

*Flexible Cradle to Grave Data Management Tools
for Complex Tasks Including Data Visualization,
Data Evaluation, Optimization, and Site Closeout*

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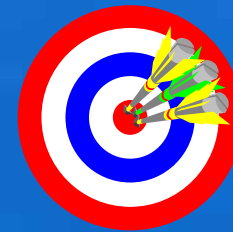
Conference on Accelerating Site Closeout, Improving Performance, and
Reducing Costs Through Optimization

June 17 2004

Projects without a full featured Data Management System



Perfect
Defensible
Reproducible

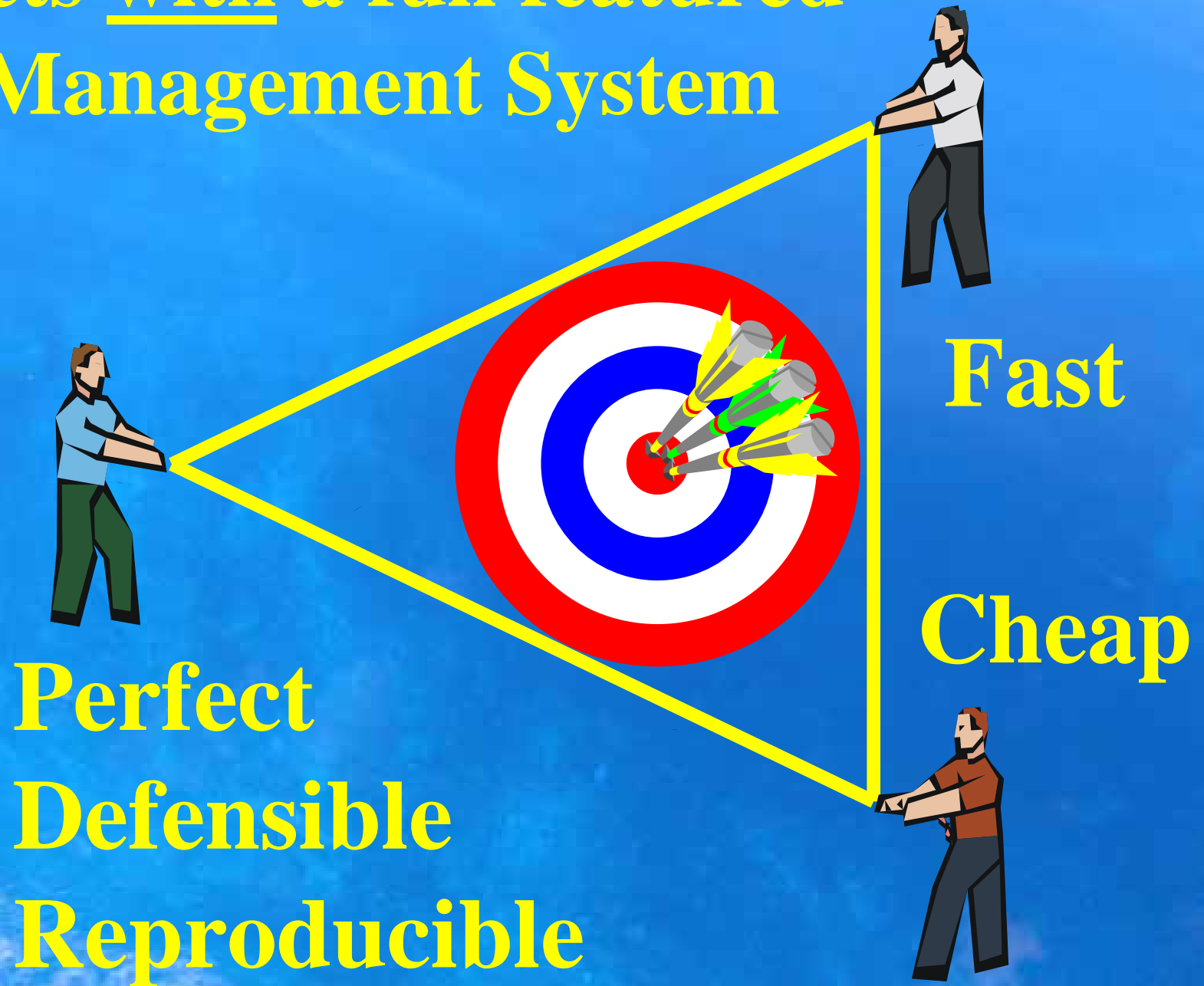


Fast

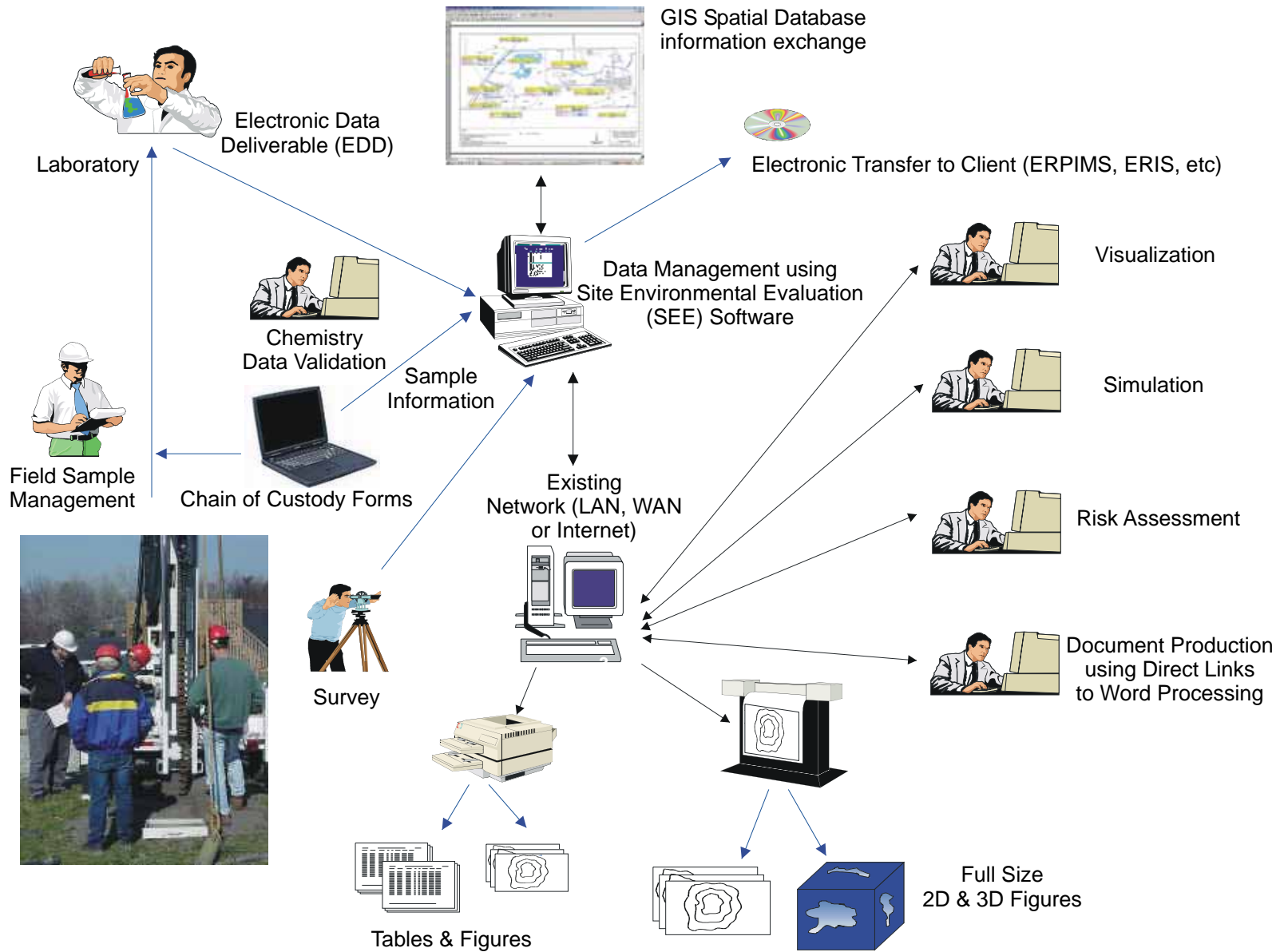
Cheap



Projects with a full featured Data Management System



Typical Data Flow

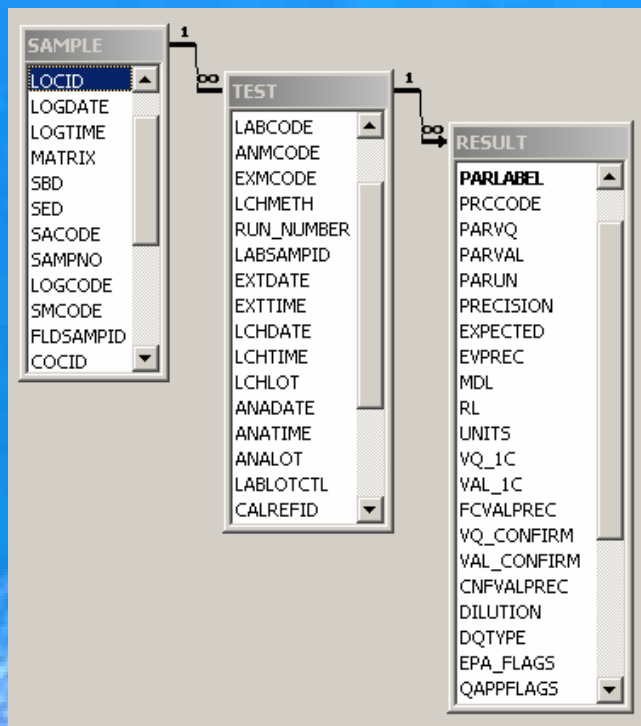


All Data should originate from a single source

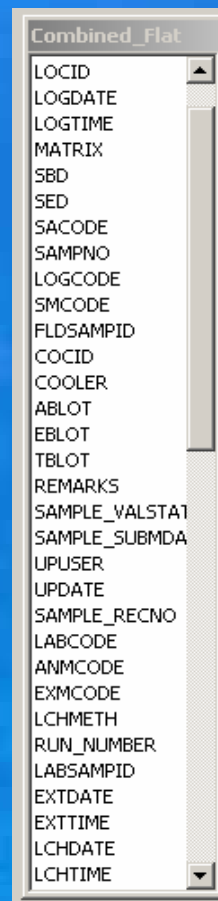
- Avoid duplicate data entry/corrections
- Identify Owner/Administrator and be realistic
- If master version of data is another database, then update information frequently

Database information exchange approach

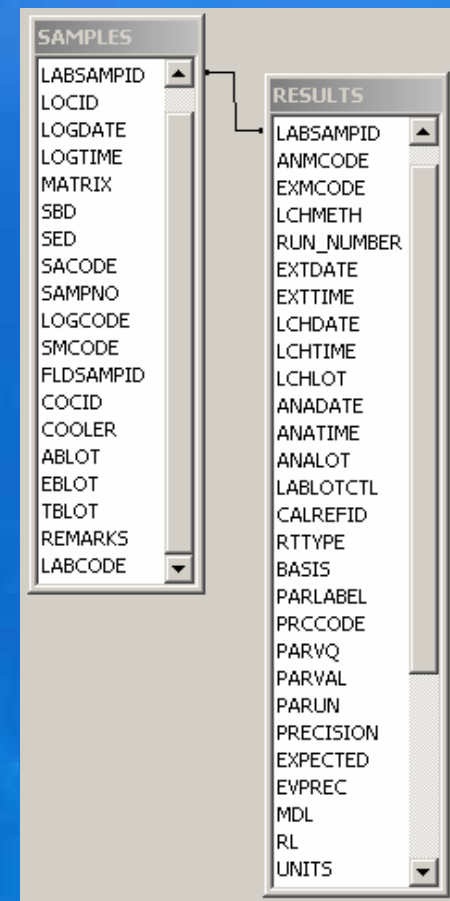
Source Database



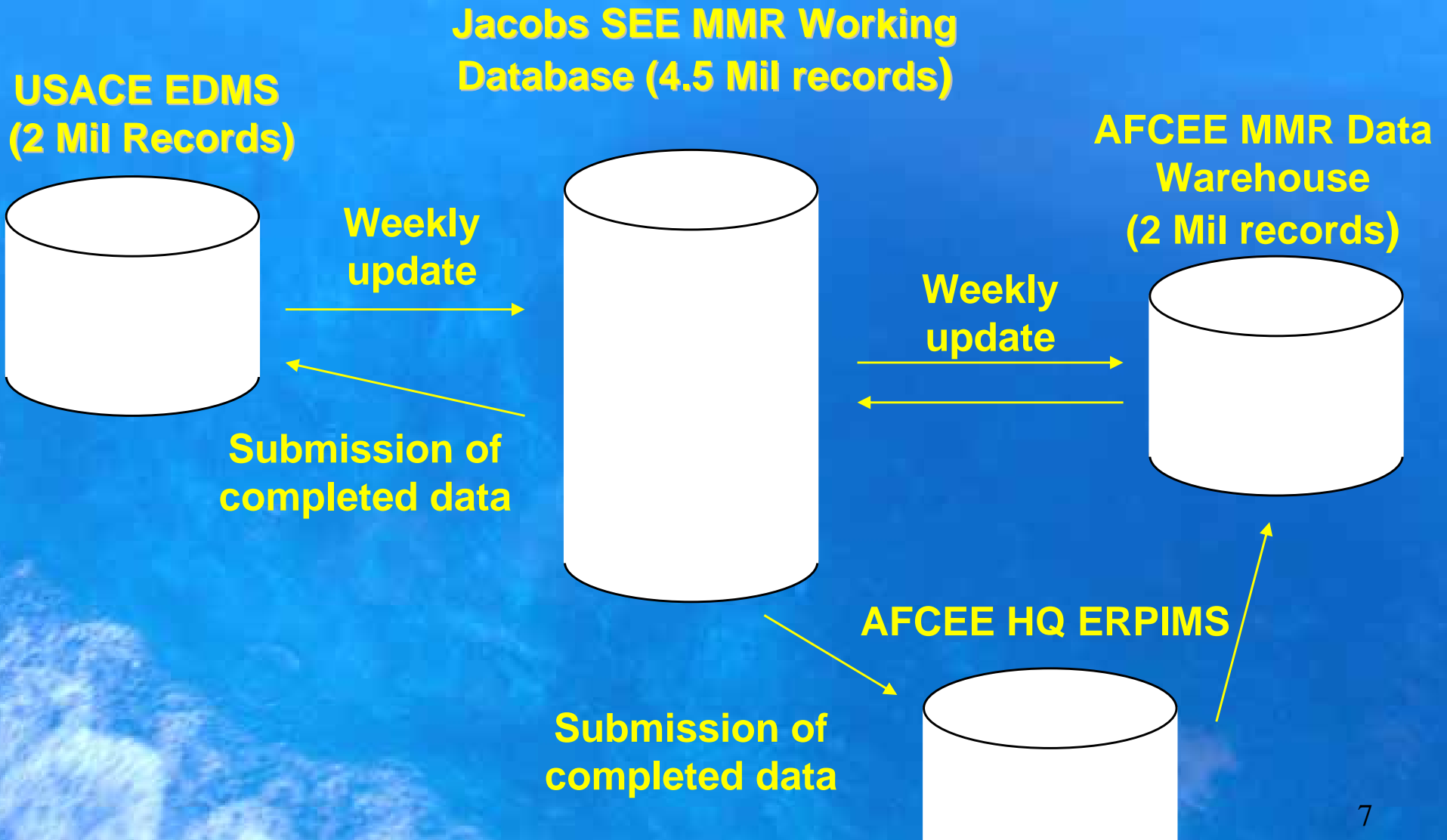
Temp Table



Destination Database



Case Study: Database Information Exchange at MMR



Populate as much data as possible

- The sum of the QA/QC benefit is greater than the sum of the effort
- The QA/QC benefit is especially good for dates, depths, and measurements that have relationships
- Possibly required for project closeout exports to ERPIMS, ERIS etc

Data Defensibility

- Automated QA/QC at each step
- Automated log of edit history
- Restricted Edit Privileges
- Processed on a Proven System

Automated QA/QC is essential on large projects



Example:

At MMR, the working database Site Environmental Evaluation (SEE) that Jacobs uses contains over 300 million data values. This would take someone 417 years of work to make even a single pass through the database to manually check the values if they check one value every 10 seconds.

Project Configurable System Flexibility

- Needs to be compatible with USACE, AFCEE, EPA, DOE, Navy using look up lists and configuration files
- Data driven edit screens and report modules allowing new fields to all tables
- User configurable reports
- User configurable browse/edit screens
- Data review and auto-flagging tools based on project validation criteria

Capacity Issues

- More than just the back end database
- Interface limits (i.e. lists of 32K+ locations, 128K+ samples, auto spanning of Excel sheets, etc.)
- 2 GB output limit on Windows PCs
- Transfer speed over the web for large queries

Users should be able to choose locations out of thousands using a variety of methods

MMR TERC & AFCEE Combined 04-05-2004 snapshot Site Environmental Evaluation (SEE)

Edit

Location Pick List including Instant Mapping with ArcGIS by ESRI (IMAGE)

Location	Site ID
03MW0053	140, 20C
03MW0054A	140, 20C
03MW0054B	140, 20C
03MW0055	140, 38C
03MW0055A	140, 38C
03MW0055Z	14
03MW0056	03C, 14D
03MW0057A	140, 20C
03MW0057B	140, 20C
03MW0057Z	140, 20C
03MW0058	140
03MW0058EFF	14
03MW0059	140
03MW0059EFF	14
03MW0060	08C, 14C
03MW0060B	14
03MW0060IDW	14
03MW0061	140
03MW0062	200, 14C
03MW0063	200, 14C
03MW0064	140, 20C
03MW0065	140
03MW0066	200
03MW0067	140, 38C, 03C
03MW0068	03C, 140
03MW0069	030, 14C
03MW0070	03C, 140
03MW0070A	03C, 140
03MW0070B	03C, 140
03MW0071	03C, 140
03MW0072	20C, 14C
03MW0073	14C
03MW0074	03C, 140
03MW0075	03C, 140, 99C
03MW0076	03C, 14D, 99C
03MW0077	03C, 14C
03MW0078	140
03MW0079	140
03MW0080	14C
03MW0081	03C, 14D, 99C
03MW0082	03C, 14D, 12U
03MW0083	140, 12U
03MW0084	140, 12U
03MW0085	03C, 14D, 12U
03MW0086	14D, 20C

East: 370115.76 North: 4613008.30

- Buildings
- Roads
- Runways
- Base Boundary
- Ponds
- Streams
- Impact Area
- Ranges
- Demo Areas
- Plumes
- Coastline

Click & Drag Rectangle of Interest
 Click & Drag Circle of Interest
 Click on Corners to make an irregular polygon
 Double Click Location Symbol to toggle selection

Label posting Label Angle: 0
 Separate Very Close Labels
 Display cross-hair on current location

Do Not Post Sampling Locations
 Post All Sampling Locations
 Post Selected Sampling Locations

Posting Symbol Size: 4
 Label point size: 6
 Show Scale

Start | MMR TERC & AFCEE Co... | see_part3_reports.doc - ... | Links » | 7:39 AM

“On the fly” Compression Performance Gains

Example:

Approximate time to query 1 million records over
the Internet with a 512KB connection

File Type	Uncompressed transfer time	Compressed Transfer Time
.CSV	40 Min	3 Min
XML	3 Hrs	12 Minutes

Innovative Technologies developed by Jacobs Engineering

- Relational Browse/Edit data windows joined directly to instant map windows
- Remote Internet users have the same features as local users and “On the fly compression” for fast performance
- Data Review and Flagging Tools (DRAFT)
- Automatic links with other software to create maps and figures

Browse/Edit data windows are linked directly to instant map windows

EDIT Filter Sort Locate Refresh Save/Restore view EXIT

Location

Location	Class	Surf_north	Surf_east	Surf_elev	Total
03MW0108A	WL	242094.79	858351.99	127.11	292.00
03MW0108B	WL	242098.39	858342.45	127.18	207.00
03MW0109A	WL	241697.50	860311.92	124.01	287.00
03MW0109B	WL	241697.15	860311.87	124.01	287.00
03MW0110A	WL	239258.28	859982.79	115.27	282.00
03MW0110B	WL	239258.67	859982.68	115.27	282.00
03MW0111A	WL	239483.45	861443.94	115.26	293.50
03MW0111B	WL	239479.97	861451.54	115.02	141.00
03MW0112A	WL	243345.97	861451.77	130.77	306.00

Samples

Location	Sample_id	Date_samp	Time_s	Samp_num	Depth_to	Depth_b
03MW0110B	CPWCFN1	01/11/99	12:25	03MW0110B-04	174.00	174.00
03MW0110B	CPWCGN1	01/11/99	12:25	03MW0110B-04	174.00	174.00
03MW0110B	CM687N1	10/05/98	11:50	03MW0110B-02	173.60	173.60
03MW0110B	CM689N1	10/05/98	11:50	03MW0110B-02	173.60	173.60
03MW0110B	CM68AN1	10/05/98	11:50	03MW0110B-02	173.60	173.60

Instant Mapping with ArcGIS by ESRI (IMAGE)

Click and drag rectangle to zoom in - Right Click on sampling location to see data

- Buildings
- Major Roads
- Minor Roads
- Ponds
- Streams
- Base Bounda
- Runways
- Aerial_tile_9
- Impact Area
- Plumes
- Coastline

Show Scale Post Locations Post dot size: 3
 Label posting Label size: 6 Label Angle: 0
 Display cross-hair

Results

Sample_id	Analyte	Units	Result	Lab_qual	Val_qual	D1	Pquant	Dfact	Run	Method	Exmcod	Anal_end	Anal
CM689N1	1,1,1-TRICHLOROETHAN	UG/L	0	U	U	2.10	10	10	1	CUOL	METHOI	10/11/98	15:2
CM689N1	1,1,2,2-TETRACHLORO	UG/L	0	U	U	1.80	10	10	1	CUOL	METHOI	10/11/98	15:2
CM689N1	1,1,2-TRICHLOROETHAN	UG/L	0	U	U	2.30	10	10	1	CUOL	METHOI	10/11/98	15:2
CM689N1	1,1-DICHLOROETHANE	UG/L	0	U	U	1.90	10	10	1	CUOL	METHOI	10/11/98	15:2
CM689N1	1,1-DICHLOROETHENE	UG/L	0	U	U	2.10	10	10	1	CUOL	METHOI	10/11/98	15:2
CM689N1	1,2,4-TRICHLOROBENZE	UG/L	0	U	U	3.10	10	10	1	CUOL	METHOI	10/11/98	15:2
CM689N1	1,2-DIBROMO-3-CHLORO	UG/L	0	U	R	3.70	10	10	1	CUOL	METHOI	10/11/98	15:2
CM689N1	1,2-DIBROMOETHANE	UG/L	0	U	U	2.20	10	10	1	CUOL	METHOI	10/11/98	15:2
CM689N1	1,2-DICHLOROBENZENE	UG/L	0	U	U	2.60	10	10	1	CUOL	METHOI	10/11/98	15:2
CM689N1	1,2-DICHLOROETHANE	UG/L	0	U	U	1.80	10	10	1	CUOL	METHOI	10/11/98	15:2
CM689N1	1,2-DICHLOROPROPANE	UG/L	0	U	U	1.50	10	10	1	CUOL	METHOI	10/11/98	15:2
CM689N1	1,3-DICHLOROBENZENE	UG/L	0	U	U	2.40	10	10	1	CUOL	METHOI	10/11/98	15:2
CM689N1	1,4-DICHLOROBENZENE	UG/L	0	U	U	2.00	10	10	1	CUOL	METHOI	10/11/98	15:2
CM689N1	2-HEXANONE	UG/L	0	U	U	8.70	50	10	1	CUOL	METHOI	10/11/98	15:2
CM689N1	ACETONE	UG/L	0	U	R	8.20	50	10	1	CUOL	METHOI	10/11/98	15:2
CM689N1	BENZENE	UG/L	0	U	U	1.90	10	10	1	CUOL	METHOI	10/11/98	15:2
CM689N1	BROMOCHLOROMETHANE	UG/L	0	U	U	2.30	10	10	1	CUOL	METHOI	10/11/98	15:2

Chaininf

Control_no	Samp_type	Proj_num	Samplers	Methods	Date_samp	Time_samp	Matrix	Location
01-N023103	N1	35085203	T0	E504 <EDB>	07/02/98	16:00	WG	03MW0110B

Maps can include both Vector and Raster spatial layers such as Aerial Photos

EDIT Filter Sort Locate Refresh Save/Restore view Exit

Location

Location	Class	Surf_north	Surf_east	Surf_elev	Totald
02MW0001D	HW	232977.40	855121.40	97.12	177.00
02MW0002	HW	241983.00	858322.00	124.80	72.00
02MW0002D	HW	232939.50	855281.10	96.76	177.10
02MW0003	HW	242456.00	858588.00	127.40	81.50
02MW0003D	HW	232853.20	855495.30	98.10	178.00
02MW0004	HW	243448.00	859265.00	130.80	76.00
02MW0005	HW	242499.00	858809.00	129.30	76.00
02MW0006D	HW	232796.30	855667.90	97.26	178.00
02MW0008	HW	242902.00	858992.00	130.20	81.00

Samples

Location	Sample_id	Date_samp	Time_s	Samp_num	Depth_toj	Depth_b
02MW0004	52115D1N1	09/06/96	10:26	CS4-MW-4-01	67.86	77.86
02MW0004	52115ORN1	09/06/96	10:26	CS4-MW-4-01	67.86	77.86
02MW0004	52118ORN1	09/06/96	10:26	CS4-MW-4-01	67.86	77.86
02MW0004	52119ORN1	09/06/96	10:26	CS4-MW-4-01	67.86	77.86

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Click and drag rectangle to zoom in - Right Click on sampling location to see data

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Show Scale Post Locations Post dot size: 4
 Label posting Label size: 6 Label Angle: 0
 Display cross-hair

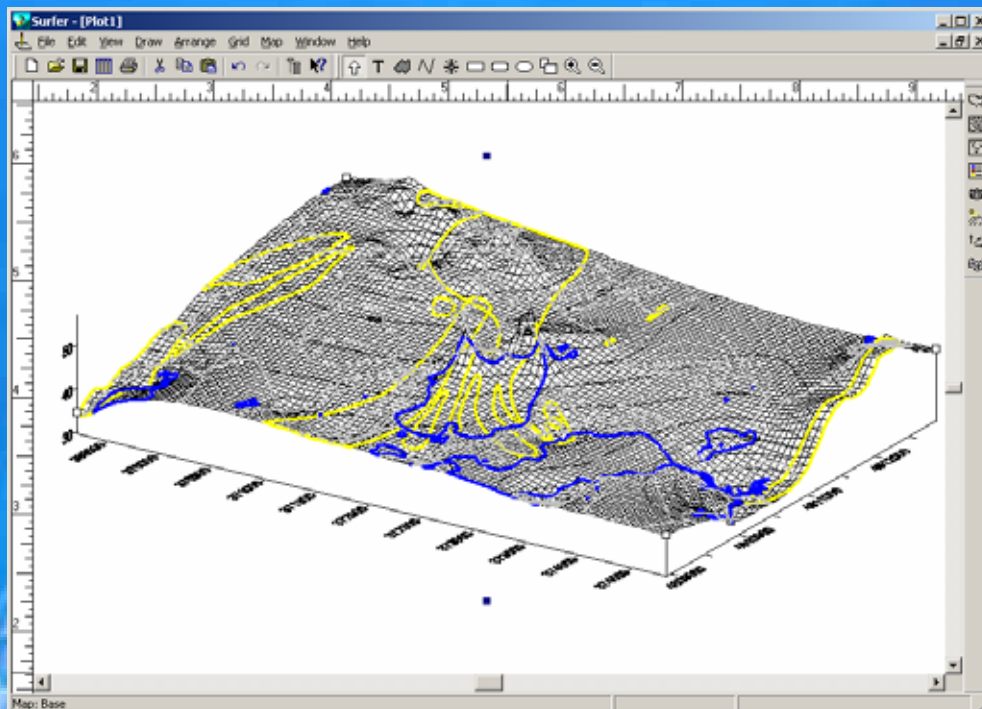
Results

Sample_id	Analyte	Units	Result	Lab_qual	Val_qual	D1	Pquant	Dfact	Run	Method	Exmcod	Anal_end	Anal
52118ORN1	ALUMINUM	UG/L	84.8	J		23.9	100	1	1	C200.7	FLDFL1 09/18/96	04:0	
52118ORN1	ANTIMONY	UG/L	5.1	J		4.9	5	1	1	C200.7	FLDFL1 09/18/96	03:2	
52118ORN1	ARSENIC	UG/L	0	U	U	1	2	1	1	C206.2	FLDFL1 09/18/96	11:0	
52118ORN1	BARIUM	UG/L	56.3			1.8	5	1	1	C200.7	FLDFL1 09/18/96	03:2	
52118ORN1	BERYLLIUM	UG/L	0	U	U	.54	1	1	1	C200.7	FLDFL1 09/18/96	03:2	
52118ORN1	CADMIUM	UG/L	0	U	U	1.3	3	1	1	C200.7	FLDFL1 09/18/96	03:2	
52118ORN1	CALCIUM	UG/L	5100			21.4	500	1	1	C200.7	FLDFL1 09/18/96	04:0	
52118ORN1	CHROMIUM, TOTAL	UG/L	2.9	J		1.2	5	1	1	C200.7	FLDFL1 09/18/96	03:2	
52118ORN1	COBALT	UG/L	2.8	J		2.6	5	1	1	C200.7	FLDFL1 09/18/96	03:2	
52118ORN1	COPPER	UG/L	0	U	U	1.7	5	1	1	C200.7	FLDFL1 09/18/96	03:2	

Chaininf

Control_no	Samp_type	Proj_num	Samplers	Methods	Date_samp	Time_samp	Matrix	Location
0T-I003101	N1	35K78411	TM	E300 <ANION>	09/06/96	10:26	WG	02MW0004

Here are examples of direct links to contouring and boring log software



LogPlot 2001
 File Edit View 1:40 per ft. MULTI 10.65 x 6.14 in. 503.DWG.DIP
 LogView - unattached
 File Edit View 0.36 Elevation
CHANUTE AFB Draft Page 1 of 8

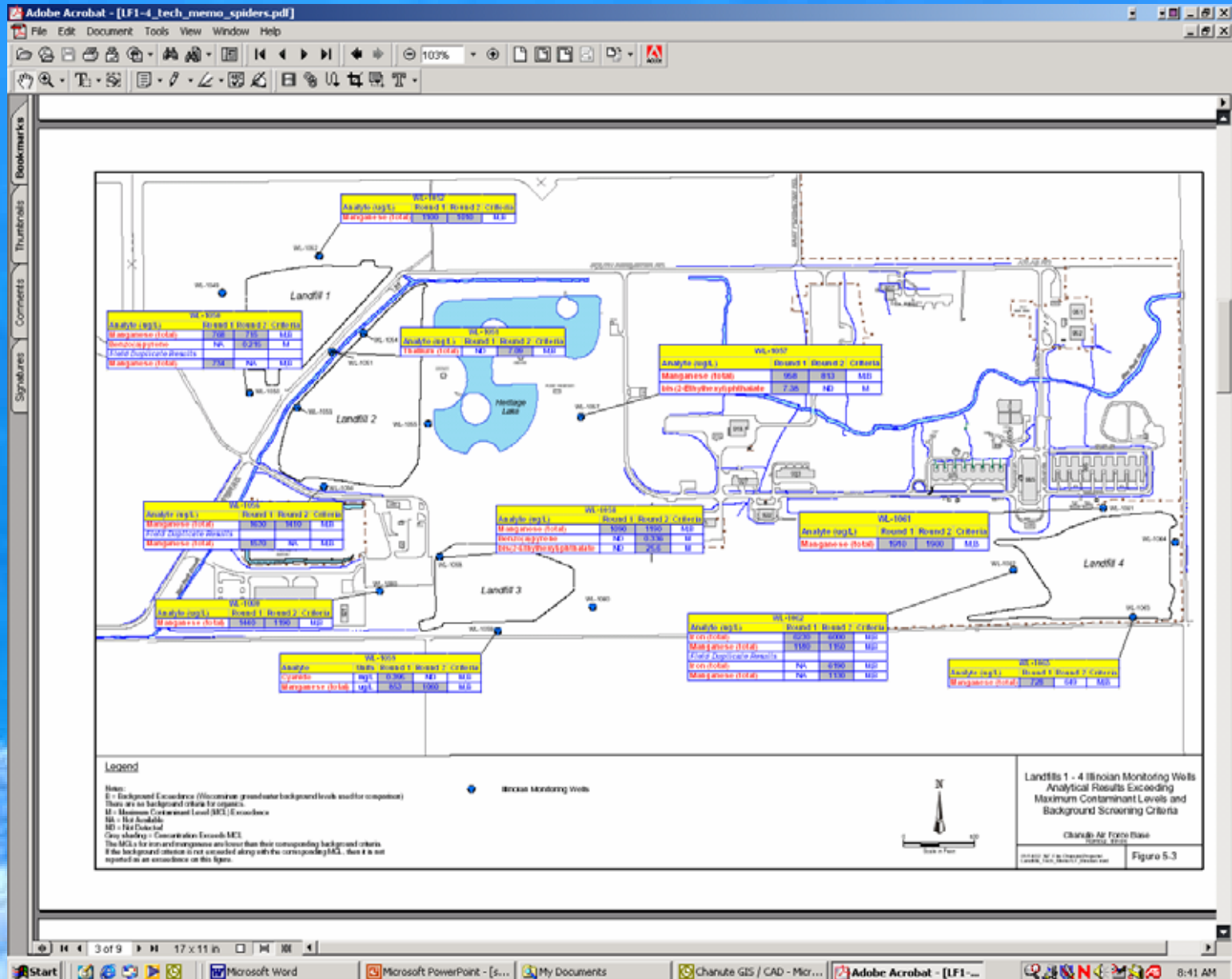
Project Name:	LANDFILLS RI	Location:	WL-1058
Project Number:	35x70703	Nothing ID:	1317613.38
Drilling Contractor:	Alliance Environmental, Marietta, OH	Easting (ft):	1039281.66
Drilling Equipment:	Superhill 120	TOC Elevation (ft map):	734.78
Drilling Method:	Sonic Core	Date Started:	10/14/99
Sampling Method:	Sonic Core	Date Finished:	10/16/99
Const. Materials:	SCHEDULE 40 PVC	Total Sample Core Depth (ft logs):	68.00
		Drilled Depth (ft logs):	71.00
		Borehole Diameter (inches):	7.00
		Well Diameter (inches):	2.00
		Well Depth (ft logs):	71.00
		Static Water (ft b70C):	62.54
Logged by:	B. Heffernan	Reviewed by:	
		Completion:	Above Ground
		Date Measured:	06/08/00

Depth (ft logs)	Show Counts and Statistics	Sample ID	PGSTD	Color	Moisture	Consistency	USCS Class	Lithologic Description and Associated Lithographic Symbol	Well Construction Diagram	Screening (ft logs)
0		DL942					CL	CLAY, red, dense & in thin layers of other loam, intermediate plasticity, 30% fine coarse sand, trace fine gravel, max size 0.25 mm; some silt, trace silt organic; F.S.I. - GENEVA, OH 1993-2000 S-235. Please refer to the 1993 boring log for 0 to 10 ft, with organic. 9 with white organic.		128.0
0		DL943					GM	SAND, brown, poorly sorted, fine coarse gravel, max size 1.2 in., very angular, trace fine stone sand, F.S.I. - GENEVA, OH 1993-2000 S-235. Please refer to the 1993 boring log for 0 to 1.2 ft.		126.4
0		and 2934					CL	CLAY, red, olive brown & reddish brown, low plasticity, some fine coarse sand, trace fine gravel, max size 0.25 mm, very angular. Note some silty, silty-sandy, F.S.I. - GENEVA, OH 1993-2000 S-235. Please refer to the 1993 boring log for 0 to 1.2 ft.		125.2
0										124.0
0										122.8
0										121.6
0										120.4
0										119.2
0										118.0
0										116.8
0										115.6
0										114.4
0										113.2
0										112.0
0										110.8

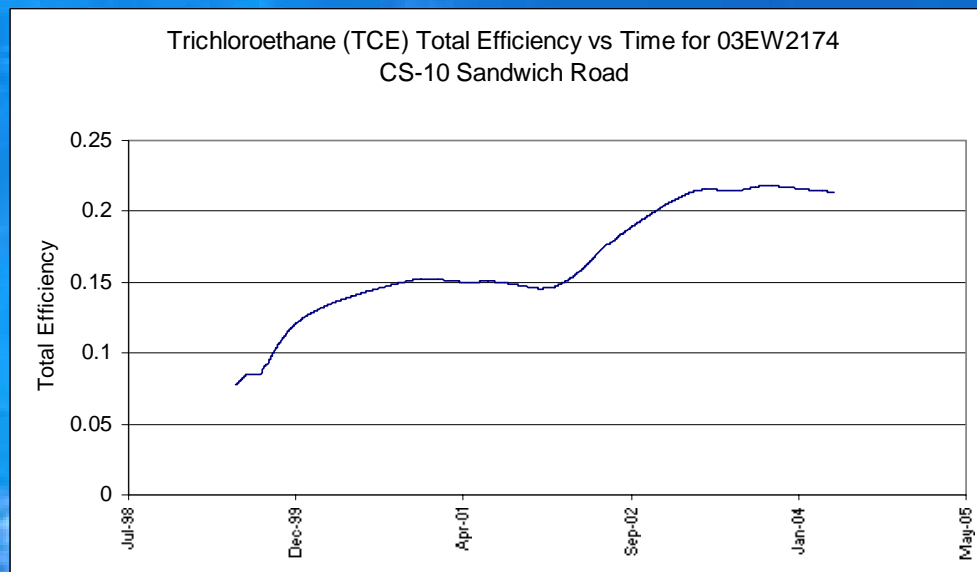
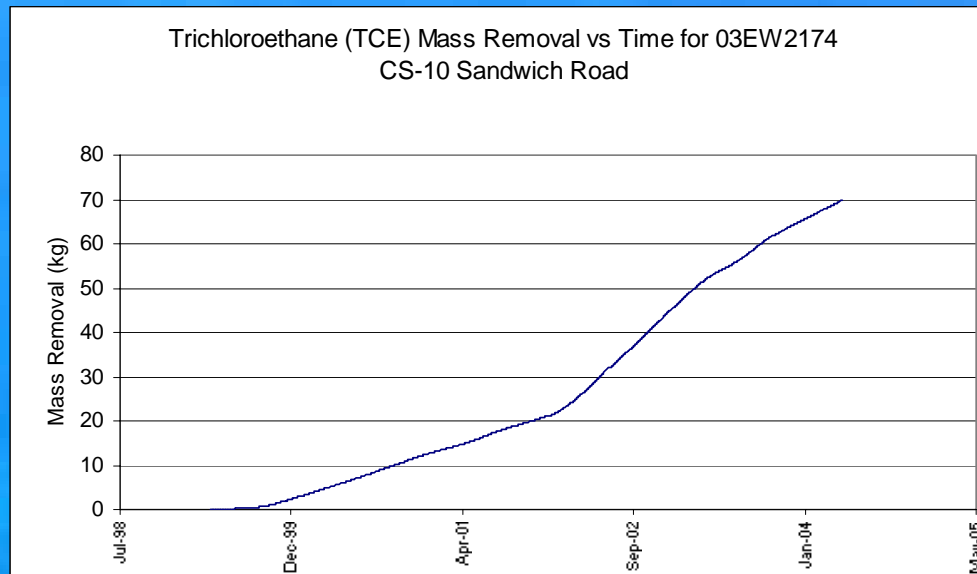
1 of 8

Windows Taskbar: CHANUTE LANDFILLS Site | LogPlot 2001 | 4:35 AM

Automating Spider diagrams to query database results and compare to risk criteria



History of Operations & Modeling Evaluations (HOME)



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