Appendix O: Cargill East River (MN – 14.2 RMP) Dredge Material Site Management Plan

Cargill East River (MN – 14.2 RMP)
Dredge Material Site Management Plan

Lower Minnesota River Watershed District

January 2013

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1.0 BACKGROUND

In the 1950's, the United States (U.S) Congress ordered the U.S. Army Corps of Engineering ("Corps") to deepen the Minnesota River channel from four to nine feet from the confluence with the Mississippi River to river mile (R.M.) 14.7 in Savage, Minnesota so that barges could transport grain and other materials out of and transport goods into Minnesota. The congressional order required the Corps to partner with a local regulatory entity to serve as the local sponsor.

Pursuant to statutory authority, five counties (Hennepin, Ramsey, Dakota, Scott and Carver) petitioned for the establishment of the Lower Minnesota River Watershed District ("District"). On March 23, 1960, the Minnesota Water Resources Board, now the Board of Water and Soil Resources ("BWSR"), established the District. Since the 1960's, the District has been and continues to be the State's local sponsor to work with the Corps to maintain the 9-ft channel. In 2007, the Corps developed a Dredge Material Management Plan (DMMP) for the Minnesota River above the Interstate 35W Bridge (Corps, 2007), to address concerns which surfaced in 1988. Concerns ranged from capacity at dredge material placement sites to complaints by industrial users about the condition of the channel. The DMMP identified 11potential placement sites, with the following only six sites emerging as practical and cost effective locations requiring detailed evaluation: Cargill West Field Site (MN-14.8-RMP); Cargill East River (MN-14.2-RMP); Cargill East (MN-13.5-RMP); Below Cargill (MN-12.4-RMP); Kraemer (MN-12.1-RMP); and NSP (MN-10.1-RMP). After alternative formulation and detailed analysis and evaluation of sites individually an0d in combination with others, the Cargill East River (MN-14.2 RMP) site and the Kraemer (MN-12.1-RMP) site were the Corps' recommended alternative. In 2007, the District acquired the Cargill East River (MN-14.2 RMP) site. Because of an ownership change which resulted in higher fees for use of the Kraemer (MN-12.1-RMP) site, the Cargill East River (MN-14.2 RMP) site has been exclusively used for dredge material placement.

1.1 Purpose and Need Statement

The Districts' Third Generation Watershed Management Plan documents funding and management concerns associated with their role as local sponsor. The purpose of this dredge material site management plan is to review options for managing the Cargill East River (MN-14.2 RMP) site and deposited material and to review the financial liability of the local sponsor role on the District.

1.2 Economic Evaluation

The Minnesota River is a significant branch of the inland navigation system. Several of the world's largest grain marketing companies operate terminals on the River. These terminals serve as important nodes in the flow of grain from the Upper Midwest to domestic and foreign markets. In addition to grain, other miscellaneous commodities move through Minnesota River terminals and docks. The Corps' DMMP Table 1-1 lists the terminals located on the Minnesota River (Corps, 2007). In addition to the terminals listed below, six fleeting areas exist on the River to serve the terminals with a total capacity of 90 barges.

Table 1-1 Terminals on the Minnesota River		
Name	River Mile	Purpose
Cargill Co.	14.7 (R)	Ship grain; receive salt, fertilizer
Harvest States Coop	14.6 (R)	Ship grain
Bunge Corp.	14.5 (R)	Ship grain
Richards / Shiely Dock	14.4 (R)	Receive asphalt (Richards), sand, gravel, limestone (Shiely)
Port Cargill		
Molasses Dock	13.3 (R)	Receive molasses
Fertilizer Dock	13.1 (R)	Receive dry fertilizer, salt, limestone, etc.
General Dock	13.0 (R)	Receive general cargo (metal products and lumber)
Elevator C Dock	12.9 (R)	Ship grain
U.S. Salt	11.1 (R)	Receipt and transfer of salt, coal, stone, etc.
Northern States Power	8.6 (R)	Coal unloading dock (no longer used)
Source: Port Series No. 69, Port of Minneapolis - St. Paul, MN and Ports on Upper Mississippi River (Miles 300 to 860 AOR), Revised 1994, NDC 94-P-6, U.S. Army Corps of Engineers		

Since 2007, the traffic level on the River has averaged over 2 million tons. The primary commodities moved on the River are farm products (wheat, corn, soybeans, oats and barley) bound for Gulf of Mexico ports. These account for approximately 64 percent of total traffic on the River. Other commodities include dry fertilizer, salt, sand and gravel, metal products, and other miscellaneous commodities. Table 1 presents Minnesota River traffic data for recent years.

Table 1: Minnesota River Freight Traffic – 2007 to 2010 (Tons x 1,000)

Commodity	2007	2008	2009	2010	Average	Percent Total
Food and Farm Products						
Grain (Wheat, corn, oats)	1,084	1,258	216	1,532	1,023	48.1%
Soybeans	308	516	273	223	330	15.5%
Other	23	5	2	3	8	0.4%
Fertilizers	42	32	86	150	78	3.6%
Crude Materials	626	711	781	628	687	32.3%
Total Tons (times 1,000)	2,083	2,522	1,358	2,536	2,125	100.00%
Source: Waterborne Commerce Statistics						

Grain terminals on the Minnesota River serve as the access point to foreign markets for producers in Minnesota and the Dakotas. Producers rely on this route as an important option in marketing their grain. This route is often the least cost alternative compared to other marketing outlets: the Pacific Northwest, the Great Lakes through Duluth, the Gulf via rail, or domestic markets. Therefore, maintaining navigability of the Minnesota River is crucial in allowing producers to get the best price for their grain. Without this option, grain will move along other, more costly routes. The higher costs would be passed on to the producer in the form of lower prices offered by the grain companies.

The analysis presented here uses data obtained for the current Upper Mississippi River - Illinois Waterway (UMR-IWW) Navigation Study. Transportation costs were estimated for a sample of commodity movements using the UMR-IWW navigation system and for alternate routings and destinations that would bypass the system. Among the many movements evaluated were grain shipments from the Minnesota River to various destinations for domestic use and export. Transportation costs were estimated for moving grain from the producer to market using the water-based route through the Minnesota River terminals and using alternate routings. Rate savings range from $1.40 to $20 per ton, averaging $12 per ton. Other commodities have savings ranging from $2 to $13 per ton, with an average of $9 per ton.

By applying the savings of $12 per ton to approximately 1.023 million tons of grain annually from Minnesota River terminals, the resultant benefits would be about $12.3 million annually. For the other commodities, moving an average of 1.103 million tons at a savings of $9 per ton results in transportation cost savings benefits of $9.9 million. Total annual savings for traffic moving on the Minnesota River are estimated at $22.2 million.

2.0 EXISTING CARGIL EAST RIVER –MN14.2 RMP SITE CONDITIONS

2.1 Site Layout and Storage Capacity

The existing Cargill East River (MN 14.2 RMP) site is located along the shoreline just downstream from the Port Richards slip (see Figure 1). The total area of the available site excluding the wooded perimeter buffer is approximately 11 acres, and the usable storage area within the site considering the use of sufficiently sized perimeter dikes is approximately 7 to 8 acres. The District has indicated that the dredging work completed to date for placement onto the site has been mechanically excavated sediment that was offloaded from barges at the north river access point and then physically spread within the site for drying, limited distribution and stockpiling (see Figure 2).

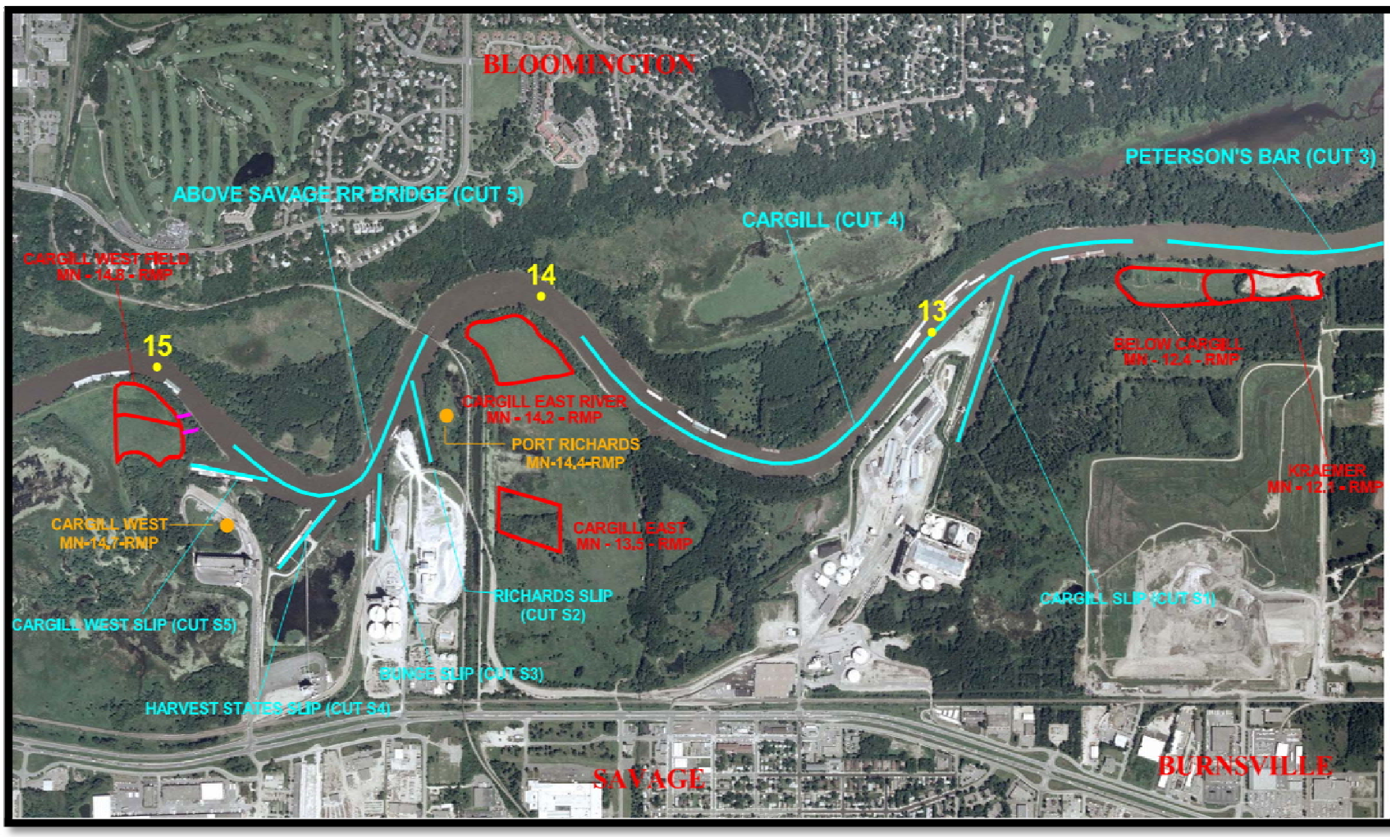


Figure 1: Cargill East River (MN-14.2 RMP) Site Location Map (*Corps, 2007*)

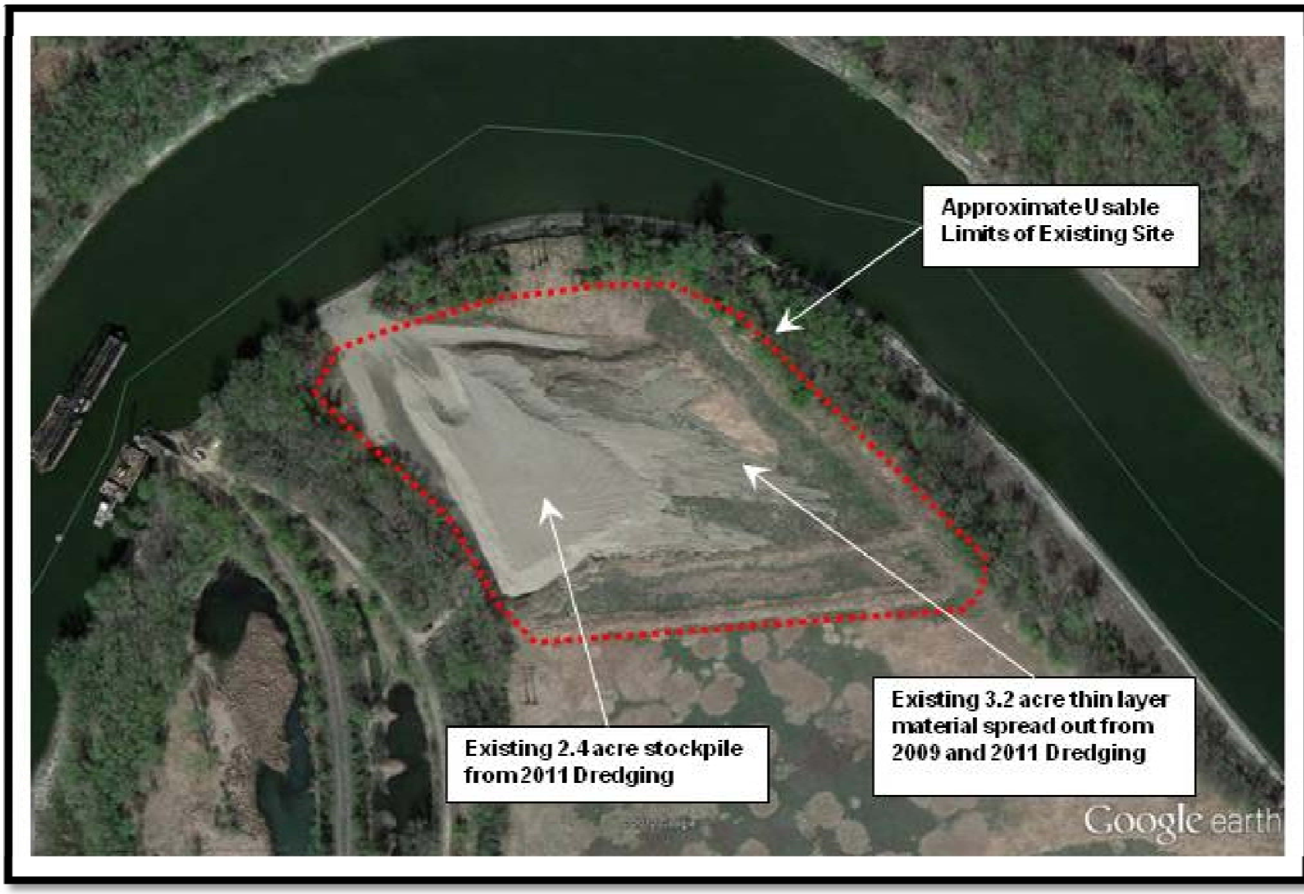


Figure 2: Cargill East River (MN-14.2 RMP) Existing Site Map

According to the DMMP, two areas would be required for placement of dredge material at the Cargill East River (MN-14.2 RMP) site if finer grained material from the private barge slips were to be stored on this site in addition to the material dredged from the main channel of the river. For the main channel material, an area of 7 acres would be required to accommodate a job of 35,500 cubic yards with material stockpiled to a depth of 15 feet. For the barge slip material, an area of 4 acres would be required to accommodate a job of 20,000 cubic yards with material placed to a depth of 10 feet. It was stated in the DMMP that there was enough area at the Cargill East River (MN-14.2 RMP) site to have an 11 acre site with a division to separate the sand from the fine placement areas. Other than material required for a containment dike, no permanent on-site storage is planned.

However, based on the Corps' assumption of a 7 acre area accommodating a 15 ft. high sand stockpile and a 4 acre area to accommodate a 10 ft. high stockpile of silty material (if private barge slips were to be included), then the 11 acre site would be able to store a maximum of 233,933 cubic yards. However, this assumption may be over estimating site capacity since it assumes a total stockpile area of 11 acres with no outside embankment slope for stability, erosion control and site access. If a safe outside embankment slope of 3:1 (3 ft. horizontal and 1 ft. vertical) is used, then the maximum site storage capacity according to the above Corps scenario would be approximately 193,600 cubic yards assuming dredged material is used to construct the perimeter dikes.

2.2 Summary of Existing Access Points

The primary access points to the site presently include the river access at the north end of the site and the access road off Vernon Ave. located at the southwest corner of the site. The river site is primarily used to offload mechanically dredged material from barges to be placed onto the site. The Vernon Ave. access road currently allows limited land based site access, but could be extended and further developed to allow for site management and material loading.

2.3 Estimated Channel Dredging Volumes and Frequencies

In order to estimate sediment storage requirements for the Cargill East River (MN-14.2 RMP) site, historical and navigational dredging estimates were used. Based on historical dredging data presented in the DMMP (Corps, 2007) and currently available data, estimated Corps dredging volumes projected to be placed onto the Cargill East River (Mn 14.2 RMP) site are summarized below. However, projecting future dredging requirements is difficult because of the many variables and unknowns that influence channel maintenance. Actual future dredging quantities may be significantly different from the projections, which could either lengthen or shorten the life expectancy and maintenance required for the site. To arrive at the projected quantities, comparisons were made between the projections used during the Great River Environmental Action Team (GREAT) Study and historic dredging data collected between 1976 and 1998. Adjustments were made to the average quantities per year using estimates based on historic records and experiences during recent years (See the DMMP Tables 3-1 and 3-2). Based on the adjusted dredging quantities shown, approximately 21,800 cubic yards per year on average are estimated to be removed in total from Dredge Cuts #3 (Peterson's Bar), #4 (Cargill) and #5 (Savage Bridge) through 2025.

Table 3-1 Projected Dredging Quantities for Minnesota River Study : 1999-2025						
Cut #	Cut Name	Location	Avg./Job	Frequency	Number of Events	27-Year Projection
1	Mouth of the MN River	0.0-1.1	18,000	11%	3	54,000
2	4-Mile Cut-off	3.4-4.4	9,000	11%	3	27,000
3	Peterson's Bar	11.3-12.4	27,000	55%	15	405,000
4	Cargill	12.5-13.6	7,200	11%	3	21,600
5	Savage Br.	14.3-14.7	20,250	31%	8	162,000
S1	Cargill East Slip	12.7	14,400	55%	15	216,000
S2	Richards Asphalt Slip	14.4	0	0%	0	0
S3	Bunge Slip	14.5	4,500	44%	12	54,000
S4	Harvest States Slip	14.6	5,800	53%	14	81,200
S5	Cargill West Slip	14.7	11,300	43%	12	135,600
				Total 27-Year Projection =		1,156,400

Table 3-2 Evaluation of Corps Dredging Quantities				
MPFWG (Most Probable Future with GREAT) Projections from GREAT				
Cut #	Cut Name	40-Year Projection	Avg/Yr 2001-2025	27 Yr. DMMP Qty.
1	Mouth of the MN River	117,500	2,900	78,300
2	4-Mile Cut-off	80,000	2,000	54,000
3	Peterson's Bar	387,500	9,500	256,500
4	Cargill	35,500	800	21,600
5	Savage Br.	101,500	2,500	67,500
	Total Projections	722,000	17,700	477,900
Adjusted Projections				
Cut #	Cut Name	Actual Avg 76-98	Adjusted Avg/Yr	27 Yr. DMMP Qty.
1	Mouth of the MN River	1,409	2,000	54,000
2	4-Mile Cut-off	191	1,000	27,000
3	Peterson's Bar	10,381	15,000	405,000
4	Cargill	665	800	21,600
5	Savage Br.	6,901	6,000	162,000
	Total Projections	19,547	24,800	669,600

2.4 Quantity and Distribution of Dredged Sediment Onsite

According to the navigational dredging records for the Lower Minnesota River provided by the Corps, approximately 109,485 cubic yards of dredged material has been placed onto the Cargill East River (MN-14.2 RMP) site from 2008 through 2011 (USACE 2012)More specifically, in 2008 there were approximately 16,803 cubic yard, 29,627 cubic yard in 2009, 15,886 cubic yard in 2010 and 47, 169 cubic yard in 2011. Therefore, the annual average for 2008 through 2011 of 27,371 cubic yards is higher than the estimated long term (27 year period) annual dredging volume of 21,800 cubic yards for Dredge Cuts 3, 4, and 5.

It is important to note that these dredging quantities originated from Dredge Cuts 3, 4 and 5 instead of only originating from Dredge Cut 5 as was indicated in the Corps DMMP. Also, the estimated dredging volume stated above has likely decreased in volume on-site as a result of dewatering and consolidation over time. In order to determine the actual dredged material quantity currently on-site, a topographic survey would have to be completed.

2.5 Sediment Quality

The Corps has historically obtained representative sediment core samples for specific Minnesota River locations to complete physical and chemical analysis prior to dredging. In 1999, updated sediment core samples were obtained that included seven (7) sample locations between River Mile 11.0 and 14.6. The analyses included physical characteristics such as grain size, total organic carbon, total solids, total volatile solids and percent moisture. The chemical analyses included PCBs, pesticides and heavy metals. (See Appendix A)

Based on this historical data, sediment characteristics vary from location to location and from year to year. In general, the sediment from the main channel dredging on the Minnesota River can be characterized as predominantly sand, containing an average of 1% to 4% silt and clays, depending on the dredge cut. This is based on analysis of sediment samples from historic dredging locations. Recent samples have been obtained in 2009 and 2012 from the dredged material presently deposited on the Cargill East River (MN-14.2 RMP) site. The sediment analysis work completed in 2009 by Braun Intertec included one sample analysis composited from six separate stockpile locations for metals, nutrients, PCBs and total organic carbon (See Appendix B). The purpose of the 2009 chemical analysis was to evaluate whether the stockpiled dredged material may require special management and disposal. The 2012 analysis also completed by Braun Intertec, included a total of four samples, two of which were from the 2009 dredged material and two from the 2011 dredged material (See

Appendix C). Each of the four samples was analyzed for grain size distribution and organic content.

The results of the composite sample indicated that no values exceeded the Minnesota Pollution Control Agency (MPCA) Dredged Material Level 1 Soil Reference Values (SRV). However, it should be noted that the testing was not completed in accordance with MPCA dredged material sampling guidance which typically requires in-situ sampling prior to dredging. (See Table 2 for Sampling Results) The 2012 sampling analysis results for grain size indicated that samples 1 and 2, which represented the 2011 dredging work, consisted of poorly graded sand with silt and included 3.8% to 6.1% fine grained particles passing through the #200 Sieve. Samples 3 and 4, which represented the 2009 dredging work, consisted of silty sand and included 18% passing through the #200 Sieve, which indicates a greater fine grained or silt sized component. (See Appendix C for Sieve analysis results)

Table 2: 1999 Minnesota River Sediment Sampling Results

Sample Identifier		MN-1	MN-13	MN-3	MN-4	MN-5	MN-6	MN-7	MN-8	MN-9	MN-10	MN-11	MN-12						
Record #		78497		78498		78500	78501	78502	78503	78504	78505	78506	78507	Comparison					
River Mile		0.1	0.6	3.8	4	4.4	11.0	11.5	12.0	12.3	12.5&12.6	14.5	14.7						
Location		Mouth of Minnesota	Mouth of Minnesota	4-Mile Cutoff (airport drain)	4-Mile Cutoff	4-Mile Cutoff (above 494)	Blw Peterson's Bar	Blw Peterson's Bar	Peterson's Bar	Peterson's Bar	Cargill Slip	Above Savage RR Bridge	Above Savage RR Bridge	1999 Maximum	MOE LEL	Great Lakes Moderate	Great Lakes Heavy	Mississippi River - above Lake Pepin	Wisc Draft
Year		1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999						
Metals																			
As (arsenic)	mg/kg	1.91	1.39	1.61	5.84	3.53	3.44	1.13	1.43	1.16	1.89	1.81	1.30	5.84	6	3	8	11	
Cd (cadmium)	mg/kg	0.19	<0.03	0.12	**0.69**	0.30	0.17	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	**0.69**	0.6		6	1.4	1
Cr (chromium)	mg/kg	4.05	3.06	3.69	9.5	8.17	5.60	3.07	3.30	2.96	3.81	3.82	3.25	9.5	26	25	75	20	100
Cu (copper)	mg/kg	2.2	1.87	1.54	10.4	7.37	3.97	2.17	1.67	1.24	2.18	2.04	1.72	10.4	16	25	50	17	100
Hg (mercury)	mg/kg	<0.0048	<0.0048	<0.0048	0.0198	0.0095	0.0058	<0.0048	<0.0048	<0.0048	0.0052	0.0069	.0065	0.0198	0.2		1	0.18	0.1
Mn (manganese)	mg/kg	**784**	217	199	**955**	426	357	160	235	154	242	**931**	143	**955**	460	300	500	731	
Ni (nickel)	mg/kg	9.15	6.64	7.69	**24.8**	**16.4**	12.3	6.54	7.32	6.12	7.92	8.27	6.14	**24.8**	16	20	50	18	100
Pb (lead)	mg/kg	6.6	6.2	5.9	15.1	12.6	9.2	6.4	5.8	4.7	6.3	6.3	5.0	15.1	31	40	60	25	50
Zn (zinc)	mg/kg	12.0	9.33	10.4	46.5	30.1	19.3	8.53	9.29	8.12	11.1	12.3	9.47	46.5	120	90	200	81	100
Other																			
Cyanide, Total	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.1	0.1	0.25	<2	10
Ammonia (elutriate)	mg/l	0.38	0.44	0.41	0.55	0.47	0.33	0.41	0.21	0.3	0.25	0.26	0.25	0.55					
Physical																			
Total Organic Carb	%	0.02	0.03	0.02	0.72	0.50	0.18	0.02	0.01	0.02	0.03	0.03	0.04	0.72				2.9	
Moisture	%	0.2	0.3	0.1	2.2	1.3	0.7	0.1	0.2	0.2	0.2	0.2	0.2	2.2					
Total Solids	%	99.8	99.7	99.9	97.8	98.7	99.3	99.9	99.8	99.8	99.8	99.8	99.8	99.7					
Volatile Solids	%	0.43	0.4	0.31	2.92	2.31	0.95	0.29	0.49	0.25	0.35	0.54	0.41	2.92	6	5	8		
Grain Size Analysis																			
3 in																			
1 1/2																			
3/4																			
3/8																			
4		99.5		100	96.5	100	100.0		100	100.0	99.2	99.9	100.0						
8																			
10		98.4	98.7	99.9	94.5	99.0	98.8	100	97.4	100.0	96.5	98.3	100.0						
16																			
		93.4	95.8	99.5	92.8	97.8	97.6	99.8	91.7	99.9	92.4	93.8	100.0						
20																			
30		80.2	90.9	97.9	91.5	96.4	93.8	98.7	84.0	99.5	85.1	87.9	99.9						
40		65.2	84.4	89.0	78.7	87.8	85.2	94.0	76.6	95.0	71.1	79.6	99.1						
50																			
60		32.3	45.7	53.6	66.7	77.8	54.3	38.9	36.9	39.6	37.0	48.7	79.9						
70																			
80																			
100		1.9	4.0	2.8	38.0	39.0	30.4	2.6	3.4	3.4	6.4	9.9	15.8						
140		0.7	1.4	1.2	27.7	27.2	20.6	0.7	1.0	1.5	2.7	5.0	6.6						
200		0.4	0.8	0.8	19.6	19.0	12.5	0.4	0.4	0.8	1.1	2.2	1.9						
		0.3	0.6	0.5	14.7	13.2	7.8	0.2	0.3	0.5	0.8	1.2	0.5						

2.6 Regulatory Requirements

All proposed placement operations including the discharge of an effluent into navigable waters or adjacent wetlands are required by Section 404(b) of the Clean Water Act to undergo a detailed impact analysis. If an evaluation finds that a site complies with guidelines, the site may be used. Section 404(t) of the Act requires that the Corps comply with State regulatory requirements when placing material below the ordinary high water level or discharging an effluent. The Minnesota Department of Natural Resources (MnDNR) has a long-term permit and Memorandum of Understanding (MOU) with the Corps that provides details on complying with Section 404(t) for the placement of dredged material. The use of selected sites on the Minnesota River has been approved by the MnDNR (Cargill East, Kraemer, NSP, and Hwy. 77 Bridge).

The Corps also has a long-term agreement with the MPCA for water quality certification when material or effluent is discharged below the ordinary high water level. Since the Corps controls the type of equipment used for a particular dredging job and controls the effluent when hydraulic dredging is required, the Corps is responsible for acquiring water quality certification from the MPCA for the placement site areas.

As required by the City of Savage's zoning ordinance, the District was granted a conditional use permit to manage the Cargill East River (MN-14.2 RMP) site located in a floodway district for the expressed purpose of managing dredge material. New sites that may be identified will require coordination with the MnDNR, MPCA and the City of Savage.

3.0 POTENTIAL EXISTING SITE IMPROVEMENTS

Optimizing the existing Cargill East River (MN-14.2 RMP) site is essential since there is currently an unconfirmed quantity of consolidated material on site and the overall usable size of the site is limited. It was reported that the 2009 dredged material, which contain a higher percentage of fine grained silts (approx. 18% passing through the #200 sieve), was difficult to manage during the offloading and spreading process due to higher water contents and slower dewatering rates. The existing site configuration is clearly more receptive to accepting primarily sand as observed from the 2011 dredged material (See Figure 2). The existing berms that have been constructed on site have been estimated to be approximately four (4) feet in height and are only functional for containing mechanically placed sediment. Preliminary analysis of the visible dredged material currently on-site indicates that a sandy stockpile that is approximately 10 ft. in height occupies approximately 2.4 acres; and thinner layers of dredged material that have been physically distributed using dozers and conventional excavating equipment occupy an additional 3.2 acres. Available Corps dredging records indicate that approximately 109,485 cubic yards of dredged material was placed on the Cargill East River (MN-14.2 RMP) site in four separate work efforts (2008, 2009, 2010 and 2011). Although the overall percentage of sand content was generally high, it is highly probable that some level of consolidation and volume reduction has occurred.

Accurate estimates of on-site material can be determined by completing a topographic survey of the site and evaluating compared pre-dredge topography, which was fairly level and generally ranged from elevation 701 to 702. In order to fully utilize the available space and to maximize site storage capacity on the site, several options should be considered. The current site usage has been restricted to accepting mechanically excavated sediment which typically would contain 10 to 15 percent, dredged material solids and 85 to 90 percent water because of limitations related to the perimeter dikes and the inability of the site to retain hydraulically dredged slurry. A properly designed confined dewatering facility would allow the sediment to settle out within one or more dewatering cells and would allow regulatory compliant effluent water to be discharged back to the River. Since the existing dikes are reported to be approximately four ft. high and not configured as enclosed cells with water control outlet structures, hydraulic dredging is not currently a feasible dredging method for this site.

As described above, mechanically dredged material off-loaded from barges must be physically distributed throughout the site in order to utilize available storage space. This placement and distribution method requires double handling and therefore is not as efficient and cost effective as hydraulic dredging methods would be if a suitably designed confined dewatering facility with multiple cells were constructed. Hydraulically dredged slurry could be routed into selective cells or compartments depending on the total volume and the estimated silt percentage of the targeted navigational dredging area. Additionally, mechanically dredged sediment could also be placed within a designated cell if designed appropriately.

It is recommended that the DMMP includes the evaluation of various dike configurations to optimize site storage capacity, efficient distribution and containment, and efficiency of access for eventual site storage management and beneficial use applications. A preliminary conceptual site configuration layout is included for reference purposes. Since material used for dike construction can be considered permanent site material, the utilization of existing dredged material currently on-site should be evaluated for use in constructing perimeter and interior dikes in an effort to optimize the management of existing dredged material. The original site assessment completed by the Corps estimated site usage based on constructing dikes that would be capable of storing dredged material up to a 10 or 15 ft. height above existing grade. However, it should be noted that depending on the total height of any perimeter dike configuration, that the horizontal footprint occupied by the dike may limit or reduce the available space for dredged material storage. For example, a 15 ft. high perimeter dike with a 3:1 slope (3 ft. horizontal to 1 ft. vertical) and a 10 ft. top width would occupy a bottom site footprint width of 100 ft. Therefore, various dike height and cell configurations should be evaluated. Once the containment dikes are constructed, newly placed dredged material would be then considered temporary site material and subject to management guidelines.

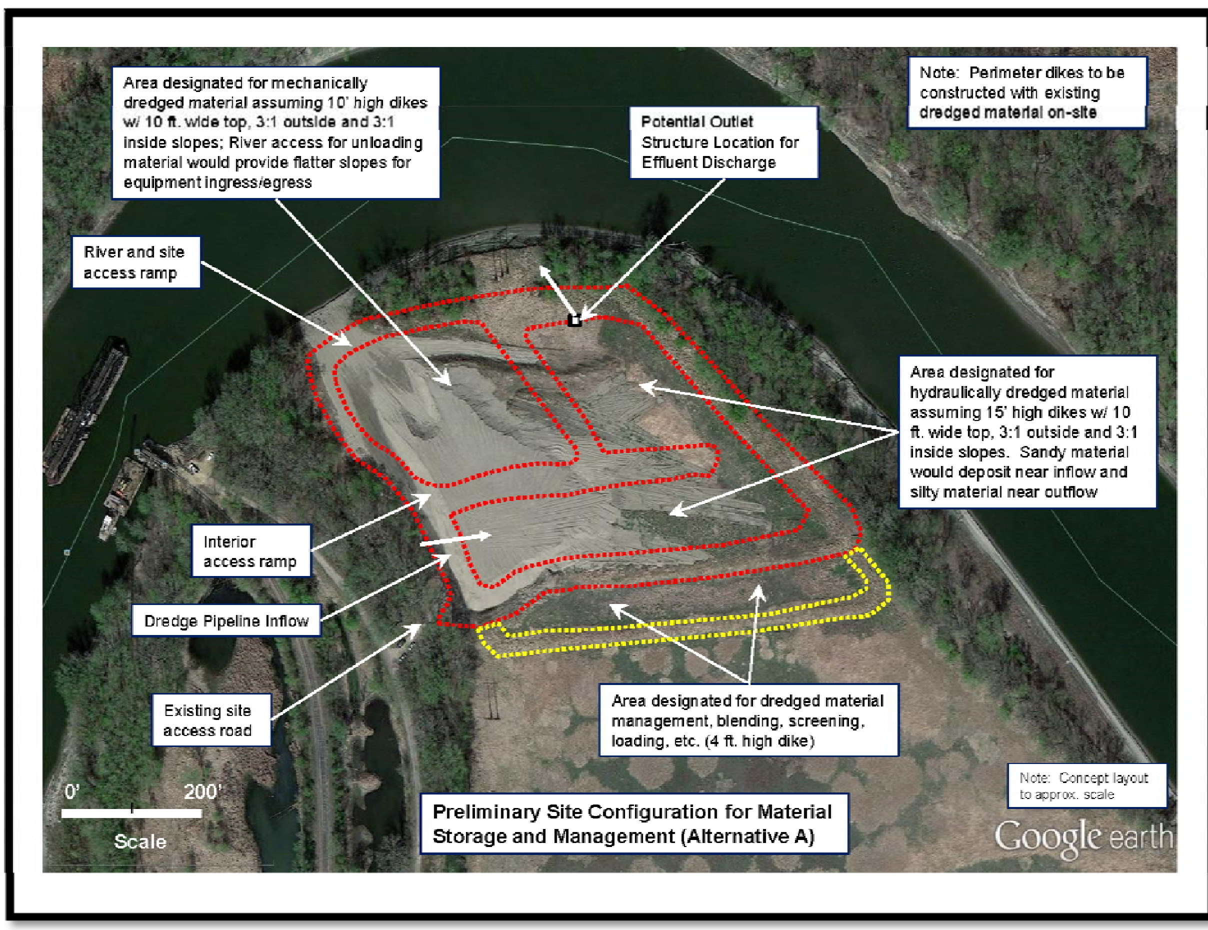


Figure 3: Cargill East River (MN-14.2 RMP) Preliminary Site Configuration for Material Storage and Management

3.1 Material Management Plan

A Material Management Plan should be developed as a guide for short and long term site management for dredged materials currently on-site and for all future dredged materials planned for placement and storage at the existing Cargill East River (MN 14.2 RMP) site. The existing Draft "*Operational Manual for Material Management at LMRWD's Dredge Disposal Site*" (Draft Plan) developed by the District should be revised as necessary (LMRWD 2012). The Draft Plan begins to address major site concerns and anticipated site requirements for the management of dredge materials placed on the site by Corps dredging activities on the Lower Minnesota River and to market excess materials for sale to interested parties.

The Draft Plan should evaluate physical and environmental alternatives to enhance and optimize the ability to store, dewater and access dredged material in a manner that allows optimum material management and off-site deployment. Verification of materials placed on the site will be performed by the site manager at the completion of each project. Quarterly reports on inventory will track: 1. Materials placed (by type), 2. Materials removed (by type), and 3. Total materials on-site. These reports will be maintained and provided to District personnel by the site manager on a quarterly basis.

The District will coordinate with the Corps regarding future acceptance of dredged material with regard to dredging schedule, anticipated volume of material and the physical and environmental characteristics of the targeted material. The method of dredging and subsequent material placement will also be determined prior to dredging to allow for strategic site placement and to facilitate subsequent material management.

On-site material management should include, at a minimum, periodic gradation and sediment quality tests and inventory management to measure and validate all material brought in by barge counts and material pile surveys. Materials removed from the site over land will be authenticated by truck counts with standard cubic yard capacities applied to individual trucks.

Marketing efforts undertaken will primarily consist of maintaining on-going contact with material brokers/contractors and other outside sources to be determined. Pricing for materials will be established in accordance with current market price. Upon sale of material, management will ticket and invoice the transaction. Paper receipts for all sales will be totaled and copies submitted to the District quarterly. Site operating costs will be totaled and reported quarterly to the District.

4.0 MATERIAL USE

The District, as the local sponsor, has a continuing role in providing new placement sites or insuring that the placement sites selected in the Corps' 2007 DMMP have capacity when required for dredged material placement. The District should act as a site manager, or acquire agreements with local contractors to become placement site managers with the responsibility for insuring that capacity exists at each placement site. Material placed into sites should be removed as soon as practicable. Material with higher concentrations of fines will require a longer period to dewater and may need to be mixed with coarser sand to provide a more useable product. The Corps will assist the District in actively promoting the beneficial use of dredged material.

The following sections discuss material use options for the site. The options include: no action or maintaining the status quo with the Cargill East River (MN-14.2 RMP) site; identifying and managing beneficial uses of the dredge material; and lastly, hauling the material off-site for disposal.

4.1 No Action

The No Action option represents the option of allowing the current site to reach its capacity and acquiring no additional placement sites. Under this scenario, the site will gradually reach a point where no additional dredged material can feasibly be offloaded from barges and stockpiled in a safe manner due to the limited size of the site and the absence of sufficient impounding dikes to allow for hydraulically dredged material to be received. In its current state, the site has approximately 7 to 8 acres of space that can realistically accommodate and store mechanically dredged material assuming a maximum stockpile height of 15 feet. As described previously in Section 3.0, there is an existing 2.4 acre stockpile on-site that is reported to be approximately 10 feet in height, plus a 3.2 acre area of a 2 to 3 feet thick area of material that has been physically distributed throughout the site. These dredged material deposits that area visible on aerial site images would require a site topographic survey to conform actual on-site volumes. The Corps has indicated that approximately 109,485 cubic yards of dredged material (measured in-situ) was placed on this site from 2008 through 2011, which has likely reduced in volume over time as a result of dewatering and consolidation. However, based on visible sediment observed via aerial photo reconnaissance as describe above, the approximate material volume on-site in the range of 60,000 cubic yards, which means a significant amount of previously placed material has become re-vegetated and is difficult to delineate and estimate without completing a detailed topographic survey of the site.

If we assume that a 7 acre area can be stockpiled to a maximum 15 ft. height throughout the site by physically hauling, dozing and distributing material, then the site potentially can store approximately 170,000 cubic yards of mechanically dredged material before reaching its maximum storage limit.

For conservative estimating purposes, if we assume that there are 80,000 to 100,000 cubic yards of consolidated dredged material currently on-site and the remaining potential storage capacity of the site assuming a 15 ft. maximum stockpile height and no further improvements or actions, approximately 70,000 to 90,000 cubic yards of additional mechanically dredged material could potentially be stored before having to take action to remove some of the material to create storage capacity. Based on the information presented above, it would take 3.2 to 4.1 years for the site to reach capacity.

4.2 Beneficial Uses

Beneficial reuse involves using dredged sediments as a resource material in a productive way. While the term "beneficial" indicates some benefit is gained by a particular use, the term has come to generally mean any reuse of dredged material. Beneficial uses of dredged material can minimize, or eliminate, the need for traditional disposal of dredged material. As part of overall sediment management, regulatory agencies generally support the productive reuse of dredged material.

The potential uses for dredged material depend on the type of dredged material, location of dredging, how it is dredged and the overall suitability of the material for use. Legislation and local conditions must also be considered. Three broad categories of use are often distinguished: engineering uses, agricultural/product uses and environmental uses. In each of these cases, criteria must be established that ensure that sufficient testing is completed to adequately evaluate the suitability of the dredged materials, that the potential use site is located within reasonable proximity to where the dredging activity is planned and that a thorough physical and chemical evaluation is completed of the dredge materials.

How will beneficial reuse alternatives be assessed?

Beneficial use projects involve coordination between the dredged material generator, regulators of dredged material placement, and other interested parties including federal, state and local natural resource management agencies, public interest groups, and local residents.

The decision process for identifying the most appropriate match for dredge material reuse involves analysis of the sediment to determine compatibility with needs in the area. It is necessary to determine the following items during the decision process:

- Contaminant Status of Materials
- Site Selection
- Technical Feasibility
- Environmental Acceptability
- Market Demand and Cost/Benefit
- Legal Constraints

Limited dredged material characterization was conducted to establish contaminant status of the dredged material and determine whether a particular dredged material may be suitable for a proposed reuse. As previously noted, sediment core samples were obtained from different areas of the Cargill East River (MN-14.2 RMP) site and analyzed for various contaminants, as well as for particle size, total organic carbon, and total nutrients.

The 2009 Sediment Analysis Report (Braun) indicates that the on-site dredged material samples that were analyzed did not contain elevated or harmful levels of contaminants or metals and did not exceed MPCA Level 1 Soil Reference Values (SRV). Therefore, removing and reusing the sediment will not likely require special conditions or restrictions beyond those typically imposed on dredging projects. The Report also indicates that the targeted dredged material consists of varying percentages of sand and silt. Historic uses of these materials in the region include the following:

Sand: Fine grained sand is generally easy to compact, affected little by moisture, and not subject to frost action. Minnesota Department of Transportation (MnDOT) quality standards refer to this fine grain sand as Mason Sand. It is typically used in children's sand boxes and sand volleyball courts. Mason Sand is also used as an additive to the cement used to make mortar for laying bricks, filling gaps in pavement and also as a base under delicate materials such as liners.

Silt: Silt of this grain size is typically used in ponds, for water control and containment and for berm strengthening. Silt is inherently unstable, particularly when moisture is increased, with a tendency to become quick (soft) when saturated. It is relatively impervious, difficult to compact, highly susceptible to frost heave, easily erodible and subject to piping and boiling.

Clay: The permeability of clay is very low; it is subject frost heave, expansion and shrinkage with changes in moisture. However, clay has good nutrient holding capability and is considered to be a valuable additive to topsoil in the correct proportion. However, very little clay is typically contained in the dredged material obtained from the Lower Minnesota River.

Retail prices for these materials vary depending on quality and availability. Table 3 below indicates average retail prices for these products within the Minneapolis area:

Table 3: Average Retail Prices

Top Soil	$20-25 CY (Screened) $10-15 unscreened
Fill Material	$8-10 CY
Sand (used to grade or mix with topsoil)	$34 per ton*
*The number of cubic yards in a ton of sand generally varies from 1.3 to 1.6 tons per cubic yard depending on density and water content of material.	

In addition, combinations of the above materials have been found to have beneficial applications for agricultural and landscaping purposes, particularly when small percentages of sand, clay and even leaf compost are blended with primarily silt sized soil.

What are the beneficial reuse options for the Lower Minnesota River sediment?

The technical feasibility of connecting a dredging project to a beneficial reuse project requires overall project coordination, timing and physical location of activities. It is important to consider proximity of dredged material source to the ultimate reuse site, associated handling and trucking of material, and available access to the Cargill East River (MN-14.2 RMP) site. It is also necessary to ensure that the amount and type of dredged material is compatible with the specific reuse project requirements. The suitability of a particular dredged material type for a specific use will depend largely on the intended use of the land after the dredge material is placed on it. Table 4 below identifies the potential beneficial reuse option associated with the type of sediment present in the Lower Minnesota River.

Table 4: Dredge Material Sediment type

Beneficial Use Options	Consolidated (Stiff) Clay	Silt	Sand (fine and coarse)
Engineered Uses			
Land creation	x	x	x
Land improvement	x	x	x
Capping	x		
Replacement Fill			x
Agriculture & Product Use			
Agriculture/Topsoil		x	
Construction materials	x	x	x
Road construction and maintenance			x
Environmental Enhancements			
Habitats Enhancement	x	x	x
Fisheries Improvement	x	x	x
Wetland Restoration	x	x	?
Source: U.S. EPA and USACE, Beneficial Use Planning Manual 2007			

4.2.1 Engineered Use

Land Creation and Improvement: Land created within a project area would be limited to uses compatible with fine-grained materials present at the Cargill East River (MN-14.2 RMP) site. These materials are more suitable for recreational uses, such as parks and trails.

Dredged material may also be used to improve the quality of soil or where improvements are necessary to the slope and/or elevation of the land. Proven methods have been developed for land improvement by filling with the fine material, such as silts and clays, produced by dredging. Land improved using fine material is generally of lower strength than land improved using coarse-grained material. Potential applications include recreation areas, playing fields, golf course, parks, light residential development or light commercial storage areas.

County Planning Department (various locations). Identify potential for new parks planned within and smaller maintenance projects within recreational areas that will continue to occur. If dredged sediment is used for a recreation project it may be difficult to coordinate the timing of each individual project with the availability of the dredged sediment.

Parks and Recreation Department (various locations). Confirm whether any new or existing parks may likely have improvement projects occurring within the next two to 10 years that may require fill material.

Capping: Dredged material can be applied as a means of isolating the contaminated sediment from the surrounding environment. Upland capping of abandoned quarries is the most suitable use within the project area. Confirm any existing Brownfield projects within the Minneapolis area that may utilize dredged material for capping purposes.

Replacement Fill: Dredged material may be used as a replacement fill when the physical qualities of dredged sediment are superior to soils in the surrounding area. Peat and clayish soils can be removed from fill material and replaced by sand or other granular dredged material to improve physical properties needed to meet building requirements (USACE, 2006).

Minneapolis-St. Paul International Airport Runway Expansion . Confirm whether any nearby airports are in the process of planning an extension of existing runway facilities. This application could be potentially utilize significant quantities of dredged material for the construction runway expansion and safety zones at the end of runways.

Local Solid Waste Authorities. Local Solid Waste Authorities may be potential recipients of dredged material.

4.2.2 Agriculture/Product Uses

As an alternative to permanent placement in sediment basins, sediment could be used to increase yields on eroded or low-yielding soils. Dredged material may be used for land improvement when the quality of existing land is not adequate for a planned use or where the elevation of the land is too low to prevent occasional flooding. Additional options include land grading or filling of gullies and farmed depressions, and construction of terraces, pond embankments, or other on-farm uses of clean fill.

Topsoil: Dredged material is commonly composed of silt, sand, clay and organic matter, all important components of topsoil. Dewatering and conditioning of dredged material can result in a product that can be used in topsoil creation or structural enhancement. For horticultural use, sediment may be mixed with other materials to produce a manufactured topsoil superior to any of its individual components. Dredged material from rivers and reservoirs consists primarily of eroded topsoils and organic matter that may be used on land of poor agricultural quality to improve the soil structure. In some cases, the mixed soil product has been suitable for sale or free distribution to the public. The advantages of such an operation are that environmental benefits are obtained at both ends; topsoil does not have to be taken from new subdivisions, scattered construction sites or farmland; the Cargill East River (MN-14.2 RMP) site can provide large quantities of soil with consistent quality, with limited need for trucking material to arrive at most placement sites.

Local Soil and Water Conservation District (various locations). SWCD manages erosion and sediment control programs, agricultural programs, stormwater programs, as well as conservation and education programs. The local Soil and Water Conservation District coordinates conservation efforts within the county. Currently SWCDs do not have a large project involving berm construction that could use the dredged material. The organization indicated that local farms could potentially be users of dredged material as supplementary topsoil on farmlands. However, because the sediment would not be available for approximately three to four years, it is not feasible to identify topsoil needs for individual farms and commit to the material. In addition, it is unlikely to get one landowner to take all of the sediment available which could cause logistical complications caused by the need to coordinate with multiple end users.

Construction Materials: Some dredged material can be used as construction material. In many cases, dredged material consists of a mixture of sand and clay fractions, which may require some type of separation and moisture control process.

Local Construction Companies (various locations). Depending on the sediment type and processing requirements, dredged material may be used as concrete aggregates (sand and gravel); backfill material or in the production mortar (sand); raw material for brick manufacturing (clay with less than 30 percent sand); ceramics, such as tile (clay) pellets for insulation or lightweight backfill or aggregate (USACE, 2006). Many construction companies make use of excavated material on their project site and do not have storage capacity to take substantial amounts of the dredged material. Therefore, it is necessary to coordinate the availability of dredged material with local construction projects.

Road Construction and Maintenance:

Minnesota Department of Transportation (various locations): MnDOT local road projects may be a potential recipient of dredged material to use during road construction projects. MnDOT road construction projects typically make use of excavated materials on site. If it is determined that excess fill is needed, it would be difficult to estimate the required amount until the time of construction activity. In addition, the scale of these projects would not be large enough to take on all of the dredged sediment, resulting in a need to coordinate the availability of dredged material and transporting material to numerous MnDOT projects within the region.

4.2.3 Environmental

Dredged material can be used to enhance or create various wildlife habitats. Native vegetation established in these areas then provides food and cover for wildlife. Nesting meadows and habitat for large and small mammals and songbirds can be developed on upland or floodplain (seasonally flooded) dredged material placement sites. Strategic placement of dredged material can replenish eroding natural wetland shorelines or nourish subsiding wetlands by serving as an erosion barrier or providing shoreline stabilization (Great Lakes Commission 2001).

Dredged material sediment can be used to stabilize eroding natural wetland shorelines or nourish subsiding wetlands. Dewatered dredged material can also be used to construct erosion barriers and other structures that aid in restoring a degraded or impacted wetland (USACE 2006).

Habitat Enhancement (various locations, distance varies): Properties located along the Minnesota River can be good candidates for habitat enhancement projects. This habitat could be created on property located within close proximity to the dredge placement site to minimize the need for loading and hauling away material. Property owners would work in coordination with the District in order to implement these projects.

The Natural Resources Conservation Service (NRCS) (various locations) often conducts land rehabilitation and resource conservation projects. Coordination with the NRCS may identify potential projects that could be partners for a beneficial reuse project.

4.2.4 Cost/Benefit

Although difficult to quantify, intangible benefits should always be taken into account when assessing overall costs and benefits. The actual costs of a proposed project are balanced with the value of the benefits including the potential for an improved environment, aesthetic enhancement, and a more viable local community. Implementing a beneficial reuse option often means saving valuable primary resources and avoids creating more borrow pits. In addition, the combination of two projects (dredging project and reuse project) can create a cost-effective solution by accomplishing two things at once, such as maintaining depth and developing a natural habitat area.

However, the economic consequences for each particular use of dredged material must be thoroughly evaluated and all costs and benefits, both long-term and short-term, must be weighed. Where possible, local pricing estimates should be used for estimating the cost of activities associated with the beneficial use project. These numbers are supplemented with 2009 RS means, an annually updated construction cost information handbook.

<u>Screening soil</u>: The need for and degree of screening dredged material will depend on the end use of the sediment. A coarse screening may be necessary to remove rocks and debris from sediment. A fine screening may be necessary to separate topsoil, gravel and sand. Fine screening would use a screen with smaller holes resulting in a slower, costlier, more time consuming process. The screening process would cost approximately $6 to $9 per cubic yard, depending on the extent of coarse or fine screening that is necessary.

<u>Loading of Truck</u>: A front end loader would be required to load dump trucks for hauling sediment to the beneficial use project site. Depending on the conditions at the dewatering/storage site, either a wheel mounted or crawler mounted front-end loader will be used. A track mounted loader would be used on areas with a steep slope, while a wheel mounted loader would be used in areas sensitive to surface disturbance. Wheel mounted loaders are typically more expensive to maintain, therefore, it would be a more expensive option. RS Means indicates that the estimated cost for loading sediment using a front end loader would be $9.35 per 5 CY (bucket capacity) for a track mounted loader or $25.50 per 3 or 5 CY (bucket capacity depends on model of loader) for a wheel mounted loader. Cost of loading one 16.5 CY dump truck would cost about $30 for a track mounted loader and $80 for a wheel mounted loader.

<u>Hauling Sediment</u>: Costs are frequently lower when distances from the dredge material placement site to reuse placement site are reduced. For preliminary analysis purposes, it is assumed that sediment will be hauled from the Cargill East River (MN-14.2 RMP) site. Hauling costs can vary depending on amount being hauled, permitted speed on roads and total trip distance. A 16.5 cubic yard dump truck and average speed limit of 35 miles per hour was assumed for cost estimate purposes. Table 5 below indicates the average cost of hauling.

Table 5: Hauling Costs

Truck Size	Round Trip Distance at 35 MPH	Price per Loose CY
16.5 Cubic Yard	20 miles	$ 7.05
16.5 Cubic Yards	30 miles	$ 9.05
16.5 Cubic Yards	40 miles	$12.65
Source: (RS Means Site Work and Landscape Cost Data 2009)		

Therefore, hauling sediment to a beneficial use project site located 10 miles from the Cargill East River (MN-14.2 RMP) site would cost approximately $2,327 per truck load. A project located 20 miles away from the site would cost approximately $8,349 per truck load to transport sediment. Trucking prices would vary depending on the capability of the end user to load and haul the dredge materials with their own equipment and staff.

4.2.5 Regulatory Requirements

Permits for the beneficial reuse of dredged material outside of the dewatering/storage area will be coordinated with federal, state, and local agency reviews as required by U.S. EPA, Corps, MPCA and any other local agencies. These permits could include:

Table 6: Required Permits and Clearances

Permit	Granting Agency	Applicable Portion of Project
Conditional Use Permit	County	For construction activity outside of uses permitted by right.
Minnesota Water Permit	MPCA	Applicable if proposed project results in fill or discharge any pollutant into, or adjacent to surface waters, withdraw surface water, otherwise alter the physical, chemical or biological properties of surface waters.
Erosion and Sediment Control Plan	County	Required at site of Beneficial Use Project.
Section 404/401	Corps and MPCA	Required if project occurs within Waters of the U.S.
Federal/State Threatened and Endangered Species	U.S. Fish and Wildlife Service	A site survey would be necessary for the project area. Permit requirements would be identified at later date.

Considerations for placement of dredged material and any required easements would be coordinated with the county and property owners. The county will first review a plan for the activity to ensure the proposed project satisfies the requirements of local zoning ordinances. In addition, a Performance Bond may be required by the county to ensure satisfactory completion of the project.

All activity associated with loading and hauling dredged sediment for beneficial reuse will be in compliance with the existing Conditional Use Permit and/or Erosion and Sediment Control Plan and associated conditions put in place for approval of a dewatering/storage site by County. The Conditional Use Permit would cover construction equipment accessing the parcel (s) to load and haul sediment, access across adjacent parcels to and from the dewatering/storage site to roads and necessary mitigation to rehabilitate the site. Conditions set forward in the Conditional Use Permit and Erosion and Sediment Control Plan for the dewatering site would also apply to Beneficial Reuse operations at the dewatering site including possible limits on hours of equipment use and trucking operation activity and avoidance of areas for resource protection.

Permits for the beneficial reuse of sediment outside of the dewatering/storage area would be the responsibility of the project proponent or end user. It is assumed that any beneficial reuse of the dredged materials would not adversely affect regulated wetlands and waters, and therefore would not require federal or state permits beyond those obtained for the dredging and dewatering operations. Local permits may be required, particularly where the placement of dredged material is part of a land disturbing project. Local permit requirements will be project specific.

4.2.6 Local Opportunity and Market Demand for Beneficial Use Projects

There are multiple potential beneficial reuse options that have been identified for dredged material. However, few of the potential reuse options have a confirmed market demand to absorb or use most or all of the potential volume of material that could be dredged from the Lower Minnesota River. Most of the specific reuse options would involve small quantities of material in comparison to targeted dredging volumes. The ability of many of the following reuse options to "mesh" with any navigational channel dredging project will require a balance of timing, cost, need, and the ability to screen, wash and/or blend the dredged material with other material on the site to enhance market value. Distance is another key factor in evaluating the feasibility of a particular reuse option; transporting sediment by truck is typically cost-prohibitive over long distances.

It is important to note that during the recent economic downturn, the demand for construction materials has decreased and that decreased will likely continue until the current economy recovers and construction activity shows an increasing trend. Discussion with local contractors including Frattalone Companies, S.M. Hentges, and Veit has confirmed that there is a small market for beneficial reuse of dredged material. If the material meets analytical and geotechnical specifications, it has greater potential to be used as fill at a construction site. The practicality of reuse would still depend on the dredge work having concurrent timing with and close proximity to local construction projects. Contractors who typically work with dredged material have more interest in offering their services to haul the material off-site at the District's expense than purchasing the sediment for reuse.

4.3 Off-Site Disposal

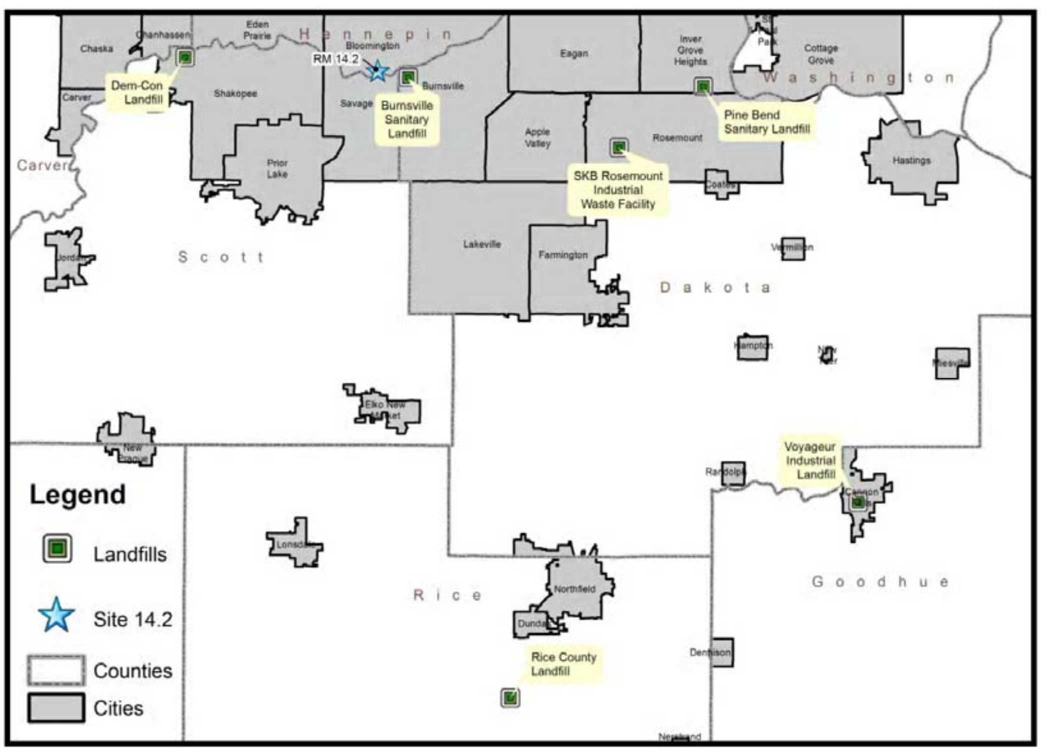
Off-Site disposal of dredged material is a consideration for landfills which accept mixed municipal solid waste or industrial waste. Landfills may also accept contaminated dredged material when properly permitted to do so by MPCA. Figure 4 shows the locations of landfill within 30 miles of the Cargill East River (MN-14.2 RMP) site which can accept sediment. The nearest facility is the Burnsville Sanitary Landfill, just less than 2 miles away.

Costs of off-site disposals at these facilities can vary. The Burnsville Sanitary Landfill would charge $8.50 to $12 per ton, with up front fee of $680 for the material. On the opposite side of the cost range, the Pine Bend Sanitary Landfill in Inver Grove Heights charges $45 per ton with an additional $28 per ton in taxes. The amount of tons in each cubic yard of dredge material varies depending on sediment types and water content. Generally, there is approximately 1.5 to 2.0 tons per cubic yard of sediment leading to disposal cost ranges of $13.20 to $146 per cubic yard (plus loading and trucking).

There may be some discounts imposed at landfill facilities based on volume of business and if the material can be used as daily cover. SKB Rosemount Industrial Waste Facility suggested that their price is negotiable and can be discounted for repeat business, and if the dredged material is used as daily cover their price could be reduced by roughly 33%. Most of disposal facilities indicated discounted rate if the material could be used for daily cover. The potential for using the material as daily cover depends on the timing of disposal and the characteristics of the dredged sediment.

Since the Burnsville Sanitary Landfill is the closest and most cost effective, a preliminary estimate of dredged material hauling and disposal costs would include approximately $1.87 per cubic yard for loading and $7.05 per cubic yard for hauling as described in the Beneficial Use Section 4.2.4 above (RS. Means); and the estimated Burnsville Sanitary Landfill disposal cost would be $8.50 per ton or approximately $13.20 per cubic yard. Therefore, the cost of loading, hauling and disposing of dredged material at the closest landfill without factoring any additional cost savings would be approximately $22.12 per cubic yard. Since the Cargill East River (MN-14.2 RMP) site has been estimated to potentially store as much as 193,600 cubic yards (or more) of dredged material, a total site cleanout that includes disposal at the nearby Burnsville Sanitary Landfill would be approximately $4.3 million based on the estimated costs summarized above.

Figure 4. Landfills Accepting Dredge Materials Within 30 Miles of Cargill East River (MN-14.2 RMP) site



4.4 Material Use Summary

After review of the options available to the District for material use, the option with the least uncertainty the option of hauling the material off-site. As noted, hauling the material off-site would cost the District approximately $4.3 million to clear the Cargill East River (MN-14.2 RMP) site. Fund required to cover the expense would have to be generate by a special assessment against the benefitted property or an ad valorem levy.

5.0 ALTERNATIVE MANAGEMENT SCENARIOS

Removal of snags and boulder between the mouth of the Minnesota River and the mouth of the Yellow Medicine River at RMP 237.0 was authorized by the US Congress in 1867. In 1892, the Rivers and Harbors Act authorized the maintenance of a 4-foot navigation channel from the mouth of the Minnesota River to RMP 25.6. The existing 9-foot navigation channel on the Minnesota River from its mouth to RMP 14.7 was authorized by the Rivers and Harbors Act of 1958, Public Law 85-500, in accordance with Senate Document 144, 84th Congress, 2nd Session. The enabling legislation required local contributions including provision for dredge material placement sites. The District was created to act as the local sponsor. As the local sponsor, the District is required to furnish "without cost to the United States all lands, easements, and rights-of-way necessary for the construction of the project and for subsequent maintenance when and as required."(Strandberg, 1962)

A one-time special assessment against benefitted properties in the District was done in support of the Corps' initial construction of the 9-foot channel. This was supplemented in 1980 by a District-wide ad valorem levy. The balances from those activities were kept in a special fund (the 9-Foot Channel Fund). The 9-foot Channel Fund was used for implementation activities that address commercial navigation purposes, such as the purchase of the Cargill East River (MN-14.2 RMP) site and management of the Kraemer (MN-12.1-RMP) and the Cargill East River (MN-14.2 RMP) dredge material placement sites. Over the years, the 9-Foot Channel Fund has been depleted. The status of the 9-foot Channel Fund and disagreements between District managers about how to generate revenue has caused District managers to evaluate alternative management scenarios for the 9-foot Channel and the Cargill East River (MN-14.2 RMP) dredge material placement site. The following sections explore the potential management scenarios.

5.1 Alternative A: District maintains role as local sponsor

Alternative A consists of the District maintaining its role as the local sponsor. The District would generate funds to operate and manage the Cargill East River (MN-14.2 RMP) site and to purchase additional dredge placements sites, if necessary. Alternative A will require the District to use funding mechanisms afforded them by Minnesota Statues 103B and 103D to generate fund.

5.2 Alternative B: District operates and manages the Cargill East River (MN-14.2 RMP) site and other dredge material placement sites purchased and funded by the State of Minnesota

Alternative B consists of the District serving as the operator and manager of the Cargill East River (MN-14.2 RMP) site and other dredge placements sites for the 9-foot Channel. Alternative B would be fully funded by the State of Minnesota

5.3 Alternative C: District ends role as local sponsor

Alternative C consists of the District ending its role as the local sponsor. If this alternative is chosen, the District will notify the appropriate agencies to take the proper regulatory actions.

6.0 REFERENCES

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W. B. Strandberg (U.S. Army Corps of Engineers, St. Paul District, St. Paul, MN) Letter to: A. W. Hubbard (Lower Minnesota River Watershed District, Minneapolis, MN)1962 September 13

Appendix A: Chemical Analyses Data for the Minnesota River

Chemical Analyses Data for Minnesota River

		Record #	78507	402	301	302	303	78506	401	404	304	305	403
		River Mile	14.7	14.6	14.52	14.51	14.5	14.5	14.4	13.4	13.21	13.2	13.2
		Location	Above Savahe RR Bridge	AB SAVAGE RR BR.	AB SAVAGE RR BR.	AB SAVAGE RR BR.	AB SAVAGE RR BR.	Above Savahe RR Bridge	AB SAVAGE RR BR.	AB & BLW CARGILL	AB & BLW CARGILL	AB & BLW CARGILL	AB & BLW CARGILL
		Year	1999	1989	1982	1982	1978	1999	1989	1989	1979	1979	1989
		System	2	2	2	2	2	2	2	2	2	2	2
		Habitat Type	1	1	1	1	1	1	1	1	1	1	1
		Pool	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
		Sam. Gear	1	1	1	1	1	1	1	1	1	1	1
		Sam. Depth	10	10	10	10	10	10	10	10	10	10	10
		Data Cit.	COE	COE	COE	COE	COE	COE	COE	COE	COE	COE	COE
CHC's	ug/kg	a-BHC	<0.08	< 0.01				<0.08	< 0.08	< 0.07			< 0.11
	ug/kg	b-BHC	<0.08	< 0.2				<0.08	< 0.16	< 0.15			< 0.21
	ug/kg	BHC	<0.08	< 0.3				<0.08	< 0.24	< 0.22			< 0.32
	ug/kg	2,4´-DDD											
	ug/kg	2,4´-DDE											
	ug/kg	2,4´-DDT											
	ug/kg	g-BHC (lindane)	<0.08	< 0.13				<0.08	< 0.11	< 0.1			< 0.14
	ug/kg	Heptachlor	<0.10	< 0.1				<0.10	< 0.08	< 0.07			< 0.11
	ug/kg	Anthracene											
	ug/kg	Aldrin		< 0.13					< 0.11	< 0.1			< 0.14
	ug/kg	Acenaphthene											
	ug/kg	Acenaphthylene											
	ug/kg	Benz(a)anthracene											
	ug/kg	Benzo(a)pyrene											
	ug/kg	Heptachlorepoxide	<0.12	< 0.17				<0.12	< 0.13	< 0.12			< 0.18
	ug/kg	Benzo(g,h,i)perylene											
	ug/kg	Benzo(b)fluoranthene											
	ug/kg	Benzo(k)fluoranthene											
	ug/kg	Endosulfan I		< 0.17					< 0.13	< 0.12			< 0.18
	ug/kg	Dieldrin	<0.04	< 0.17	< 0.1	< 0.1	< 1	<0.04	< 0.13	< 0.12	0	0	< 0.18
	ug/kg	4,4'-DDE	<0.04	< 0.13	< 0.1	< 0.1		<0.04	< 0.11	< 0.1	0	0	< 0.14
	ug/kg	Endrin	<0.06	< 0.3	< 0.1	< 0.1	< 1	<0.06	< 0.24	< 0.22	0	0	< 0.32
	ug/kg	Endosulfan II		< 0.33					< 0.26	< 0.25			< 0.35
	ug/kg	4,4'-DDD	<0.06	< 0.36	< 0.1	< 0.1		<0.06	< 0.29	< 0.27	0	0	< 0.39
	ug/kg	Endrinaldehyde		< 0.36					< 0.29	< 0.27			< 0.39
	ug/kg	Sulfan sulfate		< 0.36					< 0.29	< 0.27			< 0.39
	ug/kg	4,4'-DDT	<0.18	< 0.43	< 0.1	< 0.1	< 4	<0.18	< 0.34	< 0.32	0	0	< 0.46
	ug/kg	Methoxychlor		< 0.73					< 0.58	< 0.55			< 0.77
	ug/kg	Endrinketone		< 0.36					< 0.29	< 0.27			< 0.39
	ug/kg	alpha-Chlordane											
	ug/kg	Chlorodane	<0.20	< 1.98	< 1	< 1		<0.20	< 1.58	< 1.49	0	0	< 2.11
	ug/kg	gamma-Chlordane											
	ug/kg	Oxychlordane	<0.20					<0.20					
	ug/kg	Fluoranthene											
	ug/kg	Toxaphene		< 1.98					< 1.58	< 1.49			< 2.11
	ug/kg	Hexachlorobenzene											
	ug/kg	Pyrene											
METALS	mg/kg	Ag (silver)											
	mg/kg	Al (aluminum)											
	mg/kg	As (arsenic)	1.30	< 1.2	1.6	2.2	2.54	1.81	< 1.2	1.6	0	0	2.7
	mg/kg	B (boron)											
	mg/kg	Ba (barium)									40	80	
	mg/kg	Be (beryllium)											
	mg/kg	Cd (cadmium)	<0.03	< 1.3	< 0.2	< 0.19	1.18	<0.03	< 1.3	< 1.3	< 10	< 10	< 1.6
	mg/kg	Cr (chromium)	3.25	3.8	3.9	4.2	28.7	3.82	4.3	5	< 10	< 10	8.1
	mg/kg	Cu (copper)	1.72	8.7	2.9	3.3	12	2.04	13.3	4.8	< 10	< 10	15
	mg/kg	Fe (iron)			4300	5500	10700				3800	9700	
	mg/kg	Hg (mercury)	.0065	< 0.01	0.015	0.0165	0.031	0.0069	< 0.01	< 0.01	0	0	< 0.02
	mg/kg	Mg (magnesium)											
	mg/kg	Mn (manganese)	143	254			419	931	263	232	160	720	56.8
	mg/kg	Mo (molybdenum)											
	mg/kg	Ni (nickel)	6.14	7.5	7	7	16.7	8.27	< 6.4	7	< 10	20	9.4
	mg/kg	Pb (lead)	5.0	4.4	4	4.4	44	6.3	4.6	3.6	< 10	20	5.8
	mg/kg	Sb (antimony)											
	mg/kg	Se (selenium)		< 0.92					< 0.93	< 0.93			< 1.2
	mg/kg	Sn (tin)											
	mg/kg	Sr (strontium)											
	mg/kg	Ti (titanium)											
	mg/kg	Zn (zinc)	9.47					12.3					
	mg/kg	V (vanadium)											
	mg/kg	Chromium, Hexavalent											

Chemical Analyses Data for Minnesota River

					E	F	G	H	I	J	K	L	M	N	O
5				Record #	78507	402	301	302	303	78506	401	404	304	305	403
6				River Mile	14.7	14.6	14.52	14.51	14.5	14.5	14.4	13.4	13.21	13.2	13.2
7				Location	Above Savahe RR Bridge	AB SAVAGE RR BR.	AB SAVAGE RR BR.	AB SAVAGE RR BR.	AB SAVAGE RR BR.	Above Savahe RR Bridge	AB SAVAGE RR BR.	AB & BLW CARGILL	AB & BLW CARGILL	AB & BLW CARGILL	AB & BLW CARGILL
8				Year	1999	1989	1982	1982	1978	1999	1989	1989	1979	1979	1989
9				System	2	2	2	2	2	2	2	2	2	2	2
10				Habitat Type	1	1	1	1	1	1	1	1	1	1	1
11				Pool	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
12				Sam. Gear	1	1	1	1	1	1	1	1	1	1	1
13				Sam. Depth	10	10	10	10	10	10	10	10	10	10	10
14				Data Cit.	COE	COE	COE	COE	COE	COE	COE	COE	COE	COE	COE
77	PCB's	ug/kg		Aroclor-1016	<0.24	< 1.98				<0.24	< 1.58	< 1.49			< 2.11
78	PCB's	ug/kg		Aroclor-1221	<0.28	< 1.98				<0.28	< 1.58	< 1.49			< 2.11
79	PCB's	ug/kg		Aroclor-1232	<0.26	< 1.98				<0.26	< 1.58	< 1.49			< 2.11
80	PCB's	ug/kg		Aroclor-1242	<0.32	< 1.98				<0.32	< 1.58	< 1.49			< 2.11
81	PCB's	ug/kg		Aroclor-1248	<0.22	< 1.98				<0.22	< 1.58	< 1.49			< 2.11
82	PCB's	ug/kg		Aroclor-1254	<0.34	< 4.13				<0.34	< 3.3	< 3.1			< 4.4
83	PCB's	ug/kg		Aroclor-1260	<0.32	< 4.13				<0.32	< 3.3	< 3.1			< 4.4
84	PCB's	ug/kg		Total PCB's											
85															
86	PARTICLE SIZE %FINER	SAND	coarse	3 in					100				100	100	
87	PARTICLE SIZE %FINER	SAND	coarse	1 1/2			100	100	100				100	100	
88	PARTICLE SIZE %FINER	SAND	coarse	3/4			100	100	100				100	100	
89	PARTICLE SIZE %FINER	SAND	coarse	3/8			100	100	100				100	100	
90	PARTICLE SIZE %FINER	SAND	coarse	4		100.0	100	100	100	100	99.9456	100	100	100	99.4659
91	PARTICLE SIZE %FINER	SAND	coarse	8			100	100							
92	PARTICLE SIZE %FINER	SAND	coarse	10		99.8				98	99.7595	99.9211	100	100	99.339
93	PARTICLE SIZE %FINER	SAND	medium	16		99.5	100	100		94	99.3005	99.3583			98.8504
94	PARTICLE SIZE %FINER	SAND	medium	20									100	100	
95	PARTICLE SIZE %FINER	SAND	medium	30	100	98.5	100	100		88	93.9681	92.8675			96.6491
96	PARTICLE SIZE %FINER	SAND	medium	40	98		100	99					100	100	
97	PARTICLE SIZE %FINER	SAND	medium	50		98.5	98	96			93.9681	92.8675			96.6491
98	PARTICLE SIZE %FINER	SAND	fine	60	80					48					
99	PARTICLE SIZE %FINER	SAND	fine	70			87	79							
100	PARTICLE SIZE %FINER	SAND	fine	80		84.8					83.0929	68.9342	92	80	92.6698
101	PARTICLE SIZE %FINER	SAND	fine	100	16	13.5	58	50		10	10.3533	14.5539			42.5172
102	PARTICLE SIZE %FINER	SAND	fine	140	7	8.5				50	6.36015858	9.9257696			26.39172056
103	PARTICLE SIZE %FINER	SILT	clay	200	2	4.8	31	36	34	2	4.39382985	7.18111026	12	46	17.37520712
104	PARTICLE SIZE %FINER	SILT	clay	270	1	4.5	25	32		1	2.93210559	5.17041208			11.90172384
105	PARTICLE SIZE %FINER	SILT	clay	0.20 mm		3.5	11	19			2.14905649	3.62252512	5	35	8.54970672
106	PARTICLE SIZE %FINER	SILT	clay	0.05 mm		2.1	5	8	21		1	2.09050416	2	19	4.54007512
107															
108	MISC	mg/kg		Total Organic Carbon											
109	MISC	%		Total Organic Carb	0.04	0.4				0.03	0.91	1.13			1.02
110	MISC	mg/kg		Chem Oxy Demand			10000	10580	19700				8700	29000	
111	MISC	mg/kg		Kjedahl Nitrogen			440	520	740				1300	4100	
112	MISC	mg/kg		Phosphorus (as P)			290	230	561				400	510	
113	MISC	mg/kg		Oil and Grease											
114	MISC	mg/kg		Cyanide, Total	<0.20					<0.20					
115	MISC	mg/kg		Ammonia											
116	MISC	mg/l		Ammonia Elutriate											
117	MISC	%		Moisture	0.2					0.2					
118	MISC	%		Total Solids	99.8					99.8					
119	MISC	gVS/gTS		Total Volatile Solids											
120	MISC	%		Volatile Solids	0.41					0.54					
121	MISC	mg/kg		Phenolics, Total Recoverable											

Chemical Analyses Data for Minnesota River

Group	Unit	Parameter	P	Q	R	S	T	U	V	W	X	Y	Z	AA
		Record #		78505	306	405	78504	307	78503	406	78502	308		78501
		River Mile	12.9	12.5&12.6	12.5	12.4	12.3	12	12.0	11.7	11.5	11.4	11.3	11.0
		Location	Cargill	Cargill Slip	AB&BW PETERSON BAR	AB&BW PETERSON BAR	Perterson's Bar	AB&BW PETERSON BAR	Perterson's Bar	AB&BW PETERSON BAR	Blw Perterson's Bar	AB&BW PETERSON BAR	Above 35W	Blw Perterson's Bar
		Year	10/17/2007	1999	1980	1989	1999	1975	1999	1989	1999	1980	10/17/2007	1999
		System		2	2	2	2	2	2	2	2	2		2
		Habitat Type		1	1	1	1	1	1	1	1	1		1
		Pool		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5		2.5
		Sam. Gear	1	1	1	1	1	1	1	1	1	1	1	1
		Sam. Depth	10	10	10	10	10	10	10	10	10	10	10	10
		Data Cit.	COE	COE	COE	COE	COE	COE	COE	COE	COE	COE	COE	COE
CHC's	ug/kg	a-BHC		<0.08		< 0.07	<0.08		<0.08	< 0.09	<0.08			<0.08
	ug/kg	b-BHC		<0.08		< 0.14	<0.08		<0.08	< 0.18	<0.08			<0.08
	ug/kg	BHC		<0.08		< 0.22	<0.08		<0.08	< 0.27	<0.08			<0.08
	ug/kg	2,4´-DDD	<4										<4	
	ug/kg	2,4´-DDE	<4										<4	
	ug/kg	2,4´-DDT	<4										<4	
	ug/kg	g-BHC (lindane)		<0.08		< 0.1	<0.08		<0.08	< 0.12	<0.08			<0.08
	ug/kg	Heptachlor		<0.10		< 0.07	<0.10		<0.10	< 0.09	<0.10			<0.10
	ug/kg	Anthracene	<0.79										1.4	
	ug/kg	Aldrin				< 0.1				< 0.12				
	ug/kg	Acenaphthene	<0.71										<0.71	
	ug/kg	Acenaphthylene	<1.0										<1.0	
	ug/kg	Benz(a)anthracene	1.8										8.4	
	ug/kg	Benzo(a)pyrene	1.7										9.8	
	ug/kg	Heptachlorepoxide		<0.12		< 0.12	<0.12		<0.12	< 0.15	<0.12			<0.12
	ug/kg	Benzo(g,h,i)perylene	1.6										6.2	
	ug/kg	Benzo(b)fluoranthene	3.1										19	
	ug/kg	Benzo(k)fluoranthene	0.94										5.6	
	ug/kg	Endosulfan I				< 0.12				< 0.15				
	ug/kg	Dieldrin	<3.2	<0.04	0	< 0.12	<0.04		<0.04	< 0.15	<0.04	0.5	<3.2	<0.04
	ug/kg	4,4'-DDE	<3.5	<0.04	0	< 0.1	<0.04		<0.04	< 0.12	<0.04	0	<3.5	<0.04
	ug/kg	Endrin		<0.06	0	< 0.22	<0.06		<0.06	< 0.27	<0.06	0		<0.06
	ug/kg	Endosulfan II				< 0.24				< 0.3				
	ug/kg	4,4'-DDD	<3.7	<0.06	0	< 0.26	<0.06		<0.06	< 0.33	<0.06	0.8	<3.7	<0.06
	ug/kg	Endrinaldehyde				< 0.26				< 0.33				
	ug/kg	Sulfan sulfate				< 0.26				< 0.33				
	ug/kg	4,4'-DDT	<4.2	<0.18	0	< 4.8	<0.18		<0.18	< 0.4	<0.18	0	<4.2	<0.18
	ug/kg	Methoxychlor				< 0.53				< 0.67				
	ug/kg	Endrinketone				< 0.26				< 0.33				
	ug/kg	alpha-Chlordane	<1.7										<1.7	
	ug/kg	Chlorodane		<0.20	0	< 1.44	<0.20		<0.20	< 1.82	<0.20	1		<0.20
	ug/kg	gamma-Chlordane	<1.6										<1.6	
	ug/kg	Oxychlordane		<0.20			<0.20		<0.20		<0.20			<0.20
	ug/kg	Fluoranthene	5										26	
	ug/kg	Toxaphene				< 1.44				< 1.82				
	ug/kg	Hexachlorobenzene	<2										<2	
	ug/kg	Pyrene	4.3										21	
METALS	mg/kg	Ag (silver)												
	mg/kg	Al (aluminum)												
	mg/kg	As (arsenic)	0.97	1.89	0	1.8	1.16	0.83	1.43	3.2	1.13	0	1.2	3.44
	mg/kg	B (boron)												
	mg/kg	Ba (barium)			40							60		
	mg/kg	Be (beryllium)												
	mg/kg	Cd (cadmium)	<1.0	<0.03	< 10	< 1.2	<0.03	< 0.1	<0.03	< 1.6	<0.03	< 10	<1.0	0.17
	mg/kg	Cr (chromium)	4.7	3.81	20	3.4	2.96	7	3.30	7.1	3.07	10	5.3	5.60
	mg/kg	Cu (copper)	1.9	2.18	< 10	3.9	1.24	2.8	1.67	12.1	2.17	< 10	2.5	3.97
	mg/kg	Fe (iron)			2600							5200		
	mg/kg	Hg (mercury)	<0.10	0.0052	0	< 0.01	<0.0048	0.13	<0.0048	< 0.02	<0.0048	0	<0.10	0.0058
	mg/kg	Mg (magnesium)												
	mg/kg	Mn (manganese)	218	242	170	163	154		235	59.3	160	660	203	357
	mg/kg	Mo (molybdenum)												
	mg/kg	Ni (nickel)	<0.10	7.92	< 10	< 6.2	6.12		7.32	11.5	6.54	10	4.7	12.3
	mg/kg	Pb (lead)	2.5	6.3	< 10	3	4.7	< 0.1	5.8	11.6	6.4	10	2.5	9.2
	mg/kg	Sb (antimony)												
	mg/kg	Se (selenium)				< 0.89				2.2				
	mg/kg	Sn (tin)												
	mg/kg	Sr (strontium)												
	mg/kg	Ti (titanium)												
	mg/kg	Zn (zinc)	12.1	11.1			8.12		9.29		8.53		13.6	19.3
	mg/kg	V (vanadium)												
	mg/kg	Chromium, Hexavalent	<5.9										<5.8	

Chemical Analyses Data for Minnesota River

	A	B	C	D	P	Q	R	S	T	U	V	W	X	Y	Z	AA
5				Record #		78505	306	405	78504	307	78503	406	78502	308		78501
6				River Mile	12.9	12.5&12.6	12.5	12.4	12.3	12	12.0	11.7	11.5	11.4	11.3	11.0
7				Location	Cargill	Cargill Slip	AB&BW PETERSON BAR	AB&BW PETERSON BAR	Perterson's Bar	AB&BW PETERSON BAR	Perterson's Bar	AB&BW PETERSON BAR	Blw Perterson's Bar	AB&BW PETERSON BAR	Above 35W	Blw Perterson's Bar
8				Year	10/17/2007	1999	1980	1989	1999	1975	1999	1989	1999	1980	10/17/2007	1999
9				System		2	2	2	2	2	2	2	2	2		2
10				Habitat Type		1	1	1	1	1	1	1	1	1		1
11				Pool		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5		2.5
12				Sam. Gear	1	1	1	1	1	1	1	1	1	1	1	1
13				Sam. Depth	10	10	10	10	10	10	10	10	10	10	10	10
14				Data Cit.	COE	COE	COE	COE	COE	COE	COE	COE	COE	COE	COE	COE
77	PCB's	ug/kg		Aroclor-1016	<50	<0.24		< 1.44	<0.24		<0.24	< 1.82	<0.24		<50	<0.24
78		ug/kg		Aroclor-1221	<50	<0.28		< 1.44	<0.28		<0.28	< 1.82	<0.28		<50	<0.28
79		ug/kg		Aroclor-1232	<50	<0.26		< 1.44	<0.26		<0.26	< 1.82	<0.26		<50	<0.26
80		ug/kg		Aroclor-1242	<50	<0.32		< 1.44	<0.32		<0.32	< 1.82	<0.32		<50	<0.32
81		ug/kg		Aroclor-1248	<40	<0.22		< 1.44	<0.22		<0.22	< 1.82	<0.22		<40	<0.22
82		ug/kg		Aroclor-1254	<50	<0.34		< 3	<0.34		<0.34	< 3.8	<0.34		<50	<0.34
83		ug/kg		Aroclor-1260	<40	<0.32		< 3	<0.32		<0.32	< 3.8	<0.32		<40	<0.32
84		ug/kg		Total PCB's												
85																
86	PARTICLE SIZE %FINER	SAND	coarse	3 in			100			100				100		
87				1 1/2			100			100				100		
88				3/4			100			100				100		
89				3/8			100			100				100		
90				4	99.14	99	100	99.3761		99	100	100		100	100	
91				8			100			95				100		
92				10	64.29	97		98.6943			97	99.9173	100		99.89	100
93			medium	16		93	100	96.2073	100	84	92	99.6276	99	100		97
94				20	84.45										99.04	
95				30		95		83.8046	99		84	98.5519	98			84
96				40	66.31	71	99		95	41	76		94	98	95.1	
97				50				83.8046				98.5519				
98			fine	60	33.37	37			39		37		38		64.79	54
99				70												
100				80	6.97			41.9038				81.6715			27.25	
101				100	5.26	6	42	17.4719	4	6	4	52.1307		83	21.89	31
102				140		3		10.74500323	2		1	40.47394665	2			21
103		SILT	clay	200	2.87	1	20	6.81403086	1	2		26.9826311	1	70	13.16	13
104				270				4.65926604				17.59732573				7
105				0.20 mm			7	3.29043663				13.27129692		33		
106				0.05 mm			2	2.30048832				9.16528674		18		
107																
108	MISC	mg/kg		Total Organic Carbon	<85										<84	
109		%		Total Organic Carb		0.03		1.11	0.02		0.01	1.2	0.02			0.18
110		mg/kg		Chem Oxy Demand			5300			1950				31000		
111		mg/kg		Kjedahl Nitrogen	170		1600							3700	300	
112		mg/kg		Phosphorus (as P)	280										270	
113		mg/kg		Oil and Grease												
114		mg/kg		Cyanide, Total	<0.20	<0.20			<0.20		<0.20		<0.20		<0.20	<0.20
115		mg/kg		Ammonia	6.5										16	
116		mg/l		Ammonia Elutriate												
117		%		Moisture	25.57	0.2			0.2		0.2		0.1		24.88	0.7
118		%		Total Solids	74.43	99.8			99.8		99.8		99.9		75.12	99.3
119		gVS/gTS		Total Volatile Solids	0.013										0.013	
120		%		Volatile Solids		0.35			0.25		0.49		0.29			0.95
121		mg/kg		Phenolics, Total Recoverable	1.5										6.2	

Appendix B: 2009 and 2011 Dredge Soil Stockpile Sampling – Savage Stockpile Facility

(Cargill East River [MN-14.2 RMP] site)

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

October 09, 2009 7:58:00AM

Client:	Braun Intertec (8230)	Work Order:	NSJ0062
	11001 Hampshire Avenue South	Project Name:	Braun Intertec
	Bloomington, MN 55438	Project Nbr:	0905424
Attn:	William R. Dahl	P/O Nbr:	
		Date Received:	10/01/09

SAMPLE IDENTIFICATION	LAB NUMBER	COLLECTION DATE AND TIME
0905424-01	NSJ0062-01	09/29/09 11:45

An executed copy of the chain of custody, the project quality control data, and the sample receipt form are also included as an addendum to this report. If you have any questions relating to this analytical report, please contact your Laboratory Project Manager at 1-800-765-0980. Any opinions, if expressed, are outside the scope of the Laboratory's accreditation.

Minnesota Certification Number: 047-999-345

The Chain(s) of Custody, 2 pages, are included and are an integral part of this report.

These results relate only to the items tested. This report shall not be reproduced except in full and with permission of the laboratory.

All solids results are reported in wet weight unless specifically stated.
Estimated uncertainty is available upon request.
This report has been electronically signed.
Report Approved By:

Andrea Runnels

Andrea Runnels
Project Manager

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	Braun Intertec (8230) 11001 Hampshire Avenue South Bloomington, MN 55438	Work Order:	NSJ0062
		Project Name:	Braun Intertec
		Project Number:	0905424
Attn	William R. Dahl	Received:	10/01/09 08:00

ANALYTICAL REPORT

Analyte	Result	Flag	Units	MRL	Dilution Factor	Analysis Date/Time	Method	Batch
Sample ID: NSJ0062-01 (0905424-01 - Soil) Sampled: 09/29/09 11:45								
General Chemistry Parameters								
Total Organic Carbon	**3080**		mg/Kg dry	1000	1	10/07/09 10:05	SW846 9060M	9100659

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	Braun Intertec (8230)	Work Order:	NSJ0062
	11001 Hampshire Avenue South	Project Name:	Braun Intertec
	Bloomington, MN 55438	Project Number:	0905424
Attn	William R. Dahl	Received:	10/01/09 08:00

PROJECT QUALITY CONTROL DATA
Blank

Analyte	Blank Value	Q	Units	Q.C. Batch	Lab Number	Analyzed Date/Time
General Chemistry Parameters						
9100659-BLK1						
Total Organic Carbon	<630		mg/Kg dry	9100659	9100659-BLK1	10/07/09 10:05

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	Braun Intertec (8230)	Work Order:	NSJ0062
	11001 Hampshire Avenue South	Project Name:	Braun Intertec
	Bloomington, MN 55438	Project Number:	0905424
Attn	William R. Dahl	Received:	10/01/09 08:00

PROJECT QUALITY CONTROL DATA
Duplicate

Analyte	Orig. Val	Duplicate	Q	Units	RPD	Limit	Batch	Sample Duplicated	% Rec.	Analyzed Date/Time
General Chemistry Parameters										
9100659-DUP1										
Total Organic Carbon	14100	13200		mg/Kg dry	7	35	9100659	NSI2062-01		10/07/09 10:05

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	Braun Intertec (8230)	Work Order:	NSJ0062
	11001 Hampshire Avenue South	Project Name:	Braun Intertec
	Bloomington, MN 55438	Project Number:	0905424
Attn	William R. Dahl	Received:	10/01/09 08:00

PROJECT QUALITY CONTROL DATA
LCS

Analyte	Known Val.	Analyzed Val	Q	Units	% Rec.	Target Range	Batch	Analyzed Date/Time
General Chemistry Parameters								
9100659-BS1								
Total Organic Carbon	40.0	33.0		%	82%	80 - 120	9100659	10/07/09 10:05

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	Braun Intertec (8230)	Work Order:	NSJ0062
	11001 Hampshire Avenue South	Project Name:	Braun Intertec
	Bloomington, MN 55438	Project Number:	0905424
Attn	William R. Dahl	Received:	10/01/09 08:00

CERTIFICATION SUMMARY

TestAmerica Nashville

Method	Matrix	AIHA	Nelac	Minnesota
SW846 9060M	Soil	N/A	N/A	N/A

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Nashville, TN

COOLER RECEI[illegible]

NSJ0062

Cooler Received/Opened On 10 / 1 / 09 @ 08:00

1. Tracking # 8005 (last 4 digits, FedEx)

Courier: Fed Ex IR Gun ID 96210146

2. Temperature of rep. sample or temp blank when opened: 3.6 Degrees Celsius

3. If item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO (NA)

4. Were custody seals on outside of cooler? (YES)...NO...NA

   If yes, how many and where: 1 front

5. Were the seals intact, signed, and dated correctly? (YES)...NO...NA

6. Were custody papers inside cooler? (YES)...NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial)

7. Were custody seals on containers: YES (NO) and Intact YES...NO...(NA)

   Were these signed and dated correctly? YES...NO...(NA)

8. Packing mat'l used? (Bubblewrap) (Plastic bag) Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: (Ice) Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)? (YES)...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? (YES)...NO...NA

12. Did all container labels and tags agree with custody papers? (YES)...NO...NA

13a. Were VOA vials received? YES...(NO)...NA

b. Was there any observable headspace present in any VOA vial? YES...NO...(NA)

14. Was there a Trip Blank in this cooler? YES...(NO)...NA If multiple coolers, sequence #_______

I certify that I unloaded the cooler and answered questions 7-14 (intial)

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES..NO..(NA)

b. Did the bottle labels indicate that the correct preservatives were used YES...NO...(NA)

16. Was residual chlorine present? YES...NO...(NA)

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial)

17. Were custody papers properly filled out (ink, signed, etc)? (YES)...NO...NA

18. Did you sign the custody papers in the appropriate place? (YES)...NO...NA

19. Were correct containers used for the analysis requested? (YES)...NO...NA

20. Was sufficient amount of sample sent in each container? (YES)...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial)

I certify that I attached a label with the unique LIMS number to each container (intial)

21. Were there Non-Conformance issues at login? YES...(NO) Was a PIPE generated? YES...(NO)...#_______

BIS = Broken in shipment
Cooler Receipt Form.doc

Revised 6-24-09

2960 Foster Creighton Road Nashville, TN 37204 * 800-765-0980 * Fax 615-726-3404

Client	Braun Intertec (8230)	Work Order:	NSJ0062
	11001 Hampshire Avenue South	Project Name:	Braun Intertec
	Bloomington, MN 55438	Project Number:	0905424
Attn	William R. Dahl	Received:	10/01/09 08:00

DATA QUALIFIERS AND DEFINITIONS

ND Not detected at the reporting limit (or method detection limit if shown)

LEGEND Technical Services, Inc.
www.legend-group.com

88 Empire Drive
St Paul, MN 55103
Tel: 651-642-1150
Fax: 651-642-1239

LS Marine Inc.	Project: MN River	
3625 Talmage Circle Suite 202	Project Number: 10822	Work Order #: 1102219
Vadnais Heights, MN 55110	Project Manager: Mr. Taylor Luke	Date Reported: 06/03/11

TCLP METALS
Legend Technical Services, Inc.

Analyte	Result	RL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Cargill West (1102219-01) Soil Sampled: 05/23/11 00:00 Received: 05/23/11 15:00										
Arsenic	<0.050	0.050	0.010	mg/L	1	B1E2603	05/26/11	05/26/11	EPA 1311/6010B	
Barium	**0.72**	0.10	0.013	mg/L	1	"	"	"	"	
Cadmium	<0.0050	0.0050	0.00050	mg/L	1	"	"	"	"	
Chromium	<0.050	0.050	0.0012	mg/L	1	"	"	"	"	
Lead	<0.015	0.015	0.0034	mg/L	1	"	"	"	"	
Mercury	<0.0010	0.0010	0.00019	mg/L	1	B1F0207	06/02/11	06/03/11	EPA 1311/7470A	
Selenium	<0.10	0.10	0.011	mg/L	1	B1E2603	05/26/11	05/26/11	EPA 1311/6010B	
Silver	<0.025	0.025	0.00090	mg/L	1	"	"	"	"	
CHS (1102219-02) Soil Sampled: 05/23/11 00:00 Received: 05/23/11 15:00										
Arsenic	<0.050	0.050	0.010	mg/L	1	B1E2603	05/26/11	05/26/11	EPA 1311/6010B	
Barium	**0.81**	0.10	0.013	mg/L	1	"	"	"	"	
Cadmium	<0.0050	0.0050	0.00050	mg/L	1	"	"	"	"	
Chromium	<0.050	0.050	0.0012	mg/L	1	"	"	"	"	
Lead	<0.015	0.015	0.0034	mg/L	1	"	"	"	"	
Mercury	<0.0010	0.0010	0.00019	mg/L	1	B1F0207	06/02/11	06/03/11	EPA 1311/7470A	
Selenium	<0.10	0.10	0.011	mg/L	1	B1E2603	05/26/11	05/26/11	EPA 1311/6010B	
Silver	<0.025	0.025	0.00090	mg/L	1	"	"	"	"	

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Fax: 651-642-1239

LS Marine Inc. 3625 Talmage Circle Suite 202 Vadnais Heights, MN 55110	Project: MN River Project Number: 10822 Project Manager: Mr. Taylor Luke	Work Order #: 1102219 Date Reported: 06/03/11

PCB 8082 - Quality Control
Legend Technical Services, Inc.

Analyte	Result	RL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	%RPD	%RPD Limit	Notes
Batch B1E2404 - EPA 3545 ASE Extraction											
Blank (B1E2404-BLK1)					Prepared & Analyzed: 05/24/11						
Aroclor 1016	< 0.20	0.20	0.0079	mg/kg wet							
Aroclor 1221	< 0.20	0.20	0.020	mg/kg wet							
Aroclor 1232	< 0.20	0.20	0.023	mg/kg wet							
Aroclor 1242	< 0.20	0.20	0.010	mg/kg wet							
Aroclor 1248	< 0.20	0.20	0.040	mg/kg wet							
Aroclor 1254	< 0.20	0.20	0.040	mg/kg wet							
Aroclor 1260	< 0.20	0.20	0.0059	mg/kg wet							
Surrogate: Decachlorobiphenyl	*0.0607*			*mg/kg wet*	*0.0667*		*91.0*	*65.3-143*			
Surrogate: Tetrachloro-meta-xylene	*0.0610*			*mg/kg wet*	*0.0667*		*91.5*	*60.9-138*			
LCS (B1E2404-BS1)					Prepared: 05/24/11		Analyzed: 05/25/11				
Aroclor 1260	0.315	0.20	0.0059	mg/kg wet	0.333		94.4	70-130			
Surrogate: Decachlorobiphenyl	*0.0587*			*mg/kg wet*	*0.0667*		*88.0*	*65.3-143*			
Surrogate: Tetrachloro-meta-xylene	*0.0560*			*mg/kg wet*	*0.0667*		*84.0*	*60.9-138*			
Matrix Spike (B1E2404-MS1)	**Source: 1102199-05**				Prepared: 05/24/11		Analyzed: 05/25/11				
Aroclor 1260	0.347	0.20	0.0059	mg/kg wet	0.335	<0.20	104	70-130			
Surrogate: Decachlorobiphenyl	*0.0657*			*mg/kg wet*	*0.0670*		*98.0*	*65.3-143*			
Surrogate: Tetrachloro-meta-xylene	*0.0670*			*mg/kg wet*	*0.0670*		*100*	*60.9-138*			
Matrix Spike Dup (B1E2404-MSD1)	**Source: 1102199-05**				Prepared: 05/24/11		Analyzed: 05/25/11				
Aroclor 1260	0.341	0.20	0.0059	mg/kg wet	0.334	<0.20	102	70-130	1.73	17.2	
Surrogate: Decachlorobiphenyl	*0.0645*			*mg/kg wet*	*0.0668*		*96.5*	*65.3-143*			
Surrogate: Tetrachloro-meta-xylene	*0.0635*			*mg/kg wet*	*0.0668*		*95.0*	*60.9-138*			

88 Empire Drive
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Fax: 651-642-1239

LS Marine Inc.	Project: MN River		
3625 Talmage Circle Suite 202	Project Number: 10822	Work Order #:	1102219
Vadnais Heights, MN 55110	Project Manager: Mr. Taylor Luke	Date Reported:	06/03/11

PERCENT SOLIDS - Quality Control
Legend Technical Services, Inc.

Analyte	Result	RL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	%RPD	%RPD Limit	Notes
Batch B1E2514 - General Preparation											
Duplicate (B1E2514-DUP1)	**Source: 1102219-02**				Prepared: 05/25/11 Analyzed: 05/26/11						
% Solids	58.0			%		57.0			1.74	20	

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LS Marine Inc.	Project: MN River	
3625 Talmage Circle Suite 202	Project Number: 10822	Work Order #: 1102219
Vadnais Heights, MN 55110	Project Manager: Mr. Taylor Luke	Date Reported: 06/03/11

TCLP METALS - Quality Control
Legend Technical Services, Inc.

Analyte	Result	RL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	%RPD	%RPD Limit	Notes
Batch B1E2603 - EPA 200.7/3005A Digestion											
Blank (B1E2603-BLK1)					Prepared & Analyzed: 05/26/11						
Arsenic	< 0.050	0.050	0.010	mg/L							
Barium	< 0.10	0.10	0.013	mg/L							
Cadmium	< 0.0050	0.0050	0.00050	mg/L							
Chromium	< 0.050	0.050	0.0012	mg/L							
Lead	< 0.015	0.015	0.0034	mg/L							
Selenium	< 0.10	0.10	0.011	mg/L							
Silver	< 0.025	0.025	0.00090	mg/L							
LCS (B1E2603-BS1)					Prepared & Analyzed: 05/26/11						
Arsenic	4.25	0.050	0.010	mg/L	3.99		107	80-120			
Barium	4.10	0.10	0.013	mg/L	3.99		103	80-120			
Cadmium	4.14	0.0050	0.00050	mg/L	3.99		104	80-120			
Chromium	4.14	0.050	0.0012	mg/L	3.99		104	80-120			
Lead	4.18	0.015	0.0034	mg/L	3.99		105	80-120			
Selenium	4.29	0.10	0.011	mg/L	3.99		108	80-120			
Silver	0.411	0.025	0.00090	mg/L	0.399		103	80-120			
LCS Dup (B1E2603-BSD1)					Prepared & Analyzed: 05/26/11						
Arsenic	4.23	0.050	0.010	mg/L	3.99		106	80-120	0.508	20	
Barium	4.06	0.10	0.013	mg/L	3.99		102	80-120	1.01	20	
Cadmium	4.10	0.0050	0.00050	mg/L	3.99		103	80-120	0.845	20	
Chromium	4.10	0.050	0.0012	mg/L	3.99		103	80-120	0.908	20	
Lead	4.11	0.015	0.0034	mg/L	3.99		103	80-120	1.70	20	
Selenium	4.24	0.10	0.011	mg/L	3.99		106	80-120	1.12	20	
Silver	0.404	0.025	0.00090	mg/L	0.399		101	80-120	1.72	20	
Matrix Spike (B1E2603-MS1)	**Source: 1102200-01**				Prepared & Analyzed: 05/26/11						
Arsenic	4.22	0.050	0.010	mg/L	3.99	<0.050	105	75-125			
Barium	4.38	0.10	0.013	mg/L	3.99	0.385	100	75-125			
Cadmium	4.11	0.0050	0.00050	mg/L	3.99	<0.0050	103	75-125			
Chromium	4.04	0.050	0.0012	mg/L	3.99	<0.050	101	75-125			
Lead	4.03	0.015	0.0034	mg/L	3.99	<0.015	101	75-125			
Selenium	4.25	0.10	0.011	mg/L	3.99	<0.10	106	75-125			
Silver	0.404	0.025	0.00090	mg/L	0.399	<0.025	101	75-125			
Matrix Spike Dup (B1E2603-MSD1)	**Source: 1102200-01**				Prepared & Analyzed: 05/26/11						
Arsenic	4.19	0.050	0.010	mg/L	3.99	<0.050	105	75-125	0.828	20	
Barium	4.40	0.10	0.013	mg/L	3.99	0.385	101	75-125	0.464	20	
Cadmium	4.09	0.0050	0.00050	mg/L	3.99	<0.0050	102	75-125	0.504	20	
Chromium	4.03	0.050	0.0012	mg/L	3.99	<0.050	101	75-125	0.384	20	
Lead	4.02	0.015	0.0034	mg/L	3.99	<0.015	101	75-125	0.268	20	
Selenium	4.20	0.10	0.011	mg/L	3.99	<0.10	105	75-125	1.14	20	

LEGEND Technical Services, Inc.
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88 Empire Drive
St Paul, MN 55103
Tel: 651-642-1150
Fax: 651-642-1239

LS Marine Inc. 3625 Talmage Circle Suite 202 Vadnais Heights, MN 55110	Project: MN River Project Number: 10822 Project Manager: Mr. Taylor Luke	Work Order #: 1102219 Date Reported: 06/03/11

TCLP METALS - Quality Control
Legend Technical Services, Inc.

Analyte	Result	RL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	%RPD	%RPD Limit	Notes
Batch B1E2603 - EPA 200.7/3005A Digestion											
Matrix Spike Dup (B1E2603-MSD1)	**Source: 1102200-01**				Prepared & Analyzed: 05/26/11						
Silver	0.405	0.025	0.00090	mg/L	0.399	<0.025	102	75-125	0.376	20	
Batch B1F0207 - EPA 245.1/7470A Digestion											
Blank (B1F0207-BLK1)					Prepared: 06/02/11 Analyzed: 06/03/11						
Mercury	< 0.0010	0.0010	0.00019	mg/L							
LCS (B1F0207-BS1)					Prepared: 06/02/11 Analyzed: 06/03/11						
Mercury	0.0104	0.0010	0.00019	mg/L	0.0100		104	80-120			
LCS Dup (B1F0207-BSD1)					Prepared: 06/02/11 Analyzed: 06/03/11						
Mercury	0.0101	0.0010	0.00019	mg/L	0.0100		101	80-120	2.93	20	
Matrix Spike (B1F0207-MS1)	**Source: 1102200-01**				Prepared: 06/02/11 Analyzed: 06/03/11						
Mercury	0.0104	0.0010	0.00019	mg/L	0.0100	<0.0010	104	75-125			
Matrix Spike Dup (B1F0207-MSD1)	**Source: 1102200-01**				Prepared: 06/02/11 Analyzed: 06/03/11						
Mercury	0.0102	0.0010	0.00019	mg/L	0.0100	<0.0010	102	75-125	2.91	20	

Legend Technical Services, Inc.
www.legend-group.com

88 Empire Drive
St Paul, MN 55103
Tel: 651-642-1150
Fax: 651-642-1239

LS Marine Inc.	Project: MN River	
3625 Talmage Circle Suite 202	Project Number: 10822	Work Order #: 1102219
Vadnais Heights, MN 55110	Project Manager: Mr. Taylor Luke	Date Reported: 06/03/11

Notes and Definitions

<	Less than value listed
dry	Sample results reported on a dry weight basis
NA	Not applicable. The %RPD is not calculated from values less than the reporting limit.
MDL	Method Detection Limit
RL	Reporting Limit
RPD	Relative Percent Difference
LCS	Laboratory Control Spike = Blank Spike (BS) = Laboratory Fortified Blank (LFB)
MS	Matrix Spike = Laboratory Fortified Matrix (LFM)

LEGEND TECHNICAL SERVICES, INC.

88 Empire Drive, St. Paul, MN 55103 - Telephone: 651-642-1150, Fax: 651-642-1239

CHAIN-OF-CUSTODY RECORD

Page ____ of ____

Client Name: LS Marine
Address: 3625 Talmage Cr. Suite 202 Vadnais Heights, MN 55110
Attn: Taylor Lake
Phone:
Project Name:

Bill To:
Address:
PO #:
Fax:
Project #:

LEGEND Project #: 1102219
Turnaround Time: ☑ Normal ☐ RUSH
Requested Due Date: ________

Condition Received:
☑ Received at 16.9 °C
☒ Received on ice
☐ No temp. blank
☐ Received on ice pack
☐ Received on melt water
☐ Received ambient
☐ Acceptable (IH/ISO only)
☐ Custody Seals

Item No.	Field ID	Sample Description	Grab	Comp.	Collection Date	Collection Time	Sample Matrix	Lab ID No.	Number of Containers	TCLP Metals	Moisture	PCBs			
1		Cargill West			5/23			01		X	X	X			
2		CHS						02		X	X	X			
3															
4															
5															
6															
7															
8															
9															
10															

Sample Collector (please print):	Item No.	Relinquished By:	Date:	Time:	Accepted By:	Date:	Time:
Scott E.		[signature]	5/23/11				
Comments:	Item No.		Date:	Time:	Received By Lab: [signature]	5/23/11	1530

[illegible] TERMS AND CONDITIONS ON BACK BEFORE SIGNING
White [illegible] Sent to Lab Yellow Copy - Lab Pink Copy - Customer or Field Copy

[illegible] (05/07)

Drop off

Appendix C: 2012 Dredge Soil Stockpile Sampling – Savage Stockpile Facility

(Cargill East River [MN-14.2 RMP] site)

Young, Della

To: Terry Schwalbe
Subject: RE: Synopsis, Agenda and Map for tomorrow's meeting

AMServiceURLStr: https://Slingshot.hdrinc.com:443/CFSS/control?view=services/FTService

---

From: Schnick, Emily (MPCA) [mailto:Emily.Schnick@state.mn.us]
Sent: Wednesday, February 06, 2013 1:48 PM
To: Terry Schwalbe; 'Bergstrom, Douglas'
Subject: RE: Synopsis, Agenda and Map for tomorrow's meeting

Terry and Doug,

I apologize for my delayed response. As we discussed, the Permittee is the USCOE. Their permit authorizes the use and maintenance of the MN-14.2-RMP placement site along with the management of the dredged material placed. The permit allows for the material to be beneficially reused if the material meets the criteria listed in Chapter 2 part 4. It is the Permittee's responsibility to ensure that the proper management levels are met for reuse. If the Watershed district is not confident that the material meets the management level determined by the Permittee, they can do additional sampling for their own assurances.

Let me know if you have further questions.

Thanks!

Emily Schnick
Pollution Control Specialist
MN Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155
Phone: (651) 757-2699
emily.schnick@state.mn.us

From: Terry Schwalbe [mailto:terrys@lowermn.com]
Sent: Wednesday, January 30, 2013 2:50 PM
To: Schnick, Emily (MPCA); 'Bergstrom, Douglas'
Subject: RE: Synopsis, Agenda and Map for tomorrow's meeting

THANKS

From: Schnick, Emily (MPCA) [mailto:Emily.Schnick@state.mn.us]
Sent: Wednesday, January 30, 2013 2:48 PM
To: Terry Schwalbe; 'Bergstrom, Douglas'
Subject: RE: Synopsis, Agenda and Map for tomorrow's meeting

Terry and Doug,

I am meeting with my supervisor, the compliance supervisor, the assigned compliance staff and hydros tomorrow afternoon. We should have an answer for you by Monday.

Emily Schnick
Pollution Control Specialist

MN Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155
Phone: (651) 757-2699
emily.schnick@state.mn.us

From: Terry Schwalbe [mailto:terrys@lowermn.com]
Sent: Wednesday, January 30, 2013 2:39 PM
To: Schnick, Emily (MPCA); 'Bergstrom, Douglas'
Subject: RE: Synopsis, Agenda and Map for tomorrow's meeting

Emily,
Thanks for taking the time to meet on Friday. I feel much better about our situation at the dredge site. I look forward to you written comments on the meeting.
Thanks again,
Terry

From: Schnick, Emily (MPCA) [mailto:Emily.Schnick@state.mn.us]
Sent: Monday, January 28, 2013 9:12 AM
To: Bergstrom, Douglas
Cc: Terry Schwalbe
Subject: RE: Synopsis, Agenda and Map for tomorrow's meeting

Doug and Terry,

Thank you for providing additional information on Friday. I have asked other staff at the MPCA to review as well. Attached is the final permit issued to the Corp last summer.

Thanks,

Emily Schnick
Pollution Control Specialist
MN Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155
Phone: (651) 757-2699
emily.schnick@state.mn.us

From: Bergstrom, Douglas [mailto:DBergstrom@braunintertec.com]
Sent: Thursday, January 24, 2013 12:04 PM
To: Schnick, Emily (MPCA)
Cc: Terry Schwalbe
Subject: Synopsis, Agenda and Map for tomorrow's meeting

Emily,
Attached are a synopsis, a proposed agenda, and a map for your review. The map shows the location of the Braun Intertec St. Paul office (actually in White Bear Lake) where we will meet. Terry and I look forward to our discussion tomorrow morning at 10:00. Thanks.

BRAUN INTERTEC GEOTHERMAL

Employee Ownership working for you

Douglas J. Bergstrom, PG, CHMM
Principal
11001 Hampshire Avenue South | Bloomington, MN 55438
952.995.2404 direct | 612.360.0716 mobile
dbergstrom@braunintertec.com
braunintertec.com | Twitter: Braun Intertec | LinkedIn: Braun Intertec

BRAUN
INTERTEC
GEOTHERMAL

Braun Intertec Geothermal, LLC
16744 11th Street NE
Little Falls, MN 56345

Phone: 320.632.1081
Fax: 320.632.1673
Web: braunintertec.com

June 14, 2012

Project GT-11-07305

Terry Schwalbe
Lower Minnesota River Watershed District
112 E. Fifth Street, Suite 102
Chaska, MN 55318

RE: Results of Dredged Sediment Testing

Dear Mr. Schwalbe,

Braun Intertec has completed testing of sediment collected from the MP 14.2 Dredge Disposal Site, and the testing results are attached.

Sample Collection and Testing

A total of 4 sediment samples were collected on June 7, 2012 by Doug Bergstrom, and the samples were transported to the Braun Intertec soils laboratory where each was tested for a gradation and Total Organic Carbon (YOC) content. Two samples were taken and tested form each stockpile, and approximate sample locations are shown on the attached site aerial photograph.

Prior to sample collection, a general reconnaissance of each stockpile was performed by shallow (e.g., 6") shovel testing to evaluate the relative variability in soil textures in each stockpile. Sample collection methodology was to excavate approximately 6"below the sediment surface to minimize weathering effects and the minimize inclusion of plant roots in the samples (the 2009 stockpile was covered with vegetation while the 2011 stockpile was largely devoid of vegetation).

Testing Results

In our geotechnical laboratory, we completed sieve analysis (ASTM D 422) and organic content (ASTM D 2974) tests on four samples collected from the dredge stockpiles. The results of the laboratory tests are summarized below in Table 1. Samples were classified in general accordance with the Unified Soil Classification System (USCS).

Table 1. Laboratory Test Results

Sample	Classification	Percent Passing #200 Sieve	Percent Passing #40 Sieve	Organic Content
LMRWD #1	SP	3.8 %	79 %	0.5 %
LMRWD #2	SP-SM	6.1 %	67 %	0.5 %
LMRWD #3	SM	18 %	90 %	1.2 %
LMRWD #4	SM	18 %	89 %	1.1 %

AA/EOE

The results indicate the tested material consists of non-organic, fine- to medium-grained sands which may be suitable for various applications, including certain structural applications. As specific uses for the material develop, the soils should be further evaluated for each specific application. The soils should not be considered free draining.

The test results also meet the requirements of Minnesota Department of Transportation (MnDOT) Specification 3149.2 B1 for Granular Borrow. However, as a whole, the results do not meet MnDOT Specification 3149.2 B2 for Select Granular Borrow.

We appreciate the opportunity to be of service to you on this project. If you have further questions, please contact me at 612.360.0716.

Sincerely,

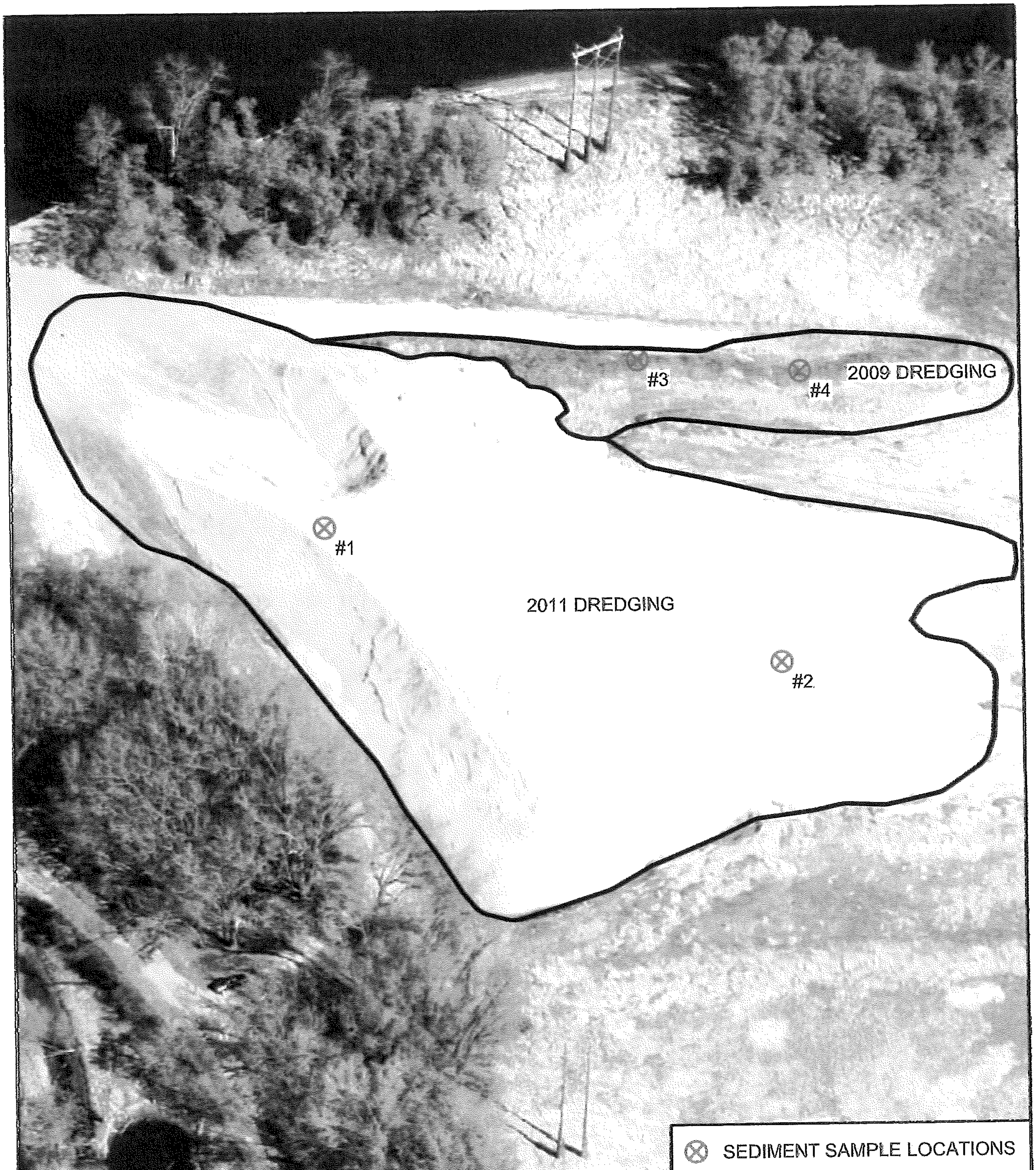
BRAUN INTERTEC GEOTHERMAL, LLC

Douglas J. Bergstrom, PG, CHMM
Principal Scientist

Attachments:

-Site sample location map

-Soil testing laboratory reports



BRAUN INTERTEC	LMRWD MP 14.2 Dredged Materials Disposal Site Savage, Minnesota	Soil Sample Location Map Savage, MN	
		DATE:	06/12/2012
		JOB NO:	GT-11-07305
		SCALE:	NONE
		FIGURE NO:	1
		DRAWN BY:	JBC

BRAUN INTERTEC

Minneapolis Laboratory
Braun Intertec Corporation
Phone:

Material Test Report

Report No: MAT:W12-002450-S1
Issue No: 2

Client: Terry Schwalbe
Lower Minnesota River Watershed District
112 E. Fifth Street, Suite 102
Chaska, MN, 55318

Project: GT-11-07305
Lower MN River dredge site
Vernon Road
Savage, MN, 55378

PM: Douglas J. Bergstrom, dbergstrom@BraunIntertec.com

Jim Streier
Geotechnical Laboratory
Date of Issue: 6/13/2012

Sample Details

Sample ID:	W12-002450-S1
Alternate Sample ID:	LMRWD #1
Sampled By:	Douglas Bergstrom
Sampling Method:	
Date Sampled:	6/7/2012
Date Submitted:	6/7/2012
Specification:	Sieve only D422
Source:	
Material Type:	Poorly Graded Sand
Sample Location:	River Dredge Stockpile

Other Test Results

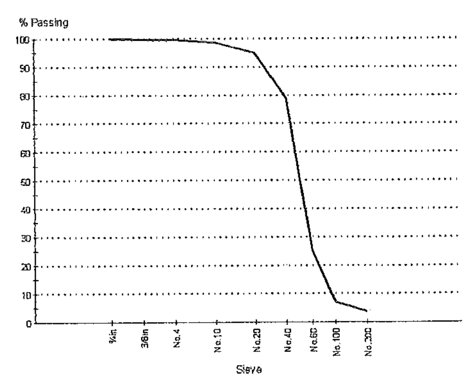
Description	Method	Result	Limits
Ash Content (%)	ASTM D 2974 - 07	99.5	
Organic Content (%)		0.5	
Furnace Temperature (°C)		440	
Moisture Content (%)		5.0	
Moisture contents are proportioned by		oven-dried mass	
Moisture Content Method (A or B)		A	
Ash Content Method (C or D)		C	
Date Tested		6/13/2012	
Dispersion device	ASTM D 422 - 07		
Dispersion time (min)			
Shape			
Hardness			

Particle Size Distribution

Method: ASTM D 422 - 07
Drying by:
Date Tested: 6/13/2012

Sieve Size	% Passing	Limits
¾in (19.0mm)	100	
3/8in (9.5mm)	100	
No.4 (4.75mm)	100	
No.10 (2.0mm)	99	
No.20 (850µm)	95	
No.40 (425µm)	79	
No.60 (250µm)	25	
No.100 (150µm)	7	
No.200 (75µm)	3.8	

Chart



Comments
N/A

BRAUN INTERTEC

Minneapolis Laboratory
Braun Intertec Corporation
Phone:

Material Test Report

Report No: MAT:W12-002450-S2
Issue No: 2

Client: Terry Schwalbe
Lower Minnesota River Watershed District
112 E. Fifth Street, Suite 102
Chaska, MN, 55318

Project: GT-11-07305
Lower MN River dredge site
Vernon Road
Savage, MN, 55378

PM: Douglas J. Bergstrom, dbergstrom@BraunIntertec.com

Jim Streier
Geotechnical Laboratory
Date of Issue: 6/13/2012

Sample Details

Sample ID:	W12-002450-S2
Alternate Sample ID:	LMRWD #2
Sampled By:	Douglas Bergstrom
Sampling Method:	
Date Sampled:	6/7/2012
Date Submitted:	6/7/2012
Specification:	Sieve only D422
Source:	
Material Type:	Poorly Graded Sand with Silt
Sample Location:	River Dredge Stockpile

Other Test Results

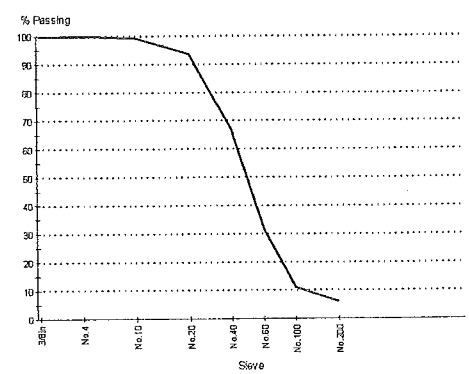
Description	Method	Result	Limits
Ash Content (%)	ASTM D 2974 - 07	99.5	
Organic Content (%)		0.5	
Furnace Temperature (°C)		440	
Moisture Content (%)		5.0	
Moisture contents are proportioned by		oven-dried mass	
Moisture Content Method (A or B)		A	
Ash Content Method (C or D)		C	
Date Tested		6/13/2012	
Dispersion device	ASTM D 422 - 07		
Dispersion time (min)			
Shape			
Hardness			

Particle Size Distribution

Method: ASTM D 422 - 07
Drying by:
Date Tested: 6/13/2012

Sieve Size	% Passing	Limits
3/8in (9.5mm)	100	
No.4 (4.75mm)	100	
No.10 (2.0mm)	99	
No.20 (850µm)	94	
No.40 (425µm)	67	
No.60 (250µm)	32	
No.100 (150µm)	11	
No.200 (75µm)	6.1	

Chart



Comments
N/A

BRAUN INTERTEC

Minneapolis Laboratory
Braun Intertec Corporation
Phone:

Material Test Report

Report No: MAT:W12-002450-S3
Issue No: 2

Client: Terry Schwalbe
Lower Minnesota River Watershed District
112 E. Fifth Street, Suite 102
Chaska, MN, 55318
Project: GT-11-07305
Lower MN River dredge site
Vernon Road
Savage, MN, 55378
PM: Douglas J. Bergstrom, dbergstrom@BraunIntertec.com

Jim Streier
Geotechnical Laboratory
Date of Issue: 6/13/2012

Sample Details

Sample ID:	W12-002450-S3
Alternate Sample ID:	LMRWD #3
Sampled By:	Douglas Bergstrom
Sampling Method:	
Date Sampled:	6/7/2012
Date Submitted:	6/7/2012
Specification:	Sieve only D422
Source:	
Material Type:	Silty Sand
Sample Location:	River Dredge Stockpile

Other Test Results

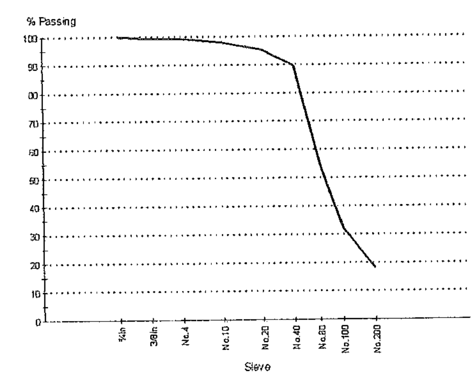
Description	Method	Result	Limits
Ash Content (%)	ASTM D 2974 - 07	98.8	
Organic Content (%)		1.2	
Furnace Temperature (°C)		440	
Moisture Content (%)		8.0	
Moisture contents are proportioned by		oven-dried mass	
Moisture Content Method (A or B)		A	
Ash Content Method (C or D)		C	
Date Tested		6/13/2012	
Dispersion device	ASTM D 422 - 07		
Dispersion time (min)			
Shape			
Hardness			

Particle Size Distribution

Method: ASTM D 422 - 07
Drying by:
Date Tested: 6/13/2012

Sieve Size	% Passing	Limits
¾in (19.0mm)	100	
3/8in (9.5mm)	99	
No.4 (4.75mm)	99	
No.10 (2.0mm)	98	
No.20 (850µm)	95	
No.40 (425µm)	90	
No.60 (250µm)	55	
No.100 (150µm)	32	
No.200 (75µm)	18	

Chart



Comments
N/A

BRAUN INTERTEC

Minneapolis Laboratory
Braun Intertec Corporation
Phone:

Material Test Report

Report No: MAT:W12-002450-S4
Issue No: 2

Client: Terry Schwalbe
Lower Minnesota River Watershed District
112 E. Fifth Street, Suite 102
Chaska, MN, 55318

Project: GT-11-07305
Lower MN River dredge site
Vernon Road
Savage, MN, 55378

PM: Douglas J. Bergstrom, dbergstrom@BraunIntertec.com

Jim Streier
Geotechnical Laboratory
Date of Issue: 6/13/2012

Sample Details

Sample ID:	W12-002450-S4
Alternate Sample ID:	LMRWD #4
Sampled By:	Douglas Bergstrom
Sampling Method:	
Date Sampled:	6/7/2012
Date Submitted:	6/7/2012
Specification:	Sieve only D422
Source:	
Material Type:	Silty Sand
Sample Location:	River Dredge Stockpile

Other Test Results

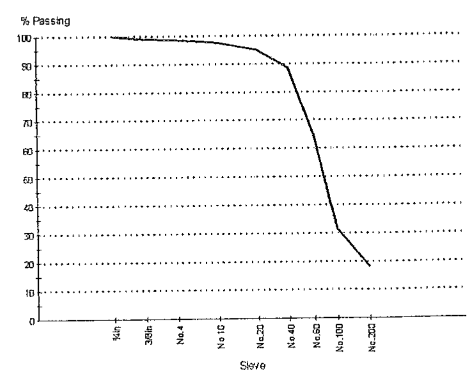
Description	Method	Result	Limits
Ash Content (%)	ASTM D 2974 - 07	98.9	
Organic Content (%)		1.1	
Furnace Temperature (°C)		440	
Moisture Content (%)		6.0	
Moisture contents are proportioned by		oven-dried mass	
Moisture Content Method (A or B)		A	
Ash Content Method (C or D)		C	
Date Tested		6/13/2012	
Dispersion device	ASTM D 422 - 07		
Dispersion time (min)			
Shape			
Hardness			

Particle Size Distribution

Method: ASTM D 422 - 07
Drying by:
Date Tested: 6/13/2012

Sieve Size	% Passing	Limits
¾in (19.0mm)	100	
3/8in (9.5mm)	99	
No.4 (4.75mm)	99	
No.10 (2.0mm)	98	
No.20 (850µm)	95	
No.40 (425µm)	89	
No.60 (250µm)	65	
No.100 (150µm)	31	
No.200 (75µm)	18	

Chart



Comments

N/A

BRAUN
INTERTEC
GEOTHERMAL

Braun Intertec Geothermal, LLC
16744 11th Street NE
Little Falls, MN 56345

Phone: 320.632.1081
Fax: 320.632.1673
Web: braunintertec.com

August 9, 2012

GT-11-07305

Terry Schwalbe
Lower Minnesota River Watershed District
112 E. Fifth Street, Suite 102
Chaska, MN 55318

Re: Review of Proposed MPCA Dredging Permit to US Army Corps of Engineers

Dear Mr. Schwalbe:

Braun Intertec has reviewed the draft MPCA permit proposed to be issued to the US Army Corps of Engineers (SDS Permit MN0050580) and here presents our findings and opinions relative to the interests and responsibilities of the Lower Minnesota River Watershed District.

Findings

1. There is no clarity that Corps of Engineers (COE) is the generator of these solid wastes and is therefore responsible for their ultimate use or disposal. Specifically, once placed, the draft permit states that COE will <u>not</u> be responsible for removing the material if not removed by others.
2. There are no specific requirements for testing of dredged sediment, only the Tier 1, 2, and 3 land use restrictions embedded elsewhere in MPCA rules that presume that relevant testing is to be performed by COE.

Opinions

It appears that as a matter of policy, MPCA is holding other dredging entities (e.g., all but the COE) to a higher standard that it holds the COE to, specifically in the case of all required testing of the sediment before it is dredged and being held responsible for the dredged materials ultimate use or disposal. While the COE does do certain testing of river sediments, the testing performed by COE does not strictly adhere to MPCA guidance. Although we have no reason to believe that the dredged material coming to MP 14.2 from COE dredging activities is regulated waste, the lack of specific COE testing responsibilities in this draft permit is inconsistent with other governmental entities that are following the MPCA guidance. Also, the absence of COE ownership and required testing in the draft permit disconnects the reality of programmatic testing and the risk management of beneficial reuse by effectively putting the onus, risk and cost for testing on the placement site owner (e.g., Lower Minnesota River Watershed District) rather than on the waste generator (COE).

In closing, we appreciate this opportunity to provide our professional services to the District. Please contact me with any questions or concerns.

Respectfully submitted,
Braun Intertec Geothermal, LLC

Douglas J, Bergstrom, PG (MN), CHMM
Principal

AA/EOE

BRAUN
INTERTEC

Memo

Date: December 12, 2012

To: Terry Schwalbe, Lower Minnesota River Watershed District
CC: Bruce Malkerson
From: Doug Bergstrom

Subject: Long-term Reuse/Disposal of Dredged Materials

This memo is a summary of the discussion held at the LMRWD office on December 9, 2012 between Terry Schwalbe, Bruce Malkerson and Doug Bergstrom regarding to long-term disposal of dredged materials generated by the Corps of Engineers from maintenance activities (dredging) of the 9-Foot Channel.

Action Plan (draft- subject to revision)

1. **Explore/develop beneficial reuse options for dredged materials**
    a. Corps repermitting by MPCA is currently underway; work with MPCA to have new permit address the following LMRWD issues (December 2011-January 2012):
        i. Establish ownership of sediments (e.g., State? Corps?) as waste generator and resultant potential liability
        ii. Establish requirements for sediment testing (e.g., require Corps to perform current MPCA-recommended testing prior to dredging)
        iii. If testing determines that dredged materials are contaminated, Corps responsible for disposal
        iv. Corps responsible for segregation of dredged materials placed at River Mile 14.2 Dredge Disposal Site
        v. Corps responsible for any additional laboratory testing to maintain soil "pedigree" of placed materials
        vi. Determine sediment testing protocols necessary to establish ongoing beneficial reuse program for LMRWD
    b. Investigate what Corps has been required to do by EPA and by other states and incorporate these requirements into permit as appropriate for the benefit of LMRWD (December 2011-January 2012)
    c. Retain specialized law firm (e.g., Kennedy and Graven) to assist LMRWD in identifying legal precedents and in liability management of contaminated sediment issues (December 2011-January 2012)
    d. Evaluate need/potential for assembling user group alliance with similar interests to LMRWD (e.g., City of Minneapolis, St. Paul Port Authority, MnDOT, etc.) to assist in development of state exemption of liability? (February 2012 -March 2012)
    e. Explore/evaluate potential beneficial reuses of dredged materials (December 2011-March 2012)
        i. Corps currently exploring use as frac sand; LMRWD investigate/join this effort
        ii. Use as clean structural soil fill (e.g., roadway bedding)
        iii. Use as non-structural soil fill (e.g., rain garden soil, slope dressing, etc.)

f. Estimated costs

   i. Testing costs for existing material (~90,000 yd^3 at River Mile 14.2 Site)

      1. Drilling and sample collection $3,500
      2. Chemical laboratory testing $22,500
      3. Soil properties testing $2,250
      4. Oversight and reporting $1,950
      5. Work assumes 3 boreholes to 25 feet, total of 9 samples collected and tested per MPCA current guidance in January 2012

   ii. Estimated ongoing cost for Braun Intertec development of beneficial reuse and management plan, interface with MPCA (December 2011-May 2012) $15,000

   iii. External legal costs (December 2011-May 2012) $?????

   iv. Internal legal costs (December 2011-May 2012) $?????

2. Develop site management plan

a. Details of requirements will be in new MPCA permit being developed for Corps
b. Scope development of management plan will depend on nature of beneficial reuse activities performed on-site
c. Further detail level of effort/costs for management plan development when above-listed issues become clear

Task	Days	Unit cost	Extension
Drilling equipment and staff	1	2500	2500
Env. field technician	1	900	900
Env. Equipment	1	100	100
		Subtotal	**$3,500**

Chemical Testing	# tests	Unit cost	Extension
As	9	18	162
CD	9	18	162
Chiii	9	18	162
Crvi	9	72	648
Cu	9	18	162
Pb	9	18	162
Hg	9	40	360
Ni	9	18	162
Se	9	18	162
Zn	9	18	162
total K	9	41	369
Nitrate + Nitrite	9	37	333
Ammonia-nitrogen	9	37	333
Total Kjel Nitrogen	9	79	711
PCBs	9	178	1602
Total organic C	9	66	594
Ba	9	18	162
Cyanide	9	72	648
Mn	9	18	162
Oil and grease	9	84	756
Insecticides	9	190	1710
dioxin	9	1000	9000
cPAHs	9	407	3663
digestion	9	18	162
		Subtotal	**$22,509**

Soils lab	# tests	Unit cost	Extension
sieve+ hydrometer	2	167	334
sieve only	7	127	889
proctors	4	177	708
soil moisture	18	18	324
		Subtotal	**$2,255**

Oversight/reporting	Hours	Rate/hour	Extension
Staff scientist	8	130	1040
Senior scientist	4	180	720
clerical	2	85	170
		Subtotal	**$1,930**

Total estimated cost **$30,194**

General

The analyses and conclusions submitted in this report are based on our field observations and the results of laboratory chemical analyses of the soil sample collected from the stockpile area.

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, expressed or implied, is made.

We appreciate the opportunity to provide our professional services to you for this project. If you have any questions or comments regarding this report, please call Doug Bergstrom at 651.487.7004.

Sincerely,

BRAUN INTERTEC CORPORATION

Douglas J. Bergstrom, PG CHMM
Principal Scientist

Attachments:
Sampling Location Map
Laboratory Summary Table
Laboratory Report

Methods and Procedures

Sediment Sampling Procedures

The stockpile location is near the intersection of Vernon Avenue and the Minnesota River in Savage, Minnesota, and the general location is shown on the attached Site Location Map. Sediment sampling was completed by Braun Intertec personnel on September 29, 2009, and consisted of collecting discrete samples (vertical interval sampled was to approximately 5 feet below grade) from six areas of the site (approximate sampling locations shown in the site map) and creating one composite sample to represent the entire stockpiled material. The sample was placed in clean, laboratory supplied containers, labeled, and transported to the Braun Intertec laboratory under refrigerated conditions using chain-of-custody procedures.

The sediment samples were submitted for laboratory chemical analyses for the presence and concentrations of the following chemical parameters:

- Arsenic, cadmium, chromium III, chromium VI, copper, lead, mercury, nickel, selenium, zinc by SW-846 EPA
- Total phosphorus, nitrate+nitrite, ammonia+nitrogen and total Kjeldahl nitrogen by SM 4500P
- PCBs by SW-846; and
- Total organic carbon by SW-846

Standard Braun Intertec quality assurance/quality control (QA/QC) procedures were used.

Summary of Analytical Results

Analytical results for the soil sample are summarized on the attached table and detailed in the attached laboratory report. Chemical components detected in the sediment samples are compared with their respective MPCA Dredge Material Level 1 (Residential) and Level 2 (Industrial) Soil Reference Values (SRVs). The SRVs are derived by the MPCA using risk assessment methodology, modeling, and risk management policy. The SRVs are expressed as a concentration in milligrams per kilogram (mg/kg).

Based on the analytical report, all values detected were below Level 1 SRVs.

Conclusions and Recommendations

Dredged material is defined as a "waste" and "other waste material" by Minn. Statute 115.01 as stated in the Minnesota Pollution Control Agency's (MPCA) guidance document titled: *Managed Dredged Materials,* dated February 2009. In accordance with the previously mentioned document, except for specific situations, a permit is required for the management of dredged material in the State of Minnesota.

The composite sample tested showed no values that exceeded the Level 1 SRVs. As the testing was not done in accordance with MPCA dredged materials sampling guidance (e.g., in-situ sampling <u>before</u> dredging), the testing results are somewhat equivocal regarding whether the dredged material is or is not a regulated waste under the MPCA Dredged Materials program.

BRAUN
INTERTEC

Braun Intertec Corporation
1826 Buerkle Road
Saint Paul, MN 55110

Phone: 651.487.3245
Fax: 651.487.1812
Web: brauninterec.com

October 13, 2009

Project SP-09-04160

Mr. Terry L. Schwalbe
Administrator
Lower Minnesota River Watershed District
112 East 5th Street, Suite 102
Chaska, MN 55318

Re: Results of Dredge Soil Stockpile Sampling
Savage Stockpile Facility
Savage, Minnesota

Dear Mr. Schwalbe:

Braun Intertec has completed the sampling and chemical testing of sediment samples taken from the dredged materials stockpile as authorized and in accordance with the scope of services described in our proposal dated September 22, 2009. The objective of the evaluation was to collect a composite sample of the sediment in the stockpile areas, analyze it for various compounds, and evaluate whether the stockpiled pond sediments would require special management and disposal.

Introduction

It is our understanding that the stockpile site is used by the US Army Corps of Engineers for stockpiling of dredged river sediment. Braun Intertec was contacted to conduct dredge sediment stockpile sampling, to analyze the sediment sample, and to provide recommendations for disposal of the sediment.

Scope of Work

Sediment testing for this evaluation was performed in general conformance with the guidelines outlined in *Managing Dredged Materials in the State of Minnesota* (February 2009) for river dredging projects. The following tasks were conducted as part of this evaluation.

- Collected one sediment sample (composited from 6 individual samples) from the site for laboratory analysis.
- Submitted the composite sediment sample for laboratory analysis for the presence and concentrations of the following parameters:
  - Arsenic, cadmium, chromium III, chromium VI, copper, lead, mercury, nickel, selenium, zinc by SW-846 EPA
  - Total phosphorus, nitrate+nitrite, ammonia+nitrogen and total Kjeldahl nitrogen by SM 4500P
  - PCBs by SW-846; and
  - Total organic carbon by SW-846
- Evaluated the data and prepared this report.

Sediment Stockpile Sampling

U.S. Army Corps of Engineers Stockpile Site
Vernon Avenue
Savage, Minnesota

Prepared for

Lower Minnesota River Watershed District

Project SP-09-04160
October 13, 2009

Braun Intertec Corporation

Terry Schwalbe

From: Bergstrom, Douglas [DBergstrom@braunintertec.com]
Sent: Wednesday, March 14, 2012 12:51 PM
To: 'Terry Schwalbe'
Subject: RE: latest iteration of dredged disposal permit to COE

Terry,
I looked over the draft permit and offer the following comments relative to our previous discussion with Judy and the concerns of LMRWD:

1. Discuss what MPCA has learned regarding what Corps has been required to do by EPA and/or by other states related to ownership, testing and disposal of dredged materials and whether/how such requirements elsewhere have been incorporated into new MPCA permit: I don't see anything in the draft permit but would not expect to see it directly. Perhaps we should contact Judy and see what she learned?
2. Corps repermitting by MPCA : clarify with MPCA the following LMRWD issues:

a) Discuss ownership of in-situ sediments (e.g., State? Corps?) as waste generator and resultant potential liability: No new clarity in the draft permit. Conversely, section 4.14 states that "If the dredged material is placed in a permanent disposal site, then the Permittee will not be responsible for removing the material if it is not removed by others unless otherwise agreed to by the Permittee and the Commissioner". This statement seems to me to give the Corps broad reach in walking away from dredged material once it has been placed. I suggest that we ask Judy for additional language about ownership of dredged sediment.

b) Establish permit requirements for Corps sediment testing (e.g., explicitly require Corps to perform current MPCA-recommended sampling protocols and chemical testing prior to dredging): This seems well-established in the draft permit in section 4.14, at least for dredged sediments that are designated for beneficial reuse. Are all sediments received from COE at the LMRWD placement site designated for beneficial reuse? If not, then I read the permit language that such testing would not be required. I suggest that the permit be modified so that COE is responsible for testing all placed dredged material.

c) Establish permit requirement that if pre-dredging testing determines that dredged materials are contaminated, Corps is responsible for disposal: I do not see this explicitly stated anywhere and would feel much more comfortable if I did. This issue is related to item 2a above (e.g., ownership of the sediments).

d) Establish permit requirement that Corps responsible for segregation of placed dredged materials: I do not see this explicitly stated anywhere and would feel much more comfortable if I did. I can envision comingling of stockpiles that would make any chemical pedigrees useless.

e) Establish permit requirement that Corps responsible for any additional laboratory testing to maintain soil "pedigree" of placed materials if mixing of materials or untested materials are placed: I do not see this explicitly stated anywhere and would feel much more comfortable if I did.

All in all, I think a phonecall to Judy is warranted for additional discussion. Do you agree? I would also like to hear what Bruce's thoughts are before we contact Judy.

Terry Schwalbe

From:	Bergstrom, Douglas [DBergstrom@braunintertec.com]
Sent:	Monday, October 01, 2012 4:49 PM
To:	Terry Schwalbe
Subject:	FW: Dredged Material Beneficial Reuse

Terry,
I will let you know what I hear. Please alert Bruce of this as appropriate. Thanks.
Doug

From: Bergstrom, Douglas
Sent: Monday, October 01, 2012 4:47 PM
To: 'trevor.shearen@state.mn.us'
Subject: Dredged Material Beneficial Reuse

Trevor,
Thank you for your time earlier this afternoon.

To summarize, a local unit of government in the Metro area receives approximately 50,000 cubic yards of dredged material (dredged by the Corps of Engineers from metro area rivers) every other year and has a programmatic agreement with the Corps to accept this material. Until a couple of years ago, a local landfill used the material for daily cover, but ownership of the landfill changed hands recently and the new owners no longer need the material. The local unit of government wishes to provide for beneficial reuse for this material.

The Corps does programmatic chemical testing of river sediments (approved in the recently-issued MPCA SDS permit to the Corps for all of their dredging operations in Minnesota) and now includes a wide variety of parameters including nearly all of those recommended in the MPCA Dredged Materials Guidance document. In looking over the Corps data, there appear to be minimal exceedences of the Tier 1 SRVs. The local unit of government has also done limited testing of the material, with no exceedences observed.

It would be beneficial to the local unit of government if MPCA would provide some sort of beneficial reuse designation for this material to assuage potential concerns by the future beneficial reusers. Anticipated future reusers would be larger excavation contractors/construction companies who could use the material as fill as they see fit on their construction sites.

Please discuss with others at MPCA and let me know any questions that you have or what other information I can provide to you.
Thank you for entertaining this request.

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Employee Ownership working for you

Douglas J. Bergstrom, PG, CHMM
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SP-09-04160

Approximate Sampling Locations

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Table 1
Soil Analytical Results
Savage Stockpile
Site Location
SP-09-04160

Compound/Parameter	CAS No.	Sample Identifier **Sediment** **09/29/2009**	Residential Soil Reference Value (mg/kg)	Industrial Soil Reference Value (mg/kg)	Tier I Soil Leaching Value (mg/kg)
Polychlorinated Biphenyls(mg/kg dry)					
PCB 1016	12674-11-2	<(0.11)			
PCB 1221	11104-28-2	<(0.11)			
PCB 1232	11141-16-5	<(0.11)			
PCB 1242	53469-21-9	<(0.11)			
PCB 1248	12672-29-6	<(0.11)			
PCB 1254	11097-69-1	<(0.11)			
PCB 1260	11096-82-5	<(0.11)			
PCB 1268	11100-14-4	<(0.11)			
Total PCBs	1336-36-3	-	1.2	8	2.1
Metals(mg/kg dry)					
Arsenic, Total	7440-38-2	**2.3**	9	20	15.1
Cadmium, Total	7440-43-9	<(0.52)	25	200	4.4
Chromium, Total	7440-47-3	**5.5**	87*	650*	18*
Chromium, Hexavalent, Total	18540-29-9	<(2.2)	87	650	18
Chromium, Trivalent, Total	7440-47-3	**5.5**	87*	650*	18*
Copper, Total	7440-50-8	**2.6**	100	9000	400
Lead, Total	7439-92-1	**3.4**	300	700	525
Mercury, Total	7439-97-6	<(0.018)	0.5	1.5	1.6
Nickel, Total	7440-02-0	**5.3**	560	2500	88
Selenium, Total	7782-49-2	<(1.0)	160	1300	1.5
Zinc, Total	7440-66-6	**15**	8700	75000	1500
Other Parameters					
% Solids(% Wt)	SOLIDS	**90**			
Ammonia as N(mg/kg dry)	7664417	**16**			
Nitrate + Nitrite as N(mg/kg dry)	C-005	**27**			
Phosphorus, Total as P(mg/kg dry)		**320**			
Total Kjeldahl Nitrogen(mg/kg dry)	TKN	**340**			
Total Organic Carbon(mg/kg)	NA	**3080**[2]			

Notes:
[2] This analysis was performed by a subcontract laboratory.
mg/kg = Milligrams per kilogram.
ug/l = Micrograms per liter.
< = Less than the reporting limit indicated in parentheses.
NE =Not Established
SRV - Soil Reference Value established by the Minnesota Pollution Control Agency; 1999, revised 2008
SLV - Soil Leaching Value established by the Minnesota Pollution Control Agency; 1999, revised 2005
HRL - Health Risk Limit; Minnesota Department of Health, 2001.
If no HRL has been established, the USEPA Maximum Contaminant Level (MCL) is in parentheses or the Health Based Value (HB) is in bold italics.
* = SRV or SLV for hexavalent chromium.
** = Benzo(a)pyrene (BaP) equivalent is calculated
based on the concentration and weighted toxicity of
*** = cPAH. Individual SRV or SLV not established. Included in BaP equivalent calculation.

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Web: braunintertec.com

Mr. Doug Bergstrom
Braun Intertec-St. Paul
1826 Buerkle Road
St. Paul, MN 55110

October 09, 2009

Work Order #: 0905424

RE: Savage Stockpile
SP-09-04160

Dear Doug Bergstrom:

Braun Intertec Corporation received samples for the project identified above on September 29, 2009. Analytical results are summarized in the following report.

All routine quality assurance procedures were followed, unless otherwise noted.

Analytical results are reported on an "as received" basis unless otherwise noted. Where possible, the samples will be retained by the laboratory for 14 days following issuance of the initial final report. The samples will be disposed of or returned at that time. Arrangements can be made for extended storage by contacting me at this time.

We appreciate your decision to use Braun Intertec Corporation for this project. We are committed to being your vendor of choice to meet your analytical chemistry needs.

If you have any questions please contact me at the above phone number.

Sincerely,

William R. Dahl
Senior Scientist

Certification/Accreditation Numbers

Minnesota Department of Health. 027-053-117 Wisconsin DNR: 999462640 NVLAP: 101234-0 AIHA: 101103

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Braun Intertec-St. Paul	Client Ref: Savage Stockpile	Work Order #: 0905424
1826 Buerkle Road	Client Contact: Mr. Doug Bergstrom	Project Mgr: William R. Dahl
St. Paul, MN 55110	PO Number: SP-09-04160	Account ID:

How to Use this Report

In order to get the most out of the information presented in this report please refer to the following explanations as to how the data in this report is tied together and how some of the terms are defined.

Qualifiers and Abbreviations are defined in the following section. You will find these codes used throughout the report in headers and in note sections to designate a unique fact about the data to which they are associated.

The Case Narrative gives a "story" about the analysis and results. Here you will find greater elaboration on relevant qualifiers as well as an explanation of anything of particular note in the data. This is a discussion of the data in terms of quality control and chemistry. It is a summary of any deviations that could affect the usefulness of the data. This is not an interpretation as to how this information relates to regulatory compliance, toxicity, or hazardous characterization. These items are beyond the scope of this report.

The Sample Summary provides detail on sample receipt. The association between Client sample ID and the Laboratory sample ID are defined here; this information is valuable to have when discussing results with your project manager. Sample collection and receipt dates and times are provided here as well. General notes regarding the work order are also documented here. This is a mini "case narrative" that describes any anomalies regarding the condition of the samples upon arrival to the laboratory or special circumstances regarding the work order.

The Conditions Upon Receipt summarizes the results of specific checks that have been performed at sample receipt. This includes items like custody documentation, sample condition, and temperature at receipt. Each "cooler" is identified and the conditions associated with that cooler are documented. A "cooler" is defined as the larger container used to transport the individual samples. In most cases this is a standard recreational cooler but it can be a box, plastic bag, or other container.

The laboratory results are summarized in the following sections. Data is broken down into major categories for convenience. An example of such a category would be "Total Petroleum Hydrocarbons." Here you would find data that references the testing of such parameters as diesel range organics and gasoline range organics. Other categories are similarly mapped. The batch number is associated with each sample. This is important to evaluate Quality Control (QC) data. Surrogate results samples are provided with each sample. Laboratory control limits are provided for comparison (see below). The reference method is also identified. If a method is denoted with an "M" (e.g. EPA 1234(M)) this means that it has been modified. An explanation of the modification will be found in the Case Narrative. A result is given with appropriate units. If a soil sample is dry-weight corrected then the word "dry" will appear next to the units. If the word "dry" does not appear then the result is "as received."

The Method Reporting Limit (MRL) is provided. It is important to understand this term. The MRL is a level that has been empirically verified to provide reliable quantification of results. Results that are equal to or greater than this value will show up as bolded. They are considered "hits." If a result is less than the MRL, the result is given as less than the MRL (e.g. if the MRL = 10 then a less than would be given as "< 10").

The Quality Control (QC) samples are documented in the following section. Here you will find the preparation batches associated with each sample from the results section. The sample preparation method is also defined here. Accuracy is represented in terms of a percent recovery as compared to a known value. Precision is represented as a relative percent difference between two duplicate sample aliquots. The laboratory control limits are provided as a means to evaluate the quality control data. If the result falls outside the laboratory control limits this simply means that it is outside what is typical for the laboratory and is noted accordingly. This does not mean that the data is invalid. Laboratory control limits are generally tighter than most program limits. This is a very important distinction. How the data is ultimately used determines its validity. Program requirements are defined in the Quality Assurance Project Plan (QAPP) governing the project. If your project manager is aware of your specific program requirements then a note will be made in the case narrative if the data fails to meet any of these requirements.

The last section contains copies of important documents and/or instrument printouts relevant to the report. This includes the chain of custody. It also may include items like chromatograms or spectra.

Please note that this report is paginated and must be reproduced in its entirety.

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Braun Intertec-St. Paul 1826 Buerkle Road St. Paul, MN 55110	Client Ref: Savage Stockpile Client Contact: Mr. Doug Bergstrom PO Number: SP-09-04160	Work Order #: 0905424 Project Mgr: William R. Dahl Account ID:

Qualifiers and Abbreviations

ts	This analysis was performed by a subcontract laboratory.
COC	Chain of Custody
dry	Sample results reported on a dry weight basis
MRL	Method Reporting Limit
NA	Not Applicable
ND	Analyte NOT DETECTED
NR	Not Reported
%Rec	Percent Recovery
RPD	Relative Percent Difference
VOC	Volatile Organic Compound

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SAMPLE SUMMARY

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Sediment	0905424-01	Soil	09/29/09 11:45	09/29/09 16:05

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1826 Buerkle Road	Client Contact: Mr. Doug Bergstrom	Project Mgr: William R. Dahl
St. Paul, MN 55110	PO Number: SP-09-04160	Account ID:

Conditions Upon Receipt

Cooler: Cooler #1

Temperature:	1.4 °C	**Received on Ice:**	Yes	**Preservation Confirmed:**	No
COC Included:	Yes	**Hand Delivered by Sampler:**	Yes	**Temperature Blank:**	Yes
Custody Seals Used:	No	**Sufficient Sample Provided:**	Yes	**COC Complete:**	Yes
Custody Seals Intact:	No	**Headspace Present (VOC):**	No	**COC & Labels Agree:**	Yes

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Sediment

0905424-01 (Soil)

9/29/09 11:45

Classical Chemistry Parameters

Analyte	Result	MRL	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Total Kjeldahl Nitrogen	**340**	190	mg/kg dry	1	B9J0099	10/6/09	10/8/09	SM 4500-N	
Ammonia as N	**16**	1.5	mg/kg dry	1	B9I0660	9/30/09	10/2/09	SM4500NH3	
Nitrate + Nitrite as N	**27**	1.5	mg/kg dry	1	B9J0109	10/7/09	10/8/09	SM4500 NO3F	
Phosphorus, Total as P	**320**	21	mg/kg dry	10	B9J0015	10/1/09	10/1/09	SM4500-P (MOD)	
% Solids	**90**	0.050	% Wt	1	B9I0627	9/29/09	10/1/09	EPA 3545 7.2	

Metals

Analyte	Result	MRL	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	**2.3**	1.0	mg/kg dry	1	B9J0003	10/1/09	10/2/09	EPA 6010B	
Cadmium	< 0.52	0.52	mg/kg dry	1	B9J0003	10/1/09	10/2/09	EPA 6010B	
Chromium	**5.5**	1.0	mg/kg dry	1	B9J0003	10/1/09	10/2/09	EPA 6010B	
Copper	**2.6**	1.0	mg/kg dry	1	B9J0003	10/1/09	10/2/09	EPA 6010B	
Lead	**3.4**	1.0	mg/kg dry	1	B9J0003	10/1/09	10/2/09	EPA 6010B	
Nickel	**5.3**	0.52	mg/kg dry	1	B9J0003	10/1/09	10/2/09	EPA 6010B	
Selenium	< 1.0	1.0	mg/kg dry	1	B9J0003	10/1/09	10/2/09	EPA 6010B	
Zinc	**15**	1.0	mg/kg dry	1	B9J0003	10/1/09	10/2/09	EPA 6010B	
Chromium, Hexavalent	< 2.2	2.2	mg/kg dry	10	B9I0638	9/30/09	10/1/09	EPA 7199	
Mercury	< 0.018	0.018	mg/kg dry	1	B9J0104	10/7/09	10/7/09	EPA 7471A	
Chromium, Trivalent	**5.5**	2.2	mg/kg dry	1	B9J0131	10/7/09	10/7/09	CALC	

Polychlorinated Biphenyls

Analyte	Result	MRL	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PCB 1016	< 0.11	0.11	mg/kg dry	1	B9J0148	10/8/09	10/8/09	EPA 8082	
PCB 1221	< 0.11	0.11	mg/kg dry	1	B9J0148	10/8/09	10/8/09	EPA 8082	
PCB 1232	< 0.11	0.11	mg/kg dry	1	B9J0148	10/8/09	10/8/09	EPA 8082	
PCB 1242	< 0.11	0.11	mg/kg dry	1	B9J0148	10/8/09	10/8/09	EPA 8082	
PCB 1248	< 0.11	0.11	mg/kg dry	1	B9J0148	10/8/09	10/8/09	EPA 8082	
PCB 1254	< 0.11	0.11	mg/kg dry	1	B9J0148	10/8/09	10/8/09	EPA 8082	
PCB 1260	< 0.11	0.11	mg/kg dry	1	B9J0148	10/8/09	10/8/09	EPA 8082	
PCB 1268	< 0.11	0.11	mg/kg dry	1	B9J0148	10/8/09	10/8/09	EPA 8082	
Surrogate: DBC	*100 %*	*Limits: 50-150%*			*B9J0148*	*10/8/09*	*10/8/09*	*EPA 8082*	
Surrogate: TCMX	*57.1 %*	*Limits: 50-140%*			*B9J0148*	*10/8/09*	*10/8/09*	*EPA 8082*	

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Sediment

0905424-01 (Soil)

9/29/09 11:45

Subcontracted to Test America, Nashville, TN (MDH# 047-999-345)

Analyte	Result	MRL	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Total Organic Carbon	**3080**	1000	mg/kg	1	B9J0186	10/7/09	10/7/09	EPA 9060M	ts

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Classical Chemistry Parameters - Quality Control

Batch B9I0627 - % Solids

Method Blank (B9I0627-BLK1) Prepared: 09/29/09 Analyzed: 10/01/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
% Solids	< 0.050	0.050	% Wt	NA	NA	NA	NA	NA	NA	

Duplicate (B9I0627-DUP1) Source: 0905350-10 Prepared: 09/29/09 Analyzed: 10/01/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
% Solids	86.0	0.050	% Wt	NA	85.8	NA	NA	0.278	20	

Standard Reference Material (B9I0627-SRM1) Prepared: 09/29/09 Analyzed: 10/01/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
% Solids	88.2		% Wt	91.3	NA	96.7	90-110	NA	NA	

Batch B9I0660 - SM 4500-NH3

Method Blank (B9I0660-BLK1) Prepared: 09/30/09 Analyzed: 10/02/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	< 2.0	2.0	mg/kg	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B9I0660-BS1) Prepared: 09/30/09 Analyzed: 10/02/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	48.0	2.0	mg/kg	50.0	NA	96.1	80-120	NA	NA	

Laboratory Control Sample Duplicate (B9I0660-BSD1) Prepared: 09/30/09 Analyzed: 10/02/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	48.7	2.0	mg/kg	50.0	NA	97.5	80-120	1.43	20	

Matrix Spike (B9I0660-MS1) Source: 0905424-01 Prepared: 09/30/09 Analyzed: 10/02/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	48.4	1.5	mg/kg dry	36.7	15.6	89.6	75-125	NA	NA	

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1826 Buerkle Road	Client Contact: Mr. Doug Bergstrom	Project Mgr: William R. Dahl
St. Paul, MN 55110	PO Number: SP-09-04160	Account ID:

Classical Chemistry Parameters - Quality Control

Batch B9I0660 - SM 4500-NH3

Matrix Spike Duplicate (B9I0660-MSD1) Source: 0905424-01 Prepared: 09/30/09 Analyzed: 10/02/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	49.8	1.5	mg/kg dry	36.7	15.6	93.4	75-125	2.85	20	

Batch B9J0015 - EPA 365.2

Method Blank (B9J0015-BLK1) Prepared & Analyzed: 10/01/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus, Total as P	< 0.50	0.50	mg/kg	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B9J0015-BS1) Prepared & Analyzed: 10/01/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus, Total as P	5.08	0.50	mg/kg	5.02	NA	101	80-120	NA	NA	

Laboratory Control Sample Duplicate (B9J0015-BSD1) Prepared & Analyzed: 10/01/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus, Total as P	4.88	0.50	mg/kg	5.02	NA	97.2	80-120	4.12	20	

Duplicate (B9J0015-DUP1) Source: 0905424-01 Prepared & Analyzed: 10/01/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus, Total as P	327	16	mg/kg dry	NA	319	NA	NA	2.34	20	

Batch B9J0099 - SM 4500-N

Method Blank (B9J0099-BLK1) Prepared: 10/06/09 Analyzed: 10/08/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Kjeldahl Nitrogen	< 200	200	mg/kg	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B9J0099-BS1) Prepared: 10/06/09 Analyzed: 10/08/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Kjeldahl Nitrogen	933	200	mg/kg	1000	NA	93.3	80-120	NA	NA	

Laboratory Control Sample Duplicate (B9J0099-BSD1) Prepared: 10/06/09 Analyzed: 10/08/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

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Braun Intertec-St. Paul 1826 Buerkle Road St. Paul, MN 55110	Client Ref: Savage Stockpile Client Contact: Mr. Doug Bergstrom PO Number: SP-09-04160	Work Order #: 0905424 Project Mgr: William R. Dahl Account ID:

Classical Chemistry Parameters - Quality Control

Batch B9J0099 - SM 4500-N

Laboratory Control Sample Duplicate (B9J0099-BSD1) Prepared: 10/06/09 Analyzed: 10/08/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Kjeldahl Nitrogen	970	200	mg/kg	1000	NA	97.0	80-120	3.87	20	

Duplicate (B9J0099-DUP1) Source: 0905424-01 Prepared: 10/06/09 Analyzed: 10/08/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Kjeldahl Nitrogen	302	180	mg/kg dry	NA	341	NA	NA	11.9	20	

Batch B9J0109 - NO PREP

Method Blank (B9J0109-BLK1) Prepared: 10/07/09 Analyzed: 10/08/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Nitrate + Nitrite as N	< 1.6	1.6	mg/kg	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B9J0109-BS1) Prepared: 10/07/09 Analyzed: 10/08/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Nitrate + Nitrite as N	42.2	1.6	mg/kg	40.0	NA	105	80-120	NA	NA	

Laboratory Control Sample Duplicate (B9J0109-BSD1) Prepared: 10/07/09 Analyzed: 10/08/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Nitrate + Nitrite as N	47.6	1.6	mg/kg	40.0	NA	119	80-120	12.1	20	

Matrix Spike (B9J0109-MS1) Source: 0905294-01 Prepared: 10/07/09 Analyzed: 10/08/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Nitrate + Nitrite as N	1450	56	mg/kg dry	1410	ND	103	75-125	NA	NA	

Matrix Spike Duplicate (B9J0109-MSD1) Source: 0905294-01 Prepared: 10/07/09 Analyzed: 10/08/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Nitrate + Nitrite as N	1540	56	mg/kg dry	1410	ND	109	75-125	5.88	20	

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Metals - Quality Control

Batch B9I0638 - Default Prep GenChem

Method Blank (B9I0638-BLK1) Prepared: 09/30/09 Analyzed: 10/01/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chromium, Hexavalent	< 2.0	2.0	mg/kg	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B9I0638-BS1) Prepared: 09/30/09 Analyzed: 10/01/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chromium, Hexavalent	39.5	2.0	mg/kg	41.7	NA	94.8	80-120	NA	NA	

Laboratory Control Sample Duplicate (B9I0638-BSD1) Prepared: 09/30/09 Analyzed: 10/01/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chromium, Hexavalent	41.2	2.0	mg/kg	41.7	NA	98.8	80-120	4.16	20	

Matrix Spike (B9I0638-MS1) Source: 0905383-04 Prepared: 09/30/09 Analyzed: 10/01/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chromium, Hexavalent	44.9	2.1	mg/kg dry	43.0	0.799	103	75-125	NA	NA	

Matrix Spike Duplicate (B9I0638-MSD1) Source: 0905383-04 Prepared: 09/30/09 Analyzed: 10/01/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chromium, Hexavalent	44.4	2.1	mg/kg dry	43.8	0.799	99.6	75-125	1.07	25	

Standard Reference Material (B9I0638-SRM1) Prepared: 09/30/09 Analyzed: 10/01/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chromium, Hexavalent	68.9	2.0	mg/kg	109	NA	63.2	16.3-140	NA	NA	

Batch B9J0003 - EPA 3050B

Method Blank (B9J0003-BLK1) Prepared: 10/01/09 Analyzed: 10/02/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	< 1.0	1.0	mg/kg	NA	NA	NA	NA	NA	NA	
Cadmium	< 0.50	0.50	mg/kg	NA	NA	NA	NA	NA	NA	
Chromium	< 1.0	1.0	mg/kg	NA	NA	NA	NA	NA	NA	
Copper	< 1.0	1.0	mg/kg	NA	NA	NA	NA	NA	NA	
Lead	< 1.0	1.0	mg/kg	NA	NA	NA	NA	NA	NA	

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Metals - Quality Control

Batch B9J0003 - EPA 3050B

Method Blank (B9J0003-BLK1)

Prepared: 10/01/09 Analyzed: 10/02/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Nickel	< 0.50	0.50	mg/kg	NA	NA	NA	NA	NA	NA	
Selenium	< 1.0	1.0	mg/kg	NA	NA	NA	NA	NA	NA	
Zinc	< 1.0	1.0	mg/kg	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B9J0003-BS1)

Prepared: 10/01/09 Analyzed: 10/02/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	227	1.0	mg/kg	200	NA	113	80-120	NA	NA	
Cadmium	214	0.50	mg/kg	200	NA	107	80-120	NA	NA	
Chromium	206	1.0	mg/kg	200	NA	103	80-120	NA	NA	
Copper	200	1.0	mg/kg	200	NA	99.8	80-120	NA	NA	
Lead	216	1.0	mg/kg	200	NA	108	80-120	NA	NA	
Nickel	208	0.50	mg/kg	200	NA	104	80-120	NA	NA	
Selenium	207	1.0	mg/kg	200	NA	103	80-120	NA	NA	
Zinc	213	1.0	mg/kg	200	NA	107	80-120	NA	NA	

Laboratory Control Sample Duplicate (B9J0003-BSD1)

Prepared: 10/01/09 Analyzed: 10/02/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	221	1.0	mg/kg	200	NA	110	80-120	2.93	20	
Cadmium	207	0.50	mg/kg	200	NA	104	80-120	2.98	20	
Chromium	200	1.0	mg/kg	200	NA	99.7	80-120	3.14	20	
Copper	194	1.0	mg/kg	200	NA	96.8	80-120	3.09	20	
Lead	209	1.0	mg/kg	200	NA	104	80-120	3.29	20	
Nickel	201	0.50	mg/kg	200	NA	101	80-120	3.25	20	
Selenium	201	1.0	mg/kg	200	NA	101	80-120	2.59	20	
Zinc	207	1.0	mg/kg	200	NA	103	80-120	3.19	20	

Matrix Spike (B9J0003-MS1)

Source: 0905431-06 Prepared: 10/01/09 Analyzed: 10/02/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

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1826 Buerkle Road	Client Contact: Mr. Doug Bergstrom	Project Mgr: William R. Dahl
St. Paul, MN 55110	PO Number: SP-09-04160	Account ID:

Metals - Quality Control

Batch B9J0003 - EPA 3050B

Matrix Spike (B9J0003-MS1) — **Source: 0905431-06** — Prepared: 10/01/09 Analyzed: 10/02/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	213	1.0	mg/kg dry	204	2.63	103	75-125	NA	NA	
Cadmium	199	0.52	mg/kg dry	204	0.0948	97.4	75-125	NA	NA	
Chromium	201	1.0	mg/kg dry	204	14.3	91.4	75-125	NA	NA	
Copper	200	1.0	mg/kg dry	204	12.6	91.7	75-125	NA	NA	
Lead	200	1.0	mg/kg dry	204	2.65	96.4	75-125	NA	NA	
Nickel	202	0.52	mg/kg dry	204	16.3	90.6	75-125	NA	NA	
Selenium	191	1.0	mg/kg dry	204	0.206	93.5	75-125	NA	NA	
Zinc	216	1.0	mg/kg dry	204	19.1	96.6	75-125	NA	NA	

Matrix Spike Duplicate (B9J0003-MSD1) — **Source: 0905431-06** — Prepared: 10/01/09 Analyzed: 10/02/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	205	1.0	mg/kg dry	202	2.63	100	75-125	3.73	20	
Cadmium	194	0.51	mg/kg dry	202	0.0948	95.7	75-125	2.89	20	
Chromium	194	1.0	mg/kg dry	202	14.3	88.9	75-125	3.54	20	
Copper	192	1.0	mg/kg dry	202	12.6	88.9	75-125	3.83	20	
Lead	194	1.0	mg/kg dry	202	2.65	94.8	75-125	2.69	20	
Nickel	198	0.51	mg/kg dry	202	16.3	89.7	75-125	1.86	20	
Selenium	186	1.0	mg/kg dry	202	0.206	91.7	75-125	3.01	20	
Zinc	212	1.0	mg/kg dry	202	19.1	95.5	75-125	1.95	20	

Standard Reference Material (B9J0003-SRM1) — Prepared: 10/01/09 Analyzed: 10/02/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	125	2.1	mg/kg	153	NA	81.5	56.2-110	NA	NA	
Cadmium	258	1.0	mg/kg	294	NA	87.6	64.6-111	NA	NA	
Chromium	143	2.1	mg/kg	153	NA	93.4	63.4-118	NA	NA	
Copper	119	2.1	mg/kg	129	NA	92.0	70.5-118	NA	NA	
Lead	130	2.1	mg/kg	148	NA	87.8	67.2-117	NA	NA	
Nickel	116	1.0	mg/kg	125	NA	92.8	64.7-114	NA	NA	

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Metals - Quality Control

Batch B9J0003 - EPA 3050B

Standard Reference Material (B9J0003-SRM1) — Prepared: 10/01/09 Analyzed: 10/02/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Selenium	195	2.1	mg/kg	223	NA	87.6	61-117	NA	NA	
Zinc	315	2.1	mg/kg	330	NA	95.5	68.5-122	NA	NA	

Batch B9J0104 - EPA 7471A

Method Blank (B9J0104-BLK1) — Prepared & Analyzed: 10/07/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Mercury	< 0.020	0.020	mg/kg	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B9J0104-BS1) — Prepared & Analyzed: 10/07/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Mercury	0.255	0.020	mg/kg	0.250	NA	102	85-115	NA	NA	

Laboratory Control Sample Duplicate (B9J0104-BSD1) — Prepared & Analyzed: 10/07/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Mercury	0.256	0.020	mg/kg	0.250	NA	103	85-115	0.509	20	

Matrix Spike (B9J0104-MS1) — Source: 0905324-02 — Prepared & Analyzed: 10/07/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Mercury	0.289	0.021	mg/kg dry	0.258	0.0135	107	75-125	NA	NA	

Matrix Spike Duplicate (B9J0104-MSD1) — Source: 0905324-02 — Prepared & Analyzed: 10/07/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Mercury	0.282	0.021	mg/kg dry	0.258	0.0135	104	75-125	2.34	20	

Standard Reference Material (B9J0104-SRM1) — Prepared & Analyzed: 10/07/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Mercury	7.27	1.8	mg/kg	8.16	NA	89.1	49-142	NA	NA	

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Polychlorinated Biphenyls - Quality Control

Batch B9J0148 - EPA 3546

Method Blank (B9J0148-BLK1) Prepared & Analyzed: 10/08/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
PCB 1016	< 0.10	0.10	mg/kg	NA	NA	NA	NA	NA	NA	
PCB 1221	< 0.10	0.10	mg/kg	NA	NA	NA	NA	NA	NA	
PCB 1232	< 0.10	0.10	mg/kg	NA	NA	NA	NA	NA	NA	
PCB 1242	< 0.10	0.10	mg/kg	NA	NA	NA	NA	NA	NA	
PCB 1248	< 0.10	0.10	mg/kg	NA	NA	NA	NA	NA	NA	
PCB 1254	< 0.10	0.10	mg/kg	NA	NA	NA	NA	NA	NA	
PCB 1260	< 0.10	0.10	mg/kg	NA	NA	NA	NA	NA	NA	
PCB 1268	< 0.10	0.10	mg/kg	NA	NA	NA	NA	NA	NA	
Surrogate: DBC	*0.117*		mg/kg	*0.124*	*NA*	*94.5*	*50-150*			
Surrogate: TCMX	*0.0801*		mg/kg	*0.124*	*NA*	*64.8*	*50-140*			

Laboratory Control Sample (B9J0148-BS1) Prepared & Analyzed: 10/08/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
PCB 1268	0.765	0.097	mg/kg	0.971	NA	78.7	70-120	NA	NA	
Surrogate: DBC	*0.107*		mg/kg	*0.121*	*NA*	*87.8*	*50-150*			
Surrogate: TCMX	*0.0765*		mg/kg	*0.121*	*NA*	*63.1*	*50-140*			

Laboratory Control Sample Duplicate (B9J0148-BSD1) Prepared & Analyzed: 10/08/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
PCB 1268	0.736	0.10	mg/kg	0.993	NA	74.2	70-120	3.74	20	
Surrogate: DBC	*0.106*		mg/kg	*0.124*	*NA*	*85.3*	*50-150*			
Surrogate: TCMX	*0.0729*		mg/kg	*0.124*	*NA*	*58.8*	*50-140*			

Matrix Spike (B9J0148-MS1) **Source: 0905424-01** Prepared & Analyzed: 10/08/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
PCB 1268	0.741	0.11	mg/kg dry	1.08	ND	68.6	60-120	NA	NA	
Surrogate: DBC	*0.109*		mg/kg dry	*0.135*	*NA*	*80.9*	*50-150*			
Surrogate: TCMX	*0.0730*		mg/kg dry	*0.135*	*NA*	*54.0*	*50-140*			

Matrix Spike Duplicate (B9J0148-MSD1) **Source: 0905424-01** Prepared & Analyzed: 10/08/09

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
PCB 1268	0.810	0.11	mg/kg dry	1.10	ND	73.7	60-120	8.91	25	
Surrogate: DBC	*0.120*		mg/kg dry	*0.137*	*NA*	*87.5*	*50-150*			
Surrogate: TCMX	*0.0728*		mg/kg dry	*0.137*	*NA*	*53.0*	*50-140*			

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1826 Buerkle Road	Client Contact: Mr. Doug Bergstrom	Project Mgr: William R. Dahl
St. Paul, MN 55110	PO Number: SP-09-04160	Account ID:

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Laboratory Work Order No.
0905424

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REQUEST FOR LABORATORY ANALYTICAL SERVICES

labservices@braunintertec.com

IMPORTANT
Date Results Requested
Time
Rush Charges Authorized? Yes No
Rush / Quote #

Page 1 of 1

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STD

REPORT RESULTS TO

Contact Name: Doug Bergstrom
Company: Braun Intertec
Mailing Address: 1826 Buerkle Road
City, State, Zip: White Bear Lake, MN
Telephone #: 6514877004
Fax #: 7629952020
Email: dbergstrom@braunintertec.com

Project ID/Name: Savage Stockpile
PO #/Project #: SP-09-04160

SEND INVOICE TO

Contact Name
Company
Address
City, State, Zip
Telephone #
Fax #

Special Instructions and/or Specific Regulatory Requirements:

ANALYSIS REQUESTED

State: MN

Lab ID	Client Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	Analyses (Cu, Pb, Hg, Ni; Zn; Total Phosphorus; Nitrate/Nitrite; Ammonia-N; Total Kjeldahl N; PCB; Total Organic Carbon)	For Lab Use Only
1	Sediment	9/29/09	1145	SOIL	2	X X X X X X X X X	

CHAIN OF CUSTODY

Collected by (Print): Nathan D. Gruman
Collector's Signature: [signature]
Relinquished by: N. Gruman — Date/Time: 9/29/09 1605
Received by: — Date/Time:
Relinquished by: — Date/Time:
Received: — Date/Time:
Received: [signature] — Date/Time: 9/29/09 1605
Custody Seal Intact: Yes No N/A — Hand Delivered by Client
On Ice: ✓ Yes No
Temp Blank: ✓ Yes No
Temp: 1.4
Comments: