

Automated Environmental Data Workflow:

EQuIS Implementations of EDD
Subsystems and 'Push' Interfaces

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EarthSoft, Inc.



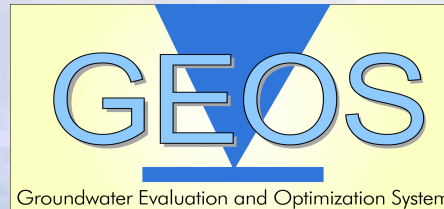
Presented at Ivry-sur-Seine, France
October 5, 2006



October 2006
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Thanks to our Clients and Partners!

EPA Region 5



EPA Region 4, 3, and 2

Large
Organizations!!!

States of WV, NJ, CA, CO, LA

Shell Oil, Agip, BP, El Paso Gas, Olin, and others

Camp Dresser and McKee, CH2M Hill, Retec,
Arcadis, ERM, and others

What is EQulS?

- Samples-Tests-Results
- Environmental or ‘Technical’ Data Management
 - Oracle or SQL Server Database
 - Encapsulated by ESRI GIS
 - Interfaces to Reports, Graphs, EVS, Rockware, gINT, Surfer, GMS, Groundwater Vistas, and other software
 - Specialized Reports for scientists and engineers
 - Sediment, Water, Soil, limnology, geotechnical, eco-risk (fish tissue), other data types
 - Metadata
 - Instrument, Collection Technique, etc.
 - Chemistry....

Electronic Data Deliverables (EDDs)

What types of electronic data?

Physical, chemical, geology, and biological data
related to your site or project

Metadata

Location Data

‘Flat file’, Excel spreadsheet, and XML

GIS data:

Geographic information

Topography, geological, geophysical data

Points of Interest

Aerial photographs, satellite imagery

Electronic Data Deliverables (EDDs)

www.geosdev.org/EPAGEOS/

Microsoft Excel - EPAR5chemEDDs.xls

Type a question for help

File Edit View Insert Format Tools Data Window ACTI Help

100%

Reply with Changes... End Review...

10 Arial

A3

	A	B	C	D	E	F	G	H	I	J	K	L
1	sys_sample_code	lab_anl_method_name	analysis_date	analysis_time	total_or_dissolved	column_number	test_type	lab_matrix_code	analysis_location	basis	container_id	dilution
2	1 Text(40)	2 Text(35)	3 Date	4 Text(5)	5 Text(1)	6 Text(2)	7 Text(10)	8 Text(10)	9 Text(2)	10 Text(10)	11 Text(30)	12 S
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182 fields

9 Excel spreadsheets

Ready

NUM1

Camp Ripley Well and Boring Record

WELL LOCATION County Name Morrison		CAMP RIPLEY WELL AND BORING RECORD		UNIQUE WELL NO. 677254	
Township Name Gm. Plane	Township No. 130	Range No. 29	Section No. 6	FEDERAL NE1/4 NE1/4 NW1/4	
House Number, Street Name, City and Zip Code of Well Location (None)				or Fire Number (None)	

Show exact location of well in section grids with 'X' Sketch map of well location showing property lines, roads and buildings

Live Fire Facility
Camp Ripley
Little Falls, MN
Purchase Order 7215

X Coordinate
392591.82611

Y Coordinate
5108656.51607

PROPERTY OWNER'S NAME

Military Affairs Department

Property owner's mailing address if different than well location address indicated above

Camp Ripley, 15500 Hwy. 115
Little Falls, MN 56345

WELL OWNER'S NAME

Military Affairs Department

Well owner's mailing address if different than property owner's address indicated above

Camp Ripley, 15500 Hwy. 115
Little Falls, MN 56345

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Geological Material	Remark	Color	Hardness	From	To
LOAMY SAND	soft	tan		0	12.5
CLAY LOAM				12.5	16
SAND				16	33.5

REMARKS/ELEVATION/SOURCE OF DATA, etc.

Received Well Hgt.
Aug. 2, 2002

WELL DEPTH (completed) 109 ft.		DATE WORK COMPLETED 06/05/2002	
DRILLING METHOD <input type="checkbox"/> Cable Tool <input type="checkbox"/> Auger <input type="checkbox"/> Driven Rotary <input type="checkbox"/> Dug Jetted		Well Hydrofractured? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No From (ft) _____ To (ft) _____	
USE <input type="checkbox"/> Borehole <input type="checkbox"/> Monitoring Well		<input checked="" type="checkbox"/> Water Supply Well <input type="checkbox"/> Domestic Well	
CASING Drive Shaft? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Steel <input checked="" type="checkbox"/> Threaded <input type="checkbox"/> Valsled <input type="checkbox"/> Plastic		HOLE DIAMETER 6.75 in. to 109 ft. _____ in. to _____ ft. _____ in. to _____ ft. _____ in. to _____ ft.	
CASING DIAMETER 4 in. to 105 ft. _____ in. to _____ ft. _____ in. to _____ ft.		WEIGHT 200 LBS/ft. _____ in. to _____ ft. _____ in. to _____ ft.	
SCREEN Material Make Diameter Type Slot/Gauge Set Between		OPEN HOLE From _____ ft. To _____ ft. Diameter Length Fittings	

STATIC WATER LEVEL 65 ft. <input checked="" type="checkbox"/> below land surface <input type="checkbox"/> above land surface Date measured 06/05/2002	
PUMPING LEVEL (below land surface) _____ ft. after _____ hrs. pumping @ _____ g.p.m.	
WELL HEAD COMPLETION <input checked="" type="checkbox"/> Fitness adapter manufacturer Building Model Stamp-on <input type="checkbox"/> Casing Protection <input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY)	
GROUTING INFORMATION Well grouted? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Grout Material <input type="checkbox"/> Neat cement <input type="checkbox"/> Bentonite <input checked="" type="checkbox"/> High Solids Bentonite 65 ft. <input checked="" type="checkbox"/> below land surface <input type="checkbox"/> above land surface Date installed 06/05/2002	
PUMPING LEVEL (below land surface) _____ ft. after _____ hrs. pumping @ _____ g.p.m.	
WELL HEAD COMPLETION <input checked="" type="checkbox"/> Fitness adapter manufacturer Building Model Stamp-on <input type="checkbox"/> Casing Protection <input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY)	
GROUTING INFORMATION Well grouted? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Grout Material <input type="checkbox"/> Neat cement <input type="checkbox"/> Concrete <input checked="" type="checkbox"/> Bentonite <input checked="" type="checkbox"/> High Solids Bentonite From _____ To _____ ft. From _____ To _____ ft. From _____ To _____ ft.	

NEAREST KNOWN SOURCE OF CONTAMINATION _____ feet _____ direction _____ type Well disinfected upon completion? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
PUMP <input checked="" type="checkbox"/> Not installed Date installed 06/20/2002 Manufacturer's name Model number T12-50 HP 0.5 yd/s ft 330 Length of drop pipe 65 ft. Capacity 200 g.p.m. Type <input checked="" type="checkbox"/> Submersible <input type="checkbox"/> L.S. Turbine <input type="checkbox"/> Reciprocating <input type="checkbox"/> Jet	

ABANDONED WELLS Does property have any not in use and not sealed well(s)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Voids any variance granted from the MDH for this well? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> That	
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WELLS CONTRACTOR CERTIFICATION This well was planned, installed, operation and in accordance with Minnesota Rules Chapter 4720. The information contained in this report is true to the best of my knowledge. _____ (Boat Longyear) 69588 Licensee Business Name [Signed] Registe Authorized representative Signature [Signed] Names Name of Driller Date 06/05/2002	
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Lab Data + Field Data...

Discovery and Notification

- What is data discovery and notification?

- Data Discovery

- The system discovers problems at your site
 - Examples may include: new analytes detected, results above action level, pumping wells under-performing

Superfund, RCRA,
Phase II, Phase III
Investigations

- Notification

- The system immediately notifies you about these problems
 - Includes a variety of channels for notification delivery

Web-site,
email,
ftp,
others

*Environmental
Information Agents
= 'Push'*

Benefits

- Benefits
 - Know about problems faster
 - Gain this knowledge routinely
 - Find solutions faster
- Net results
 - Shift from reactive to proactive
 - The system informs you of potential problems
 - Automatically via email
 - Better risk management and communication

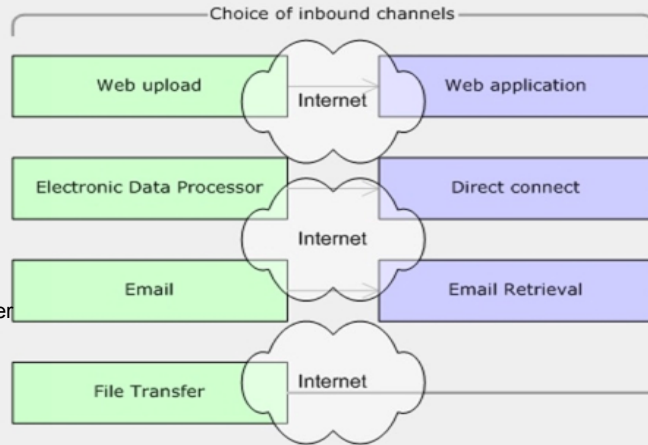
Reduces the risk
from not knowing
potential problems
at a site

Accelerates
site closeout

Individual sites or across multiple sites

Enterprise Workflow

Data Provider

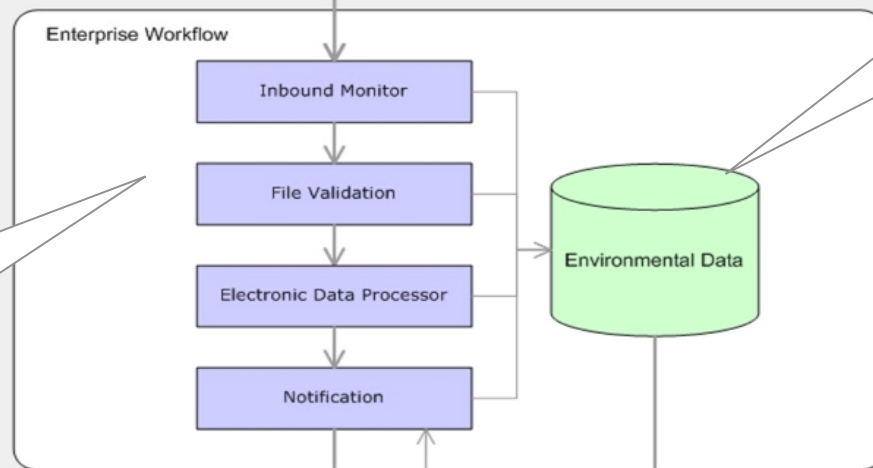


Update local valid values and submit EDDs directly to Enterprise

Supports POP3 and Lotus Notes email retrieval

Includes Oracle schema for monitoring and managing the Enterprise workflow

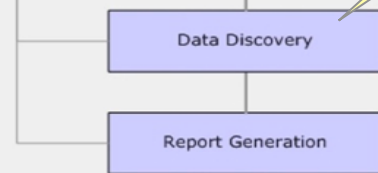
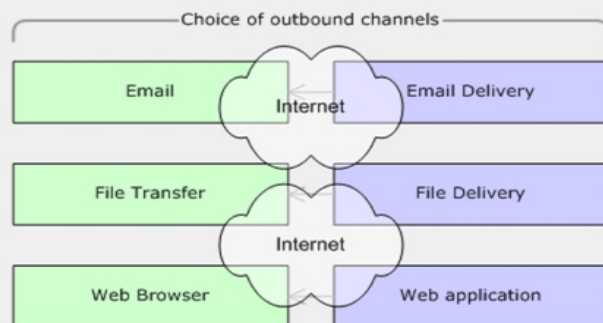
Enterprise File Management and EDD Processing



Real-time data discovery and notification

Reports, Graphs, Graphics, (Boring Logs, Cross Sections) Statistics, Central Data Exchange, User Defined ...

RPM



EQulS Modules

- Intelligent Data Entry Forms (IDEFs)
 - Field Data Capture and conversion to Excel
- EQulS Data Processor (EDP) Distribution License
 - Check LIMS output and analytical data capture
- EQulS Professional
 - Build custom reports
- Enterprise EDP
 - receives EDDs via email, checks and loads EDDs, notifies data submitter and project manager of status
- EZView
 - Builds new easy reports, 'Pick List' of standard reports
- Environmental Information Agents (EIA)
 - emails standard reports upon trigger trip, ie, date, data level

Typical system cost = \$125,000

GEOS

- Include a formal, open interface specification describing electronic data exchange guidelines
- Push the responsibility of submitting data to the data provider
- Provide software to the Data Provider for preparing, authenticating, checking, and submitting EDDs
- Provide an automated system for managing inbound and outbound files
- Provide automated Electronic Data Processor (EDP)
(Closed Loop: same code used by both the data provider and enterprise system)
- Provide a mechanism for receiving notification of site restoration progress by email

EDD Specifications

- Formal, open interface specifications describing electronic data exchange guidelines
 - Describes types of data that can be submitted in the EDD format
 - What information to be included with each EDD submittal
 - EDD file naming and table formatting conventions, data integrity rules, and valid data types
 - Checks for completeness and correctness

EPA Region 5 Groundwater Evaluation and Optimization System (GEOS) EDD

Other EDD formats for individual sites, facilities, or agencies, ie ERPIMS, ERIS, SEDD, Multimedia EDD, DIGGS, other

Data Submissions

- Pushes the responsibility of submitting correct/complete data to the data provider
 - The data provider submits an EDD directly to the automated Enterprise EDP
 - Forces compliance with the EDD format
 - Simple projects (USTs) can live with simple formats, but Superfund and Base Closure programs need more data
 - Common concern
 - “It’s too difficult to meet the specification”

Provide EDP to the data providers for no charge for preparing and submitting EDDs

Data Provider Software

- EQulS Data Processor (EDP):
 - Disconnected checking for the Data Providers for preparing and submitting EDDs
 - .Net 'Smart Client' product
 - Provide disconnected syntax and reference value checking
 - Local XML Schema for formats
 - Local XML Database for reference values
 - Includes a mechanism for receive local XML updates from the Enterprise system
 - Free to all EPA R5 labs
 - And EPA R5, R3, R2, R1 and several states

Closed Loop EDD Checking

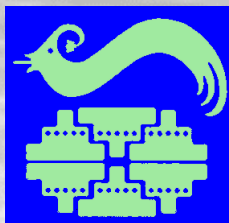
- Enterprise EDP is same code as EDP
- Ensures same checks on both sides of data transaction:
 - EDP offers privacy, advanced checks, **color coded error designations**, can be called programmatically from LIMS or other data collection software.
 - Enterprise EDP offers web or email interface, **high throughput, automated responses** with complete error log with EDD rejections, automated data loading into EQuIS
- Ensures complete, correct transaction of data from lab and field to EQuIS data warehouse

Data Discovery

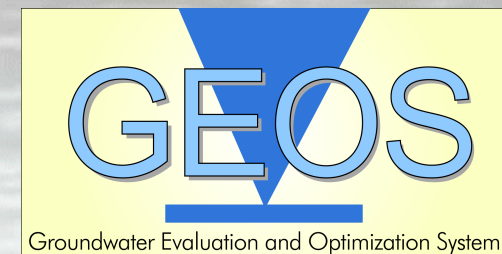
- Server-side (java) Environmental Information Agents (EIA)
 - Triggered
 - New data, new ‘hits’
 - » For example: If we have a new Arsenic ‘hit’ , then generate:
 - New Arsenic contours
 - New Arsenic trend charts
 - Scheduled
 - Weekly, monthly regular events
 - On-demand
 - Ad Hoc
- Automated generation of reports, graphs, graphics, models, statistics, visualizations, exports, etc.
- Automated delivery via email (or web or ftp)

Summary

- Process 1,000s of EDDs per month *automatically*
- The system produce emails for hundreds of project managers and engineers per month with reports and graphics, *automatically*
 - Commercially available software

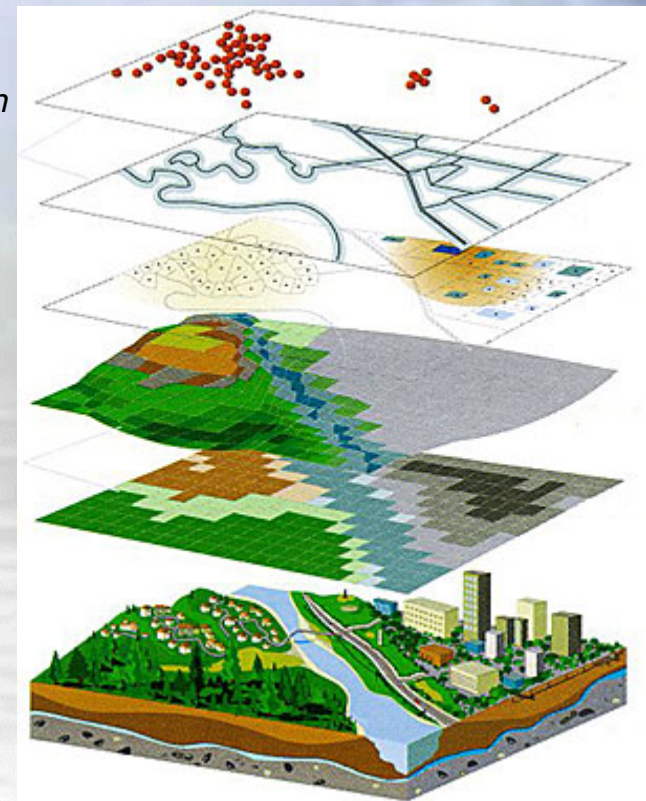
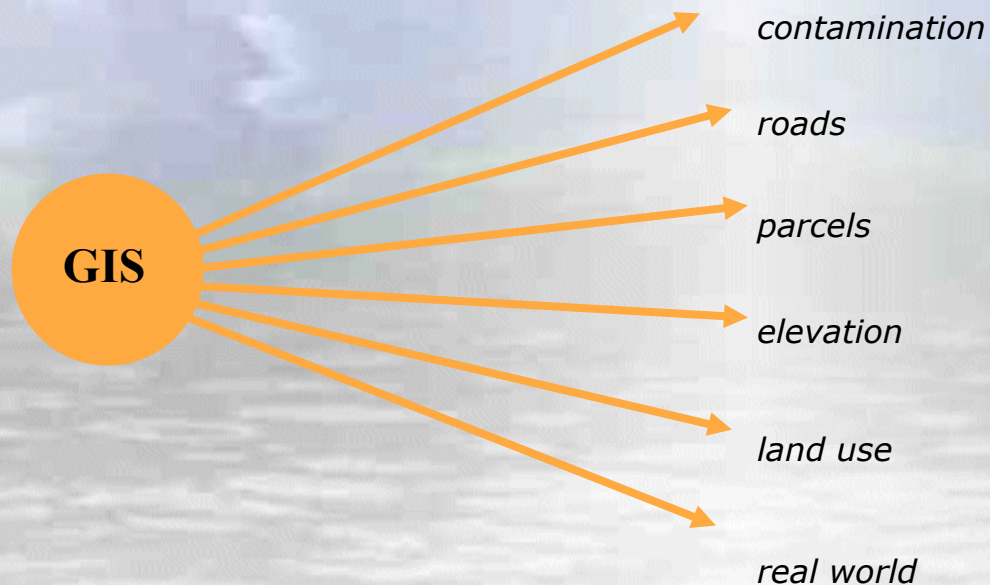


EarthSoft



Managing Risk Using EQuIS and GIS

Geographic Information Systems (GIS) present real world data as interactive layers of information



Thank you!

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