



# Electronic Data Capture

*Region 4, SESD*

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# Background

- The legacy systems for moving information to and from the lab were inadequate
  - These systems were developed and functioned independent of one another
- In addition, the Region had no method for storing\retrieving environmental data electronically



# Storing And Retrieving Data

- EQuIS (a commercially available Oracle database) was chosen
- While EQuIS is an excellent system for storing and reporting data, it does not provide a mechanism for tracking pending datasets, or provide error reports for these pending datasets



# Tracking System

- An automated tracking system was developed to monitor EQUIS and the server based legacy systems
- This system checks the quality of the pending datasets at every step and sends status reports as needed



# Legacy Systems

- Region 4 Project Log (server based)
  - Request for lab space made to SESD
- FORMS II Lite (standalone)
  - Samples collected\COC sent
- Element (server based)
  - LIMS reports data in .pdf format



# Current System

- Project Log is used to request lab space:
  - Tracking System emails report with site\project data
- FORMS\Scribe used to generate COC:
  - Samplers send FORMS\Scribe .xml file to lab
- Element reports data in .pdf format
  - EDD files sent to EQulS
  - Tracking System sends errors\data reports to sampler



# Region 4 Project Log

- In-house software to track lab requests
- After the request is made, the Tracking System sends a summary report:
  - Project metadata for FORMS\Scribe
  - A summary of requested samples\media\analyses
  - a table of existing Station IDs and coordinates







# Region 4 Project Log Feedback

- FORMS\Scribe setup data

## Project Log Summary Report:

Use information in the table below to create your site in FORMS II Lite (step one). If you used the DARTER utility to update FORMS, the screen labels in step one will match the table.

Anything 'Missing' should be corrected before going to the field.

FORMS II Lite//DART Info	
Site\Waterbody	FORMER WEST FLORIDA SCRAP METAL
Site Name	Former West Florida Scrap Metal
State	FL
Project Number	08-0356
DART ID	08-0356
Program	PASI
Project Leader	Schuster, Barbara
Sampling Company	PL-FDEP



## COC Data In Region 4

- Using FORMS (or Scribe) a .xml file is sent to SESD.
- This information is loaded directly to Element (Region 4 LIMS)
  - Fewer transcription errors
  - Much quicker



### Step Four: Station/Location Information - Southeastern Wood Preserving

<b>Station ID:</b> Mw08S	<input type="button" value="Add"/> <input type="button" value="Copy"/> <input type="button" value="Delete"/>	Select Station #R4DART# Mw08S Mw12C
<b>Sample ID:</b> Mw-08S-GW	<input type="button" value="Add"/> <input type="button" value="Copy"/> <input type="button" value="Delete"/>	Select Location Mw-08S-GW
<b>Media Description:</b> Groundwater		
<b>Media Code:</b> GW		
<b>Sample Date/Time:</b> 04/17/2009 13:20	<input type="button" value="System Time"/>	
<b>Sample Type:</b> Field Sample		<input type="checkbox"/> Sample Split
<b>Concentration:</b> L		<input type="radio"/> Composite <input checked="" type="radio"/> Grab
<b>Sampling Team Member:</b> DAN SAMPLER		<b>Depth of Sample:</b> <input type="text"/>
<b>Sampler Comments:</b>		<b>Depth Units:</b> <input type="text"/>

All fields in Red are required fields

- JESCO
  - Planning
  - Events
  - Property Info
  - Sampling Locations**
  - Analyses
  - Sampler
  - Instrument List
  - Lab List
  - Sampling
    - Air Sampling
    - Wipe Sampling
    - Biota
    - Soil/Sediment**
      - Soil Gas Sampling
    - Water Sampling**
  - Sample Management
  - Samples
  - Chain of Custody
  - Lab Results
  - Monitoring Data
  - Custom Data Views
    - Data for GIS-Lab
    - Data For GIS-Monitoring
    - EDD for GIS-Monitoring I
    - EDD for GIS-Sampling D
    - LabResults Analyte/Unit
    - LabResults Crosstab
    - LabResults Crosstab with
    - LabResults Without Sam
    - Samples Without LabRe

Sampling Locations Remove Filter Save Layout Layout: Default Layout

Sampling Locations

Sampling Locations: 9									
	Sampling Location	Location Description	PropertyID	Zone	Latitude	Longitude	Altitude	Northing	Easting
▶	JC001								
	JC002								
	JC003								
	JC004								
	JC005								
	JC006								
	JC007								
	JC008								
	JC009								

Empty area for map or data visualization.



# Error Summaries

- After the samples are logged to the LIMS, any errors are highlighted in reports sent out the next Monday

## DART Error Summary Report: Chain of Custody

If there are any errors in the Station IDs or Media Codes listed below, make your corrections in the 'Edited' column(s) and forward this email to [R4DART@epa.gov](mailto:R4DART@epa.gov). You should receive another email the following Monday with a new Location EDD file attached containing your corrections.

(No need to request a re-report of the data)

DART Information From Chain of Custody					
Lab Sample ID	StationID		Field Sample ID	Media Code	
	<i>Original</i>	<i>Edited</i>		<i>Original</i>	<i>Edited</i>
-	-	-	-	-	-
R4-C081806-01	-	-	CTS-211-TW	TW (Trip Blank - Water)	-
R4-C081806-02	-	-	CTS-213-PB	PB (Preservative Blank)	-
R4-C081806-03	Missing	-	CTS-005-SW	SW (Surface Water)	-
R4-C081806-04	Missing	-	CTS-001-PW	PW (Potable Water)	-
R4-C081806-05	Missing	-	CTS-020-PW	PW (Potable Water)	-



# Location EDD Request

- After any LIMS errors are corrected, the Tracking System will request any missing coordinates
  - The Station IDs in Element are compared to EQulS
  - The report requests only those that are missing in EQulS

## **DART Error Summary Report: Location EDD Status**

**Location EDD:** **Missing**

The Station IDs listed below were submitted with your Traffic Report, and are in the attached file (*08-0459-LocationEDD.csv*). If any are incorrect, please correct them as explained below in 'Element Dataset Error Summary Report: Chain of Custody':

MW34D, MW35D, MW36D,

No errors were found in this dataset. The data can be loaded when the Location EDD is sent to [R4DART@epa.gov](mailto:R4DART@epa.gov) (as outlined below).



# Coordinates – The Location EDD

- The Location EDD is the Region 4 format for providing coordinates
- The data provider can create this file by:
  - Using the ‘stub’ file provided with the requesting email
  - Reporting from FORMS\Scribe
  - Utilizing EDP (error checking software from EarthSoft)



# Current Status

- All EPA led projects in Region 4 utilizing the SESD lab or CLP are sent to EQulS:
  - Superfund, Air, Water, RCRA, UST, Brownfields, etc.
- Samples from all media are captured:
  - Groundwater, tissue, waste, soil, sediment, etc.
- Field Measurement Data:
  - pH, Temperature, Conductivity, Turbidity, etc.





# Current Status

- 947,468 analytical results
- 54,829 analyses
- 18,350 samples
- 7,214 sampling locations
- 445 sites or waterbodies
- 61 regulatory standards or guidelines

**D.A.R.T. Data Archival and ReTrieval**

- DART Overview**
- DART Lists**
  - Sites\Station IDs
  - Program\Activity
  - Company Codes
  - Field Parameters
  - Media Codes
  - Location Types
  - Analytes
  - Qualifiers
  - Units
  - Regulatory Standards
- Project Status**
- DART Backlog**
- R4 Programs**
- Tutorials & Training**

**Regulatory Standards** (Total: 61)

Type	Regulatory Standard	Link
Federal	2004 Edition of the Drinking Water Standards and Health Advisories	<a href="#">DWS HA 2004 1 DAY</a>
Federal	2004 Edition of the Drinking Water Standards and Health Advisories	<a href="#">DWS HA 2004 10 DAY</a>
Federal	2004 Edition of the Drinking Water Standards and Health Advisories	<a href="#">DWS HA 2004 10-4 CR</a>
Federal	2004 Edition of the Drinking Water Standards and Health Advisories	<a href="#">DWS HA 2004 DWEL</a>
Federal	2004 Edition of the Drinking Water Standards and Health Advisories	<a href="#">DWS HA 2004 LIFE</a>
Federal	2004 Edition of the Drinking Water Standards and Health Advisories	<a href="#">DWS HA 2004 MCL</a>
Federal	2004 Edition of the Drinking Water Standards and Health Advisories	<a href="#">DWS HA 2004 MCLG</a>
Federal	2004 Edition of the Drinking Water Standards and Health Advisories	<a href="#">DWS HA 2004 SECOND</a>
Federal	40 CFR 261.24, as amended	<a href="#">RCRA (TCLP)</a>
Federal	Federal EPA RCRA Universal Treatment Standards (Non-Wastewater Standard) 40 CFR 268.48 as of 2005	<a href="#">RCRA (NON-WW STD)</a>
Federal	Federal EPA RCRA Universal Treatment Standards (Wastewater Standard) 40 CFR 268.48 as of 2005	<a href="#">RCRA (WW STD)</a>
Federal	Federal EPA Region 4 ECO Freshwater Surface Water Screening Values Updated 2005	<a href="#">R4 FRESH SWSV</a>
Federal	Federal EPA Region 4 ECO Saltwater Surface Water Screening Values Updated 2005	<a href="#">R4 SALT SWSV</a>
Federal	Federal EPA Region 4 ECO Sediment Screening values Updated 2005	<a href="#">R4 SEDIMENT SV</a>
Federal	Federal EPA Region 4 ECO Surf Soil Screening values Updated 2005	<a href="#">R4 SSSV</a>
Federal	Federal EPA Region 9 Preliminary Remediation Goals for Ambient Air as of 2004	<a href="#">2004 PRG (AMB. AIR)</a>
Federal	Federal EPA Region 9 Preliminary Remediation Goals for Industrial Soil as of 2004	<a href="#">2004 PRG (IND. SOIL)</a>
Federal	Federal EPA Region 9 Preliminary Remediation Goals for Industrial Soil as of May 2008	<a href="#">R9 PRG IND SOIL</a>
Federal	Federal EPA Region 9 Preliminary Remediation Goals for Residential Soil as of 2004	<a href="#">2004 PRG (RES. SOIL)</a>
Federal	Federal EPA Region 9 Preliminary Remediation Goals for Residential Soil as of May 2008	<a href="#">R9 PRG RES SOIL</a>
Federal	Federal EPA Region 9 Preliminary Remediation Goals for Soil Screening Levels for Migration to Groundwater as of 2004 (DAF 1)	<a href="#">2004 PRG (GW DAF 1)</a>
Federal	Federal EPA Region 9 Preliminary Remediation Goals for Soil Screening	<a href="#">2004 PRG (GW DAF 20)</a>



# Unexpected Roadblocks

- Communicating effectively across several government and corporate email systems has been a challenge
- While it was understood up front that training was necessary, this has also proved difficult across the various government and corporate organizations



## Up Next

- It is the intent of Region 4 to begin loading data from PRPs to the EQulS system
- In addition, the current system will be expanded to collect the following data:
  - Water levels
  - Geology
  - Ecological



# This Is A Lot Of Work...

- So what is the return?
  - EQulS allows data collected across programs and time to be compared to regulatory standards
  - EQulS allows data to be output to GoogleEarth, ArcMap, Surfer, Excel, SAS, RockWorks, LogPlot, etc.
  - The EQulS database is a permanent Oracle based archive
  - EQulS can run as a sophisticated desktop application, or as a web application across the enterprise

Action Level Exceedance\* Action Level Exceedance\* Crosstab

				Station ID:	EPADPT01	EPADPT01	EPADPT01	EPADPT01	EPADPT02	EPADPT02	EPADPT03	E
				Sample ID:	EPADPT01-D	EPADPT01-I	EPADPT01-IS	EPADPT01-S	EPADPT02-I	EPADPT02-S	EPADPT03-I	EF
				Sample Date:	7/26/2006 4:00:00	7/26/2006 2:45:00 PM	7/26/2006 2:45:00	7/26/2006 3:00:00	7/27/2006 1:30:00	7/27/2006 1:15:00	7/28/2006 8:40:00	7/28/
Analyte	Result Units	DWS MCLs	MCL Units									
▶ 1,2,4-Trichlorobe	ug/l	0.07	mg/l		140	130	210					
1,2-Dichlorobenz	ug/l	0.60	mg/l	76	1400	1300	3100					
1,4-Dichlorobenz	ug/l	0.0750	mg/l	87	1900	1700	4500					
Benzene	ug/l	0.0050	mg/l	140	640	600	4600					
Carbon Tetrachlor	ug/l	0.0050	mg/l	16	9900	9600	7700	2.3	0.52			94
Chlorobenzene	ug/l	0.10	mg/l	380	4100	3800	15000					
Chloroform	ug/l	0.08	mg/l	20	2400	2200	19000	4.4	2.2	15		7.5
Methylene Chlori	ug/l	0.0050	mg/l				130					
Tetrachloroethen	ug/l	0.0050	mg/l									
Toluene	ug/l	1	mg/l								0.56	

Home [fsloan]

- My Dashboard
- My Notices
- My Account
- Sign Out

Facility: SONFORD PRODUCTS

Enterprise EDP

Enterprise EZView

- Build Reports
  - Action Level Exceedance
  - Action Level Exceedance (by EDD)
  - Analyte Exceedance
  - Analytical Results
  - Analytical Results (Aggregate)
  - Analytical Results (Hits)
  - Analytical Results (QC)
  - Basic Results
  - Facility Results
  - Facility Results (Summary)

Docs & Photos

Administration

Copyright



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Version: 5.3.2.131

Enterprise EZView

**View:** Preview Tab-delimited Microsoft Excel Google Earth Shapefile

**Save:** Pick Report (EZView)

Build Report: Analytical Results

- Location
  - Individual(s)
  - Group(s)
- Sample
  - Type(s)
  - Date Range
    - Start: 08/23/2006
    - end: 01/28/2009
  - Matrix(es): GW
  - Task(s)
  - Delivery Group(s)
- Test
  - Method(s)
  - Fraction(s)

Code	Desc
BK	Other Blank
CM	CLP Metals Blank
CT	Control Tissue
EB	Equipment Rinse Blank
<b>GW</b>	<b>Groundwater</b>
IB	Dry Ice Blank
OW	Organic Free Water Blank
PB	Preservative Blank
PW	Potable Water
SB	Subsurface Soil
SD	Sediment
SF	Surface Soil
SW	Surface Water
TI	Tissue
TW	Trip Blank Water

Preview



**Search**

Fly To Find Businesses Directions

Fly to e.g., New York, NY

**Places** Add Content

- [SP158](#)  

FACILITY_ID	FACIL
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- [SP159](#)  

FACILITY_ID	FACIL
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- [SP160](#)  

FACILITY_ID	FACIL
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- [SP161](#)  

FACILITY_ID	FACIL
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- [SP162](#)  

FACILITY_ID	FACIL
-------------	-------
- [SP163](#)  

FACILITY_ID	FACIL
-------------	-------

**Layers**

View: Core

- Primary Database
- Geographic Web
- Roads
- 3D Buildings
- Borders and Labels
- Traffic
- Weather
- Gallery
- Global Awareness
- Places of Interest
- More
- Terrain

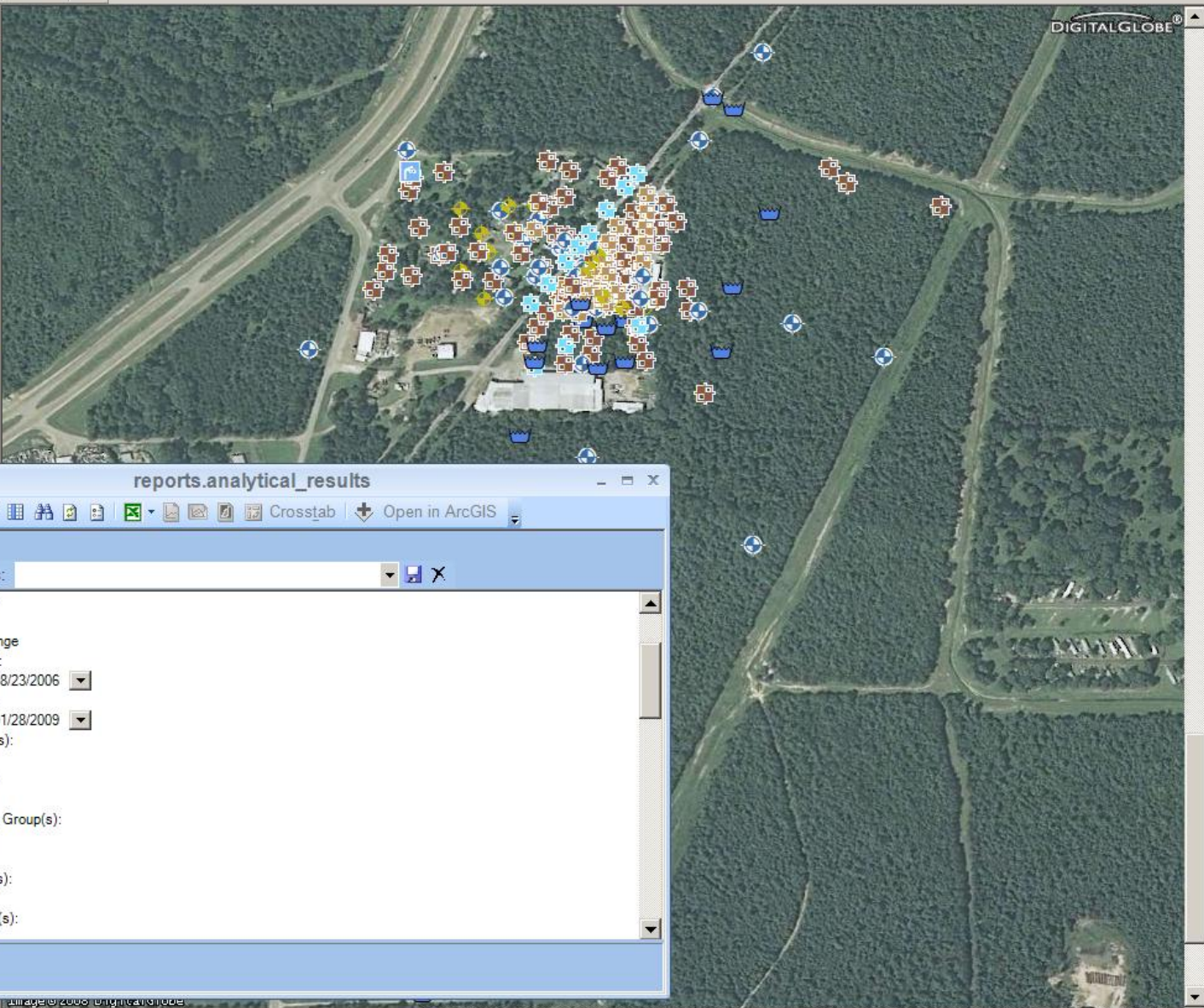


Image U.S. Geological Survey  
 © 2009 Tolo Atlas



**Layers**

- C:\Documents and Settings\vsloar
  - EQ5OWNER-110003996962 (f)
    - Type of Sampling Location
      - GW - Groundwater (43)
      - GW - Temp Well (14)
      - SW - Surface Water (18)
      - SF - Surface Soil (86)
      - SB - Subsurface Soil (26)
      - PW - Potable Water (2)
      - SD - Sediment (11)
- c:\temp\gximages\
  - GlobeExplorer\_13.jpg
    - RGB
      - Red: Band\_1
      - Green: Band\_2
      - Blue: Band\_3
- r4esdst
  - eqis5\_dt\_action\_level
  - eqis5\_dt\_coordinate
  - eqis5\_dt\_facility
  - eqis5\_dt\_field\_samp
  - eqis5\_dt\_location
  - eqis5\_dt\_result
  - eqis5\_dt\_sample
  - eqis5\_dt\_task
  - eqis5\_dt\_test



**reports.analytical\_results**

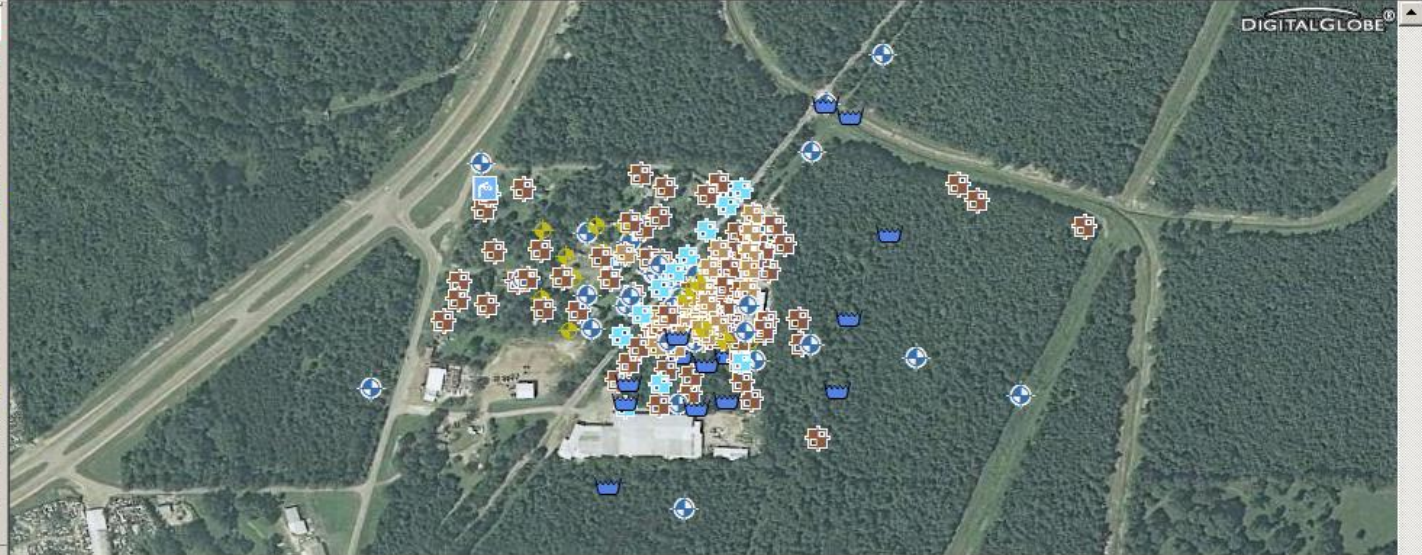
Pick Reports:

- Type(s):
- Date Range
  - Start: 08/23/2006
  - End: 01/28/2009
- Matrix(es):
- Task(s):
- Delivery Group(s):
- Test
  - Method(s):
  - Fraction(s):



**Layers**

- C:\Documents and Settings\vsloa
  - EQ5OWNER-110003996962 (Type of Sampling Location)
    - GW - Groundwater (43)
    - GW - Temp Well (14)
    - SW - Surface Water (18)
    - SF - Surface Soil (86)
    - SB - Subsurface Soil (26)
    - PW - Potable Water (2)
    - SD - Sediment (11)
- c:\temp\gximages\
  - GlobeExplorer\_15.jpg
    - RGB
      - Red: Band\_1
      - Green: Band\_2
      - Blue: Band\_3



**Attributes of equis5\_dt\_result**

OBJECTID	FACILITY_ID	TEST_ID	CAS_RN	RESULT_TEXT	RESULT_NUMERIC	RESULT_ERROR_DELTA	RESULT_TYPE_CODE	STAT_RESULT	REPORTABLE_RESULT	DETECT_FLAG	LAB_QUALIFIERS
1	63	102	50-32-8	<Null>	<Null>	<Null>	TRG	<Null>	Yes	N	<Null>
2	63	103	100-01-6	<Null>	<Null>	<Null>	TRG	<Null>	Yes	N	<Null>
3	63	103	100-02-7	<Null>	<Null>	<Null>	TRG	<Null>	Yes	N	<Null>
4	63	103	100-52-7	<Null>	<Null>	<Null>	TRG	<Null>	Yes	N	<Null>
5	63	103	101-55-3	<Null>	<Null>	<Null>	TRG	<Null>	Yes	N	<Null>
6	63	103	105-60-2	<Null>	<Null>	<Null>	TRG	<Null>	Yes	N	<Null>
7	63	103	105-67-9	<Null>	<Null>	<Null>	TRG	<Null>	Yes	N	<Null>
8	63	103	106-47-8	<Null>	<Null>	<Null>	TRG	<Null>	Yes	N	<Null>
9	63	103	108-95-2	<Null>	<Null>	<Null>	TRG	<Null>	Yes	N	<Null>
10	63	103	111-44-4	<Null>	<Null>	<Null>	TRG	<Null>	Yes	N	<Null>
11	63	103	111-91-1	<Null>	<Null>	<Null>	TRG	<Null>	Yes	N	<Null>
12	63	103	117-81-7	750	750	<Null>	TRG	<Null>	Yes	Y	<Null>
13	63	103	117-84-0	<Null>	<Null>	<Null>	TRG	<Null>	Yes	N	<Null>
14	63	103	118-74-1	<Null>	<Null>	<Null>	TRG	<Null>	Yes	N	<Null>
15	63	103	120-12-7	<Null>	<Null>	<Null>	TRG	<Null>	Yes	N	<Null>
16	63	103	120-82-1	<Null>	<Null>	<Null>	TRG	<Null>	Yes	N	<Null>
17	63	103	120-83-2	<Null>	<Null>	<Null>	TRG	<Null>	Yes	N	<Null>
18	63	103	121-14-2	<Null>	<Null>	<Null>	TRG	<Null>	Yes	N	<Null>
19	63	103	122-39-4	<Null>	<Null>	<Null>	TRG	<Null>	Yes	N	<Null>
20	63	103	129-00-0	<Null>	<Null>	<Null>	TRG	<Null>	Yes	N	<Null>

Record: 1 | Show: All Selected | Records (0 out of \*2000 Selected) | Options

Display Source Selection | Drawing | Arial | 10 | B I U | 90°8'54.913"W 32°17'34.123"N