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Data Management for the New and Expected Baseline Sampling Rules

20th IPEC Conference

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Introduction

- Petroleum project challenges
- Petroleum data challenges
- Types of petroleum environmental data
- Baseline sampling
- Example state sampling rules
- Colorado Rules 609 and 318A
- Future direction and discussion

Petroleum Project Challenges

Petroleum environmental projects from upstream to downstream have different needs:

- **Baseline samples should be taken prior to and after drilling**
- **Accidental spills during drilling may require sampling and analysis**
- **Hydraulic fracturing is now under great scrutiny from a number of angles: water supply, fluid composition, and disposal or re-use of frac fluids**
- **Unconventional resources such as coalbed and shale gases often involve the production of a large amount of water, which must be managed, and often discharge monitoring reports must be provided to regulators**
- **Transportation activities, such as by pipeline and truck, can result in spills with environmental impact**
- **Refining has its own set of environmental issues, such as monitoring of discharges and nearby groundwater and surface water**

Petroleum Data Challenges

Petroleum environmental data provides special challenges:

- **Handling on non-detected results**
- **Multiple dilutions to maintain a linear instrument response**
- **Comparison to multiple, and often complex, regulatory limits and target levels**
- **Special handling of non-aqueous phase liquid data**
- **Potentially large amounts of data**
- **Inconsistent reporting of hydrocarbon ranges**
- **Often complex site geology**

Baseline Sampling

- Program requirement Types
  - Voluntary - Example: COGA
  - Mandatory - Examples: COGCC, Ohio
- Timing
  - Pre-drilling
  - Post-drilling
- Reporting requirements
  - Agency
  - Operator
  - Landowner

Example State Sampling Rules

State	Agency	Summary of Rules	Reference
Alabama	State Oil and Gas Board of Al	Sampling apparently not required [1]	gsa.state.al.us/documents/misc_ogb/goldbook.pdf
Alaska	Alaska Oil and Gas Conservation Commission	Sampling apparently not required	www.legis.state.ak.us/cgi-bin/folioisa.dll/stattx07/query=%5BJUMP:'AS3105030'%5D/doc/%7B@1%7D?firsthit
Arkansas	Arkansas Oil and Gas Comm.	Sampling apparently not required	aogc.state.ar.us/operator_requirements.htm
California	Division of Oil, Gas and Geothermal Resources	May be required by state supervisor	ftp://ftp.consrv.ca.gov/pub/oil/laws/PRC01.pdf
Colorado	Colorado Oil and Gas Conservation Commission	Baseline sampling before and after drilling [2]	cogcc.state.co.us/RR_HF2012/Groundwater/FinalRules/FinalRule609-01092013.pdf
Kansas	Kansas Geological Survey	Baseline sampling voluntary	www.kcc.state.ks.us/conservation/kgs_baseline_groundwater_quality.pdf
Louisiana	Louisiana Dept. of Nat. Res.	Sampling apparently not required	dnr.louisiana.gov/assets/OC/43XIX_June2010.pdf
Ohio	Ohio Dept. of Natural Resources	Baseline sampling before drilling [2]	oilandgas.ohiodnr.gov/laws-regulations/senate-bill-315
Oklahoma	Oklahoma Corp. Commission	Baseline sampling recommended	oklahomawatersurvey.org/?p=214
Pennsylvania	Pennsylvania Dept. of Environmental Protection	No sampling requirement, but operators presumed responsible for pollution	stateimpact.npr.org/pennsylvania/tag/impact-fee/
New Mexico	New Mexico Energy, Minerals and Natural Resources Dept.	Sampling apparently not required	www.emnrd.state.nm.us/OCD/documents/SearchablePDFofOCDTitle19Chapter15created3-2-2012.pdf
New York	New York State Dept. of Environmental Conservation	Baseline sampling before drilling proposed, voluntary sampling in southern New York	www.dec.ny.gov/energy/47554.html
North Dakota	North Dakota Industrial Comm.	Sampling not required	www.dmr.nd.gov/oilgas/rules/rulebook.pdf
Texas	Railroad Commission of Texas	Sampling apparently not required, except City of Fort Worth	info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=4&ti=16&pt=1&ch=3&rl=Y
Utah	UT Div. of Oil, Gas and Mining	Sampling apparently not required	www.rules.utah.gov/publicat/code/r649/r649-003.htm
West Virginia	West Virginia Department of Environmental Protection	No sampling requirement, but operators presumed responsible for pollution	www.legis.state.wv.us/WVcode/ChapterEntire.cfm?chap=22&art=6A&section=18
Wyoming	Wyoming Oil and Gas Conservation Commission	Pre-drilling sampling recommended [1]	wogcc.state.wy.us/

[1] Working with Ground Water Protection Council [2] Worked with GWPC

COGCC Rule 609

- Rule 609, and modifications to Rule 318A, were published by the Colorado Oil and Gas Conservation Commission (COGCC) in February, 2013, for permits issued after May 1, 2013
- These rules make Colorado the first state in the country to require pre- and post-drilling sampling of water sources near new oil and gas wells
- Consultants, labs, and software vendors have cooperated with COGCC to update the transfer of data to COGCC's database using COGCC's new XML or an Excel format

Rule 609 Sample Requirements

- Sampling required for new oil and gas wells, multi-site wells, and dedicated injection wells
- Installing of monitoring wells is not required
- Samples must be collected from up to four water sources within a half mile of proposed well location
- One pre-drill sample required with 12 months prior to setting conductor pipe
- Two post-drill samples required, one 6-12 months and one 5-6 years after drilling
- Data must be made publicly available on the COGCC website
- Rule 318A (Wattenberg Area) has slightly different requirements (one sample per quarter, one post-drill)

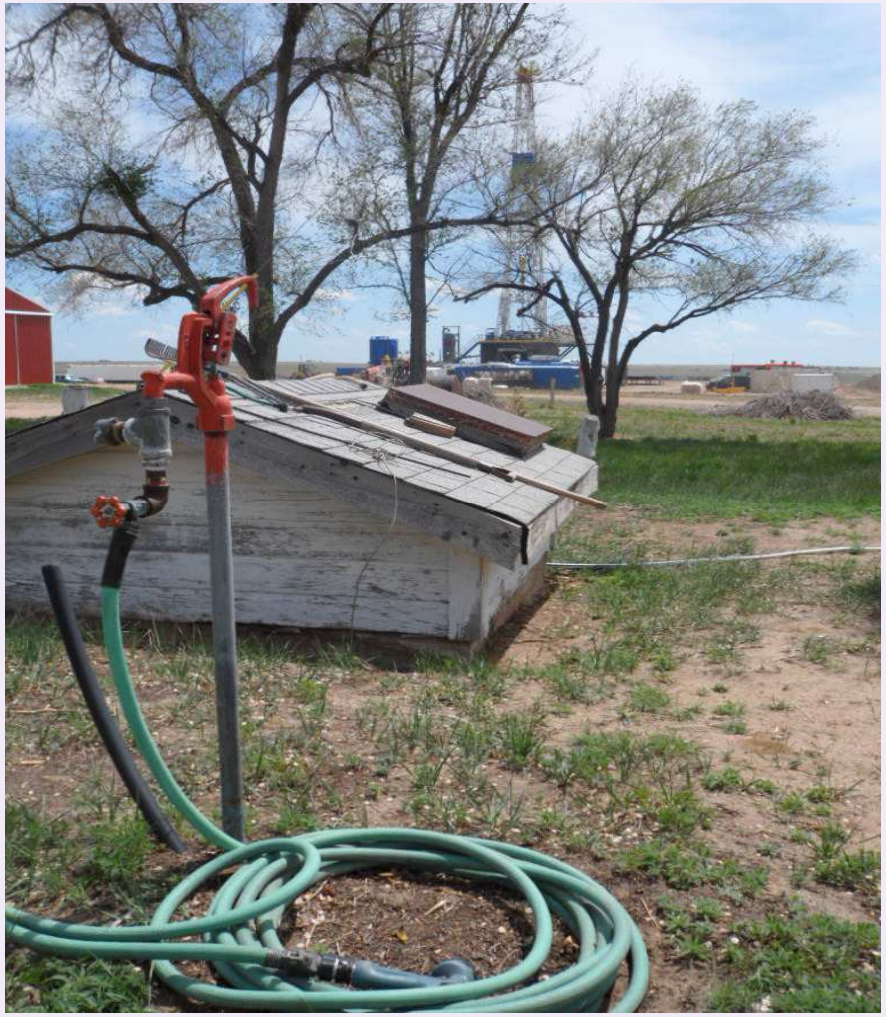
Baseline Sampling and Reporting Steps

- Determine locations
- Obtain landowner permission
- Take samples and field measurements
- Enter locations in COGCC website
- Obtain the Facility ID
- Import field measurements
- Obtain and import lab data
- Review data
- Export to COGCC format, with Facility ID
- Upload to the COGCC website
- Review submission online

COGCC Facility Information

- The first step on the state website is to upload the location
- The location is then given a Facility ID
- This should be recorded and added to the lab and field data before upload
- This can also be used on the COGCC website to retrieve and view the data

Typical Sample Location



- **Typical compliance costs:**
  - **Sampling: $2,500**
  - **Lab analysis: $500 - 600**
  - **Isotopic analysis, if needed: $300 - 400 more**

Photo courtesy of
Ben Baugh
Olsson Associates

Container Labels

Rad Industries

Environmental Project Number None

Sample No: MW-1_2009-08-01_0-0

Lab: XYZ Labs Location: MW-1

Sample Date: 08/01/2009 Time: 00:00

Analysis 8260A

Preservation: Cool to 4°

Cooler Temp 4 Filtered: Unknown

Sampler Container 40 ml VOA Vials

Rad Industries

Environmental Project Number None

Sample No: MW-1_2009-08-01_0-0

Lab: XYZ Labs Location: MW-1

Sample Date: 08/01/2009 Time: 00:00

Analysis 8260A

Preservation:

Cooler Temp 4 Filtered: Unknown

Sampler Container

Rad Industries

Environmental Project Number None

Sample No: MW-1_2009-08-01_0-0

Lab: XYZ Labs Location: MW-1

Sample Date: 08/01/2009 Time: 00:00

Analysis 8270

Preservation: Cool to 4°

Cooler Temp 4 Filtered: Unknown

Sampler Container 40 ml VOA Vials

Rad Industries

Environmental Project Number None

Sample No: MW-1_2009-08-01_0-0

Lab: XYZ Labs Location: MW-1

Sample Date: 08/01/2009 Time: 00:00

Analysis Method:As

Preservation: Cool to 4°

Cooler Temp 4 Filtered: Unknown

Sampler Container 1 Liter Clear Glass

Rad Industries

Environmental Project Number None

Sample No: MW-1_2009-08-01_0-0

Lab: XYZ Labs Location: MW-1

Sample Date: 08/01/2009 Time: 00:00

Analysis Method:Cd

Preservation: Cool to 4°

Cooler Temp 4 Filtered: Unknown

Sampler Container 1 Liter Clear Glass

Rad Industries

Environmental Project Number None

Sample No: MW-1_2009-08-01_0-0

Lab: XYZ Labs Location: MW-1

Sample Date: 08/01/2009 Time: 00:00

Analysis TO-13

Preservation: Cool to 4°

Cooler Temp 4 Filtered: Unknown

Sampler Container 1 Liter Amber Glass

Enviro Data®

COC # DWR Q1

Chain of Custody

Lab XYZ Labs

Client

W. O.

TAT 0 Days

Lab Contact

Lab Phone

Site Name Rad Industries

Contact Name 1

Contact Phone

Bill To:
Phone
Fax
Address
City
State Zip

Results To:
Phone
Fax
Address
City
State Zip

	8260A	8270	Method : As	MW-1 : Method : Cd	TO-13 : Pet. Hydrocarb.					
Container	VAO	2	2	2	2					
Preservative	HCL	2	a	a	a					

Sample ID	Matrix	Wt/ Vol	Date-Time Collected	Filtered	Number Containers									
MW-1_2009-08-01_0-0	Water		8/1/2009		6	X	X	X	X	X				
MW-3_2009-08-01_0-0	Water		8/1/2009		3	X	X			X				
MW-3_2009-08-01_DUP_0-0	Water		8/1/2009		4	X	X							
MW-3_2009-08-01_MS_0-0	Water		8/1/2009		5	X	X	X		X				
MW-3_2009-08-01_MSD_0-0	Water		8/1/2009		4	X	X	X		X				
SB-2_2009-08-01_0-2	Water		8/1/2009		3	X	X			X				
SB-2_2009-08-01_2-4	Water		8/1/2009		3	X	X			X				
SB-2_2009-08-01_4-6	Water		8/1/2009		3	X	X			X				
SB-2_2009-08-01_6-8	Water		8/1/2009		3	X	X			X				
SB-2_2009-08-01_8-10	Water		8/1/2009		2	X	X			X				

Remarks/Comments

Sampled By _____

Lab Use Only

Temp of Cooler when Received, C

1	2	3	4	5

COC Tape was present on outer package Y N

COC Tape was unbroken on outer package Y N

COC Tape was present on sample Y N

COC Tape was unbroken on sample Y N

Received in good condition Y N

Labels indicate Properly Preserved Y N

Received within Holding Time Y N

Relinquished By	Date / Time	Received By	Date / Time	Relinquished By	Date / Time	Received By	Date / Time

Gathering Field Data

Microsoft Excel - FieldFile.xls

File Edit View Insert Format Tools Data Window Help WebEx Adobe PDF — Type a question for help

Arial 8.5 — 100% — Reply with Changes... End Review...

I2

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Field ID	Site	Station	Date	Top	Bottom	QC Type	Parameter	Value	Units	Super.	COC Num.	Sampler	Descrip.	Result
2	86Q1MW10	Refining Inc.	MW-1				Original	Field pH		s.u.	0	08-33507			
3	86Q1MW10	Refining Inc.	MW-1				Original	Field pH		s.u.	1	08-33507			
4	86Q1MW10	Refining Inc.	MW-1				Original	Field pH		s.u.	2	08-33507			
5	86Q1MW10	Refining Inc.	MW-1				Original	Field Cond.		umhos/cm	0	08-33507			

Station	Date	Top	Bottom	QC Type	Parameter	Value	Units	Super.	COC Num.	Sampler	Descrip.	Result
MW-1	4/22	–	–	Original	Field pH	8.1	s.u.	0	08-33507	DWR	CLEAR	
MW-1	4/22	–	–	Original	Field pH	7.9	s.u.	1	08-33507	DWR	CLEAR	
MW-1	4/22	–	–	Original	Field pH	7.9	s.u.	2	08-33507	DWR	CLEAR	
MW-1	4/22	–	–	Original	Field Cond.	43	umhos/cm	0	08-33507	DWR	CLEAR	
MW-1	4/22	–	–	Original	Temp.	17	Deg C	0	08-33507	DWR	CLEAR	
MW-1	4/22	–	–	Duplicate	Field pH	7.8	s.u.	0	08-33507	DWR	CLEAR	
MW-1	4/22	–	–	Duplicate	Field Cond.	44	umhos/cm	0	08-33507	DWR	CLEAR	
MW-1	4/22	–	–	Duplicate	Temp.	17	Deg C	0	08-33507	DWR	CLEAR	
MW-3	4/22	–	–	Original	~~Field pH~~		~~s.u.~~	0	~~08-33507~~	DWR		DRY
~~MW-3~~				Original	Field Cond.		umhos/cm	0	08-33507			
~~MW-3~~				Original	Temp.		Deg C	0	08-33507			

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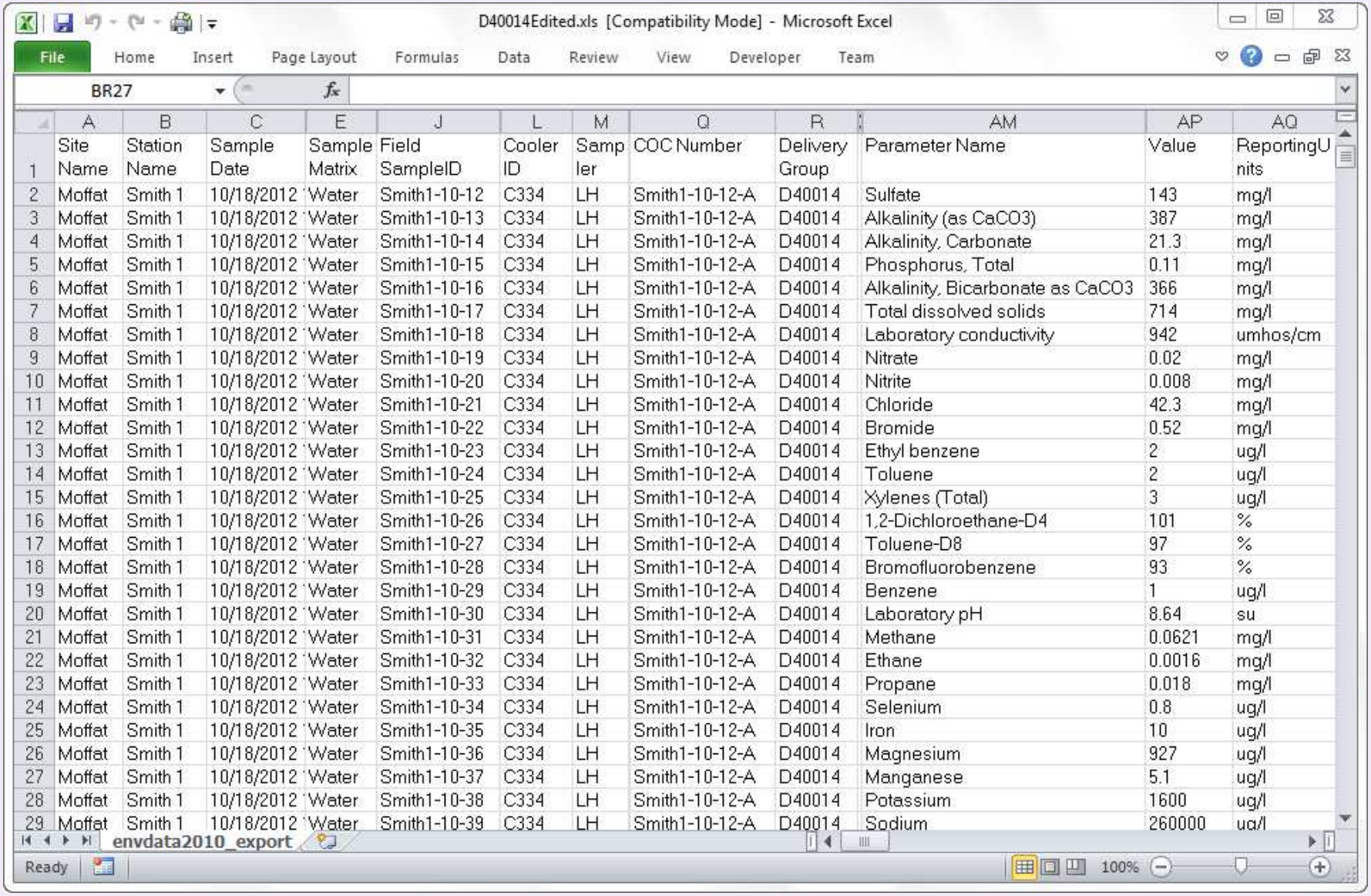
Required Analyses

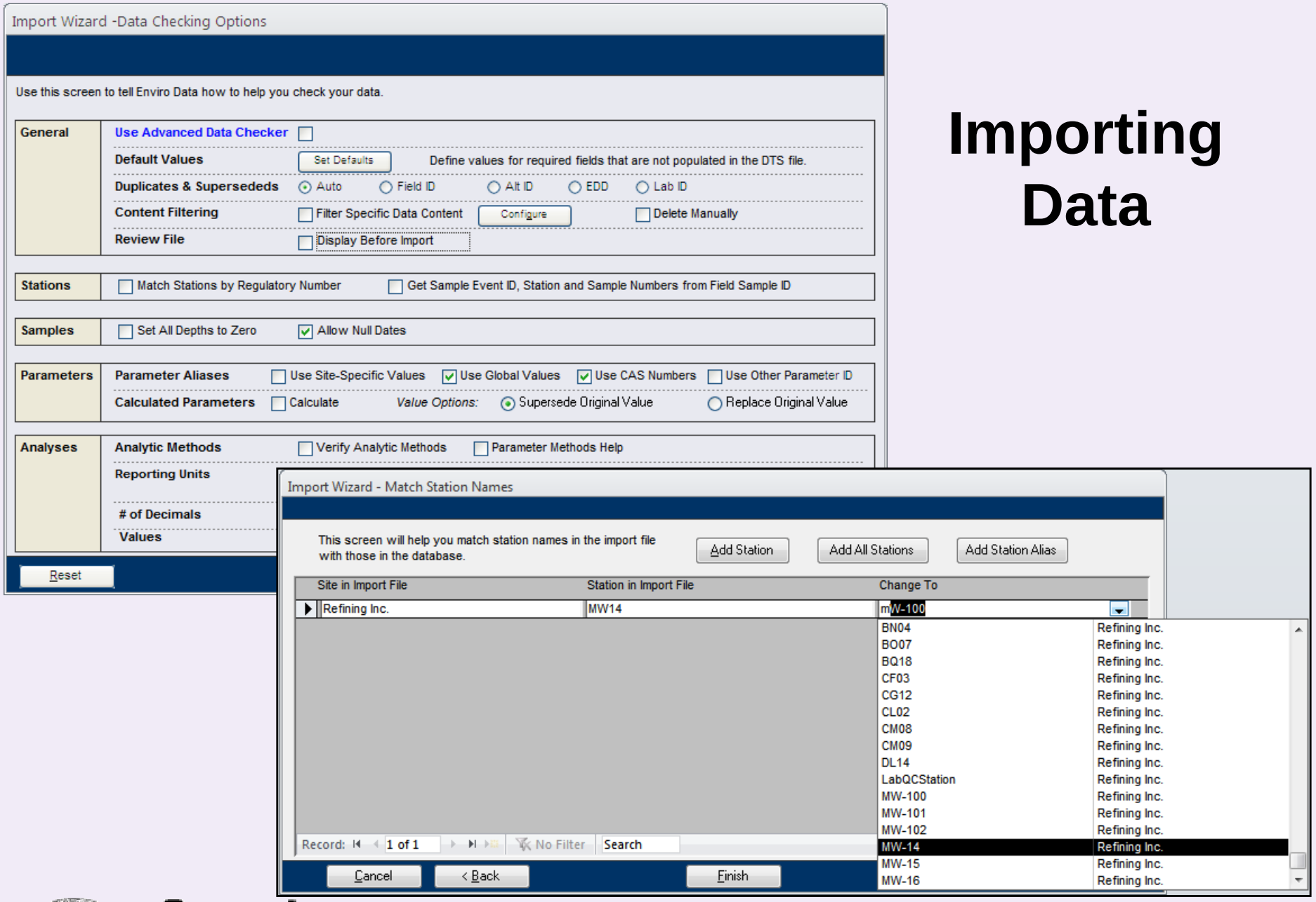
Required Analyses for Rules 318A and 609 pre-drilling samples
pH
Specific Conductance
Total Dissolved Solids*
Dissolved Gases (methane, ethane, propane)*
Total Alkalinity as CaCO3*
Bicarbonate Alkalinity as CaCO3*
Carbonate Alkalinity as CaCO3*
Major Anions (bromide*, chloride*, fluoride*, sulfate*, nitrate, nitrite as N, phosphorus)
Major Cations (calcium*, iron, magnesium*, manganese, potassium*, sodium*)
Other Elements (barium, boron, selenium, strontium)
Bacteria (iron related, sulfate reducing, slime, coliform)
Total Petroleum Hydrocarbons*
BTEX (benzene, toluene, ethylbenzene, xylenes)*
Field Observations (odor, water color, sediment, bubbles, effervescence)
Gas Composition (if methane exceeds 1mg/L)
Stable Isotopes of methane and water (if methane exceeds 1 mg/L)
Notes: 1. All of the above analyses must be performed on pre-drilling samples. Analyses marked with an asterisk (*) are also required for post-drilling samples. 2. If free gas or a dissolved methane concentration greater than 1.0 milligram per liter (mg/l) is detected in a water sample, gas compositional analysis and stable isotope analysis of the methane (carbon and hydrogen – 12C, 13C, 1H and 2H) must also be performed to determine gas type. 3. Field observations such as odor, water color, sediment, bubbles, and effervescence must also be documented.

Example Laboratory Deliverable



	A	B	C	E	J	L	M	Q	R	AM	AP	AQ
1	Site Name	Station Name	Sample Date	Sample Matrix	Field SampleID	Cooler ID	Sampler	COC Number	Delivery Group	Parameter Name	Value	ReportingUnits
2	Moffat	Smith 1	10/18/2012	Water	Smith1-10-12	C334	LH	Smith1-10-12-A	D40014	Sulfate	143	mg/l
3	Moffat	Smith 1	10/18/2012	Water	Smith1-10-13	C334	LH	Smith1-10-12-A	D40014	Alkalinity (as CaCO3)	387	mg/l
4	Moffat	Smith 1	10/18/2012	Water	Smith1-10-14	C334	LH	Smith1-10-12-A	D40014	Alkalinity, Carbonate	21.3	mg/l
5	Moffat	Smith 1	10/18/2012	Water	Smith1-10-15	C334	LH	Smith1-10-12-A	D40014	Phosphorus, Total	0.11	mg/l
6	Moffat	Smith 1	10/18/2012	Water	Smith1-10-16	C334	LH	Smith1-10-12-A	D40014	Alkalinity, Bicarbonate as CaCO3	366	mg/l
7	Moffat	Smith 1	10/18/2012	Water	Smith1-10-17	C334	LH	Smith1-10-12-A	D40014	Total dissolved solids	714	mg/l
8	Moffat	Smith 1	10/18/2012	Water	Smith1-10-18	C334	LH	Smith1-10-12-A	D40014	Laboratory conductivity	942	umhos/cm
9	Moffat	Smith 1	10/18/2012	Water	Smith1-10-19	C334	LH	Smith1-10-12-A	D40014	Nitrate	0.02	mg/l
10	Moffat	Smith 1	10/18/2012	Water	Smith1-10-20	C334	LH	Smith1-10-12-A	D40014	Nitrite	0.008	mg/l
11	Moffat	Smith 1	10/18/2012	Water	Smith1-10-21	C334	LH	Smith1-10-12-A	D40014	Chloride	42.3	mg/l
12	Moffat	Smith 1	10/18/2012	Water	Smith1-10-22	C334	LH	Smith1-10-12-A	D40014	Bromide	0.52	mg/l
13	Moffat	Smith 1	10/18/2012	Water	Smith1-10-23	C334	LH	Smith1-10-12-A	D40014	Ethyl benzene	2	ug/l
14	Moffat	Smith 1	10/18/2012	Water	Smith1-10-24	C334	LH	Smith1-10-12-A	D40014	Toluene	2	ug/l
15	Moffat	Smith 1	10/18/2012	Water	Smith1-10-25	C334	LH	Smith1-10-12-A	D40014	Xylenes (Total)	3	ug/l
16	Moffat	Smith 1	10/18/2012	Water	Smith1-10-26	C334	LH	Smith1-10-12-A	D40014	1,2-Dichloroethane-D4	101	%
17	Moffat	Smith 1	10/18/2012	Water	Smith1-10-27	C334	LH	Smith1-10-12-A	D40014	Toluene-D8	97	%
18	Moffat	Smith 1	10/18/2012	Water	Smith1-10-28	C334	LH	Smith1-10-12-A	D40014	Bromofluorobenzene	93	%
19	Moffat	Smith 1	10/18/2012	Water	Smith1-10-29	C334	LH	Smith1-10-12-A	D40014	Benzene	1	ug/l
20	Moffat	Smith 1	10/18/2012	Water	Smith1-10-30	C334	LH	Smith1-10-12-A	D40014	Laboratory pH	8.64	su
21	Moffat	Smith 1	10/18/2012	Water	Smith1-10-31	C334	LH	Smith1-10-12-A	D40014	Methane	0.0621	mg/l
22	Moffat	Smith 1	10/18/2012	Water	Smith1-10-32	C334	LH	Smith1-10-12-A	D40014	Ethane	0.0016	mg/l
23	Moffat	Smith 1	10/18/2012	Water	Smith1-10-33	C334	LH	Smith1-10-12-A	D40014	Propane	0.018	mg/l
24	Moffat	Smith 1	10/18/2012	Water	Smith1-10-34	C334	LH	Smith1-10-12-A	D40014	Selenium	0.8	ug/l
25	Moffat	Smith 1	10/18/2012	Water	Smith1-10-35	C334	LH	Smith1-10-12-A	D40014	Iron	10	ug/l
26	Moffat	Smith 1	10/18/2012	Water	Smith1-10-36	C334	LH	Smith1-10-12-A	D40014	Magnesium	927	ug/l
27	Moffat	Smith 1	10/18/2012	Water	Smith1-10-37	C334	LH	Smith1-10-12-A	D40014	Manganese	5.1	ug/l
28	Moffat	Smith 1	10/18/2012	Water	Smith1-10-38	C334	LH	Smith1-10-12-A	D40014	Potassium	1600	ug/l
29	Moffat	Smith 1	10/18/2012	Water	Smith1-10-39	C334	LH	Smith1-10-12-A	D40014	Sodium	260000	ug/l

Importing Data



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Quality Control - Completeness

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COC # DWR Q1

Completeness Report

Lab XYZ Labs

Page 1 of 1

Lab Contact

Lab Phone

Client

W.O.

TAT 0 Days

Site Name Rad Industries

Contact Name 1

Contact Phone

Bill To:
Phone
Fax
Address
City
State Zip

Results To:
Phone
Fax
Address
City
State Zip

Sample ID	Matrix	Wt/ Vol	QC Code	Date-Time Collected	Filtered	Number Containers	8260A	8270	As	Pb						
Container							VA0	z	z	z						
Preservative							HCL	None or Unknown	None or Unknown	None or Unknown						
MW-1_2009-08-01_O_0-0			O	8/1/2009		2	97	63	1	1						
MW-3_2009-08-01_DUP_0-0			DUP	8/1/2009		2	97	63	1	1						
MW-3_2009-08-01_MS_0-0			MS	8/1/2009		2	97	63	0	0						
MW-3_2009-08-01_MSD_0-0			MSD	8/1/2009		2	97	63	0	0						
MW-3_2009-08-01_O_0-0			O	8/1/2009		2	97	63	1	1						
SB-2_2009-08-01_O_0-2			O	8/1/2009		2	97	63	1	1						
SB-2_2009-08-01_O_2-4			O	8/1/2009		2	97	63	1	1						
SB-2_2009-08-01_O_4-6			O	8/1/2009		2	97	63	1	1						
SB-2_2009-08-01_O_6-8			O	8/1/2009		2	97	63	1	1						
SB-2_2009-08-01_O_8-10			O	8/1/2009		2	97	63	1	1						

Excel Table for Review

Book1

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	**Crosstab Report**														
2	Station Name	Reporting Units	Federal MCL	Primary	Safe Drinking Water Standards	State Drinking Water Levels	MW-1	MW-1	MW-1	MW-1	Summary Statistics				
3	Sample Date						2/8/1984	5/10/1984	9/14/1984	11/13/1984					
4	QC Code						O	O	O	O	Results	Non-Detects	Minimum	Maximum	Mean**
5	**Field Param**														
6	Field pH	s.u.				7.1-8.4	7.70	7.10	7.10	7.20	4	0	7.1	7.7	7.2
7	**Inorganics**														
8	Bicarbonate	mg/l					520	550	470	560	4	0	470	560	525
9	Chloride	mg/l					250	260	230	190	4	0	190	260	232.5
10	Fluoride	mg/l					<1.00	<1.00	<1.00	<1.00	4	4	<1	<1	<1
11	Nitrate	mg/l		2			<1.00	2.00	2.00	<1.00	4	2	<1	2	1.2
12	Sulfate	mg/l	725	800	350	1000	1040	900	880	800	4	0	800	1040	905
13	**Metals**														
14	Arsenic (As)	mg/l	0.025	0.1	0.002	0.03	<0.11	<0.11	<0.11	<0.06	4	4	<0.06	<0.11	<0.11
15	Calcium	mg/l					180	170	203	180	4	0	170	203	183.2
16	Iron (Ferrous)	mg/l		0.1			0.2	3.2	3.7	4.8	4	0	0.2	4.8	2.9
17	Lead (Pb)	mg/l	0.001	0.004	0.005	0.0025	<0.068	<0.068	0.14	<0.08	4	3	<0.068	0.14	0.06
18	Magnesium	mg/l					94	100	107	100	4	0	94	107	100.2
19	Manganese	mg/l	0.0105	0.015	0.02	0.00225	0.077	0.066	0.076	0.086	4	0	0.066	0.086	0.07
20	Molybdenum	mg/l					0.02	<0.018	0.034	0.008	4	1	<0.018	0.034	0.01
21	Potassium	mg/l					5.20	6.20	5.61	20	4	0	5.2	20	9.2
22	Selenium	mg/l					<0.10	<0.10	<0.10	<0.08	4	4	<0.08	<0.1	<0.1
23	Sodium	mg/l					390	430	390	460	4	0	390	460	417.5
24	UTotal - sol	mg/l					0.003	0.01	0.003	0.003	4	0	0.003	0.01	0.004
25	**Other**														
26	Total Dissolved Solids	mg/l					2220	2230	2220	2200	4	0	2200	2230	2217.5
27	**Radiologic**														
28	Gross Alpha	pCi/l	1				<10.00	<10.00	<10.00	<10.00	4	4	<10	<10	<10
29	Ra-226 - soluble	mg/l			0.4375		0.32		0.035	0.0525	3	0	0.035	0.32375	0.1
30	Ra-228 - soluble	mg/l					0.59	0.36	0.33	0.27	4	0	0.27125	0.595	0.3
31	Th-230 - soluble	mg/l					0.025375	0.028875	0.041125	0.35	4	0	0.025375	0.35175	0.1
32															
33	** 1/2 RL used to calculate the mean wherer non-detect data occurred.														

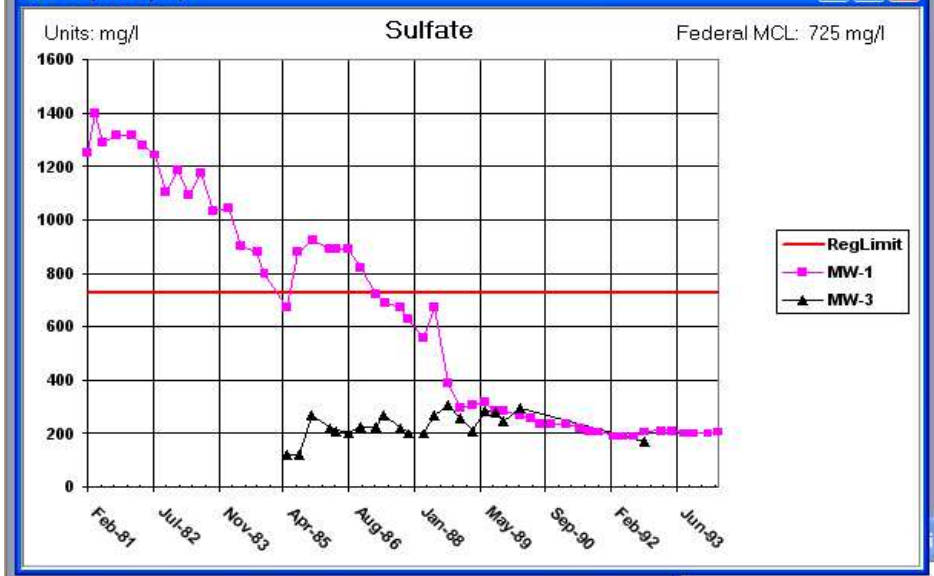
Crosstab Report | Sheet1 | Sheet2 | Sheet3

Enviro Data Viewer

File Edit View Insert Format Records Tools Window Help WebEx Adobe PDF

Type a question for help

Graph Display



Map

Base Map:
[CAD]C:\Enviro\eData2008\RadInd.dwg

Image:
C:\Enviro\eData2008\envdata.bmp

Parameter:
Ra-226 - soil (Max.)

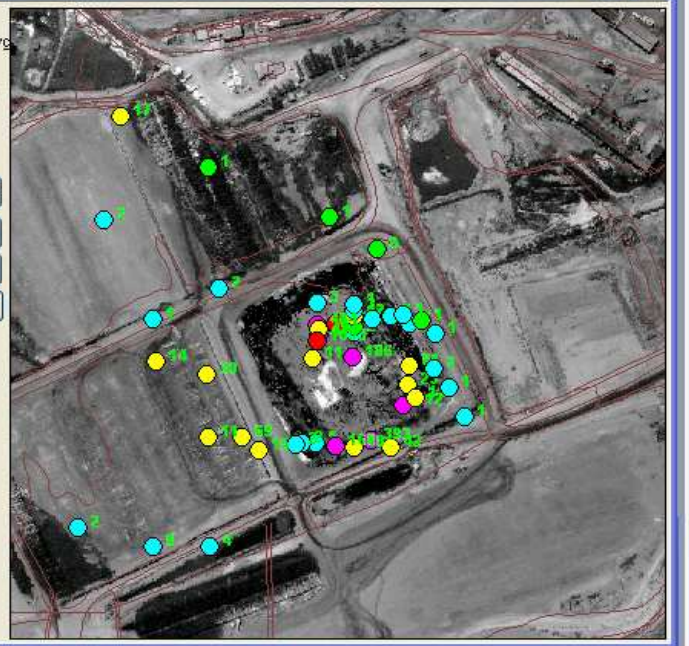
1
10
100
1000

Clear | Refresh
Full Extent
Draw Stations
Draw Image

Show Sta. Name

Min X -420
Max X 4116
Min Y 278
Max Y 2898

Export to Clipboard
BMP
EMF



Tree View

- Rad Industries
  - A2 - Soil boring
  - AA1 - Soil boring
  - AA2 - Soil boring
  - AA3 - Soil boring
    - Soil - Date: 9/1/1995 - Depth: 725.96:724.46
      - Ra-226 - soil: 2.3 pCi/g - Flag: v
      - Th-232 - soil: 1.4 pCi/g - Flag: v
      - Total Radium-soil: 3.7 pCi/g - Flag: v
      - U-238: 2 pCi/g - Flag: u
    - Soil - Date: 9/1/1995 - Depth: 730.96:729.46
    - Soil - Date: 9/1/1995 - Depth: 735.96:734.46
    - Soil - Date: 9/1/1995 - Depth: 740.96:739.46
  - B1 - Soil boring
  - B2 - Soil boring
  - B3 - Soil boring
  - B4 - Soil boring
  - B5 - Soil boring
  - B6 - Soil boring
  - BB1 - Soil boring
  - BB2 - Soil boring
  - BB3 - Soil boring
  - Blank - Unknown
  - C2 - Soil boring
  - D4 - Soil boring
  - D4A - Soil boring

Site: Rad Industries

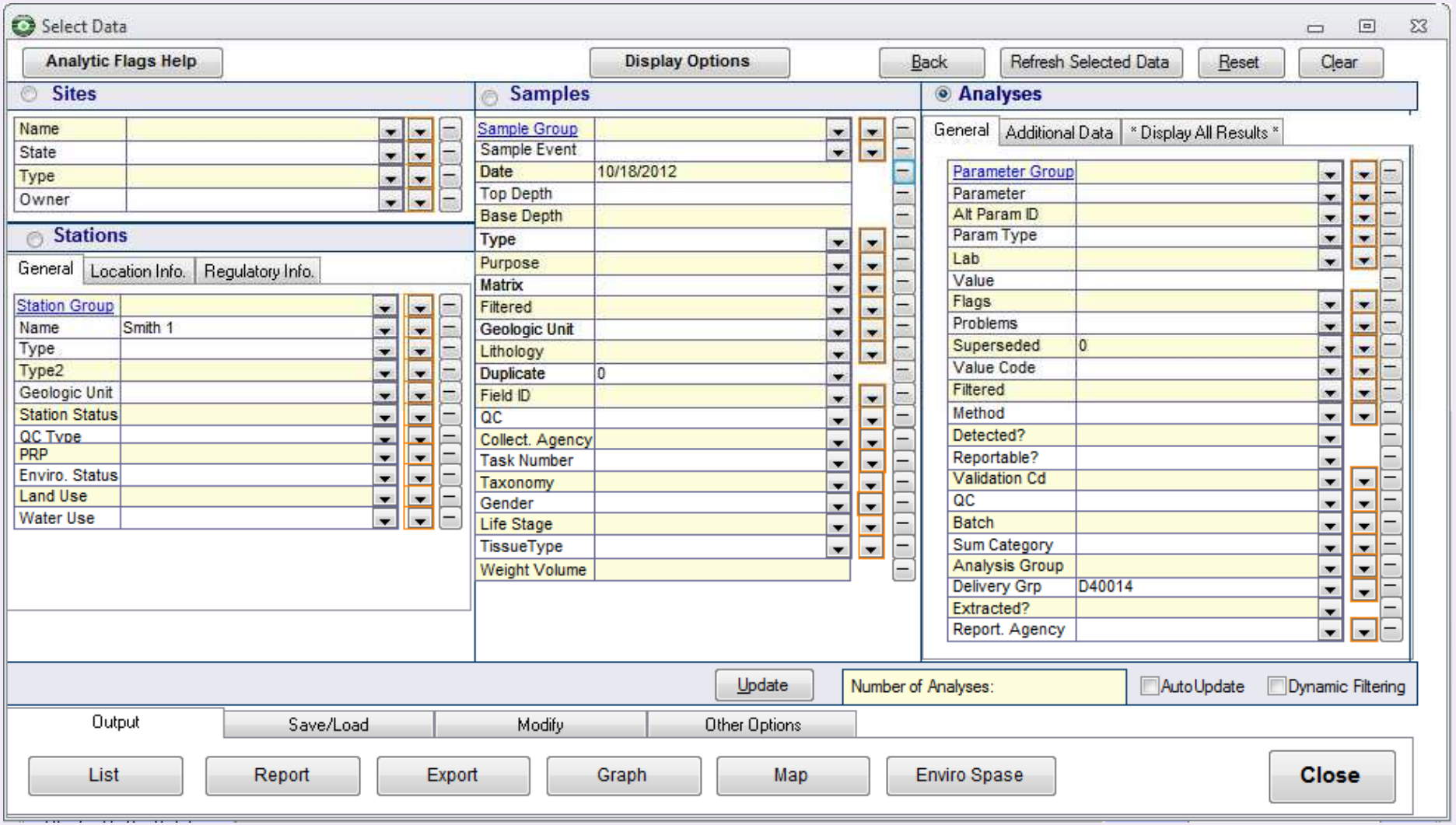
			Deep	Deep	Deep	Station Group ->	Deep	Deep	
						Sample ID ->			
						Date ->	5/20/1982	7/27/1982	10/1
						Depth ->			
Analyte	**Units**	**Federal MCL**	**Primary**	**Safe Drinking Water**	**State Drinking Water Levels**			
Metals								
Calcium	mg/l	NA	NA	NA	NA	150	170	180
Iron (Ferrous)	mg/l	NA	0.1	NA	NA	2.6	0.074	0.9
Potassium	mg/l	NA	NA	NA	NA	4.2	3.2	3.8
Sodium	mg/l	NA	NA	NA	NA	120	86	110
Inoganics								
Chloride	mg/l	NA	NA	NA	NA	230	190	200
Nitrate	mg/l	NA	2	NA	NA	1	<1	<1
Sulfate	mg/l	725	800	350	1000	370	280	350
Field Param								
Field pH	su.	NA	NA	NA	8.4	7.2	7	7.7
Other								
Total Dissolved Solids	mg/l	NA	NA	NA	NA	1120	1020	106

Page: 1

Form View

NUM

Selection and Output



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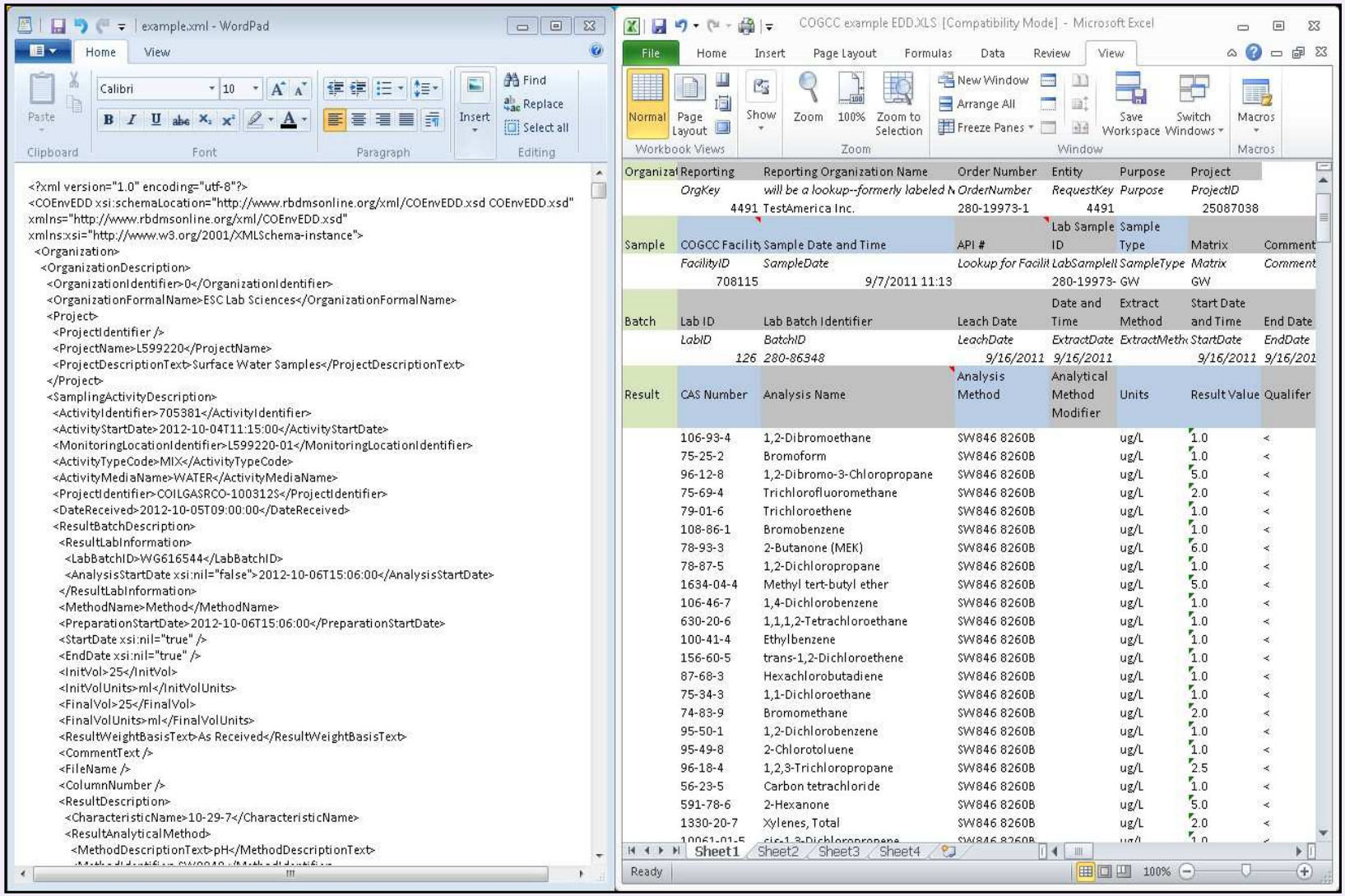
Exporting COGCC Format



Data files courtesy of Arthur Koepsell, COGCC

Uploading to COGCC

- **Data is uploaded using COGCC website**

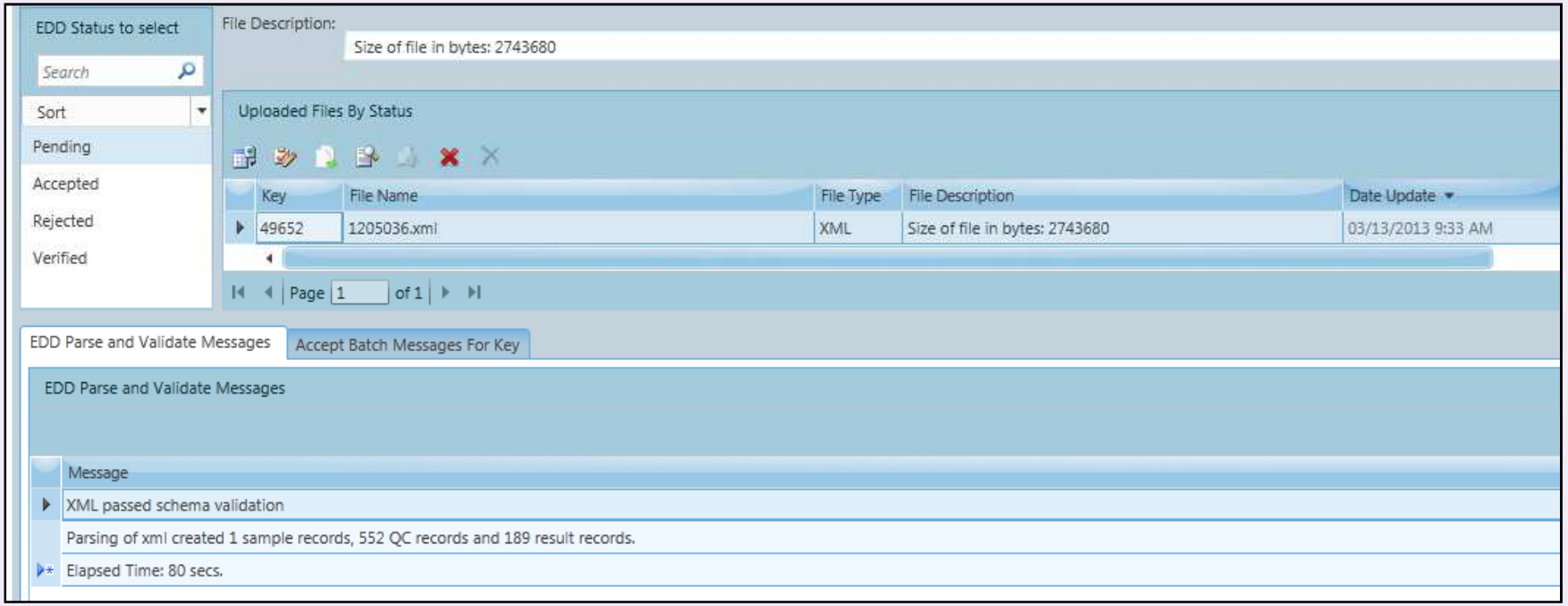
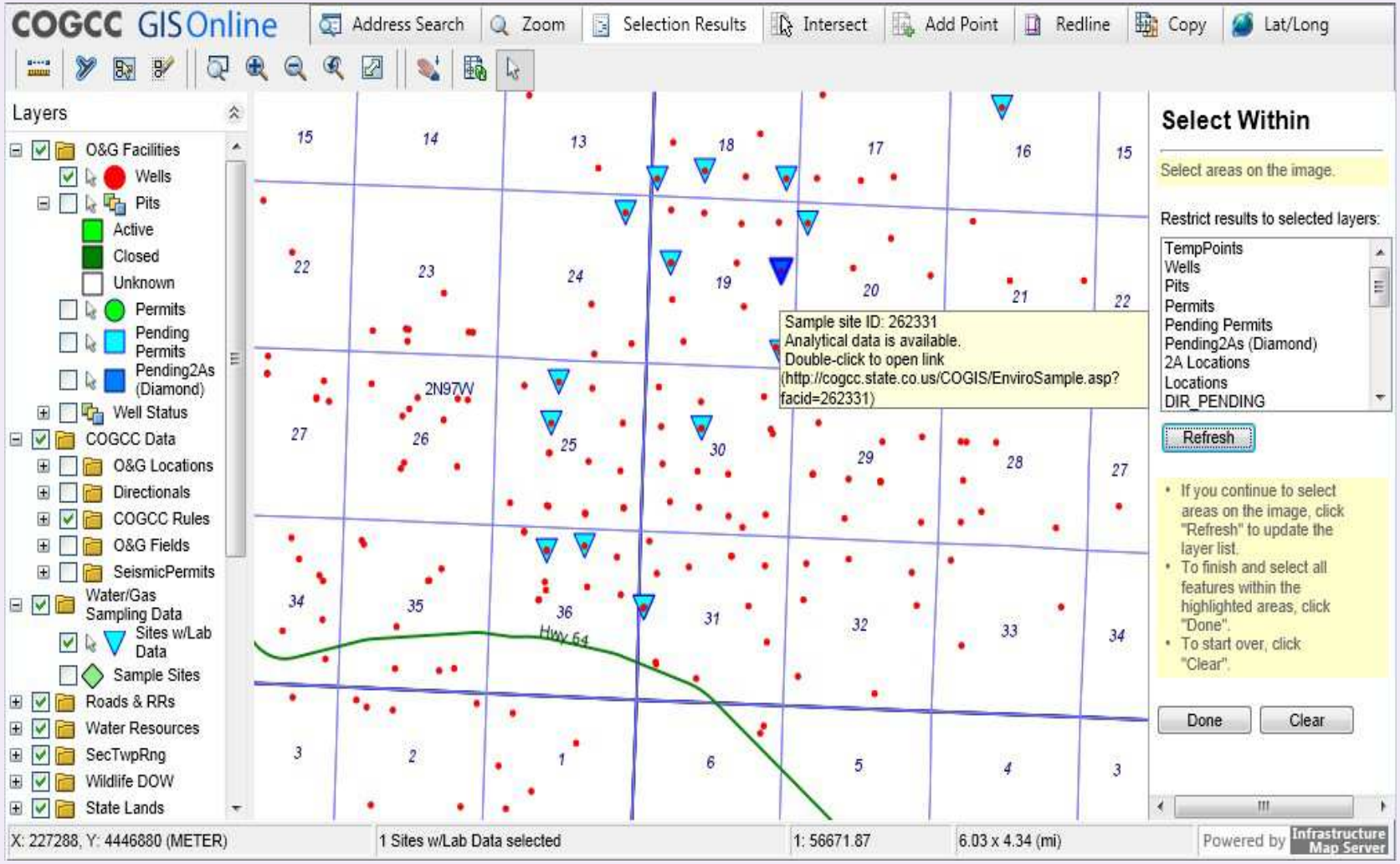


Image courtesy of Arthur Koepsell, COGCC

Map from COGCC website



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Data from COGCC website

Sample(s) All Export to CSV

Sample ID: 457572 Sample Date: 9/11/2003 Matrix: WATER

Sample Results for Sample # 457572 - Minimize

Methodcode	ParamDescription	ResultValue	Units	DetectionLimit	Qualifier
UnSpec	BICARBONATE ALKALINITY as CACO3	22900	mg/L		
UnSpec	CALCIUM	32	mg/L		
UnSpec	CARBONATE ALKALINITY AS CACO3	ND	mg/L		U
UnSpec	CHLORIDE	1700	mg/L		
UnSpec	IRON	2.1	mg/L		
UnSpec	MAGNESIUM	29	mg/L		
UnSpec	MANGANESE	ND	mg/L		U
UnSpec	pH	8	SU		
UnSpec	POTASSIUM	85	mg/L		
UnSpec	RESISTIVITY	0.43	ohm/M		
UnSpec	SODIUM	9943	mg/L		
UnSpec	SPECIFIC GRAVITY	1.024	Ratio		
UnSpec	SULFATE	800	mg/L		
UnSpec	TOTAL DISSOLVED SOLIDS	35406	mg/L		

Future Direction and Discussion

- For COGCC, perhaps a way to download the Facility IDs and Sample IDs
- More data retrieval options from website
- Expansion to other states
- Use by the public
- Use in litigation
- Other issues?

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Data Management for the New and Expected Baseline Sampling Rules

20th IPEC Conference

Dr. David W. Rich
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San Antonio, TX
November 14, 2013