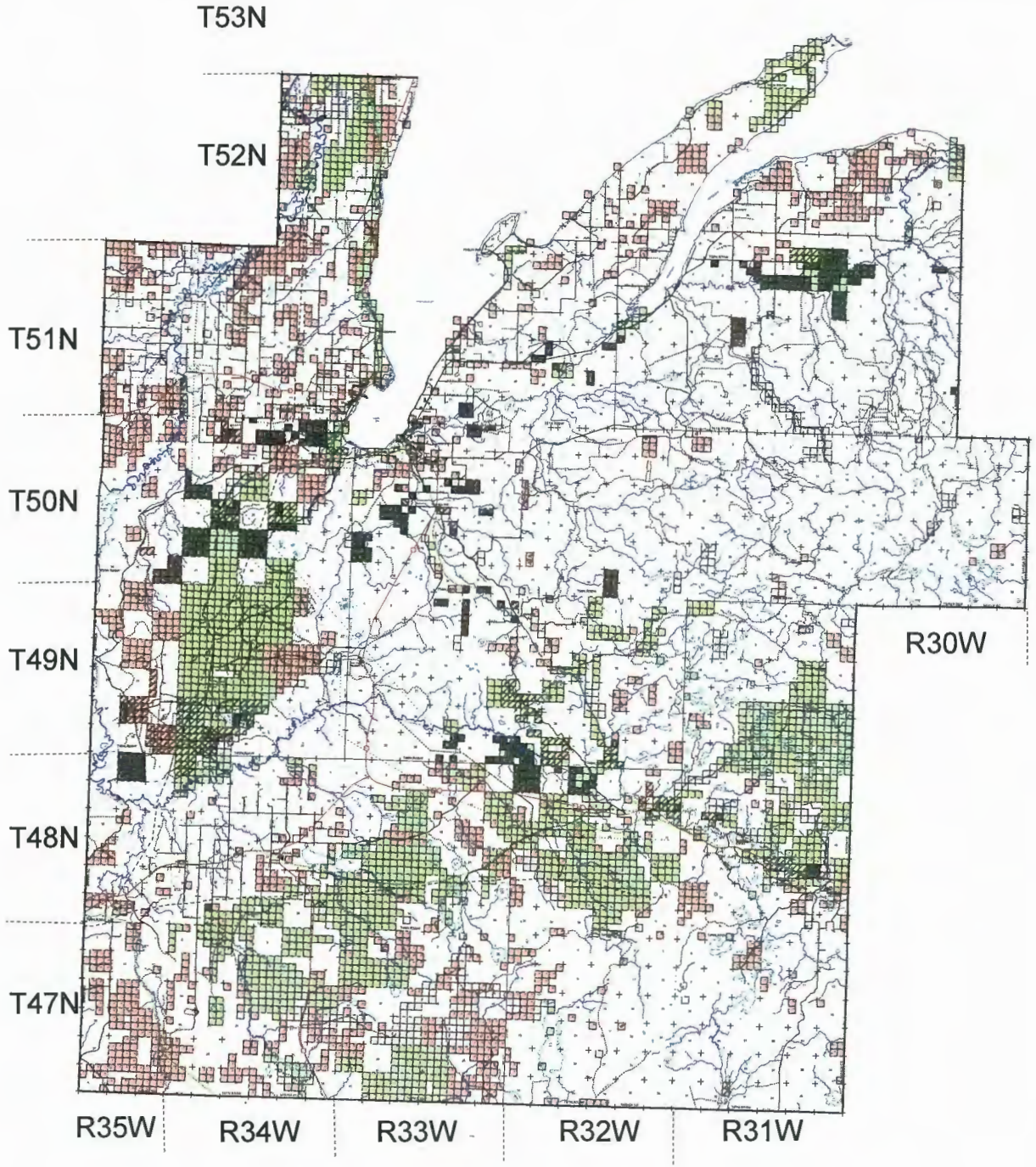
N

0 0.5 1 2

Miles

MINERAL LEASE [illegible]ORMATION, AND DNR OWNERSHIP

Baraga County



Map Locator

LEGEND

LEASE CLASSIFICATION RECOMMENDATION
- Development
- Development with Restrictions
- Non-Development
- Non-Leasable
- Mixed Classification

LEASE NUMBER
- 12345 Development Lease
- R12345 Development with Restrictions Lease
- N12345 Non-Development Lease
- S12345 Gas Storage Lease
- M12345 Metallic Mineral Lease
- Z12345 Nonmetallic Mineral Lease
- \+ Multiple Leases within QQS - one lease # shown

DNR OWNERSHIP
- Surface
- Mineral and Surface
- Minerals
- Mixed Ownership
- Other Rights
- R Reserved Minerals
- 40.00 Acres of Surface Ownership
- 40.00 Acres of Mineral and Surface Ownership
- 40.00 Acres of Mineral Ownership
- ROW DNR has a Right of Way and/or an acquired easement(s) from private landowner within the quarter-quarter section

TRANSPORTATION
- Two-Track and Seasonal Roads
- Highways
- Residential Roads
- Railroads
- Paved Airports
- Unpaved Airports
- County Roads

UTILITY
- Pipelines and Transmission Lines
- Electric Transmission Lines

POLITICAL
- Township Boundaries
- Great Lakes Shoreline
- County Boundary
- Section Lines

HYDROLOGY
- Lakes and Ponds
- Rivers and Streams
- Drains and Intermittent Streams

0 1 2 3 4 Miles

N

MAP INFORMATION

Lease classification recommendations are current and may differ from lease type (i.e., the lease was issued prior to the most current review).

Classification designations on individual parcels are reviewed each time lands are offered for lease. Parcels may be offered for lease under different classifications at future sales.

Mineral Lease and DNR Land Ownership information is derived weekly from the MDNR's Land Ownership Database. Parcel information is compiled to the quarter-quarter section level. Multiple parcels with varying types of ownership within a quarter-quarter section result in the Mixed Ownership Category. Non-ownership rights are identified as Other Rights.

COMPLETENESS and QUALITY
In general, the data does not reflect platted parcels, Private Claims, and parcels within the City of Detroit and/or Saint Clair County Plats.

The amount of acreage owned within a quarter-quarter section is identified by acreage labels in the upper-right corner of each quarter-quarter section.

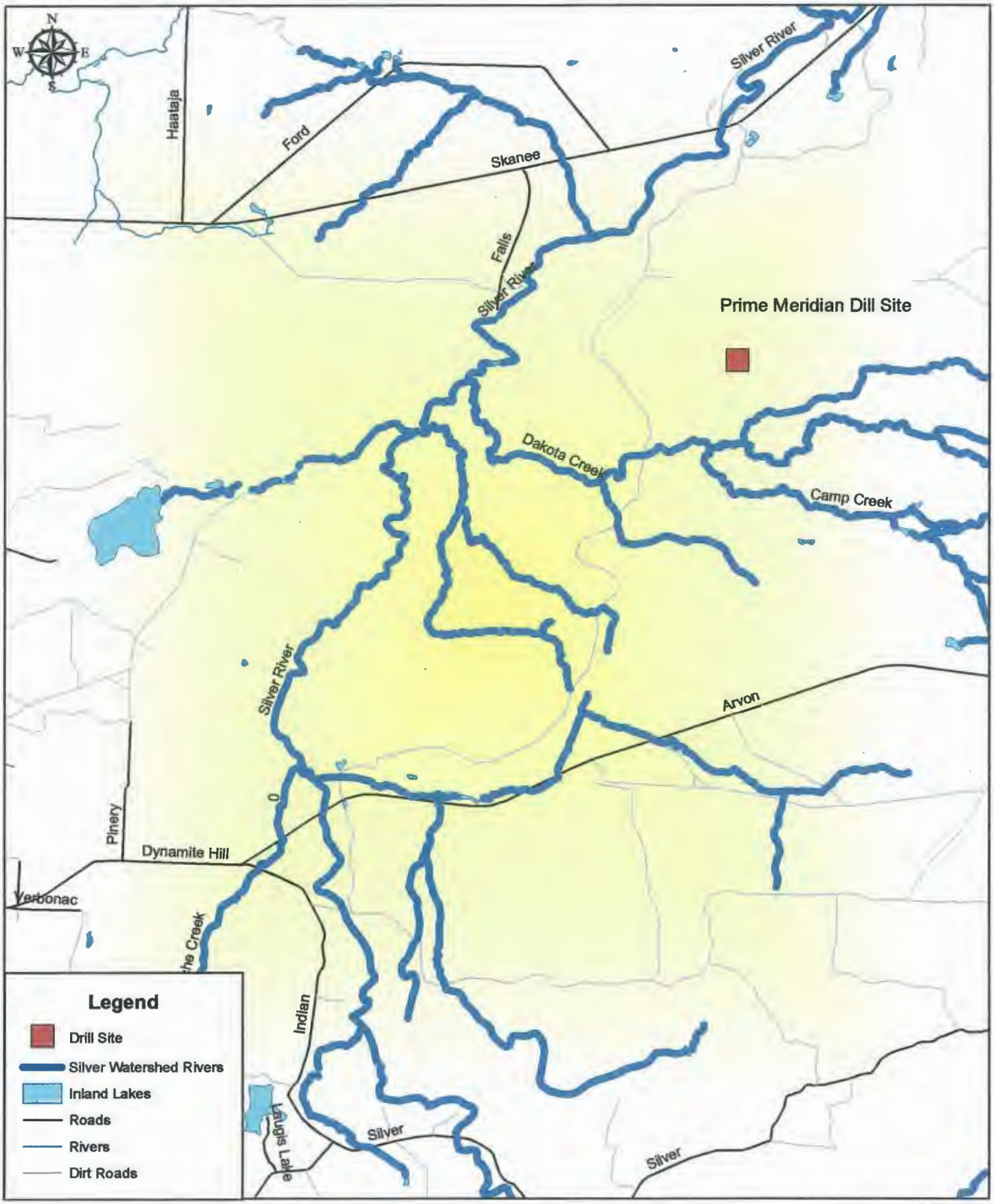
The quality and completeness of this data is unknown. It is suggested that this data be combined with a second source, such as plat maps, to further identify ownership.

This information displayed on this map is intended for general planning purposes only. Specific ownership

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
Forest, Mineral and Fire Management

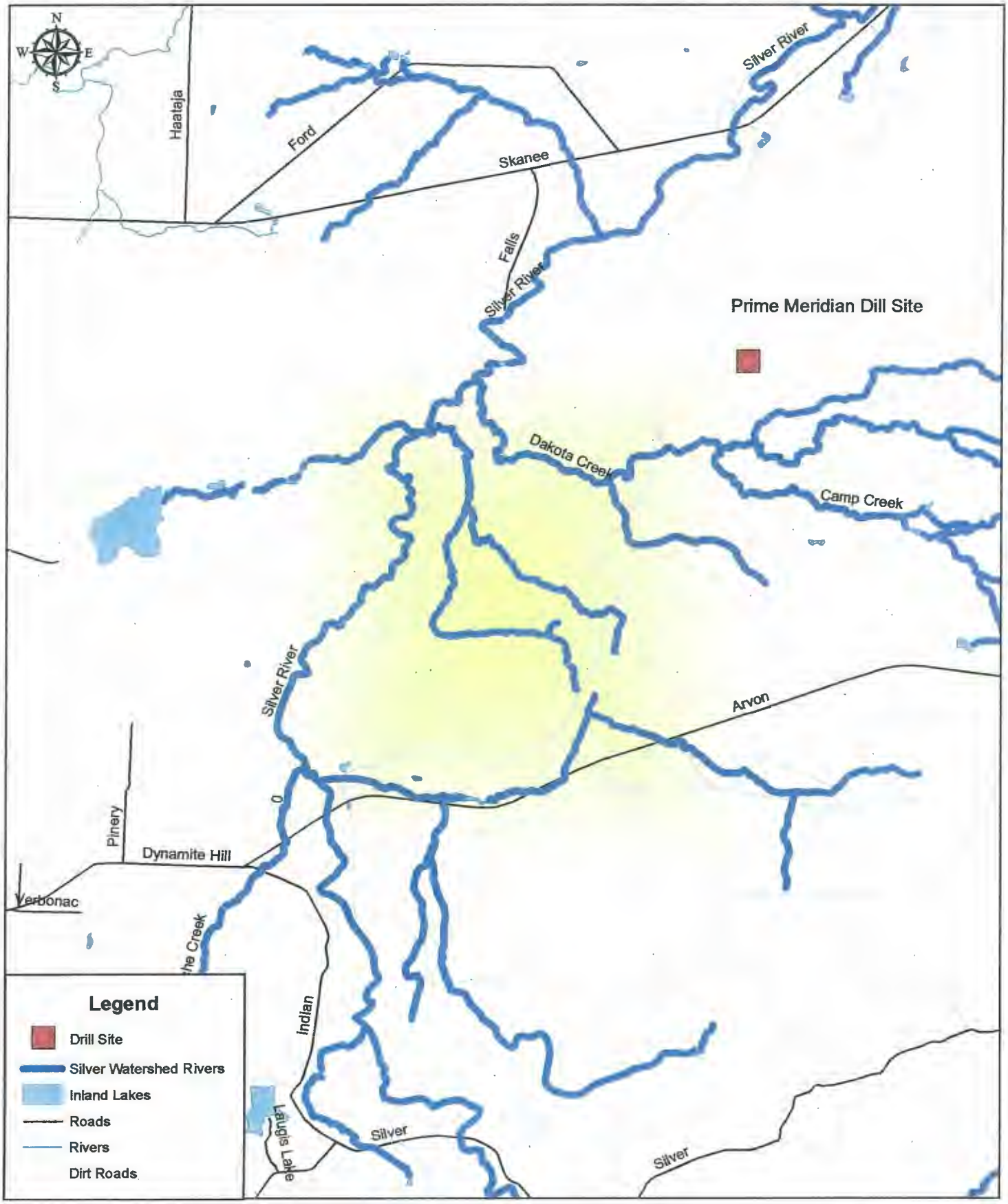
DATE 11/15/2011

Keweenaw Bay Indian Community
Prime Meridian Drill Site



Cartographer: Micah Petoskey

Keweenaw Bay Indian Community
Prime Meridian Drill Site

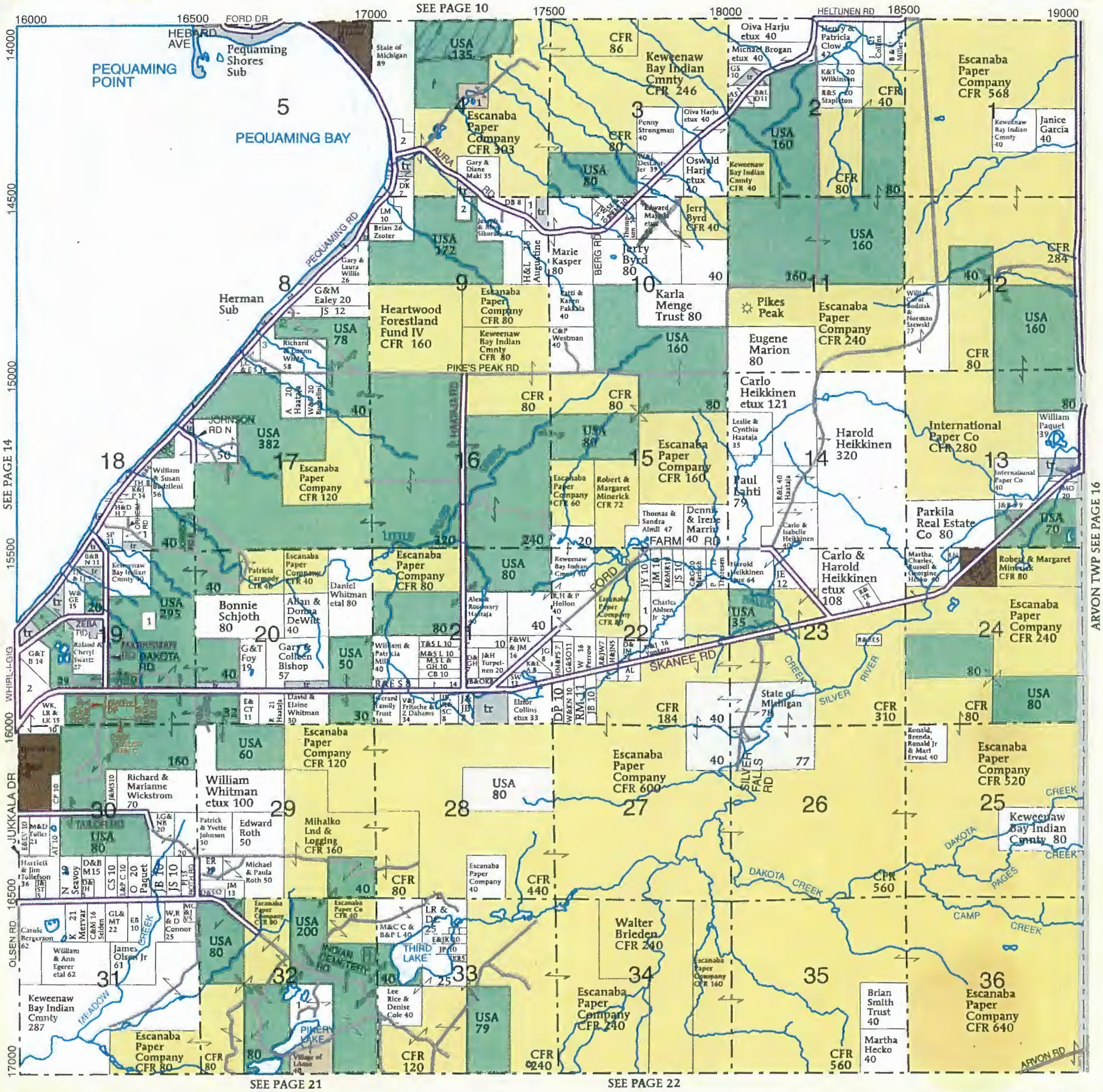


Cartographer: Micah Petoskey

L'ANSE

T-51-N • R-32-W

See Page 63 For Additional Names.



54th Annual Institute on Lake Superior Geology

Field Trip 7

GEOLOGY OF THE KEWEENAWAN BIC INTRUSION

Dean Rossell

Kennecott Minerals Company

Petrology and Cu-Ni-PGE mineralization of the Bovine Igneous Complex, Baraga County, Northern Michigan

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The Bovine Igneous Complex (BIC), located 8 km southeast of the town of L'Anse, Michigan, is a small basin-shaped mafic/ultramafic intrusion emplaced in the southwestern part of the Baraga Basin. Although age dating of the intrusion has so far been unsuccessful, the BIC intrusion was very likely emplaced during the early magmatic stage of Midcontinent Rift development, given its similarities to other early stage intrusions, such as Tamarack (MN) and Eagle (MI).

Investigated by Kennecott as a possible Cu-Ni-PGE prospect, the intrusion has undergone extensive exploration drilling since 1995. This work has shown the intrusion to be weakly to moderately mineralized with Cu-Ni-PGE-enriched sulfides. Metal tenors provided by initial drilling averaged less than .5% Cu and Ni, and less than 350 ppb Pt and Pd (Rossell, 2008). For this study, which is part of Dan Foley's MS thesis, two drill cores that profile the BIC (08BIC044 and BIC01-01) were investigated for their petrographic attributes, cryptic mineral compositions, and whole rock geochemistry. A detailed (1:6,000) re-mapping of the BIC was also conducted for this study.

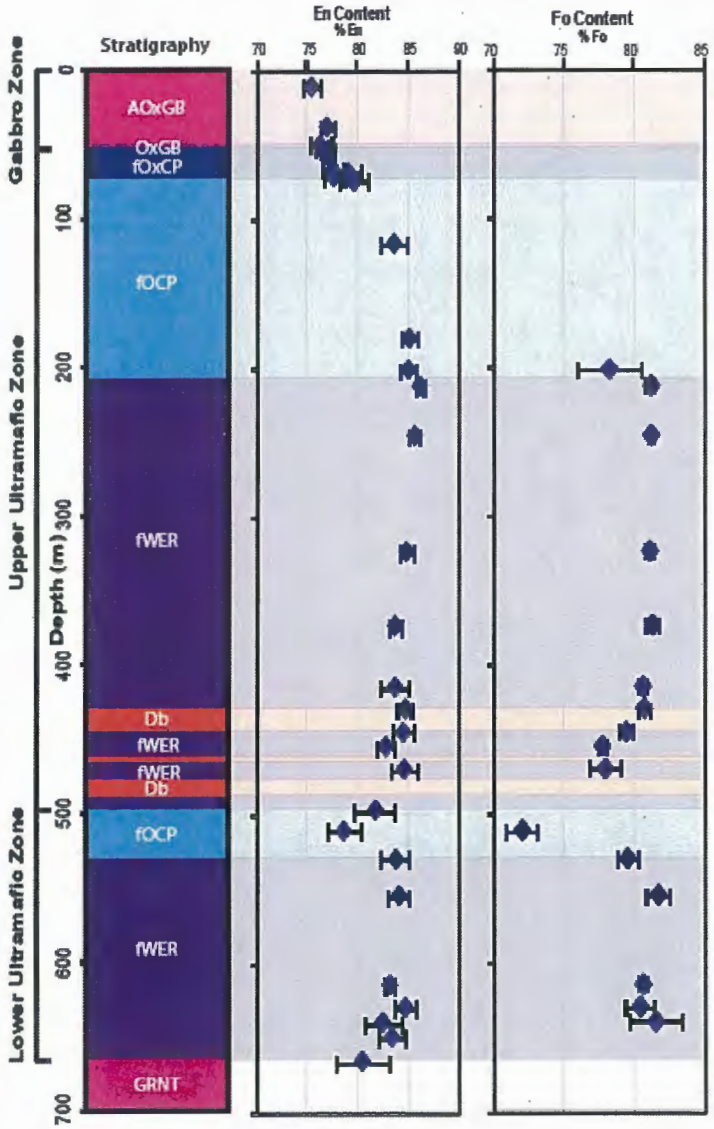
Preliminary field and petrographic studies by Rossell (2008) interpreted the intrusion to be a simple three unit system composed of a basal wehrlite/melagabbro, overlain by a clinopyroxenite/gabbro, and finally an oxide gabbro. Field mapping, core logging, and petrography conducted for this study have found that the lithostratigraphy of the BIC is a somewhat more complicated. The stratigraphy can be subdivided into three main zones – a lower ultramafic zone, an upper ultramafic zone, and a gabbro zone, each of which can be further subdivided by cumulate mineralogy. As profiled in core 08BIC044 (Fig. 1), the lower ultramafic zone is in sharp contact with a footwall of granitic gneiss at about 670m. A medium fine-grained feldspathic wehrlite (Ol cumulate with intercumulus Cpx and Pl) occurs at the basal contact and gradually coarsens up section and becomes less feldspathic. At about 525m, augite abruptly increases in mode and becomes granular to create a feldspathic olivine pyroxenite (Cpx+Ol cumulate with intercumulus Pl). The contact with the base of the upper ultramafic zone, at about 500m, is marked by the abrupt reappearance of feldspathic wehrlite that is vari-textured and contains abundant inclusions of chert and carbonate. Several fine-grained mafic dikes cut the lower 70 meters of this heterogeneous wehrlite. Above the uppermost dike, a more homogeneous, medium-grained feldspathic wehrlite (Ol cumulate with intercumulus Cpx and Pl) persists up to about 205m, at which point cumulus augite reappears and the modal rock type becomes a feldspathic olivine clinopyroxenite (Cpx+Ol cumulate with intercumulus Pl). At about 75m, an abrupt increase in the Fe-Ti oxide mode to about 10% and a loss of olivine generates a feldspathic oxide clinopyroxenite (Cpx+Ox±Ol cumulate with intercumulus Pl). Soon thereafter (~ 60m), plagioclase becomes abundant (>50%) and lath-shaped to create an oxide gabbro (Pl+Cpx+Ox cumulate). Apatite becomes a cumulus phase at about 50m to create an uppermost cumulate of Pl+Cpx+Ox+Ap. Outcrops of apatitic oxide gabbro, at presumably higher stratigraphic levels than seen in drill core, contain patches of interstitial granophyre. Assuming upward-directed crystallization, this igneous stratigraphy implies a cumulus paragenesis of:

$$Ol \rightarrow Cpx+Ol \;//\; Ol \rightarrow Cpx+Ol \rightarrow Cpx+Ox\pm Ol \rightarrow Pl+Cpx+Ox \rightarrow Pl+Cpx+Ox+Ap.$$

The cumulus regression evident at the lower and upper ultramafic zone contact and the heterogeneous nature of the basal upper ultramafic zone strongly implies that this contact demarks two major magma emplacement events.

Further evidence of two episodes of magma emplacement come from mineral chemical data on olivine and augite. Cryptic variations of Fo and En components through core 08BIC044

(Fig. 1) show trends that are consistent with two major episodes of emplacement followed by fractional crystallization. The base of each ultramafic zone is characterized by decreased En content of postcumulus augite which is consistent with chilling of a parental magma. Fo content of olivine in the lower ultramafic zone remains elevated, which is consistent with chilling of primocrystic olivine. Olivine at the base of the upper ultramafic zone shows a decrease in Fo suggesting reequilibration of a new magma pulse with the resident magma. As both the lower and upper ultramafic zone wehrlites transition into olivine clinopyroxenites, both Fo and En decrease, which is consistent with progressive iron enrichment due to fractional crystallization. Interestingly, the upper ultramafic zone and overlying gabbro zone progress to more evolved cumulates, but the cryptic variation is more muted than in the lower ultramafic zone. Noting that the upper ultramafic cumulates are more adcumulate (i.e. contain less postcumulus minerals) than the lower ultramafic zone cumulates, the more subdued cryptic variation of the upper cumulates may be due to a lower trapped liquid shift.



A suite of 27 samples have been submitted for lithogeochemical and assay analyses, but the results were not available at the time of this writing. We hope to report on the geochemical data at the meeting. The whole rock geochemistry will be used to evaluate whether the two magma pulses involved similar parental magma composition. Analyses of wehrlite from the base of the lower ultramafic zone and mafic dikes from the base of the upper ultramafic zone will be evaluated as potential candidates for chilled parent magma compositions. The geochemical data will also be used to evaluate the history of sulfide saturation and metallogenesis during the crystallization of the BIC magma(s).

Figure 1. Lithostratigraphy and cryptic variation of Fo in olivine and En in augite in DDH 08BIC044. Unit abbreviations are fWER-feldspathic wehrlite, fOCP-feldspathic olivine clinopyroxenite, Db-diabase, fOxCP – feldspathic oxide clinopyroxenite, OxGB – oxide gabbro, AOxGB – apatitic oxide gabbro

REFERENCES

Rossell, D., 2008. Geology of the Keweenawan BIC Intrusion. 54th Annual Institute on Lake Superior Geology, Part II: Field Trip Guidebook, pp. 181-193.

The Geology and Geologic Setting of the BIC Cu-Ni-PGE Prospect, Baraga County, Michigan U.S.A.

Introduction

The BIC mafic/ultramafic intrusion is located in Baraga County, Michigan, approximately 8 km southeast of the town of L'anse, Michigan. The roughly 1.1 km by 0.4 km, oval shaped intrusion forms a prominent hill with good exposures of the principle units that comprise the intrusion. The BIC intrusion has not been dated yet. However, based primarily on compositional similarities, Kennecott geologists believe it is similar in age to the mafic/ultramafic intrusion that hosts the Eagle Cu-Ni-PGE deposit, located ~35km to the east (fig 1), which has been recently dated at 1107.2+/- 5.7ma (Ding, 2007)

The BIC intrusion has been the target of periodic exploration by Kennecott Exploration Company since the first discovery of Cu-Ni-PGE mineralized boulders near the intrusion in the mid-1990's. The first drill hole into the intrusion, in 1995, was positioned at the south edge of the intrusion. The hole (BIC95-1, fig. 3) intersected ~3 m of disseminated sulfide mineralization in olivine melagabbro at the base of the intrusion, averaging 0.43%Cu, 0.32%Ni, 0.325ppm Pt and 0.345ppm Pd.

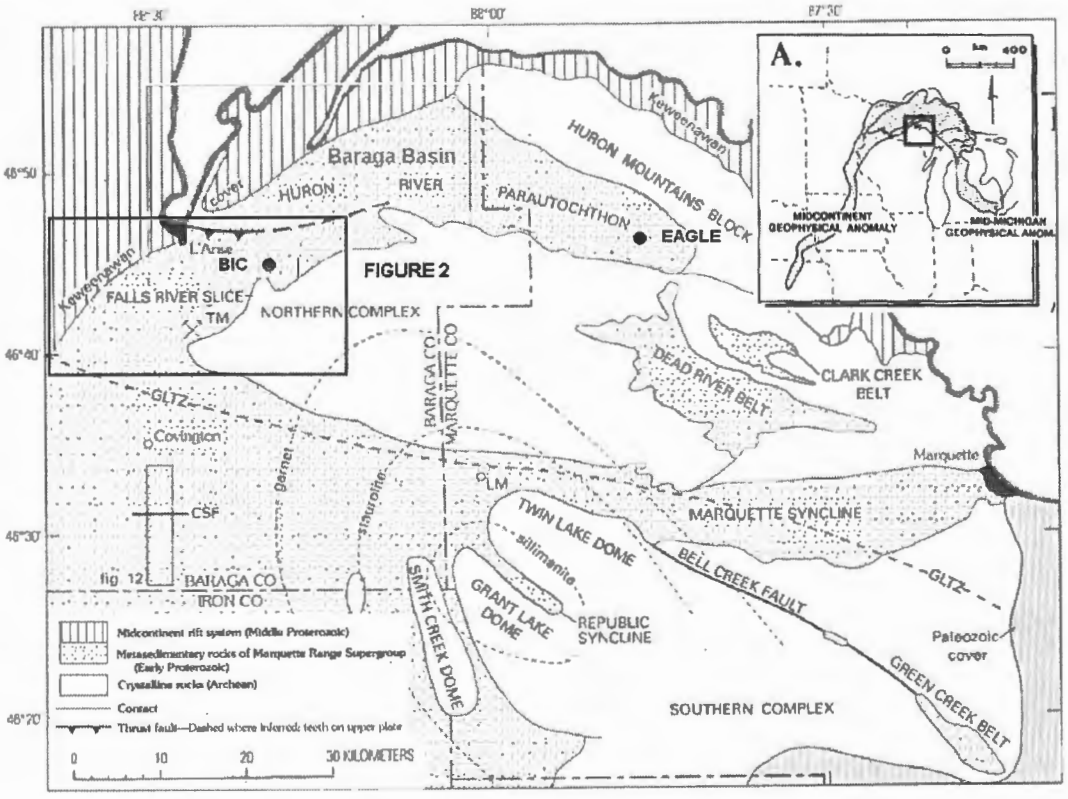


Figure 1) Geology map of the northern portion of the Upper Peninsula of Michigan showing the location of the Baraga Basin and the BIC intrusion. Modified from Gregg (1993)

No significant Cu-Ni-PGE resource has been identified at the BIC prospect yet. However, a drill hole completed by Kennecott Minerals Company in 2006 (07BIC-007), intersected 16.47m averaging 0.88%Cu, 1.00%Ni, 0.679ppm Pt, 0.991ppm Pd and 0.104ppm Au . This interval included a 2.8m interval with bands of massive sulfide, located in the meta-sediments immediately below the base of the intrusion, which averaged 1.66%Cu, 4.23%Ni, 1.383ppm Pt and 2.521ppm Pd. The metal tenor of the massive sulfide bands is comparable to some of the massive sulfides in the Eagle deposit. This could suggest that there is still some potential for a high grade massive sulfide body in the less explored portions of the BIC intrusion.

Previous Geologic Studies

No detailed geology map covers the area immediately around the BIC intrusion. The geology shown in Figure 2 is, in part, modified from data included in the USGS 1:62,500 scale open file geology map of the Precambrian geology of the Dead River, Clark Creek and Baraga Basins (Cannon, 1977). The area in figure 2 is also covered by the Iron River 1° x 2° quadrangle (Cannon, 1986). Geology in the Taylor Mine area (fig. 2) is compiled and modified from detailed mapping by Klasner (1972) and Klasner and others (1991).

Ojakangas (1991) discussed stratigraphic correlations of Paleoproterozoic rocks in the area shown in figure 2. Gregg (1991) and Klasner and others (1991) described Penokean age deformation in the same area. The Archean geology to the southeast of the BIC intrusion is described in an unpublished master's thesis by Turner (1979). A review of the Paleoproterozoic stratigraphy in the Baraga Basin, including the Taylor mine area, was recently undertaken by Gabe Nelson as part of a Masters thesis at Acadia University under Pier Pufal.

The above data sources were supplemented by periodic reconnaissance mapping by me during the period 1999-1996. This work was augmented by regional geophysical studies and drilling programs carried out by personnel of Kennecott Exploration Company, Kennecott Minerals Company and various contractors. The more detailed geologic data from the BIC area is compiled from work by me, other Kennecott Exploration and Kennecott Minerals geologists, contract geologists and reports on petrography completed for Kennecott by Barnett (1995), Hauck (2001) and Johnson (2007).

Regional Setting

The BIC intrusion cuts Paleoproterozoic sediments in the southwestern portion of the Baraga Paleoproterozoic sedimentary basin (fig 1). The Baraga basin is bounded to the north and south, and underlain by Archean crystalline rocks. The Baraga basin merges with the Paleoproterozoic sediments of the Marquette Syncline southwest of the BIC intrusion (fig 1). The Archean, Paleoproterozoic and Mesoproterozoic geology is briefly summarized below.

<u>Archean</u>
The Archean terrane to the immediate south of the BIC intrusion (fig.2) is comprised largely of coarse grained, felsic gneiss and lesser amphibolite intruded by a variety of small mafic to ultramafic intrusions. Although there has been little mapping to confirm it, the gneissic rocks are most likely a continuation of the gneiss, intrusions and lower metamorphic grade supracrustal

rocks (Marquette Greenstone Belt) that collectively comprise the Northern Complex (fig 1) to the east. A tonalitic intrusion dated at 2703 Ma and a rhyolite dated at 2780 Ma (Sims, 1993), are the only available age dates from the Northern Complex.

Paleoproterozoic

The recent discovery of the Sudbury ejecta horizon in the Baraga Basin (see below) constrains the bulk of Paleoproterozoic sedimentation to post 1850ma. Gregg (1993) divided the Baraga basin into two principle structural domains; the northern Huron River parautochthon and the southern allochthonous Falls River slice. Gregg proposed the boundary between the terrranes, which is marked by an abrupt change in structural style, is a south dipping thrust fault that he named the Falls River Thrust (fig. 2).

Paleoproterozoic sediments to the north of the Falls River Thrust are characterized by weakly asymmetrical, relatively open folds with shallow axial plunges to the northwest or southeast. A single, southwest dipping, axial planar foliation is evident in most pelitic and siltstone horizons. Immediately south of the Falls River Thrust, folds are tight to isoclinal, generally overturned and often recumbent. In the Falls River slice, larger scale folds are overprinted by a second generation of folds with an associated crenulating foliation that is particularly evident in pelitic sediments. Boudinaged and folded quartz veins and lenses are prevalent in coarser-grained meta-greywacke beds in the Falls River slice.

Klasner and others (1991) mapped a thrust fault in the Komtie Lake area, south of the BIC intusion (fig. 2). They reported that a vertical exploration drill hole, located on the south side of Komtie Lake, penetrated 30 m of Archean gneiss followed by 3 m of mylonite before intersecting 45 m of Paleoproterozoic sediments. They proposed an approximately east-west striking and south dipping thrust fault that brought Archean gneiss over a thin veneer of the basal Paleoproterozoic sediments. They extended the fault westward to include strongly foliated rocks exposed along Plumbago Creek (fig 2). I extended the Komtie Lake thrust fault further to the northeast in figure 2, to an area where magnetic anomalies originating in the Paleoproterozoic sediments appear to continue under exposures of Archean gneiss. This extension has not been confirmed by mapping.

Exposures of pelitic rocks in the immediate area of the Taylor mine (stop 3, fig. 2) generally lack the prominent crenulating cleavage seen in pelitic rocks exposed all along Taylor Creek further to the north (stop 4, fig. 2). Drill hole T-5, a 68.5 m deep vertical exploration hole collared northeast of the Taylor mine pit (fig. 2), bottomed in mylonitic rock. I propose that there is another generally east-west striking thrust fault north of drill hole T-5, separating the overriding Taylor Mine slice from the more deformed rocks of the Falls River Slice. Alternatively, the fault could be the westward continuation of the Komtie Lake thrust fault.

Historically, deformation of the Paleoproterozoic sediments in the western portion of the Upper Peninsula has been attributed to a series of collisional events between 1888 Ma and 1830 Ma that collectively make up the Penokean orogeny (Schultz and Cannon, 2007). However, Schultz and Cannon (2007) point out that there is evidence of vertical faulting and uplift that significantly post date1830 Ma. They concluded that this younger deformation cannot be attributed to the Penokean orogeny and that it is more likely of Yavapai age.

Mesoproterozoic

Mesoproterozoic flood basalts associated with the Keweenaw Flood basalt Province are exposed along the length of the Keweenaw Peninsula and 30km southwest of the BIC intrusion at Silver Mountain, Michigan. The Keweenaw Flood Basalt province represents the exposed portion of the Midcontinent Rift system in the Lake Superior region. The Midcontinent Rift forms a prominent gravity anomaly that can be traced from the Lake Superior region southwest into central Kansas, and southeastward into southern Michigan. The total length of the geophysical feature is in excess of 2000 km (Hinze and others, 1997). Seismic data indicates the rift below Lake Superior is filled with more than 25km of volcanics buried beneath a total thickness of up to 8km of rift filling sediments (Bornhorst and others, 1994). The estimated volume of magmatic rocks associated with the rift is greater than 2 million cubic kilometers (Cannon, 1992).

The Keweenaw Flood Basalt province was formed over an approximately 23 million year period, from ~1111 Ma. to ~1089 Ma. Volcanism was bimodal, but with preserved basaltic rocks much more abundant than rhyolitic rocks. Volcanism occurred in two distinct phases, with an approximately 5 million-year hiatus between phases (Miller, 1996). In Michigan and Wisconsin, the early phase volcanics are comprised of the Sieman's Creek formation and volcanics of the Powdermill group (Wiband and Wasuwanich, 1980). The Portage Lake volcanics comprise the younger phase. The early phase volcanics are primarily reversely polarized. The Portage Lake volcanics are normally polarized. A mantle plume model has been widely evoked to explain the staged evolution and large volume of magmatic products associated with the Midcontinent Rift (Nicholson, 1997).

Red bed sandstones (Jacobsville Sandstone) shed off the horst block formed during inversion of the Midcontinent Rift, cover Paleoproterozoic sediments west of BIC (fig. 2). Rift inversion may have begun as early as 1080 Ma and was completed by about 1040 Ma (Cannon, 1994). The probable cause of compression was continental collision in the Grenville province (Cannon, 1994).

Paleoproterozoic Stratigraphy

Archean rocks are either unconformably overlain by, or in fault contact with, Paleoproterozoic meta-sediments along the southern margin of the Baraga Basin. Ojakangas (1994) has correlated sediments in the Baraga Basin and western Marquette trough with the Baraga Group, the youngest of the three dominantly clastic sedimentary groups that comprise the Marquette Range Supergroup. He concluded, on the basis of paleocurrents, paleogeographic setting and isotopic data that the best tectonic model for Baraga Group sedimentation is a northward migrating foreland basin.

Quartzites at the base of the Paleoproterozoic sedimentary sequence in the Baraga basin north of the Falls River thrust and in the Canyon Falls area (stop 1-fig. 2) are correlated with the Goodrich formation by Ojakangas (1994). The basal quartzites at both these localities appear to rest unconformably on Archean basement. The quartzites range from thickly to thinly bedded, with locally well developed planar and trough cross bedding. Quartzites in the Baraga basin are typically arkosic with conglomerate lenses. Ojakangas (1994) proposed that the Goodrich

quartzites were deposited in a tidal environment. In the Baraga Basin, the Goodrich formation ranges in thickness from less than a meter in the eastern portion of the basin, to approximately 40 m in the western portion of the basin (Nelson, 2006).

I interpret widely scattered outcrops of similar appearing quartzite exposed along the margins of the Archean to the south and east of the BIC intrusion as equivalents of the Goodrich quartzite described above. However, in most places they appear to be in fault contact with the Archean. Klasner and others (1991) interpreted strongly foliated, quartz rich schists along the north side of Plumbago Creek in the Taylor mine area (fig. 2) as mylonitic textured Archean gneiss. I have examined some of these outcrops and feel they could, in part, be strongly foliated arkosic Goodrich quartzite. The proximity of the sheared "quartzite" with iron formation exposed along the banks of Plumbago Creek has potential stratigraphic implications in the Taylor mine area.

The Goodrich formation is overlain by the Michigamme formation, the uppermost formally recognized formation in the Baraga Group. Leith, et al (1935) divided the Michigamme formation into three principle members which, in ascending order are: the Lower Slate member, the Bijiki iron formation, and the Upper Slate member. Kennecott geologists have generally used this nomenclature for describing stratigraphic relationships in the Baraga Basin. However, in the western portion of the Baraga Basin, the Goodrich formation quartzites are immediately overlain by a thin interval (typically less than 20m thick) of inter-bedded chert and iron rich carbonate. Ojakangas (1994) suggested that this cherty horizon may be the equivalent of the Bijiki iron formation and that the Lower Slate member is missing in parts of the Baraga basin. However, Kennecott geologists believe this is a separate unit below the Lower Slate member and informally refer to it as the Chert Carbonate member. That informal designation is used in the rest of this field guide and in figure 2.

William Cannon (personal communication) has identified layers with accretionary lapilli, pumice grains and, at one location, quartz grains, with shock lamellae from bedrock exposures and core samples of the Chert Carbonate member in the Baraga Basin. Cannon has proposed that these are ejecta from the 1850 Ma Sudbury impact event and correlated them with other ejecta horizons previously identified in Ontario and Minnesota (Addison et al, 2005). Kennecott drill hole 07BIC-033, the deepest hole completed at the BIC prospect, intersected intervals with probable accretionary lapilli and pumice fragments (Cannon, personal communication) in cherty rocks starting at a depth of 586 m. The likely presence of the Sudbury ejecta layer in the BIC drill hole provides confidence that the more deformed rocks in the southwestern portion of the Baraga basin (south of the L'anse thrust fault in figure 2) are stratigraphically correlative with the rocks in the northern portions of the Baraga Basin.

The Chert Carbonate member and Sudbury ejecta layer is overlain by dominantly black to dark gray, thinly bedded, meta-siltstone and pelite in the Baraga Basin. The pelitic rocks are often graphitic and sulfide rich and contain only minor intervals of fine-grained greywacke. As mentioned above, Kennecott geologists believe this is the Lower Slate member of the Michigamme formation. This siltstone-pelite dominated interval increases from 20-90 m in the northern part of the Baraga Basin to thicknesses I speculate might be greater than 200 m in the vicinity of the BIC intrusion. However, structural complexities and insufficient drilling make

accurate determinations of the thickness of this sequence currently impossible in much of the southern portion of the Baraga Basin.

In the Taylor mine area (stop 3-fig.2) the Lower Slate member is overlain by the Bijiki iron formation. The Bijiki iron formation is primarily comprised of thinly bedded, black and white chert with lesser siltstone, iron carbonate and iron oxides (Ojakangas, 1994). In the immediate Taylor mine area the Bijiki iron formation ranges from 20-80m in thickness (Ford Motor Company reports).

A Kennecott Exploration drill hole, ALB95-3, located approximately 2.7km west of the Taylor mine (fig. 2), intersected 280 m of banded iron formation, with lesser intervals of graphitic slate, starting at a depth of 110 m and continuing to the bottom of the hole. Bedding angles to core, along with the lack of any compelling evidence of fold or fault repetition, suggest that this is likely to be close to a true thickness. A second hole, ALB95-2, collared 1.1 km further to the west, intersected 194 m of iron formation. Both holes were terminated while still in iron formation so the total thickness of iron formation at this location is unknown. Kennecott geologists believe the iron formation in both holes is the Bijiki indicating a rapid westward thickening of the unit. This thicker part of the Bijiki is within a rhomb shaped magnetic and gravity high. The rapid westward thickening of the iron formation, and shape of the coincident geophysical anomalies, might be evidence of a fault bounded, second order basin that formed during deposition of the Lower Slate and Bijiki iron formation.

The BIC intrusion cross cuts an approximately 15km long linear magnetic anomaly. Drilling and mapping by Kennecott geologists has confirmed that the linear magnetic anomaly is caused by abundant pyrrhotite in graphitic sediments. The sediments contain numerous thin bands of contorted quartz and 0.5-1cm thick bands and lenses of semi-massive pyrrhotite and pyrite with minor sphalerite and chalcopyrite. The ratio of pyrrhotite and pyrite varies considerably along strike, and within a drill intersection, significantly affecting its magnetic susceptibility. Similar sulfide rich sediments are seen immediately below the Bijiki iron formation at the Taylor mine and in a 25-35m interval immediately above the Bijiki iron formation in drill holes ALB95-2 and ALB95-3 (pyrite rich in hole ALB95-3 and pyrrhotite rich in hole ALB95-2). The author proposes that these sulfide rich, variably magnetic sediments are the continuation of the Bijiki iron formation member northward into the BIC area. However, this important marker horizon has not been identified anywhere else in the northern part of the Baraga basin.

The Bijiki member is overlain by the Upper Slate member in the Taylor mine and BIC prospect areas. The Upper Slate member contains a significant percentage of greywacke inter-bedded with siltstone and pelite distinguishing it from the Lower Slate member. Ojakangas (1994) reported that greywacke beds made up 18% of a measured section in the Silver River north of the BIC intrusion. The greywacke beds are commonly graded and contain rip ups and other features indicative of deposition by turbidity currents.

Baraga-Marquette Dyke Swarm

The Baraga-Marquette dyke swarm is comprised of more than 150 diabase dykes (Green and others, 1987). The primarily east-west trending dikes form a belt that extends from the northern edge of the Baraga basin at least 75 km southward into southern Marquette County. Although

most dykes in the swarm are less than 30 m thick, individual dykes are up to 185 m thick and can be traced for up to 59 km (Green et al., 1987).

The majority of the known dykes are reversely polarized, forming prominent magnetic linear anomalies on magnetic maps. None of the diabase dykes have been dated. However, the measured diabase dyke paleomagnetic pole position in the Marquette area is virtually identical to that of reversely magnetized intrusions from the Thunder Bay area (Wilband and Wasuwanich, 1980). Sutcliff (1987) reported an age of 1109ma for the reversely polarized Logan sills in the Thunder Bay area.

The dykes typically have subophitic to diabasic textures and contain 50-70% plagioclase, 30-50% clinopyroxene and 1% or less olivine and Fe-Ti oxides. Most dykes are relatively fresh with little sign of alteration (Wilband and Wasuwanich, 1980). Most of the reversely polarized dykes have high TiO2 (3-5%), P2O5 (0.30-0.55%) and <15% Al2O3 (Wilband and Wasuwanich, 1980).The dykes also typically have high Cu (300-500ppm) and low Ni (<100ppm) contents (Kennecott data).

Interestingly, no reversely polarized dykes are evident in magnetic data sets north of the Falls River thrust fault (fig. 2). This might suggest that the fault played some role in localizing the reversely polarized dykes of the Baraga-Marquette dyke swarm.

The BIC Intrusion

The BIC intrusion is located about 35km southwest of Eagle and 8km southeast of the town of L'anse, Michigan. The intrusion forms a prominent hill approximately 1100m long by 400m wide. Mapping, geophysics and drilling indicate the intrusion has roughly the same dimensions as the hill at bedrock surface (fig. 3). Although not well constrained along much of the intrusion, based on the drilling completed, the intrusion appears to be generally V shaped in cross section. Drilling and mapping in the eastern portion of the intrusion suggest the southern margin of the intrusion dips moderately to the north (fig. 4). Knowledge of the northern contact is limited, but it appears to be steeply, south dipping.

A much smaller, shallow bowl shaped intrusion, referred to as Little BIC, was located just to the northwest of the BIC intrusion during 2006 drilling (fig. 3). The smaller intrusion is comprised mostly of relatively olivine rich lithologies very similar to those seen along the base of the main BIC intrusion. This smaller intrusion could be a fault offset of the larger BIC intrusion, or possibly a separate intrusion. The best mineralized intersections in drilling completed through 2007 have primarily come from this smaller intrusion.

Unlike the intrusion hosting the Eagle ore body, the BIC intrusion is distinctly layered. Core logging, thin section work and very limited geochemistry show that the BIC intrusion can be subdivided into three principal units; an upper coarse-grained gabbro, a middle unit comprised of fine-grained gabbro and feldspathic clinopyroxenite, and a lower unit of feldspathic wehrlite and olivine melagabbro. All three units thicken toward the center of the intrusion and thin toward the margins.

The following descriptions of the units are summarized from core logs and observations of outcrops and hand samples. Most of the descriptive mineralogy is taken from unpublished

petrography reports prepared for Kennecott Exploration and Kennecott Minerals by Rod Johnson (2007) Steve Hauck (2002), and Bob Barnett (1995).

Upper Unit - Gabbro

The upper gabbro is the thinnest unit with no drill intersections exceeding 75 m (no upper contact has been located so this is only a minimum total thickness). It is exposed in a few scattered locations on the top of the hill. The best exposures are along the drill roads on top of the hill in the eastern portion of the Intrusion.

The upper gabbro is an altered, medium to coarse-grained, oxide gabbro with 55% lath like plagioclase and 35% prismatic or granular clinopyroxene. The gabbro contains up to several percent titanomagnetite, minor apatite and trace olivine. The upper gabbro is moderately to strongly magnetic.

Strong alignment of plagioclase laths, which can be up to 2cm in length, and prismatic clinopyroxnene creates a foliation in the gabbro in places. In other places, the crystals radiate, creating a stellate pattern. Small patches of granophyre are present in drill core and outcrop.

The upper gabbro is moderately to intensely altered with plagioclase variably altered to sericite and clinopyroxene altered to amphibole and chlorite. Very fine grained hematite coats some plagioclase giving it a pinkish color and titanomagnetite is altered to martite and maghemite. Pyrite occurs as disseminations and rare veins (Hauck, 2002).
Football size and shape pods of strong light green, epidote rich rock are common in outcrop and drill core of the upper gabbro. The pods, which have sharp contacts, can form up to 5% of some outcrops. The shape, size and distribution of the pods suggests that they might be preferentially altered xenoliths or autoliths.

Middle Unit-Gabbro/Clinopyroxenite

The middle unit is comprised of gabbro and clinopyroxenite which forms 3-10m high cliffs around the perimeter of the hill. The middle unit is by far the best exposed unit at the BIC prospect. Intersections in drill core of the middle unit reach 100m in drill holes in the eastern half of the intrusion but it appears to thin to the west.

The unit is comprised of fine-grained, equigranular gabbro and feldspathic clinopyroxenite. The upper few meters of the unit is a fine-grained, strongly magnetic equigranular, oxide rich, cumulate textured gabbro with 40-50% granular clinopyroxene and 20-50% granular titanomagnetite and minor ilmenite. Plagiclase content varies, but is typically less than 40% in this oxide rich part. Biotite and amphibole are minor components in the upper portion of the unit. This magnetite rich interval is present in most holes and creates a distinctive spike in magnetic susceptibility profiles in most BIC drill holes (a magnetic profile is shown for hole BIC02-02 in figure 4)

Magnetite content decreases rapidly with depth in the middle unit and most of the unit below the first few meters is weakly to non-magnetic. Clinopyroxene content increases downward and in the eastern portion of the intrusion much of the lower part of the middle unit is fine-grained, cumulate textured, feldspathic clinopyroxenite. The presence of cumulate clinopyroxenite is suspected in the western portion of the intrusion but not yet confirmed by thin section work.

Alteration is similar to that seen in the upper gabbro with plagioclase largely altered to sericite, carbonate and actinolite and pyroxene is variably altered to chlorite, carbonate and amphibole.

Fine-grained, disseminated chalcopyrite and trace bornite is found through out the unit, generally in trace amounts, but locally up to 0.5%. Minor pyrite and sphalerite are present in western outcrops of the middle unit, in addition to chalcopyrite.

Lower Unit- Wehrlite/Olivine Melagabbro

Unlike the upper two units, which contain only very rare olivine and orthopyroxene, the lower unit is relatively olivine rich and has up to 5% orthopyroxene in some thin sections. The lower unit is poorly exposed, with just a few outcropings along the south side and none on the north side. The unit is best exposed on the west end of the hill. Drilling indicates it is the thickest of the three units and has a thickness of greater than 200 m in drill hole BIC02-02 (fig 4).

The upper portion of the lower unit is comprised of fine grained, moderately magnetic, feldspathic wehrlite and olivine melagabbro with 35-60% cumulate olivine, 10-20% clinopyroxene, 10-34% plagioclase and minor sulfide. Clinopyroxene is either granular or poikolitic on olivine and plagioclase is poikolitic on both olivine and clinopyroxene. Titanium rich phlogopite and amphibole are also minor (1-2%) primary mineral phases. Chromite occurs as grains within olivine and minor titanomagnetite and ilmenite occur as single or composite grains, often subpoikolitic on clinopyroxene.

Barnett (1995) reported olivine compositions for outcrop samples of the lower unit that ranged from fo76 to 83. These values closely overlap with the range of fo76 to 85 reported for olivine melagabbro at the Eagle deposit (Ding, 2008). In most holes, olivine content decrease with depth in the lower unit, while clinopyroxene, plagioclase and sulfide increase. In the eastern portion of the intrusion, this change in mineralogy is accompanied by an increase in grain size in the lower 50m of the intrusion.

Alteration is moderate to severe in the lower unit with olivine partially to completely altered to either iddingsite or serpentine and fine-grained magnetite. Both plagioclase and clinopyroxene are variably altered to chlorite and carbonate. The alteration tends to turn everything green in the most altered samples, often making visual determination of the primary mineralogy difficult in hand and core samples.

Contact metamorphic Aureole

Meta-sedimentary rocks peripheral to the BIC intrusion show the effects of low pressure contact metamorphism. Johnson (2007) studied thin sections cut from drill core samples of meta-sediments peripheral to the BIC intrusion. He divided metamorphic assemblages in the meta-sediments into a proximal granoblastic hornfels, a more distal porphroblastic spotted hornfels, and a regional green schist assemblage.

Within two to three meters of the contact of the intrusion, primary structures and foliations in the meta-sediments are very poorly preserved. The regional metamorphic assemblage is overprinted by a granoblastic assemblage of cordierite, quartz, biotite, vesuvianite and sphene +/- andalusite, sillimanite, kspar and plagioclase. Scattered small pods and veins of coarser grained k-spar and quartz within the granoblastic hornfels suggest localized partial melting of the meta-sediments in close proximity to the intrusion.

The granoblastic hornfels grades outward into spotted hornfels which in some drill holes can be recognized in the meta-sediments10 to 15m from the contact with the intrusion. The spotted hornfels is characterized by the growth of small (<0.5 mm) porphyroblasts in phyllosilicate rich

beds. Johnson (2007) reported cordierite, andalusite and sillimanite as the principal prophyroblasts in the spotted hornfels. Johnson also reported that much of the high temperature metamorphic assemblage has been overprinted by a retrograde assemblage with porphyroblasts replaced by chlorite and white mica and biotite by chlorite.

Mineralization

Three types of sulfide mineralization related to the BIC intrusion have been recognized: disseminated chalcopyrite-pyrite mineralization in the middle unit, copper and PGE rich disseminated sulfide mineralization in the lower unit and thin bands of "Eagle like" massive sulfide in the hornfels beneath the intrusion. However, exploration work completed to date at BIC has not yet identified any significant Cu-Ni-PGE resource.

Fine-grained chalcopyrite with trace pyrite, sphalerite and rare bornite is disseminated throughout the middle unit. Limited sampling of this interval in drill hole BIC01-01 gave Cu values up to 0.16% over 1.5 m. However, Ni values were all below 500ppm and Pt and Pd values were all at, or below, the detection limits (Kennecott Exploration data).

Disseminated sulfides are erratically distributed throughout the lower unit In the BIC intrusion. However, sulfide abundance seldom exceeds 5% in most of the drill tested portions of the intrusion. The greatest abundance of sulfide is typically located within a 3-4m interval 1-2m above the base of the intrusion. In the Little BIC intrusion, the abundance of disseminated sulfides reaches 10% over short intervals. Continuous intervals with >4% disseminated sulfides exceeding 20 m have been intersected in some drill holes at Little BIC.

Sulfides in the lower unit are comprised of irregularly shaped, composite grains of pyrrhotite, chalcopyrite and pentlandite that are subpoikolitic on olivine, clinopyroxene, plagioclase, amphibole, ilmenite and titanomagnetite (Hauck, 2002). Cubanite occurs both as lamellae in chalcopyrite and as irregular grains. Recalculating the metal contents of disseminated sulfides to 100% sulfide, BIC and Little BIC disseminated sulfide metal tenors in the lower unit average 12.77% Cu, 5.88% Ni, 10.5ppm Pt and 12.91ppm Pd (avg. 109 samples with 0.9-10% S). In contrast, disseminated sulfides in the Eagle deposit recalculated to 100% sulfide average 6.24% Cu, 6.39% Ni, 1.5ppm Pt and 0.9ppm Pd (avg. 2350 samples with 0.9-10% S). The significantly higher Cu:Ni ratio and greater PGE content of BIC disseminated sulfides compared to Eagle disseminated sulfides suggest a greater silicate melt to sulfide melt ratio (R factor) at BIC.

Thin (<1m) bands of massive sulfide occur in the hornfels within a few meters of the base of the Little BIC intrusion, and in a few holes in the western portion of the BIC intrusion. Two samples of massive sulfide from hole 06BIC-007 (Little BIC intrusion- fig.3), selected to maximize sulfide content, averaged 2.72% Cu, 6.02% Ni, 1.8ppm Pt and 3.1ppm Pd (avg. 35.8% S). The significantly lower Cu and PGE tenors of the massive sulfides hosted in the meta-sediments suggests that they were not directly formed by gravitational settling of the overlying disseminated sulfides. Interestingly, the massive sulfides at BIC have metal tenors and Cu:Ni ratios very similar to Cu poor massive sulfides at the Eagle deposit.

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Field Trip Stops

The first four stops on this trip are intended to highlight the variety of sediments that comprise the Paleoproterozoic Baraga Group in the vicinity of the BIC intrusion. They also provide an opportunity to see and discuss some of the structural complexity in this area. At stops 5 and 6 we'll examine exposures of the BIC intrusion. Stop 7 will be at the Kennecott Minerals Company core shed near Negaunee, Michigan. Here we'll have an opportunity to look at drill core form the BIC intrusion including mineralized intervals that are not exposed in the field. The location of field trip stops 1-6 are shown on figure 2. The locations of stops 5 and 6 are also shown on the more detailed BIC geology map. GPS coordinate locations provided for the stops are in UTM (Universal Transverse Mercator), zone 16. The datum is Nad 83.

All of the field trip stops, except stop 1, are in areas of privately owned surface. Permission from the surface owners is required before accessing these areas.
Some of the stops are along rivers and streams with high, often slippery banks and with potentially poor footing. Caution should be used in walking around these areas. Steep, cliff like outcrops are present in the vicinity of Stop 6, they provide great views but please stay well back from the edges.

Stop 7-1 Canyon Falls on the Sturgeon River
(UTM coordinates 386938E 5164275N)

Good exposures of the Goodrich formation quartzites are exposed along the Sturgeon River at this location. To access the area, park at the Sturgeon River roadside park on the west side of US Highway 41 and follow the marked hiking trial south about 600m to the falls overlook.

This area was a stop on a previous ILSG field trip led by Bill Cannon and John Klasner in 1972. The following stop description is an excerpt from that field guide.

"This stop illustrates an anomalous structural style in that the rocks are relatively nonfolded as compared with the deformation style of nearby Precambrian X metasedimentary rocks, Here the quartzites, composed of quartz grains in a clay matrix with chlorite porphyroblasts, show very gentle N 70° W trending monoclinal folds. Ripple marks and sole marks are common on bedding surfaces. The more argillaceous layers show the development of a N 70° W cleavage"

Ojakangas (1994) has correlated the thinly layered quartzite at this location with the Goodrich formation.

Stop 7-2 Conglomerates on top of the Bijiki iron formation near the Taylor Mine.
(UTM coordinates 388973E 5168500N)

The stop is at rubble (subcrop) along the north side of a small drainage into Ogemaw Creek about 30m southeast of Old Hwy 41 (note: Old hwy 41 from the turn off of US highway 41 to the Taylor mine turnoff is a poorly maintained road that is often rutted and muddy and occasionally flooded.

Klasner (1972) mapped a horizon of poorly exposed conglomerate and greywacke along the top of the Bijiki banded iron formation at this location. The reddish sandstone contains scattered matrix supported clasts of chert up to 10cm across. Drilling by Kennecott a few km to west of this location suggests that the Bijiki iron formation rapidly increases in thickness to the west. Perhaps, these conglomerates are additional evidence of a higher energy environment associated with the formation of a fault controlled sub-basin to the west.

Stop 7- 3 Taylor mine site
(UTM coordinates ~ 389660E 5169000N)

The Taylor Mine site can be accessed by walking east from old hwy 41 along the old Taylor mine road. A trail to the north, along an old rail grade just before the old Taylor mine pit, leads to several good bedrock exposures.

The Taylor Iron Co. shipped 32,970 tons of iron ore from the Taylor mine between 1880 and 1883 (Lake Superior Iron Ore Association, 1952). The property was explored by Ford Motor Company for iron ore during the 1950's and 1960's. Additional drilling was carried out on the property in the 1970's as part of a regional uranium exploration program. John Klasner (1972) produced a detailed map of the mine area as part of his Ph.D. dissertation at Michigan Technological University. Kennecott acquired mineral title to the property as part of the purchase of all of the Ford Motor Company mineral title holdings in the Upper Peninsula.

The mine site provides good exposures of the Lower Slate and Bijiki members of the Michigamme formation and diabase dykes of the Baraga-Marquette dyke swarm. Well exposed folds also contrast with the very weakly folded quartzite at stop 1. Klasner (1972) describes the folds at the Taylor mine as "asymmetric with slight overturning to the north and a recognizable S_1 axial plane foliation. The folds have an amplitude of 400 feet (122 m) and a period of 600 feet (183 m). Minor folds are superimposed on the larger folds"

Stop 7-4 Taylor Creek (optional)
(UTM coordinates 390436E 5170300N)

Good exposures of probable Upper Slate member of the Michigamme formation are found downstream along Taylor Creek from where old hwy 41 crosses it. However, in many places the banks of Taylor Creek are very steep and rocky. Access to this stop will depend on how high spring run off water level is.

The banks of Taylor Creek at this stop are steep and the footing can be poor. Use caution when climbing down to view the exposures along the creek.

Taylor Creek is within the Falls River slice, the allocthon proposed by Gregg (1993) south of the Falls River thrust fault (see fig. 2). Deformation evident in the bedrock exposures along Taylor Creek is different than that seen at either the Taylor mine or further north in the Baraga basin. In Taylor creek, small scale folds, where visible, are often nearly recumbent. In pelitic horizons, S_1 foliations typically dip gently southward and are affected by a well developed crenulating cleavage associated with a second generation of folds.

Stop 7-5 Exposures of the Lower and Middle Units on the west end of the BIC intrusion
(UTM coordinates 396027E 5174514N)

The west end of the BIC intrusion is accessible by hiking eastward from the Indian road along a series of old logging trails. The best exposures are located just below the top of the hill. **The surface and mineral title are held by Kennecott Minerals Company at this stop and permission is required to access the area.**

At this stop, a natural flat terrace on the west facing slope of the prominent hill held up by the BIC intrusion, marks the unexposed contact between the Lower and Middle units of the BIC intrusion. Outcrops down slope from the terrace are comprised of rocks that range in composition from feldspathic werhlite to olivine melagabbro. They contain minor disseminate pyrrhotite, chalcopyrite and pentlandite. Nearly complete replacement of plagioclase by secondary minerals makes accurate determinations of modes very difficult in most hand samples of this unit. The Lower Unit of the BIC intrusion is compositionally similar to the olivine rich melagabbro that hosts much of the mineralization at the Eagle Ni-Cu-PGE deposit in the eastern end of the Baraga basin.

Exposures upslope from the terrace are of equigranular, locally ophitic textured gabbros of the Middle unit. Unlike the Lower unit, neither olivine nor orthopyroxene appear to be present in the Middle unit. Minor pyrite and chalcopyrite are found as disseminations through out the unit. Hematite locally coats plagioclase giving it a pinkish hue.

The contact between the olivine rich Lower unit and the olivine free Middle unit is relatively sharp. It is currently unclear if the change represents closed system fractionation or multiple pulses of different magmas. There is currently no recognized analog for the BIC intrusion Middle or Upper units at Eagle.

More detailed descriptions of the units at BIC can be found in the first part of the guide.

Stop 7-6 Upper Unit exposures on the east end of the BIC intrusion.
(UTM coordinates 397013E 5174477N)

The east end of the BIC intrusion is accessible by a series of logging and drill roads starting off the Silver River road north of the intrusion. The last part of the road to the top of the hill is typically deeply rutted and often not drivable. Walking the last part is recommended. **Permission from Kennecott Minerals Company is required before accessing this stop.**

Glaciated exposures of the medium to coarse-grained oxide gabbro that comprise the Upper unit of the BIC intrusion are present in, and alongside the drill road going up the eastern end of the hill. Exposures of the gabbro near the top of the hill contain football size and shape patches with intense epidote alteration. The boundaries of the intensely altered rock are very sharp. It is currently uncertain if these are intensely altered xenoliths or cross sections of sub-parallel "pipe like" zones of hydrothermal alteration.

Stop 7-7 Kennecott Minerals Company core shed.

The Kennecott core shed is located 2.6 miles east of the town of Negaunee. Turn north off of US Highway 41 at the blue TV 6 building (across from the Michigan Police post) on to the old airport road. Follow the road around the curve to the west and proceed through the gate. The core buildings are the long sheds on the south side of the road just past the gate.

Core from the BIC and Little BIC intrusion will available for viewing and discussion.

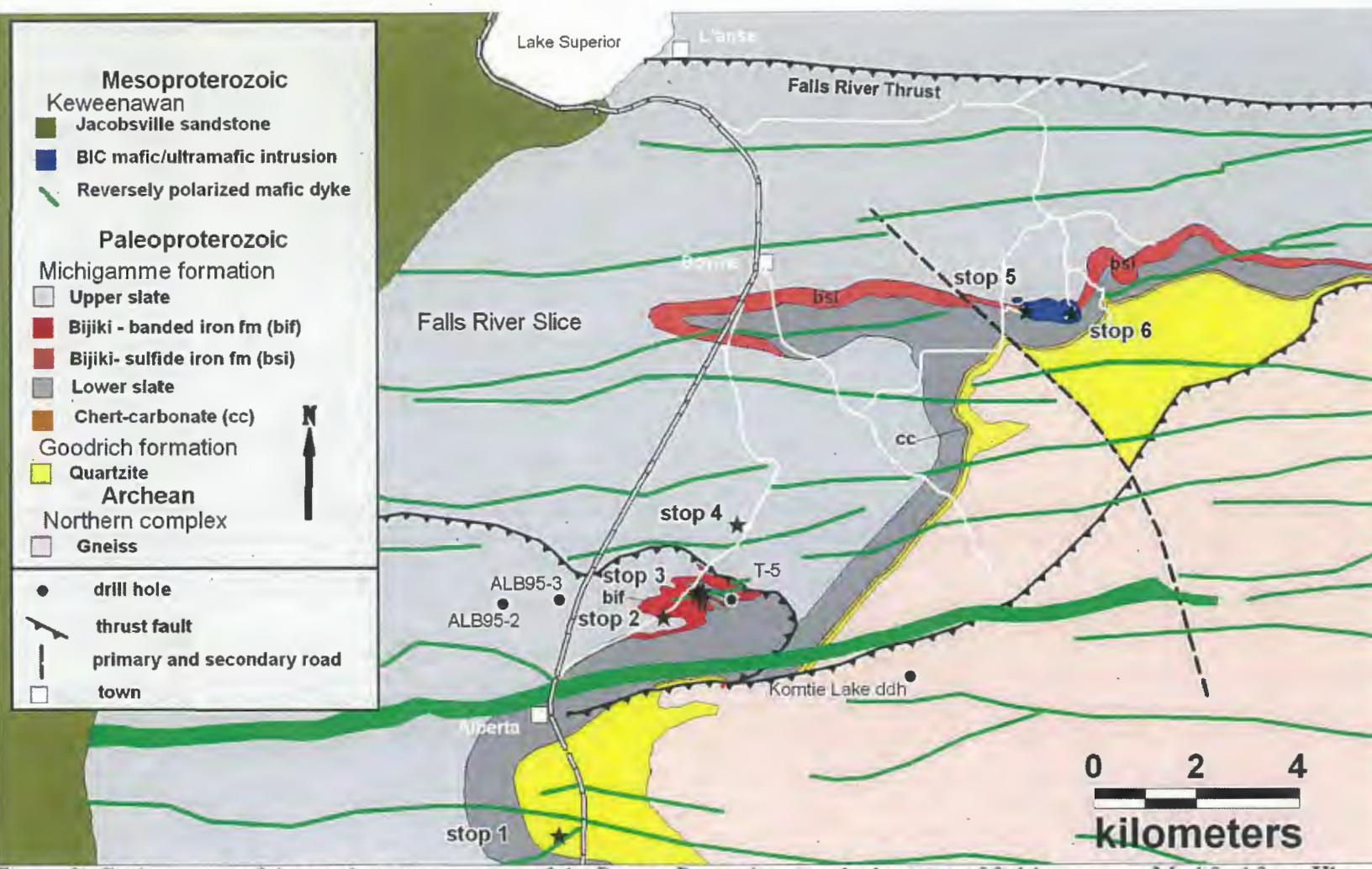


Figure 2) Geology map of the southwestern portion of the Baraga Basin showing the location of field trip stops. Modified from Klasn (1972), Klasner and others (1991) and Cannon (1977)

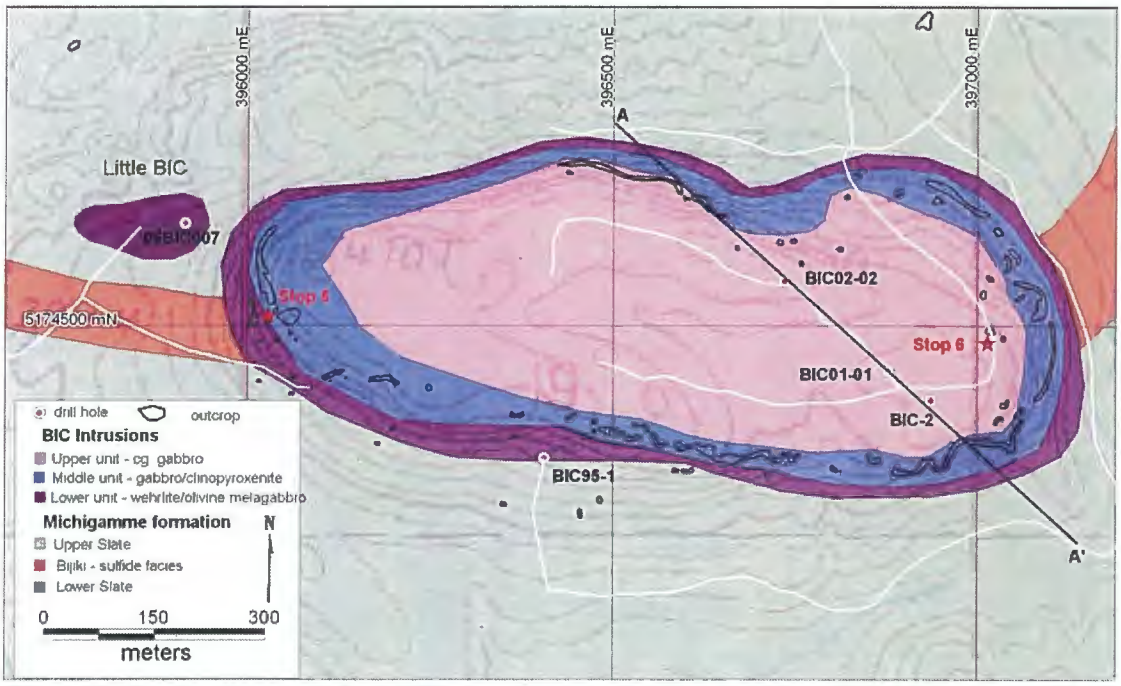


Figure 3) Geology map of the BIC intrusion showing the location of field trip stops 7-5 and 7-6.

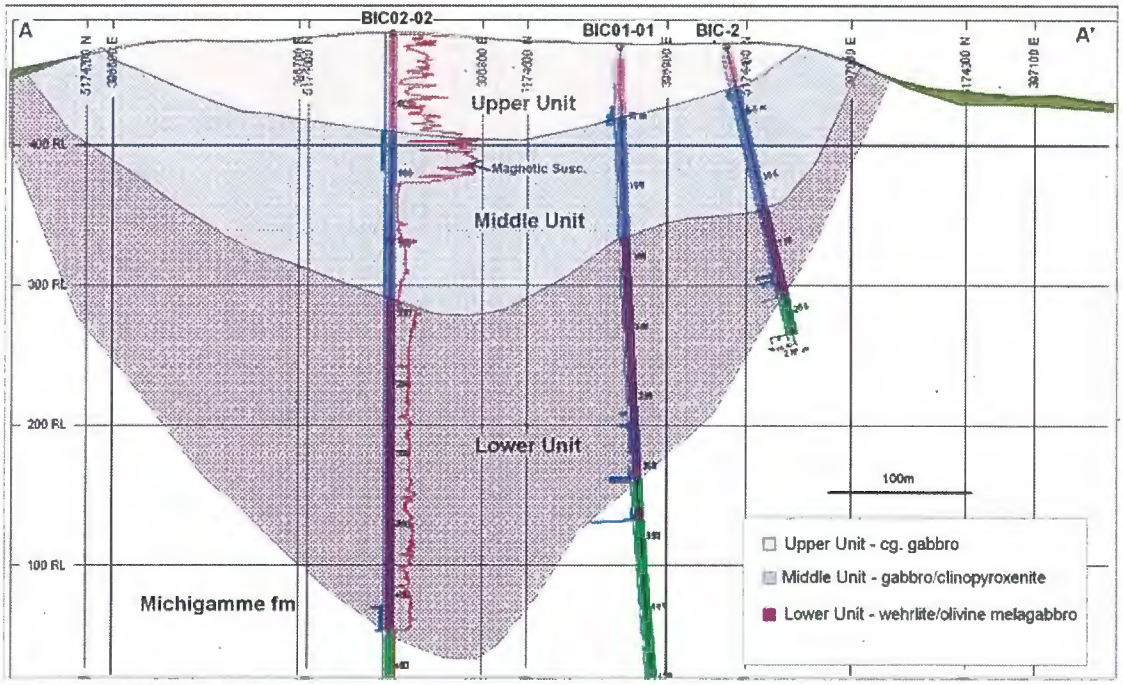


Figure 4) BIC intrusion cross-section A to A'

APPENDIX KK:

Self Determination Act Funding Resolution

KEWEENAW BAY INDIAN COMMUNITY

Keweenaw Bay Tribal Center
16429 Beartown Road
Baraga, Michigan 49908
Phone (906) 353-6623
Fax (906) 353-7540

RESOLUTION
KB-1575-2007

WHEREAS: the Keweenaw Bay Indian Community is a federally recognized Indian tribe exercising inherent sovereign authority over its members and its territories, and the Keweenaw Bay Indian Community has a reservation created pursuant to the 1854 Treaty with the Chippewa, 10 Stat. 1109; and

WHEREAS: the Keweenaw Bay Indian Community is organized pursuant to the provisions of the Indian Reorganization Act of 1934, (48 Stat. 984 U.S.C. §476) with a Constitution and Bylaws duly approved by the Secretary of the United States Department of the Interior on December 17, 1936; and

WHEREAS: Article VI, Section 1 (a) of the Constitution imposes a duty on the Tribal Council to protect the health, security and general welfare of the Community; and

WHEREAS: the Keweenaw Bay Indian Community desires to contract with the Bureau of Indian Affairs for the Law Enforcement Program, Higher Education Program, Judicial Program, Social Services Program, General Assistance Program, Indian Child Welfare Act, Aid to Tribal Government, Fisheries Management Development, Employment Assistance Program, Road Maintenance, Home Improvement Program, Circle of Flight, and Real Estate Services.

NOW THEREFORE BE IT RESOLVED THAT: the proposed contracts shall commence on January 1, 2008 to December 31, 2010 and the authorizing person to sign all contracts shall be the President of the Keweenaw Bay Indian Community.

CERTIFICATION

We, Susan J. LaFernier, President and Toni J. Minton, Secretary of the Keweenaw Bay Indian Community, do hereby certify that this Resolution No. KB-1575-2007 to be a true and exact copy as approved by the Tribal Council of the Keweenaw Bay Indian Community at a duly called meeting held on 11/29/07 there being a quorum present, by a vote of: 9 In Favor, 0 Opposed, and 0 Abstentions, as follows:

Vice President, Warren C. Swartz Jr.:	AYE	NAY	ABSTAIN	(NOT PRESENT)
Secretary, Toni J. Minton:	(AYE)	NAY	ABSTAIN	NOT PRESENT
Asst. Secretary, Gary F. Loonsfoot, Sr.:	(AYE)	NAY	ABSTAIN	NOT PRESENT
Treasurer, Jennifer Misegan:	(AYE)	NAY	ABSTAIN	NOT PRESENT
Councilperson, Larry J. Denomie III:	(AYE)	NAY	ABSTAIN	NOT PRESENT
Councilperson, Doreen G. Blaker:	(AYE)	NAY	ABSTAIN	NOT PRESENT
Councilperson, Jerry Lee Curtis:	(AYE)	NAY	ABSTAIN	NOT PRESENT
Councilperson, William E. Emery:	(AYE)	NAY	ABSTAIN	NOT PRESENT
Councilperson, Michael F. LaFernier, Sr.:	AYE	NAY	ABSTAIN	(NOT PRESENT)
Councilperson, Elizabeth "Chiz" Matthews:	(AYE)	NAY	ABSTAIN	NOT PRESENT
Councilperson, Elizabeth D. Mayo:	(AYE)	NAY	ABSTAIN	NOT PRESENT
President, Susan J. LaFernier: (If Required)	AYE	NAY	ABSTAIN	NOT PRESENT

Susan J. LaFernier, President

Toni J. Minton, Secretary

APPENDIX LL:

Natural Resource Department Information

KBIC Natural Resources Department

Fall

Volume 1, Issue 1

Hatchery Facility Upgrade

The hatchery facility is currently in the process of an equipment upgrade. The purpose of the upgrade is to reduce water use through recycling, reduce groundwater pumping, improve water quality and systems monitoring, and improve our alarm and backup systems. The first part of the systems upgrade was actually completed last year when we installed a new backup generator transfer switch. The transfer switch is the equipment responsible for monitoring electric current from the electric grid into the hatchery and turning on the backup generator when there is a problem with the electric current, due to low voltage, power outage, or other electric supply problem.

The current work includes installation of a common water head tank, reconfiguration of the water distribution system, installation of groundwater pump motor controls, installation of new fish rearing tanks, installation of a number of monitoring systems, addition of oxygen injection equipment, and installation of a new alarm system.

One of the major goals is to reduce groundwater use to help protect the groundwater resource in the Pequaming area. Similar systems in other hatcheries have been able to reduce water use by 25-50% and we hope to achieve similar results. Another objective is to improve operations but maintain our current fish production capacity. Our production targets of a minimum of 50,000 yearling lake trout and 40,000 yearling brook trout annually remain the same.

For approximately 20 years, the lake trout and brook trout rearing operations have been using 100-700 gallons of fresh groundwater pumped from the aquifer beneath the Pequaming area. Reducing water use by 25% could reduce the amount of groundwater pumped by over 10 million gallons per year. Time will tell.

25-50% reduction in water demand!

Inside this issue:

Special points of interest:

- Household Hazardous and Electronic Waste Collections
- Walleye and Lake Trout Stocking
- Sand Point Restoration Project
- Mining Information

New recirculating tanks at the KBIC fish hatchery

Household Hazardous and Electronic Waste Collections

KBIC hosted two free household hazardous and electronic waste collection events, one in June the other in October. The collection events were open to tribal members and all non-tribal residents of Baraga County. More than 350 used electronic devices such as TVs, computers, monitors, and microwaves were collected as well as over 5,000 pounds of household hazardous waste during the June collection.

Hazardous household waste collected

Wastes collected included used oil, old gasoline, pesticides, mercury, oil filters, car batteries, and other hazardous materials. Both collection events were considered a big successes by all involved considering that Baraga County only has about 8,860 residents. One of the most exciting items collected was a jar containing liquid mercury. **A total of 29,636 pounds of waste was collected during the two events, including 19 pounds of mercury!**

All waste collected will be recycled or disposed of depending upon material type. Proper handling and disposal of hazardous waste materials is a critical part of preventing potential contaminant release to the Lake Superior ecosystem which helps protect this precious resource. With the help of U.S. EPA Great Lakes Restoration Initiative funding we will be able to establish a regular collection program, leading to increased protections for our wonderful Lake Superior.

Electronic waste collected in June

KBIC is also hosting a three day tire collection event and a hazardous and electronic waste "milk run" program in November. The "milk run" is through Northwest Regional Planning Commission and is designed to accept hazardous and electronic wastes from municipalities, businesses and schools in Baraga County. Items accepted are monitors, CPU, printers, faxes, copy machines, peripherals, TVs, floor copiers, keyboards, fluorescent bulbs, oil-based paint, solvents or adhesives, antifreeze, aerosols, batteries, poison solids, pesticides (solid or liquid), ballasts, and other items considered hazardous, especially items containing mercury. Two collection events are planned each year starting in November 2011.

KBIC Hosts MTEG Meeting

KBIC hosted the Michigan Tribal Environmental Group (MTEG) summer meeting on August 17 and 18 at the Keweenaw Bay Ojibwa Community College. The purpose of MTEG is to serve as a forum for tribal environmental and (to a lesser extent) natural resource staff to share information and knowledge in the interest of protecting tribal resources. The meeting opened with a warm welcome from KBIC President, Chris Swartz. Employees from all 12 Michigan tribes were in attendance including Bay Mills, Grand Traverse, Pokagon Band of Potowatomi, Saginaw Chippewa, Litter River Band, representatives from the Inter-Tribal Council of Michigan, and the EPA Tribal Liaison for Michigan. Several KBIC Natural Resources Department employees presented information on mining, uranium testing, and the Sand Point restoration project. Other topics of discussion included wild rice, air quality monitoring programs, and tribal environmental health issues. The group toured the Sand Point restoration area, KBIC walleye ponds and the KBIC fish hatchery. The group ended the day Wednesday with a canoe trip to visit several wild rice beds in Huron Bay. The next MTEG meeting will be hosted by the Grand Traverse Band of Lake Superior Chippewa in Traverse City, MI.

Canoe trip to visit wild rice beds in Huron Bay

MTEG members touring the KBIC walleye ponds

Water Program Staff Attend USGS Training in Colorado

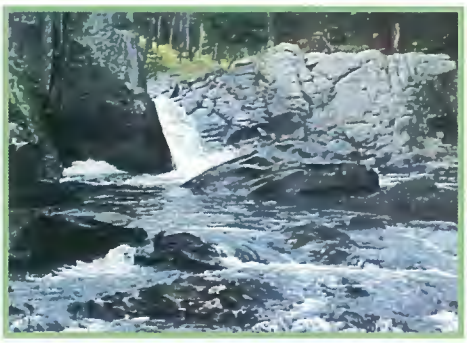
KBNRD water resources specialist, Micah Petoskey, and water resources technician, Kit Laux, attended a U.S. Geological Survey (USGS) two week training this summer in Colorado. The purpose of the training was to learn USGS methodologies for collecting and processing samples of ground and surface water for water quality analyses and for completing commonly made field water quality measurements. The training also covered field handling techniques, equipment use, theory, and methodology for a variety of water sampling parameters. Micah and Kit hope to take what they learned at the training and improve the KBNRD water program methods of collection and safety in the field and in the office. They will be developing standardized forms for use of equipment, maintenance, and field protocols similar to those used by USGS.

Pedestrian bridge over Clear Creek at Lions Park in Golden, Co.

Water Quality Monitoring

Collecting water quality data

The water program is finishing up their annual water quality assessments on waters throughout the reservation. Sampling includes chemical, physical (habitat), and biological (macroinvertebrates) parameters. This information is compiled and analyzed to determine the quality of water for fish and wildlife on the reservation. In general, the waters of the reservation are of high quality. Collecting this information allows us to prepare for future water issues involving quality and quantity of reservation waters. In the past several months the water crew has also had the opportunity to participate in sampling of off reservation waters within the ceded territory and assist local school kids with macroinvertebrate sampling on the Huron River.



Falls River

Brownfield Program Activities

Summer and fall activities for the Brownfield Assessment Program include groundwater and soil sampling for contamination at several locations on the reservation. Highlights for the program include disposal of several barrels of non-hazardous substances and several containers of oil and unidentified substances from two brownfield sites on the reservation. OSI Environmental Services was contracted to haul away the waste and properly dispose of it. The Brownfields Program in the KBNRD is supported using funds from the U.S. Environmental Protection Agency (EPA). Although the Brownfield Assessment Coordinator, Jennifer Merk, will be leaving KBNRD in December, the brownfield program will continue under the Tribal Response Program.

Containers of waste at a brownfield site in need of disposal

A Good Year for Walleye Rearing and Stocking

Collecting walleye in the ponds for stocking

In 2011 the KBIC NRD walleye program had another successful year. The walleye rearing and stocking program began in 2008 and was developed to support walleye population restoration efforts in the western Lake Superior area and tribal walleye harvest activities. KBIC's current rearing capacity consists of 2 rearing ponds, each approximately 1/2 acre in size. Capacity expansion plans are being developed to add additional acreage to the current facility. 2011 walleye stocking to date include 275,000 walleye fry stocked into Portage Lake, 6,000 walleye fry stocked into Lower Keweenaw Bay, and 38,000 walleye fingerlings 2 to 4 inch in size divided between Huron Bay, Keweenaw Bay, and Portage Lake. In September, an additional 3,000 walleye were stocked into local waters. These walleye were part of an extended growth trial at the walleye ponds.

Walleye fingerling for stocking

Lake Trout Stocking

In addition to walleye, KBIC also recently stocked 5,100 lake trout into Keweenaw Bay. The lake trout were surplus USFWS Iron River National Fish Hatchery (IRNFH) stock, and are marked with a unique finclip and fitted with an internal Coded Wire Tag (CWT) for future stock evaluation studies. Fish stocked were subfingerlings, averaging 3.5 inches in length. Natural Resource Department staff request that people watch for lake trout from Lake Superior with finclips (missing adipose fins) as it's likely that these fish also have a CWT.

Finclipped lake trout

We encourage people to retain the entire head of captured lake trout if they would like to help with our data collection and research.

You can contact KBNRD at 906-524-5757 (ext 12) if you capture a finclipped or tagged fish or for other information.

Coded wire tag

Fish Assessments

Monitoring and assessment of brook trout, lake sturgeon and lake trout continued this year throughout the reservation and several off-reservation locations. Captured fish are measured, weighed, examined for fin clips, tags, disease, sea lamprey attacks and overall health and condition. For lake sturgeon, tissue samples are collected for genetic testing. Collecting this information allows the NRD to better understand the fisheries in the area and to plan for stocking events in the future.

This summer/fall assessment and collection activities include collection of brook trout eggs from Jumbo River watershed, surveying of fish communities in the Falls River watershed, lake sturgeon surveys at South Entry and Keweenaw Bay, and collection of lake trout eggs from Traverse Island Schoals.

Processing a captured lake sturgeon

KBIC Tribal Wildlife Management Plan

Bobcat caught on KBIC remote camera

KBIC is proposing to develop a Wildlife Management Plan for the L'Anse Reservation using data collected during a soon to be completed Phase I Wildlife and Habitat Inventory project. Currently, KBIC does not have comprehensive data sets for wildlife planning, decision making, or long term monitoring. Our goal is to develop a Wildlife Management Plan that reflects the values and traditions of KBIC using sound scientific baseline data collected and community involvement. Work on the plan is set to begin 2012.

Coyote caught on KBIC remote camera

ANA Wildlife & Habitat

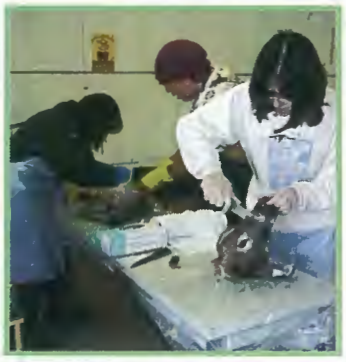
Volunteer Valorie Gagnon checking a remote camera

A two year project funded through Administration of Native Americans (ANA) to conduct baseline surveys for carnivores/furbearers in upland and riparian habitat is coming to an end. A total of 51 study areas have been surveyed using remote camera surveillance and plant/habitat data collected. Information gathered will be analyzed, summarized and presented during the second phase ANA funded project between 2011-2013 and used in the creation of a KBIC Tribal Wildlife Management Plan (see section above).

Wildlife biologist Pam Nankervis collecting field data for the wildlife/habitat study

Chronic Wasting Disease Surveillance

CWD surveillance will take place again this 2011 hunting season. We hope to collect a minimum of 100 heads from hunter harvested and road-killed deer. A prize drawing will be implemented again this year since it was so successful in helping us to attain our goal for 100 heads in 2010. Watch for posters and details on how to donate your deer head and a possible chance to win cool stuff! For more information contact Pam Nankervis, 906-524-5757 ext 19.



KBIC staff removing lymph nodes from deer heads for CWD testing

Waterfowl Index Surveys

Waterfowl surveys are being conducted on four local bodies of water again this fall for the 16th year of data collection. Head of the Bay between Baraga and L'Anse, Sand Point, Mud Lakes, and Huron Bay are all included in the survey. All waterfowl including ducks, geese, swans and mergansers are counted during the survey. A total of twenty-seven different species of waterfowl have been detected over the years with an average of 15 species detected per year. Some common species include mallard, black duck, blue winged teal, bufflehead, common merganser, Canada goose, American coot, lesser scaup, and ring-neck duck.

Sand Point Restoration Project Underway

The Sand Point restoration project, which began in 2006 with placing a soil cover over stamp sands, is moving ahead with funds received from the EPA administered Great Lakes Restoration Initiative program. The new work includes addition of more soil, gardens, soil mounds, and native plantings. Soil mounds and native seed plots have been installed. One acre has been planted with approximately 48 species of native herbaceous plants and seven different species of trees and shrubs. New plantings have been irrigated. A fall planting with cover crop was completed at the end of September. Our field season is quickly winding down, so further work will take place in spring. Additional work will include placement of boulders, additional native plantings and associated irrigation. Improvements will provide habitat for a variety of wildlife and add some variety to the scenery.

Sand Point before cap and re-vegetation in 2006

One-acre native plant garden and pond at Sand Point restoration site, 2011

Sand point after 2006 cap and re-vegetation

KBIC Green House

In 2010, a tribal green house was built as part of a cooperative pollinator project with The US Forest Service and The Cedar Tree Institute. There are close to 30 species being grown with additional native seeds collected this year. Species include but are not limited to tobacco, sweetgrass, white sage, big bluestem, black-eyed susan, wild columbine, ginger, and yellow aven. Plant grown are being used for the Sand Point Restoration Project. The green house has been a great addition to our department tour and has drawn interest from local tribal members, areas schools, US Forest Service employees, university students and instructors, and health center employees.

KBIC green house

Plant technician Karen Andersen transplanting seedlings

NRD Staff Attend Intertribal Nursery Council Meeting

During the week of September 12th, three NRD staff traveled to Temecula, CA to attend the 11th Intertribal Nursery Council annual meeting. The Intertribal Nursery Council is managed by the USDA Forest Service. The organization is tribally guided and seeks to advance the interests of native peoples involved in plant production in nurseries. Topics covered included cold storage of seedlings, improving propagation success, and growing media and containers. Plant Technician, Karen Andersen remarked that the best part of the trip was the tours to a local tribal nursery and local attractions and monuments. Although the climate and plants are much different in California compared to Michigan, many of the techniques and methods for plant production discussed are transferable across varying landscapes and climates. NRD staff plan to attend this meeting annually.

California scenery

Invasive Species Control

Natural Resource Department staff continue with monitoring, locating, and working on controlling non-native invasive plant species on the reservation. This summer and into the fall, attention was focused on four invasive species: purple loosestrife, Japanese barberry, spotted knapweed and Eurasian watermilfoil. Actions are being taken to control these species on the reservation including cutting, pulling and in some case use of herbicides (Japanese barberry). KBIC collaborates with ~ 9 other groups in an effort to protect our natural resources from invasive species. U.S. Forest Service, Great Lakes Indian Fish and Wildlife Commission, Midwest Invasive Plant Network (MIPN), and Baraga Conservation District are a few of our partner organizations. Other species of concern include exotic honeysuckle, marsh thistle, giant knotweed and common and glossy buckthorn.

To avoid introducing or encouraging invasive species in our area, we urge people to follow the following steps:

- Use native plant species when landscaping your property
- Encourage use of native plant seed for roadsides and ditches
- Remove all invasive/non-native species from your property
- Plant native species for livestock feed
- Properly clean boats and lawn equipment before and after use

For more information, contact Karen Andersen (ext 23) or Evelyn Ravindran (ext 11).

Chemical control of Japanese barberry

Manual control of spotted knapweed

Manual control of purple loosestrife

Spotted knapweed

Purple loosestrife

Japanese barberry

Buckthorn spp.

Eurasian watermilfoil

Seed Collection for Propagation and Preservation

Early fall is prime time to collect seed for propagation and preservation of native species in our area. Plant technician Karen Andersen has been roaming the reservation collecting seed from native plants to propagate in the green house and eventually transplant at Sand Point. Seed has been collected from many of the species already planted at Sand Point including black-eyed susan, wild columbine, tobacco, and white sage. New plants include blue vervain, boneset, and sweet fern.

Black-eyed susan's at Sand Point

Collection of ash seed is also ongoing in an effort to preserve and protect the ash resource in our area from the threat of the emerald ash borer (shown in lower picture on right). The Natural Resource Department is a partner in a cooperative effort with BIA Forestry and USDA Natural Resources Conservation Service for collecting local native ash seed. Collections have been completed from locations on approximately 96 acres of tribal land.

An agreement with the USDA Agricultural Research Service in Colorado provides for long term cold-storage of ash seed collected from KBIC lands. The agreement prohibits any genetic alteration or other use of the ash seed without KBIC approval. The Department of Agriculture continues to monitor for the presence of emerald ash borer in our area. One of the ways we can help reduce the spread of emerald ash borer is to stop the transportation of firewood onto or out of tribal lands.

Climbing to the top of the ash tree to collect seed

Jerry Jondreau with ash tree branch with seed. Top right:: Emerald Ash Borer

Wild Rice

Spreading wild rice seed

For the last 10 years the Natural Resource Department has worked to restore wild rice throughout the reservation and ceded territories at locations known or suspected to have historically had wild rice beds. Over that time we have planted wild rice seed at 13 sites within Baraga County. Wetlands that have had wild rice present in the last 5 years are surveyed annually. Seeding each year is dependent on seed available, and varies from year to year. This year, seed was planted in Huron Bay and previous seeding efforts in this area were assessed for growth and abundance. Human and natural disturbance and consumption of wild rice by wildlife, mainly waterfowl, has impacted establishment and abundance of wild rice in seeded areas. **Our long term goal is to develop harvestable** self-sustaining wild rice populations on the reservation and within the ceded territory for future generations.

Wild rice harvest

"Plants can exist alone; but neither animals nor men can exist without plants. Without plants, or when their balance is disturbed, the quality of life and existence declines."

Basil Johnston, Ojibwa Heritage

Lake Superior Day

The Natural Resource Department organized a beach cleanup on July 15th in celebration of Lake Superior Day. About 30 people including Natural Resources Department staff, tribal youth crews, and area community members cleaned approximately 5 miles of Lake Superior beaches from Assinins/Sand Point all the way around the bottom of the Bay and up the eastern shoreline to Pequaming. The day started with an opening ceremony performed by KBIC member, Debra Williamson.

The cleanup was followed by a pot luck luncheon at the Sand Point Light House day use area. We estimate we collected and disposed of about 40 bags of trash off the beaches. Local businesses and restaurants shared in the celebration by distributing post cards and bookmarks and using special Lake Superior Day place mats throughout the week and weekend that contained information about threats to and ways to protect Lake Superior.

Summer youth crew members picking up trash near Assinins. Photo by Gene Bertram

Lake Superior Day, which was created in the early 1990's by the Binational Forum, is officially the third Sunday in July. The Binational Forum, a group of volunteers from the United States and Canada working together to protect Lake Superior, states that Lake Superior Day is a "special day held around the lake to highlight the importance of the world's largest freshwater lake to the basin's environment and economy."

KBIC will continue to hold annual events in honor of Lake Superior Day, but we encourage the community to treat every day as Lake Superior Day and take actions to restore and protect our beautiful Lake.

Summer Youth Conservation Corps

For the third year in a row KBIC and the Superior Watershed Partnership (SWP) teamed up to offer a Youth Conservation Corps (YCC) for tribal youth. This year's crew was supervised by Joy BLANK and Gene Bertram from SWP. YCC activities included (but were not limited to) beach clean-ups, macroinvertebrate sampling, invasive species control, native plantings at Sand Point, lamprey monitoring, salamander and turtle surveys, and tagging brook trout. We hope to be able to offer this program every year to provide opportunities for tribal youth to get outdoors and learn about natural resources and natural resource stewardship.

Checking the sea lamprey trap

Planting at Sand Point

Macroinvertebrate collection

2011 YCC participants and supervisors

Helping with the green house

Photos for this section provided by Joy Bender Hadley and Gene Bertram

Tracking Mineral Exploration

The Natural Resource Department is tracking mineral exploration occurring throughout the Keweenaw Bay Indian Community's 1842 ceded territory in Michigan's Upper Peninsula and throughout the Lake Superior watershed. Advanced on-reservation drilling has occurred about six miles from the village of L'Anse by Kennecott Eagle Minerals Company, a subsidiary of multi-national mining company Rio Tinto based in England and Australia. The sulfide-ore deposit at this site, called BIC (Bovine Igneous Complex), consists of nickel, copper, and platinum group elements. Kennecott is exploring numerous additional targets in the western Upper Peninsula. Other companies active in exploration include Bitterroot Resources, Prime Meridian, Orvana Minerals Corp, and Aquila Resources.

How do companies gain access to mineral rights? Typically, landowners in the U.P. do not control the mineral rights underneath their property. Within the L'Anse Reservation, some mineral rights have been severed from surface rights. Researching the ownership of mineral rights is often long and complicated. In Michigan, information about exploration activities may not be released to the public, which makes it difficult to know where companies are exploring. Companies may receive mineral rights leases from the state or federal government, or mineral rights could be owned entirely by a corporation. Kennecott currently holds 462,000 acres of mineral rights in Baraga and Marquette Counties.

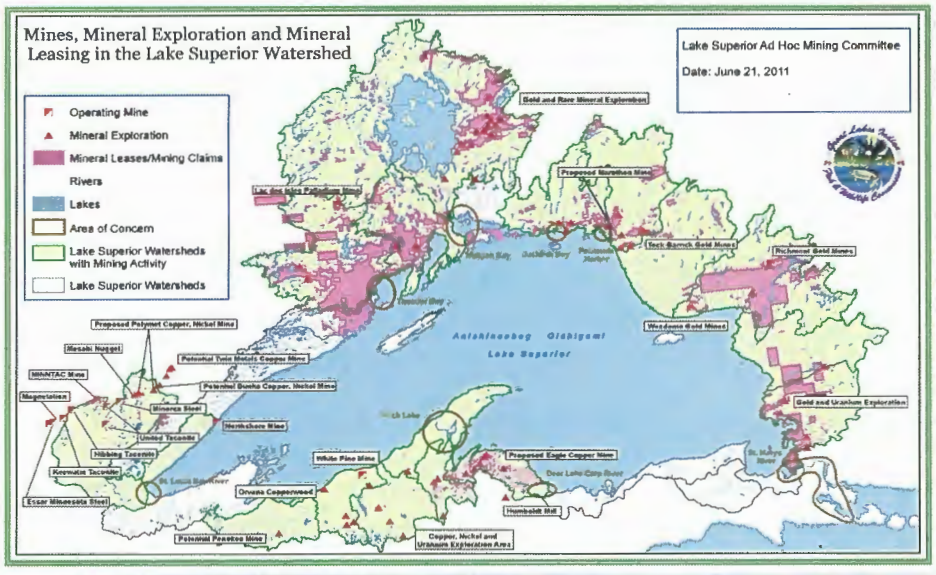
Exploratory drilling cores left at the Kennecott BIC Exploration Site

A Threat to Lake Superior?

There are past, current and proposed mining operations throughout the Lake Superior watershed that may have a significant negative cumulative impact on the Lake Superior ecosystem. Present-day Great Lakes Areas of Concern, including Deer Lake and Torch Lake in Michigan's Upper Peninsula, are sources of contamination from previous mining. Other areas of stamp sands also impact the local environment. Former tailings basins, old stream diversions, waste rock piles, former processing or smelting areas all have impacted the local environment in some manner.

Environmental impacts from mining may include destruction of fish and wildlife habitat, destruction of wetlands, degraded air quality, mercury emissions, loading of heavy metals such as copper, arsenic, nickel, and others into area waters, and general degradation of water quality. Also of concern are potential impacts from uranium and radioactive waste materials. Current mining and metals production accounted for 65% of mercury releases into Lake Superior in 2010. Increased mercury emissions from proposed mining development would likely hinder the Lake Superior Binational Program goal of zero mercury releases in the basin by 2020.

The Kennecott Eagle Project, located within the Yellow Dog Watershed of Lake Superior, was the first sulfide mine permitted within the State of Michigan using a new mining law. Despite legal challenges and concerns regarding the impact to a sacred place (Eagle Rock), and the potential for mine collapse and water contamination, above ground construction began in the summer of 2010 and mine portal excavation started in September 2011.



65% of mercury released in the basin in 2010 was from mining

Acid Mine Drainage

Acid mine drainage (AMD) is one of the primary ways mining of metallic sulfide ores causes water pollution. Metallic sulfide mining involves extracting metals (such as nickel, copper and gold) from a sulfide ore body. These deposits generally also contain other metals, such as arsenic and mercury. When sulfide-bearing ores are unearthed, transported, crushed and processed, they are exposed to oxygen and water which triggers a chemical reaction that produces sulfuric acid. When acidic waters carrying heavy metals and other contaminants drain into nearby rivers, streams, lakes and groundwater, through either direct discharge or stormwater runoff, this causes many problems.

AMD can dissolve heavy metals such as cadmium, zinc, selenium, arsenic, mercury and lead, which can be toxic to aquatic life, plants, wildlife and people. AMD is extremely difficult to stop once it begins, and can require expensive perpetual care and water treatment, long after a mining company is done and has closed the mine. According to the U.S. Environmental Protection Agency, more than 40 percent of western U.S. watersheds are contaminated from mining, largely due to acid mine drainage. Even modern mines pose a threat and **there has never been a metallic sulfide mine that has not polluted water resources when water was present.**

Acid Mine Drainage in Sudbury, Ontario

Locations such as the Eagle Mine and the Humboldt Mill are likely areas where acid mine drainage will occur. At the former Humboldt mine it appears that acid mine drainage from former ore processing operations at the facility is already occurring. Kennecott plans to process Eagle Mine ore in the Humboldt Mill and dispose of about 2.5 million tons of sulfide-bearing waste tailings into the pit lake. This will be a potential source of future acid drainage for many years to come.

Mining Workshops in the Basin

"There is knowledge about what is threatening us as Anishinaabe people. We are connected to this land 1,000 years forward and back. We need to rise up and face the challenge ahead for future generations."

~ Bad River Elder Joe Rose at the GLIFWC Tribal Mining

Natural Resource Department staff have recently attended a number of informative mining workshops and conferences. These gatherings have provided an opportunity to better understand technical, legal, socio-economic and cultural dimensions associated with proposed mining developments. Recent events included; (1) a Tribal Mining Workshop hosted by the U.S. Environmental Protection Agency Region 5 Office in Chicago, IL; (2) A conference titled "Understanding the Impacts of Mining in the Western Lake Superior Region" hosted by the U.S. Geological Survey and the Bad River Band of Lake Superior Ojibwa in Odanah, WI; (3) A mining workshop titled "Let's Talk About Our Land" Tribal hosted by the Great Lakes Indian Fish & Wildlife Commission (GLIFWC) and the Mott Foundation in Odanah, WI; and, (4) the Western Mining Action Network Bi-Annual Conference in Prince Albert, Saskatchewan whose theme was "Working Together As One; Sustaining Water, Culture & Healthy Communities."

These workshops and conferences have helped to increase the capability of Natural Resource Department staff to understand, address and review mining proposals, and have also provided opportunities to network and share lessons learned with other tribal natural resource staff, government officials and community members.

Mining Film Series

In August, the KBIC Natural Resources Department launched a monthly movie series "Mining Impacts on Native Lands." The goal of the series is to increase community awareness of mining and its impacts as mineral interest expands throughout the region. Featured films focus on the environmental and social impacts of mining, particularly on Native communities. Mining updates and Q&A follow each film. Films have included "Keepers of the Water" highlighting the Crandon Mine controversy in Wisconsin and "Mining Madness, Water Wars: The Great Lakes in the Balance" showing the potential impacts of the Eagle Mine in Michigan.

The November film will be "Red Gold: The Pebble Mine Debate" which gives rise to questions of sustainability and community subsistence in the face of a large proposed gold mine at the headwaters of Bristol Bay—the world's largest salmon spawning grounds. Red Gold will be screened on Thursday, November 3rd at the Ojibwa Casino Chippewa Room at 6pm and on Friday, November 18th at the Ojibwa Senior Citizens Center at 1pm.

KBIC Natural Resources Department
14359 Pequaming Road
L'Anse, MI 49946
Phone: 906-524-5757
Fax: 906-524-5748

We're on the web!

www.kbic-nsn.gov

Announcements

Equipment Loan Program

The Natural Resource Committee's Equipment loan program will now be managed by the Public Works Department. To reserve a log splitter, rototiller, brush cutter, or wood chipper, please contact: **Mark Misegan (906) 201-1702**

CWD Deer Head Collection

We are collecting deer heads for chronic wasting disease testing again this year. All donators will be entered in a raffle to win one of six awesome prizes (including a deer blind)! Collection boxes can be found at the following locations: KBIC Tribal Police Station, MDNR Station, KBNRD, Indian Country Sports, and Karvakko's Market. For more information please contact **Wildlife Biologist Pam Nankervis at (906) 524-5757 ext 19.**

Fall / Winter Calendar

November 2011

Native American Heritage Month

3rd (Thursday): Mining film series "Red Gold: The Pebble Mine Debate", Ojibwa Casino Chippewa Room **6pm**

6th (Sunday): End Daylight Savings Time (turn clocks back 1 hour)

9th (Wednesday): Orvana Copperwood Mining Project Public Hearing, **7-10pm** at Gogebic Community College Lindquist Student Center - Courtside Dining Area

16th-18th (Wednesday-Friday): NRD Tire Collection, Old Tribal Construction on Main St., Baraga. Watch for collection announcement or call NRD for details. **Wednesday 2-6pm, Thursday 12-4pm, Friday 7-11am**

18th (Friday): Mining film series "Red Gold: The Pebble Mine Debate", Ojibwa Senior Citizens Center, **1pm**

24th-25th (Thursday-Friday): Thanksgiving, KBIC Offices closed

December 2011

1st (Thursday): Mining film series "Under Rich Earth", Ojibwa Casino Chippewa Room, **6pm**

2nd (Friday): Mining film series "Under Rich Earth", Ojibwa Senior Citizens Center, **1pm**

7th (Wednesday): MDEQ will accept written comments on the Orvana Copperwood mining permit application until **5pm**

22nd (Thursday): First Day of Winter (winter solstice)

26th-27th, 30th (Monday, Tuesday, Friday): KBIC Government Offices Closed

January 2012

2nd (Monday): KBIC Government Offices Closed

16th (Monday): Martin Luther King Day Observed, KBIC Government Offices Closed

NATIVE PLANTS

KBIC has a memorandum of agreement (MOA) with the United States Department of Agriculture- Natural Resources Conservation Service (USDA-NRCS) for the re-establishment of culturally significant plants on Reservation [illegible]

In 2010, a tribal greenhouse was built as part of The Zaagkii Project, a cooperative pollinator project with The US Forest Service and The Cedar Tree Institute. There are close to 30 species being grown with additional native seeds to be collected.

Other Plant Projects

- Sand Point restoration
- Wild rice planting
- Ash seed collection
- Invasive species control

MINING

Since 2004, mineral exploration activities have increased within KBIC ceded territories and within the L'Anse Indian Reservation. There are at least six companies actively exploring metallic sulfide and uranium mineral deposits within and around the boundaries of the L'Anse and Ontonagon Reservations. Mining of metallic sulfides and uranium, and associated activities, has the potential to significantly impact treaty rights, reserved treaty resources, area ecosystems, and the health and welfare of the community and future generations. A KBNRD Mining Technical Assistant tracks mineral exploration and potential mining activity within ceded territories and Reservation boundaries. Technical and scientific information is collected to assist the KBIC Government in decision-making, participate in permitting processes, and inform the community.

EVENTS

- Environmental Fair
- Kid's Fishing Derby
- Lake Superior Day
- Tree Give-away
- Hazardous and electronic waste collections

COLLABORATED EVENTS

- Michigan Technological University (Touch the Future)
- Keweenaw Bay Ojibwa Community College
- Wild Rice Mini-camps
- Earth Keepers Covenant (clean sweep, cedar tree institute)
- KBIC Health Department (i.e. Men's Health, Healthy Heart)

SERVICES

- Invasive species monitoring and control
- Hatchery Tours
- Volunteerism
- Outreach and Education
- Summer Youth Crew
- Equipment loan program (rototiller, logsplitter, weed trimmer, wood chipper, brush cutter)

PARTNERSHIPS

- U.S. Fish & Wildlife Service
- U.S. Forest Service
- U.S. Geological Survey
- Superior Watershed Partnership
- Great Lakes Indian Fish & Wildlife Commission
- And many others

Phone: (906) 524-5757
Fax: (906) 524-5748
13359 Pequaming Road
L'Anse, MI 49946
WWW.KBIC-NSN.GOV

KEWEENAW BAY INDIAN COMMUNITY

NATURAL RESOURCES DEPARTMENT

WHO ARE WE AND WHAT DO WE DO?

The **KBIC Natural Resources Department** (KBNRD) administers natural resource programs for the Keweenaw Bay Indian Community on the L'Anse, Marquette, and Ontonagon reservations as well as the western Upper Peninsula of Michigan (1842 ceded territory).

Programs & Activities

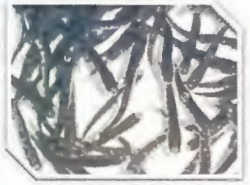
- Lake Superior fishery assessments
- Baraga County stream assessments
- Surface water and ground water monitoring
- Air and radon studies
- Brownfield programs
- Wildlife and wetland management
- Fish stocking from our hatchery

The Department was organized in 1999 and brought environmental and fish and wildlife programs under one department. Our staff work closely with the KBIC Natural Resources Committee and Cultural Committee. Our department is guided by a 10 year Integrated Resource Management Plan adopted by the Tribal Council and Bureau of Indian Affairs in 2003.

Funding Sources

- Keweenaw Bay Indian Community
- Bureau of Indian Affairs
- U.S. Environmental Protection Agency
- U.S. Fish & Wildlife Service
- U.S. Department of Agriculture

FISHERIES



Stocking Since 1993

- 1.5 million yearling lake trout
- 980,000 brook trout (including coasters)
- 320,000 walleye

Current Stocking Targets

- 50,000 lake trout fingerlings
- 40,000 stream brook trout
- 30,000 coaster brook trout
- 25,000 walleye

Fish Rearing Facilities

- Indoor raceways
- Recirculating water system/tanks
- Walleye ponds

Assessment & Monitoring

- Lake sturgeon
- Lake trout
- Brook trout
- Aquatic disease (i.e. VHS)
- Tribal commercial fish harvest
- Fish habitat (restoration/degradation)

WATER

Projects & Activities

- Ongoing water quality sampling throughout the reservation
- Well abandonment
- Residential water testing for contaminants (uranium)
- Storm water inspection

ENVIRONMENT

Projects & Activities

- Human health risk assessment
- Sustainable and renewable energy
- Emergency management
- Environmental management
- Brownfield site restoration/cleanup
- Waste stream characterization
- Hazardous and electronic waste collections
- Spring cleanups
- Environmental Fair

WILDLIFE

Program Outline

- Habitat and species inventories (wetland and upland)
- Habitat and species monitoring
- Wildlife surveys
- Endangered species monitoring
- Disease monitoring

Projects & Activities

- Wetland habitat inventory
- Upland habitat inventory
- Frog and toad surveys
- Sandhill crane surveys
- Waterfowl surveys
- Endangered species monitoring
- Song bird surveys
- Carnivore monitoring
- Disease monitoring/testing (i.e. chronic wasting disease)

APPENDIX MM:

Indian Health Service 2011 Sanitary Survey

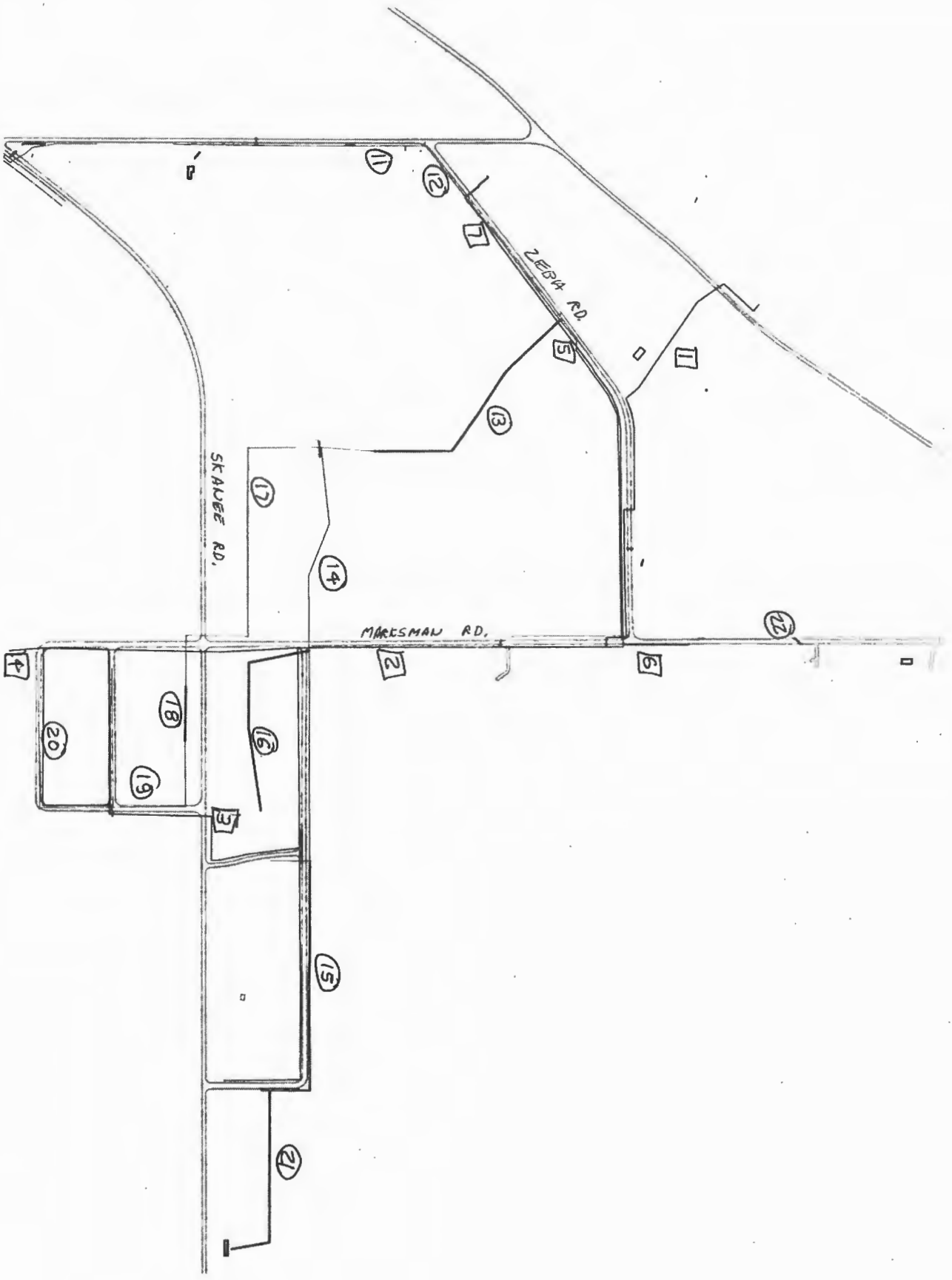
KEWEENAW BAY TOTALS

	6" WATER MAIN L=
1	2516
2	2632
3	3560
4	176
5	4950
6	341
7	326
	0
	0
TOTAL	**14501**

SEWER SYSTEM

	8" SEWER L=		3" SEWER L=		3" F.M. SEWER L=
11	3622	21	**987**	22	**1668**
12	1229				
13	1297				
14	2657				
15	1435				
16	1091				
17	1945				
18	277				
19	1443				
20	1113				
	0				
TOTAL	**16109**				

BREWERY-VUK 8" SEWER	L=
	7068
ABOVE TOTAL	16109
GRAND TOTAL	**23177**


ZEBA RD.
SKANEE RD.
MARKSMAN RD.

DEPARTMENT OF HEALTH HUMAN SERVICES

Public Health Service

Indian Health Service
9A South Brown Street
Rhinelander, Wisconsin 54501-3450
715-365-5145
FAX: 715-365-5113

Mr. Warren Chris Swartz, President
Keweenaw Bay Tribal Council
107 Beartown Rd
Baraga MI 49908

Dear President Swartz,

On the dates indicated below the Indian Health Service conducted annual sanitary surveys of the community water and/or wastewater systems. The individuals that participated in each survey as well as suggestions that are offered for your consideration are presented below. The individual rating based on the condition of the facilities is also presented for each system. The basis for this rating score is described in the table presented at the end of this letter.

In addition, the Bemidji Area IHS is implementing a new methodology that will be used to determine the Operation and Maintenance (O&M) score. The score determined from this new methodology will be applied to all current and new projects included in the 2012 Sanitation Deficiency System (SDS) submittal cycle. The new methodology focuses on the health of the utility rather than the condition of each facility and is based on standard templates that have been developed nationally within IHS. The proposed changes were described in detail in a letter sent to the Tribal Chairperson in February 2011. The O&M scores calculated based on this new methodology that will be used during the 2012 SDS cycle are as follows:

O&M Score for Water Projects: 12 (Max 16 points)
O&M Score for Wastewater Projects: 12 (Max 16 points)
O&M Score for Solid Waste Projects: NA (Max 16 points)

The scores determined from this new methodology replace the average system rating that was previously used as the "O & M Capability " factor for projects listed on the SDS priority list.

Water System(s)

Zeba

PWSID#: 55293302

SYSTEM RATING: 14

SURVEY DATE: 5/25/2011

Surveyor Names: Arlan Friisvall of the Keweenaw Bay Maintenance Department and Brian Willoughby and Shane Hoffmann of the Indian Health Service

CRecommend installing a screen or flap gate on the overflow pipe to address the EPA Potential Significant Deficiency.

Recommend repairing the fence around the stand pipe.

Recommend repairing the insulation, exterior coating system and the fence for the standpipe.

Recommend posting chemical placards on the exterior of the building to alert fire/rescue personnel of the chemical hazards contained within the building.

Recommend repairing the inoperable hydrant and the leaking hydrant.

Recommend reading the residential and commercial water meters on a monthly basis and analyze the data to calculate water loss in the system.

Recommend installing an eyewash/emergency shower with tempered water.

Kawbawgam Road

PWSID#: 55293303

SYSTEM RATING: 14

SURVEY DATE: 5/25/2011

Surveyor Names: Mark VanLinden Ojibwe Housing Authority Maintenance and Brian Willoughby and Shane Hoffmann of the Indian Health Service

Recommend installing a sealed and vented cap for Well #2.

Recommend installing smooth bore sample taps on each well line at a minimum of 8-inches above the floor.

Recommend construction of a suitable concrete pad or the replacement of Well #1.

Recommend correcting the potential cross connection in the backwash piping.

Recommend sampling the iron filter media to determine the "health" of the iron filter.

Recommend installing an eyewash/emergency shower with tempered water.

Recommend repairing the inoperable hydrant.

Recommend installing a safety cable/chain for the chemical feed injector.

Recommend posting chemical placards on the exterior of the building to alert fire/rescue personnel of the chemical hazards contained within the building.

Wastewater System(s)

Zeba

NPDES#:	NA
SYSTEM RATING:	14
SURVEY DATE:	5/25/2011
Surveyor Names:	Arlan Friisvall of the Keweenaw Bay Maintenance Department and Drian Willoughby and Shane Hoffmann of the Indian Health Service

Recommend labeling the wet well and valve vault as confined spaces. Consider doing this by making a stencil and painting on the message to reduce cost.

Recommend troubleshooting and repairing the controller for the lift station pumps.

Recommend contracting a local septic hauler to stop by the lift station and clean the trash basket on reguler basis.

Each system rating describes the system condition based on the following table. This rating is used for informational purposes only. As indicated above the O&M Capability factor used in SDS is no longer based on the individual system ratings.

Rating	Condition
	If Significant components of the facility:
0.0	have failed, are inoperable and the system does pose a health hazard
2.0	have failed, are inoperable and the system may pose a health hazard.
4.0	may be close to failure and could pose a health hazard.
7.0	may be close to failure and would not pose a health hazard.
	If the System:
9.0	requires major maintenance but significant components continue to operate. The system could eventually pose a health hazard if the major maintenance items continue to be ignored.
11.0	requires major maintenance but significant components continue to operate. The system would not eventually pose a health hazard if the major maintenance items continue to be ignored
12.0	receives routine maintenance but not through a written scheduled maintenance plan/program. However, there is some amount of routine maintenance that is not being performed regularly
14.0	receives most of the routine maintenance through a written scheduled maintenance program. However, some routine maintenance is not being performed
16.0	is in excellent condition.

The following are examples of conditions that define the terms Significant, Major, and Routine.

SIGNIFICANT:

hand operated controls do not function; the system is not meeting minimum needs due to inoperable components; wastewater is overflowing; a lift station is not operating; chlorine, fluoride or other chemical feed equipment is significantly overfeeding chemical; building or tank structural damage threatens the integrity of the system.

MAJOR:

automatic controls do not function; system is not meeting peak needs due to inoperable components; water or sewage lift station pumps are not operating; chlorine, fluoride or other chemical feed equipment is not operating properly; building or tank structural damage (including tank repainting) exists but does not threaten the immediate integrity of the item; fire hydrants or critical valves are not operational.

ROUTINE:

Flush hydrants or non-critical valves are not operational; flushing, grounds maintenance, painting, or general building and lift station maintenance is required.

A copy of this report has been sent to your principle operator and the information in the letter shared with the staff of the IHS Office of Environmental Health and Engineering. A copy of the report will also be provided to the United States Environmental Protection Agency, Region Five Office to assist with compliance under the Ground Water Rule (unless we have been directed otherwise) and to help identify potential EPA funding opportunities. If you have any questions regarding these suggestions feel free to contact your staff members or me at 715-365-5129.

Thank you for allowing us to provide these services and we look forward to providing these services to you in the future.

Sincerely,

Digitally signed by Shane Hoffmann
Date: 2011.10.20 13:21:22 -05'00'

Shane Hoffmann, P.E.
Indian Health Service
Tribal Utility Consultant

Attachments:

O&M Evaluation Score Sheets
Letter – Proposed Changes to SDS O&M Scoring

Indian Health Service
Sanitation Deficiency System – Operation & Maintenance Scoring

WATER SUPPLY

TRIBE:	SCORED BY:	DATE: (mm/dd/yy)
Keweenaw Bay	Shane Hoffmann	10/19/11

OPERATION (Maximum points possible = (15)

	Points*
A. The operators have the appropriate certification level for their PWS (Max. points =2)	1
B. Preventive maintenance is performed with a written schedule and records of completion (Max. points =2)	1
C. Records are kept on all meters, pumping hours, etc. and analyzed (Max. points =2)	1
D. Sufficient repair parts, tools, & equipment to maintain water production are on hand (Max. points =1)	1
E. A safety program is in place, with training and equipment provided (Max. points =1)	1
F. Operators attended at least 10 hours of training during last year (Max. points =1)	1
G. Accurate and updated as built/system maps available, maintained, & properly stored (Max. points = 4)	2
H. Treatment facilities, well heads, and storage tanks secure (Max. points =2)	2
Subtotal	10

COMPLIANCE (Maximum points possible = 12)

A. PWSs were in compliance for monitoring during the last year (Max. points = 10)	8
B. The tribal utility organization participates with IHS and EPA in sanitation facility surveys and capacity development and corrects noted deficiencies (Max. points = 2)	2
Subtotal	10

BUDGET & ORGANIZATION (Maximum points possible = 13)

A. Written rules and regulations governing the O&M of the PWS have been developed, approved, and enforced (Max. points =2)	1
B. A budget is prepared and tracked on a regular basis (Max. points =1)	1
C. The user fee structure is implemented (Max. points = 8)	6
D. Written emergency response plan in place (Max. points = 2)	1
Subtotal	9

TOTAL POINTS	29
ADJUSTED SCORE (Total Points X 0.40)	12

***see WATER SUPPLY O&M SCORING INSTRUCTIONS**

Indian Health Service
Sanitation Deficiency System – Operation & Maintenance Scoring

WATER SUPPLY - O&M SCORING INSTRUCTIONS

OPERATION

A. The operators have the appropriate certification level for their PWS

>1 certified operator	2
1 certified operator	1
Does not have a certified operator	0

B. Preventive maintenance is performed with a written schedule and records of completion

Fully executed preventive maintenance program	2
Does not have a preventive maintenance program	0

C. Records are kept on all meters, pumping hours, etc. and analyzed

Operators keep and analyze records	2
No records are kept	0

D. Sufficient repair parts, tools, and equipment to maintain water production are on hand

Majority of necessary parts, tools, and equipment on hand	1
Minimal or no parts	0

E. A safety program is in place, with training and equipment provided

Operators are trained and use safety equipment	1
Operators lack safety training and equipment	0

F. Operators attended at least 10 hours of training during the last year

1 operator attended 10 hours of training	1
Operators did not attend 10 hours of training	0

G. Accurate and updated as built/system maps available, maintained, & properly stored

Comprehensive set of as-builts maintained and easily accessed	4
As-builts for 50% of facilities are maintained and easily accessed	2
No as-builts maintained	0

H. Treatment facilities, well heads, and storage tanks secure

Treatment facilities are fenced and well head and storage tank access secured	2
Treatment facilities are not fenced and well head and tank access is not secured	0

COMPLIANCE

A. PWSs were in compliance for monitoring during the last year

Zero notices of non-compliance	10
1 notice of non-compliance with appropriate response	5
2 or more notices of non-compliance	0

B. The tribal utility organization participates with IHS and EPA in sanitation facility surveys and capacity development and corrects noted deficiencies

Participated and corrected all deficiencies	2
Did not participate or correct deficiencies	0

BUDGET & ORGANIZATION

A. Written rules and regulations governing the O&M of the PWS have been developed, approved, and enforced

Ordinances are enforced	2
No ordinances or not enforced	0

B. A budget report is prepared and tracked on a regular basis

Reports are prepared to identify potential issues	1
Reports are not generated	0

WATER SUPPLY - O&M SCORING INSTRUCTIONS

C. The user fee structure is implemented

Fee structure is implemented with ≥ 50%of fees collected	8
Fee structure is implemented with < 50%of fees collected	4
No fee structure	0

D. Written emergency response plan in place

Written emergency response plan in place	2
No written emergency response plan	0

Indian Health Service
Sanitation Deficiency System – Operation & Maintenance Scoring

SEWAGE TREATMENT

TRIBE:	SCORED BY:	DATE: (mm/dd/yy)
Keweenaw Bay	Shane Hoffmann	10/19/11

OPERATION (Maximum points possible = 20)

	Points*
A. The operators have the appropriate certification level for their wastewater system (Max. points = 3)	0
B. Preventive maintenance is performed with a written schedule and records of completion (Max. points = 3)	1
C. Records are kept on all, pumping hours, pump starts, etc. and analyzed (Max. points = 2)	1
D. Sufficient repair parts, tools, & equipment to maintain sewage collection / treatment are on hand (Max. points = 2)	2
E. A safety program is in place, with training and equipment provided (Max. points = 2)	2
F. Operators attended at least 10 hours of training during last year (Max. points =2)	2
G. Accurate and updated as built/system maps available, maintained, & properly stored (Max. points = 4)	2
H. Sewage facilities are secure (Max. points = 2)	2
Subtotal	12

COMPLIANCE (Maximum points possible = 6)

A. Treatment facility discharges were compliant during the last year (Max. points = 4)	4
B. The tribal utility organization participates with IHS and EPA in sanitation facility surveys and capacity development and corrects noted deficiencies (Max. points = 2)	2
Subtotal	6

BUDGET & ORGANIZATION (Maximum points possible = 16)

A. Written rules and regulations governing the O&M of the wastewater system have been developed, approved, and enforced (Max. points = 3)	3
B. A budget is report is prepared and tracked on a regular basis (Max. points = 3)	3
C. The user fee structure is implemented (Max. points = 8)	6
D. Written emergency response plan in place (Max. points = 2)	1
Subtotal	13

TOTAL POINTS	31
ADJUSTED SCORE (Total Points X 0.381)	12

***see SEWAGE TREATMENT O&M SCORING INSTRUCTIONS**

SEWAGE TREATMENT - O&M SCORING INSTRUCTIONS

OPERATION

A. The operators have the appropriate certification level for their wastewater system

>1 certified operator	3
1 certified operator	2
Does not have a certified operator	0

B. Preventive maintenance is performed with a written schedule and records of completion

Fully executed preventive maintenance program	3
Does not have, or fully execute a preventive maintenance program	0

C. Records are kept on all pumping hours, pump starts, etc. and analyzed

Operators keep and analyze records	2
No records are kept	0

D. Sufficient repair parts to maintain sewage collection / treatment are on hand

Repair parts on hand	2
No repair parts on hand	0

E. A safety program is in place, with training and equipment provided

Operators are trained and use safety equipment	2
Operators lack safety training and equipment	0

F. Operators attended at least 10 hours of training during the last year

1 operator attended 10 hours of training	2
Operator(s) did not attend 10 hours of training	0

G. Accurate and updated as built/system maps available, maintained, & properly stored

Comprehensive set of as-builts maintained and easily accessed	4
As-builts for 50% of facilities are maintained and easily accessed	2
No as-builts maintained	0

H. Sewage facilities are secure

Treatment facility fenced, lift station and appurtenances secured, and signage evident	2
Treatment facility not fenced, lift station not secured, and no signage	0

COMPLIANCE

A. Treatment facility discharges were compliant during the last year

Zero occurrences of non-compliance	4
1 occurrence/notice of non-compliance with appropriate response	2
2 or more occurrences/notices of non-compliance	0

B. The tribal utility organization participates with IHS and EPA in sanitation facility surveys and capacity development and corrects noted deficiencies

Participated and corrected all deficiencies	2
Did not participate or correct deficiencies	0

BUDGET & ORGANIZATION

A. Written rules and regulations governing the O&M of the wastewater system have been developed, approved, and enforced

Ordinances are enforced	3
No ordinances or not enforced	0

SEWAGE TREATMENT - O&M SCORING INSTRUCTIONS

B. A budget report is prepared and tracked on a regular basis

Reports are prepared to identify potential issues	3
Reports are not generated	0

C. The user fee structure is implemented

Fee structure is implemented with ≥ 50%of fees collected	8
Fee structure is implemented with < 50%of fees collected	4
No fee structure	0

D. Written emergency response plan in place

Written emergency response plan in place	2
No emergency response plan	0

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Bemidji Area
Indian Health Service
522 Minnesota Ave.
Bemidji, MN 56601

OUR REFERENCE: Office of Environmental Health and Engineering

Honorable Warren C. Swartz Jr., President
Keweenaw Bay Tribal Community
16429 Beartown Road
Baraga, MI 49908

Subject: Proposed Changes to SDS Operation & Maintenance Scoring

Dear President Swartz Jr.:

The Bemidji Area Indian Health Service (IHS), Office of Environmental Health and Engineering (OEHE) is sending you this correspondence to inform you of proposed changes in the methodology used by the Indian Health Service to assign the Operation and Maintenance (O&M) Scores in the IHS Sanitation Deficiency System (SDS).

The 1988 Amendment to the Indian Health Care Improvement Act (IHCIA), P. L. 94-437 requires that IHS maintain an inventory of sanitation deficiencies for new and existing Native American homes and communities; to prioritize those deficiencies for funding (proposed projects); and to annually report them to Congress. As part of the sanitation deficiency system (SDS) process, IHS has conducted annual surveys of community water and wastewater infrastructure in order to assist in determining the operation and maintenance scoring factor within SDS. These surveys also provide observations and suggestions for improving and maintaining the facilities in good working condition in order to help protect the health and well being of customers that rely on these systems and to maximize the useful life of the facilities.

Over the past several years a workgroup of IHS O&M coordinators representing each of the twelve (12) IHS Areas has been working to develop a standardized rating tool to be used in determining the O&M score that is used within the SDS. As a result of these efforts a recommended set of scoring templates was finalized. Each of the IHS Areas has been working to implement the new scoring methodology. The Bemidji Area IHS, Division of Sanitation Facilities Construction (DSFC) is proposing to implement these new scoring templates during the 2011 O&M surveys. However, prior to doing so we would like to solicit feedback from Bemidji Area Tribes regarding any concerns related to implementation of the new scoring methodology.

The current methodology has been utilized for many years and involves conducting physical surveys of each utility system. Information about each system is compiled in a database and suggestions are made regarding the condition and maintenance needs of major system components. Based on these observations an O&M score is assigned to each system. The individual system scores are then averaged to provide a single O&M score for use in SDS. A description of the current rating criteria is attached for your reference.

The new methodology proposed by IHS for determining the O&M score to be used in SDS involves the continued use of these physical surveys. However, the scores that are used in SDS will be derived from an evaluation of each utility organization based on a defined set of scoring criteria. Separate score sheets will be used to rate the O&M capability of each utility organization for water, sewer, and solid waste. The scoring factors within each score sheet are grouped into the broad categories of "Operation", "Compliance", and "Budget and Organization". The individual questions and the weight given to each category vary with the type of system (water, sewer, or solid waste). The O&M score used in SDS will

be based on the organization's O&M score for the type of system proposed by each project. In the case of combined projects (i.e. water and sewer), the organization's O&M scores will be prorated based on the project cost for each type of system. Whereas the existing methodology emphasizes the health of each individual system, the proposed methodology emphasizes the health of the utility as a whole. Copies of the proposed new score sheets, including scoring guidance, are attached for your review.

Since approximately 1998 EPA has utilized the SDS project list to fund projects through the Safe Drinking Water Act (SDWA) and Clean Water Act (CWA) tribal set aside programs. IHS continues to use the SDS priority list as the basis for funding projects to correct sanitation deficiencies for existing homes. The SDS project list is generated, in part, from the IHS annual operation and maintenance (O&M) surveys. It is anticipated that some SDS projects may see a significant change in their O&M score resulting from these changes based on a preliminary analysis of a few selected organizations, though the exact changes are difficult to predict. However, it is anticipated that these effects will be generally uniform across all Bemidji Area Tribes.

If possible, please take a moment to review the attached scoring sheets with your utility director and consider any comments, concerns, or objections you may have with implementing the O&M scoring methodology currently under consideration. It is hoped that by adopting this new methodology a more objective and consistent scoring system will result; a system that promotes and supports sustainable Tribal O&M organizations. Please send your comments or concerns to the following by February 28, 2011.

CDR Scott R. Snell
Bemidji Area Indian Health Service
Office of Environmental Health and Engineering
522 Minnesota Avenue, Fed Building Rm 216
Bemidji, MN 56601

If you have any questions regarding any of the information presented in this letter, please contact Mr. Scott Snell at 218-444-0502. He can provide any assistance you may need regarding the implications of the proposed changes described in this letter.

Sincerely,

Craig S. Morin

Craig Morin, Director DSFC
Bemidji Area Indian Health Service

Attachments (4)

cc: Louis Erdrich, Associate Area Director
Dan Tadgerson, Tribal Utility Consultant
Scott Snell, Asst. Director, DSFC
Arlan Frisvall, Keweenaw Bay

SYSTEM RATING:	14	CERT OPERATOR	no	**TREATMENT CONSTRUCTED**	1/1/1990
UTILITY NAME	Keweenaw Bay Maintenance	CERT CLASS	S-4	# TREATMENT PLANTS	1
SYSTEM NAME	Kawbawgam Road	SYSTEM CLASS	C	TYPE OF CHLORINE:	Liquid
IRVEY TYPE:	ANNUAL	# RES CONNECTIONS:	40	AVE FREE RESIDUAL	0.1
URVEY DATE:	5/25/2011	# OTHER CONNECTIONS:	2	MONITOR FREQ:	Daily
SurveyorNames:	Mark VanLinden Oji	# WATER METERS(Res)	40	MONITOR LOC	house and sy
PWSID#:	55293303	# WATER METERS(other):	2	CONTACT TIME:	12
SanFac Code:	1152260693	**POPULATION SERVED**		SPARE PARTS AVAIL?:	yes
SYSTEM TYPE:	Community	Res Pop 140	NT Pop: 0	MANUFACTURER:	Tonka
ADDRESS1	Carl Rassenin	Indian Pop: 140	T Pop: 0	FILTRATION:	Pressure
ADDRESS2	220 North Main	PLANT CAP 12 HR (GPD)	30,240	PRE CHLORINATION?:	yes
CITY	Baraga	AVE PROD (GPD)	6,400	BACKWASH FREQ:	ssue diff
STATE ZIP	MI 49908	MAX PROD (GPD)	9,000	ADEQUATE SAMPLE TAP?:	yes
COUNTY	Marquette	**Sampling**	Last Done / Next Due	BYPASS AVAILABLE:	yes
TELEPHONE	(906) 353-7117	IOC'S:	/ 2012	OTHER:	NONE
FAX	(906) 353-7623	VOC'S:	7/16/2008 / 2011	FLUORIDE:	Saturator
EMAIL	carl@oha.com	SOC'S:	6/18/2008 / 2013	FI Equip Installed	☑
OPERATOR	Mark VanLinden	NITRATE:	7/21/2010 / 2011	FI Equip Operational?	☐
MANAGER	Matthew Keniston	Pb Cu:	9/27/2009 / 2012	FI Monitoring	☐
		Rad's:	7/1/2003 / 2016	Fluoride Policy	None

WATER SOURCE: Groundwater	Well #1	Well #2	Well #3	Well #4
CURRENT PUMPING RATE(gpm):	42	46		
METER READING:	41187200	42683100		
PUMP RUN HRS:	4273	4638	262	
PUMP STARTS:	4848	4684	409	
WELL LOG AVAILABLE?	yes	yes		

WATER QUALITY	**RAW**	**TREATED**
pH:		
Hardness(ppm):		115
Iron(ppm):	0.60	0.15
Manganese(ppm):		0.88

DISTRIBUTION	
Pipe Type:	PVC
Main Flushing Freq:	2 times /ye
All Hydrants Operational?:	no
All Valves Operational?:	yes

NEAREST:		Water Storage Type:	Hydro Tank
WATER SUPPLY	Harvey Township	VOLUME(gals):	1,450
CONTAM'T SOURCE:	home septic tank 75 ft.	ElectricMeter#:	23 213 079
OBSERVATIONS:		ElecMeterreading	47,975

As_builts Current:	yes		
Tribally Subsidized?:	yes		
Collection Rate(%):	100.0%		
Adequate budget?:	yes		
Water Rate per month(Res):	$20.00		
Utility Ordinance:	Yes		
Scheduled Maintenance:	Yes		
Emergency Plan:	No		
Cross Connection Plan:	No		
SWPP?:	Yes		
SDWA Compliant?:	yes		
If No, Explain:			
LAST EDITED:			

GENERAL

Recent improvements to the system include a new, smaller chlorine pump to lower the chlorine dosage to address Disinfection By-product concerns and the repair of a water leak in the pumphouse 6-inch interior piping.

The residential population was based on 40 residential connections with an assumed population of 3.5 residents per connection.

The general housekeeping of the facility is good.

The Utility utilizes a written maintenance schedule.

The Utility charges for water at a flat rate of $20.00/month up to 20,000 gallons per month. Water used in excess of 20,000 gallons per month is billed at $5.00 per 1000 gallons.

The remaining Utility expenses are subsidized by the Tribal Government.

POTENTIAL SIGNIFICANT DEFICIENCIES

:ording to the USEPA's list of Significant Sanitary Survey Deficiencies, the following items are considered potential significant deficiencies:
Vell must be vented with a screened opening that is turned down to reduce the chance of allowing contaminants into the water supply. This deficiency can be corrected by the installation of a vented and sealed well cap on Well #2.

* Well must be grouted to reduce the vulnerability to surface water contamination. This deficiency can be corrected by the construction of a suitable

concrete pad or the replacement of Well #1.

* A smooth bore sample tap is required at the well head for compliance sampling. This deficiency can be corrected by the installation of smooth bore sample taps on each well line prior to treatment in the pumphouse.

WATER SOURCE (WELLS)

The system is served by (2) groundwater wells.

Well #1
Pumping Rate = 42 gpm @ 62 psi
Pump Size: 3 Hp
Casing Height = 30"
Grading around the well is good and drainage is away from the casing.
The well cap is sealed and vented.
There is not a well security box for the well.
The electrical conduit is secure and in good condition.

Well #2
Pumping Rate = 46 gpm @ 58 psi
Pump Size: 3 Hp
Casing Height = 13"
Grading around the well is good and drainage is away from the casing.
The well cap is sealed but not vented.
There is not a well security box for the well.
The electrical conduit is secure and in good condition.

The well logs indicate Well #1 is not grouted per the well construction code.

The nearest source of contamination is the backwash pit which is located ~50 yards from the well.

According to the USEPA database, a Source Water Protection Plan was completed in conjunction with the USGS and was approved on 11/4/2003.

WATER TREATMENT (PUMPHOUSE)

The pumphouse is a single room, single block wall building with an external hydro-pneumatic tank. Water treatment includes iron removal and disinfection. Each Tonka Filter is rated at 40 gpm.

The twelve hour plant capacity is based on 42 gpm for 12 hours (represents the pumphouse production capacity for 12-hours with the largest well out of service).

The Average Production Day was approximately 6,400 gpd and was based on water meter readings in the pumphouse.

The Maximum Production Day was approximately 9,000 gpd and was based on utility records. The high usage was due to backwashing of the filter. This would require both pumps to run approximately 1.7 hours.

There are no sample taps on either well line.

There is a check valve in each well line in the interior pumphouse piping.

The water service line for the pumphouse is unmetered.

The well pumps are controlled by water level probes in the hydro-pneumatic tank.

One pump runs at a time but both pumps run each cycle. When the water level in tank reaches a certain height, the lead pump shuts off and the lag pump turns on.

The operator backwashes the filter 1x/month. The backwash rate is 200 gpm. There is no backwash meter to monitor the volume of water used to backwash the iron filter.

The operator reported the iron concentration in the raw water has increased from 0.3 mg/L to 1.0 mg/L. This could be due to the recent rains. He also noted the free chlorine residual normally runs 0.8 ppm but due to the increased iron in the source water, has decreased to 0.09 ppm in the finished water.

Well #1 averaged 1.2 hours per day of run time (12 minutes per cycle) since the 2010 Survey.

Well #2 averaged 1.3 hours per day of run time (13 minutes per cycle) since the 2010 Survey.

The pumphouse is heater by a natural gas heater with portable electric back-up heaters.

The site is not fenced but the facilities are secure and well maintained.

The Pumphouse used approximately 3,805 kwh of energy since the 2010 survey or approximately 13.3 kwh/day.

There is a potential cross connection on the backwash line for the filters.

The address for the pumphouse is 103 Keweenaw Trail.

CHEMICAL FEED:

The raw water from the wells is disinfected prior to distribution.

Chlorine (Sodium Hypochlorite):
LMI pump: Model A841-910HI; Max output = 0.25 gph; speed/stroke = 75/65
5-gallons of 12.5% chlorine solution are mixed with 3-gallons of water prior to injection.
The 35 gallon chemical vat is not scaled and does not have a spill containment system.
The Utility targets a free chlorine residual of 0.1 mg/L at the Community Center.

The bulk chlorine is NSF approved.

The pumphouse facility does not have an eyewash station or emergency shower.

The ventilation fan is operational.

The operator reported there have been no odor or taste problems.

The facility has the proper test kits.

The flow switches are properly located and are functional.

There is no spill containment for the chemicals.

DISTRIBUTION:

All of the water services are metered and read on a monthly basis. Residents are charged based on the amount of water they use.

The average water consumption since the 2010 Survey was approximately 160 gpd per residential connection. This average does not separately account for water usage for non-residential connections.

The "Other" connections include the Pumphouse and the Community Building.

There is a written hydrant flushing plan for this water system. The Utility reported the system is flushed 2 times/year and was last flushed in the Fall of 2010.

The hydrants and gate valves are exercised 2 times/years. All valves are operational. (1) hydrant is not operational due to a stripped operator nut.

The Utility did not experience any water main breaks for this system since the 2010 Survey.

The Utility has paper copy as-builts for this water system.

There have not been any pressure complaints for the system. The operator reported that there have been some recent complaints regarding iron in water.

WATER STORAGE:

The storage tank is a hydro-pneumatic air/water tank manufactured by Tonka - 1992 (SN92183).
Volume: 6500 gallon; 1450 usable
High pressure safety setting: 78 psi
All equipment is operational

COMPLIANCE:

Based on an Annual Compliance Report from the EPA for 2010, the Kawbawgam Rd Water System had a Nitrate monitoring violation for 2010 with no return to compliance date.

TTHM's and HAA5's sampling was completed on 7/21/10.

Most recent Consumer Confidence Report was dated June 2010.

SAFETY:

Safety equipment available in the pumphouse includes an apron, face shield and rubber gloves.

The safety chain for the chemical feed injector was not connected.

There are no chemical warning placards posted on the exterior of the building for the chlorine inside.

SUGGESTIONS

Recommend installing a sealed and vented cap for Well #2.

Recommend installing smooth bore sample taps on each well line at a minimum of 8-inches above the floor.

Recommend construction of a suitable concrete pad or the replacement of Well #1.

Recommend correcting the potential cross connection in the backwash piping.

Recommend sampling the iron filter media to determine the "health" of the iron filter.

Recommend installing an eyewash/emergency shower with tempered water.

Recommend repairing the inoperable hydrant.

Recommend installing a safety cable/chain for the chemical feed injector.

Recommend posting chemical placards on the exterior of the building to alert fire/rescue personnel of the chemical hazards contained within the building.

SYSTEM RATING:	14	CERT OPERATOR	yes	**TREATMENT CONSTRUCTED**	6/1/1987
UTILITY NAME	Keweenaw Bay Maintenance	CERT CLASS	S	# TREATMENT PLANTS	1
SYSTEM NAME	Zeba	SYSTEM CLASS	C	TYPE OF CHLORINE:	Liquid
`` IRVEY TYPE:	ANNUAL	# RES CONNECTIONS:	113	AVE FREE RESIDUAL	0.45
,RVEY DATE:	5/25/2011	# OTHER CONNECTIONS:	3	MONITOR FREQ:	uously and w
SurveyorNames:	Arlan Friisvall of the	# WATER METERS(Res)	113	MONITOR LOC	Varies
PWSID#:	55293302	# WATER METERS(other):	2	CONTACT TIME:	20 min
SanFac Code:	1152260689			SPARE PARTS AVAIL?:	yes
SYSTEM TYPE:	Community			MANUFACTURER:	ter - Wallace & Ti
ADDRESS1	Arlan Friisvall			FILTRATION:	Pressure
ADDRESS2	107 Bear Town Roa			PRE CHLORINATION?:	no
CITY	Baraga			BACKWASH FREQ:	ually by ti
STATE ZIP	MI 49908			ADEQUATE SAMPLE TAP?:	yes
COUNTY	Baraga			BYPASS AVAILABLE:	yes
TELEPHONE	(906) 353-6623			OTHER:	NONE
FAX	906 353-7540			FLUORIDE:	Saturator
EMAIL	tmaint@up.net			FI Equip Installed	☑
OPERATOR	Kerry Picciano			FI Equip Operational?	☑
MANAGER	Arlan Friisvall			FI Monitoring	☑
				Fluoride Policy	None

POPULATION SERVED

Res Pop	395	NT Pop:	0
Indian Pop:	395	T Pop:	0

PLANT CAP 12 HR (GPD)	15,840
AVE PROD (GPD)	18,800
MAX PROD (GPD)	42,300

Sampling	Last Done	Next Due
IOC'S:	9/13/2010	2011
VOC'S:	9/13/2010	2011
SOC'S:	9/13/2010	2011
NITRATE:	9/13/2010	2011
Pb Cu:	9/14/2008	2011
Rad's:	12/20/2007	2016

WATER SOURCE:	Surface Water	Well #1	Well #2	Well #3	Well #4
CURRENT PUMPING RATE(gpm):		33	22		
METER READING:		56071000			
PUMP RUN HRS:		8637	9320		
PUMP STARTS:		23265	7421		
WELL LOG AVAILABLE?		NA	NA		

WATER QUALITY	**RAW**	**TREATED**
pH:		
Hardness(ppm):		
Iron(ppm):		0.00
Manganese(ppm):		

DISTRIBUTION	
Pipe Type:	PVC & AC
Main Flushing Freq:	Twice a yea
All Hydrants Operational?:	yes
All Valves Operational?:	yes

NEAREST:		Water Storage Type:	Elevated
WATER SUPPLY	Lanse'	VOLUME(gals):	65,000
CONTAM'T SOURCE:	Bay Area Water Shed	ElectricMeter#:	UPPCO 811 050
OBSERVATIONS:		ElecMeterreading	

As_builts Current:	Yes		
Tribally Subsidized?:	Yes		
Collection Rate(%):	100.0%		
Adequate budget?:	yes		
Water Rate per month(Res):	$30.00		
Utility Ordinance:	Yes		
Scheduled Maintenance:	Yes		
Emergency Plan:	Yes		
Cross Connection Plan:	Yes		
SWPP?:	Yes		
SDWA Compliant?:	Yes		
If No, Explain:			
LAST EDITED:			

GENERAL

The Utility recently purchased repair parts for the PVC water main, for fire hydrants and extra valves. This summer they plan on repairing (2) hydrants and several curb stops.

The residential population was based on 113 residential connections with an assumed population of 3.5 residents per connection.

The general housekeeping of the facility is good.

The Utility utilizes a written maintenance schedule.

The Utility charges for water at a flat rate of $30.00/month.

Utility expenses in excess of the income generated from the water rates are subsidized by the Tribal Government.

POTENTIAL SIGNIFICANT DEFICIENCIES

According to the USEPA's list of Significant Sanitary Survey Deficiencies, the overflow pipe must have a screen or flap gate. This deficiency can be rected by the installation of a screen or flap gate on the overflow pipe.

WATER SOURCE (SURFACE WATER)

This system draws water from the Keweenaw Bay of Lake Superior.

Intake Pump #1
Pumping Rate = 68.5 gpm @ 69 psi
Pump Size: 3 Hp

Intake Pump #2
Pumping Rate = 68.5 gpm @ 69 psi
Pump Size: 3 Hp

Distribution Pump #1
Pumping Rate = 57 gpm @ 137 psi
Pump Size: 10 Hp

Distribution Pump #2
Pumping Rate = 57 gpm @ 137 psi
Pump Size: 10 Hp

The nearest source of contamination is a residential septic tank approximately 75 feet from the facility.

According to the USEPA database, a Source Water Protection Plan was completed in conjunction with the USGS and was approved on 2/6/2004.

WATER TREATMENT (PUMPHOUSE)

The pumphouse is a three room, single block wall building. The water is treated by a US Filter membrane filtration system. Water is filter, disinfected, fluoride is added and the water is then pumped to a 12,000 gallon contact chamber. Transfer pumps pump the water from the contact chamber to the elevated storage tank for distribution.

The twelve hour plant capacity is based on 22 gpm for 12 hours and represents the pumphouse production capacity for 12-hours with the largest intake pump out of service.

The following meter readings were recorded from the Daily Report during the 2011 Survey:
Raw Water Meter: 76,850,000 gallons
Finished Water Meter: 56,071,000 gallons

The Average Production Day since the 2010 Survey was approximately 18,800 gpd and was based on the finished water meter readings in the pumphouse.

The Maximum Production Day is to be approximately 42,300 gpd and is based 2.25x the Average Production Day. The high usage was due to backwashing of the filter. This would require both intake pumps to run approximately 12.8 hours.

There is a sample tap on the intake line installed 10" above the floor.

There is not a check valve in the intake line in the interior pumphouse piping.

The water service line for the pumphouse is unmetered.

The intake pumps are controlled by water level in the contact chamber. The distribution pumps are controlled by a pressure switch which monitors the pressure in the water system.

Each filter skid is rated at 60 gpm. The intake pumps run at approximately 22 gpm and 33 gpm.

The filters backwash based on differential pressure. Each filter will backwash for 45 minutes.

Intake Pump #1 averaged 3.2 hours per day of run time (2.2 minutes per cycle) from 5/25/2011 to 8/11/2011.

Intake Pump #2 averaged 3.1 hours per day of run time (2.2 minutes per cycle) from 5/25/2011 to 8/11/2011.

Distribution Pump #1 averaged 2.5 hours per day of run time (68 minutes per cycle) from 5/25/2011 to 8/11/2011.

Distribution Pump #2 averaged 3.1 hours per day of run time (84 minutes per cycle) from 5/25/2011 to 8/11/2011.

The pumphouse is heater by a gas heater with portable electric back-up heaters.

The site is not fenced but the facilities are secure and well maintained.

The address for the pumphouse is 15614 Pequaming Road.

CHEMICAL FEED:

The raw water from the surface water intakes is disinfected prior to distribution.

Chlorine (Sodium Hypochlorite):
W&T pump: Model P75MEH3MAVUC9AXX; Max output = 0.87 gph; speed/stroke = 100/95
4-gallons of 10% chlorine solution are mixed with 16-gallons of water prior to injection.
The 55 gallon chemical vat is not scaled and does not have a spill containment system.
The Utility targets a free chlorine residual of 1.2 mg/L from the analyzer.

The bulk chlorine is NSF approved.

Fluoride (Sodium Fluoride):

W&T pump: Model P75MEO2MAKDCIA6X; Max output = 0.45 gph; speed/stroke = 100/70
The 55 gallon chemical vat is not scaled and does not have a spill containment system.
The Utility targets a fluoride concentration of 1.1 mg/L from the analyzer.

The fluoride NSF approved.

e natural fluoride level in the raw water is 0.18 mg/L. the Utility routinely performs slit samples with the City of Baraga.

There are automatic analyzers for chlorine and fluoride. The fluoride analyzer will shut off the fluoride chemical feed pump if the fluoride concentration exceeds 1.1 mg/L

The pumphouse facility does not have an eyewash station or emergency shower.

The ventilation fan in the chemical feed room is operational.

The operator reported there have been no odor or taste problems.

The facility has the proper test kits.

The flow switches are properly located and are functional.

There is no spill containment for the chemicals.

DISTRIBUTION:

All of the water services are metered but are not read on a monthly basis. Residents are charged based on a flat rate.

The average water consumption since the 2010 Survey was approximately 166 gpd per residential connection. This average does not separately account for water usage for "Other" connections.

"Other" connections include the Head Start, Community Building and the Pumphouse.

There is a written hydrant flushing plan for this water system. The Utility reported the system is flushed 2 times/year and was last flushed in the Fall of 2010.

The hydrants and gate valves are exercised 2 times/years. All valves are operational. (1) hydrant is inoperable and (1) hydrant leaks.

The Utility did not experience any water main breaks for this system since the 2010 Survey.

The Utility has paper copy as-builts for this water system.

ere is (1) pressure reducing valve in the distribution system. The discharge pressure is set at 70 psi.

There have not been any pressure or water quality complaints for the system.

WATER STORAGE:

The storage tank is a standpipe.
Volume = 67,600 gallons
Tank is 12' diameter x 80' high
Electric Meter No. - 17-237-035; Reading = 8,480 kWH
Caged ladder climbing system
The overflow pipe is not screened.
The site is fenced and maintained. The fence is damaged and should be repaired.
The splash pad is in good condition.
The tank was last inspected 5-years ago and included a dive inspection.
The tank insulation is in poor condition and has been damaged by woodpeckers.
The exterior coating is in poor condition and needs to be repaired.

COMPLIANCE:

Based on an Annual Compliance Report from the EPA for 2010, there were no violations reported for the Zeba Water System.

TTHM's and HAA5's sampling was completed on 9/13/10.

Most recent Consumer Confidence Report was dated June 2010.

SAFETY:

Safety equipment available in the pumphouse includes an apron, face shield and rubber gloves.

There are no chemical warning placards posted on the exterior of the building for the chlorine inside.

SUGGESTIONS

Recommend installing a screen or flap gate on the overflow pipe to address the EPA Potential Significant Deficiency.

commend repairing the fence around the stand pipe.

Recommend repairing the insulation, exterior coating system and the fence for the standpipe.

Recommend posting chemical placards on the exterior of the building to alert fire/rescue personnel of the chemical hazards contained within the building.

Recommend repairing the inoperable hydrant and the leaking hydrant.

Recommend reading the residential and commercial water meters on a monthly basis and analyze the data to calculate water loss in the system.

Recommend installing an eyewash/emergency shower with tempered water.

SYSTEM RATING	14	As_builts Curren	Yes	EffluentPH	0
UTILITY NAME	Keweenaw Bay Maintenanc	NPDES Compliant?:	Yes	EffluentBOD	0
'STEM NAME	Zeba	All Valves Operational?	Yes	EffluentTSS	0
SurveyorNames:	Arlan Friisvall of the Keweenaw Bay Maintenance Department and Drian Willoughby and Shane Hoffmann of the Indian Health Service	How often exercised?	Not sure	EffluentAmmonia	0
SURVEY DATE	5/25/2011	Manholes and lines clean?:	Yes		
NPDES#	NA	Pipe Material Type(s)	Asbestos cement, PV	Sewer Rate per month(Res)	$38.00
SanFac Code	1152280688	DATE CONSTRUCTED	6/1/1965	Sewer Rate per month(Com)	$38.00
SYSTEM TYPE	Collection			# RES CONNECTIONS	117
SYSTEM DESIGN CAPACITY(GPD)	127,000			# OTHER CONNECTIONS	3
County:	Baraga	LAST UPDATED	8/19/2009	ESTIMATED POP	400
SURVEY TYPE	ANNUAL				
SYSTEM CLASS	D				

OBSERVATIONS:

The community is served by a conventional gravity collection system with one lift station. The wastewater is pumped to City of L'Anse for treatment.

Most of the collection system was constructed in 1965.

Paper as-builts are available for some of the collection system.

The Utility maintains a stock of some repair parts for the collection 'tem.

SUGGESTIONS:

Recommend labeling the wet well and valve vault as confined spaces. Consider doing this by making a stencil and painting on the message to reduce cost.

Recommend troubleshooting and repairing the controller for the lift station pumps.

Recommend contracting a local septic hauler to stop by the lift station and clean the trash basket on regular basis.

NOTES:

L... stations

Liftstation ID	1	CURRENT PUMPING RATE(gpm)	150	# RES CONNECTIONS	117
SURVEY DATE	5/25/2011	Date Pumps last Calibrated	unknown	# OTHER CONNECTIONS	3
System name:	Zeba	All Valves Operational?	Yes	ESTIMATED POP	400
LIFT STATION TYPE	Submersible	How often exercised?	annual	DATE CONSTRUCTED	
DIAMETER(FT)	8	SPARE PARTS AVAILABLE	yes		
Electricmeter#:	811048	Grease Problems?:	minor		
Electric meter reading	79119	BackupEnergy	Mobile		

OBSERVATIONS:

The number noted in column #3 are for combined operation of the pumps.

The flow meter reading was 91,638,668 gallons.

At the time of the 2011 Survey, the pump discharge was as follows:
Pump #1 = 123 gpm (mixer)
Pump #2 = 192 gpm

The average run time for Pump #1 and Pump #2 was 8.0 minutes per cycle and 6.3 minutes per cycle respectively.

The average starts for Pump #1 and Pump #2 was 16 starts per day and 6 starts per day respectively.

Based on this information, it is evident the alternator for the pumps 'ot functioning properly. The operator noted he was alternating pump operation manually.

This station has emergency bypass piping in the valve vault but the Utility does not have a portable pump to utilize the bypass.

	#1	#2	#3
PUMP RUN HR	6560	4946	1715
PUMP STARTS	105168	82272	31694

The trash basket is full and needs to be cleaned. The Utility does not have a place to dump the waste from the basket.

e site is not fenced but is well maintained

SUGGESTIONS:

consider a yard hydrant at the lift station.

NOTES:

APPENDIX NN:

Water Quality Program Job Descriptions

WATER RESOURCES TECHNICIAN

ALL REQUIRED DOCUMENTATION MUST BE SUBMITTED BY THE CLOSING DATE OR THE APPLICANT WILL NOT BE CONSIDERED FOR EMPLOYMENT

- ☐ Completed Keweenaw Bay Indian Community application
- ☐ Current Resume'
- ☐ Personal Statement
- ☐ College Transcripts, if applicable
- ☐ Minimum of three (3) Letters of Recommendation
- ☐ If you are American Indian, you must attach a copy of tribal enrollment or proof of descendency
- ☐ If you are a Veteran, you must attach a copy of your DD214

Keweenaw Bay Indian Community
Pauline Spruce, Personnel Director
107 Beartown Road
Baraga, MI 49908
906-353-6623, ext. 4140
Fax: 906-353-8068
Email: pauline@kbic-nsn.gov

Distribution Date: November 18, 2005

Closing Date: December 6, 2005 at 4:00 pm

POSITION ANNOUNCEMENT

POSITION: **WATER RESOURCES TECHNICIAN**
One (1) Full-time position
Non-Exempt

LOCATION: Natural Resources Department
Pequaming, Michigan

SUPERVISORY CONTROL: Natural Resources Director

SALARY: Grade 5 (minimum starting wage = $10.87/hour)

QUALIFICATIONS:

- High School Diploma or equivalent required. Additionally, college level algebra and chemistry are required. Successful applicant must pass a standardized test in math and chemistry to determine proficiency in these subjects.
- Must be in good physical condition
- Must have legible handwriting
- Valid drivers license, good driving record.
- Good attention to details and be highly motivated to learn new and challenging skills.
- Employment is contingent upon the satisfactory result of a Security Background Check, pre-employment drug testing, and pre-employment physical.

INDIAN PREFERENCE: Preference will be given to qualified individuals of American Indian descent.

VETERAN PREFERENCE: Preference will also be given to qualified Veterans (need DD214).

DUTIES AND RESPONSIBLITIES:

The applicant will assist the Water Quality Specialist and other Natural Resources Department staff with water quality assessment, monitoring and assist in the implementation of a water pollution control program.

- Water Assessment and Monitoring:

  Assisting the Water Quality Specialist and Natural Resources Technicians with water sample collection, handling and laboratory analysis. Laboratory work requires strong algebra skills for calculations and attention to detail. Assisting with collecting field measurements, such as stream flow and secchi depths.

- Stream Surveys:

  Assisting the Water Quality Specialist with biological and physical stream surveys. Involves hiking into remote areas and carrying 10 lbs or more in equipment.

- Data Entry and Collation

  Assisting the Water Quality Specialist with recording and transcribing water quality and biological assessment data and entering this data into a computer using word processing, spreadsheets and DBASE software.

- GPS and GIS (Global Positioning System and Geographic Information System)

  Assisting the Water Quality Specialist and Natural Resources Technicians with gathering GPS data and entering the data into GIS.

- Other:

  Technician may be required to perform other duties related to the department's activities on or near the Reservation.

This position announcement summary is intended to indicate the kinds of tasks which will be required of this position and shall not be construed as declaring what the specific duties and responsibilities of the position will be. It is not intended to limit or modify the right of the supervisor to assign, direct and control the work of this position, nor to exclude other similar duties not mentioned. The use of a particular expression or illustration describing duties shall not beheld to exclude other duties not mentioned that are of similar kind or level difficulty.

Distribution Date: November 18, 2005

Closing Date: December 6, 2005 at 4:00 pm

Changes made 12-2008 in conjunction with Wage Review

JOB DESCRIPTION

POSITION: **Water Quality Specialist**
Full-time position

LOCATION: KBIC Natural Resources -- Pequaming, Michigan
(Located 7 miles from L'Anse on Pequaming Road)

SUPERVISORY CONTROL: Director of Natural Resources

SALARY: Grade 8 (minimum starting wage ~~$12.92~~/hour) $15.21

REQUIRED QUALIFICATIONS:

- Bachelor of Science Degree in Environmental Engineering, Environmental Sciences or Water Resources or 5 or more years experience working with EPA Section 106, Clean Water Act activities and program, EPA grants, data collection and management, water sampling, drinking water quality, report writing, budget management, and GIS.
- Be in good physical condition.
- Excellent oral and written communications skills; legible handwriting; must work effectively with other people at a variety of ages and levels; able to work independently to get a project completed.
- Must possess a valid Michigan Drivers License and have a good driving record; must be insurable; personal vehicle/vehicle insurance may need to be utilized.
- Must be willing to travel at least 50 miles three (3) days per week.
- Other travel as necessary for job performance and training.
- Work experience in performing investigative studies, administering grants, grant funding and report writing.
- Must be computer literate. Word Perfect, MS Word, Excel, Quattro, GIS preferred.
- Employment is contingent upon the satisfactory result of a Security Background Check, pre-employment drug testing, and pre-employment physical.

INDIAN PREFERENCE: Preference will be given to qualified individuals of American Indian descent.

VETERAN PREFERENCE: Preference will also be given to qualified Veterans (need DD214).

SUMMARY: The individual will assist the Keweenaw Bay Tribal Council with the administration of U.S. Environmental Protection Agency (EPA) and Indian Health Service (IHS) grants pertaining to Surface, Ground, Wetlands and Wastewater issues on the L'Anse Indian Reservation, 1842 Treaty Ceded Territory, and Lake Superior.

DUTIES AND RESPONSIBLITIES:

The duties of the Water Quality Specialist shall include:

1. EPA Grants –
    a. Specialist shall assist the Natural Resources staff and Tribal Council to implement various surface, ground, wetlands and wastewater programs, such as:
    b. Water quality planning and monitoring
    c. Enforcement and compliance to water standards
    d. Environmental permit issuance
    e. Storm water and sludge management
    f. Groundwater protection
    g. Non-point source programs, and
    h. Outreach and education
    i. Drinking water testing and protection plans
    j. Well abandonment
    k. Storm water permit compliance inspections

2. U.S. Indian Health Service –
    Specialist shall assist the Indian Health Service water and wastewater programs on Tribal lands in Baraga and Marquette counties and shall assist Indian Health Service when necessary.

3. Water Testing and Equipment -
    Specialist shall operate KBIC water sampling, testing, and monitoring equipment and perform necessary analysis of water samples. Conduct storm water discharge permit compliance inspections at construction sites on reservation and obtain and maintain federal inspector credentials for this work.

4. BIA-
    Specialist shall serve as the contact for the BIA water program staff for water programs on Tribal lands in Baraga and Marquette counties and shall complete and mange BIA funded water programs.

5. Grant Administration Project Management and reporting–
    Specialist shall insure proper management of grants and Tribal Council funds necessary to implement program activities. Specialist shall manage and oversee subcontractors completing grant or tribally funded water program activities. Specialist shall prepare water quality and other reports as requested or directed

6. Supervises water Quality Technician.

7. Other –
    Specialist may be required to perform other duties related to biological and/or water quality services and activities on or near the Reservation.

This position announcement summary is intended to indicate the kinds of tasks which will be required of this position and shall not be construed as declaring what the specific duties and responsibilities of the position will be. It is not intended to limit or modify the right of the supervisor to assign, direct and control the work of this position, nor to exclude other similar duties not mentioned. The use of a particular expression or illustration describing duties shall not beheld to exclude other duties not mentioned that are of similar kind or level difficulty.

WARRANTY DEED

WILLIAM HOMIER AND ELIZABETH HOMIER, HIS WIFE,

TO

THE UNITED STATES OF AMERICA IN TRUST FOR THE KEWEENAW BAY INDIAN COMMUNITY

REGISTER'S OFFICE)
) SS.
BARAGA COUNTY)

Received for Record the 7th day of July A.D. 1941 at 10 o'clock A.M., and Recorded in Vol. 52 of Deeds on page 416.

REGISTER

WARRANTY DEED

THIS INDENTURE, Made this 25 day of February, A.D. 1941, between William Homier and Elizabeth Homier, his wife, of the Township of L'Anse, County of Baraga, State of Michigan, parties of the first part and The United States of America in trust for the Keweenaw Bay Indian Community, party of the second part;

WITNESSETH: That the said parties of the first part, for and in consideration of the sum of Fifteen Hundred Dollars ($1500.00) to them in hand paid by the said party of the second part, the receipt whereof is hereby confessed and acknowledged, do by these presents, grant, bargain, sell, remise, release, alien and confirm unto the said party of the second part and assigns, forever, all that certain piece or parcel of land situate and being in the Township of L'Anse, county of Baraga, and State of Michigan, and described as follows, to-wit:

A parcel of land in the Southeast quarter (SE¼) of the Southeast quarter (SE¼) of Section Nine (9), Township Fifty (50) North of Range Thirty-three (33) West, described as follows: Commencing at the southeast corner of Section Nine (9), Township Fifty (50) North of Range Thirty-three (33) West; thence West 1320 feet; thence north 924 feet; thence east 1320 feet; thence south 924 feet to the place of beginning, containing twenty-eight (28) acres, more or less.

Together with all and singular the hereditaments and appurtenances thereunto belonging or in anywise appertaining: TO HAVE AND TO HOLD the said premises as herein described, with the appurtenances, unto the said party of the second part, and assigns, Forever. And the said William Homier and Elizabeth Homier, his wife, parties of the first part, for themselves, their heirs, executors and administrators, do covenant, grant, bargain and agree to and with the said party of the second part, and assigns, that at the time of the ensealing and delivery of these presents they are well seized of the above-granted premises in fee simple; that they are free from all incumbrances whatever and that they will and their heirs, executors and administrators shall WARRANT AND DEFEND the same against all lawful claims whatsoever.

IN WITNESS WHEREOF' the said parties of the first part have hereunto set their hands and seals the day and year first above written.

OFFICE OF COUNTY TREASURER,
Baraga County,
L'Anse, Mich., July 7th 1941
I hereby Certify, That there are no tax liens or titles held by the State on the lands described above, and that there are no tax liens or titles held by individuals on the said lands, and that the taxes on said lands for the five years preceding the 25 day of February 1941 are ..... paid, as shown by the records of this office.
Catherine Lemanski
Deputy County Treasurer.

Signed, sealed and delivered in presence of:

ALFRED LA BINE, M.D.

ANGELINE HOCKING, R. N.

WILLIAM HOMIER (L.S.)

ELIZABETH HOMIER (L.S.)
HER X MARK

STATE OF MICHIGAN)
) SS.
COUNTY OF BARAGA)

On this 25 day of February, A.D. 1941, before me, a Notary Public in and for said County, personally appeared William Homier, of the Township of L'Anse, Baraga County, Michigan, to me known to be the same person described in and who executed the within instrument, who acknowledged the same to be his free act and deed.

SELMA C. PELTO
NOTARY PUBLIC, BARAGA CO., MICH.
My commission expires:

(NOTARIAL SEAL)

SELMA C. PELTO
Notary Public, Houghton County, Mich.
My commission expires Aug. 6, 1943.

STATE OF MICHIGAN)
) SS.
COUNTY OF HOUGHTON)

On this 25 day of February, A.D. 1941, before me, a Notary Public in and for said County, personally appeared Elizabeth Homier, of the Township of L'Anse, Baraga County, Michigan, temporarily in the City of Hancock, Houghton County, Michigan, wife of William Homier, of the Township of L'Anse, Baraga County, Michigan, to me known to be the same person described in and who executed the within instrument, who acknowledged the same to be her free act and deed.

SELMA C. PELTO
NOTARY PUBLIC, HOUGHTON CO. MICH.
My commission expires: Aug. 6, 1943.

(NOTARIAL SEAL)

(CANCELLED REVENUE STAMPS ($1.65)

KEWEENAW BAY INDIAN COMMUNITY TRIBAL SURFACE WATER QUALITY REGULATIONS

Draft: February 28, 2017

Table of Contents

Chapter 1: General Provisions

Section 1.1 Authority, Purpose, and Intent

The Keweenaw Bay Indian Community is a federally recognized Indian Tribe exercising inherent sovereign authority over its members and its territories, and has a Reservation created by the 1854 Treaty with the Chippewa, 10 Stat. 1109. The Community is organized pursuant to the provisions of the Indian Reorganization Act of 1934, 48 Stat. 984, 25 U.S. C § 476. Pursuant to that Act, the Community has adopted a Constitution and Bylaws which were duly approved by the Secretary of the United States Department of the Interior on December 17, 1936. Under the Community's Constitution, all executive and legislative powers are vested in a twelve-member Tribal Council. Article VI, Section 1(a) of the Constitution empowers the Tribal Council "to protect and preserve the tribal property, wildlife and natural resources of the Community." In addition, Article VI, Section 1 (n) of the Constitution empowers the Tribal Council "to promulgate and enforce ordinances which are intended to safeguard and promote the peace, safety, morals, and general welfare of the Keweenaw Bay Indian Community by regulating the conduct of trade and the use and disposition of property upon the Reservation.

The Keweenaw Bay Tribal Water Quality Regulations provide the basis for all water management decisions and activities that affect waters of the Reservation including but not limited to point-source permitting, non-point source permitting, and the physical alteration of water bodies including wetlands. In addition, they recognize, protect, and provide for the sacred relationship that exists between the Ojibwa people of the Keweenaw Bay Indian Community, their waters, and all life.

These regulations ensure compliance with sections 303 and 518 of the Clean Water Act, prohibit and regulate unauthorized discharges of substances into the waters of the Reservation, and regulate water quality and quantity, and activities that affect water quality, quantity, and uses for the Reservation. They also ensure compliance with the anti-degradation goals of section 101 of the Clean Water Act. They are designed to meet or exceed the minimum requirements set by EPA in 40 CFR Parts 131 and 132 for Tribes and States in the Great Lakes Region under the Great Lakes Initiative. The tribal intent is to establish water quality requirements applicable to all waters of the Reservation. The standards and requirements found (within this enactment) are intended to protect the public health and welfare; to restore, enhance, and conserve the chemical, physical, and biological integrity of our waters; and to protect the natural resources of the Keweenaw Bay Indian Community for present and future generations.

Section 1.2 Territory Covered

These regulations shall apply to all surface waters located within the L'Anse Indian Reservation, including waters with reaches flowing through the Reservation, and to all facilities, practices, and activities which may affect the quality and quantity of waters of the Reservation. These standards shall be the primary basis by which all water quality based effluent limits will be established for point sources and non point sources of pollution that affect any waters of the Keweenaw Bay Indian Community. Appendix B is a map of the L'Anse Indian Reservation.

The water quality standards contained in these regulations are not directed toward off-Reservation waters within the territory claimed or ceded by the Community pursuant to various treaties entered into between Keweenaw Bay Indian Community (KBIC) and the United States.

Section 1.3 Review and Amendment

1.3.1 Three-Year Review. At least once every three years, the Tribe shall hold public hearings for the purpose of reviewing these standards and, as appropriate, amend these standards.

1.3.2 Review and Amendment Generally. Notwithstanding Section 1.3.1, these regulations may be subject to amendment or modification at such time or as the need arises.

1.3.3 Public Participation and EPA Approval. Any potential modification of water quality standards shall be subject to public participation consistent with the requirements of 40 CFR 131.20 and 40 CFR 25. In addition, any amendments shall first be adopted by KBIC and then submitted to the US EPA Regional Administrator for review and approval.

Section 1.4 Severability

Should any provision(s) of these regulations be declared invalid or unconstitutional for any reason, the remainder of these regulations shall not be affected thereby.

Chapter 2: Definitions

Section 2.0 Definitions

The following definitions apply in this Regulation. Terms not defined in this section have the meaning given by the Clean Water Act and EPA implementing regulations.

Acute: A stimulus severe enough to rapidly induce an effect; in aquatic toxicity tests, an effect observed in 96 hours or less is typically considered acute. When referring to aquatic toxicology or human health, an acute effect is not always measured in terms of lethality.

Acute toxicity: Concurrent and delayed adverse effect(s) that results from an acute exposure and occurs within any short observation period which begins when the exposure begins, may extend beyond the exposure period, and usually does not constitute a substantial portion of the life span of the organism.

Adverse effect: Any deleterious effect to organisms due to exposure to a substance. This includes effects which are or may become debilitating, harmful, or toxic to the normal functions of the organism, but does not include non-harmful effects such as tissue discoloration alone or the induction of enzymes involved in the metabolism of the substance.

Agricultural and/or industrial use: Refer to Chapter 3, herein.

Ambient conditions: The measurable biological, chemical, and physical characteristics of tribal waters and associated dependent biotic communities.

Anthropogenic: Caused by or related to human actions either directly or indirectly.

Aquatic community: Any and all animal, plant, or other life form which resides during any stage of its life cycle within a waterbody.

Background conditions: The biological, chemical, and physical conditions of a water body, including flow, that existed prior to a point or non-point source discharge(s) or would exist in the absence of such discharge(s).

Bioaccumulation: The net accumulation of a substance by an organism as a result of uptake from all environmental sources.

Bioaccumulation factor (BAF): The ratio in liters per kilogram (L/kg) of a substance's concentration in tissue of an aquatic organism to its concentration in the ambient water, where both the organism and its food are exposed and the ratio does not change substantially over time.

Bioaccumulative chemical of concern (BCC): Any chemical that has the potential to cause adverse effects which, upon entering the surface waters, by itself or as its toxic transformation product, accumulates in aquatic organisms by a human health bioaccumulation factor greater than 1,000, after considering metabolism and other physicochemical properties that might enhance or inhibit bioaccumulation. Chemicals with half-lives of less than eight weeks in the water column, sediment, and biota are not BCCs. The minimum BAF information needed to define an organic chemical as a BCC is either a field-measured BAF or a BAF derived using the BSAF methodology. The minimum BAF information needed to define an inorganic chemical, including an organometal, as a BCC is either a field-measured BAF or a laboratory-measured BCF. BCCs include, but are not limited to, the pollutants identified as BCCs in 40 CFR Part 132, Table 6, as amended.

Carcinogen: A substance which causes an increased incidence of benign or malignant neoplasms in animals or humans, or substantially decreases the time to develop neoplasms.

Ceremonial, religious, and spiritual uses: Refer to designated uses, Chapter 3, herein.

Chemical of concern: A chemical on EPA's list of pollutants that are the focus of the Great Lakes Water Quality Initiative identified in 40 CFR Part 132 Table 6, as amended. The pollutants on this list are categorized as either bioaccumulative chemicals of concern (BCCs) or pollutants that are not bioaccumulative chemicals of concern.

Chronic toxicity: Concurrent and delayed adverse effect(s) that occurs only as a result of a chronic exposure.

Cold water fishery use (CW1): Refer to designated uses, chapter 3, herein.

***Control document*:** Any authorization issued by the appropriate permitting authority to any source of pollutants to waters under its jurisdiction and which specifies conditions under which the source is allowed to operate.

***Congener*:** Refers to a group of compounds that vary in the number of substituents and/or the configuration of these substituents, but share a basic chemical structure.

Contaminant: A harmful chemical or biological substance which can be incorporated into, onto, or be ingested by aquatic organisms, consumers of aquatic organisms, or users of the aquatic environment; or an anthropogenic input that alters any physical, biological or chemical property of the water.

Cool water fishery use (CW2): Refer to designated uses, chapter 3, herein

Criteria: Element of the Community's water quality standards, expressed as constituent concentrations or levels, or as a narrative statement, representing a quality of water that supports a particular use. When criteria are met, water quality will protect the designated use.

Critical habitat: A specific geographic area occupied by a species that is listed in accordance with the provisions of section 4 of the Endangered Species Act, on which are found those physical or biological features essential to the conservation of the species and which may require special management consideration or protection.

Cultural use: Refer to designated uses, chapter 3, herein.

CWA: The Clean Water Act.

Degradation: Lowering of the existing quality or desired quality of the waters of the Reservation including, but not limited to, the chemical, physical, and biological characteristics and values associated with waters of the Reservation. Undesirable changes in the beds and banks of waters of the Reservation that constitute degradation include, but are not limited to, objectionable deposits, changes in the shore lands, changes in wetland vegetation, local ecology, and bank stability.

Design flow: The stream flow that represents critical conditions, upstream from the source, for protection of aquatic life, human health, or wildlife.

Designated uses: Those uses specified in water quality standards for each waterbody or segment whether or not such uses are being attained.

Discharge(s): Any addition of any pollutant or combination of pollutants to water. Industrial discharge(s) that meet with background conditions shall constitute a discharge; i.e., any addition of any wastewater or pollutant, even though this discharge water meets with background conditions, is considered a discharge.

Discharger(s): Any person, business, legal entity, or other party who engages in activities resulting in a discharge into waters of the Reservation.

Dissolved solids: Refers to the amount of materials dissolved in water and is commonly expressed as a concentration in terms of milligrams per liter (mg/L).

Drainage basin: A waterbody and the land area drained by it.

Effluent: Refers to a wastewater discharge from a point source to the waters of the Keweenaw Bay Indian Community or connecting waters.

Effluent limitations: Any restriction imposed by the Keweenaw Bay Indian Community, EPA, and/or other federal entity, on quantities, discharge rates, and concentrations of pollutants which are discharged from point sources into water.

Endangered or threatened species: Those species that are listed as endangered or threatened under section 4 of the Endangered Species Act.

EPA and USEPA: The United States Environmental Protection Agency.

Epilimnion: If a lake is deep enough, the water stratifies into layers created by the differing temperature and density of the water. The upper warmer, lighter layer is referred to as the epilimnion. The cooler, denser layer is referred to as the hypolimnion. The transitional layer between the epilimnion and the hypolimnion is referred to as the thermocline or metalimnion.

Existing uses: Those uses actually attained by Ojibwa peoples in a waterbody on or after November 28, 1975, whether or not they are included in the water quality standards.

Great Lakes System: All the streams, rivers, lakes, and other waterbodies within the drainage basin of the Great Lakes within the United States.

Hydric: Water saturated.

Hypolimnion: If a lake is deep enough, the water stratifies into layers created by the differing temperature and density of the water. The upper warmer, lighter layer is referred to as the epilimnion. The cooler, denser layer is referred to as the hypolimnion. The transitional layer between the epilimnion and the hypolimnion is referred to as the thermocline or metalimnion.

Loading: The addition of a substance to a waterbody.

Micrograms per liter (ug/l): Equivalent to 10^{-9} kilograms per liter; may also be referred to as parts per billion (ppb).

Milligrams per liter (mg/l): Equivalent to 10^{-6} kilograms per liter; may also be referred to as parts per million (ppm).

Natural background conditions: The expected conditions that exist in the absence of any impact from point or non-point source pollutants attributable to human activity or from physical alteration attributable to human activity.

Natural biological community: The characteristic/expected biological community for a water body absent human-induced impacts to water bodies including wetlands.

Nonpoint source pollution: Pollution sources that are diffuse and do not have a single point of origin and are introduced into a receiving stream or other body of water, from a nonspecific outlet. The pollutants are generally carried by runoff, including urban runoff. This term includes other sources of pollution that generally cannot be classified as point sources of pollution. Common sources include agriculture, urban areas, certain industrial activities, construction sites, land disposal, dams and other hydrologic and hydraulic modifications.

Numeric criteria: Criteria expressed as a concentration of chemicals in water or properties of water that serves to protect a designated use.

Organoleptic effects: Non-toxicity based criteria for taste and odor which make water and edible aquatic life unpalatable but nontoxic to humans.

***Outstanding Keweenaw Bay Indian Community Resource Waters (OKRWs)*:** All waters, including any portion flowing through or adjacent to, within the exterior boundaries of the Reservation *not designated* on Table 5.3.1 as Outstanding National Resource Waters (ONRWs) are designated as Outstanding Keweenaw Bay Indian Community Resource Waters (OKRW). OKRWs are important for the cultivation of wild rice or have other special resource values. These waters are considered to be of high quality and culturally important for the fisheries and ecosystems they support. This classification corresponds to a Tier 2 classification under USEPA's antidegradation policy.

Outstanding National Resource Waters (ONRWs): Waters designated as ONRWs within these regulations will not be subject to any lowering of water quality for economic or social development purposes. Waters designated as ONRWs are shown on Table 5.3.1 in Section 5.3 of these regulations. These waters correspond to Tier 3 waters under USEPA's antidegradation policy.

Permit: A legal authorization or license which regulates activity within the L'Anse Reservation and is issued by the Community or other appropriate permitting authority.

Permitting authority: Regulatory authority relative to issuance of permits pursuant to the CWA lies with the Environmental Protection Agency, until such time as permitting authority maybe delegated by the EPA to the Keweenaw Bay Indian Community.

Point source: Any discernable, confined and discrete conveyance from which wastewater is or may be discharged to the waters of the Reservation that may include, but is not limited to, a pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other watercraft from which pollutants are or may be discharged.

Pollutant: Shall have the meaning found in 33 USC § 1362 (6).

Pollution: Shall have the meaning found in 33 USC § 1362 (19).

Receiving waters: The waters or watercourse of the Reservation into which an effluent is or may be discharged.

Recreational use: Refer to designated uses, chapter 3, herein.

The Reservation: Refers to the L'Anse Indian Reservation and informal reservation lands as EPA may include within the scope of the approved KBIC TAS application. A map of the established exterior boundaries of the L'Anse Indian Reservation and informal reservation lands can be found in Appendix B.

Sewage: The waste and wastewater discharged into sewers from homes and industry.

Surface water: All water above the surface of the ground within the boundaries of the Reservation including but not limited to lakes, ponds, reservoirs, artificial impoundments, streams, rivers, springs, seeps, and wetlands.

Thermocline: If a lake is deep enough, the water stratifies in to layers created by the differing temperature of the water which alters its density. The upper, warmer, less dense layer is referred to as the epilimnion. The lower, cooler, denser layer is referred to as the hypolimnion. The transitional layer between the epilimnion and the hypolimnion is referred to as the thermocline or metalimnion.

Tribal Council: Twelve members of an elected governing body of the Keweenaw Bay Indian Community. This body is empowered with authority and jurisdiction over the Keweenaw Bay Indian Community which is dictated by the Constitution and Bylaws of the Keweenaw Bay Indian Community.

Tributary: A river, stream, or creek inlet flowing into a larger waterbody.

Trophic level: This refers to the arrangement of producer and consumer aquatic organisms into hierarchical feeding levels. These levels are based on the role of an organism within the food web. Each individual level is referred to as a trophic level and is assigned a number.

Turbidity: The presence of organic and/or inorganic particulate matter and/or planktonic organisms in water which results in decreased water clarity causing it to appear unclear, discolored, murky, or opaque.

Uptake: The acquisition of a substance from the environment by an organism as a result of any active or passive process.

Urban runoff: Storm water from city streets and adjacent domestic or commercial properties, construction and other surface disturbance sites, parking lots and other impermeable surfaces. It is one of the means by which terrestrial pollutants are conveyed to receiving waters.

Water quality standards variance: A temporary exemption from any water quality for specific pollutants granted to an individual entity, corporation, or business.

Warm water fishery use: Refers to designated uses, chapter 4, herein.

Wastewater: The liquid waste resulting from commercial, institutional, domestic, industrial, and agricultural activities, also including cooling and condensing waters, sanitary sewage, stormwater runoff, and industrial waste.

Water column: The pelagic/open water in a body of water that is measured from the surface to the bottom sediments.

Waters of the Reservation: Such accumulations of water, surface and/or underground, natural or artificial, public and private, or parts thereof, which are wholly or partially within, flow through, or border upon the Reservation. The term does not include any pond, reservoir or facility built water body for reduction or control of pollution or cooling of water prior to discharge unless the discharge therefrom causes or threatens to cause water pollution. This definition includes inland lakes, rivers, streams, creeks, impoundments, and open drains and all other surface waterbodies of water within the Reservation.

Wetlands or wetland ecosystems: Transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. It includes those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in hydric soil conditions. Wetlands generally include swamps, marshes, bogs, muskegs, fens, and similar areas.

Whole effluent: The total effect of an effluent measured directly with a toxicity test.

Wild rice (Zizania palustris / aquatica): A tall, aquatic grass which produces an edible grain native to the regional areas of Canada and the northern United States. The harvesting, propagation, and protection of wild rice are of significant cultural value to the Keweenaw Bay Indian Community.

Wildlife use: See Designated Uses Chapter 3, herein.

Chapter 3: Designated Uses and Affected Waterbodies

Section 3.1 Designated Uses

The following are the designated uses that apply to all surface waters of the Keweenaw Bay Indian Community:

3.1.1 Cold and Cool Water Fisheries (CW1 and CW2) This designated use applies to waterbodies supporting aquatic communities that thrive in relatively cold or cool water or areas which serve as spawning or nursery habitat or areas of overwintering for any cold or cool water fish species. Cold/Cool water fish that are typical to this region include, but are not limited to:

Cold Water (CW1)
Trout and salmon (salmonids),
Whitefishes (lake whitefish, cisco (commonly known as lake herring), deepwater chubs, etc.), and
Burbot, Lake Sturgeon, a variety of forage species (sucker, redhorse)

Cool Water (CW2)
Percids (walleye, yellow perch, log perch, etc.), and
Smallmouth bass, a variety of forage species (bullhead, sucker, common carp, black crappe, etc.)

3.1.2 Warm Water Fishery (WW). This designated use applies to warm water ecosystems or waterbodies that contain aquatic communities that thrive in relatively warm water or serve as spawning or nursery habitat for warm water fish species. Warm water fish that are typical of this region include, but are not limited to: largemouth bass, rock bass, various panfish (bluegill, pumpkinseed, sunfish, etc.), and various minnow (Cyprinidae) species.

3.1.3 Wetland (T). This designated use is for an area that will be protected and maintained for at least some of the following uses: maintaining biological diversity, providing recreational activities, erosion control, groundwater recharge, low flow augmentation, stormwater retention, prevention of stream sedimentation, and the propagation of wild rice.

3.1.4 Wildlife Use (W). This designated use is for any waters that are capable of providing a water supply, riparian habitat and/or provides a major dietary food source for the support and propagation of terrestrial or aquatic wildlife within the Reservation.

3.1.5 Recreational Use, Primary Contact (R^1) and Secondary Contact (R^2)

A. Primary Contact (R^1). This use designation is for the recreational use of any waterbody which involves prolonged direct contact with water to the point of complete submersion and involves the risk of incidental ingestion of water in quantities sufficient to

pose a potential health risk. These uses include swimming, water-skiing, surfing, skin/scuba diving, or any other activity which will most likely lead to immersion of the head into said waterbody.

B. Secondary Contact (R^2). This designation is for the recreational use of any waterbody where direct contact may but need not occur and does not normally involve immersion including the head or the incidental ingestion of water. These uses include boating, fishing, sailing, hiking, wading, hunting, trapping, or any other activity that would not likely lead to complete immersion into said waterbody.

3.1.6 Ceremonial, Religious, or Spiritual Use (S). This designated use is to protect and provide for the sacred relationship that exists between the Ojibwa people of Keweenaw Bay Indian Community and their waters, this use includes, but is not limited to, any ceremonial use of water, water-borne based religious practice or spiritual belief of a waterbody. This use also provides for ceremonies and other activities such as, but not limited to, the Sturgeon Feast, the "Breaking of the Water" ceremony, and any religious prayers or blessings practiced by the people of the Keweenaw Bay Indian Community.

3.1.7 Cultural Use (C). This designated use applies to waters which are suitable or potentially suitable for present, cultural, historical, or heritage uses by the Ojibwa people of the Keweenaw Bay Indian Community. This includes practices such as, but not limited to, harvesting of any aquatic/riparian flora or fauna for food, medicinal or ceremonial purposes, taking of water for use in traditional ceremonial healing practices, and historical feasts, fishing, hunting, and trapping.

3.1.8 Wild Rice (WR). This use applies to a stream, reach, lake, or impoundment, or portion thereof, presently, historically, or with the potential to be vegetated with wild rice that supports or has the potential to support wild rice habitat for sustainable growth and safe consumption.

3.1.9 Navigational Use (N). This use applies to all navigable waters and includes any waterway that has been used, or is susceptible to use by itself or in connection with other waterways, for the transportation of cargo, crew, or use as a highway of commerce.

3.1.10 Public Drinking Water Supply Use (P). Any raw surface water source that, after conventional treatment, provides as a source of safe water for various uses, including but not limited to, human consumption, cooking, food processing, and in food preparation or as an ingredient in foods and beverages for the Reservation.

3.1.11 Agricultural and/or Industrial Use (A). This use designation is for water for agricultural purposes including irrigation of crops, livestock watering, grazing, farming, ranching, and the support of vegetation. It also provides for the use of water for industrial cooling and processing purposes.

Section 3.2 Affected Waters and Associated Designated Uses

The waters listed on the following pages are those affected by Surface Water Quality Standards of the Keweenaw Bay Indian Community. As more than one designated use may apply to a given waterbody, the most restrictive water quality standards for the one or more of those designated uses shall apply to that waterbody.

Table 3.2.1 Designated uses for KBIC waterbodies.

Waters	Designated Uses												Location
	CW1	CW2	WW	T	W	R	S	C	WR	N	P	A	
Bella Lake Creek	Y	Y		Y	Y	R[2]	Y	Y				Y	51N 32W 25
Bishop Lake	Y	Y	Y		Y	R[1]	Y	Y	Y	Y			50N 33W 13 50N 33W 24
Camp Creek	Y				Y	R[2]	Y	Y				Y	51N 32W 25 51N 32W 36
Dakota Creek	Y			Y	Y	R[2]	Y	Y				Y	51N 32W 26 51N 32W 25 51N 32W 27 51N 32W 35 51N 32W 36
Daults Creek	Y			Y	Y	R[2]	Y	Y				Y	50N 33W 27 50N 33W 22 50N 33W 34 50N 33W 35
Dead Man's Creek	Y			Y	Y	R[2]	Y	Y					51N 33W 10 51N 33W 15 51N 33W 16 51N 33W 17 51N 33W 20 51N 33W 21
Denomie Creek	Y			Y	Y	R[2]	Y	Y					50N 33W 22 50N 33W 23 50N 33W 25 50N 33W 36 50N 32W 19
Gomanche Creek and its tributaries	Y			Y	Y	R[2]	Y	Y	Y			Y	50N 33W 13 50N 33W 12 50N 32W 07 50N 32W 06 50N 32W 19 50N 33W 24 50N 32W 30
Kallio Creek	Y				Y	R[2]	Y	Y					51N 32W 14 51N 32W 15 51N 32W 21 51N 32W 22 51N 32W 23
Kelsey Creek	Y				Y	R[2]	Y	Y	Y				51N 33W 05 51N 33W 06

Waters	Designated Uses												Location
	CW1	CW2	WW	T	W	R	S	C	WR	N	P	A	
													51N 33W 07 51N 33W 12 51N 33W 18
Laughs/Laws/ Lost Lake			Y		Y	R[1]	Y	Y	Y	Y			50N 32W 18
Linden Creek	Y				Y	R[2]	Y	Y				Y	50N 33W 03 50N 33W 02 50N 33W 01 50N 33W 12 50N 33W 11
Little Carp River	Y			Y	Y	R[2]	Y	Y					51N 33W 19 51N 33W 30 51N 33W 20 51N 33W 17 51N 33W 16 51N 33W 09 51N 33W 10 51N 33W 31
Little Silver Creek	Y			Y	Y	R[2]	Y	Y	Y				51N 32W 16 51N 32W 18 51N 32W 17 51N 32W 20 51N 32W 21 51N 32W 15 51N 32W 10
Meadow Creek	Y			Y	Y	R[2]	Y	Y				Y	51N 32W 31 51N 32W 29 51N 32W 30 51N 32W 32 51N 33W 36 50N 33W 03
Mud Lakes and Sloughs			Y	Y	Y	R[2]	Y	Y	Y	Y			51N 33W 15
Page(s) Creek	Y			Y	Y	R[2]	Y	Y				Y	50N 32W 06 50N 32W 05 50N 32W 08 50N 32W 09 50N 32W 17
Pekkala Creek	Y			Y	Y	R[2]	Y	Y	Y			Y	50N 33W 22 50N 33W 27 50N 33W 26 50N 33W 35
Pequaming coastal sloughs and wetland	Y	Y	Y	Y	Y	R[2]	Y	Y	Y	Y			51N 32W 04 51N 32W 09
Pinery Lakes			Y	Y	Y	R[1]	Y	Y	Y	Y		Y	51N 32W 32 50N 33W 02
Robillard Creek	Y	Y		Y	Y	R[2]	Y	Y	Y				50N 33W 14 50N 33W 15

Waters	Designated Uses											Location
	CW1	CW2	WW	T	W	R	S	C	WR	N	P	A	
													50N 33W 23 50N 33W 24 50N 33W 13 50N 33W 25 50N 33W 30
Sand Point Sloughs	Y	Y	Y	Y	Y	R[1]	Y	Y	Y	Y		Y	51N 33W 23 51N 33W 26 51N 33W 27
Silver River and its tributaries	Y	Y	Y	Y	Y	R[1]	Y	Y	Y	Y		Y	50N 32W 06 50N 32W 07 50N 32W 18 50N 32W 17 50N 32W 16 50N 32W 21 50N 32W 28 50N 32W 20 50N 32W 29 50N 32W 32 50N 32W 33 51N 32W 34 51N 32W 35 51N 32W 27 51N 32W 28 51N 32W 26 51N 32W 23 51N 32W 24 51N 32W 13 51N 31W 18 51N 32W 33
Third Lake (including its inlet creek)			Y	Y	Y	R[1]	Y	Y	Y	Y		Y	51N 32W 33
Unlabeled #1 Creek into Huron Bay	Y			Y	Y	R[2]	Y	Y					51N 31W 06 51N 32W 01 51N 32W 12
Unlabeled #2 Creek into Huron Bay	Y			Y	Y	R[2]	Y	Y					51N 31W 07 51N 32W 11 51N 32W 12
Unlabeled #3 Creek into Huron Bay	Y			Y	Y	R[2]	Y	Y					51N 31W 07 51N 32W 12

Chapter 4: Water Quality Standards and Criteria Protection Criteria for Water Quality

Section 4.1 Legislative Intent and Interpretation of this Chapter

To preserve and enhance the quality of the waters of the Reservation and to protect designated and existing uses, the following standards of water quality are established. These standards are established to govern water management decisions within the drainage basins that affect waters of the Reservation. To every extent practical and possible, the following general water quality criteria shall apply to all waters of the Reservation. In instances where more stringent standards for designated waterbodies are set, the stricter numerical standards supersede the general standards.

These standards may not reflect current water quality in all cases. Water quality of certain waters of the Reservation may not meet standards as a result of natural causes or conditions unrelated to human influence. Where waters of the Reservation may have been degraded due to past human activities and attainment of standards in the near future is not economically or technically achievable, these standards shall be used to improve water quality. These standards are the minimum water quality requirements by which the waters of the Reservation are to be managed.

The water quality standards established herein are the minimally acceptable water quality conditions. Water quality shall be equal to or better than these minimal water quality conditions not less than ninety-five (95) percent of the time. Water quality standards shall apply at all flows equal to or exceeding the design flow. The subsequent design flow must be used unless data exist to demonstrate that an alternate design flow is more appropriate.

Section 4.2 General Narrative Criterion

Pollutants shall not be present in concentrations that cause or may contribute to an adverse effect to human, plant, animal or aquatic life, or in quantities that may interfere with the normal propagation, growth, and survival of indigenous aquatic biota.

Section 4.3 Standards for Physical and Aesthetic Water Quality and Conventional Pollutants

4.3.1 Physical and Aesthetic Water Quality: The waters of the Reservation shall not have any of the following unnatural physical properties in quantities, which are or may become injurious to any designated use or that impair the aesthetic value of the waterbody:

A. Deposits
B. Color
C. Oil films
D. Floating solids

E. Foams
F. Settleable solids
G. Suspended solids
H. Turbidity
I. Floating debris or other materials as a result of human activity in amounts sufficient enough to be unsightly or cause degradation

4.3.2 Dissolved Solids: The addition of any dissolved solids shall not exceed concentrations which are or may become injurious to any designated use. Point sources containing dissolved solids shall obtain any and all applicable permits. At no instance shall total dissolved solids in the waters of the Reservation exceed a concentration of 500 mg/L as a monthly average or more than 750 mg/L at any time as a result of controllable point sources. Waters connecting to Keweenaw Bay and waters designated as a public water supply source shall not exceed 50 mg/L of chlorides as a monthly average.

4.3.3 Organoleptic Substances: The waters of the Reservation shall contain no taste-producing or odor-producing substances in concentrations that impair or may impair their use for a public or agricultural water supply source or as recreational water or impair the palatability of fish as measured by test procedures approved by EPA.

4.3.3 Hydrogen Ion Concentration: The hydrogen ion concentration expressed as pH shall be maintained within the range of 6.5 to 8.5 in all waters of the Reservation. Any artificially induced variation in the natural pH shall remain within this range and shall not exceed 0.5 units of pH. The pH is not permitted to fluctuate in excess of 1.0 pH unit over a 24-hour period for other than natural causes.

4.3.4 Nutrients: Reservation waters shall not exceed 3ug/L of chlorophyll-a, 5 ug/L of phosphorus, or 20mg/L of nitrogen and shall be free from other nutrients entering the waters as a result of human activity in concentrations that create nuisance growth of macrophytes, fungi, bacteria, or algae.

4.3.5 Dissolved Oxygen: Unless otherwise demonstrated through a use attainability analysis or site-specific criterion that aquatic life cannot be supported, a water body capable of supporting aquatic life shall have a daily minimum dissolved oxygen standard of 5 mg/L in all cases except waters designated as a Cold Water Fishery. For those waters designated as a Cold Water Fishery, the dissolved oxygen shall have a daily minimum of 6 mg/L at any time and 8 mg/L when and where early life stages of cold water fish occur. These criteria will not apply to areas with lower dissolved oxygen due to their natural conditions.

4.3.6 Temperature: The natural daily and seasonal temperature fluctuations of the Reservation waters shall be preserved including the natural seasonal stratification – epilimnion, thermocline, and hypolimnion -- of water bodies. No measurable change (increase or decrease) in temperature from other than natural causes shall be allowed that causes or contributes to an

adverse effect to the natural biological community. For those waters designated as a Cold Water Fishery, there shall be no measurable increase in temperature from other than natural causes.

4.3.7 Microorganisms

A. Enterococci: Culturable enterococci at a geometric mean (GM) of 35 colony forming units (CFU per 100 milliliters (mL) and a statistical threshold value (STV) of 130 cfu per 100 mL, measured using EPA Method 1600, or any other equivalent method that measures culturable enterococci.

B. E. coli: Culturable E. coli at a geometric mean of 126 cfu per 100 mL and an STV of 410 cfu per 100 mL measured using EPA Method 1603, or any other equivalent method that measures culturable E. coli.

C. The waterbody geometric mean should not be greater than the selected geometric mean magnitude in any 30-day interval. There should not be greater than a ten percent excursion frequency of the selected STV magnitude in the same 30-day interval.

Section 4.4 Radionuclides

Concentrations of radioactive pollutants shall not exceed the background concentration caused by naturally occurring materials.

Section 4.5 Wild Rice

Water quantity and quality that may limit the growth and propagation of, or otherwise cause or contribute to an adverse effect to wild rice, wildlife, and other flora and fauna of cultural importance to the Tribe shall be prohibited. The following criteria shall be met in reservation waters with a wild rice use designation:

A. natural erosion or sedimentation patterns,
B. natural sedimentation rates,
C. natural water temperature variations, and
D. sulfate less than 10mg/L.

Section 4.6 Numeric Criteria for the Protection of Human Health, Aquatic Life, and Wildlife

4.6.1 Numeric Criteria. Numeric criteria shall apply to all Reservation waters in order to govern water management decisions and activities that affect Reservation waters, and to protect and enhance water quality. The numeric criteria as set forth in Tables 4.6.1 – 4.6.4 have been established for different objectives, in particular, the protection of human health, aquatic life, and wildlife; further, both acute and chronic criteria apply.

Table 4.6.1 Numeric Criteria for the Protection of Human Health.

Table 4.6.2 Aquatic Life Chronic and Acute Toxicity Values

Table 4.6.3 Water Quality Criteria for the Protection of Wildlife

Table 4.6.4 Water Quality Criteria for Organoleptic Effects

Unless otherwise stated, all concentrations expressed in these criteria represent dissolved concentrations to better approximate the bioavailable fraction in the water column.

4.6.2 Application Criteria Where More Than One Criterion Exists in the Tables. Levels of pollutants in the surface waters of the Reservation shall not exceed the lowest applicable aquatic life, human health, or wildlife value where the applicability of a value is determined by the waters designated use.

4.6.3 A Pollutant For Which There Is No Numeric Criterion in the Tables. In the absence of an aquatic life, human health, or wildlife value for a given pollutant in Tables 4.6.1 – 4.6.4, values shall be derived in accordance with the methodology described in 40 CFR 132, Final Water Quality Guidance for the Great Lakes Basin, as amended.

Table 4.6.1. Water quality criteria for protection of human health. Values in red are the lowest values of either the calculated values for KBIC based on their fish consumption rate, EPA revised values from 2015, or EPA's Great Lakes Initiative values.

Pollutant	CASRN	Drinking Water (ug/L)	Nondrinking Water (ug/L)
Benzene (c)	71-43-2	2.2	6.8
alpha-BHC	319-84-6	3.9 E–4	3.9 E–4
beta- BHC	319-85-7	1.0 E–3	1.0 E–3
total BHCs (Hexachlorocyclohexanes)	608-73-1	1.0 E–3	1.0 E–3
Chlordane (c)	57-74-9	1.70E-4	1.70E-4
Chlorobenzene	108-90-7	43	63
Cyanides	n/a	17	4000
DDD (c)	72-54-8	7.1 E–5	7.1 E–5
DDE (c)	72-55-9	4.7 E–6	4.7 E–6
DDT (c)	50-29-3	1.2 E–5	1.2 E–5
Dieldrin (c)	60-57-1	6.1 E-7	6.1 E-7
2,4-Dimethylphenol	105-67-9	7.9	20
2,4-Dinitrophenol	51-28-5	0.92	3.0
Heptachlor	76-44-8	6.7 E-4	6.8 E-4
Hexachlorobenzene (c)	118-74-1	4.3 E-5	4.3 E-5
Hexachlorobutadiene (c)	87-68-3	0.12	0.12
Hexachloroethane (c)	67-72-1	0.093	0.093

Lindane (gamma-BHC) (c)	58-89-9	0.13	0.13
Mercury (including methylmercury)	22967-92-6	1.8 E-3	1.8 E-3
Methylene Chloride (Dichloromethane) (c)	75-09-2	20	247
Mirex	2385-85-5	1.4 E-2	1.4 E-2
PCBs (as a class) (c)	27323-18-8	2.0 E -6	2.0 E -6
Pentachlorobenzene	608-93-5	0.12	0.12
2,3,7,8-TCDD (dioxin) (c)	1746-01-6	1.3 E-10	1.3 E-10
1,2,4,5-Tetrachlorobenzene	95-94-3	0.24	0.24
Toluene	108-88-3	24	39
Toxaphene (c)	8001-35-2	6.8 E-5	6.8 E-5
Trichloroethylene (c)	71-55-6	0.6	2.6

Legend: (c) carcinogen

Table 4.6.2. Aquatic life chronic and acute toxicity values. HD indicates that values are dependent on water hardness. BLM indicates values dependent on Biotic Ligand Model.

Pollutant	CASRN	Aquatic Life Chronic Toxicity (ug/L)	Aquatic Life Acute Toxicity (ug/L)
Acenaphthene	83-32-9	19	48
Acetic Acid	64-19-7	360	3200
Acetone	67-64-1	1700	15000
Acrylonitrile	107-13-1	37	330
Alachlor	15972-60-8	11	150
Arsenic (III)	22569-72-8	148	340
Atrazine	1912-24-9	7.3	50
Barium	7440-39-3	190	1200
Benzene	71-43-2	200	890
Boron	7440-42-8	1400	12000
Bromine	7726-95-6	0.27	2.4
Bromomethane	74-83-9	35	320
Butylamine	109-73-9	57	510
Cadmium	7440-43-9	HD	HD
Chlordane	57-74-9	0.029	0.27
Chlorine	7782-50-5	3.9	19
Chlorobenzene	108-90-7	47	420
Chloroform	67-66-3	170	1300
6-Chloropicolinic acid	4684-94-0	26	230
2-Chlorophenol	95-57-8	22	200
4-Chlorophenol	106-48-9	15	140
Chromium (III)	16065-83-1	HD	HD
Chromium (VI)	18540-29-9	11	16
Cobalt	7440-48-4	100	370
Copper	7440-50-8	BLM	BLM
Cyanazine	21725-46-2	110	1000
Cyanide (as free CN^-)	57-12-5	5.2	22
2,4-D (2,4- Diphenyldioxyacetic acid)	94-75-7	220	1400
DDT	50-29-3	0.0032	0.029
1,2-Dichlorobenzene	95-50-1	16	140
1,3-Dichlorobenzene	541-73-1	38	210
1,4-Dichlorobenzene	106-46-7	13	80
3,3'-Dichlorobenzidine	91-94-1	4.5	41
1,2-Dichloroethane	107-06-2	1000	7700
1,1-Dichloroethylene	75-35-4	65	1200

Pollutant	CASRN	Aquatic Life Chronic Toxicity (ug/L)	Aquatic Life Acute Toxicity (ug/L)
1,2-Dichloropropane	78-87-5	360	3200
2,4-Dichlorophenol	120-83-2	19	160
Dieldrin	60-57-1	0.056	0.24
Diethylamine	109-89-7	20	180
Di-n-butyl phthalate	84-74-2	9.7	38
2,4-Dimethylphenol	105-67-9	12	80
Dimethylsulfoxide	67-68-5	1.9E5	1.7E6
2,4-Dinitrophenol	51-28-5	12	110
1,4-Dioxane	123-91-1	2.2E 4	2.0E 5
Endrin	72-20-8	0.036	0.086
N-ethylaniline	103-69-5	1.8	16
Ethylbenzene	100-41-4	18	160
bis (2-ethylhexyl) phthalate	117-81-7	0	285
Fluoranthene	206-44-0	1.6	14
Fluorene	86-73-7	12	110
Formaldehyde	50-00-0	120	1000
Hexachloroethane	67-72-1	8	70
Hydrogen peroxide	7722-84-1	10	92
Hydrogen sulfide	7783-06-4	0.088	0.8
Lead	7439-92-1	HD	HD
Lindane (gamma-BHC)	58-89-9		0.95
Lithium	7439-93-2	25	155
Manganese	7439-96-5	140	1200
Mercury (II)	n/a	0.77	1.4
Methylene Chloride (Dichloromethane)	75-09-2	940	8500
Molybdenum	7439-98-7	800	7200
Naphthalene	91-20-3	13	100
Nickel	7440-02-0	HD	HD
4-Nitrophenol	100-02-7	60	540
N,N-dimethylacetamide	127-19-5	4100	37000
Nonylphenol	25154-52-3	1.8	6.8
o-cresol	95-48-7	82	740
Octylphenol	140-66-9	2	13
Parathion	56-38-2	0.013	0.065
Pentachlorophenol	87-86-5	15	19
Phenanthrene	85-01-8	2.4	21
Phenol	108-95-2	210	1600
Propylene oxide	75-56-9	220	2000
Selenium	7782-49-2	4.6	17.8

Pollutant	CASRN	Aquatic Life Chronic Toxicity (ug/L)	Aquatic Life Acute Toxicity (ug/L)
Silver	7440-22-4	HD	HD
Strontium	7440-24-6	760	6900
Styrene	100-42-5	160	1400
1,1,2,2-Tetrachloroethane	79-34-5	380	910
Tetrachloroethylene	127-18-4	45	360
Tetrachloromethane	56-23-5	150	1300
Thallium	7440-28-0	10	78
1,2,4-Trichlorobenzene	120-82-1	30	100
1,1,1 Trichloroethane	71-55-6	200	1800
1,1,2-Trichloroethane	79-00-5	500	2800
Trichloroethylene	71-55-6	1800	200
2,4,8-Trichlorophenol	88-06-2	4.4	40
Triethylamine	121-44-8	260	1100
Toluene	108-88-3	140	840
Toxaphene	8001-35-2	0.005	0.15
Vanadium	7440-62-2	12	110
Xylene	1330-20-7	35	310
Zinc	7440-66-6	HD	HD

Table 4.6.3. Water Quality Criteria for the Protection of Wildlife

Pollutant	CASRN	Wildlife Chronic (ug/L)
DDT and metabolites	n/a	1.1E-5
Mercury (including methylmercury)	22967-92-6	1.3 E-3
PCBs (as a class)	27323-18-8	7.4E-5
2,3,7,8-TCDD (dioxin)	1746-01-6	3.1E-9

Table 4.6.4. Water quality criteria for organoleptic effects.

Pollutant	CASRN	Organoleptic Effects (ug/L)
Acenaphthene	83-32-9	20
2-Chlorophenol	95-57-8	0.1
4-Chlorophenol	106-48-9	0.1

Chromium (VI)	18540-29-9	32
Copper	7440-50-8	1000
Cyanide (as free CN^-)	57-12-5	44
2,4-Dichlorophenol	120-83-2	0.3
2,4-Dimethylphenol	105-67-9	400
Endrin	72-20-8	0.17 *
Pentachlorophenol	87-86-5	30
Phenol	108-95-2	300
2,4,8-Trichlorophenol	88-06-2	2
Zinc	7440-66-6	5000

KEY FOR TABLES 4.6.1-4.6.4

* concentration expressed as total concentration
a human health criteria for surface water with the designated use as a public drinking water source
b human health criteria for surface water with the designated use as primary contact recreation
c carcinogen
(class) Includes all 209 congeners of PCBs
App. A Refer to Appendix A, § I.A.2-3 for these values
BHC common name for hexachlorocyclohexanes
CASRN Chemical Abstracts System Reference Number
DWS National Primary Drinking Water Standards
E exponent, for example E-2 = 10^{-2}
(GLI) Criterion adopted directly from 40 CFR 132.6, Final Water Quality Guidance for the Great Lakes System
MFL million fibers per liter
MCL Maximum Contaminant Level
(PAH) Polycyclic Aromatic Hydrocarbon

TABLE DEFINITIONS

Acute Toxicity: The level of a toxicant, whole effluent or mixture in the ambient water column to which an aquatic community can be exposed briefly without resulting in unacceptable effects. It is equivalent to one half of the final acute value. The averaging period of 1 hour will be used for acute toxicity values.

Chronic Toxicity: The lowest concentration of a toxicant, whole effluent, or mixture that does not cause injurious or debilitating effects in an aquatic organism resulting from repeated long-term exposure to a substance relative to the organism's lifespan.

Organoleptic Effects: Non-toxicity based criteria for taste and odor, which make water and edible aquatic life unpalatable but not toxic to humans.

Chapter 5 Antidegradation, Variances and Mixing Zones

Section 5.1 Antidegradation Policy

This antidegradation policy shall be applicable to any action or activity by any source (nonpoint or point) that is anticipated to result in new or increased loading of pollutants to surface waters of the Keweenaw Bay Indian Community. Pursuant to these standards, for all waters of the Keweenaw Bay Indian Community, the level of water quality necessary to protect existing uses shall be maintained and protected. Where designated uses of the waterbody are not attained, there shall be no lowering of the water quality with respect to the pollutant or pollutants that are causing the nonattainment. In those cases where a lowering of water quality is associated with a thermal discharge, the decision to allow such degradation shall be consistent with section 316 of the Clean Water Act.

Section 5.2. Definitions

Bioaccumulative Chemical of Concern (BCC): A chemical which upon entering the surface water, by itself or as its toxic transformation product, accumulates in aquatic organisms. Generally, chemicals with a half-life in the water of less than eight weeks are not BCCs. BCCs in this regulation are those chemicals listed by USEPA as BCCs at 40 CFR Part 132, Table 6, as amended.

Chemical of Concern: A chemical on EPA's list of pollutants that are the focus of the Great Lakes Water Quality Initiative identified in 40 CFR 132.6 Table 6, as amended. The pollutants on this list are categorized as either bioaccumulative chemicals of concern (BCCs) or pollutants that are not bioaccumulative but still of concern.

Control Document: Any authorization issued by the permitting authority to any source of pollutants to waters under its jurisdiction that specifies conditions under which the source is allowed to operate.

Non-bioaccumulative Chemical of Concern (NBCC): A chemical on EPA's list of pollutants that are the focus of the Great Lakes Water Quality Initiative identified in 40 CFR Part 132 Table 6, as amended, which are categorized by USEPA as non-bioaccumulative.

Load allocation (LA). The definition found in 40 CFR 130.2(g), as amended.

Total maximum daily load (TMDL): The definition found at 40 CFR 130.2(i).

Outstanding Keweenaw Bay Indian Community Resource Waters (OKRWs): All waters, including any portion flowing through or adjacent to, within the exterior boundaries of the Reservation *not listed* on Table 5.3.1 as Outstanding National Resource Waters (ONRWs) *are designated* as Outstanding Keweenaw Bay Indian Community Resource Waters (OKRW).

OKRWs are important for the cultivation of wild rice or have other special resource values. These waters are considered to be of high quality and culturally important for the fisheries and ecosystems they support. This classification corresponds to a Tier 2 classification under USEPA's antidegradation policy.

Outstanding National Resource Waters (ONRWs): Waters designated as ONRWs within these regulations will not be subject to any lowering of water quality for economic or social development purposes. Waters designated as ONRWs are shown on Table 5.3.1 in Section 5.3 of these regulations. These waters correspond to Tier 3 waters under USEPA's antidegradation policy.

Section 5.3 Designation of Waters and Applicable Standards

5.3.1 Outstanding National Resource Waters (ONRWs)

A. Waters designated as ONRWs will not be subject to any lowering of water quality and they shall be protected.

B. No new or increased discharges shall be allowed to ONRW-designated waters of the Reservation. Temporary (i.e., weeks or months) lowering of water quality may be permitted, as determined on a case by case basis, by the KBIC Natural Resources Deaprtment.

Table 5.3.1 at the end of this subsection 5.3 lists those waters that have been designated as ONRWs.

5.3.2 Outstanding Keweenaw Bay Indian Community Waters (OKRWs)

A. For waters designated as OKRWs, all new discharges of any BCC are prohibited.

B. New or increased discharges may be permitted provided that the new or increased discharge does not result in a change in background conditions or negatively impact designated uses or existing uses.

C. For new or expanded discharges to OKRWs which do not contain any BCCs, the permitting authority may choose to allow a lowering of water quality if, after appropriate public notice, pursuant to 40 CFR 132- Final Water Quality Guidance for the Great Lakes System, and fulfilling the intergovernmental coordination requirements and after due consideration of such technical, economic, social and other criteria in the area in which the water is located, *only* if it is demonstrated that there are no feasible and prudent alternatives to a lowering of water quality *and* the lower water quality is necessary to accommodate important tribal cultural, social and economic development on the Reservation. In addition, when allowing a lowering of water quality, the Community and permitting authority shall ensure, through the application of appropriate controls on point

and nonpoint pollutant sources, that water quality necessary to protect the associated designated uses is maintained and protected.

D. Any entity proposing new or increased discharges or loadings that will affect OKRW designated waters of the Reservation shall obtain the requisite control documents. In no case shall any new or increased discharges or loadings be allowed if they interfere with or become injurious to existing and designated uses or they would result in the violation of any applicable narrative or numeric criteria.

Table 5.3.1 Outstanding National Resource Waters

Waterbody	Location	Waterbody	Location
Silver River and its tributaries	50N 32W 06 50N 32W 07 50N 32W 18 50N 32W 17 50N 32W 16 50N 32W 21 50N 32W 28 50N 32W 20 50N 32W 29 50N 32W 32 50N 32W 33 51N 32W 34 51N 32W 35 51N 32W 27 51N 32W 28 51N 32W 26 51N 32W 23 51N 32W 24 51N 32W 13 51N 31W 18 51N 32W 33	Sand Point Sloughs	51N 33W 23 51N 33W 26 51N 33W 27
Mud Lakes and Sloughs	51N 33W 10 51N 33W 15 51N 33W 16 51N 33W 20 51N 33W 21	Pequaming Bay coastal wetland	51N 32W 04 51N 32W 05
Laugh's Lake	50N 32W 18		

Section 5.4 Antidegradation Implementation Procedures

Section 5.4.1 Antidegradation Demonstration. Any entity seeking to lower water quality of any waterbody of the Reservation or seeking an increase in a discharge of any Chemical of Concern must first submit an antidegradation demonstration for consideration by the Community and the appropriate regulatory authority. The antidegradation demonstration shall include, but may not be limited, to the following:

A. **Pollution Prevention Alternative Analysis.** Identification of any pollution prevention alternatives and techniques that are available to eliminate or significantly reduce the extent to which the increased loading results in a lowering of water quality.

B. **Alternative or Enhanced Treatment Analysis.** Identification of alternative or enhanced treatment techniques that are available that would eliminate the lowering of water quality and their costs relative to the cost of treatment necessary to achieve the applicable effluent limitations.

C. **Important Social and Economic Development Analysis.** Identification of the social and economic development benefits to the area in which the waters are located that will be foregone if the lowering of water quality is not allowed.

D. **Special Provision for Remedial Actions**. Entities proposing remedial actions pursuant to the CERCLA, as amended, corrective actions pursuant to the Resource Conservation and Recovery Act, as amended, or similar actions pursuant to other Federal or Tribal environmental statutes may submit information to KBIC that demonstrates that the action utilizes the most cost effective pollution prevention and treatment techniques available, and minimizes the necessary lowering of water quality of the antidegradation demonstration of subsection B and C of this Section 5.4.1.

5.4.2 Exemptions from Antidegradation Demonstration: Changes in loadings of any Chemical of Concern within the existing capacity and processes, and that are covered by the existing applicable control document, are not subject to an antidegradation review. These changes include, but are not limited to:

A. Normal operational variability;
B. Changes in intake water pollutants;
C. Increasing the production hours of the facility, (e.g., adding a second shift); or
D. Increasing the rate of production.

Also, excluded from an antidegradation review are new effluent limits based on improved monitoring data or new water quality criteria or values that are not a result of changes in pollutant loading.

5.4.1 Significant Lowering of Water Quality.

A significant lowering of water quality occurs when there is a new or increased loading of any BCC from any regulated existing or new facility, either point source or nonpoint source for which there is a control document or reviewable action, as a result of any activity including, but not limited to:

A. Construction of a new regulated facility or modification of an existing regulated facility such that a new or modified control document is required;
B. Modification of an existing regulated facility operating under a current control document such that the production capacity of the facility is increased;
C. Addition of a new source of untreated or pretreated effluent containing or expected to contain any BCC to an existing wastewater treatment works, whether public or private;
D. A request for an increased limit in an applicable control document;
E. Other deliberate activities that, based on the information available, could be reasonably expected to result in an increased loading of any BCC to any waters of the Great Lakes System.

Section 5.5 Antidegradation Decision

If the permitting authority determines that the antidegradation demonstration shows that lowering water quality is necessary to support important social and economic development in the area, then the permitting authority may authorize all or part of the proposed lowering to occur through the establishment of conditions in the control document. Prior to the issuance of a decision, the permitting authority shall publish a notice in a local newspaper and provide a minimum forty-five consecutive day comment period. During this comment period, any tribal member or other interested persons may request a public hearing of such changes or revisions by the permitting authority. The decision to hold a public hearing shall be made in accordance with 40 CFR 25. Upon approval of a public hearing request, the permitting authority shall by public notice in a local newspaper announce the date, time, and location of such public hearing and said public notice shall be published at least forty-five consecutive days prior to the public hearing. Any reports, documents, and data relevant to the discussion at the public hearing shall be made available at least thirty days before the hearing at the expense of the permitting authority.

Section 5.6 Variances

A variance is a temporary exemption from any water quality standard in situations where the ambient water quality conditions do not meet the water quality standards established herein. No variances will be granted by the Keweenaw Bay Indian Community from any water quality standard as they apply to Reservation waters, unless there is a full study and hearing regarding whether a variance is warranted and can still achieve protection of the waters of the reservation consistent with the Clean Water Act, the Great Lakes initiatives, and the standards, principles, and tribal intent underlying these regulations.

Section 5.7 Mixing Zones

5.7.1 General Guidelines. A mixing zone is a zone of initial dilution within the immediate area of a point source discharge. Generally, no mixing zones will be allowed. On a case by case basis, KBIC may allow mixing zones for discharges of non-bioaccumulative chemicals of concern to the waters of the Reservation.

5.7.2 Mixing Zones: Non-bioaccumulative Chemicals of Concern. To the extent any mixing zone is considered by KBIC, it will be reviewed and considered and subject to the methods and standards set forth in 40 CFR §132, Appendix E, the Great Lakes Water Quality Initiative Antidegradation Policy, and 40 CFR §132 Appendix F, Great Lakes Water Quality Initiative Implementation Procedures, as amended, and these regulations. Further, for approval by KBIC, proponents of mixing zones must also show that:

A. Exposure in the mixing zone will not cause an irreversible response that results in deleterious effects to populations of aquatic life or wildlife.
B. The mixing zone will not prevent the passage of fish or fish food organisms in a manner that would result in adverse impacts on their immediate or future populations.
C. The mixing zone will not jeopardize the continued existence of any endangered or threatened species listed under Section 4 of the Endangered Species Act, United States Code, Title 16, Section 1533, or result in the destruction or adverse modification of such species' critical habitat.
D. The mixing zone will not violate the provisions of Chapter 5 regarding antidegradation.
E. The mixing zone will not result in a harm of the cultural resources of KBIC.

5.7.3 Mixing Zones: Bioaccumulative Chemicals of Concern. Notwithstanding the provisions of subsection 5.7.1, there shall be no mixing zones available for new discharges of Bioaccumulative Chemicals of Concern, as defined by 40 CFR Part 132 Table 6, as amended, to the waters of the Reservation effective upon the adoption of this Ordinance. New discharges shall be defined as:

A. A discharge of pollutants to the waters of the Reservation from a building, structure, facility or installation, the construction of which commences after the date this ordinance takes effect or
B. An expanded discharge from an existing discharger that commences after the date this ordinance takes effect.

Appendix A: Support for Criteria Calculations

The basis for the human health calculations is presented below. As documented below, KBIC used EPA methods and guidance and adjusted input parameters more appropriate to KBIC tribal members based on a recent fish consumption survey of tribal members.

Table 1. Carcinogenic and Non-Carcinogenic COPCs for Updated Human Health WQC

Carcinogenic COPCs	Non-carcinogenic COPCs
benzene	chlorobenzene
chlordane	cyanides
DDT	2,4 dimethylphenol
dieldrin	2,4 dinitrophenol
hexachlorobenzene	lindane
hexachloroethane	mercury
methylene chloride	toluene
dioxins/furans (as 2,3,7,8-TCDD)*	dioxins/furans (as 2,3,7,8-TCDD)
PCBs (class)	
toxaphene	
trichloroethylene	

*inclusion of 2,3,7,8-TCDD in both columns of the table reflects EPA's contention that dioxin toxicity is deleterious as both a carcinogen and neurological disruptor

Equations

Human health-based WQC were calculated based on current, updated guidance from EPA (EPA 2000; FR 2000; EPA 2014, EPA 2015). Calculations were performed using the following equations:

For human non-cancer values (HNV):
$$\mathbf{RfD * RSC * BW/(DI + (\sum FI_i * BAF_i))}$$

For linear human cancer values (HCV):
$$\mathbf{RSD * BW/(DI + (\sum FI_i * BAF_i))}$$

Where:
RfD = reference dose for non-carcinogenic effects (mg/kg-day)
RSD = risk-specific dose for carcinogenic effects based on a linear low-dose extrapolation (mg/kg-day) and on the selected target risk level
RSC = relative source contribution factor to account for non-water sources of exposure (expressed as a fraction of the total exposure)
BW = human body weight (kg)
DI = drinking water intake (L/day)
FI_i = fish intake at trophic level (TL i (i = 3,4); this is the fish consumption rate (kg/d); and
BAF_i = bioaccumulation factor at trophic level I, lipid normalized (L/kg).

Table 2. Input Values for Calculation of Human Health Criteria

Chemical Name	CAS	Cancer Slope Factor, CSF (per mg/kg*d)	Reference Dose, RfD (mg/kg*d)	Relative Source Contribution RSC	Bioaccumulation Factor	
					Trophic Level 3 (L/kg tissue)	Trophic Level 4 (L/kg tissue)
benzene	71-43-2	0.015	0.0005	0.2	4.5	5.0
chlordane	57-74-9	0.35	0.0005	0.2	44,000	60,000
chlorobenzene	108-90-7	ND	0.02	0.2	19	22
cyanides	57-12-5	ND	0.0006	0.2	ND	ND
DDT	50-29-3	0.34	0.0005	0.2	240,000	1,100,000
dieldrin	60-57-1	16	0.00005	0.2	210,000	410,000
dioxins/furans (as 2,3,7,8-TCDD)				0.2		
hexachlorobenzene	118-74-1	1.02	0.0008	0.2	46,000	90,000
hexachloroethane	67-72-1	0.04	0.0007	0.2	280	600
lindane	58-89-9	ND	0.0047	0.5	2,400	2,500
mercury				0.2		
methylene chloride	75-09-2	0.002	0.006	0.2	1.5	1.6
PCBs (class)				0.2		
toluene	108-88-3	ND	0.0097	0.2	15	17
toxaphene	8001-35-2	1.1	0.00035	0.2	6,600	6,300
trichloroethylene	79-01-6	0.05	0.0005	0.2	12	13
2,4 dimethylphenol	105-67-9	ND	0.02	0.2	6.2	7.0
2,4 dinitrophenol	51-28-5	ND	0.002	0.2	4.4	4.4

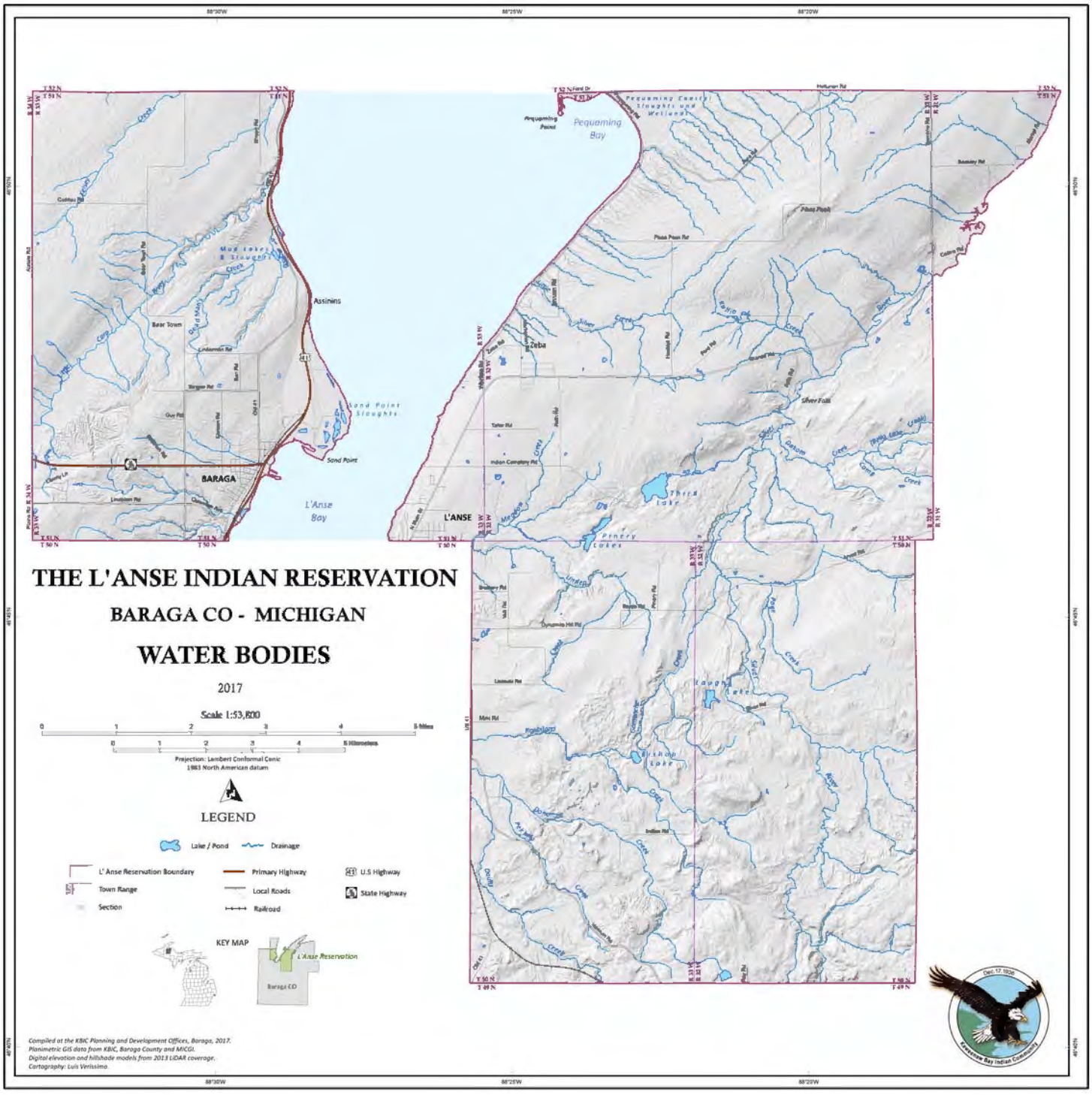
The EPA sources used for the updated inputs are summarized in Table 3 below.

Table 3. Specific Sources for Updated Exposure Input Parameters

Equation Input	Former Value / Updated Value	Source for Updated Values
Reference Doses (RfD)	Various	https://www.epa.gov/sites/production/files/2016-03/documents/summary_of_inputs_final_revised_3.24.16.pdf
Relative Source Contribution (RSC)	0.8/0.2	https://www.epa.gov/sites/production/files/2016-03/documents/summary_of_inputs_final_revised_3.24.16.pdf
Drinking Water Intake (DI)	2.0 L day/2.4 L day	https://nepis.epa.gov/Exe/ZyPDF.cgi/P100NAIG.PDF?Dockey=P100NAIG.PDF
Body Weight (BW)	70 kg/80 kg	https://nepis.epa.gov/Exe/ZyPDF.cgi/P100NAIG.PDF?Dockey=P100NAIG.PDF
Bioaccumulation Factors	Various	https://www.epa.gov/sites/production/files/2016-03/documents/summary_of_inputs_final_revised_3.24.16.pdf
Fish Intake Rate	22g per day/242 g per day	Assessment of the Keweenaw Bay Indian Community's Fish Consumption 2015

Appendix B: Map of the L'Anse

Legal Description of L'Anse Indian Reservation: T. 51 N., R. 33 W.; T. 51 N., R. 32 W.; All that part of T. 51 N., R. 31 W. lying West of Huron Bay; the West Half of T. 50 N., R. 32 W. and the East Half of T. 50 N., R. 33 W.



Ordinance 2016-01

Tribal Council President, Warren C. Swartz Jr., introduces the following ordinance:

An ordinance of the Keweenaw Bay Indian Community adopted under the authority of the Constitution and By-Laws of the Keweenaw Bay Indian Community ("the Tribe") for the purposes of securing the preservation of life, health, property, and natural resources of the Tribe and its people by ensuring that efficient, practicable, environmentally-sound, and nuisance-free waste management practices are implemented on the Keweenaw Bay Indian Community L'Anse Reservation.

§ 28.101 Title.

This Ordinance shall be known as the "Keweenaw Bay Indian Community Waste Management Ordinance" or "WMO."

§ 28.102 Declaration of Policy.

A. The beneficial stewardship and preservation of all natural resources of the Tribe, including the land, air, and waters of the Keweenaw Bay Indian Community L'Anse Reservation (the "Reservation Environment"), is a solemn obligation of the present generation for the benefit of future generations.

B. Each Person either residing on or doing business within the Keweenaw Bay Indian Community L'Anse Reservation (the "Reservation Population") benefits from a healthful environment, and each person has a responsibility to preserve and protect the quality of the Reservation Environment.

C. It is the policy of the Keweenaw Bay Indian Community to, consistent with the principles of due process, provide fair and effective procedures for enforcement of this Ordinance to both Tribal members and non-members that comprise the Reservation Population.

D. The Tribal Council, in enacting this Waste Management Ordinance, is taking action to secure the health and welfare of the Reservation Population and preserve the lands, waters and natural resources of the Reservation Environment. The Tribe further finds that this Waste Management Ordinance will not adequately protect the health of the Reservation Population or quality of the Reservation Environment unless it: (1) applies with equal force to Tribal members and non-members; and (2) is remedial in nature and shall be applied retroactively in order to address both the past disposal, as well as the future disposal, of Waste that poses or may pose a substantial risk to the human health of the Reservation Population and/or the quality of the land, waters, and resources of the Reservation Environment.

E. The primary purpose of this Ordinance is to ensure that efficient, practicable, environmentally-sound, and nuisance-free waste management procedures are practiced within the Reservation Environment.

§ 28.103 Definitions.

A. "Attorney" or "Tribal Attorney" means the attorney authorized by the Tribal Council to carry out the duties described in this Ordinance.

B. "Composting" means the controlled microbial degradation of solid waste yielding a safe and nuisance-free product.

C. "Construction and Demolition Waste" means the following materials from demolition and new construction: brick; mortar; concrete; clean wood; floor tile; ceramic tile; wallboard materials, including gypsum board ("sheet rock"); and plaster and paneling that cannot be separated from small amounts of steel or aluminum. Construction and Demolition Waste is not defined here to include any hazardous waste such as asbestos, waste paints, solvents, sealants, or any other chemicals utilized in the construction or demolition process.

D. "Council" or "Tribal Council" means the Tribal Council of the Keweenaw Bay Indian Community.

E. "Corrective Action" means action taken to address or ameliorate a condition caused by the disposal of Waste.

F. "Department" means the Natural Resources Department of the Keweenaw Bay Indian Community.

G. "Disposal" means the discharge, abandonment, deposit, injection, dumping, spilling, leaking, or placing of any Waste into or on any soil, air, or water within the Reservation Environment.

H. "Hazardous Waste" means any which (a) will persist in a hazardous form for three years or more at a disposal site and which in its persistent form (i) presents a significant environmental hazard and may be concentrated by living organisms through a food chain or may affect the genetic makeup of people or wildlife, (ii) is toxic to people or wildlife, or (iii) adversely affects living organisms in soil, sediment, surface water, ground water, or air; or (b) if disposed of at a disposal site in such quantities or concentrations as might present a hazard to people or the environment. This includes, but is not limited to: petroleum products, including sludge from within an underground storage tank; chlorine, anti-freeze; agricultural pesticides and fertilizers; and hazardous industrial chemicals.

I. "Household Hazardous Waste" means hazardous wastes derived from households, including single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds and day-use recreation areas. Such wastes include but are not limited to: non-latex paints; solvents; cleaners; petroleum products hazardous to the environment or human health; insecticides; herbicides; anti-freeze; car batteries; television tubes and screens; computer monitor tubes and screens; fluorescent light bulbs; light ballasts containing polychlorinated biphenyls (PCBs); and any other product produced for consumer use that could be hazardous to human health or the environment.

J. "Littering" means the discarding of Waste in areas or receptacles other than those designated for such materials.

K. "Medical Waste" means Waste that is produced during the treatment of humans or animals and includes, but is not limited to, blood, bodily fluid, products containing blood or bodily fluid, bodily tissue, bodily organs, and used medical instruments such as hypodermic needles, syringes, and scalpels.

L. "Mining Waste" means any Wastes associated with mining practices, including, but not limited to, tailings and sludge.

M. "Open Burning" means the outdoor burning of Waste.

N. "Open Dump" means any location or area within the Reservation Environment not authorized by the Tribe to accept Waste.

O. "Person," for the purposes of this Ordinance only, means an individual, firm, corporation, association, partnership, consortium, joint venture, commercial entity, state government agency, unit of local government, federal government agency, or a Tribal instrumentality subject to a waiver of sovereign immunity.

P. "Processing" means the reduction, separation, recovery, treatment or recycling of any Solid Waste.

Q. "Public notice" means notice published at least twice, with an interval of at least seven (7) days between the two (2) publication dates, in a newspaper or other publication of general circulation within the appropriate area, and/or by posting the notice at a reasonable number of conspicuous places within the appropriate area, and such posting to include, where possible, posting at the Keweenaw Bay Indian Community Tribal Center, the Department's Offices, and the Tribal Court.

R. "Putrescible" means Waste capable of being decomposed by microorganisms with sufficient rapidity as to cause nuisances from odors and gases, such as kitchen wastes, animal offal and carcasses.

S. "Radioactive Waste" means any Waste consisting of radioactive material or having radioactive properties.

T. "Recyclable Material" means office paper, glass, metal, plastic, aluminum, newspaper, corrugated paper, yard clippings, and other materials that may be recycled or composted.

U. "Recycling" means the process of sorting, cleansing, treating, and reconstituting Solid Waste or other discarded materials in order to prepare the altered form for use.

V. "Reservation Environment" means all lands and waters within the exterior boundaries of the L'Anse Reservation, and other lands held in trust status by the U.S. Government for the Tribe or its members.

W. "Reservation Population" means all persons residing or doing business within the Reservation Environment.

X. "Sanitary" means free of conditions that negatively affect hygiene, human health, or the environment.

Y. "Solid Waste" means all putrescible and non-putrescible solid, semisolid and liquid Waste, including but not limited to garbage, trash, refuse, paper, rubbish, ashes, industrial waste, construction and demolition waste, abandoned vehicles and parts thereof, discarded home and industrial appliances, manure, vegetable or animal solid and semisolid waste, other discarded solid, liquid and semisolid waste from a wastewater treatment plant, water supply treatment plant or air pollution control facility or other discarded containerized gaseous material resulting from industrial, commercial, mining or agricultural operations, or community activities; but not including hazardous waste; solid or dissolved material in domestic sewage; solid or dissolved material in irrigation return flows; industrial discharges that are point sources subject to permits under 33 U.S.C. §1342; or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended, 42 U.S.C. §§2011, et seq.

Z. "Store" means to place or leave in a location for later disposal.

AA. "Transfer Station" means a facility used to receive, temporarily store, or transfer solid waste directly from smaller to larger vehicles for transport.

BB. "Treatment" means any method, technique, or process designed or intended to change the physical, chemical or biological characteristics of any waste to render it less harmful to the quality of the soil, air and water; safer to handle; or easier to contain, manage or use as fuel, nutrient, soil amendment or other additive.

CC. "Tribal Court" means the Tribal Court of the Keweenaw Bay Indian Community.

DD. "Tribe" means the Keweenaw Bay Indian Community.

EE. "Waste" means Solid Waste, Hazardous Waste, Household Hazardous Waste, Yard Waste, Radioactive Waste, and Mining Waste, as well as any unwanted material resulting from a person's activities, including any producing, manufacturing, or processing operation; this includes such materials placed within containers of whatever nature prior to, and for purposes of, disposal.

FF. "Waste Disposal Facility" means a facility authorized to receive and dispose of Waste and includes all contiguous land and structures, as well as other appurtenances and improvements on the land.

GG. "Waste Hauler" means a provider of waste management services that picks up and transports Waste.

HH. "Yard Waste" means stumps, shrubbery, leaves, grass, hay, trees, sand, and other organic matter which is naturally found on or growing on the earth.

§ 28.104 Scope and Application of Laws – Jurisdiction and Procedure.

A. This Ordinance regulates the storage, collection, transportation and disposal of any Waste within the Reservation Environment.

B. This Ordinance applies to the Reservation Population and all lands held in trust status by the U.S. Government for the Tribe or its members.

C. The Tribe, including its Tribal agencies and courts, shall have exclusive jurisdiction over all matters arising under this Ordinance. Notwithstanding any other provision of Tribal law, for purposes of this Ordinance, the Tribe, including its Tribal agencies and courts, shall have territorial jurisdiction over the Reservation Environment, and shall have personal jurisdiction over the Reservation Population.

§ 28.105 Powers and Duties of the Natural Resources Department and Tribal Police Department

A. In addition to any other powers granted by Tribal or federal law, the Natural Resources Department may: (1) Conduct inspections and carry out investigations, including investigating reports of non-compliance with this Ordinance; (2) Implement administrative enforcement actions in accordance with this Ordinance; (3) Utilize the Tribal Attorney, including referring matters to the Tribal Attorney's Office, to enforce the provisions of this Ordinance; (4) Conduct Corrective Actions; (5) Register Waste Haulers that provide waste management services within the Reservation Environment; and (6) Propose that the Council amend this Ordinance or adopt additional ordinances intended to further the goals and purposes of this Ordinance.

B. The Natural Resources Department is authorized to develop proposed Waste Management guidelines and guidance documents consistent with this Ordinance, which shall not be implemented by the Department until approved by the Council.

C. A Waste Management Advisory Board ("Advisory Board") shall be established within 60 days of the enactment of this Ordinance; its purpose shall be to provide guidance to the Department regarding the implementation of this Ordinance. The Advisory Board members shall be appointed by the Tribal Council and serve two year terms. The Advisory Board shall consist of two members of the Tribal Council, who shall co-chair the Advisory Board, and one representative from each of the following Tribal organizations: the Health Department; the Housing Department; the Natural Resources Department; the Public Works Department; the Realty Department; the on-Reservation Transfer Station(s); the Tribal Historic Preservation Office; and the Tribal Police Department.

D. The provisions of this Ordinance shall be enforced by the Director of the Natural Resources Department or any designated employee of the Natural Resources Department, and by Tribal Police Officers or Tribal Conservation Officers.

§ 28.106 Waste Management

A. Disposal of Solid Waste within the Reservation Environment not in compliance with this Ordinance is expressly prohibited.

B. Open Dumping of any Waste anywhere within the Reservation Environment is expressly prohibited.

C. Except for the Open Burning of Yard Waste as may be authorized in accordance with other tribal law, the Open Burning of Waste within the Reservation Environment is expressly prohibited.

D. Solid Waste shall not contain any Household Hazardous Waste and shall be disposed of within the Reservation Environment by: (1) contracting with a Waste Hauler registered with the Department for the regular removal and appropriate Disposal of waste; or (2) disposing of such Solid Waste at a Waste Disposal Facility or Transfer Station authorized to receive such waste.

E. Household Hazardous Waste shall not contain any Solid Waste and shall be disposed of within the Reservation Environment by: (1) contracting with a Waste Hauler registered with the Department for the regular removal and appropriate Disposal of waste; or (2) disposing of such Household Hazardous Waste at a Waste Disposal Facility or Transfer Station authorized to receive such waste.

F. Disposal of Hazardous Waste anywhere within the Reservation Environment is expressly prohibited.

G. Unless specifically authorized by the subsequent action of the Tribal Council, no Mining Waste shall be collected, stored, treated, processed, disposed of, or reclaimed within the Reservation Environment.

H. Except for health care facilities specifically authorized by license issued by the State or Federal Government, no Radioactive Waste shall be collected, stored, treated, processed, disposed of, or reclaimed within the Reservation Environment.

I. This Ordinance is not intended to regulate Medical Waste generated at health care facilities or residences located within the Reservation Environment, so long as such Medical Waste is being managed and disposed of in accordance with other applicable law.

§ 28.107 Storage and Transportation of Waste

A. Sanitary Waste Storage. The owner or occupant of any dwelling, residence, premises or business establishment shall be responsible for the sanitary condition of said dwelling, residence, premises or business establishment. All waste shall be stored in a manner that: (1) poses no threat to human health or the environment; and (2) minimizes the potential of release of the Waste into the environment. Waste shall be disposed of in a timely manner so as not to cause unsanitary conditions or a nuisance. No Person shall place or deposit Waste of any kind on any public street, road, or alley within the Reservation, except in compliance with this Ordinance. If stored Waste is released into the environment, the person(s) responsible for storing such Waste shall re-store the released Waste in a timely manner so as not to cause unsanitary conditions or a nuisance.

B. Transportation of Waste. Waste transported within the Reservation Environment must be transported in a manner to prevent Disposal or Littering of such Waste. Any Person responsible for the Disposal or Littering of any Waste during transport of the Waste shall be strictly liable for all costs incurred due to the Disposal of such Waste, regardless of the Person's intent.

§ 28.108 Enforcement Actions

A. Warning of Violation; Notice of Violation; Cease and Desist Order; Enforcement Order. The Director of the Natural Resources Department, other authorized Natural Resources Department staff, Tribal Police Officers and Tribal Conservation Officers may enforce this Ordinance as follows:

1. Warning of Violation. A Warning of Violation may be issued to any Person(s) responsible for the violation of any provision of this Ordinance. Issuance of a Warning of Violation does not include the imposition of a Civil Fine but serves to notify those Person(s) of a need to comply with the provisions of this Ordinance.

2. Notice of Violation. A Notice of Violation may be issued to any Person(s) responsible for the violation of any provision of this Ordinance. Issuance of a Notice of Violation may include the imposition of a Civil Fine pursuant to Section 28.112 of this Ordinance.

3. Cease and Desist Order. A Cease and Desist Order may be issued to any Person(s) to prevent a threatened or continuing violation of this Ordinance. A Notice of Violation may be contemporaneously issued with a Cease and Desist Order. Each day of noncompliance with a Cease and Desist Order shall constitute a separate violation of this Ordinance.

4. Enforcement Order. An Enforcement Order may be issued to any Person(s) responsible for violation of any provision of this Ordinance, whether such violation occurred before or after enactment of this Ordinance. An Enforcement Order may require such responsible Person(s) to perform and/or fund Corrective Action(s),

including all administrative costs, necessary to remove Waste from the Reservation Environment and return the Reservation Environment to the state it was in before the disposal of the Waste.

§ 28.109 Informal Conferences

A. In general, the Department shall afford any Person issued a Warning of Violation, Notice of Violation, Cease and Desist Order, or Enforcement Order a period of not less than thirty (30) days within which to request the opportunity to participate in an Informal Conference before such action is deemed final; provided that if the Department determines that the alleged noncompliant behavior may pose an imminent or substantial threat to human health or the environment, the Department may require that immediate action be taken to address the threat before such informal conference takes place. Informal conferences shall be conducted by the Director of the Department or an authorized representative. The Director or his or her authorized representative have the authority to uphold, vacate, or amend any violation or order and shall issue their decision within twenty (20) days of the informal conference.

B. A Person participating in an Informal Conference may represent himself or herself or may appoint a representative at his or her expense.

C. The Department shall create a written record of the conference, which shall include the date and place of the conference, the persons in attendance, the subject matter of the conference, and a written decision that identifies whether the violation or order was upheld, vacated, or amended.

§ 28.110 Enforcement Hearings; Enforcement Orders

[Reserved]

§ 28.111 Judicial Review

A. In the event of non-compliance with an Order issued under this Ordinance, the Department may request the assistance of the Tribal Attorney's Office to bring an action exclusively in Tribal Court to secure compliance.

B. Any Person who has been issued a Notice of Violation, Cease and Desist Order, or Enforcement Order may challenge such Notice or Order by filing a petition for review in the Tribal Court within thirty (30) days after receiving the Director's decision following the Informal Conference or if no informal conference is requested, within forty-five (45) days of receiving the Notice or Order. The Court is authorized to hear such petition and shall uphold the Department's actions unless they were arbitrary and capricious, or contrary to applicable law. The Department may request the assistance of the Tribal Attorney's Office to defend the Department's actions.

C. A party to a Tribal Court action arising under this Ordinance may be represented by an attorney or may represent himself or herself. Parties may subpoena witnesses to appear and testify in the Tribal Court. Each party shall pay its own costs.

§ 28.112 Civil Fine

A. Open Burning. The Open Burning of all Wastes shall be treated as Disposal of those Wastes in violation of this Ordinance; however, violation of this Ordinance's provisions concerning Open Burning of Solid Waste shall result in the following civil penalties:

1. A first offense for Opening Burning of Solid Waste on or before July 1, 2016, shall result in a warning and the person may be directed to attend an educational program as may be established by the Department.

2. A second offense for Opening Burning of Solid Waste on or before July 1, 2016, is subject to a civil penalty of up to $50.00 per day per violation.

3. Opening Burning of Solid Waste that occurs after July 1, 2016, is subject to a civil penalty of up to $75.00 per day per violation.

B. Solid Waste and Household Hazardous Waste. The violation of any provision of this Ordinance (other than § 28.112(A)) concerning Solid Waste or Household Hazardous Waste is subject to a civil penalty not to exceed $100.00 per day per violation.

C. Hazardous Waste and Other Wastes. Violation of any provision of this Ordinance concerning all other Wastes, including Hazardous Waste, Mining Waste, Radioactive Waste, and Medical Waste regardless of where the waste may have originated is subject to a civil fine not to exceed $500.00 per day per violation.

D. Enforcement Orders may impose civil fines in the event that a person found to have committed a violation of this Ordinance does not take Corrective Action in accordance with the Order within a prescribed timeframe. If a person who has been found to have committed a violation does not take Corrective Action within the prescribed timeframe, the Department may take the necessary Corrective Action, in which case the amount of any civil fine shall be increased by twice the amount of the cost incurred by the Tribal department or agency in taking such Corrective Action.

E. In addition to the foregoing civil fines, a Person in violation of any provision of this Ordinance may be ordered to attend an educational program concerning proper Waste Disposal practices.

F. Nothing herein shall prevent the Tribe from filing suit against any Person violating this Ordinance under any other portion of the Tribal Code or applicable law.

§ 28.113 Waste Management Account and Deposits Thereto

A. A waste management account, to be administered by the Department, may be established by the Tribal Council.

B. If established, the following funds shall be deposited into the waste management account: (1) Civil fines collected or other monies recovered under this Ordinance; (2) Funds appropriated or transferred to the account. All funds in the account shall be used only to carry out the purposes of this Ordinance.

§ 28.114 Waste Reduction Program

[Reserved]

§ 28.115 Effective Date

This Ordinance shall become effective immediately upon its enactment by the Tribal Council.

§ 28.116 Captions.

As used in this Ordinance, captions constitute no part of the law.

§ 28.117 Construction.

The provisions of this Ordinance are to be liberally construed to effectuate the policies and purposes of this Ordinance. In the event of a conflict between the provisions of this Ordinance and any other act or ordinance, the provisions of this Ordinance shall govern.

§ 28.118 Amendments

The Tribal Council reserves the sole right to amend, modify or revoke this Ordinance in accordance with applicable tribal law.

§ 28.119 Severability

If any provision of this Ordinance or its application to any person or circumstance is held invalid, the remainder of the Ordinance or the application of the provision to other persons or circumstances shall not be affected.

§ 28.120 Sovereign Immunity.

Nothing in this Ordinance shall be construed to constitute a waiver of the sovereign immunity of the Tribe, or of any instrumentality of the Tribe.

Motion by Eddy Edwards Seconded by Gary F. Loonsfoot, Sr.

Ayes 8 Nays 2 Abstained 0 Not Present 1

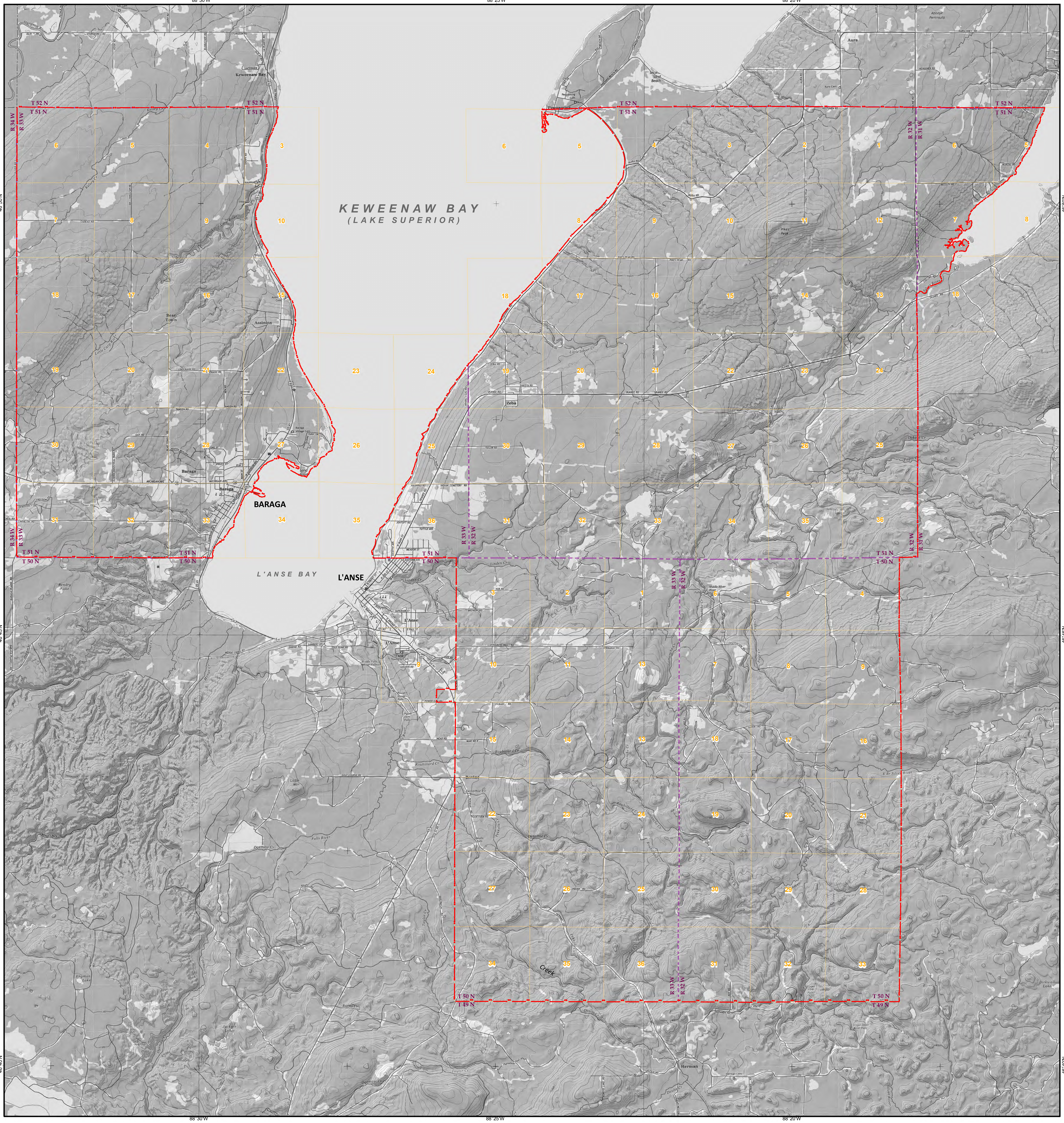
Adopted X (yes) _____(no) **Date: 5-26-2016**

CERTIFIED by the Secretary of the Keweenaw Bay Indian Community, this 15th day of June, 2016.

Susan J. LaFernier

SIGNED by the President of the Keweenaw Bay Indian Community, this 15th day of June, 2016.

Warren C. Swartz



PREPARED BY:

Luis Verissimo

DATE:

16 /October /2017

SIZE:

55 in x 49 in

REFERENCE:

KBIC-PDO-RB1-12O2017

THE L'ANSE INDIAN RESERVATION

BOUNDARIES

SCALE: 1:50,000

Every reasonable effort was made to ensure the accuracy and completeness of the planimetric data on this map up to the indicated reference scale. This map is not a substitute for an accurate field survey.

Compiled at the KBIC Planning and Development Offices, Baraga, 2017.
Boundary and Land Survey Planimetric Data: KBIC Geospatial Unit
Base cartographic coverage: USGS, 7.5 Minute Series (Topographic).
Hillshade model generated from USGS NED10m data.

CONVENTIONS

Reservation Boundary

Town / Range Line

09 Section Line

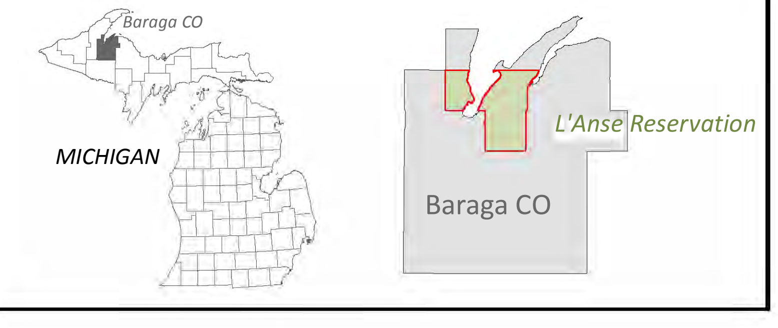
KBIC - OFFICE OF PLANNING & DEVELOPMENT

0 0.5 1 1.5 2 Miles

0 0.5 1 1.5 2 Kilometers

Projection: Lambert Conformal Conic
1983 North American datum

LOCATOR MAP



THE L'ANSE INDIAN RESERVATION

BARAGA CO - MICHIGAN

TOPOGRAPHY

2017

Scale 1:53,800

0 1 2 3 4 5 Miles

0 1 2 3 4 5 Kilometers

Projection: Lambert Conformal Conic
1983 North American datum

LEGEND

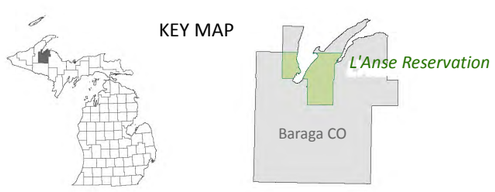
200 250 300 350 400 450 500 550

Elevation (m)

Lake Superior Average Water Level (m.a.s.l.):183.4m

- L' Anse Reservation Boundary
- Town Range (R 33 W / R 32 W)
- 09 Section
- Primary Highway
- Local Roads
- Railroad
- 41 U.S Highway
- M 38 State Highway
- Drainage

KEY MAP



Compiled at the KBIC Planning and Development Offices, Baraga, 2017.
Planimetric GIS data from KBIC, Baraga County and MICGI.
Digital elevation and hillshade models from 2013 LiDAR coverage.
Cartography: Luis Verissimo

Keweenaw Bay Indian Community
Dec. 17, 1936

THE L'ANSE INDIAN RESERVATION

BARAGA CO - MICHIGAN

WATER BODIES & DRAINAGE BASINS

2017

Scale 1:53,800

0 1 2 3 4 5 Miles

0 1 2 3 4 5 Kilometers

Projection: Lambert Conformal Conic
1983 North American datum

LEGEND

Lake / Pond
Drainage
Drainage Basin Boundary
L' Anse Reservation Boundary
Town Range
Section
Primary Highway
Local Roads
Railroad
U.S Highway
State Highway

KEY MAP

L'Anse Reservation
Baraga CO

Compiled at the KBIC Planning and Development Offices, Baraga, 2017.
Planimetric GIS data from KBIC, Baraga County and MICGI.
Digital elevation and hillshade models from 2013 LiDAR coverage.
Cartography: Luis Verissimo

Keweenaw Bay Indian Community
Dec. 17, 1936

THE L'ANSE INDIAN RESERVATION

BARAGA CO - MICHIGAN

WETLANDS

2017

Scale 1:53,800

0 1 2 3 4 5 Miles

0 1 2 3 4 5 Kilometers

Projection: Lambert Conformal Conic
1983 North American datum

LEGEND

Wetland

L' Anse Reservation Boundary

Town Range

Section

Primary Highway

Local Roads

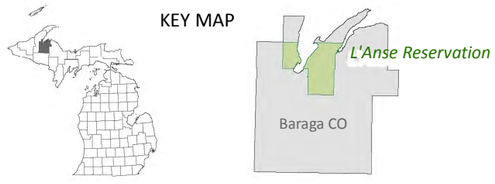
Railroad

U.S Highway

State Highway

Drainage

KEY MAP



Compiled at the KBIC Planning and Development Offices, Baraga, 2017.
Wetlands from: National Wetlands Inventory (NWI), USFWS.
Planimetric GIS data from KBIC, Baraga County and MICGI.
Digital elevation and hillshade models from 2013 LiDAR coverage.
Cartography: Luis Verissimo

Kewaunee Bay Indian Community Dec. 17, 1936

ORDINANCE 2016-02

Tribal Council President, Warren C. Swartz Jr., introduces the following ordinance:

An ordinance of the Keweenaw Bay Indian Community adopted under the authority of the Constitution and By-Laws of the Keweenaw Bay Indian Community for the purposes of securing the preservation of life, health, property, and natural resources of the Tribe and its people by providing for the cleanup of hazardous substances sites and to prevent the creation of future hazards due to improper disposal of hazardous substances on or into the air, land, surface water and ground waters, located within the Reservation Environment.

Keweenaw Bay Indian Community
TRIBAL CODE TITLE TWENTY
HAZARDOUS SUBSTANCES CONTROL ORDINANCE

TABLE OF CONTENTS

TITLE TWENTY

§ 20.201 Title.

This Ordinance shall be known as the "Keweenaw Bay Indian Community Hazardous Substances Control Ordinance" or "HSCO."

§ 20.202 Declaration of Policy.

A. The beneficial stewardship and preservation of all natural resources of the Tribe, including the land, air, and waters of the Reservation Environment of the Keweenaw Bay Indian Community, is a solemn obligation of the present generation for the benefit of future generations.

B. Each person either residing on or doing business within the Reservation Environment ("Reservation Population") benefits from a healthful environment, and each person has a responsibility to preserve and protect the quality of the Reservation Environment.

C. The Tribal Council, in enacting this Hazardous Substances Control Ordinance, is taking action to secure the preservation of life, health, property, and natural resources of the Tribe and its people. The Tribe further finds that this Tribal Hazardous Substances Control Ordinance will only adequately protect the health of the Reservation Population and the quality of the Reservation Environment if it applies with equal force to Tribal members and non-members and is a remedial measure that is intended to address both future as well as past releases of hazardous substances that pose a substantial risk to human health and the quality of the land, waters and resources of the Keweenaw Bay Indian Community.

D. The main intent of this Ordinance is to provide for the cleanup of hazardous substances sites and to prevent the creation of future hazards due to improper disposal of hazardous substances on or into the air, land, surface water and ground waters, located within the Reservation Environment.

§ 20.203 Definitions.

A. "Attorney" or "Tribal Attorney" means the attorney authorized by the Tribal Council to carry out the duties as described in this Ordinance.

B. "Agreed order" means an order issued by the Department under this Ordinance with which the potentially liable person receiving the order agrees to comply. An agreed order may be used to require or approve any cleanup or other remedial actions, but it is not a settlement under §20.206(D), and shall not contain a covenant not to sue, or provide protection from claims for contribution.

C. "Council" means the Tribal Council of the Keweenaw Bay Indian Community.

D. "Department" means the Natural Resources Department of the Keweenaw Bay Indian Community.

E. "Director" means the Director of the Natural Resources Department of the Keweenaw Bay Indian Community.

F. "Facility" means:

1. any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond,

lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, vessel, or aircraft, or

2. any site or area where a hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed of, released, or placed, or otherwise come to be located.

G. "Federal cleanup law" means the federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. § 9601 et seq., as amended by Public Law 99-499 through the effective date of this Ordinance.

H. "Foreclosure and its equivalents" means purchase at a foreclosure sale, acquisition, or assignment of title in lieu of foreclosure, termination of a lease, or other repossession, acquisition of a right to title or possession, an agreement in satisfaction of the obligation, or any other comparable formal or informal manner, whether pursuant to law or under warranties, covenants, conditions, representations, or promises from the borrower, by which the holder acquires title to or possession of a facility securing a loan or other obligation.

I. "Hazardous substance" means:

1. Any "dangerous waste," defined as any discarded, useless, unwanted, or abandoned substances disposed of in such quantity or concentration as to pose a present or potential hazard to human health, wildlife, or the environment because such wastes or constituents or combinations of such wastes:
    a) Have short-lived, toxic properties that may cause death, injury, or illness or have mutagenic, teratogenic, or carcinogenic properties; or
    b) Are corrosive, explosive, flammable, or may generate pressure throughout decomposition or other means.
2. Any "hazardous waste," defined as any waste which
    a) Will persist in a hazardous form for three years or more at a disposal site and which in its persistent form
        i. presents a significant environmental hazard and may be concentrated by living organisms through a food chain or may affect the genetic makeup of people or wildlife,
        ii. is toxic to people or wildlife, or
        iii. adversely affects living organisms in soil, sediment, surface water, ground water, or air; or
    b) If disposed of at a disposal site in such quantities or concentrations as might present a hazard to people or the environment.
3. Any liquid, solid, gas, or sludge, including any material, substance, product, commodity, or waste, regardless of quantity, that exhibits any of the characteristics of dangerous waste or extremely hazardous waste.
4. Any substance that, on March 1, 1989, is a hazardous substance under section 101(14) of the federal cleanup law, 42 U.S.C. § 9601(14), as amended through the effective date of this Ordinance;
5. Petroleum or petroleum products; and
6. Any substance or category of substances, including solid waste decomposition products, determined by the Director to present a threat to human health or the environment if released into the environment.

7. The term "hazardous substance" does not include any of the following when contained in an underground storage tank from which there is not a release: Crude oil or any fraction thereof or petroleum, if the tank is in compliance with all applicable federal and Tribal laws.

J. "Hazardous waste account" means an account of money set aside for uses described in §20.209.

K. "Holder" means a person who holds indicia of ownership primarily to protect a security interest. A holder includes the initial holder such as the loan originator, any subsequent holder such as a successor-in-interest or subsequent purchaser of the security interest on the secondary market, a guarantor of an obligation, surety, or any other person who holds indicia of ownership primarily to protect a security interest, or a receiver, court-appointed trustee, or other person who acts on behalf or for the benefit of a holder. A holder can be a public or privately owned financial institution, receiver, conservator; loan guarantor, or other similar persons that loan money or guarantee repayment of a loan. Holders typically are banks or savings and loan institutions but may also include others such as insurance companies, pension funds, or private individuals that engage in loaning of money or credit.

L. "Independent remedial actions" means remedial actions conducted without Department oversight or approval, and not under an order, agreed order, or consent decree.

M. "Indicia of ownership" means evidence of a security interest, evidence of an interest in a security interest, or evidence of an interest in a facility securing a loan or other obligation, including any legal or equitable title to a facility acquired incident to foreclosure and its equivalents. Evidence of such interests includes mortgages, deeds of trust, seller's interest in a real estate contract, surety bonds, and guarantees of obligations, title held pursuant to a lease financing transaction in which the lessor does not select initially the leased facility, or legal or equitable title obtained pursuant to foreclosure and their equivalents. Evidence of such interests also includes assignments, pledges, or other rights to or other forms of encumbrance against the facility that are held primarily to protect a security interest.

N. "Operating a facility primarily to protect a security interest"
   1. occurs when all of the following are met:
      a) Operating the facility where the borrower has defaulted on the loan or otherwise breached the security agreement;
      b) Operating the facility to preserve the value of the facility as an ongoing business;
      c) The operation is being done in anticipation of a sale, transfer, or assignment of the facility; and
      d) The operation is being done primarily to protect a security interest.
   2. Operating a facility for longer than one year prior to foreclosure or its equivalents shall be presumed to be operating the facility for a purpose other than to protect a security interest.

O. "Owner or operator" means:
   1. Any person with any ownership interest in the facility or who exercises any control over the facility; or

2. In the case of an abandoned facility, any person who had owned, or operated, or exercised control over the facility any time before its abandonment;
3. The term does not include:
    a) The Tribe or any tribal instrumentality which acquired ownership or control involuntarily through bankruptcy, tax delinquency, abandonment, or through donation or a property exchange transaction, or circumstances in which the Tribal Council involuntarily acquired title. This exclusion does not apply to an instrumentality of the Tribe which is subject to a waiver of sovereign immunity and which has caused or contributed to the release or threatened release of a hazardous substance from the facility;
    b) A person who, without participating in the management of a facility, holds indicia of ownership primarily to protect the person's security interest in the facility.
        i. Holders after foreclosure and its equivalent and holders who engage in any of the activities identified in §20.203(P)(5) through (7) shall not lose this exemption provided the holder complies with all of the following:
            (a) The holder properly maintains the environmental compliance measures already in place at the facility;
            (b) The holder complies with the reporting requirements in the rules adopted under this Ordinance;
            (c) The holder complies with any order issued to the holder by the Department to abate an imminent or substantial endangerment;
            (d) The holder allows the Department or potentially liable persons under an order, agreed order, or settlement agreement under this Ordinance access to the facility to conduct remedial actions and does not impede the conduct of such remedial actions;
            (e) Any remedial actions conducted by the holder are in compliance with any preexisting requirements identified by the Department, or, if the Department has not identified such requirements for the facility, the remedial actions are conducted consistent with the rules adopted under this Ordinance; and
            (f) The holder does not exacerbate an existing release.
        ii. The exemption in §20.203(O)(3)(b) does not apply to holders who cause or contribute to a new release or threatened release or who are otherwise liable under §20.206(A)(2), (3), (4), and (5); provided, however, that a holder shall not lose this exemption if it establishes that any such new release has been remediated according to the requirements of this Ordinance and that any hazardous substances remaining at the facility after

remediation of the new release are divisible from such new release;

c) A fiduciary in his, her, or its personal or individual capacity. This exemption does not preclude a claim against the assets of the estate or trust administered by the fiduciary or against a nonemployee agent or independent contractor retained by a fiduciary. This exemption also does not apply to the extent that a person is liable under this Ordinance independently of the person's ownership as a fiduciary or for actions taken in a fiduciary capacity which cause or contribute to a new release or exacerbate an existing release of hazardous substances.

i. This exemption applies provided that, to the extent of the fiduciary's powers granted by law or by the applicable governing instrument granting fiduciary powers, the fiduciary complies with all of the following:

(a) The fiduciary properly maintains the environmental compliance measures already in place at the facility;

(b) The fiduciary complies with the reporting requirements in the rules adopted under this Ordinance;

(c) The fiduciary complies with any order issued to the fiduciary by the Department to abate an imminent or substantial endangerment;

(d) The fiduciary allows the Department or potentially liable persons under an order, agreed order, or settlement agreement under this Ordinance access to the facility to conduct remedial actions and does not impede the conduct of such remedial actions;

(e) Any remedial actions conducted by the fiduciary are in compliance with any preexisting requirements identified by the Department, or, if the Department has not identified such requirements for the facility, the remedial actions are conducted consistent with the rules adopted under this Ordinance; and

(f) The fiduciary does not exacerbate an existing release.

ii. The exemption in §20.203(O)(3)(b) does not apply to fiduciaries who cause or contribute to a new release or threatened release or who are otherwise liable under §20.206(A)(2), (3), (4), and (5); provided however, that a fiduciary shall not lose this exemption if it establishes that any such new release has been remediated according to the requirements of this Ordinance and that any hazardous substances remaining at the facility after remediation of the new release are divisible from such new release. The exemption in §20.203(O)(3)(b) also does not apply where the fiduciary's powers to comply with §20.203(O)(3)(b) are

limited by a governing instrument created with the objective purpose of avoiding liability under this Ordinance or of avoiding compliance with this Ordinance; or

d) Any person who has any ownership interest in, operates, or exercises control over real property where a hazardous substance has come to be located solely as a result of migration of the hazardous substance to the real property from a source off the property, if:
   i. The person can demonstrate that the hazardous substance has not been used, placed, managed, or otherwise handled on the property in a manner likely to cause or contribute to a release of the hazardous substance that has migrated onto the property;
   ii. The person has not caused or contributed to the release of the hazardous substance;
   iii. The person does not engage in activities that damage or interfere with the operation of remedial actions installed on the person's property or engage in activities that result in exposure of humans or the environment to the contaminated ground water that has migrated onto the property;
   iv. If requested, the person allows the Department or potentially liable persons who are subject to an order, agreed order, or consent decree, and the authorized employees, agents, or contractors of each, access to the property to conduct remedial actions required by the Department. The person may negotiate an access agreement for the purposes of providing access to the Department; and
   v. Legal withdrawal of groundwater does not disqualify a person from the exemption in §20.203(O)(3)(d).

P. "Participation in management" means exercising decision-making control over the borrower's operation of the facility, environmental compliance, or assuming or manifesting responsibility for the overall management of the enterprise encompassing the day-to-day decision making of the enterprise. The term does not include any of the following:
   1. A holder with the mere capacity or ability to influence, or the unexercised right to control facility operations;
   2. A holder who conducts or requires a borrower to conduct an environmental audit or an environmental site assessment at the facility for which indicia of ownership is held;
   3. A holder who requires a borrower to come into compliance with any applicable laws or regulations at the facility for which indicia of ownership is held;
   4. A holder who requires a borrower to conduct remedial actions including setting minimum requirements, but does not otherwise control or manage the borrower's remedial actions or the scope of the borrower's remedial actions except to prepare a facility for sale, transfer, or assignment;
   5. A holder who engages in workout or policing activities primarily to protect the holder's security interest in the facility;

6. A holder who prepares a facility for sale, transfer, or assignment or requires a borrower to prepare a facility for sale, transfer, or assignment;
7. A holder who operates a facility primarily to protect a security interest or requires a borrower to continue to operate, a facility primarily to protect a security interest; and
8. A prospective holder who, as a condition of becoming a holder, requires an owner or operator to conduct an environmental site assessment, come into compliance with any applicable laws or regulations, or conduct remedial actions prior to holding a security interest is not participating in the management of the facility.

Q. "Person," for the purposes of this Ordinance only, means an individual, firm, corporation, association, partnership, consortium, joint venture, commercial entity, state government agency, unit of local government, federal government agency or a Tribal instrumentality subject to a waiver of sovereign immunity.

R. "Policing activities" means actions the holder takes to insure that the borrower complies with the terms of the loan or security interest or actions the holder takes or requires the borrower to take to maintain the value of the security. Policing activities include: Requiring the borrower to conduct remedial actions at the facility during the term of the security interest; requiring the borrower to comply or come into compliance with applicable federal, state, and local environmental and other laws, regulations, and permits during the term of the security interest; securing or exercising authority to monitor or inspect the facility including on-site inspections, or to monitor or inspect the borrower's business or financial condition during the term of the security interest; or taking other actions necessary to adequately police the loan or security interest such as requiring a borrower to comply with any warranties, covenants, conditions, representations, or promises from the borrower.

S. "Potentially liable person" means any person whom the Department finds, based on credible evidence, to be liable under §20.206. The Department shall give notice to any such person and allow an opportunity for comment before making the finding, unless an emergency requires otherwise.

T. "Prepare a facility for sale, transfer, or assignment" means to secure access to the facility; perform routine maintenance on the facility; remove inventory, equipment, or structures; properly maintain environmental compliance measures already in place at the facility; conduct remedial actions to clean up releases at the facility; or to perform other similar activities intended to preserve the value of the facility where the borrower has defaulted on the loan or otherwise breached the security agreement or after foreclosure and its equivalents and in anticipation of a pending sale, transfer, or assignment, primarily to protect the holder's security interest in the facility. A holder can prepare a facility for sale, transfer, or assignment for up to one year prior to foreclosure and its equivalents and still stay within the security interest exemption in §20.203(O)(3)(b) of this section.

U. "Primarily to protect a security interest" means the indicia of ownership is held primarily for the purpose of securing payment or performance of an obligation. The term does not include indicia of ownership held primarily for investment purposes nor indicia of ownership held primarily for purposes other than as protection for a security interest. A holder may have other, secondary reasons, for maintaining

indicia of ownership, but the primary reason must be for protection of a security interest. Holding indicia of ownership after foreclosure or its equivalents for longer than five years shall be considered to be holding the indicia of ownership for purposes other than primarily to protect a security interest. For facilities that have been acquired through foreclosure or its equivalents prior to the date this Ordinance is enacted and adopted by the Tribal Council, this five-year period shall begin as of the date of enactment and adoption.

V. "Public notice" means notice published at least twice, with an interval of at least seven (7) days between the two (2) publication dates, in a newspaper or other publication of general circulation within the appropriate area, and/or by posting the notice at a reasonable number of conspicuous places within the appropriate area, and such posting to include, where possible, posting at the Keweenaw Bay Indian Community Tribal Center, the Department's Offices, the Tribal Court, and any other public places where it may be customary to post notices concerning tribal affairs generally. Any hearing held pursuant to a public notice, and at the time and place designated in the notice, may be adjourned from time to time without the necessity of renewing the notice for such adjourned dates.

W. "Reservation Environment" means all lands within the exterior boundaries of the L'Anse Reservation, and other lands held in trust status by the U.S. Government for the Tribe or its members.

X. "Reservation Population" means all persons residing or doing business within the Reservation Environment.

Y. "Release" means any intentional or unintentional entry of any hazardous substance into the environment, including but not limited to the abandonment or disposal of containers of hazardous substances.

Z. "Remedy" or "remedial action" means any action or expenditure consistent with the purpose of this Ordinance to identify, eliminate, clean up, or minimize any threat or potential threat posed by hazardous substances to human health or the environment including any investigative and monitoring activities with respect to any release or threatened release of a hazardous substance and any health assessments or health effects studies conducted in order to determine the risk or potential risk to human health.

AA. "Tribe" means the Keweenaw Bay Indian Community.

BB. "Tribal Instrumentality" means a unit of tribal government or a tribal organization that is ultimately responsible to the Keweenaw Bay Indian Community.

CC. "Tribal Court" shall mean the Tribal Court System of the Keweenaw Bay Indian Community.

§ 20.204 Scope and Application of Laws – Jurisdiction.

A. This Ordinance applies to all lands and to all persons residing or doing business on or within the exterior boundaries of the L'Anse Reservation and all lands held in trust status by the U.S. Government for the Tribe or its members.

B. The Natural Resource Damages provisions of this Ordinance shall be coextensive with 42 U.S.C. § 9607, and apply to natural resources belonging to, managed by, controlled by, or appertaining to the Tribe, or held in trust for the benefit of the Tribe, or belonging to a member of the Tribe if such resources are subject to a trust restriction on alienation.

C. The Tribal Court shall have exclusive jurisdiction over all matters arising under this Ordinance. Notwithstanding any other provision of Tribal law, for purposes of this Ordinance, the Tribal Court shall have territorial jurisdiction over all lands within the exterior boundaries of the L'Anse Reservation and all lands held in trust status by the U.S. Government for the Tribe or its members, and shall have personal jurisdiction over all persons residing or doing business within the exterior boundaries of the L'Anse Reservation and all lands held in trust status by the U.S. Government for the Tribe or its members.

§ 20.205 Department's Powers and Duties.

A. The Department may exercise the following powers in addition to any other powers granted by Tribal or federal law:
   1. Investigate, provide for investigating, or require potentially liable persons to investigate any releases or threatened releases of hazardous substances, including but not limited to inspecting, sampling, or testing to determine the nature or extent of any release or threatened release. If there is a reasonable basis to believe that a release or threatened release of a hazardous substance may exist, the Department's authorized employees, agents, or contractors may enter upon any property and conduct investigations. The Department shall give reasonable notice before entering property unless an emergency prevents such notice. The Department may by subpoena require the attendance or testimony of witnesses and the production of documents or other information that the Department deems necessary;
   2. Conduct, provide for conducting, or require potentially liable persons to conduct remedial actions (including investigations under §20.205(A)(1)) to remedy releases or threatened releases of hazardous substances. In carrying out such powers, the Department's authorized employees, agents, or contractors may enter upon property. The Department shall give reasonable notice before entering property unless an emergency prevents such notice. In conducting, providing for, or requiring remedial action, the Department shall give preference to permanent solutions to the maximum extent practicable and shall provide for or require adequate monitoring to ensure the effectiveness of the remedial action;
   3. Utilize or retain contractors, consultants, the tribal attorney or outside counsel to assist the Department in carrying out investigations, remedial actions or other actions authorized under this Ordinance;
   4. Carry out all Tribal programs authorized under the federal cleanup law, the Resource Conservation and Recovery Act, 42 U.S.C. § 6901 et seq., as amended, and other federal laws;
   5. Classify substances as hazardous substances for purposes of §20.203(I) of this Ordinance;
   6. Issue orders or enter into consent decrees or agreed orders that include, or issue written opinions under §20.205(A)(9) that may be conditioned upon, deed restrictions or other appropriate institutional controls as may be necessary to protect human health and the environment from a release or threatened release of a hazardous substance from a facility. Prior to establishing a deed restriction or other appropriate institutional control under

this subsection, the Department shall notify and seek comment from the Tribal Reality Department;

7. Enforce the application of permanent and effective institutional controls that are necessary for a remedial action to be protective of human health and the environment;
8. Require holders to conduct remedial actions necessary to abate an imminent or substantial endangerment pursuant to §20.203(O)(3)(b)(i)(c);
9. Provide informal advice and assistance to persons regarding the administrative and technical requirements of this Ordinance. This may include site-specific advice to persons who are conducting or otherwise interested in independent remedial actions. Any such advice or assistance shall be advisory only, and shall not be binding on the Department. As a part of providing this advice and assistance for independent remedial actions, the Department may prepare written opinions regarding whether the independent remedial actions or proposals for those actions meet the substantive requirements of this Ordinance or whether the Department believes further remedial action is necessary at the facility. The Department may collect, from persons requesting advice and assistance, the costs incurred by the Department in providing such advice and assistance; however, the Department shall, where appropriate, waive collection of costs in order to provide an appropriate level of technical assistance in support of public participation. The Tribe, Department, and officers, agents, attorneys and employees of the Tribe are immune from all liability, and no cause of action of any nature may arise from any act or omission in providing, or failing to provide, informal advice and assistance;
10. Provide for public notice of investigative plans, cleanup plans, or remedial plans and other significant actions taken under this Ordinance;
11. Require the reporting by an owner or operator of releases of hazardous substances to the environment that may be a threat to human health or the environment within twenty-four (24) hours of discovery, including such exemptions from reporting as the Department deems appropriate, however this requirement shall not modify any existing requirements provided for under other laws;
12. Establish reasonable deadlines for initiating an investigation of a hazardous waste site after the Department receives information that the site may pose a threat to human health or the environment and other reasonable deadlines for remedying releases or threatened releases at the site;
13. Publish and periodically update minimum cleanup standards for remedial actions at least as stringent as the cleanup standards under Section 121 of the federal cleanup law, 42 U.S.C. § 9621, and at least as stringent as all applicable Tribal and federal laws, including health based standards under Tribal and federal law. Tribal cleanup standards shall be maintained and available for review at the Department Office;
14. The Department may, as available resources permit, establish a program to identify potential hazardous waste sites and to encourage persons to provide information about hazardous waste sites;

15. Carry out such enforcement actions as in accordance with §20.207 of this Ordinance; and
16. Take any other actions necessary to carry out the provisions of this Ordinance, including proposing that the Tribal Council amend this Ordinance or adopt additional ordinances.

§ 20.206 Standard of Liability-Settlement

A. Except as provided in §20.206(C), the following persons are liable with respect to a facility:
   1. The owner or operator of the facility;
   2. Any person who owned or operated the facility at the time of disposal or release of the hazardous substances;
   3. Any person who owned or possessed a hazardous substance and who by contract, agreement, or otherwise arranged for disposal or treatment of the hazardous substance at the facility, or arranged with a transporter for transport for disposal or treatment of the hazardous substances at the facility, or otherwise generated hazardous wastes disposed of or treated at the facility;
   4. Any Person
      a) Who accepts or accepted any hazardous substance for transport to a disposal, treatment, or other facility selected by such person from which there is a release or a threatened release for which remedial action is required, unless such facility, at the time of disposal or treatment, could legally receive such substance; or
      b) Who accepts a hazardous substance for transport to such a facility and has reasonable grounds to believe that such a facility is not operated in accordance with Resource Conservation and Recovery Act (RCRA), 42 U.S.C. § 6901 et seq., as amended, and programs appropriately delegated under RCRA; and
   5. Any person who both sells a hazardous substance and is responsible for written instructions for its use if
      a) The substance is used according to the instructions; and
      b) The use constitutes a release for which remedial action is required at the facility.

B. Each person who is liable under this section is strictly liable, jointly and severally, for all remedial action costs and for all natural resource damages resulting from the releases or threatened releases of hazardous substances. The Department is empowered to recover all costs and damages from persons liable therefore.

C. The following persons are not liable under this section:
   1. Any person who can establish that the release or threatened release of a hazardous substance for which the person would be otherwise responsible was caused solely by:
      a) An act of God;
      b) An act of war; or
      c) An act or omission of a third party (including but not limited to a trespasser) other than
         i. An employee or agent of the person asserting the defense, or

ii. Any person whose act or omission occurs in connection with a contractual relationship existing, directly or indirectly, with the person asserting this defense to liability. This defense only applies where the person asserting the defense has exercised the utmost care with respect to the hazardous substance, the foreseeable acts or omissions of the third party, and the foreseeable consequences of those acts or omissions;

2. Any person who is an owner, past owner, or purchaser of a facility and who can establish by a preponderance of the evidence that at the time the facility was acquired by the person, the person had no knowledge or reason to know that any hazardous substance, the release or threatened release of which has resulted in or contributed to the need for the remedial action, was released or disposed of on, in, or at the facility. §20.206(C)(2) is limited as follows:
   a) To establish that a person had no reason to know, the person must have undertaken, at the time of acquisition, all appropriate inquiry into the previous ownership and uses of the property, consistent with good commercial or customary practice in an effort to minimize liability. Any court interpreting §20.206(C)(2) shall take into account any specialized knowledge or experience on the part of the person, the relationship of the purchase price to the value of the property if uncontaminated, commonly known or reasonably ascertainable information about the property, the obviousness of the presence or likely presence of contamination at the property, and the ability to detect such contamination by appropriate inspection;
   b) The defense contained in §20.206(C)(2) is not available to any person who had actual knowledge of the release or threatened release of a hazardous substance when the person owned the real property and who subsequently transferred ownership of the property without first disclosing such knowledge to the transferee;
   c) The defense contained in §20.206(C)(2) is not available to any person who, by any act or omission, caused or contributed to the release or threatened release of a hazardous substance at the facility;
3. Any natural person who uses a hazardous substance lawfully and without negligence for any personal or domestic purpose in or near a dwelling or accessory structure when that person is:
   a) A resident of the dwelling;
   b) A person who, without compensation, assists the resident in the use of the substance; or
   c) A person who is employed by the resident but who is not an independent contractor;
4. Any person who, for the purpose of growing food crops, applies pesticides or fertilizers without negligence and in accordance with all applicable Tribal and federal laws and regulations.

D. There may be no settlement by the Department with any person potentially liable under this Ordinance except in accordance with this subsection.

1. The Department may agree to a settlement with any potentially liable person only if the Department finds that the proposed settlement would lead to a more expeditious cleanup of hazardous substances in compliance with cleanup standards under §20.212 and with any remedial orders issued by the Department. Whenever practicable and in the public interest the Department may expedite such a settlement with a person whose contribution is insignificant in amount and toxicity.
2. A settlement agreement under this subsection shall be entered as a consent decree issued by the Tribal Court.
3. A settlement agreement may contain a covenant not to sue only of a scope commensurate with the settlement agreement in favor of any person with whom the Department has settled under this section. Any covenant not to sue shall contain a reopener clause which requires the Tribal Court to amend the covenant not to sue if factors not known at the time of entry of the settlement agreement are discovered and present a previously unknown threat to human health or the environment.
4. A party who has resolved its liability to the Department under this subsection shall not be liable for claims for contribution regarding matters addressed in the settlement. The settlement does not discharge any of the other liable parties but it reduces the total potential liability of the others to the Department by the amount of the settlement.
5. If the Department has entered into a consent decree with an owner or operator under this section, the Department shall not enforce this Ordinance against any owner or operator who is a successor in interest to the settling party unless under the terms of the consent decree the Department could enforce against the settling party, if:
    a) The successor owner or operator is liable with respect to the facility solely due to that person's ownership interest or operator status acquired as a successor in interest to the owner or operator with whom the Department has entered into a consent decree; and
    b) The stay of enforcement under this subsection does not apply if the consent decree was based on circumstances unique to the settling party that do not exist with regard to the successor in interest, such as financial hardship. Such unique circumstances shall be specified in the consent decree.
6. Any person who is not subject to enforcement by the Department under §20.206(D) is not liable for claims for contribution regarding matters addressed in the settlement.

E. In addition to the settlement authority provided under §20.206(D), the Department may agree to a settlement with a person not currently liable for remedial action at a facility who proposes to purchase, redevelop, or reuse the facility, provided that:
    1. The settlement will yield substantial new resources to facilitate cleanup;
    2. The settlement will expedite remedial action consistent with this Ordinance; and
    3. Based on available information, the Department determines that the redevelopment or reuse of the facility is not likely to contribute to the existing

release or threatened release, interfere with remedial actions that may be needed at the site, or increase health risks to persons at or in the vicinity of the site.

4. The Department does not have adequate resources to participate in all property transactions involving contaminated property. The primary purpose of this subsection, §20.206(E), is to promote the cleanup and reuse of vacant or abandoned commercial or industrial contaminated property. The Department may give priority to settlements that will provide a substantial public benefit, including, but not limited to the reuse of a vacant or abandoned manufacturing or industrial facility, or the development of a facility by a Tribal entity to address an important public purpose.

F. Nothing in this Ordinance affects or modifies in any way any person's right to seek or obtain relief under Tribal law, or other applicable laws, including but not limited to damages for injury or loss resulting from a release or threatened release of a hazardous substance. No settlement by the Department or remedial action ordered by the Tribal Court or the Department affects any person's right to obtain a remedy under Tribal law, or other applicable laws. This Ordinance does not create any cause of action against the Tribe or otherwise constitute a waiver of the sovereign immunity of the Tribe or of any instrumentality of the Tribe.

§ 20.207 Enforcement.

A. With respect to any release or threatened release for which the Department does not conduct or contract for conducting remedial action and for which the Department believes remedial action is in the public interest, the Director shall issue orders or agreed orders requiring potentially liable persons to provide the remedial action.

1. Any liable person who refuses, without sufficient cause, to comply with an order or agreed order of the Director is liable in an action brought by the Department for:
    a) Up to three (3) times the amount of any costs incurred by the Department as a result of the party's refusal to comply; and
    b) A civil penalty of up to twenty-five thousand dollars ($25,000) for each day the party refuses to comply.
2. The treble damages and civil penalty under this subsection apply to all recovery actions filed on or after the effective date of this Ordinance.

B. The Department shall seek, by filing an action if necessary, to recover the amounts spent by the Department for investigative and remedial actions and orders, including amounts spent prior to the effective date of this Ordinance.

C. The Department may request the assistance of the Tribal Attorney's Office to bring an action to secure such relief as is necessary to protect human health and the environment under this Ordinance.

§ 20.208 Judicial Review.

A. The Department's investigative and remedial decisions under §20.205 and §20.207, and its decisions regarding potentially liable persons under §20.203(S) and §20.205, shall be reviewable exclusively in Tribal Court and only at the following times:

1. In a cost recovery suit under §20.206(B);

2. In a suit by the Department to enforce an order or an agreed order, or seek a civil penalty under this Ordinance; and
3. In a suit by the Department to compel investigative or remedial action.

B. The Tribal Court shall uphold the Department's actions unless they were arbitrary and capricious, or contrary to applicable law.

§ 20.209 Deposits to Hazardous Waste Account

A. There may be established a hazardous waste account to be administered by the Department.

B. The following moneys shall be deposited into the hazardous waste account:
   1. The costs of remedial actions recovered under this Ordinance;
   2. Penalties collected or recovered under this Ordinance; and
   3. Any other money appropriated or transferred to the account by the Department. Moneys in the account may be used only to carry out the purposes of this Ordinance including but not limited to the following activities:
      a) The hazardous waste cleanup program required under this Ordinance;
      b) Matching funds required under any federal law;
      c) Tribal programs for the safe reduction, recycling, or disposal of hazardous wastes from households, small businesses, and agriculture;
      d) Hazardous materials emergency response training; and
      e) Water and environment health protection and monitoring programs.

§ 20.210 Private Right of Action—Remedial Action Costs.

A. A person may bring a private right of action, including a claim for contribution or for declaratory relief against any other person liable under §20.206 for the recovery of remedial action costs, except that no private right of action may be brought against the following:
   1. The Tribe or instrumentalities of the Tribe, except where specifically provided for by waiver of sovereign immunity; or
   2. As provided in §20.206(D)(4) and (6).

B. Recovery shall be based on such equitable factors as the Tribal Court determines are appropriate. Natural resource damages paid to the Tribe under this Ordinance may be recovered. Remedial action costs shall include reasonable attorneys' fees and expenses. Recovery of remedial action costs shall be limited to those remedial actions that, when evaluated as a whole, are the substantial equivalent of a Department-conducted or Department-supervised remedial action. Substantial equivalence shall be determined by the Tribal Court with reference to this Ordinance. An action under this section may be brought after remedial action costs are incurred but must be brought within three (3) years from the date remedial action confirms cleanup standards are met. The prevailing party in such an action shall recover its reasonable attorneys' fees and costs.

§ 20.211 Remedial Actions—Exemption from Procedural Requirements.

A. A person conducting a remedial action at a facility under a consent decree, order, or agreed order, and the Department when it conducts a remedial action, are exempt from the procedural requirements of all otherwise applicable Tribal laws. The

Department shall ensure compliance with the substantive provisions of all otherwise applicable Tribal laws. The Department shall establish procedures for ensuring that such remedial actions comply with the substantive requirements adopted pursuant to such laws. The procedures shall provide an opportunity for comment by the public and by the Tribal agencies that would otherwise implement the laws referenced in this section. Nothing in this section is intended to prohibit implementing agencies from charging a fee to the person conducting the remedial action to defray the costs of services rendered relating to the substantive requirements for the remedial action.

B. An exemption in this section or in any other applicable Tribal law shall not apply if the Department determines that the exemption would result in loss of approval from a federal agency necessary for the Tribe to administer any federal law, including the federal Resource Conservation and Recovery Act; the federal Clean Water Act the federal Clean Air Act, and the federal Coastal Zone Management Act. Such a determination by the Department shall not affect the applicability of the exemptions to other statutes specified in this section.

§ 20.212 Cleanup Standards.

A. Groundwater, soil, and sediment cleanup standards. The cleanup standards enforced by the Department shall be those cleanup standards set out in Appendix A, Appendix B, and Appendix C to this Ordinance.

B. Application of Standards.

1. The Department shall apply the cleanup standards set out in Appendix A, Appendix B, and Appendix C to this Ordinance.
2. No remedial action pursuant to this Ordinance shall result in an exceedance of any applicable Water Quality Standard.
3. If a necessary cleanup standard is not identified in the Appendices to this Ordinance, the Department may determine the appropriate cleanup standard through reference to applicable tribal, state, or federal cleanup standards, or the Department may consult with tribal, state and federal agencies, institutions of higher learning, or other entities or persons with expertise in toxic cleanup and human or environmental toxicology to determine the appropriate cleanup level that is protective of human health (consistent with Tribal practices and consumptive uses) and the environment.
4. In cases involving multiple chemicals with multiple health effects, the Department may determine the appropriate cleanup standard through reference to applicable tribal, state, or federal cleanup standards, or the Department may consult with tribal, state and federal agencies, institutions of higher learning, and other entities or persons with expertise in toxic cleanup and human or environmental toxicology to determine aggregate cleanup levels that are protective of human health (consistent with Tribal practices and consumptive uses) and the environment.
5. Background levels will be determined by the Department based upon data and tests either performed by the Department or performed by the potentially liable party.

C. Development of Cleanup Standards. The Department may develop specific proposed surface water, groundwater, soil and sediment cleanup standards for the Keweenaw Bay Indian Community for adoption by the Tribal Council. In developing these

standards, the Department may consult with tribal, state and federal agencies, institutions of higher learning, and other entities with expertise in toxic cleanup and human or environmental toxicology in order to determine clean up levels that are protective of human health (consistent with Tribal practices and consumptive uses) and the environment. Upon the Tribal Council's enactment of such future cleanup standards which shall be in the form of amendments to this Ordinance, such standards shall, on the effective date determined by the Tribal Council and applicable law, become enforceable hereunder.

§ 20.213 Sovereign Immunity.

Nothing in this Ordinance shall be construed to constitute a waiver of the sovereign immunity of the Tribe, or of any instrumentality of the Tribe.

§ 20.214 Captions.

As used in this Ordinance, captions constitute no part of the law.

§ 20.215 Construction.

The provisions of this Ordinance are to be liberally construed to effectuate the policies and purposes of this Ordinance. In the event of conflict between the provisions of this Ordinance and any other act or ordinance, the provisions of this Ordinance shall govern.

§ 20.216 Effective Date.

The effective date of this Ordinance shall be the date this Ordinance is enacted and adopted by the Tribal Council. This Ordinance shall apply retroactively.

§ 20.217 Severability.

If any provision of this Ordinance or its application to any person or circumstance is held invalid, the remainder of the Ordinance or the application of the provision to other persons or circumstances shall not be affected.

Motion by Susan J. LaFernier Seconded by Jennifer Misegan & Donald Shalifoe, Sr.

Ayes 10 Nays 0 Abstained 0 Not Present 1

Adopted X (yes) _____(no) **Date: 5-26-2016**

CERTIFIED by the Secretary of the Keweenaw Bay Indian Community, this 15th day of June, 2016.

Susan J. LaFernier

SIGNED by the President of the Keweenaw Bay Indian Community, this 15th day of June, 2016.

Warren Swartz

Pursuant to Article VI, Section 2 of the Constitution and By-laws of the Keweenaw Bay Indian Community Ordinance 2016-02, Chapter 20 - Hazardous Substance Control Ordinance of the Keweenaw Bay Indian Community's Tribal Code is approved this date.

JUN 2 9 2016

Jason D. Oberle
Superintendent

Date