26 July, 2006

Commander, Chicago District
U.S. Army Corps of Engineers
Attn: Megan Hurst
111 North Canal Street, Suite 600
Chicago, IL 60606-7026

Reference: Chicago District Contract No. DACW23-02-D-0003, D.O. 0007

Subject: Final Report for Collection and Analysis of Environmental Samples For Calumet Harbor and River Dredged Material Management Plan

Dear Ms. Hurst:

Enclosed are six copies (five sets of page inserts and one bound copy) of the final report for the above-referenced project. The final report incorporates all U.S. Army Corps of Engineers (USACE) comments on the draft final report dated May 19, 2006. Also included is a compact disc (CD) that contains a digital copy of the report, background documentation, QA/QC data not included in the final report, and an electronic data deliverable.

The final report has been reviewed by CDM as described in the Sampling and Analysis Plan. All required services have been performed in accordance with the terms and conditions of the contract documents.

If you have any questions or comments, please call me at (312) 346-5000.

Sincerely,

John P. D'Aniello, P.E.
Vice President
CDM Federal Programs Corporation

United States Army Corps of Engineers
Chicago District

Collection and Analysis of Environmental Samples For Calumet Harbor and River Dredged Material Management Plan (DMMP)

July 26, 2006

Final Report

Contents

Section 1 Introduction and Scope of Work 1-1
1.1 Introduction 1-1
1.2 Site Description and History 1-1
1.3 Scope of Work 1-1

Section 2 Field Investigation Methods and Procedures 2-1
2.1 Introduction 2-1
2.2 Site Conditions 2-1
2.3 Subsurface Sediment Investigation 2-1
2.3 Sampling and Analysis Procedures 2-4
2.4.1 CDM Environmental Sampling Procedures 2-4
2.4.2 USACE Environmental Sampling Procedures 2-7
2.4.3 Geotechnical Sampling Procedures 2-7
2.4.4 Analytical Parameters 2-7
2.5 Investigation-Derived Waste 2-10
2.6 Laboratory Analysis 2-10

Section 3 Results of the Field Investigation 3-1
3.1 Subsurface Conditions 3-1
3.2 Comparison Objectives Development 3-1
3.3 Comparison Objectives Screening 3-3
3.4 Mass Balance Summary 3-3
3.5 Quality Assurance/Quality Control (QA/QC) 3-4
3.6 Data Quality Evaluation 3-4
3.7 Conclusions 3-7

Appendices

Appendix A Soil Boring Logs and Field Notes
Appendix B Geotechnical Results
Appendix C Analytical Results Tables

CD-ROM

Sampling and Analysis Plan (includes Health and Safety Plan)
Final Report
Data Quality Assessment Worksheets and Validated Form 1s
Katahdin Raw Data Packages
Electronic Data Deliverable

Figures

1-1 Site Location 1-2
2-1 Chicago CDF Sampling Locations 2-2
2-2 Track Mounted Hollow-Stem Auger Drill Rig 2-3
2-3 Track Mounted Hollow-Stem Auger Drill Rig Installing Core 2-4
3-1 Typical Silt Sample 3-1
3-2 Contaminated Sample 3-2

Tables

2-1 GPS Coordinates of Sample Points 2-5
2-2 Bulk Chemistry, General Characterization, Geotechnical Parameters, and Number of Samples Submitted 2-6
2-3 Parameters for General Characterization 2-8
2-4 Parameters for Bulk Chemical Analysis 2-9
2-5 Parameters for Geotechnical Analysis 2-10
2-6 Parameters Analyzed by Each Laboratory 2-11
3-1 Summary of Bulk Chemistry Results 3-8
3-2 Summary of Comparison Objective Exceedances 3-10
3-3 Comparison to IEPA and IDEM Residential Screening Criteria 3-11
3-4 Summary of Exceedances for Coarse Grain Fraction 3-19
3-5 General Characterization, Original Samples 3-20
3-6 General Characterization, Fine- and Coarse-Grained Samples 3-23
3-7 Geotechnical Samples 3-27
3-8 Mass Balance Comparison Summary 3-28

Acronyms

ASTM	American Society for Testing and Materials
CDF	confined disposal facility
CDM	CDM Federal Programs Corporation
DMMP	dredged material management plan
DQA	data quality assessment
DQO	data quality objective
EDD	electronic data deliverable
ERDC-EL	Environmental Research and Development Center, Environmental Laboratories
^{o}F	degrees Fahrenheit
GPS	global positioning system
HASP	Health and Safety Plan
HDPE	high-density polyethylene
HEM	n-hexane extractable material
HSA	hollow-stem auger
ICP-AES	inductively coupled plasma-atomic emission spectrometry
ICP-MS	inductively coupled plasma-mass spectrometry
IDEM	Indiana Department of Environmental Management
IDW	investigation-derived waste
IEPA	Illinois Environmental Protection Agency
kg	kilogram
LWD	low water datum
mg	milligram
MS	matrix spike
MSD	matrix spike duplicate
NGVD	National Geodetic Vertical Datum
NELAC	National Environmental Laboratory Accreditation Conference
PARCC	precision, accuracy, representativeness, comparability, and completeness
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PPE	personal protective equipment
QA	quality assurance
QC	quality control
RISC	risk integrated system of closure
SAP	Sampling and Analysis Plan
SDG	sample delivery group
SIM	selected ion monitoring
SOP	standard operating procedure
SOW	scope of work
SRO	soil remediation objective
TACO	tiered approach to corrective action objectives
TCLP	toxicity characteristic leaching procedure
TOC	total organic carbon
USACE	United States Army Corps of Engineers
USCS	Unified Soil Classification System

Section 1
Introduction and Scope of Work

1.1 Introduction

This report presents the results of the collection and analysis of sediment samples from the Chicago Area Confined Disposal Facility (CDF). The project was conducted by CDM Federal Programs Corporation (CDM) on behalf of the U.S. Army Corps of Engineers (USACE) under Contract Number DACW23-02-D-0003 as Delivery Order 0007.

1.2 Site Description and History

The following information is from the USACE scope of work (SOW) for this project.

The Chicago Area CDF is a 43-acre, triangular-shaped area that contains disposed dredge sediments from the Calumet Harbor and River. It is located on the southern corner of the intersection of Lake Michigan and the Calumet River (**Figure 1-1**). The total storage capacity of the CDF is roughly 1.3 million cubic yards of dredged materials.

From 1984 to present, over 1 million cubic yards of material dredged from the Calumet Harbor and River have been disposed in the Chicago CDF. This disposal option may not be available long-term, however, as the CDF is nearing capacity. Given the current dredging schedule, the Chicago Area CDF will be able to accommodate dredged material from the Chicago Harbor and River for approximately the next 6 years.

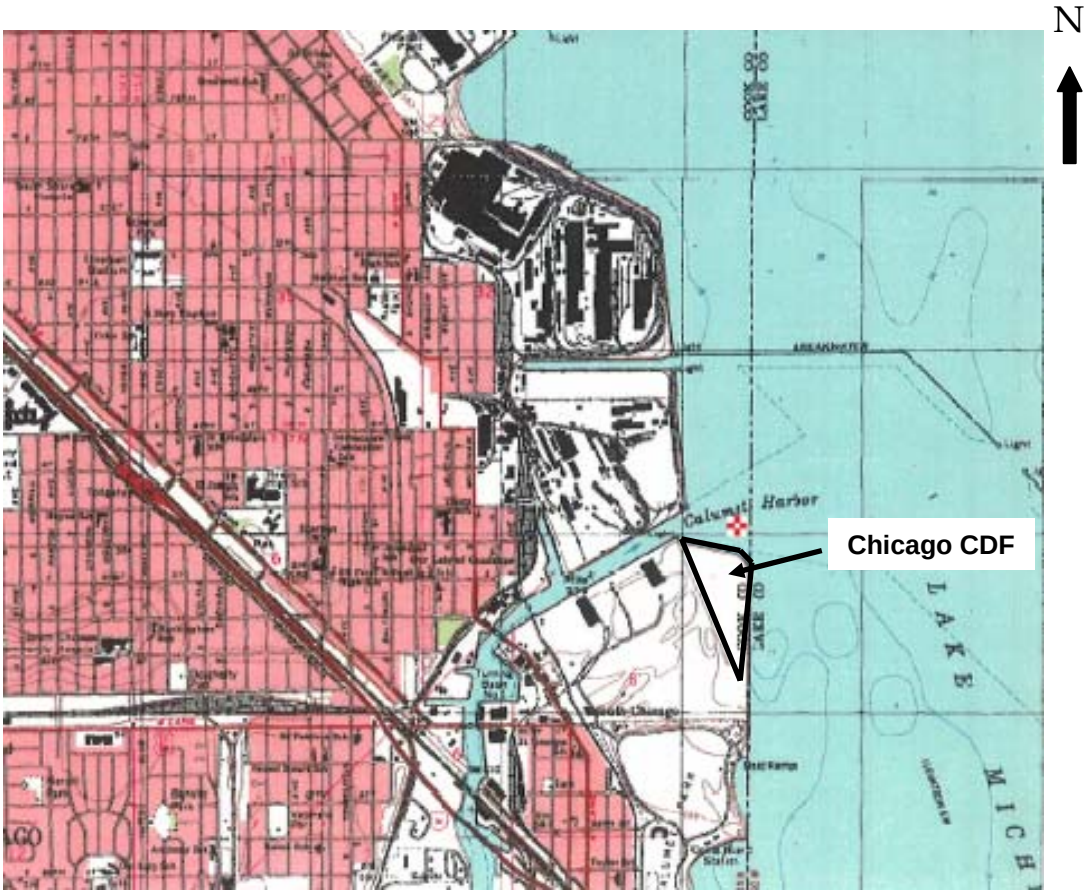
Prior to the placement of dredged material in the CDF, the original bottom of the CDF was approximately 14 feet below Low Water Datum (LWD). A dike is located along the northern and eastern borders of the CDF. The dike has a limestone core and a graded armor stone on the exterior of the dike face with a 1.5 horizontal to 1 vertical slope. On the interior of the dike face, there is a blanket of sand and clay on a 3 horizontal to 1 vertical slope and a plastic liner underneath.

Chemical data from previous sampling events between 1984 and 2003 indicate that various metals, polychlorinated biphenyls (PCBs), oils, and grease have been detected in samples collected from the dredged sediments disposed at the CDF.

1.3 Scope of Work

CDM was contracted on September 28, 2005 by USACE to conduct sampling and laboratory analysis of sediments collected from the Chicago Area CDF.

Figure 1-1
Site Location
Chicago Confined Disposal Facility



The goal of this investigation was to gather data to assess the feasibility of mining and processing material from the Chicago Area CDF for beneficial purposes and to collect geotechnical data for use in CDF expansion designs. This data will aid the USACE, Chicago District in completing the Calumet Harbor and River Dredged Material Management Plan (DMMP). The purpose of the DMMP is to document the availability of dredged material capacity sufficient to accommodate the next 20 years of maintenance dredging for the Calumet Harbor and River. As part of the DMMP process, various options for the management of dredged material will be identified and evaluated.

The field investigation was conducted according to CDM's Final Sampling and Analysis Plan (SAP), dated January 17, 2006 and approved by USACE in November 2005. With the exception of three samples collected by USACE as noted below, CDM completed the following tasks:

1. Collected 12 sediment samples from the CDF for environmental testing as follows:

    - Nine samples were collected by CDM using a track-mounted hollow-stem auger (HSA) drill rig

    - Three samples collected by USACE using a piston sampler

    - Of the 12 total samples collected, 7 samples were selected by the USACE representative to be split into fine and coarse grain fractions (passing and not passing a #200 sieve, respectively) for additional analysis; analytical parameters for all samples is described in Section 2

2. Collected two sediment samples from within the CDF and one soil/fill sample from outside the CDF with a track-mounted HSA drill rig for analysis of geotechnical parameters as described in Section 2

3. Classified sediments in the field according to the Unified Soil Classification System (USCS)

4. Collected and submitted sediment samples for laboratory analysis

5. Prepared this report which includes the following:

    - Description of the site conditions encountered during work

    - Copies of field notes and boring logs

    - A map identifying sample locations with a table including GPS coordinates

    - Documentation of the sampling locations and methods

- Color photographs of collected samples
- Water surface elevation measurements with respect to LWD for each day of sampling (provided by USACE)
- Water depth measurements at each under water sampling location (provided by USACE)
- Sample drilling depth at each location
- Ground surface elevation with respect to LWD at each land sampling location
- All information provided by USACE regarding the three samples collected in the pond area
- A hard copy of the laboratory analytical results, excluding Quality Assurance (QA)/Quality Control (QC) data for each sample location
- Electronic data deliverable (EDD) (including QA/QC) on CD-ROM
- Discussion of Data Quality Objectives (DQOs), including whether or not the DQOs were met
- Chain of Custody sheets
- A table that summarizes all sampling analysis and results
- A discussion of all sampling and analysis results
- A comparison of the coarse-grained fraction analytical results to Illinois Environmental Protection Agency (IEPA) Tiered Approach to Corrective Action Objectives (TACO) and Indiana Department of Environmental Managements (IDEM) risk integrated system of closure (RISC) levels for residential use

No other data evaluation or interpretation was performed.

This report is divided into three sections. These sections contain the following information:

- Section 1 - Introduction
- Section 2 - Description of methods and procedures used during the field investigation
- Section 3 - Results of the field investigation

Section 2
Field Investigation Methods and Procedures

2.1 Introduction

Sediment sampling was conducted in the Chicago Area CDF from March 13 through 16, 2006 and was performed in accordance with the CDM Final SAP dated January 17, 2006. A Health and Safety Plan (HASP) was prepared prior to the start of field activities and was included in the SAP.

2.2 Site Conditions

The Chicago Area CDF was accessible to sampling at all the planned locations. Weather conditions during sampling included sunny to cloudy skies, with some precipitation. Temperatures ranged from the upper 30s to upper 60s degrees Fahrenheit (ºF).

Subsurface conditions are described in Section 3.1, with coring logs and USCS classifications provided in **Appendix A**. Water surface elevations were provided by USACE.

2.3 Subsurface Sediment Investigation

Twelve borings were advanced by CDM at the project location using a hollow-stem auger (HSA) drill rig. These borings were numbered 1 through 9 for environmental analysis and G1 through G3 for geotechnical analysis. Each boring was advanced until native lake bottom sediment was encountered. In addition, three samples for environmental analysis were collected in the pond area by USACE representatives at locations numbered P1 through P3. All samples were sediment samples except for that collected from location G3, which consisted of fill and native soil; however, no sample was collected for analysis from location G3 as described in Section 2.4.3. A total of 15 samples, one from each location, were collected.

Sediment boring locations were based on global positioning system (GPS) coordinates provided by the USACE and all core locations were approved by the USACE representative in the field. Sediment boring locations are shown on **Figure 2-1.**

Boart Longyear of Schofield, Wisconsin was retained to provide drilling services. A track mounted hollow-stem auger drill rig was used to conduct field activities (**Figure 2-2**). Drilling was conducted using a Dietrich 50 hollow-stem auger rig mounted on a Bombardier track, as pictured in **Figure 2-3**. Split-spoon sampling for logging lithology was performed through the center of the augers and blow counts were recorded.

Figure 2-1
Chicago CDF Sampling Locations

- General Samples (Land), 1 through 9
- Geotechnical Samples, G1 through G3
- General Samples (Pond Area) collected by USACE, P1 through P3

Figure 2-2
Track Mounted Hollow-stem Auger Drill Rig
Chicago Area CDF

Figure 2-3
Track Mounted Hollow-stem Auger Drill Rig Installing Core
Chicago Area CDF

2.4 Sampling and Analysis Procedures

Sample locations were surveyed using a Trimble ProXRF GPS unit. Real-time differential GPS correction was automatically applied to survey points. The position of the sample points, as well as surface elevation, depth to water, and depth to lake bed are listed in **Table 2-1**.

Depth to water was logged by the CDM geologist based on observation of saturated sediment. The ground surface elevation of the core locations are referenced to Low Water Datum (LWD). LWD was recorded by collecting GPS information of the surface water elevation of the water within the CDF. Photographs of sediment samples are shown in Section 3.0.

2.4.1 CDM Environmental Sampling Procedures

Environmental samples (1 through 9) of the disposed dredge material were collected from the homogenized drill cuttings placed on plastic sheeting. To the extent possible, drill cuttings were from the entire dredge material column. Samples were submitted for laboratory analysis as shown in **Table 2-2** and described in Section 2.5.4. The numbers shown in **Table 2-2** include samples collected in 5-gallon buckets from seven locations selected by the USACE representative that were separated into fine- and coarse-grained fractions (passing and not passing a #200 sieve, respectively). The separated fine and coarse grain samples were subsequently analyzed for select parameters as shown on **Table 2-2**. Therefore, **Table**

Table 2-1
GPS Coordinates of Sample Points,
Chicago Area CDF

Sample ID #	Sample Description	Longitude/ Latitude	Ground/Water Surface(a) Elevation (feet LWD)	Depth to Water (feet)	Depth to Lake Bed (feet)	Date Measured
CHCDF2006-01	Core sample of CDF contents	Long: -87.52828784 Lat: 41.73150866	+9.159 (Ground)	7.0	16	3/16/06
CHCDF2006-02	Core sample of CDF contents	Long: -87.52804687 Lat: 41.73099479	+7.779 (Ground)	5.0	17.5	3/16/06
CHCDF2006-03	Core sample of CDF contents	Long: -87.52761695 Lat: 41.73056053	+4.389 (Ground)	2.0	23.5	3/16/06
CHCDF2006-04	Core sample of CDF contents	Long: -87.52681266 Lat: 41.73126833	+9.769 (Ground)	5.0	28.8	3/16/06
CHCDF2006-05	Core sample of CDF contents	Long: -87.52686439 Lat: 41.73076529	+7.699 (Ground)	5.0	18	3/16/06
CHCDF2006-06	Core sample of CDF contents	Long: -87.52529662 Lat: 41.73094847	+9.089 (Ground)	7.5	31	3/16/06
CHCDF2006-07	Core sample of CDF contents	Long: -87.52592824 Lat: 41.73073554	+5.779 (Ground)	2.5	17.5	3/16/06
CHCDF2006-08	Core sample of CDF contents	Long: -87.52498644 Lat: 41.72941419	+7.549 (Ground)	5.5	15	3/16/06
CHCDF2006-09	Core sample of CDF contents	Long: -87.52520957 Lat: 41.72795088	+5.489 (Ground)	7.5	20	3/16/06
CHCDF2006-P1*	Grab sample of CDF contents	Long: -87.52682 Lat: 41.73035	+2.629 (Water)	0	NA	3/16/06
CHCDF2006-P2*	Grab sample of CDF contents	Long: -87.52554 Lat: 41.72974	+2.629 (Water)	0	NA	3/16/06
CHCDF2006-P3*	Grab sample of CDF contents	Long: -87.52605 Lat: 41.72807	+2.629 (Water)	0	NA	3/16/06
CHCDF2006-G1	Core sample of CDF contents	Long: -87.52850708 Lat: 41.73149482	+9.149 (Ground)	6.5	17.5	3/16/06
CHCDF2006-G2	Core sample of CDF contents	Long: -87.52497979 Lat: 41.73001488	+8.239 (Ground)	4.0	15	3/16/06
CHCDF2006-G3	Core sample of fill material	Long: -87.52730309 Lat: 41.72746796	+12.889 (Ground)	7.0	27.5	3/16/06

* Samples collected by USACE

(a) – Ground and water surface elevation is given with respect to Low Water Datum (LWD)

NA = not applicable

Table 2-2
Bulk Chemistry, General Characterization, Geotechnical Parameters and Number of Samples Submitted
Chicago Area CDF

Analysis	Method	01	02	03	04	05	06	07	08	09	P1	P2	P3	G1	G2	G3
Particle Size Analysis with Hydrometer	ASTM D422	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
% Organic	ASTM D2974	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Moisture Content	ASTM D2216	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Void Ratio	Calculated	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Particle Size Separation via Wet Sieving	See Notes	1	0	1	1	0	1	1	1	1	0	0	0	0	0	0
Specific Gravity of Soil Solids by Pycnometer	ASTM D854	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Bulk Specific Gravity	ASTM D2937	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Soot/TOC	Env. Sci. 1997 /Lloyd Kahn	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Oil & Grease	ASTM D1664	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Metals	6010B/7196A/7471A	3	1	3	3	1	3	3	3	3	0	0	0	0	0	0
PAHs	8270C, 8270 SIM	3	1	3	3	1	3	3	3	3	0	0	0	0	0	0
PCBs	8082	3	1	3	3	1	3	3	3	3	0	0	0	0	0	0
TCLP Analytes	6010B/6020B/7470/ 9014	2	1	2	2	1	2	2	2	2	0	0	0	0	0	0
Atterberg Limits	ASTM D4318	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
Q-Test, 3 points each test	ASTM D2850	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
R-Test, 3 points each test	ASTM D4767	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
Consolidation Test with Time Deformation Curves	ASTM D2435	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

Notes:

Method for Particle Size Separation via Wet Sieving included as Attachment 1 to the USACE SOW for this project
ASTM – American Society for Testing and Materials
PAHs – polynuclear aromatic hydrocarbons
TOC – total organic carbon
PCBs – polychlorinated biphenyl
TCLP – toxicity characteristic leaching procedure

2-2 indicates a total of three samples for these locations, except for metals via TCLP for which only the coarse-grained fraction was analyzed.

2.4.2 USACE Environmental Sampling Procedures

Environmental samples in the pond area of the CDF (P1 through P3) were collected manually by USACE using a piston sampler. Undisturbed samples were collected to a depth of approximately 6-7 feet below the ground surface. All recovered sample material from each location was homogenized prior to being bottled for laboratory analysis. None of the pond samples were selected for the optional bench scale testing. Notes describing the USACE sampling activities are provided in Appendix A.

2.4.3 Geotechnical Sampling Procedures

Two undisturbed samples, one each from G1 and G2, were collected using Shelby tubes. A sample was taken from the adjacent split-spoon sample and sealed in an air-tight jar for moisture content determination. The Shelby tube samples were analyzed for the geotechnical parameters as shown on **Table 2-2** and described in Section 2.4.4. A Shelby tube sample from location G3 could not be recovered because of the high liquid content of the material being sampled.

2.4.4 Analytical Parameters

All 12 environmental samples (9 samples collected by CDM and 3 samples collected by USACE) were submitted for grain size analysis and the general characterization parameters shown in **Table 2-3**. However, the void ratio for each sample was calculated based on the results of other general characterization analyses.

Particle size separation via wet sieving was performed on seven samples (CHCDF-2005-01, -03, -04, and -06 through -09) selected by the USACE representative to obtain coarse- and fine-grained fractions (passing and not passing a #200 sieve, respectively). The seven coarse- and seven fine-grained fractions were then analyzed for specific gravity, soot/total organic carbon (TOC), and oil and grease as shown in **Table 2-3**.

In addition, the same seven original samples and the seven coarse-grained and seven fine-grained fractions were also analyzed for the bulk chemical parameters (metals, polynuclear aromatic hydrocarbons [PAH], and polychlorinated biphenyls [PCB]) listed in **Table 2-4**. However, analysis of metals via the toxicity characteristic leaching procedure (TCLP) was performed only on the seven original samples and the seven coarse-grained fraction samples.

Two samples (G1 and G2) were submitted for analysis of the geotechnical parameters listed in **Table 2-5**. As noted in Section 2.4.3, a planned third sample could not be collected. Both samples were analyzed for each parameter with the exception of the consolidation test, which was performed only on sample G2, which was selected by the USACE representative.

Table 2-3
Parameters for General Characterization
Chicago Area CDF

General Characterization	Analytical Method	Comments
Particle Size Analysis Via Sieve and Hydrometer	D422	12 original samples
% Organic	D2974 loss or ignition	12 original samples
Moisture Content	D2216	12 original samples
Void Ratio	NA (calculated)	12 original samples
Particle size separation via wet sieving	See Note	7 selected original samples (separates samples into coarse and fine fractions)
Specific Gravity of Soil Solids by Water Pycnometer	D854	12 original samples plus 7 coarse and 7 fine fractions
Bulk Specific Gravity	D2937	12 original samples
Soot/TOC	Env. Sci. 1997/Lloyd Kahn	12 original samples plus 7 coarse and 7 fine fractions
Oil and Grease	D1664	12 original samples plus 7 coarse and 7 fine fractions

Notes: Method for Particle Size Separation via Wet Sieving included as Attachment 1 to the USACE SOW for this project
TOC = Total Organic Carbon

Table 2-4
Parameters for Bulk Chemical Analysis
Chicago Area CDF

	Analytical Method	Comparison Objectives	Units
METALS			
Arsenic	6010B	0.4	mg/kg
Barium	6010B	1,600	mg/kg
Beryllium	6010B	0.1	mg/kg
Cadmium	6010B	7.5	mg/kg
Chromium (VI)	7196A	38	mg/kg
Copper	6010B	920	mg/kg
Lead	6010B	81	mg/kg
Mercury	7471A	2.1	mg/kg
Nickel	6010B	950	mg/kg
Selenium	6010B	5.2	mg/kg
Silver	6010B	31	mg/kg
PAHs			
Naphthalene	8270C/8270 SIM	0.7	mg/kg
Acenaphthylene	8270C/8270 SIM	18	mg/kg
Acenaphthene	8270C/8270 SIM	130	mg/kg
Fluorene	8270C/8270 SIM	170	mg/kg
Phenanthrene	8270C/8270 SIM	0.1	mg/kg
Anthracene	8270C/8270 SIM	51	mg/kg
Fluoranthene	8270C/8270 SIM	880	mg/kg
Pyrene	8270C/8270 SIM	570	mg/kg
Benzo(a)anthracene	8270C/8270 SIM	0.9	mg/kg
Chrysene	8270C/8270 SIM	25	mg/kg
Benzo(b)fluoranthene	8270C/8270 SIM	0.9	mg/kg
Benzo(k)fluoranthene	8270C/8270 SIM	9.0	mg/kg
Benzo(a)pyrene	8270C/8270 SIM	0.09	mg/kg
Indeno(1,2,3-cd)pyrene	8270C/8270 SIM	0.9	mg/kg
Dibenzo(a,h)anthracene	8270C/8270 SIM	0.09	mg/kg
Benzo(g,h,i)perylene	8270C/8270 SIM	0.1	mg/kg
PCBs			
Aroclors	8082	Varies	mg/kg
TCLP METALS			
Arsenic	6020A	0.05	mg/L
Barium	6010B	2.0	mg/L
Beryllium	6010B	0.004	mg/L
Cadmium	6020A	0.005	mg/L
Chromium	6010B	0.1	mg/L
Copper	6010B	0.65	mg/L
Cyanide (free)	9014	0.2	mg/L
Lead	6010B	0.0075	mg/L
Mercury	7470	0.002	mg/L
Nickel	6010B	0.1	mg/L
Selenium	6020A	0.05	mg/L
Silver	6010B	0.05	mg/L
Zinc	6010B	5.0	mg/L

Table 2-5
Parameters for Geotechnical Analysis
Chicago Area CDF

Geotechnical Testing	ASTM Method
Atterberg Limits	D4318
Q-Test (Unconsolidated, Undrained), 3 points each test	D2850
R-Test (Consolidated, Undrained) with pore pressure measurements, 3 points each test	D4767
Water Content	D2216
Consolidation Test with Time Deformation Curves	D2435

2.5 Investigation Derived Waste

All sampling and processing equipment that came into direct contact with the sediment samples were thoroughly decontaminated between each sampling location with a Liquinox® solution.

Investigation-derived waste (IDW) produced during sampling was handled in accordance with CDM SOP 2-2, *Guide to Handling of Investigation-Derived Waste* and the USACE SOW. Personal protective equipment (PPE) was placed into high-density polyethylene (HDPE) bags and disposed in conventional waste containers as non-hazardous waste. All rinsate and extra sediment volume collected during field activities was returned to the sampling location from which it was obtained. No IDW was containerized on site.

2.6 Laboratory Analysis

The samples were sent on the day of collection via overnight courier to two different laboratories. **Table 2-6** lists the analytical parameters that were tested by each of the laboratories. Katahdin Analytical Services, Inc. (Katahdin), is located in Westbrook, Maine and Kemron Environmental Services (Kemron) is located in Atlanta, Georgia. Additional 5-gallon buckets of sediment were collected from each of the seven selected sample locations and shipped to the Environmental Research and Development Center, Environmental Laboratories (ERDC-EL) in Vicksburg, Mississippi in case USACE determined the need for additional analyses in the future.

Table 2-6
Parameters Analyzed by Each Laboratory
Chicago Area CDF

Kemron	Katahdin
Atterberg Limits	Moisture Content
Q-Test (Unconsolidated, Undrained), 3 points each test	% Organic
R-Test (Consolidated, Undrained), with pore pressure measurements, 3 points each test	Soot/TOC
Consolidation Test with Time Deformation Curves	Oil & Grease
Particle Size Analysis via Hydrometer	Metals
Void Ratio	PAHs
Specific Gravity	PCBs
Bulk Specific Gravity	TCLP Analytes
Particle Size Separation via Wet Sieving	

Section 3
Results of the Field Investigation

3.1 Subsurface Conditions

Subsurface conditions at the site are described based on field observations recorded on boring logs and laboratory grain size analysis. Boring logs are included in **Appendix A** and geotechnical results are provided in **Appendix B**.

Dredged materials disposed in the Chicago Area CDF generally consist of 15 to 20 feet of silt and clay overlying native fine- to medium-grained sands. A typical silt sample is shown in **Figure 3-1**. The overlying silts contain some clays and sands. Numerous samples exhibited staining, hydrocarbon odors, and sheens as shown in **Figure 3-2**.

Figure 3-1
Typical Silt Sample

3.2 Comparison Objectives Development

In accordance with the USACE SOW, coarse grain fraction samples analyzed for bulk chemistry parameters (metals, metals via TCLP, PAHs, and PCBs) were compared to values from IEPA TACO Tier 1 Soil Remediation Objectives (SRO) for Residential Properties (Appendix B, Table A), and IDEM RISC Residential Closure Levels (Appendix 1, Table A). For both the IEPA TACO Tier 1 SROs and the IDEM RISC values, the lowest concentration of the various applicable exposure scenarios or pathways was used.

Illinois' TACO guidance system was designed for uses such as brownfield remediation and RCRA closure, however, it provides a framework that is potentially applicable to evaluating the dredged material for beneficial use. Tier 1 provides conservative risk-based criteria classified by the end-use of the property. Tiers 2 and 3 provide guidance for determining site-specific criteria for material that fail to meet Tier 1 guidelines. Indiana's RISC system also provides a framework for evaluation remediation criteria and also provides a set of guidelines that may apply to some beneficial uses of dredged material. Like TACO, RISC provides default tables as well as a framework to support case-specific evaluation of contaminants. Failure to meet the appropriate TACO Tier 1 or RISC default standards may only indicate that further analysis is required.

In addition, metals were also compared to IEPA TACO Concentrations of Inorganic Chemicals in Background Soils for Counties within Metropolitan Statistical Areas (Appendix A, Table G) and PAHs were compared to available background values from the City of Chicago Department of Environment *Polynuclear Aromatic Hydrocarbon Study, City of Chicago* (2003) for Chicago. Although these PAH background values are not officially part of TACO, IEPA has determined that the PAH background values are valid and may eventually be incorporated into the TACO SROs.

Figure 3-2
Contaminated Sample

3.3 Comparison Objectives Screening

A summary of sample concentrations and comparison objectives from the USACE SOW is included in **Table 3-1** and a summary of comparison objective exceedances is provided in **Table 3-2**. **Tables 3-3 and 3-4** provide comparisons of individual samples to each State's set of applicable screening criteria. All tables referenced in Section 3.0 are located at the end of the section.

Analytical results for all non-geotechnical analyses are provided in **Tables 3-5 through 3-7**, as well as **Appendix C** (as **Tables 7 through 9**). Validated Form 1s and QA/QC (raw) data are included on the CD-ROM included with this report.

Of the 11 metals analyzed, samples exceed comparison objectives for only arsenic and lead. Concentrations of arsenic exceed comparison objectives in six samples and lead exceeds in two samples. The maximum concentration of each of the two metals was detected in a different sample. In addition, the maximum concentration of all 10 metals detected was spread among all seven samples indicating that metals contamination is generally spread across the CDF. The greatest number of maximum concentrations occurred in sample CHCDF-2005-004. Selenium was not detected in any sample.

Of the 16 PAHs analyzed, samples exceed comparison objectives for 6 PAHs: naphthalene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a) pyrene, indeno(1,2,3-cd)pyrene, and dibenzo(a,h)anthracene. Exceedances of these PAHs were relatively widespread with most of the PAHs exceeding comparison objectives in six or seven of the samples. However, almost all of the maximum concentrations for all PAHs were in either CHCDF-2005-004 or CHCDF-2005-007.

Total concentrations of PCBs were used for comparison; however, Aroclor-1242 and Aroclor-1254 were the only congeners detected. Total concentrations of PCBs exceed comparison objectives in two samples, but PCBs were detected in all samples with the highest concentration detected in sample CHCDF2005-001.

Of 13 metals analyzed via TCLP, only lead and nickel were detected at concentrations that exceed comparison objectives. Lead concentrations in all samples exceed comparison objectives and nickel concentrations exceed comparison objectives in two samples. Sample CHCDF2005-007 contained the maximum concentration of both lead and nickel. Most other metals analyzed via TCLP were either not detected or detected below the practical quantitation level.

3.4 Mass Balance Summary

Most of the sediments, both coarse and fine-grained, have been impacted by metals, PAHs, and PCBs. In general, metals such as arsenic, barium, beryllium, chromium, copper, lead, mercury, nickel, selenium, and silver and PCBs are found at higher concentrations in the fine-grained material samples as shown in **Table 3-8**.

In contrast, PAHs such as naphthalene, acenapthylene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene, can be found at higher concentrations in the coarse-grained material sampled, with the exception of sample CHCDF-2005 08 where higher concentrations of PAHs are found in the fine-grained material. The concentrations reported in the original sample, in most cases, fall in between the concentrations found in the fine and coarse-grained material.

Some type of soot (hard carbon) phase may account for the high PAH concentrations in the coarse fraction. A soot phase is likely to be particulate in nature and would report with the sand rather than the fines in a grain size separation such as that used in this study. In this case, employing a hydrocyclone or hydroseparator to separate the soot phase by taking advantage of the density differences in the carbon particles and the sand particles may be an option for removing more contaminants from the coarse fraction. To gather more information, density testing could be performed on the extra sample volume sent to ERCD-WES to determine the characteristics of the contaminant bearing phases in the coarse and fine fractions. The density testing may also be able to quantify oil associated contaminant phases, which could potentially be reduced through the use of a surfactant and density based separation.

3.5 Quality Assurance/Quality Control (QA/QC)

CDM performed all field sampling activities in accordance with the USACE-approved SAP (CDM 2006) that included project-specific QA/QC requirements. Decontamination, sampling methods, and all other procedures used during field work were conducted as described in the SAP. A USACE representative was onsite observing field work during the entire sampling event.

3.6 Data Quality Assessment

Katahdin provided analytical services in March 2006 for Sample Delivery Groups (SDG) CAL-03 and CAL-04. The data were validated by CDM. SDG CAL-03 consisted of eight soil samples received by Katahdin on March 15 and 16, 2006. SDG CAL-04 consisted of 14 soil samples received by Katahdin on March 23 and 24, 2006.

The data was validated in accordance with the *USEPA Contract Laboratory National Functional Guidelines for Inorganic Data Review, October 2004*, the *National Functional Guidelines for Organic Data Review, October 1999*, and with respect to the following methods:

Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods (SW-846), Third Edition, Final Update III

- 8270C - Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS) for Polyaromatic Hydrocarbons (PAHs)

- M8270 and M8270-SIM - Selected Ion Monitoring for PAH analysis (these two methods were used due to laboratory problems with Matrix Spike interference)
- SW846 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography
- SW846 6010B - Inductively Coupled Plasma-Atomic Emission Spectrometry
- SW846 6020 - Inductively Coupled Plasma-Mass Spectrometry
- SW846 7471 - Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique)
- SW846 1311 - Toxicity Characteristic Leaching Procedure
- SW846 7470 - Mercury in Liquid Waste (Manual Cold-Vapor Technique)
- SW846 9071B - n-Hexane Extractable Material (HEM) for Sludge, Sediment, and Solid Samples (Oil and Grease)
- SW846 7196A - Chromium, Hexavalent (Colorimetric)
- SW846 M9014 - Titrimetric and Manual Spectrophotometric Determinative Methods for Cyanide, (TCLP extract)
- Soot Carbon – USACE SOW, Attachment 2
- Lloyd Kahn - Total Organic Carbon (TOC)
- CLP SOW 788 - Total Solids

Signed and validated sample result report forms as well as validation worksheets summarizing the findings are provided on the CD-ROM that accompanies this report.

The worksheets are organized according to the precision, accuracy, representativeness, comparability, and completeness (PARCC) parameters; the QA objectives expressed in terms of precision, accuracy, representativeness, comparability, and completeness. Both field duplicates and laboratory duplicates are reviewed in the assessment of precision. The field duplicate results are summarized in the data validation worksheets. The field duplicate relative percent differences are presented here but qualifiers were not applied because soil field duplicates can have a degree of variability due to the non-homogeneity of the matrix. Laboratory precision is also reflected in the relative percent difference between the spike and spike duplicate analyses. Accuracy is evaluated through the percent recovery results from known spiking concentrations. Matrix spikes, blank spikes (also known as laboratory control samples), surrogate spikes, internal standards and calibration standard recoveries are all compared to defined quality control (QC) criteria. Representativeness of the samples is evaluated through the examination of the condition of the samples when received at the laboratory, preservations and analytical

timeliness. Qualifiers were applied to the data and are described in the data validation reports.

PAHs were analyzed and reported by two different techniques, method SW8270C performed in full scan mode, as well as Selected Ion Monitoring (SIM) mode because of matrix interference during analysis. SIM is more sensitive and commonly used for clean samples, such as drinking waters, and can provide lower detection limits. In this case, the samples had to be diluted, resulting in reporting limits roughly equivalent to the reporting limits in the scan mode. The instrument in SIM mode was, at least for these samples, apparently not as stable as in full scan mode, resulting in increased response drift and sample result qualifications because of continuing calibration verification results outside of method criteria. Data for the PAH compounds were generated from analysis, re-analysis and re-extraction analysis under both full scan and SIM instrument modes. SIM data results were designated as the final result in a few cases where a compound was not detected in the scan mode and the lower SIM detection limit was preferred.

The data has been evaluated on the basis of the PARCC parameters above, the method requirements and the analytical results. The data reported is that deemed to be the most accurate and supportable in the validator's professional judgment. There is one final result for each compound, in each sample. The original Form 1s are validated such that the source of the every final result is documented.

In SDG CAL-03, selenium met all calibration criteria in the ICP-AES and thus all selenium results were reported by SW846 method 6010. The selenium calibration was not always method compliant in SDG Cal-04 and in these cases, the selenium concentration was reported from the ICP-MS analysis (method 6020). In all cases, the reported results are from compliant calibrations.

Many of the samples were TCLP extracted. These samples were analyzed for metals as both soils and TCLP extracts. The TCLP extracts were analyzed by Inductively Coupled Plasma-Atomic Emission Spectrometery (ICP-AES) method SW6010. The soil samples were analyzed for the same set of analytes but used both ICP-AES as well as Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) method 6020 for selected analytes. The method that was used for each analyte is documented on the sample result report form. In the analysis of samples in both SDGs, the method 6010 analysis of the water extract was obtained over multiple analytical runs. Which analysis resulted in the final value reported for each analyte was well documented on the appropriate form in SDG CAL-04. The validator could not locate this information in SDG CAL-03. There were cases for two TCLP extract samples that the final result reported could not be reproduced from any of the multiple analyses. However, all analyses provided data within reasonable limits of precision of the reported result and the discrepancy was not pursued. Based upon professional judgment, sample results are considered valid.

All data generated during this sampling event were found to be usable. Data that was reported from analyses that did not fully meet the quality control criteria of the

method have been qualified as estimated "UJ/J." No data within these two SDGs were rejected.

3.7 Conclusions

CDM and USACE collected environmental and geotechnical samples for USACE at the Chicago Area CDF to aid in preparation of the Calumet Harbor DMMP. Twelve sediment samples were collected inside the CDF (9 samples collected by CDM and 3 samples collected by USACE) to assess the feasibility of mining material from the CDF. All 12 sediment samples were analyzed for a list of general parameters. In addition, 7 of the samples were selected for bench scale testing which involved an initial bulk chemical analysis, grain size separation, and subsequent bulk chemical analysis of coarse and fine grained fractions. CDM also collected 2 geotechnical samples from 3 borings both inside and outside the CDF to aid in evaluating CDF expansion alternatives.

The results from the sediment bench scale testing do not rule out sediment mining as a feasible option. The coarse sand fraction accounted for between 20% and 59% of the sample volume in the 12 samples collected. The soil washing grain size separation process reduced many of the contaminants to below IEPA TACO and IDEM RISC objectives in the coarse grained fraction; however, the concentrations of some contaminants including many of the PAHs were increased. This may suggest the presence of a coarse soot fraction in the sediment, which could potentially be removed through density dependent field separation methods. Additional laboratory testing may be needed prior to initiating a full pilot study.

Table 3-1
Summary of Bulk Chemistry Results, Comparison for Coarse Grain Fraction – Chicago CDF

	Analyte	Number of Comparison Objective Exceedances*	Minimum Concentration Detected	Maximum Concentration Detected	Location of Highest Detection
Metals (6010B)	Arsenic	6/7	3.7 mg/kg	13.6 mg/kg	09
	Barium	0/7	13.1 mg/kg	76 mg/kg	07
	Beryllium	0/7	0.2 mg/kg	0.64 mg/kg	08
	Cadmium	0/7	0.21B mg/kg	0.95 mg/kg	04
	Chromium (VI)	0/7	0.65U mg/kg	2.6 mg/kg	06
	Copper	0/7	13.8 mg/kg	39.2 mg/kg	04
	Lead	2/7	27.9 mg/kg	142 mg/kg	04
	Mercury	0/7	0.02BJ- mg/kg	0.37 mg/kg	04
	Nickel	0/7	11.4 mg/kg	27.9 mg/kg	09
	Selenium	0/7	0.27U mg/kg	5.0U mg/kg	01
	Silver	0/7	0.08U mg/kg	7.6 mg/kg	05
PAH (8270C)	Naphthalene	2/7	280J µg/kg	16,000 µg/kg	06
	Acenaphthylene	0/7	74J µg/kg	210 µg/kg	03
	Acenaphthene	0/7	260J µg/kg	900 µg/kg	04
	Fluorene	0/7	240J µg/kg	1,200 µg/kg	07
	Phenanthrene	0/7	1,300 µg/kg	7,400 µg/kg	07
	Anthracene	0/7	390J µg/kg	1,700 µg/kg	07
	Fluoranthene	0/7	1,800 µg/kg	5,600 µg/kg	07
	Pyrene	0/7	1,500 µg/kg	6,400 µg/kg	04
	Benzo(a)anthracene	6/7	700 µg/kg	3,400 µg/kg	07
	Chyrsene	0/7	900 µg/kg	4,000 µg/kg	07
	Benzo(b)fluoranthene	6/7	820 µg/kg	4,000 µg/kg	04
	Benzo(k)fluoranthene	0/7	340J µg/kg	1,800 µg/kg	07
	Benzo(a) pyrene	7/7	680 µg/kg	3,200µg/kg	07
	Indeno(1,2,3-cd)pyrene	3/7	410 µg/kg	1,900 µg/kg	07
	Dibenzo(a,h)anthracene	7/7	160 µg/kg	510 µg/kg	07
	Benzo (g,h,i) perylene	N/A	300J µg/kg	3,700 µg/kg	04
	Total PAHs[1]	N/A	8,764 µg/kg	46,000 µg/kg	06

Notes:

* - Results exceed criteria for TACO, RISC, or both.

1 - Total PAH calculated based on analyte concentrations detected above method detection limits.

2 - Total PCB calculated based on analyte concentrations detected above method detection limits.

U - Compound was analyzed for but not detected. The associated value is the sample quantitation limit.

J - Estimated data due to exceeded quality control criteria; plus or minus indicates likely bias if known.

B - Reported value was obtained from a reading that was less than the practical quantitation limit but greater than or equal to the instrument detection limit.

N/A – No screening criteria established by IEPA or IDEM.

Table 3-1 Continued
Summary of Bulk Chemistry Results, Comparison for Coarse Grain Fraction – Chicago CDF

	Analyte	Number of Comparison Objective Exceedances*	Minimum Concentration Detected	Maximum Concentration Detected	Location of Highest Detection
TCLP Analytes	Arsenic	0/7	0.0063B mg/L	0.0099 mg/L	07
	Barium	0/7	0.323 mg/L	0.612 mg/L	08
	Beryllium	0/7	0.00035U mg/L	0.004U mg/L	Multiple
	Cadmium	0/7	0.0004U mg/L	0.0025BJ- mg/L	04
	Chromium	0/7	0.001U mg/L	0.0036B mg/L	09
	Copper	0/7	0.00174U mg/L	0.0055B mg/L	06
	Cyanide (free)	0/7	0.010U mg/L	0.030U mg/L	Multiple
	Lead	7/7	0.013 mg/L	0.449 mg/L	07
	Mercury	0/7	0.00002U mg/L	0.00002U mg/L	Multiple
	Nickel	2/7	0.0536 mg/L	0.113 mg/L	07
	Selenium	0/7	0.00359U mg/L	0.00359U mg/L	Multiple
	Silver	0/7	0.00104U mg/L	0.00104U mg/L	Multiple
	Zinc	0/7	0.422 mg/L	1.51 mg/L	01
PCB (8082)	Aroclor-1242	N/A	25U µg/kg	2,000 µg/kg	01
	Aroclor-1254	N/A	110 µg/kg	590 µg/kg	06
	Total PCBs[2]	2/7	208 µg/kg	2,330 µg/kg	01

Notes:

* - Results exceed criteria for TACO, RISC, or both.

1 - Total PAH calculated based on analyte concentrations detected above method detection limits.

2 - Total PCB calculated based on analyte concentrations detected above method detection limit.

U - Compound was analyzed for but not detected. The associated value is the sample quantitation limit.

J - Estimated data due to exceeded quality control criteria; plus or minus indicates likely bias if known.

B - Reported value was obtained from a reading that was less than the practical quantitation limit but greater than or equal to the instrument detection limit.

N/A - No screening criteria established by IEPA or IDEM.

Table 3-2
Summary of Comparison Objective Exceedances
Chicago Area CDF

Analyte	01	03	04	06	07	08	09
Arsenic (mg/kg)	X		X	X	X	X	X
Lead (mg/kg)			X		X		
Naphthalene (µg/kg)			X	X	X		
Benzo(a)anthracene (µg/kg)	X	X	X	X	X		X
Benzo(b)fluoranthene (µg/kg)	X	X	X	X	X		X
Benzo(a)pyrene (µg/kg)	X	X	X	X	X	X	X
Indeno(1,2,3-cd)pyrene (µg/kg)			X	X	X		
Dibenzo(a,h)anthracene (µg/kg)	X	X	X	X	X	X	X
Total PCBs (µg/kg)	X			X			

Notes:
X – Results exceed criteria for TACO, RISC, or both.
2 – Total PCB based on sum of analyte concentrations detected above method detection limits.
- Only seven of the 12 environmental samples were chosen for the full bench scale testing (including the bulk chemistry analysis)

Table 3-3

Comparison to IEPA and IDEM Residential Screening Criteria
Chicago Area CDF

CHCDF2005-001(COARSE)		Criteria			
Chemical Name	Unit	IEPA TACO[a]	Background Metropolitan Statistical Area[b]	IDEM RISC Default Closure Level	Result
BARIUM	mg/kg	5,500	110	1,600	44.4
CADMIUM	mg/kg	78	0.6	7.5	0.57
CHROMIUM	mg/kg	230	16.2	38	27.9
COPPER	mg/kg	2,900	19.6	920	31
LEAD	mg/kg	400	36	81	78.9
NICkEL	mg/kg	1,600	18	950	24.4
SELENIUM (6010B)	mg/kg	390	0.48	5.2	
SILVER	mg/kg	390	0.55	31	0.09 U
ARSENIC	mg/kg	13	13	3.9	7.7
BERYLLIUM	mg/kg	160	0.59	63	0.52
SELENIUM (6020)	mg/kg	390	0.48	5.2	5.0U
CHROMIUM, HEXAVALENT	mg/kg	230	NE	38	0.71 J-
MERCURY	mg/kg	10	0.06	2.1	0.06 J-
ARSENIC, TCLP	ug/L	50	NE	NE	7.3 B
BARIUM, TCLP	ug/L	2,000	NE	NE	401
BERYLLIUM, TCLP	ug/L	4	NE	NE	4.0U
CADMIUM, TCLP	ug/L	5	NE	NE	1 B, J-
CHROMIUM, TCLP	ug/L	100	NE	NE	2.5 B
COPPER, TCLP	ug/L	650	NE	NE	1.74 U
LEAD, TCLP	ug/L	7.5	NE	NE	77.3
NICkEL, TCLP	ug/L	100	NE	NE	104
SELENIUM, TCLP	ug/L	50	NE	NE	3.59 U
SILVER, TCLP	ug/L	50	NE	NE	1.04 U
ZINC, TCLP	ug/L	5,000	NE	NE	1510
MERCURY, TCLP	ug/L	2	NE	NE	0.02 U
CYANIDE(FREE), TCLP	ug/L	200	NE	NE	10 U
2-METHYLNAPHTHALENE	ug/kg	NE	NE	3,100	360 J
ACENAPHTHENE	ug/kg	570,000	NE	130,000	440
ACENAPHTHYLENE	ug/kg	NE	NE	18,000	150 J
ANTHRACENE	ug/kg	12,000,000	NE	51,000	660
BENZO(A)ANTHRACENE	ug/kg	900	1100	5,000	1,400
BENZO(A)PYRENE	ug/kg	90	1300	500	1,400
BENZO(B)FLUORANTHENE	ug/kg	900	1500	5,000	1,600
BENZO(k)FLUORANTHENE	ug/kg	9,000	1,000	39,000	650
BENZO[G,H,I]PERYLENE	ug/kg	NE	NE	NE	790
CHRYSENE	ug/kg	88,000	1,100	25,000	2,000
DIBENZO(A,H)ANTHRACENE	ug/kg	90	200	500	290 J
FLUORANTHENE	ug/kg	3,100,000	NE	880,000	2,400
FLUORENE	ug/kg	560,000	NE	170,000	690
INDENO(1,2,3-CD)PYRENE	ug/kg	900	860	3,100	790
NAPHTHALENE	ug/kg	12,000	NE	700	430
PHENANTHRENE	ug/kg	NE	NE	13,000	2,200
PYRENE	ug/kg	2,300,000	NE	570,000	2,800
Total PCBs	ug/kg	1000	NE	1800	2,330

See last page of table for notes.

Table 3-3 Continued

Comparison to IEPA and IDEM Residential Screening Criteria
Chicago Area CDF

CHCDF2005-003(COARSE)		Criteria			
Chemical Name	Unit	IEPA TACO[a]	Background Metropolitan Statistical Area[b]	IDEM RISC Default Closure Level	Result
BARIUM	mg/kg	5,500	110	1600	13.1
CADMIUM	mg/kg	78	0.6	7.5	0.21 B
CHROMIUM	mg/kg	230	16.2	38	12.1
COPPER	mg/kg	2,900	19.6	920	13.8
LEAD	mg/kg	400	36	81	27.9
NICkEL	mg/kg	1,600	18	950	11.4
SELENIUM (6010B)	mg/kg	390	0.48	5.2	0.27 U
SILVER	mg/kg	390	0.55	31	0.3 B
ARSENIC	mg/kg	13	13	3.9	3.7
BERYLLIUM	mg/kg	160	0.59	63	0.2
SELENIUM (6020)	mg/kg	390	0.48	5.2	
CHROMIUM, HEXAVALENT	mg/kg	230	NE	38	0.65 UJ-
MERCURY	mg/kg	10	0.06	2.1	0.04 J-
ARSENIC, TCLP	ug/L	50	NE	NE	6.6 B
BARIUM, TCLP	ug/L	2,000	NE	NE	479
BERYLLIUM, TCLP	ug/L	4	NE	NE	4.0U
CADMIUM, TCLP	ug/L	5	NE	NE	0.4 U
CHROMIUM, TCLP	ug/L	100	NE	NE	1.01 U
COPPER, TCLP	ug/L	650	NE	NE	1.74 U
LEAD, TCLP	ug/L	7.5	NE	NE	13
NICkEL, TCLP	ug/L	100	NE	NE	53.6
SELENIUM, TCLP	ug/L	50	NE	NE	3.59 U
SILVER, TCLP	ug/L	50	NE	NE	1.04 U
ZINC, TCLP	ug/L	5,000	NE	NE	422
MERCURY, TCLP	ug/L	2	NE	NE	0.20U
CYANIDE(FREE), TCLP	ug/L	200	NE	NE	30 U
2-METHYLNAPHTHALENE	ug/kg	NE	NE	3,100	230 J
ACENAPHTHENE	ug/kg	570,000	NE	130,000	260 J
ACENAPHTHYLENE	ug/kg	NE	NE	18,000	210
ANTHRACENE	ug/kg	12,000,000	NE	51,000	390 J
BENZO(A)ANTHRACENE	ug/kg	900	1,100	5,000	990
BENZO(A)PYRENE	ug/kg	90	1,300	500	930
BENZO(B)FLUORANTHENE	ug/kg	900	1,500	5,000	1,000
BENZO(k)FLUORANTHENE	ug/kg	9,000	1,000	39,000	420 J
BENZO[G,H,I]PERYLENE	ug/kg	NE	NE	NE	560
CHRYSENE	ug/kg	88,000	1,100	25,000	1,100
DIBENZO(A,H)ANTHRACENE	ug/kg	90	200	500	280 J
FLUORANTHENE	ug/kg	3,100,000	NE	880,000	1,800
FLUORENE	ug/kg	560,000	NE	170,000	240 J
INDENO(1,2,3-CD)PYRENE	ug/kg	900	860	3,100	560
NAPHTHALENE	ug/kg	12,000	NE	700	300 J
PHENANTHRENE	ug/kg	NE	NE	13,000	1,300
PYRENE	ug/kg	2,300,000	NE	570,000	1,700
Total PCBs	ug/kg	1,000	NE	1,800	208

See last page of table for notes.

Table 3-3 Continued

Comparison to IEPA and IDEM Residential Screening Criteria
Chicago Area CDF

CHCDF2005-004(COARSE)		Criteria			
Chemical Name	Unit	IEPA TACO[a]	Background Metropolitan Statistical Area[b]	IDEM RISC Default Closure Level	Result
BARIUM	mg/kg	5,500	110	1600	37
CADMIUM	mg/kg	78	0.6	7.5	0.95
CHROMIUM	mg/kg	230	16.2	38	21.9
COPPER	mg/kg	2,900	19.6	920	39.2
LEAD	mg/kg	400	36	81	142
NICkEL	mg/kg	1,600	18	950	16.7
SELENIUM (6010B)	mg/kg	390	0.48	5.2	0.28 U
SILVER	mg/kg	390	0.55	31	7.6
ARSENIC	mg/kg	13	13	3.9	5.5
BERYLLIUM	mg/kg	160	0.59	63	0.24
SELENIUM (6020)	mg/kg	390	0.48	5.2	
CHROMIUM, HEXAVALENT	mg/kg	230	NE	38	0.68 UJ-
MERCURY	mg/kg	10	0.06	2.1	0.37
ARSENIC, TCLP	ug/L	50	NE	NE	8
BARIUM, TCLP	ug/L	2,000	NE	NE	490
BERYLLIUM, TCLP	ug/L	4	NE	NE	4.0U
CADMIUM, TCLP	ug/L	5	NE	NE	2.5 B, J-
CHROMIUM, TCLP	ug/L	100	NE	NE	1.1 B
COPPER, TCLP	ug/L	650	NE	NE	1.74 U
LEAD, TCLP	ug/L	7.5	NE	NE	447
NICkEL, TCLP	ug/L	100	NE	NE	90.8
SELENIUM, TCLP	ug/L	50	NE	NE	3.59 U
SILVER, TCLP	ug/L	50	NE	NE	1.04 U
ZINC, TCLP	ug/L	5,000	NE	NE	956
MERCURY, TCLP	ug/L	2	NE	NE	0.02 U
CYANIDE(FREE), TCLP	ug/L	200	NE	NE	30 U
2-METHYLNAPHTHALENE	ug/kg	NE	NE	3,100	240 J
ACENAPHTHENE	ug/kg	570,000	NE	130,000	900
ACENAPHTHYLENE	ug/kg	NE	NE	18,000	140
ANTHRACENE	ug/kg	12,000,000	NE	51,000	1,400
BENZO(A)ANTHRACENE	ug/kg	900	1100	5,000	3,200
BENZO(A)PYRENE	ug/kg	90	1300	500	3,000
BENZO(B)FLUORANTHENE	ug/kg	900	1500	5,000	4,000
BENZO(k)FLUORANTHENE	ug/kg	9,000	1,000	39,000	1,600
BENZO[G,H,I]PERYLENE	ug/kg	NE	NE	NE	1,300 J
CHRYSENE	ug/kg	88,000	1,100	25,000	3,700
DIBENZO(A,H)ANTHRACENE	ug/kg	90	200	500	400 J
FLUORANTHENE	ug/kg	3,100,000	NE	880,000	5,400
FLUORENE	ug/kg	560,000	NE	170,000	910
INDENO(1,2,3-CD)PYRENE	ug/kg	900	860	3,100	1,600 J
NAPHTHALENE	ug/kg	12,000	NE	700	380 J
PHENANTHRENE	ug/kg	NE	NE	13,000	6200
PYRENE	ug/kg	2,300,000	NE	570,000	6,400
Total PCBs	ug/kg	1,000	NE	1,800	730

See last page of table for notes.

Table 3-3 Continued

Comparison to IEPA and IDEM Residential Screening Criteria
Chicago Area CDF

CHCDF2005-006(COARSE)		Criteria			
Chemical Name	Unit	IEPA TACO[a]	Background Metropolitan Statistical Area[b]	IDEM RISC Default Closure Level	Result
BARIUM	mg/kg	5,500	110	1600	13.6
CADMIUM	mg/kg	78	0.6	7.5	0.36 B
CHROMIUM	mg/kg	230	16.2	38	15.1
COPPER	mg/kg	2,900	19.6	920	28.7
LEAD	mg/kg	400	36	81	32.7
NICkEL	mg/kg	1,600	18	950	25.3
SELENIUM (6010B)	mg/kg	390	0.48	5.2	0.27 U
SILVER	mg/kg	390	0.55	31	0.08 U
ARSENIC	mg/kg	13	13	3.9	9.4
BERYLLIUM	mg/kg	160	0.59	63	0.35
SELENIUM (6020)	mg/kg	390	0.48	5.2	
CHROMIUM, HEXAVALENT	mg/kg	230	NE	38	2.6 J-
MERCURY	mg/kg	10	0.06	2.1	0.02 B, J-
ARSENIC, TCLP	ug/L	50	NE	NE	7.5 B
BARIUM, TCLP	ug/L	2,000	NE	NE	328
BERYLLIUM, TCLP	ug/L	4	NE	NE	4.0U
CADMIUM, TCLP	ug/L	5	NE	NE	0.95 B
CHROMIUM, TCLP	ug/L	100	NE	NE	1.1 B
COPPER, TCLP	ug/L	650	NE	NE	5.5 B
LEAD, TCLP	ug/L	7.5	NE	NE	37.2
NICkEL, TCLP	ug/L	100	NE	NE	93.2
SELENIUM, TCLP	ug/L	50	NE	NE	3.59 U
SILVER, TCLP	ug/L	50	NE	NE	1.04 U
ZINC, TCLP	ug/L	5,000	NE	NE	777
MERCURY, TCLP	ug/L	2	NE	NE	0.20U
CYANIDE(FREE), TCLP	ug/L	200	NE	NE	30 U
2-METHYLNAPHTHALENE	ug/kg	NE	NE	3,100	890
ACENAPHTHENE	ug/kg	570,000	NE	130,000	750
ACENAPHTHYLENE	ug/kg	NE	NE	18,000	99 U
ANTHRACENE	ug/kg	12,000,000	NE	51,000	1,200
BENZO(A)ANTHRACENE	ug/kg	900	1100	5,000	2,600
BENZO(A)PYRENE	ug/kg	90	1300	500	2,000
BENZO(B)FLUORANTHENE	ug/kg	900	1500	5,000	2,700
BENZO(k)FLUORANTHENE	ug/kg	9,000	1,000	39,000	1,200
BENZO[G,H,I]PERYLENE	ug/kg	NE	NE	NE	910
CHRYSENE	ug/kg	88,000	1,100	25,000	2,700
DIBENZO(A,H)ANTHRACENE	ug/kg	90	200	500	350 J
FLUORANTHENE	ug/kg	3,100,000	NE	880,000	4,500
FLUORENE	ug/kg	560,000	NE	170,000	580 J
INDENO(1,2,3-CD)PYRENE	ug/kg	900	860	3,100	1,100
NAPHTHALENE	ug/kg	12000	NE	700	16,000
PHENANTHRENE	ug/kg	NE	NE	13,000	4,200
PYRENE	ug/kg	2,300,000	NE	570,000	4,300
Total PCBs	ug/kg	1000	NE	1800	1,460

See last page of table for notes.

Table 3-3 Continued

Comparison to IEPA and IDEM Residential Screening Criteria
Chicago Area CDF

CHCDF2005-007(COARSE)		Criteria			
Chemical Name	Unit	IEPA TACO[a]	Background Metropolitan Statistical Area[b]	IDEM RISC Default Closure Level	Result
BARIUM	mg/kg	5,500	110	1600	76
CADMIUM	mg/kg	78	0.6	7.5	0.4 B
CHROMIUM	mg/kg	230	16.2	38	14
COPPER	mg/kg	2,900	19.6	920	35.8
LEAD	mg/kg	400	36	81	115
NICkEL	mg/kg	1,600	18	950	14.2
SELENIUM (6010B)	mg/kg	390	0.48	5.2	0.4 U
SILVER	mg/kg	390	0.55	31	0.31 B
ARSENIC	mg/kg	13	13	3.9	5
BERYLLIUM	mg/kg	160	0.59	63	0.22
SELENIUM (6020)	mg/kg	390	0.48	5.2	
CHROMIUM, HEXAVALENT	mg/kg	230	NE	38	0.99 J-
MERCURY	mg/kg	10	0.06	2.1	0.24 J-
ARSENIC, TCLP	ug/L	50	NE	NE	9.9
BARIUM, TCLP	ug/L	2,000	NE	NE	534
BERYLLIUM, TCLP	ug/L	4	NE	NE	4.0U
CADMIUM, TCLP	ug/L	5	NE	NE	2.1 B
CHROMIUM, TCLP	ug/L	100	NE	NE	1.9 B
COPPER, TCLP	ug/L	650	NE	NE	1.74 U
LEAD, TCLP	ug/L	7.5	NE	NE	449
NICkEL, TCLP	ug/L	100	NE	NE	113
SELENIUM, TCLP	ug/L	50	NE	NE	3.59 U
SILVER, TCLP	ug/L	50	NE	NE	1.04 U
ZINC, TCLP	ug/L	5,000	NE	NE	1,310
MERCURY, TCLP	ug/L	2	NE	NE	0.20U
CYANIDE(FREE), TCLP	ug/L	200	NE	NE	30 U
2-METHYLNAPHTHALENE	ug/kg	NE	NE	3,100	410 J
ACENAPHTHENE	ug/kg	570,000	NE	130,000	800
ACENAPHTHYLENE	ug/kg	NE	NE	18,000	180 J
ANTHRACENE	ug/kg	12,000,000	NE	51,000	1,700
BENZO(A)ANTHRACENE	ug/kg	900	1100	5,000	3,400
BENZO(A)PYRENE	ug/kg	90	1300	3.9	3,200
BENZO(B)FLUORANTHENE	ug/kg	900	1500	5,000	3,800
BENZO(k)FLUORANTHENE	ug/kg	9,000	1,000	39,000	1,800
BENZO[G,H,I]PERYLENE	ug/kg	NE	NE	NE	1,600
CHRYSENE	ug/kg	88,000	1,100	25,000	4,000
DIBENZO(A,H)ANTHRACENE	ug/kg	90	200	500	510
FLUORANTHENE	ug/kg	3,100,000	NE	880,000	5,600
FLUORENE	ug/kg	560,000	NE	170,000	1,200
INDENO(1,2,3-CD)PYRENE	ug/kg	900	860	3,100	1,900
NAPHTHALENE	ug/kg	12,000	NE	700	860
PHENANTHRENE	ug/kg	NE	NE	13,000	7,400
PYRENE	ug/kg	2,300,000	NE	570,000	6,300
Total PCBs	ug/kg	1,000	NE	1,800	970

See last page of table for notes.

Table 3-3 Continued

Comparison to IEPA and IDEM Residential Screening Criteria
Chicago Area CDF

CHCDF2005-008(COARSE)		Criteria			
Chemical Name	Unit	IEPA TACO[a]	Background Metropolitan Statistical Area[b]	IDEM RISC Default Closure Level	Result
BARIUM	mg/kg	5,500	110	1600	48.8
CADMIUM	mg/kg	78	0.6	7.5	0.29 B
CHROMIUM	mg/kg	230	16.2	38	14.4
COPPER	mg/kg	2,900	19.6	920	18.6
LEAD	mg/kg	400	36	81	47.7
NICkEL	mg/kg	1,600	18	950	14.4
SELENIUM (6010B)	mg/kg	390	0.48	5.2	0.32 U
SILVER	mg/kg	390	0.55	31	0.09 U
ARSENIC	mg/kg	13	13	3.9	6.1
BERYLLIUM	mg/kg	160	0.59	63	0.64
SELENIUM (6020)	mg/kg	390	0.48	5.2	
CHROMIUM, HEXAVALENT	mg/kg	230	NE	38	1.1 J-
MERCURY	mg/kg	10	0.06	2.1	0.36
ARSENIC, TCLP	ug/L	50	NE	NE	7.2 B
BARIUM, TCLP	ug/L	2,000	NE	NE	612
BERYLLIUM, TCLP	ug/L	4	NE	NE	4.0U
CADMIUM, TCLP	ug/L	5	NE	NE	0.4 U
CHROMIUM, TCLP	ug/L	100	NE	NE	2.8 B
COPPER, TCLP	ug/L	650	NE	NE	1.74 U
LEAD, TCLP	ug/L	7.5	NE	NE	27.6
NICkEL, TCLP	ug/L	100	NE	NE	58.1
SELENIUM, TCLP	ug/L	50	NE	NE	3.59 U
SILVER, TCLP	ug/L	50	NE	NE	1.04 U
ZINC, TCLP	ug/L	5,000	NE	NE	703
MERCURY, TCLP	ug/L	2	NE	NE	0.02 U
CYANIDE(FREE), TCLP	ug/L	200	NE	NE	30 U
2-METHYLNAPHTHALENE	ug/kg	NE	NE	3,100	230 J
ACENAPHTHENE	ug/kg	570,000	NE	130,000	290 J
ACENAPHTHYLENE	ug/kg	NE	NE	18,000	74 J
ANTHRACENE	ug/kg	12,000,000	NE	51,000	420 J
BENZO(A)ANTHRACENE	ug/kg	900	1,100	5,000	700
BENZO(A)PYRENE	ug/kg	90	1,300	500	680
BENZO(B)FLUORANTHENE	ug/kg	900	1,500	5,000	820
BENZO(k)FLUORANTHENE	ug/kg	9,000	1,000	39,000	340 J
BENZO[G,H,I]PERYLENE	ug/kg	NE	NE	NE	300 J
CHRYSENE	ug/kg	88,000	1,100	25,000	900
DIBENZO(A,H)ANTHRACENE	ug/kg	90	200	500	160 J
FLUORANTHENE	ug/kg	3,100,000	NE	880,000	1,800
FLUORENE	ug/kg	560,000	NE	170,000	350 J
INDENO(1,2,3-CD)PYRENE	ug/kg	900	860	3,100	410
NAPHTHALENE	ug/kg	12,000	NE	700	280 J
PHENANTHRENE	ug/kg	NE	NE	13,000	1,400
PYRENE	ug/kg	2,300,000	NE	570,000	1,500
Total PCBs	ug/kg	1,000	NE	1,800	330

See last page of table for notes.

Table 3-3 Continued

Comparison to IEPA and IDEM Residential Screening Criteria
Chicago Area CDF

CHCDF2005-009(COARSE)		Criteria			
Chemical Name	Unit	IEPA TACO[a]	Background Metropolitan Statistical Area[b]	IDEM RISC Default Closure Level	Result
BARIUM	mg/kg	5,500	110	1600	24.3
CADMIUM	mg/kg	78	0.6	7.5	0.37 B
CHROMIUM	mg/kg	230	16.2	38	21.5
COPPER	mg/kg	2,900	19.6	920	34
LEAD	mg/kg	400	36	81	46.4
NICkEL	mg/kg	1,600	18	950	27.9
SELENIUM (6010B)	mg/kg	390	0.48	5.2	0.29 U
SILVER	mg/kg	390	0.55	31	0.09 U
ARSENIC	mg/kg	13	13	3.9	13.6
BERYLLIUM	mg/kg	160	0.59	63	0.48
SELENIUM (6020)	mg/kg	390	0.48	5.2	
CHROMIUM, HEXAVALENT	mg/kg	230	NE	38	0.65 UJ-
MERCURY	mg/kg	10	0.06	2.1	0.07 J-
ARSENIC, TCLP	ug/L	50	NE	NE	6.3 B
BARIUM, TCLP	ug/L	2,000	NE	NE	323
BERYLLIUM, TCLP	ug/L	4	NE	NE	0.35 U
CADMIUM, TCLP	ug/L	5	NE	NE	0.97 B, J-
CHROMIUM, TCLP	ug/L	100	NE	NE	3.6 B
COPPER, TCLP	ug/L	650	NE	NE	1.74 U
LEAD, TCLP	ug/L	7.5	NE	NE	15
NICkEL, TCLP	ug/L	100	NE	NE	87.4
SELENIUM, TCLP	ug/L	50	NE	NE	3.59 U
SILVER, TCLP	ug/L	50	NE	NE	1.04 U
ZINC, TCLP	ug/L	5,000	NE	NE	482
MERCURY, TCLP	ug/L	2	NE	NE	0.02 U
CYANIDE(FREE), TCLP	ug/L	200	NE	NE	30 U
2-METHYLNAPHTHALENE	ug/kg	NE	NE	3,100	400 J
ACENAPHTHENE	ug/kg	570,000	NE	130,000	390 J
ACENAPHTHYLENE	ug/kg	NE	NE	18,000	170 J
ANTHRACENE	ug/kg	12,000,000	NE	51,000	640
BENZO(A)ANTHRACENE	ug/kg	900	1100	5,000	1,200
BENZO(A)PYRENE	ug/kg	90	1300	500	1,400
BENZO(B)FLUORANTHENE	ug/kg	900	1,500	5,000	1,400
BENZO(k)FLUORANTHENE	ug/kg	9,000	1,000	39,000	600
BENZO[G,H,I]PERYLENE	ug/kg	NE	NE	NE	860
CHRYSENE	ug/kg	88,000	1,100	25,000	1,700
DIBENZO(A,H)ANTHRACENE	ug/kg	90	200	500	300 J
FLUORANTHENE	ug/kg	3,100,000	NE	880,000	2,300
FLUORENE	ug/kg	560,000	NE	170,000	390 J
INDENO(1,2,3-CD)PYRENE	ug/kg	900	860	3,100	860
NAPHTHALENE	ug/kg	12,000	NE	700	420 J
PHENANTHRENE	ug/kg	NE	NE	13,000	1,900
PYRENE	ug/kg	2,300,000	NE	570,000	2,200
Total PCBs	ug/kg	1,000	NE	1,800	440

See last page of table for notes.

Table 3-3 Continued

Comparison to IEPA and IDEM Residential Screening Criteria
Chicago Area CDF

Notes:

[a] For total metals, comparison value is lowest of ingestion or inhalation; for TCLP metals, comparison value is soil component of the Groundwater Ingestion exposure route; and for PAHs and total PCBs, comparison value is lowest of ingestion, inhalation, or soil component of the groundwater ingestion exposure route.

[b] Background values for metals (Appendix A, Table G) for Counties within Metropolitan Statistical Areas; background values for PAHS from City of Chicago Department of Environment *Polynuclear Aromatic Hydrocarbon Study, City of Chicago* (2003) for Chicago.

mg/kg = milligram per kilogram
ug/L = microgram per liter
ug/kg = microgram per kilogram
NE = Not Established
B = Reported value was obtained from a reading that was less than the practical quantitation limit but greater than or equal to the instrument detection limit.
J = Estimated data due to exceeded quality control criteria; plus or minus indicates likely bias if known.
U = Compound was analyzed for but not detected. The associated value is the sample quantitation limit.

Table 3-4

Summary of Exceedances for Coarse Grain Fraction
Chicago Area CDF

Sample	Chemical Name	IEPA TACO	IDEM RISC Default Closure Level	Result[1]	Background - Metropolitan Statistical Area
01	ARSENIC	13	3.9	7.7	13
04	ARSENIC	13	3.9	5.5	13
06	ARSENIC	13	3.9	9.4	13
07	ARSENIC	13	3.9	5	13
08	ARSENIC	13	3.9	6.1	13
09	ARSENIC	13	3.9	13.6	13
04	LEAD	400	81	142	36
07	LEAD	400	81	115	36
01	LEAD (TCLP)	7.5	NE	77.3	NE
03	LEAD (TCLP)	7.5	NE	13	NE
04	LEAD (TCLP)	7.5	NE	447	NE
06	LEAD (TCLP)	7.5	NE	37.2	NE
07	LEAD (TCLP)	7.5	NE	449	NE
08	LEAD (TCLP)	7.5	NE	27.6	NE
09	LEAD (TCLP)	7.5	NE	15	NE
01	NICKEL (TCLP)	100	NE	104	NE
07	NICKEL (TCLP)	100	NE	113	NE
01	BENZO(A)ANTHRACENE	900	5,000	1,400	1,100
03	BENZO(A)ANTHRACENE	900	5,000	990	1,100
04	BENZO(A)ANTHRACENE	900	5,000	3,200	1,100
06	BENZO(A)ANTHRACENE	900	5,000	2,600	1,100
07	BENZO(A)ANTHRACENE	900	5,000	3,400	1,100
09	BENZO(A)ANTHRACENE	900	5,000	1,200	1,100
01	BENZO(A)PYRENE	90	500	1,400	1,300
03	BENZO(A)PYRENE	90	500	930	1,300
04	BENZO(A)PYRENE	90	500	3,000	1,300
06	BENZO(A)PYRENE	90	500	2,000	1,300
07	BENZO(A)PYRENE	90	500	3,200	1,300
08	BENZO(A)PYRENE	90	500	680	1,300
09	BENZO(A)PYRENE	90	500	1,400	1,300
01	BENZO(B)FLUORANTHENE	900	5,000	1,600	1,500
03	BENZO(B)FLUORANTHENE	900	5,000	1,000	1,500
04	BENZO(B)FLUORANTHENE	900	5,000	4,000	1,500
07	BENZO(B)FLUORANTHENE	900	5,000	3,800	1,500
06	BENZO(B)FLUORANTHENE	900	5,000	2,700	1,500
09	BENZO(B)FLUORANTHENE	900	5,000	1,400	1,500
01	DIBENZO(A,H)ANTHRACENE	90	500	290 J	200
03	DIBENZO(A,H)ANTHRACENE	90	500	280 J	200
04	DIBENZO(A,H)ANTHRACENE	90	500	400 J	200
06	DIBENZO(A,H)ANTHRACENE	90	500	350 J	200
07	DIBENZO(A,H)ANTHRACENE	90	500	510	200
08	DIBENZO(A,H)ANTHRACENE	90	500	160 J	200
09	DIBENZO(A,H)ANTHRACENE	90	500	300 J	200
04	INDENO(1,2,3-CD)PYRENE	900	3,100	1,600 J	860
06	INDENO(1,2,3-CD)PYRENE	900	3,100	1,100	860
07	INDENO(1,2,3-CD)PYRENE	900	3,100	1,900	860
06	NAPTHALENE	12,000	700	16,000	NE
07	NAPTHALENE	12,000	700	860	NE
01	TOTAL PCBs	1,000	1,800	2,330	NE
06	TOTAL PCBs	1,000	1,800	1,460	NE

[1] Results exceed criteria for TACO, RISC, or both.

TABLE 3-5

GENERAL CHARACTERIZATION, ORIGINAL SAMPLES
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005 01 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 02 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 03 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 04 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 05 INITIAL RESULT	FLAG	VALID QUAL
KATAHDIN ANALYSIS																	
ASTM D2216	Water Content	%	25			30			28			26			30		
ASTM D2974-87	TOTAL COMBUSTIBLE ORGANICS	% as Dry Weight	13.6			12			8.65			12.9			9.01		
CLP/CIP SOW	TOTAL SOLIDS	%	75			70			72			74			70		
Env. Science Technology 1997	Soot Carbon	ug/g	44000		J	30000		J	4400		J	9200		J	18000	J	
LYDKHN	TOTAL ORGANIC CARBON	ug/g	110000			73000			44000			66000			33000		
SW846 9071A	OG(HEXANE EXTRACTED)	% as Dry Weight	0.44			0.5			0.2			0.24			0.32		
SW846 7196A	Hexavalent Chromium	mg/kg	1.9	U	J-				0.68	U	UJ-	0.72	U	J-			
SW846 M9014	Cyanide (free)	ug/L	20	U		20	U		20	U		20	U		20	U	
KEMRON ANALYSIS																	
Particle Size Analysis	ASTM D422																
- Gravel		%	0.8			0.3			0.1			0.6			0.1		
- Sand		%	23.2			28.3			20.2			35.8			31.8		
- Silt		%	44.4			49.5			52.3			41.3			46.7		
- Clay		%	31.6			21.9			27.4			22.3			21.4		
Void Ratio	-		1.0			1.0			1.0			1.0			1.0		
Bulk Density	ASTM D2937	lb/ft^3	112.3			115.3			113.7			113.0			112.7		
Dry Density	ASTM D2937	lb/ft^3	79.5			85.7			80.6			82.1			80.1		
Moisture Content	ASTM D2216	%	41.25			34.55			41.12			37.6			40.68		
Specific Gravity	ASTM D854	-	2.72			2.74			2.76			2.69			2.77		
Specific Gravity > #200 Fraction	ASTM D854	-	2.51						2.69			2.60					
Specific Gravity < #200 Fraction	ASTM D854	-	2.80						2.78			2.76					
Total Porosity	-	%	53.2			49.9			53.2			51.1			53.7		

TABLE 3-5 CONTINUED

GENERAL CHARACTERIZATION, ORIGINAL SAMPLES
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005 06 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 07 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 08 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 09 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 DUP INITIAL RESULT	FLAG	VALID QUAL
KATAHDIN ANALYSIS																	
ASTM D2216	Water Content	%	24			32			19			28					
ASTM D2974-87	TOTAL COMBUSTIBLE ORGANICS	% as Dry Weight	12			11			10.7			11.7					
CLP/CIP SOW	TOTAL SOLIDS	%	76			68			81			72			80		
Env. Science Technology 1997	Soot Carbon	ug/g	10000			17000		J	5900		J	11000		J			
LYDKHN	TOTAL ORGANIC CARBON	ug/g	39000			56000			51000			67000					
SW846 9071A	OG(HEXANE EXTRACTED)	% as Dry Weight	0.33			0.29			0.16			1					
SW846 7196A	Hexavalent Chromium	mg/kg	0.65	U	UJ-	0.74	U	UJ-	0.62	U	UJ-	0.68	U	UJ-	0.62	U	UJ-
SW846 M9014	Cyanide (free)	ug/L	20	U		20	U		20	U		20	U		20	U	
KEMRON ANALYSIS																	
Particle Size Analysis	ASTM D422																
- Gravel		%	1.1			1.1			2.6			11.7			0		
- Sand		%	24.0			27.5			49.7			32.7			22.1		
- Silt		%	37.2			37.3			26.3			29.6			49.7		
- Clay		%	37.7			34.1			21.4			26.0			28.2		
Void Ratio	-		1.0			1.0			1.0			1.0			1.0		
Bulk Density	ASTM D2937	lb/ft^3	121.9			111.2			117.7			117.0			108.1		
Dry Density	ASTM D2937	lb/ft^3	91.0			77.7			85.0			90.1			71.8		
Moisture Content	ASTM D2216	%	33.95			43.06			38.43			29.92			50.48		
Specific Gravity	ASTM D854	-	2.76			2.73			2.66			2.72			2.77		
Specific Gravity > #200 Fraction	ASTM D854	-	2.67			2.62			2.66			2.54					
Specific Gravity < #200 Fraction	ASTM D854	-	2.74			2.71			2.78			2.79					
Total Porosity	-	%	47.2			54.4			48.8			46.9			58.4		

TABLE 3-5 CONTINUED

GENERAL CHARACTERIZATION, ORIGINAL SAMPLES
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005 G1 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 G2 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 P1 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 P2 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 P3 INITIAL RESULT	FLAG	VALID QUAL
KATAHDIN ANALYSIS																	
ASTM D2216	Water Content	%	30			26			34			26			26		
ASTM D2974-87	TOTAL COMBUSTIBLE ORGANICS	% as Dry Weight	9.04			8.46			10.5			9.72			7.26		
CLP/CIP SOW	TOTAL SOLIDS	%							66			74			74		
Env. Science Technology 1997	Soot Carbon	ug/g							5900		J	16000		J	7900		J
LYDKHN	TOTAL ORGANIC CARBON	ug/g							32000			57000			40000		
SW846 9071A	OG(HEXANE EXTRACTED)	% as Dry Weight							0.16			0.75			0.14		
SW846 7196A	Hexavalent Chromium	mg/kg															
SW846 M9014	Cyanide (free)	ug/L															
KEMRON ANALYSIS																	
Particle Size Analysis	ASTM D422																
- Gravel		%							0			4.7			3.6		
- Sand		%							22.1			39.4			58.5		
- Silt		%							49.7			29.2			23		
- Clay		%							28.2			26.7			14.9		
Void Ratio	-								1.5			1.0			1		
Bulk Density	ASTM D2937	lb/ft³							108.1			118.8			113		
Dry Density	ASTM D2937	lb/ft³							71.8			88.9			86.4		
Moisture Content	ASTM D2216	%							50.48			33.68			30.76		
Specific Gravity	ASTM D854	-							2.77			2.74			2.61		
Specific Gravity > #200 Fraction	ASTM D854	-															
Specific Gravity < #200 Fraction	ASTM D854	-															
Total Porosity	-	%							58.4			48.0			46.9		

TABLE 3-6

GENERAL CHARACTERIZATION, FINE- AND COARSE-GRAINED FRACTIONS
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	SAMPLE ID CHCDF2005-001 (FINE) INITIAL RESULT	RUN FLAG	VALID QUAL	CHCDF2005-001(COARSE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-003(COARSE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-003(FINE) INITIAL RESULT	FLAG	VALID QUAL
CLP/CIP SOW	TOTAL SOLIDS	%	68			77			77			66		
Env. Science Technology 1997	SOOT CARBON	ug/g	14000			130000			24000		J	9700		J
LYDKHN	TOTAL ORGANIC CARBON	ug/g	74000			210000			52000			51000		
SW846 9071A	OG(HEXANE EXTRACTED)	% as Dry Weight	0.56			0.16			0.053			0.11		
SW846 7196A	Hexavalent Chromium	mg/kg	0.65	U	UJ-	0.71		J-	0.65	U	UJ-	0.75	U	UJ-
SW846 M9014	Cyanide (free)	ug/L	10	U		10	U		30	U				

* Hexavalent Chromium and free cyanide rows added by the data validator

TABLE 3-6 CONTINUED

GENERAL CHARACTERIZATION, FINE- AND COARSE-GRAINED FRACTIONS
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005-004(COARSE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-004(FINE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-006(COARSE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-006(FINE) INITIAL RESULT	FLAG	VALID QUAL
CLP/CIP SOW	TOTAL SOLIDS	%	74			68			80			68		
Env. Science Technology 1997	SOOT CARBON	ug/g	36000			15000		J	10000		J	4600		J
LYDKHN	TOTAL ORGANIC CARBON	ug/g	78000			48000			47000			45000		
SW846 9071A	OG(HEXANE EXTRACTED)	% as Dry Weight	0.088			0.11			0.043			0.13		
SW846 7196A	Hexavalent Chromium	mg/kg	0.68	U	UJ-	0.74	U	UJ-	2.6		J-	0.87		J-
SW846 M9014	Cyanide (free)	ug/L	30	U					30	U				

* Hexavalent Chromium and free cyanide rows added by the data validator

TABLE 3-6 CONTINUED

GENERAL CHARACTERIZATION, FINE- AND COARSE-GRAINED FRACTIONS
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005-007(COARSE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-007(FINE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-008(COARSE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-008(FINE) INITIAL RESULT	FLAG	VALID QUAL
CLP/CIP SOW	TOTAL SOLIDS	%	75			61			77			58		
Env. Science Technology 1997	SOOT CARBON	ug/g	9700		J	24000		J	30000			15000		J
LYDKHN	TOTAL ORGANIC CARBON	ug/g	58000			69000			73000			78000		
SW846 9071A	OG(HEXANE EXTRACTED)	% as Dry Weight	0.13			0.46			0.072			0.21		
SW846 7196A	Hexavalent Chromium	mg/kg	0.99		J-	0.83	U	UJ-	1.1		J-	0.86	U	UJ-
SW846 M9014	Cyanide (free)	ug/L	30	U					30	U				

* Hexavalent Chromium and free cyanide rows added by the data validator

TABLE 3-6 CONTINUED

GENERAL CHARACTERIZATION, FINE- AND COARSE-GRAINED FRACTIONS
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005-009 (FINE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-009(COARSE) INITIAL RESULT	FLAG	VALID QUAL
CLP/CIP SOW	TOTAL SOLIDS	%	71			77		
Env. Science Technology 1997	SOOT CARBON	ug/g	14000			36000		
LYDKHN	TOTAL ORGANIC CARBON	ug/g	51000			130000		
SW846 9071A	OG(HEXANE EXTRACTED)	% as Dry Weight	0.2			0.086		
SW846 7196A	Hexavalent Chromium	mg/kg	0.7	U	UJ-	0.65	U	UJ-
SW846 M9014	Cyanide (free)	ug/L				30	U	

* Hexavalent Chromium and free cyanide rows added by the data validator

TABLE 3-7

GEOTECHNICAL SAMPLES
CHICAGO AREA CDF

	Atterberg Limits			Unconsolidated Undrained Shear Strength								
Sample No.	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Friction Angle (degrees)	Cohesion (ksf)	Cell Pressure (ksf)	Applied Failure Stress (ksf)	Failure Strain (%)	Specific Gravity (-)	Initial Moisture Content (%)	Initial Dry Density (pcf)	Initial Saturation (%)
G01 @ 9.5 -12 ft.	47	29	17	6.7	0.07	0.5	0.27	14.4	2.74	45.5	75.1	97.6
	47	31	16			1.0	0.43	15.3		46.6	74.5	98.5
						2.0	0.67	14.0		37.5	84.0	99.1
G02 @ 7 - 9.5 ft.	41	25	16	0	0.13	0.99	0.26	14.7	2.73	42.4	78.8	99.6
	40	25	15			2.0	0.26	16.5		45.9	74.2	96.7

		Consolidated Undrained Shear Strength										
	Total Stress		Effective Stress									
Sample No.	Friction Angle (degrees)	Cohesion (ksf)	Friction Angle (degrees)	Cohesion (ksf)	Cell Pressure (ksf)	Applied Failure Stress (ksf)	Failure Strain (%)	Pore Pressure (ksf)	Specific Gravity (-)	Initial Moisture Content (%)	Initial Dry Density (pcf)	Initial Saturation (%)
G02 @ 12 - 14.5 ft.	5.6	0.72	27.6	0.25	0.5	1.68	15.3	1.3	2.74	42.6	76.9	95.3
					1.0	3.96	15.2	-0.35		26.0	98.9	97.5
					2.0	2.03	15.8	-0.02		43.6	77.9	99.9
G02 @ 12 - 14.5 ft.	36.5	0.04	33.9	0.03	0.5	1.6	15.6	-0.1	2.72	22.8	104.2	98.5
					2.0	7.8	15.3	-1.0		21.1	107.1	97.0

	Consolidation							
Sample No.	Preconsolidation Pressure (ksf)	Compression Index (-)	Applied Pressure (ksf)	Coefficient of Consolidation (sf/day)	Specific Gravity (-)	Moisture Content (%)	Dry Density (pcf)	Saturation (%)
G02 @ 7 - 9.5 ft.	0.5	0.14	0.5	1.46	2.73	35.1	86.7	99.1
			1.0	0.64				
			1.0	0.82				
			2.0	0.83				
			4.0	0.75				
			8.0	0.67				

Table 3-8
Mass Balance Comparison Summary
Chicago Area CDF

	CHCDF-2005 01			CHCDF-2005 03			CHCDF-2005 04			CHCDF-2005 06			CHCDF-2005 07			CHCDF-2005 08			CHCDF-2005 09		
Analyte	**Original**	**Coarse Grained**	**Fine Grained**	**Original**	**Coarse Grained**	**Fine Grained**	**Original**	**Coarse Grained**	**Fine Grained**	**Original**	**Coarse Grained**	**Fine Grained**	**Original**	**Coarse Grained**	**Fine Grained**	**Original**	**Coarse Grained**	**Fine Grained**	**Original**	**Coarse Grained**	**Fine Grained**
Arsenic (mg/kg)	17	7.7	21.2	12.4	3.7	11	11.7	5.5	12	11.1	9.4	8	14	5	18.3	9.8	6.1	15.5	21.3	13.6	13.8
Barium (mg/kg)	49.5	44.4	58	45	13.1	37.1	64.1	37	77.6	36.5	13.6	30.2	66.5	76	78.1	69.4	48.8	75.5	59.4	24.3	49.8
Beryllium (mg/kg)	0.74	0.52	0.8	0.62	0.2	0.52	0.57	0.24	0.62	0.5	0.35	0.38	0.5	0.22	0.78	0.95	0.64	0.95	0.93	0.48	0.72
Cadmium (mg/kg)	2.6	0.57	3.4	1B	0.21B	0.91	2.8	0.95	3.8	0.67B	0.36B	0.47B	1.5	0.4B	2	0.8B	0.29B	2.3	2.3B	0.37B	1.2
Chromium (VI) (mg/kg)	1.9J-	0.71J-	0.74UJ-	0.68UJ-	0.65UJ-	0.75UJ-	0.72J-	0.68UJ-	0.74UJ-	0.65UJ-	2.6J-	0.87J-	0.74UJ-	0.99J-	0.83UJ-	0.62UJ-	1.1J-	0.86UJ-	0.68UJ-	0.65UJ-	0.7UJ-
Copper (mg/kg)	68.8J	31	96.5	87.1J	13.8	45.4	77.2J	39.2	96.2	39.4J	28.7	31.5	70.8J	35.8	92.9	36.4J	18.6	88.9	91.7J	34	54.2
Lead (mg/kg)	222J	78.9	260	135J	27.9	87.6	198J	142	228	79.4J	32.7	66.1	213J	115	270	85.7J	47.7	337	292J	46.4	123
Mercury (mg/kg)	0.15	0.06J-	0.17J-	0.12	0.04J-	0.11J-	0.68	0.37	0.85	0.1	0.02BJ-	0.1J-	0.43	0.2J-	0.47	0.12	0.36	0.21J-	0.24	0.07J-	0.1J-
Nickel (mg/kg)	50.6	24.4	56.6	25.4	11.4	24.5	25.6	16.7	33.1	29.2	25.3	25.7	35.4	14.2	46.9	20.4	14.4	45.8	53.9	27.9	36.7
Selenium (mg/kg)	1.72U	5.0U	0.51U	0.85U	0.27U	0.64B	0.69U	0.28U	0.76B	0.61U	0.27U	0.36U	0.78U	0.4U	1.2B	0.62U	0.32U	1	1.86U	0.29U	1.9U
Silver (mg/kg)	0.5U	0.09U	0.61B	0.62B	0.3B	0.26B	5.7	7.6	5.6	0.18U	0.08U	0.16B	1B	0.31B	1.2B	0.18U	0.09U	0.96B	0.54U	0.09U	0.29B
Naphthalene (µg/kg)	350J	430	550	130	300J	240J	320J	380J	300J	44000	16000	26000	1400	860	1000	190J	280J	690	230J	420J	220J
Acenaphthylene (µg/kg)	180J	150J	130	91	210	100	280J	140	140	79U	99U	150U	180J	180J	77J	84	74J	95J	120	170J	150
Acenaphthene (µg/kg)	390J	440	430J	150	260J	200J	330J	900	330J	1400	750	810	680	800	400J	200J	290J	370J	290J	390J	290J
Fluorene (µg/kg)	790	690	950	200J	240J	200J	490	910	340J	610J	580J	470J	830J	1200	470J	250J	350J	640J	280J	390J	250J
Phenanthrene (µg/kg)	1900	2200	1700	980	1300	610	2200	6200	1700	5000	4200	3000	4900	7400	1800	880	1400	1600	940	1900	970
Anthracene (µg/kg)	620	660	660	300	390J	220J	550	1400	460J	220J	1200	240J	1100	1700	530J	300J	420J	550J	310J	640	320J
Fluoranthene (µg/kg)	2700	2400	2200	1400	1800	820	2800	5400	2000	1600	4500	1100	4100	5600	1900	1200	1800	1800	1200	2300	1200
Pyrene (µg/kg)	2700	2800	2700	1400	1700	890	3000	6400	2200	1100	4300	900	4800	6300	2100	950	1500	2400	1300	2200	1300
Benzo(a)anthracene (µg/kg)	1500	1400	1100	670	9900	280J	1300	3200	830	390J	2600	230J	2400	3400	830	550	700	930	540	1200	540
Chrysene (µg/kg)	1900	2000	1700	830	1100	410J	2100	3700	1100	910	2700	670	2600	4000	1200	770	900	1300	850	1700	850
Benzo(b)fluoranthene (µg/kg)	1800	1600	1500	860	1000	400J	1600	4000	1000	610	2700	450J	2700	3800	1100	610	820	1300	770	1400	750
Benzo(k)fluoranthene (µg/kg)	640	650	630	300J	420J	130	590	1600	420J	200J	1200	130J	1000	1800	380J	260J	340J	410J	330J	600	290J
Benzo(a)pyrene (µg/kg)	1400	1400	1100	680	930	290J	1300	3000	740	240J	2000	280J	2000	3200	860	540	680	950	660	1400	640
Indeno(1,2,3-cd)pyrene (µg/kg)	970	790	690J	490	5650	200J	880	1600J	460J	280	1100	140J	1000J	1900	610	410	410	620	410J	860	420J
Dibenzo(a,h)anthracene (µg/kg)	290J	290J	170J	180	280J	90UJ	300J	400J	210J	110	350J	150UJ	300J	510	160UJ	170	160J	250J	170	300J	260J
Benzo(g,h,i)perylene (µg/kg)	940	790	790J	370J	560	160	940	1300J	440J	230J	910	180J	950J	1600	580	300J	300J	620	410J	860	450J
Total PCBs (µg/kg)	2300	2330	2380	590	208	480	251	730	660	22U	1460	25U	3420	970	2710	620	330	1100	4680	440	500

Notes: PAHs were tested by methods 8270 and 8270-SIM.
U - Compound was analyzed for but not detected. The associated value is the sample quantitation limit.
J - Estimated data due to exceeded quality control criteria; plus or minus indicates likely bias if known.
B - Reported value was obtained from a reading that was less than the practical quantitation limit but greater than or equal to the instrument detection limit.

APPENDIX A

SOIL BORING LOGS AND FIELD NOTES
CHICAGO AREA CONFINED DISPOSAL FACILITY

CAMP DRESSER & McKEE
CDM
125 South Wacker Drive, Suite 600
Chicago, Illinois 60606

BOREHOLE LOG
01

Client: U.S. Army Corps of Engineers
Project Name:
Project Location:
Project Number:

Drilling Contractor: Boart Longyear
Surface Elevation (ft.):
Drilling Method/Rig: HSA/Split Spoon/Cuttings
Total Depth (ft.): 19
Drillers:
Depth to Initial Water Level (ft. BGS):
Drilling Date: Start: 3/14/06 **End:** 3/14/06
Abandonment Method:
Borehole Coordinates:
Field Screening Instrument:
N E
Logged By: Dan Cooper

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	1	18/6	0		1 1 1		CL	dark grayish-brown to dark gray, clayey silt, some sand, trace gravel, very soft, moist, low to moderate plasticity
SS	2	18/6			1 2 1		CL	same as above, dark grayish-brown to dark gray, clayey silt, very soft, some fine sand
SS	3	18/12	5		3 3 4		ML	dark gray to black, silt with some fine sand, very little clay, little to no plasticity, wood pieces, slight hydrocarbon odor
SS	4	18/0			4 3 2			water @ ~7' bgs. No recovery
SS	5	18/16	10		1 0 0		MLS	dark gray to black, fine sand and silt, little or no clay, very soft, cohesive but non plastic, hydrocarbon odor and sheen, wet
SS	6	18/18			1 1 0		MLS	same as above, dark gray to black, silt with some fine sand, little clay, no gravel, very soft, non plastic, runny, hydrocarbon odor (less sand than previous sample)
SS	7	18/18	15		1 6 30		CL-ML	dark gray to black, silt with clay, very little sand (more clay), very soft, low plasticity, black with HC staining, hydrocarbon odor
							SW	fine to medium sand, dark gray to black, well sorted, appears to be lake bottom sand-stained black, hydrocarbon odor, no fines, some shells
SS	8	18/18			6 31 40		SW	dark gray to olove gray (5Y 4/1-4/2), fine to medium sand, well sorted, no odor, wet lake bottom sediments

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER
AGS - Above Ground Surface

REMARKS

Reviewed by: Date:

BL USACOE.GPJ CDM_CORP.GDT 4/26/06

CAMP DRESSER & McKEE
CDM
125 South Wacker Drive, Suite 600
Chicago, Illinois 60606

BOREHOLE LOG
02

Client: U.S. Army Corps of Engineers
Project Name:
Project Location:
Project Number:

Drilling Contractor: Boart Longyear
Surface Elevation (ft.):
Drilling Method/Rig: HSA/Split Spoon/Cuttings
Total Depth (ft.): 19
Drillers:
Depth to Initial Water Level (ft. BGS):
Drilling Date: Start: 3/15/06 **End:** 3/15/06
Abandonment Method:
Borehole Coordinates:
Field Screening Instrument:
N E
Logged By: Dan Cooper

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	1	18/12	0		1 2 3		CL-ML	dark grayish-brown with some brown mixed, silt with clay, some very fine sand, trace gravel, soft, moist, no odor
SS	2	18/2			2 3 2		CL-ML	same as above, poor recovery, slightly stiffer
SS	3	18/16	5		1 1 1		MLS	brown to grayish-brown, silt with fine sand, no clay, non plastic, soft, very moist
							ML	dark gray, silt, very little fine sand and clay, very moist to wet
SS	4	18/16			1 1 1		ML	same as above, trace gravel, stronger odor
SS	5	18/18	10		1 1 1		CL-ML	dark grayish-brown, silt with clay, no sand, trace gravel, low plasticity, very soft, slight odor
							MLS	very dark gray to black silt with fine sand, trace medium to coarse sand, wet, very soft, hydrocarbon sheen and strong odor
SS	6	18/18			1 0 0		ML	very dark gray to black, silt with very little clay and fine sand, wet, non plastic, very soft, hydrocarbon odor
SS	7	18/18	15		1 0 0		ML	same as above, silt, trace fine sand and gravel with some clay, trace organics, very soft, wet, hydrocarbon odor
SS	8	18/18			12 12 20		SW	dark gray to olive-gray, fine to medium sand, well sorted, no fines, loose, wet, lake bottom sediments

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: Date:

CAMP DRESSER & McKEE
CDM
125 South Wacker Drive, Suite 600
Chicago, Illinois 60606

BOREHOLE LOG
03

Client: U.S. Army Corps of Engineers
Project Name:
Project Location:
Project Number:

Drilling Contractor: Boart Longyear
Surface Elevation (ft.):
Drilling Method/Rig: HSA/Split Spoon/Cuttings
Total Depth (ft.): 24
Drillers:
Depth to Initial Water Level (ft. BGS):
Drilling Date: Start: 3/15/06 **End:** 3/15/06
Abandonment Method:
Borehole Coordinates:
Field Screening Instrument:
N E
Logged By: Dan Cooper

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	1	18/4	0		1 1 0		CL-ML	dark grayish-brown (10YR 4/2), silt with clay, little sand, very soft, wet, low plasticity
SS	2	18/8			1 2 1		CL-ML	grayish-brown, silty clay, no sand, soft
							MLS	dark gray to very dark gray, sandy silt, no clay, soft, wet, some odor
SS	3	18/12	5		1 1 1		ML	very dark gray, silt with very fine sand and clay, very soft, low plasticity, wet, slight odor
SS	4	18/6			1 0 0		ML	same as above, very dark gray, silt with clay and very fine sand, very soft, wet, hydrocarbon odor
SS	5	18/18	10		1 0 0		ML	same as above, very dark gray, silt with clay and very fine sand, very soft, wet, hydrocarbon odor
SS	6	18/18			1 0 0		ML	same as above, very dark gray, silt with clay and fine sand, slight increase in sand content (still less than 5%), hydrocarbon odor, wet
SS	7	18/18	15		1 1 0		ML	same as above, very dark gray, silt with clay and very fine sand (less than 5% each), very soft, non plastic but cohesive hydrocarbon odor
SS	8	18/18			1 1 0		ML	same as above, very dark gray, silt with little clay and fine sand as before, trace medium to coarse sand which was not previously present, very soft, hydrocarbon odor

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: Date:

BL USACOE.GPJ CDM_CORP.GDT 4/26/06

CAMP DRESSER & McKEE
CDM
125 South Wacker Drive, Suite 600
Chicago, Illinois 60606

BOREHOLE LOG
03

Client: U.S. Army Corps of Engineers
Project Name:
Project Location:
Project Number:

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	9	18/18	20		1 1 0		ML	same as above, very dark gray, silt as before, strong odor, @ 21'-1" layer of black, fine sand with very little silt @ 21.5-1" layer of black, fine sand with vey little silt
SS	10	18/18			1 1 10		CL-ML SW	very dark gray to black, clayey silt, very soft, wet, strong odor, low plasticity dark gray to olove-gray (as previous lake bottom), fine to medium sand, well sorted, no fines, lake bottom sediments

25
30
35
40
45
50
55

CAMP DRESSER & McKEE
CDM
125 South Wacker Drive, Suite 600
Chicago, Illinois 60606

BOREHOLE LOG
04

Client: U.S. Army Corps of Engineers
Project Name:
Project Location:
Project Number:

Drilling Contractor: Boart Longyear
Surface Elevation (ft.):
Drilling Method/Rig: HSA/Split Spoon/Cuttings
Total Depth (ft.): 29.2
Drillers:
Depth to Initial Water Level (ft. BGS):
Drilling Date: Start: 3/14/06 **End:** 3/14/06
Abandonment Method:
Borehole Coordinates:
Field Screening Instrument:
N E
Logged By: Dan Cooper

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	1	18/8	0		2 2 3		CL-ML	dark grayish-brown (2.5Y 4/2), clayey silt, very little fine sand, trace gravel, soft to medium stiff, moderate plasticity, moist to wet, no odor
SS	2	18/13			2 3 5		MLS	very dark brown (10YR 2/2), sandy silt, mostly silt with very fine sand, little clay, no plasticity, soft to medium stiff (1.0 on CPT), moist to wet, no odor, mixed with grayish-brown @ 3.5-4'
SS	3	18/10	5		3 4 6		MLS	very dark gray (10YR 3/1), sandy silt, silt and fine sand, little clay, trace gravel and shells, soft to medium stiff, wet, no odor
SS	4	18/8			1 2 3		MLS	same as above, very dark gray, sandy silt, very soft (0 on CPT) @ 9', fine to medium sand (2"), very dark gray, very little silt, no clay, very soft
SS	5	18/6	10		1 1 1		ML	very dark gray (5Y 3/1), silt with very fine to fine sand, little clay, cohesive but non plastic, wet, very soft, no obvious hydrocarbon odor
SS	6	18/6			1 3 4		ML	very dark gray (5Y 3/1), same as above, stiffens slightly @ 14' with less sand and more clay, no odor
SS	7	18/15	15		7 8 8		SW	very dark gray to black, fine to medium sand, very little silt, no clay, wet, hydrocarbon odor, black staining, loose
							CL-ML	light gray, silty clay, no sand, plastic, medium stiff
SS	8	18/18			1 0 1		ML	very dark gray to dark gray, silt with some clay, little fine sand, no gravel, very very soft, wet, wet, runny, not plastic, very slight hydrocarbon odor

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: Date:

BL USACOE.GPJ CDM_CORP.GDT 4/25/06

CAMP DRESSER & McKEE
CDM
125 South Wacker Drive, Suite 600
Chicago, Illinois 60606

BOREHOLE LOG
04

Client: U.S. Army Corps of Engineers
Project Name:
Project Location:
Project Number:

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	9	18/18	20		1 0 0		ML	same as above, very dark gray to black, silt with some clay, little sand, no gravel, very soft, strong hydrocarbon odor, appears darker from staining
SS	10	18/18			2 1 1		SW	light gray to some olive (similar to previous lake bottom), fien to medium sand, little to no silty clay, well sorted, wet, loose
							CL-ML	very dark gray to black, silt with clay, little to no sand, very soft, hydrocarbon odor
SS	11	18/18	25		1 1 1		ML	same as above, very dark gray to black, silt with some clay, no sand, very soft, hydrocarbon odor
SS	12	18/18			1 1 11		ML	same as above, very dark gray to black, silt with clay, no sand, hydrocarbon odor, very soft, strong odor and sheen on water
							SW	dark gray to olive-gray, fine to medium sand, well sorted, no fines, trace shells, lake bottom sediments
			30					
			35					
			40					
			45					
			50					
			55					

CAMP DRESSER & McKEE
CDM
125 South Wacker Drive, Suite 600
Chicago, Illinois 60606

BOREHOLE LOG
05

Client: U.S. Army Corps of Engineers
Project Name:
Project Location:
Project Number:

Drilling Contractor: Boart Longyear
Surface Elevation (ft.):
Drilling Method/Rig: HSA/Split Spoon/Cuttings
Total Depth (ft.): 19
Drillers:
Depth to Initial Water Level (ft. BGS):
Drilling Date: Start: 3/15/06 **End:** 3/15/06
Abandonment Method:
Borehole Coordinates:
Field Screening Instrument:
N E
Logged By: Dan Cooper

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	1	18/2	0		1 2 2		ML	dark grayish-brown (10YR 4/2), silt with some clay and fine sand, soft, low plasticity, moist
SS	2	18/18			3 3 3		SM	dark grayish-brown to brown, very fine sand and silt with some fine sand, no gravel or clay, very moist, soft to loose, some apparent Fe staining
							SM	very dark gray, fine sand with some silt and very fine sand, no clay, very moist, slight odor
SS	3	18/18	5		1 1 1		MLS	same color as above very dark gray (10YR 3/1), sandy silt, mostly silt with fine to very fine sand, no clay, non plastic
SS	4	18/12			1 2 2		MLS	same as above, very dark gray, sandy silt, some clay, mostly silt with very fine to fine sand, wet, very soft, slight hydrocarbon odor
SS	5	12/12	10		1 1 50 for 0"		SW	very dark gray to black, fine to medium sand with abundant fine gravel, several glass fragments, wet, wood @ 11' - refusal
SS	6	18/8			1 1 1		CL-ML	Drill past wood for next sample very dark gray, clayey silt, little to no fine sand, wet, very soft, hydrocarbon odor
SS	7	18/6	15		1 1 2		CL-ML	same as above mixed with some brown sandy silt, not stratified, very soft, very strong hydrocarbon odor, mostly clayey silt
SS	8	18/18			41 33 10		CL-ML SW	same as above, wood in sampler above sand, very hard to blow through, black clayey silt above wood, strong odor dark gray (5Y 4/1) to olive-gray (5Y 4/2), fine to medium sand, well sorted, no fines, wet, no odor, lake bottom sediment

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2 1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER
AGS - Above Ground Surface

REMARKS

Last 10' of augers broke off pounding through wood, leave last 10' in ground

Reviewed by: **Date:**

BL USACOE.GPJ CDM_CORP.GDT 4/26/06

CAMP DRESSER & McKEE
CDM
125 South Wacker Drive, Suite 600
Chicago, Illinois 60606

BOREHOLE LOG
06

Client: U.S. Army Corps of Engineers
Project Location:
Project Name:
Project Number:

Drilling Contractor: Boart Longyear
Drilling Method/Rig: HSA/Split Spoon/Cuttings
Drillers:
Drilling Date: Start: 3/15/06 **End:** 3/15/06
Borehole Coordinates:
N E

Surface Elevation (ft.):
Total Depth (ft.): 31.5
Depth to Initial Water Level (ft. BGS):
Abandonment Method:
Field Screening Instrument:
Logged By: Dan Cooper

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	1	18/6	0		1 2 2		ML	very dark grayish-brown (2.5Y 3/2), silt with very fine sand and clay, trace coarse sand and gravel, soft, low plasticity, moist, no odor
SS	2	18/18			4 5 6		SM	very dark grayish-brown to brown, fine to very fine sand with some silt, no clay, no plasticity, loose (0.5 on CPT), well sorted with some shells, moist, no odor
SS	3	18/9	5		2 2 3		CL-ML	very dark gray (5Y 3/1), clayey silt, very little fine sand, soft, low to moderate plasticity, very moist, "sewer" odor
SS	4	18/14			1 1 1		CL-ML	dark gray to grayish-brown (2.5Y 5/2), clayey silt, some fine sand, trace gravel and shells, very soft, low plasticity, wet, no obvious odor
SS	5	18/10	10		1 1 1		CL-ML	same as above, grayish-brown to dark grayish-brown, clayey silt, little to no sand, trace gravel, very soft, low plasticity, wet and runny, no obvious odor
SS	6	18/9			1 1 1		CL-ML	same as above, dark grayish-brown to dark gray, clayey silt, some very fine sand, trace coarse sand and gravel, very soft, low plasticity, wet and runny, no obvious odor
SS	7	18/18	15		1 3 5		CLS	very dark gray, sandy clay with silt, increased clay content and stiffness, also clay contains abundent coarse sand and fine gravel, subrounded, moderate plasticity, very moist
SS	8	18/9			1 2 3		CL-ML	very dark grayish-brown (10YR 3/2), clayey silt, trace fine to coarse sand, low plasticity, very moist to wet, no obvious odor

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: Date:

CAMP DRESSER & McKEE
CDM
125 South Wacker Drive, Suite 600
Chicago, Illinois 60606

BOREHOLE LOG
06

Client: U.S. Army Corps of Engineers
Project Name:
Project Location:
Project Number:

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	9	18/18	20		1 1 1		CL-ML	same as above, very dark grayish-brown (10YR 3/2), clayey silt, trace coarse sand and gravel, low plasticity, wet, no odor, very soft
SS	10	18/18			1 1 1		CL-ML	Same as above, same color and content
							CL-ML	black (10YR 2/1), clayey silt, little fine sand, trace gravel, hydrocarbon odor, black likely from staining, very soft
SS	11	18/18	25		1 1 1		ML	black (2.5Y 2.5/1), silt with some clay and very fine sand, trace coarse sand and shells, very soft, hydrocarbon odor and staining, wet, orange waste @ 25' may be hardened paint
SS	12	18/18			1 1 1		ML	same as above, black, silt with little clay and sand, very soft, trace gravel, hydrocarbon odor
SS	13	18/18	30		6 6 20		SW	very dark grayish-brown (2.5Y 3/2), fine sand, well sorted, little tono silt, wet, loose, slight hydrocarbon odor, lake bottom @ 31'
			35					
			40					
			45					
			50					
			55					

CAMP DRESSER & McKEE
CDM
125 South Wacker Drive, Suite 600
Chicago, Illinois 60606

BOREHOLE LOG
07

Client: U.S. Army Corps of Engineers
Project Name:
Project Location:
Project Number:

Drilling Contractor: Boart Longyear
Surface Elevation (ft.):
Drilling Method/Rig: HSA/Split Spoon/Cuttings
Total Depth (ft.): 19
Drillers:
Depth to Initial Water Level (ft. BGS):
Drilling Date: Start: 3/15/06 **End:** 3/15/06
Abandonment Method:
Borehole Coordinates:
Field Screening Instrument:
N E
Logged By: Dan Cooper

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	1	18/8	0		1 2 2		ML	grayish-brown mixed with brown, silt with fine sand, little to no clay, soft, very moist, no plasticity
SS	2	18/16			1 1 3		ML	brown (10YR 4/3), silt with some fine sand and clay, soft, very moist to wet, low plasticity
							MLS	very dark gray (10YR 3/1), silt and very fine sand, no clay, very soft, no plasticity, wet, water @ 3.5' as noted from driller
SS	3	18/18	5		1 1 1		SM	very dark gray to black, fine sand with some coarse and silt (5-5.25' bgs.), no clay, wet
							ML	dark gray to black silt with some very fine sand, no clay, no plasticity, wet, very soft, slight odor
SS	4	18/14			1 0 0		ML	dark gray to black, silt with some very fine sand, little clay, same as above
SS	5	18/16	10		1 1 2		ML	same as above, black silt with some very fine sand, little clay, stronger hydrocarbon odor
SS	6	18/18			1 0 0		CL-ML	Increase clay content, less sand, still black, clayey silt, very soft, hydrocarbon odor
SS	7	18/16	15		1 6 10		CL-ML	same as above, clayey silt, very soft
							CH	gray (10YR 5/1), clay little silt, no sand, stiff, moist, high plasticity, no odor, clay appears to be native
SS	8	18/16			3 10 20		SW	dark grayish-brown (2.5Y 4/2), sand, fine to medium sand, well sorted, no fines, trace shells, wet, no odor, lake bottom sediments

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: Date:

BL USACOE.GPJ CDM_CORP.GDT 4/26/06

CAMP DRESSER & McKEE

CDM

125 South Wacker Drive, Suite 600
Chicago, Illinois 60606

BOREHOLE LOG
08

Client: U.S. Army Corps of Engineers
Project Name:
Project Location:
Project Number:

Drilling Contractor: Boart Longyear
Surface Elevation (ft.):
Drilling Method/Rig: HSA/Split Spoon/Cuttings
Total Depth (ft.): 16.5
Drillers:
Depth to Initial Water Level (ft. BGS):
Drilling Date: Start: 3/14/06 **End:** 3/14/06
Abandonment Method:
Borehole Coordinates:
Field Screening Instrument:
N E
Logged By: Dan Cooper

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	1	18/6	0		3 4 5		ML	vey dark grayish-brown, silt with some fine to coarse sand, trace gravel, shells and organics and clay, low plasticity, soft, moist
SS	2	18/12			5 6 5		ML	same as above, mixed with some brown fine sand not stratified, soft to medium stiff, moist, mostly silt, no odor
SS	3	18/12	5		2 3 2		SP	dark gray, medium sand with some fine and coarse sand, few fines or gravel, some shells, no plasticity, loose, wet
SS	4	18/10			3 4 4		SP	same as above, dark gray, medium sand with some fine and coarse well sorted, some shells, slight sheen and hydrocarbon odor, wet, loose, no plasticity
SS	5	18/10	10		4 5 6		SP	same as above, dark gray sand, no obvious odor
SS	6	18/18			1 1 2		MLS	dark gray as before, sandy silt, mostly silt and very fine to fine sand, cohesive but very soft, some clay, no odor
								Driller noticed change at ~14.5' bgs.
SS	7	18/14	15		4 4 5		SW	grayish-brown sand as previous lake bottom, fine to medium sand, well sorted, some shells

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: Date:

BL USACOE.GPJ CDM_CORP.GDT 4/26/06

CAMP DRESSER & McKEE
CDM
125 South Wacker Drive, Suite 600
Chicago, Illinois 60606

BOREHOLE LOG
09

Client: U.S. Army Corps of Engineers
Project Name:
Project Location:
Project Number:

Drilling Contractor: Boart Longyear
Surface Elevation (ft.):
Drilling Method/Rig: HSA/Split Spoon/Cuttings
Total Depth (ft.): 21.5
Drillers:
Depth to Initial Water Level (ft. BGS):
Drilling Date: Start: 3/14/06 **End:** 3/14/06
Abandonment Method:
Borehole Coordinates:
Field Screening Instrument:
N E
Logged By: Dan Cooper

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	1	18/16	0		2 3 3		CL-ML	very dark grayish-brown, clayey silt, trace fine sand and gravel, soft (CPT 1.0), but not very soft, moist, trace organics, no odor, moderate plasticity
SS	2	18/6			5 7 10		CL-ML	same as above, clayey silt, trace sand and gravel, porr recovery, (2.0 on CPT)
SS	3	18/14	5		2 4 5		CL-ML	dark gray (10YR 4/1), clayey silt, trace sand and gravel, subrounded, (1.0 on CPT), moist, moderate plasticity
SS	4	18/4			2 1 1			
SS	5	18/10			1 1 2		ML	very dark gray, silt with some clay, trace sand and gravel, very soft and runny as there boring
SS	6	18/10	10		2 2 2		ML	very dark gray, silt with some clay and fine sand, no gravel, trace organics, very soft and runny
SS	7	18/12			2 3 5		ML	same as above, very dark gray, silt with fine sand and clay, very soft
SS	8	18/18	15		1 1 2		CL-ML	dark gray to black, silty clay and fine sand mixture, very soft 15.5-16.5' hydrocarbon odor and sheen
SS	9	18/18			9 15 30			
							CL-ML	same as above, dark gray to black, silty clay, very little sand, trace organics, very soft, hydrocarbon odor and sheen

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: Date:

BL USACOE.GPJ CDM_CORP.GDT 4/26/06

CAMP DRESSER & McKEE
CDM
125 South Wacker Drive, Suite 600
Chicago, Illinois 60606

BOREHOLE LOG
09

Client: U.S. Army Corps of Engineers
Project Name:
Project Location:
Project Number:

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
			20				SW	grayish-brown with some olive, (same color as previous lake bed), fine to medium sand, well sorted, wet, some shells, wet lake bed @ 20.5' bgs.
			25					
			30					
			35					
			40					
			45					
			50					
			55					

CAMP DRESSER & McKEE
CDM
125 South Wacker Drive, Suite 600
Chicago, Illinois 60606

BOREHOLE LOG
G-1

Client: U.S. Army Corps of Engineers
Project Name:
Project Location:
Project Number:

Drilling Contractor: Boart Longyear
Surface Elevation (ft.):
Drilling Method/Rig: HSA/Split Spoon/Shelby Tube
Total Depth (ft.): 19
Drillers:
Depth to Initial Water Level (ft. BGS):
Drilling Date: Start: 3/13/06 **End:** 3/13/06
Abandonment Method:
Borehole Coordinates:
Field Screening Instrument:
N E
Logged By: Dan Cooper

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	1	18/12	0		1 1 1		CL-ML	dark grayish-brown (2.5Y 3/2) to dark gray (2.5Y 4/1), clayey silt, no sand or gravel, very soft, (0 on CPT), slightly plastic, moist to very moist, trace organics and gravel
SS	2	18/8			1 2 2		CL-ML	Same as above, dark grayish-brown to dark gray, clayey silt, trace organics and gravel, very soft, (0 on CPT), very moist
SS	3	18/10	5		1 2 3		ML	dark grayish-brown to dark gray, silt with very fine sand, little clay, non plastic, very soft, trace organics and shells, appears as non stratified dredged lake bottom
								Shelby tube 7-9.5', pushed 29"-21" recovery
			10					Shelby tube 9.5-12', pushed 29"-21" recovery
SS	4	18/18			1 1 1		ML	dark grayish-brown, very runny and soft, silt with some clay and little sand, trace gravel, slight sheen and hydrocarbon odor, runny soft mucky sediment blowing back up hallow stem
SS	5	18/18	15		1 6 8		ML	Same as above, with no obvious hydrocarbon odoror sheen
							SP	very dark gray (5Y 3/1), fine to very fine sand, well sorted, appears slightly layered with darker bands
SS	6	18/18			4 12 44		SW	olive gray to dark olive-gray (5Y 4/2 and 3/2), well sorted, fine sand, some stratification with trace well rounded gravel, appears to be lake bottom sand

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: Date:

CAMP DRESSER & McKEE
CDM
125 South Wacker Drive, Suite 600
Chicago, Illinois 60606

BOREHOLE LOG
G-2

Client: U.S. Army Corps of Engineers
Project Name:
Project Location:
Project Number:

Drilling Contractor: Boart Longyear
Surface Elevation (ft.):
Drilling Method/Rig: HSA/Split Spoon/Shelby Tube
Total Depth (ft.): 16
Drillers:
Depth to Initial Water Level (ft. BGS):
Drilling Date: Start: 3/13/06 **End:** 3/14/06
Abandonment Method:
Borehole Coordinates:
Field Screening Instrument:
N E
Logged By: Dan Cooper

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. / Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	1	18/12	0		1 2 4		MLS	very dark grayish-brown (10YR 3/2), sandy silt, mostly silt and fine sand, very little clay or medium sand, trace gravel some caficher organics, moist @ 1.5' bgs. (2.0 with CPT)
SS	2	18/16			3 6 8		ML	black silt soft and runny hydrocarbon odor
							MLS	sandy silt as previous, little to no plasticity, mostly silt and fine sand, water @ ~4' bgs.
SS	3	18/18	5		2 7 4		ML	very dark gray, silt with some fine sand and clay, very soft and runny, slight sheen and hydrocarbon odor
								Shelby tube 7-9.5', push 24" *- recovery 13" very soft until 9" and lot of water running out at top of tube
			10					Shelby tube 9.5-12', no recovery
								Shelby tube 12-14.5', push 29" - recovery 20"
								Stop at 14.5' for the day, will return to sample to lake bottom tomorrow
SS	4	18/18	15		1 14 14		ML	Same as above, very dark gray silt, soft and runny, some fine sand and clay, no hydrocarbon odor or sheen
							SW	light grayish-brown, fine to medium sand, well sorted, slightly layered with some darker sediments lake bottom sediments

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: Date:

BL USACOE.GPJ CDM_CORP.GDT 4/26/06

CAMP DRESSER & McKEE
CDM
125 South Wacker Drive, Suite 600
Chicago, Illinois 60606

BOREHOLE LOG
G-3

Client: U.S. Army Corps of Engineers
Project Name:
Project Location:
Project Number:

Drilling Contractor: Boart Longyear
Surface Elevation (ft.):
Drilling Method/Rig: HSA/Split Spoon/Shelby Tube
Total Depth (ft.): 29
Drillers:
Depth to Initial Water Level (ft. BGS):
Drilling Date: Start: 3/13/06 **End:** 3/13/06
Abandonment Method:
Borehole Coordinates:
Field Screening Instrument:
N E
Logged By: Dan Cooper

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	1	18/10	0		12 23 26		MLS	dark brown (10YR 3/31), 0-6" silty sand, some rounded gravel, moist to very moist, 6-18" poor recovery, silty sand with a lot of gravel, dry pieces of slag, slag-grayish green in color
SS	2	18/13			7 18 13		MLS	dark brown to black, sandy silt to silty sand with gravel and slag fragments, moist, very stiff @ 3.5-4.5' on CPT, mostly silty sand with medium grained sand, dark brown sand mixed with white sand and silt and hard with black slag @ 4.0' bgs., white salty precipitate
SS	3	18/8	5		9 50 50/for 2"		MLS	same as above, dark brown, silty sand with angular slag and gravel, moist, very hard @ 6' bgs. (4.5 on CPT), white slat precipitate binding the sand and silt , 1st water @ 7'
SS	4	18/6			16 49 50/for 3"		MLS	same as above, dark brown to very dark brown, silty sand with gravel and slag pieces up to 1.5" diameter, very stiff @ 9' bgs. with heavy salt caliche and grayish sand
SS	5	18/12	10		12 13 50/for 5"		SW	dark greenish gray (1 Gley 4/1), fine to medium sand with white salt precipitate, very stiff and littified in some spots, difficult to break up, littified foundary sand, dry to slightly moist
SS	6	18/5			50/for 5"		SW	dark bluish-gray (2 Gley 3/1 10 BG), medium to coarse sand, very stiff to littified foundary sand with some binding precipitate @ 14', driller noticed change - smoother turn on augers
SS	7	18/18	15		7 20 41		SW	same as above, dark bluish-gray (2G 3/1 10 BG), with some green coarse sand bound up, very stiff, semi-littified
SS	8	18/18			3 7 16		SW	same as above, but looser and not as compaced, very uniform, angolar, medium to coarse sand

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

Reviewed by: Date:

CAMP DRESSER & McKEE
CDM
125 South Wacker Drive, Suite 600
Chicago, Illinois 60606

BOREHOLE LOG
G-3

Client: U.S. Army Corps of Engineers
Project Name:
Project Location:
Project Number:

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	9	18/12	20		13 30 50/for 3"		SW	same as above, very stiff @ 21'
							SW	from 22-23' bgs. driller notes increased stiffness, increases down pressure to 1500 lbs.
SS	10	18/16			31 34 50/for 3"		ML	fine grained layered mud stone and silt stone of brown, dark brown and some bluish-gray sand as previous near 24', drilling was very hard thru 25'
			25					
								Driller noticed change @ 26'
SS	11	18/18			19 46 43		SW	layered dark blusih-gray and dark brown, finer grained fine sand and silt, semi consolidated, shell found within layered sediments
			30					
			35					
			40					
			45					
			50					
			55					

6

Location Calumet CDF Date 3-15-06

Project / Client USACOE

Weather - 60° Sunny, windy

Purpose - Collect geotech sample in CDF Area including shelby tubes and split spoons.

07:50 Onsite, met Dan Cooper, Megan Hurst, John Eorsch, Jeff Zuercher, Melvin McLaurin (USACOE), Matt Gohlke and Cory Jones (Boart)

08:20 Entered into site, staked location of G-3 with GPS, within 2.8ft of assigned location.

08:45 David de Courcy-Bower performed site H&S meeting with USACOE and Boart Longyear.

09:30 Boart setup on G-3.

09:40 Started collecting split spoons, split spoon are 18" long, one entry 2.5 feet

3-15-06 MB

Location Calumet CDF Date 3-15-06 7

Project / Client USACOE

10:00 H.A. very hard material looks like hard-pan material comprised of leached metal salts

10:50 Drillers noticed change in drilling conditions, will see what is in next split-spoon. Blue sand photo

11:30 Driller noticed change in material required more down force to

12:20 Driller noticed change at 26 ft tech split spoon, material looked like lake bed, called hole. No shelby tubes collected

12:30 offsite for LUNCH

13:20 Onsite from LUNCH

14:00 Begin drilling @ G-1
Shelby Tube from 7-9½'
Shelby Tube from 9½-12'

MB 3-15-06

Location Calumet CDF Date 3-13-06

Project / Client USACOE

1540 Complete drilling @ G-L, lake bottom approx 15' bgs.
1600 Start to set up @ G2 for final geotech sampling location
1620 Begin Drilling G2 (East of Basin)
Shelby Tube 7-9½ OK
Shelby Tube 10½-12' — No Recovery
Shelby Tube 12-14½ OK
1730 Stop for the Day after Shelby Tube @ 14½' bgs
1800 offsite
Dave will Drop Shelby Tubes @ Fedex for shipment

J. Cooper
3/13/06

Location Calumet CDF Date 3-14-04

Project / Client USACOE

weather: Sunny 30's cold windy

06:50 Dave deC-Bower + Dan Cooper onsite, start loading for the day.

07:20 Started crushing G2.
08:30 Finished G2 after reaching lake bed at ~ 15 ft.

08:45 Set up on sample location #9. Started taking splitspoons, area is very muddy.

10:00 Sampled CHCDF 2005 09 for selected parameters

1030 Finish sampling
1030 Pack up and move to next location
1045 Set up @ CHCDF-2005 08
1050 Begin Drilling 08 - collected DUP
1200 - Complete drilling to 16½' bgs
- Need to get water and Down
1230 Meet Melvin (USACOE) and get pump

DTB 3-15-06

Location CALUMET CDF Date 3-14-05

Project / Client USACOE

for drillers to fill their water tank

1315 - Water tank filling @ 4gpm

Offsite for Lunch

1400 Return from Lunch - Drillers begin decon - Dave and Dan use GPS to strike out remaining locations

15:00 Setup at CHCDF 2005 01

16:00 Collected CHCDF 2005 01, sampled for selected parameters

16:15 Setup at CHCDF 2005 04.

16:20 Megan Hurst dropped off CHCDF 2005 P3

17:25 Sampled CHCDF 2005 04

17:45 Megan Hurst dropped off CHCDF 2005 P1

17:50 Packing coolers & filling Chain of custody.

19:10 Offsite to FEDEX

3-14-06

Location Calumet CDF Date 3-15-05

Project / Client USACOE

weather sunny, 30's

0650 Dan Cooper, Daniel de Courcy - Bower onsite

07:30 Setup at CHCDF 2005 06

09:25 Sampled CHCDF 2005 06 for selected parameters, took MS/MSD here also.

09:35 Setup at CHCDF 2005 07

10:30 Sampled CHCDF 2005 07 for selected parameters.

11:15 Offsite for LUNCH

12:00 Onsite, drillers decon augers and sampling equipment

12:05 Megan Hurst gave samples for CHCDF 2005 P2, and extra 8oz jars for CHCDF 2005 P1 and CHCDF 2005 P3

13:45 Setup on CHCDF 2005 05

14:15 Sampled CHCDF 2005 05 for Regular parameters

14:20 lost auger in hole

3-15-06

Location CALUMET CDF Date 3-15-06

Project / Client: USACOE

14:45 Setup on CHCDF 2005 03
15:45 Sampled CHCDF 2005 03 for selected parameters.
16:00 Rig down due to leak in hydraulic hose
16:35 Rig up, set up on CHCDF 2005 02
17:30 Sampled CHCDF 2005 02 for Regular parameters
18:00 packing coolers.
18:25 David de Cooley-Bowser offsite for ice and to ship coolers
19:20 coolers shipped via fedex.

3-15-06

Location Calumet CDF Date 3-15-06

Project / Client: USACOE

weather: overcast 30's

07:45 Onsite to demob rig and take GPS survey of locations.

08:45 Kemron called, one shelby tube was missing from the fedex box. After talking to John, they said to collect another tube.
09:15 Called Kemron to find out which shelby tubes have arrived
G02 7-9.5
G01 12-14.5
G01 7-9.5

09:30 Talked to Greg with Gannett, we will retake shelby tube sample from 9.5-12 feet at G02

10:00 Setup on G02
10:30 Collected shelby tube from 12-14.5 feet after 5 foot drilling

Location USACOE Date J-16-06

Project / Client CALUMET CDF

GPS Ipe G1

41° 43' 53.38135" N
87° 31' 42.62548" W

01
41° 43' 53.43116" N
87° 31' 41.83622" W

02
41° 43' 51.58123" N
87° 31' 40.96872" W

03
41° 43' 50.01792" N
87° 31' 39.42103" W

04
41° 43' 52.56600" N
87° 31' 36.52556" W

05
41° 43' 50.75505" N
87° 31' 36.71182" W

06
41° 43' 51.9491" N
87° 31' 31.06784" W

Location CALUMET CDF Date J-16-06

Project / Client USACOE

07
41° 43' 50.54793" N
87° 31' 33.34166" W

G2
41° 43' 48.05356" N
87° 31' 29.92726" W

08
41° 43' 45.89109" N
87° 31' 29.95117" W

09
~~41° 43' 40.57799" N~~ NG
~~87° 31' 30.75272" W~~ OK
41° 43' 40.62316" N
87° 31' 30.75495" W

G03
41° 43' 38.88484" N
87° 31' 38.29114" W

DESCRIPTIONS OF ENVIRONMENTAL SAMPLES COLLECTED BY USACE CHICAGO AREA CDF

Point P1
First set of bottles collected at 17:30 on March 14, 2006
Last bottle (grain size) collected at 09:50 on March 14, 2006
Water Depth: 1 inch
GPS Location:
W 87.52682
N 41.73035
6 feet of sample recovered
Sediment is of uniform consistency (predominantly dark gray clayey silt with small (1-5%) fine sand.

Point P2
Collected at 10:30 on March 15 2006
Water Depth: 6 inches
GPS Location:
W 87.52554
N 41.72974
6 feet of sample recovered
Grain size sample composite of sediment between 3-6' below ground surface

0-1'	Dark gray clayey silt. Trace amount of find sand.
1-2'	Dark gray clayey silt. Trace amount of find sand.
2-3'	Mixture of the dark gray clayey silt and 10-20% light gray dense clay.
3-4'	Mostly light gray dense clay with small amount of the dark gray clayey silt.
4-5'	Mostly light gray dense clay with small amount of the dark gray clayey silt.
5-6'	Mixture of the dark gray clayey silt and 10-20% light gray dense clay.

Point P3
First set of bottles collected at 12:00 on March 14 2006
Last bottle (grain size) collected at 11:00
Water Depth: 8 inches
GPS Location:
W 87.52605
N 41.72807
7 feet of sample recovered
Grain size sample composite of sediment between 4-6' below ground surface

0-1'	Larger grained coal and rocks in dark gray clayey silt matrix.
1-2'	Dark gray clayey silt with small amount of fine sand and coarse grained coal and rock material.
2-3'	Dark gray clayey silt with small amount of fine sand and coarse grained coal and rock material.
3-4'	Dark gray clayey silt. No coarse grained material.
4-5'	Dark gray clayey silt. No coarse grained material.
5-6'	Clayey silt with visible fine grained sand.
6-7'	Dark gray clayey silt. No coarse grained material..

APPENDIX B

GEOTECHNICAL RESULTS
CHICAGO AREA CONFINED DISPOSAL FACILITY

KEMRON
ENVIRONMENTAL SERVICES
A Ellsworth Industrial Boulevard ■ Atlanta, Georgia 30318 ■ Telephone (404) 636-0928 ■ FAX (404) 636-7162 ■ http://www.kemron.com

1 May 1, 2006

Mr. David de Courcy-Bower P.E.
CDM.
125 S. Wacker Drive, Suite 600
Chicago, Illinois 60606
(312) 251-8327

Subject: Calumet CDF Site Testing Project
KEMRON Project No. SE-0160
Data Package

Dear David:

Enclosed, please find the testing results performed on the sludge material received from the Calumet CDF Site. For this project KEMRON received seven 5-gallon buckets of the sludge material, five 8 oz jar samples and 4 shelby tube samples. The chains of custody for this project are included as Attachment A. All data pertaining to this testing is included as Attachment B. A table summarizing all testing performed on the bucket and jar samples is included with this letter.

Note that due to insufficient recovery of the shelby tube samples, the UU Triaxial Testing (Q Test) for sample G02 @ 7.0-9.5 ft., and the CU with pore pressure testing (R test) for sample G02 @ 12-14.5 ft. was performed on two specimens. Also, note that the shelby tube materials did not appear to be homogeneous, therefore the Mohr's envelope plotted should be used with caution.

KEMRON Environmental Services, Inc. appreciates this opportunity to provide laboratory services to CDM Environmental Services, Inc. If you have any questions, or require additional information, please contact me at (404) 601-6930.

Sincerely,

KEMRON ENVIRONMENTAL SERVICES, INC.

Chana Gilzenrat
Project Manager
cgilzenrant@kemron.com

Attachments

3635/3635_501

Printed on Recycled Paper

Protecting Our Environmental Future

ATTACHMENT A

CHAINS OF CUSTODY

SAMPLE CHAIN-OF-CUSTODY RECORD

KEMRON ENVIRONMENTAL SERVICES, INC.
APPLIED TECHNOLOGIES GROUP
1359-A Ellsworth Industrial Boulevard
ATLANTA, GEORGIA 30318
(404) 636-0928 FAX (404) 636-7162
WWW.KEMRON.COM

KEMRON ENVIRONMENTAL SERVICES

PROJECT NAME: Calumet CDF

ATG PROJECT #:

TAT or DUE DATE:

CONTACT: Dave Bower

ATG PROJECT MANAGER: CHANA GILZERAT

PHONE#: 312 346 5000 EXT.

RECEIVING LAB:

PO#:

SAMPLED BY: PRINTED NAME

SIGNATURE

ANALYSES (indicate target list): Atterberg Limits, Q-Test, R-Test, Consolidation test

SAMPLE NUMBER	SAMPLE DESCRIPTION	SAMPLE DATE/TIME	Sample	Preservative	# / Size of Cont.	Atterberg Limits	Q-Test	R-Test	Consolidation test						
CHCDF 2005G02	12-14.5 Sediment	3-16-06		NO	1-Shelby	X X	X	H							

SAMPLES RELINQUISHED BY:	DATE/ TIME	SAMPLES ACCEPTED BY:	DATE/ TIME
[signature]	3-16-06	[signature]	3/17/06

COMMENTS: HOLD Consolidation test

REV 5 11/26/01

Dry Weight Results is Default for Soils/Applicable Wastes

h:\forms\coc1.xls

SAMPLE CHAIN-OF-CUSTODY RECORD

KEMRON ENVIRONMENTAL SERVICES

KEMRON ENVIRONMENTAL SERVICES, INC.
APPLIED TECHNOLOGIES GROUP
1359-A Ellsworth Industrial Boulevard
ATLANTA, GEORGIA 30318
(404) 636-0928 FAX (404) 636-7162
WWW.KEMRON.COM

PROJECT NAME: CALUMET CDF

ATG PROJECT #:

TAT or DUE DATE:

CONTACT: DAVID BOWER

ATG PROJECT MANAGER: CHANA GILZENRAT

PHONE#: 312 3465000 EXT.

RECEIVING LAB:

PO#:

SAMPLED BY: DAVID BOWER

PRINTED NAME

SIGNATURE

ANALYSES (indicate target list)

SAMPLE NUMBER	SAMPLE DESCRIPTION	SAMPLE DATE/TIME	Sample	Preservative	# / Size of Cont.	Wet Sieving per shipment to Kalahdin	Particle Size via Hydrometer	Void Ratio	Specific Gravity	Bulk Specific Gravity				
CHCDF 2005 06	Sediment	3-15-06		NA	1-5 gallon	X	X	X	X	X				
CHCDF 2005 07					1-5 gallon	X	X	X	X	X				
CHCDF 2005 P1					1-8oz		X	X	X	X				
CHCDF 2005 P2					1-8oz		X	X	X	X				
CHCDF 2005 P3					1-8oz		X	X	X	X				
CHCDF 2005 05					1-8oz		X	X	X	X				
CHCDF 2005 03					1-5 gallon	X	X	X	X	X				
CHCDF 2005 02					1-8oz		X	X	X	X				

SAMPLES RELINQUISHED BY:	DATE/ TIME	SAMPLES ACCEPTED BY:	DATE/ TIME
	3-15-06 19:00		3/16/06

COMMENTS:

Dry Weight Results is Default for Soils/Applicable Wastes

REV 5 11/26/01

h:\treat\coc1.xls

SAMPLE CHAIN OF-CUSTODY RECORD

KEMRON ENVIRONMENTAL SERVICES

ENVIRONMENTAL SERVICES

KEMRON ENVIRONMENTAL SERVICES, INC.
APPLIED TECHNOLOGIES GROUP
1359-A Ellsworth Industrial Boulevard
ATLANTA, GEORGIA 30318
(404) 636-0928 FAX (404) 636-7162
WWW.KEMRON.COM

PROJECT NAME: CALUMET CDF

ATG PROJECT #:

TAT or DUE DATE:

CONTACT: DAVID BOWER

ATG PROJECT MANAGER: CHANA GILZENRAT

PHONE#: 312 3465000 EXT

RECEIVING LAB: ATLANTA

PO#:

SAMPLED BY: DAVID BOWER
PRINTED NAME

SIGNATURE

SAMPLE NUMBER	SAMPLE DESCRIPTION	SAMPLE DATE/TIME	Sample	Preservative	# / Size of Cont.	ANALYSES (indicate target list): Wet sieving for separation & shipment to Katahdin								
CHCDF 2005 09	Sediment	3-14-06		NA	1-5 gallon	X								
CHCDF 2005 08	Sediment	3-14-06		NA	1-5 gallon	X								
CHCDF 2005 01	Sediment	3-14-06		NA	1-5 gallon	X								
CHCDF 2005 04	Sediment	3-14-06		NA	1-5 gallon	X								

SAMPLES RELINQUISHED BY:	DATE/TIME	SAMPLES ACCEPTED BY:	DATE/TIME
	3-14-06 19:30		3/15/06

COMMENTS:

REV 5 11/26/01

Dry Weight Results is Default for Soils/Applicable Wastes

h:\treatcoc1.xls

ATTACHMENT B

DATA REPORTS

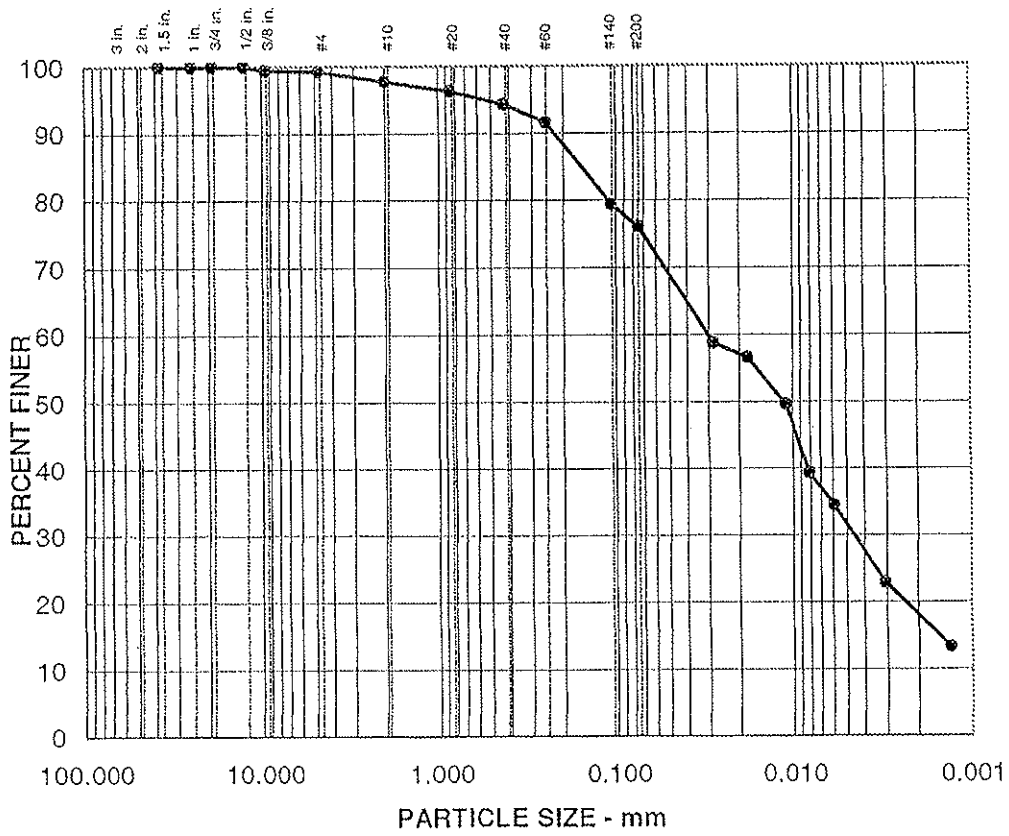
KEMRON ENVIRONMENTAL SERVICES, INC.
CDM FEDERAL PROGRAMS CORPORATION
CALUMET CDF SITE

TABLE 1
Summary of Analyses

TESTING PARAMETER	TEST METHOD	UNIT	RESULTS											
			2005-01	2005-02	2005-03	2005-004	2005-05	2005-06	2005-07	2005-08	2005-09	2005-P1	2005-P2	2005-P3
PHYSICAL PROPERTIES														
Particle Size Analysis	ASTM D422													
- Gravel		%	0.8	0.3	0.1	0.6	0.1	1.1	1.1	2.6	11.7	0	4.7	3.6
- Sand		%	23.2	28.3	20.2	35.8	31.8	24.0	27.5	49.7	32.7	22.1	39.4	58.5
- Silt		%	44.4	49.5	52.3	41.3	46.7	37.2	37.3	26.3	29.6	49.7	29.2	23
- Clay		%	31.6	21.9	27.4	22.3	21.4	37.7	34.1	21.4	26.0	28.2	26.7	14.9
Bulk Density	ASTM D2937	lb/ft³	112.3	115.3	113.7	113.0	112.7	121.9	111.2	117.7	117.0	108.1	118.8	113
Dry Density	ASTM D2937	lb/ft³	79.5	85.7	80.6	82.1	80.1	91.0	77.7	85.0	90.1	71.8	88.9	86.4
Moisture Content	ASTM D2216	%	41.25	34.55	41.12	37.6	40.68	33.95	43.06	38.43	29.92	50.48	33.68	30.76
Specific Gravity	ASTM D854	-	2.72	2.74	2.76	2.69	2.77	2.76	2.73	2.66	2.72	2.77	2.74	2.61
Specific Gravity > #200 Fraction	ASTM D854	-	2.51		2.69	2.60		2.67	2.62	2.66	2.54			
Specific Gravity < #200 Fraction	ASTM D854	-	2.80		2.78	2.76		2.74	2.71	2.78	2.79			
Total Porosity	-	%	53.2	49.9	53.2	51.1	53.7	47.2	54.4	48.8	46.9	58.4	48.0	46.9

- Not aplicable

PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
0.8	23.2	44.4	31.6

SAMPLE INFORMATION	
Project Name:	Calumet CDF Site
Project Number:	SE-0160
Sample ID:	CHCDF 2005-01
Sample Description:	Black-brown
Testing Date:	03/20/06

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	
USCS Classification	
Classification	
AASHTO Classification	
Classification	
Group Index	
DESCRIPTION: Sandy Clayey Silt	

KEMRON ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM
ASTM D422

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-01
SAMPLE DESCRIPT:	Black-brown
TESTING DATE:	03/20/06
TESTED BY:	CLG/KFS
TRACKING CODE:	3708

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	118.59 g
WT WET SOIL + TARE	216.90 g
WT DRY SOIL + TARE	188.19 g
WT WATER, Ww	28.71 g
WT DRY SOIL, Ws	69.60 g
ASTM MOISTURE	41.25 %
EPA MOISTURE	29.20 %

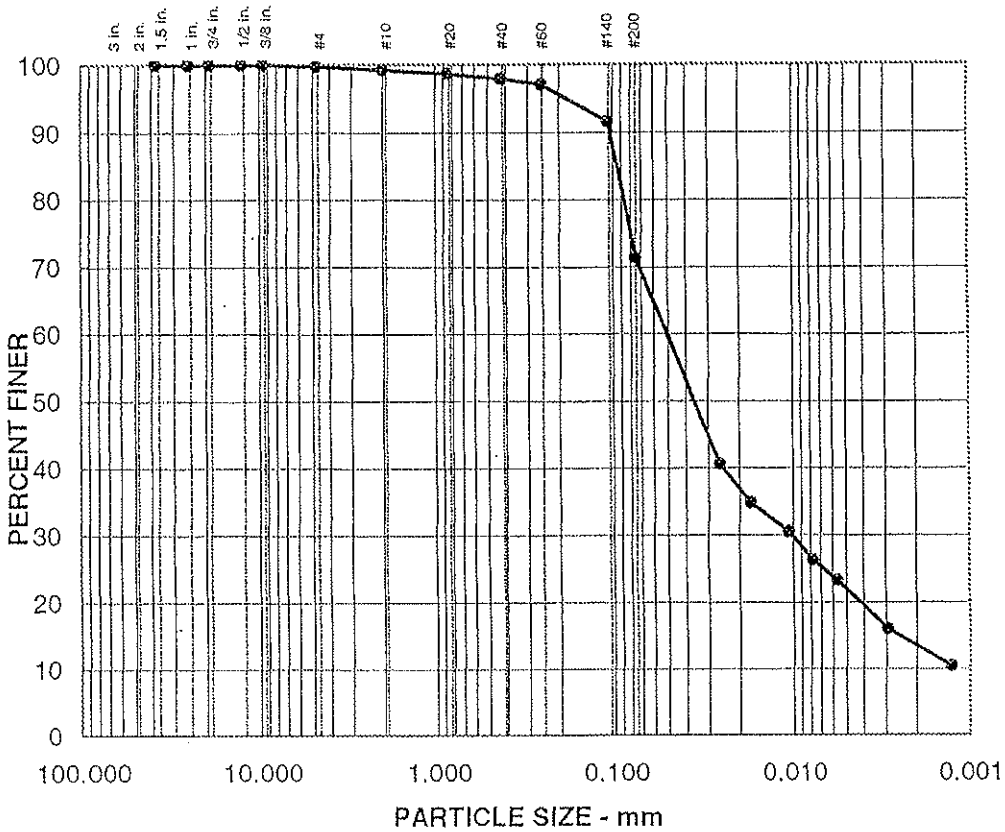
SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	100.0 %
0.375	99.4 %
#4	99.2 %
#10	97.8 %
#20	96.4 %
#40	94.3 %
#60	91.6 %
#140	79.4 %
#200	76.1 %

HYDROMETER ANALYSIS	
HYDROMETER No.	2
WT OF DRY SOIL, Ws	52.94
DATE TESTING INITIATED	03/20/06
TIME TESTING INITIATED	9:33:00 AM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	44.5	41.7	0.0283	58.7
5	42.8	40.2	0.0180	56.6
15	37.8	35.2	0.0108	49.5
30	30.5	27.9	0.0081	39.3
60	27.0	24.4	0.0059	34.4
250	18.8	16.2	0.0030	22.8
1440	12.0	9.4	0.0013	13.3

KEMRON
ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
0.3	28.3	49.5	21.9

SAMPLE INFORMATION	
Project Name:	Calumet CDF Site
Project Number:	SE-0160
Sample ID:	CHCDF 2005-02
Sample Description:	Black-brown
Testing Date:	03/20/06

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	
USCS Classification	
Classification	
AASHTO Classification	
Classification	
Group Index	
DESCRIPTION: Sandy Clayey Silt	

KEMRON ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM
ASTM D422

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-02
SAMPLE DESCRIPT:	Black-brown
TESTING DATE:	03/20/06
TESTED BY:	CLG/KFS
TRACKING CODE:	3709

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	185.29 g
WT WET SOIL + TARE	339.65 g
WT DRY SOIL + TARE	300.10 g
WT WATER, Ww	39.64 g
WT DRY SOIL, Ws	114.72 g
ASTM MOISTURE	34.55 %
EPA MOISTURE	25.68 %

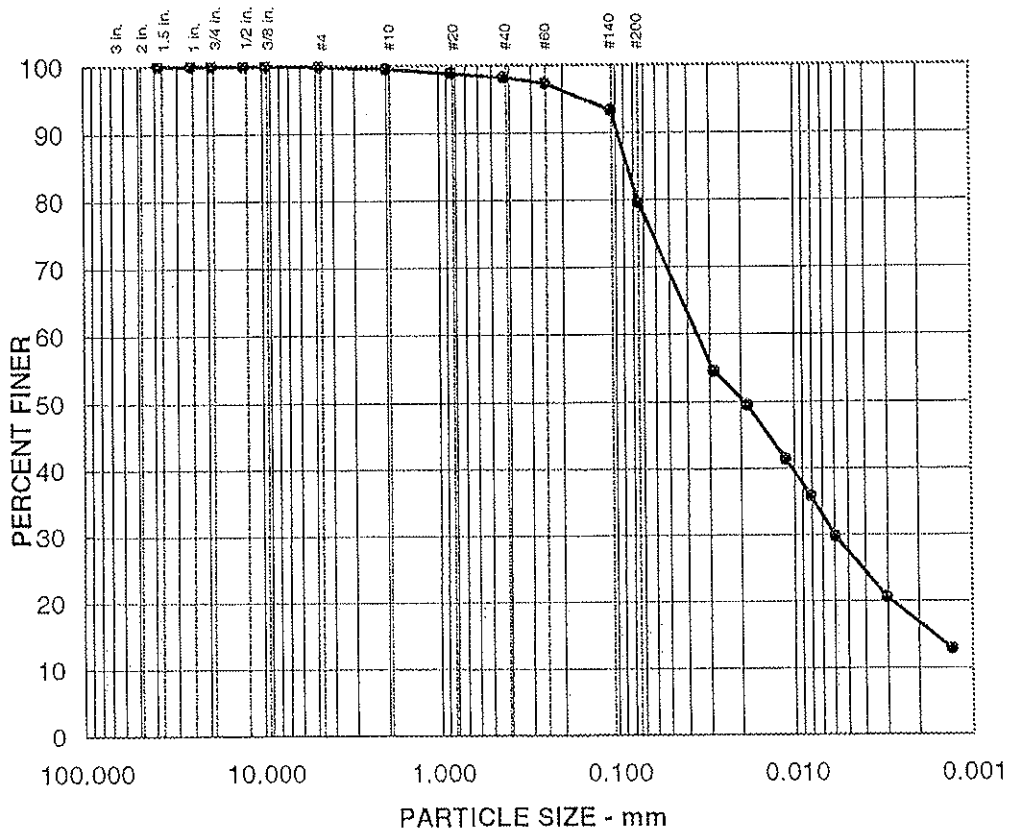
SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	100.0 %
0.375	100.0 %
#4	99.7 %
#10	99.3 %
#20	98.7 %
#40	98.0 %
#60	97.1 %
#140	91.6 %
#200	71.4 %

HYDROMETER ANALYSIS	
HYDROMETER No.	2
Wt OF DRY SOIL, Ws	81.90
DATE TESTING INITIATED	03/20/06
TIME TESTING INITIATED	9:34:00 AM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	53.0	47.5	0.0259	40.5
5	46.0	40.7	0.0174	34.7
15	41.0	35.7	0.0105	30.5
30	36.0	30.7	0.0077	26.2
60	32.5	27.2	0.0056	23.2
250	24.0	18.7	0.0029	16.0
1440	17.5	12.2	0.0013	10.4

KEMRON
ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
0.1	20.2	52.3	27.4

SAMPLE INFORMATION	
Project Name:	Calumet CDF Site
Project Number:	SE-0160
Sample ID:	CHCDF 2005-03
Sample Description:	Black-brown
Testing Date:	03/20/06

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	
USCS Classification	
Classification	
AASHTO Classification	
Classification	
Group Index	
DESCRIPTION: Sandy Clayey Silt	

KEMRON ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM
ASTM D422

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-03
SAMPLE DESCRIPT:	Black-brown
TESTING DATE:	03/20/06
TESTED BY:	CLG/KFS
TRACKING CODE:	3710

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	98.94 g
WT WET SOIL + TARE	199.92 g
WT DRY SOIL + TARE	170.50 g
WT WATER, Ww	29.43 g
WT DRY SOIL, Ws	71.56 g
ASTM MOISTURE	41.12 %
EPA MOISTURE	29.14 %

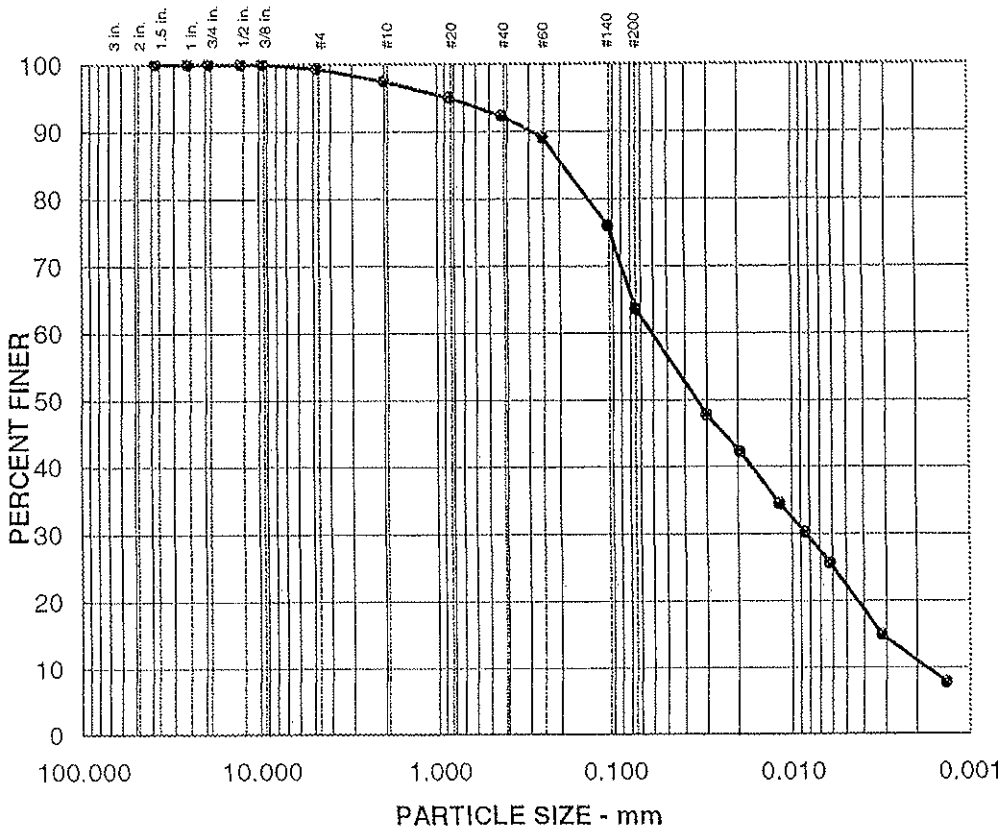
HYDROMETER ANALYSIS	
HYDROMETER No.	2
Wt OF DRY SOIL, Ws	57.01
DATE TESTING INITIATED	03/20/06
TIME TESTING INITIATED	9:35:00 AM

SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	100.0 %
0.375	100.0 %
#4	99.9 %
#10	99.5 %
#20	98.9 %
#40	98.2 %
#60	97.4 %
#140	93.3 %
#200	79.7 %

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	43.0	40.2	0.0284	54.5
5	39.0	36.4	0.0184	49.4
15	33.0	30.4	0.0111	41.2
30	29.0	26.4	0.0081	35.8
60	24.5	21.9	0.0059	29.7
250	17.8	15.2	0.0030	20.6
1440	12.0	9.4	0.0013	12.8

KEMRON
ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
0.6	35.8	41.3	22.3

SAMPLE INFORMATION	
Project Name:	Calumet CDF Site
Project Number:	SE-0160
Sample ID:	CHCDF 2005-04
Sample Description:	Black-brown
Testing Date:	03/20/06

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	
USCS Classification	
Classification	
AASHTO Classification	
Classification	
Group Index	
DESCRIPTION: Sandy Clayey Silt	

KEMRON ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM
ASTM D422

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-04
SAMPLE DESCRIPT:	Black-brown
TESTING DATE:	03/20/06
TESTED BY:	CLG/KFS
TRACKING CODE:	3711

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	117.67 g
WT WET SOIL + TARE	222.43 g
WT DRY SOIL + TARE	193.81 g
WT WATER, Ww	28.63 g
WT DRY SOIL, Ws	76.14 g
ASTM MOISTURE	37.60 %
EPA MOISTURE	27.32 %

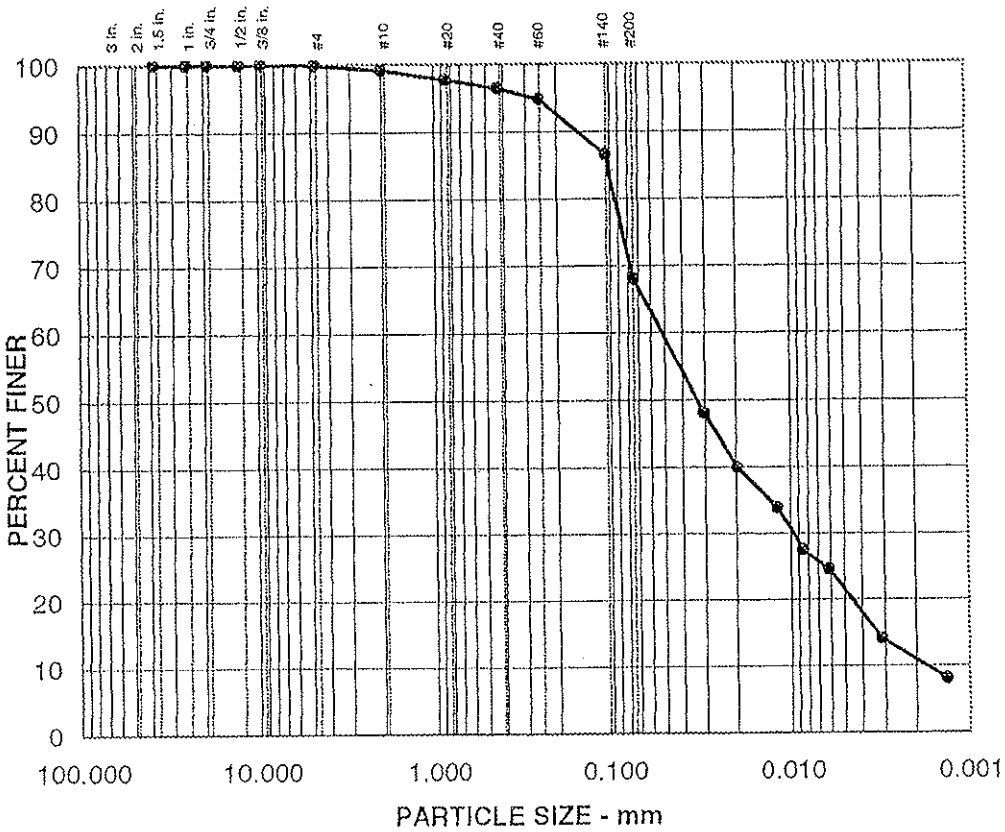
HYDROMETER ANALYSIS	
HYDROMETER No.	2
Wt OF DRY SOIL, Ws	48.41
DATE TESTING INITIATED	03/20/06
TIME TESTING INITIATED	9:36:00 AM

SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	100.0 %
0.375	100.0 %
#4	99.4 %
#10	97.5 %
#20	95.0 %
#40	92.3 %
#60	89.1 %
#140	75.9 %
#200	63.6 %

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	39.5	36.7	0.0299	47.7
5	35.0	32.4	0.0194	42.2
15	29.0	26.4	0.0117	34.4
30	25.8	23.2	0.0085	30.1
60	22.3	19.7	0.0061	25.6
250	14.0	11.4	0.0032	14.9
1440	8.5	5.9	0.0014	7.7

KEMRON
ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
0.1	31.8	46.7	21.4

SAMPLE INFORMATION	
Project Name:	Calumet CDF Site
Project Number:	SE-0160
Sample ID:	CHCDF 2005-05
Sample Description:	Black-brown
Testing Date:	03/20/06

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	
USCS Classification	
Classification	
AASHTO Classification	
Classification	
Group Index	
DESCRIPTION: Sandy Clayey Silt	

KEMRON ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM
ASTM D422

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-05
SAMPLE DESCRIPT:	Black-brown
TESTING DATE:	03/20/06
TESTED BY:	CLG/KFS
TRACKING CODE:	3712

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	91.87 g
WT WET SOIL + TARE	183.45 g
WT DRY SOIL + TARE	156.97 g
WT WATER, Ww	26.49 g
WT DRY SOIL, Ws	65.10 g
ASTM MOISTURE	40.68 %
EPA MOISTURE	28.92 %

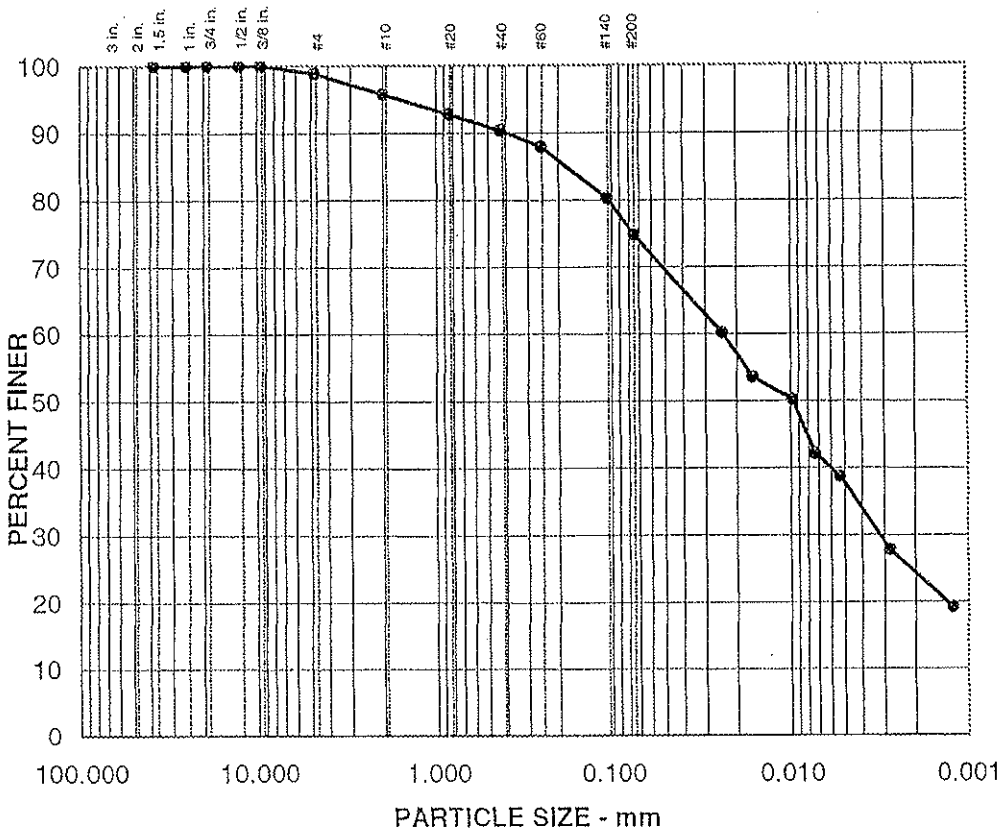
HYDROMETER ANALYSIS	
HYDROMETER No.	2
WT OF DRY SOIL, Ws	44.35
DATE TESTING INITIATED	03/20/06
TIME TESTING INITIATED	9:37:00 AM

SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	100.0 %
0.375	100.0 %
#4	99.9 %
#10	99.1 %
#20	97.8 %
#40	96.4 %
#60	94.8 %
#140	86.6 %
#200	68.1 %

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	35.0	32.2	0.0303	48.0
5	29.3	26.7	0.0197	39.7
15	25.3	22.7	0.0117	33.8
30	21.0	18.4	0.0085	27.5
60	19.0	16.4	0.0061	24.5
250	12.0	9.4	0.0031	14.0
1440	8.0	5.4	0.0013	8.1

KEMRON
ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
1.1	24.0	37.2	37.7

SAMPLE INFORMATION	
Project Name:	Calumet CDF Site
Project Number:	SE-0160
Sample ID:	CHCDF 2005-06
Sample Description:	Black-brown
Testing Date:	03/20/06

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	
USCS Classification	
Classification	
AASHTO Classification	
Classification	
Group Index	
DESCRIPTION: Sandy Silty Clay	

KEMRON
ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM
ASTM D422

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-06
SAMPLE DESCRIPT:	Black-brown
TESTING DATE:	03/20/06
TESTED BY:	CLG/KFS
TRACKING CODE:	3713

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	234.92 g
WT WET SOIL + TARE	348.20 g
WT DRY SOIL + TARE	319.49 g
WT WATER, Ww	28.71 g
WT DRY SOIL, Ws	84.57 g
ASTM MOISTURE	33.95 %
EPA MOISTURE	25.34 %

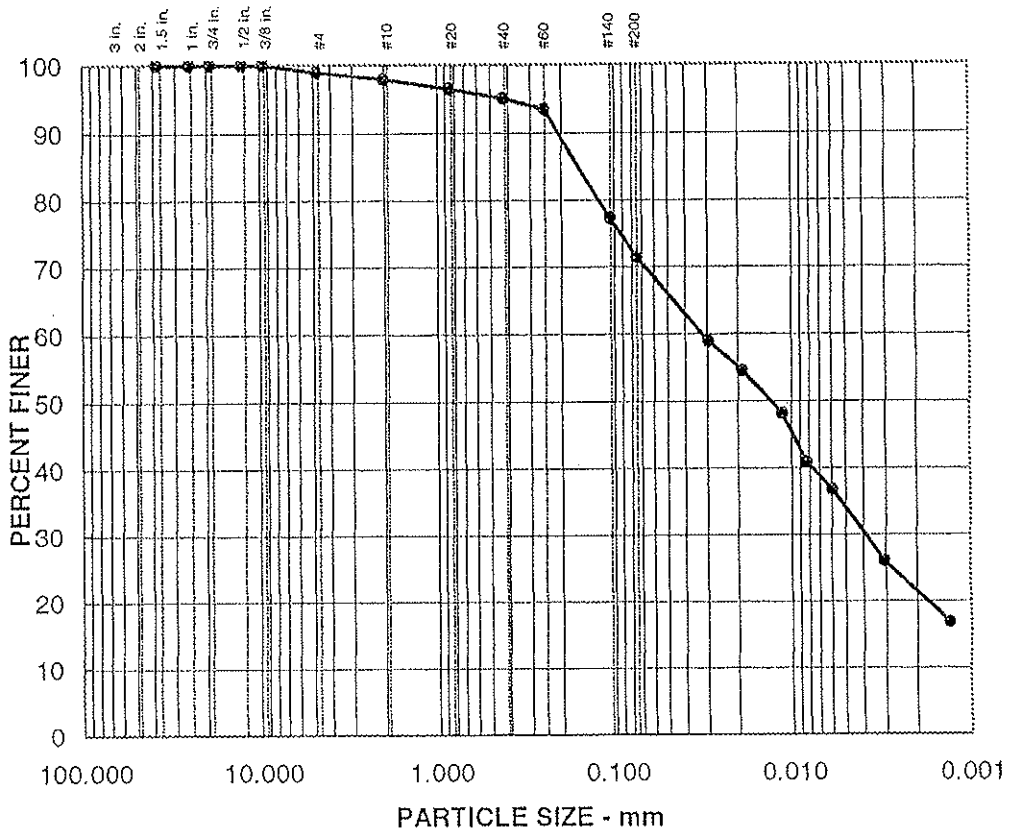
HYDROMETER ANALYSIS	
HYDROMETER No.	2
Wt OF DRY SOIL, Ws	63.32
DATE TESTING INITIATED	03/20/06
TIME TESTING INITIATED	9:38:00 AM

SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	100.0 %
0.375	100.0 %
#4	98.9 %
#10	95.8 %
#20	92.9 %
#40	90.4 %
#60	87.9 %
#140	80.3 %
#200	74.9 %

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	58.0	52.5	0.0243	60.2
5	52.0	46.7	0.0162	53.5
15	49.0	43.7	0.0097	50.1
30	42.0	36.7	0.0073	42.1
60	39.0	33.7	0.0053	38.6
250	29.5	24.2	0.0028	27.7
1440	22.0	16.7	0.0012	19.1

KEMRON
ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
1.1	27.5	37.3	34.1

SAMPLE INFORMATION	
Project Name:	Calumet CDF Site
Project Number:	SE-0160
Sample ID:	CHCDF 2005-07
Sample Description:	Black-brown
Testing Date:	03/20/06

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	
USCS Classification	
Classification	
AASHTO Classification	
Classification	
Group Index	
DESCRIPTION: Sandy Clayey Silt	

KEMRON ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM
ASTM D422

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-07
SAMPLE DESCRIPT:	Black-brown
TESTING DATE:	03/20/06
TESTED BY:	CLG/KFS
TRACKING CODE:	3714

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	121.22 g
WT WET SOIL + TARE	208.56 g
WT DRY SOIL + TARE	182.27 g
WT WATER, Ww	26.29 g
WT DRY SOIL, Ws	61.05 g
ASTM MOISTURE	43.06 %
EPA MOISTURE	30.10 %

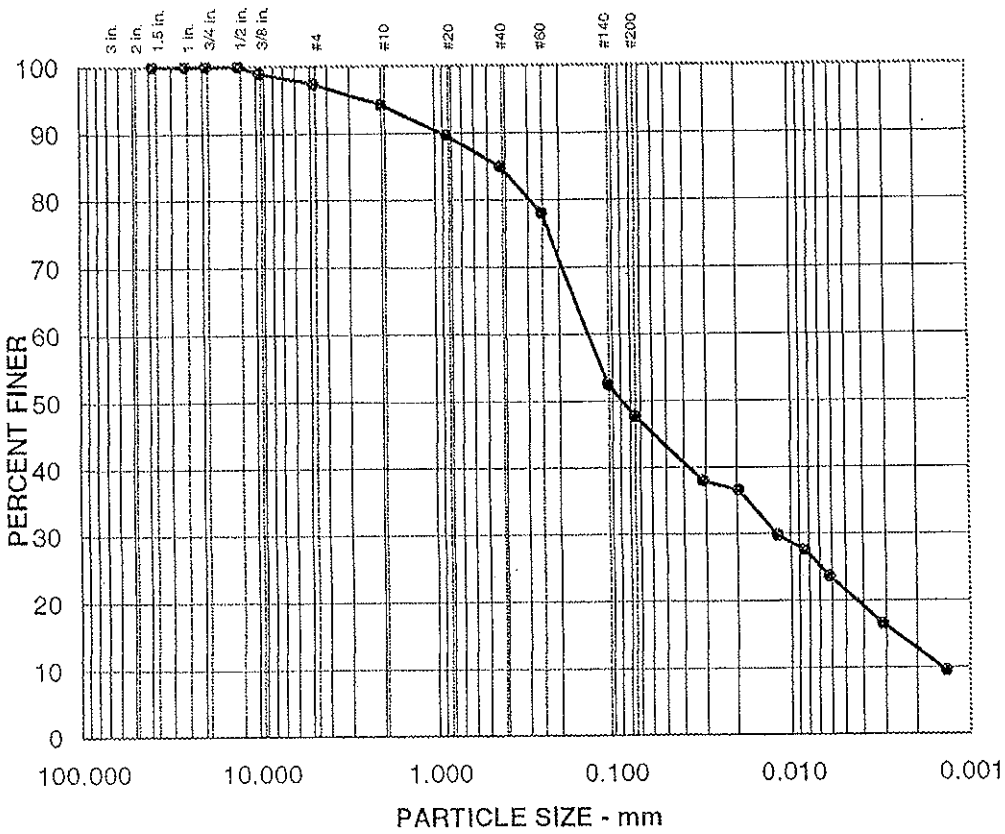
HYDROMETER ANALYSIS	
HYDROMETER No.	2
Wt OF DRY SOIL, Ws	43.60
DATE TESTING INITIATED	03/20/06
TIME TESTING INITIATED	9:44:00 AM

SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	100.0 %
0.375	100.0 %
#4	98.9 %
#10	97.9 %
#20	96.5 %
#40	95.1 %
#60	93.5 %
#140	77.2 %
#200	71.4 %

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	39.5	36.7	0.0295	58.9
5	36.5	33.9	0.0189	54.5
15	32.5	29.9	0.0113	48.0
30	28.0	25.4	0.0082	40.8
60	25.5	22.9	0.0059	36.8
250	18.8	16.2	0.0030	26.0
1440	13.0	10.4	0.0013	16.7

kemron
ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
2.6	49.7	26.3	21.4

SAMPLE INFORMATION	
Project Name:	Calumet CDF Site
Project Number:	SE-0160
Sample ID:	CHCDF 2005-08
Sample Description:	Black-brown
Testing Date:	03/20/06

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	
USCS Classification	
Classification	
AASHTO Classification	
Classification	
Group Index	
DESCRIPTION: Clayey Silty Sand	

KEMRON ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM
ASTM D422

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-08
SAMPLE DESCRIPT:	Black-brown
TESTING DATE:	03/20/06
TESTED BY:	CLG/KFS
TRACKING CODE:	3715

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	98.88 g
WT WET SOIL + TARE	220.69 g
WT DRY SOIL + TARE	186.88 g
WT WATER, Ww	33.82 g
WT DRY SOIL, Ws	88.00 g
ASTM MOISTURE	38.43 %
EPA MOISTURE	27.76 %

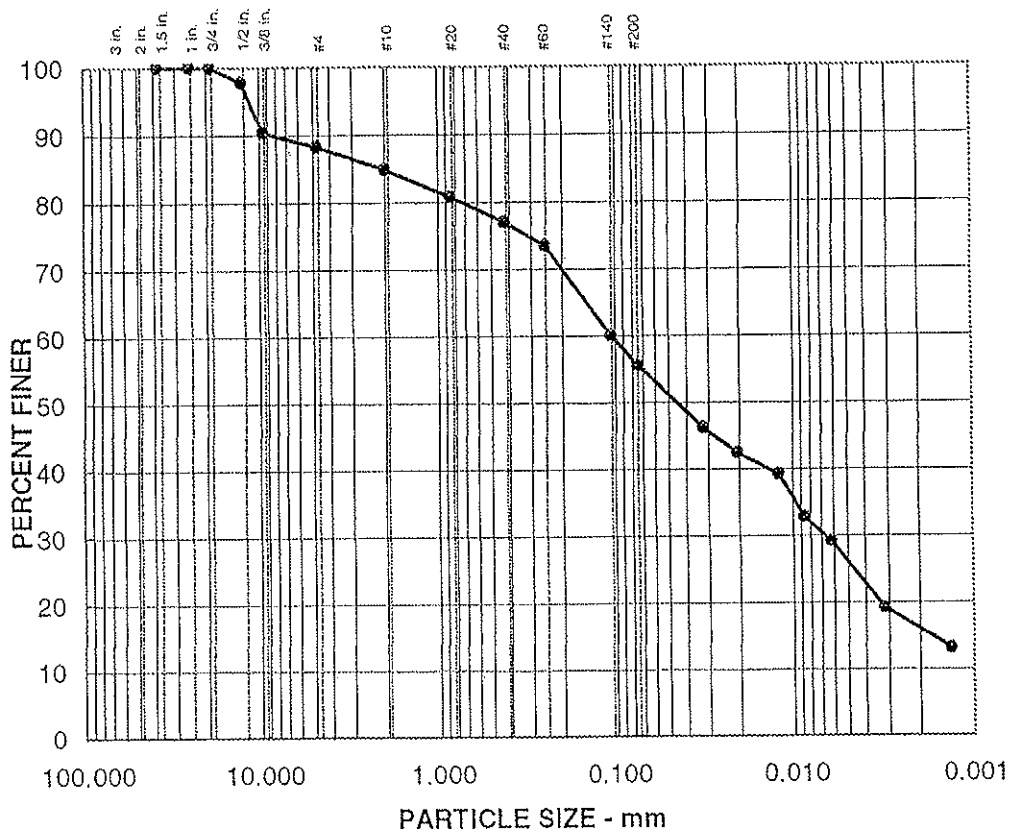
HYDROMETER ANALYSIS	
HYDROMETER No.	2
Wt OF DRY SOIL, Ws	41.90
DATE TESTING INITIATED	03/20/06
TIME TESTING INITIATED	9:40:00 AM

SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	100.0 %
0.375	99.0 %
#4	97.4 %
#10	94.2 %
#20	89.6 %
#40	84.9 %
#60	77.9 %
#140	52.5 %
#200	47.6 %

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	36.5	33.7	0.0309	37.9
5	35.0	32.4	0.0195	36.5
15	29.0	26.4	0.0118	29.7
30	27.0	24.4	0.0085	27.5
60	23.5	20.9	0.0061	23.5
250	17.3	14.7	0.0031	16.5
1440	11.0	8.4	0.0013	9.5

kemron
ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
11.7	32.7	29.6	26.0

SAMPLE INFORMATION	
Project Name:	Calumet CDF Site
Project Number:	SE-0160
Sample ID:	CHCDF 2005-09
Sample Description:	Black-brown
Testing Date:	03/20/06

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	
USCS Classification	
Classification	
AASHTO Classification	
Classification	
Group Index	
DESCRIPTION: Gravelly Sandy Clayey Silt	

KEMRON ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM
ASTM D422

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-09
SAMPLE DESCRIPT:	Black-brown
TESTING DATE:	03/20/06
TESTED BY:	CLG/KFS
TRACKING CODE:	3716

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	98.28 g
WT WET SOIL + TARE	167.82 g
WT DRY SOIL + TARE	151.80 g
WT WATER, Ww	16.02 g
WT DRY SOIL, Ws	53.52 g
ASTM MOISTURE	29.92 %
EPA MOISTURE	23.03 %

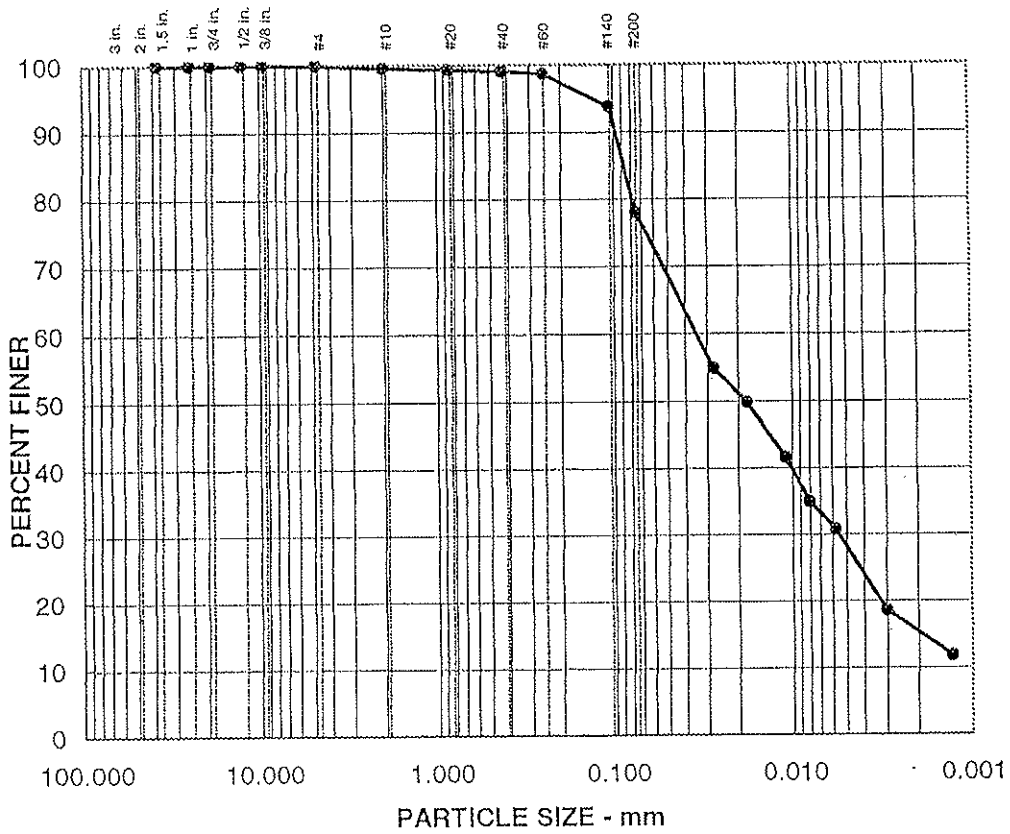
HYDROMETER ANALYSIS	
HYDROMETER No.	2
Wt OF DRY SOIL, Ws	29.75
DATE TESTING INITIATED	03/20/06
TIME TESTING INITIATED	9:42:00 AM

SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	97.8 %
0.375	90.4 %
#4	88.3 %
#10	84.9 %
#20	80.9 %
#40	77.1 %
#60	73.6 %
#140	60.1 %
#200	55.6 %

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	28.0	25.2	0.0323	46.2
5	25.8	23.2	0.0205	42.4
15	24.0	21.4	0.0120	39.2
30	20.5	17.9	0.0087	32.8
60	18.5	15.9	0.0062	29.2
250	13.0	10.4	0.0031	19.1
1440	9.8	7.2	0.0013	13.1

KEMRON
ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
0.0	22.1	49.7	28.2

SAMPLE INFORMATION	
Project Name:	Calumet CDF Site
Project Number:	SE-0160
Sample ID:	CHCDF 2005-P1
Sample Description:	Black-brown
Testing Date:	03/20/06

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	
USCS Classification	
Classification	
AASHTO Classification	
Classification	
Group Index	
DESCRIPTION: Sandy Clayey Silt	

KEMRON
ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM
ASTM D422

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-P1
SAMPLE DESCRIPT:	Black-brown
TESTING DATE:	03/20/06
TESTED BY:	CLG/KFS
TRACKING CODE:	3717

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	240.43 g
WT WET SOIL + TARE	348.04 g
WT DRY SOIL + TARE	311.94 g
WT WATER, Ww	36.10 g
WT DRY SOIL, Ws	71.51 g
ASTM MOISTURE	50.48 %
EPA MOISTURE	33.55 %

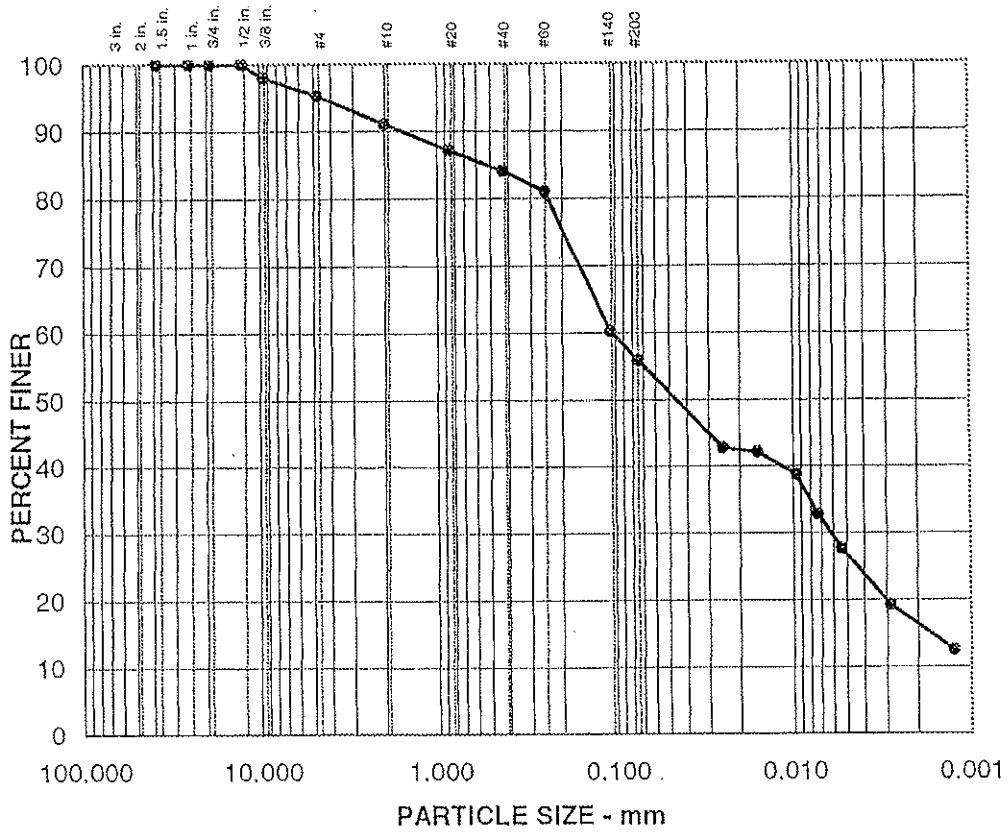
SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	100.0 %
0.375	100.0 %
#4	100.0 %
#10	99.5 %
#20	99.4 %
#40	99.0 %
#60	98.7 %
#140	93.8 %
#200	77.9 %

HYDROMETER ANALYSIS	
HYDROMETER No.	2
WT OF DRY SOIL, Ws	55.72
DATE TESTING INITIATED	03/20/06
TIME TESTING INITIATED	9:30:00 AM

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	46.0	40.5	0.0276	54.9
5	42.0	36.7	0.0179	49.7
15	36.0	30.7	0.0108	41.6
30	31.0	25.7	0.0080	34.8
60	28.0	22.7	0.0057	30.8
250	19.0	13.7	0.0030	18.6
1440	14.0	8.7	0.0013	11.8

KEMRON
ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
4.7	39.4	29.2	26.7

SAMPLE INFORMATION	
Project Name:	Calumet CDF Site
Project Number:	SE-0160
Sample ID:	CHCDF 2005-P2
Sample Description:	Black-brown
Testing Date:	03/20/06

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	
USCS Classification	
Classification	
AASHTO Classification	
Classification	
Group Index	
DESCRIPTION: Sandy Clayey Silt	

KEMRON ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM
ASTM D422

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-P2
SAMPLE DESCRIPT:	Black-brown
TESTING DATE:	03/20/06
TESTED BY:	CLG/KFS
TRACKING CODE:	3718

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	234.41 g
WT WET SOIL + TARE	389.22 g
WT DRY SOIL + TARE	350.22 g
WT WATER, Ww	39.00 g
WT DRY SOIL, Ws	115.81 g
ASTM MOISTURE	33.68 %
EPA MOISTURE	25.19 %

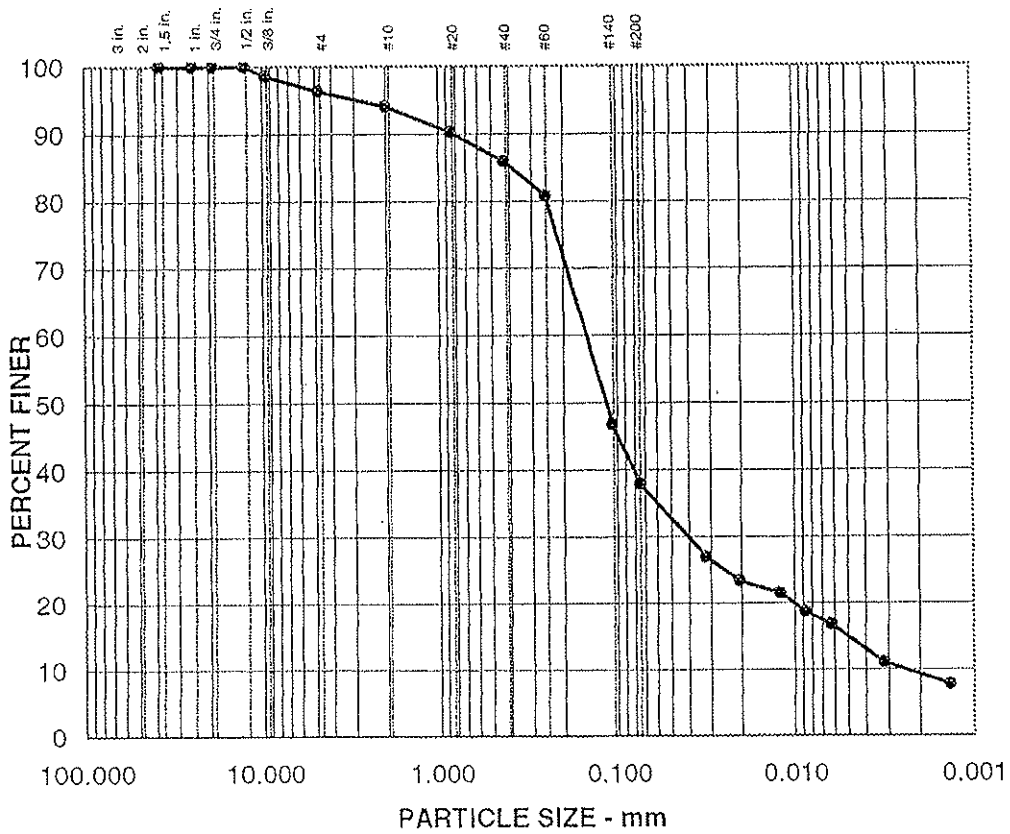
HYDROMETER ANALYSIS	
HYDROMETER No.	2
Wt OF DRY SOIL, Ws	64.71
DATE TESTING INITIATED	03/20/06
TIME TESTING INITIATED	9:31:00 AM

SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	100.0 %
0.375	98.1 %
#4	95.3 %
#10	91.0 %
#20	87.2 %
#40	84.1 %
#60	81.1 %
#140	60.3 %
#200	55.9 %

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	56.0	50.5	0.0251	42.7
5	55.0	49.7	0.0158	42.0
15	51.0	45.7	0.0095	38.7
30	44.0	38.7	0.0072	32.7
60	38.0	32.7	0.0054	27.7
250	28.0	22.7	0.0028	19.2
1440	20.0	14.7	0.0012	12.4

kemron
ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION TEST REPORT



% GRAVEL	% SAND	% SILT	% CLAY
3.6	58.5	23.0	14.9

SAMPLE INFORMATION	
Project Name:	Calumet CDF Site
Project Number:	SE-0160
Sample ID:	CHCDF 2005-P3
Sample Description:	Black-brown
Testing Date:	03/20/06

SAMPLE CLASSIFICATION	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	
USCS Classification	
Classification	
AASHTO Classification	
Classification	
Group Index	
DESCRIPTION: Clayey Silty Sand	

KEMRON ENVIRONMENTAL SERVICES

PARTICLE SIZE DISTRIBUTION DATA REPORT

REPORT FORM
ASTM D422

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-P3
SAMPLE DESCRIPT:	Black-brown
TESTING DATE:	03/20/06
TESTED BY:	CLG/KFS
TRACKING CODE:	3719

MOISTURE CONTENT (DRY AND WET BASIS)	
TARE WEIGHT	211.59 g
WT WET SOIL + TARE	349.66 g
WT DRY SOIL + TARE	317.18 g
WT WATER, Ww	32.48 g
WT DRY SOIL, Ws	105.59 g
ASTM MOISTURE	30.76 %
EPA MOISTURE	23.52 %

HYDROMETER ANALYSIS	
HYDROMETER No.	2
WT OF DRY SOIL, Ws	39.99
DATE TESTING INITIATED	03/20/06
TIME TESTING INITIATED	9:32:00 AM

SIEVE NUMBER	PERCENT PASSING
1.5	100.0 %
1.0	100.0 %
0.75	100.0 %
0.5	100.0 %
0.375	98.6 %
#4	96.4 %
#10	94.1 %
#20	90.3 %
#40	85.9 %
#60	80.7 %
#140	46.8 %
#200	37.9 %

ELAPSED TIME (minutes)	ACTUAL READING	CORRECTED READING	DIAMETER (mm)	PERCENT FINER (%)
2	34.0	28.5	0.0320	27.0
5	30.0	24.7	0.0206	23.4
15	28.0	22.7	0.0121	21.5
30	25.0	19.7	0.0087	18.6
60	23.0	17.7	0.0062	16.7
250	17.0	11.7	0.0032	11.1
1440	13.5	8.2	0.0013	7.7

KEMRON
ENVIRONMENTAL SERVICES

SOLID SPECIFIC GRAVITY

ASTM D 854
DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	3/27/2006
TESTED BY:	clg/kfs
TRACKING CODE:	3721_gs

SOLID SPECIFIC GRAVITY			
1. SAMPLE NUMBER	2005-07	2005-05	2005-02
2. FLASK NUMBER	2	1	1
3. TEMPERATURE	21.1 °C	21.1 °C	21.9 °C
4. WT. FLASK & WATER	219.30 g	225.82 g	208.25 g
5. WT. WATER, FLASK & SOIL	250.56 g	253.26 g	238.2 g
6. WT OF SOIL	31.26 g	27.44 g	29.96 g
7. CALIBRATION WATER & FLASK	351.42 g	347.88 g	347.84 g
8. DEAIRED SAMPLE	371.23 g	365.41 g	366.88 g
9. SPECIFIC GRAVITY	2.73	2.77	2.74
10. CORRECTION FACTOR K	0.9998	0.9998	0.9996
11. Gs @ 20 °C	2.73	2.77	2.74

SOLID SPECIFIC GRAVITY

ASTM D 854
DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	3/27/2006
TESTED BY:	kfs
TRACKING CODE:	3722_gs

SOLID SPECIFIC GRAVITY			
1. SAMPLE NUMBER	2005-09	2005-08	2005-P3
2. FLASK NUMBER	2	1	2
3. TEMPERATURE	22.1 °C	23.1 °C	23.0 °C
4. WT. FLASK & WATER	216.88 g	218.27 g	224.84 g
5. WT. WATER, FLASK & SOIL	246.62 g	249.05 g	255.2 g
6. WT OF SOIL	29.74 g	30.78 g	30.39 g
7. CALIBRATION WATER & FLASK	351.36 g	347.77 g	351.31 g
8. DEAIRED SAMPLE	370.17 g	366.97 g	370.06 g
9. SPECIFIC GRAVITY	2.72	2.66	2.61
10. CORRECTION FACTOR K	0.9996	0.9993	0.9993
11. Gs @ 20 °C	2.72	2.66	2.61

SOLID SPECIFIC GRAVITY

ASTM D 854
DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	3/27/2006
TESTED BY:	kfs
TRACKING CODE:	3723_gs

SOLID SPECIFIC GRAVITY			
1. SAMPLE NUMBER	2005-04	2005-P2	2005-P1
2. FLASK NUMBER	1	2	1
3. TEMPERATURE	22.9 °C	23.0 °C	22.9 °C
4. WT. FLASK & WATER	228.13 g	225.30 g	227.13 g
5. WT. WATER, FLASK & SOIL	258.69 g	258.82 g	257.64 g
6. WT OF SOIL	30.56 g	33.52 g	30.51 g
7. CALIBRATION WATER & FLASK	347.78 g	351.31 g	347.78 g
8. DEAIRED SAMPLE	366.99 g	372.59 g	367.27 g
9. SPECIFIC GRAVITY	2.69	2.74	2.77
10. CORRECTION FACTOR K	0.9993	0.9993	0.9993
11. Gs @ 20 °C	2.69	2.74	2.77

SOLID SPECIFIC GRAVITY

ASTM D 854
DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	3/27/2006
TESTED BY:	kls
TRACKING CODE:	3724_gs

SOLID SPECIFIC GRAVITY			
1. SAMPLE NUMBER	2005-03	2005-01	2005-06
2. FLASK NUMBER	2	1	2
3. TEMPERATURE	23.1 °C	22.8 °C	22.8 °C
4. WT. FLASK & WATER	223.29 g	221.50 g	225.38 g
5. WT. WATER, FLASK & SOIL	254.59 g	252.21 g	256.23 g
6. WT OF SOIL	31.30 g	30.71 g	30.85 g
7. CALIBRATION WATER & FLASK	351.30 g	347.79 g	351.32 g
8. DEAIRED SAMPLE	371.28 g	367.23 g	370.98 g
9. SPECIFIC GRAVITY	2.76	2.73	2.76
10. CORRECTION FACTOR K	0.9993	0.9993	0.9993
11. Gs @ 20 °C	2.76	2.72	2.76

SOLID SPECIFIC GRAVITY

ASTM D 854
DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	3/27/2006
TESTED BY:	kfs
TRACKING CODE:	3725_gs

SOLID SPECIFIC GRAVITY			
1. SAMPLE NUMBER	2005-06(>200)	2005-08(>200)	2005-04(>200)
2. FLASK NUMBER	1	2	1
3. TEMPERATURE	21.2 °C	21.8 °C	21.2 °C
4. WT. FLASK & WATER	224.53 g	221.89 g	225.26 g
5. WT. WATER, FLASK & SOIL	254.80 g	253.51 g	255.61 g
6. WT OF SOIL	30.27 g	31.62 g	30.35 g
7. CALIBRATION WATER & FLASK	347.88 g	351.38 g	347.88 g
8. DEAIRED SAMPLE	366.80 g	371.10 g	366.56 g
9. SPECIFIC GRAVITY	2.67	2.66	2.60
10. CORRECTION FACTOR K	0.9998	0.9996	0.9998
11. Gs @ 20 °C	2.67	2.66	2.60

SOLID SPECIFIC GRAVITY

ASTM D 854
DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	3/27/2006
TESTED BY:	kfs
TRACKING CODE:	3726_gs

SOLID SPECIFIC GRAVITY			
1. SAMPLE NUMBER	2005-03(>200)	2005-09(<200)	2005-01(<200)
2. FLASK NUMBER	2	1	2
3. TEMPERATURE	21.4 °C	20.4 °C	20.4 °C
4. WT. FLASK & WATER	226.66 g	224.80 g	225.54 g
5. WT. WATER, FLASK & SOIL	257.47 g	255.12 g	255.77 g
6. WT OF SOIL	30.81 g	30.32 g	30.23 g
7. CALIBRATION WATER & FLASK	351.40 g	347.92 g	351.46 g
8. DEAIRED SAMPLE	370.76 g	367.36 g	370.90 g
9. SPECIFIC GRAVITY	2.69	2.79	2.80
10. CORRECTION FACTOR K	0.9998	1.0000	1.0000
11. Gs @ 20 °C	2.69	2.79	2.80

SOLID SPECIFIC GRAVITY

ASTM D 854
DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	3/27/2006
TESTED BY:	kfs
TRACKING CODE:	3727_gs

SOLID SPECIFIC GRAVITY			
1. SAMPLE NUMBER	2005-03(<200)	2005-04(<200)	2005-07(<200)
2. FLASK NUMBER	1	2	1
3. TEMPERATURE	20.6 °C	20.6 °C	21.6 °C
4. WT. FLASK & WATER	214.02 g	219.67 g	220.69 g
5. WT. WATER, FLASK & SOIL	245.21 g	250.45 g	250.93 g
6. WT OF SOIL	31.19 g	30.78 g	30.24 g
7. CALIBRATION WATER & FLASK	347.91 g	351.44 g	347.85 g
8. DEAIRED SAMPLE	367.90 g	371.06 g	366.92 g
9. SPECIFIC GRAVITY	2.78	2.76	2.71
10. CORRECTION FACTOR K	0.9998	0.9998	0.9996
11. Gs @ 20 °C	2.78	2.76	2.71

SOLID SPECIFIC GRAVITY

ASTM D 854
DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	3/27/2006
TESTED BY:	kfs
TRACKING CODE:	3728_gs

SOLID SPECIFIC GRAVITY			
1. SAMPLE NUMBER	2005-08(<200)	2005-06(<200)	2005-07(>200)
2. FLASK NUMBER	2	1	2
3. TEMPERATURE	22.0 °C	21.5 °C	21.0 °C
4. WT. FLASK & WATER	223.60 g	219.21 g	219.56 g
5. WT. WATER, FLASK & SOIL	254.03 g	250.53 g	250.34 g
6. WT OF SOIL	30.43 g	31.32 g	30.78 g
7. CALIBRATION WATER & FLASK	351.36 g	347.86 g	351.42 g
8. DEAIRED SAMPLE	370.87 g	367.76 g	370.46 g
9. SPECIFIC GRAVITY	2.79	2.74	2.62
10. CORRECTION FACTOR K	0.9996	0.9996	0.9998
11. Gs @ 20 °C	2.78	2.74	2.62

SOLID SPECIFIC GRAVITY

ASTM D 854
DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	3/27/2006
TESTED BY:	kfs
TRACKING CODE:	3729_gs

SOLID SPECIFIC GRAVITY			
1. SAMPLE NUMBER	2005-09(>200)	2005-01(>200)	
2. FLASK NUMBER	1	2	
3. TEMPERATURE	21.0 °C	20.5 °C	°C
4. WT. FLASK & WATER	220.94 g	221.24 g	g
5. WT. WATER, FLASK & SOIL	251.32 g	251.51 g	g
6. WT OF SOIL	30.38 g	30.27 g	g
7. CALIBRATION WATER & FLASK	347.89 g	351.45 g	g
8. DEAIRED SAMPLE	366.33 g	369.66 g	g
9. SPECIFIC GRAVITY	2.54	2.51	
10. CORRECTION FACTOR K	0.9998	0.9998	
11. Gs @ 20 °C	2.54	2.51	

TOTAL POROSITY

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	4/24/2006
TRACKING CODE:	3708

TOTAL POROSITY CALCULATION	
SAMPLE No.	CHCDF 2005-01
1. Bulk Density	112.3 lbs/ft^3
2. Moisture Content	41.3 %
3. Specific Gravity	2.72 -
4. Dry Density	79.5 lbs/ft^3
6. Weight of Solids$_{(1)}$	1.3 g
7. Volume of Solids$_{(1)}$	0.5 cm^3
8. Volume of Voids$_{(1)}$	0.5 cm^3
9. Total Porosity (e)	**53.2 %**

$_1$ Calculated for 1 cubic centimeter

TOTAL POROSITY

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	4/24/2006
TRACKING CODE:	3709

TOTAL POROSITY CALCULATION	
SAMPLE No.	CHCDF 2005-02
1. Bulk Density	115.3 lbs/ft^3
2. Moisture Content	34.6 %
3. Specific Gravity	2.74 -
4. Dry Density	85.7 lbs/ft^3
6. Weight of Solids$_{(1)}$	1.4 g
7. Volume of Solids$_{(1)}$	0.5 cm^3
8. Volume of Voids$_{(1)}$	0.5 cm^3
9. Total Porosity (e)	**49.9 %**

$_1$ Calculated for 1 cubic centimeter

TOTAL POROSITY

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	4/24/2006
TRACKING CODE:	3710

TOTAL POROSITY CALCULATION	
SAMPLE No.	CHCDF 2005-03
1. Bulk Density	113.7 lbs/ft^3
2. Moisture Content	41.1 %
3. Specific Gravity	2.76 -
4. Dry Density	80.6 lbs/ft^3
6. Weight of Solids$_{(1)}$	1.3 g
7. Volume of Solids$_{(1)}$	0.5 cm^3
8. Volume of Voids$_{(1)}$	0.5 cm^3
9. Total Porosity (e)	**53.2 %**

$_1$ Calculated for 1 cubic centimeter

TOTAL POROSITY

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	4/24/2006
TRACKING CODE:	3711

TOTAL POROSITY CALCULATION	
SAMPLE No.	CHCDF 2005-04
1. Bulk Density	113.0 lbs/ft^3
2. Moisture Content	37.6 %
3. Specific Gravity	2.69 -
4. Dry Density	82.1 lbs/ft^3
6. Weight of Solids$_{(1)}$	1.3 g
7. Volume of Solids$_{(1)}$	0.5 cm^3
8. Volume of Voids$_{(1)}$	0.5 cm^3
9. Total Porosity (e)	**51.1 %**

$_1$ Calculated for 1 cubic centimeter

TOTAL POROSITY

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	4/24/2006
TRACKING CODE:	3712

TOTAL POROSITY CALCULATION	
SAMPLE No.	CHCDF 2005-05
1. Bulk Density	112.7 lbs/ft^3
2. Moisture Content	40.7 %
3. Specific Gravity	2.77 -
4. Dry Density	80.1 lbs/ft^3
6. Weight of Solids$_{(1)}$	1.3 g
7. Volume of Solids$_{(1)}$	0.5 cm^3
8. Volume of Voids$_{(1)}$	0.5 cm^3
9. Total Porosity (e)	**53.7 %**

(1) Calculated for 1 cubic centimeter

TOTAL POROSITY

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	4/24/2006
TRACKING CODE:	3713

TOTAL POROSITY CALCULATION	
SAMPLE No.	CHCDF 2005-06
1. Bulk Density	121.9 lbs/ft^3
2. Moisture Content	34.0 %
3. Specific Gravity	2.76 -
4. Dry Density	91.0 lbs/ft^3
6. Weight of Solids$_{(1)}$	1.5 g
7. Volume of Solids$_{(1)}$	0.5 cm^3
8. Volume of Voids$_{(1)}$	0.5 cm^3
9. Total Porosity (e)	**47.2 %**

$_1$ Calculated for 1 cubic centimeter

TOTAL POROSITY

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	4/24/2006
TRACKING CODE:	3714

TOTAL POROSITY CALCULATION	
SAMPLE No.	CHCDF 2005-07
1. Bulk Density	111.2 lbs/ft^3
2. Moisture Content	43.1 %
3. Specific Gravity	2.73 -
4. Dry Density	77.7 lbs/ft^3
6. Weight of Solids$_{(1)}$	1.2 g
7. Volume of Solids$_{(1)}$	0.5 cm^3
8. Volume of Voids$_{(1)}$	0.5 cm^3
9. Total Porosity (e)	**54.4 %**

$_1$ Calculated for 1 cubic centimeter

TOTAL POROSITY

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	4/24/2006
TRACKING CODE:	3715

TOTAL POROSITY CALCULATION	
SAMPLE No.	CHCDF 2005-08
1. Bulk Density	117.7 lbs/ft^3
2. Moisture Content	38.4 %
3. Specific Gravity	2.66 -
4. Dry Density	85.0 lbs/ft^3
6. Weight of Solids$_{(1)}$	1.4 g
7. Volume of Solids$_{(1)}$	0.5 cm^3
8. Volume of Voids$_{(1)}$	0.5 cm^3
9. Total Porosity (e)	**48.8 %**

$_1$ Calculated for 1 cubic centimeter

TOTAL POROSITY

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	4/24/2006
TRACKING CODE:	3716

TOTAL POROSITY CALCULATION	
SAMPLE No.	CHCDF 2005-09
1. Bulk Density	117.0 lbs/ft^3
2. Moisture Content	29.9 %
3. Specific Gravity	2.72 -
4. Dry Density	90.1 lbs/ft^3
6. Weight of Solids$_{(1)}$	1.4 g
7. Volume of Solids$_{(1)}$	0.5 cm^3
8. Volume of Voids$_{(1)}$	0.5 cm^3
9. Total Porosity (e)	**46.9 %**

$_1$ Calculated for 1 cubic centimeter

TOTAL POROSITY

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	4/24/2006
TRACKING CODE:	3717

TOTAL POROSITY CALCULATION	
SAMPLE No.	CHCDF 2005-P1
1. Bulk Density	108.1 lbs/ft^3
2. Moisture Content	50.5 %
3. Specific Gravity	2.77 -
4. Dry Density	71.8 lbs/ft^3
6. Weight of Solids$_{(1)}$	1.2 g
7. Volume of Solids$_{(1)}$	0.4 cm^3
8. Volume of Voids$_{(1)}$	0.6 cm^3
9. Total Porosity (e)	**58.4 %**

$_1$ Calculated for 1 cubic centimeter

TOTAL POROSITY

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	4/24/2006
TRACKING CODE:	3718

TOTAL POROSITY CALCULATION	
SAMPLE No.	CHCDF 2005-P2
1. Bulk Density	118.8 lbs/ft^3
2. Moisture Content	33.7 %
3. Specific Gravity	2.74 -
4. Dry Density	88.9 lbs/ft^3
6. Weight of Solids$_{(1)}$	1.4 g
7. Volume of Solids$_{(1)}$	0.5 cm^3
8. Volume of Voids$_{(1)}$	0.5 cm^3
9. Total Porosity (e)	**48.0 %**

$_1$ Calculated for 1 cubic centimeter

TOTAL POROSITY

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
TESTING DATE:	4/24/2006
TRACKING CODE:	3719

TOTAL POROSITY CALCULATION	
SAMPLE No.	CHCDF 2005-P3
1. Bulk Density	113.0 lbs/ft^3
2. Moisture Content	30.8 %
3. Specific Gravity	2.61 -
4. Dry Density	86.4 lbs/ft^3
6. Weight of Solids$_{(1)}$	1.4 g
7. Volume of Solids$_{(1)}$	0.5 cm^3
8. Volume of Voids$_{(1)}$	0.5 cm^3
9. Total Porosity (e)	**46.9 %**

$_1$ Calculated for 1 cubic centimeter

UNIT WEIGHT DETERMINATION

DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-01
TESTING DATE:	3/20/06
TESTED BY:	CLG
TRACKING CODE:	3708

UNIT WEIGHT (DENSITY)			
1. SAMPLE NO.	A	B	C
2. WT OF MOLD (tare weight)	0.00 g	0.00 g	0.00 g
3. WT OF MOLD + SOIL	369.03 g	371.33 g	370.62 g
4. WT OF WET SOIL, W	369.03 g	371.33 g	370.62 g
5. DIAMETER OF SPECIMEN, D	2.00 in	2.00 in	2.00 in
6. HEIGHT OF SPECIMEN, H	4.00 in	4.00 in	4.00 in
7. VOLUME OF SPECIMEN	12.57 in^3	12.57 in^3	12.57 in^3
8. BULK UNIT WEIGHT	111.9 pcf	112.6 pcf	112.4 pcf
9. BULK SPECIFIC GRAVITY	1.8	1.8	1.8
10. AVERAGE BULK UNIT WEIGHT	112.3 pcf		
11. AVERAGE BULK SPECIFIC GRAVITY	1.8		

UNIT WEIGHT DETERMINATION

DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-02
TESTING DATE:	3/20/06
TESTED BY:	CLG
TRACKING CODE:	3709

UNIT WEIGHT (DENSITY)			
1. SAMPLE NO.	A	B	C
2. WT OF MOLD (tare weight)	0.00 g	0.00 g	0.00 g
3. WT OF MOLD + SOIL	380.38 g	381.12 g	379.13 g
4. WT OF WET SOIL, W	380.38 g	381.12 g	379.13 g
5. DIAMETER OF SPECIMEN, D	2.00 in	2.00 in	2.00 in
6. HEIGHT OF SPECIMEN, H	4.00 in	4.00 in	4.00 in
7. VOLUME OF SPECIMEN	12.57 in^3	12.57 in^3	12.57 in^3
8. BULK UNIT WEIGHT	115.3 pcf	115.5 pcf	114.9 pcf
9. BULK SPECIFIC GRAVITY	1.8	1.9	1.8
10. AVERAGE BULK UNIT WEIGHT	115.3 pcf		
11. AVERAGE BULK SPECIFIC GRAVITY	1.8		

UNIT WEIGHT DETERMINATION

DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-03
TESTING DATE:	3/20/06
TESTED BY:	CLG
TRACKING CODE:	3710

UNIT WEIGHT (DENSITY)			
1. SAMPLE NO.	A	B	C
2. WT OF MOLD (tare weight)	0.00 g	0.00 g	0.00 g
3. WT OF MOLD + SOIL	376.43 g	372.63 g	376.18 g
4. WT OF WET SOIL, W	376.43 g	372.63 g	376.18 g
5. DIAMETER OF SPECIMEN, D	2.00 in	2.00 in	2.00 in
6. HEIGHT OF SPECIMEN, H	4.00 in	4.00 in	4.00 in
7. VOLUME OF SPECIMEN	12.57 in^3	12.57 in^3	12.57 in^3
8. BULK UNIT WEIGHT	114.1 pcf	113.0 pcf	114.0 pcf
9. BULK SPECIFIC GRAVITY	1.8	1.8	1.8
10. AVERAGE BULK UNIT WEIGHT	113.7 pcf		
11. AVERAGE BULK SPECIFIC GRAVITY	1.8		

UNIT WEIGHT DETERMINATION

DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-04
TESTING DATE:	3/20/06
TESTED BY:	CLG
TRACKING CODE:	3711

UNIT WEIGHT (DENSITY)			
1. SAMPLE NO.	A	B	C
2. WT OF MOLD (tare weight)	0.00 g	0.00 g	0.00 g
3. WT OF MOLD + SOIL	373.09 g	369.78 g	375.52 g
4. WT OF WET SOIL, W	373.09 g	369.78 g	375.52 g
5. DIAMETER OF SPECIMEN, D	2.00 in	2.00 in	2.00 in
6. HEIGHT OF SPECIMEN, H	4.00 in	4.00 in	4.00 in
7. VOLUME OF SPECIMEN	12.57 in^3	12.57 in^3	12.57 in^3
8. BULK UNIT WEIGHT	113.1 pcf	112.1 pcf	113.8 pcf
9. BULK SPECIFIC GRAVITY	1.8	1.8	1.8
10. AVERAGE BULK UNIT WEIGHT	113.0 pcf		
11. AVERAGE BULK SPECIFIC GRAVITY	1.8		

UNIT WEIGHT DETERMINATION

DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-05
TESTING DATE:	3/20/06
TESTED BY:	CLG
TRACKING CODE:	3712

UNIT WEIGHT (DENSITY)			
1. SAMPLE NO.	A	B	C
2. WT OF MOLD (tare weight)	0.00 g	0.00 g	0.00 g
3. WT OF MOLD + SOIL	369.09 g	371.05 g	375.00 g
4. WT OF WET SOIL, W	369.09 g	371.05 g	375.00 g
5. DIAMETER OF SPECIMEN, D	2.00 in	2.00 in	2.00 in
6. HEIGHT OF SPECIMEN, H	4.00 in	4.00 in	4.00 in
7. VOLUME OF SPECIMEN	12.57 in^3	12.57 in^3	12.57 in^3
8. BULK UNIT WEIGHT	111.9 pcf	112.5 pcf	113.7 pcf
9. BULK SPECIFIC GRAVITY	1.8	1.8	1.8
10. AVERAGE BULK UNIT WEIGHT	112.7 pcf		
11. AVERAGE BULK SPECIFIC GRAVITY	1.8		

UNIT WEIGHT DETERMINATION

DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-06
TESTING DATE:	3/20/06
TESTED BY:	CLG
TRACKING CODE:	3713

UNIT WEIGHT (DENSITY)			
1. SAMPLE NO.	A	B	C
2. WT OF MOLD (tare weight)	0.00 g	0.00 g	0.00 g
3. WT OF MOLD + SOIL	401.42 g	402.45 g	402.30 g
4. WT OF WET SOIL, W	401.42 g	402.45 g	402.30 g
5. DIAMETER OF SPECIMEN, D	2.00 in	2.00 in	2.00 in
6. HEIGHT OF SPECIMEN, H	4.00 in	4.00 in	4.00 in
7. VOLUME OF SPECIMEN	12.57 in^3	12.57 in^3	12.57 in^3
8. BULK UNIT WEIGHT	121.7 pcf	122.0 pcf	122.0 pcf
9. BULK SPECIFIC GRAVITY	2.0	2.0	2.0
10. AVERAGE BULK UNIT WEIGHT	121.9 pcf		
11. AVERAGE BULK SPECIFIC GRAVITY	2.0		

UNIT WEIGHT DETERMINATION

DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-07
TESTING DATE:	3/20/06
TESTED BY:	CLG
TRACKING CODE:	3714

UNIT WEIGHT (DENSITY)			
1. SAMPLE NO.	A	B	C
2. WT OF MOLD (tare weight)	0.00 g	0.00 g	0.00 g
3. WT OF MOLD + SOIL	366.32 g	364.47 g	369.36 g
4. WT OF WET SOIL, W	366.32 g	364.47 g	369.36 g
5. DIAMETER OF SPECIMEN, D	2.00 in	2.00 in	2.00 in
6. HEIGHT OF SPECIMEN, H	4.00 in	4.00 in	4.00 in
7. VOLUME OF SPECIMEN	12.57 in^3	12.57 in^3	12.57 in^3
8. BULK UNIT WEIGHT	111.1 pcf	110.5 pcf	112.0 pcf
9. BULK SPECIFIC GRAVITY	1.8	1.8	1.8
10. AVERAGE BULK UNIT WEIGHT	111.2 pcf		
11. AVERAGE BULK SPECIFIC GRAVITY	1.8		

UNIT WEIGHT DETERMINATION

DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-08
TESTING DATE:	3/20/06
TESTED BY:	CLG
TRACKING CODE:	3715

UNIT WEIGHT (DENSITY)			
1. SAMPLE NO.	A	B	C
2. WT OF MOLD (tare weight)	0.00 g	0.00 g	0.00 g
3. WT OF MOLD + SOIL	384.49 g	386.06 g	394.70 g
4. WT OF WET SOIL, W	384.49 g	386.06 g	394.70 g
5. DIAMETER OF SPECIMEN, D	2.00 in	2.00 in	2.00 in
6. HEIGHT OF SPECIMEN, H	4.00 in	4.00 in	4.00 in
7. VOLUME OF SPECIMEN	12.57 in^3	12.57 in^3	12.57 in^3
8. BULK UNIT WEIGHT	116.6 pcf	117.0 pcf	119.7 pcf
9. BULK SPECIFIC GRAVITY	1.9	1.9	1.9
10. AVERAGE BULK UNIT WEIGHT	117.7 pcf		
11. AVERAGE BULK SPECIFIC GRAVITY	1.9		

UNIT WEIGHT DETERMINATION

DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-09
TESTING DATE:	3/20/06
TESTED BY:	CLG
TRACKING CODE:	3716

UNIT WEIGHT (DENSITY)			
1. SAMPLE NO.	A	B	C
2. WT OF MOLD (tare weight)	0.00 g	0.00 g	0.00 g
3. WT OF MOLD + SOIL	383.55 g	386.16 g	388.27 g
4. WT OF WET SOIL, W	383.55 g	386.16 g	388.27 g
5. DIAMETER OF SPECIMEN, D	2.00 in	2.00 in	2.00 in
6. HEIGHT OF SPECIMEN, H	4.00 in	4.00 in	4.00 in
7. VOLUME OF SPECIMEN	12.57 in^3	12.57 in^3	12.57 in^3
8. BULK UNIT WEIGHT	116.3 pcf	117.1 pcf	117.7 pcf
9. BULK SPECIFIC GRAVITY	1.9	1.9	1.9
10. AVERAGE BULK UNIT WEIGHT	117.0 pcf		
11. AVERAGE BULK SPECIFIC GRAVITY	1.9		

UNIT WEIGHT DETERMINATION

DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-P1
TESTING DATE:	3/20/06
TESTED BY:	CLG
TRACKING CODE:	3717

UNIT WEIGHT (DENSITY)			
1. SAMPLE NO.	A	B	C
2. WT OF MOLD (tare weight)	0.00 g	0.00 g	0.00 g
3. WT OF MOLD + SOIL	355.50 g	356.76 g	357.08 g
4. WT OF WET SOIL, W	355.50 g	356.76 g	357.08 g
5. DIAMETER OF SPECIMEN, D	2.00 in	2.00 in	2.00 in
6. HEIGHT OF SPECIMEN, H	4.00 in	4.00 in	4.00 in
7. VOLUME OF SPECIMEN	12.57 in^3	12.57 in^3	12.57 in^3
8. BULK UNIT WEIGHT	107.8 pcf	108.2 pcf	108.2 pcf
9. BULK SPECIFIC GRAVITY	1.7	1.7	1.7
10. AVERAGE BULK UNIT WEIGHT	108.1 pcf		
11. AVERAGE BULK SPECIFIC GRAVITY	1.7		

UNIT WEIGHT DETERMINATION

DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-P2
TESTING DATE:	3/20/06
TESTED BY:	CLG
TRACKING CODE:	3718

UNIT WEIGHT (DENSITY)							
1. SAMPLE NO.	A		B		C		
2. WT OF MOLD (tare weight)	0.00	g	0.00	g	0.00	g	
3. WT OF MOLD + SOIL	391.47	g	392.02	g	392.60	g	
4. WT OF WET SOIL, W	391.47	g	392.02	g	392.60	g	
5. DIAMETER OF SPECIMEN, D	2.00	in	2.00	in	2.00	in	
6. HEIGHT OF SPECIMEN, H	4.00	in	4.00	in	4.00	in	
7. VOLUME OF SPECIMEN	12.57	in^3	12.57	in^3	12.57	in^3	
8. BULK UNIT WEIGHT	118.7	pcf	118.8	pcf	119.0	pcf	
9. BULK SPECIFIC GRAVITY	1.9		1.9		1.9		
10. AVERAGE BULK UNIT WEIGHT	118.8	pcf					
11. AVERAGE BULK SPECIFIC GRAVITY	1.9						

UNIT WEIGHT DETERMINATION

DATA SHEET

PROJECT:	Calumet CDF Site
PROJECT No.:	SE-0160
SAMPLE No.:	CHCDF 2005-P3
TESTING DATE:	3/20/06
TESTED BY:	CLG
TRACKING CODE:	3719

UNIT WEIGHT (DENSITY)			
1. SAMPLE NO.	A	B	C
2. WT OF MOLD (tare weight)	0.00 g	0.00 g	0.00 g
3. WT OF MOLD + SOIL	372.83 g	372.83 g	372.83 g
4. WT OF WET SOIL, W	372.83 g	372.83 g	372.83 g
5. DIAMETER OF SPECIMEN, D	2.00 in	2.00 in	2.00 in
6. HEIGHT OF SPECIMEN, H	4.00 in	4.00 in	4.00 in
7. VOLUME OF SPECIMEN	12.57 in^3	12.57 in^3	12.57 in^3
8. BULK UNIT WEIGHT	113.0 pcf	113.0 pcf	113.0 pcf
9. BULK SPECIFIC GRAVITY	1.8	1.8	1.8
10. AVERAGE BULK UNIT WEIGHT	113.0 pcf		
11. AVERAGE BULK SPECIFIC GRAVITY	1.8		

ATTERBERG LIMITS

REPORT FORM

ASTM D 4318 (Method B)

Project:	Calamut CDF Site	Testing Date:	4/12/2006
Project No.:	SE-0160	Tested By:	clg
Sample No.:	G02 @ 7-9.5 Ft.	Tracking Code:	3734_AT
Description:	Dark Brown Sandy Clayey Sit		

Liquid Limit Determination		
Pan No.	A	B
Pan Weight	0.95 g	0.95 g
Wet Soil + Pan	7.66 g	10.18 g
Dry Soil + Pan	5.71 g	7.51 g
Wt of Dry Soil, Ws	4.76 g	6.56 g
Wt of Water, Ww	1.95 g	2.67 g
Moisture Content, ASTM	40.97 %	40.70 %
No. of Blows, N	24	24
Correction Factor, K	0.995	0.995
Liquid Limit	***41***	***40***

Liquid Limit:	41
Plastic Limit:	25
Plasticity Index:	*16*

N	k
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022

Plastic Limit Determination		
Pan No.	C	D
Pan Weight	0.95 g	0.95 g
Wet Soil + Pan	9.24 g	9.12 g
Dry Soil + Pan	7.56 g	7.48 g
Wt of Dry Soil, Ws	6.61 g	6.53 g
Wt of Water, Ww	1.68 g	1.64 g
Moisture Content, ASTM	25.42 %	25.11 %
Plastic Limit	***25 %***	***25 %***

ATTERBERG LIMITS

REPORT FORM

ASTM D 4318 (Method B)

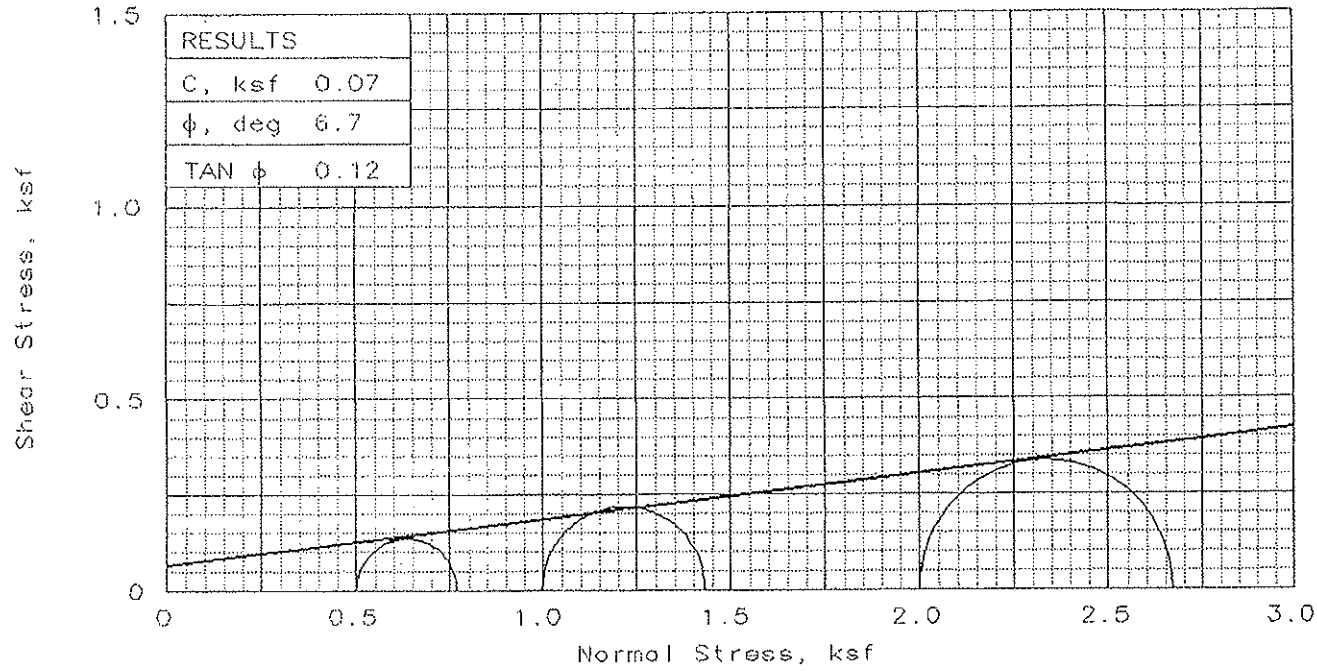
Project:	Calumet CDF Site	Testing Date:	4/12/2006
Project No.:	SE-0160	Tested By:	clg
Sample No.:	G01 @ 9.5-12 Ft.	Tracking Code:	3735_AT
Description:	Dark Brown Sandy Clayey Sit		

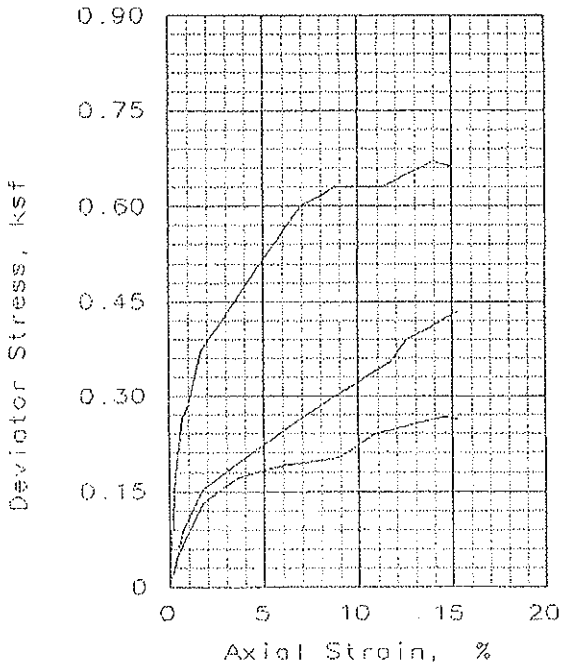
Liquid Limit Determination		
Pan No.	A	B
Pan Weight	0.95 g	0.95 g
Wet Soil + Pan	9.22 g	6.64 g
Dry Soil + Pan	6.58 g	4.82 g
Wt of Dry Soil, Ws	5.63 g	3.87 g
Wt of Water, Ww	2.64 g	1.82 g
Moisture Content, ASTM	46.89 %	47.03 %
No. of Blows, N	26	26
Correction Factor, K	1.005	1.005
Liquid Limit	***47***	***47***

Liquid Limit:	47
Plastic Limit:	30
Plasticity Index:	*17*

N	k
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022

Plastic Limit Determination		
Pan No.	C	D
Pan Weight	0.95 g	0.95 g
Wet Soil + Pan	6.63 g	7.86 g
Dry Soil + Pan	5.36 g	6.23 g
Wt of Dry Soil, Ws	4.41 g	5.28 g
Wt of Water, Ww	1.27 g	1.63 g
Moisture Content, ASTM	28.80 %	30.87 %
Plastic Limit	***29 %***	***31 %***





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	45.5	46.6	37.5
	DRY DENSITY, pcf	75.1	74.5	84.0
	SATURATION, %	97.6	98.5	99.1
	VOID RATIO	1.278	1.295	1.036
	DIAMETER, in	2.87	2.87	2.87
	HEIGHT, in	5.55	5.55	5.70
AT TEST	WATER CONTENT, %	45.5	46.6	37.5
	DRY DENSITY, pcf	75.1	74.5	84.0
	SATURATION, %	97.6	98.5	99.1
	VOID RATIO	1.278	1.295	1.036
	DIAMETER, in	2.87	2.87	2.87
	HEIGHT, in	5.55	5.55	5.70
Strain rate, %/min		0.50	0.50	0.50
BACK PRESSURE, ksf		0.00	0.00	0.00
CELL PRESSURE, ksf		0.50	1.00	2.00
FAIL. STRESS, ksf		0.27	0.43	0.67
STRAIN, %		14.4	15.3	14.0
ULT. STRESS, ksf		0.27	0.43	0.66
STRAIN, %				
σ_1 FAILURE, ksf		0.77	1.43	2.67
σ_3 FAILURE, ksf		0.50	1.00	2.00

TYPE OF TEST:
Unconsolidated Undrained

SAMPLE TYPE: Undisturbed

DESCRIPTION: Dark Brown Sandy Clayey silt

SPECIFIC GRAVITY= 2.74

REMARKS:

CLIENT: CDM

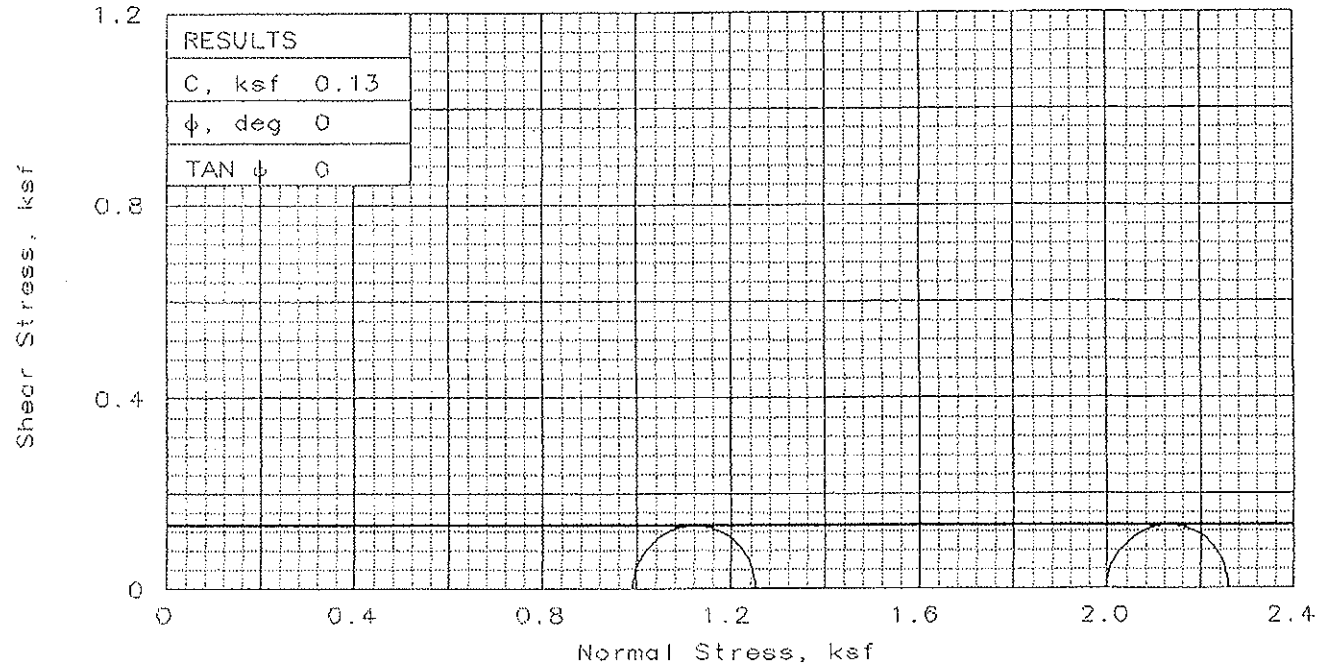
PROJECT: Calumet CDF Site

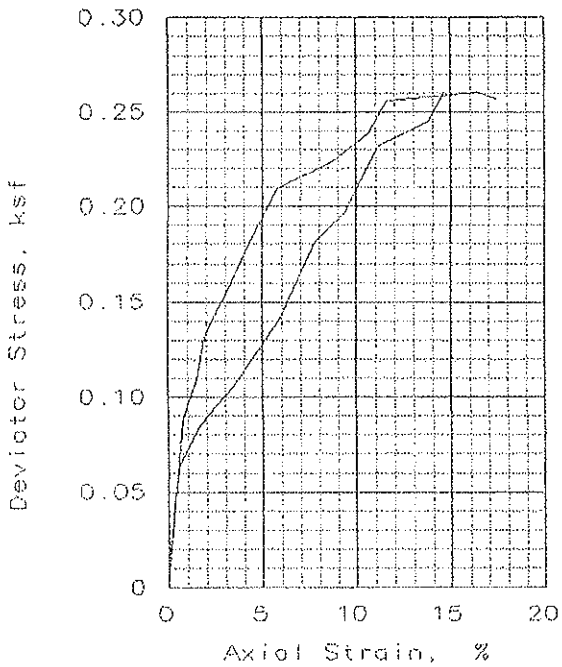
SAMPLE LOCATION: G01 @ 9.5-12 ft.

PROJ. NO.: SE-0160 DATE: 4/12/2006

TRIAXIAL SHEAR TEST REPORT

Fig. No.: _____





SAMPLE NO.:		1	2
INITIAL	WATER CONTENT, %	42.4	45.9
	DRY DENSITY, pcf	78.8	74.2
	SATURATION, %	99.6	96.7
	VOID RATIO	1.163	1.297
	DIAMETER, in	2.90	2.87
	HEIGHT, in	5.80	5.16
AT TEST	WATER CONTENT, %	42.4	45.9
	DRY DENSITY, pcf	78.8	74.2
	SATURATION, %	99.6	96.7
	VOID RATIO	1.163	1.297
	DIAMETER, in	2.90	2.87
	HEIGHT, in	5.80	5.16
Strain rate, %/min		0.50	0.50
BACK PRESSURE, ksf		0.00	0.00
CELL PRESSURE, ksf		0.99	2.00
FAIL. STRESS, ksf		0.26	0.26
STRAIN, %		14.7	16.5
ULT. STRESS, ksf		0.26	0.26
STRAIN, %			
σ_1 FAILURE, ksf		1.25	2.26
σ_3 FAILURE, ksf		0.99	2.00

TYPE OF TEST:
Unconsolidated Undrained

SAMPLE TYPE: Undisturbed

DESCRIPTION: Dark Brown Sandy Clayey Silt

SPECIFIC GRAVITY= 2.73

REMARKS:

CLIENT: CDM

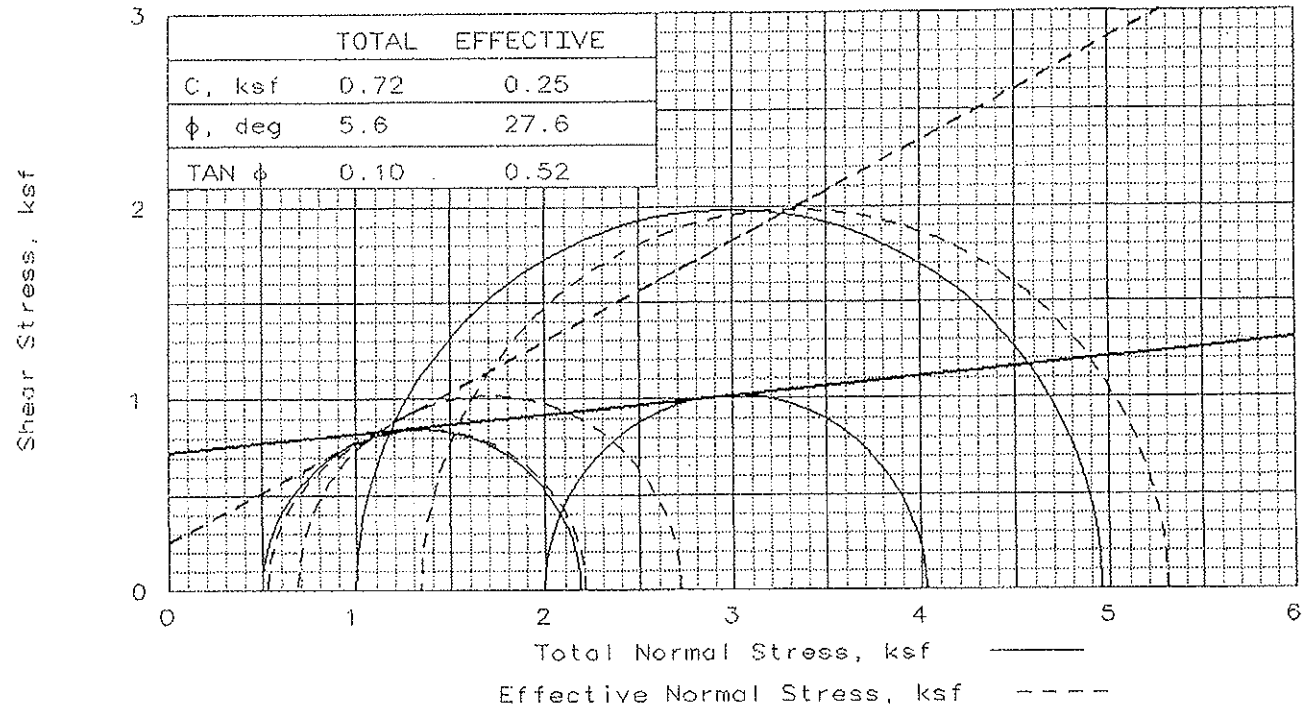
PROJECT: Calumet CDF Site

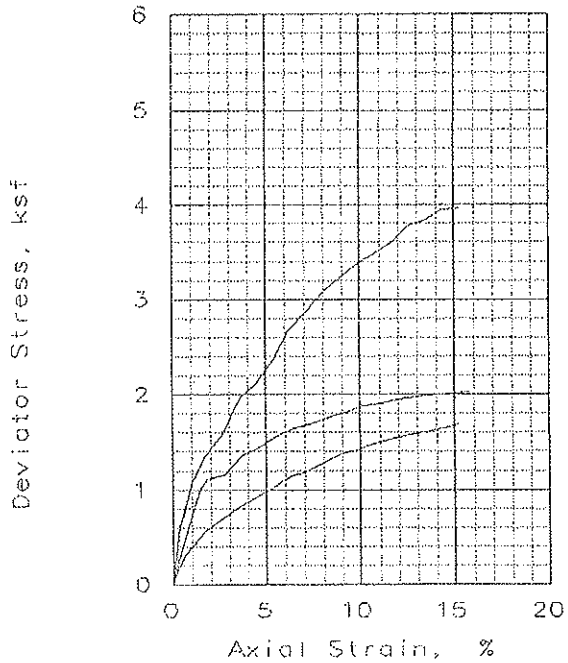
SAMPLE LOCATION: G02 @ 7.0-9.5 Ft.

PROJ. NO.: SE-0160 DATE: 4/4/2006

TRIAXIAL SHEAR TEST REPORT

Fig. No.: _____





SAMPLE NO.:		1	2	3
INITIAL	WATER CONTENT, %	42.6	26.0	43.6
	DRY DENSITY, pcf	76.9	98.9	77.9
	SATURATION, %	95.3	97.5	99.9
	VOID RATIO	1.225	0.730	1.196
	DIAMETER, in	2.87	2.87	2.87
	HEIGHT, in	5.60	5.60	5.60
AT TEST	WATER CONTENT, %	43.0	25.8	34.7
	DRY DENSITY, pcf	78.5	100.3	87.7
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	1.179	0.706	0.950
	DIAMETER, in	2.85	2.86	2.76
	HEIGHT, in	5.56	5.57	5.39
Strain rate, %/min		0.13	0.13	0.13
EFF CELL PRESSURE, ksf		0.50	1.00	2.00
FAIL. STRESS, ksf		1.68	3.96	2.03
TOTAL PORE PR., ksf		4.29	3.97	5.63
STRAIN, %		15.3	15.2	15.8
ULT. STRESS, ksf		1.68	3.96	2.03
TOTAL PORE PR., ksf		4.29	3.97	5.63
STRAIN, %		15.3	15.2	15.8
$\bar{\sigma}_1$ FAILURE, ksf		2.22	5.31	2.72
$\bar{\sigma}_3$ FAILURE, ksf		0.53	1.35	0.69

TYPE OF TEST:
CU with Pore Pressures
SAMPLE TYPE: Undisturbed
DESCRIPTION: Sandy Clayey Silt

SPECIFIC GRAVITY= 2.74
REMARKS:

CLIENT: CDM

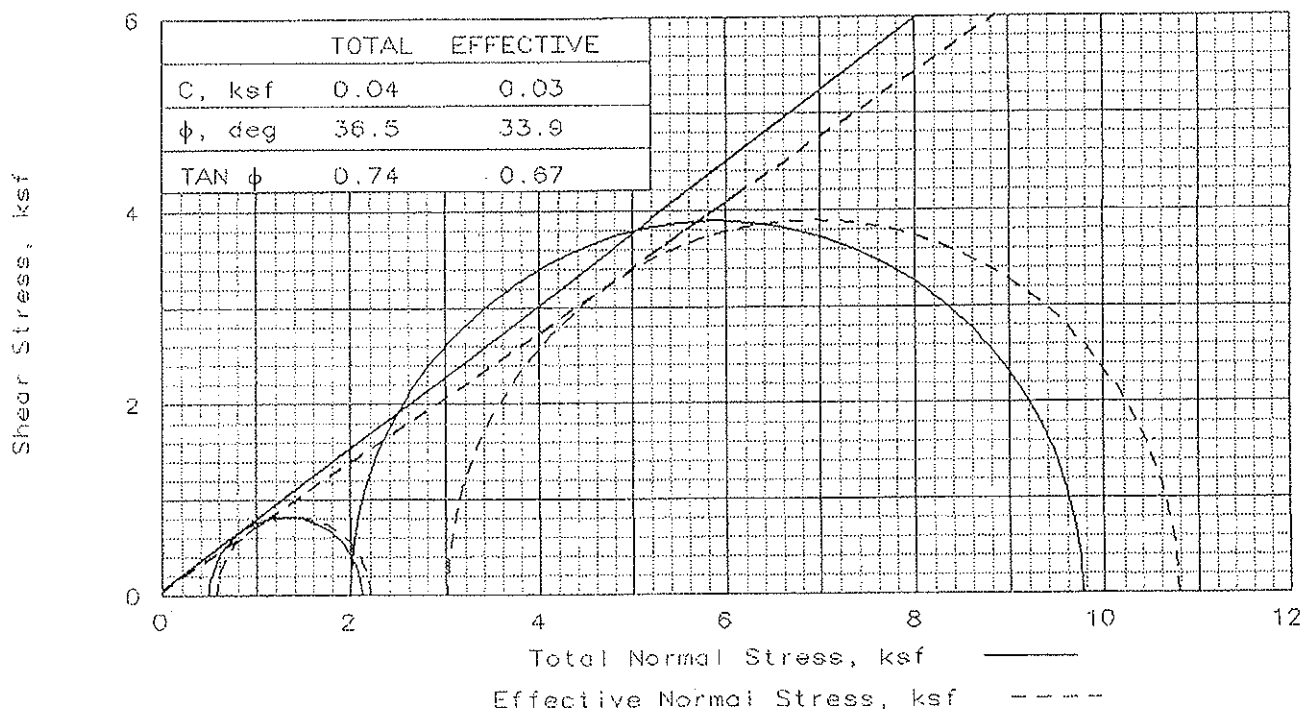
PROJECT: Calumet CDF Site

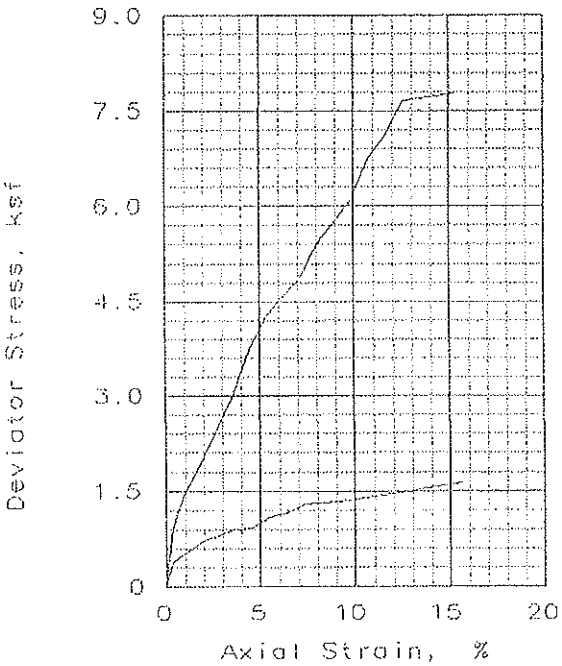
SAMPLE LOCATION: G02 @ 12-14.5 Ft.

PROJ. NO.: SE-0160 DATE: 4/18/2006

TRIAXIAL SHEAR TEST REPORT

Fig. No.: _____





SAMPLE NO.:		1	2
INITIAL	WATER CONTENT, %	22.8	21.1
	DRY DENSITY, pcf	104.2	107.1
	SATURATION, %	98.5	97.0
	VOID RATIO	0.630	0.597
	DIAMETER, in	2.87	2.89
	HEIGHT, in	5.45	5.60
AT TEST	WATER CONTENT, %	22.8	20.6
	DRY DENSITY, pcf	104.8	109.4
	SATURATION, %	100.0	100.0
	VOID RATIO	0.620	0.564
	DIAMETER, in	2.86	2.87
	HEIGHT, in	5.44	5.56
Strain rate, %/min		0.13	0.13
EFF CELL PRESSURE, ksf		0.5	2.0
FAIL. STRESS, ksf		1.6	7.8
TOTAL PORE PR., ksf		4.2	4.0
STRAIN, %		15.6	15.3
ULT. STRESS, ksf		1.6	7.8
TOTAL PORE PR., ksf		4.2	4.0
STRAIN, %		15.6	15.3
$\bar{\sigma}_1$ FAILURE, ksf		2.2	10.8
$\bar{\sigma}_3$ FAILURE, ksf		0.6	3.0

TYPE OF TEST:
CU with Pore Pressures
SAMPLE TYPE: Undisturbed
DESCRIPTION: Sandy Clayey Silt

SPECIFIC GRAVITY= 2.72
REMARKS: The 2 KSF sample was significally more sandy than the 0.5KSF sample

Fig. No.: _____

CLIENT: CDM

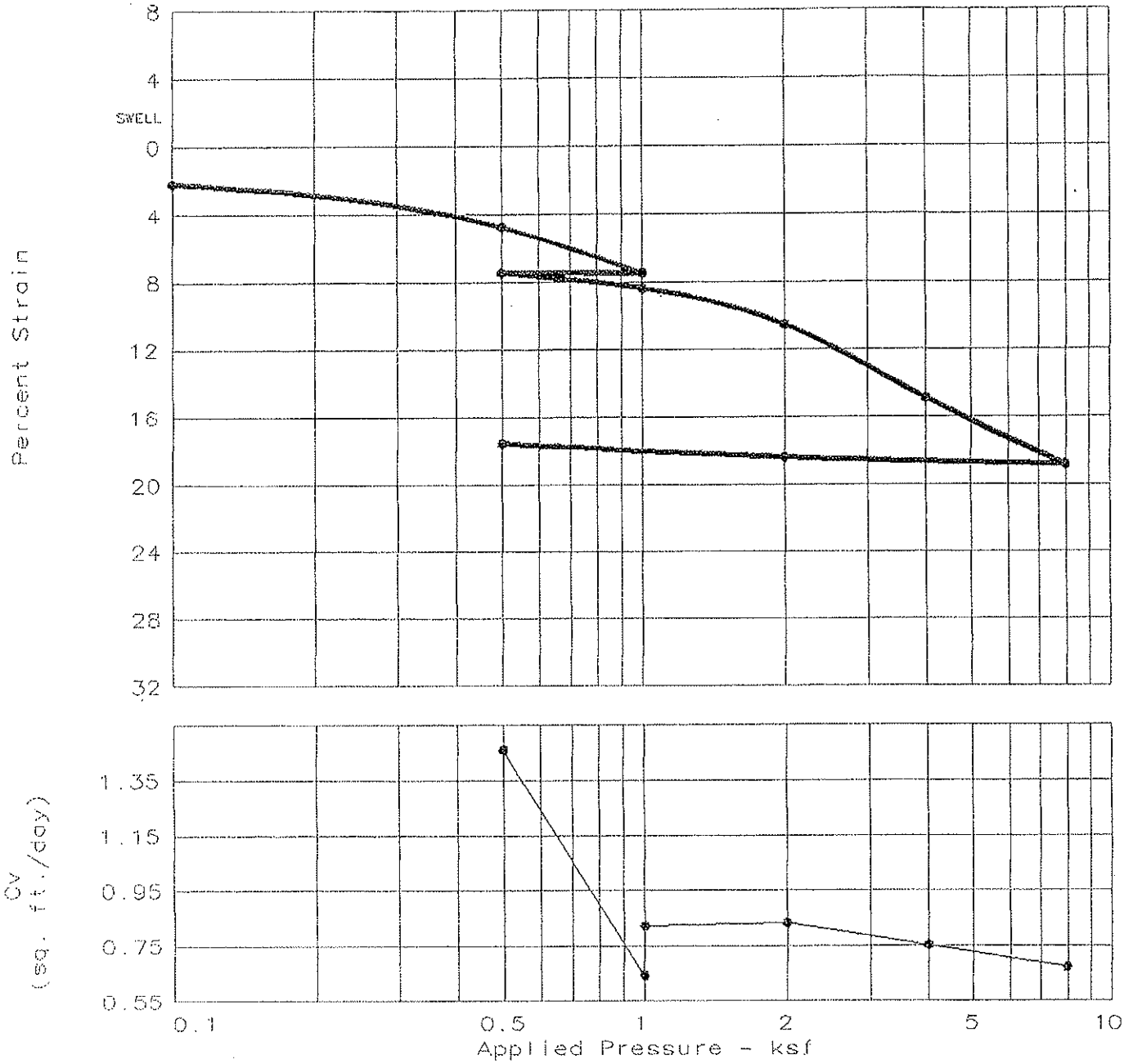
PROJECT: Calumet CDF Site

SAMPLE LOCATION: G02 @ 12-14.5 ft.

PROJ. NO.: SE-0160 DATE: 4/18/2006

TRIAXIAL SHEAR TEST REPORT

CONSOLIDATION TEST REPORT



Natural Saturation	Natural Moisture	Dry Dens. (pcf)	LL	PI	Sp.Gr.	Initial void ratio
99.1 %	35.1 %	86.7			2.730	0.9669

TEST RESULTS	MATERIAL DESCRIPTION

Project No.: SE-0160
Project: CALUMET CDF SITE
Location: CHCDF 2005 G02 @ 7-9.5 fT.

Date: 3/30/06

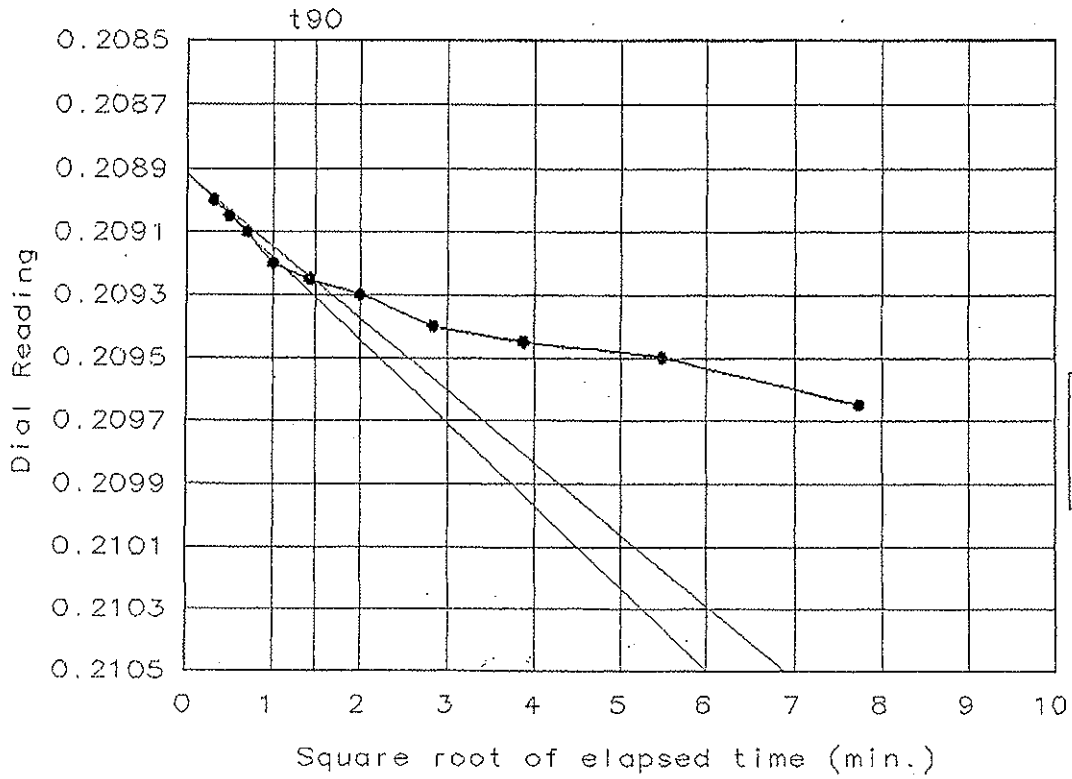
Remarks:
Testing performed on an inundated sample

Fig. No. _____

Dial Reading vs. Time

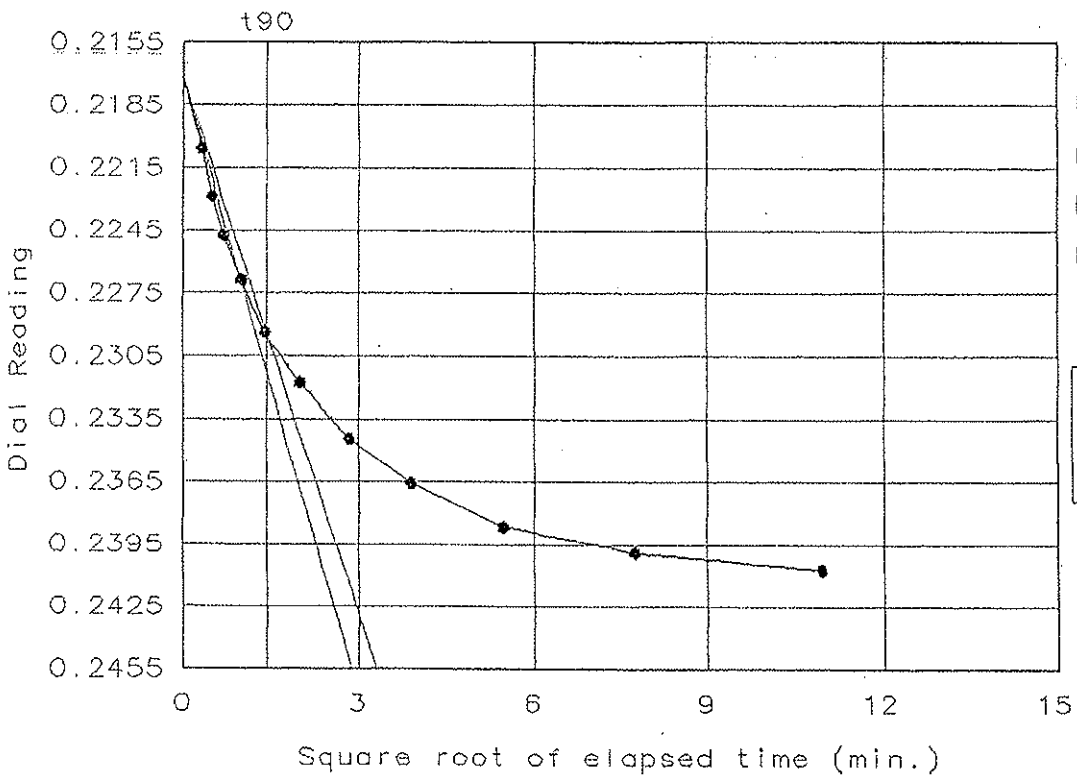
Project No.: SE-0160
Project: CALUMET CDF SITE
Location: CHCDF 2005 G02 @ 7-9.5 fT.

Date: 3/30/06



Load No.= 5
Load= 1.00 ksf
D_0 = 0.2089
D_{90} = 0.2093
D_{100}= 0.2093
T_{90}= 2.18 min.

C_v @ T_{90} =
.82 ft^2/day



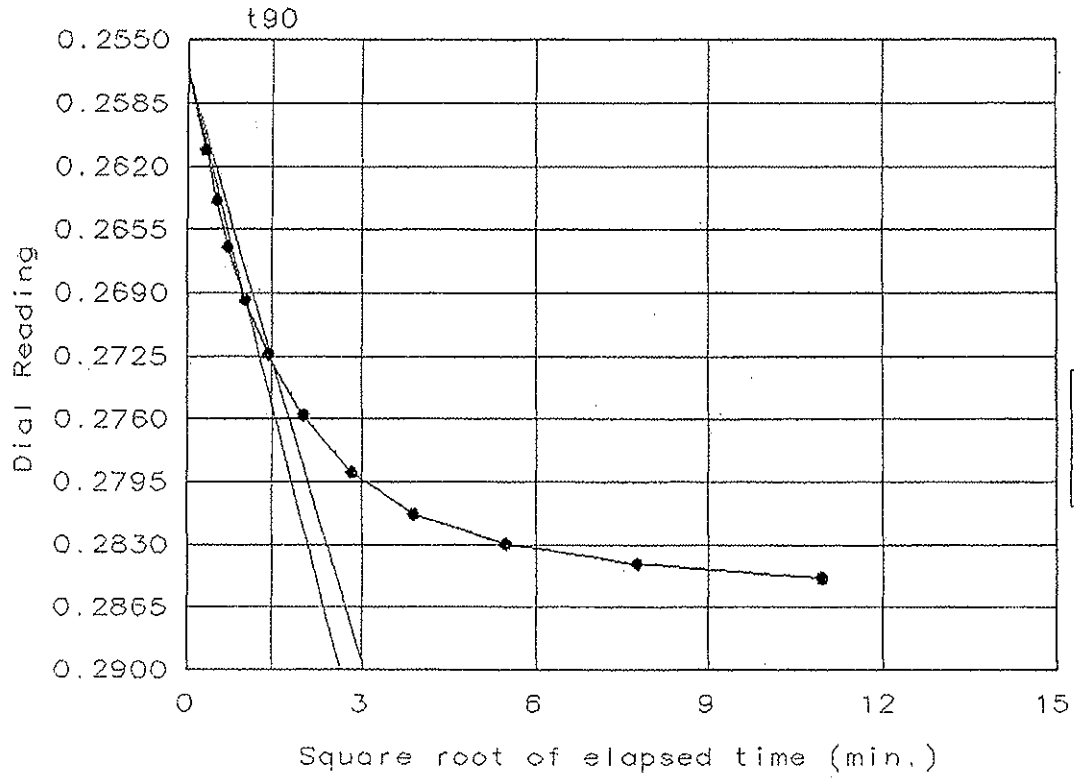
Load No.= 6
Load= 2.00 ksf
D_0 = 0.2172
D_{90} = 0.2295
D_{100}= 0.2309
T_{90}= 2.07 min.

C_v @ T_{90} =
.83 ft^2/day

Dial Reading vs. Time

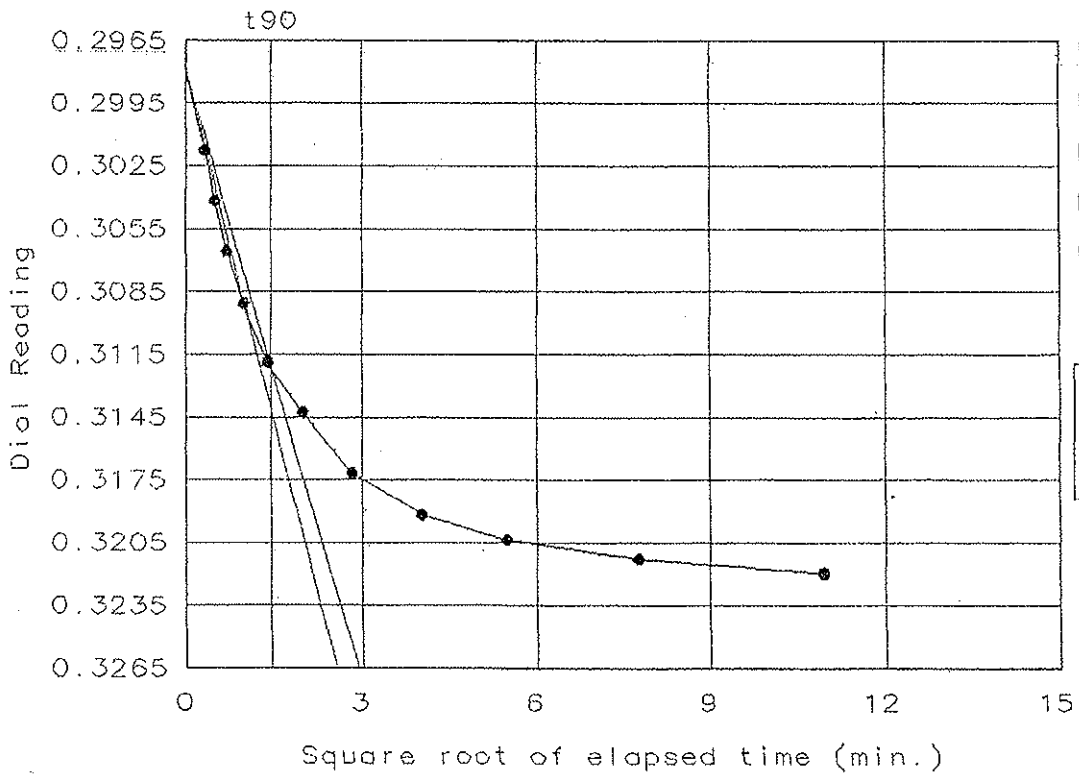
Project No.: SE-0160
Project: CALUMET CDF SITE
Location: CHCDF 2005 G02 @ 7-9.5 fT.

Date: 3/30/06



Load No.= 7
Load= 4.00 ksf
D_0 = 0.2567
D_{90} = 0.2726
D_{100}= 0.2743
T_{90}= 2.09 min.

C_v @ T_{90} =
.75 ft^2/day



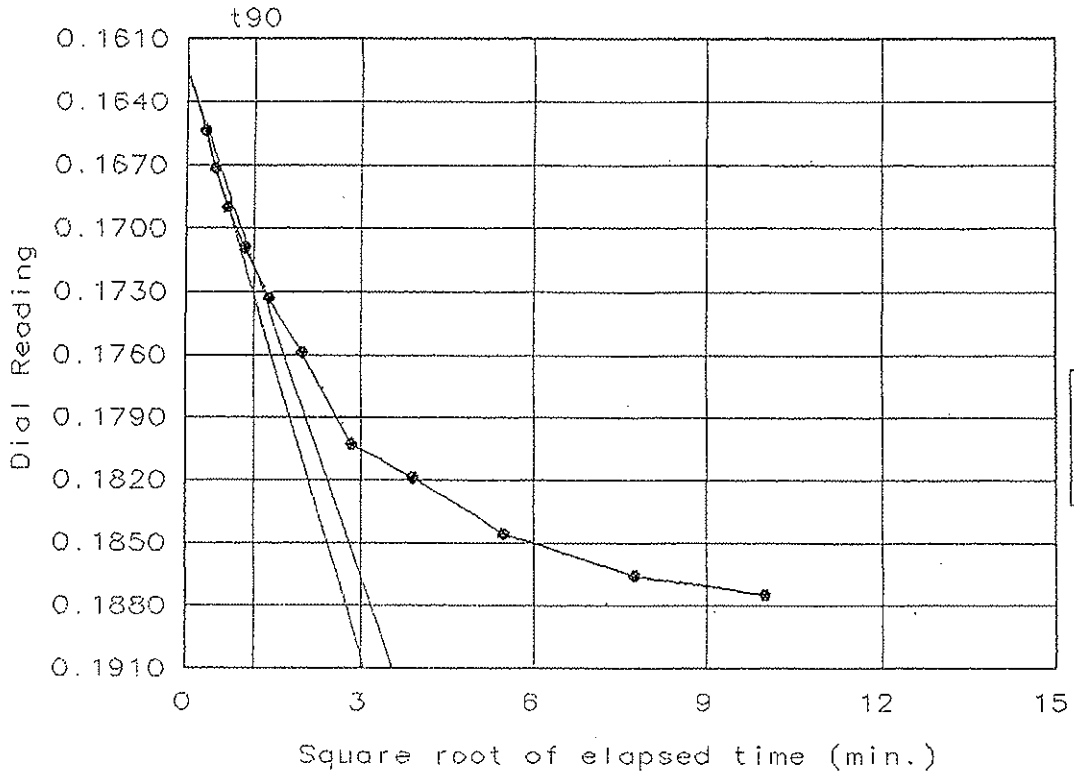
Load No.= 8
Load= 8.00 ksf
D_0 = 0.2979
D_{90} = 0.3121
D_{100}= 0.3136
T_{90}= 2.11 min.

C_v @ T_{90} =
.67 ft^2/day

Dial Reading vs. Time

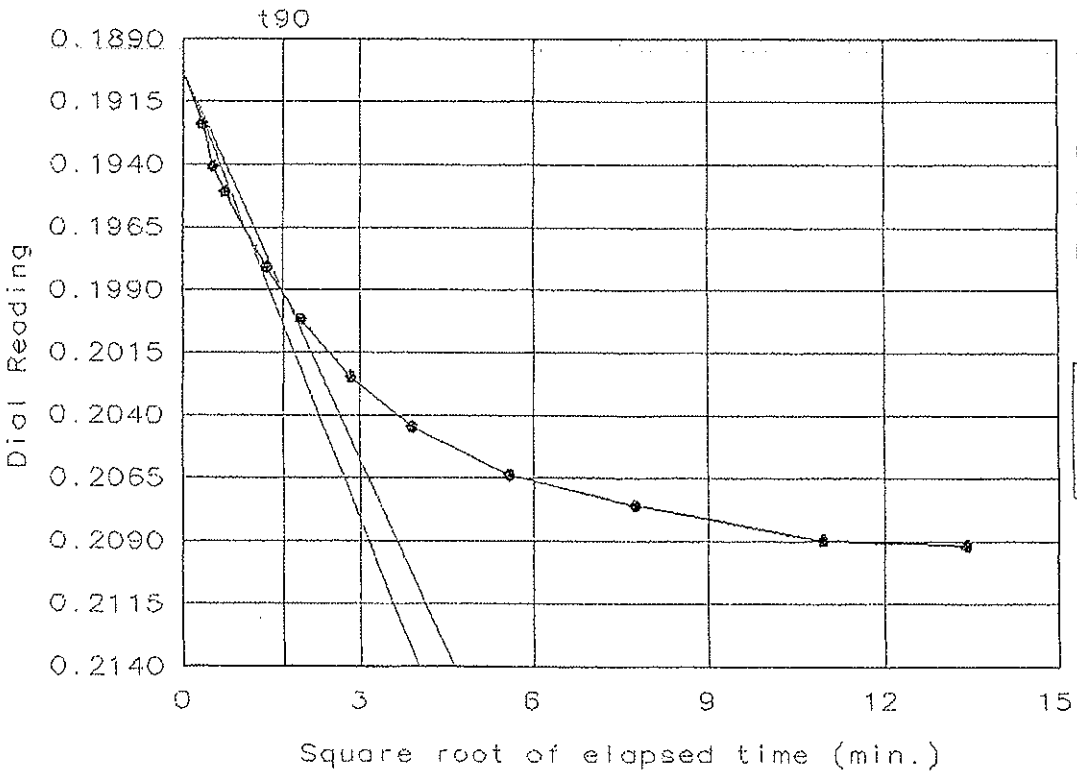
Project No.: SE-0160
Project: CALUMET CDF SITE
Location: CHCDF 2005 G02 @ 7-9.5 fT.

Date: 3/30/06



Load No.= 2
Load= 0.50 ksf
D_0 = 0.1625
D_{90} = 0.1718
D_{100}= 0.1728
T_{90}= 1.33 min.

C_v @ T_{90} =
1.46 ft^2/day



Load No.= 3
Load= 1.00 ksf
D_0 = 0.1903
D_{90} = 0.1991
D_{100}= 0.2001
T_{90}= 2.88 min.

C_v @ T_{90} =
.64 ft^2/day

APPENDIX C

ANALYTICAL RESULTS TABLES
CHICAGO AREA CONFINED DISPOSAL FACILITY

CONTENTS AND DATA QUALIFIERS

APPENDIX C
ANALYTICAL RESULTS TABLES
CHICAGO AREA CONFINED DISPOSAL FACILITY

Table 1	Total and TCLP Metals, Original Samples
Table 2	Total and TCLP Metals, Fine- and Coarse-Grained Fractions
Table 3	Polynuclear Aromatic Hydrocarbons, Original Samples
Table 4	Polynuclear Aromatic Hydrocarbons, Fine- and Coarse-Grained Fractions
Table 5	Polychlorinated Biphenyls, Original Samples
Table 6	Polychlorinated Biphenyls, Fine- and Coarse-Grained Fractions
Table 7	General Characterization, Original Samples
Table 8	General Characterization, Fine- and Coarse-Grained Fractions
Table 9	Geotechnical Samples

Notes:

µg/kg	microgram per kilogram
mg/kg	milligram per kilogram
µg/L	microgram per liter

Organic Data Qualifiers:

U	Compound was analyzed for but not detected. The associated numerical value is the sample quantitation limit.
J	Estimated data due to exceeded quality control criteria; plus or minus indicates likely bias if known.

Inorganic Qualifiers:

B	Reported value was obtained from a reading that was less than the practical quantitation limit but greater than or equal to the instrument detection limit.
J	Estimated data due to exceeded quality control criteria; plus or minus indicates likely bias if known.

TABLE 1

TOTAL AND TCLP METALS, ORIGINAL SAMPLES
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005 01 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 03 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 04 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 06 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 07 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 08 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 09 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 DUP INITIAL RESULT	FLAG	VALID QUAL
SW6010B	BARIUM	mg/Kg	49.5			45			64.1			36.5			66.5			69.4			59.4			69.1		
	CADMIUM	mg/Kg	2.6			1	B		2.8			0.67	B		1.5			0.8	B		2.3	B		0.73	B	
	CHROMIUM	mg/Kg	67.4		J+	41.8		J+	51.1		J+	27.2		J+	53.9		J+	26.1		J+	67.3		J+	31.2		J+
	COPPER	mg/Kg	68.8		J	87.1		J	77.2		J	39.4		J	70.8		J	36.4		J	91.7		J	35.4		J
	LEAD	mg/Kg	222		J	135		J	198		J	79.4		J	213		J	85.7		J	292		J	150		J
	NICKEL	mg/Kg	50.6			25.4			25.6			29.2			35.4			20.4			53.9			20.8		
	SELENIUM	mg/Kg	1.72	U		0.85	U		0.69	U		0.61	U		0.78	U		0.62	U		1.86	U		0.78	U	
	SILVER	mg/Kg	0.5	U		0.62	B		5.7			0.18	U		1	B		0.18	U		0.54	U		0.24	B	
SW6020	ARSENIC	mg/Kg	17			12.4			11.7			11.1			14			9.8			21.3			9.4		
	BERYLLIUM	mg/Kg	0.74			0.62			0.57			0.5			0.5			0.95			0.93			0.91		
SW7196	CHROMIUM, HEXAVALENT	mg/Kg	1.9			0.68	U		0.72			0.65	U		0.74	U		0.62	U		0.68	U		0.62	U	
SW7470A	MERCURY	mg/Kg	0.15			0.12			0.68			0.1			0.43			0.12			0.24			0.07		
SW6010B	ARSENIC, TCLP	ug/L	11.4			9.8			10.6			13.7			21.8			8.2			15.9					
	BARIUM, TCLP	ug/L	630			573			566			618			735			603			622					
	BERYLLIUM, TCLP	ug/L	0.71	B		0.99	B	4.0U	0.7	B	4.0U	1.1	B	4.0U	1	B	4.0U	0.35	U		0.48	B	4.0U			
	CADMIUM, TCLP	ug/L	2.2	B		6.6			18.7			9.8			1.3	B		3.2	B		2.2	B				
	CHROMIUM, TCLP	ug/L	5	B		1.9	B		3.4	B		2.9	B		2	B		4.6	B		3.7	B				
	COPPER, TCLP	ug/L	1.74	U		1.8	B	J-	2.1	B	J-	16.3	B	J-	1.74	U		1.74	U		1.74	U				
	LEAD, TCLP	ug/L	42.4			26.3			76.4			113			83.3			22			58.4					
	NICKEL, TCLP	ug/L	132			88.6			98			87.1			170			62.9			103					
	SELENIUM, TCLP	ug/L	3.59	U		3.59	U		5.6	B	10U	3.59	U		3.59	U		3.59	U		3.59	U				
	SILVER, TCLP	ug/L	1.04	U		1.04	U		1.04	U		1.04	U		1.04	U		1.04	U		1.04	U				
	ZINC, TCLP	ug/L	2290		J	1700		J	2070		J	3680		J	4520		J	1320		J	2640		J			
SW7470A	MERCURY, TCLP	ug/L	0.02	U		0.02	U		0.02	U		0.02	U		0.02	U		0.02	U		0.02	U				
SW846 9014	CYANIDE(FREE), TCLP	ug/L	20	U		20	U		20	U		20	U		20	U		20	U		20	U				

TABLE 2

TOTAL AND TCLP METALS, FINE- AND COARSE-GRAINED FRACTIONS
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005-001 (FINE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-001(COARSE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-003(COARSE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-003(FINE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-004(COARSE) INITIAL RESULT	FLAG	VALID QUAL
SW6010B	BARIUM	mg/Kg	58			44.4			13.1			37.1			37		
	CADMIUM	mg/Kg	3.4			0.57			0.21	B		0.91			0.95		
	CHROMIUM	mg/Kg	71			27.9			12.1			36.2			21.9		
	COPPER	mg/Kg	96.5			31			13.8			45.4			39.2		
	LEAD	mg/Kg	260			78.9			27.9			87.6			142		
	NICKEL	mg/Kg	56.6			24.4			11.4			24.5			16.7		
	SELENIUM	mg/Kg							0.27	U		0.64	B		0.28	U	
	SILVER	mg/Kg	0.61	B		0.09	U		0.3	B		0.26	B		7.6		
SW6020	ARSENIC	mg/Kg	21.2			7.7			3.7			11			5.5		
	BERYLLIUM	mg/Kg	0.8			0.52			0.2			0.52			0.24		
	SELENIUM	mg/Kg	0.51	U		0.92		5.0U									
SW7196	CHROMIUM, HEXAVALENT	mg/Kg	0.74	U		0.71			0.65	U		0.75	U		0.68	U	
SW7470A	MERCURY	mg/Kg	0.17		J-	0.06		J-	0.04		J-	0.11		J-	0.37		
SW6010B	ARSENIC, TCLP	ug/L				7.3	B		6.6	B					8		
	BARIUM, TCLP	ug/L				401			479						490		
	BERYLLIUM, TCLP	ug/L				0.94	B	4.0U	0.41	B	4.0U				0.61	B	4.0U
	CADMIUM, TCLP	ug/L				1	B	J-	0.4	U					2.5	B	J-
	CHROMIUM, TCLP	ug/L				2.5	B		1.01	U					1.1	B	
	COPPER, TCLP	ug/L				1.74	U		1.74	U					1.74	U	
	LEAD, TCLP	ug/L				77.3			13						447		
	NICKEL, TCLP	ug/L				104			53.6						90.8		
	SELENIUM, TCLP	ug/L				3.59	U		3.59	U					3.59	U	
	SILVER, TCLP	ug/L				1.04	U		1.04	U					1.04	U	
	ZINC, TCLP	ug/L				1510			422						956		
SW7470A	MERCURY, TCLP	ug/L				0.02	U		0.02	B	0.20U				0.02	U	
SW846 9014	CYANIDE(FREE), TCLP	ug/L				10	U		30	U					30	U	

TABLE 2

TOTAL AND TCLP METALS, FINE- AND COARSE-GRAINED FRACTIONS
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005-004(FINE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-006(COARSE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-006(FINE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-007(COARSE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-007(FINE) INITIAL RESULT	FLAG	VALID QUAL
SW6010B	BARIUM	mg/Kg	77.6			13.6			30.2			76			78.1		
	CADMIUM	mg/Kg	3.8			0.36	B		0.47	B		0.4	B		2		
	CHROMIUM	mg/Kg	71.7			15.1			24.5			14			72.9		
	COPPER	mg/Kg	96.2			28.7			31.5			35.8			92.9		
	LEAD	mg/Kg	228			32.7			66.1			115			270		
	NICKEL	mg/Kg	33.1			25.3			25.7			14.2			46.9		
	SELENIUM	mg/Kg				0.27	U		0.36	U		0.4	U				
	SILVER	mg/Kg	5.6			0.08	U		0.16	B		0.31	B		1.2	B	
SW6020	ARSENIC	mg/Kg	12			9.4			8			5			18.3		
	BERYLLIUM	mg/Kg	0.62			0.35			0.38			0.22			0.78		
	SELENIUM	mg/Kg	0.76	B											1.2	B	
SW7196	CHROMIUM, HEXAVALENT	mg/Kg	0.74	U		2.6			0.87			0.99			0.83	U	
SW7470A	MERCURY	mg/Kg	0.85			0.02	B	J-	0.1		J-	0.24		J-	0.47		
SW6010B	ARSENIC, TCLP	ug/L				7.5	B					9.9					
	BARIUM, TCLP	ug/L				328						534					
	BERYLLIUM, TCLP	ug/L				0.35	B	4.0U				0.5	B	4.0U			
	CADMIUM, TCLP	ug/L				0.95	B					2.1	B				
	CHROMIUM, TCLP	ug/L				1.1	B					1.9	B				
	COPPER, TCLP	ug/L				5.5	B					1.74	U				
	LEAD, TCLP	ug/L				37.2						449					
	NICKEL, TCLP	ug/L				93.2						113					
	SELENIUM, TCLP	ug/L				3.59	U					3.59	U				
	SILVER, TCLP	ug/L				1.04	U					1.04	U				
	ZINC, TCLP	ug/L				777						1310					
SW7470A	MERCURY, TCLP	ug/L				0.02	B	0.20U				0.02	B	0.20U			
SW846 9014	CYANIDE(FREE), TCLP	ug/L				30	U					30	U				

TABLE 2

TOTAL AND TCLP METALS, FINE- AND COARSE-GRAINED FRACTIONS
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005-008(COARSE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-008(FINE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-009 (FINE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-009(COARSE) INITIAL RESULT	FLAG	VALID QUAL
SW6010B	BARIUM	mg/Kg	48.8			75.5			49.8			24.3		
	CADMIUM	mg/Kg	0.29	B		2.3			1.2			0.37	B	
	CHROMIUM	mg/Kg	14.4			55.4			38.6			21.5		
	COPPER	mg/Kg	18.6			88.9			54.2			34		
	LEAD	mg/Kg	47.7			337			123			46.4		
	NICKEL	mg/Kg	14.4			45.8			36.7			27.9		
	SELENIUM	mg/Kg	0.32	U								0.29	U	
	SILVER	mg/Kg	0.09	U		0.96	B		0.29	B		0.09	U	
SW6020	ARSENIC	mg/Kg	6.1			15.5			13.8			13.6		
	BERYLLIUM	mg/Kg	0.64			0.95			0.72			0.48		
	SELENIUM	mg/Kg				1	B		0.36	B	1.9U			
SW7196	CHROMIUM, HEXAVALENT	mg/Kg	1.1			0.86	U		0.7	U		0.65	U	
SW7470A	MERCURY	mg/Kg	0.36			0.21		J-	0.1		J-	0.07		J-
SW6010B	ARSENIC, TCLP	ug/L	7.2	B								6.3	B	
	BARIUM, TCLP	ug/L	612									323		
	BERYLLIUM, TCLP	ug/L	0.83	B	4.0U							0.35	U	
	CADMIUM, TCLP	ug/L	0.4	U								0.97	B	J-
	CHROMIUM, TCLP	ug/L	2.8	B								3.6	B	
	COPPER, TCLP	ug/L	1.74	U								1.74	U	
	LEAD, TCLP	ug/L	27.6									15		
	NICKEL, TCLP	ug/L	58.1									87.4		
	SELENIUM, TCLP	ug/L	3.59	U								3.59	U	
	SILVER, TCLP	ug/L	1.04	U								1.04	U	
	ZINC, TCLP	ug/L	703									482		
SW7470A	MERCURY, TCLP	ug/L	0.02	U								0.02	U	
SW846 9014	CYANIDE(FREE), TCLP	ug/L	30	U								30	U	

TABLE 3

POLUNUCLEAR AROMATIC HYDROCARBONS, ORIGINAL SAMPLES
CHICAGO AREA CDF

METHODS	ANALYTE	UNIT	CHCDF2005 01 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 03 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 04 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 06 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 07 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 08 INITIAL RESULT	FLAG	VALID QUAL
SW846 8270	2-METHYLNAPHTHALENE	ug/Kg	270	J		180			240	J		2400			430			180		
SW846 M8270C	ACENAPHTHENE	ug/Kg	390	J		150			330	J		1400			680			200	J	
	ACENAPHTHYLENE	ug/Kg	180	J		91			280	J		79	U		180	J		84		
	ANTHRACENE	ug/Kg	620			300			550			220	J		1100			300	J	
	BENZO(A)ANTHRACENE	ug/Kg	1500			670			1300			390	J		2400			550		
	BENZO(A)PYRENE	ug/Kg	1400			680			1300			240	J		2000			540		
	BENZO(B)FLUORANTHENE	ug/Kg	1800			860			1600			610			2700			610		
	BENZO(K)FLUORANTHENE	ug/Kg	640			300	J		590			200	J		1000			260	J	
	BENZO[G,H,I]PERYLENE	ug/Kg	940			370	J		940			230	J		950		J	300	J	
	CHRYSENE	ug/Kg	1900			830			2100			910			2600			770		
	DIBENZO(A,H)ANTHRACENE	ug/Kg	290	J		180			300	J		110			300	J	J	170		
	FLUORANTHENE	ug/Kg	2700			1400			2800			1600			4100			1200		
	FLUORENE	ug/Kg	790			200		J	490			610		J	830		J	250	J	
	INDENO(1,2,3-CD)PYRENE	ug/Kg	970			490			880			280			1000		J	410		
	NAPHTHALENE	ug/Kg	350	J		130			320	J		44000			1400			190	J	
	PHENANTHRENE	ug/Kg	1900			980			2200			5000			4900			880		
	PYRENE	ug/Kg	2700			1400			3000			1100			4800			950		

TABLE 3

POLUNUCLEAR AROMATIC HYDROCARBONS, ORIGINAL SAMPLES
CHICAGO AREA CDF

METHODS	ANALYTE	UNIT	CHCDF2005 09 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 DUP INITIAL RESULT	FLAG	VALID QUAL
SW846 8270	2-METHYLNAPHTHALENE	ug/Kg	200	J		280	J	
SW846 M8270C	ACENAPHTHENE	ug/Kg	290	J		380	J	
	ACENAPHTHYLENE	ug/Kg	120			110		
	ANTHRACENE	ug/Kg	310	J		660		
	BENZO(A)ANTHRACENE	ug/Kg	540			1300		
	BENZO(A)PYRENE	ug/Kg	660			1300		
	BENZO(B)FLUORANTHENE	ug/Kg	770			1500		
	BENZO(K)FLUORANTHENE	ug/Kg	330	J		630		
	BENZO[G,H,I]PERYLENE	ug/Kg	410	J		850		
	CHRYSENE	ug/Kg	850			1700		
	DIBENZO(A,H)ANTHRACENE	ug/Kg	170			260	J	
	FLUORANTHENE	ug/Kg	1200			2700		
	FLUORENE	ug/Kg	280	J		440		
	INDENO(1,2,3-CD)PYRENE	ug/Kg	410	J		900		
	NAPHTHALENE	ug/Kg	230	J		320	J	
	PHENANTHRENE	ug/Kg	940			2100		
	PYRENE	ug/Kg	1300			2600		

TABLE 4

POLYNUCLEAR AROMATIC HYDROCARBONS, FINE- AND COARSE-GRAINED FRACTIONS
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	SAMPLE ID CHCDF2005-001 (FINE) RESULT	FLAG	VALID QUAL	CHCDF2005-001(COARSE) RESULT	FLAG	VALID QUAL	CHCDF2005-003(COARSE) RESULT	FLAG	VALID QUAL	CHCDF2005-003(FINE) RESULT	FLAG	VALID QUAL
SW8270	2-METHYLNAPHTHALENE	ug/Kg	310	J		360	J		230	J		210		J
SW M8270	ACENAPHTHENE	ug/Kg	430	J		440			260	J		200	J	
	ACENAPHTHYLENE	ug/Kg	130			150	J		210			100		
	ANTHRACENE	ug/Kg	660			660			390	J		220	J	
	BENZO(A)ANTHRACENE	ug/Kg	1100			1400			990			280	J	
	BENZO(A)PYRENE	ug/Kg	1100			1400			930			290	J	
	BENZO(B)FLUORANTHENE	ug/Kg	1500			1600			1000			400	J	
	BENZO(K)FLUORANTHENE	ug/Kg	630			650			420	J		130		
	BENZO[G,H,I]PERYLENE	ug/Kg	790		J	790			560			160		
	CHRYSENE	ug/Kg	1700			2000			1100			410	J	
	DIBENZO(A,H)ANTHRACENE	ug/Kg	170		J	290	J		280		J	90	U	J
	FLUORANTHENE	ug/Kg	2200			2400			1800			820		
	FLUORENE	ug/Kg	950			690			240	J	J	200	J	J
	INDENO(1,2,3-CD)PYRENE	ug/Kg	690		J	790			560			200		J
	NAPHTHALENE	ug/Kg	550			430			300	J		240	J	
	PHENANTHRENE	ug/Kg	1700			2200			1300			610		
	PYRENE	ug/Kg	2700			2800			1700			890		

TABLE 4

POLYNUCLEAR AROMATIC HYDROCARBONS, FINE- AND COARSE-GRAINED FRACTIONS
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005-004(COARSE) RESULT	FLAG	VALID QUAL	CHCDF2005-004(FINE) RESULT	FLAG	VALID QUAL	CHCDF2005-006(COARSE) RESULT	FLAG	VALID QUAL	CHCDF2005-006(FINE) RESULT	FLAG	VALID QUAL
SW8270	2-METHYLNAPHTHALENE	ug/Kg	240	J		230	J		890			1300		
SW M8270	ACENAPHTHENE	ug/Kg	900			330	J		750			810		
	ACENAPHTHYLENE	ug/Kg	140			140			99	U		150	U	
	ANTHRACENE	ug/Kg	1400			460	J		1200			240	J	
	BENZO(A)ANTHRACENE	ug/Kg	3200			830			2600			230	J	
	BENZO(A)PYRENE	ug/Kg	3000			740			2000			280	J	
	BENZO(B)FLUORANTHENE	ug/Kg	4000			1000			2700			450	J	
	BENZO(K)FLUORANTHENE	ug/Kg	1600			420	J		1200			130	J	
	BENZO[G,H,I]PERYLENE	ug/Kg	1300		J	440	J		910			180		J
	CHRYSENE	ug/Kg	3700			1100			2700			670		
	DIBENZO(A,H)ANTHRACENE	ug/Kg	400	J	J	210		J	350	J		150	U	UJ
	FLUORANTHENE	ug/Kg	5400			2000			4500			1100		
	FLUORENE	ug/Kg	910			340	J	J	580		J	470	J	J
	INDENO(1,2,3-CD)PYRENE	ug/Kg	1600		J	460	J		1100			140	J	J
	NAPHTHALENE	ug/Kg	380	J		300	J		16000			26000		
	PHENANTHRENE	ug/Kg	6200			1700			4200			3000		
	PYRENE	ug/Kg	6400			2200			4300			900		

TABLE 4

POLYNUCLEAR AROMATIC HYDROCARBONS, FINE- AND COARSE-GRAINED FRACTIONS
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005-007(COARSE) RESULT	FLAG	VALID QUAL	CHCDF2005-007(FINE) RESULT	FLAG	VALID QUAL	CHCDF2005-008(COARSE) RESULT	FLAG	VALID QUAL	CHCDF2005-008(FINE) RESULT	FLAG	VALID QUAL
SW8270	2-METHYLNAPHTHALENE	ug/Kg	410	J		330	J		230	J		390	J	
SW M8270	ACENAPHTHENE	ug/Kg	800			400	J		290	J		370	J	
	ACENAPHTHYLENE	ug/Kg	180	J		77	J		74	J		95	J	
	ANTHRACENE	ug/Kg	1700			530	J		420	J		550	J	
	BENZO(A)ANTHRACENE	ug/Kg	3400			830			700			930		
	BENZO(A)PYRENE	ug/Kg	3200			860			680			950		
	BENZO(B)FLUORANTHENE	ug/Kg	3800			1100			820			1300		
	BENZO(K)FLUORANTHENE	ug/Kg	1800			380	J		340	J		410	J	
	BENZO[G,H,I]PERYLENE	ug/Kg	1600			580			300	J		620		
	CHRYSENE	ug/Kg	4000			1200			900			1300		
	DIBENZO(A,H)ANTHRACENE	ug/Kg	510			160	U	J	160		J	250		J
	FLUORANTHENE	ug/Kg	5600			1900			1800			1800		
	FLUORENE	ug/Kg	1200			470	J	J	350	J		640		J
	INDENO(1,2,3-CD)PYRENE	ug/Kg	1900			610			410			620		
	NAPHTHALENE	ug/Kg	860			1000			280	J		690		
	PHENANTHRENE	ug/Kg	7400			1800			1400			1600		
	PYRENE	ug/Kg	6300			2100			1500			2400		

TABLE 4

POLYNUCLEAR AROMATIC HYDROCARBONS, FINE- AND COARSE-GRAINED FRACTIONS
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005-009 (FINE) RESULT	FLAG	VALID QUAL	CHCDF2005-009(COARSE) RESULT	FLAG	VALID QUAL
SW8270	2-METHYLNAPHTHALENE	ug/Kg	210	J		400	J	
SW M8270	ACENAPHTHENE	ug/Kg	290	J		390	J	
	ACENAPHTHYLENE	ug/Kg	150			170	J	
	ANTHRACENE	ug/Kg	320	J		640		
	BENZO(A)ANTHRACENE	ug/Kg	540			1200		
	BENZO(A)PYRENE	ug/Kg	640			1400		
	BENZO(B)FLUORANTHENE	ug/Kg	750			1400		
	BENZO(K)FLUORANTHENE	ug/Kg	290	J		600		
	BENZO[G,H,I]PERYLENE	ug/Kg	450	J		860		
	CHRYSENE	ug/Kg	850			1700		
	DIBENZO(A,H)ANTHRACENE	ug/Kg	260		J	300	J	
	FLUORANTHENE	ug/Kg	1200			2300		
	FLUORENE	ug/Kg	250	J		390	J	
	INDENO(1,2,3-CD)PYRENE	ug/Kg	420	J		860		
	NAPHTHALENE	ug/Kg	220	J		420	J	
	PHENANTHRENE	ug/Kg	970			1900		
	PYRENE	ug/Kg	1300			2200		

TABLE 5

POLYCHLORINATED BIPHENYLS, ORIGINAL SAMPLES
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005 01 REANALYSIS RESULT	FLAG	VALID QUAL	CHCDF2005 03 REANALYSIS RESULT	FLAG	VALID QUAL	CHCDF2005 04 REANALYSIS RESULT	FLAG	VALID QUAL	CHCDF2005 06 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 07 REANALYSIS RESULT	FLAG	VALID QUAL	CHCDF2005 08 REANALYSIS RESULT	FLAG	VALID QUAL	CHCDF2005 09 REANALYSIS RESULT	FLAG	VALID QUAL	CHCDF2005 DUP REANALYSIS RESULT	FLAG	VALID QUAL
SW8082	AROCLOR-1016	ug/Kg	23	U		24	U		23	U		22	U		25	U		21	U		47	U		21	U	
	AROCLOR-1221	ug/Kg	23	U		24	U		23	U		22	U		25	U		21	U		47	U		21	U	
	AROCLOR-1232	ug/Kg	23	U		24	U		23	U		22	U		25	U		21	U		47	U		21	U	
	AROCLOR-1242	ug/Kg	2300			410			170			22	U		2900			420			4100			230		
	AROCLOR-1248	ug/Kg	23	U		24	U		23	U		22	U		25	U		21	U		47	U		21	U	
	AROCLOR-1254	ug/Kg	23	U		180			81			22	U		520			200			580			120		
	AROCLOR-1260	ug/Kg	23	U		24	U		23	U		22	U		25	U		21	U		47	U		21	U	

TABLE 6

POLYCHLORINATED BIPHENYLS, FINE- AND COARSE-GRAINED FRACTIONS
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	SAMPLE ID CHCDF2005-001 (FINE) REANALYSIS RESULT	RUN FLAG	VALID QUAL	CHCDF2005-001(COARSE) REANALYSIS RESULT	FLAG	VALID QUAL	CHCDF2005-003(COARSE) REANALYSIS RESULT	FLAG	VALID QUAL	CHCDF2005-003(FINE) REANALYSIS RESULT	FLAG	VALID QUAL	CHCDF2005-004(COARSE) REANALYSIS RESULT	FLAG	VALID QUAL
SW8082	AROCLOR-1016	ug/Kg	25	U		22	U		22	U		26	U		23	U	
	AROCLOR-1221	ug/Kg	25	U		22	U		22	U		26	U		23	U	
	AROCLOR-1232	ug/Kg	25	U		22	U		22	U		26	U		23	U	
	AROCLOR-1242	ug/Kg	2000			2000			98			290			420		
	AROCLOR-1248	ug/Kg	25	U		22	U		22	U		26	U		23	U	
	AROCLOR-1254	ug/Kg	380			330			110			190			310		
	AROCLOR-1260	ug/Kg	25	U		22	U		22	U		26	U		23	U	

TABLE 6

POLYCHLORINATED BIPHENYLS, FINE- AND COARSE-GRAINED FRACTIONS
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005-004(FINE) REANALYSIS RESULT	FLAG	VALID QUAL	CHCDF2005-006(COARSE) REANALYSIS RESULT	FLAG	VALID QUAL	CHCDF2005-006(FINE) REANALYSIS RESULT	FLAG	VALID QUAL	CHCDF2005-007(COARSE) REANALYSIS RESULT	FLAG	VALID QUAL	CHCDF2005-007(FINE) REANALYSIS RESULT	FLAG	VALID QUAL
SW8082	AROCLOR-1016	ug/Kg	25	U		21	U		25	U		23	U		28	U	
	AROCLOR-1221	ug/Kg	25	U		21	U		25	U		23	U		28	U	
	AROCLOR-1232	ug/Kg	25	U		21	U		25	U		23	U		28	U	
	AROCLOR-1242	ug/Kg	340			870			25	U		720			2200		
	AROCLOR-1248	ug/Kg	25	U		21	U		25	U		23	U		28	U	
	AROCLOR-1254	ug/Kg	320			590			25	U		250			510		
	AROCLOR-1260	ug/Kg	25	U		21	U		25	U		23	U		28	U	

TABLE 6

POLYCHLORINATED BIPHENYLS, FINE- AND COARSE-GRAINED FRACTIONS
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005-008(COARSE) REANALYSIS RESULT	FLAG	VALID QUAL	CHCDF2005-008(FINE) REANALYSIS RESULT	FLAG	VALID QUAL	CHCDF2005-009 (FINE) REANALYSIS RESULT	FLAG	VALID QUAL	CHCDF2005-009(COARSE) REANALYSIS RESULT	FLAG	VALID QUAL
SW8082	AROCLOR-1016	ug/Kg	22	U		29	U		24	U		22	U	
	AROCLOR-1221	ug/Kg	22	U		29	U		24	U		22	U	
	AROCLOR-1232	ug/Kg	22	U		29	U		24	U		22	U	
	AROCLOR-1242	ug/Kg	220			780			360			240		
	AROCLOR-1248	ug/Kg	22	U		29	U		24	U		22	U	
	AROCLOR-1254	ug/Kg	110			320			140			200		
	AROCLOR-1260	ug/Kg	22	U		29	U		24	U		22	U	

TABLE 7

GENERAL CHARACTERIZATION, ORIGINAL SAMPLES
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005 01 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 02 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 03 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 04 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 05 INITIAL RESULT	FLAG	VALID QUAL
KATAHDIN ANALYSIS																	
ASTM D2216	Water Content	%	25			30			28			26			30		
ASTM D2974-87	TOTAL COMBUSTIBLE ORGANICS	% as Dry Weight	13.6			12			8.65			12.9			9.01		
CLP/CIP SOW	TOTAL SOLIDS	%	75			70			72			74			70		
Env. Science Technology 1997	Soot Carbon	ug/g	44000		J	30000		J	4400		J	9200		J	18000	J	
LYDKHN	TOTAL ORGANIC CARBON	ug/g	110000			73000			44000			66000			33000		
SW846 9071A	OG(HEXANE EXTRACTED)	% as Dry Weight	0.44			0.5			0.2			0.24			0.32		
SW846 7196A	Hexavalent Chromium	mg/kg	1.9	U	J-				0.68	U	UJ-	0.72	U	J-			
SW846 M9014	Cyanide (free)	ug/L	20	U		20	U		20	U		20	U		20	U	
KEMRON ANALYSIS																	
Particle Size Analysis	ASTM D422																
- Gravel		%	0.8			0.3			0.1			0.6			0.1		
- Sand		%	23.2			28.3			20.2			35.8			31.8		
- Silt		%	44.4			49.5			52.3			41.3			46.7		
- Clay		%	31.6			21.9			27.4			22.3			21.4		
Void Ratio	-		1.0			1.0			1.0			1.0			1.0		
Bulk Density	ASTM D2937	lb/ft³	112.3			115.3			113.7			113.0			112.7		
Dry Density	ASTM D2937	lb/ft³	79.5			85.7			80.6			82.1			80.1		
Moisture Content	ASTM D2216	%	41.25			34.55			41.12			37.6			40.68		
Specific Gravity	ASTM D854	-	2.72			2.74			2.76			2.69			2.77		
Specific Gravity > #200 Fraction	ASTM D854	-	2.51						2.69			2.60					
Specific Gravity < #200 Fraction	ASTM D854	-	2.80						2.78			2.76					
Total Porosity	-	%	53.2			49.9			53.2			51.1			53.7		

TABLE 7

GENERAL CHARACTERIZATION, ORIGINAL SAMPLES
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005 06 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 07 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 08 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 09 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 DUP INITIAL RESULT	FLAG	VALID QUAL
KATAHDIN ANALYSIS																	
ASTM D2216	Water Content	%	24			32			19			28					
ASTM D2974-87	TOTAL COMBUSTIBLE ORGANICS	% as Dry Weight	12			11			10.7			11.7					
CLP/CIP SOW	TOTAL SOLIDS	%	76			68			81			72			80		
Env. Science Technology 1997	Soot Carbon	ug/g	10000			17000		J	5900		J	11000		J			
LYDKHN	TOTAL ORGANIC CARBON	ug/g	39000			56000			51000			67000					
SW846 9071A	OG(HEXANE EXTRACTED)	% as Dry Weight	0.33			0.29			0.16			1					
SW846 7196A	Hexavalent Chromium	mg/kg	0.65	U	UJ-	0.74	U	UJ-	0.62	U	UJ-	0.68	U	UJ-	0.62	U	UJ-
SW846 M9014	Cyanide (free)	ug/L	20	U		20	U		20	U		20	U		20	U	
KEMRON ANALYSIS																	
Particle Size Analysis	ASTM D422																
- Gravel		%	1.1			1.1			2.6			11.7			0		
- Sand		%	24.0			27.5			49.7			32.7			22.1		
- Silt		%	37.2			37.3			26.3			29.6			49.7		
- Clay		%	37.7			34.1			21.4			26.0			28.2		
Void Ratio	-		1.0			1.0			1.0			1.0			1.0		
Bulk Density	ASTM D2937	lb/ft³	121.9			111.2			117.7			117.0			108.1		
Dry Density	ASTM D2937	lb/ft³	91.0			77.7			85.0			90.1			71.8		
Moisture Content	ASTM D2216	%	33.95			43.06			38.43			29.92			50.48		
Specific Gravity	ASTM D854	-	2.76			2.73			2.66			2.72			2.77		
Specific Gravity > #200 Fraction	ASTM D854	-	2.67			2.62			2.66			2.54					
Specific Gravity < #200 Fraction	ASTM D854	-	2.74			2.71			2.78			2.79					
Total Porosity	-	%	47.2			54.4			48.8			46.9			58.4		

TABLE 7

GENERAL CHARACTERIZATION, ORIGINAL SAMPLES
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005 G1 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 G2 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 P1 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 P2 INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005 P3 INITIAL RESULT	FLAG	VALID QUAL
KATAHDIN ANALYSIS																	
ASTM D2216	Water Content	%	30			26			34			26			26		
ASTM D2974-87	TOTAL COMBUSTIBLE ORGANICS	% as Dry Weight	9.04			8.46			10.5			9.72			7.26		
CLP/CIP SOW	TOTAL SOLIDS	%							66			74			74		
Env. Science Technology 1997	Soot Carbon	ug/g							5900		J	16000		J	7900		J
LYDKHN	TOTAL ORGANIC CARBON	ug/g							32000			57000			40000		
SW846 9071A	OG(HEXANE EXTRACTED)	% as Dry Weight							0.16			0.75			0.14		
SW846 7196A	Hexavalent Chromium	mg/kg															
SW846 M9014	Cyanide (free)	ug/L															
KEMRON ANALYSIS																	
Particle Size Analysis	ASTM D422																
- Gravel		%							0			4.7			3.6		
- Sand		%							22.1			39.4			58.5		
- Silt		%							49.7			29.2			23		
- Clay		%							28.2			26.7			14.9		
Void Ratio	-								1.5			1.0			1		
Bulk Density	ASTM D2937	lb/ft³							108.1			118.8			113		
Dry Density	ASTM D2937	lb/ft³							71.8			88.9			86.4		
Moisture Content	ASTM D2216	%							50.48			33.68			30.76		
Specific Gravity	ASTM D854	-							2.77			2.74			2.61		
Specific Gravity > #200 Fraction	ASTM D854	-															
Specific Gravity < #200 Fraction	ASTM D854	-															
Total Porosity	-	%							58.4			48.0			46.9		

TABLE 8

GENERAL CHARACTERIZATION, FINE- AND COURSE-GRAINED FRACTIONS
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	SAMPLE ID CHCDF2005-001 (FINE) INITIAL RESULT	RUN FLAG	VALID QUAL	CHCDF2005-001(COARSE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-003(COARSE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-003(FINE) INITIAL RESULT	FLAG	VALID QUAL
CLP/CIP SOW	TOTAL SOLIDS	%	68			77			77			66		
Env. Science Technology 1997	SOOT CARBON	ug/g	14000			130000			24000		J	9700		J
LYDKHN	TOTAL ORGANIC CARBON	ug/g	74000			210000			52000			51000		
SW846 9071A	OG(HEXANE EXTRACTED)	% as Dry Weight	0.56			0.16			0.053			0.11		
SW846 7196A	Hexavalent Chromium	mg/kg	0.65	U	UJ-	0.71		J-	0.65	U	UJ-	0.75	U	UJ-
SW846 M9014	Cyanide (free)	ug/L	10	U		10	U		30	U				

* Hexavalent Chromium and free cyanide rows added by the data validator

TABLE 8

GENERAL CHARACTERIZATION, FINE- AND COURSE-GRAINED FRACTIONS
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005-004(COARSE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-004(FINE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-006(COARSE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-006(FINE) INITIAL RESULT	FLAG	VALID QUAL
CLP/CIP SOW	TOTAL SOLIDS	%	74			68			80			68		
Env. Science Technology 1997	SOOT CARBON	ug/g	36000			15000		J	10000		J	4600		J
LYDKHN	TOTAL ORGANIC CARBON	ug/g	78000			48000			47000			45000		
SW846 9071A	OG(HEXANE EXTRACTED)	% as Dry Weight	0.088			0.11			0.043			0.13		
SW846 7196A	Hexavalent Chromium	mg/kg	0.68	U	UJ-	0.74	U	UJ-	2.6		J-	0.87		J-
SW846 M9014	Cyanide (free)	ug/L	30	U					30	U				

* Hexavalent Chromium and free cyanide rows added by the data validator

TABLE 8

GENERAL CHARACTERIZATION, FINE- AND COURSE-GRAINED FRACTIONS
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005-007(COARSE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-007(FINE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-008(COARSE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-008(FINE) INITIAL RESULT	FLAG	VALID QUAL
CLP/CIP SOW	TOTAL SOLIDS	%	75			61			77			58		
Env. Science Technology 1997	SOOT CARBON	ug/g	9700		J	24000		J	30000			15000		J
LYDKHN	TOTAL ORGANIC CARBON	ug/g	58000			69000			73000			78000		
SW846 9071A	OG(HEXANE EXTRACTED)	% as Dry Weight	0.13			0.46			0.072			0.21		
SW846 7196A	Hexavalent Chromium	mg/kg	0.99		J-	0.83	U	UJ-	1.1		J-	0.86	U	UJ-
SW846 M9014	Cyanide (free)	ug/L	30	U					30	U				

* Hexavalent Chromium and free cyanide rows added by the data validator

TABLE 8

GENERAL CHARACTERIZATION, FINE- AND COURSE-GRAINED FRACTIONS
CHICAGO AREA CDF

METHOD	ANALYTE	UNIT	CHCDF2005-009 (FINE) INITIAL RESULT	FLAG	VALID QUAL	CHCDF2005-009(COARSE) INITIAL RESULT	FLAG	VALID QUAL
CLP/CIP SOW	TOTAL SOLIDS	%	71			77		
Env. Science Technology 1997	SOOT CARBON	ug/g	14000			36000		
LYDKHN	TOTAL ORGANIC CARBON	ug/g	51000			130000		
SW846 9071A	OG(HEXANE EXTRACTED)	% as Dry Weight	0.2			0.086		
SW846 7196A	Hexavalent Chromium	mg/kg	0.7	U	UJ-	0.65	U	UJ-
SW846 M9014	Cyanide (free)	ug/L				30	U	

* Hexavalent Chromium and free cyanide rows added by the data validator

TABLE 9

GEOTECHNICAL SAMPLES
CHICAGO AREA CDF

	Atterberg Limits			Unconsolidated Undrained Shear Strength								
Sample No.	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Friction Angle (degrees)	Cohesion (ksf)	Cell Pressure (ksf)	Applied Failure Stress (ksf)	Failure Strain (%)	Specific Gravity (-)	Initial Moisture Content (%)	Initial Dry Density (pcf)	Initial Saturation (%)
G01 @ 9.5 -12 ft.	47	29	17	6.7	0.07	0.5	0.27	14.4	2.74	45.5	75.1	97.6
	47	31	16			1.0	0.43	15.3		46.6	74.5	98.5
						2.0	0.67	14.0		37.5	84.0	99.1
G02 @ 7 - 9.5 ft.	41	25	16	0	0.13	0.99	0.26	14.7	2.73	42.4	78.8	99.6
	40	25	15			2.0	0.26	16.5		45.9	74.2	96.7

		Consolidated Undrained Shear Strength										
	Total Stress		Effective Stress									
Sample No.	Friction Angle (degrees)	Cohesion (ksf)	Friction Angle (degrees)	Cohesion (ksf)	Cell Pressure (ksf)	Applied Failure Stress (ksf)	Failure Strain (%)	Pore Pressure (ksf)	Specific Gravity (-)	Initial Moisture Content (%)	Initial Dry Density (pcf)	Initial Saturation (%)
G02 @ 12 - 14.5 ft.	5.6	0.72	27.6	0.25	0.5	1.68	15.3	1.3	2.74	42.6	76.9	95.3
					1.0	3.96	15.2	-0.35		26.0	98.9	97.5
					2.0	2.03	15.8	-0.02		43.6	77.9	99.9
G02 @ 12 - 14.5 ft.	36.5	0.04	33.9	0.03	0.5	1.6	15.6	-0.1	2.72	22.8	104.2	98.5
					2.0	7.8	15.3	-1.0		21.1	107.1	97.0

	Consolidation							
Sample No.	Preconsolidation Pressure (ksf)	Compression Index (-)	Applied Pressure (ksf)	Coefficient of Consolidation (sf/day)	Specific Gravity (-)	Moisture Content (%)	Dry Density (pcf)	Saturation (%)
G02 @ 7 - 9.5 ft.	0.5	0.14	0.5	1.46	2.73	35.1	86.7	99.1
			1.0	0.64				
			1.0	0.82				
			2.0	0.83				
			4.0	0.75				
			8.0	0.67				

CDM