LOOHN'S CLEANERS AND LAUNDERERS SOURCE AREA – FINAL SAMPLING TRIP REPORT

Site Name: Loohn's Cleaners and Launderers Source Area (Olean Well Field) Superfund Site
CERCLIS ID Number: NYD980528657
Sampling Date(s): August 16, 2022
LSASD Lab Project #: P-2208010

1. **Site Location:**

Olean, Cattaraugus County, New York

2. **Sample Descriptions:**

Refer to Appendix B, *Chain-of-Custody (COC) Records.* Appendix B contains the Chain-of-Custody (COC) Record. The COC Record contains the following sample information: Sample ID, Sample Location, Sample Analysis, Matrix, Sample Type, Sample Collection Date, Sample Time, Sample Container Type, Number of Containers, and Sample Preservation.

Laboratories Receiving Samples:

LSASD Lab Case #	Sample Type	Laboratory Code	Name and Address of Laboratory
P-2208010	Trace VOCs USEPA Region 2 LSASD Lab SOP DW-1 (Groundwater)	LSASD	U.S. EPA Region 2 Laboratory Building 209, MS 230 2890 Woodbridge Avenue Edison, NJ 08837

4. **Sample Dispatch Data:**

A total of six (6) aqueous (groundwater) samples were collected by the U.S. EPA Region 2 Laboratory Services and Applied Science Division (LSASD)/Hazardous Waste Support Branch (HWSB)/Superfund Support Team (SST) personnel from five (5) on-site source area monitoring wells on August 16, 2022. The sample total includes one (1) field duplicate sample, one (1) trip blank, and one (1) equipment rinsate blank sample collected for QA purposes. All groundwater samples were collected according to U.S. EPA Region 2 LSASD/HWSB/SST Standard Operating Procedure (SOP) #FA-SST-T-007*: Groundwater Sampling Procedure - Low-Stress (Low Flow) Purging and Sampling* dated November 2019.

All groundwater and Quality Control (QC) samples were hand delivered to the U.S. EPA Region 2 LSASD Lab for the analysis of trace level Volatile Organics on August 17, 2022 under Chain of Custody (COC) Record Number 2-081722-185344-0001. All samples were analyzed for trace level Target Compound List (TCL) Volatile Organic Compound (VOC) fraction only by the EPA Region 2 Laboratory in accordance with their SOP DW-1 *ANALYSIS OF VOLATILE ORGANIC COMPOUNDS IN WATER BY PURGE AND TRAP GC/MS,* Rev. 2.7. The complete Analytical Data Package is presented in Appendix D, *Laboratory Analytical Data Package*.

Physio-chemical stabilization parameters including pH, Temperature, Specific Conductivity, Dissolved Oxygen (DO), Turbidity, Oxidation Reduction Potential (ORP), Depth to Water (DTW), and Flow Rate were collected at each monitoring well via In-Situ Aqua-TROLL 600^{TM} multi-parameter sondes and HACH Turbidity analyzer 2100Q^{TM} . All results are recorded via low-flow test report outputs which are presented in Appendix E, *Low-Flow Test Reports*. Depth-to-water/total depths were collected at all monitoring wells that were sampled. All wells had viable water with well hardware intact.

5. Sampling Personnel:

Name	Organization	Site Duties
Robert Finke	USEPA Region 2 LSASD/HWSB/Superfund Support Team	Sampling/Sample Management
Sean O'Hare	USEPA Region 2 LSASD/HWSB/Superfund Support Team	Sampling

6. Additional Comments:

All analytical results were compared to the February 28, 2021, 6 CRR-NY 703.5, *New York State Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations*, Class GA, Health (Water Source), provided in Appendix A tables. All analytical exceedances are highlighted in red and non-detect results, with the laboratory's reporting limit above the New York criteria, highlighted in yellow.

The quality control samples are presented in Table 1 below and include the field duplicate, trip blank, rinsate blank and sample submitted for matrix spike (MS) analyses. The field quality control samples included collecting one (1) trip blank and one (1) rinsate blank to determine if any extraneous contamination was introduced to the samples in the field and/or during shipment. Trip Blank ID # BFYZ1 and Rinsate Blank ID # BFYZ0 contain 4.21 µg/L (ppb) and 3.14 µg/L respectively of tetrachloroethene (PCE). No action to the data is warranted due to the fact that the sample concentrations are greater than 10 times that of PCE detected in the associated blanks. The field duplicate results were compared to its respective pair via Relative Percent Difference (RPD) calculations for compounds detected in both the sample and the associated duplicate above the reporting limits. These RPD calculations are presented in Table 2 below and are used to assess the overall precision of sampling in the field, as well as the analyses performed by the laboratory. Please note that the CLP numbers on the attached COC are not the same as listed on Worksheet 18 of the associated UFP-QAPP. The choice of CLP numbers has no affect on the data. Additionally, a field decision was made to change collection of the pre-determined field duplicate sample from MW-05 to MW-04. This decision was made due to a good recharge of groundwater at MW-04 and a previously unpredictable groundwater recharge at MW-05. It should be noted that concentrations of PCE and TCE in particular have been increasing in samples collected from all wells sampled since 2009. PCE in samples collected from MW-02 for example have increased from 3,800 µg/L in August 2011 to 17,000 µg/L in August 2022.

Table 1 – Loohn's Cleaners/Olean Wellfield Quality Control Samples			
Laboratory Quality Control (QC) Samples		Field Quality Control (QC) Samples	
Matrix Spike (MS)	Field Duplicate	Trip Blank	Rinsate Blank
BFYY8/MW-05	BFYY7 / BFYY9 MW-04/MW-06	BFYZ1/TB-01	BFYZ0/RB-01

Table 2 - Field Duplicate VOC RPD Results

Analyte	MW-04 (BFYY7) µg/L	MW-06 (BFYY9) µg/L	Relative Percent Difference (RPD) (absolute value)
Vinyl Chloride	14.6	15.4	5.3
trans-1,2-Dichloroethene	2.67	2.84	6.2
1,1-Dichloroethene	2.29	2.48	8.0
cis-1,2-Dichloroethene	626	874	33.1
Tetrachloroethene	4680	4450	5.0
Trichloroethene	459	599	26.5

7. Report Prepared by: Robert Finke Robert Finke **Date:** November 15, 2022

Appendices

Appendix A – Data Summary Reports
Appendix B – Chain-of-Custody Records
Appendix C – 2022 UFP-QAPP
Appendix D – Laboratory Analytical Data Package
Appendix E – Low-Flow Test Reports

APPENDIX A

DATA SUMMARY REPORTS

Olean/Loohn's Cleaner's Superfund Site
Groundwater Monitoring Well Sampling
Volatile Organics
LSASD-HWSB-SST
August 2022

(pink)	Result Rejected, Qualified R
(yellow)	Result equal to or over action level but Not Detected
(red)	Detected result equal to or over the action level

Feb 28, 2021 NYS Standard and Guidance Values in Criterion for H(WS) in Class GA Groundwater (ug/L)

Lab Sample ID:	2208010-01	2208010-02
Field Sample ID:	BFYY4	BFYY5
Sampling Location Code:	MW-01	MW-02
Latitude:	42.071951	42.071568
Longitude:	-78.400160	-78.400044
Sampling Sub-location:	18'-28'	18'-28'
Sampling Date:	8/16/2022	8/16/2022
Units:	ug/L	ug/L

CAS No.	Fraction.	Feb 28, 2021 NYS Standard and Guidance Values in Criterion for H(WS) in Class GA Groundwater (ug/L) Action Level	2208010-01 Result	2208010-01 Qualifier	2208010-02 Result	2208010-02 Qualifier
100-41-4	Ethylbenzene	5	0.5	U	0.5	U
100-42-5	Styrene	5	0.5	U	0.5	U
10061-01-5	cis-1,3-Dichloropropene	0.4	0.5	U	0.5	U
10061-02-6	trans-1,3-Dichloropropene	0.4	0.5	U	0.5	U
106-46-7	1,4-Dichlorobenzene	3	0.5	U	0.5	U
106-93-4	1,2-Dibromoethane	0.0006	0.5	U	0.5	U
107-06-2	1,2-Dichloroethane	0.6	0.5	U	0.5	U
108-10-1	4-Methyl-2-Pentanone	-	5	U	5	U
108-87-2	Methylcyclohexane	-	0.5	U	0.5	U
108-88-3	Toluene	5	0.5	U	0.5	U
108-90-7	Chlorobenzene	5	0.5	U	0.5	U
110-82-7	Cyclohexane	-	0.5	U	0.5	U
120-82-1	1,2,4-Trichlorobenzene	5	0.5	U	0.5	U
124-48-1	Dibromochloromethane	50	0.5	U	0.5	U
127-18-4	Tetrachloroethene	5	0.5	U		
156-59-2	cis-1,2-Dichloroethene	5	8.94		0.5	U
156-60-5	trans-1,2-Dichloroethene	5	0.5	U	11.5	
1634-04-4	Methyl tert-Butyl Ether	10	0.5	U	0.5	U
179601-23-1	m,p-Xylene	5	0.5	U	0.5	U
541-73-1	1,3-Dichlorobenzene	3	0.5	U	0.5	U
56-23-5	Carbon Tetrachloride	5	0.5	U	0.5	U
591-78-6	2-Hexanone	50	5	U	5	U
67-64-1	Acetone	50	5	U	5	U
67-66-3	Chloroform	7	0.5	U	0.5	U
71-43-2	Benzene	1	0.5	U	0.5	U
71-55-6	1,1,1-Trichloroethane	5	0.5	U	0.5	U
74-83-9	Bromomethane	5	0.5	U	0.5	U
74-87-3	Chloromethane	5	0.5	UL	0.88	L
74-97-5	Bromochloromethane	5	0.5	U	0.5	U
75-00-3	Chloroethane	5	0.51		0.5	U
75-01-4	Vinyl Chloride	2	15.8			
75-09-2	Methylene Chloride	5	0.5	U	0.5	U
75-15-0	Carbon Disulfide	60	0.5	U	0.5	U
75-25-2	Bromoform	50	0.5	U	0.5	U
75-27-4	Bromodichloromethane	50	0.5	U	0.5	U
75-34-3	1,1-Dichloroethane	5	0.5	U	0.56	
75-35-4	1,1-Dichloroethene	5	0.5	U	13.6	
75-69-4	Trichlorofluoromethane	5	0.5	U	0.5	U
75-71-8	Dichlorodifluoromethane	5	0.5	UL	0.5	UL
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane	5	0.5	U	0.5	U
78-87-5	1,2-Dichloropropane	1	0.5	U	0.5	U
78-93-3	2-Butanone	50	5	U	5	U
79-00-5	1,1,2-Trichloroethane	1	0.5	U	0.5	U
79-01-6	Trichloroethene	5	0.5	U		
79-20-9	Methyl Acetate	-	0.5	U	0.5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	0.5	U	0.5	U
87-61-6	1,2,3-Trichlorobenzene	5	0.5	U	0.5	U
95-47-6	o-Xylene	5	0.5	U	0.5	U
95-50-1	1,2-Dichlorobenzene	3	0.5	U	0.5	U
96-12-8	1,2-Dibromo-3-Chloropropane	0.04	0.5	U	0.5	U
98-82-8	Isopropylbenzene	5	0.5	U	0.5	U

Qualifier Key:

U - Not detected at or above the Reporting Limit;

J - The identification of the analyte is acceptable, the reported value is an estimate;

K - The identification of the analyte is acceptable, the reported value may be biased high;

L - The identification of the analyte is acceptable, the reported value may be biased low;

NJ - There is presumptive evidence that the analyte is present, the analyte is reported as a tentative identification, the reported value is an estimate.

B - Analyte is present in associated laboratory and/or field blank.

Olean/Loohn's Cleaner's Superfund Site
Groundwater Monitoring Well Sampling
Volatile Organics
LSASD-HWSB-SST
August 2022

(pink)	Result Rejected, Qualified R
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Feb 28, 2021 NYS Standard and Guidance Values in Criterion for H(WS) in Class GA Groundwater (ug/L)

Lab Sample ID:	2208010-02RE1 (Dilution1)	2208010-02RE3 (Dilution 3)
Field Sample ID:	BFYY5	BFYY5
Sampling Location Code:	MW-02	MW-02
Latitude:	42.071568	42.071568
Longitude:	-78.400044	-78.400044
Sampling Sub-location:	18'-28'	18'-28'
Sampling Date:	8/16/2022	8/16/2022
Units:	ug/L	

CAS No.	Fraction.	Feb 28, 2021 NYS Standard and Guidance Values in Criterion for H(WS) in Class GA Groundwater (ug/L) Action Level	2208010-02RE1 Result	Qualifier	2208010-02RE3 Result	Qualifier
100-41-4	Ethylbenzene	5				
100-42-5	Styrene	5				
10061-01-5	cis-1,3-Dichloropropene	0.4				
10061-02-6	trans-1,3-Dichloropropene	0.4				
106-46-7	1,4-Dichlorobenzene	3				
106-93-4	1,2-Dibromoethane	0.0006				
107-06-2	1,2-Dichloroethane	0.6				
108-10-1	4-Methyl-2-Pentanone	-				
108-87-2	Methylcyclohexane	-				
108-88-3	Toluene	5				
108-90-7	Chlorobenzene	5				
110-82-7	Cyclohexane	-				
120-82-1	1,2,4-Trichlorobenzene	5				
124-48-1	Dibromochloromethane	50				
127-18-4	Tetrachloroethene	5			17000	J
156-59-2	cis-1,2-Dichloroethene	5				
156-60-5	trans-1,2-Dichloroethene	5				
1634-04-4	Methyl tert-Butyl Ether	10				
179601-23-1	m,p-Xylene	5				
541-73-1	1,3-Dichlorobenzene	3				
56-23-5	Carbon Tetrachloride	5				
591-78-6	2-Hexanone	50				
67-64-1	Acetone	50				
67-66-3	Chloroform	7				
71-43-2	Benzene	1				
71-55-6	1,1,1-Trichloroethane	5				
74-83-9	Bromomethane	5				
74-87-3	Chloromethane	5				
74-97-5	Bromochloromethane	5				
75-00-3	Chloroethane	5				
75-01-4	Vinyl Chloride	2	522			
75-09-2	Methylene Chloride	5				
75-15-0	Carbon Disulfide	60				
75-25-2	Bromoform	50				
75-27-4	Bromodichloromethane	50				
75-34-3	1,1-Dichloroethane	5				
75-35-4	1,1-Dichloroethene	5				
75-69-4	Trichlorofluoromethane	5				
75-71-8	Dichlorodifluoromethane	5				
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane	5				
78-87-5	1,2-Dichloropropane	1				
78-93-3	2-Butanone	50				
79-00-5	1,1,2-Trichloroethane	1				
79-01-6	Trichloroethene	5	2640			
79-20-9	Methyl Acetate	-				
79-34-5	1,1,2,2-Tetrachloroethane	5				
87-61-6	1,2,3-Trichlorobenzene	5				
95-47-6	o-Xylene	5				
95-50-1	1,2-Dichlorobenzene	3				
96-12-8	1,2-Dibromo-3-Chloropropane	0.04				
98-82-8	Isopropylbenzene	5				

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Olean/Loohn's Cleaner's Superfund Site
Groundwater Monitoring Well Sampling
Volatile Organics
LSASD-HWSB-SST
August 2022

(magenta)	Result Rejected, Qualified R
(yellow)	Result equal to or over action level but Not Detected
(red)	Detected result equal to or over the action level

Feb 28, 2021 NYS Standard and Guidance Values in Criterion for H(WS) in Class GA Groundwater (ug/L)

Lab Sample ID:	2208010-03	2208010-04
Field Sample ID:	BFYY6	BFYY7
Sampling Location Code:	MW-03	MW-04
Latitude:	42.071563	42.071655
Longitude:	-78.400021	-78.400433
Sampling Sub-location:	25'-35'	20'-30'
Sampling Date:	8/16/2022	8/16/2022
Units:	ug/L	ug/L

CAS No.	Fraction.	Action Level (Feb 28, 2021 NYS Standard and Guidance Values in Criterion for H(WS) in Class GA Groundwater (ug/L))	MW-03 Result	MW-03 Qualifier	MW-04 Result	MW-04 Qualifier
100-41-4	Ethylbenzene	5	0.5	U	0.5	U
100-42-5	Styrene	5	0.5	U	0.5	U
10061-01-5	cis-1,3-Dichloropropene	0.4	0.5	U	0.5	U
10061-02-6	trans-1,3-Dichloropropene	0.4	0.5	U	0.5	U
106-46-7	1,4-Dichlorobenzene	3	0.5	U	0.5	U
106-93-4	1,2-Dibromoethane	0.0006	0.5	U	0.5	U
107-06-2	1,2-Dichloroethane	0.6	0.5	U	0.5	U
108-10-1	4-Methyl-2-Pentanone	-	5	U	5	U
108-87-2	Methylcyclohexane	-	0.5	U	0.5	U
108-88-3	Toluene	5	0.5	U	0.5	U
108-90-7	Chlorobenzene	5	0.5	U	0.5	U
110-82-7	Cyclohexane	-	0.5	U	0.5	U
120-82-1	1,2,4-Trichlorobenzene	5	0.5	U	0.5	U
124-48-1	Dibromochloromethane	50	0.5	U	0.5	U
127-18-4	Tetrachloroethene	5	57			
156-59-2	cis-1,2-Dichloroethene	5	17.2			
156-60-5	trans-1,2-Dichloroethene	5	0.5	U	2.67	
1634-04-4	Methyl tert-Butyl Ether	10	0.5	U	0.5	U
179601-23-1	m,p-Xylene	5	0.5	U	0.5	U
541-73-1	1,3-Dichlorobenzene	3	0.5	U	0.5	U
56-23-5	Carbon Tetrachloride	5	0.5	U	0.5	U
591-78-6	2-Hexanone	50	5	U	5	U
67-64-1	Acetone	50	5	U	5	U
67-66-3	Chloroform	7	0.5	U	0.5	U
71-43-2	Benzene	1	0.5	U	0.5	U
71-55-6	1,1,1-Trichloroethane	5	0.5	U	0.5	U
74-83-9	Bromomethane	5	0.5	U	0.5	U
74-87-3	Chloromethane	5	0.5	UL	0.82	L
74-97-5	Bromochloromethane	5	0.5	U	0.5	U
75-00-3	Chloroethane	5	0.5	U	0.5	U
75-01-4	Vinyl Chloride	2	0.5	U	14.6	
75-09-2	Methylene Chloride	5	0.5	U	0.5	U
75-15-0	Carbon Disulfide	60	0.5	U	0.5	U
75-25-2	Bromoform	50	0.5	U	0.5	U
75-27-4	Bromodichloromethane	50	0.5	U	0.5	U
75-34-3	1,1-Dichloroethane	5	0.5	U	0.5	U
75-35-4	1,1-Dichloroethene	5	0.5	U	2.29	
75-69-4	Trichlorofluoromethane	5	0.5	U	0.5	U
75-71-8	Dichlorodifluoromethane	5	0.5	UL	0.5	UL
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane	5	0.5	U	0.5	U
78-87-5	1,2-Dichloropropane	1	0.5	U	0.5	U
78-93-3	2-Butanone	50	5	U	5	U
79-00-5	1,1,2-Trichloroethane	1	0.5	U	0.5	U
79-01-6	Trichloroethene	5	15.2			
79-20-9	Methyl Acetate	-	0.5	U	0.5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	0.5	U	0.5	U
87-61-6	1,2,3-Trichlorobenzene	5	0.5	U	0.5	U
95-47-6	o-Xylene	5	0.5	U	0.5	U
95-50-1	1,2-Dichlorobenzene	3	0.5	U	0.5	U
96-12-8	1,2-Dibromo-3-Chloropropane	0.04	0.5	U	0.5	U
98-82-8	Isopropylbenzene	5	0.5	U	0.5	U

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(pink)	Result Rejected, Qualified R
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Feb 28, 2021 NYS Standard and Guidance Values in Criterion for H(WS) in Class GA Groundwater (ug/L)

CAS No.	Fraction.	Feb 28, 2021 NYS Standard and Guidance Values in Criterion for H(WS) in Class GA Groundwater (ug/L)	Lab Sample ID:	2208010-04RE1 (Dilution 1)		2208010-04RE2 (Dilution 2)	
			Field Sample ID:	BFYY7		BFYY7	
			Sampling Location Code:	MW-04		MW-04	
			Latitude:	42.071655		42.071655	
			Longitude:	-78.400433		-78.400433	
			Sampling Sub-location:	20'-30'		20'-30'	
			Sampling Date:	8/16/2022		8/16/2022	
			Units:	ug/L		ug/L	
CAS No.	Fraction.	Action Level		Result	Qualifier	Result	Qualifier
100-41-4	Ethylbenzene	5					
100-42-5	Styrene	5					
10061-01-5	cis-1,3-Dichloropropene	0.4					
10061-02-6	trans-1,3-Dichloropropene	0.4					
106-46-7	1,4-Dichlorobenzene	3					
106-93-4	1,2-Dibromoethane	0.0006					
107-06-2	1,2-Dichloroethane	0.6					
108-10-1	4-Methyl-2-Pentanone	-					
108-87-2	Methylcyclohexane	-					
108-88-3	Toluene	5					
108-90-7	Chlorobenzene	5					
110-82-7	Cyclohexane	-					
120-82-1	1,2,4-Trichlorobenzene	5					
124-48-1	Dibromochloromethane	50					
127-18-4	Tetrachloroethene	5				4680	J
156-59-2	cis-1,2-Dichloroethene	5		626			
156-60-5	trans-1,2-Dichloroethene	5					
1634-04-4	Methyl tert-Butyl Ether	10					
179601-23-1	m,p-Xylene	5					
541-73-1	1,3-Dichlorobenzene	3					
56-23-5	Carbon Tetrachloride	5					
591-78-6	2-Hexanone	50					
67-64-1	Acetone	50					
67-66-3	Chloroform	7					
71-43-2	Benzene	1					
71-55-6	1,1,1-Trichloroethane	5					
74-83-9	Bromomethane	5					
74-87-3	Chloromethane	5					
74-97-5	Bromochloromethane	5					
75-00-3	Chloroethane	5					
75-01-4	Vinyl Chloride	2					
75-09-2	Methylene Chloride	5					
75-15-0	Carbon Disulfide	60					
75-25-2	Bromoform	50					
75-27-4	Bromodichloromethane	50					
75-34-3	1,1-Dichloroethane	5					
75-35-4	1,1-Dichloroethene	5					
75-69-4	Trichlorofluoromethane	5					
75-71-8	Dichlorodifluoromethane	5					
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane	5					
78-87-5	1,2-Dichloropropane	1					
78-93-3	2-Butanone	50					
79-00-5	1,1,2-Trichloroethane	1					
79-01-6	Trichloroethene	5		459			
79-20-9	Methyl Acetate	-					
79-34-5	1,1,2,2-Tetrachloroethane	5					
87-61-6	1,2,3-Trichlorobenzene	5					
95-47-6	o-Xylene	5					
95-50-1	1,2-Dichlorobenzene	3					
96-12-8	1,2-Dibromo-3-Chloropropane	0.04					
98-82-8	Isopropylbenzene	5					

Qualifier Key:
U - Not detected at or above the Reporting Limit;
J - The identification of the analyte is acceptable, the reported value is an estimate;
K - The identification of the analyte is acceptable, the reported value may be biased high;
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B - Analyte is present in associated laboratory and/or field blank.

Olean/Loohn's Cleaner's Superfund Site
Groundwater Monitoring Well Sampling
Volatile Organics
LSASD-HWSB-SST
August 2022

(pink)	Result Rejected, Qualified R
(yellow)	Result equal to or over action level but Not Detected
(red)	Detected result equal to or over the action level

Feb 28, 2021 NYS Standard and Guidance Values in Criterion for H(WS) in Class GA Groundwater (ug/L)

			Lab Sample ID:	2208010-05		2208010-06
			Field Sample ID:	BFYY8		BFYY9
			Sampling Location Code:	MW-05		MW-06 (MW-04 Duplicate)
			Latitude:	42.071647		42.071655
		Feb 28, 2021 NYS Standard and Guidance Values in Criterion for H(WS) in Class GA Groundwater (ug/L)	Longitude:	-78.400451		-78.400433
			Sampling Sub-location:	39'-49'		20'-30'
			Sampling Date:	8/16/2022		8/16/2022
			Units:	ug/L		ug/L
CAS No.	Fraction.	Action Level	Result	Qualifier	Result	Qualifier
100-41-4	Ethylbenzene	5	0.5	U	0.5	U
100-42-5	Styrene	5	0.5	U	0.5	U
10061-01-5	cis-1,3-Dichloropropene	0.4	0.5	U	0.5	U
10061-02-6	trans-1,3-Dichloropropene	0.4	0.5	U	0.5	U
106-46-7	1,4-Dichlorobenzene	3	0.5	U	0.5	U
106-93-4	1,2-Dibromoethane	0.0006	0.5	U	0.5	U
107-06-2	1,2-Dichloroethane	0.6	0.5	U	0.5	U
108-10-1	4-Methyl-2-Pentanone	-	5	U	5	U
108-87-2	Methylcyclohexane	-	0.5	U	0.5	U
108-88-3	Toluene	5	0.5	U	0.5	U
108-90-7	Chlorobenzene	5	0.5	U	0.5	U
110-82-7	Cyclohexane	-	0.5	U	0.5	U
120-82-1	1,2,4-Trichlorobenzene	5	0.5	U	0.5	U
124-48-1	Dibromochloromethane	50	0.5	U	0.5	U
127-18-4	Tetrachloroethene	5	1.78	L		
156-59-2	cis-1,2-Dichloroethene	5	0.53			
156-60-5	trans-1,2-Dichloroethene	5	0.5	U	2.84	
1634-04-4	Methyl tert-Butyl Ether	10	0.5	U	0.5	U
179601-23-1	m,p-Xylene	5	0.5	U	0.5	U
541-73-1	1,3-Dichlorobenzene	3	0.5	U	0.5	U
56-23-5	Carbon Tetrachloride	5	0.5	U	0.5	U
591-78-6	2-Hexanone	50	5	U	5	U
67-64-1	Acetone	50	5	U	5	U
67-66-3	Chloroform	7	0.5	U	0.5	U
71-43-2	Benzene	1	0.5	U	0.5	U
71-55-6	1,1,1-Trichloroethane	5	0.5	U	0.5	U
74-83-9	Bromomethane	5	0.5	U	0.5	U
74-87-3	Chloromethane	5	0.5	UL	0.5	UL
74-97-5	Bromochloromethane	5	0.5	U	0.5	U
75-00-3	Chloroethane	5	0.5	U	0.5	U
75-01-4	Vinyl Chloride	2	0.5	U	15.4	
75-09-2	Methylene Chloride	5	0.5	U	0.5	U
75-15-0	Carbon Disulfide	60	0.5	U	0.5	U
75-25-2	Bromoform	50	0.5	U	0.5	U
75-27-4	Bromodichloromethane	50	0.5	U	0.5	U
75-34-3	1,1-Dichloroethane	5	0.5	U	0.5	U
75-35-4	1,1-Dichloroethene	5	0.5	U	2.48	
75-69-4	Trichlorofluoromethane	5	0.5	U	0.5	U
75-71-8	Dichlorodifluoromethane	5	0.5	UL	0.5	UL
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane	5	0.5	U	0.5	U
78-87-5	1,2-Dichloropropane	1	0.5	U	0.5	U
78-93-3	2-Butanone	50	5	U	5	U
79-00-5	1,1,2-Trichloroethane	1	0.5	U	0.5	U
79-01-6	Trichloroethene	5	1.12			
79-20-9	Methyl Acetate	-	0.5	U	0.5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	0.5	U	0.5	U
87-61-6	1,2,3-Trichlorobenzene	5	0.5	U	0.5	U
95-47-6	o-Xylene	5	0.5	U	0.5	U
95-50-1	1,2-Dichlorobenzene	3	0.5	U	0.5	U
96-12-8	1,2-Dibromo-3-Chloropropane	0.04	0.5	U	0.5	U
98-82-8	Isopropylbenzene	5	0.5	U	0.5	U

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Olean/Loohn's Cleaner's Superfund Site
Groundwater Monitoring Well Sampling
Volatile Organics
LSASD-HWSB-SST
August 2022

(pink)	Result Rejected, Qualified R
(yellow)	Result equal to or over action level but Not Detected
(red)	Detected result equal to or over the action level

Feb 28, 2021 NYS Standard and Guidance Values in Criterion for H(WS) in Class GA Groundwater (ug/L)

Lab Sample ID:	2208010-06RE1 (dilution 1)	2208010-06RE2 (dilution 2)
Field Sample ID:	BFYY9	BFYY9
Sampling Location Code:	MW-06 (MW-04 Duplicate)	MW-06 (MW-04 Duplicate)
Latitude:	42.071655	42.071655
Longitude:	-78.400433	-78.400433
Sampling Sub-location:	20'-30'	20'-30'
Sampling Date:	8/16/2022	8/16/2022
Units:	ug/L	ug/L

CAS No.	Fraction.	Action Level (Feb 28, 2021 NYS Standard and Guidance Values in Criterion for H(WS) in Class GA Groundwater (ug/L))	2208010-06RE1 Result	2208010-06RE1 Qualifier	2208010-06RE2 Result	2208010-06RE2 Qualifier
100-41-4	Ethylbenzene	5				
100-42-5	Styrene	5				
10061-01-5	cis-1,3-Dichloropropene	0.4				
10061-02-6	trans-1,3-Dichloropropene	0.4				
106-46-7	1,4-Dichlorobenzene	3				
106-93-4	1,2-Dibromoethane	0.0006				
107-06-2	1,2-Dichloroethane	0.6				
108-10-1	4-Methyl-2-Pentanone	-				
108-87-2	Methylcyclohexane	-				
108-88-3	Toluene	5				
108-90-7	Chlorobenzene	5				
110-82-7	Cyclohexane	-				
120-82-1	1,2,4-Trichlorobenzene	5				
124-48-1	Dibromochloromethane	50				
127-18-4	Tetrachloroethene	5			4450	J
156-59-2	cis-1,2-Dichloroethene	5	874			
156-60-5	trans-1,2-Dichloroethene	5				
1634-04-4	Methyl tert-Butyl Ether	10				
179601-23-1	m,p-Xylene	5				
541-73-1	1,3-Dichlorobenzene	3				
56-23-5	Carbon Tetrachloride	5				
591-78-6	2-Hexanone	50				
67-64-1	Acetone	50				
67-66-3	Chloroform	7				
71-43-2	Benzene	1				
71-55-6	1,1,1-Trichloroethane	5				
74-83-9	Bromomethane	5				
74-87-3	Chloromethane	5				
74-97-5	Bromochloromethane	5				
75-00-3	Chloroethane	5				
75-01-4	Vinyl Chloride	2				
75-09-2	Methylene Chloride	5				
75-15-0	Carbon Disulfide	60				
75-25-2	Bromoform	50				
75-27-4	Bromodichloromethane	50				
75-34-3	1,1-Dichloroethane	5				
75-35-4	1,1-Dichloroethene	5				
75-69-4	Trichlorofluoromethane	5				
75-71-8	Dichlorodifluoromethane	5				
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane	5				
78-87-5	1,2-Dichloropropane	1				
78-93-3	2-Butanone	50				
79-00-5	1,1,2-Trichloroethane	1				
79-01-6	Trichloroethene	5	599			
79-20-9	Methyl Acetate	-				
79-34-5	1,1,2,2-Tetrachloroethane	5				
87-61-6	1,2,3-Trichlorobenzene	5				
95-47-6	o-Xylene	5				
95-50-1	1,2-Dichlorobenzene	3				
96-12-8	1,2-Dibromo-3-Chloropropane	0.04				
98-82-8	Isopropylbenzene	5				

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August 2022

(pink)	Result Rejected, Qualified R
(yellow)	Result equal to or over action level but Not Detected
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Feb 28, 2021 NYS Standard and Guidance Values in Criterion for H(WS) in Class GA Groundwater (ug/L)

			Lab Sample ID:	2208010-07		2208010-08	
			Field Sample ID:	BFYZ0		BFYZ1	
			Sampling Location Code:	RB-01		TB-01	
			Latitude:	N/A		N/A	
		Feb 28, 2021 NYS Standard and Guidance Values in Criterion for H(WS) in Class GA Groundwater (ug/L)	Longitude:	N/A		N/A	
			Sampling Sub-location:	N/A		N/A	
			Sampling Date:	8/16/2022		8/16/2022	
			Units:	ug/L		ug/L	
CAS No.	Fraction.	Action Level		Result	Qualifier	Result	Qualifier
100-41-4	Ethylbenzene	5		0.5	U	0.5	U
100-42-5	Styrene	5		0.5	U	0.5	U
10061-01-5	cis-1,3-Dichloropropene	0.4		0.5	U	0.5	U
10061-02-6	trans-1,3-Dichloropropene	0.4		0.5	U	0.5	U
106-46-7	1,4-Dichlorobenzene	3		0.5	U	0.5	U
106-93-4	1,2-Dibromoethane	0.0006		0.5	U	0.5	U
107-06-2	1,2-Dichloroethane	0.6		0.5	U	0.5	U
108-10-1	4-Methyl-2-Pentanone	-		5	U	5	U
108-87-2	Methylcyclohexane	-		0.5	U	0.5	U
108-88-3	Toluene	5		0.5	U	0.5	U
108-90-7	Chlorobenzene	5		0.5	U	0.5	U
110-82-7	Cyclohexane	-		0.5	U	0.5	U
120-82-1	1,2,4-Trichlorobenzene	5		0.5	U	0.5	U
124-48-1	Dibromochloromethane	50		0.5	U	0.5	U
127-18-4	Tetrachloroethene	5		4.21		3.14	
156-59-2	cis-1,2-Dichloroethene	5		0.5	U	0.5	U
156-60-5	trans-1,2-Dichloroethene	5		0.5	U	0.5	U
1634-04-4	Methyl tert-Butyl Ether	10		0.5	U	0.5	U
179601-23-1	m,p-Xylene	5		0.5	U	0.5	U
541-73-1	1,3-Dichlorobenzene	3		0.5	U	0.5	U
56-23-5	Carbon Tetrachloride	5		0.5	U	0.5	U
591-78-6	2-Hexanone	50		5	U	5	U
67-64-1	Acetone	50		5	U	5	U
67-66-3	Chloroform	7		0.5	U	0.5	U
71-43-2	Benzene	1		0.5	U	0.5	U
71-55-6	1,1,1-Trichloroethane	5		0.5	U	0.5	U
74-83-9	Bromomethane	5		0.5	U	0.5	U
74-87-3	Chloromethane	5		0.5	UL	0.5	UL
74-97-5	Bromochloromethane	5		0.5	U	0.5	U
75-00-3	Chloroethane	5		0.5	U	0.5	U
75-01-4	Vinyl Chloride	2		0.5	U	0.5	U
75-09-2	Methylene Chloride	5		0.5	U	0.5	U
75-15-0	Carbon Disulfide	60		0.5	U	0.5	U
75-25-2	Bromoform	50		0.5	U	0.5	U
75-27-4	Bromodichloromethane	50		0.5	U	0.5	U
75-34-3	1,1-Dichloroethane	5		0.5	U	0.5	U
75-35-4	1,1-Dichloroethene	5		0.5	U	0.5	U
75-69-4	Trichlorofluoromethane	5		0.5	U	0.5	U
75-71-8	Dichlorodifluoromethane	5		0.5	UL	0.5	UL
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane	5		0.5	U	0.5	U
78-87-5	1,2-Dichloropropane	1		0.5	U	0.5	U
78-93-3	2-Butanone	50		5	U	5	U
79-00-5	1,1,2-Trichloroethane	1		0.5	U	0.5	U
79-01-6	Trichloroethene	5		0.5	U	0.5	U
79-20-9	Methyl Acetate	-		0.5	U	0.5	U
79-34-5	1,1,2,2-Tetrachloroethane	5		0.5	U	0.5	U
87-61-6	1,2,3-Trichlorobenzene	5		0.5	U	0.5	U
95-47-6	o-Xylene	5		0.5	U	0.5	U
95-50-1	1,2-Dichlorobenzene	3		0.5	U	0.5	U
96-12-8	1,2-Dibromo-3-Chloropropane	0.04		0.5	U	0.5	U
98-82-8	Isopropylbenzene	5		0.5	U	0.5	U

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APPENDIX B

CHAIN OF CUSTODY RECORDS

USEPA
DateShipped: 8/17/2022
AirbillNo: Hand Delivered
Case Complete: True

CHAIN OF CUSTODY RECORD
Olean Well Field/NY
Contact Name: Bob Finke
Contact Phone: 732-586-9987

No: 2-081722-185344-0001
Cooler #: 1
Lab: USEPA R2 LSASD Laboratory
Lab Phone: 732-321-4431

Lab #	Sample #	Location	Analyses	Matrix	Sample Type	Sample Date	Sample Time	Numb Cont	Container	Preservative	Lab QC
2208010-01	BFYY4	MW-01	TCL VOC - Trace	Ground Water	Field Sample	8/16/2022	10:45	3	40 ml vial	HCl	
-02	BFYY5	MW-02	TCL VOC - Trace	Ground Water	Field Sample	8/16/2022	12:20	3	40 ml vial	HCl	
-03	BFYY6	MW-03	TCL VOC - Trace	Ground Water	Field Sample	8/16/2022	15:00	3	40 ml vial	HCl	
-04	BFYY7	MW-04	TCL VOC - Trace	Ground Water	Field Sample	8/16/2022	14:45	3	40 ml vial	HCl	
-05	BFYY8	MW-05	TCL VOC - Trace	Ground Water	Lab QC	8/16/2022	15:45	6	40 ml vial	HCl	Y
-06	BFYY9	MW-06	TCL VOC - Trace	Ground Water	Field Duplicate	8/16/2022	14:45	3	40 ml vial	HCl	
-07	BFYZ0	RB-01	TCL VOC - Trace	DI Water	Equipment Blank	8/16/2022	09:15	3	40 ml vial	HCl	
-08	BFYZ1	TB-01	TCL VOC - Trace	DI Water	Trip Blank	8/16/2022	09:00	3	40 ml vial	HCl	
-09	BFYZ2	50-1	TAL Metals - Low	Aqueous	Equipment Blank	8/16/2022	10:00	1	100 ml poly	HNO3 pH<2	
-10	BFYZ3	100-4	TAL Metals - Low	Aqueous	Equipment Blank	8/16/2022	10:05	1	100 ml poly	HNO3 pH<2	
-11	BFYZ4	300-4	TAL Metals - Low	Aqueous	Equipment Blank	8/16/2022	10:10	1	100 ml poly	HNO3 pH<2	
-12	BFYZ5	200-8	TAL Metals - Low	Aqueous	Equipment Blank	8/16/2022	10:15	1	100 ml poly	HNO3 pH<2	
-13	BFYZ6	100-64	TAL Metals - Low	Aqueous	Equipment Blank	8/16/2022	10:20	1	100 ml poly	HNO3 pH<2	

8/18/22

Special Instructions: Hand Delivered
Case is complete!

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
Samples/Analysis	K. Finke, EPA	8/17/22/1930	[signature]	8/17/22 19:30	INTACT

Direct from sampling, chilling initiated. 8/18/22

APPENDIX C

UNIFORM FEDERAL POLICY

QUALITY ASSURANCE PROJECT PLAN (UFP-QAPP) for the

LOOHN'S CLEANERS AND LAUNDERERS GROUNDWATER SAMPLING

U.S. Environmental Protection Agency Region 2

August 15-16, 2022

Document Control Number: Loohns_UFP-QAPP_August2022

TABLE OF CONTENTS

APPENDICES

ACRONYMS AND ABBREVIATIONS

ADR	Automated Data Review
ANSETS	Analytical Services Tracking System
AOC	Acknowledgment of Completion
ASTM	American Society for Testing and Materials
BGS	Below ground Surface
BNA	Base Neutral and Acid Extractables
CCV	Continuing Calibration Verification
CDC	Continuing Demonstration of Capability
CEO	Chief Executive Officer
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFM	Contract Financial Manager
CLP	Contract Laboratory Program
CO	Contract Officer
COC	Chain-of-Custody
COI	Conflict of Interest
COO	Chief Operations Officer
CQLOSS	Corporate Quality Leadership and Operations Support Services
CRDL	Contract Required Detection Limit
CRQL	Contract Required Quantitation Limit
CRTL	Core Response Team Leader
CWA	Clean Water Act
DCN	Document Control Number
DI	Deionized Water
DMC	Deuterated Monitoring Compound
DPO	Deputy Project Officer
DQI	Data Quality Indicator
DQO	Data Quality Objective
EB	Equipment Blank
EDD	Electronic Data Deliverable
EM	Equipment Manager
ENVL	Environmental Unit Leader
EPA	Environmental Protection Agency
ERT	Environmental Response Team
ESD	Explanation of Significant Differences
FASTAC	Field and Analytical Services Teaming Advisory Committee
FD	Field Duplicate
FFS	Focus Feasibility Study
GC/ECD	Gas Chromatography/Electron Capture Detector
GC/MS	Gas Chromatography/Mass Spectrometry
GIS	Geographic Information System
HASP	Health and Safety Plan
HRS	Hazard Ranking System
HSO	Health and Safety Officer
HWSB	Hazardous Waste Support Branch
HWSS	Hazardous Waste Support Section
ICS	Initial Calibration Standard
ICV	Initial Calibration Verification

ACRONYMS AND ABBREVIATIONS

IDC	Initial Demonstration of Capability
IDL	Instrument Detection Limit
ITM	Information Technology Manager
LCS	Laboratory Control Sample
LD	Laboratory Duplicate
LEL	Lower Explosive Limit
LSASD	Laboratory Services & Applied Science Division
MB	Method Blank
MDL	Method Detection Limit
mg/Kg	miligrams per kilogram
MPC	Measurement Performance Criteria
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MSA	Mine Safety Appliances
NELAC	National Environmental Laboratory Accreditation Conference
NELAP	National Environmental Laboratory Accreditation Program
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
NJDEP	New Jersey Department of Environmental Protection
NYSDEC	New York State Department of Environmental Conservation
OSC	On-Scene Coordinator
OSHA	Occupational Safety and Health Administration
OLEM	Office of Land and Emergency Management
OU	Operable Unit
PAH	Polynuclear Aromatic Hydrocarbons
PARCCS	Precision, Accuracy, Representativeness, Completeness, Comparability, Sensitivity
PCB	Polychlorinated Biphenyls
PID	Photoionization Detector
PIO	Public Information Officer
PM	Program Manager
PO	Project Officer
ppb	Parts Per Billion
ppm	Parts Per Million
PQO	Project Quality Objective
PRG	Proposed Remediation Goal
PRP	Potentially Responsible Party
PT	Proficiency Testing
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QAL	Quality Assurance Leader
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	Quality Control
QL	Quanitation Limit
QMP	Quality Management Plan
RA	Remedial Action
RC	Readiness Coordinator
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI	Remedial Investigation

ACRONYMS AND ABBREVIATIONS

ROD	Record of Decision
RPD	Relative Percent Difference
RPM	Remedial Project Manager
RRF	Relative Response Factor
RSCC	Regional Sample Control Coordinator
RSD	Relative Standard Deviation
RST	Removal Support Team
SARA	Superfund Amendments and Reauthorization Act
SDG	Sample Delivery Group
SEDD	Staged Electronic Data Deliverable
SEMD	Superfund and Emergency Management Division
SOP	Standard Operating Procedure
SOW	Statement of Work
SPCC	System Performance Check
SPM	Site Project Manager
START	Superfund Technical Assessment and Response Team
STR	Sampling Trip Report
SVOC	Semivolatile Organic Compound
TAL	Target Analyte List
TBD	To Be Determined
TCL	Target Compound List
TDD	Technical Direction Document
TDL	Technical Direction Letter
TO	Task Order
TPH	Total Petroleum Hydrocarbons
TQM	Total Quality Management
TSCA	Toxic Substances Control Act
UFP	Uniform Federal Policy
ug/L	micrograms per liter
µg/Kg	micrograms per kilogram
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Analysis
TQM	Total Quality Management
TSCA	Toxic Substances Control Act
UFP	Uniform Federal Policy
µg/Kg	micrograms per kilogram
USEPA	United States Environmental Protection Agency
VOA	Volatile Organic Analysis
VOC	Volatile Organic Compound

QAPP Worksheet# 1
Title and Approval Page

Site Name: **Loohn's Cleaners and Launderers**
Site Location: **Olean, Cattarargus County, NY**
Operable Unit: **OU2**

Lead Organization: **U.S. Environmental Protection Agency, Region 2**

Preparer's Name: **Robert Finke**
Organizational Affiliation: **U.S. Environmental Protection Agency (USEPA), Region 2 (R2)**
Laboratory Services and Applied Science Division (LSASD)
Hazardous Waste Support Branch (HWSB)
Superfund Support Team (SST)

Preparer's Address: **U.S. EPA Region 2, 2890 Woodbridge Ave, Edison, NJ 08837**
Telephone Number: **732-906-6802**
E-mail Address: finke.robert@epa.gov

Preparation Date: **8/4/2022**
(Day/Month/Year)

Remedial Project Manager: Maeve Wurtz 8/4/22
Maeve Wurtz **Date**
U.S.EPA Region 2 SEMD/NYRB/WNYRS/RPM

Supervisor/Team Leader: Amelia Jackson 8/4/2022
Amelia Jackson **Date**
U.S.EPA Region 2 LSASD/HWSB/SST TL

Quality Assurance Officer (QAO) Approval: for **Donna Ringel, QAO** **Date**
U.S.EPA Region 2 LSASD/HWSB/HWSS SC

Document Control Number: Loohns_Cleaners_UFP-QAPP_August2022

QAPP Worksheet# 2

Site Name/ Project Name: LOOHN'S CLEANERS AND LAUNDERERS
Site Location: Olean, Cattaraugus County, New York
Operable Unit: 02

1. Identify guidance used to prepare QAPP:
Uniform Federal Policy for Quality Assurance Project Plans

2. Identify regulatory program:
The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA)

3. Identify approval entity:
EPA Region 2

4. Indicate whether the QAPP is a generic or a project-specific QAPP.
QAPP is site specific

5. List dates of scoping sessions that were held:
Tuesday, July 19, 2022
Tuesday, July 26, 2022

6. List dates and titles of QAPP and other documents written for previous site work, if applicable:

Title	Date
UNIFORM FEDERAL POLICY (UFP) QUALITY ASSURANCE PROJECT PLAN (QAPP) FOR THE LOOHN'S CLEANERS AND LAUNDERERS GROUNDWATER SAMPLING	May 20, 2021

7. List organizational partner (stakeholders) and connection with lead organization:
EPA Region 2 SEMD

8. List data users:
EPA Region 2 SEMD

9. If any required QAPP elements and required information are not applicable to the project, then provide an explanation for their exclusion below:
None

10. Document Control Number: Loohns_Cleaners_UFP-QAPP_August2022

QAPP Worksheet# 3
Distribution List

QAPP Recipient	Title	Organization	Telephone Number	E-mail Address	Document Control Number
Maeve Wurtz	Remedial Project Manager	EPA, Region 2	(212) 637-4230	wurtz.renee@epa.gov	Loohns_Cleaners_UFP-QAPP_August2022
Donna Ringel	EPA Region 2 LSASD/HWSB Hazardous Waste Support Section, Section Chief	EPA, Region 2	732-321-4383	ringle.donna@epa.gov	Loohns_Cleaners_UFP-QAPP_August2022
Amelia Jackson	EPA Region 2 LSASD/HWSB Superfund Support Team, Team Leader	EPA, Region 2	732-906-6164	jackson.amelia@epa.gov	Loohns_Cleaners_UFP-QAPP_August2022
Robert Finke	EPA Region 2 LSASD/HWSB, Physical Scientist, Field Project Manager	EPA, Region 2	(732) 906-6802	finke.robert@epa.gov	Loohns_Cleaners_UFP-QAPP_August2022

QAPP Worksheet #4
Project Personnel Sign-Off Sheet

Organization: EPA Region 2

[Have copies of this form signed by key project personnel from each organization to indicate that they have read the applicable sections of the QAPP and will perform the tasks as described; add additional sheets as required. Ask each organization to forward signed sheets to the central project file.]

Project Personnel	Title	Telephone #	Signature	Date QAPP Read
Robert Finke	Field Project Lead	(732) 906-6802	Robert Finke	08/04/2022
Sean O'Hare	Field Support	(732) 321-6637	Sean O'Hare	08/04/2022

QAPP Worksheet #5
Project Organizational Chart

Project Lead:
Remedial Project Manager (RPM)
USEPA Region 2, SEMD-NYRB-WNYRS
Maeve Wurtz

QA Officer:
Donna Ringel
USEPA Region 2
LSASD-HWSB-HWSS

Supervisor/ Team Leader :
Amelia Jackson
USEPA Region 2, LSASD-HWSB-SST

Sampling Project Lead:
Robert Finke
USEPA Region 2, LSASD-HWSB-SST

Sample Assistance:
USEPA Region 2, LSASD-HWSB-SST
Sean O'Hare

QAPP Worksheet #6
Communication Pathways

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathways, etc.)
Sampling Request	EPA RPM	Maeve Wurtz	(212) 637-4230	All technical, QA and decision-making matters in regard to the project (verbal, written or electronic)
Point of Contact with RPM	Sampling Project Lead	Robert Finke	(732) 906-6802	All technical, QA and decision-making matters in regard to the project (verbal, written or electronic) while in the field – communication with the RPM who ultimately makes decisions regarding the project.
Laboratory Request	RAS RSCC	Christina Leung	(732) 906-6995	Analytical laboratory booking with R2 Lab/CLP lab
Laboratory Request	LSASD-LB-OICS	Ness Tirol	(732) 321-4431	Internal analytical laboratory booking (i.e., LSASD-LB)
Sample Receipt Variances	LSASD LB-OICS	Ness Tirol	(732) 321-4431	The R2 Laboratory will contact Sampling Lead to determine sample variances and rectify.
Laboratory QC Variances	LSASD LB-OICS	Ness Tirol	(732) 321-4431	The R2 Lab will contact Sampling Lead and QA Officer.
Analytical Corrective Actions	LSASD LB-OICS	Ness Tirol	(732) 321-4431	Lab will contact Sampling Lead and QA Officer.
Data Verification & Data Validation Findings (issues and/or corrective actions)	LSASD LB-OICS	Ness Tirol	(732) 321-4431	R2 Lab will contact Sampling Lead and QA Officer regarding data validation issues.
Data Usability Assessment	Sampling Project Lead	Robert Finke	(732) 906-6802	Data usability will be performed by the Sampling Project Lead and SST TL upon receipt of validated data.
Stop Work	EPA RPM, Sampling Project Lead	Maeve Wurtz, Robert Finke	(212) 637-4230 (732) 906-6802	Stop work can be initiated by Field Project Lead for Health and Safety Reasons or technical and/or mechanical issues in the field with the notification and agreement of RPM.
Adjustments to QAPP	Sampling Project Lead with SST TL	Robert Finke, Amelia Jackson	(732) 906-6802 (732) 906-6164	QAPP approval dialogue

QAPP Worksheet #7
Personnel Responsibilities and Qualifications Table

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
Maeve Wurtz	Remedial Project Manager	EPA Region 2/SEMD-NYRB-WNYRS	Overall project management	B.S. Environmental Engineering. Three (3) years of EPA job-related qualifications and Project Management.
Donna Ringel	Quality Assurance (QA) Officer	EPA Region 2/LSASD/HWSB/HWSS	Final review and approval of the QAPP	MPH-Environmental and Occupational Health, with 20+ years of experience as EPA QAO
Amelia Jackson	SST Supervisor/ Team Leader	EPA Region 2/LSASD/HWSB/SST	Initial review and approval of the QAPP before QA Officer's review and approval	B.S. Degree Chemistry. Over 30 years experience with EPA focusing on QA and Management.
Robert Finke	Physical Scientist	EPA Region 2 /LSASD/HWSB/SST	Sampling and Field Operations. Data management and final sampling report.	B.S. Biology, M.S. Environmental Policy & Management. Over 30 years experience in environmental consulting, investigation, analytical instrumentation, and project management
Sean O'Hare	Life Scientist	EPA Region 2 /LSASD/HWSB/SST	Sampling	B.S. Biological Sciences. Over 13 Years Experience In Environmental Investigation And Project Management

QAPP Worksheet #8
Special Personnel Training Requirements Table

Project Function	Specialized Training- Title or Description of Course	Training Provider	Training Date	Personnel/ Groups Receiving Training	Personnel Titles/ Organizational Affiliation	Location of Training Records/ Certificates
All Field Activities	40-hour OSHA Annual 8-hour refresher	40-hour- EPA; 8-hour refresher training- EPA and on-site safety briefings	Various	All SST field team members	LSASD/HWSB/ SST staff	On-site and EPA Edison office records
Sample Collection	Trained in EPA CERCLA QA, sampling methods, sample shipping procedures	Office and on-site training	Various	LSASD/HWSB/SST Staff	LSASD/HWSB/ SST staff	EPA Region 2 in Edison, NJ
Sample Analysis	NELAC certified	Per lab specific requirements	Various	EPA Region 2 LSASD Laboratory	LSASD Laboratory management and staff	Individual laboratory records
Data Validation	EPA data validation experience	LSASD-HWSS and Lab	Various	EPA Region 2 LSASD-LB staff	LSASD-LB analyst (Peer review)	EPA Region 2 in Edison, NJ
Data Review and Assessment	EPA data validation experience	EPA R2 LSASD/HWSB/ SST TL	Various	LSASD/HWSB/SST Staff	LSASD/HWSB/ SST staff	EPA Region 2 in Edison, NJ

QAPP Worksheet #9
Project Scoping Session Participants Sheet

Site Name/Project Name: Loohn'S Cleaners And Launderers
Site Location: Olean, Cattaraugus County, New York
Operable Unit: 02
Date of Session: July 19 & 26, 2022

Scoping Session Purpose:
To discuss questions, comments and assumptions regarding technical issues involved with the project.

Name	Title	Affiliation	Phone #	E-mail Address
Maeve Wurtz	RPM	EPA	(212) 637-4414	wurtz.maeve@epa.gov
Amelia Jackson	SST TL	EPA	(732) 906-6164	jackson.amelaia@epa.gov
Robert Finke	Field Lead-Field Sampler	EPA	(732) 906-6802	finke.robert@epa.gov
Sean O'Hare	Life Scientist-Field Sampler	EPA	(732) 321-6637	ohare.sean@epa.gov

Comments/Decisions
Discussed the 2022 VOC sampling event in concert with PFAS and 1,4-Dioxane sampling as requested by NYSDEC. The PFAS/1,4-Dioxane sample retrieval via Hydrasleeve and low-flow groundwater methodology will be performed prior to VOC sampling via low-flow methodology. The scope of this document solely pertains to the VOC sample collection as a contractor to the State of New York Department of Environmental Conservation (NYSDEC) will be present on-site and is responsible for PFAS/1,4-dioxane sample containerization, labeling, custody form completion and storage into coolers for delivery to their contracted analytical lab. A separate NYSDEC QAPP will cover the PFAS and 1,4-dioxane portion of the sampling. USEPA R2-LSASD-HWSB-SST personnel will be responsible for all tasks related to collection of the VOC samples only, as described herein.

Action Items:

Plan to sample groundwater by low-flow technique from monitoring wells MW-01, MW-02, MW-03, MW-04 and MW-05 for the analysis of trace level volatile organics (VOCs). Data will be used to support the continued trend monitoring of contaminant concentrations at this Site. Samples collected for VOC analyses will be collected after samples are collected for PFAS compounds by the Hydrasleeves and the 1,4-dioxane via low-flow groundwater methodology.

Consensus Decisions:
<u>Sample Design</u>
All groundwater samples will be collected via submersible centrifugal pumps via low-flow sampling protocols from five (5) monitoring wells located on the site to characterize endemic groundwater conditions. For reference, a map depicting the monitoring well locations is provided herein as Appendix A. All well depths, screened intervals, and available monitoring well records and permits are also provided in Appendix A. The total number of samples collected is eight (8), including one (1) field duplicate for laboratory Quality Control (QC) purposes plus two (2) field QC samples in the form of one (1) rinsate blank and one (1) trip blank.

QAPP Worksheet #9
Project Scoping Session Participants Sheet

Sampling Locations

As predetermined by the RPM in consultation with the regional hydrogeologist; the monitoring wells to be sampled include:

MW-01	MW-02	MW-03	MW-04	MW-05

Sampling Analyses

Groundwater samples will be analyzed for the following EPA Region 2 LSASD Laboratory Branch (LB) Routine Analytical Services (RAS) parameters including: trace level Target Compound List (TCL) - Volatile Organic Compound (VOC) fraction in accordance with the most current revisions of internal Standard Operating Procedure (SOP) DW-1. All samples will contain hydrochloric acid for preservation. SST field staff will collect physio-chemical parameters on-site via multi-parameter sondes and will include temperature (Temp), pH, Oxidation Reduction Potential (ORP), Specific Conductivity (Sp, Cond.), Dissolved Oxygen (DO), and Turbidity. See Appendix B for sampling SOPs, Appendix C for analytical SOPs, Worksheet 18 for analytical breakdown by location and Worksheet 21 for the list of sampling SOP references.

ARARs/TBCs

Analytical results will be compared to the 6 NYCRR Part 703.5, *Surface water and Groundwater Quality Standards and Groundwater Effluent Limitations* for H(WS) Class GA groundwater. See Worksheet #15 for specific compound/analyte criteria.

QAPP Worksheet #10
Problem Definition

Problem Definition:

The overall project objective for this groundwater sampling event is to assess current endemic groundwater conditions, specifically VOC concentrations in the contaminant plume, to be used in the five-year review (FYR) process regarding the implementation and performance of the remedy in order to determine if the remedy is and will continue to be protective of human health and the environment.

The problem to be addressed by the project:

The Loohn's Cleaners and Launderers Operable Unit area of the Olean Wellfield Superfund site (Site) is located in Olean, Cattaraugus County, New York (Appendix A). Improper disposal and storage of hazardous materials at the facility has been associated with releasing VOCs, specifically Tetrachloroethylene (PCE) into the environment. Operations at the Site have resulted in the contamination of on-site soils and groundwater. On-Site soils were removed from the site in 1996, however, remaining contaminated sub-surface soil may still be present. Under the 1996 cleanup plan, a groundwater treatment system was installed at the nearby McGraw-Edison property, and about 10,000 tons of contaminated soil were removed from the property where a dry cleaning building was also demolished.

The Site is underlain by approximately 300 feet of unconsolidated glacial deposits. Previous groundwater investigations in the Site have indicated that the upper 100 feet of glacial deposits can be divided into five lithologic units based on color, texture, grain size and mode of deposition. These lithologic units have been grouped in topographically descending order into four hydrogeologic units referred to as the upper aquifer, upper aquitard, lower aquifer, and lower aquitard. The upper aquifer is comprised of glaciofluvial coarse sands and sandy gravels, recent fluvial deposits of fine sands, and silts with some clay. The upper aquifer is not continuous at the Site. The thickest portion of the upper aquifer (approximately 41 feet) is found along the Allegheny River. The upper aquifer thins to the north, pinching out just south of the Loohn's Property. The upper aquifer is recharged by the infiltration of precipitation. Groundwater in the upper aquifer is generally encountered at a depth of approximately 12 to 15 feet below land surface and flow is toward the Allegheny River.

The environmental questions being asked:

- Are the contaminants of concern, specifically VOCs cis-1,2-Dichloroethene, trichloroethene, tetrachloroethene and vinyl chloride increasing, decreasing or staying the same over time?
- Does groundwater COCs migration present a risk to off-site groundwater and/or surface water?

Observations from any site reconnaissance reports:

Loohn's Cleaners and Launderers is one (1) of four (4) Operable Units of the Olean Site. For remedial purposes, OU1 addresses the drinking water supply for the City and Town of Olean. OU2 addresses the sources of volatile organic compound (VOC) contamination to groundwater. OU3 pertains to groundwater and soil contamination at the Alcas Source area, with remediation activities initiated. OU4 designates several properties located to the general and immediate south of the AVX facility, also with the remedial action in progress. Investigations conducted to date identified four (4) source areas of VOC contamination to groundwater at the Site: Alcas Cutlery Corporation (Alcas); Loohn's Dry Cleaners and Launderers (Loohn's); McGraw-Edison Company (McGraw); and AVX Corporation (AVX), with the Loohn's property being the subject of this event.

A synopsis of secondary data or information from site reports:

There are reports dating back to 1988 providing results from the Olean Wellfield site as a whole and from the Loohn's Cleaners and Launderers defined area since 1995. EPA Region 2 LSASD has been collecting VOC samples and providing data in ten (10) separate reports for the Loohn's property since 2010. Results from these sampling events have shown increasing concentrations of tetrachloroethene, trichloroethene, cis-1,2-Dichloroethene, chloroethane and vinyl chloride.

QAPP Worksheet #10
Problem Definition

The possible classes of contaminants and the affected matrices:

The site COCs include VOCs. The primary transport mechanism for environmental contamination is vertical migration of residual contaminants from site soils. The depth of contamination for some compounds is attributed to dissolved-phase transport under prevailing vertical hydraulic gradients and chemical dispersion. Potential transport processes at the site include diffusion and leaching from surface soil, resulting in migration to deeper soil or groundwater.

The rationale for Inclusion of chemical and non-chemical analyses:

Historical groundwater sampling within the boundaries of the Loohn's Launderers and Cleaners site indicates that VOCs concentrations exceed federal and/or state groundwater quality criteria. The groundwater underlying the Site is classified as a Class IIA groundwater aquifer (potable water source) by the State of New York.

Information concerning various environmental indicators:

Based upon the increasing concentrations of VOCs in MW-1 through MW-5, the potential for VOCs in the subsurface soils exists.

Project decision conditions (“If..., then...” statements):

All analytical results will be compared to the 6 NYCRR Part 703.5, *Surface water and Groundwater Quality Standards and Groundwater Effluent Limitations* for H(WS) Class GA groundwater, March 31, 2021. If any analytical results exceed this criteria, the data results will be highlighted in red on the Data Summary Report tables. Depending on the concentrations and the number of compounds exceeding their respective criteria, the RPM may decide on additional rounds of sampling and/or removal of additional, potentially contaminated sub-surface soil.

QAPP Worksheet #11
Project Quality Objectives /Systematic Planning Process Statements

Overall project objectives include:

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards such as the 6 NYCRR Part 703.5, *Surface water and Groundwater Quality Standards and Groundwater Effluent Limitations* for H(WS) Class GA groundwater (see Worksheet 15).

The following RAOs are established for the Site groundwater:

- Prevent or minimize unacceptable risk from exposure (via direct contact, ingestion, or inhalation) to contaminated groundwater attributable to the Site.
- Prevent further off-Site migration of contaminated groundwater.

Who will use the data?

Data will be used by EPA Region 2 SEMD.

What will the data be used for?

Data will be used to derive observable trends of the results for the following analytes:

VOCs				

Water quality parameters including turbidity, pH, temperature, specific conductance, dissolved oxygen, and oxidation-reduction potential will be collected during purging of wells to determine well stabilization before sampling.

What type of data is needed?

Definitive groundwater data will be acquired. Routine Analytical Service (RAS) parameters for groundwater to include VOCs via internal R2 Lab Standard Operating Procedures (SOP) DW-1. See Worksheet 18 for analytical breakdown by location and Appendix C for analytical SOPs.

Collection of physio-chemical parameters for each well on-site via multi-parameter sondes to include Temperature (Temp), pH, Oxidation Reduction Potential (ORP), Specific Conductivity (Sp, Cond.), Dissolved Oxygen (DO), and Turbidity via In-situ Aquatroll sondes and Hach turbidity meter, with results recorded via the sondes output (low-flow test reports). See Worksheet 21 for field SOPs and Appendix E for sonde operation.

Groundwater will be collected from the specified five (5) wells utilizing submersible centrifugal pumps via low-flow sampling protocols. Worksheets #17 and #18 define the number of samples planned and analytical breakdown by location. Furthermore, Appendix A contains site maps with well locations for reference and Appendix B contains sampling SOPs.

How "good" do the data need to be in order to support the environmental decision?

Definitive and screening level data are required to meet project objectives. The quantitation limits for the samples are specified on Worksheet #15. All definitive laboratory analyses will be performed by EPA Region 2 LSASD Laboratory. Worksheets #12 and #28 contain the measurement performance criteria that are needed for the quality indicators. Worksheet #20 contains the quality control (QC) samples required. All data generated will be validated by the LSASD-Lab prior to release. Refer to Worksheets 34-36 for details regarding data verification and validation tasks.

QAPP Worksheet #11
Project Quality Objectives /Systematic Planning Process Statements

How much data are needed?

A total of five (5) monitoring wells will be sampled for the analysis of trace level VOCs to characterize endemic groundwater conditions. The total number of samples includes: six (6) groundwater samples including one (1) field duplicate sample for laboratory Quality Control (QC) purposes, plus one (1) rinsate blank and one (1) trip blank.

Where, when, and how should the data be collected/generated?

The samples are scheduled to be collected during the week of August 15, 2022. Worksheet #16 defines the project schedule/time frame. Worksheets #17 and #18 the sampling locations planned. See Appendix A for the site map with well locations. The LSASD Region 2 Sampling SOPs can be found Appendix B.

Who will collect and generate the data?

Groundwater samples will be collected by U.S. EPA Region 2 LSASD-HWSB-SST personnel. Analytical data will be generated by EPA Region 2 LSASD Laboratory in Edison, NJ.

How will the data be reported?

Data will be electronically reported in excel and .pdf format and posted to the Region 2 Environmental Data Services SharePoint site. Both the RPM and SST project Lead will receive notification once posted.

How will the data be archived?

A copy of the complete data package will be maintained with the project files at the Federal Records Center in Kansas City, Missouri for a period of thirty years.

QAPP Worksheet #12
Measurement Performance Criteria Table - VOC

Matrix	Aqueous
Analytical Group	VOCs
Conc. Level (ug/L)	Trace

Sampling Procedure	Analytical Method/ SOP	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
SOP#FA-SST-T-07 Rev. 2.0	**SOP# DW-1: ANALYSIS OF TRACE VOC IN WATER BY PURGE AND TRAP GC/MS**	Accuracy & Precision	%R ranges from 15%-175% (compound dependent); < 20 % RPD	Lab Control Samples (LFB, LCS/LCS Duplicate, BS/BSD), Field Duplicate	S & A
		Accuracy	Limits: Average Recovery ranges from 15%-175%	LFM, Matrix spike	A
		Accuracy	< RL	Method Blank, LRB/Prep Blank, Trip Blank Equipment Rinsate Blank	S & A
		Precision	70% - 130%	Surrogate Compounds	A
		Accuracy	±50% from the initial/continuing calibration check	Internal Standards	A

QAPP Worksheet #13
Secondary Data Criteria and Limitations Table

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation / Collection Dates)	How Data May Be Used (if deemed usable during data assessment stage)	Limitations on Data Use
Sampling Trip Reports	SUPERFUND SUPPORT TEAM SAMPLING REPORT for the LOOHN's DRY CLEANERS and LAUNDERERS PROPERTY at the OLEAN WELLFIELD in OLEAN, CATTARAUGUS COUNTY, NEW YORK, 2010-2016, 2018-2019, 2021	EPA Region 2 LSASD/HWSB/SST Trace Level VOCs in groundwater. Collection Dates: 4/28-29/2010, 8/11/2011, 4/10/2012, 4/10/2013, 4/9/2014, 4/7-9/2015, 6/15/2016, 10/24-25/2018, 10/15-16/2019, 5/24-25/2021	Used by EPA R2 SEMD RPM to chart VOC data at the 5 wells on the site.	Historical Data
2015 U.S. EPA ROD Amendment	U.S. EPA RECORD OF DECISION AMENDMENT FOR OU2 -AVX PROPERTY FOR THE OLEAN WELL FIELD SITE 9/30/2015	U.S. EPA Region 2 SEMD, 2015	Site History/Information	Background Information
2014 U.S. EPA RECORD OF DECISION	U.S. EPA RECORD OF DECISION AMENDMENT FOR OU2 -AVX PROPERTY FOR THE OLEAN WELL FIELD SITE 9/30/2015	U.S. EPA Region 2 SEMD/PAD, 2014	Site History/Information	Background Information
1996 Record of Decision	Record of Decision - Olean Well Field Site, Olean, Cattaraugus County, New York, September 1996.	U.S. EPA, 1996	Site History/Information	Background Information

QAPP Worksheet #14
Summary of Project Tasks

Sampling Tasks:

Groundwater samples will be collected on site from 5 groundwater wells in accordance with the Sampling Standard Operating Procedures (SOPs) specified on WS 21. Prior to sampling all monitoring wells are measured for potentiometric surface elevations and total depths.

This method requires the following water quality parameter data to be measured/recorded for well stabilization prior to sampling: turbidity, pH, depth to water, temperature, specific conductance, dissolved oxygen, and oxidation-reduction potential. Quality control samples include the collection of one (1) field duplicate, one (1) aqueous rinsate blank and one (1) trip blank, (at a rate of one per Sample Delivery Group (SDG) of twenty (20) samples). Furthermore, additional volume will be collected for analysis of one (1) matrix spike (MS) sample. Worksheets 17 and 18 define the number of samples planned.

Site Access:

The EPA RPM is responsible for providing site access to wells for the Sampling Team. SST has been sampling the monitoring wells associated with this site since prior to 2006 and are in possession of the well keys.

Field Planning:

Prior to each field mobilization, each team member will review all project plans and participate in a field planning meeting. The meeting will be conducted by the EPA HWSB/SST Project Lead and attended by all field staff. The meeting objective is to allow team members to become familiar with the site history, special project requirements, and other items listed below:

-Objectives of field work
-Equipment and training needs
-Health and safety requirements
-Field operating procedures, schedules of events, communications, and individual assignments
-Required QC measures
-Documents, governing field work that must be on site such as the HASP and QAPP.

Decontamination Procedures:

For this project, the sampling tubing is disposable and the pumps are decontaminated off site prior to use.

Other tasks to be conducted in the field by the SST include:

Electronic records of groundwater quality well stabilization parameter data will be obtained via the In-Situ sondes. These data sheets will be kept and provided in the event Interim and Final Sampling Trip Report. See Appendix E for sonde information.

Analysis Tasks:

The groundwater samples collected from each monitoring well will be definitively analyzed according to the EPA Region 2 LSASD Laboratory SOPs referenced in Worksheets 12, 23, 28 and provided in Appendix C for the following analytes:

VOCs

The samples will also be screened for pH, turbidity, oxidation reduction potential, specific conductance, temperature, and DO in the field.

QAPP Worksheet #14
Summary of Project Tasks

Quality Control Tasks:

Groundwater samples will have one or more of the following QC samples analyzed: field duplicates, matrix spike, VOC trip blanks, cooler temperature blank, equipment rinsate blanks, and all other QA/QC samples as defined in the analytical method. Equipment rinsate blank samples will be collected on decontaminated equipment at a rate of one per equipment type, per day, per decontamination event. See Worksheet #20 for the field quality control sample summary table. Other QC Tasks are described in Worksheets #34, #35, #36, and #37.

Secondary Data

Secondary data listed in Worksheet #13 will be reviewed and used to plan sampling locations.

Data Management Tasks:

The data collected for the sampling activities will be organized, analyzed, and summarized in a Final Sampling Trip Report that will be submitted to the RPM according to the Project Schedule. The report will be prepared by the project sampling lead and include appropriate data quality assessment. Standard methods and references will be used as guidelines for data reduction and reporting.

Data management tasks include data receipt, verification, completeness check, uploading, usability evaluations, and the preparation of reports, tables, and figures. The sampling project lead will be downloading the data and Summary Report tables from the Region 2 Environmental Data Services SharePoint site for inclusion in the Final Sampling Trip Report. The RPM will also be notified of data and Summary Report posting to the SharePoint (SP) site, with permissions to download. The Final Sampling Trip Report prepared by the sampling project lead will be uploaded onto the SP site upon completion. The sample handling and custody requirements, including field logbook and generation of sample paperwork/sample labels, is discussed in worksheets #26 and #27. Data tables that compare the results obtained to the criteria specified on Worksheet 15 will be prepared and included in the Final Sampling Trip Report. Data management will utilize personal computers, local area networks, and electronic communications to support the software.

The following deliverables will be provided under this project:

Interim Sampling Trip Report:

A Interim Sampling Trip Report will be prepared to provide a detailed accounting of what occurred during the sampling event. If an Interim Sampling Trip Report is prepared than it will be provided within one week of the last day of the sampling event. Information will be provided such as sample dispatch, field personnel, field observations, and sample management (i.e., Chain-of-Custody).

Final Sampling Trip Report:

A Final Sampling Trip Report will be prepared to provide a detailed accounting of what occurred during each sampling event. Information will be provided in regards to time of major events, dates, and personnel on-site (including affiliations) as well as Site map, COCs, and well data sheets. Data Summary Tables and a field duplicate comparison table will be prepared subsequent to the receipt of final, validated laboratory data for inclusion in the Final Sampling Trip Report posted to the Region 2 Environmental Data Services Sharepoint site.

<u>Final Report to include (but not limited to):</u>

Maps/Figures: Maps depicting site layout, contaminant source areas, and sample locations will be included in the Final Sampling Trip Report, as appropriate.

Analytical Report : An analytical report will be prepared for samples analyzed under this plan. Information regarding the analytical methods or procedures employed, sample results, QA/QC results, chain-of-custody documentation, laboratory correspondence, and raw data will be used for validation. The Final Sampling Trip Report deliverable will contain the laboratory's results per sample and a Data Summary Report Table containing the results as compared to the criteria specified in WS 15.

Data Review: A review of the data generated under this plan will be undertaken by the lab on a peer review basis. The assessment of data acceptability or usability will be provided separately and posted to the site-specific library on the Region 2 Environmental Data Services SharePoint site.

QAPP Worksheet #14
Summary of Project Tasks

Documentation and Records:

All field and sample documents will be legibly written in indelible ink. Any correction or revisions will be made by lining through the original entry and initialing the change. The following field and sample documentation will be maintained by the Project Sampling Lead:

Chain-of-Custody Records: Chain-of-Custody Records will be maintained from the time of sample collection until final deposition. Every transfer of custody will be noted and signed for and a copy of the record will be kept for each individual who has signed it. The chain-of-custody records will include, at a minimum, sample identification number, number of samples collected, sample collection date and time, sample type, sample matrix, sample container type, sample analysis requested, sample preservation, and the name(s) and signature(s) of samplers and all individuals who have had custody. Copies of the COC will be provided in Final Sampling Trip Report as an attachment. Well Data Sheets containing the well stabilization parameters will be available for each well sampled and included as an attachment in the Final Sampling Trip Report.

Field Logbook: The field log book will be completed for each sample collected. All field and sample documents will be legibly written in indelible ink. Any correction or revisions will be made by lining through the original entry and initialing the change. The field logbook will be used by field personnel to record all aspects of sample collection and handling, visual observations, and field measurements. The field logbook is a descriptive notebook detailing site activities and observations so that an accurate, factual account of field procedures may be reconstructed. The sample team or individuals performing a particular sampling activity are required to maintain a field notebook. This field notebook will be a bound weatherproof logbook that shall be filled out at the location of sample collection immediately after sampling. All entries will be signed by the individuals making them. At a minimum, the logbook will contain sample particulars including sample number, collection time, location, descriptions, methods used, daily weather conditions, field measurements, name(s) of sampler(s), sample preservation, and other site-specific observations including any deviations from protocol.

Assessment/Audit Tasks:

No performance audit of field operations is anticipated at this time. If conducted, performance and systems audits will be in accordance with the U.S. EPA Region 2 LSASD-HWSB-SST SOP for Performing Oversight of CERCLA Field Operations; SST SOP FA-SST-T-001, Rev. 2, 11/08/19.

Data Review Tasks:

All samples will be processed by EPA Region 2 LSASD Laboratory and data will be validated by the U.S. EPA Region 2 LSASD LAB in accordance with their internal procedures for compliance to technical criteria specified in the Data Validation and Analytical SOPs found in Appendix C and D and per WS 34-37 herein.

UFP QAPP Worksheet #15 - Reference Limits and Evaluation Table

Matrix: Aqueous
Analytical Group: Volatile Organic Compounds (VOCS)
Concentration Level: Trace (ug/L)
SOP Number: DW-1, Rev. 2.7 (10/15/20)

CAS	Parameters	6 NYCRR Part 703.5 for H(WS) in Class GA Groundwater (ug/L) 3/31/2021	LSASD LAB SOP DW-1, Rev.2.7 Reporting Limit (ug/L)
100-41-4	Ethylbenzene	5	0.5
100-42-5	Styrene	5	0.5
10061-01-5	cis-1,3-Dichloropropene	0.4	0.5
10061-02-6	trans-1,3-Dichloropropene	0.40	0.5
106-46-7	1,4-Dichlorobenzene	3	0.5
106-93-4	1,2-Dibromoethane	0.00060	0.5
107-06-2	1,2-Dichloroethane	0.60	0.5
108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentanone)	na	5
108-87-2	Methylcyclohexane	na	0.5
108-88-3	Toluene	5	0.5
108-90-7	Chlorobenzene	5	0.5
110-82-7	Cyclohexane	na	0.5
120-82-1	1,2,4-Trichlorobenzene	5	0.5
124-48-1	Dibromochloromethane (Chlorodibromomethane)	50	0.5
127-18-4	Tetrachloroethene	5	0.5
156-59-2	cis-1,2-Dichloroethene	5	0.5
156-60-5	trans-1,2-Dichloroethene	5	0.5
1634-04-4	Methyl tert-Butyl Ether (MTBE)	10	0.5
179601-23-1	m,p-Xylene	5	0.5
541-73-1	1,3-Dichlorobenzene	3	0.5
56-23-5	Carbon Tetrachloride	5	0.5
563-58-6	1,1-dichloropropene	na	0.5
591-78-6	2-Hexanone	50	5
67-64-1	Acetone	50	5
67-66-3	Chloroform	4	0.5
71-43-2	Benzene	1	0.5
71-55-6	1,1,1-Trichloroethane	5	0.5
74-83-9	Methyl bromide (bromomethane)	5	0.5
74-87-3	Chloromethane	5	0.5
74-97-5	Bromochloromethane	5	0.5
75-00-3	Chloroethane	5	0.5

UFP QAPP Worksheet #15 - Reference Limits and Evaluation Table

Matrix: Aqueous
Analytical Group: Volatile Organic Compounds (VOCS)
Concentration Level: Trace (ug/L)
SOP Number: DW-1, Rev. 2.7 (10/15/20)

CAS	Parameters	6 NYCRR Part 703.5 for H(WS) in Class GA Groundwater (ug/L) 3/31/2021	LSASD LAB SOP DW-1, Rev.2.7 Reporting Limit (ug/L)
75-01-4	Vinyl chloride	2	0.5
75-09-2	Methylene chloride	5	0.5
75-15-0	Carbon Disulfide	60	0.5
75-25-2	Bromoform	50	0.5
75-27-4	Bromodichloromethane (Dichlorobromomethane)	50	0.5
75-34-3	1,1-Dichloroethane	5	0.5
75-35-4	1,1-Dichloroethylene	5	0.5
75-69-4	Trichlorofluoromethane (Freon 11)	5	0.5
75-71-8	Dichlorodifluoromethane (Freon 12)	5	0.5
76-13-1	Trichloro-1,2,2-trifluoroethane, 1,1,2-	5	0.5
78-87-5	1,2-Dichloropropane	1	0.5
78-93-3	Methyl Ethyl Ketone (2-Butanone)	50	5
79-00-5	1,1,2-Trichloroethane	1	0.5
79-01-6	Trichloroethylene (TCE)	5	0.5
79-20-9	Methyl acetate	na	0.5
79-34-5	1,1,2,2-Tetrachloroethane	1	0.5
87-61-6	1,2,3-Trichlorobenzene	5	0.5
95-47-6	o-xylene	5	0.5
95-50-1	1,2-Dichlorobenzene	3	0.5
96-12-8	1,2-Dibromo-3-chloropropane (DBCP)	0.04	0.5
98-82-8	Isopropyl benzene (Cumene)	5	0.5
96-18-4	1,2,3-Trichloropropene	0.04	0.5
95-63-6	1,2,4-Trimethylbenzene	5	0.5
108-67-8	1,3,5-Trimethylbenzene	5	0.5

na: not applicable

QAPP Worksheet #16
Project Schedule / Timeline Table

Activities	Organization	Dates (MM/DD/YY)		Deliverable	Deliverable Due Date
		Anticipated Date(s) of Initiation	Anticipated Date of Completion		
Preparation of UFP-QAPP	EPA/LSASD/SST	7/14/2022	7/29/2022	UFP-QAPP	8/12/2022
Preparation of Health and Safety Plan	EPA/LSASD/SST	7/12/2022	7/15/2022	HASP	8/12/2022
Procurement of Equipment	EPA/LSASD/SST	NA	NA	Procurement Form	NA
Laboratory Request	EPA/LSASD/SST	7/11/2022	7/15/2022	Analytical Request Form	7/15/2022
Collection of Field Samples	EPA/LSASD/SST	8/15/2022	8/16/2022	C-O-C/SCRIBE File, Trip Report	8/16/2022
Validation of Laboratory Results	EPA R2 LSASD/HWSS	8/17/2022	9/28/2022	Validated data Packages	9/28/2022
Electronic Laboratory Package Received	from EPA/LSASD/Lab to EPA/LSASD/SST	9/28/2022	9/28/2022	Validated data Packages	9/28/2022
Preparation of Interim Sampling Trip Report	EPA/LSASD/SST	8/18/2022	8/27/2022	Interim Sampling Trip Report	8/27/2022
Data Evaluation / Preparation of Final Sampling Trip Report	EPA/LSASD/SST	9/29/2022	11/29/2022	Final Sampling Trip Report	11/29/2022

QAPP Worksheet #17
Sampling Design and Rationale

Describe and provide a rationale for choosing the sampling approach (e.g., grid system, biased statistical approach):

The sampling design for monitoring well selection, including the rationale for sample frequency and location, was predetermined by the Remedial Project Manager (RPM) in coordination with a regional hydrogeologist. The overall project objective for this groundwater sampling event is to assess current endemic groundwater conditions and c]long term monitoring in the contaminant plume as part of the Loohn's Cleaners and Launderers Operable Unit of the Olean Well Field Superfund site. COCs of interest are VOCs.

EPA excavated this source area. In April 2004, EPA completed soil excavation activities, which included the demolition and removal of the old dry cleaner's building and over 10,000 tons of contaminated soils for off-site disposal. The groundwater monitoring program continues and will be used to assess the need for further response action at this property.

Describe the sampling design and rationale in terms of what matrices will be sampled, what analytical groups will be analyzed and at what concentration levels, the sampling locations (including QC, critical, and background samples), the number of samples to be taken, and the sampling frequency (including seasonal considerations) [May refer to map or Worksheet #18 for details]:

Groundwater samples will be collected by submersible centrifugal pumps via low-flow sampling protocols from five (5) monitoring wells. For reference, maps depicting all monitoring well locations previously installed are provided herein as Appendix A. Furthermore, all well depths, screened intervals, and available monitoring well permits/records/logs are provided within Appendix A as well. In addition, all sampling SOPs can be found in Appendix B. A total of eight (8) samples including a field duplicate, a rinse blank and a trip blank will be collected to characterize endemic groundwater conditions. As per the regional analytical method, one (1) MS will be analyzed. As such, extra volume will be collected for one (1) MS sample. Additional sample information can be found in Worksheet #18.

Groundwater samples will be analyzed for the following EPA Region 2 LSASD Laboratory Branch (LB) Routine Analytical Services (RAS) parameters including: trace level Target Compound List (TCL) - Volatile Organic Compounds (VOCs). See Worksheet #18 for analytical breakdown by location. Refer to Appendix C for the analytical SOP.

The monitoring well physio-chemical stabilization parameters including pH, Temperature, Specific Conductivity, Dissolved Oxygen, Oxidation Reduction Potential, Depth to Water, and Flow Rate will be collected via In-Situ Aqua-TROLL 600 multi-parameter sondes, while Turbidity will be collected with a HACH 2100Q Turbidimeter. Results will be recorded via low-flow test report outputs and presented in the final sampling trip report. Additional information regarding the In-situ sondes is located in Appendix E. Additional duties as assigned include the measurements of potentiometric surface elevations in all monitoring/piezometer wells, as well as the total depth sounding, and visual observations.

All analytical results will be compared to the 6 NYCRR Part 703.5, *Surface water and Groundwater Quality Standards and Groundwater Effluent Limitations* for H(WS) Class GA groundwater (ug/L), 3/31/2021. See Worksheet #15 for specific compound/analyte criteria.

QAPP Worksheet #18
Sampling Locations and Methods/SOP Requirements Table

Sample Number	Sample Locations/ Field Sample Number	Matrix	Screen Depth (Feet)	Analytical Group(s)	Conc. Level	# Samples (Incl. Field Duplicates)	Sampling SOP Reference	Rationale For Sampling Location
BGRQ7	MW-01	Groundwater	17.5-27.5	VOC (DW-1)	Trace	1	SOP# FA-SST-T-07, Rev.2.0	Selected by RPM
BGRQ8	MW-02		20-30	VOC (DW-1)	Trace	1		
BGRQ9	MW-03		24-34	VOC (DW-1)	Trace	1		
BGRR0	MW-04		20-30	VOC (DW-1)	Trace	1		
BGRR1	MW-05		39-49	VOC (DW-1)	Trace	1		
BGRR2	MW-06 (MW-05 Dup)		39-49	VOC (DW-1)	Trace VOCs/	1		
BGRR3	RB-01	RO, EDI, GAC	NA	VOC (DW-1)	Trace	1	NA	Field QC
BGRR4	TB-01	RO, EDI, GAC	NA	VOC (DW-1)	Trace	1	NA	Field QC

* RO-EDI-GAC: Reverse Osmosis, Electrodeionization, Granular Activated Carbon Treatment

QAPP Worksheet #19
Analytical SOP Requirements Table

Matrix	Approximate No. of Samples	Analytical Group [Lab Assignment]	Conc. Level	Analytical Prep. Method/ SOP Reference	Sample Volume	Containers (number, size, type)	Preservation Requirements (chemical, temp., light protected)	Maximum Holding Time (preparation /analysis)
Aqueous	5 + 3 QC, total 8	VOCs	Trace	DW-1 Rev. 2.7	120 ml	(3) 40 mL amber glass VOC vials w/Teflon lined septum	1:1 HCl to pH<2; cool to 4°C	14 days (preserved)

QAPP Worksheet #20
Field Quality Control Sample Summary Table

Matrix	Analytical Group	Conc. Level	Analytical Prep. Method/ SOP Reference	Approx. No. of Sampling Locations	No. of Field Duplicate Pairs	No. of Extra Volume Lab QC (e.g., MS Samples	No. of Equipment Blanks	No. of Trip Blanks
Aqueous	VOCs	Trace	DW-1 Rev. 2.7	5	1	6 X 40 ml vials	1	1

QAPP Worksheet #21
Project Samping SOP Reference Table

Reference #	Title, Revision Date and/or Number	Originating Organization	Equipment Type	Modified for Project Work? (Y/N)	Comments
FA-SST-T-007 Rev 2.0	Standard Operating Procedure for Groundwater Sampling Procedure: Low Stress (Low-flow) Purging and Sampling, 11/08/19	EPA/LSASD/HWSB/SST	Submersible pump, Teflon lined tubing, water level meter, parameter meter, power source	N	N/A
FA-SST-T-015	Standard Operating Procedure for Groundwater Sampling: Operation of the Water Quality Multi-Parameter Meters, 7/2020	EPA/LSASD/HWSB/SST	Aqua Troll 600 Multi-Parameter Sonde	N	N/A
FA-SST-T-018	Groundwater Sampling: Operation of the 2100Q Turbidity Meters, 09/2020	EPA/LSASD/HWSB/SST	HACH 2100Q Turbidity Meters	N	N/A

QAPP Worksheet #22
Field Equipment Calibration, Maintenance, Testing, and Inspection Table

Field Equipment	Calibration Activity	Maintenance Activity	Testing/ Inspection Activity	Frequency	Acceptance Criteria +/-		Corrective Action	Responsible Person(s)	SOP Reference
In-Situ Aqua TROLL 600™ (Multi-Parameter Sondes)	Calibrate with standard solutions	Periodic	Daily	Pre- & Post-daily activities; Anytime anomaly suspected.	pH	± 0.1 s.u.	Clean probe, replace battery, replace membrane, replace probe, Recalibrate	U.S.EPA R2 LSASD/HWSB/SST	SOP# FA-SST-T-015; Manufacturer Specifications & Operators Manual
					ORP	± 5.0 mV			
					Dissolved	± 0.1 mg/L			
					Spec. Cond.	± 0.5% + 1.0			
					Temp.	± 0.1 °C			
HACH 2100Q™ Turbidimeter	Calibrate with StablCal standards	Periodic	Daily	Pre- & Post-daily activities; Anytime anomaly suspected.	10% with 10 NTU Standard		Replace Batteries; replace tape		SOP# FA-SST-T-018; Manufacturer Specifications & Operators Manual
Water Level Indicator	NA	Periodic	Daily/Visual	Prior to day's activities	No defects noted		Replace battery; replace tape		SOP# FA-SST-T-007; Manufacturer Specifications & Operators Manual

QAPP Worksheet #23
Analytical SOP Reference Table

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
DW-1 Rev. 2.7	SOP# DW-1: Analysis of Trace VOC in Water by Purge and Trap GC/MS	Definitive	VOC	GC/MS	US EPA Region 2 LSASD Laboratory	N

QAPP Worksheet #24
Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
In-Situ AquaTroll 600 Multi-Parameter Sondes	1) Calibrate with standard solutions; 2)as per instrument manufacturer's recommended procedures	1) Prior to day's activities; end of day's activities; 2) anytime anomaly suspected	See Owners Manual	1) Clean probe, or 2) replace battery, or 3) replace membrane, or 4) replace probe	EPA SST	SOP# FA-SST-T-015 and Manufacturer's Instructions
Hach 2100Q Turbidimeter	1) Calibrate with standard solutions; 2)as per instrument manufacturer's recommended procedures	1) Prior to day's activities; end of day's activities; 2) anytime anomaly suspected	10% with 10 NTU StablCal Std.	1) Replace battery, or 2) replace standards, or 3) replace bottle, or 4) replace lightbulb	EPA SST	SOP# FA-SST-T-018 and Manufacturer's Instructions
GC/MS	SOP DW-1 (VOC)	One Initial Calibration; ICV/CCV: beginning of 12 hr shift and every 12 hrs thereafter	Initial 5-pt Calibration curve %RSD of average RRF <20%; ICV +/- 30% of ICAL; CCV every 12 hrs with +/- 30% Difference from ICAL average RRFs	1) If more than 10% of analytes outside acceptance range, recalibrate. 2) If less than 10% analytes exced acceptance range, qualify data.	EPA Region 2 Laboratory	DW-1

QAPP Worksheet #25
Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

Instrument/ Equipment	Maintenance Activity	Testing/Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
GC/MS	See SOP DW-1 & LQMP, G-10, G-11, G-12, G-19	See SOP DW-1 & LQMP, G-10, G-11, G-12, G-19	See SOP DW-1 & LQMP, G-10, G-11, G-12, G-19	See SOP DW-1 & LQMP, G-10, G-11, G-12, G-19	See SOP DW-1 & LQMP, G-10, G-11, G-12, G-19	EPA Region 2 Laboratory Chemists	See SOP DW-1 & LQMP, G-10, G-11, G-12, G-19
In-Situ Aqua Troll 600 Multi-Parameter Sonde (Temperature, DO, pH, ORP, Specific Conductance)	Check & replace batteries, application software updates	Inspect; calibrate	Prior to day's activities; anytime anomaly suspected	No visual defect; recalibrate; see Worksheet 22	Replace battery	EPA LSASD-HWSB-SST	SOP FA-SST-T-015; Manufacturer's Instructions
Hach 2100Q Turbidity meter	See SOP FA-SST-T-018; as per instrument manufacturer's recommendations	Inspect; calibrate	Prior to day's activities; anytime anomaly suspected	No visual defect; recalibrate; see Worksheet 22	Replace battery	EPA LSASD-HWSB-SST	SOP FA-SST-T-018; Manufacturer's Instructions

QAPP Worksheet #26
Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): USEPA R2 LSASD HWSB SST
Sample Packaging (Personnel/Organization): USEPA R2 LSASD HWSB SST
Coordination of Shipment (Personnel/Organization): USEPA R2 LSASD HWSB SST
Type of Shipment/Carrier: Hand deliver to R2 LSASD Lab via USEPA R2 LSASD HWSB SST Staff
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Sample Custodian, R2 LSASD laboratory
Sample Custody and Storage (Personnel/Organization): Sample Custodian, R2 LSASD laboratory
Sample Preparation (Personnel/Organization): Laboratory Technicians, R2 LSASD laboratory
Sample Determinative Analysis (Personnel/Organization): Laboratory Technicians, R2 LSASD laboratory
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): Samples to be hand delivered at the end of sampling event.
Sample Extract/Digestate Storage (No. of days from extraction/digestion): As per analytical method SOP; see Worksheet #19
SAMPLE DISPOSAL
Personnel/Organization: Laboratory Technicians, R2 LSASD laboratory
Number of Days from Analysis: Until analysis and QA/QC checks are completed; per analytical method, see Worksheet #19

QAPP Worksheet #27
Sample Custody Requirements

Sample Identification Procedures:

Each sample will be labeled with the number that depicts a specific monitoring well location. Refer to Worksheet #18 which provides planned sample number identifications, locations and sublocations.

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory):

Each sample will be individually identified and labeled. All samples will be secured and maintained on ice. The sample information will be recorded on chain-of-custody (COC) forms, and the samples will be hand delivered to the R2 LSASD laboratory for analysis. EPA SCRIBE program will be used for field documentation including sample labels and COC records. Refer to the U.S. EPA ERT User Manual for Scribe in Appendix E.

Laboratory Sample Custody Procedures (receipt of samples, archiving, disposal):

A sample custodian at the laboratory will accept custody of the shipped samples, and check them for discrepancies, proper preservation, integrity, etc. If noted, issues will be forwarded to the laboratory manager for corrective action. The sample custodian will relinquish custody to the appropriate department for analysis. At this time, no samples will be archived at the laboratory. Disposal of the samples will occur only after analyses and QA/QC checks are completed.

Chain of Custody Procedures:

A COC record establishes the documentation necessary to trace sample possession from time of collection through sample analysis and disposition. A sample is in the custody of a person if any of the following criteria are met:

1) The sample is in a person's physical possession;
2) The sample is in a person's view after being in his or her physical possession;
3) The sample was in a person's physical possession and was then locked up or sealed to prevent tampering; and
4) The sample is kept in a secured area.

The sample collector will complete a COC record to accompany each delivery container (cooler) and will be responsible for delivery of samples to the laboratory. The sample collector will provide the site name and their signature in the designated fields on the COC record. For each sample submitted to the project laboratory, the sample collector will indicate the date, time, number of containers, analytical parameters, and designated sample ID numbers. When hand delivering the samples, the sample collector will sign the bottom of the form and enter the date and time (24-hour) at which the samples were relinquished. Lines not used on the COC record will be crossed out. Any required special handling of analyzed samples, such as hold or return, must be written on the COC record. A second member of the field crew will review the completed COC record to assure that required information is not omitted and that unused lines are crossed out. The original signature copy of the COC record will be enclosed in a plastic bag and placed in the shipping cooler. A copy of the COC record will be retained for project files.

QAPP Worksheet #28
QC Samples Table

Matrix	Aqueous
Analytical Group	Target Compound List Volatile Organics Compounds (VOCs)
Concentration Level	Trace
Sampling SOP	SOP#FA-SST-T-07 Rev. 2.0
Analytical method/SOP Reference	DW-1
Sampler's Name	Robert Finke
Field Sampling Organization	LSASD-HWSB-SST
Analytical Organization	EPA R2 LSASD Laboratory
No. of Sample Locations	5

Lab QC Sample	Frequency / Number	Method/ SOP QC Acceptance limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Lab reagent blank(LRB)/Prep Blank (PB), Method Blank	1 per extraction batch , </= 20 samples, every 12 hrs samples are run.	< RL	Investigate source of contamination, clean/perform instrument maintenance. If contaminants detected in the blank, do not report as present if < 10x blank amount.For non-common contaminants, if blank > RL then all samles with concentration </= 10x blank should be re-prepared/re-analyzed or qualify data.	Lab personnel	Sensitivity Contamination	< RL
Surrogates	Each sample, standard, blank	70%-130% R	Reinject, Qualify data	Lab personnel	Extraction efficiency, Accuracy	Limits 70%-130%
Internal Standards	Each sample, standard, blank	+/- 50% from the initial/continuing calibration	Check Instrument re-analyze / Qualify data	Lab personnel	Quantitation	+/- 50% from the initial/continuing calibration
LFB, BS/BSD, LCS/LCSD	2 per extraction batch , </= 20 samples	%R ranges from 15%-175% (compound dependent); % RPD < 20. See analytical SOP Table 3	If %R exceeds limits for > 10% of analytes, recalibrate. If %R exceeds for < 10% of analytes, qualify associated results.	Lab personnel	Accuracy/ Precision	%R ranges from 15%-175% (compound dependent); % RPD < 20. See analytical SOP Table 3
Matrix Spike or LFM	1 per extraction batch , </= 20 samples	%R ranges from 15%-175% (compound dependent). See analytical SOP Table 3.	%R exceeds limits, qualify data accordingly.	Lab personnel	Accuracy	175% (compound dependent). See analytical SOP Table 3.

QAPP Worksheet #28
QC Samples Table

Matrix		Aqueous				
Analytical Group		Target Compound List Volatile Organics Compounds (VOCs)				
Concentration Level		Trace				
Sampling SOP		SOP#FA-SST-T-07 Rev. 2.0				
Analytical method/SOP Reference		DW-1				
Sampler's Name		Robert Finke				
Field Sampling Organization		LSASD-HWSB-SST				
Analytical Organization		EPA R2 LSASD Laboratory				
No. of Sample Locations		5				
ICV (also used as LFB/BS/BSD if samples analyzed after the initial calibration curve within same 12 hour sequence)	whenever a new calibration curve is generated	%R 70-130%	%R exceeds limits, identify cause and analyze a third independent sourse. If 10% of the analytes fail, re-run ICV. If exceedance remains, recalibrate. If reporting any analyte that fails low (provided < 10% total analtes), qualify data including non-detects.	Lab personnel	Accuracy	%R 70-130%

QAPP Worksheet #29
Project Documents and Records Table

Sample Collection Documents and Records	On-site Analysis Documents and Records	Off-site Analysis Documents and Records	Data Assessment Documents and Records	Other
Scribe Chain-of-Custody Records	Field Logs/Logbooks	Scribe Chain-of-Custody Records	Final Data Packages (Case Narrative, Sample Results, QC Summaries, and Raw Data)	Procurement Forms
Field Logs/Logbooks	Equipment Calibration Logs	Sample Receipt, Custody and Tracking Logs	Data Quality Assessment Reports	Equipment Maintenance Logs
Corrective Action Forms	Monitoring Well Low-Flow Test Reports	Sample Preparation Log	Data Validation SOPs	Health and Safety Plan
Sample Labels		Standards Tracking Log	Data Package Completeness Checklist	
Site maps		Instrument Calibration Data	Electronic Data Deliverables	
Signed, approved UFP-QAPP		Instrument Maintenance Log	Final Sampling Trip Report	
Analytical Request Form		Instrument Analysis/Run Log		
Overnight Carrier Receipts (if required)		Final Data Packages (Case Narrative, Sample Results, QC Summaries, and Raw Data)		
		Final Sampling Trip Report		
		Electronic Data Deliverables		

QAPP Worksheet #30
Analytical Services Table

Matrix	Analytical Group	Concentration Level	Sample Locations/ID Numbers	Analytical SOP	Data Package Turnaround Time	Laboratory/Organization	Backup Laboratory/Organization
Aqueous	VOCs	Trace	See Worksheet #18	DW-1 Rev. 2.7	42	EPA Region 2 LSASD Laboratory 2890 Woodbridge Ave, Edison NJ O8837 Ness Tirol 732-321 4431	NA

QAPP Worksheet #31
Planned Project Assessments Table

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment	Person(s) Responsible for Responding to Assessment Findings	Person(s) Responsible for Identifying and Implementing Corrective Actions	Person(s) Responsible for Monitoring Effectiveness of Corrective Actions
Data Review and Verification	As data becomes available from the laboratory	Internal	EPA Reg. 2 LSASD lab	EPA Reg. 2 LSASD QA Officer	EPA Reg. 2 LSASD Lab analysts	EPA Reg. 2 LSASD Lab analysts, QA Officer	EPA Region 2 LSASD Lab managers, QA Officer
Field Observations, Deviations from UFP-QAPP	Daily	Internal	SST Project Leader Robert Finke, EPA	SST Project Leader Robert Finke, EPA	SST Field Team	SST Field Team	SST Project Leader Robert Finke, EPA
Data Package/ Deliverable Review	Upon receipt of validated/finalized data	Internal	EPA Reg. 2 LSASD/ HWSB/SST	SST Project Leader Robert Finke, EPA	EPA Region 2 LSASD Laboratory-OICS Section Chief	EPA Region 2 LSASD Laboratory-OICS Section Chief	SST Field Project Manager Robert Finke and SST Team Leader/QA Manager.

QAPP Worksheet #32
Assessment Findings and Corrective Response Actions

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (Name, Title, Organization)	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (Name, Title, Org.)	Timeframe for Response
Field Observations/ Deviations from approved UFP-QAPP	Logbook and/or Sampling Trip Report	SST Field Team	Immediately to within 24 hours of deviation	Logbook and/or Sampling Trip Report	EPA R2 LSASD-HWSB-SST Field Project Lead Robert Finke and EPA RPM	Immediately to within 24 hours of deviation
Data Review and Verification (Internal)	Laboratory Resubmissions	Laboratory OICS Section Chief & QA Officer	After arrival of data from the lab and during data verification activities	Corrective Action Reports and/or updated case narratives and corrected data submissions.	EPA Region 2 LSASD-HWSB-SST Field Project Lead Robert Finke	7 Business Days

QAPP Worksheet #33 - QA Management Reports Table

Type of Report	Frequency (daily, weekly, monthly, quarterly, annually, etc.)	Projected Delivery Date(s)	Person Responsible for Report Preparation (Title and Organizational Affiliation	Report Recipient(s) (Title and Organizational Affiliation)
Field Change Request	As Required per field change	3 days after identification of need for field change	Maeve Wurtz	SST Project Leader Robert Finke, EPA
Interim Trip Report	Once	7 days after all samples submitted	SST Project Leader Robert Finke, EPA	RPM Maeve Wurtz
U.S.EPA R2 LSASD-LB Validated Data	As Submitted	42 days/SDG after submittal of all samples	U.S.EPA R2 LSASD-LB	SST Project Leader Robert Finke, EPA
Data Usability Assessments	Once	Submitted with Final Sampling Trip Report	SST Project Leader Robert Finke, EPA	RPM Maeve Wurtz
Final Sampling Trip Report	Once	60 days after receipt of validated data package	SST Project Leader Robert Finke, EPA	RPM Maeve Wurtz

QAPP Worksheet #34
Verification (Step I) Process Table

Verification Input	Description	Internal/External	Responsible for Verification (Name, Organization)
Site/field logbooks	Field notes will be prepared daily by the EPA Sample Leader and will be complete, appropriate, legible and pertinent. Upon completion of field work, logbooks will be placed in the project files.	Internal	SST Project Leader Robert Finke, EPA
Chain of Custody (COC) forms	Chain-of-custody forms will be verified against the sample cooler they represent. Sample Acceptance Checklist is completed. The Lab staff supervisor utilizes the analytical request form and the external COC to review the accuracy and completeness of LIMS log-in entries, as reflected on the LIMS Sample Receipt Form.	Internal	SST Project Lead and OSCAR Personnel, R2 LSASD Lab
Interim Sampling Trip Reports	An Interim Trip Report will be prepared for the event, summarizing the name, number, date and time of collection, procedure used for collection, personnel on-site and parameters to be analyzed. Information in the report will be reviewed against the COC forms, and potential discrepancies will be discussed with field personnel to verify locations, dates, etc.	External	SST Project Leader Robert Finke, EPA

QAPP Worksheet #34
Verification (Step I) Process Table

Verification Input	Description	Internal/External	Responsible for Verification (Name, Organization)
Analytical Data Package/Final Report	The procedures for data review: 1)Data reduction/review by Primary Analyst. 2)Review complete data package (raw data) by independent Peer Reviewer 3) The Sample Project Coordinator reviews the project documentation for completeness followed by a QA review by the QAO 4) Final review by Branch Chief/Section Chief prior to release. This review is to ensure completeness and general compliance with the objectives of the project. This final review typically does not include a review of raw data. 5) Submittal/upload to the R2 Environmental Data Services SharePoint site. One hundred percent (100%) of the data is validted internally within the lab, using the appropriate R2 LSASD Lab SOP provided in Appendix D. The validation narrative, validated results, EDD and Data Summary Report tables are posted to the R2 Environmental Data Services Sharepoint site for retrieval by the Field Project Manager.	Internal	John Bourbon, Branch Chief U.S.EPA R2 LSASD-LB Sumy Cherukara, Quality Assurance Officer U.S.EPA R2 LSASD-LB Sample Project Coordinator U.S.EPA R2 LSASD-LB Primary Analyst, Peer Reviewer U.S.EPA R2 LSASD-LB
Final Sampling Trip Report	The project data results will be compiled in a Final Sampling Trip Report for the project summarizing the name, number, data and time of sample collection, procedure used for collection, personnel on-site, parameters analyzed and results obtained. Information in the FSTR will be reviewed/verified against hardcopy information including the COC forms, and potential discrepancies will be discussed with field personnel to verify locations, dates, etc. Once final, the FSTR will be posted to the R2 Environmental Data Services SharePoint site.	Internal	Amelia Jackson, SST Team Leader and Project QA

QAPP Worksheet #35
Validation (Steps IIa and IIb) Process Table

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Name, Organization)
IIa	Procedures/Methods	Ensure that the sampling methods/procedures outlined in QAPP were followed, and that any deviations were noted/approved.	SST Project Leader Robert Finke, EPA
IIb	SOPs	Determine potential impacts from noted/approved deviations, in regard to PQOs.	SST Project Leader Robert Finke, EPA
IIa	Chains of custody	Examine COC forms against QAPP and laboratory contract requirements (e.g., analytical methods, sample identification, etc.).Chain-of-custody forms will be verified against the sample cooler they represent. Sample Acceptance Checklist is completed. The LSASD Lab OSCAR staff supervisor utilizes the analytical request form and the external COC to review the accuracy and completeness of LIMS log-in entries, as reflected on the LIMS Sample Receipt Form.	EPA Region 2 Project Lead (prior to shipment) and LSASD sample custodian (laboratory receipt)
IIa	Data Packages (Internal)	The procedures for data review: 1)Data reduction/review by Primary Analyst. 2)Review complete data package (raw data) by independent Peer Reviewer 3) The Sample Project Coordinator reviews the project documentation for completeness followed by a QA review by the QAO 4) Final review by Branch Chief/Section Chief prior to release, this review is to ensure completeness and general compliance with the objectives of the project. This final review typically does not include a review of raw data. 5) Submittal/upload to the R2 Environmental Data Services SharePoint site.	John Bourbon, Branch Chief U.S.EPA R2 LSASD-LB Sumy Cherukara, Quality Assurance Officer U.S.EPA R2 LSASD-LB Sample Project Coordinator U.S.EPA R2 LSASD-LB Primary Analyst, Peer Reviewer U.S.EPA R2 LSASD-LB
IIb	Field Documentation	Verify accuracy and completeness of field notes and documentation daily and that the sampling SOPs were followed.	SST Project Leader Robert Finke, EPA

QAPP Worksheet #35
Validation (Steps IIa and IIb) Process Table

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Name, Organization)
IIb	Laboratory data package	Determine potential impacts from noted/approved deviations, in regard to PQOs. Examples include PQLs and QC sample limits (precision/accuracy).	SST Project Leader Robert Finke, EPA
IIb	Field duplicates	Compare results of field duplicate (or replicate) analyses with RPD criteria.	SST Project Leader Robert Finke, EPA
IIb	Field and Laboratory QC Sample Results	A summary of all Field/Laboratory QC sample results for field duplicates, and rinse/trip blanks will be verified against measurement performance criteria.	SST Project Leader Robert Finke, EPA
IIb	Data Usability Evaluation	Evaluate data to precision, accuracy, representativeness, comparability, and completeness for project objectives.	SST Project Leader Robert Finke, EPA

QAPP Worksheet #36 - Sampling and Analysis Validation (Steps Iia and Iib) Summary Table

Step IIa/IIb	Matrix	Analytical Group	Conc. Level	Validation Criteria	Data Validator (Title and Organizational Affiliation)
IIa / IIb	Aqueous	VOCs	Trace	Peer review in accordance with EPA Region 2 LSASD Data Validation SOP G-26: Guidance for Laboratory Data Review (See Appendix D)	EPA Region 2 LSASD laboratory Personnel with contractor support

QAPP Worksheet #37
Usability Assessment

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used:

Precision:

Results of laboratory duplicates will be assessed during data validation and data will be qualified according to the data validation procedures cited in Worksheet# 36. Field duplicates will be reviewed during the data usability assessment using the RPD for each pair of results above the RL for the performed analyses. RPD acceptance criteria, presented in Worksheet #12, will be used to assess field sampling precision. A discussion summarizing the results of laboratory and field precision and any limitations on the use of the data will be described.

To calculate field precision:

$$RPD=100 \times \frac{(X_1-X_2)}{(X_1-X_2)/2}$$

where X_1 and X_2 are the reported concentrations for each duplicate or replicate.

Accuracy/Bias Contamination:

Results for all laboratory blanks will be assessed as part of the data validation. During the data validation process, the validating personnel will qualify the data following the procedures described on Worksheet #36. A discussion summarizing the results of the laboratory accuracy and bias based on contamination will be presented and any limitations on the use of the data will be described. When the regional LSASD lab is used, the validating personnel will not assess field QC results (equipment rinse blank, trip blank and field duplicate) against the sample results. The project lead will discuss sample contamination relative to the equipment rinse blank, trip blank, and field duplicate pair results in the Final Sampling Trip Report.

Overall Accuracy/Bias:

The results of instrument calibration and matrix spike recoveries will be reviewed and data will be qualified according to the data validation procedures cited on Worksheet #36. A discussion summarizing the results of laboratory accuracy and any limitations on the use of the data will be described.

Sensitivity:

Data results will be compared to criteria provided in Worksheet #15. A discussion summarizing any conclusions about the sensitivity of the analyses will be presented and any limitations on the use of the data will be described.

Representativeness:

Data representativeness will be assessed by collecting field replicate samples. The field replicates are, by definition, equally representative of a given point and space and time. Representativeness is a qualitative parameter which is dependent upon the proper design of the sampling program and proper laboratory protocol. The sampling design and locations are prescribed by the EPA RPM. Therefore, data representativeness will be satisfied by ensuring that the sampling program is followed according to RPM instructions and use of cited SOPs noted here and provided in Appendix B:

EPA/LSASD/HWSB/SST SOP:

SOP#FA-SST-T-07 Rev. 2.0

QAPP Worksheet #37
Usability Assessment

Comparability:

To ensure data comparability, sampling and analysis for all samples will be performed using standardized analytical methods and adherence to the quality control procedures outlined in the methods and this QAPP. Therefore, the data will be comparable.

Reconciliation:

The PQOs presented in Worksheet #11 will be examined against the data quality to determine if the objectives were met. This examination will include a combined overall assessment of the results of each analysis pertinent to an objective. Each analysis will first be evaluated separately in terms of major impacts observed from data validation, data quality indicators, and measurement performance criteria assessments. Based on the results of these assessments, the quality and usability of the data will be determined. The combined usability of the data from all analyses will be used to determine if the PQOs were met and whether project goals have been achieved. Conclusions will be drawn and any limitations on the usability of the data will be described.

Completeness:

Calculate completeness: Data completeness will be expressed as the percentage of valid data obtained from the measurement system. In other words, every well or location that was initially intended to be sampled, was sampled. For data to be considered valid, it must meet all the acceptable criteria including accuracy and precision, as well as any other criteria specified by the analytical method used. All data points submitted to USEPA Region 2 LSASD Laboratory will be 100% validated by USEPA Region 2 LSASD Lab staff. All validated data will be peer reviewed in accordance with EPA Region 2 LSASD LB SOP G-26, Guidance for Laboratory Data Review. 10/3/20 Rev. 1.7. See Appendix D.

Describe the evaluative procedures used to assess overall measurement error associated with the project:

EPA Region 2 LSASD Lab personnel will determine if quality control data is within specification through validation process IIb. See Appendix D for the data validation SOP.

Identify the personnel responsible for performing the usability assessment:

LSASD-HWSB-SST Sampling Project Lead Robert Finke, the SST Team Leader and the R2 SEMD RPM.

Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies:

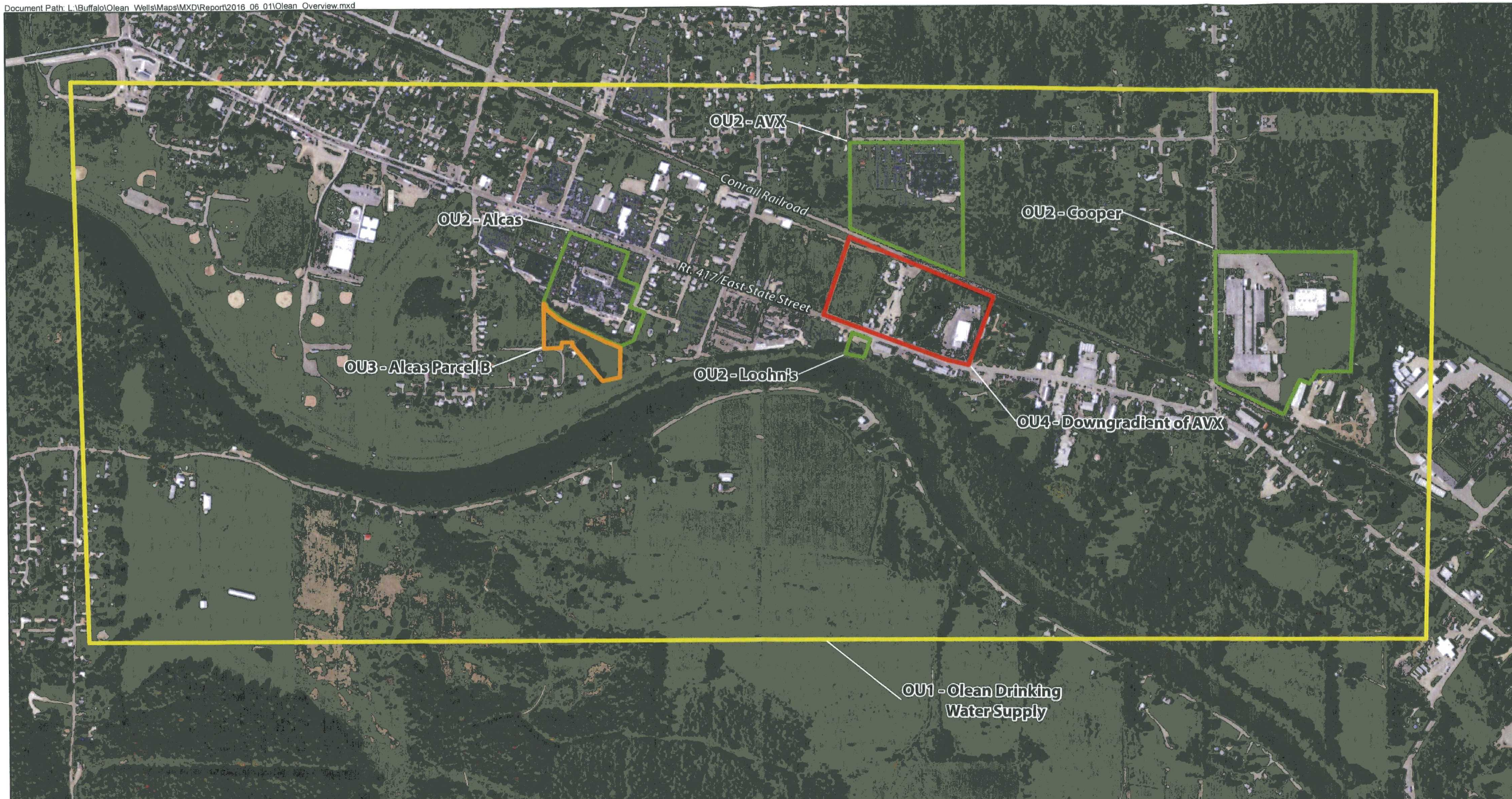
A Final Sampling Trip Report will be generated by the SST Project Leader based on the final, validated data package and data evaluation report. Tables will be prepared and attached in the Final Sampling Trip Report, including: a summary of samples collected, parameters analyzed and results obtained as compared to the specified criteria; detections in equipment rinse (field) blanks and trip blanks; and comparison of field duplicates. The Report will be provided to the RPM to allow examination of the current extent of groundwater contamination within Site and decide the strategy going forward.

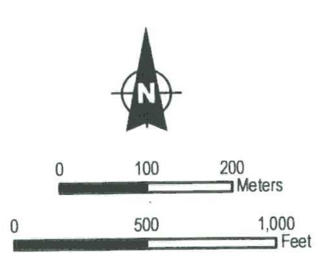
Discuss the impacts of any qualified data, any deviations from the original plan or sampling procedures, whether the project objectives were met, etc.

Data qualified as estimated, J, is considered usable. Data qualified as rejected, R, is not usable and may need to be re-sampled.

Appendix A-1
LOOHN'S CLEANERS AND LAUNDERERS UFP-QAPP 2022-OLEAN WELL FIELD OPERABLE UNIT MAPS

Document Path: L:\Buffalo\Olean_Wells\Maps\MXD\Report\2016_06_01\Olean_Overview.mxd





Operable Unit	Current Phase
OU1 - Olean Drinking Water Supply	Response in Place
OU2 - Alcas	Remedial Design Phase
OU2 - AVX	Remedial Action Phase
OU2 - Loohn's	Interim Removal Active Complete
OU2 - Cooper	Response in Place
OU3 - Alcas Parcel B	Remedial Design Phase
OU4 - Downgradient of AVX	RI/FS Phase

Approximate OU1 Boundary
Approximate OU2 Boundary
Approximate OU3 Boundary
Approximate OU4 Boundary

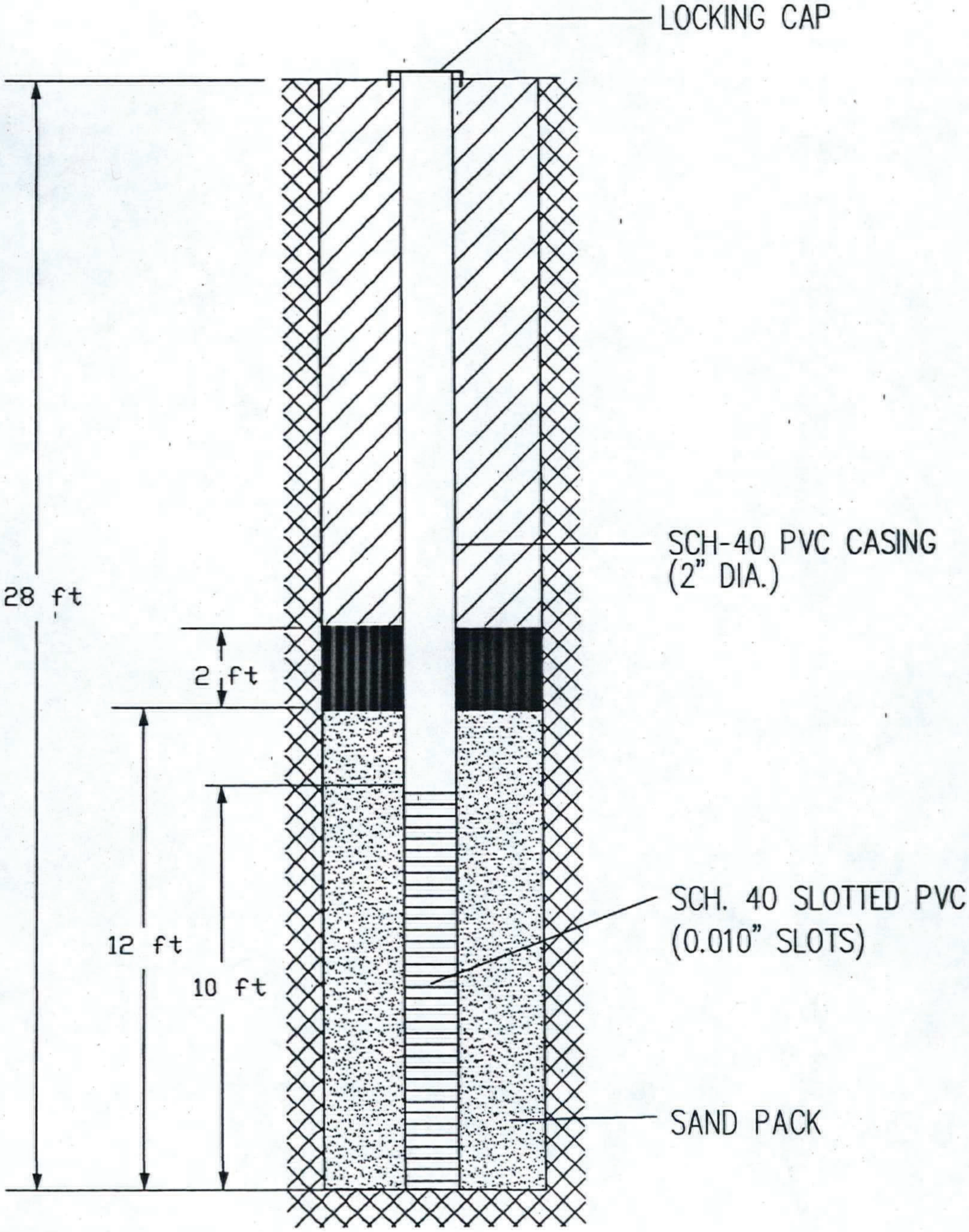
Figure 2-2
Olean Well Field
Operable Unit Map
Olean, New York

Date: 6/1/2016

Appendix A-2
LOOHN'S CLEANERS AND LAUNDERERS UFP-QAPP 2022-MONITORING WELL LOCATION MAP

Olean Well Field/Loohn's Cleaners Site
Monitoring Well Locations

Appendix A-3
LOOHN'S CLEANERS AND LAUNDERERS UFP-QAPP 2022-MONITORING WELL CONSTRUCTION LOGS



LEGEND

- BENTONITE SEAL
- SAND PACK
- FORMATION
- CEMENT GROUT

U.S. EPA ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C99-223
V.O.# R1A00276

MW1-03 & MW2-03
CONSTRACTION DIAGRAM
OLEAN WELL FIELD SITE
OLEAN, NEW YORK
OCTOBER 2003

276_mw1,2_diagram.dwg

LOCKHEED MARTIN (REAC)
Environmental Services
EDISON,N.J.

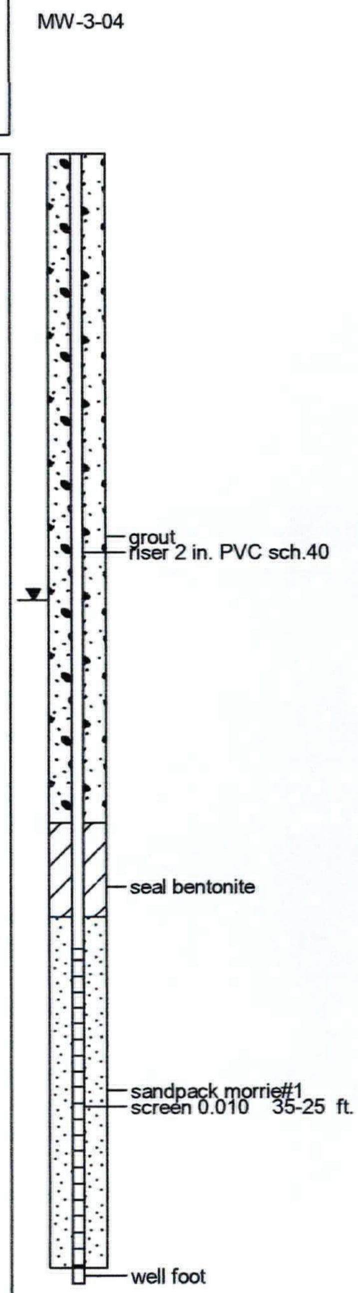
LOG OF BORING MW-3-04

(Page 1 of 1)

EPA/NYDEC
Olean Well Field Site
Site Investigation
Olean,NY
WA# R1A00276

Date Started	: 04/07/2004	Flush-Mount Well Head	
Date Completed	: 04/07/2004	Northing Coord.	: 230062.364M
Hole Diameter	: 8 in.	Easting Coord.	: 365168.205M
Drilling Method	: HSA 4 1/4 in.	Survey By	:
Sampling Method	: split-spoons	Logged By	: Charles Maroni,P.G.

Depth in Feet	USCS	DESCRIPTION	Split-Spoons	Blow Count
0	GP	loose, medium grained,GRAVEL, Well Graded, little clay,trace silt,DRY	1	11 7 10 10
5				
10	GC	stiff, olive-grey, GRAVEL,some Clay,some coarse SAND, dry, (Glacial Till)	2	7 11 11 14
15	GC	stiff, olive-grey GRAVEL & CLAY,some silt,dry, (Glacial Till)	3	12 13 17 17
20		stiff, olive-grey, GRAVEL &CLAY,some silt,dry, (Glacial Till)	4	7 9 12 16
25		stiff, moist, grey, GRAVEL & CLAY,little silt (Glacial Till)	5	9 8 10 13
30	ML	Soft,wet, CLAYEY SILT, saturated poor recovery(3 inches)	6	3 2 3 4
35	GM	Soft,brown, Silty medium grained GRAVEL, Poorly Graded,rounded pebbles,Saturated	7	5 7 7 4
40				



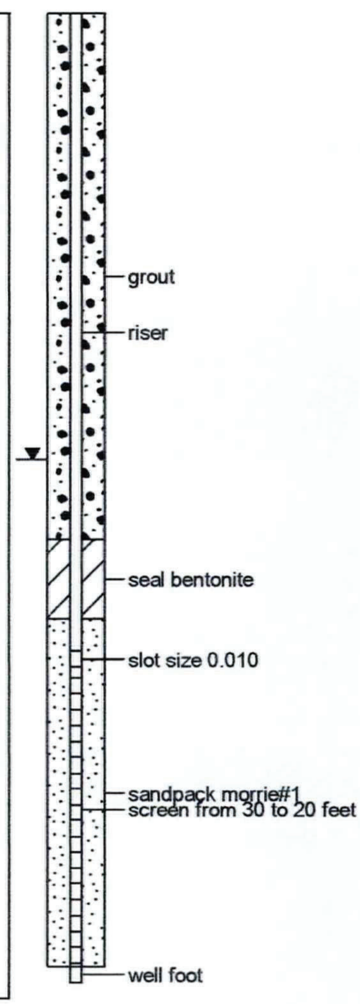
04-16-2004 C:\Documents and Settings\cmaroni\My Documents\ecustra boring logs\MW-3-04.bor

LOCKHEED MARTIN (REAC) Environmental Services EDISON,N.J.	LOG OF BORING MW4-04 (Page 1 of 1)

EPA/NYDEC Olean well field site Site Investigation	Date Started	: 04/07/2004	Flush Mount Well Head		
Olean,NY	Date Completed	: 04/07/2004	Northing Coord.	: 230070.158M	
WA# R1A00276	Hole Diameter	: 8 in.	Easting Coord.	: 365126.778M	
	Drilling Method	: HSA 4 1/4 inch	Survey By	:	
	Sampling Method	: split-spoons	Logged By	: Charles Maroni,P.G.	

Depth in Feet	USCS	DESCRIPTION	split-spoons	Blow Count
0–9	GM	Clay mottled grey to brown, dry & crumbly, Poorly Graded Gravel-Sand mixtures,some silt.	1	3 4 6 7
9–19	GC	Dry, Stiff, Grey Gravel & Clay, some Medium Sand,little silt, mottled (Glacial Till)	2	9 10 11 12
		Dry,Stiff,Grey Gravel & Clay, some Medium Sand,little silt,mottled (Glacial Till)	3	8 7 10 13
19–24	SC	Brown, loose, GRAVEL& fine SAND,some SILTY CLAY, very moist to wet,	4	6 7 11 6
24–29	GC	Brown, stiff, GRAVEL & CLAY,some fine sand dry to moist, (Glacial Till)	5	12 11 11 11
29–31	SM	Brown, loose, Gravel & SAND fine to medium grained, saturated		
		End of Boring @ 31 feet		

2 in. I.D. sch.40 PVC: MW-4-04



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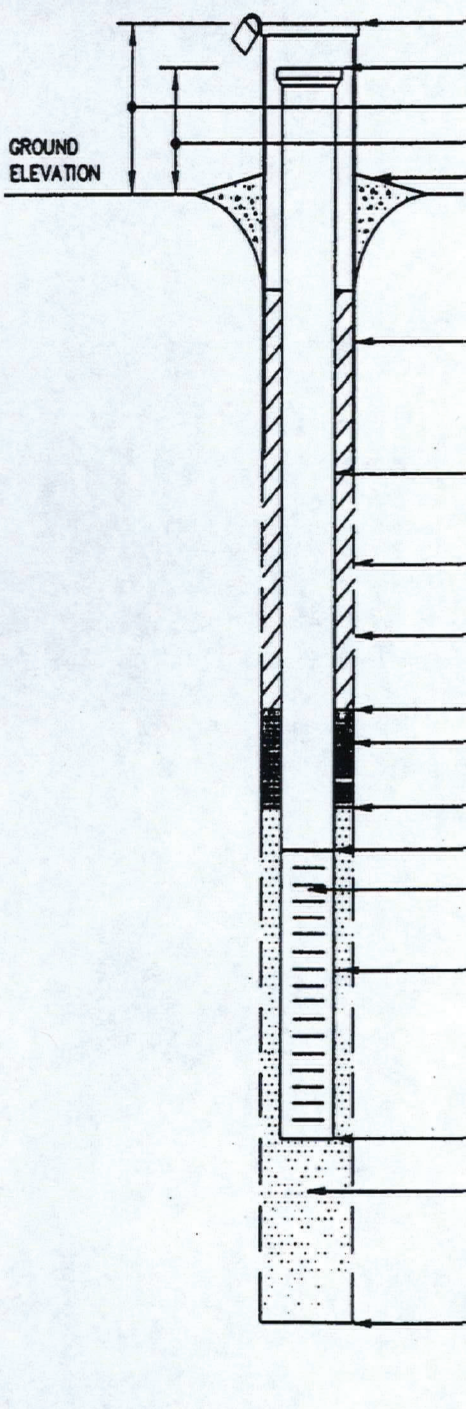
OVERBURDEN

MONITORING WELL CONSTRUCTION DIAGRAM

WELL NO. MW-5-04

PROJECT	Olean Well Field Site- Loohn's Source Area	DRILLER	STL DRILLING,INC.
PROJECT NO.	WA# R1A00276	DRILLING METHOD	Hollow-Stem- Auger
DATE	04/09/2004 BORING NO.: MW-5-04		
ELEVATION		DEVELOPMENT METHOD	Pumping until clear returns
FIELD GEOLOGIST	Charles Maroni,P.G.		Water Level from top of riser pipe 15.01 ft.



ELEVATION OF TOP OF SURFACE CASING: NA

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING: NA

STICK-UP RISER PIPE: NA

TYPE OF SURFACE SEAL: Flush-Mount Well Head

I.D. OF SURFACE CASING: 2 inch

TYPE OF SURFACE CASING: PVC

RISER PIPE I.D. 2 inch

TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 8 inches

TYPE OF BACKFILL: Cement/bentonite grout

ELEVATION/DEPTH TOP OF SEAL: 34 FT.

TYPE OF SEAL: Bentonite hole-plug

DEPTH TOP OF SAND PACK: 37 FT.

ELEVATION/DEPTH TOP OF SCREEN:

TYPE OF SCREEN: Slotted 2 in. PVC Sch.40

SLOT SIZE X LENGTH: 0.010 slot x 10 feet

TYPE OF SAND PACK: Morrie #1

ELEVATION/DEPTH BOTTOM OF SCREEN: 49 feet

ELEVATION/DEPTH BOTTOM OF SAND PACK: 50 FT.

TYPE OF BACKFILL BELOW OBSERVATION WELL: Well foot 0.5 FT.

ELEVATION/DEPTH OF HOLE: 50 FT.

Appendix B-1 LOOHN'S CLEANERS AND LAUNDERERS UFP-QAPP 2022-LOW FLOW GROUNDWATER SAMPLING & WATER QUALITY MONITORING SOPS

U.S. Environmental Protection Agency, Region 2 Field Operations Quality Procedures

TECHNICAL STANDARD OPERATING PROCEDURE

Standard Operating Procedure for Groundwater Sampling Procedure: Low Stress (Low-flow) Purging and Sampling

Effective Date	Number
11/8/2019	FA-SST-T-007

Author

Name: Michael Mercado	
Title: Environmental Scientist	
Division/Branch/Section: LSASD/HWSB/SST	
Signature:	**Date:** 24 Oct 19

Review & Approvals

Name: Robert Finke	
Title: Physical Scientist	
Signature:	**Date:** 10/24/19
Name:	
Title:	
Signature:	**Date:**
Name: Amelia Jackson	
Title: Lead Chemist, Superfund Support Team	
Signature: Amelia Jackson	**Date:** 10/30/19
Name: Jon Gabry	
Title: Chief, Hazardous Waste Support Branch	
Signature:	**Date:** 10/30/19

The table below identifies information about the reviews conducted of this SOP.

REVIEW HISTORY		
Date	Reviewer Name	Changes Required (Y/N)

The table below identifies changes to this controlled document and the respective effective date(s) over time.

REVISION HISTORY		
Revision Number	Revision Description	Effective Date
1.0	Original Issue	10/28/10

TABLE OF CONTENTS

1.0 PURPOSE AND APPLICABILITY

The *Low Stress (or Low-Flow) Purging and Sampling Procedure* is the EPA LSASD-HWSB-SST standard method for collecting low stress (low-flow) groundwater samples from monitoring wells that are representative of conditions in the geological formation. This is accomplished by minimizing stress on the geological formation and disturbance of sediment that has collected in the well. The procedure applies to monitoring wells that have an inner casing with a diameter of 2.0 inches or greater, and maximum screened intervals of ten feet (unless multiple intervals require characterization). The procedure is appropriate for collection of groundwater samples that will be analyzed for volatile and semi-volatile organic compounds (VOCs and SVOCs), pesticides, polychlorinated biphenyls (PCBs), metals, microbiological constituents and other contaminants in association with all EPA programs. This procedure does not address the collection of light or dense non-aqueous phase liquids (LNAPL or DNAPL) samples.

2.0 SUMMARY OF PROCESS OR METHODOLOGY

Sampling at the prescribed (low) flow rate has three primary benefits. First, it minimizes disturbance of sediment in the bottom of the well, thereby producing a sample with low turbidity (i.e., low concentration of suspended particles). Typically, this saves time and analytical costs by eliminating the need for collecting and analyzing an additional filtered sample from the same well. Second, this procedure minimizes aeration of the groundwater during sample collection, which improves the sample quality for VOC analysis. Third, in most cases, the procedure significantly reduces the volume of groundwater purged from a well and the costs associated with its proper treatment and disposal.

3.0 DEFINITIONS

3.1. Glossary of Terms

DNAPL	Dense Non-Aqueous Phase Liquid
DO	Dissolved Oxygen
FID	Flame Ionization Detector
HNO_3	Nitric Acid
HWSB	Hazardous Waste Support Branch
LNAPL	Light Non-Aqueous Phase Liquid
LSASD	Laboratory Services and Applied Science Division
NAPL	Non-Aqueous Phase Liquid
OSC	On-Scene Coordinator
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyls
PID	Photon Ionization Detector
PVC	Polyvinyl Chloride
QA	Quality Assurance

QC	Quality Control
QAPP	Quality Assurance Project Plan
RPM	Remedial Project Manager
SST	Superfund Support Team
SOP	Standard Operating Procedure
SVOC	Semi-volatile Organic Compound
U.S. EPA	United States Environmental Protection Agency
UFP	Uniform Federal Policy
VOC	Volatile Organic Compound

4.0 RESPONSIBILITIES/QUALIFICATIONS

4.1. All field samplers are required to take the OSHA 40-hour health and safety training course and annual refresher courses prior to participating in any field collection activities.

5.0 REFERENCES

5.1. U.S. Environmental Protection Agency, ERT/SERAS SOP #2006: Sampling Equipment Decontamination, Revision 1.0, December 28, 2015

5.2. U.S. Environmental Protection Agency, ERT/SERAS SOP #2007: Groundwater Well Sampling, Revision 1.0, June 25, 2015

5.3. Puls, R.W. and M.J. Barcelona, 1996, Low-Flow (Minimal Drawdown) Ground-water Sampling Procedures, EPA/540/S-95/504.

5.4. Yeskis, Douglas and Zavala, Bernard, 2002, Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers, Ground Water Forum Issue Paper, EPA/542/S-02/001

5.5. U.S. EPA Field Operations Group Operational Guidelines for Field Activities, April 2013.

5.6. U.S. EPA QA Field Activities Procedure, CIO 2105-P-02.0, CIO Approval date 9/23/2014, Review Date 09/23/2017

5.7. U.S. EPA, 2007. Guidance for the Preparation of Standard Operating Procedures (SOPs) for Quality-Related Documents. EPA QA/G-6, EPA/600/B-07/001. April 2007

5.8. U.S. EPA Region II Groundwater Sampling Procedure: Low Stress (Low-flow) Purging and Sampling, Final March 16, 1998

6.0 HEALTH AND SAFETY WARNINGS

6.1. When working with potentially hazardous materials, follow EPA, OSHA and specific health and safety procedures.

6.2. When sampling a groundwater well containing known or suspected hazardous substances, take adequate precautions. Proper personal protective equipment, such as gloves and steel toed boots, should always be worn by all sampling personnel.

6.3. Prior to sampling a groundwater well, the well should be screened for volatile organic compounds and explosive atmosphere immediately upon opening the well. Proper personal protective equipment, such as respiratory protection, may be warranted if screening values exceed threshold limits specified in the health and safety plan.

7.0 CAUTIONS

7.1. Not Applicable

8.0 INTERFERENCES

8.1. Problems that may be encountered using this technique include:

8.1.1. Difficulty in sampling wells with insufficient yield;

8.1.2. Failure of one or more key indicator parameters to stabilize;

8.1.3. Cascading of water and/or formation of air bubbles in the tubing; and

8.1.4. Cross-contamination between wells.

8.2. Insufficient Yield:

8.2.1. Wells with insufficient yield (i.e., low recharge rate of the well) may dewater during purging. Care should be taken to avoid loss of pressure in the tubing line due to dewatering of the well below the level of the pump's intake.

8.2.2. Purging should be interrupted before the water level in the well drops below the top of the pump, as this may induce cascading of the sand pack.

8.2.3. Pumping the well dry should be avoided to the greatest extent possible in all cases.

8.2.4. Sampling should commence as soon as the volume in the well has recovered sufficiently to allow the collection of samples.

8.2.5. Alternatively, groundwater samples may be obtained with techniques designed for the unsaturated zone, such as lysimeters.

8.3. Failure to Stabilize Key Indicator Parameters:

8.3.1. If one or more key indicator parameters fails to stabilize after 2 hours, one of four options should be considered:

8.3.1.1. Continue purging to achieve stabilization;

8.3.1.2. Discontinue purging, do not collect samples, and document attempts to reach stabilization in the log book;

8.3.1.3. Discontinue purging, collect samples, and document attempts to reach stabilization in the log book; or

8.3.1.4. Secure the well, purge and collect samples the next day (preferred). The key indicator parameter for samples to be analyzed for VOCs is dissolved oxygen. The key indicator parameter for all other samples is turbidity.

8.4. Cascading:

8.4.1. To prevent cascading and/or air bubble formation in the tubing, care should be taken to ensure that the flow rate is sufficient to maintain pump suction.

8.4.2. Minimize the length and diameter of tubing (i.e., 1/4 or 3/8-inch ID) to ensure that the tubing remains filled with groundwater during sampling.

8.5. Cross-Contamination

8.5.1. To prevent cross-contamination between wells, it is strongly recommended that dedicated, in-place pumps be used.

8.5.2. As an alternative, the potential for cross-contamination can be reduced by performing the more thorough "daily" decontamination procedures (refer to Reference 5.1) between sampling of each well in addition to the start of each sampling day.

8.6. Equipment Failure

8.6.1. Adequate equipment should be on hand so that equipment failures do not adversely impact sampling activities.

9.0 EQUIPMENT AND SUPPLIES

9.1. Well construction data, location map, field data from last sampling event.

9.2. Polyethylene sheeting

9.3. Flame Ionization Detector (FID) and Photo Ionization Detector (PID).

9.4. Adjustable rate, submersible groundwater sampling pump constructed of stainless steel or Teflon. A peristaltic or positive displacement pump may be used for certain categories of contaminants, provided the rationale is presented and approved in the project QAPP.

9.5. Interface probe or equivalent device for determining the presence or absence of NAPL.

9.6. Teflon or Teflon-lined polyethylene tubing to collect samples for organic analysis. Teflon or Teflon-lined polyethylene, PVC, Tygon or polyethylene tubing to collect samples for inorganic analysis. Use of other tubing material compatible with the contaminants of concern must be presented and approved in the project QAPP. Sufficient tubing of the appropriate material must be available so that each well has dedicated tubing.

9.7. Water level measuring device, minimum 0.01-foot accuracy, (electronic preferred for tracking water level drawdown during all pumping operations).

9.8. Flow measurement supplies (e.g., graduated cylinder and stop watch or in-line flow meter).

9.9. Power source (generator, nitrogen tank, etc.).

9.10. Monitoring instruments (e.g., Aqua Troll® 600 Multiparameter Sonde) for indicator parameters. Eh and dissolved oxygen must be monitored inline using an instrument with a continuous readout display. Specific conductance, pH, and temperature may be monitored either in-line or using separate probes. A nephelometer is used to measure turbidity if not using an inline instrument capable of measuring turbidity.

9.11. Decontamination supplies (refer to Reference 5.1. and 5.7)

9.12. Logbook

9.13. Sample bottles

9.14. Sample preservation supplies (as required by the analytical methods)

9.15. Sample tags or labels, chain of custody

10.0 PROCEDURAL STEPS

10.1. Pre-Sampling Activities:

10.1.1. Start at the well location known or believed to have the least contaminated groundwater and proceed systematically to the well with the most contaminated groundwater. Check the well, the lock, and the locking cap for damage or evidence of tampering. Record observations.

10.1.2. Lay out sheet of polyethylene for placement of monitoring and sampling equipment.

10.1.3. Measure explosive atmosphere levels and ambient air VOCs at the rim of the unopened well with a PID and FID instrument and record the reading in the field log book.

10.1.4. Remove well cap.

10.1.5. Measure explosive atmosphere levels and VOCs at the rim of the opened well with a PID and an FID instrument and record the reading in the field log book.

10.1.6. If the well casing does not have a reference point (usually a V-cut or indelible mark in the well casing), make one. Note that the reference point should be surveyed for correction of groundwater elevations to the mean geodetic datum (MSL).

10.1.7. Measure and record the depth to water (to 0.01 feet) and total well depth in all wells to be sampled prior to purging. Care should be taken to minimize disturbance in the water column and dislodging of any particulate matter attached to the sides or settled at the bottom of the well. If desired, measure and record the depth of any NAPLs using an interface probe. Care should be taken to minimize disturbance of any sediment that has accumulated at the bottom of the well. Record the observations in the log book. If LNAPLs and/or DNAPLs are detected, install the pump now, as described below. Allow the well to stabilize for several days between the measurement or sampling of any DNAPLs and the low-stress purging and sampling of the groundwater.

10.2. Sampling Procedures:

10.2.1. Install Pump: Slowly lower the pump, safety cable, tubing and electrical lines into the well to the depth specified for that well screen in the EPA-approved QAPP or a depth otherwise approved by the EPA regional hydrogeologist or project scientist. The pump intake must be kept at least two (2) feet above the bottom of the well to prevent disturbance and resuspension of any sediment or NAPL present in the bottom of the well. Record the depth to which the pump is lowered.

10.2.2. Measure Water Level: Before starting the pump, measure and record the water level again with the pump in the well. Leave the water level measuring device in the well.

10.2.3. Purge Well: Start pumping the well at 200 to 500 milliliters per minute (ml/min). The water level should be monitored and recorded every three to five minutes. Ideally, a steady flow rate should be maintained so that it results in a stabilized water level (drawdown of 0.3 feet or less). Pumping rates should, if needed, be reduced to the minimum capabilities of the pump to ensure stabilization of the water level. As noted above, care should be taken to maintain pump suction and to avoid entrainment of air in the tubing. Record each adjustment made to the pumping rate and the water level measured immediately after each adjustment.

10.2.4. Monitor Indicator Parameters using the Aqua Troll® 600 Multiparameter Sonde: During purging of the well, monitor and record the field indicator parameters (turbidity, temperature, specific conductance, pH, Eh, and Dissolved Oxygen (DO)) every three to five minutes. The well is considered stabilized and ready for sample collection when the indicator parameters have stabilized for three consecutive readings as follows (Puls and Barcelona, 1996):

- $\pm$0.1 for pH
- $\pm$3% for specific conductance (conductivity)
- $\pm$3% for temperature
- $\pm$10 mv for redox potential
- $\pm$10% for turbidity
- $\pm$10% for DO

Turbidity (10% for values greater than 5NTU; if three Turbidity values are less than 5 NTU, consider the values as stabilized).
Dissolved Oxygen (10% for values greater than 0.5 mg/L, if three Dissolved Oxygen values are less than 0.5 mg/L, consider the values as stabilized).

Dissolved oxygen and turbidity usually require the longest time to achieve stabilization. The pump must not be removed from the well between purging and sampling.

10.2.5. Collect Samples: Collect samples at a flow rate between 100 and 250 ml/min and such that drawdown of the water level within the well does not exceed the maximum allowable drawdown of 0.3 feet. All sample containers should be filled (volatile organics samples filled first) with minimal turbulence by allowing the groundwater to flow from the tubing gently down the inside of the container. Remove pump and tubing from the well. After collection of the samples, the tubing, unless permanently installed, must be properly discarded. Close and lock the well.

10.3. Post-Sampling Activities-Pump Decontamination:

10.3.1. Pre-rinse: Operate pump in a deep basin containing 8 to 10 gallons of potable water for 5 minutes and flush other equipment with potable water for 5 minutes.

10.3.2. Wash: Operate pump in a deep basin containing 8 to 10 gallons of a mixture of potable water and a non-phosphate detergent solution, such as Alconox or Luminox, for 5 minutes. Flush other equipment with fresh detergent solution for 5 minutes. Luminox can be used in place of nitric acid for decontamination of sampling equipment to be used for analyzing samples for metals, use the detergent sparingly.

10.3.3. Rinse: Operate pump in a deep basin containing 8 to 10 gallons of potable water for 5 minutes and flush other equipment with potable water for 5 minutes.

10.3.4. Solvent Rinse: Fill a container such as a PVC tube, with a 25% solvent such as acetone or isopropanol, transfer the pump into the PVC tube container with the solvent and run pump for 5 minutes.

10.3.5. Rinse: Operate pump in a deep basin containing 8 to 10 gallons of potable water for 5 minutes and flush other equipment with potable water for 5 minutes.

10.3.6. Acid Rinse (if Luminox is not utilized): Fill a container such as a PVC tube, with 1% nitric acid ($HNO3$), transfer the pump into the PVC tube container with the acid and run pump for 5 minutes.

10.3.7. Rinse: Operate pump in a deep basin containing 8 to 10 gallons of potable water for 5 minutes and flush other equipment with potable water for 5 minutes.

10.3.8. Final Rinse: Operate pump in a deep basin of distilled/deionized water for 5 minutes and flush other equipment with distilled/deionized water for 5 minutes.

10.3.9. Let pumps and equipment air dry.

10.3.10. Wrap the pumps and equipment individually into aluminum foil.

11.0 DATA AND RECORDS MANAGEMENT

11.1. Data Management

11.1.1. All data and data collection information (e.g., sample date/time, personnel, weather conditions, equipment issues, deviations, etc.) must be documented in a bound field notebook or on a field data sheet with permanent ink. When using the Aqua Troll 600 Multiparameter Sondes, well specific information is collected and/or recorded electronically via a tablet. Each well specific file is subsequently transferred by the project lead to the site-specific file within the LSASDDIV/HWSB-SST/Superfund sites folder on the network.

11.2. Records Management

11.2.1. All project/field-related records must comply with the Region 2 Records Management guidance.

12.0 QUALITY ASSURANCE AND QUALITY CONTROL

12.1. Quality control samples must be collected to determine if sample collection and handling procedures have adversely affected the quality of the groundwater samples. The appropriate EPA Program Guidance should be consulted in determining the appropriate field QC sample requirements documented in the site-specific QAPP.

12.2. All field quality control samples must be prepared in the same manner as the site-specific samples regarding sample volume, containers, and preservation. The following quality control samples are typically collected during the sampling event:

- Field duplicates
- Trip blanks (for VOCs only)
- Equipment rinse blank (not necessary if equipment is dedicated to the well) - collected at the start of the day, prior to using equipment for sample collection.

12.3. As noted above, groundwater samples should be collected systematically, starting with wells with the lowest level of contamination and proceeding to wells with the highest level of contamination.

U.S. Environmental Protection Agency, Region 2
Field Operations Quality Procedures

TECHNICAL STANDARD OPERATING PROCEDURE

Standard Operating Procedure for Groundwater Sampling: Operation of the Multiparameter Water Quality Meters

Effective Date	Number
7/17/2020	FA-SST-T-015

Author	
Name: Graham Ellison	
Title: Life Scientist	
Division/Branch/Section: LSASD/HWSB/SST	
Signature: Ellison	**Date:** 07/14/2020
Review & Approvals	
Name: Michael A. Mercado	
Title: Environmental Scientist	
Signature: Michael A. Mercado	**Date:** 07/15/2020
Name: Amelia Jackson	
Title: Lead Chemist, Superfund Support Team	
Signature: Amelia Jackson	**Date:** 07/16/2020
Name: Jon Gabry	
Title: Chief, Hazardous Waste Support Branch	
Signature: Jon Gabry	**Date:** 07/16/2020
Name:	
Title:	
Signature:	**Date:**

The table below identifies information about the reviews conducted of this SOP.

REVIEW HISTORY		
Date	Reviewer Name	Changes Required (Y/N)
07/13/2020	Graham Ellison	N
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The table below identifies changes to this controlled document and the respective effective date(s) over time.

REVISION HISTORY		
Revision Number	Revision Description	Effective Date
0.0	New SOP – No Changes	07/13/2020

TABLE OF CONTENTS

1.0 PURPOSE AND APPLICABILITY

1.1. This Standard Operating Procedure (SOP) describes the procedures for assembly, calibration, usage and post-use verification of multiparameter water quality meters. This SOP specifically covers the YSI® 556 MPS with YSI® 5563 Probe Module, and the Aqua Troll® 600 Multiparameter Sonde by In-Situ®. Hach turbidity meters are not a multiparameter meters, eventhough they are used in conjunction with both the YSI® and In-Situ® multi-parameter meters when sampling groundwater. These two units are the typical units used by Hazardous Waste Support Branch (HWSB) - Superfund Support Team (SST) personnel. If more information is needed about the Hach units see SOP# FA-T-018. The YSI® and In-Situ® multi-parameter units consist of two parts, the data logger and the sonde. These instruments are used to collect representative water quality data by quantifying the following parameters: temperature (°C), pH in standard units, dissolved oxygen (DO) in milligrams per liter (mg/L), conductivity in micro Siemens per centimeter (µS/cm), turbidity in nephelometric turbidity units (NTU) and oxidation/reduction potential (ORP) in millivolts (mV). Always refer to each unit's Operator's Manual for complete instructions.

2.0 SUMMARY OF PROCESS OR METHODOLOGY

2.1. The multiparameter water quality meters are used to obtain quantitative measurements of the physical characteristics of both surface water and groundwater. Measurements can be collected by submerging the probe directly into the water body, inserting the probe into a water sample, or through a flow cell. The instrument is calibrated prior to data collection and verified immediately following use in the field. Water quality measurements are electronically saved or manually transferred from the digital display into a site logbook or field datasheet. Electronically logged data may be saved and downloaded at a later time. For further information on the YSI® refer to EPA Region 2 HWSB-SST, Calibration logbook.

3.0 DEFINITIONS

3.1. Glossary of Terms

HWSB	Hazardous Waste Support Branch
LSASD	Laboratory Services and Applied Science Division
OSHA	Occupational Safety and Health Administration
QA	Quality Assurance
QC	Quality Control
QAPP	Quality Assurance Project Plan
SST	Superfund Support Team
SOP	Standard Operating Procedure
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

4.0 RESPONSIBILITIES/QUALIFICATIONS

4.1. All field samplers are required to complete the OSHA 40-hour health and safety training course and annual 8-hr refresher courses prior to participation in any field collection activities.

5.0 REFERENCES

5.1. YSI Environmental. August 2009. YSI 556 MPS Multi Probe System, Revision D. Website access, 2017.

5.2. In-Situ. March 2017. Aqua Troll® 600 Multiparameter Sonde, Revision 003. Website access, 2017.

6.0 HEALTH AND SAFETY WARNINGS

6.1. When working with potentially hazardous materials, follow EPA, OSHA and site-specific health and safety procedures.

6.2. Refer to the manufacturer's warnings when using the subject field water quality instrumentation. Specific calibration reagents may have specific health and safety requirements. Refer to the safety data sheet (SDS) for each reagent.

7.0 CAUTIONS

7.1. Wear protective gloves and eyewear when handling calibration reagents as they may be corrosive.

8.0 INTERFERENCES

8.1. Prior to mobilization, the batteries should be checked and replaced or recharged as necessary. Batteries without sufficient charge may result in inaccurate measurements. If any parameter begins to drift during field measurements, consult the unit's operation manual or contact the manufacturer.

8.2. It is important to complete the instrument calibration and post-use verification procedures as soon as possible, at or near the sampling location or site base station. Changes in barometric pressure, altitude, or ambient air temperature will affect the accuracy of the instrument.

8.3. Where possible, work in a shaded area as the readout may become obscured by bright sunlight. If the display is left in direct sunlight, the screen will become unreadable. Prolonged exposure to sunlight may damage the display.

8.4. If moisture gets inside the data logging unit, the unit may become inoperable.

8.5. Contaminated calibration solutions and/or air bubbles on the optical surface of the probe can lead to calibration errors when measuring turbidity. False turbidity readings may occur in clean water samples if the probe was not cleaned properly when last returned from the field and then recalibrated. Suspended particles in water may cause the turbidity readings to fluctuate.

9.0 EQUIPMENT AND SUPPLIES

9.1. The equipment required for field operation includes the following:

- Water Quality Meter Case (data logger, sonde, connection cable, and other associate parts stored within the case)
- Storage/calibration cup
- Flow-through cell (optional based on sample type)
- Tablet or Logbook (based on sonde unit)
- Soft paper wipes
- Five-gallon bucket (or similar)

9.2. The equipment required for calibration includes the following:

- National Institute of Standards and Technology (NIST) traceable thermometer (glass, -1 to 51 degrees Celsius[°C])
- Ring stand
- Clamp

9.3. The reagents required for calibration include the following:

- AMCO Clear – GFS Chemical, for use as a “10” and “100” NTU turbidity standard
- Air moisture determines DO.
- Potassium Chloride (KCl) Solution for replacement of DO membrane.
- NIST-traceable pH buffer solutions, (4.00, 7.00, and 10.00 standard units [S.U.]).
- NIST-traceable turbidity standard solutions, 10 NTU and 100 NTU standards – for the In-Situ® sonde. (If the turbidity probe is used on In-Situ®)
- NIST-traceable conductivity standard solution, 1413 uS/cm standard.
- NIST-traceable ORP powder or solution.

10.0 PROCEDURAL STEPS

10.1. Assembly

The two major components of the YSI® multi-parameter water quality meter are the data logger and the combined data cable and probe module (sonde); which houses the probes. To assemble, connect the data cable to the data logger by aligning the key on the data cable male connector to the slot in the data logger's connector head without forcing the pins into the connector.

The three major components of the In-Situ® multi-parameter water quality meter are the data logger, data cable, and probe module (sonde); which houses the probes. To assemble, first connect the data cable to the sonde by aligning the key on the data cable male connector to the slot in the sonde's connector head. Then connect the other end of the data cable to the data logger without forcing the pins into the connector. However, the In-Situ® does not require the data cable to operate unless submerging directly into a water body. The In-Situ® meters are able to communicate via Bluetooth.

10.2. Calibration

Calibration and/or verification and inspection of the water quality meter should be performed on a daily basis when in the field to adjust for changing field conditions. The inspection and calibration of the water quality meter includes:

- Testing and calibration of probes
- Inspection and cleaning of seal areas
- Replacement of damaged O-rings
- Replacement of membranes and electrolytes, as needed
- Battery check or replacement
- Documentation of calibration and maintenance is electronically saved or manually transferred from the digital display into a site logbook

Refer to each unit's operation manual prior to calibration. The YSI® and In-Situ® meters use individual solutions to calibrate the various sensors. For further information, follow sections 10.2.1 through 10.2.6 listed below. A multi-parameter solution can be used to calibrate the YSI® or In-Situ® for pH, conductivity, turbidity, and dissolved oxygen or individual solutions can be used.

For complete step-by-step instructions or troubleshooting, refer to each unit's specific user manuals as calibration procedures vary.

10.2.1. Temperature Verification

- Verification of the temperature sensor should be performed annually. The sensor is inserted into a bucket filled with water of a known temperature by using the NIST-traceable thermometer. Wait five minutes to allow the sensor probe and NIST-traceable thermometer to stabilize. Document the reading electronically in the equipment or manually transferred from the digital display into a site logbook. If the displayed temperature is greater than (>) ±5°C from the reference thermometer, the probe may need to be replaced.

10.2.2. Dissolved Oxygen Calibration

- Dissolved Oxygen (DO) calibration should be performed every two months when not in normal use to verify that the probe is operational. During field use the calibration must be made daily to adjust for atmospheric and other changes that can alter DO readings.
- The DO probe is calibrated using either the Winkler titration method of an aqueous solution or the Percent Saturation method in air. The latter method avoids the use of additional chemicals and hardware and is summarized here.
- Prior to DO calibration, determine the local barometric pressure in millimeters of mercury (mm Hg) with a calibrated altimeter/ barometer. The YSI® meter will prompt the user to enter the barometric pressure. However, most YSI® meters and all In-Situ® are equipped with an internal barometer, no entry is required. Place approximately three milliliters (mL) of water, or a damp sponge, in the bottom of the calibration cup. Place the probe end of the sonde into the cup, being careful not to submerge either the DO or temperature probe into the water. Ensure the DO probe is vented to the atmosphere by engaging only one or two threads into the calibration cup. Wait approximately 10 to 15 minutes for the air in the calibration cup to become saturated with water vapor and for the temperature to stabilize. The DO calibration procedure will automatically calibrate the probe in milligrams/liter (mg/L). Document the barometric pressure and sensor calibration results electronically in the equipment or manually transferred from the digital display into a site logbook.
- If the sensor fails to calibrate, the probe may need to be replaced.

10.2.3. Conductivity Calibration

- For conductivity calibration, rinse the calibration cup and probes with deionized or distilled water followed by a small amount of the conductivity solution. Fill the calibration cup with a known conductivity standard of 1413uS/cm and then immerse the probe end of the sonde into the solution until past the vent hole. Allow the temperature to equilibrate and conductivity readings to stabilize for at least one minute before proceeding. Enter the theoretical calibration value used during calibration (e.g., 10 mS/cm) into the unit.
- Following calibration, rinse the sonde in tap or deionized/distilled water. Document the concentration, lot number and expiration date of conductivity

solution used and calibration results electronically in the equipment or manually transferred from the digital display into a site logbook.

- If the sensor fails to calibrate it may need to be replaced.

10.2.4. pH Calibration

- Calibration procedures for pH are similar for the YSI® and In-Situ® instruments. A three-point calibration is performed within a specific calibration range (pH 4-7-10 range). Before beginning the three-point calibration procedure, the anticipated pH to be measured should be known. Record the calibration solutions used, their lot numbers, and expiration dates electronically in the equipment or manually transferred from the digital display into a site logbook.
- Rinse the calibration cup and sonde with deionized or distilled water. Fill the cup above the pH probe with the pH 7 buffer solution. Enter the actual pH value based on the calibration temperature. Document the pH value reported on the meter once the reading has stabilized. Rinse the cup and sonde with deionized or distilled water and dry. Then rinse with a small amount of pH 4 buffer and discard. Fill the cup with pH 4 buffer solution. Again, enter the actual pH value based on the calibration temperature. Document the pH value reported on the meter once the reading has stabilized. Remove the sonde and rinse both the cup and the sonde with deionized or distilled water and dry. Then rinse with a small amount of pH 10 buffer and discard. Fill the cup with pH 10 buffer solution. Again, enter the actual pH value based on the calibration temperature. Document the pH value reported on the meter once the reading has stabilized. Remove the sonde and rinse both the cup and the sonde with deionized or distilled water.
- If the sensor fails to calibrate, the probe may need to be replaced.

10.2.5. Turbidity Calibration

- The YSI® meter does not contain a turbidity probe.
- The In-Situ meter contain a turbidity probe. If the turbidity probe is going to be used, A two-point calibration is performed to calibrate the turbidity sensor. First, rinse the calibration cup with deionized or distilled water. Fill the cup with the 10 NTU turbidity standard. Agitate the sonde making sure no air bubbles adhere to the probe. Document the turbidity value reported on the meter once the reading has stabilized. Once calibrated, rinse the calibration cup with deionized or distilled water. Rinse the cup with a small amount of the 100 NTU turbidity standard. Fill the cup above the turbidity probe with the 100 NTU turbidity standard. Agitate the sonde, making sure no air bubbles adhere to the probe. Once the reading has stabilized, document the value reported, confirming the calibration.
- If the sensor fails to calibrate, the probe may need to be replaced.
- Record the calibration solutions used, their lot numbers and expiration dates in the field equipment or site logbook.

10.2.6. Oxidation-Reduction Potential (ORP) Calibration

- The ORP sensor must be verified that it is functioning correctly. First rinse the calibration cup with deionized or distilled water. Fill the cup with the ORP solution (Zobell 229mV @25C solution). Using the keypad that comes with the Zobell solution, enter the correct value of the calibration solution using the current temperature. Reading should fall between the corresponding range value.
- Record the calibration solution used, lot number and expiration date in the field equipment or site logbook
- If the sensor fails to calibrate, the probe may need to be replaced.

10.2.7. Post Calibration Check

- Confirm and verify the calibration standards and sonde units are functioning properly with a Post Calibration Check / Secondary Source Calibration Standard Check with multiparameter solution (YSI Quick Cal Solution) as per manufacturer's instructions.

10.3. Field Measurements

10.3.1. Submersion

- For collecting measurements directly from a water body with a YSI®, remove the storage cup and thread on the weighted guard, then immerse the probe. Use a rope or string to lower and raise the probe into the water. Never use the data cable to lower and raise the sonde into and out of water as this may damage the cable. Allow several minutes for the readings to stabilize to ensure accurate readings. Record the parameter values in a site logbook. When measurements are complete, remove the weighted guard and replace the storage cup.
- For collecting measurements directly from a water body with an In-Situ, flip guard so that the slots are down. Attached the Data Cable as describe in section 10.1. Once connections are secure and Sonde is operating then immerse the sonde unit. Use a rope or string to lower and raise the sonde into the water. Never use the data cable to lower and raise the sonde into and out of water as this may damage the cable. Allow several minutes for the readings to stabilize to ensure accurate readings. Record the parameter values electronically in the equipment or manually transferred from the digital display into a site logbook. When measurements are complete, remove the weighted guard and replace the storage cup.

10.3.2. Sample Cup

- The sample cup may be used to make measurements of grab samples. Fill the cup approximately ¼ full of the water to be sampled, agitate and discard the water. Then, fill the cup until it's nearly full, with the probe sensors completely covered. After allowing time for the values to stabilize, record the parameter values electronically in the equipment or manually transferred from the digital display site into a logbook.

10.3.3. Flow-Through Cell

- The flow-through cell is used to collect multi-parameter measurements while purging a groundwater monitoring well during low-flow sampling. Prior to collecting measurements, the first couple minutes of purging must be done outside of the flow-through cell to prevent sediments from entering the cell. This will help prevent possible false turbidity readings. The pumping rate must be adjusted so that no air bubbles are present. Measurements can be made at periodic intervals either manually or by programming the data logger. Parameter values are then recorded electronically in the equipment or manually transferred from the digital display into a site logbook.

10.4. Post-Use Verification

Follow the same procedures for initial calibration, except for the adjustment of parameter values. Instead, record the readings for each parameter and document in a logbook. Post-verification ensures the reliability of the field measurements by demonstrating that the instrument calibration did not drift during the monitoring period. Any significant deviations (+/- 10%) in the calibration status of the instrument should be incorporated into the final interpretation of the water quality data.

10.5. Decontamination

The following steps should be followed to decontaminate the unit after each field mobilization:

1. Clean the entire sonde and the data cable with a cloth and mild liquid detergent solution and then rinse with deionized or distilled water. If necessary, a soft brush or cotton swab may be used to clean between the probes. Repeat this step as many times as necessary to remove all visible contamination.

2. Add deionized or distilled water to the storage cup and fasten to the sonde.

3. Agitate the instrument gently to further remove any contaminants or detergent.

4. Wipe the pH probe with lens cleaner or a cotton swab. Do not use abrasive cloths to wipe the probe.

5. Repeat Steps 2 through 4 until the probes are clean. Do not use acetone, organic solvents, nitric acid or harsh detergents to clean the instrument. Once the unit is decontaminated, it is ready for calibration or storage. If calibrating, refer to Section 7.2 for calibration instructions. If storing the unit, refer to Section 3.0.

6. Due to limitations on decontamination methods, no samples should be collected directly from the water quality parameter device. Once the sample stream has achieved steady state conditions required for sampling, the water quality device must be removed prior to sampling.

10.6. Maintenance

Maintenance schedules are followed as outlined by manufacturers' guidelines. The replacement of probes should be done by a qualified individual. See each unit's operation manual for maintenance

11.0 DATA AND RECORDS MANAGEMENT

11.1. Data Management

11.1.1. All field data collection and information (e.g., sample date/time, personnel, weather conditions, equipment issues, deviations, etc.) must be documented electronically in the equipment or manually transferred from the digital display into a site logbook in permanent ink. The field equipment or field logbook should document the following:

- Field observations of sampling event
- Name of sample collector(s)
- Weather conditions
- QA/QC data for field instruments

11.2. Records Management

11.2.1. All project/field-related records must comply with the Region 2 Records Management guidance.

12.0 QUALITY ASSURANCE AND QUALITY CONTROL

12.1. Specific QA/QC activities that apply to the implementation of these procedures will be listed in the QAPP prepared for the applicable monitoring event. The following general QC procedures will also apply:

- Equipment will be calibrated prior to field use and post-verified after field use as per Sections 7.2 and 7.4.

- All data must be documented in electronically on the appropriate field equipment or manually in the site logbooks.

- Record the manufacturer lot numbers and expiration dates of all calibration standards used in the instrument logbook. Ensure all standards and solutions are not expired.

- The units are inspected quarterly and documented in the equipment logbook to ensure they are functioning properly. This will allow the user time to find and replace defective probes or components before going into the field. If units are rented, a copy of the preventive maintenance and calibration done by the environmental rental company will be requested. Renting the unit does not reduce the number of QC checks that need to be performed.

13.0 APPENDICES

13.1. A – Water Quality Meters

Example of the YSI® 556 MPS with YSI® 5563 Probe Module

Example of the Aqua Troll® 600 Multiparameter by In-Situ®

U.S. Environmental Protection Agency, Region 2
Field Operations Quality Procedures

TECHNICAL STANDARD OPERATING PROCEDURE

Standard Operating Procedure for Groundwater Sampling: Operation of the Hach 2100Q Turbidity Meters

Effective Date	Number
9/1/2020	FA-SST-T-018

Author			
Name:	Michael A. Mercado		
Title:	Environmental Scientist		
Division/Branch/Section:	LSASD/HWSB/SST		
Signature:	Michael A. Mercado	**Date:**	08/27/2020

Review & Approvals			
Name:	Graham Ellison		
Title:	Physical Scientist		
Signature:	Graham Ellison	**Date:**	08/27/2020
Name:	Amelia Jackson		
Title:	Lead Chemist, Superfund Support Team		
Signature:	Amelia Jackson	**Date:**	08/27/2020
Name:	Jon Gabry		
Title:	Chief, Hazardous Waste Support Branch		
Signature:	Jon Gabry	**Date:**	08/27/2020
Name:			
Title:			
Signature:		**Date:**	

The table below identifies information about the reviews conducted of this SOP.

REVIEW HISTORY		
Date	Reviewer Name	Changes Required (Y/N)

The table below identifies changes to this controlled document and the respective effective date(s) over time.

REVISION HISTORY		
Revision Number	Revision Description	Effective Date
0.0	New SOP – No Changes	09/01/2020

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1.0 PURPOSE AND APPLICABILITY

This Standard Operating Procedure (SOP) describes the procedures for assembly, calibration, usage, and post-use verification of the Hach 2100Q Turbidity meters. The Hach turbidity meter is used in conjunction with both the YSI® and In-Situ® multi-parameter meters when sampling groundwater. These three units are the typical units used by Hazardous Waste Support Branch (HWSB) - Superfund Support Team (SST) personnel. For more information on the use of the YSI® and In-Situ® multi-parameter meters refer to SOP# FA-SST-T-015. The Hach unit is used to collect representative water quality data by quantifying turbidity in nephelometric turbidity units (NTU). Always refer to the unit's Operator's Manual for complete instructions.

2.0 SUMMARY OF PROCESS OR METHODOLOGY

The turbidity method is based upon a comparison of intensity of light scattered by a sample under defined conditions with the intensity of light scattered by a standard reference suspension. A turbidimeter is a nephelometer with a visible light source for illuminating the sample and one or more photo-electric detectors placed ninety degrees to the path of the light source. The Hach 2100Q has a range from 0 to 1000 NTU at an accuracy $\pm$2%.

3.0 DEFINITIONS

Glossary of Terms

HWSB	Hazardous Waste Support Branch
LSASD	Laboratory Services and Applied Science Division
NTU	Nephelometric Turbidity Unit
OSHA	Occupational Safety and Health Administration
QA	Quality Assurance
QC	Quality Control
QAPP	Quality Assurance Project Plan
SST	Superfund Support Team
SOP	Standard Operating Procedure
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

4.0 RESPONSIBILITIES/QUALIFICATIONS

All field sampling personnel are required to complete the OSHA 40-hour health and safety training course and annual 8-hr refresher courses prior to participation in any field collection activities.

5.0 REFERENCES

HACH. December 2017, User Manual. 2100Q and 2100Qis, Edition 4. Website access.

https://www.hach.com/2100q-portable-turbidimeter/product-downloads?id=7640450963

6.0 HEALTH AND SAFETY WARNINGS

6.1. When working with potentially hazardous materials, follow EPA, OSHA, and site-specific health and safety procedures presented in the approved site-specific Health & Safety Plan.

6.2. Refer to the manufacturer's specifications, instructions and warnings when using the subject field water quality instrumentation. Specific calibration reagents may have specific health and safety warnings and/or requirements. Refer to the safety data sheet (SDS) for each reagent prior to use.

7.0 CAUTIONS

Wear protective gloves and eyewear when handling calibration reagents as they may be corrosive.

8.0 INTERFERENCES

8.1. Prior to mobilization, the batteries should be checked and replaced or recharged as necessary. Batteries without sufficient charge may result in inaccurate measurements.

8.2. It is important to complete the instrument calibration and post-use verification procedures at or near the sampling location. Changes in barometric pressure, altitude, or ambient air temperature will affect the accuracy of the instrument.

8.3. Where possible, work in a shaded area as the readout may become obscured by bright sunlight. If the display is left in direct sunlight, the screen will become unreadable. Prolonged exposure to sunlight may damage the display.

8.4. Protect the data logging unit from water. If moisture gets inside the data logging unit, the unit may become inoperable.

8.5. Contaminated calibration solutions and/or air bubbles can lead to calibration errors when measuring turbidity. False turbidity readings may occur in clean water samples if the sample cell was not cleaned properly when last returned from the field and then recalibrated. Suspended particles in water may cause the turbidity readings to fluctuate.

8.6. Always use a sample cell that is clean and in good condition. Dirt, scratches or damaged sample cells can lead to inaccurate readings.

8.7. Cold samples can generate condensation (i.e., fogging) on the sample cell that will interfere with readings.

9.0 EQUIPMENT AND SUPPLIES

9.1. The equipment required for field operation includes the following:

- Turbidity Meter Case (data logger, sample cells, and other associate parts stored within the case)

- Logbook
- Soft paper wipes

9.2. The equipment required for calibration includes the following:

- None

9.3. The reagents required for calibration include the following:

- STABLCAL AMPULE CALIBRATION KIT, 2100Q, 10 NTU, 20 NTU, 100 NTU, and 800 NTU standards

10.0 PROCEDURAL STEPS

10.1. Assembly

None required

10.2. Calibration: The manufacturer recommends calibration of the unit every three months (when units are in storage).

10.2.1. Prior to field operation a full calibration should be conducted.

- Full calibration consists of using the StablCal Standard 20, 100, and 800 NTU.
- Follow the calibration procedures specified in the operator manual.

10.2.2. During field operation a daily calibration verification must be conducted prior to analyzing any site samples.

- At the start of the day, perform a daily calibration verification using the StablCal Standard 10 NTU and follow the calibration verification procedures specified in the operator manual. The default setting for acceptance criteria is 10%. If exceeded, clean the cell and repeat the calibration verification.

10.3. Field Measurements

- Fill a sample cell to the line (about 15 ml).
- Cap the sample cell. Wipe the cell to remove water spots and fingerprints.
- Turn the meter on and place it on a flat, sturdy surface (do not hold the meter while making measurements).
- Gently invert and then insert the sample cell into the meter. Align the orientation mark on the sample cell with the raised orientation mark of the meter.
- Fully close the lid. Push the read button on the meter and wait while the meter goes thru stabilization.
- Once the meter is stabilized, it will provide a reading on the front display screen.

- Measurements can be made manually at periodic intervals.
- Values are then recorded in a site logbook.

10.4. Post-Use Verification

Verify calibration using the StablCal Standard 10 NTU and follow the calibration verification procedures specified in the operator manual. Post-verification ensures the reliability of the field measurements by demonstrating that the instrument calibration did not drift during the monitoring period.

10.5. Decontamination

The following steps must be followed to decontaminate exterior surfaces of the unit after each field mobilization:

- Clean the entire unit with a cloth and mild liquid detergent solution. Wipe with a slightly damp cloth. If necessary, a soft brush or cotton swab may be used to clean between the probes. Repeat this step as many times as necessary to remove all visible contamination. Use care to not scratch the turbidity cell surface.
- Ensure no water remains in the sample cell. Sample water could tint the sample cell or impart dissolved salts or solids making subsequent readings biased high. Rinse with deionized or distilled water and thoroughly dry as needed.

10.6. Maintenance

Maintenance schedules are followed as outlined by the manufacturer's recommendations and guidelines. See the unit's operation manual for maintenance schedules.

11.0 DATA AND RECORDS MANAGEMENT

11.1. Data Management

All field data collection and information (e.g., sample date/time, personnel, weather conditions, equipment issues, deviations, etc.) must be documented on the appropriate field equipment or data sheet in permanent ink. The field equipment or field logbook must also document the following:

- Field observations of sampling event
- Name of sample collector(s)
- Weather conditions
- QA/QC data for field instruments

11.2. Records Management

All project/field-related records must comply with the Region 2 Records Management guidance.

12.0 QUALITY ASSURANCE AND QUALITY CONTROL

Specific QA/QC activities that apply to the implementation of these procedures will be listed in the QAPP prepared for the applicable monitoring event. The following general QC procedures will also apply:

- Equipment will be calibrated prior to field use, daily while in field and post-verified after field use as per Sections 10.2 and 10.4.

- Record the manufacturer lot numbers and expiration dates of all calibration standards used in the instrument logbook. Ensure all standards' and solutions' expiration dates are not exceeded. The units are inspected quarterly and documented in the equipment logbook to ensure they are functioning properly. Equipment logbooks will be checked one to two weeks prior to the field sampling event. This will allow the user time to find and replace defective components before going into the field. If units are rented, a copy of the preventive maintenance and calibration performed by the environmental rental company will be requested. Renting the unit does not reduce the number of QC checks that need to be performed.

Appendix C-1
LOOHN'S CLEANERS AND LAUNDERERS UFP-QAPP 2022-EPA LSASD LAB VOC ANALYSIS SOP DW-1

STANDARD OPERATING PROCEDURE

ANALYSIS OF VOLATILE ORGANIC COMPOUNDS IN WATER BY PURGE AND TRAP GC/MS

Signature and Title

Prepared by:	MARIA JAVIER Digitally signed by MARIA JAVIER Date: 2020.10.13 09:00:37 -04'00'	
	Maria E. Javier, Chemist, OICS	Date
Peer Reviewed by:	GIRMA ADMASSU Digitally signed by GIRMA ADMASSU Date: 2020.10.14 11:17:35 -04'00'	
	Girma Admassu, Chemist, OICS	Date
QA Reviewed by:	SUMY CHERUKARA Digitally signed by SUMY CHERUKARA Date: 2020.10.14 11:32:59 -04'00'	
	Sumy Cherukara, QAO, Laboratory Branch	Date
Approved by:	GREGORY SANTACROCE Digitally signed by GREGORY SANTACROCE Date: 2020.10.14 11:46:09 -04'00'	
	Gregory J. Santacroce, Section Chief, OICS	Date
Approved by:	John Bourbon Digitally signed by John Bourbon Date: 2020.10.14 12:38:41 -04'00'	
	John R. Bourbon, Chief, Laboratory Branch	Date

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 2
LABORATORY SERVICES AND APPLIED SCIENCE DIVISION
LABORATORY BRANCH

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STANDARD OPERATING PROCEDURE (SOP)

VOLATILE ORGANICS IN WATER BY PURGE AND TRAP GC/MS

1. Scope and Application

1.1 This SOP can be used to quantitate most volatile organic compounds that have boiling points below 200°C and are insoluble or slightly soluble in water. See Table 2 for a list of compounds, retention times, and their characteristic ions that have been evaluated on a purge-and-trap GC/MS system.

1.2 The Reporting Limit for each target analyte is 0.5 ug/L except for ketones, which is 5.0 ug/L. The reporting limits for Total Xylenes Reporting is 0.5 ug/L. The Reporting Limit is based on the concentration of the lowest calibration standard analyzed. NOTE: This SOP is not applicable to drinking water compliance sample analyses.

2. Summary of Method

2.1 A 5.0 mL or 25.0 mL water sample containing the analytes, surrogate standard and internal standard compounds is purged with helium via a purge-and-trap apparatus and collected on a 'K' or equivalent analytical trap. The trap is then heated; the analytes desorb into a helium carrier gas and collect in a gas chromatographic column. The analytes are eluted via a GC with a temperature program. They are in turn identified and quantified by the mass selective detector.

2.2 If the water sample as received is suspected to contain a high concentration of analytes, the sample is diluted (say, 5 mL to 25 mL) before introducing it into the purge-and-trap apparatus.

3. **Definition**s

All definitions may be found in EPA SOP-G-15 or Section 3.0 of EPA Method 524.2 Revision 4.1 August 1995.

4. Interferences

4.1 During analysis, major contaminant sources are volatile materials in the laboratory and impurities in the inert purging gas and in the sorbent trap. The use of Teflon tubing, Teflon thread sealants, or flow controllers with rubber components in the purging device should be avoided since such materials out-gas organic compounds which will be concentrated in the trap during the purge operation. Analyses of laboratory reagent blanks provide information about the presence of contaminants. When potential interfering peaks are noted in laboratory reagent blanks, the analyst should change the purge gas source and regenerate the molecular sieve purge gas filter. Subtracting blank values from sample results is not permitted.

4.2 Interfering contamination may occur when a sample containing low concentrations of volatile organic compounds is analyzed immediately after a sample containing relatively high concentrations of volatile organic compounds. A preventive technique is between-sample rinsing of the purging apparatus and sample syringes with two portions of reagent water. After analysis of a sample containing high concentrations of volatile organic compounds, one or more laboratory reagent blanks should be analyzed to check for cross-contamination.

4.3 Special precautions must be taken to determine methylene chloride. The sample storage area should be isolated from all atmospheric sources of methylene chloride, otherwise random background levels will result. Since methylene chloride will permeate Teflon tubing, all GC carrier gas lines and purge gas plumbing should be constructed of stainless steel or copper tubing. Lab coats should be cleaned frequently since clothing previously exposed to methylene chloride fumes during common liquid/liquid extraction procedures can contribute to sample contamination.

4.4 Traces of ketones, methylene chloride, and some other organic solvents can be present even in the highest purity methanol. This is another potential source of contamination, and should be assessed before standards are prepared in the methanol.

4.5 Instrument born contamination should be monitored at trace levels. Even if instrument blanks run show no analytes above reporting levels, examine for spectra that would contribute just enough for false positive results in samples.

5. **Safety**

5.1 The toxicity and carcinogenicity of each reagent used in this method has not been fully established. Each chemical should be regarded as a potential health hazard and exposure to these compounds should be minimized by good laboratory practices, e.g. wear proper protective equipment, safety glasses, gloves, lab coat and working inside hoods whenever possible.

5.2 Refer to the Edison Facility Safety Manual Region II Part 2 – Laboratory Safety and Appendices 13/13A - Chemical Hygiene Plan for specific guidelines. The manual is available on the Region II Intranet. A hard copy is available in the Laboratory Office Area.

5.3 For detailed explanations consult the Material Safety Data Sheets (MSDS), available in the Laboratory Office area. MSDS are also electronically available.

5.4 The following method analytes have been tentatively classified as known or suspected human or mammalian carcinogens: benzene, carbon tetrachloride, 1,4-dichlorobenzene, 1,2-dichloroethane, hexachlorobutadiene, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, chloroform, 1,2-dibromoethane, tetrachloroethene, trichloroethene, and vinyl chloride. Pure standard materials and stock standard solutions of these compounds should be handled in a hood. A NIOSH/MESA approved toxic gas respirator should be worn when the analyst handles high concentrations of these toxic compounds.

6. **Apparatus and Equipment**

6.1 Gas Chromatograph

The gas chromatography (GC) system unit must be capable of temperature programming and have a flow controller that maintains a constant column flow rate throughout desorption and temperature program operations. The system must include or be interfaced to a purge and trap system, and have all required accessories including syringes, analytical columns, and gases. All GC carrier gas lined must be constructed from stainless steel or copper tubing. Non-PTFE thread sealants, or flow controllers with rubber components are not to be used.

6.2 Mass Spectrum Detector (MSD)

The MSD will scan from 35 to 260 AMU every 1 sec or less, using 70 volts (nominal) electron energy in the electron impact ionization mode.

6.3 Purge and Trap device: Velocity-XPT concentrator with moisture control system and autosampler, or equivalent. Also, use of a multi-station autosampler unit with combined P/T such as a Teledyne-Tekmar Atomx or equivalent. The outlet from the concentrator is connected to the GC inlet.

6.4 Agilent DB-VRX GC column, 20 meters long, 0.18 mm I.D, or equivalent. See Section 10 for details and operating conditions.

6.5 Syringe and syringe valves

6.5.1 Syringes - 0.5 mL and 1.0 mL gas tight with shut-off valve

6.5.2 Micro syringes - 10 µL to 500 µL, gastight.

6.6 Samples and standard solution storage containers

6.6.1 Sample containers - 40 mL screw cap vials equipped with a Teflon-faced silicone septum.

6.6.2 Standard solution storage containers - 1.0 mL to ~ 15 mL.

7. Reagents and Standards

All purchased and prepared standards and reagents are recorded in Element which assigns a unique ID# to each. All containers must be labeled with the Name, ID#, concentration, preparation date and expiration date (where applicable). Please refer to SOP # G-9 for details.

7.1 Trap Packing Materials – ‘K’ or equivalent analytical trap.

7.2 Reagents

7.2.1 Reagent water is defined as a water in which an interference is not observed ≥ the MDL of each analyte of interest.

7.2.2 Methanol - Demonstrated to be free of analytes.

7.3 Internal /Surrogate Standard Solution: A solution containing the internal standards and surrogate compounds is required to prepare laboratory reagent blanks, and to fortify each sample. Prepare a fortification solution containing Fluorobenzene, Ethylbenzene-d_{10}, and Toluene-d_8 (the internal standards), with 1,2-Dichloroethane-d_4 and p-Bromofluorobenzene (BFB) (the surrogates) in methanol at concentrations of 25 µg/mL of each (any appropriate concentration is acceptable – for a 5-mL purge volume, 5 µg/mL is prepared). A 5 µL aliquot of this solution added to a 25-mL water sample volume gives concentrations of 5 µg/L final concentration. Additional internal standards and surrogate analytes are optional. Any additional surrogate compounds used should be similar in physical and chemical characteristics to the analytes of concern. Up to 20 mL of this solution can be prepared and used in the autosampler reservoir. The solution is dated and used for up to three (3) months or until degradation in sensitivity becomes apparent.

7.4 Preparation of Calibration Standards: The number of calibration solutions (CALs) needed depends on the calibration range desired. Currently, the range is 0.5 to 60 µg/L for a six-point calibration curve. Other ranges and calibration points may be applicable depending on survey requirements. A minimum of four CAL solutions is required. Every CAL solution contains the internal standard and the surrogate compounds at the same concentration of 5 µg/L, which are dispensed from the autosampler reservoir. To prepare a calibration standard, add an appropriate volume of a primary dilution standard containing all analytes of concern to an aliquot of reagent water in a 50-mL volumetric flask. Use a microsyringe and rapidly inject the methanol solutions below the surface of the water into the expanded area of the filled volumetric flask. Remove the needle as quickly as possible after injection. Stopper the flask and mix by inverting the flask three times only. Transfer to 40 mL VOA vial with no headspace, and discard the remainder appropriately.

7.5 Initial Calibration Verification Standard- The laboratory standard solution used for verifying the initial calibration is prepared from a stock standard solution, which in turn is prepared from alternate source VOC standard mixes. The final concentration for the initial calibration verification standard is 5 µg/L.

7.6 Hydrochloric Acid (1+1)

7.7 Ascorbic Acid - ACS Reagent Grade, Granular

7.8 Sodium Thiosulfate - ACS Reagent Grade, Granular

Note: A new cracked open standard would have an expiration date of 3 months. This expiration would supersede any longer manufacturer's expiration date or until degradation in sensitivity becomes apparent. These standards are stored at -10 to -20 °C.

8. Sample Collection, Preservation, Storage & Holding Time

8.1 Samples are collected in the field in triplicate and presented to the laboratory for analysis. The samples must be in 40 ml vials capped with Teflon-faced silicone rubber septa and contain no air space. If samples contain air bubble(s) or headspace, a case narrative would have to indicate the condition.

8.2 The samples must be chilled to 4° ± 2°C when collected and maintained at that temperature until analysis. The samples must be analyzed within 14 days of sample collection if preserved with HCl to a pH < 2 at the time of collection. Samples taken in the field, which cannot be preserved w/HCl for any reason, must be analyzed within seven days from the date of sample collection.

8.3 The samples are stored in the VOC sample refrigerator located in Bay D, kept at 4° ± 2°C.

9. Sample Preparation

9.1 Sample Introduction and Purging

9.1.1 This method is designed for a 25-mL or 5-mL sample volume, but a smaller (5 mL) sample volume is recommended if the GC/MS system has adequate sensitivity to achieve the required method detection limits. An automated sampling device is employed for sample introduction to the purge and trap concentrator. Currently, a Teledyne Tekmar Atomx Autosampler/Purge & Trap instrument or equivalent is used. This allows field to instrument analysis without sample exposure as done in previous procedures. This minimizes loss of volatile components, since the sample is obtained directly from the sample container.

9.1.2 Adjust the helium purge gas flow rate to 40 mL/min. on the purge and trap concentrator.

9.1.3 Samples are placed in the autosampler tray after coming to room temperature.

9.1.4 The autosampler and concentrator are controlled by a computer program. Computer program is set up to initiate an appropriate schedule for transfer of the sample, purging and desorption. The autosampler adds a 1 µL (or other appropriate volume) of the fortification solution containing the internal standard and the surrogates from the autosampler reservoir.

9.1.5 Standards and samples must be analyzed exactly in the same manner. Room temperature must be reasonably constant, and changes in excess of 10°F will adversely affect the accuracy and precision of the method.

9.2 Sample Desorption

9.2.1 Non-cryogenic (split/split less) interface - After the 11-min purge, place the purge and trap system in the desorb mode and preheat the trap to 245°C without a flow of desorption gas. Then initiate the flow of desorption gas at a flow rate suitable for the column being used (optimum desorb flow rate is 40 mL/min) for 1 min., begin the GC temperature program, and start data acquisition.

9.2.2 While the trapped components are being introduced into the gas chromatograph (or cryogenic interface), empty the purging device using the sample syringe and wash the chamber with two 5 or 25-mL flushes of reagent water, dependent on purge volume. After the purging device has been emptied, leave syringe valve open to allow the purge gas to vent through the sample introduction needle.

9.2.3 The autosampler/concentrator combination used in this method are programmed to accomplish the procedures outlined in 11.2.1 and 11.2.2.

9.3 TRAP RECONDITIONING - After desorbing the sample for 1 minute, recondition the trap by returning the purge and trap system to the bake mode. Maintain the trap temperature at 270°C. Maintain the moisture system, if utilized, at 300°C to remove residual water for 4 minutes.

9.4 TERMINATION OF DATA ACQUISITION - When all the sample components have eluted from the GC, terminate MS data acquisition. Use appropriate data output software to display full range mass spectra and appropriate plots of ion abundance as a function of time. If any ion abundance exceeds the system working range, dilute the sample aliquot in the second syringe with reagent water and analyze the diluted aliquot.

9.5 IDENTIFICATION OF ANALYTES - Identify a sample component by comparison of its mass spectrum (after background subtraction) to a reference spectrum in the user-created data base. The GC retention time of the sample component should be within three standard deviations of the mean retention time of the compound in the calibration mixture.

9.5.1 In general, all ions that are present above 10% relative abundance in the mass spectrum of the standard should be present in the mass spectrum of the sample component and should agree within absolute 20%. For example, if an ion has a relative abundance of 30% in the standard spectrum, its abundance in the sample spectrum should be in the range of 10 to 50%. Some ions, particularly the molecular ion, are of special importance, and should be evaluated even if they are below 10% relative abundance.

9.5.2 Identification requires expert judgment when sample components are not resolved chromatographically and produce mass spectra containing ions contributed by more than one analyte. When GC peaks obviously represent more than one sample component (i.e., broadened peak with shoulder(s) or valley between two or more maxima), appropriate analyte spectra and background spectra can be selected by examining plots of characteristic ions for tentatively identified components. When analytes coelute (i.e., only one GC peak is apparent), the identification criteria can be met but each analyte spectrum will contain extraneous ions contributed by the coeluting compound. Because purgeable organic compounds are relatively small molecules and produce comparatively simple mass spectra, this is not a significant problem for most method analytes.

9.5.3 Structural isomers that produce very similar mass spectra can be explicitly identified only if they have sufficiently different GC retention times. Acceptable resolution is achieved if the height of the valley between two peaks is less than 25% of the average height of the two peaks. Otherwise, structural isomers are identified as isomeric pairs. Two of the three isomeric xylenes and two of the three dichlorobenzenes are examples of structural isomers that may not be resolved on the capillary columns. If unresolved, these groups of isomers must be reported as isomeric pairs.

10. Instrument Operating Conditions

10.1 Gas Chromatography/Mass Spectrometry

10.1.1 Mass Calibration Check-At the beginning of each 12-hour period during which GC/MS analyses are to be performed, the system is tested to ensure that acceptable performance criteria are achieved for BFB.

10.1.2 The BFB performance test requires the following instrument parameters:

Electron energy	70 volts nominal
Mass range	35 to 260 AMU
Scan time	< 2 seconds per scan

The test is performed by acquiring data from a run of 25 ng of BFB (either by purging or on-column direct injection) into the GC. After acquisition, a background subtracted mass spectrum is obtained using Chemstation BFB Autofind with three average scans and compared with the BFB ion abundance criteria in Table 1. If these performance criteria are not met, the instrument is retuned, and the test repeated until satisfactory. Only then are the blank, standards and samples run.

10.1.3 Acquire and store data over the nominal mass range 35-260 with a total cycle time (including scan overhead time) of 2 sec or less. If water, methanol, or carbon dioxide cause a background problem, start at 47 or 48 m/z. If ketones are to be determined, data must be acquired starting at m/z 43. Cycle time must be adjusted to measure five or more spectra during the elution of each GC peak.

10.2 GC Conditions

The GC conditions will be varied somewhat for different columns. The following are recommended conditions:

Run time: 17 min
Scan start time: 1.0 min
Injection port temperature: 250ºC
Detector temperature: 235ºC
Starting temperature: 40ºC
Holding time at initial temperature:3 min
Temperature program rate: 10ºC
Final Temp:235ºC
Hold time – 3 minutes

10.2.1 The GC conditions will be varied somewhat for different columns. The following are the recommended conditions: Adjust the helium carrier gas flow rate to about 1.0 mL/min. The column temperature is 30°C and held for 3 minutes from beginning of desorption, then heated to 100°C at 10°C/min, heated to 235°C at 25°C/min and held at 235°C for 4 minutes or until all compounds of interest have eluted.

10.3 Purge and Trap Device

The recommended purge and tarp sampling cycle is as follows:
Carrier gas: Helium
Purge time: 11.0 min
Purge gas flow rate: 40ml/min
Desorb time: 1.0 min
Drypurge:2.0 min

11. Calibration

11.1 Demonstration and documentation of acceptable initial calibration is required before any samples are analyzed. In addition, acceptable performance must be confirmed intermittently throughout analysis of samples by performing continuing calibration checks. These checks are required at the beginning of each work shift, but no less than every 12 hours.

11.2 Initial Calibration

11.2.1 For initial calibration of GC/MS instrument, a multipoint (minimum four points - Refer to SOP G-19 for details) calibration is made to define the operating range of the instrument. The concentration range will depend on the purpose of the intended analyses; but usually will include points at 0.5 ug/L through 60 ug/L. Larger ranges may be utilized for specific project objectives if quality control is maintained. For chemistry PT results where the concentrations are below the calibration range established by the initial calibration curve, the laboratory may re-scale its initial calibration curve to bracket the concentration of the PT sample result.

11.2.2 The occurrence of an unacceptable instrument response(s) from the analysis of calibration standards, e.g., unacceptable correlation coefficient or RSD of response factor(s), etc., is an indication of an analytical problem(s) with the selected calibration range for the analysis and must be corrected before sample analyses are conducted. Sample analysis may not proceed until the resulting calibration curve is fully acceptable according to the established criteria identified in this SOP.

Elimination of calibration point(s) from the calibration curve is an acceptable practice under the following special conditions:

11.2.2.1 *In multi-analyte tests* in which calibration solutions are prepared from mixtures, analyte concentrations analyzed which are outside of the established calibration range for a given analyte, should not be included in the calibration for that analyte. This is an unavoidable situation because the stock solutions are mixtures.

11.2.2.2 *The lowest calibration point(s)* may be eliminated from the calibration curve. If this occurs, the Reporting Limit, which is based on the lowest calibration standard, must be raised accordingly and reflected in the final report.

11.2.2.3 *The highest calibration point(s)* may be eliminated from the calibration curve if all sample concentrations and all associated quality control data (or their dilutions) are bracketed by the remaining calibration standards.

11.2.2.4 **An outlier calibration point (other than a high point or a low point**) may be eliminated only after an investigation has been performed and the reasons for the problem have been documented. At no time may this calibration point(s) be eliminated solely to meet or improve performance relative to calibration curve acceptance criteria.

11.2.3 Quantitation of the calibration standard runs provides area counts for the quantitation mass of each analyte. These area counts are used to calculate relative response factors (RRF's) according to the Method 524.2 section 10.2.6. The quantitation ion to be used for each analyte and the corresponding internal standard is given in Table 2.

11.2.4 The percent relative standard deviation (%RSD) of the average RRF values must be less than or equal to 20% for the calibration to be acceptable.

11.2.5 If the percent recovery falls outside of the acceptable range for more than 10% of the total analyte list, recalibration is required. If the percent recovery falls outside of the acceptable range for less than 10% of the total analyte list, all associated sample data for the affected analyte(s) must be qualified accordingly.

11.2.6 All analytical runs for the initial calibration must be made within a continuous 12-hour period.

11.3 Continuing Calibration Verification

11.3.1 Verify the MS tune and initial calibration at the beginning of each 12-hour work shift during which analyses are performed using the following procedure. Introduce into the GC (either by purging or on-column direct injection) 25 ng or less of BFB and acquire a mass spectrum that includes data for m/z 35-260. If the spectrum does not meet all criteria (Table 1), the MS must be retuned and adjusted to meet all criteria.

11.3.2 A continuing calibration verification standard 5 ppb is run at the start of each 12-hour time period and the acceptance criteria for all the compounds is 30% D from the initial average response factors.

11.3.2.1 If the percent recovery falls outside of the acceptable range for more than 10% of the total analyte list, recalibration is required. If the percent recovery falls outside of the acceptable range for less than 10% of the total analyte list, all associated sample data for the affected analyte(s) must be qualified accordingly.

12. Sample Analysis

12.1 Analytes are detected and identified by their characteristic chromatographic retention times and mass spectral ions. The retention time of the sample analyte should be within ±30 seconds of the corresponding analyte retention time in the daily standard run. A relative retention time of ± 0.02 units between the sample analyte and analyte of the Continuing calibration check run is used to account for possible minor variations in absolute retention times.

Note: The CCV (continuing calibration verification) analyzed on the same sequential run is used as the reference spectrum for a group of samples and QCs within a 12-hr period with the same method. The CCV uses the previous CCV run as the reference spectrum of the same method. If a new method is generated and a curve is run for the first time or maintenance was done on the instrument, then the midpoint level of the curve is used as the reference spectrum for the subsequent sample analysis until the next required CCV is run.

12.2 The mass spectrum of the sample analyte should include all the characteristic ions for that analyte as listed in Table 2.

12.3 When an analyte is detected and identified, it is quantitated by the software program by first calculating the integrated ion abundance of the quantitation mass as given in the identification file. The concentration is then calculated from the equation:

$$Conc\ \frac{\mu g}{L} = \frac{Area\ of\ Analyte \times Conc\ IS \times DF}{Area\ of\ IS \times RRF}$$

Where the RRF is the average RRF value obtained from initial calibration, IS is the internal standard, and DF is the dilution factor if necessary.

13. Data Analysis and Calculations

13.1 The quantitation report generated by the software is examined to confirm that analytes present have been detected (i.e., no visible peaks missed), that identification has been made correctly (i.e., spectra are compared with known spectra), that calculation has been performed correctly (e.g., the ion profile used for quantitation is satisfactory), and that baselines have been properly assigned. Ion ratios should always be within threshold ranges for identification. Never report a result as a definitive hit unless secondary and tertiary ions are present and at proper levels for the analyte.

13.2 Manual Integration

13.2.1 The compound identification and integration results generated by the Enviroquant software may not accurately reflect the area of a target analyte peak due to the following reasons:

The automated integration routine may not identify the target analyte as a result of retention time shift, coeluting interference, or peak inappropriate (too high or too low) intensity.

The target analyte peak area may be incorrectly integrated by the automated integration routine. Poor peak shape, co-elution with other peaks, or a significant baseline drift may need to be addressed. Poor peak shapes can also be due to overloading of the GC column by higher concentration(s) from the calibration curve of certain target analytes. The overloading can cause multiple peaks, shoulders, or humps which have the same spectra proving that they come from the same analyte. The lower concentrations of these analytes, however, do not exhibit the poor peak shape characteristics.

If one or more peaks elute within the retention time window for a target analyte, the automated integrated routine may not identify the correct target peak, i.e., the peak with a retention time that best matches the retention time established by the calibration.

13.2.2 It is the analyst's responsibility to validate the integration report generated by the computer software for every sample and calibration analysis. When an inaccurate integration is detected in the target analyte identification and/or peak integration, the analyst must conduct manual integration to correct the inaccuracy.

13.2.3 The manual integration must be reasonable, scientifically valid, and logically sound. The entire area of the subject peak and only the area of the subject should be integrated for that peak. Conducting peak-shaving to eliminate part of the subject peak or including peaks not belonging to the subject peak is prohibited. Manual integration performed solely to meet the calibration and surrogate QC criteria is unacceptable.

13.2.4 Manual integrations must be documented in the following manner.

Include the quantitation report and chromatogram for all samples and QC samples in the electronic data package.

Submit summary quantitation reports prior to manual integration in the electronic data package. Also submit detailed quantitation report showing manually integrated target analytes, surrogates and / or internal standards.

If manual integrations are done for reasons other than those listed in Section 13.2, they must be initialed and dated by the analyst performing the integration on the quantitation report along with a brief narrative explaining why the manual integrations were required.

13.3 Reporting limits- The lowest calibration concentration for a given analyte is used, generally 0.5 µg/L for most analytes. Ketones reporting lowest calibration concentration is 5.0 µg/L. In the case of a dilution, the lowest calibration concentration for a given analyte is multiplied by the dilution factor to obtain the reporting limit.

13.4 Calculations should utilize all available digits of precision, but final reported concentrations should be rounded to an appropriate number of two significant figures.

13.5 When total trihalomethanes is requested, calculate the total trihalomethane concentration by summing the four individual trihalomethane concentrations from any given analytes.

13.6 Tentatively Identified Compounds (Performed Only Upon Request, or for Superfund work)

13.6.1 A library search must be executed for non-target sample components for the purpose of tentative identification. For this purpose, the most recent release of the NIST/EPA/MSDC mass spectra library shall be used. Guidelines for making tentative identification are:

- Up to 10 organic compounds of greatest apparent concentration not listed in component list for the purgeable organic fraction, excluding the system monitoring compounds shall be tentatively identified via a forward search of the NIST/EPA/MSDC Library. Substances with responses less than 10% of the internal standard are not required to be searched.

- The relative intensities of major ions in the reference spectrum (>10% relative abundance) must be present in the sample spectrum.

- The relative intensities of major ions in the sample spectrum should agree within ± 20% of the relative intensities of major ions in the reference spectrum.

- Molecular ions present in the reference must be present in the sample spectrum.

- Ions present in the sample spectrum but not in the reference spectrum must be reviewed for possible background contamination or co-elution.

- Only after visual comparison of sample spectra with the nearest library spectrum will the analyst assign a tentative identification. Computer generated library search routines must not use normalization routines that would misrepresent the library or unknown spectra when compared to each other. (Any Qual value less than 90, on the Library Search Compound Report, is not reported.)

- Unless the compound can be tentatively identified following the above criteria, it is designated as "Unknown" and not reported.

- If a compound cannot be verified by the above criteria, but in the judgement of the analyst, the identification is correct, then the analyst will report that identification.

- Any TIC found in a sample and the corresponding method blank is considered method related and not counted as one of the ten reported TIC peaks.

14. Method Performance

A demonstration of capability (DOC) should be performed each time there is a significant change in the chemistry of the method, a major modification to an existing instrument, or a new instrument is installed. A DOC is performed by each analyst designated to analyze samples using this method. An annual check must subsequently be performed and documented for each analyst using this method. If QC criteria provided in this method are not achieved, then corrective action(s) should be implemented. This may include sample re-analysis, as determined by existing laboratory policy and/or in consult with lab management and QAO.

14.1 Accuracy and Precision

14.1.1 Demonstration of Capability

A demonstration of capability study was conducted for this method for each analyst using this method. The study consisted of the analysis of four standards which are from a source independent of the standard curve. The results of the standards are based on the Table 3 limits. The % RSD should be within 20%. The results of the accuracy and precision study (true value, % recovery, standard deviation and % RSD) are maintained by the Quality Assurance Officer for each analyst.

14.1.2 Continuing Demonstration of Capability

An annual continuing demonstration of capability study must be performed and documented. The study consists of either successfully analyzing four replicate LCS standards, successfully analyzing a PT sample that reflects all analytes of interest or analyzing 2 sets of successive BS/BSD standards analysis. Any study must be within control limits as stated in section 14.1.1. The results of the continuing accuracy and precision study (true value, % recovery, standard deviation and % RSD) are maintained by the Quality Assurance Officer.

14.2 Method Detection Limit (MDL)

An MDL Study was conducted for this method. The study is based on the requirements listed in 40 CFR Part 136 Appendix B. Specific procedures for conducting an MDL study can be found in SOP # G-8. The MDL Study comprised the analysis of seven reagent grade water samples fortified at a level between 2-3x the detection limit. The results of the MDL determination (true value, average concentration, standard deviation and calculated MDL) are maintained by the Quality Assurance Officer for each method.

14.3 Limit of Quantitation (LOQ)

The Laboratory performs a Limit of Quantitation (LOQ) study on an annual basis for analytes associated with chemistry methods. The validity of LOQ is confirmed by successful analysis of an LFB at approximately 2X the reporting limit. The recovery of each analyte is within the acceptance criteria established for the LFB, Section 15.6.2. After this study is completed, it is reviewed and approved by the Laboratory Management. A summary of all LOQ study performance is maintained in the Laboratory's Central File.

15. Quality Control

15.1 Quality control (QC) requirements are the demonstration of the laboratory capability followed by regular analyses of laboratory reagent blanks, field reagent blanks, and laboratory fortified blanks. A MDL for each analyte must also be determined.

15.2 Laboratory Reagent Blank (LRB) / Prep Blank (PB): Before any samples are analyzed, an LRB is analyzed. This blank consists of reagent grade water which has been generated from a MILLIPORE deionization/activated carbon filter/organex system or equivalent water treatment system. Additionally, the water is purged for approximately one hour with nitrogen. An internal standard and a set of surrogate standards are added to this water. The LRB demonstrates the absence of contaminants from equipment and reagents.

Acceptance Criteria: A method blank is run every 12 hours that samples are run. The method blank should be processed exactly in the same manner as the samples. It should be clean without any contaminants, but if present, the concentration should be less than the reporting limit.

Corrective Action – Clean and perform necessary instrument maintenance until analyses runs of method blanks show contaminants are under control. Common contaminants include Dichlorodifluoromethane, Trichlorofluoromethane, 1,1,2-Trichloro-1,2,2-Trifluoethane Methylene Chloride, ketones, and Toluene. If contaminants are detected in the LRB, do not report as present any of the contaminants if less than 10x the amount reported in the blank. For non-common contaminants, if the Blank results are > then reporting limit then all associated samples with a concentration of ≤ 10x the amount found in the blank should be re-prepared and re-analyzed. If the samples cannot be re-prepared and re-analyzed, then all affected sample results must be qualified "K".

15.3 Demonstration of Capability (DOC). Refer to Section 14 of this SOP.

15.4 Surrogate Standards:

Acceptance Criteria: Surrogate recoveries for each run are examined to confirm that they are within the acceptance range of 70% to 130%.

Corrective Action: If the % Recovery for one or more of the surrogate standards are outside the acceptable range, the root cause for the problem should be assessed including the reanalysis of the sample. If no correction is possible, the associated data, including the non-detect results (except when the recovery is high the sample is not qualified) should be qualified accordingly.

15.5 Internal Standards:

Acceptance Criteria: The area of the Internal Standards should be examined to confirm that the absolute areas have not changed by more than ±50% from the areas measured at the midpoint of the initial calibration and/or continuing calibration check

Corrective Action: Rerun the sample if possible, to check for purge anomalies. If no correction is possible, the associated data, including the non-detect (except where the recovery is high the sample should not be qualified) should be qualified accordingly.

15.6 Laboratory Fortified Blank (LFB) / BS/BSD / LCS/LCSD

15.6.1 Two (2) LFB samples are analyzed with each batch of samples that is processed as a survey group of ≤ 20 samples. Each LFB is prepared from a standard mix of a different source from that used to prepare the calibration solutions (synonymous to the “BS/BSD”). The average percent recovery (%R) and relative percent difference (RPD) is calculated for each analyte.

Calculate the percent relative difference (%RPD) using the equation:

$$\%RPD = \frac{|X1 - X2|}{\overline{X}} * 100$$

Where:

X1, X2 = Duplicate results

$\bar{X}$ = Average of duplicate results

15.6.2 Acceptance Criteria: The average percent recovery of the concentration for each analyte is located on Table 3. Maximum Relative Percent Difference (RPD) limit is 20%.

Corrective Actions:

15.6.2.1 If the percent recovery falls outside of the acceptable range for more than 10% of the total analyte list, recalibration is required. If the percent recovery falls outside of the acceptable range for less than 10% of the total analyte list, all associated sample data for the affected analyte(s) must be qualified accordingly. If an analyte is present in the sample and that analyte fails to meet the acceptance criteria in the average of the percent recoveries of the LCS/LCSD duplicates, the associated data, including the non-detects (except where the recovery is high) should be qualified. The sample data should be flagged with the appropriate QA/QC remark codes listed in SOP G-15.

15.7 Matrix Spike (MS) or LFM

15.7.1 One LFM/MS is prepared per matrix for an analytical batch of 20 samples or less regardless of the number of different projects that comprise the analytical batch. The LFM/MS is prepared from the same primary standard source as that used to prepare the calibration solutions. The LFM/MS is usually fortified at the midpoint concentration found in the calibration curve. In order to properly assess the LFM/MS, the concentrations should be equal to or greater than the background concentrations in the sample selected for fortification. If the fortification level is less than the background concentration, recoveries are not reported 15.7.2. The mean percent recovery of the concentration for each analyte is located on Table 3. If the percent recovery falls outside of the acceptable range, a matrix induced bias can be assumed for the respective analyte(s) and the data for the analyte(s) must be qualified accordingly.

15.8 Initial Calibration Verification Standard (ICV)

15.8.1 An ASCS/ICV sample is analyzed whenever a new calibration curve is generated. The ICV sample is usually prepared in the same manner as the midpoint level of the calibration curve, but from a separate source different from the calibration standards.

15.8.2 The percent recovery, R, of the concentration for each analyte, must be 70% – 130% for all the target analytes. If the recovery falls outside of this acceptable range, the cause(s) must be identified and resolved by analyzing a third independent source. Corrective Action: if 10% of the total analytes failed then the ICV must be rerun.

If it is still outside the acceptable range, the curve for that analyte should be reanalyzed. If reporting any analyte that failed the %D criteria (as long as it's less than 10% of the total analytes), any associated data including non-detect (except where %D is high) should be qualified

15.8.3 The (ICV) will also be used as an LFB/BS/BSD if field samples are being analyzed after the calibration curve within the same 12-hour sequence.

16. Reporting and Validation

16.1 Reporting Limits

The reporting limit is based on the concentration of the lowest calibration standard analyzed. All results are reported to 2 significant figures. The reporting limit is calculated by taking the lowest standard of the calibration curve using the appropriate equation from Section 12.3. Results for the sample that has the lowest dilution should be reported.

16.2 Electronic Data Package (EDP)

The project electronic data package (EDP) is assembled in PDF format and saved on the shared drive. Please refer to SOP G-26 for details on EDP requirements

16.3 Laboratory Information Management System (LIMS)

Note: Refer to SOP G-28 Analyst/reviewer sections

16.3.1 Data entry – upload into Element is done through DataTool. Verify the accuracy of the reported results from the instrument data, including unit conversion, reporting limit changes, dilution correction, TICs, etc.

16.3.2 Verify the contents of the Element reviewer checklist based on the method QC requirements.

16.3.3 The analyst completes the reviewer checklist. (Most instrument QC is not automatically checked and recorded in the reviewer checklist). The analyst must record these checks manually in the reviewer checklist and could be obtained from within Element (ex. Data review screen) and/or from the instrument data. Anomalies must be addressed in the comment section of the reviewer checklist by the Analyst.

16.4 Data Validation

The data package is given to the reviewer. The review is done by a peer who was not involved in the analysis. Upon completion of the review, including validation of all the appropriate codes in the LIMS for the particular project(s), the data reviewer will sign and date the QA/QC Checklist.

Analysts must include an example calculation on a sample for each method/matrix analyzed in all data packages and, if applicable, using a detect result. The calculation will begin with the sample result generated from the instrument and end with the result reported. It is the responsibility of the peer reviewer to verify the accuracy of the calculations performed.

The only exception to this policy would be if no data reduction/manipulation is performed on the sample results between the instrument output and final results reported. (that is if the sample results generated from the analyses is reported directly from the instrument). Also, for multi-analyte methods, one analyte needs to be carried through in the example calculation representing the group.

Once review is completed by the peer reviewer which is the final check off on the Reviewer Checklist, the peer reviewer, prints out the Reviewer Checklist and includes it in the Project folder.

Refer to SOP G-26 for Details.

16.5 Data Records

An analytical data package is prepared for each project and electronically stored in the designated project folder. The Electronic Data Package (EDP) is filed based on the nomenclature and sequence established. If a batch/sequence consists of several projects the associated files are copied into each project folder. Cross-reference sheets, if used to document the location of the electronic files are filed in the respective project folder.
Please refer to SOP G-26 for details.

16.6 Electronic Data Archive

Instrument data files are archived to a central server system. They are placed under subdirectories by instrument name, and date run. The main data file name generated is copied from the acquisition instrument with all associated files to the server subdirectory.

17. Pollution Prevention

17.1 Pollution prevention encompasses any technique that reduces or eliminates the quantity or toxicity of waste at the point of generation. Numerous opportunities for pollution prevention exist in laboratory operation. The EPA has established a preferred hierarchy of environmental management techniques that places pollution prevention as the management option of first choice. Whenever feasible, laboratory personnel should use pollution prevention techniques to address their waste generation. When wastes cannot be feasibly reduced at the source, the Agency recommends recycling as the next best option.

17.2 The quantity of chemicals purchased should be based on expected usage during its shelf life and disposal cost of unused material. Actual reagent preparation volumes should reflect anticipated usage and reagent stability.

17.3 For information about pollution prevention that may be applicable to laboratories and research institutions, consult “Less is Better: Laboratory Chemical and Management for Waste Reduction”, available from the American Chemical Society's Department of Government Relations and Science Policy, 1155 16th Street N.W., Washington D.C. 20036, (202)872-4477.

18. Waste Management

The USEPA requires that laboratory waste management practice be conducted consistent with all applicable rules and regulations. Excess reagents, samples and method process wastes should be characterized and disposed of in an acceptable manner. The agency urges laboratories to protect the air, water and land by minimizing and controlling all releases from hoods and bench operations, complying with the letter and spirit of any water discharge permit and regulations, and by complying with all solid and hazardous waste regulations, particularly the hazardous waste identification rules and land disposal restrictions. For further information on waste management consult the Region 2 SOP G- 6, “Disposal of samples and hazardous wastes in Regional Laboratory”.

19. References

19.1 EPA Method 524.2

19.2 EPA SOP G-15, Definitions, Current Version.

19.3 Promium Element Data System, Laboratory Information Management Systems, Promium, LLC. Current Version.

19.4 Laboratory Quality Management Plan (LQMP), U.S. Environmental Protection Agency, Region 2 Laboratory Branch. Current Version.

19.5 Environmental, Health and Safety Operations Manual & Chemical Hygiene Plan, EPA Region 2. Current Version.

19.6 SOP G-6 Disposal of Samples & Hazardous Waste and Chemical Inventory Management. Current Version.

19.7 SOP G-9, Laboratory Policy for the Establishment and Maintenance Of Logbooks Associated With Chemical Analysis. Current Version.

19.8 SOP G-26, Guidance for Laboratory Data Review Current Version

19.9 Working with Promium. Current version. Current Version

19.10 SOP G-28, Laboratory Operations using “Element” LIMS. Current Version

19.11 SOP G-8, MDLs

20. TABLES

TABLE 1 – BFB Ion Abundance Criteria

Mass	Ion Abundance
50	15-40% of base peak
75	30-80% of base peak
95	base peak, 100% relative abundance
96	5-9% of base peak
173	less than 2% of mass 174
174	greater than 50% of base peak
175	5-9% of mass 174
176	greater than 95% and less than 101% of mass 174
177	5-9% of mass 176

TABLE 2 - Quantitation Ion, Internal Standard, and Target List Reference

Compound Name ANALYTE	QUANTITATION ION	QUANTITATION SEC. ION(S)	INT STD. USED	TARGET LIST*
Fluorobenzene (IS #1)	96	---	---	---
Dichlorodifluoromethane	85	87	1	S
Chloromethane	50	52	1	S
Vinyl Chloride	62	64	1	S
Bromomethane	94	96	1	S
Chloroethane	64	66	1	S
Trichlorofluoromethane	101	103	1	S
1,1-Dichloroethene	96	61, 63	1	S
1,1,2-Trichloro-1,2,2-Trifluoroethane	101	85, 151	1	S
Carbon Disulfide	76	---	1	S
Acetone	43	58	1	S
Methyl Acetate	43	74	1	S
Acrylonitrile	52	53, 51	1	*
Methylene Chloride	49	84, 86	1	S
Trans-1,2-Dichloroethene	96	61, 98	1	S
Methyl tert-Butyl Ether	73	74, 57,43	1	S
1,1-Dichloroethane	63	65, 83	1	S
Cis-1,2-Dichloroethene	96	61, 98, 63	1	S
2-Butanone	43	57,72	1	S
Bromochloromethane	128	130, 49	1	S
2,2-Dichloropropane	77	79, 97	1	*
Chloroform	83	85	1	S
Dibromomethane	93	174, 95	1	*
Methylmethacrylate	69	100,41	1	*
1,1,1-Trichloroethane	97	61, 99	1	S
Cyclohexane	56	69, 84	1	S
Carbon Tetrachloride	117	119	1	S
Benzene	78	77	1	S
1,3-Dichloropropane	76	78,41	1	*
1,1,1,2-Tetrachloroethane	131	119, 133	1	*
1,2-Dichloroethane-d4 (SURR)	65	67	1	S

Compound Name ANALYTE	QUANTITATION ION	QUANTITATION SEC. ION(S)	INT STD. USED	TARGET LIST*
1,2-Dichloroethane	62	64	1	S
Toluene-d8 (IS #2)	98	---	---	---
Trichloroethene	95	130, 132	2	S
1,2-Dichloropropane	63	76, 65,41	2	S
1,1-Dichloropropene	75	110, 77	2	S
Bromodichloromethane	83	127, 85	2	S
Cis-1,3-Dichloropropene	75	110	2	S
4-Methyl-2-Pentanone	43	58,85	2	S
Toluene	91	92	2	S
Trans-1,3-Dichloropropene	75	77,110	2	S
1,1,2-Trichloroethane	97	83,99	2	S
Tetrachloroethene	166	168, 129	2	S
Methylcyclohexane	83	55, 98	2	S
Dibromochloromethane	129	127	2	S
1,2-Dibromoethane	107	109	2	S
2-Hexanone	43	58	2	S
Chlorobenzene	112	77, 114	2	S
Ethylbenzene-d10 (IS #3)	98	---	---	---
Ethylbenzene	91	106	3	S
m/p-Xylene	91	106	3	S
o-Xylene	91	106	3	S
n-Propylbenzene	91	120	3	*
o-Chlorotoluene	91	126	3	*
p-Chlorotoluene	91	126	3	*
t-Butylbenzene	91	119	3	*
Styrene	104	78	3	S
Bromoform	173	93, 175	3	S
Bromobenzene	156	77, 158	3	*
1,2,3-Trichloropropane	75	77	3	*
Isopropylbenzene	105	120	3	S
4-Bromofluorobenzene (SURR)	95	174, 176	3	S
1,1,2,2-Tetrachloroethane	83	85	3	S
1,3-Dichlorobenzene	146	111, 148	3	S
1,4-Dichlorobenzene	146	111, 148	3	S

Compound Name ANALYTE	QUANTITATION ION	QUANTITATION SEC. ION(S)	INT STD. USED	TARGET LIST*
1,2-Dichlorobenzene	146	111, 148	3	S
sec-Butylbenzene	105	134	3	*
n-Butylbenzene	91	134	3	*
1,2-Dibromo-3-Chloropropane	75	155,157	3	S
1,2,4-Trimethylbenzene	105	120	3	*
1,3,5-Trimethylbenzene	105	120	3	*
p-Isopropyltoluene	119	134, 91	3	*
1,2,4-Trichlorobenzene	180	145, 182	3	S
Naphthalene	128	--	3	*
Hexachlorobutadiene	225	260	3	*
1,2,3-Trichlorobenzene	180	145, 182	3	S

S = Superfund; *Non-specific project requests

Table 3 -PERCENT RECOVERY LIMITS FOR MATRIX SPIKE AND BS/BSD

Analyte List	% Recovery
Dichlorodifluoromethane	23-117
Chloromethane	15-152
Vinyl Chloride	41-147
Bromomethane	31-157
Chloroethane	57-125
Trichlorofluoromethane	68-153
1,1-Dichloroethene	68-140
1,1,2-Trichloro-1,2,2-Trifluoroethane	78-139
Carbon Disulfide	65-135
Acetone	39-154
Methyl Acetate	49-141
Methylene Chloride	70-175
Trans-1,2-Dichloroethene	74-136
Methyl tert-Butyl Ether	61-128
1,1-Dichloroethane	80-133
Cis-1,2-Dichloroethene	77-141
2-Butanone	68-157
Bromochloromethane	64-151
Chloroform	74-137
1,1,1-Trichloroethane	78-130
Cyclohexane	83-138
Carbon Tetrachloride	82-137
Benzene	76-131
1,2-Dichloroethane	70-133
1,1,1,2-Tetrachloroethane	73-124
Trichloroethene	81-120
1,2-Dichloropropane	84-123
Bromodichloromethane	79-119
Cis-1,3-Dichloropropene	79-126
4-Methyl-2-Pentanone	84-145
Toluene	83-118
Trans-1,3-Dichloropropene	74-126
1,1,2-Trichloroethane	80-125
Tetrachloroethene	85-122

Methylcyclohexane	82-127
Dibromochloromethane	79-122
1,2-Dibromoethane	76-128
2-Hexanone	82-150
Chlorobenzene	84-118
Ethylbenzene	85-115
m/p-Xylene	86-118
o-Xylene	84-120
n-Propylbenzene	85-125
Styrene	87-112
Bromoform	75-125
1,2,3-Trichloropropane	68-122
Isopropylbenzene	85-117
1,1,2,2-Tetrachloroethane	73-124
1,3-Dichlorobenzene	87-119
1,4-Dichlorobenzene	86-121
1,2-Dichlorobenzene	82-123
1,2-Dibromo-3-Chloropropane	58-130
1,2,4-Trimethylbenzene	82-129
1,3,5-Trimethylbenzene	80-110
1,2,4-Trichlorobenzene	76-124
1,2,3-Trichlorobenzene	64-145

The above limits are based on the control chart generated by Element (LIMS)

Appendix D-1
LOOHN'S CLEANERS AND LAUNDERERS UFP-QAPP 2022-EPA LSASD LAB Standard Operating Procedure Guidance for Laboratory Data Review

Standard Operating Procedure

Guidance for Laboratory Data Review

Signature and Title

Prepared by:	SUMY CHERUKARA Digitally signed by SUMY CHERUKARA Date: 2020.10.23 08:50:36 -04'00' Sumy Cherukara, QAO, Laboratory Branch	Date
Peer Reviewed by:	GREGORY SANTACROCE Digitally signed by GREGORY SANTACROCE Date: 2020.10.26 10:23:28 -04'00' Gregory J. Santacroce, Section Chief, OICS	Date
Approved by:	SUMY CHERUKARA Digitally signed by SUMY CHERUKARA Date: 2020.10.26 10:32:32 -04'00' Sumy Cherukara, QAO, Laboratory Branch	Date
Approved by:	John Bourbon Digitally signed by John Bourbon Date: 2020.10.28 01:44:54 -04'00' John R. Bourbon, Chief, Laboratory Branch	Date

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 2
LABORATORY SERVICES AND APPLIED SCIENCE DIVISION
LABORATORY BRANCH

TABLE OF CONTENTS

1. Scope and Application

The purpose of this standard operating procedure is to detail the required steps for the responsible parties and authorization necessary for review of laboratory data. Many aspects of the data review process are already covered in method and general SOPs. This SOP standardizes the data review process throughout the laboratory.

Data review is a critical part of the analytical process and an important role of the analytical laboratory. Data uses may include regulatory and, in some cases, criminal application. During data review data is assessed for accuracy and precision using established criteria. The primary objective of this quality assurance function is to assess and document the technical quality of the data generated by the laboratory analysts. A supporting objective is to evaluate the overall performance of the measurement processes on a continuous basis.

2. Summary of the Procedure

2.1 Data is peer reviewed by another analyst or assignee familiar with the test procedures. Final deliverable data is saved as an Electronic Data Package (EDP) in PDF or hard copy format and includes a QA/QC Checklist summarizing the QC results in the *Element* Laboratory Information Management System (LIMS).

2.2 Data is entered into LIMS by the analyst who updates the status to *Analyzed*. The peer reviewer reviews the entries, then updates the status to *Peer Reviewed* indicating the data are correctly entered (SOP G-28). If the peer reviewer finds any corrections necessary, the analyst is advised to change them. In some instances, the peer reviewer can make applicable corrections.

2.3 The final peer review action is to acknowledge the peer review by adding their initials to the QA/QC Checklist.

2.4 The draft final project report is generated by the Official Sample Control and Repository (OSCAR) staff with internal quality control checks included.

2.5 The project is then forwarded to the EPA Task Order Contracting Officer Representative (TOCOR) for review of analyses completed by the ESAT contractor.

2.6 OSCAR staff completes the function *OSCAR Draft Final RPT PVP + Date* in LIMS.

2.7 The TOCOR completes the function *TOCOR Review + Date* in LIMS (if applicable).

2.8 The project is then forwarded for final approval by branch chief or designee.

3. Definitions

Laboratory Information Management System (LIMS): The LIMS is a computer database system that is used to store, track, and report analysis results for environmental samples.

Analyst: The designated individual who performs the hands-on analytical methods and associated techniques, and who is the one responsible for applying required laboratory practices and other pertinent quality control to meet the required level of quality in producing analytical results for environmental samples.

Peer Reviewer: The peer reviewer is the individual who performs a technical review of the given laboratory-generated data. The peer reviewer is not significantly associated with the actual measurement operations for the given analytical batch but is knowledgeable in the analytical processes employed.

Task Order Contracting Officer Representative (TOCOR): The TOCOR is an EPA staff member who provides work assignments to the ESAT contractor and ensures performance and deliverables are acceptable through contract specified oversight.

Quality Assurance Officer (QAO): The Laboratory Branch QAO is responsible for ensuring compliance with and implementation of all QA/QC policies and practices in the laboratory.

Environmental Services Assistance Team (ESAT): Contractors offering analytical support to the laboratory.

Laboratory Management: The laboratory management which includes the Branch Chief, Section Chief and the SCBT Team Leader are responsible for ensuring all Region 2 Laboratory data or products meet client, division, and regional quality requirements and for ensuring all data are of known and documented quality.

4. Procedure

To ensure the identification and correction of potential problems early in the data generation process, all measurement data produced during laboratory analysis are reviewed, first by the analyst and then by another analyst familiar with the analytical method. Multiple levels of data review are performed on the data package to ensure data integrity before data are released to the client.

4.1 Analyst Review

4.1.1 The analyst who generates the analytical data has the primary responsibility for the accuracy and completeness of the data.

4.1.2 The analyst reviews the Analytical Request Form (ARF), project correspondences, chain-of-custody (COC) form and the LIMS Sample Acceptance Checklist information for sample-specific information (e.g., sample collection, preservation, holding time requirements, and cooler/sample condition upon arrival) to assess sample integrity.

Comparisons are made between these forms and the raw data to ensure that:

1. all samples are analyzed
2. the correct analytical methods are performed
3. all QC requirements are followed
4 holding times between sample collection, digestion or extraction, and analysis are checked to assess potential degradation or loss of analytes of interest
5. method detection limit requirements specified by the method or client are met
6. any special instructions are addressed

4.1.3 Information related to the analytical run is documented in the LIMS and/or the sample preparation and instrument analysis logbooks and other intermediate logbooks as applicable. See SOP G-9 for more information about logbooks.

4.1.3.1 The *Bench Sheet* which is prepared in the LIMS (and/or the sample preparation logbook) documents the samples, method, equipment and reagents used, other pertinent preparation information, and Quality Control (QC) check samples added to the preparation batch.

4.1.3.2 The *Sequence* sheet (optional) which is prepared in the LIMS documents the instrument and method used, the samples analyzed, all required QC instrument check samples and other pertinent information used at the analysis level. All applicable QC check samples as specified in the respective SOPs are incorporated during the analytical procedure.

4.1.3.3 During the analytical run, the analyst should monitor the ongoing QC and sample results. If a QC check exceeds acceptance criteria, analysis may be halted and the appropriate corrective action (e.g., re-digestion/re-extraction, dilution, recalibration, and/or reanalysis) implemented. Any necessary calculations may be performed either manually or using appropriate software or validated spreadsheets.

4.1.4 After analysis, the data is transferred to the LIMS. All QC is evaluated against the requirements specified in the respective SOPs.

4.1.4.1 Instrument QC (e. g. ICV/CCV, ICB/CCB etc.) are evaluated against the method criteria.

4.1.4.2 Analytical precision and accuracy are evaluated by using Blanks (BLK), Blank Spikes (BS)/Blank Spike Duplicates (BSD), Preparation Blank (PB), Laboratory Fortified Blank (LFB)/Laboratory Control Sample (LCS), Matrix Spikes (MS), Matrix Spike Duplicates (MSD) and un-spiked replicates, where applicable, to estimate the degree of variance around the reported value as well as any bias effect due to matrix or laboratory sample processing procedures.

4.1.4.3 These evaluations are done in the LIMS wherever possible. Additional calculations may be performed either manually or using appropriate software or spreadsheet when necessary.

4.1.4.4 Data generated outside the % recovery acceptance range is qualified as “K” or “L” depending on the reporting value being biased high or low, e.g. results from BS/BSD/LFB/LCS, MS/MSD. Data generated outside % RPD or RSD acceptance range is qualified as “J” e.g. BS/BSD/LFB/LCS/LCS, MS/MSD, sample replicates, replicate integration. Qualifier “J” supersedes all other qualifiers and the reported value is an estimate.

4.1.4.5 The analyst prepares the LIMS QA/QC checklists to indicate the data has been evaluated and all QC criteria have been met or the data are qualified.

4.1.4.6 The analyst must verify the following:

1. Use instrument and method specific cross tables when using *DataTool*. Any *DataTool* cross tables used should be checked for accuracy.
2. Once all data is transferred, generate a draft final report and use it for each of the subsequent instructions.
3. Review one sample upload for each sequence/work order in a project, checking both the analyte list, results and the reporting limits.
4. For dual column analysis, ensure the proper column is designated for reporting, i.e., the result reported must be a ‘PR’ (Primary) result.
5. Once data is transferred, ensure all requested analytes and associated results are marked for reporting and locked.
6. If qualifiers are used, analyst must enter comments in the *General Comments* or other appropriate section of the of the *QA/QC Checklist*. Analyst must also enter any other comments that the peer reviewer may need to review to determine if this information needs to be entered into the Project Narrative or evaluate the need for data qualification.
7. The Final Report in either electronic or hard copy format is crossed

checked with the LIMS raw data. All (100%) manual entries are verified. Automatic upload entries are verified at a minimum of 10%.

8. For multi-analyte analysis, the analyst must review the R2FinalReportWCNT and Promium Summary reports at project level in order to check analytes requested vs. analytes reported.
9. When the data evaluation is complete, the analyst must then update the LIMS sample status to *Analyzed* for all reportable analytes in each sample in the analytical batch.

***NOTE**: Do not save reports as PDF in Element – uncheck that option in order to save the file to screen for review.

4.1.5 The analyst is responsible for generating the data package for each analysis and for entering the data into the LIMS. The data package is saved as a PDF for the Electronic Data Package (EDP). EDPs are saved under a designated electronic project folder. The EDP is based on established nomenclature and sequence. If a batch/sequence consists of several projects, the associated files are copied into each electronic project folder. Specific laboratory requirements for generating an EDP are listed in Addendum 2 by department.

4.1.5.1 The supporting data includes but is not limited to: all instrument printouts, quantitation reports, chromatographs, spread sheets, sequence and bench sheets (where applicable).

4.1.5.2 A manual calculation check is prepared for each project for any data that is not entered directly from an instrument.

4.1.5.3 Comments to be included in the case narrative are prepared by the analyst. Any relevant procedural deviations or anomalies associated with the sample handling and analysis for the project are explained. The comments can be entered directly into the project narrative or noted on the QA/QC checklist.

4.2 Peer Review

4.2.1 After the analyst review, the peer reviewer performs a technical review of the data generated. This review is performed by a second analyst not significantly associated with the actual measurement operations for the given analytical batch, but knowledgeable in the analytical processes employed. It is the responsibility of the peer reviewer to ensure that all data generated are correct and of known and documented quality. The peer reviewer audits the raw data and the spreadsheets generated in either electronic or hard-copy format.

4.2.2 The reviewer rechecks all the items in section 4.1.2 and verifies that:

1. all samples were analyzed

2. the correct analytical methods were performed
3. all QC requirements were followed
4 holding times between sample collection, digestion or extraction and analysis were checked to assess potential degradation or loss of analytes of interest
5. method detection limit requirements specified by the method or client were met
6. any special instructions were addressed

4.2.3 The reviewer verifies the information related to the analytical run as documented in the LIMS and/or the sample preparation and instrument analysis logbooks and other intermediate logbooks as applicable.

4.2.3.1 The *Bench Sheet* (and/or the sample preparation logbook) is reviewed for samples, method, equipment and reagents used, other pertinent preparation information, and QC check samples added to the preparation batch.

4.2.3.2 The *Sequence* sheet (optional) (and/or the instrument analysis logbook) is reviewed for the instrument and method used, the samples analyzed, all required QC instrument check samples and other pertinent information used at the analysis level. All applicable QC check samples as specified in the respective SOPs are incorporated during the analytical procedure.

4.2.4 All QC is evaluated against the requirements specified in the respective SOPs.

4.2.4.1 The reviewer verifies that all applicable instrument (e. g. ICV/CCV, ICB/CCB etc.) and batch (e.g. BLK, BS/BSD/LCS) QC check samples have been incorporated at the required frequency during the analytical procedure.

4.2.4.2 The reviewer verifies that all QC data meet SOP requirements. These evaluations are done in the LIMS wherever possible. The reviewer also checks any calculations performed manually, using appropriate software, or using a validated spreadsheet for accuracy and completeness.

4.2.4.3 The reviewer verifies that data generated outside the % recovery acceptance range is qualified as “K” or “L” depending on the reporting value being biased high or low. Data generated outside % RPD or RSD acceptance range is qualified as “J”. Qualifier “J” supersedes all other qualifiers.

4.2.4.4 The peer reviewer must verify the following:

1. Generate a draft final report and use it for each of the subsequent instructions.
2. For every data package, review one sample upload for each sequence/work order in a project, checking both the analyte list, results,

and the reporting limits.

3. All (100%) manual entries must be examined and validated. Automatic upload entries are verified at a minimum of 10%. Reference comment section of the QA/QC Checklist for a summary of manual entries.
4. Ensure all requested analytes and associated results are marked for reporting and locked.
5. For multi-analyte analysis, the reviewer must review and save the R2FinalReportWCNT and Promium Summary reports in their respective EDPs (both reports for Organic projects and only Promium Summary for Metals projects) at project level in order to check analytes requested vs. analytes reported.

*__NOTE__: Do not save them as PDF in *Element*; uncheck that option in order to save the file to screen for review.

4.2.5 If there are any discrepancies, the data package is returned to the analyst for any necessary corrections. Any errors resulting from incorrect calculations, transcriptions, unit conversions, and switched samples are also examined by independent recalculations and raw data evaluation.

4.2.6 The peer reviewer verifies and adds their initials to the QA/QC Checklist in LIMS to indicate that the data have been reviewed and all QC criteria have been met or qualified accordingly. The checklist is then printed and included in the data package.

4.2.7 Comments to be included in the case narrative prepared by the analyst are reviewed. Any relevant procedural deviations or anomalies associated with the sample handling and analysis for the project are explained. Additional comments may be added as necessary.

4.2.8 When the data validation is complete, the peer reviewer must then update status to *Peer Reviewed* within LIMS for all reportable analytes for each sample in the analytical batch.

4.3 OSCAR Review

After all analyses associated with a given project have been reviewed and are validated on the Project Status Report, OSCAR staff will generate a draft final report.

The draft final report is reviewed for textual accuracy and completeness, then updated in the LIMS by completing the *OSCAR draft Final RPT RVR +Date* function.

The draft final report, COC, ARF, Sample Acceptance Checklist/Work Order Receipt, OSCAR tracking log, shipping form/air bills, and Project Correspondence are placed in the project folder. The draft final report package is then submitted to the

EPA Management for review as indicated in SOP G-25.

Using the draft final report, ensure that the report is complete in terms of the client deliverable. Ensure the total number of project samples for all work orders were analyzed. Check that associated analysis/analytes are reported for each sample and are 100% complete and compliant against what was requested by the client.

4.4 TOCOR Review

The TOCOR reviews the ESAT deliverable data package for accuracy of the data, completeness of the data package, and compliance to the Technical Direction Form for the project.

The TOCOR performs LIMS review of ESAT data and completes the function *TOCOR Review + Date* in the LIMS Element.

4.5 Quality Assurance Officer Review

The QAO, who is independent of routine laboratory operations, performs a QA review of the final report to assess the overall quality of analysis and general integrity of the final report.

The review includes checks for completeness, correctness and regulatory & TNI conformance/compliance of the final report package. The QA review also helps to detect any unusual trends.

The QAO may choose to perform a spot check of the entire data package. Upon review, the QAO signs and dates the Project Approval Form.

4.6 Management Review

Using the draft report, one sample in each work order is reviewed, checking both the analyte list and reporting limits against what was requested by the client.

If multiple workorders are in a survey, ensure all work orders are accounted for when generating a draft report.

Laboratory management reviews the final report for completeness and general compliance with the objectives of the project. Management then completes the project narrative and electronically signs the final report by clicking on the *Approve* button within LIMS. An electronic copy of the report including any requested supporting data may then be e-mailed to the client. A hard copy of the report, if requested, may also be authorized for distribution to the client. A draft report with sample QC is maintained with the project folder.

4.7 Electronic Signature Policy

Digital signature may be used in lieu of handwritten signature on Laboratory records. Refer to attachment 3 for procedure to insert digital signature into a "pdf" document using PIV card.

5. References

5.1 Promium *Element* Data System, Laboratory Information Management Systems, Promium, LLC. Current Version.

5.2 Laboratory Quality Management Plan (LQMP), U.S. Environmental Protection Agency, Region 2 Laboratory Branch. Current Version.

5.3 EPA Region 2 SOP G-9, *Laboratory Policy for The Establishment and Maintenance of Logbooks Associated with Chemical Analysis*. Current Version

5.4 EPA Region 2 SOP G-25, *Official Sample Control and Repository*. Current Version.

5.5 EPA Region 2 SOP G-28, *Laboratory Operations using* Element *LIMS.* Current Version.

5.6 EPA's Guidance on Environmental Data Verification and Data Validation (QA/G-8)

ATTACHMENT 1
List of Qualifiers Codes

Qualifier Codes	Definition
U	The analyte was not detected at or above the reporting limit.
J	The identification of the analyte is acceptable; the reported value is an estimate.
UJ	The analyte was not detected at or above the reporting limit. The reporting limit is an estimate.
NJ	There is presumptive evidence that the analyte is present; the analyte is reported as a tentative identification. The reported value is an estimate.
K	The identification of the analyte is acceptable; the reported value may be biased high. The actual value is expected to be less than the reported value
L	The identification of the analyte is acceptable; the reported value may be biased low. The actual value is expected to be greater than the reported value.

ATTACHMENT 2
Requirements for Electronic Data Packages

METALS DEPARTMENT

Data is filed under:

\\x0202tnjecfs2\desalab\desalab\Electronic Data Packages\YYMM\Project # Project Name\

Metals\ CVAA, ICP-OES or ICP-MS
or
E Metals\ E CVAA, E ICP-AES or E ICP-MS

Multiple runs within the same project for the same test are further differentiated into separate folders by date (mmddyy) or sequence (SXXXXXX).

Sample preparation data including logbook entries and % solids must be turned into a PDF and uploaded to Element at the Bench Sheet level.

CVAA		File Name
1	QA/QC Checklist can be done by Batch or Sequence	01 Checklist Batch# or Sequence #
2	*Element* Bench Sheet	02 BXXXXXX
3	*Element* Sequence	03 SXXXXXX
4	Raw Data – includes calibration, instrument and batch QC, and sample results	04 Raw Data mmddyy
5	Standards – PDF for all standards used in Sequence/Batch	05 Standards mmddyy
6*	Manual Calculations (e.g. solids/hardness/TCLP)	06 Man Calc mmddyy
7*	LCS (SRM) RPD Check (e.g. solids analysis, DOC)	07 LCS RPD mmddyy
8*	Percent Solids worksheet (e.g. solids analysis)	08 Percent Solids mmddyy
9*	TCLP % Dry Solids	09 TCLP % Dry Solids mmddyy
10*	TCLP PREP Book number-page number	10 TCLP PREP Book

#-pg #

11	Promium Summary Report	11 [as generated by Element]

**Should be included only if used.*

ICP-AES and ICP-OES		File Name
1	QA/QC Checklist can be done by Batch or Sequence	01 Checklist Batch # or Sequence #
2	*Element* Bench Sheet	02 BXXXXXX
3	*Element* Sequence	03 SXXXXXX
4	Calibration Summary – shows metals calibrated and correlation coefficients	04 Cal mmddyy
5	Raw Data – includes calibration, instrument and batch QC and sample results	05 Raw Data mmddyy
6	Internal Standard Recoveries	06 IS Recovery mmddyy
7	Standards - PDF for all standards used in Sequence/Batch	07 Standards mmddyy
8*	Manual Calculations (e.g. solids/hardness/TCLP)	08 Man Calc mmddyy
9*	LCS (SRM) Check (e.g. solids analysis, DOC)	09 LCS RPD mmddyy
10*	Percent Solids worksheet (e.g. solids analysis)	10 Percent Solids mmddyy
11*	TCLP % Dry Solids	11 TCLP % Dry Solids mmddyy
12*	TCLP PREP Book number-page number	12 TCLP PREP Book #-pg #
13	Promium Summary Report	13 [as generated by Element]

**Should be included only if used.*

ICP-MS		File Name
1	QA/QC Checklist can be done by Batch or Sequence	01 Checklist Batch# or Sequence #
2	Element Bench Sheet	02 BXXXXXX
3	Element Sequence	03 SXXXXXX

4	Tune Report	04 Tune mmddyy
5	Calibration Summary – shows metals calibrated and correlation coefficients	05 Cal mmddyy
6	Internal Standard Recoveries	06 IS mmddyy
7	Raw Data – includes calibration, instrument and batch QC and sample results	07 Raw Data mmddyy
8	Standards - PDF for all standards used in Sequence / Batch	08 Standards mmddyy
9*	LCS (SRM) Check (e.g. DOC)	09 LCS RPD mmddyy
10*	Turbidity & pH Logbook	10 Turbidity-pH mmddyy
11	Promium Summary Report	11 [as generated by Element]

*S*hould be included only if used*

MICROBIOLOGY DEPARTMENT

1. Data Package (in order)
   - Element **QA/QC Checklist**
   - **Raw data** (logbook pages, slide examinations, instrumentation data/QC, if applicable)
   - **Pictures** (*Cryptosporidium/Giardia,* if applicable)
   - **Percent solids** (if applicable)
   - **Manual calculations** (if applicable)
   - Element **bench sheet**

2. The data package from an analytical batch is scanned and attached in the Promium Element “Batch” screen.

3. Electronic data packages and standard reports will be filed in the corresponding project folder on the Y: drive.

4. Instructions on how to prepare the electronic data package (EDP) can be found in SOP G-25 (OSCAR).

SANITARY DEPARTMENT

1. Data package (in order)
    - Element **QA/QC checklist**
    - **Calibration** (TOC, if printed on a separate sheet from raw data)
    - **pH Calibration** (Alkalinity and pH/Corrosivity)
    - **Raw data** (includes calibration, instrument QC, batch QC, sample results, logbook pages) (if applicable)
    - **pH adjustment sheet** (BOD and CBOD if applicable)
    - **TOC screening** (BOD and CBOD if applicable)
    - **Percent solids** (if applicable)
    - **Manual calculations** (if applicable)
    - **Sequence** (if applicable to capture standards used)
    - Element **bench sheet**

2. After peer review is completed, the data package from an analytical batch is scanned and attached in the *Element* "Batch" screen.

3. Electronic data packages and standard reports will be filed in the corresponding project folder on the Y drive.

4. Instructions on how to prepare the electronic data package (EDP) can be found in SOP G-25 (OSCAR).

GC DEPARTMENT

1) Core requirements to be included in Organics project packages based on the SOPs and the current practice and nomenclature used for naming the files in the project folder (PDF).

GC	Comments
01-PEM-LPC_mmddyy	Column Breakdown (Endrin/ DDT) or Lab Performance Check (HAA, incl TF, Sensitivity, Resolution)
02-CAL Raw_mmddyy	Cal pts. & ICV pt. Unedited (All curves)
03-CAL Final_mmddyy	Cal pts. QEdited (include Cal %RSD Report,)
04-SCV_[A]_mmddyy	Second Source Verification; [A] = Pest/Tox/Chlor/Ar
05-Raw Data_mmddyy	QC and Sample raw data
06-CCV_[A]_mmddyy	Cont. Cal. Ver.[A] = Pest/Tox/Chlor/Ar

07-BLK_ Bxxxxxx	Method Blank
08-BS-BSD _Bxxxxxx	Lab Blank Spike Dup (incl. eval Report)
09-MS_Bxxxxxx	Matrix Spike for each Batch (incl Eval Report)
10-Sample Final _mmddyy	QEdited sample reports (detailed report)
11-Element Bench_Bxxxxxx	Element Bench Sheet &Total Solids
12-Instrument Seq log mmddyy	Copy of Run log page from instrument
13-Element Seq_Sxxxxxx	Element generated Seq
14-RT Window_mmddyy	RT window report
15-Example Calc.	Manual calculation (See Attachment Link)
16-Std-Reagent Prep	Include only working Stds. (Cal, BS/BSD, MS etc.)
17-Checklist_ Seq_Sxxxxxx	Element Generated QA/QC Checklist
18-Overlays	Fingerprint ID.
20-GPC Data_mmddyy	Cleanup data files.
21-[as generated by Element]	Promium Summary Report
22-[as generated by Element]	R2FinalReportWCNT

Note: Sequential numbering may change according to Analysis Requirements.
Survey Sheet is Generated (pink) with info for the project.

2) All comments should be address accordingly and included in the following places:

- Clean-up (i.e. GPC, Acid, etc.) procedure should be included in the comments under bench sheet in *Element*.
- Anomalies observed in the prep should be included in the comments under Bench sheet in *Element*.
- Sequence comments should be used for any sequence comments.
- All other comments should be included in the Checklist Comments.

After peer review, reviewer should generate checklist as a PDF with their initials and date. Save in the EDP file for the project.

3) Sample Calculation

To access file right click on selected file then choose open hyperlink. These files are validated by the QAO.

Specific files for example calculations:

Y:\Electronic Data Packages\Example Calculation Organics\Example calculation for PEST.docx

Y:\Electronic Data Packages\Example Calculation Organics\Example Calculation PCB.docx

GC/MS DEPARTMENT

1) Core requirements to be included in Organics project packages based on the SOPs and the current practice and nomenclature used for naming the files in the project folder (PDF).

GCMS	Comments
01-BFB_mmddyy	Tune Report for VOA
01-DFTPP_mmddyy	Tune Report for SVOA incl tailing factor PCP and Benzidine
02-CAL Raw_mmddyy	Cal pts. & ICV pt. Unedited
03-CAL Final_mmddyy	Cal pts. QEdited (include Cal %RSD Report)
04-ICV_mmddyy	Alt-s or BS-BSD for VOA
05-CCV_mmddyy	Midpoint of curve if no cal curve evaluated
06-BLK_ Bxxxxxx	Method Blank
07-MS_ Bxxxxxx	Matrix Spike for each Batch (incl. evaluation report)
08-BS-BSD_ Bxxxxxx	Lab Blank Spike and Dup (Incl. eval report)
09-Element Bench_Bxxxxxx	Bench Sheet with TS% if applicable (Element Bench_208014)
10-Instrument Seq log_mmddyy	Copy of Run log page
11-Element Seq_Sxxxxxx	Element generated Seq (Element Seq_S208010)
12-Sample Raw_mmddyy	Unedited Sample Reports
13-Sample Final _mmddyy	Qedited sample Reports (Detailed report)
14-QAQC Summary_mmddyy	Excel Spreadsheet for IS/SUR/Time
15-QAQC Raw_mmddyy	Raw data for sample and instrument QC runs.
16-Checklist_ Seq_Sxxxxxx	Element Generated QA/QC Checklist
17-Example Calc.	Manual calculation (see Attachment Link)
18-Std-Reagent Prep	Include only working Stds (Cal, BS/BSD, MS etc.)
19 [as generated by Element]	Promium Summary Report
20 [as generated by Element]	R2FinalReportWCNT

*Multiple instances for same file types are distinguished by date stamp in PDF file name (mmddyy). Use beginning dates for sequences and batches.

2) All comments should be address accordingly and included in the following places:

- Clean-up (i.e. GPC, Acid, etc.) procedure should be included in the comments under bench sheet in Element.
- Anomalies observed in the prep should be included in the comments under Bench sheet in Element.
- Sequence comments should be used for any sequence comments.
- All other comments should be included in the Checklist Comments.

After peer review, reviewer should generate checklist as a PDF with their initials and date. Save in the EDP file for the project

3) Sample Calculation

To access file right click on selected file then choose open hyperlink. These files are validated by the QAO.

Specific files for example calculations:

Y:\Electronic Data Packages\Example Calculation Organics\Example Calculation for VOA (Trace).xlsx
Y:\Electronic Data Packages\Example Calculation Organics\Example Calculation for VOA(Low Level).xlsx

Y:\Electronic Data Packages\Example Calculation Organics\Example Calculation for VOA(Medium Level).xlsx

Y:\Electronic Data Packages\Example Calculation Organics\Example Calculation for SVOA(aq).xlsx

Y:\Electronic Data Packages\Example Calculation Organics\Example Calculation for SVOA(soil).xlsx

Y:\Electronic Data Packages\Example Calculation Organics\Example Calculation for SVOA(Napls).xlsx

LC/MS/MS DEPARTMENT

1) Core requirements to be included in Organics project packages based on the SOPs and the current practice and nomenclature used for naming the files in the project folder (PDF).

LC/MS/MS	Comments
01-TUNE_mmddyy	Tune Report for PFAS
02-CAL Raw_mmddyy	Cal pts. & ICV pt. Unedited
03-CAL Final_mmddyy	Cal pts. QEdited
04-QCS_mmddyy	Alt-s
05-CCC_mmddyy	Midpoint of curve if no cal curve evaluated
06-LRB_ Bxxxxxx	Laboratory Reagent Blank
07-LFSM/LFSMD_ Bxxxxxx Batch (incl. evaluation report)	Laboratory Fortified Sample Matrix/ DUP for each
08-LFB_ Bxxxxxx	Laboratory Fortified Blank (Incl. eval report)
09-Element Bench_Bxxxxxx	Bench Sheet with TS% if applicable (Element

	Bench_208014)
10-Instrument Seq log_mmddyy	Copy of Run log page
11-Element Seq_Sxxxxxx	Element generated Seq (Element Seq_S208010)
12-Sample Raw_mmddyy	Unedited Sample Reports
13-Sample Final _mmddyy	Qedited sample Reports (Detailed report)
14-QAQC Summary_mmddyy	Excel Spreadsheet for IS/SUR/Time
15-QAQC Raw_mmddyy	Raw data for sample and instrument QC runs.
16-Checklist_ Seq_Sxxxxxx	Element Generated QA/QC Checklist
17-Example Calc.	Manual calculation (see Attachment Link)
18-Std-Reagent Prep	Include only working Stds (Cal, LFB, LFSM/DUP etc.)
19-[as generated by Element]	Promium Summary Report
20-[as generated by Element]	R2FinalReportWCNT
21-Mass Hunter Excel Report	Mass Hunter generated report

2) All comments should be address accordingly and included in the following places:
   - Anomalies observed in the prep should be included in the comments under Bench sheet in *Element*.
   - Sequence comments should be used for any sequence comments.
   - All other comments should be included in the Checklist Comments.

After peer review, reviewer should generate checklist as a PDF with their initials and date. Save in the EDP file for the project.

3) Sample Calculation

To access file right, click on selected file then choose open hyperlink. These files are validated by the QAO.

Specific files for example calculations

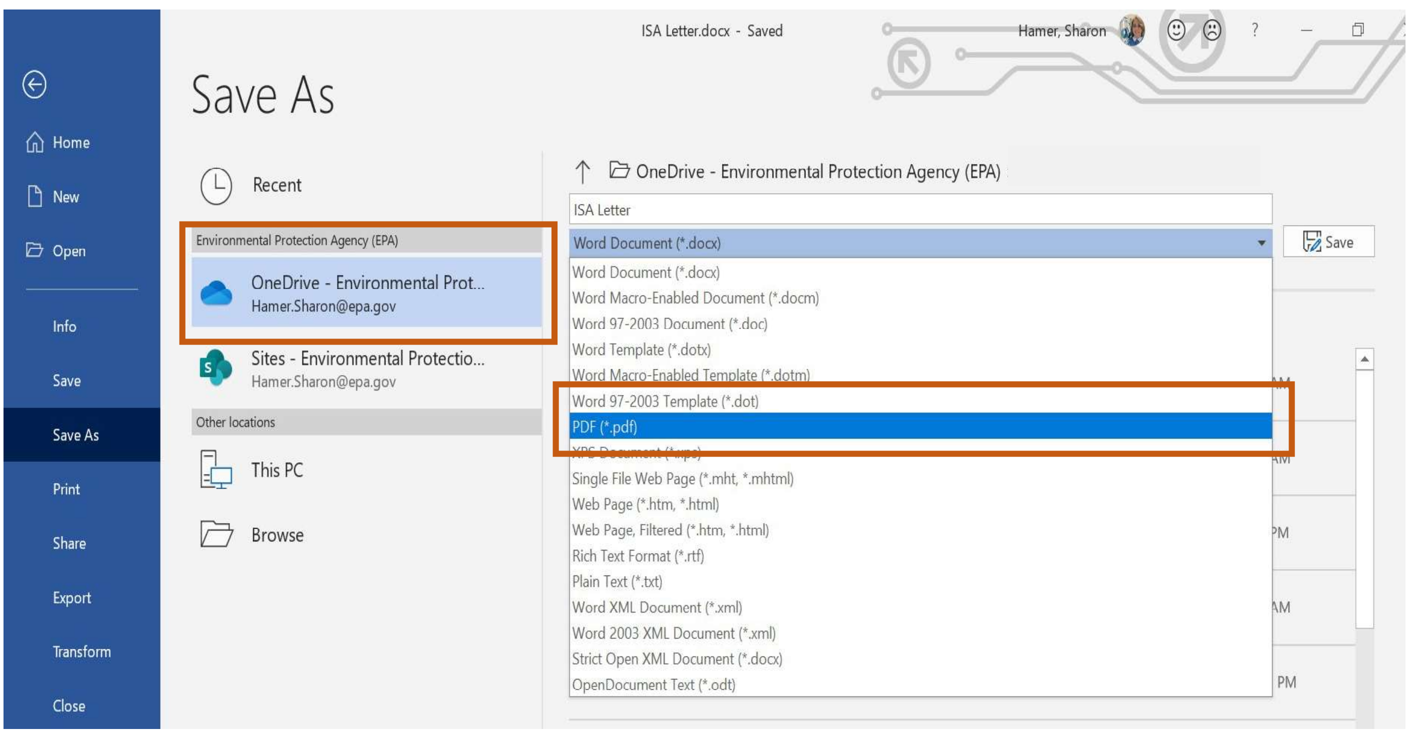
Y:\Electronic Data Packages\Example Calculation Organics\Example Calculation for PFAS.xlsx

Attachment 3

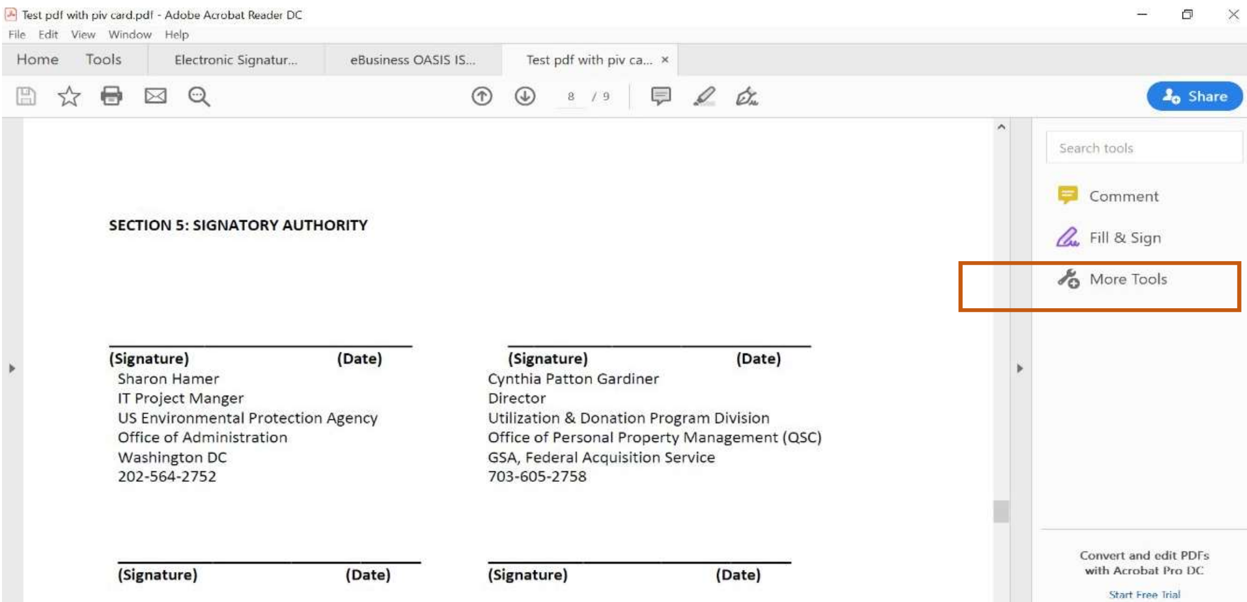
How to Insert a Digital Signature into a PDF Document Using Your PIV Card

Step 1: Ensure your PIV card is inserted into your computer's card reader.

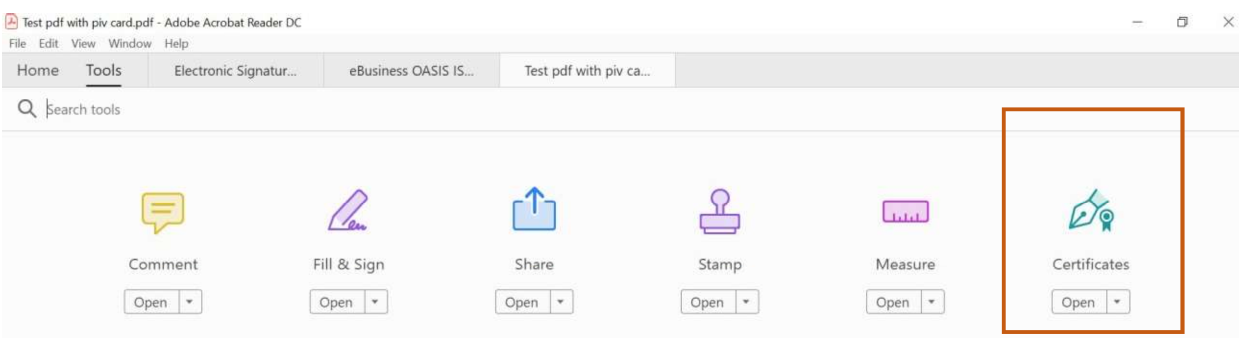
Step 2: Before digitally signing your document, save your document to PDF. Give your document a title and save to OneDrive, or other location as necessary.



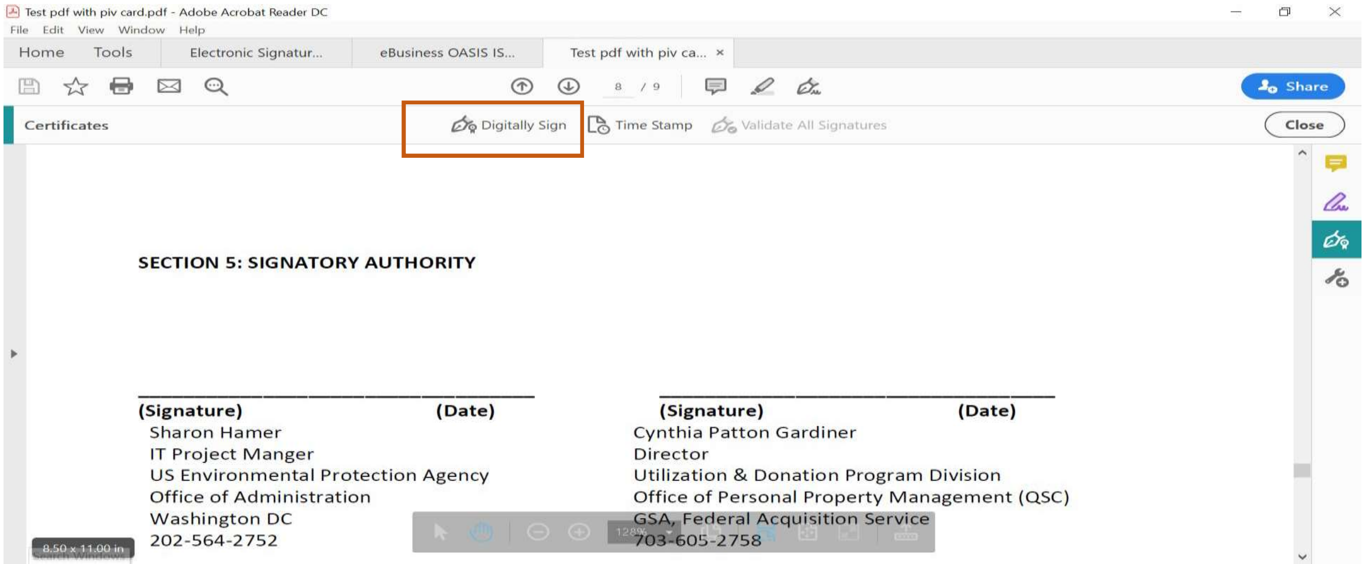
Step 3: Click on “More Tools”



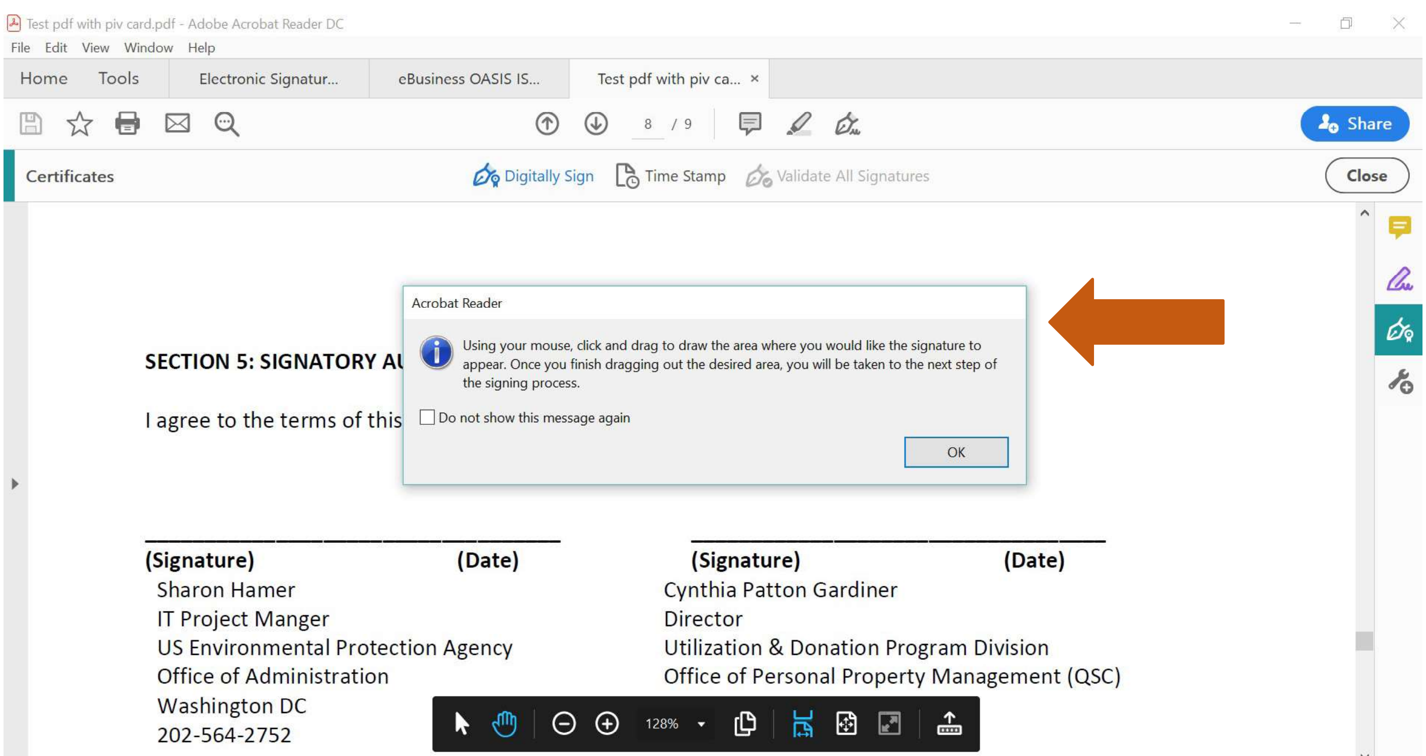
Step 4: Click on “Certificates”



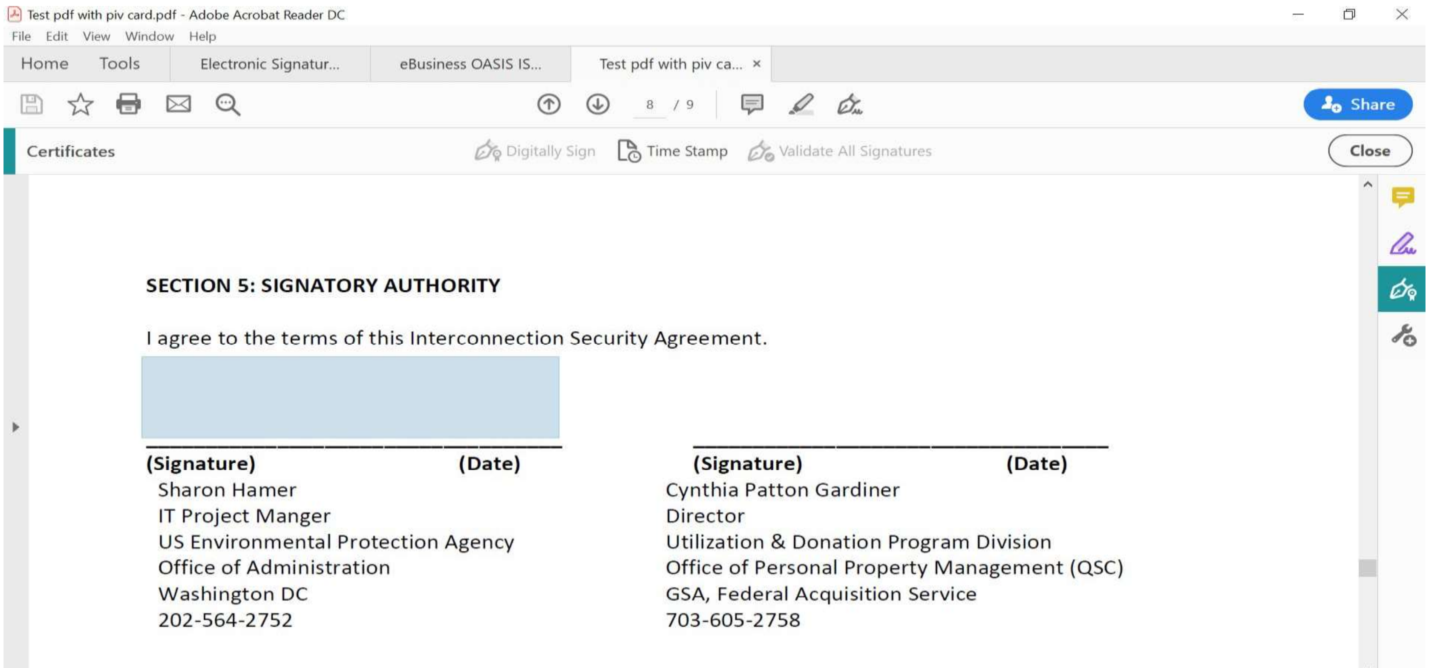
Step 5: Click on “Digitally Sign”



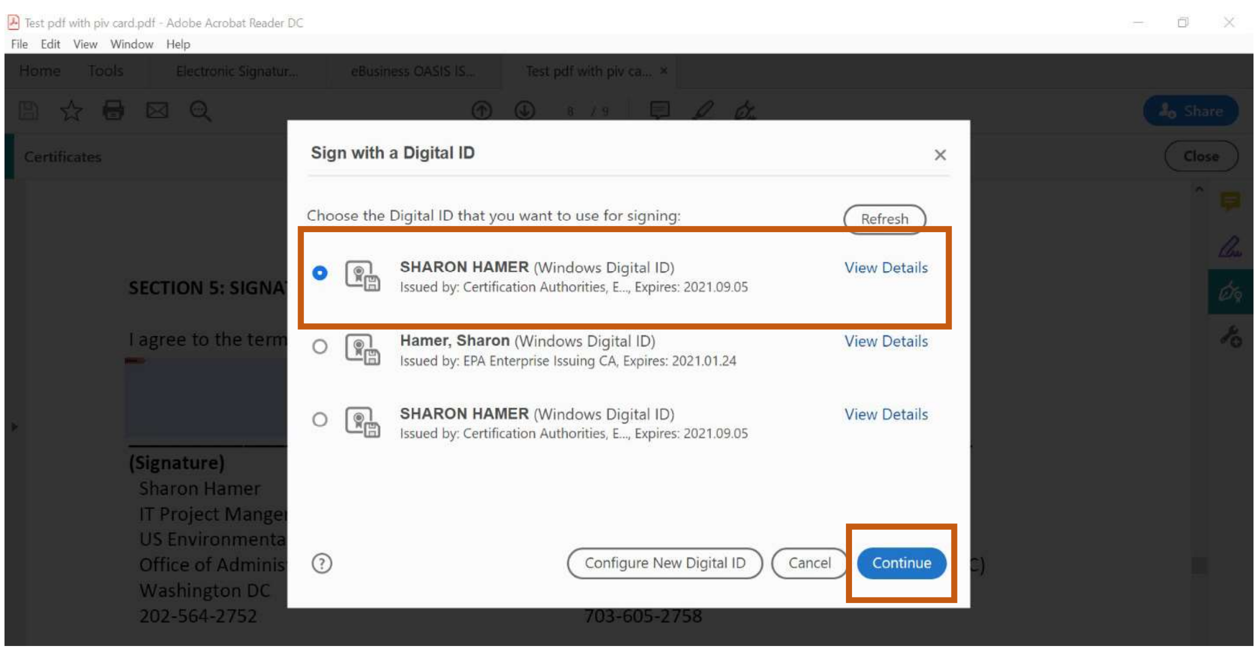
Step 6: The following pop-up screen appears. Follow the instructions.



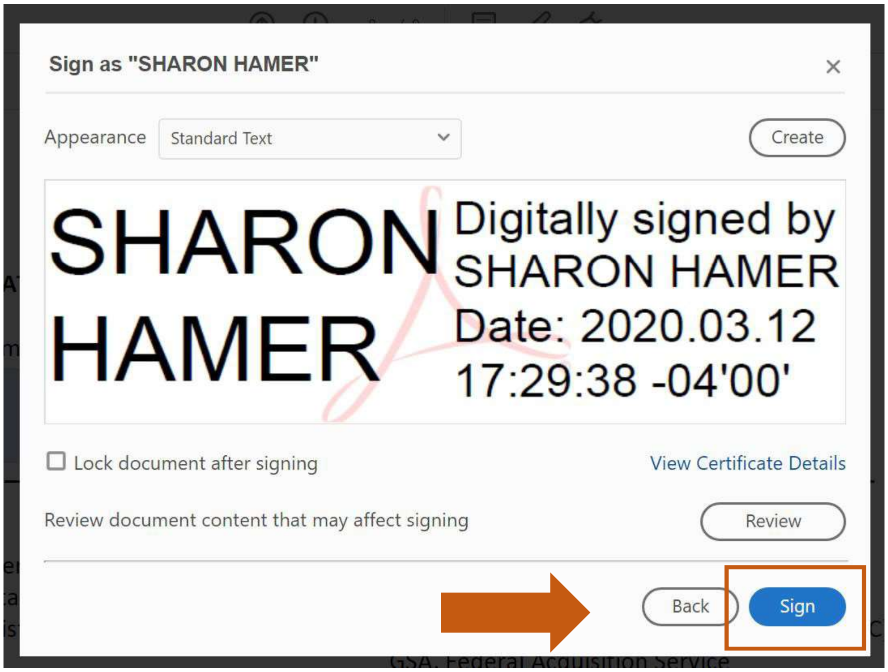
Step 7: Drag your mouse to the signature area



Step 8: Select the signature you want to use. Click the "Continue"

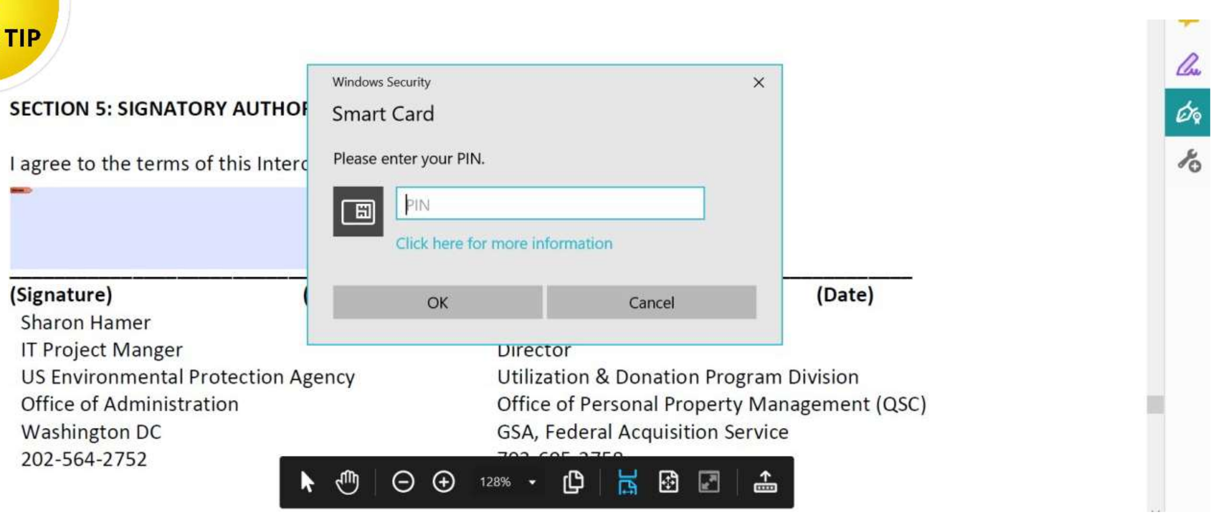


Step 9: Click on Sign

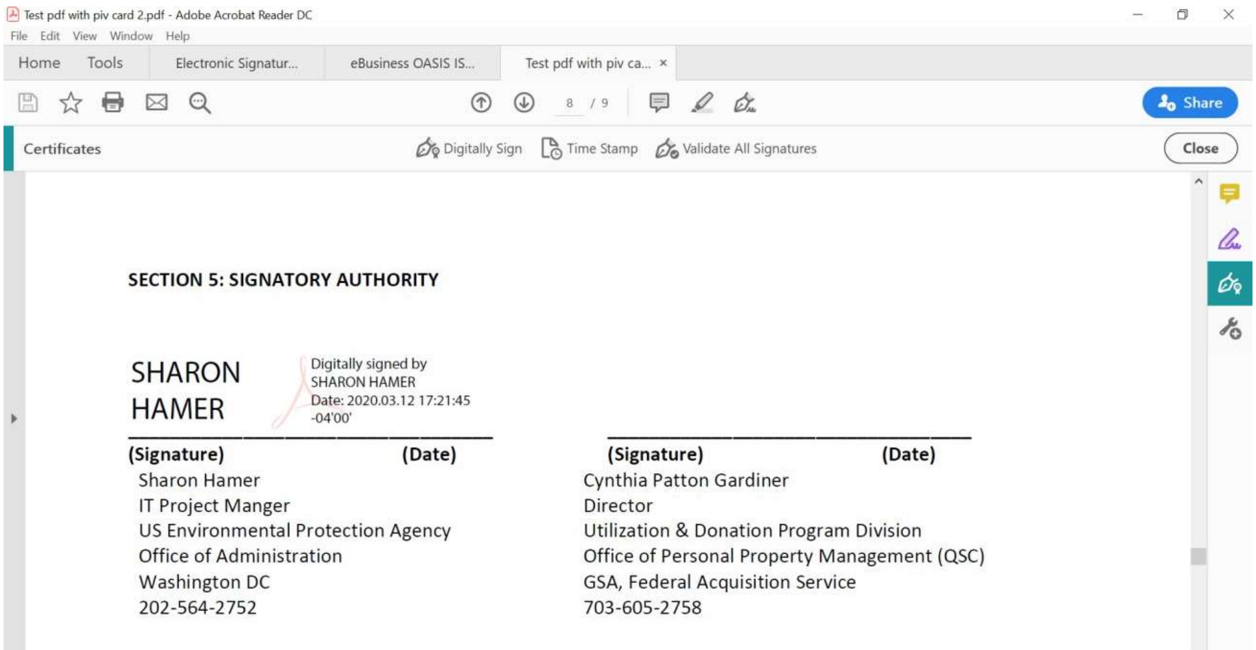


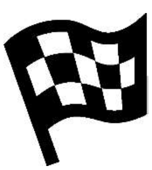
Step 10: Adobe Acrobat requires that a document be resaved before inserting a digital signature. Select or type in the OneDrive location to save your document.

You can select the same document you saved in step 2.



Step 11: Your digital signature will be inserted into your document.



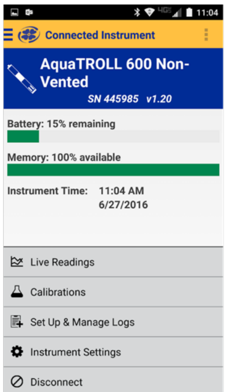


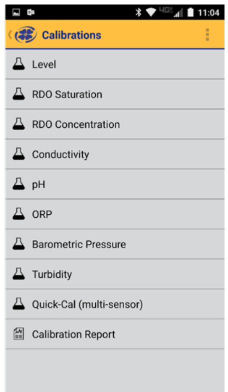
You have successfully completed the steps necessary to insert your digital signature using your PIV card!

Appendix E-1
LOOHN'S CLEANERS AND LAUNDERERS UFP-QAPP 2022-Low-Flow Water Quality Field Measurement Manufacturer's Instructions

How to Perform a Low-Flow Test with VuSitu

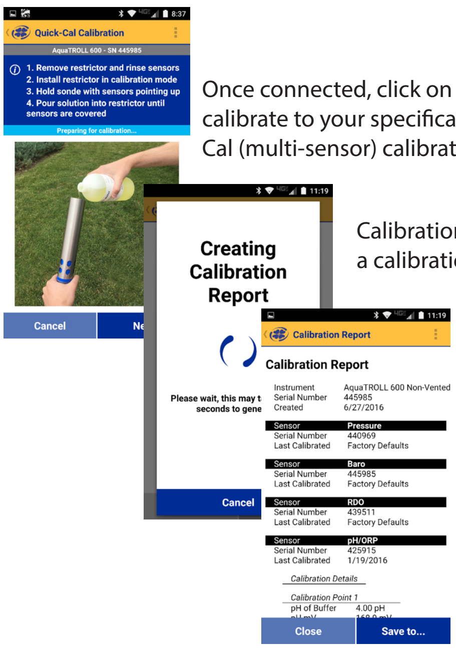
In this tech note, you'll learn how to use VuSitu with the Aqua TROLL 600 Multiparameter Sonde to conduct a low-flow test. Once your test is complete, it's easy to save the results to your mobile device. You can then share your test report via email, text or cloud storage.





Calibration Sequence

Open VuSitu and connect to the Aqua TROLL 600. If you cannot connect, remember to loosen and then tighten the battery compartment on the sonde. This will reset the Bluetooth connection and you will automatically connect with the instrument. The LCD display on the Aqua TROLL 600 will light up when you do this. If a serial number appears, you know it is working.



Once connected, click on **Calibrations** and calibrate to your specifications or click on Quick-Cal (multi-sensor) calibration.

Calibration will be automatic, and a calibration report will be created.

Click on **Save to**… and save your Calibration Report to the cloud or e-mail it to yourself.

1. Flip and Pour

After thoroughly cleaning and rinsing the sonde and sensors, flip the restrictor into calibration & storage mode. Hold the sonde with the sensors pointing up. Pour the calibration standard directly into the restrictor until the sensors are covered.

2. Hold and Calibrate

Continue holding the sonde in a vertical orientation with the sensors pointing up. This prevents bubbles from forming on the sensor face. Perform the calibration using VuSitu or WinSitu 5.

3. Rinse and Rinse

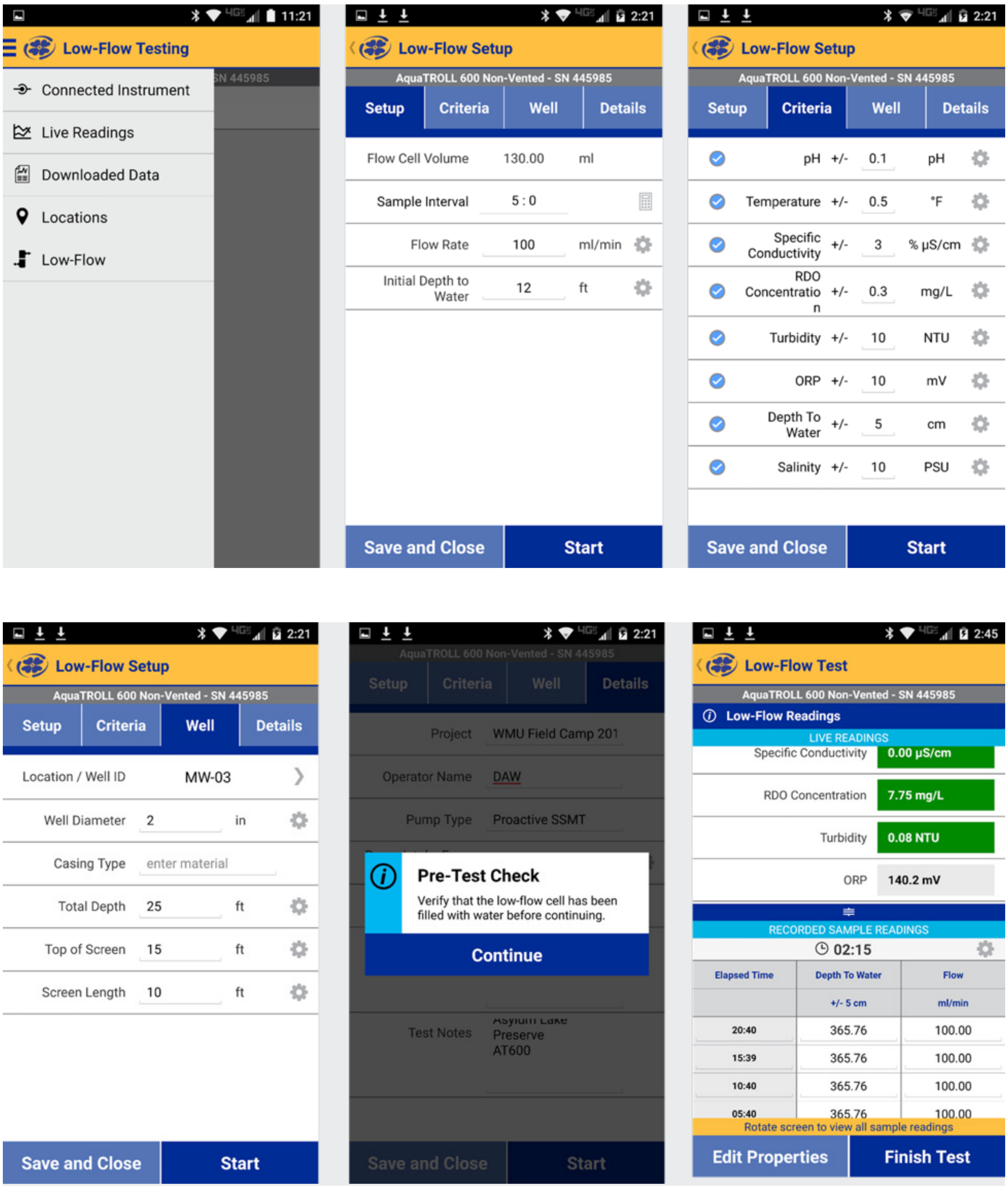
Between calibrations and calibration points, discard the calibration standard, remove the restrictor and rinse all parts thoroughly with deionized water. For best results, follow the water rinse by rinsing twice with the standard to be used for the next calibration point.

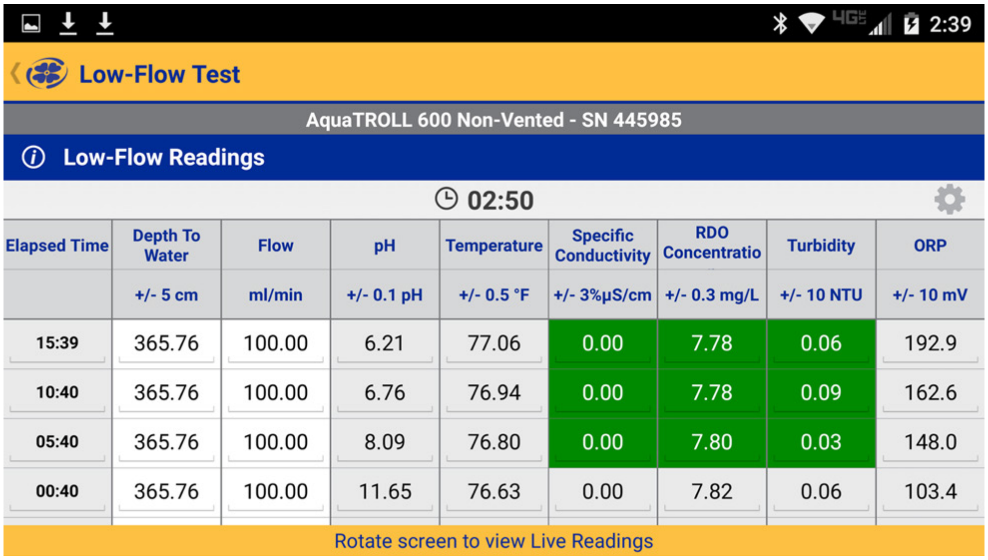
VuSitu Low-Flow Test Procedure...

- **Calibrate the Aqua TROLL 600**
- **Select Low-Flow from the VuSitu menu**
- **Configure and run the test**
- **Save and share test report**

Running the Test

To begin your sampling regime, set up on the well you want to sample, click on the upper-left menu bars, click on **Low-Flow**, choose the well template with the corresponding well you are sampling, review the Setup – Criteria – Well – Details and click **Start** when ready. Make sure you have a stable flow and drawdown established when you start the test. Click **Start**. The low-flow sampling sequence will run automatically.



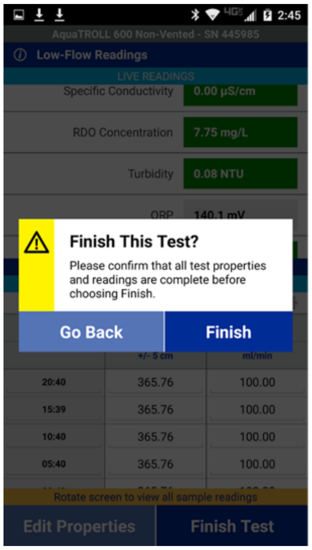


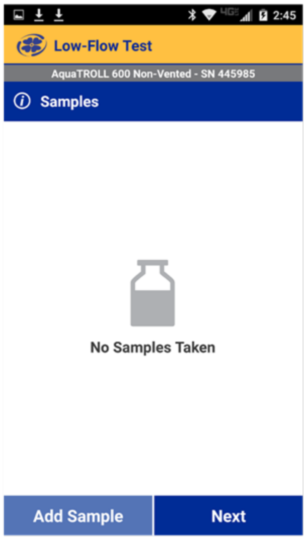
Elapsed Time	Depth To Water	Flow	pH	Temperature	Specific Conductivity	RDO Concentratio	Turbidity	ORP
	+/- 5 cm	ml/min	+/- 0.1 pH	+/- 0.5 °F	+/- 3%µS/cm	+/- 0.3 mg/L	+/- 10 NTU	+/- 10 mV
15:39	365.76	100.00	6.21	77.06	0.00	7.78	0.06	192.9
10:40	365.76	100.00	6.76	76.94	0.00	7.78	0.09	162.6
05:40	365.76	100.00	8.09	76.80	0.00	7.80	0.03	148.0
00:40	365.76	100.00	11.65	76.63	0.00	7.82	0.06	103.4

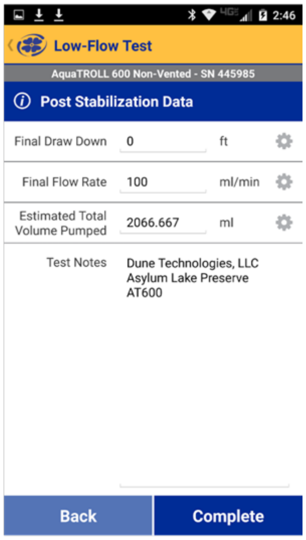
The software needs at least three water quality parameter readings to run a 3-point running average in order to calculate the stabilization values. For the sample set (A, B, C), [(Max-Min)/A] X 100 = Running Average.

You can rotate the screen to see all the water quality parameters being collected. The software will record your sample interval and show you a countdown until your next sample is taken.

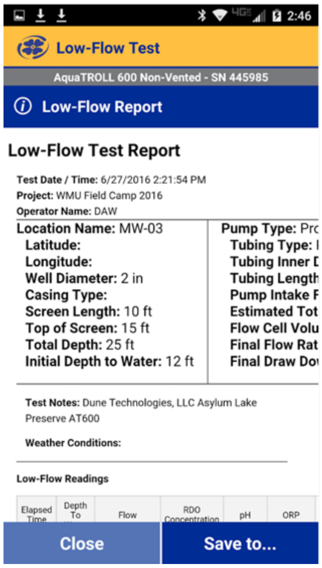
Once a parameter has reached stabilization, the field turns green. When all the fields have stabilized for the required number of readings you can click on **Finish Test**.

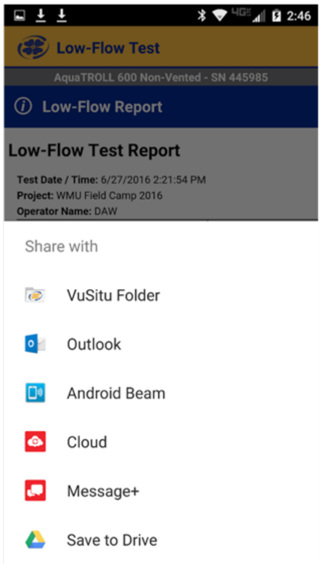


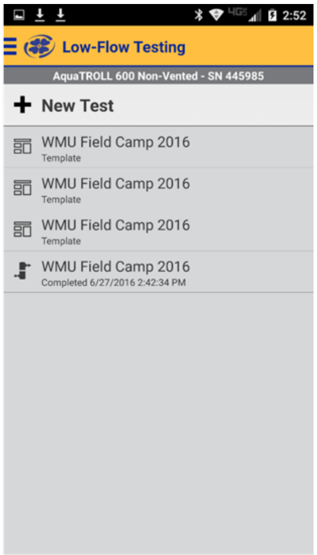




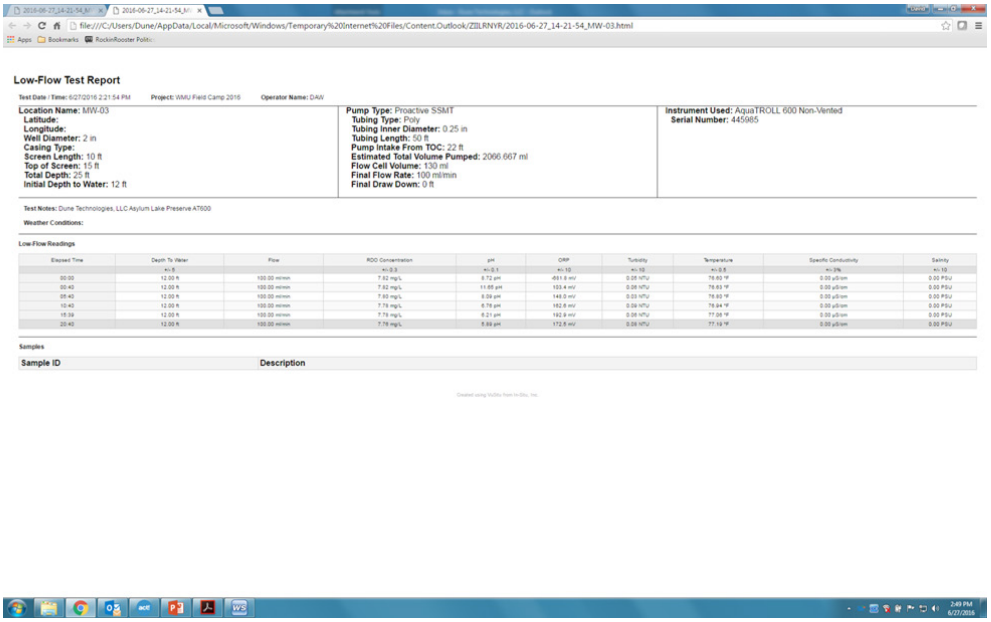
When you finish the test, you will have the option of recording laboratory samples that you collect for the well in question, and record any post-stabilization data. When you are satisfied, click **Complete**.







Once your test is complete, you will have the ability to review the data file, and then click **Save to**… You can then choose to save the file, text, e-mail, or store the file on the cloud, ensuring that you will not lose any data. The sampling event is also automatically stored on your mobile device. Then organize and manage your data to your specifications.



file:///C:/Users/Dune/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.Outlook/ZIILRNYR/2016-06-27_14-21-54_MW-03.html

Low-Flow Test Report

Test Date / Time: 6/27/2016 2:21:54 PM **Project:** WMU Field Camp 2016 **Operator Name:** DAW

Location Name: MW-03
Latitude:
Longitude:
Well Diameter: 2 in
Casing Type:
Screen Length: 10 ft
Top of Screen: 15 ft
Total Depth: 25 ft
Initial Depth to Water: 12 ft

Pump Type: Proactive SSMT
Tubing Type: Poly
Tubing Inner Diameter: 0.25 in
Tubing Length: 50 ft
Pump Intake From TOC: 22 ft
Estimated Total Volume Pumped: 2066.667 ml
Flow Cell Volume: 130 ml
Final Flow Rate: 100 ml/min
Final Draw Down: 0 ft

Instrument Used: AquaTROLL 600 Non-Vented
Serial Number: 445985

Test Notes: Dune Technologies, LLC Asylum Lake Preserve AT600

Weather Conditions:

Low-Flow Readings

Elapsed Time	Depth To Water	Flow	RDO Concentration	pH	ORP	Turbidity	Temperature	Specific Conductivity	Salinity
	+/- 5		+/- 0.3	+/- 0.1	+/- 10	+/- 10	+/- 0.5	+/- 3%	+/- 10
00:00	12.00 ft	100.00 ml/min	7.82 mg/L	8.72 pH	-681.8 mV	0.05 NTU	76.60 °F	0.00 µS/cm	0.00 PSU
00:40	12.00 ft	100.00 ml/min	7.82 mg/L	11.65 pH	103.4 mV	0.06 NTU	76.63 °F	0.00 µS/cm	0.00 PSU
05:40	12.00 ft	100.00 ml/min	7.80 mg/L	8.09 pH	148.0 mV	0.03 NTU	76.80 °F	0.00 µS/cm	0.00 PSU
10:40	12.00 ft	100.00 ml/min	7.78 mg/L	6.76 pH	162.6 mV	0.09 NTU	76.94 °F	0.00 µS/cm	0.00 PSU
15:39	12.00 ft	100.00 ml/min	7.78 mg/L	6.21 pH	192.9 mV	0.06 NTU	77.06 °F	0.00 µS/cm	0.00 PSU
20:40	12.00 ft	100.00 ml/min	7.76 mg/L	5.89 pH	172.5 mV	0.08 NTU	77.10 °F	0.00 µS/cm	0.00 PSU

Samples

Sample ID	Description

Created using VuSitu from In-Situ, Inc.

When you save the file by e-mail, three separate files are saved and sent to your computer: an HTML display of the data report (above), an Excel file with the formatted data, and a PDF file. All files are automatically generated.

Appendix E-2
LOOHN'S CLEANERS AND LAUNDERERS UFP-QAPP 2022-EPA SCRIBE SAMPLE MANAGMENT SOFTWARE MANUAL

ERT

QUICK START GUIDE
Part 1

SCRIBE v3.10

Contents

PART 1 – QUICK START GUIDE

Starting a New Project

The first time Scribe is opened, the New Project Wizard starts and offers two (2) options:

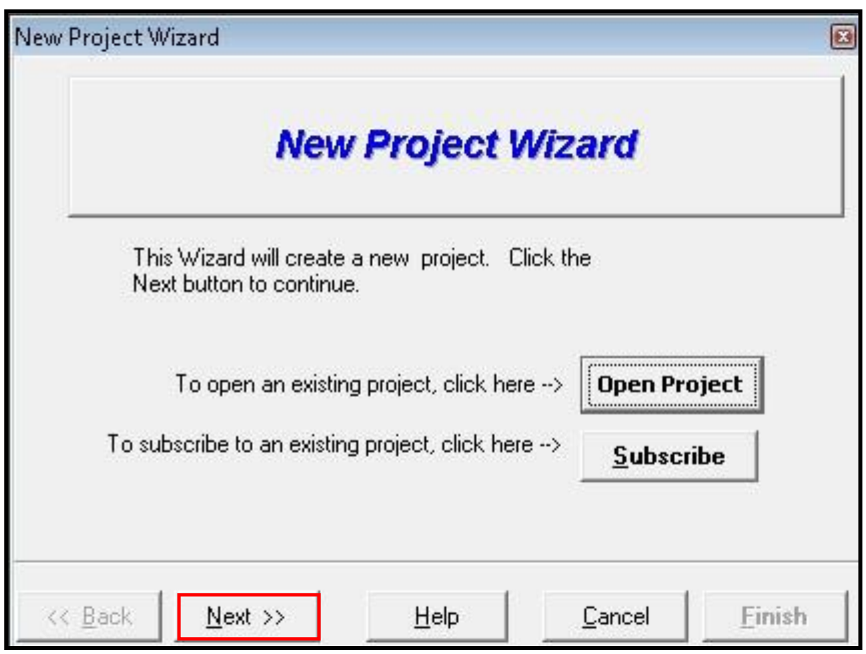
- Open a Project - if you already have an active Scribe project and would like to open it.
- Subscribe - if you have subscription information for a project that you wish to download.

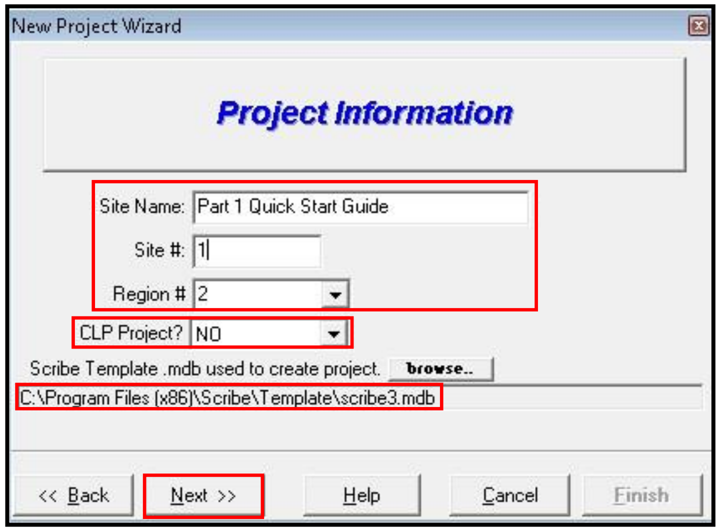
Follow the steps below to start a New Scribe project:

New Project Wizard Screen

To Start a New Scribe project,

Click the '**Next'** button.





1. Input the Site Name, Site # or Project Identifier and the Region.

2. Select 'Yes' or 'No' depending on if it is a CLP Project (Note: If Yes is selected, screen layouts and COC Types will default to CLP). However, both CLP and non-CLP samples and analyses can still be entered.

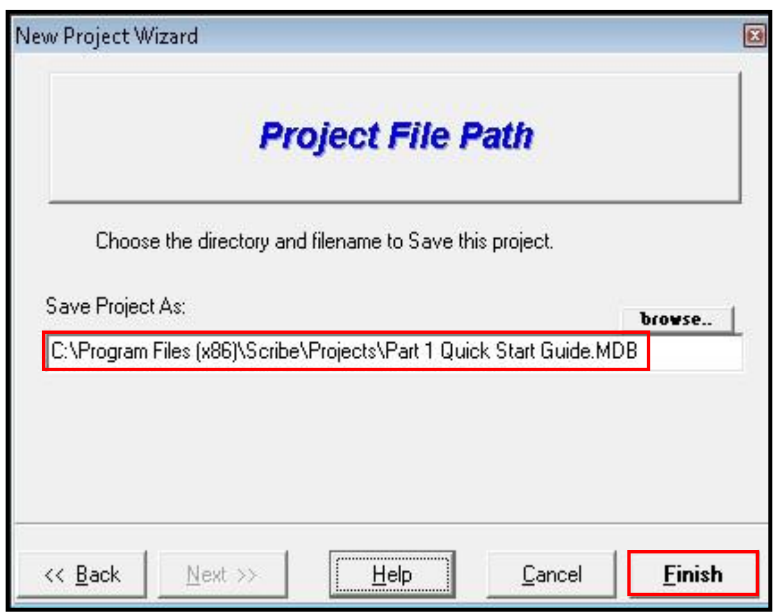
3. Use the default Template (scribe3.mdb) or a Region specific Template. Templates contain the pick-lists and layouts loaded with your new project.

4. Click the 'Next' button.

5. The Project File Path screen displays a **default location and filename** for the project.

   Optional: To change the location, click on the 'browse' button.

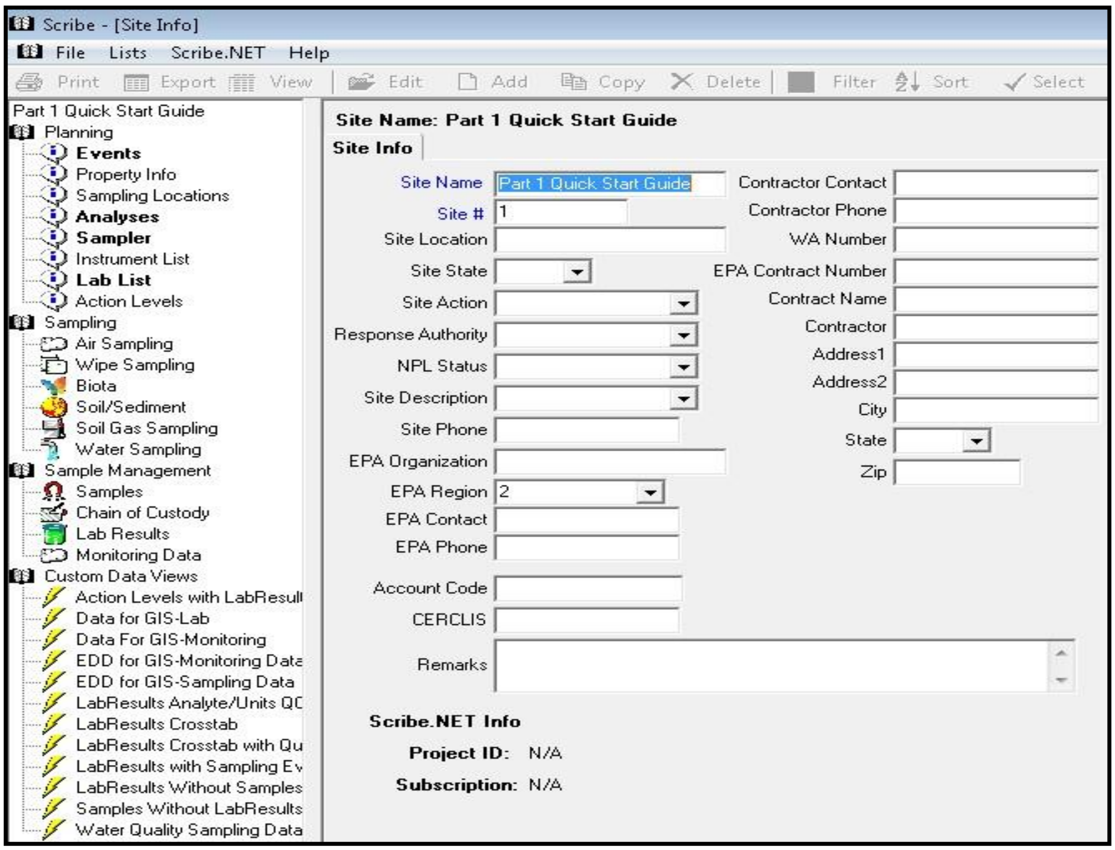
6. Click Finish to complete the creation of the new project.



The New Project Wizard closes and the 'Site Info' screen is displayed. Completing the information on this screen is not required, but is recommended when time permits.

The left navigation bar is laid out in the order of work flow.

- Planning – manage lists to pre-populate certain fields in sampling tasks
- Sampling – manage sampling tasks and analyses
- Sample Management – manage sample data including labels and chains
- Custom Data Views – query your sample data

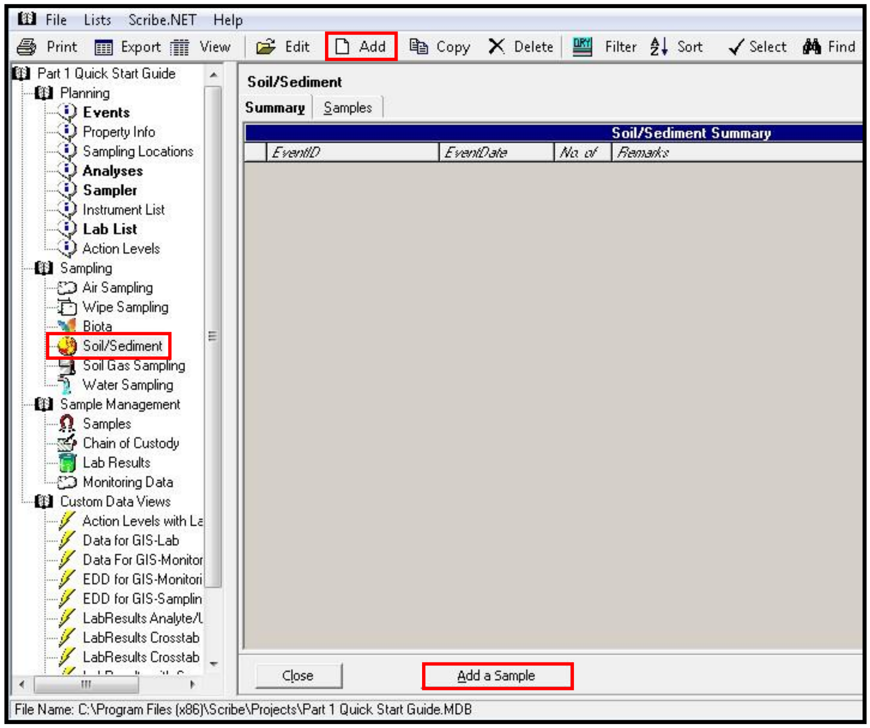


Add Samples

Sampling information can be input manually or by importing from a spreadsheet (see Management and Advanced Features Guide)

To manually add samples to the project, select one of the 'Sampling' tasks in the 'Navigation Pane' (i.e., Soil/Sediment).

1. Click on 'Add' (on the toolbar) or 'Add a Sample' button at the bottom of the window.

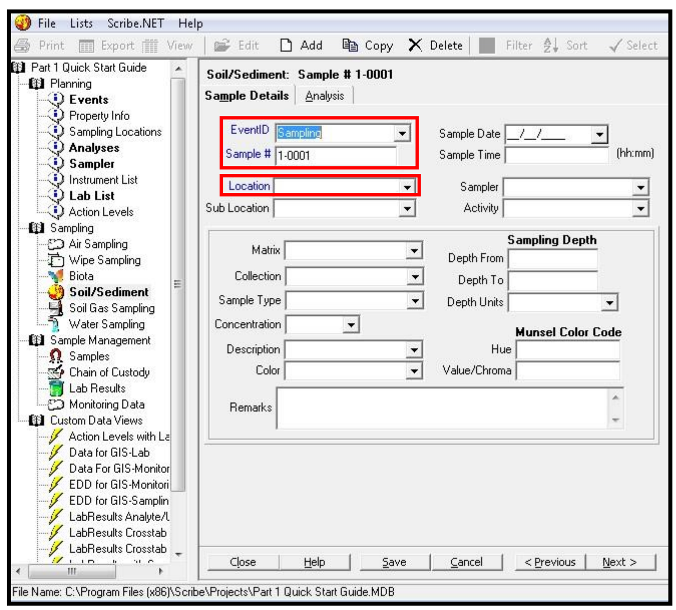


2. The Sample Details tab will display.

   Note: Any field highlighted in Blue denotes a required field.

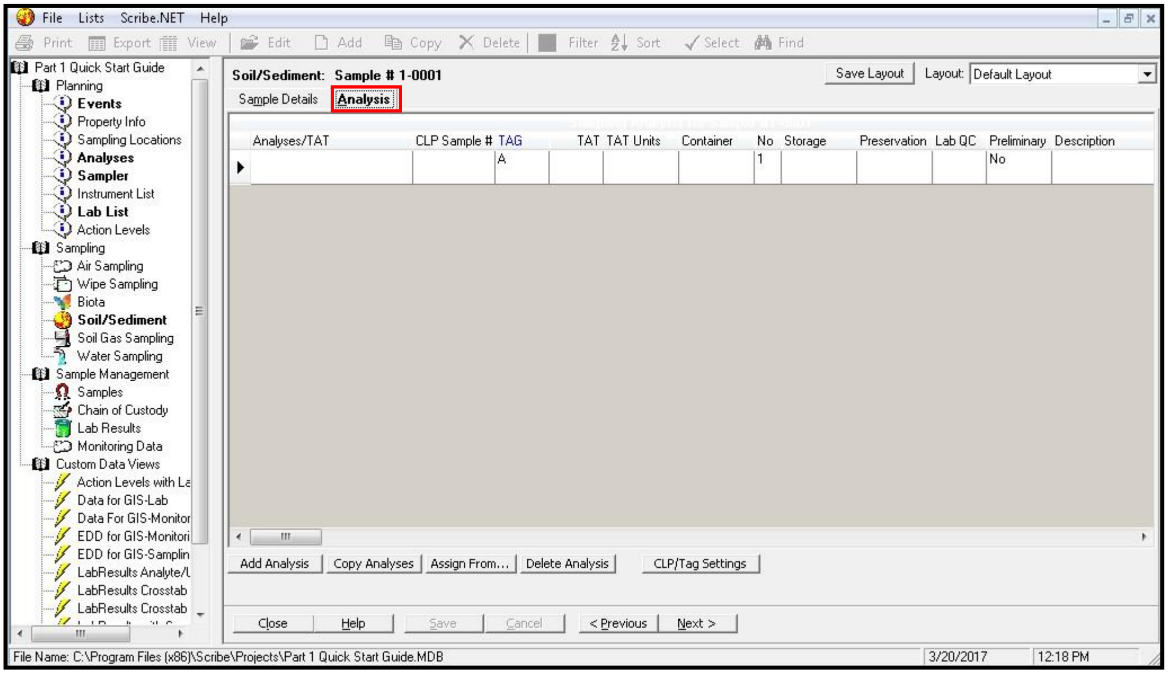
   By default, Scribe will auto-populate the EventID field with 'Sampling' and the Sample # will be the Site # you entered when creating the project, followed by sample number (1-0001). These fields can be changed at any time by entering a new value directly in the field.

3. Enter the Location and all other sample details.



Add an Analysis(es)

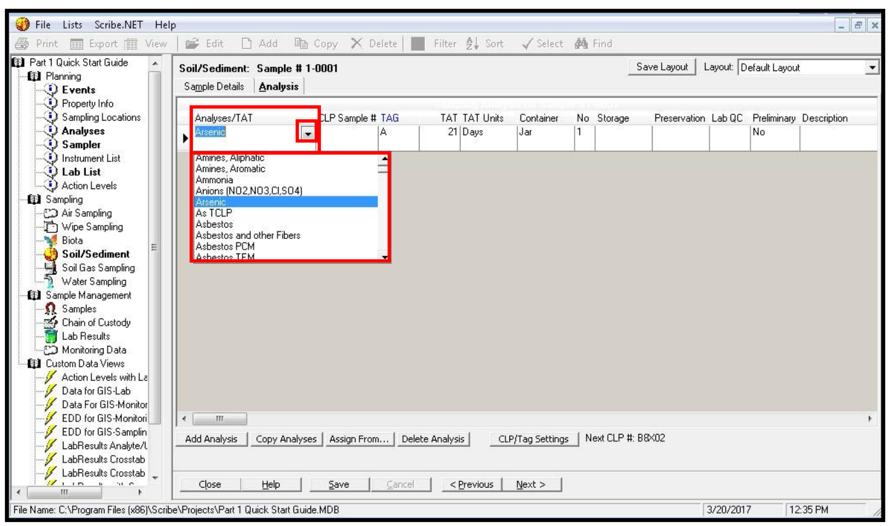
To add an analysis(es), click on the **Analysis** Tab. The information entered here will be added to the Chain of Custody.



1. Click in the **Analyses/TAT** field. A drop down arrow will appear.

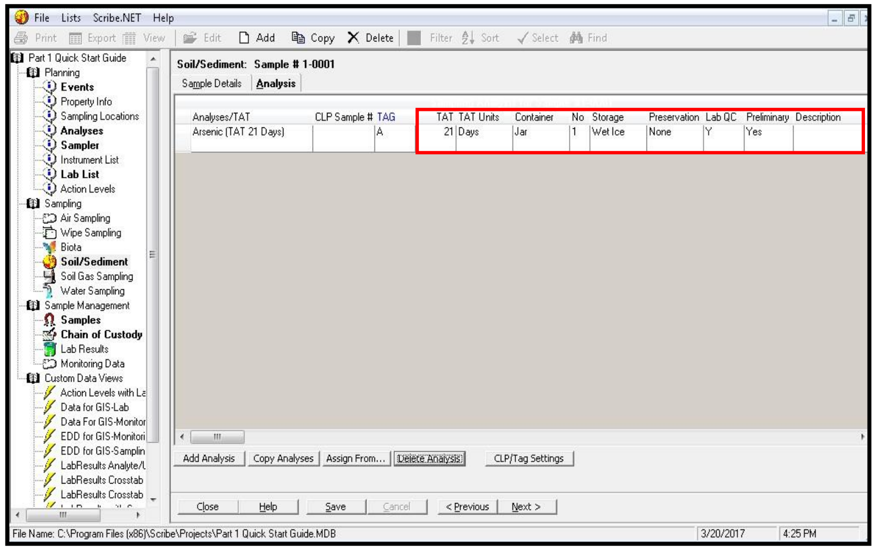
2. Click on the drop down arrow to display the list of analyses.

3. Select the analysis(es).



Note: *The 'TAG' field will automatically increment with an Alpha character (i.e., A, B, C, etc.).*

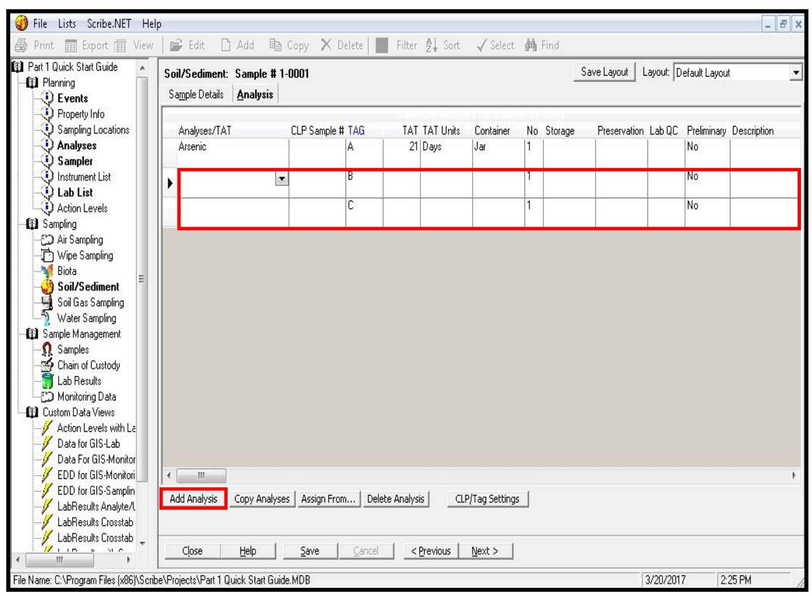
4. Enter TAT, TAT Units, Container (type), No. of Containers, Storage, Preservation, Lab QC (MS/MSD), Preliminary (Results), and additional description (if necessary).



Note: TAT, Container and Preservation can also be entered in the Analyses table under the Planning section in Scribe. When entered in the analyses table first, the information will automatically carry over to the sample analysis fields when the Analysis is selected.

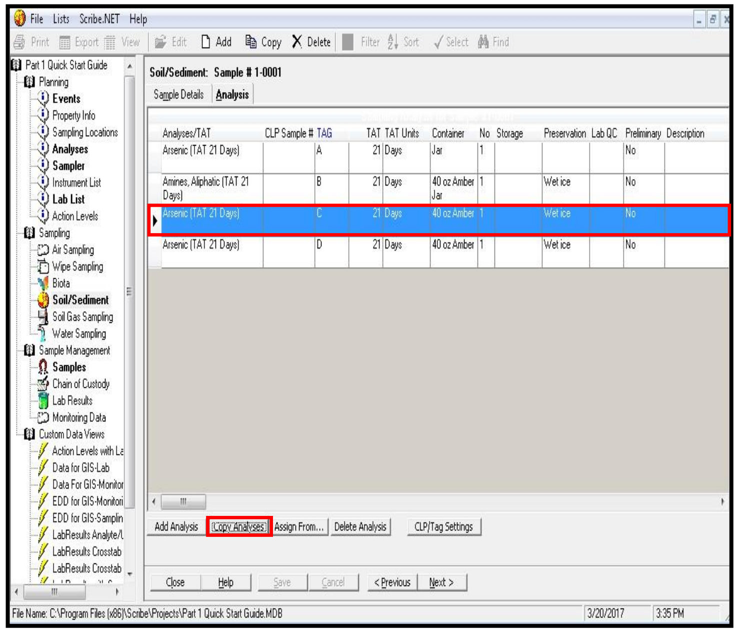
Note: *CLP Sample # will not be populated unless the CLP/Tag Settings have been set up and the analysis is part of the CLP Program. Please refer to the* ***Scribe CLP User Guide*** *for Adding CLP Analyses.*

5. To add additional analyses, click on 'Add Analysis'.
6. Follow Steps 1 and 2 above.
7. Click 'Close' to save and close the screen.



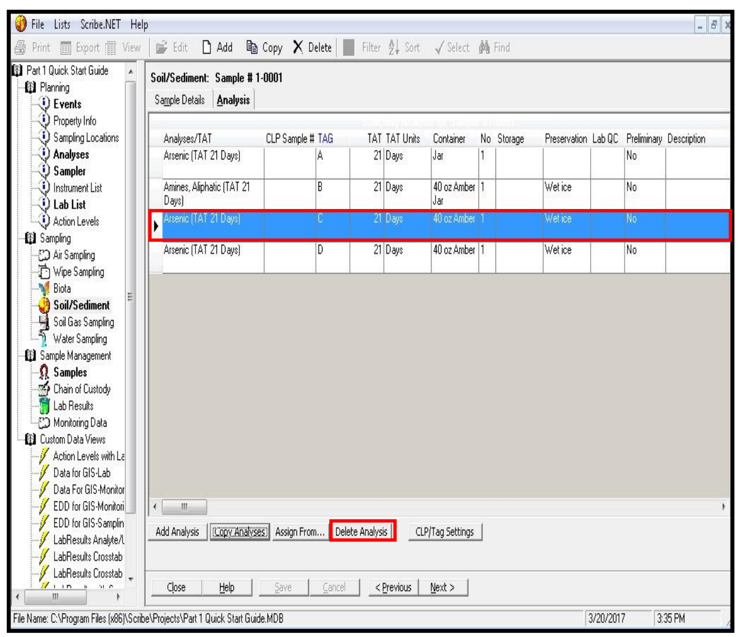
Copy an Analysis(es)

1. Highlight an analysis.
2. Click ‘Copy Analyses’.
3. Click Close to close the screen.



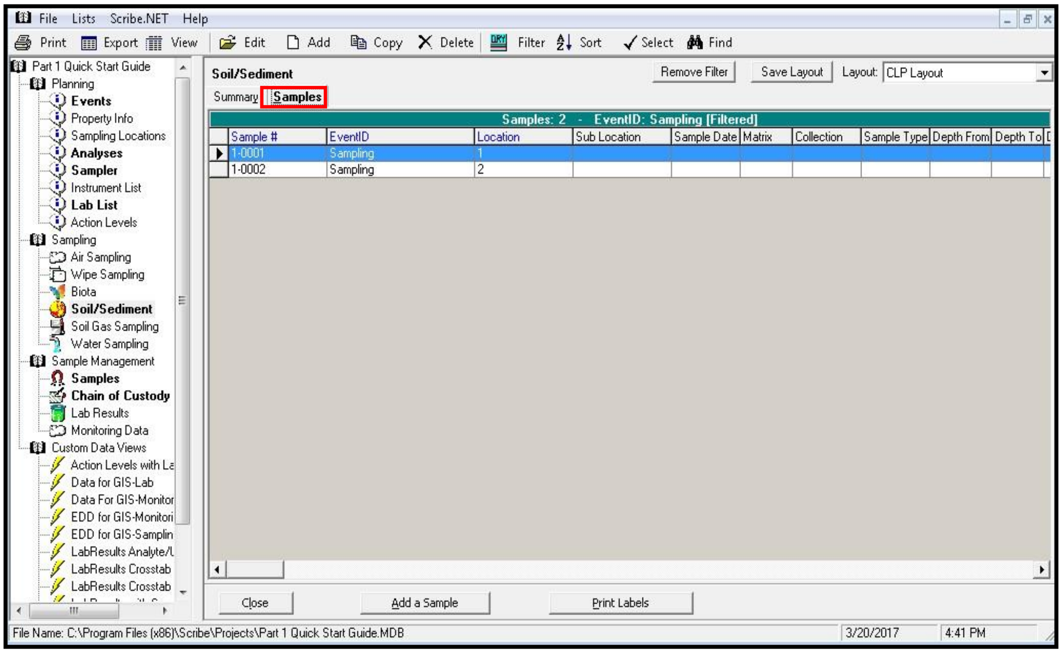
Delete an Analysis

1. Highlight an Analysis.
2. Click ‘Delete Analyses’.
3. Click Close to close the screen.

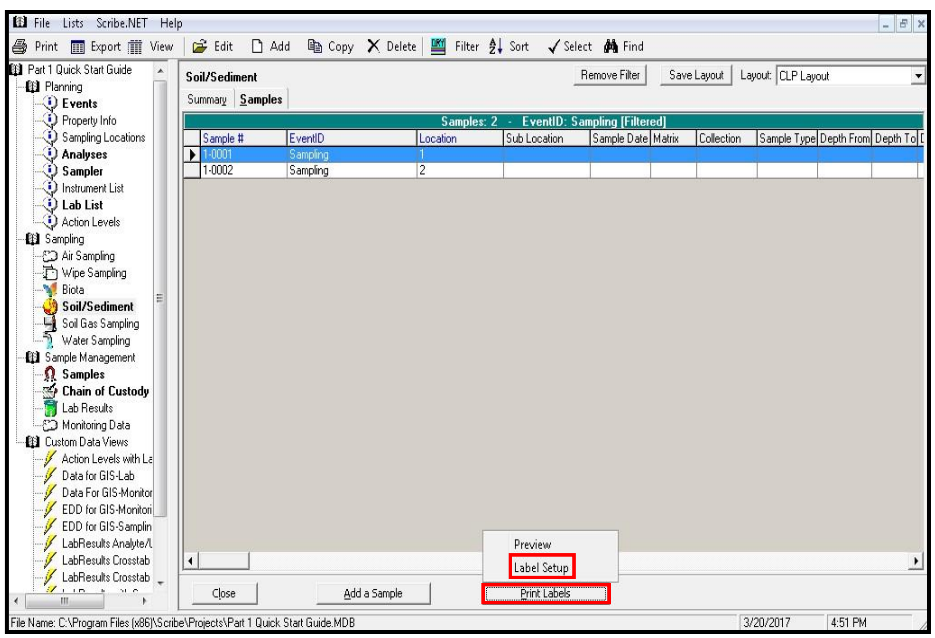


Print Labels

To print labels, return to the **Samples** tab. By default, all samples shown on the screen will be printed. For printing specific samples, use the ‘Filter’ feature to retrieve specific samples.

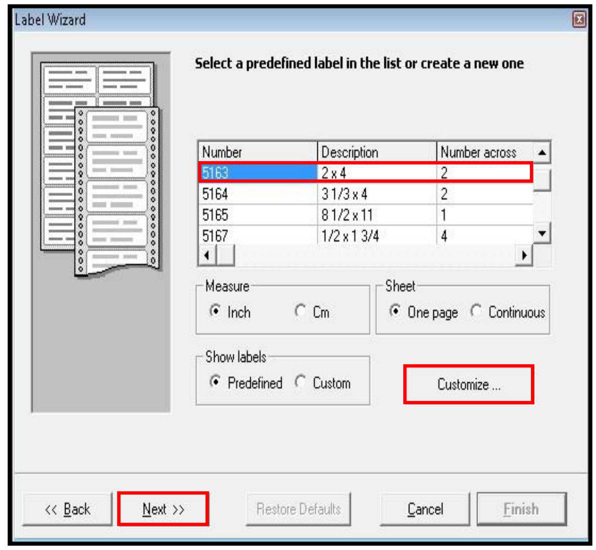


1. Click on **Print Labels** button.
2. Select ‘Label Setup’.



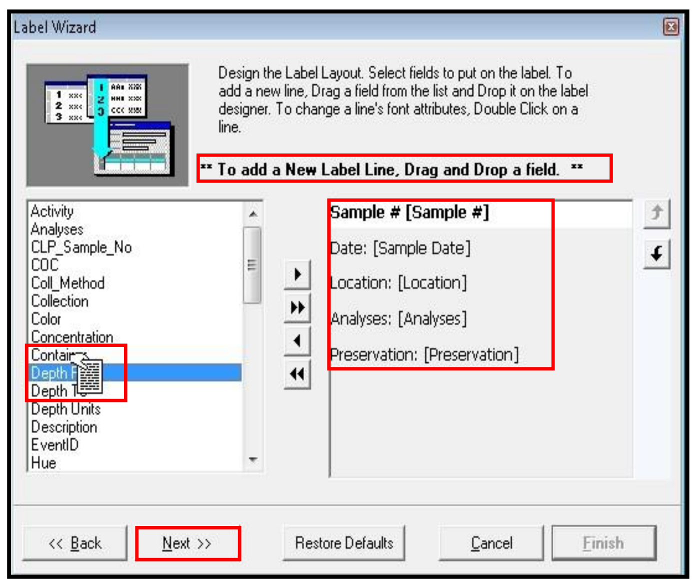
3. Select a pre-defined label (Avery) in the list or create a new one (Customize).

4. Click 'Next'.

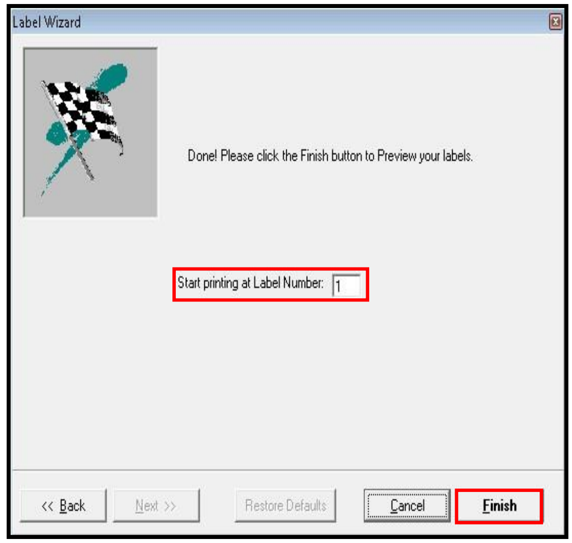


5. You may change the design by dragging and dropping fields, or accept the default Label Layout.

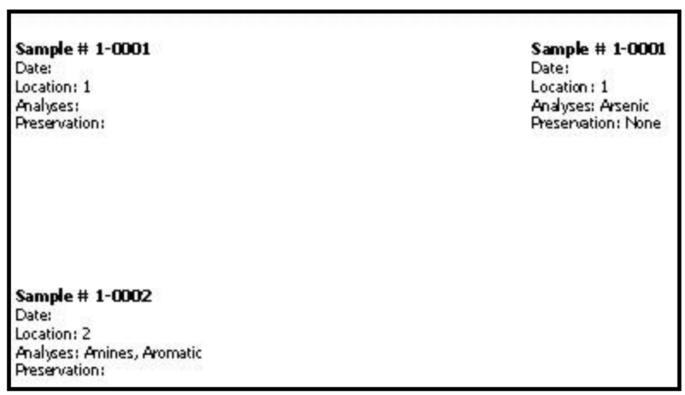
6. Click 'Next' to continue.



7. Enter the Label Number to start printing from.



8. Click ‘Finish’ to Preview the labels before printing.

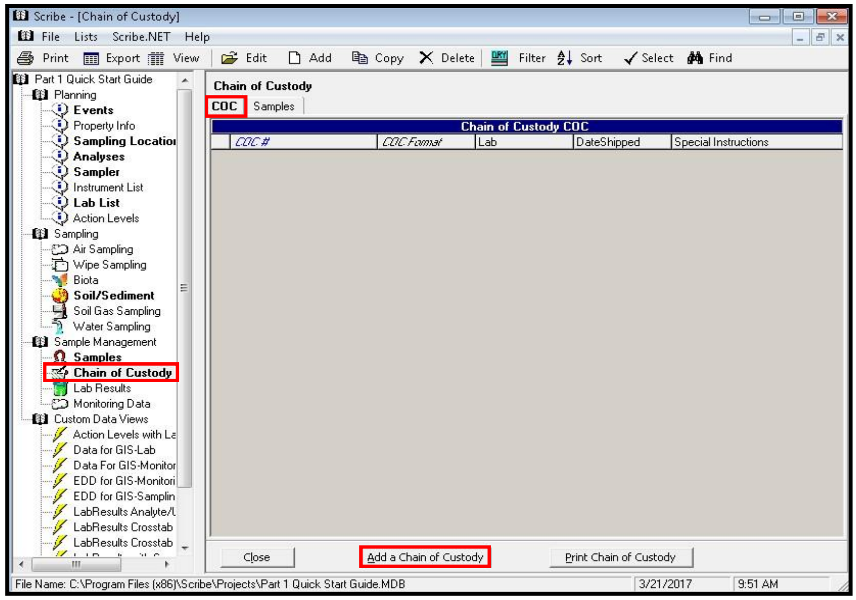


9. Click the Printer Icon to print the labels.

10. Click Close.

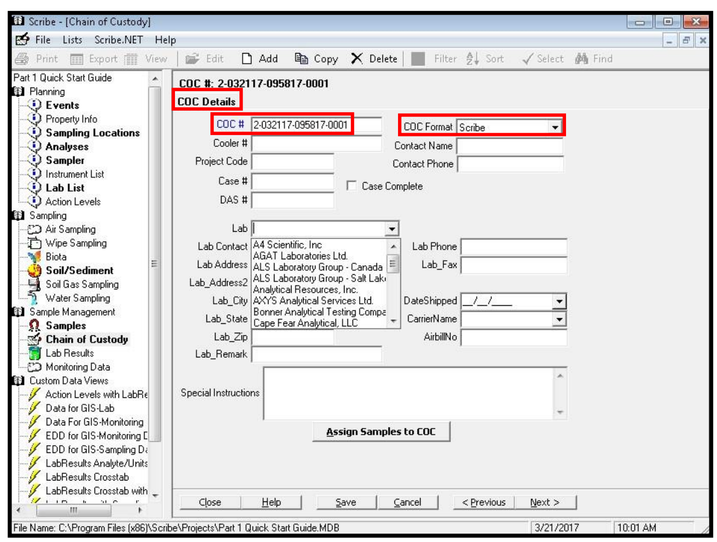
Chain of Custody

To prepare and print a Chain of Custody:



1. Select 'Chain of Custody' in left the Navigation Pane.

2. Click on the 'Add a Chain of Custody' button on the bottom of the window.



3. The COC Details form will come up. Scribe will automatically assign a unique COC number that contains the Region # (2), current date (032117), current time (095817) and COC # (0001). This number can be changed at any time.

4. By default, the COC format will be set to Scribe (if you did not say yes to CLP project when initially starting the new project. ***See Starting a New Project*.**

5. Fill out the remainder of the COC Details, as needed. ***Note:*** *the completion of other COC details will print in the header of the Chain of Custody.*

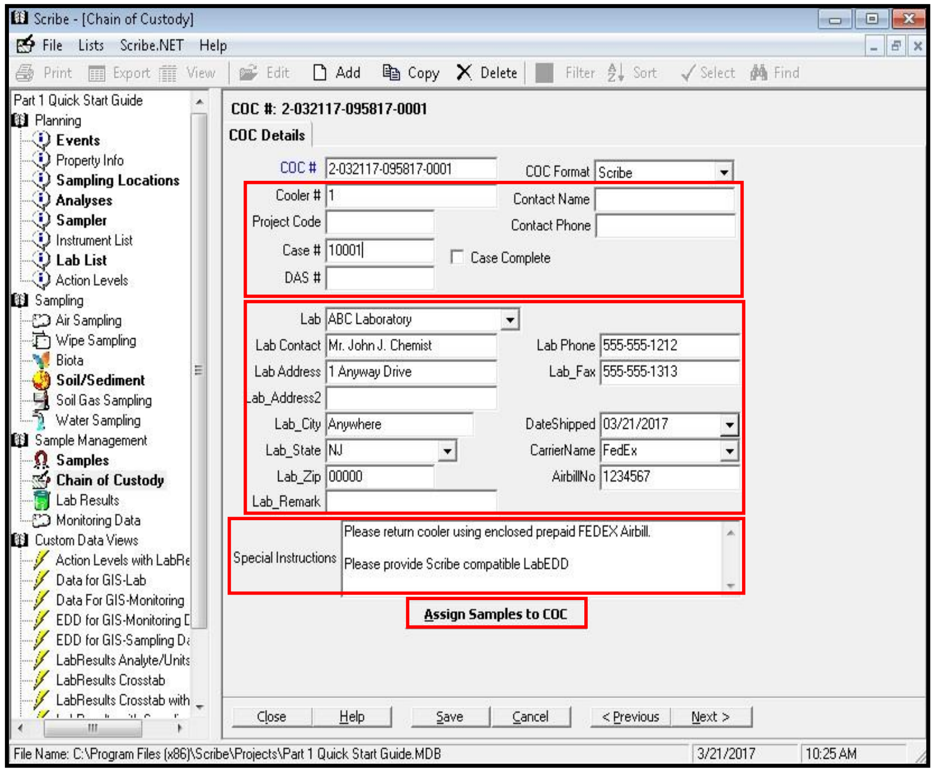
6. Select a Lab from the dropdown box or hand enter the Lab information (if the Lab was not part of the Lab picklist).

7. Select a DateShipped.

8. Select a Carrier Name from the dropdown box or hand enter a new Carrier Name.

9. Add an Airbill number.

10. Add Special Instructions, as needed.

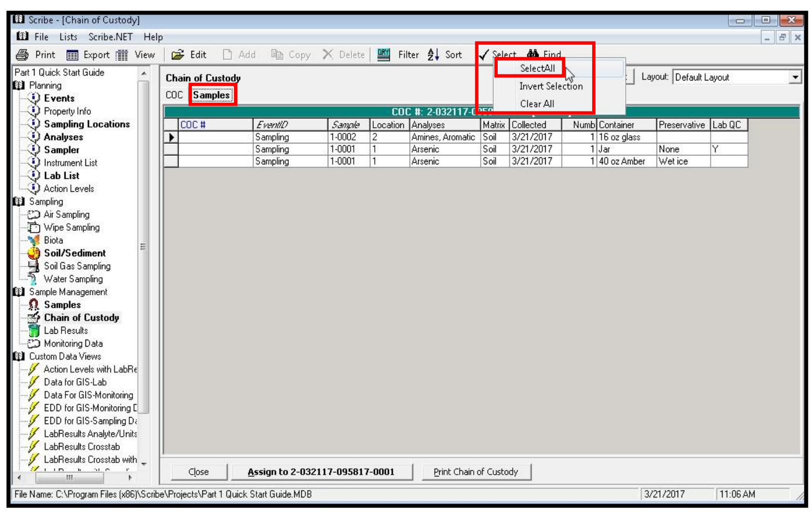


After preparing your Chain of Custody details, you can now assign samples to the Chain of Custody

11. Click ‘Assign Samples to COC’.

The list of Samples will display.

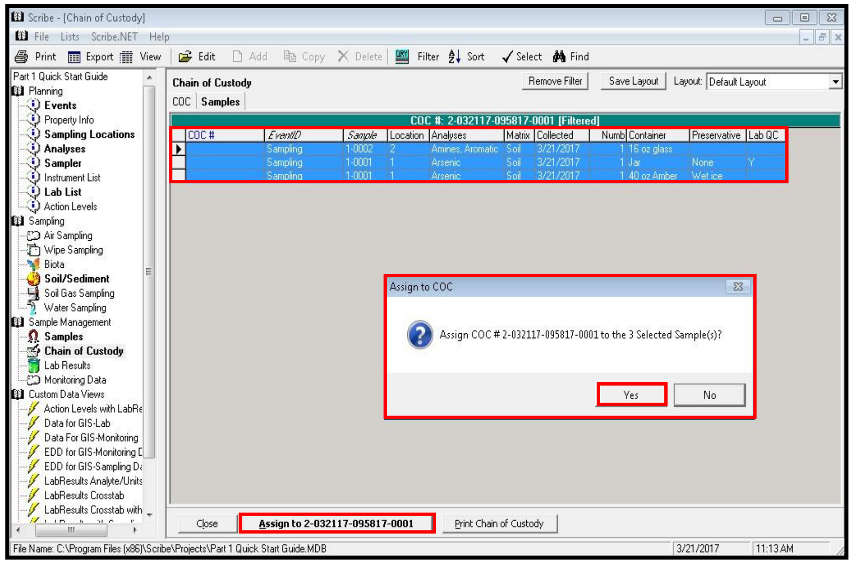
12. Click on the ‘Select’ button on the toolbar and click ‘SelectAll’ or highlight individual samples if all will not be assigned to the same COC (see step 15). The samples/analyses will be highlighted in blue.



13. Click on the ‘Assign to…’ button.

14. A prompt will display asking if you want to Assign those selected Sample(s) to the COC.

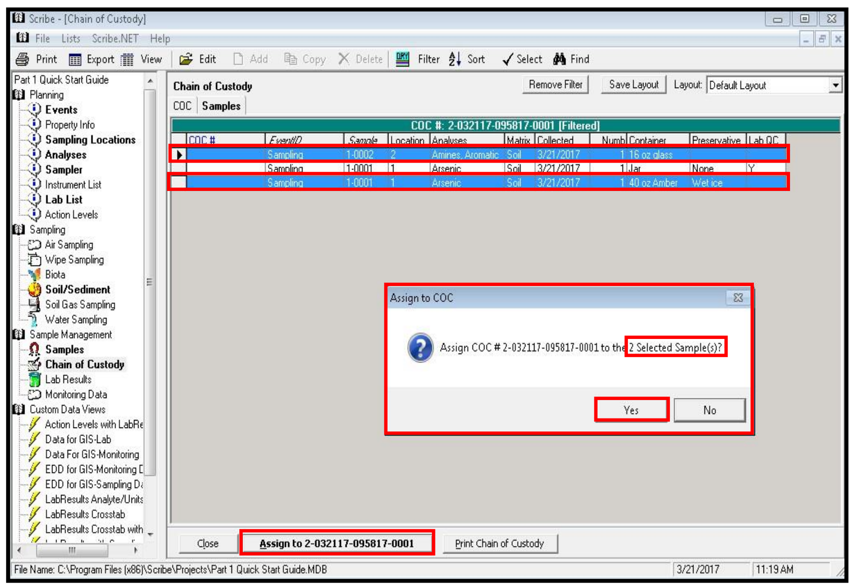
15. Click ‘Yes’.

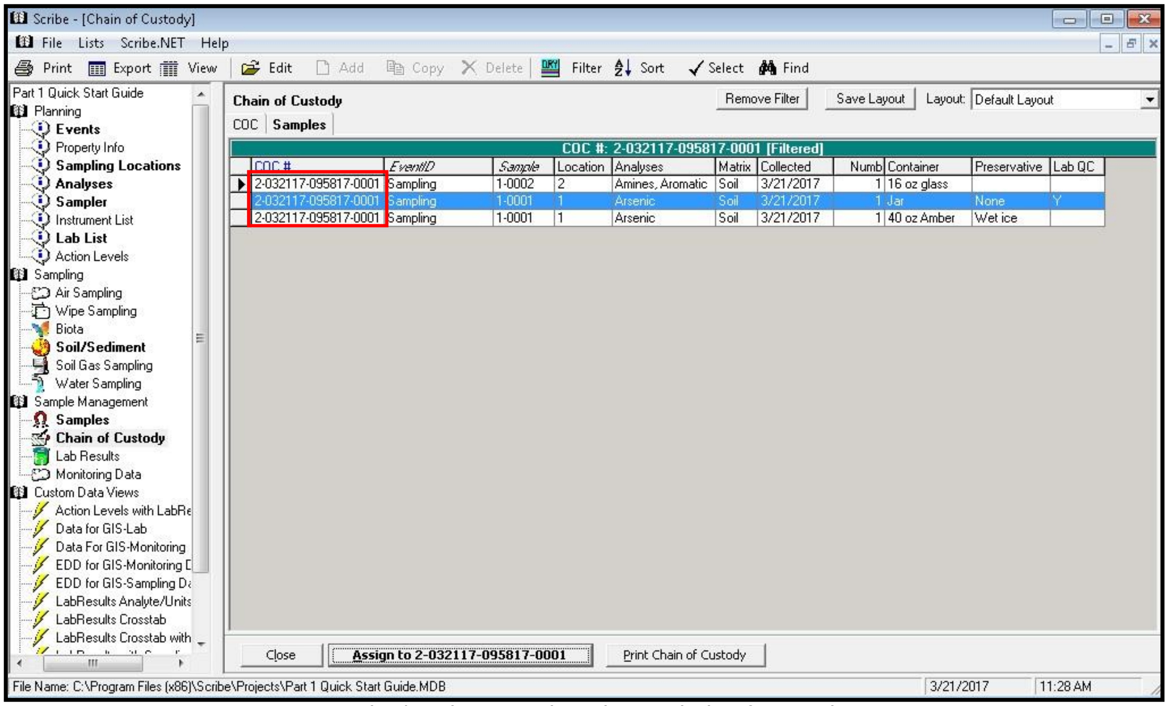


16. To select specific samples, highlight the samples by holding down the **Ctrl** key + Click on the sample(s). Or use the **Shift** + Click to highlight a series of samples.

17. Click on the ‘Assign to…’ button.

18. Click Yes.





Samples/Analyses assigned to a Chain of Custody

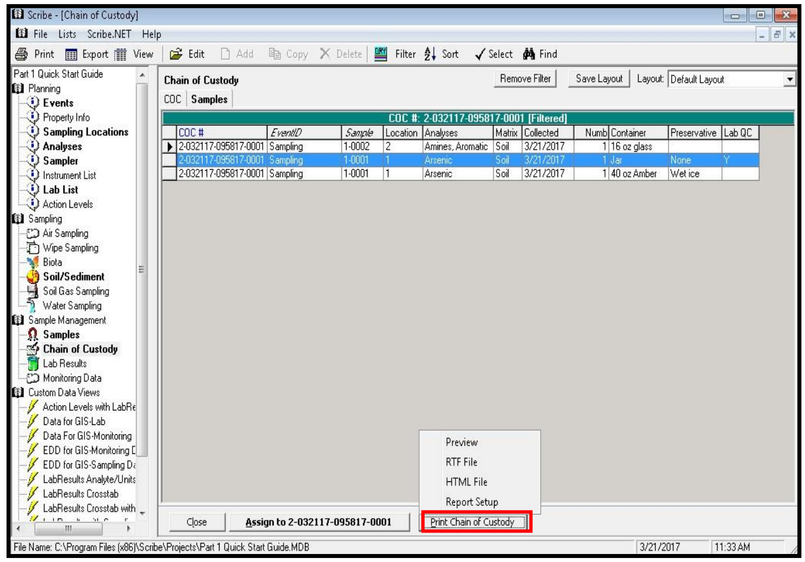
Print Chain of Custody

To print a Chain of Custody:

1. Click on 'Print Chain of Custody' button on the bottom of the window.

2. Click on Preview, RTF File, or HTML File

   Note: The Report Setup window will be displayed first for all options.

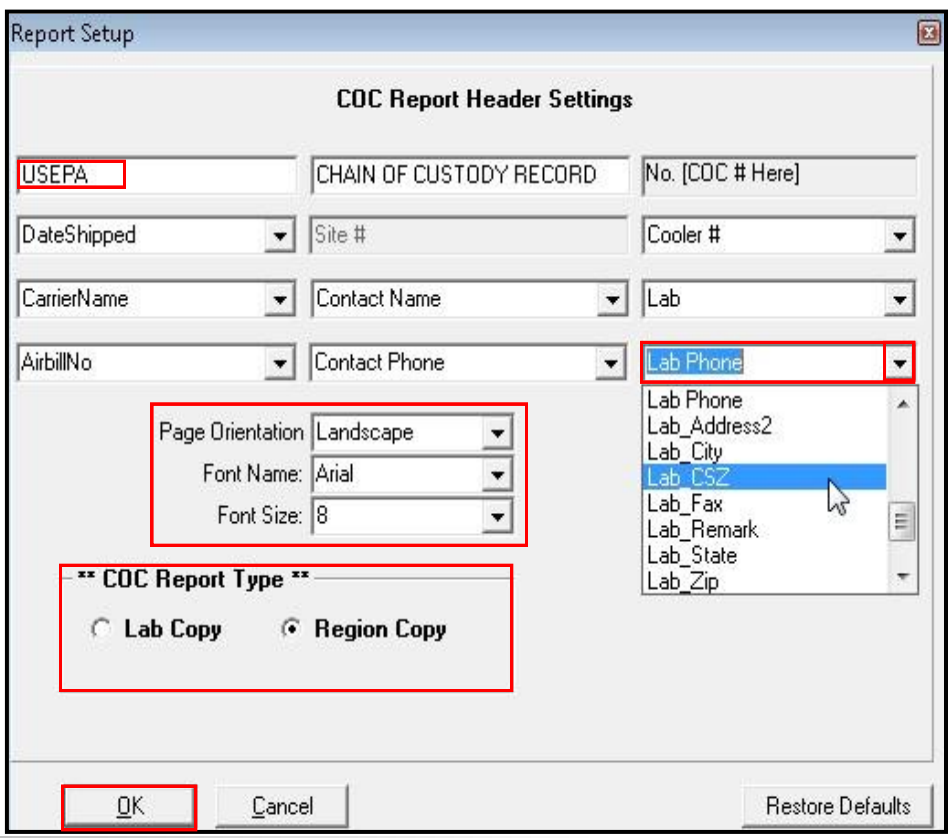


The Report Setup screen allows you to customize the Chain of Custody Report Header. Modify the fields as necessary. If the field has a drop down arrow, click on the drop down arrow and select an item from the list (see Planning section lists).

3. Select the COC Report Type.

   Note: The Lab Copy of the COC should be selected when shipping samples. Certain information about the sample/analysis is omitted from the Lab Copy of the COC (i.e., Site Name).

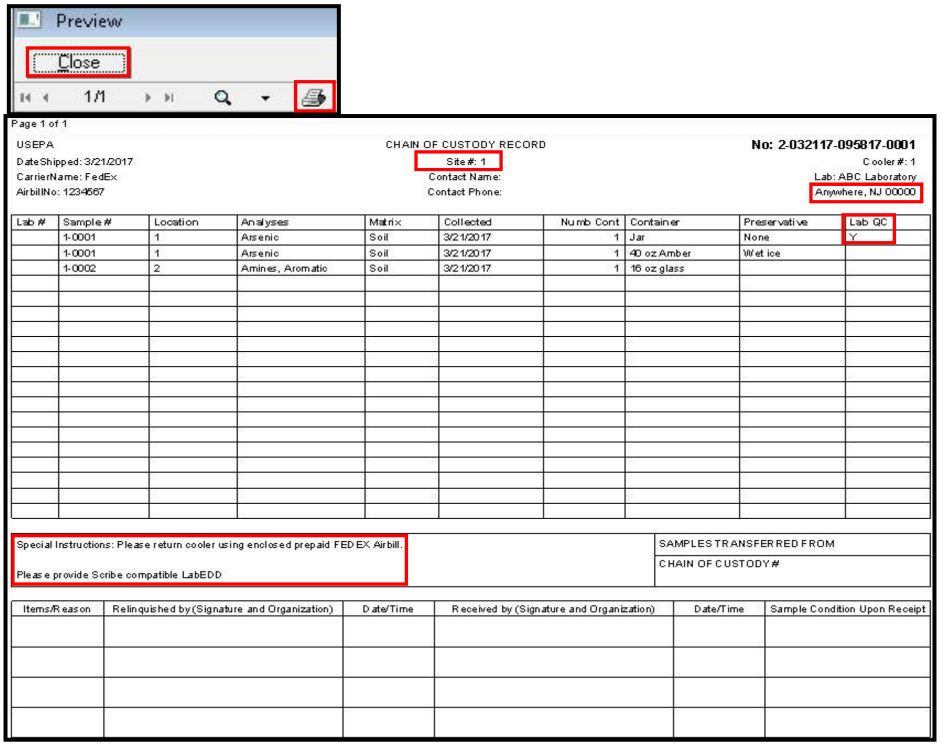
4. Click 'OK'.



A Preview of the Chain of Custody Record will display. ***Note:*** *The Site Name is not identified on a Lab Copy; changes to the Report Setup; the Lab QC from the sample; and the Special Instructions entered when creating the Chain of Custody.*

5. Click on the Printer icon to print.

6. Click 'Close'.



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USEPA
DateShipped: 3/21/2017
CarrierName: FedEx
AirbillNo: 1234567

CHAIN OF CUSTODY RECORD
Site #: 1
Contact Name:
Contact Phone:

No: 2-032117-095817-0001
Cooler #: 1
Lab: ABC Laboratory
Anywhere, NJ 00000

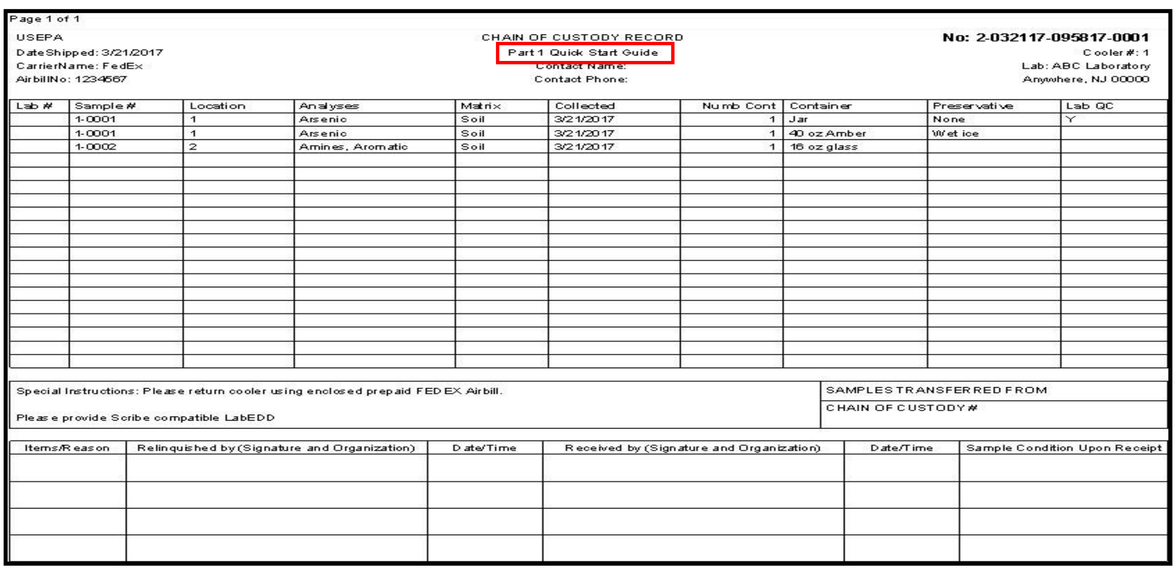
Lab #	Sample #	Location	Analyses	Matrix	Collected	Numb Cont	Container	Preservative	Lab QC
	1-0001	1	Arsenic	Soil	3/21/2017	1	Jar	None	Y
	1-0001	1	Arsenic	Soil	3/21/2017	1	40 oz Amber	Wet ice	
	1-0002	2	Amines, Aromatic	Soil	3/21/2017	1	16 oz glass		

Special Instructions: Please return cooler using enclosed prepaid FEDEX Airbill.
Please provide Scribe compatible LabEDD

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

Example 'Lab Copy' of Chain of Custody



Page 1 of 1

USEPA
DateShipped: 3/21/2017
CarrierName: FedEx
AirbillNo: 1234567

CHAIN OF CUSTODY RECORD
Part 1 Quick Start Guide
Contact Name:
Contact Phone:

No: 2-032117-095817-0001
Cooler #: 1
Lab: ABC Laboratory
Anywhere, NJ 00000

Lab #	Sample #	Location	Analyses	Matrix	Collected	Numb Cont	Container	Preservative	Lab QC
	1-0001	1	Arsenic	Soil	3/21/2017	1	Jar	None	Y
	1-0001	1	Arsenic	Soil	3/21/2017	1	40 oz Amber	Wet ice	
	1-0002	2	Amines, Aromatic	Soil	3/21/2017	1	16 oz glass		

Special Instructions: Please return cooler using enclosed prepaid FEDEX Airbill.
Please provide Scribe compatible LabEDD

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

Example 'Region Copy' of Chain of Custody

This completes the Part 1 -- Quick Start Guide. For more information on any feature discussed in this guide, refer to Part 2 -- Field Use Basics, which presents extensive information on the use of this database.

ERT

MANAGEMENT AND ADVANCED FEATURES

Part 3

SCRIBE v3.10

Contents

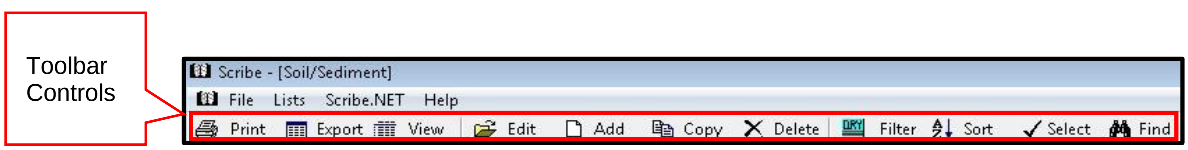
PART 3 - MANAGEMENT FEATURES & ADVANCED FEATURES

The information presented in this section describes the advanced functionality of Scribe. This section will address importing data (e.g. lab results), using the common controls (sorting, filtering), creating custom labels and grid layouts, Custom Tasks (MS Access Tables) and Custom Data Views (MS Access queries). Custom Templates, Custom Tasks and Custom Data Views will require that the user is familiar with MS Access and working the MS Access database tools on a live database.

Common Controls - Toolbar

Scribe has many features that offer convenient ways to manage and update records and files. They are also convenient when you want to display specific data in a specific format (i.e. reports). The following information will be discussed using the 'Samples' and 'Lab Results' screens as examples, but applies to most Scribe screens.

Some features and controls available on the toolbar work the same as those in the Grid Controls (right-click option). These features include Print, Export, View, Edit, Add, Copy, Delete, Filter Sort and Find.



Print

The Print feature offers several printing options:

- Preview – Preview your current grid view
- Page Setup – Change your page setup, margins, orientation
- Print – Print the current grid view to a printer
- Export – Grid data can be exported and then used in other applications for reporting, mapping or modeling. Scribe supports several standard data formats. Choices for exporting include .txt, .csv, .html, .xml file formats. ***NOTE:*** *When working in the Chain of Custody (COC) section, there is an additional export option of COC .xml. This option is required when exporting CLP COC files to be uploaded to the Sample Management Office (SMO) Portal. See User Manual for Scribe CLP Sampling.*
- Labels – Can print standard mailing labels (e.g. if Property Info is captured, standard mailing labels with property information can be created from this print feature)
- Worksheet – Can be used to create Worksheets (e.g. Sample Receipt Worksheet and Sample Weight Log reports)

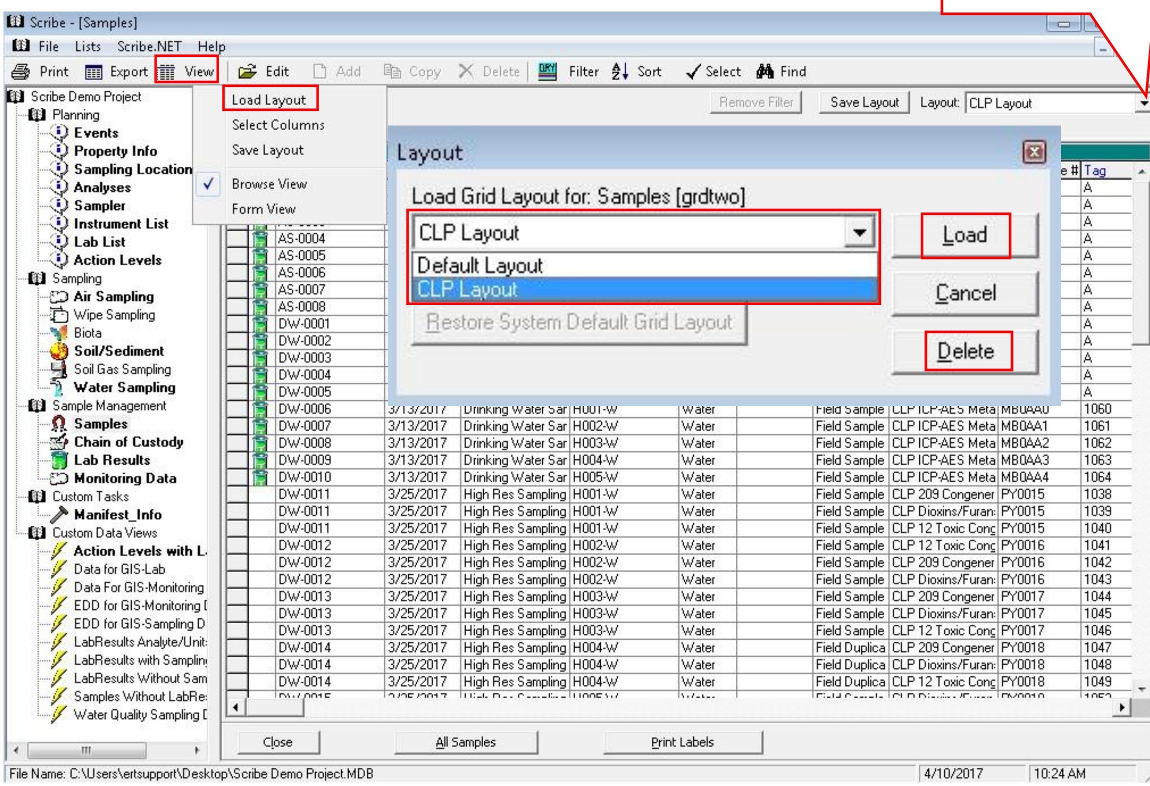
View

Depending on which section of the Navigation Pane you are in, there are a default view of columns (column headings) exposed in the grid. Under the 'View' option on the Toolbar, you can:

Load Grid Layout

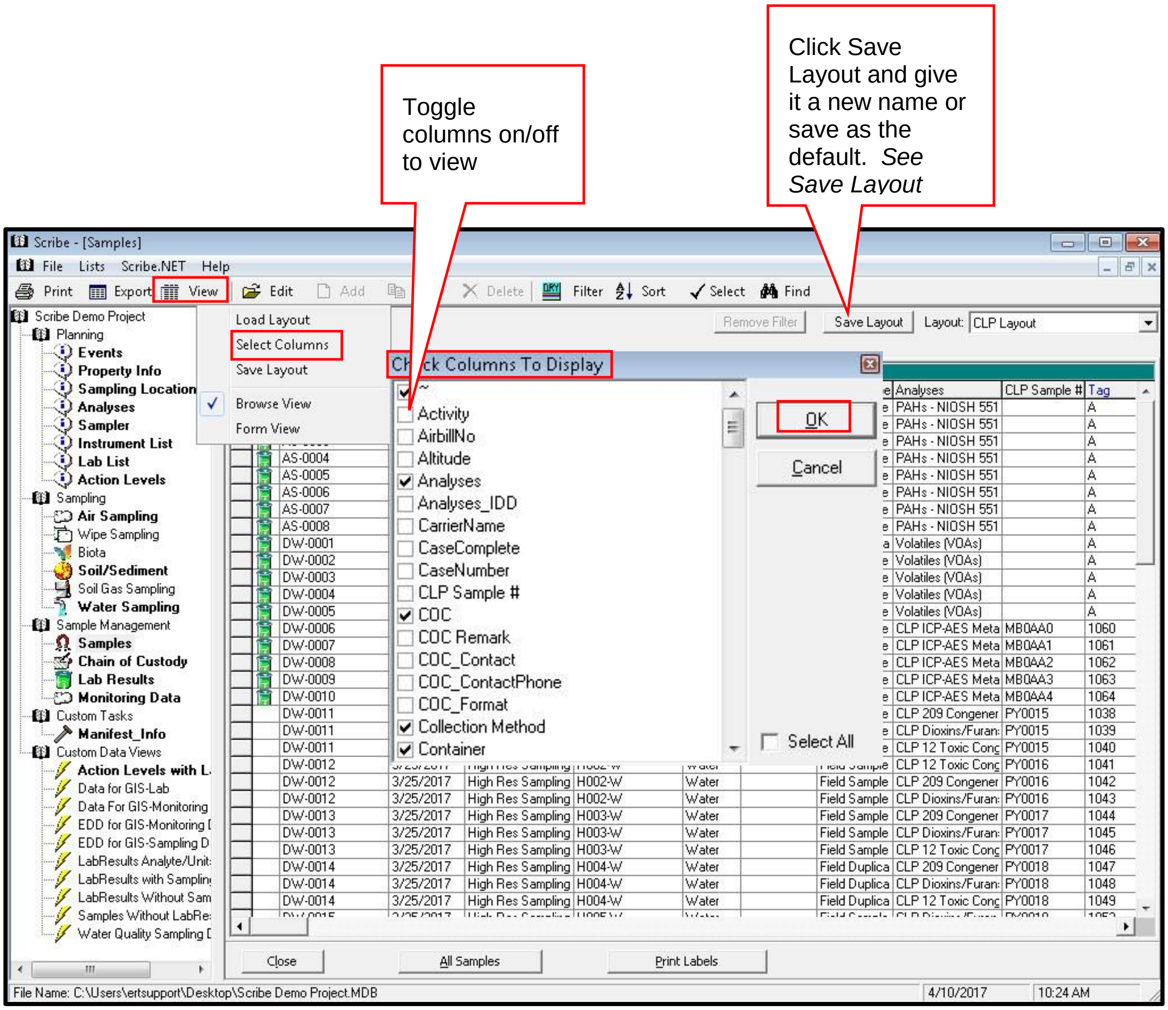
When Scribe is installed, there are two (2) Layouts: Default Layout or CLP Layout. The 'View' of the layout is determined when first creating the Scribe project. If CLP is NOT selected as the project type, the layout will be set to Default. Changing the layout is very easy and can be done from the View | Load Layout or by clicking on the down arrow at the top of the grid. Once new Layouts have been created, they will be available.

Layouts can also be loaded and/or saved as new layouts. *See Save Layout*



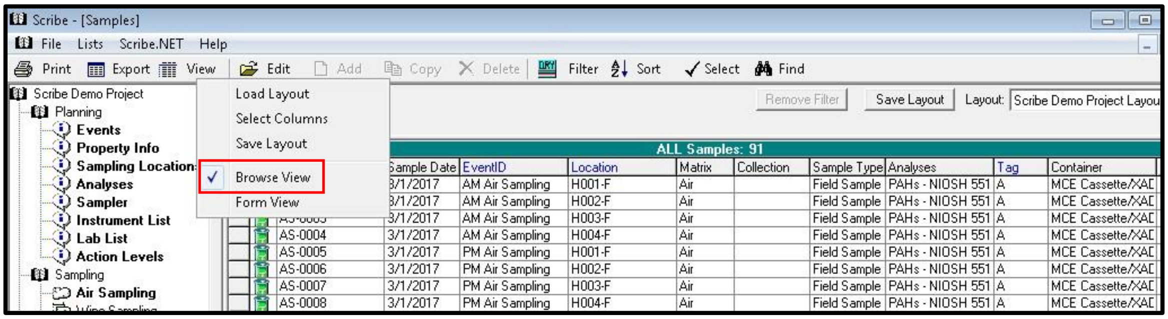
Select Columns

By default certain columns are turned on in the grid view. Columns can be turned on/off, moved and viewed differently on the grid and specific layouts can be saved.



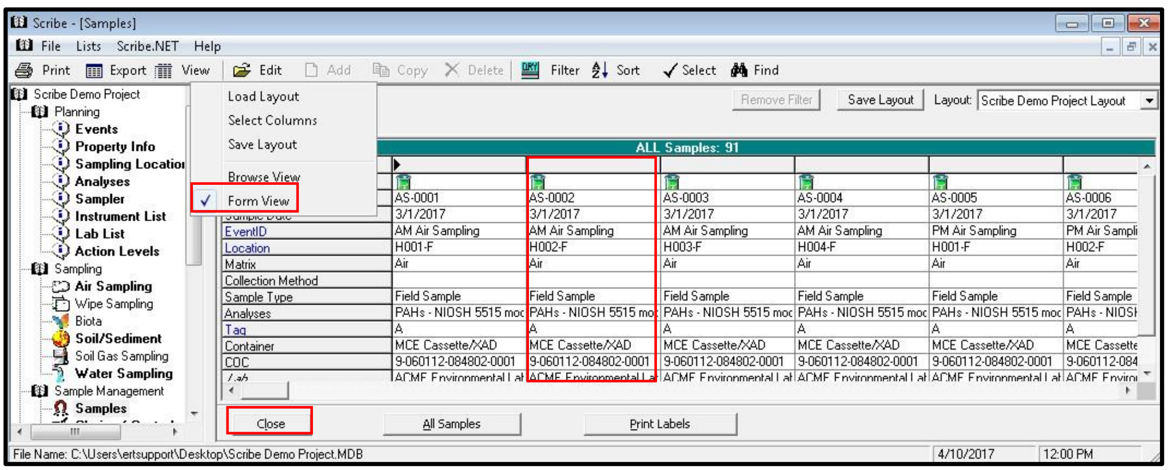
Browse View

The Browse View shows the samples in row format (default view)



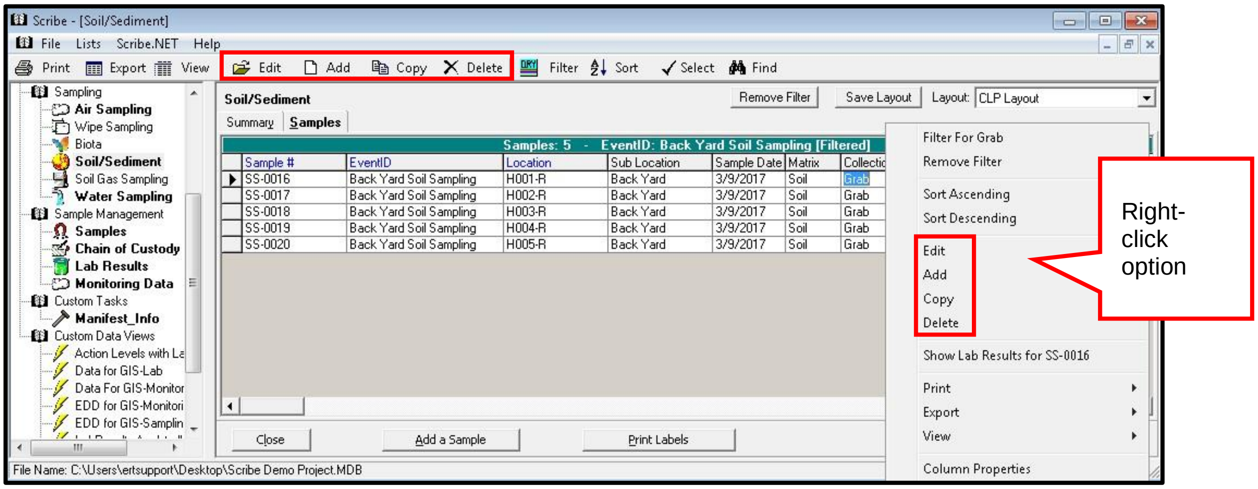
Form View

The Form View allows you to view each sample in column format. To return to the Browse View, click on Close.

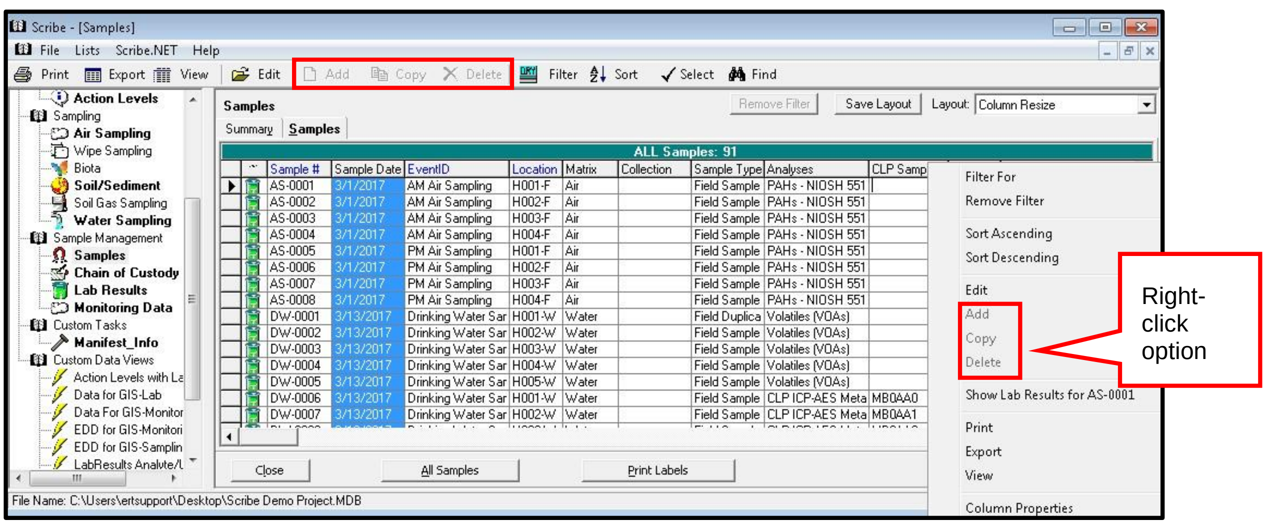


Edit, Add, Copy and Delete

The Edit, Add, Copy and Delete controls are only available on the Toolbar and right-click feature when you are working in the individual sampling tasks (e.g. Air, Soil/Sediment, Water). They can be used when editing, adding, copying or deleting samples, analyses, events, etc.

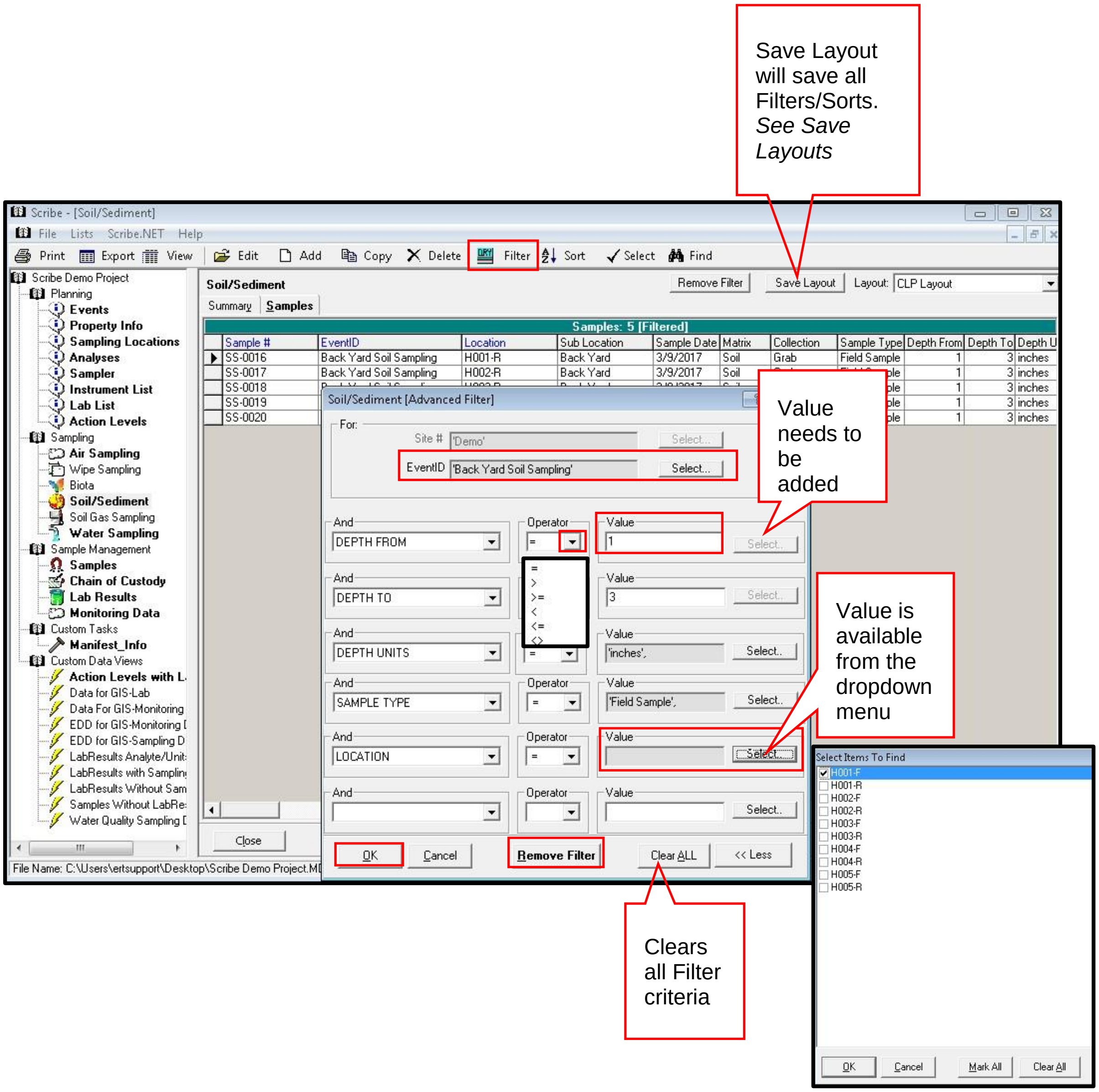


The Add, Copy and Delete controls are **not** available options under Sample Management | Samples.



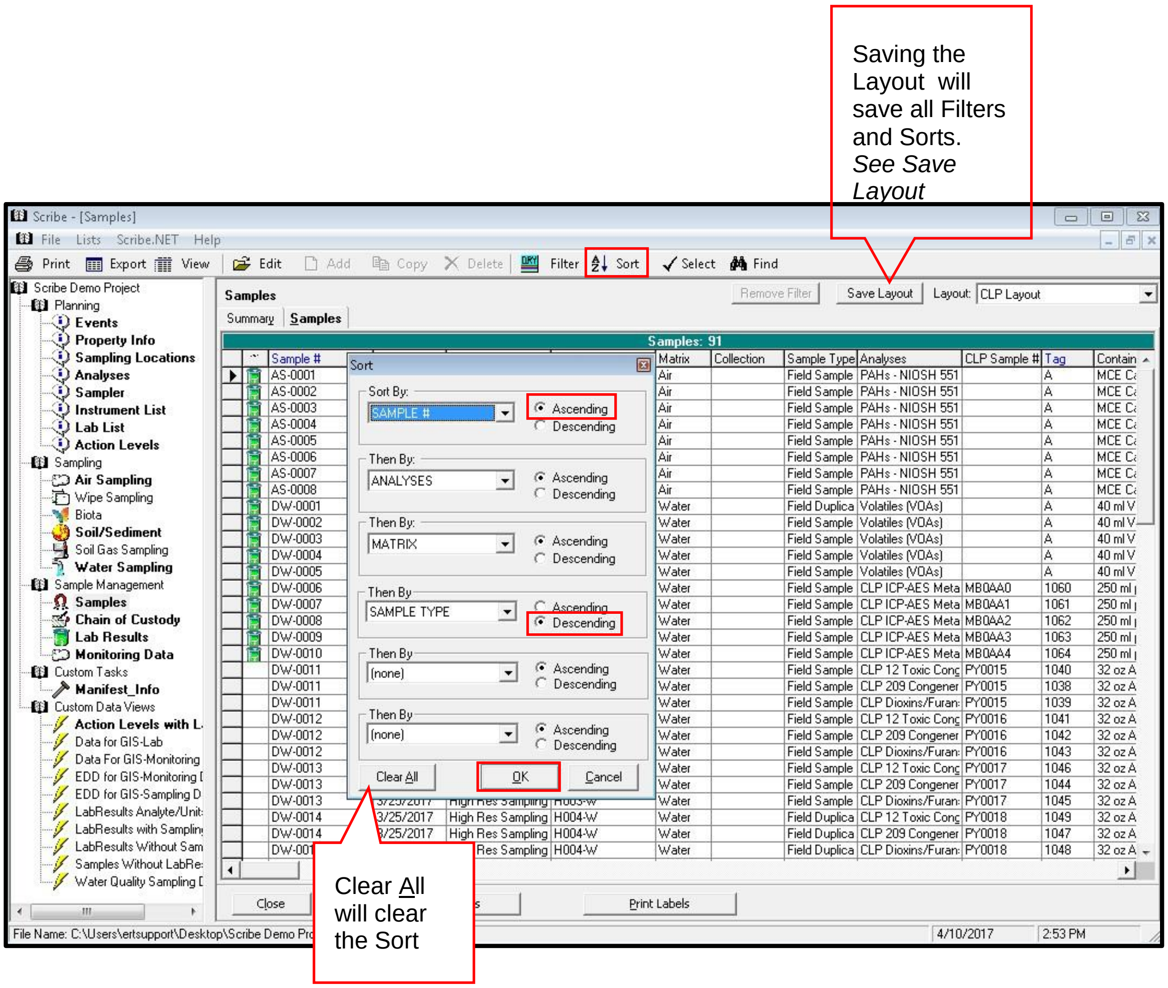
Advanced Filter

The ‘Filter’ on the toolbar offers a more advanced filter for up to six (6) fields. In this example, we are filtering for the Back Yard Soil Sampling EventID. Numerous filtering options are available using dropdown menus and select buttons. Select as many fields as needed and click OK. If the Select button is grayed out, you will need to enter a value. If the Select button is highlighted, a dropdown is available to select the field(s) in the Scribe project that need to be filtered.



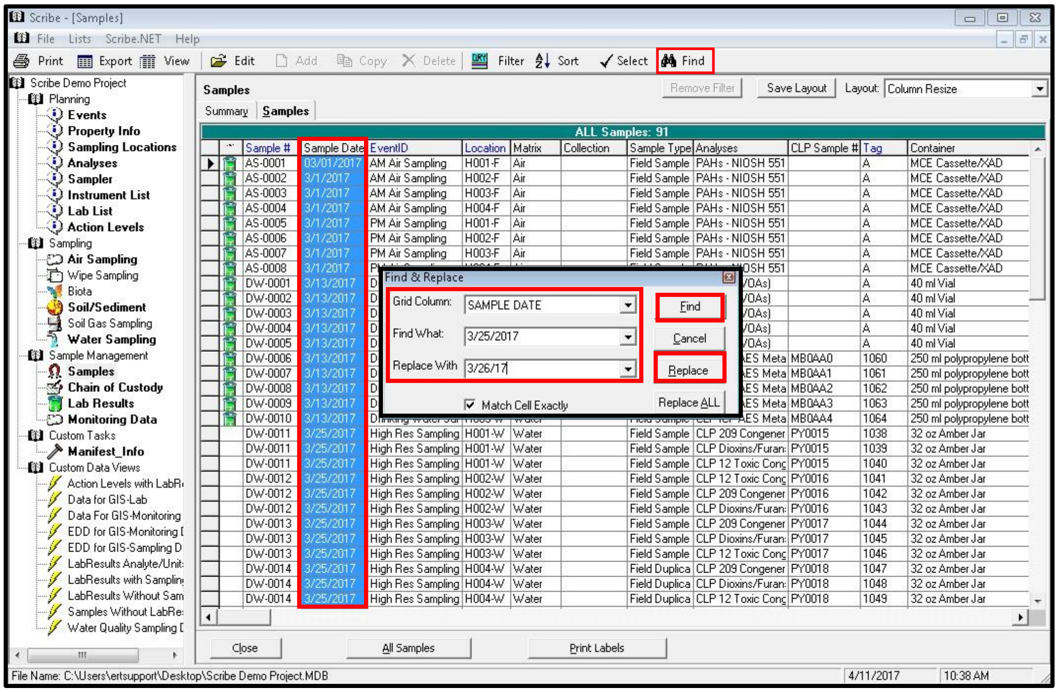
Advanced Sort

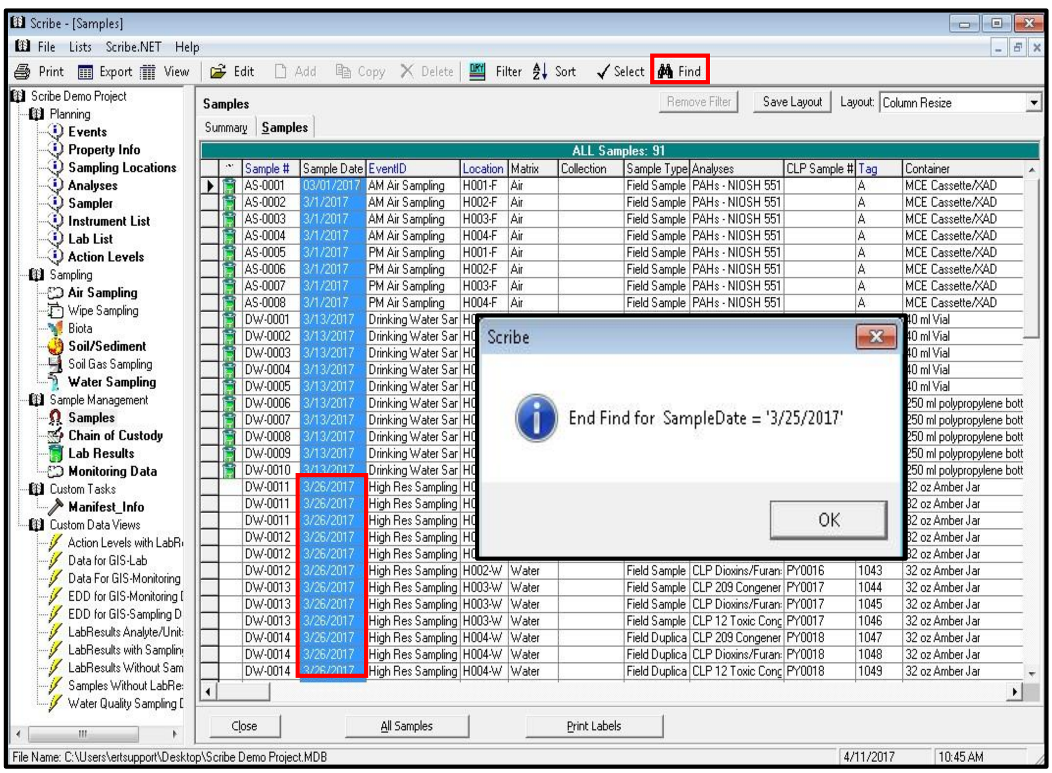
The ‘Sort’ on the toolbar opens a more advanced Sort window. The advanced feature offers a more advanced sort for up to six (6) fields. In this example, we are sorting by Sample #, Analyses and Matrix **Ascending** and Sample Type **Descending**. Select as many fields as needed and click OK.



Find and Replace

Use the Find and Replace feature in Scribe (similar to Excel) to search for something in your project, such as a particular sampling date, and replace it with another value.

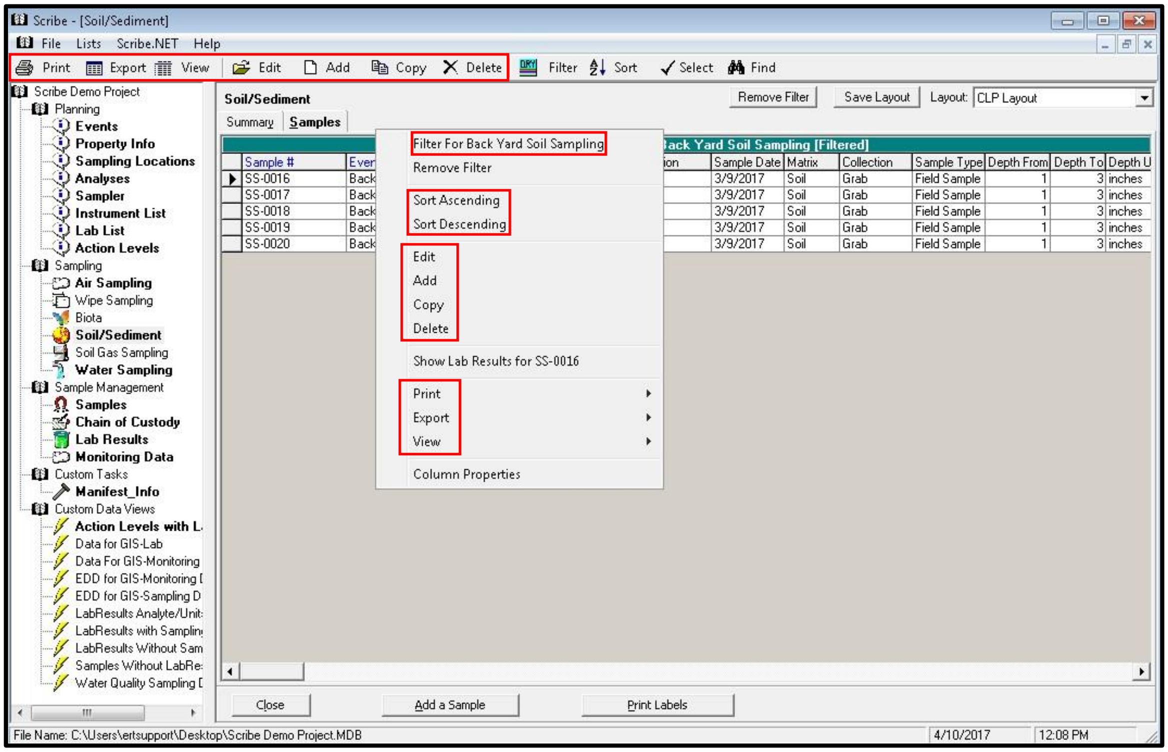




Common Controls – Right-Click

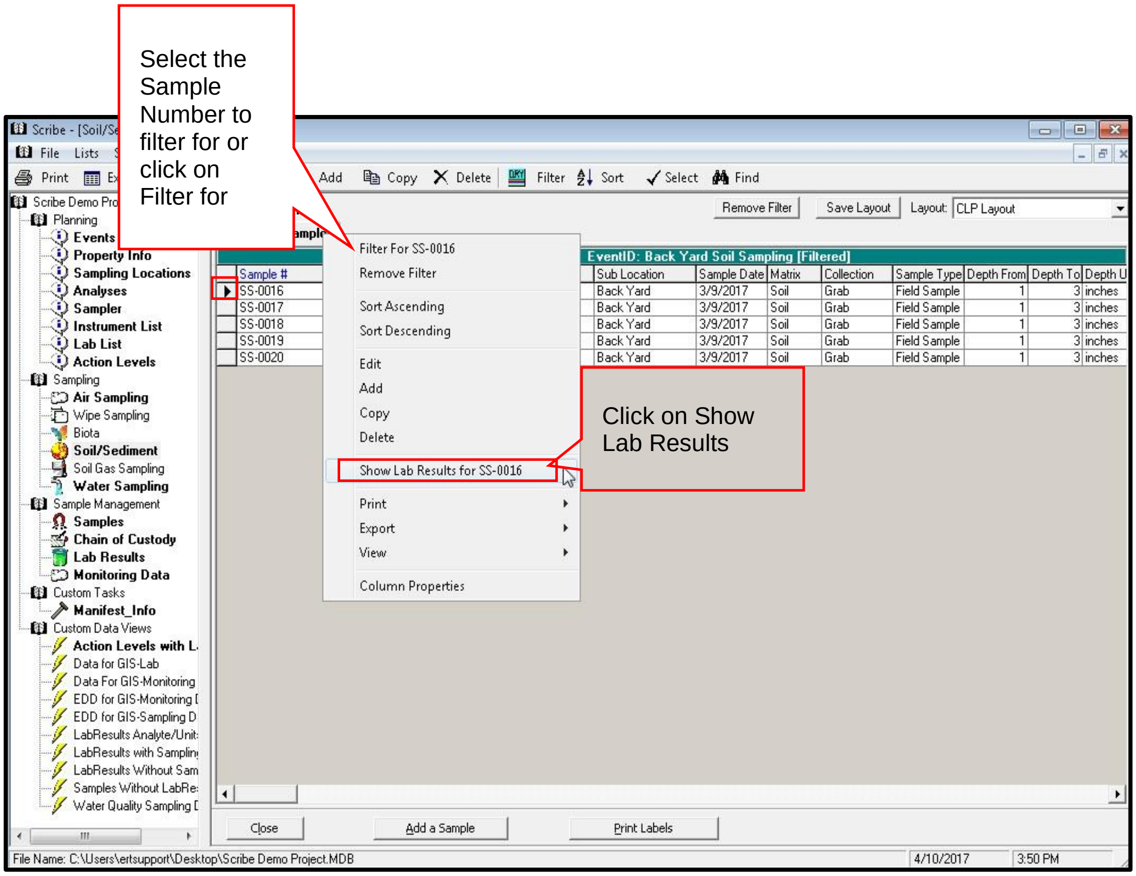
Some features and controls available on the toolbar work the same way as those in the Grid Controls (right click in the Grid). These features are **Edit**, **Add**, **Copy**, **Delete**, **Print**, **Export** and **View**.

The **Filter** and **Sort** feature on the Grid provides a simplified Filter and Sort. For example, the grid filter allows you to filter on one item (i.e., Back Yard Soil Sampling) and the Sort only allows for Ascending or Descending.



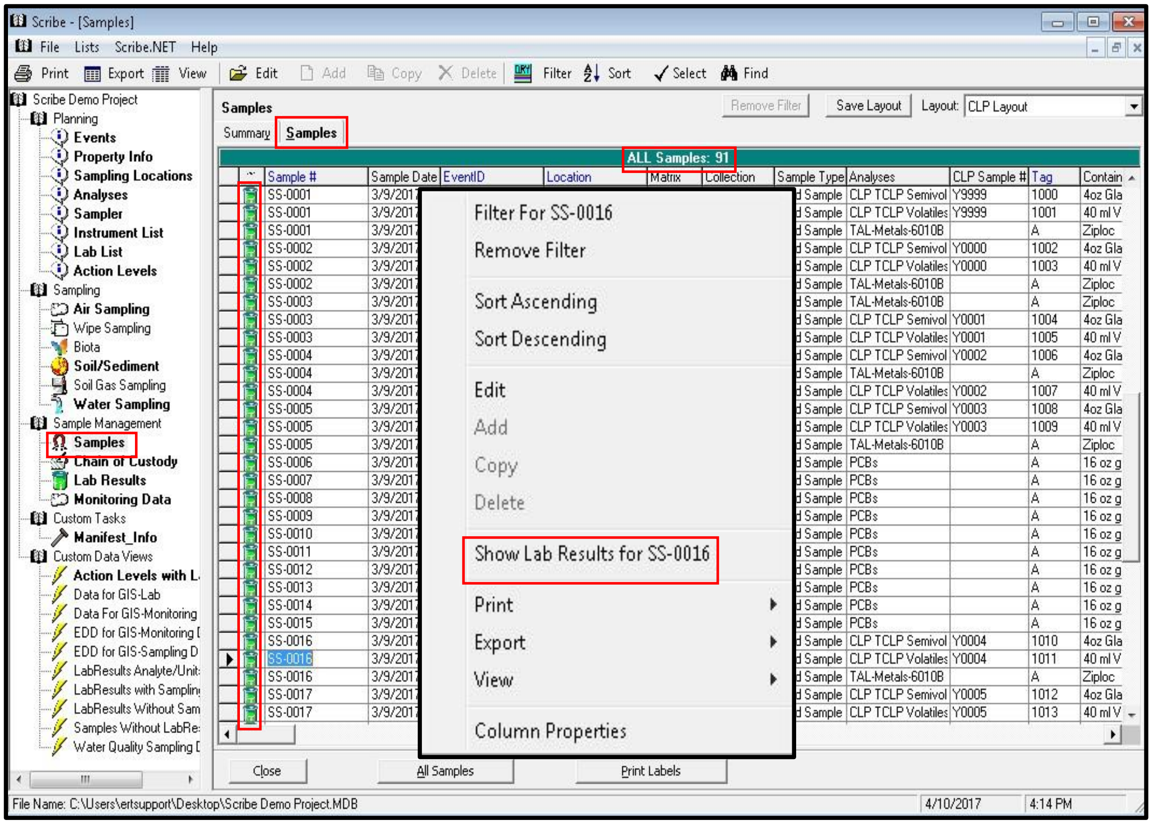
Right-Click Options in the Sampling sections

To show any **Lab Results** for a particular sample using the right click option, right-click a sample and selecting Show Lab Results, the Lab Results section of Scribe will be displayed and the results will be filtered for any Lab Results pertaining to the selected sample number.

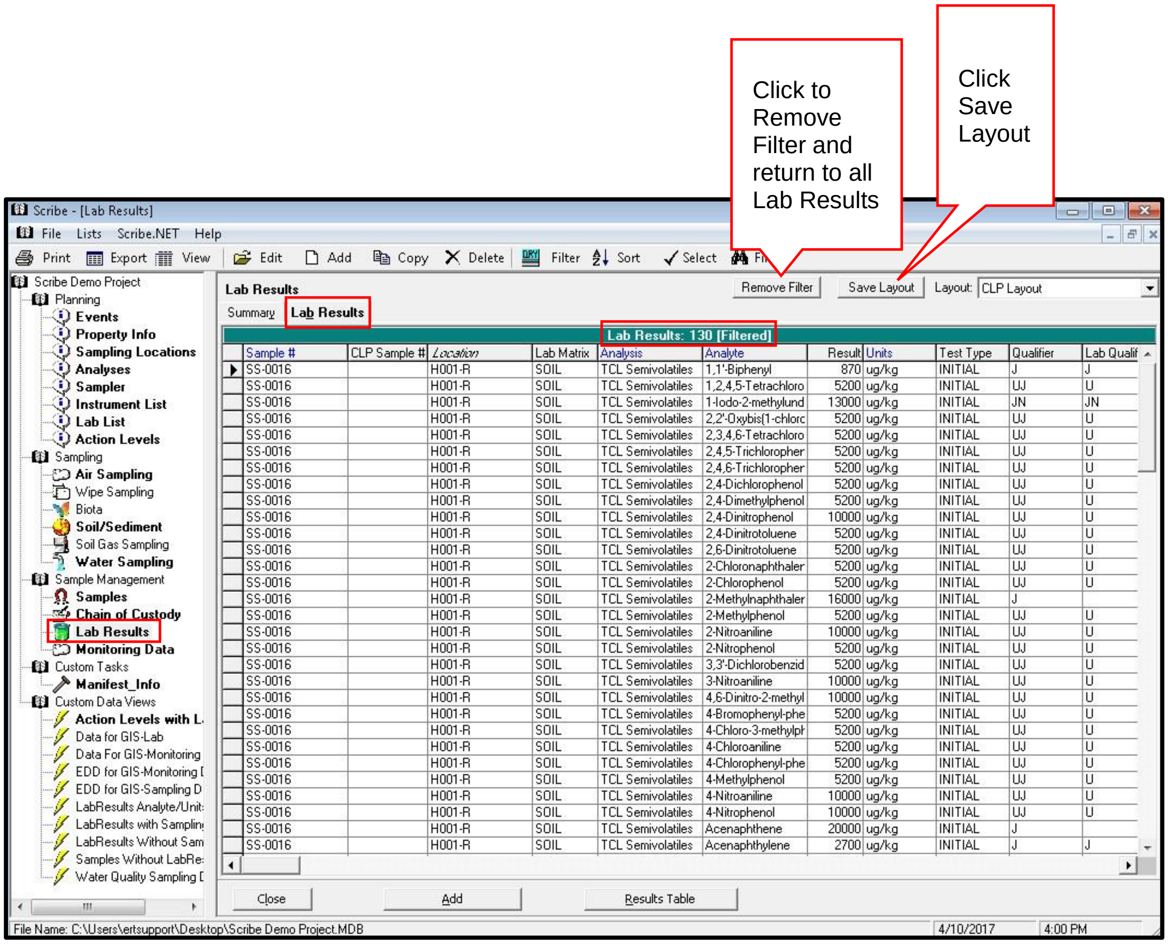


Filtering for Sample SS-0016 Under Sampling Task (Soil/Sediment)

Under Sample Management | Samples - a green beaker next to the Sample # indicates that the sample has lab results data.

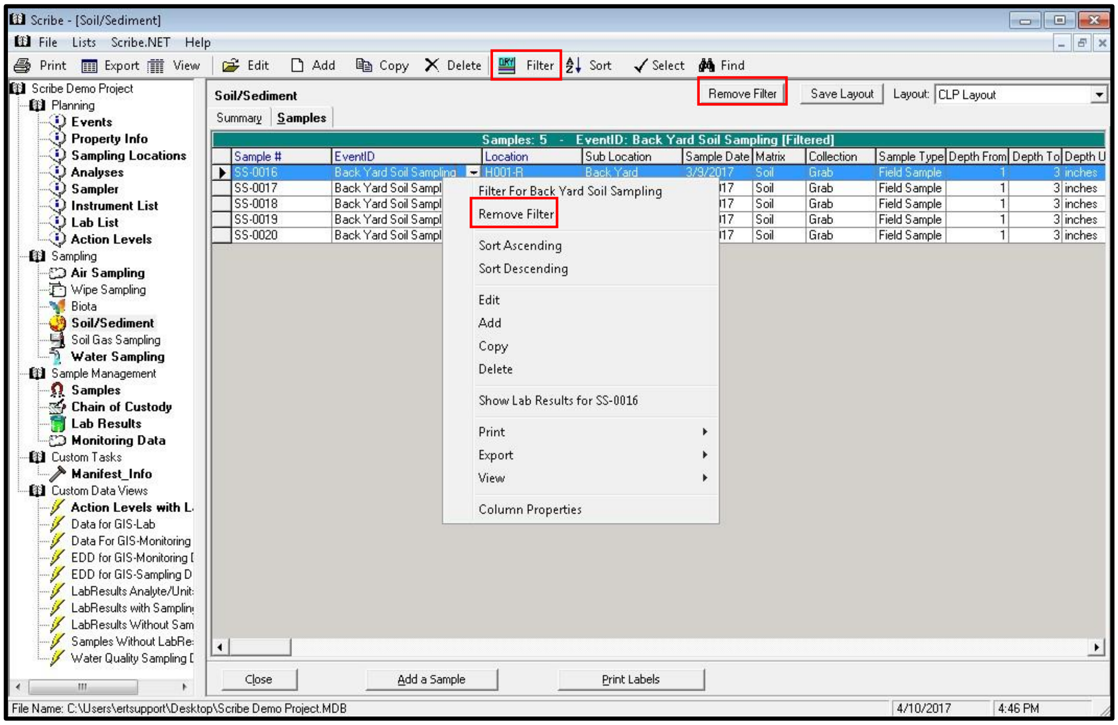


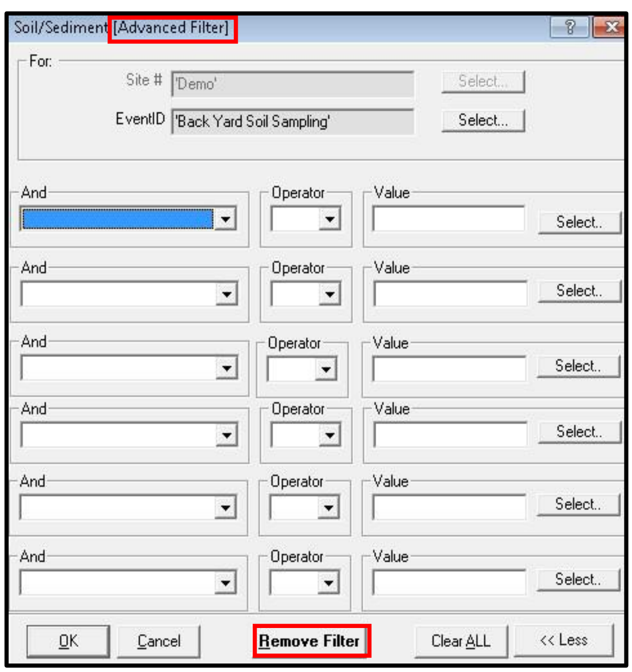
When in the Lab Results table, additional Filters and Sorts can be done. New Layouts can be created and saved.



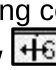
Remove Filters

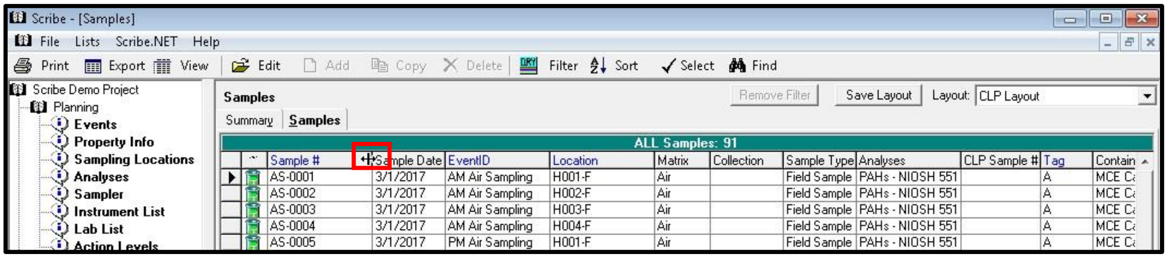
When working with the data and applying Filters, it is important to **Remove** any filter that has been applied to get back to your full data set. There are three (3) ways to remove a filter from the Grid View clicking on Remove Filter, right-clicking and select Remove Filter, or by clicking on the Filter button and click Remove Filter.



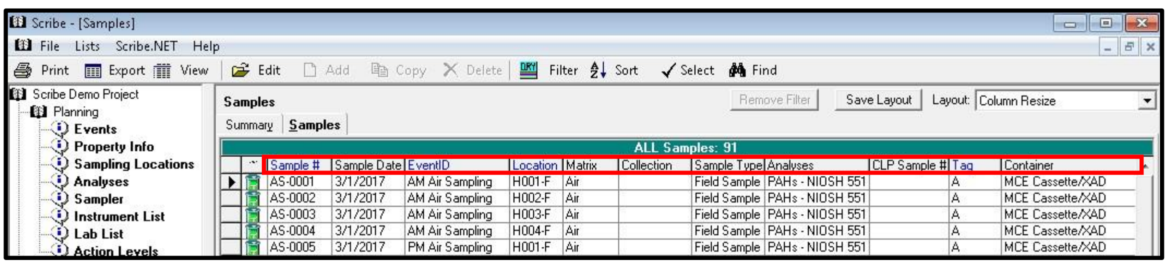


Column Resizing

To resize the columns in the Grid (similar to resizing columns in Excel), hover the mouse between columns to expose a double-sided arrow  . Drag the double-sided arrow (left or right) to adjust the column width. The resizing of columns can be saved with Layouts.



Example prior to resizing



Example after resizing

Create Layouts

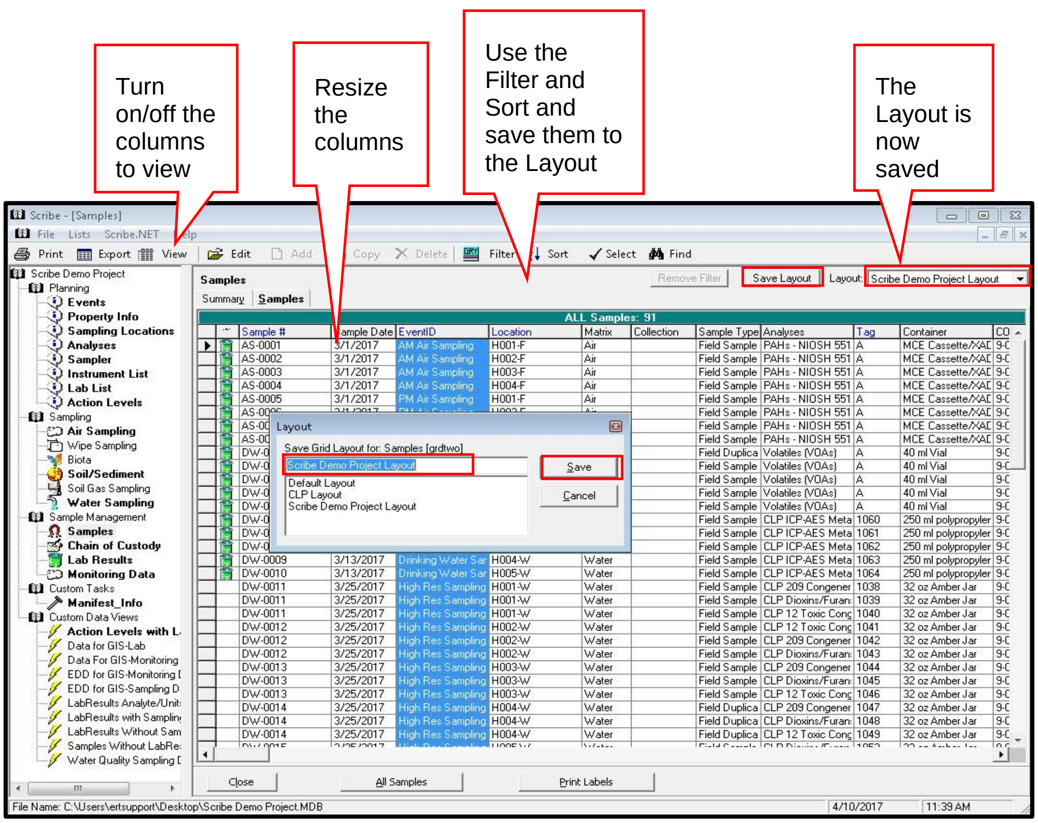
In Scribe, you can create and customize Grid Layouts and Label Layouts. These custom layouts can then be imported into new Scribe projects or be made part of a custom Template for use in future projects.

Grid Layout

Scribe is loaded with two (2) default layouts with certain fields displayed on the grid (Default and CLP). They are also sorted in a specific order.

There are many fields that are available to view/display in the various sections of Scribe (Planning, Sampling, Sample Management). Prior to saving the layout, format the grid by turning columns on/off and providing any filter or sort order required.

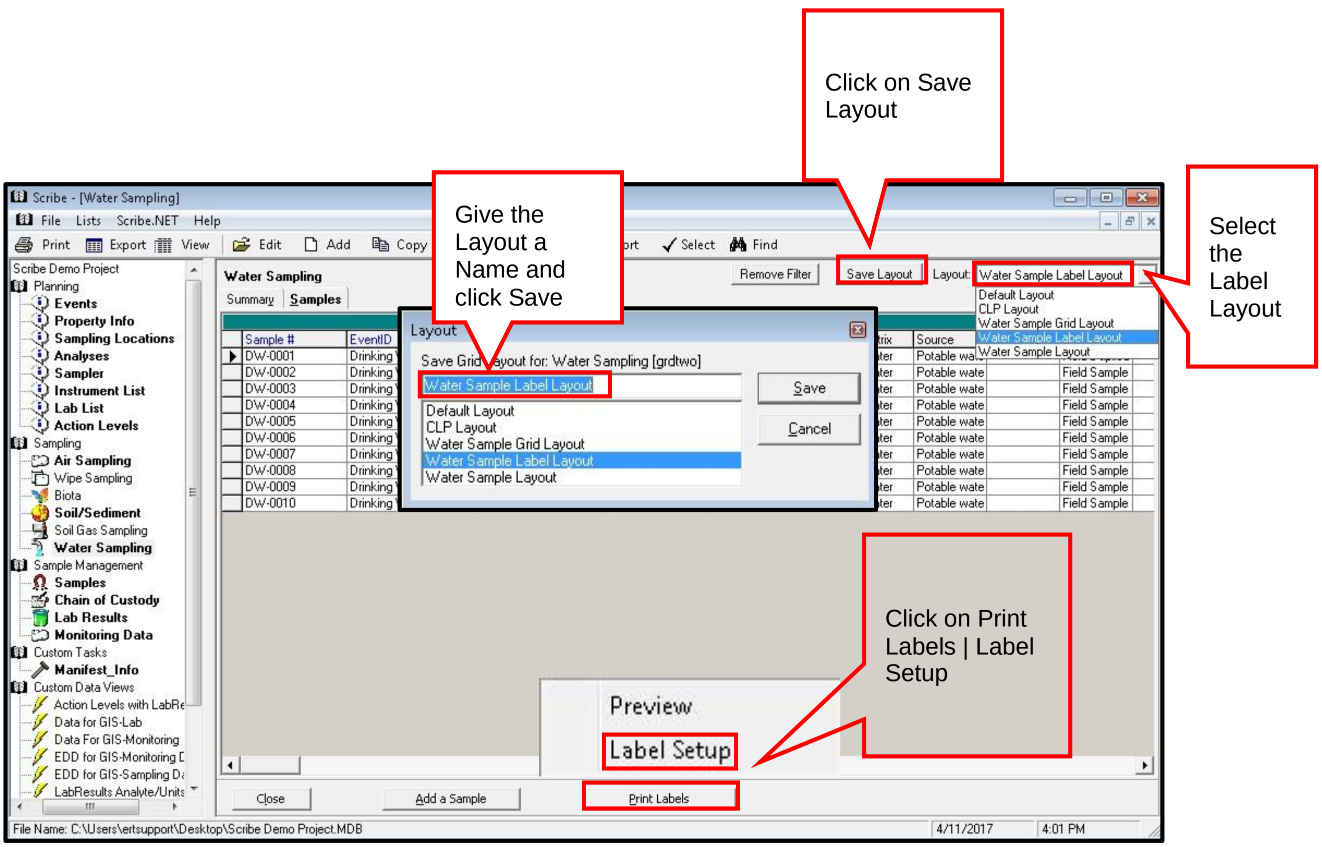
When the grid is formatted, select View | Save Layout from the toolbar or click on Save Layout on the grid. Provide a name for the grid layout and click the Save button. ***Note:*** *Layouts are only saved to the section of Scribe you are in. For example, if you are creating a layout under the Samples section, that layout is only available in that section. Many Layouts can be created.*

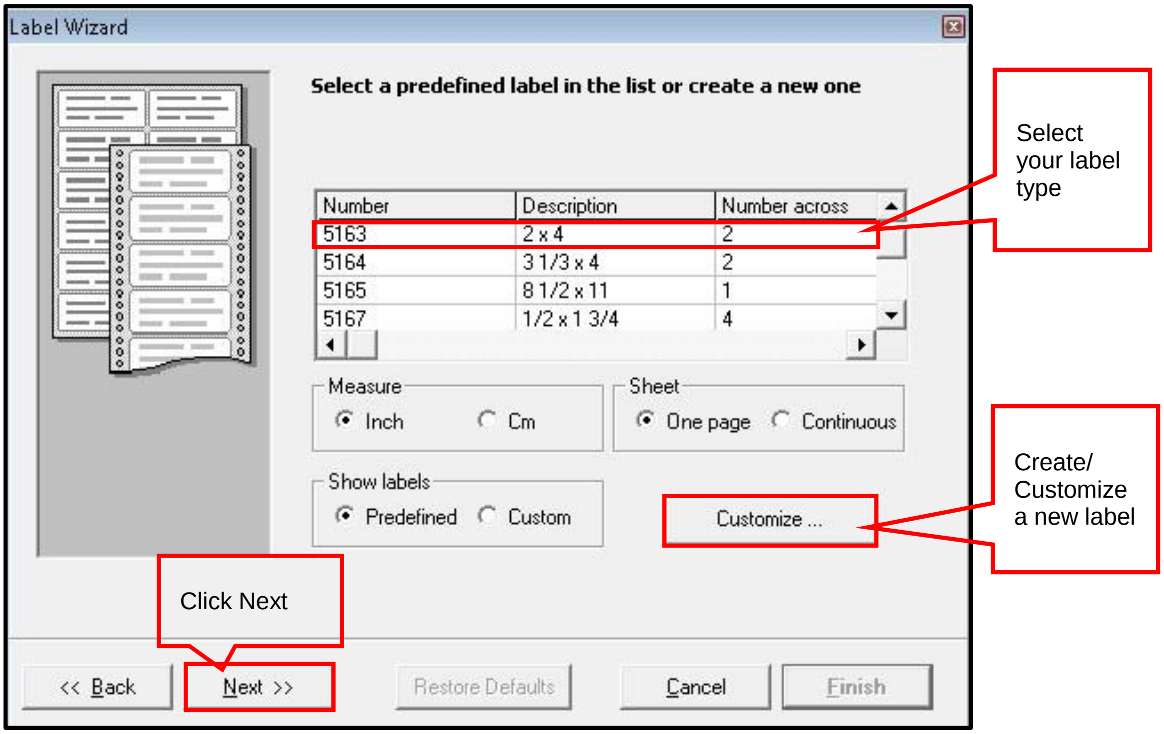


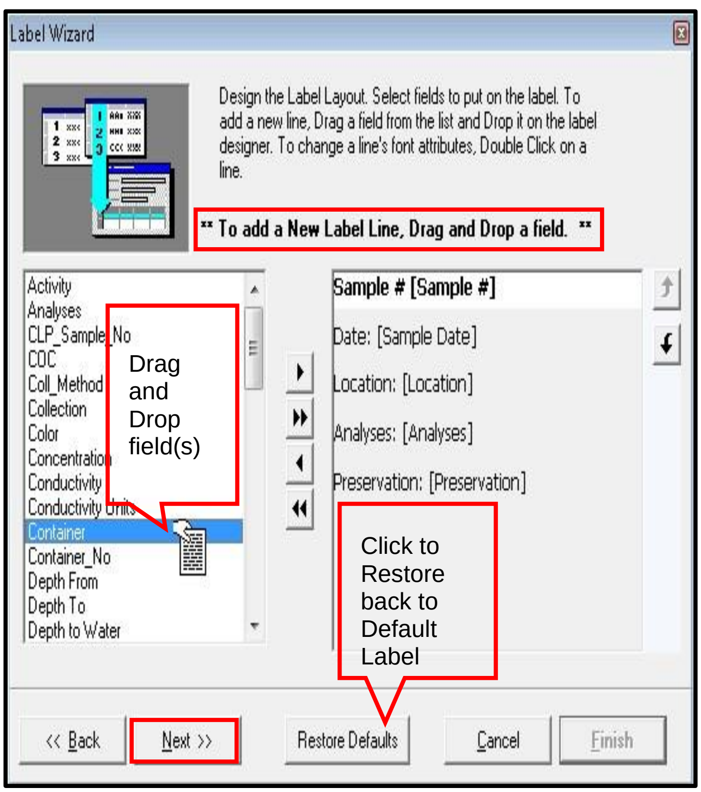
Label Layouts

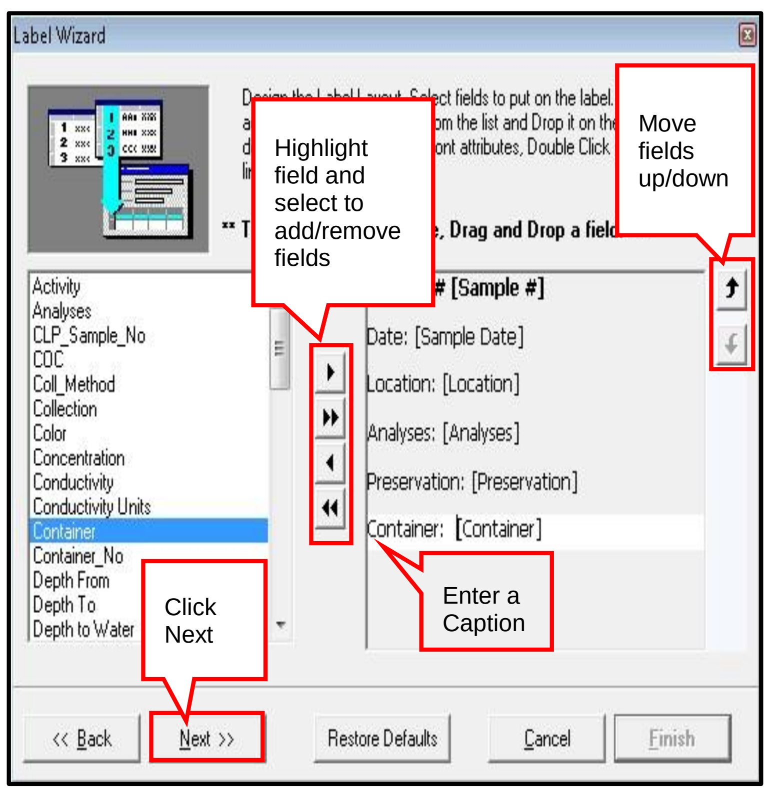
For each of the default layouts in the Samples and Sample Management sections, a default label exists. This label can be modified if necessary. Also, new custom labels can be created if you want to maintain the default label options.

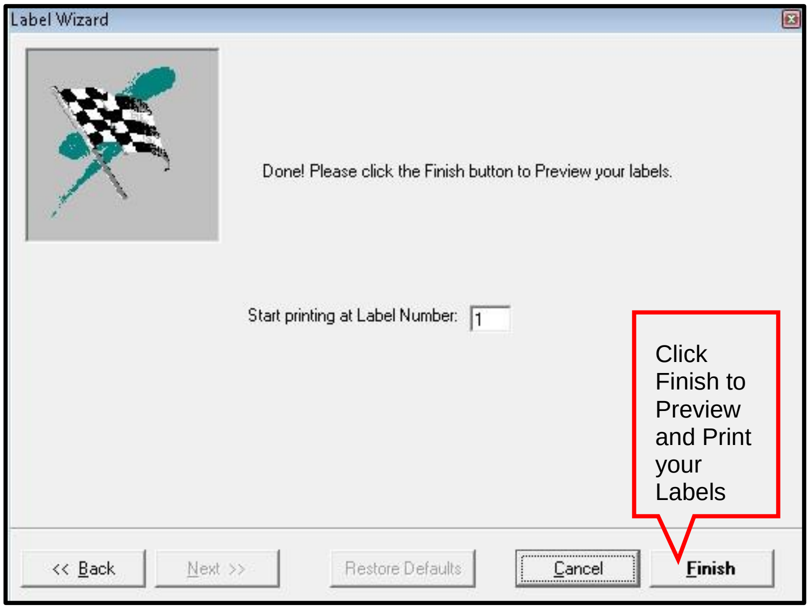
Prior to creating a Label Layout, you must first save a new Grid Layout. Labels are tied to grid layouts. Once you save a new grid layout, labels for that layout can be configured from the Print Labels button. Once the fields have been selected, that Label Layout will be available any time you select the custom grid layout it was designed under. ***Note:*** *Layouts are only saved to the section of Scribe you are in. For example, if you are creating a Label layout under the Samples section, that layout is only available in that section.*

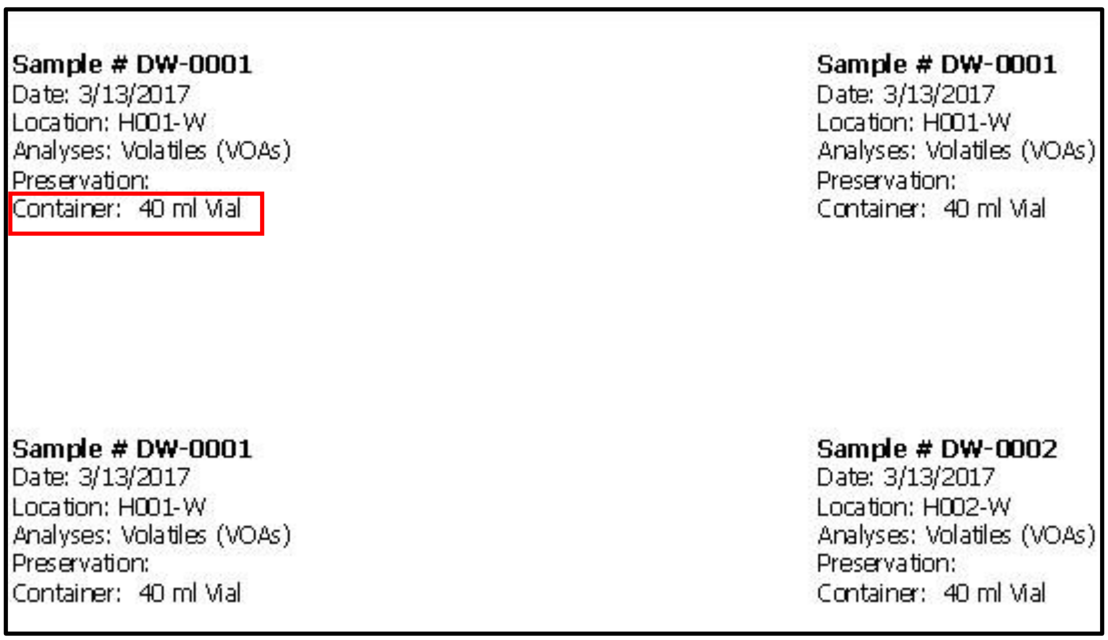



Label Wizard
Select a predefined label in the list or create a new one
Number | Description | Number across
5163 | 2 x 4 | 2
5164 | 3 1/3 x 4 | 2
5165 | 8 1/2 x 11 | 1
5167 | 1/2 x 1 3/4 | 4
Measure
Inch
Cm
Sheet
One page
Continuous
Show labels
Predefined
Custom
Customize ...
<< Back
Next >>
Restore Defaults
Cancel
Finish
Select your label type
Create/ Customize a new label
Click Next


Label Wizard
Design the Label Layout. Select fields to put on the label. To add a new line, Drag a field from the list and Drop it on the label designer. To change a line's font attributes, Double Click on a line.
** To add a New Label Line, Drag and Drop a field. **
Activity
Analyses
CLP_Sample_No
COC
Coll_Method
Collection
Color
Concentration
Conductivity
Conductivity Units
Container
Container_No
Depth From
Depth To
Depth to Water
Sample # [Sample #]
Date: [Sample Date]
Location: [Location]
Analyses: [Analyses]
Preservation: [Preservation]
<< Back
Next >>
Restore Defaults
Cancel
Finish
Drag and Drop field(s)
Click to Restore back to Default Label


Label Wizard
Activity
Analyses
CLP_Sample_No
COC
Coll_Method
Collection
Color
Concentration
Conductivity
Conductivity Units
Container
Container_No
Depth From
Depth To
Depth to Water
Date: [Sample Date]
Location: [Location]
Analyses: [Analyses]
Preservation: [Preservation]
Container: [Container]
<< Back
Next >>
Restore Defaults
Cancel
Finish
Highlight field and select to add/remove fields
Move fields up/down
Click Next
Enter a Caption





Custom Label Layout Preview

Custom Import

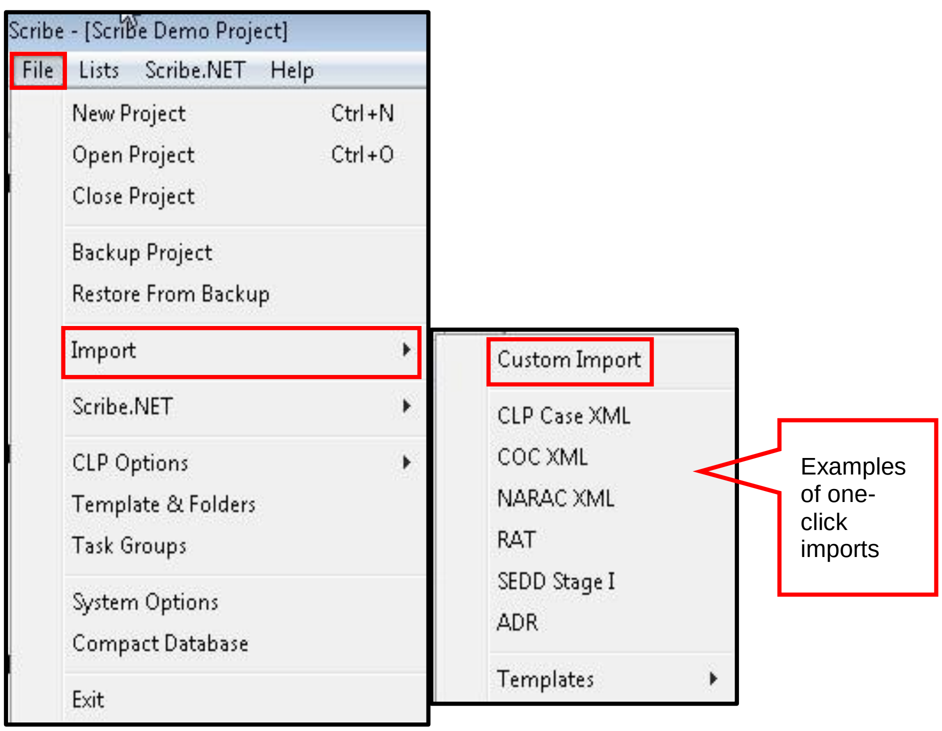
The File Menu contains several of the features described above. This section will address some of the more advanced features included with Scribe.

Import a File

Scribe supports importing of data to facilitate data entry. Rather than re-typing data into Scribe from another source (e.g., spreadsheet), the data can be imported into Scribe, thereby reducing the level of effort and transcription errors. It is very important to be familiar with the data you are importing. Column headings in your import source may differ significantly from the Column headings in Scribe.

NOTE: All file imports go through an Import Wizard that are similar in execution. This guide will only illustrate the Import process using an Electronic Data Deliverable (EDD) containing lab results. All EDDs need to be in a .csv or .txt format to go through the import process. If you are supplied with an .xlsx format, you can open it up on Excel and save it as a .csv file. PDFs are NOT Electronic Data Deliverables.

Click on File | Import | Custom Import

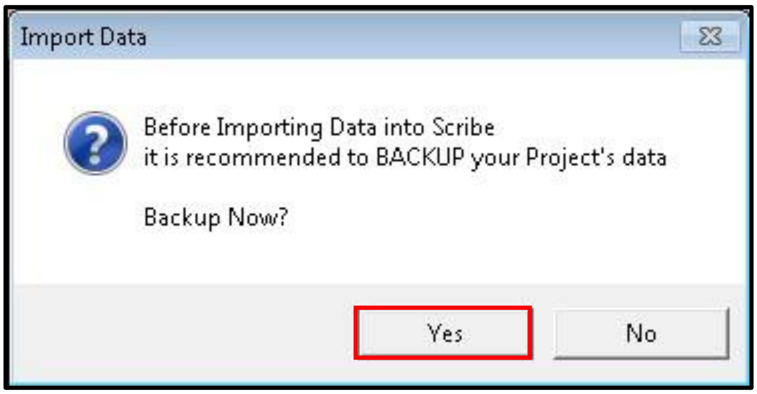


Backup Project

When doing any type of Import, Scribe will prompt you to Backup your projects data. It's always a good idea to make a backup of the project. The Backup will take a snapshot of your existing project, prior to the import. In the event something is wrong with the import data, you will be able to Restore your project prior to the import.

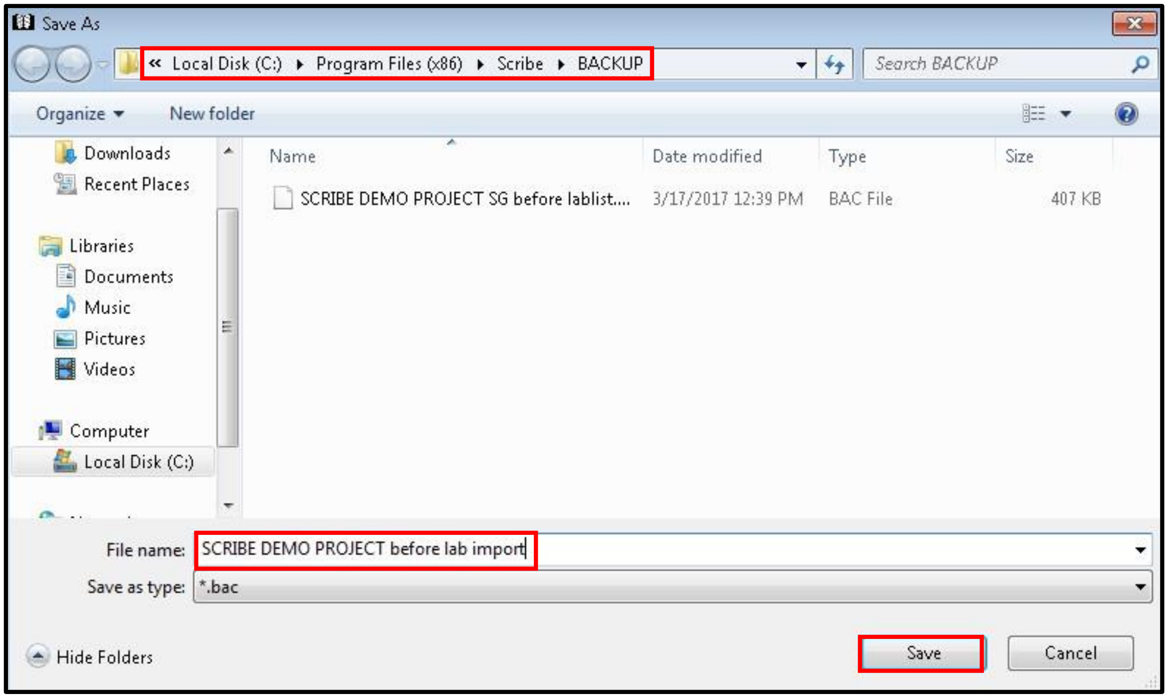
In addition to backing up your project prior to an import, you can Backup your project at anytime.

Under the File Menu select Backup Project. The following prompts remain the same throughout any backup process.



By default, Scribe will save your backup file to the BACKUP directory. BACKUPs, as well as your PROJECT files and TEMPLATE files, can be saved wherever you choose. Under the File Menu | Template and Folder, you can change your default directory or browse to another location at this screen.

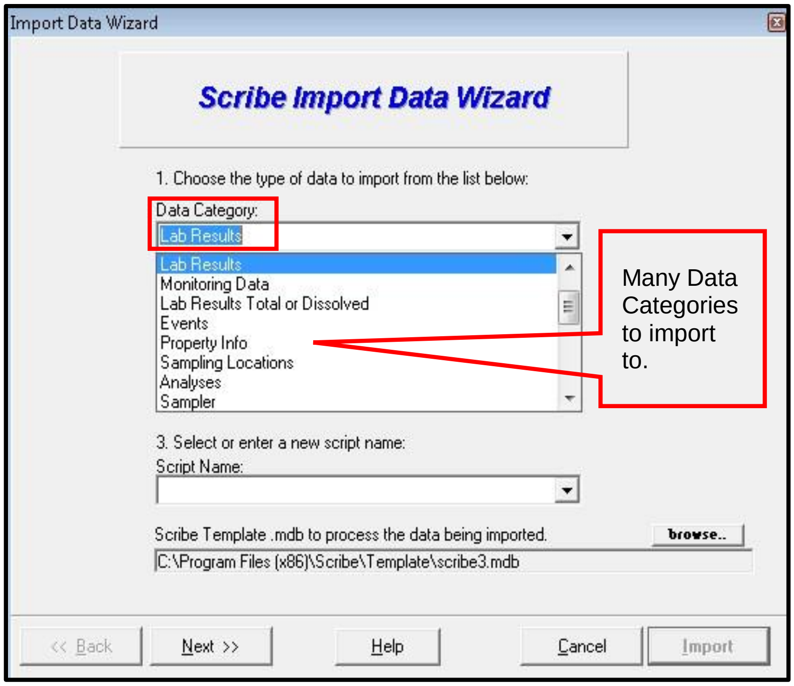
Naming your Backup file is important. By default, Scribe will stamp it with just the File Name of your project, with a .bac extension. Additional information in the file name (e.g., before import or date) is very helpful in the event there is an issue with the import and you want to restore your project prior to the import.


Save As
« Local Disk (C:) ▸ Program Files (x86) ▸ Scribe ▸ BACKUP
Search BACKUP
Organize
New folder
Downloads
Recent Places
Libraries
Documents
Music
Pictures
Videos
Computer
Local Disk (C:)
Name
Date modified
Type
Size
SCRIBE DEMO PROJECT SG before lablist....
3/17/2017 12:39 PM
BAC File
407 KB
File name:
SCRIBE DEMO PROJECT before lab import
Save as type:
*.bac
Hide Folders
Save
Cancel

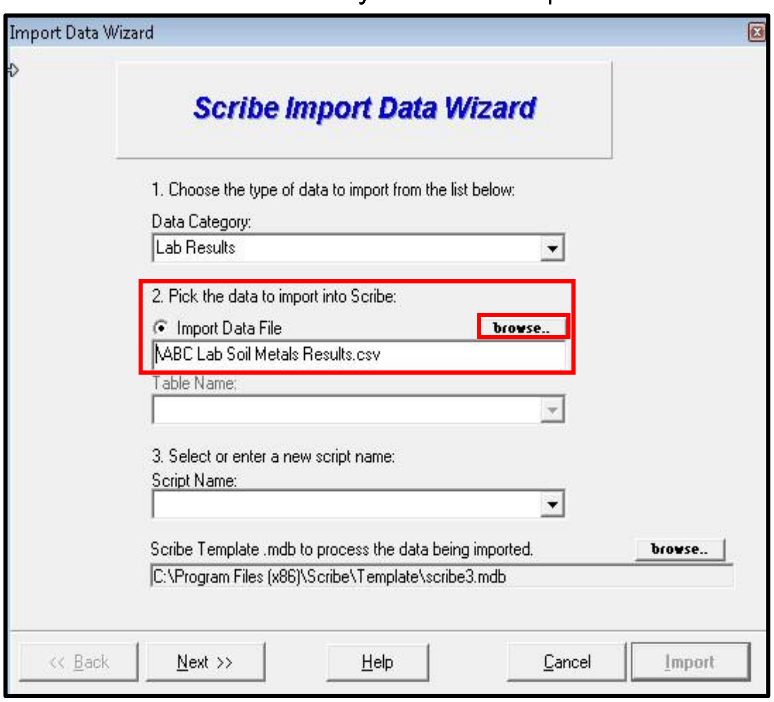

Backup
Backup To:
Backup
Backup Completed
OK

Scribe Import Data Wizard

The Scribe Import Data Wizard will launch. Click on the Data Category dropdown box and select the specific category you will be importing data to. In this example, we've selected Lab Results.

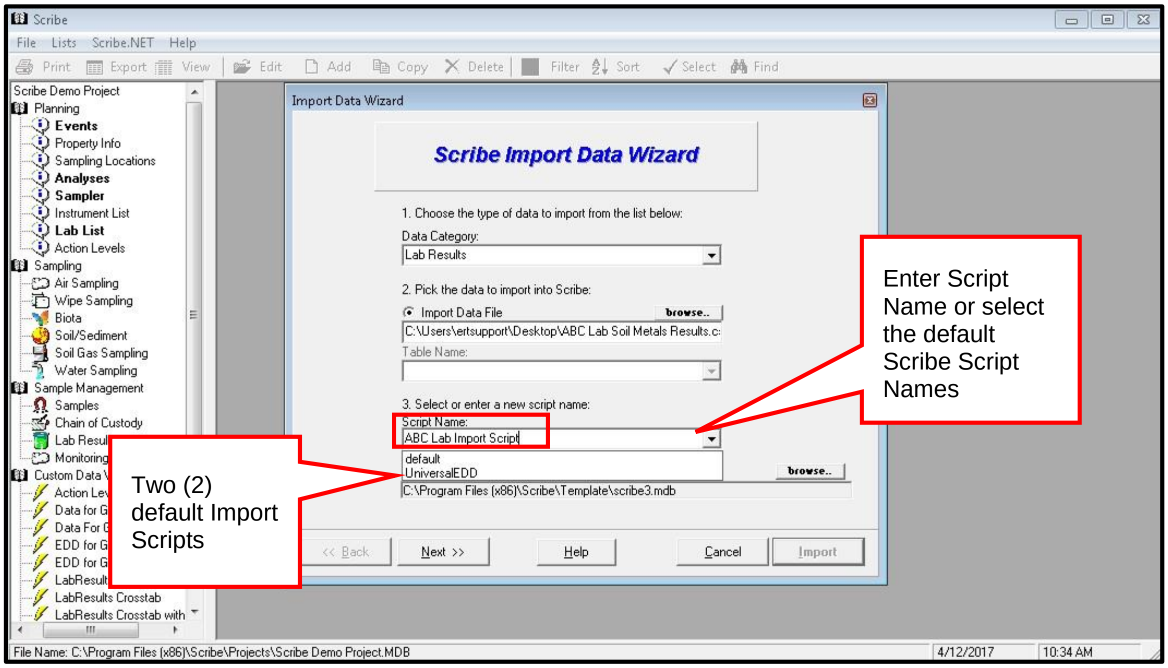


Use the 'browse' button to locate the file you want to import.

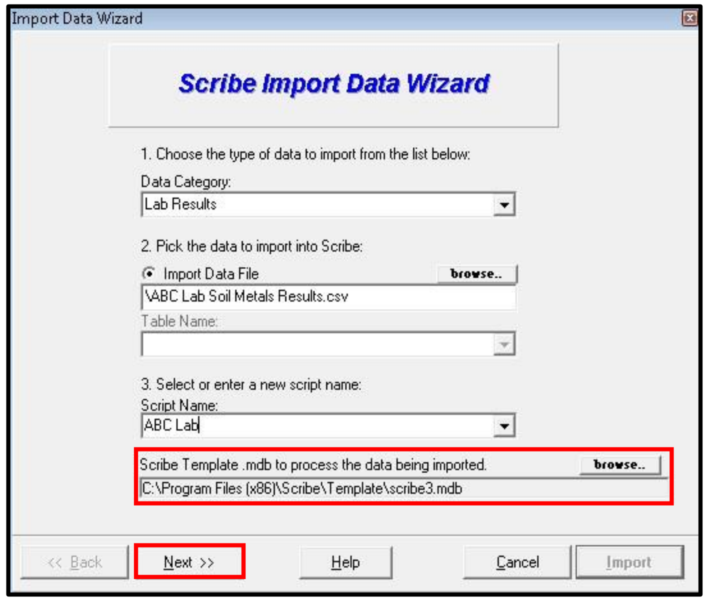


Import Scripts

Script Names provide a way to save your data mappings for a specific EDD format to avoid having to re-map future imports of similar files. For example, if you regularly get import files from a lab, you can save the data mappings to a Script Name (e.g., ABC Lab). Subsequent files from ABC Lab would not require re-mapping the data fields when importing. **Note:** *Script Names must be entered **prior** to mapping the fields. In this example, we are creating a Script Name for our ABC Lab Import.*

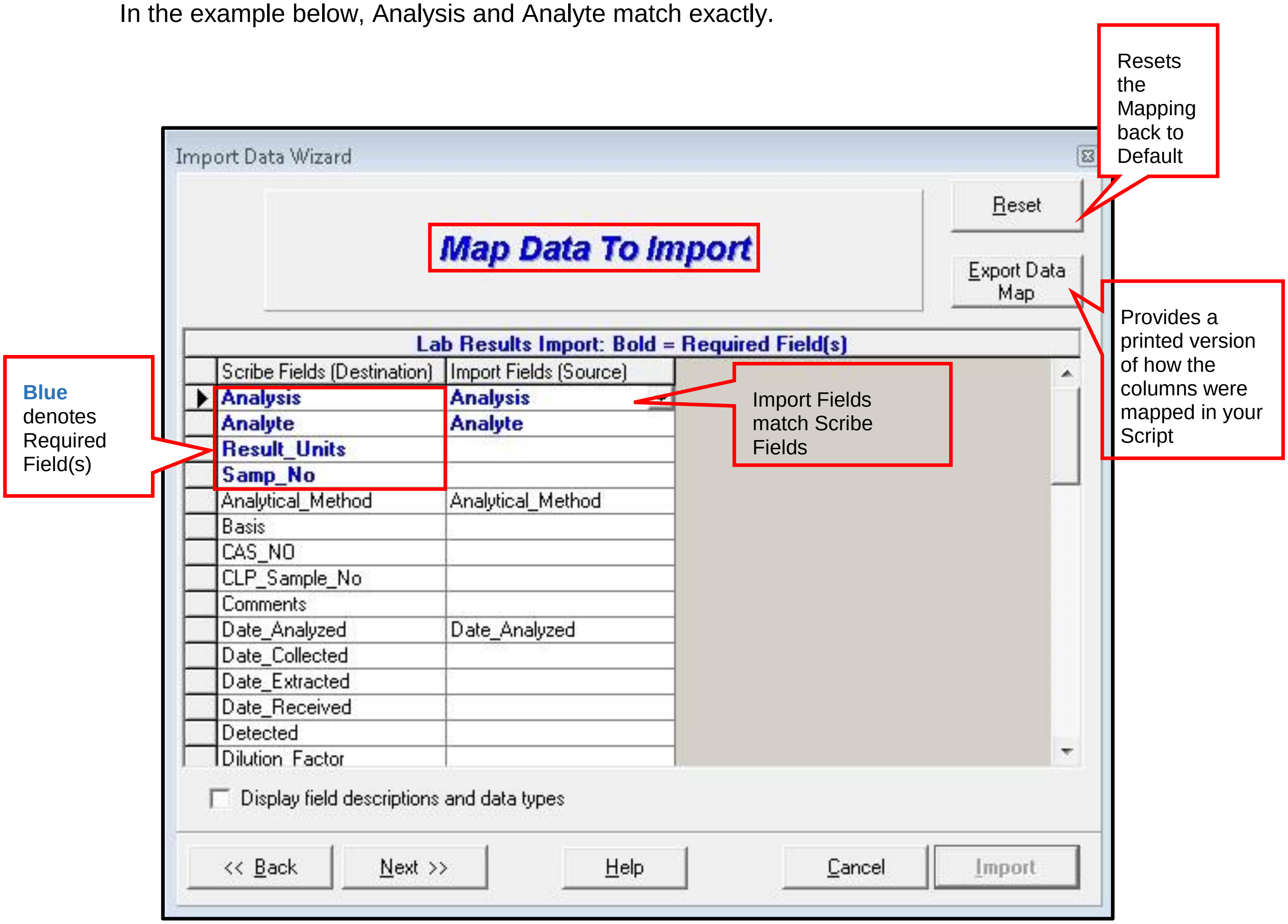


By default, Scribe uses the scribe3.mdb template file. If you are using a site/region specific template file, browse to where the file is stored. In this example, we will use the default Scribe template. When completed, click on Next.

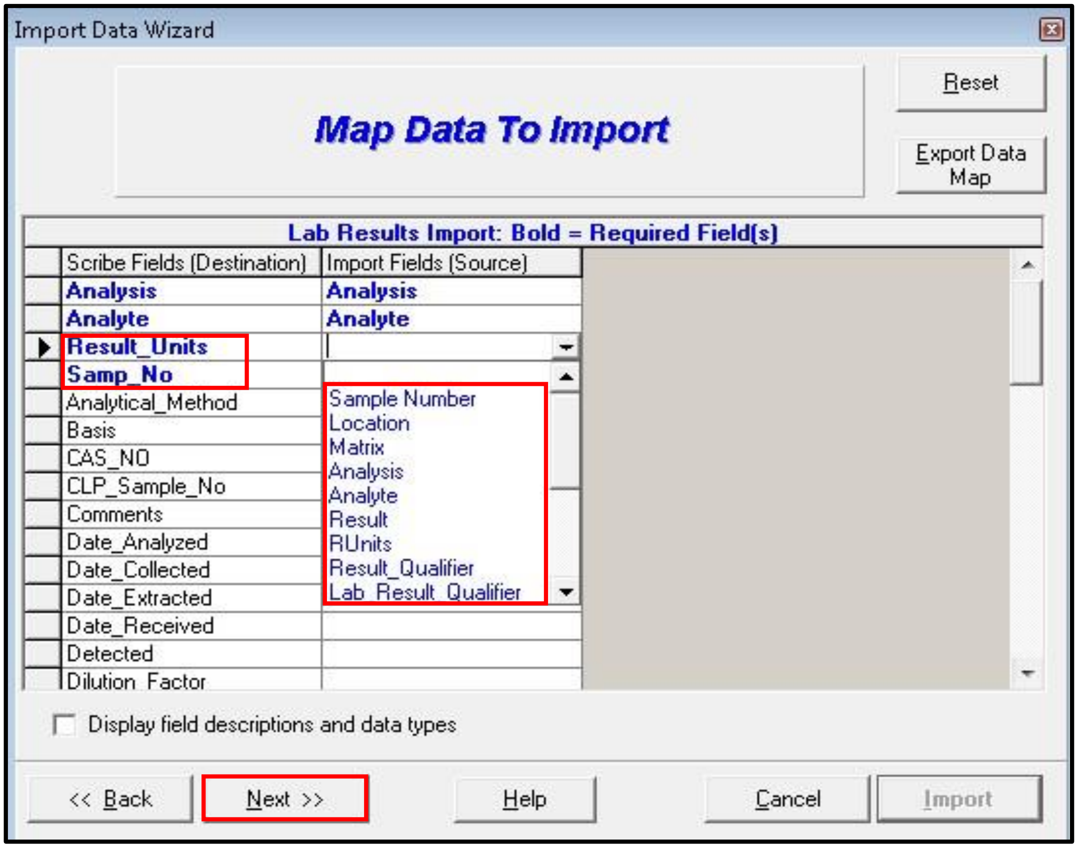


Map Data To Import

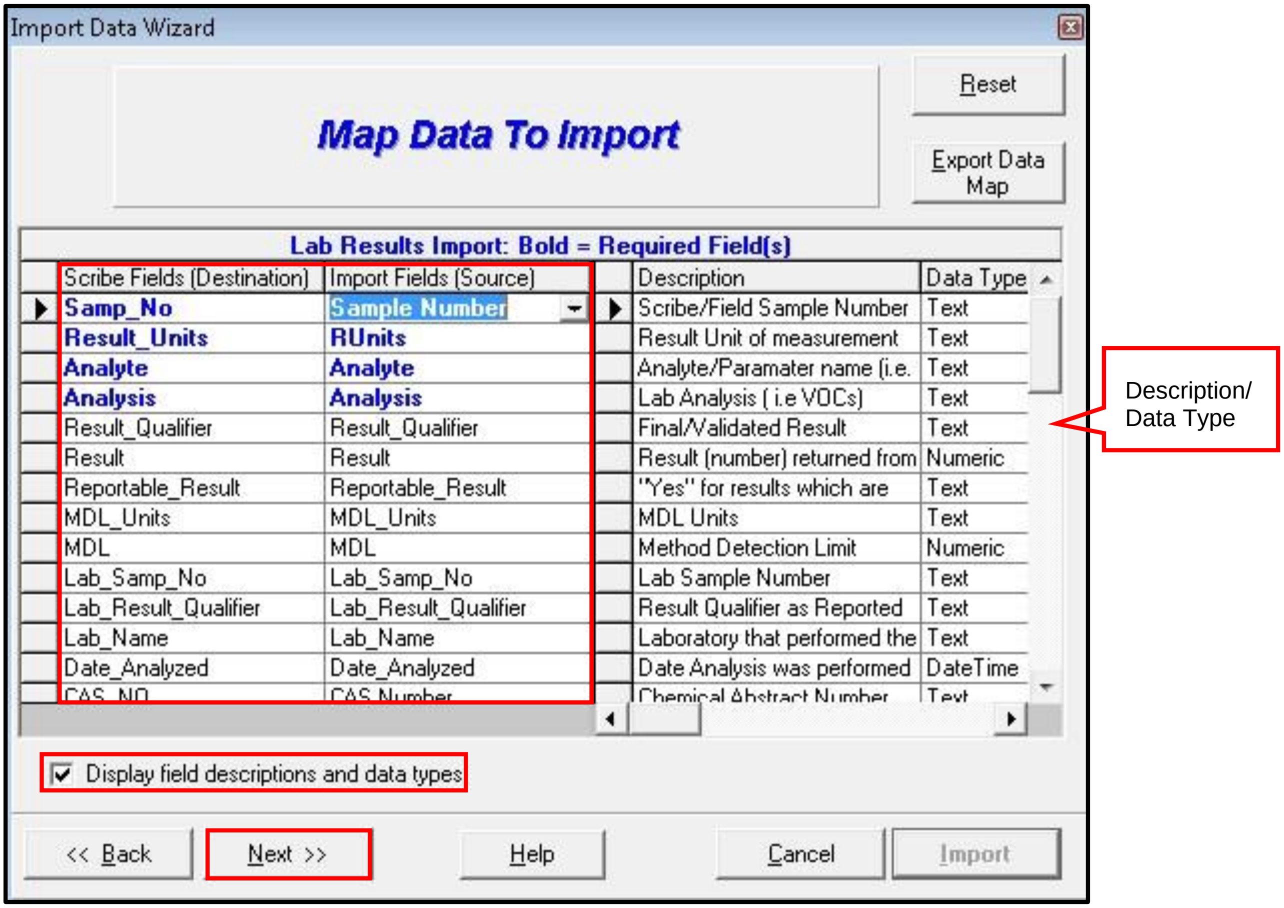
The 'Map Data To Import' window allows you to correlate Scribe data headings with the information contained in the EDD file. Any fields highlighted in **Blue** are required fields and must be mapped for the data to be imported. If the EDD (Import Fields (Source)) column headers match the Scribe Fields Destination, they will be mapped automatically. In the example below, Analysis and Analyte match exactly.



If headings do not match (e.g. Result_Units and Samp_No), click on the dropdown arrow in the cell to view the list of column headings in your EDD. Select the correct field in the EDD to map. Only data in the mapped fields will be imported into Scribe. Any heading that is not mapped will not be imported. ***NOTE**: As indicated earlier, it is very important to be familiar with your EDD. Knowing what your column headings are and what data is contained in them before the import will help eliminate any errors of data being mapped incorrectly.*

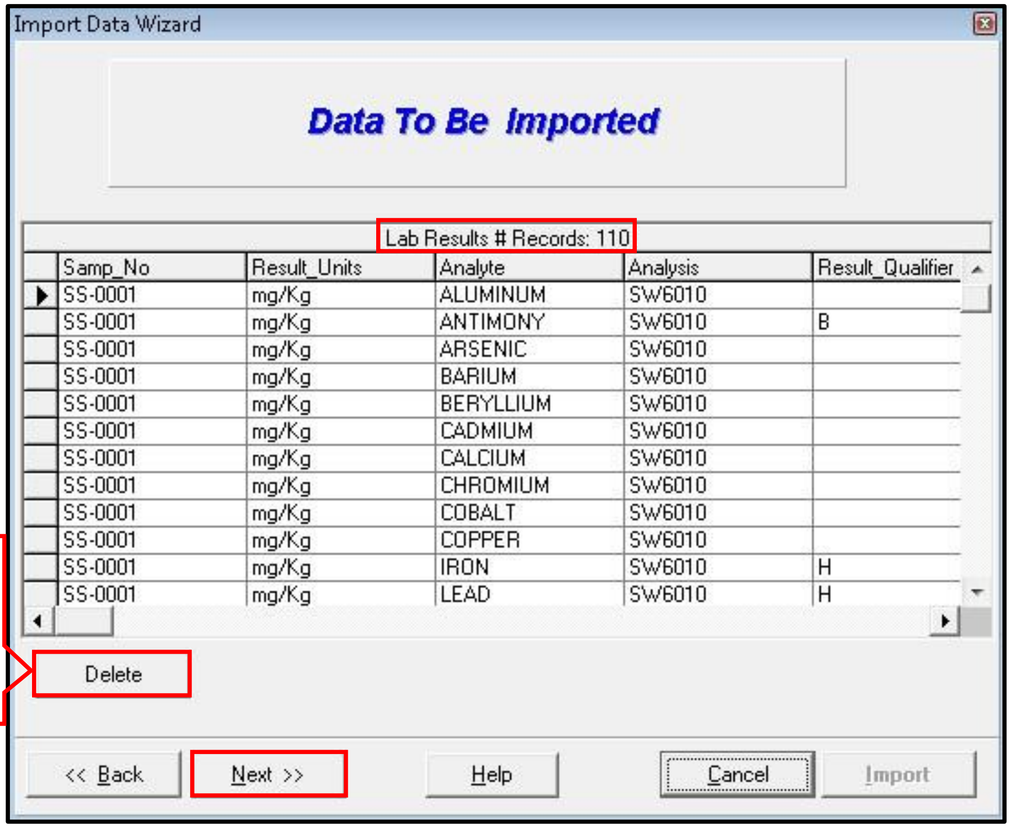


Continue mapping all other fields, as needed. ***NOTE:*** *To view the Scribe Field Description and Data Types, place a checkmark in the Display field descriptions and data types.* When all of the fields have been mapped, click Next.



Data To Be Imported

All data to be imported is displayed for you to review **before** the import process begins. ***NOTE***: *As indicated earlier, it is very important to be familiar with your EDD. This screen will give you a preview of how many records will be imported and how you mapped your data. If something is mapped incorrectly, use the Back button to get back to the Map Data To Import screen.* Click the Next button to continue.



Use the Delete button to deleted any unwanted data

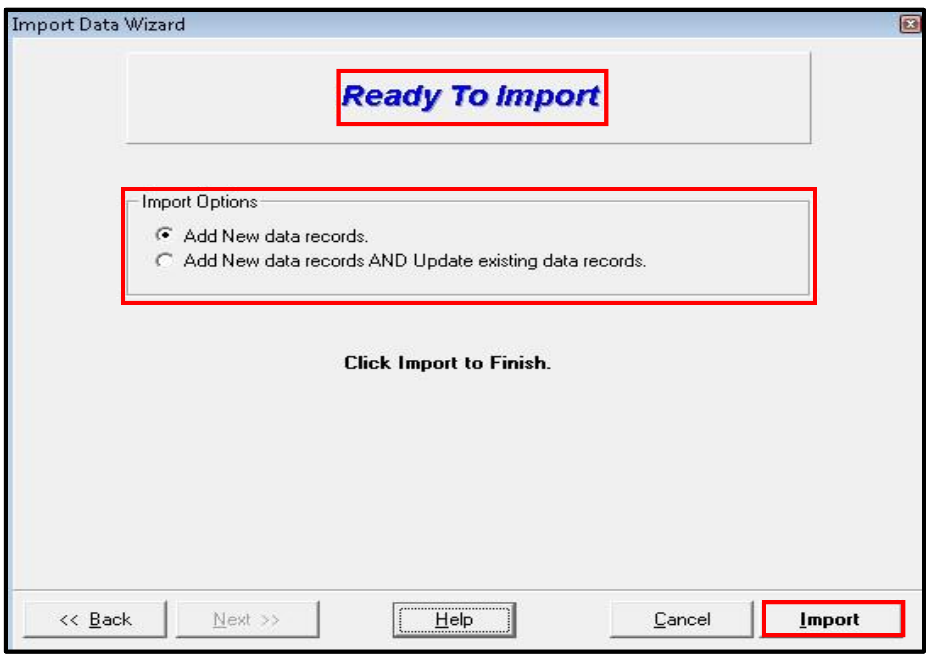
Ready To Import

The ‘Ready to Import’ screen opens. You are presented with two (2) Import Options:

- Add New data records
- Add New data records AND update existing data records

Add New data records is on by default. If this is the first time bringing this data set into Scribe, you would select this option.

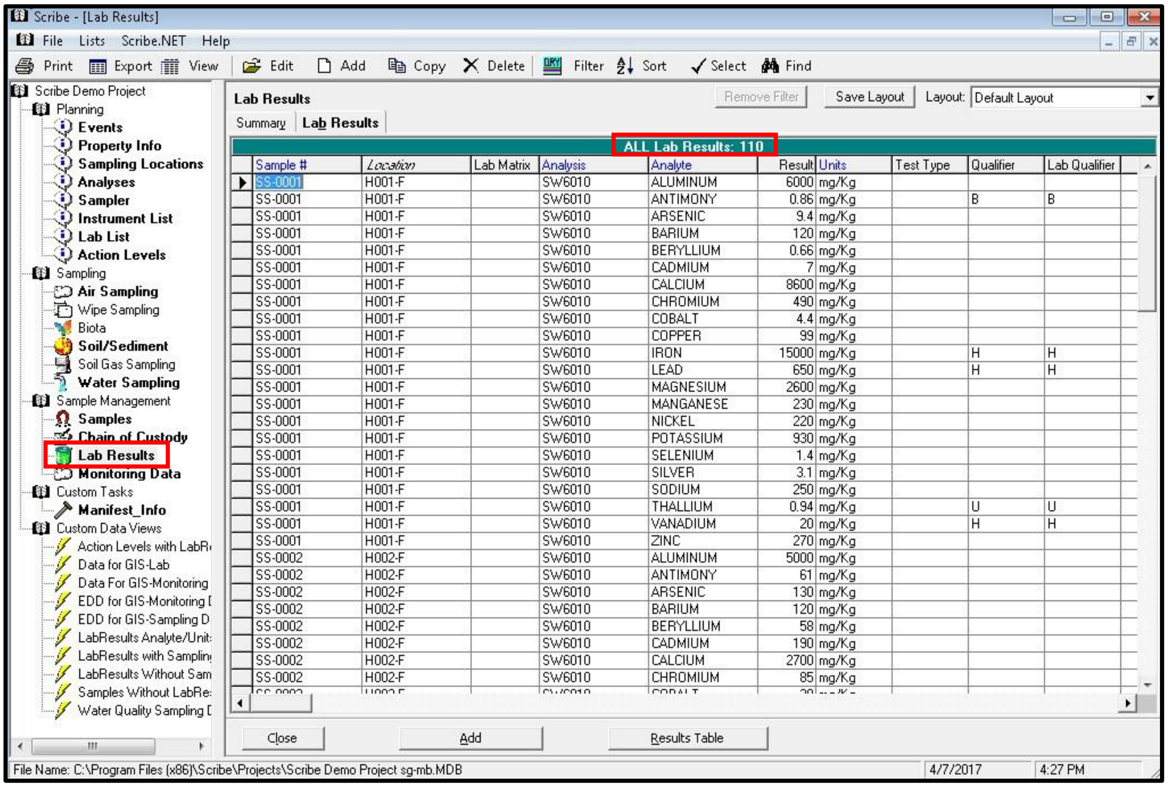
Add New data records AND Update existing data records. Use this option if updates need to be made to data already loaded or if additional information needs to be added to data already loaded.



Once the import is complete, a prompt appears asking if you wish to import more data. If no more data is to be imported, click No.

Displays # of records added

In this Import example, Lab Results were imported. Clicking on 'Lab Results' in the Navigation Pane will open the Lab Results window and display the imported records. 110 LabResult Records were imported and are displayed. ***NOTE:*** *To manually add Lab Results, please refer to Field Use Basics – Part 2 Guide.*



Export Data Map Example

A	B
Scribe Fields (Destination)	Import Fields (Source)
Samp_No	Sample Number
Result_Units	RUnits
Analyte	Analyte
Analysis	Analysis
Result_Qualifier	Result_Qualifier
Result	Result
Reportable_Result	Reportable_Result
MDL_Units	MDL_Units
MDL	MDL
Lab_Samp_No	Lab_Samp_No
Lab_Result_Qualifier	Lab_Result_Qualifier
Lab_Name	Lab_Name
Date_Analyzed	Date_Analyzed
Analytical_Method	Analytical_Method
Basis	
CAS_NO	
CLP_Sample_No	

Custom Data

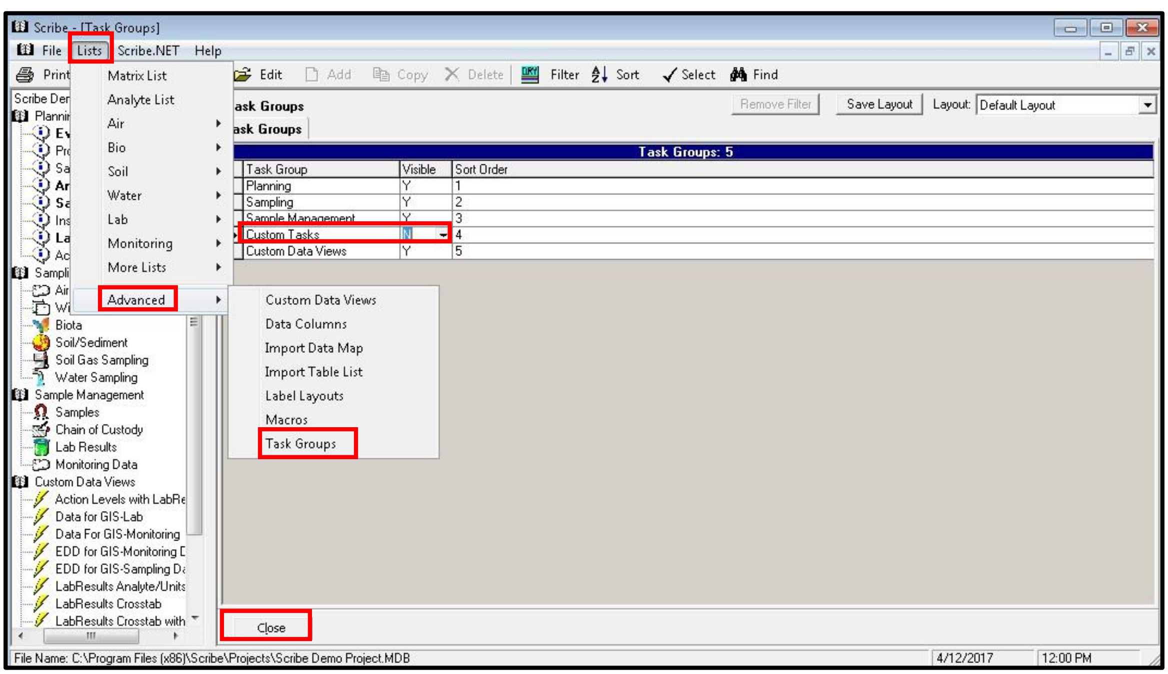
Custom Tasks and Custom Data Views are Scribe advanced features that allow users to either import or reference data external to the Scribe database. It can also be used for providing a one-click access to commonly used queries. The user must possess an understanding of Microsoft Access to create new tables for use in Custom Tasks or write a query that Scribe can then use in Custom Data Views. Scribe is the User Interface (UI) for the new database elements. Once created, the new database elements can be imported into Scribe as a new table (Custom Task) or query (Custom Data View). Below describes how to add these database elements to your Scribe project.

For additional information on creating Custom Tasks and Custom Data Views please refer to the Custom Tasks Guide and Custom Data Views Guide or contact ertsupport at 1-800-999-6990 or ertsupport@epa.gov.

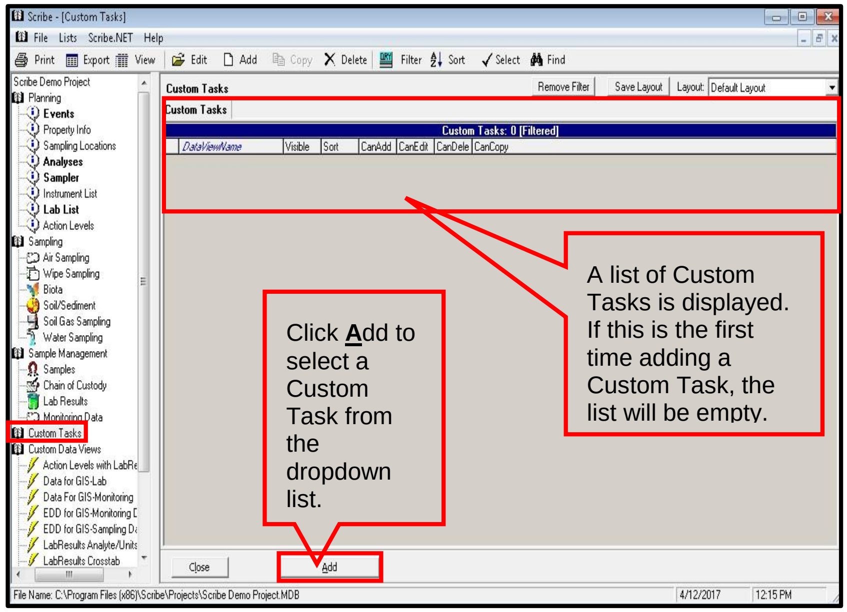
Adding Custom Tasks

When users have identified data that needs to be captured in their Scribe Project that is not native to the Scribe Database, it may be necessary to add a new table (Custom Task) to the database using MS Access. By adding this table to the database and exposing it in the Scribe User Interface (UI), users will be able to utilize many of the data functions available in Scribe (e.g., Data Entry, Import, Find, Filter and Sort). ***Note: To expose the Custom Task in your Scribe project, you must have already created the table, through MS Access in the Scribe project.***

Click on ‘Lists’ from the top menu bar and select the ‘Advanced’ option.
Then select the ‘Task Group’s option. A list of Task Groups is displayed.
Modify the Visibility of the Custom Tasks Column to **‘Y’** by clicking on the down arrow.
Click Close.

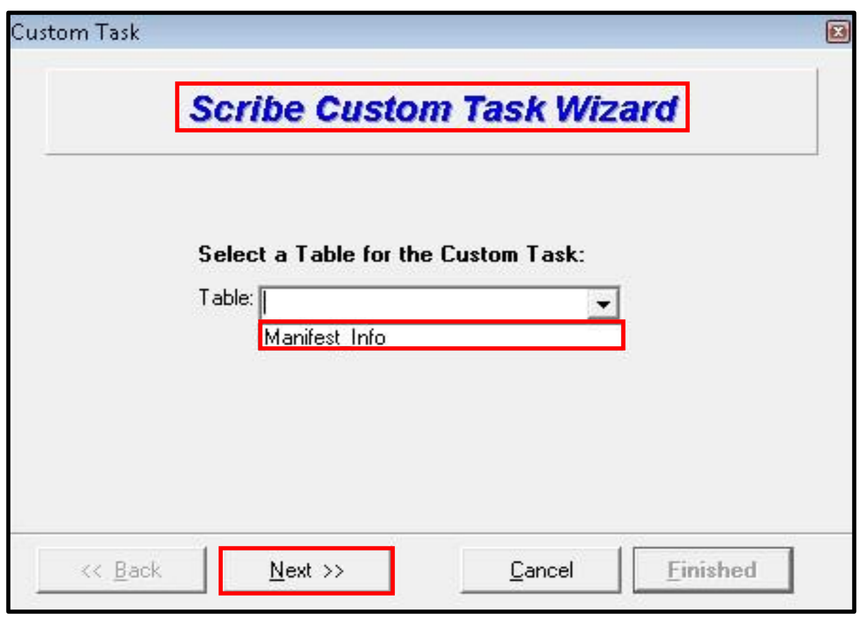


The Custom Tasks option will now be available in the Navigation Pane, below Sample Management. Click Add



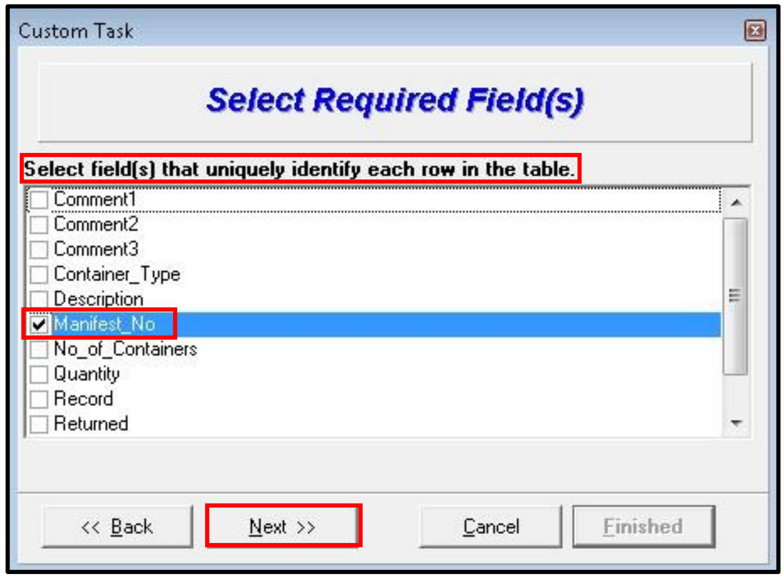
In this example, we created a Manifest table in MS Access to track Manifest data for the project. ***NOTE:*** *After adding a new database element to a Scribe project .mdb, the associated Scribe template file must also be updated with the new database element if additional data will be added using Scribe's Import wizard. If the default Scribe3.mdb template is updated, the new database element will appear in every subsequent new Scribe project created with that template.* **See Modify Scribe Template section**.

The Scribe Custom Task Wizard will display. Select the Manifest_Info table and click Next

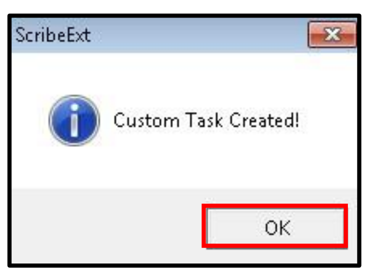


In our example, the Primary Key in the Manifest table was defined with an AutoNumber field in MS Access. Scribe, however requires that the table be defined with unique fields other than the Primary Key. The field/fields that make up a unique record in the custom table must be defined before the table is added to Scribe's user interface.

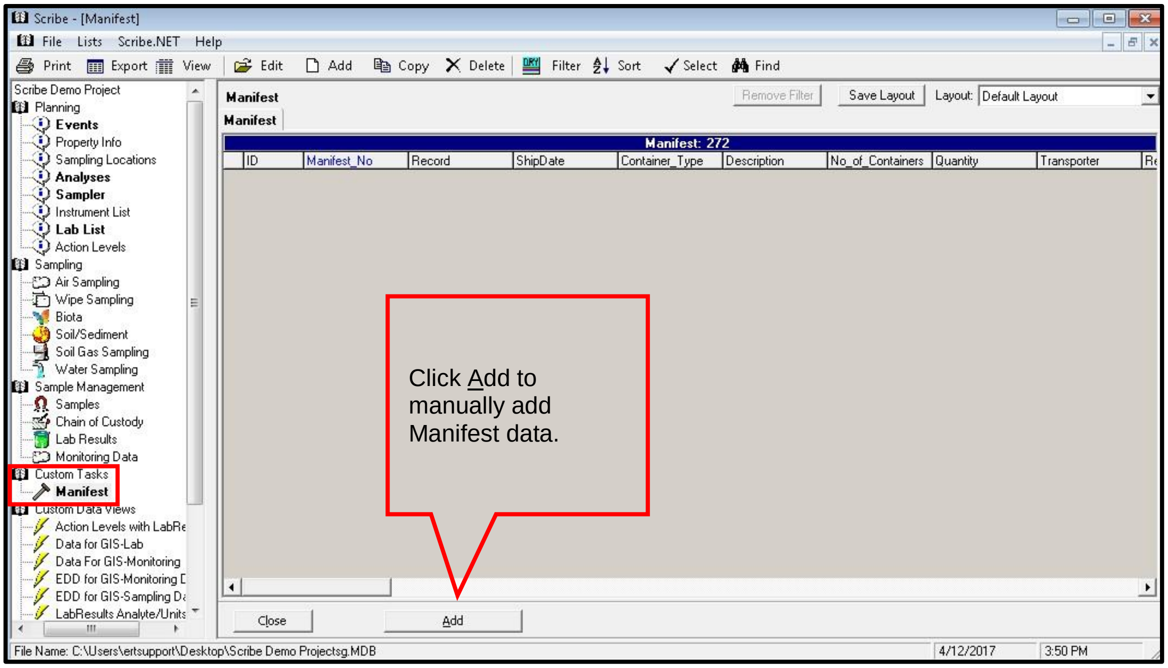
Check the 'Manifest_No" field to uniquely identify each row in the table. Click the Next button to continue.



Enter a name for the Custom Task and Click Finished. Click OK.



The Manifest Task is now listed under Custom Tasks. Access to the Manifest table is now available in the Scribe UI by clocking on Manifest under Custom Tasks. The field from the Manifest table are displayed, but there are no records in the table yet.



If additional data will be added using Scribe's Import wizard, the Scribe template file must be updated with the new database element. **Please see Update Scribe Template section of this guide.**

Add a Custom Data View

When users have identified data that needs to be provided over and over again and creating filters and sorts become cumbersome, an advanced feature would be to create a Custom Data View (query) that would provide a one-click option to answer the same commonly asked question over and over again. The user must possess an understanding of Microsoft Access to write a query that Scribe can use in Custom Data Views. Scribe is the User Interface (UI) for the new database elements. Once created, the new database elements can be imported in Scribe as a new query (Custom Data View). Below describes how to add these database elements to your Scribe project.
Note: To expose the Custom Data View in your Scribe project, you must have already created the query, through MS Access in the Scribe project.

For additional information on creating Custom Tasks and Custom Data Views please refer to the Custom Tasks Guide and Custom Data Views Guide or contact ertsupport at 1-800-999-6990 or ertsupport@epa.gov.

Update/Modify Scribe Template

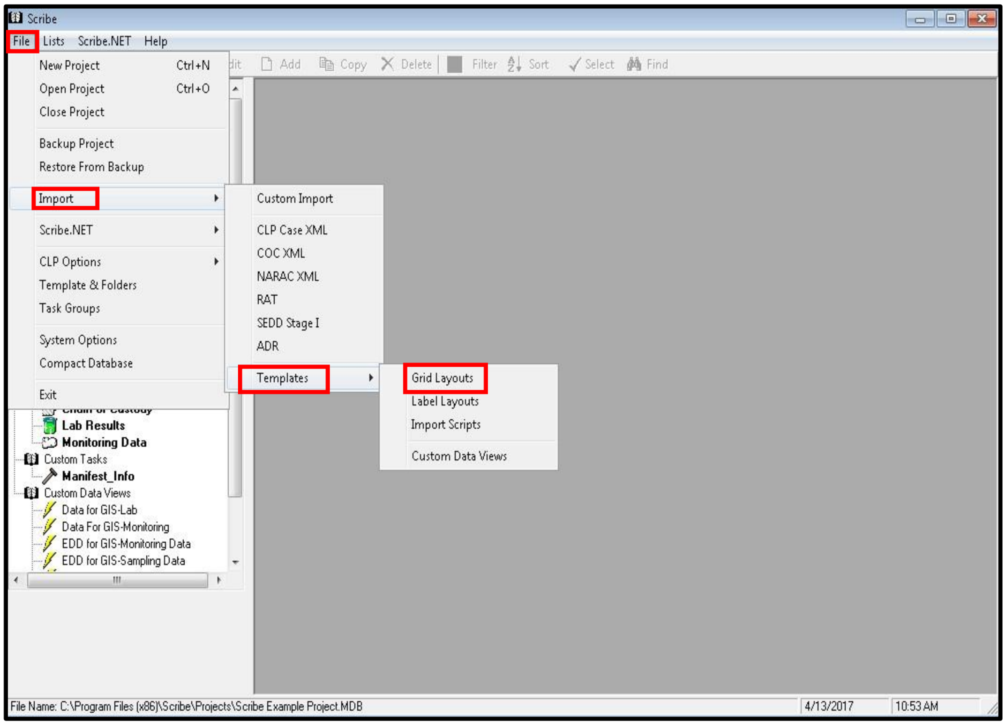
After adding a new table (Custom Task) or adding new database elements to an existing Scribe project table. The associated Scribe template file must also be updated if additional data will be added using Scribe's Import wizard.

Import Templates

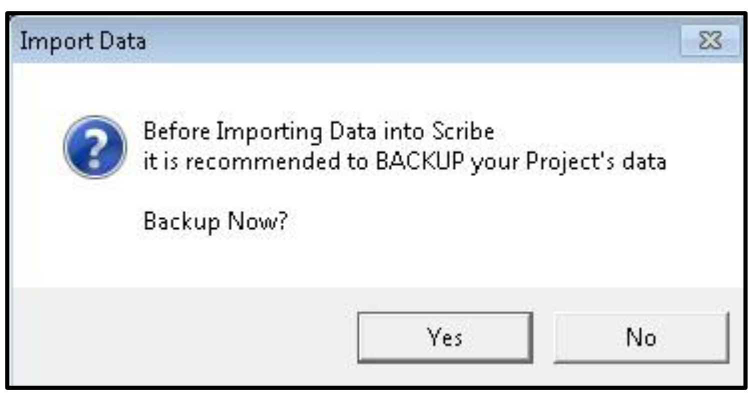
Customized layouts that were saved in previous Scribe projects can be imported into other Scribe projects. This section will describe how to import your Grid and Label layouts, Import Scripts and Custom Data Views into other Scribe projects.

Grid Layout

Click on File | Import | Templates and select Grid Layouts



A prompt to Backup your project will display. Click Yes or No. *(See Custom Import | Backup your Project)*

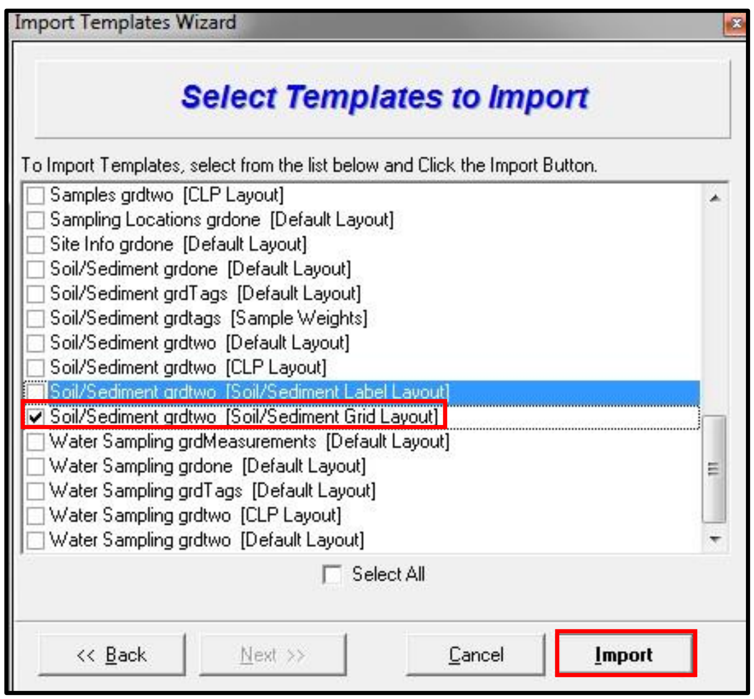


The Scribe Import Templates Wizard will display.

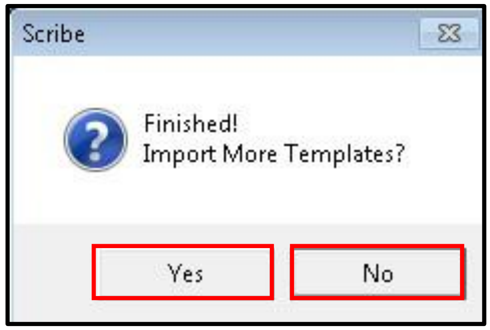
Browse to the Scribe project that you are importing templates from.

Click Next.

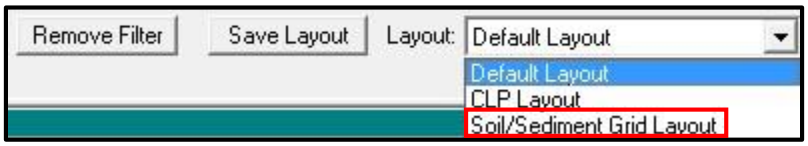
Select the Grid Layout(s) to be imported. Click Import.



When finished, you will be prompted to Import More Templates? Click Yes or No.



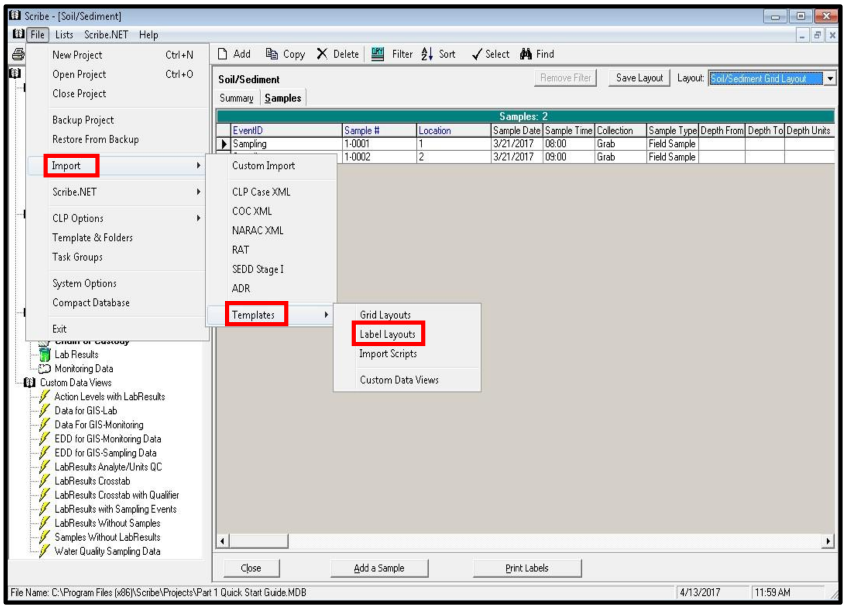
The Grid Layout is now available in the dropdown.



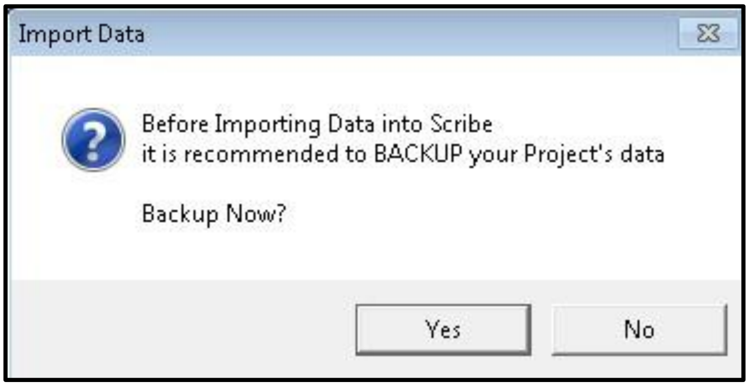
Note: *Layouts (Grid and Labels) are only imported to the section of Scribe they were created in. In this example, we are importing the Soil/Sediment Grid Layout that will import to the Soil/Sediment section in Scribe.*

Label Layout

Click on File | Import | Templates and select Label Layouts



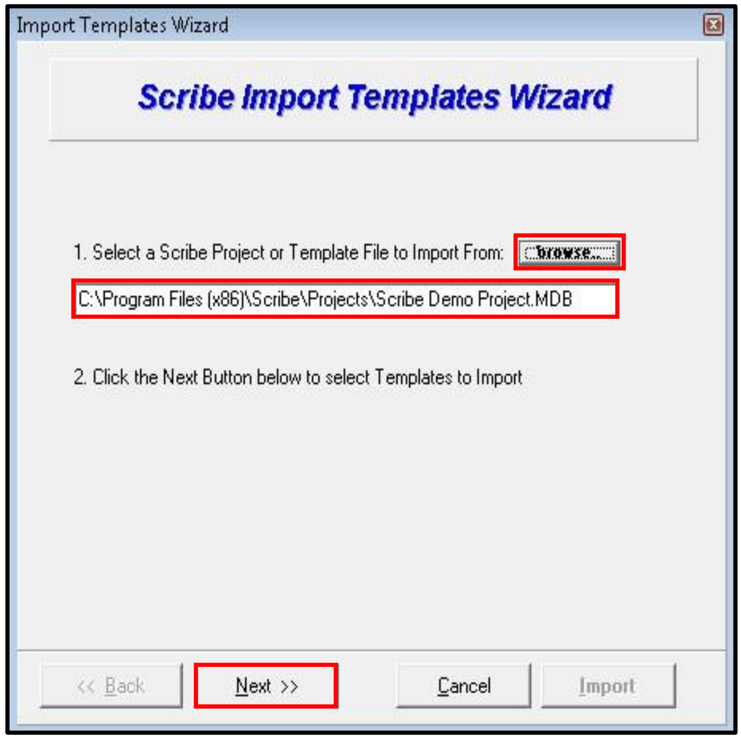
A prompt to Backup your project will display. Click Yes or No. See Custom Import | Backup your Project.



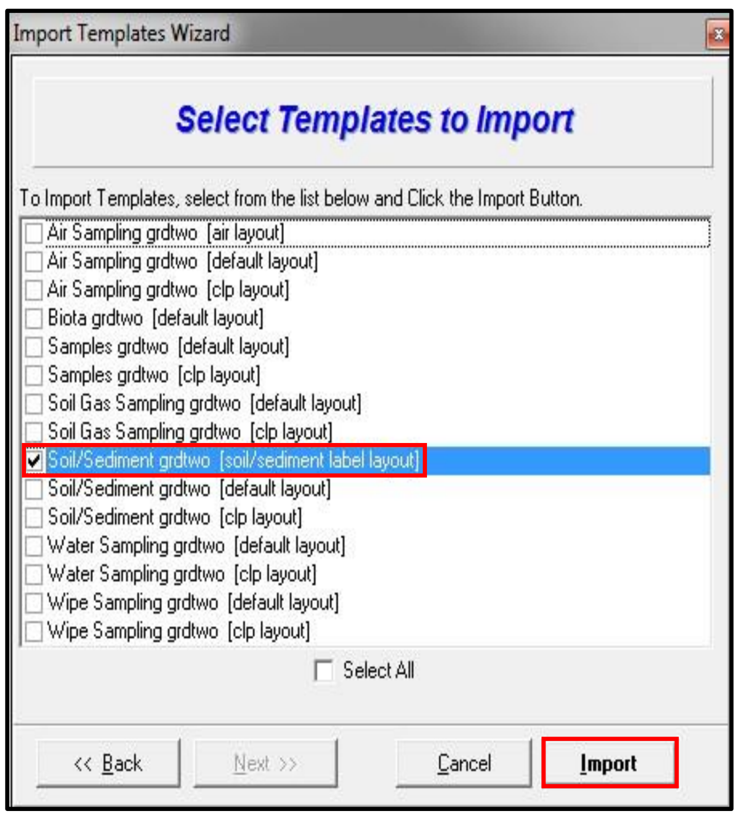
The Scribe Import Templates Wizard will display.

Browse to the Scribe project that that you are importing templates from.

Click Next.

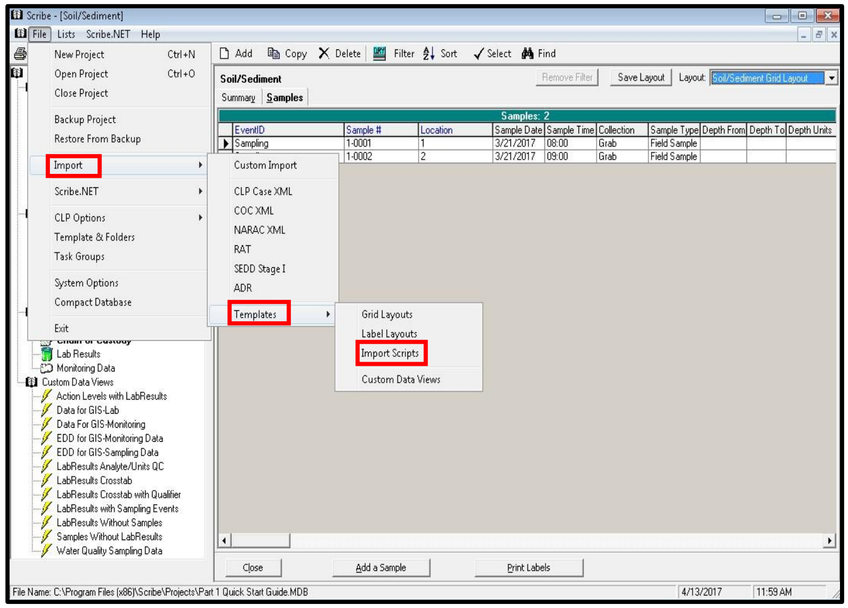


Select the Label Layout(s) to be imported. ***Note:*** *Layouts (Grid and Labels) are only imported to the section of Scribe they were created in. In this example, we are importing the Soil/Sediment Grid Layout that will import to the Soil/Sediment section in Scribe.* Click Import

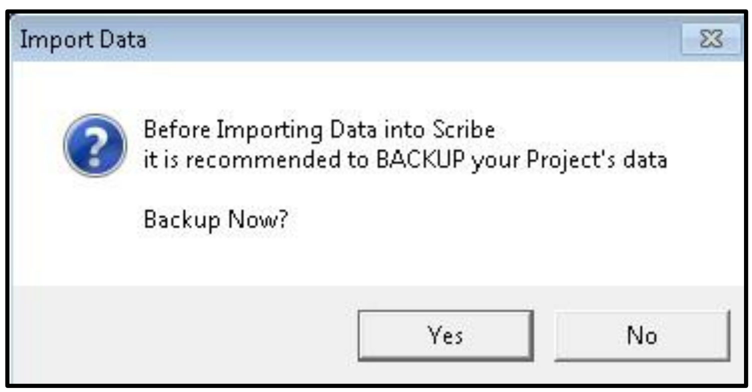


Import Scripts

Click on File | Import | Templates and select Import Scripts



A prompt to Backup your project will display. Click Yes or No. See Custom Import | Backup your Project.

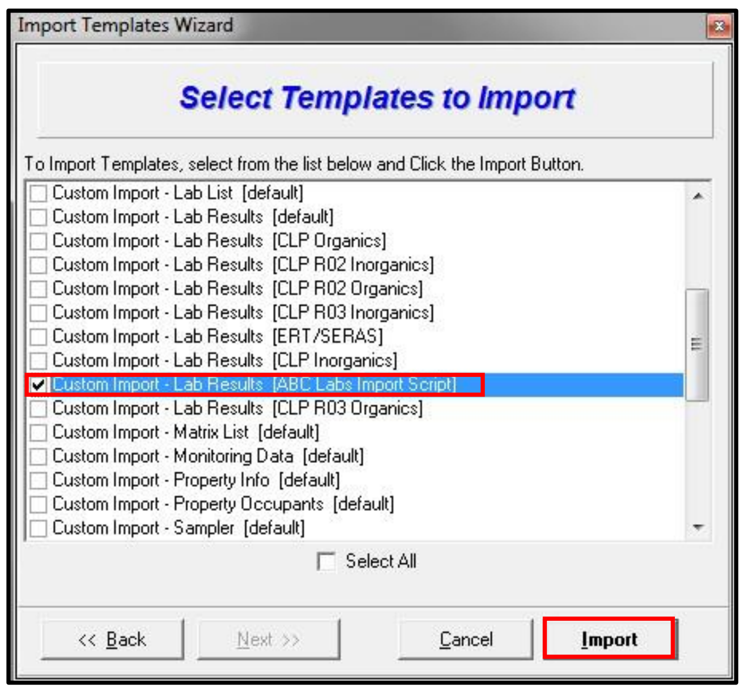


The Scribe Import Templates Wizard will display.

Browse to the Scribe project that that you are importing templates from.

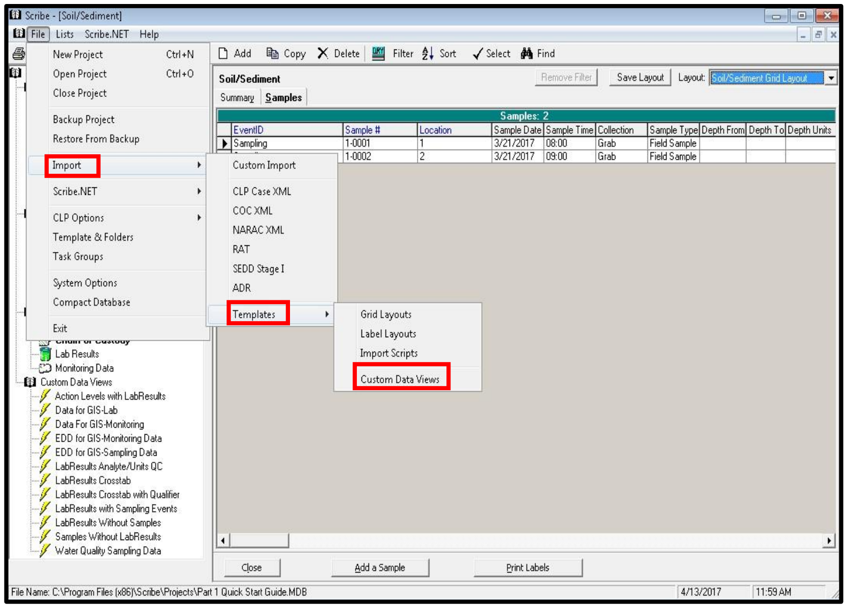
Click Next.

Select the Import Script(s) to be imported. Click Import

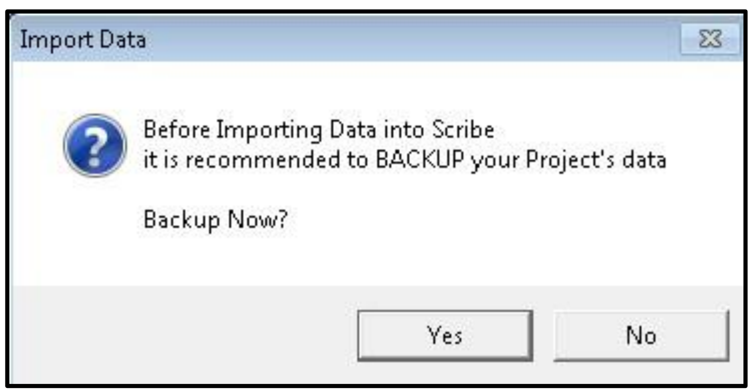


Custom Data Views

Click on File | Import | Templates and select Label Layouts



A prompt to Backup your project will display. Click Yes or No. See Custom Import | Backup your Project.

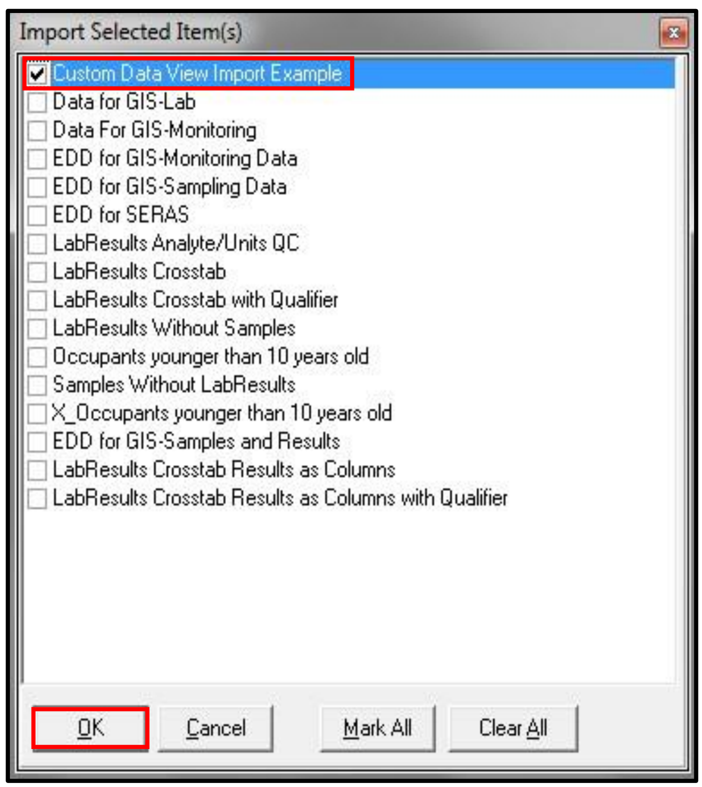


The Scribe Import Templates Wizard will display.

Browse to the Scribe project that that you are importing templates from.

Click Next.

Select the Custom Data View(s) to be imported. Click OK.



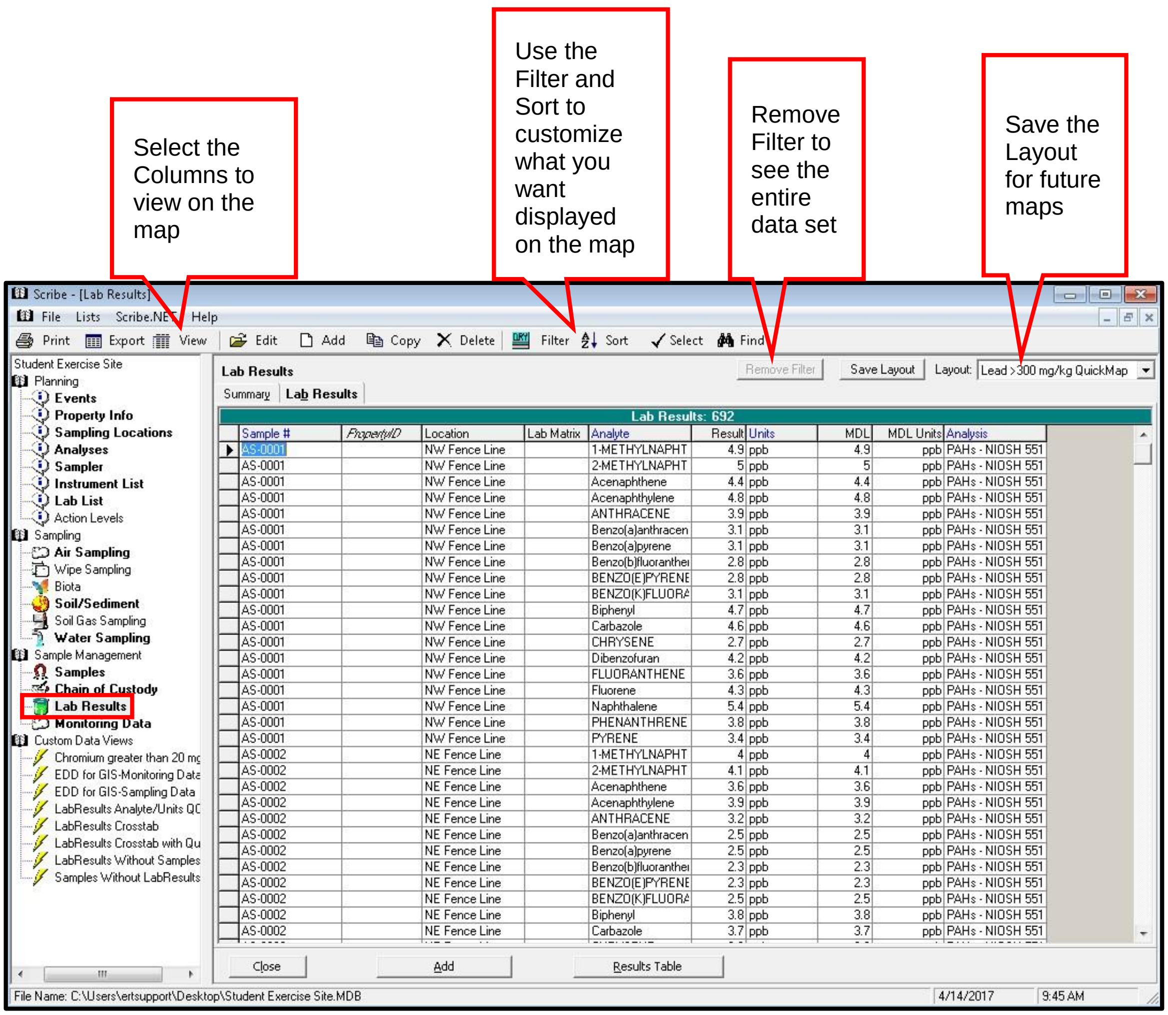
QuickMap

The option to export to a Quickmap (powered by Google Earth) is available in any section of Scribe than can display (view) longitude and latitude (e.g. Sampling Locations, Property Info, Samples task and the EDD to GIS custom data views). To use the Quickmap option an internet connection is required. To download Google Earth visit http://earth.google.com/download-earth.html.

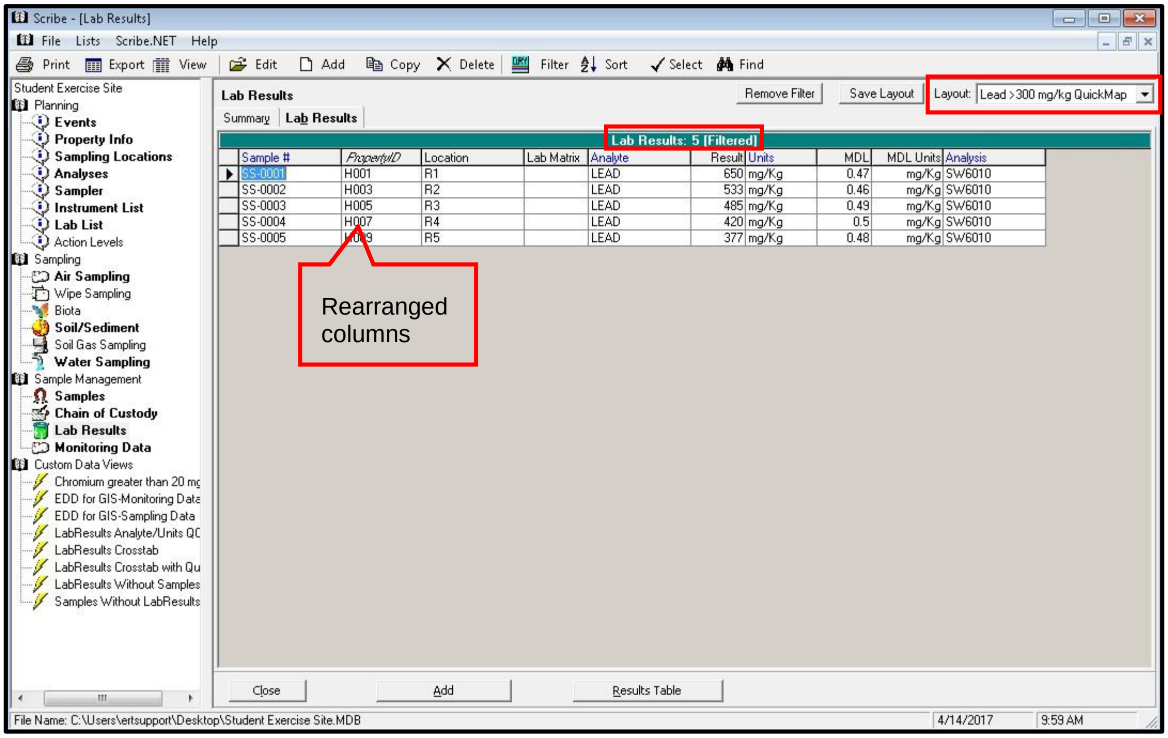
Creating a QuickMap

The Scribe grid screens are ideal for creating QuickMaps for reporting purposes. In the example below, a grid layout will be created for all Lead Levels above 300 and generate a QuickMap to display the data in Google Earth. The QuickMap will be generated from the Lab Results table of our project.

Click on Lab Results and click the 'Remove Filter' button so the entire data set is available. Use Scribes Filter, Sorts, etc. to display the data that will be displayed on the QuickMap.



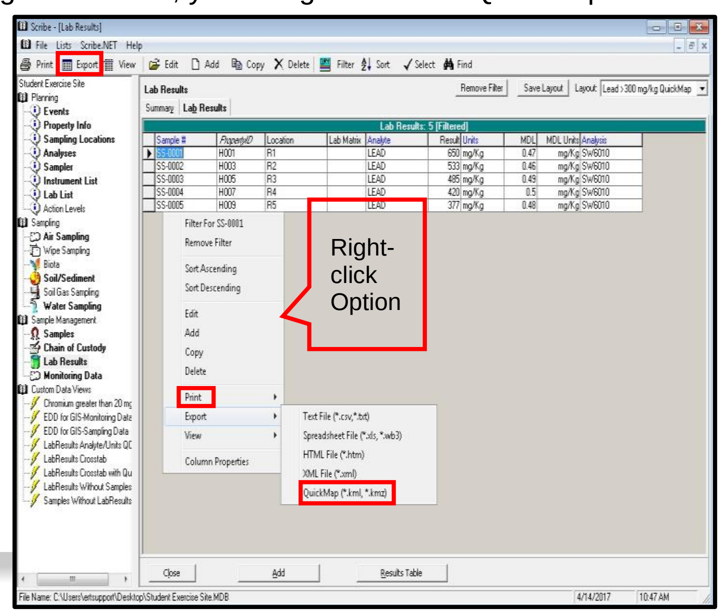
In this example, we Filtered for Lead >300 mg/kg in Ascending Sort order, limited our view to specific columns, moved (rearranged) the column order and created a Layout.



Generate a QuickMap

If your data contains latitude and longitude values, you can generate the QuickMap to display in Google Earth.

Click the Export button from the Toolbar (or use the right-click option). Select QuickMap (*.kml, *.kmz)

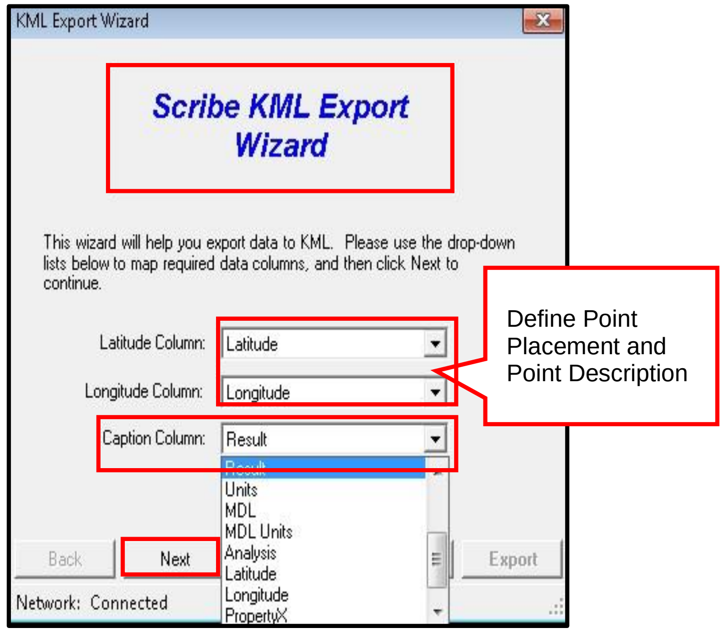


The Scribe KML Export Wizard will launch. Latitude and Longitude fields are mapped automatically.

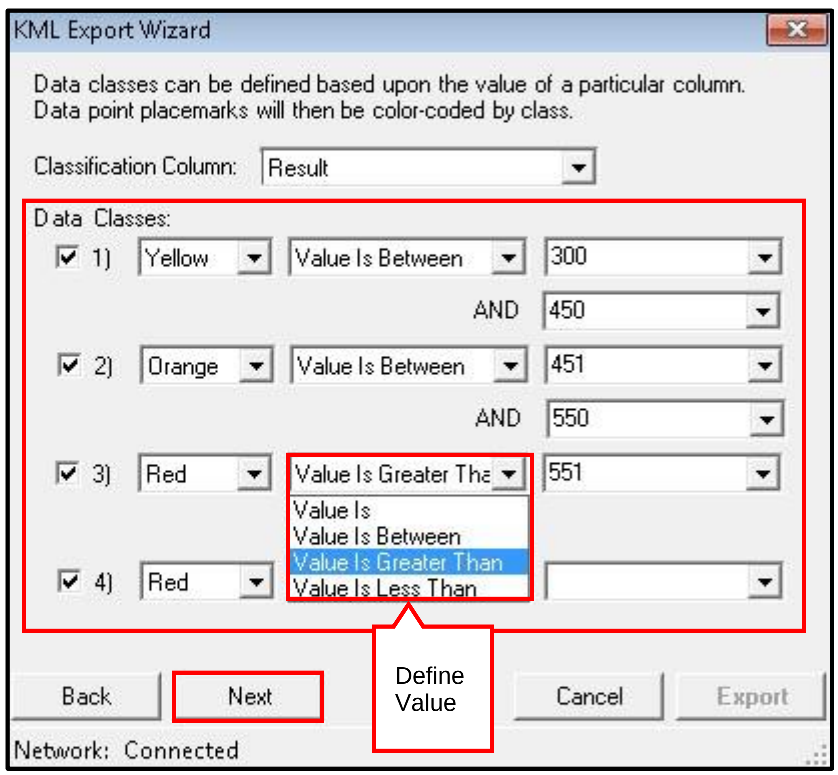
Click the down arrow to display a picklist of fields available based on your grid data (discussed above).

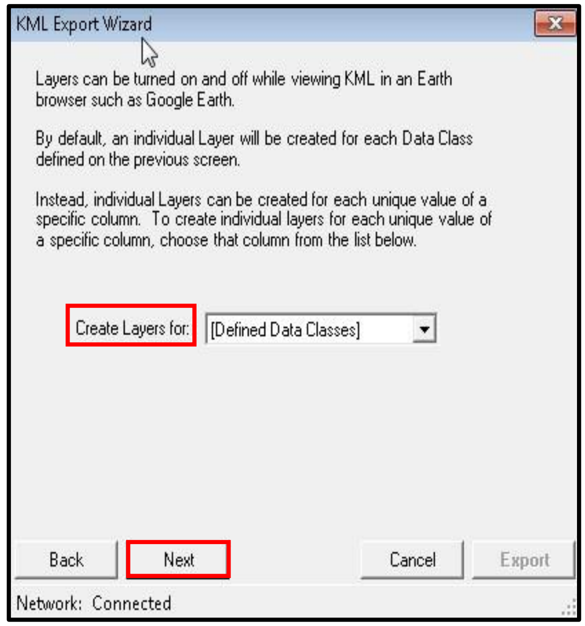
Select the field that will be used to identify (label) the individual data points on the map (e.g. Result or SampleID). In this example, we are using the Result field.

Click Next.



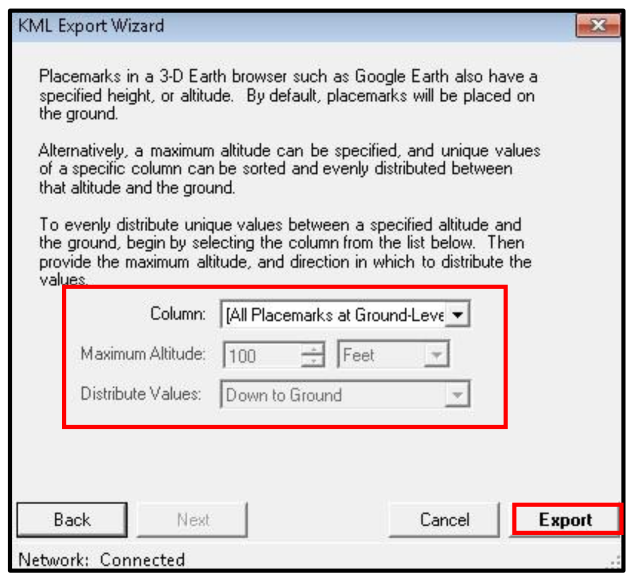
Define the Data classes of the data points. When the map is displayed, the property colors will be based on the result value. In this example, we've classified each data point based on the Results value greater than.
Click Next.





This screen allows you to create additional layers to turn on and off in Google Earth.

For example, if you used Sublocation to define front yards and backyards, you could define a layer for Sublocation and turn the yard info on and off in Google Earth.
Click Next.



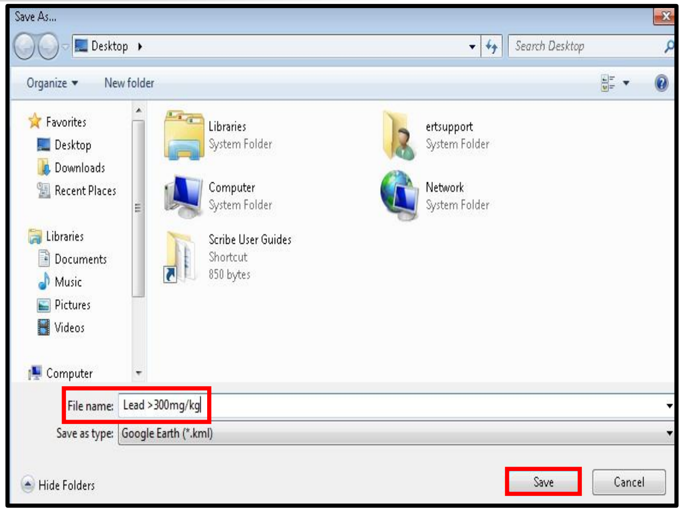
This screen allows you to define Placemarks. Datapoints can be displayed in a 3D format based on a value allowing the user to stack data points.

By default, all data points will be placed at ground level. To stack datapoints, select the field on which to base the stacked points i.e. Depth or Result.

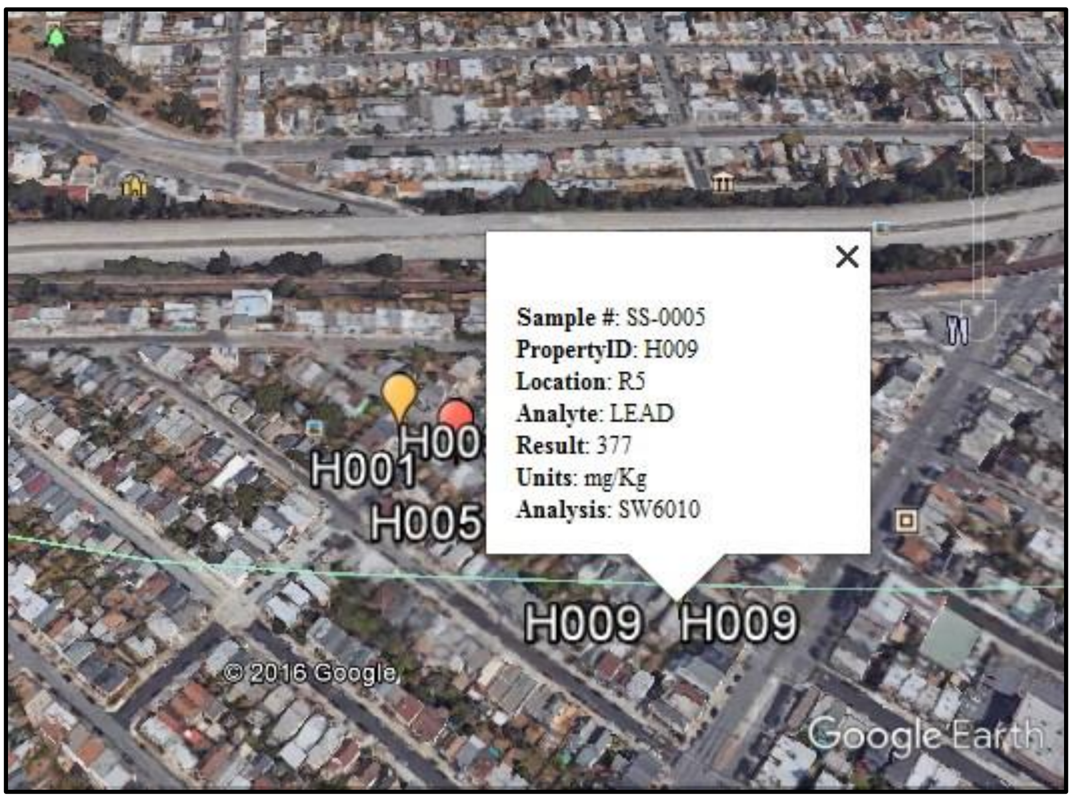
Define the Maximum Altitude and Distribute Values. Data in Google Earth based on altitude.

Click Export.

Name the *.kml file and click ‘Save’.
If Google Earth does not automatically launch and display the lab results, run Google Earth and open the .kml file.



An image similar to the one below should display in Google Earth. Notice the Property IDs are displayed by color using the value ranges specified in the Wizard. Also notice the additional information displayed when a pin is selected. Additional pin information could be displayed by turning those columns on in Scribe before creating the QuickMap export.



Scribe.NET

Scribe.NET provides a method of storing and sharing Scribe projects in a controlled environment. Using Scribe.NET, Scribe projects can be shared between Scribe desktop clients and/or enterprise Oracle/SQL database clients. Scribe projects are “Published” from the Scribe desktop client, and other desktop/enterprise users “Subscribe” to the published projects. Users can subscribe to individual or multiple projects. Regional or global subscriptions can also be created for sharing entire sets of published projects.

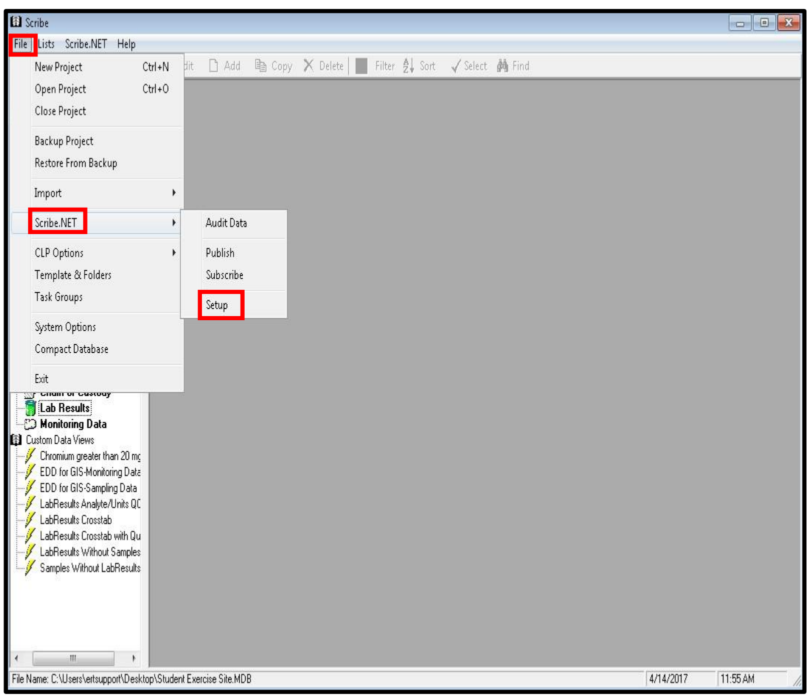
By default, Scribe desktop clients have access to generic publisher accounts in order to quickly and easily publish their project to Scribe.NET. Subscriptions, however, are managed on the server to provide secure access to the published data. An end user must have the subscription ID and Password before they can access the published project(s). The configuration of the subscription will determine which projects a user will acquire when they use a particular subscription ID. Subscriptions function differently for desktop clients than enterprise SQL clients.

An Internet Connection is required to Publish or Subscribe.

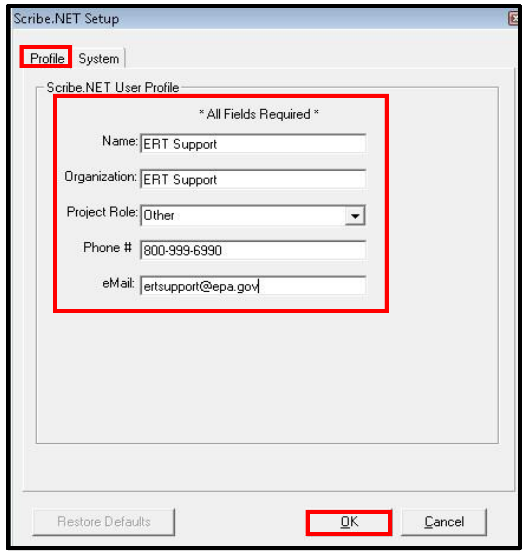
Scribe.NET Setup

The first time you use Scribe.NET, you will be prompted for some basic user identification information. This data is only used to attach ownership of the project and to ensure data integrity of published project files and is not publicly displayed.

Click on File | Scribe.NET | Setup



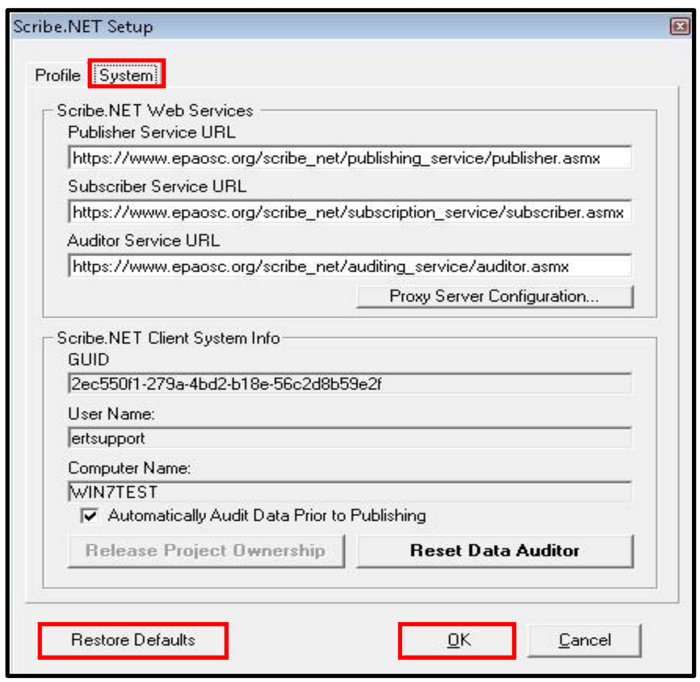
Fill in the fields on the Profile tab and click OK



The information on the System tab does not need to be modified.

To restore system default settings, click on the 'Restore Default's' button.

Click OK

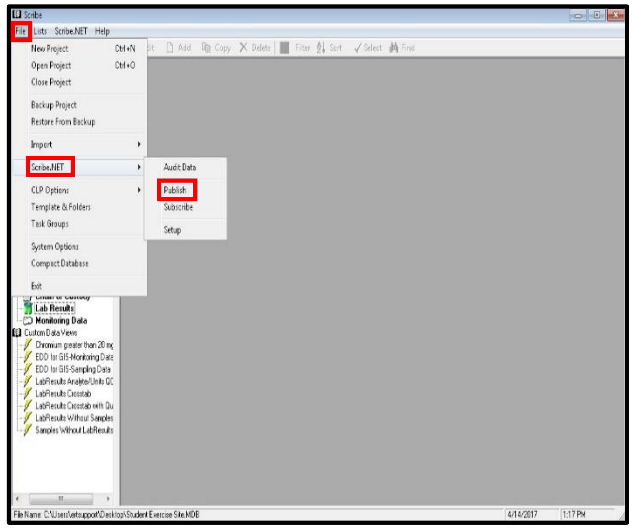


Publish to Scribe.NET

Publishing a project(s) to Scribe.NET stores your project(s) on a secure web server. By Publishing, your data can then be shared through a Subscription. By publishing to Scribe.NET, you have a backup of your project in the event something happens to the data (hard drive crash, lost computer, etc.). Scribe.NET updates the Scribe project each time the project is published.

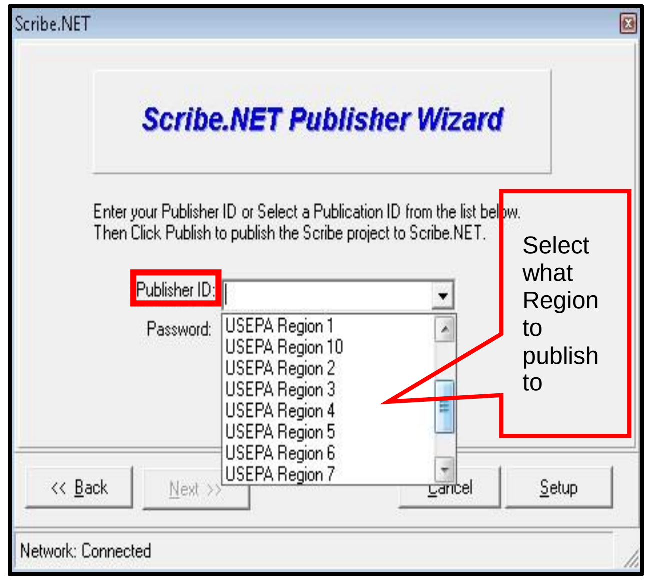
Once your project has been published to Scribe.NET, the computer it was published from becomes the 'owner' of the project. Any subsequent publishing of the project must be done from that computer. In the event the computer is damaged or the owner is no longer responsible for the project and publishing, ownership will need to be released. ***See Release Project Ownership***.

To publish a project to Scribe.NET, click on File | Scribe.NET | Publish

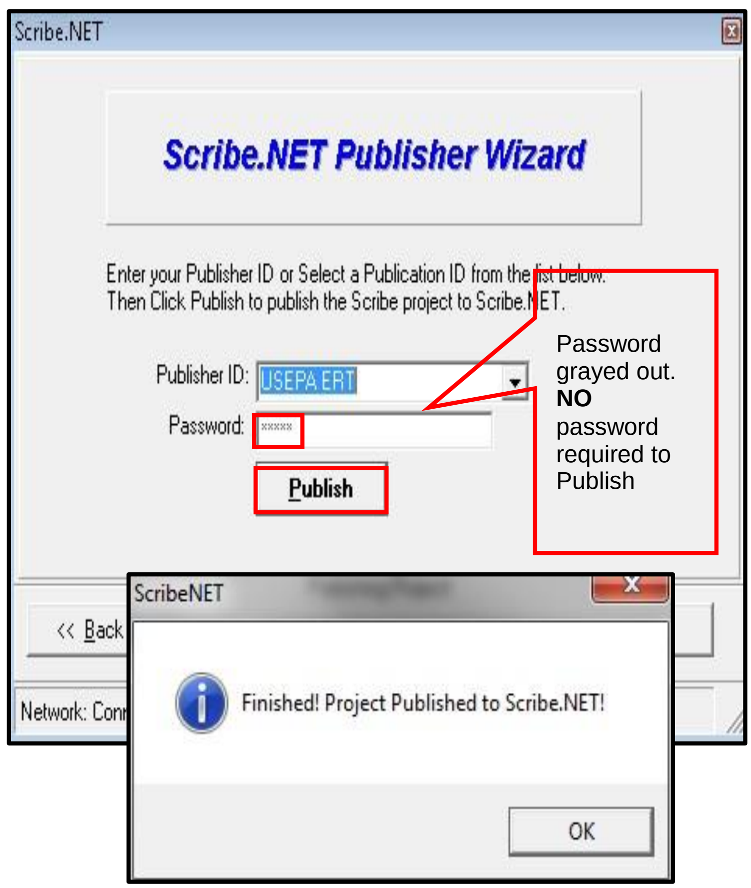


The Scribe.NET Publisher Wizard screen is displayed. Click Next.

Click the dropdown arrow and select the Publisher ID (which Region to publish it to). **Note: You must have an Internet Connection to publish toScribe.NET.**

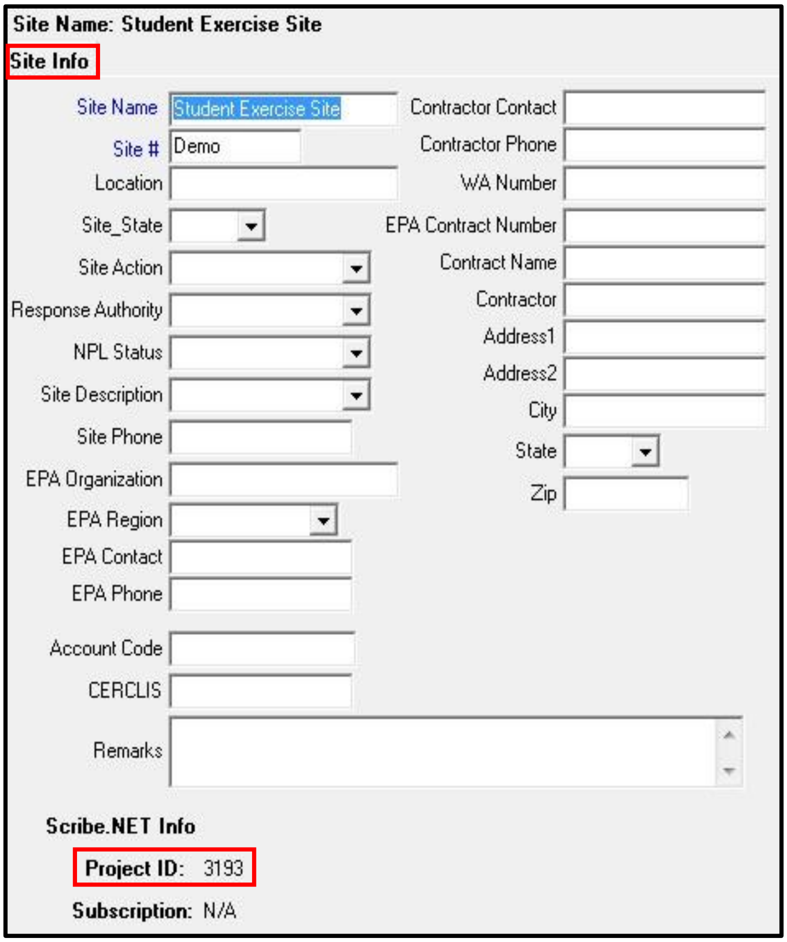


Click Publish. *Note: The password box is grayed out.* ***NO*** *password is required to publish a project to Scribe.NET*



Your project has now been Published to Scribe.NET. When a project has been Published, the project will be stamped with a ProjectID Number which can be located in the Site Info table in your Scribe project.

To request a Subscription, please email ertsupport@epa.gov with the Project ID.

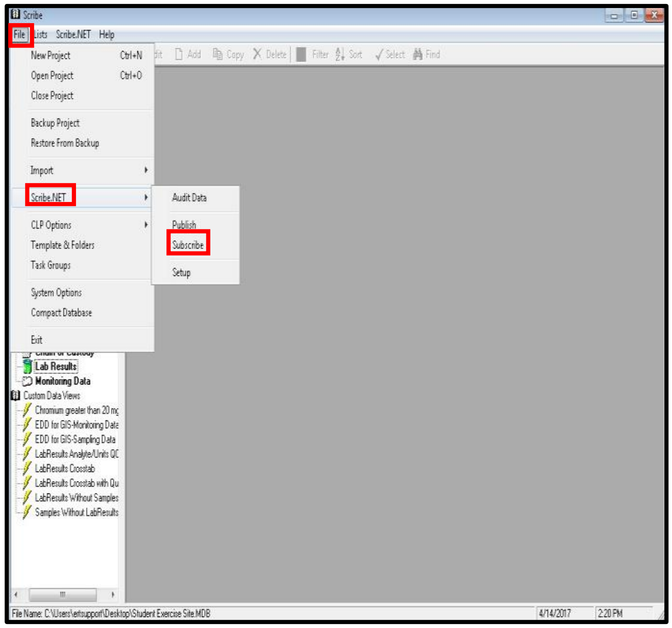


Subscribe to a Project

Subscribing/downloading a published project(s) from Scribe.NET requires a Subscription ID and password. To request a SubscriptionID and password, please contact **ERT Support at 1-800-999-6990 or via email at ertsupport@epa.gov.**

Note: There are several types of Subscriptions that can be setup (database subscription, multiple project subscriptions, etc**.). Please contact ERT Support at 1-800-999-6990 or email at ertsupport@epa.gov for additional information**

To Subscribe to a project from Scribe.NET, click on File | Scribe.NET | Subscribe

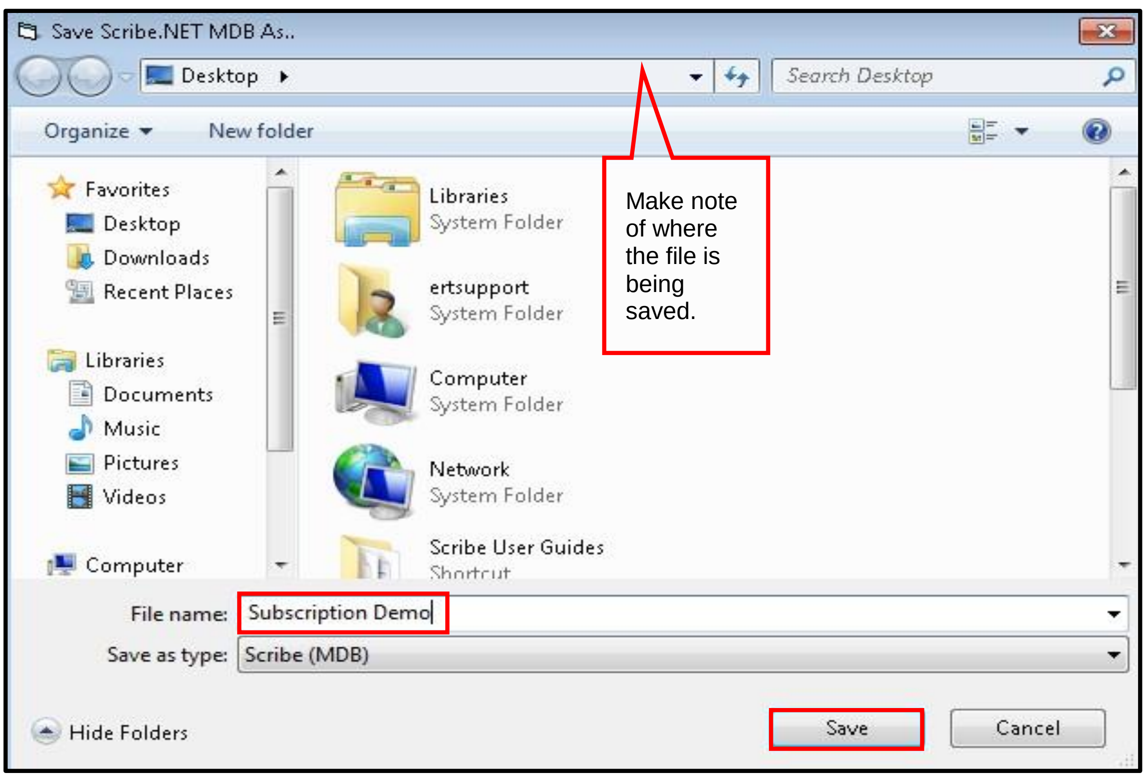


The Scribe.NET Subscriber Wizard screen is displayed. Click Next.

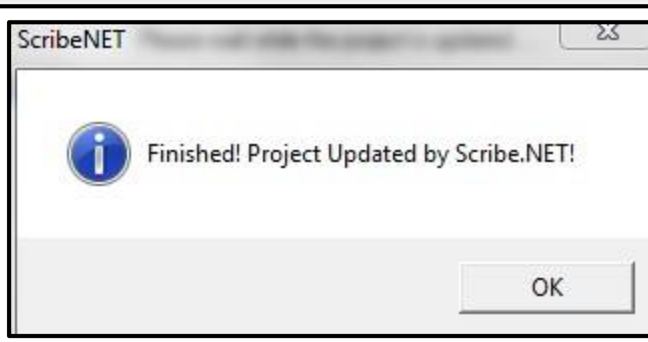
Enter the SubscriptionID and password. Click on the Subscribe button to begin downloading. **Note: You must have an Internet Connection to subscribe to a Scribe.NET project.**

First Time Subscribing

If this is the first time subscribing to this project, you will be prompted to enter a file name. Enter a filename and click Save.



Below are some screenshots of the Subscribing process

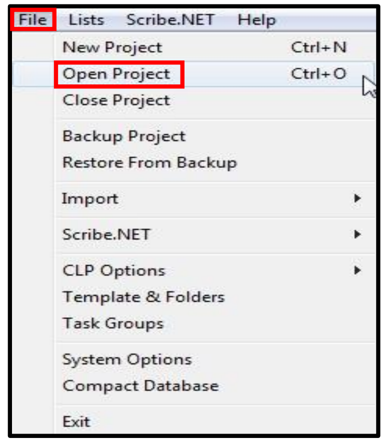


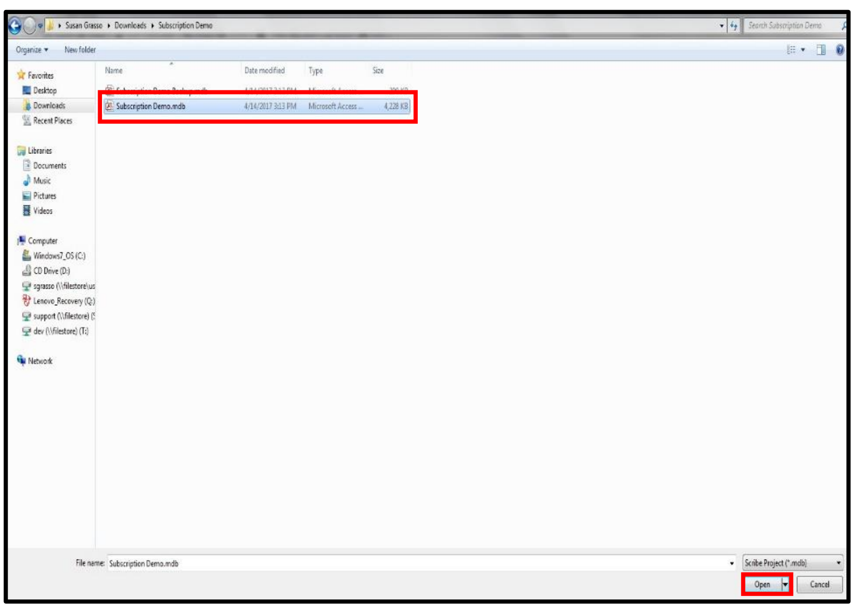
Updating Existing Subscriptions

When Scribe projects have been updated and republished to Scribe.NET, the subscription is automatically updated. A user must **re-subscribe** to update the existing local project file.

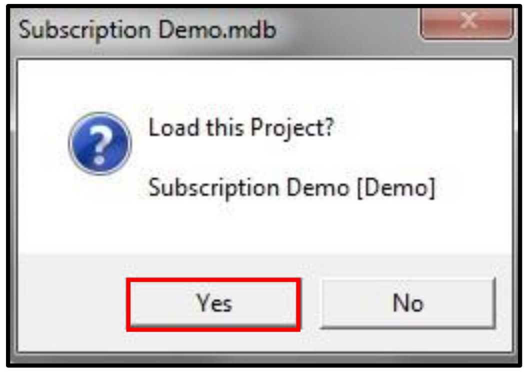
Prior to re-subscribing, open Scribe and **Open** the Scribe project that you will be updating/replacing.

File | Open Project. Browse to the project and Click Open

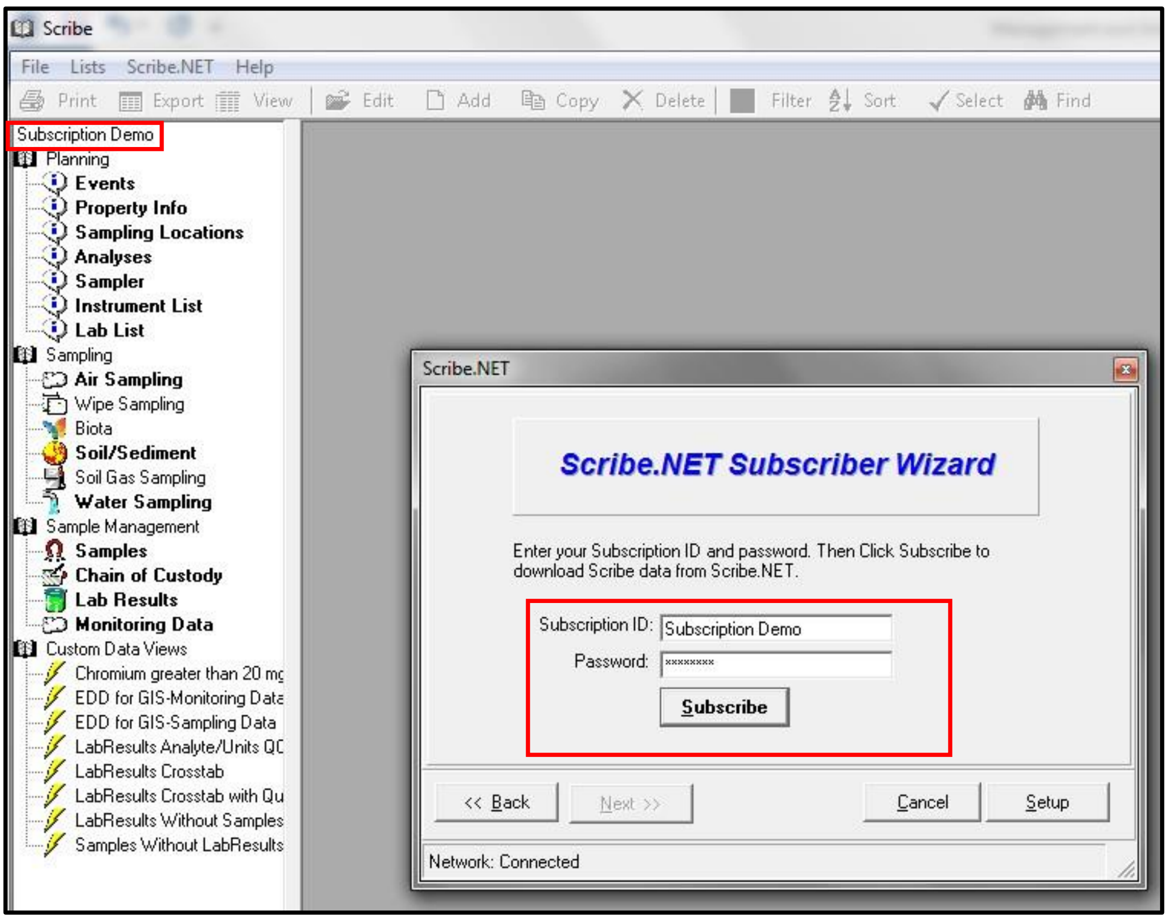




Click Yes to Load this Project.



Verify that you are in the project and click on File | Scribe.NET | Subscribe.
Enter the SubscriptionID and Password.
Click Subscribe.

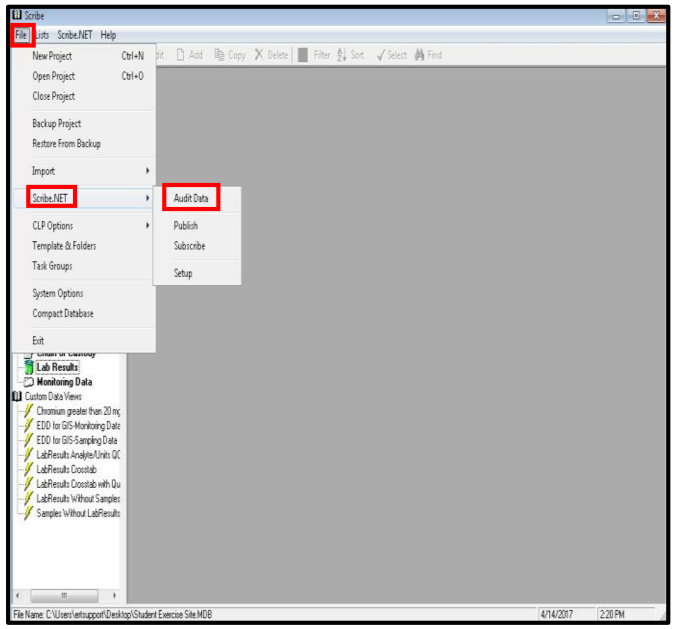


Audit Data

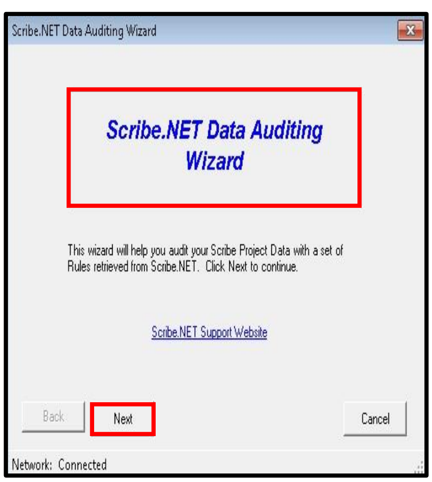
The data Auditor is a tool that allows you to audit the data in a Scribe project against a set of valid values. Valid Values can be established on a site specific basis, as a regionally based set or on a national level. Auditing is done by comparing the data in Scribe project to one or many 'rules'. A Scribe project can be audited against any set of rules uploaded to Scribe.NET. In order to audit a Scribe project, the Scribe project must be open in Scribe and the computer must have an active internet connection.

Please contact ERT Support at 1-800-999-6990 or ertsupport@epa.gov for additional information on creating an Auditor Ruleset. Users must have a working knowledge of creating queries in MS Access, as well as knowledge of the table names and field names in their Scribe Projects.

To Audit a Scribe project, click on File | Scribe.NET | Audit Data



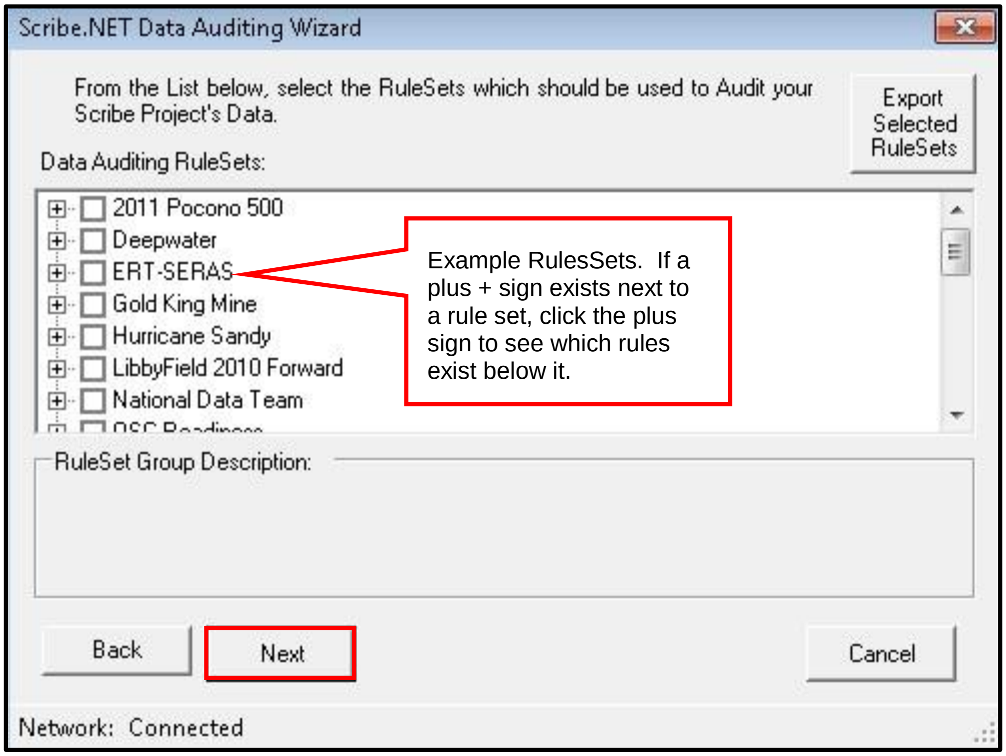
The Scribe.NET Data Auditing Wizard will display. Click Next. The RuleSets will begin downloading.

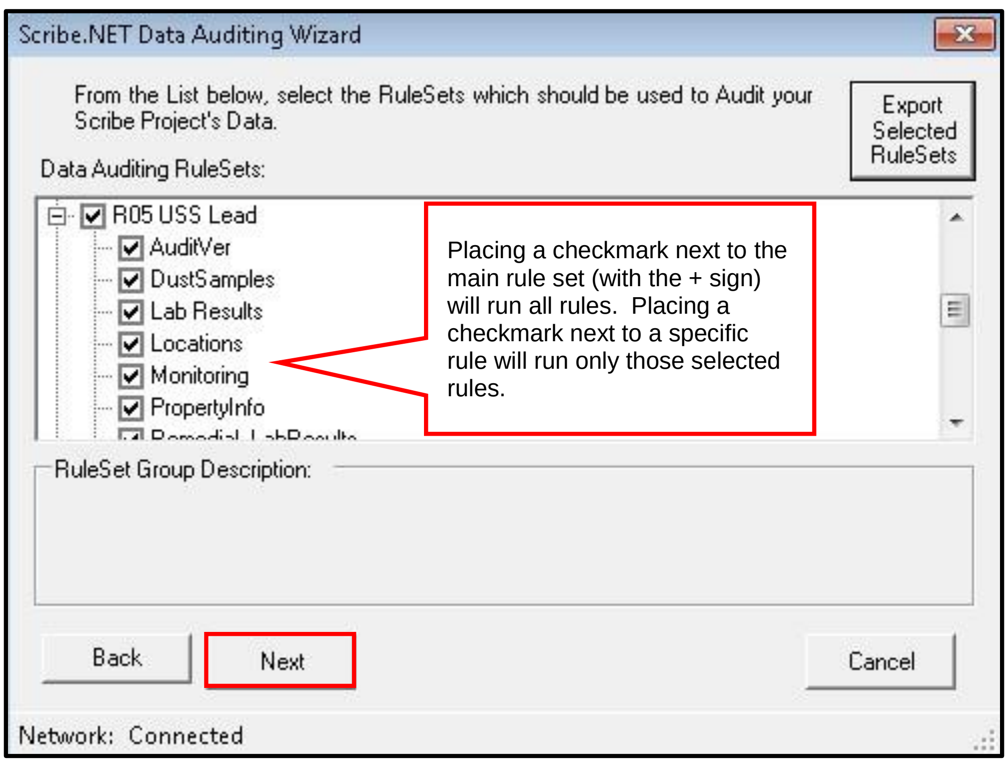


A list of all the RuleSets that have been uploaded to Scribe.NET will display.

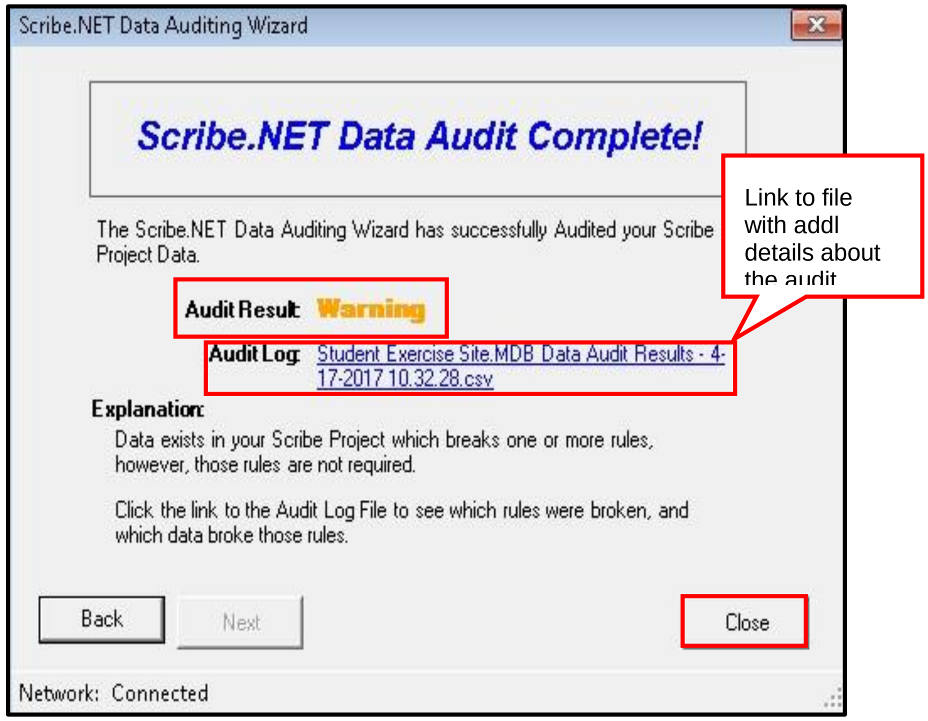
Select which RuleSet and which Rule(s) will be used to Audit your Scribe Project's Data.

Click Next.





When auditing is complete, a dialog box will display. This dialog box will indicate the error severity (Warning or Error) of any issues found and will provide a link to a file containing additional details about the audit results.



Note: *The error severity determines if a Scribe project can be published to Scribe.NET. An Audit Result of Warning indicates that some records don't meet the data requirement, but* ***can*** *be published to Scribe.NET.*

An Audit Result of Error indicates that some records don't meet the data requirements and ***cannot*** *be published to Scribe.NET until the issues are corrected.*

Scribe.NET Data Audit - 4/17/2017 10:50:02 AM

ProjectFilePath: C:\Users\sgrasso.CAMELOT\Downloads\Subscription Demo\Subscription Demo.mdb

Auditing Data Against RULESET "[551]Location Table" - RULE "[3725]Location_Lat_Long_Blank":
Warning: The following records do not contain Latitude and/or Longitude

LocationII	Site_No	Location	PropertyII	LocationD	LocationZ	Latitude	Longitude	Altitude	GPS_PDOI
21	Demo	B1							
22	Demo	B2							
23	Demo	B3							
24	Demo	B4							
25	Demo	B5							
6	Demo	NE Fence Line							
7	Demo	NW Fence Line							
8	Demo	SE Fence Line							
9	Demo	SW Fence Line							

Example of data not containing a Latitude and/or Longitude. These records don't meet the data requirements.

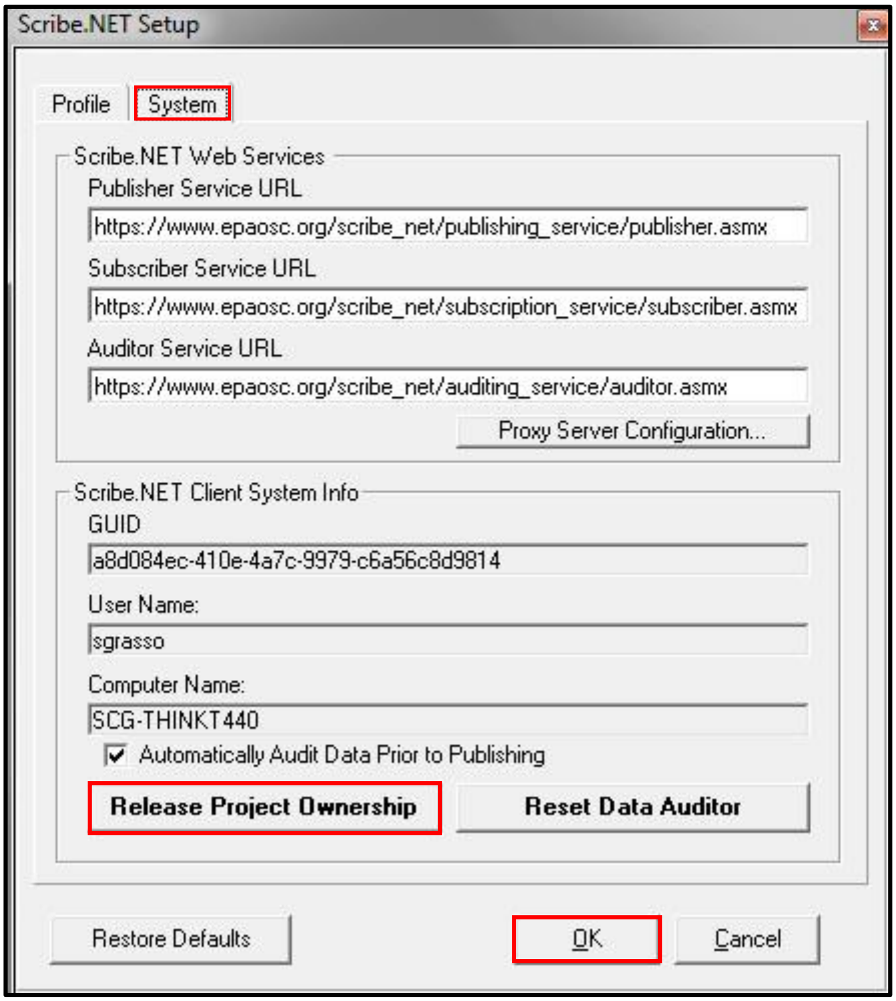
Auditing Data Against RULESET "[552]Samples Table" - RULE "[3726]Samples_Matrix_Blank": Data OK.

Example of how data is displayed in the audit report

Release Project Ownership

Once a Scribe project has been published to Scribe.NET, the computer it was published from becomes the 'owner' of the project. Any subsequent publishing of the project must be done from that computer. In the event the computer is damaged or the owner is no longer responsible for the project and publishing, ownership will need to be released.

Click on File | Scribe.NET | Setup. Click on the System tab. Click on Release Project Ownership.



***Note:** If Project Ownership cannot be released from the computer, please contact ERT Support at 1-800-999-6990 or email at ertsupport@epa.gov.*

ERT

MANAGEMENT AND ADVANCED FEATURES

Part 3

SCRIBE v3.10

Contents

PART 3 - MANAGEMENT FEATURES & ADVANCED FEATURES

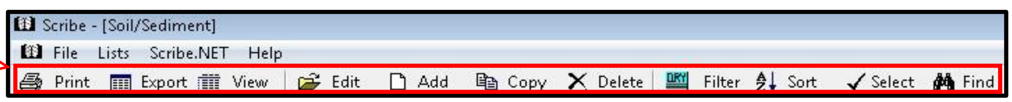
The information presented in this section describes the advanced functionality of Scribe. This section will address importing data (e.g. lab results), using the common controls (sorting, filtering), creating custom labels and grid layouts, Custom Tasks (MS Access Tables) and Custom Data Views (MS Access queries). Custom Templates, Custom Tasks and Custom Data Views will require that the user is familiar with MS Access and working the MS Access database tools on a live database.

Common Controls - Toolbar

Scribe has many features that offer convenient ways to manage and update records and files. They are also convenient when you want to display specific data in a specific format (i.e. reports). The following information will be discussed using the 'Samples' and 'Lab Results' screens as examples, but applies to most Scribe screens.

Some features and controls available on the toolbar work the same as those in the Grid Controls (right-click option). These features include Print, Export, View, Edit, Add, Copy, Delete, Filter Sort and Find.

Toolbar Controls



Print

The Print feature offers several printing options:

- Preview – Preview your current grid view
- Page Setup – Change your page setup, margins, orientation
- Print – Print the current grid view to a printer
- Export – Grid data can be exported and then used in other applications for reporting, mapping or modeling. Scribe supports several standard data formats. Choices for exporting include .txt, .csv, .html, .xml file formats. ***NOTE:*** *When working in the Chain of Custody (COC) section, there is an additional export option of COC .xml. This option is required when exporting CLP COC files to be uploaded to the Sample Management Office (SMO) Portal. See User Manual for Scribe CLP Sampling.*
- Labels – Can print standard mailing labels (e.g. if Property Info is captured, standard mailing labels with property information can be created from this print feature)
- Worksheet – Can be used to create Worksheets (e.g. Sample Receipt Worksheet and Sample Weight Log reports)

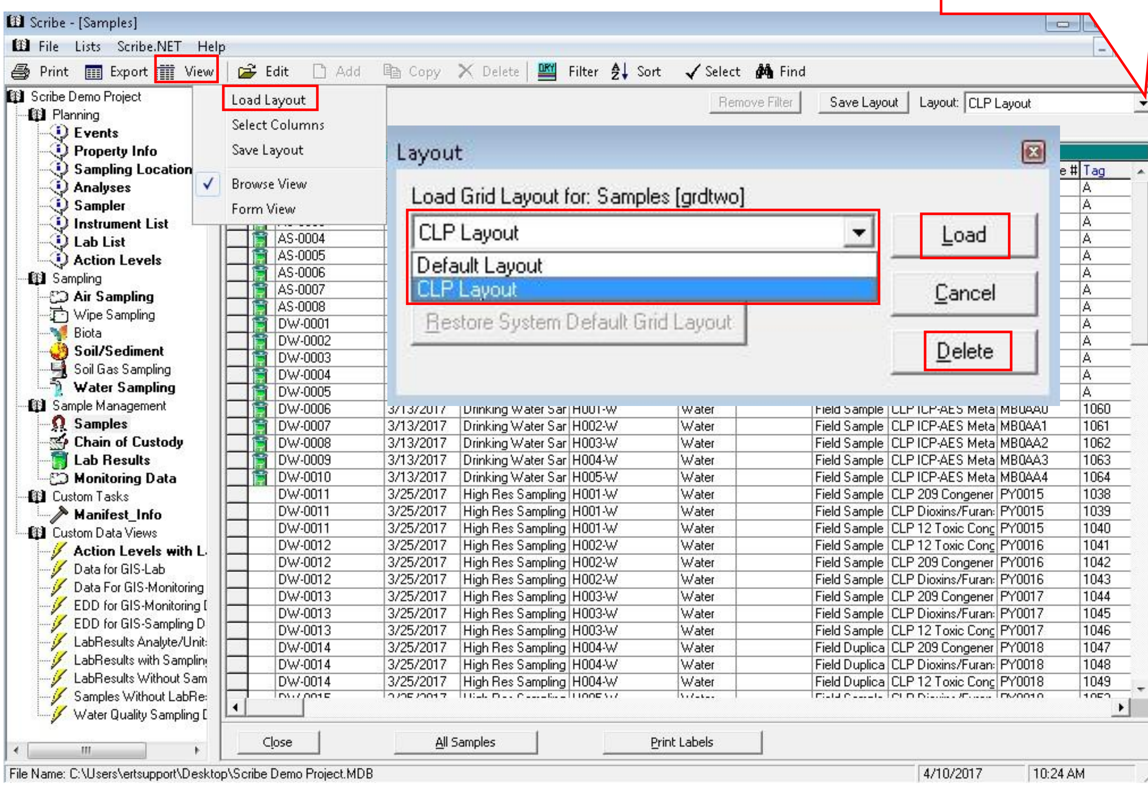
View

Depending on which section of the Navigation Pane you are in, there are a default view of columns (column headings) exposed in the grid. Under the ‘View’ option on the Toolbar, you can:

Load Grid Layout

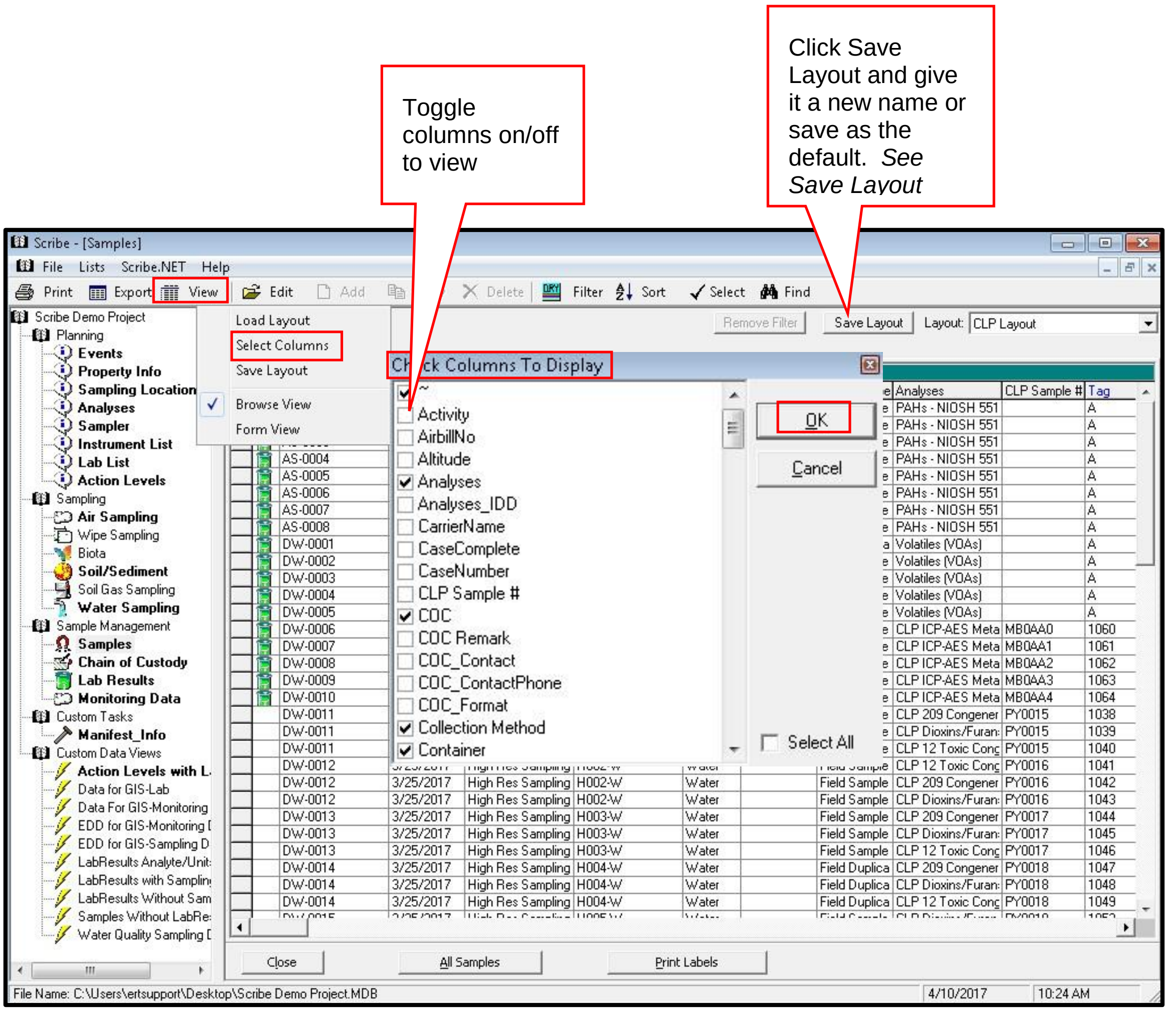
When Scribe is installed, there are two (2) Layouts: Default Layout or CLP Layout. The ‘View’ of the layout is determined when first creating the Scribe project. If CLP is NOT selected as the project type, the layout will be set to Default. Changing the layout is very easy and can be done from the View | Load Layout or by clicking on the down arrow at the top of the grid. Once new Layouts have been created, they will be available.

Layouts can also be loaded and/or saved as new layouts. *See Save Layout*



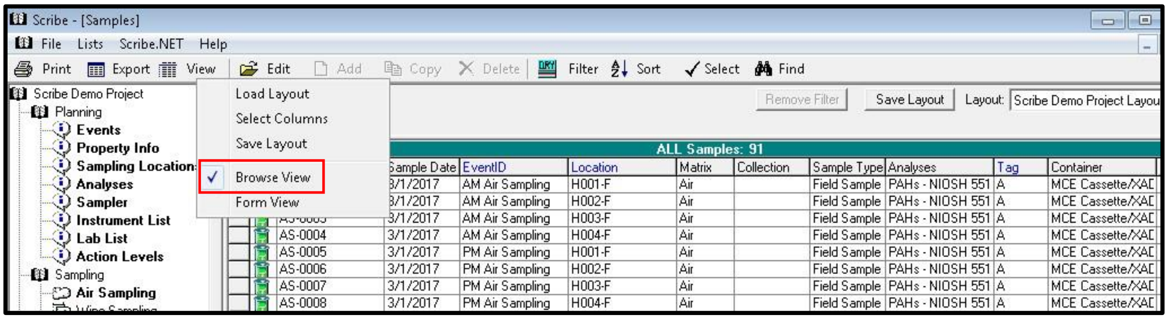
Select Columns

By default certain columns are turned on in the grid view. Columns can be turned on/off, moved and viewed differently on the grid and specific layouts can be saved.



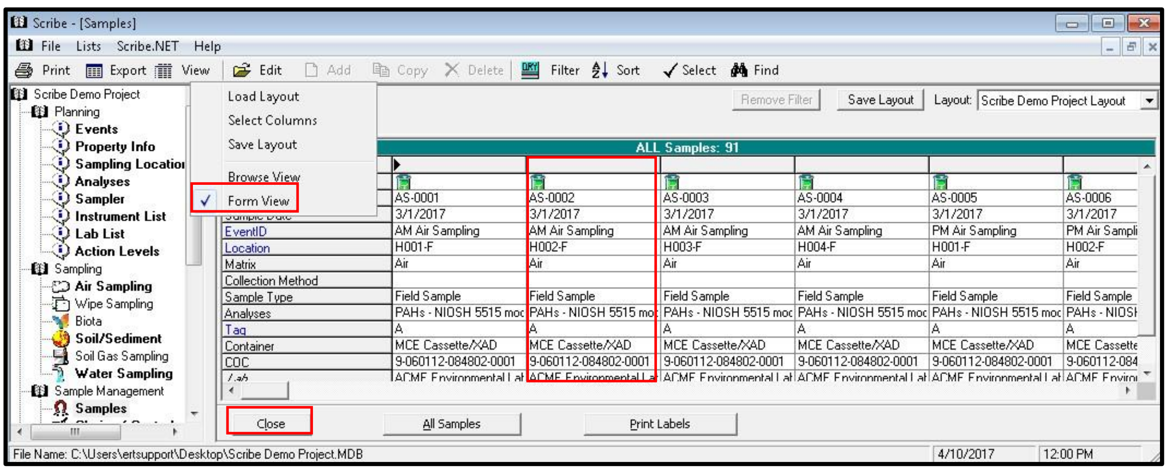
Browse View

The Browse View shows the samples in row format (default view)



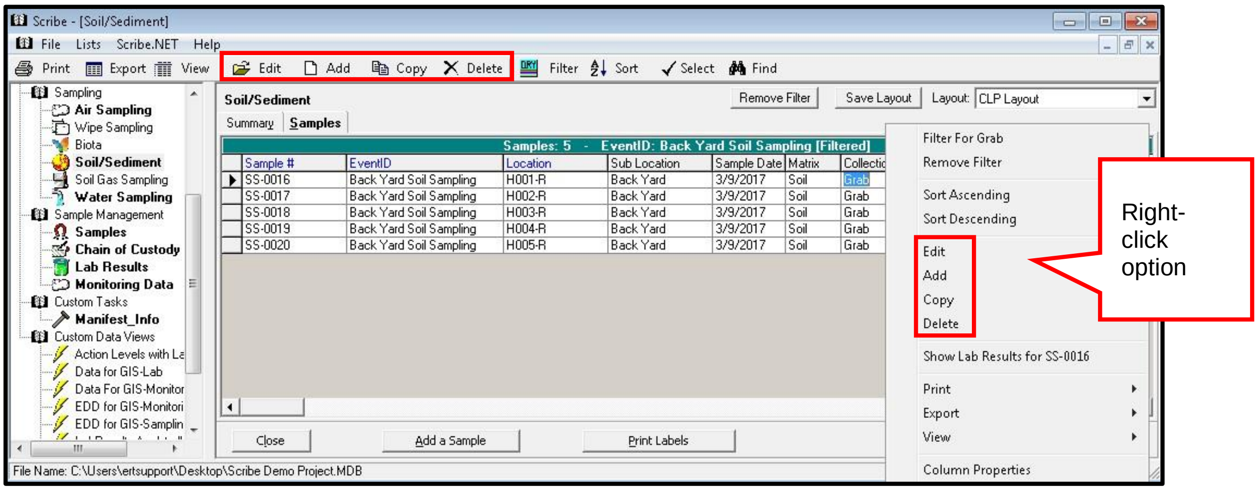
Form View

The Form View allows you to view each sample in column format. To return to the Browse View, click on Close.

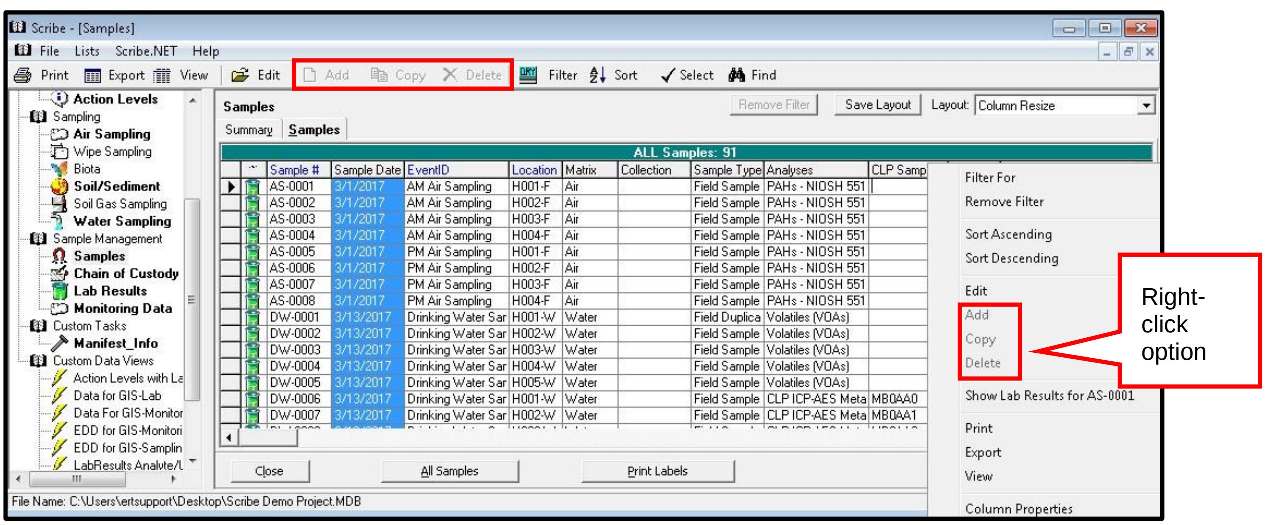


Edit, Add, Copy and Delete

The Edit, Add, Copy and Delete controls are only available on the Toolbar and right-click feature when you are working in the individual sampling tasks (e.g. Air, Soil/Sediment, Water). They can be used when editing, adding, copying or deleting samples, analyses, events, etc.

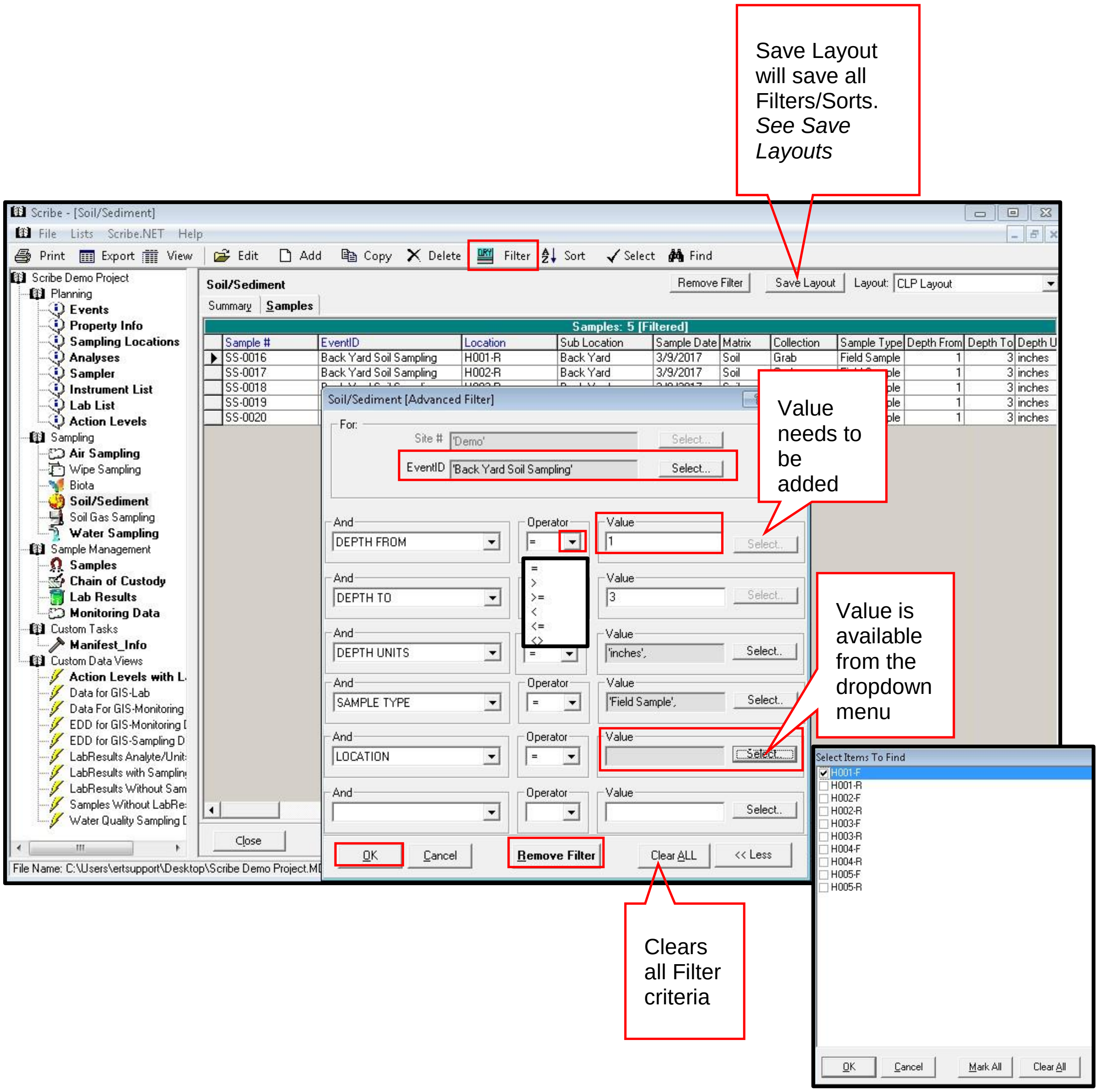


The Add, Copy and Delete controls are **not** available options under Sample Management | Samples.



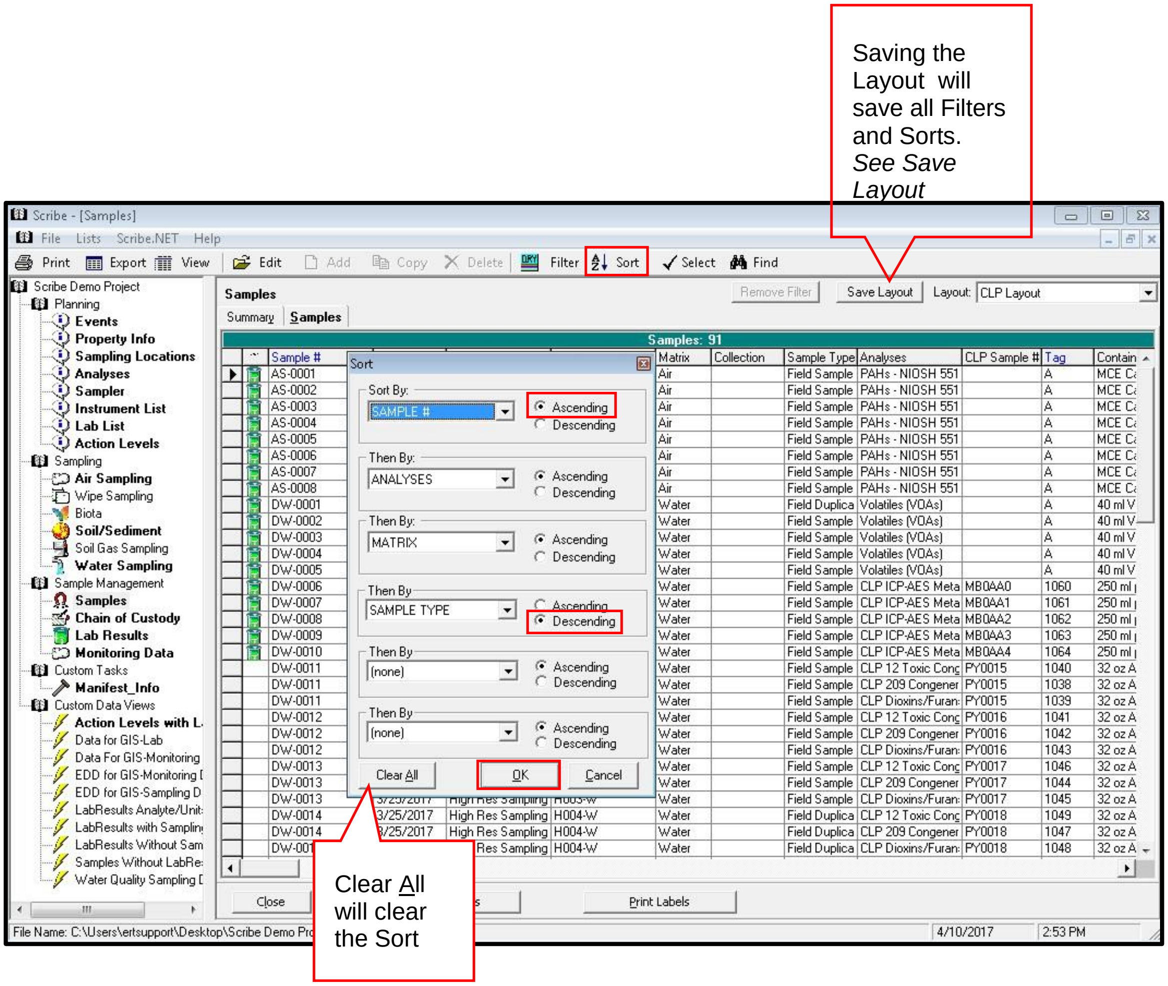
Advanced Filter

The ‘Filter’ on the toolbar offers a more advanced filter for up to six (6) fields. In this example, we are filtering for the Back Yard Soil Sampling EventID. Numerous filtering options are available using dropdown menus and select buttons. Select as many fields as needed and click OK. If the Select button is grayed out, you will need to enter a value. If the Select button is highlighted, a dropdown is available to select the field(s) in the Scribe project that need to be filtered.



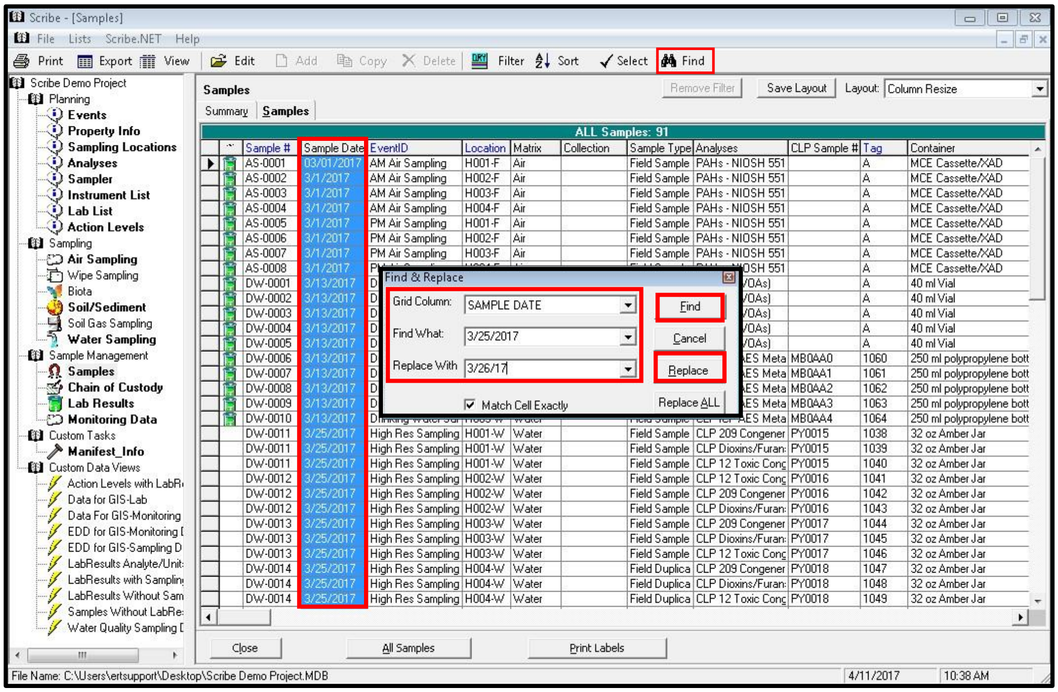
Advanced Sort

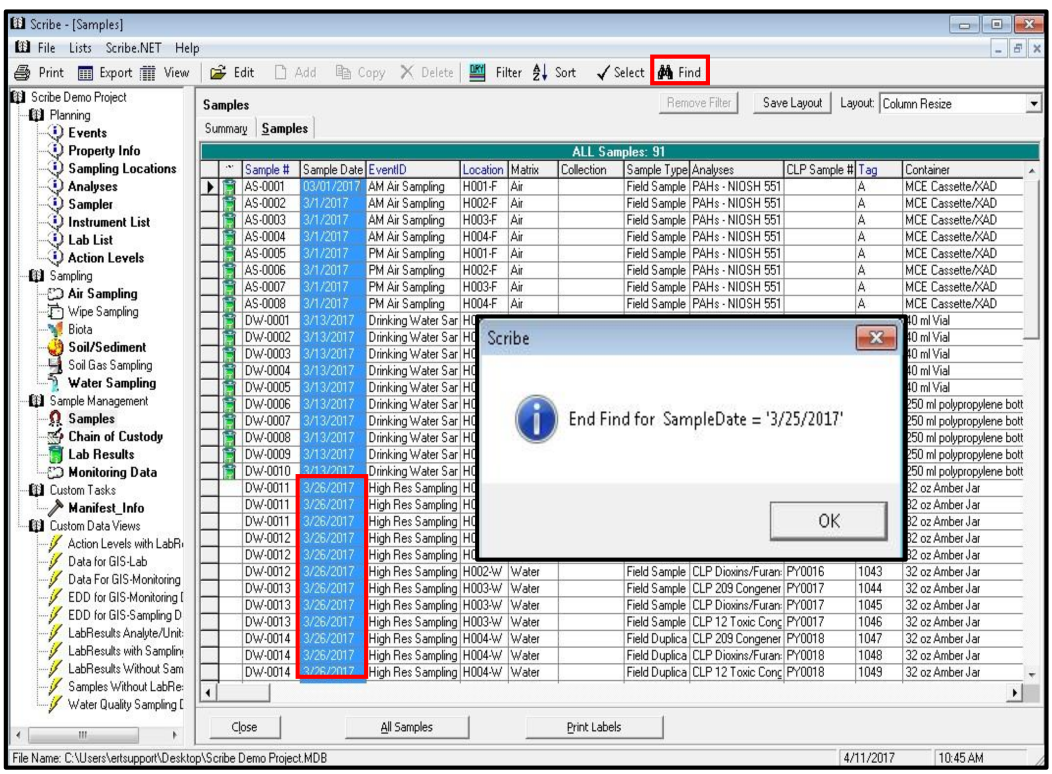
The ‘Sort’ on the toolbar opens a more advanced Sort window. The advanced feature offers a more advanced sort for up to six (6) fields. In this example, we are sorting by Sample #, Analyses and Matrix **Ascending** and Sample Type **Descending**. Select as many fields as needed and click OK.



Find and Replace

Use the Find and Replace feature in Scribe (similar to Excel) to search for something in your project, such as a particular sampling date, and replace it with another value.

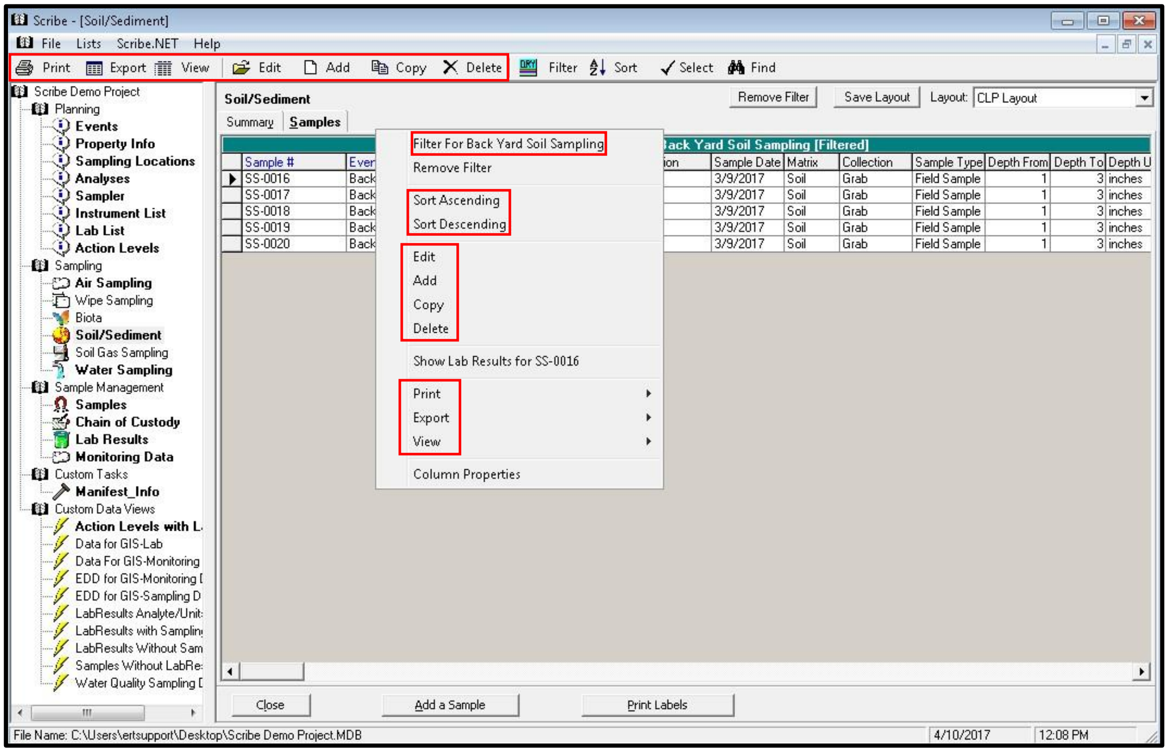




Common Controls – Right-Click

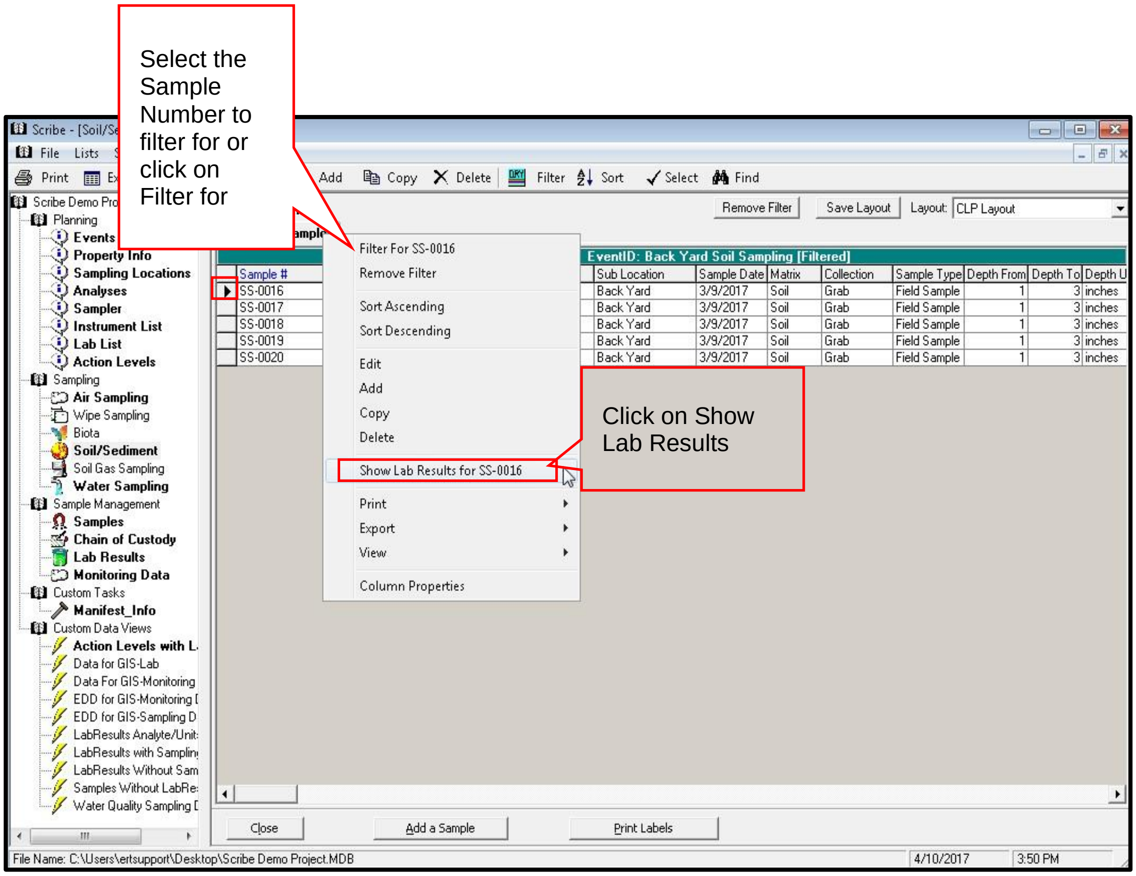
Some features and controls available on the toolbar work the same way as those in the Grid Controls (right click in the Grid). These features are **Edit**, **Add**, **Copy**, **Delete**, **Print**, **Export** and **View**.

The **Filter** and **Sort** feature on the Grid provides a simplified Filter and Sort. For example, the grid filter allows you to filter on one item (i.e., Back Yard Soil Sampling) and the Sort only allows for Ascending or Descending.



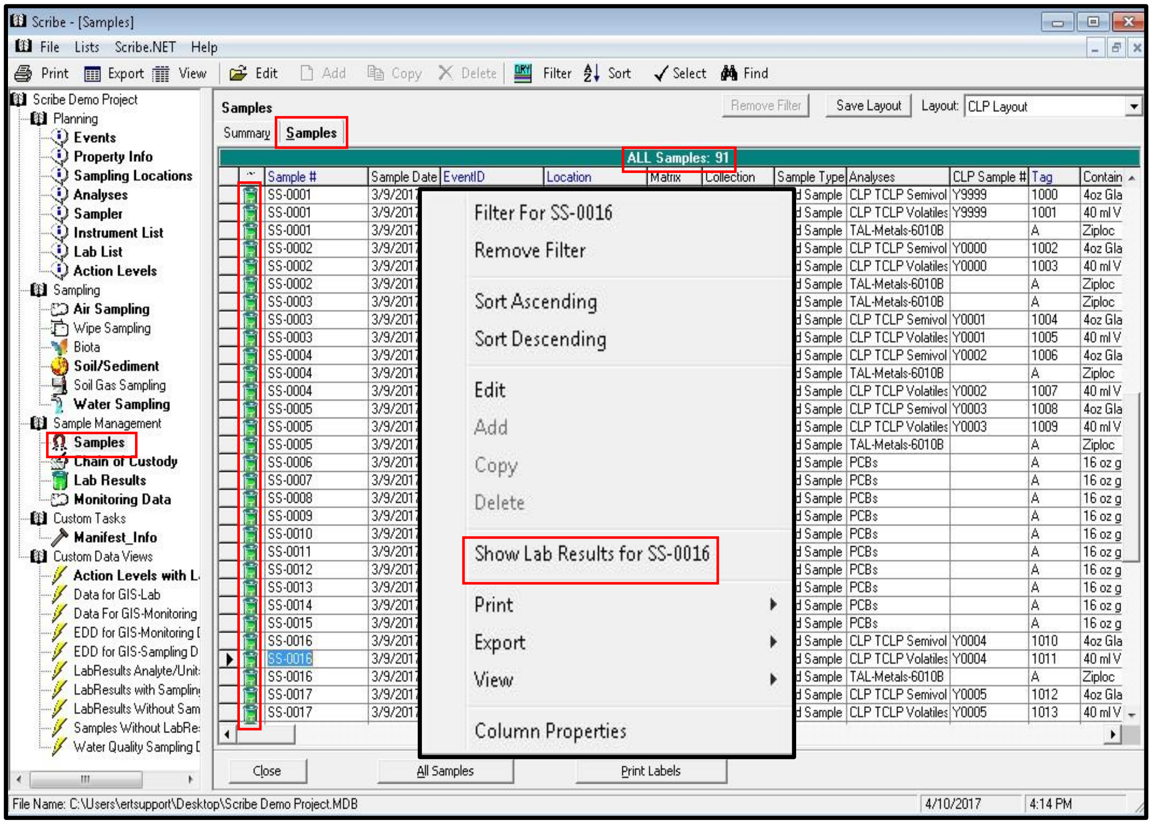
Right-Click Options in the Sampling sections

To show any **Lab Results** for a particular sample using the right click option, right-click a sample and selecting Show Lab Results, the Lab Results section of Scribe will be displayed and the results will be filtered for any Lab Results pertaining to the selected sample number.

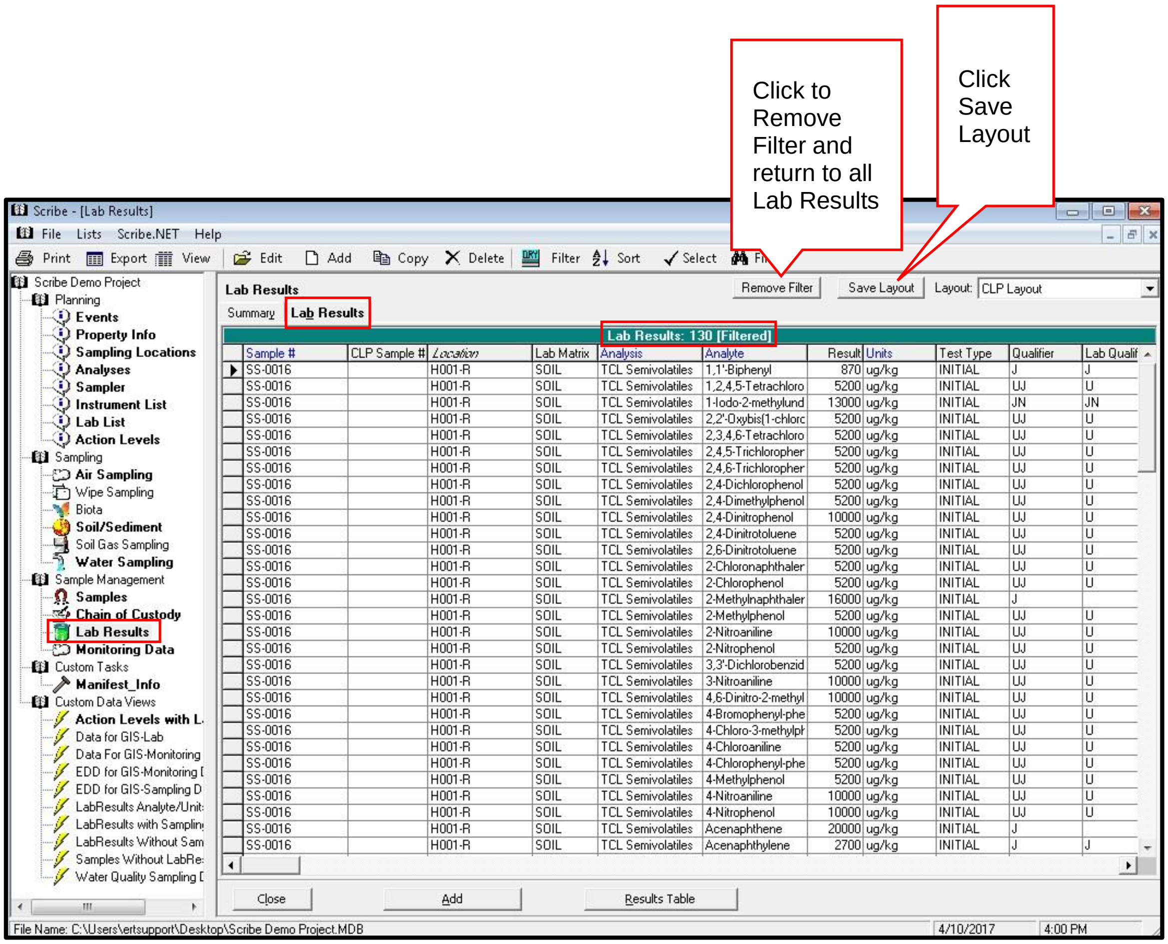


Filtering for Sample SS-0016 Under Sampling Task (Soil/Sediment)

Under Sample Management | Samples - a green beaker next to the Sample # indicates that the sample has lab results data.

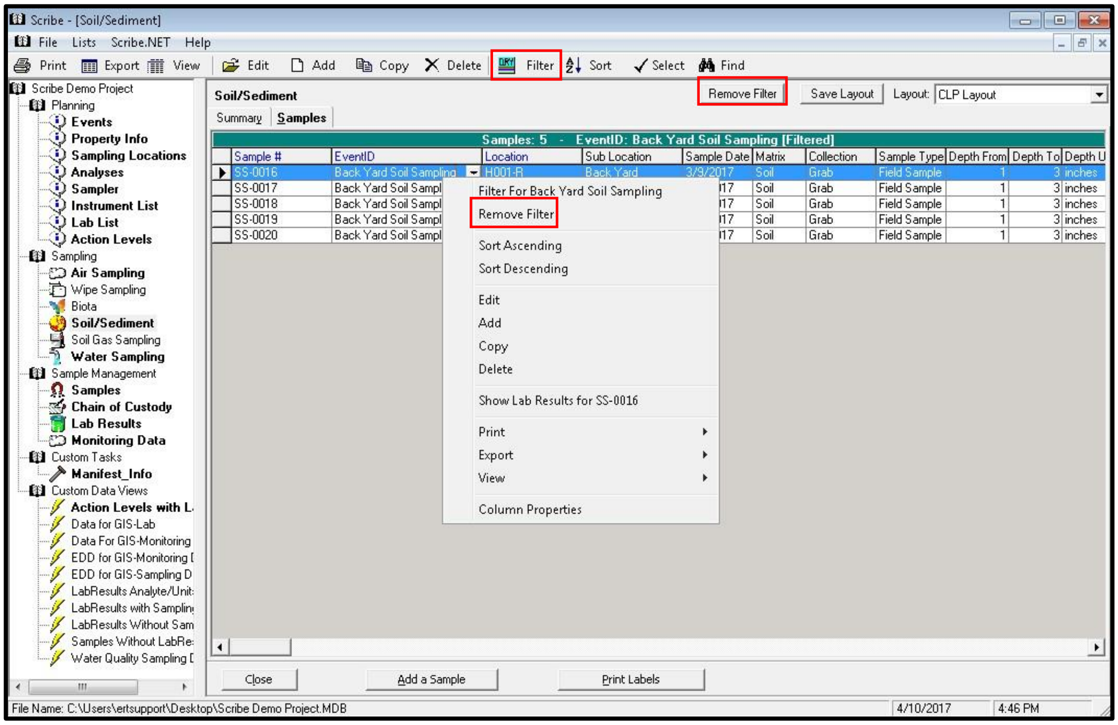


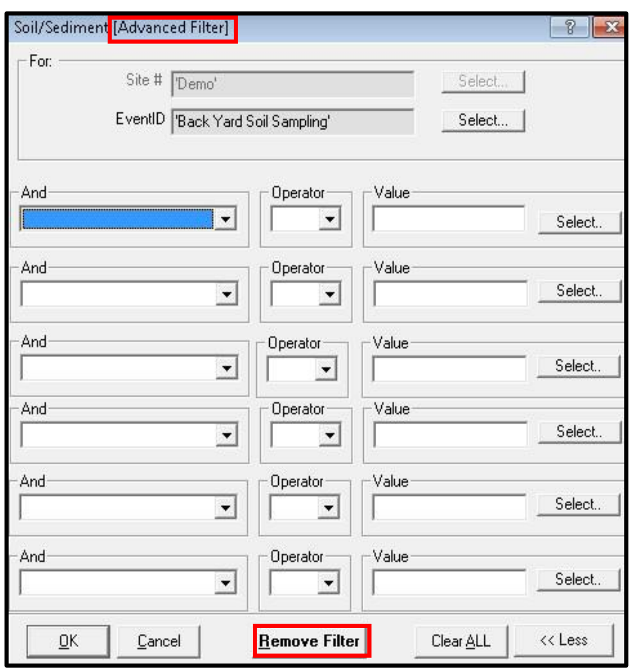
When in the Lab Results table, additional Filters and Sorts can be done. New Layouts can be created and saved.



Remove Filters

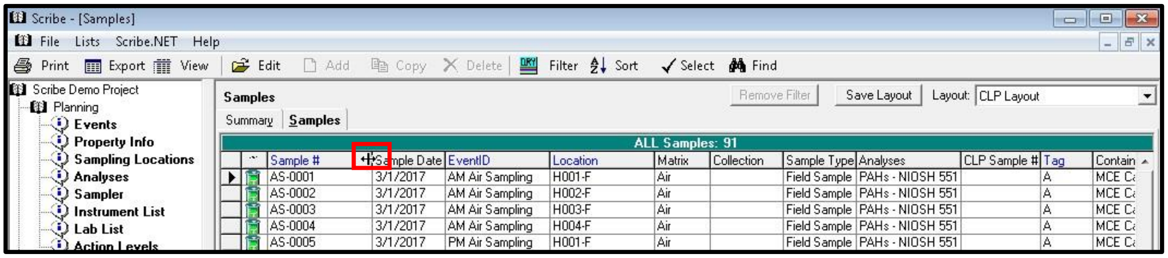
When working with the data and applying Filters, it is important to **Remove** any filter that has been applied to get back to your full data set. There are three (3) ways to remove a filter from the Grid View clicking on Remove Filter, right-clicking and select Remove Filter, or by clicking on the Filter button and click Remove Filter.



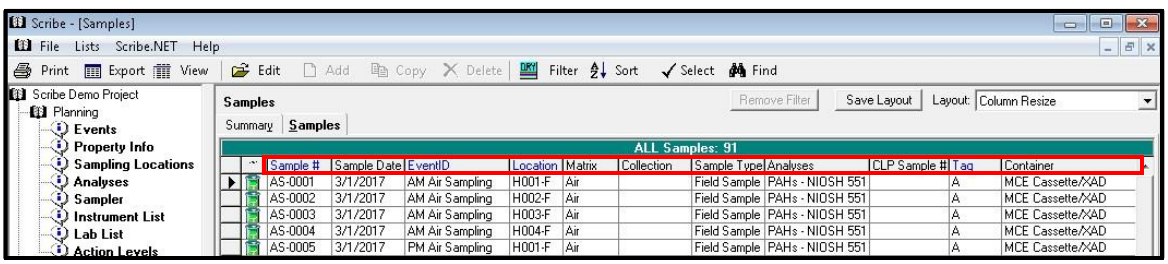


Column Resizing

To resize the columns in the Grid (similar to resizing columns in Excel), hover the mouse between columns to expose a double-sided arrow . Drag the double-sided arrow (left or right) to adjust the column width. The resizing of columns can be saved with Layouts.



Example prior to resizing



Example after resizing

Create Layouts

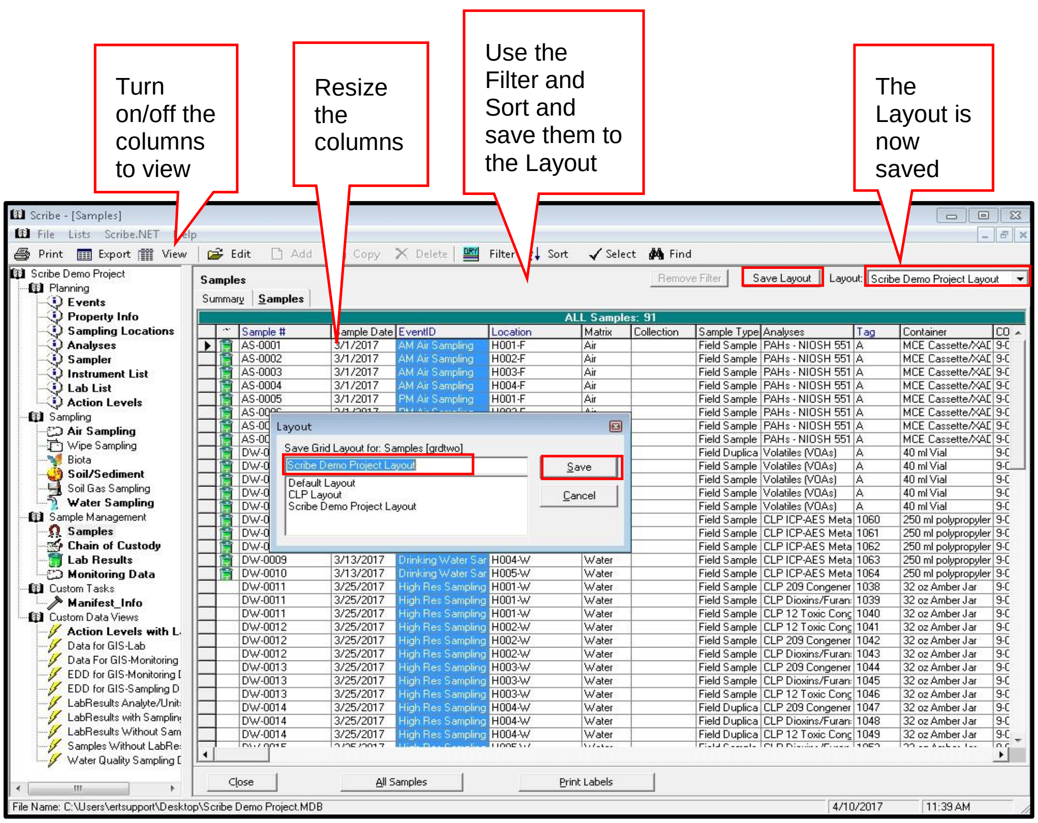
In Scribe, you can create and customize Grid Layouts and Label Layouts. These custom layouts can then be imported into new Scribe projects or be made part of a custom Template for use in future projects.

Grid Layout

Scribe is loaded with two (2) default layouts with certain fields displayed on the grid (Default and CLP). They are also sorted in a specific order.

There are many fields that are available to view/display in the various sections of Scribe (Planning, Sampling, Sample Management). Prior to saving the layout, format the grid by turning columns on/off and providing any filter or sort order required.

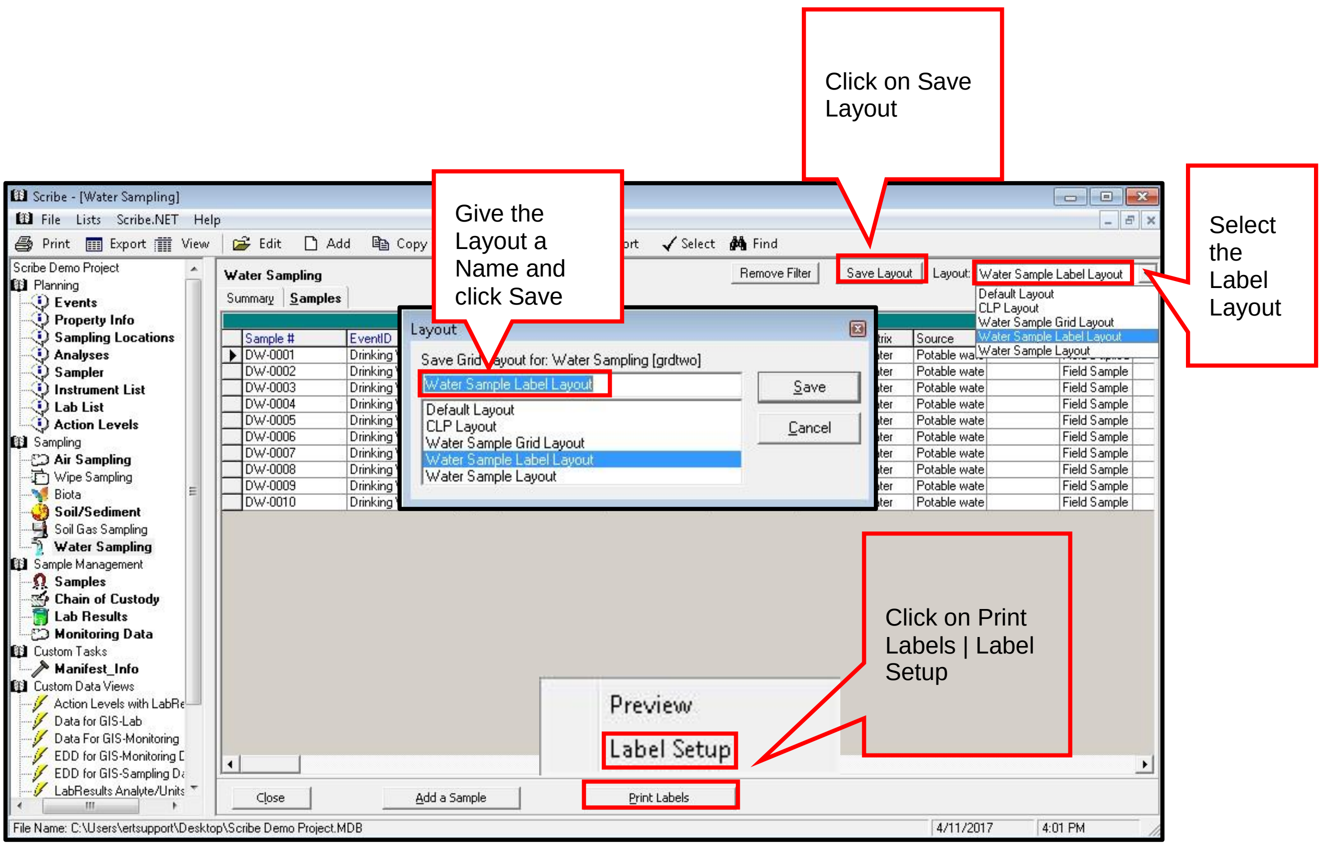
When the grid is formatted, select View | Save Layout from the toolbar or click on Save Layout on the grid. Provide a name for the grid layout and click the Save button. ***Note: Layouts are only saved to the section of Scribe you are in. For example, if you are creating a layout under the Samples section, that layout is only available in that section. Many Layouts can be created.***

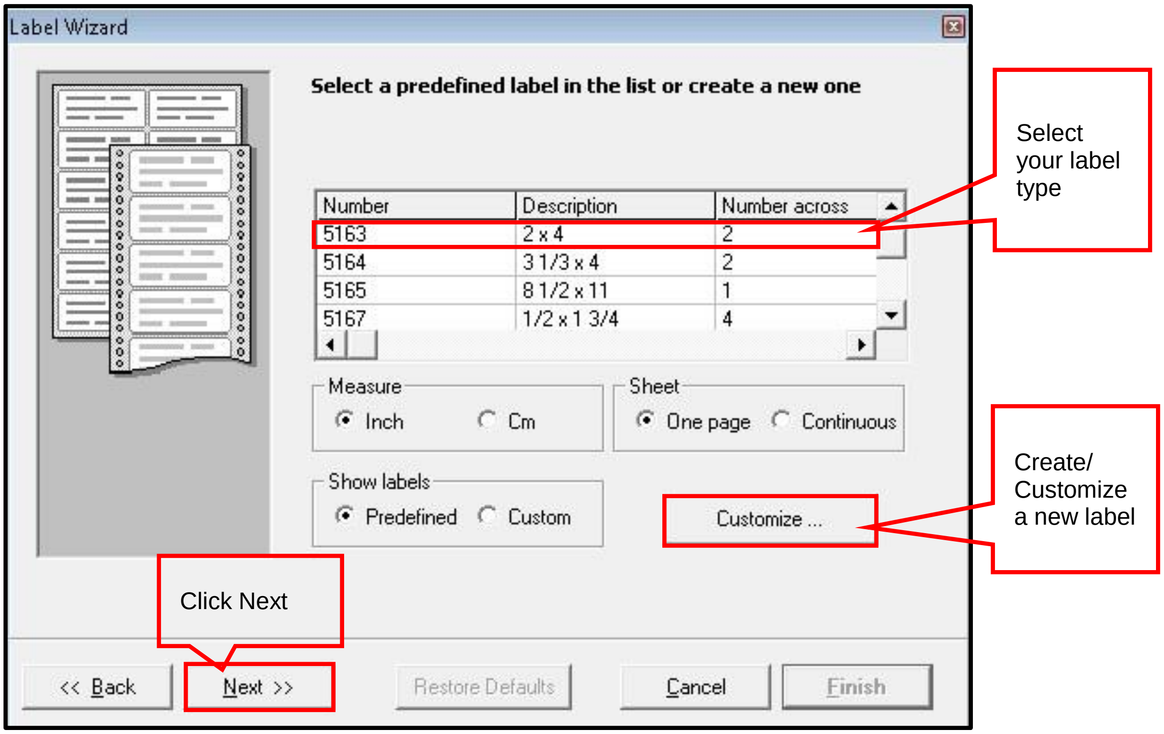


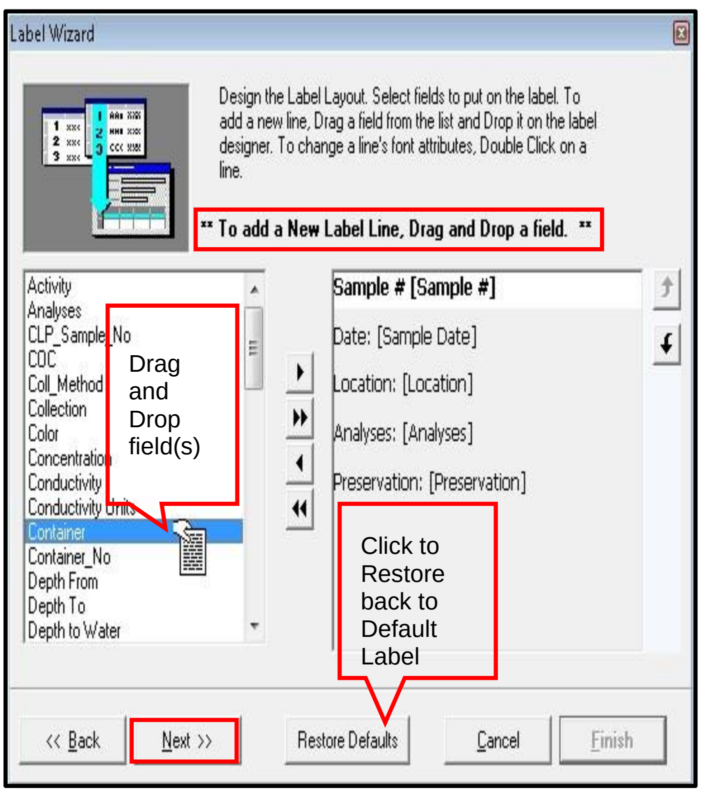
Label Layouts

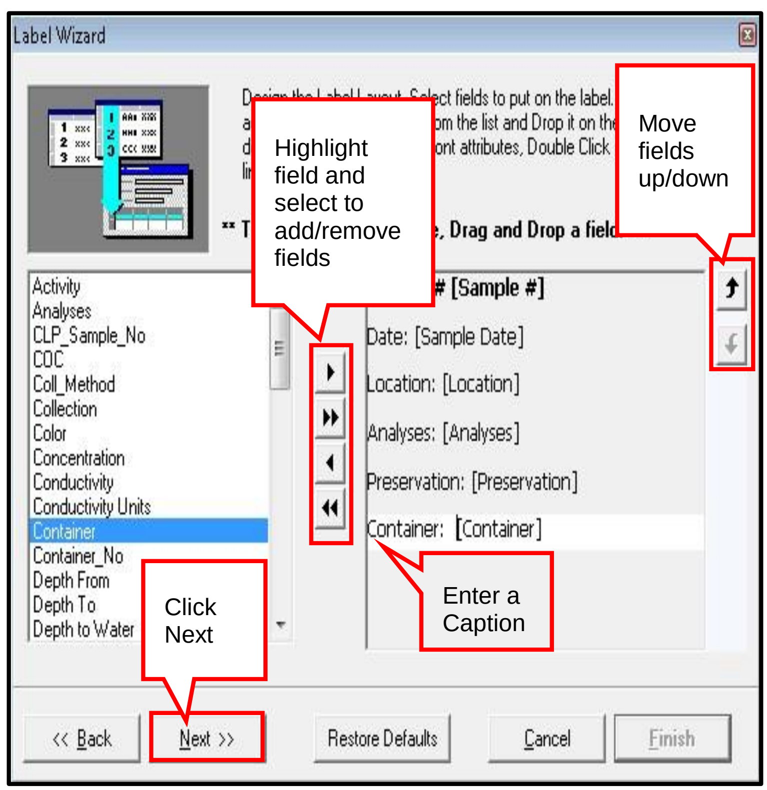
For each of the default layouts in the Samples and Sample Management sections, a default label exists. This label can be modified if necessary. Also, new custom labels can be created if you want to maintain the default label options.

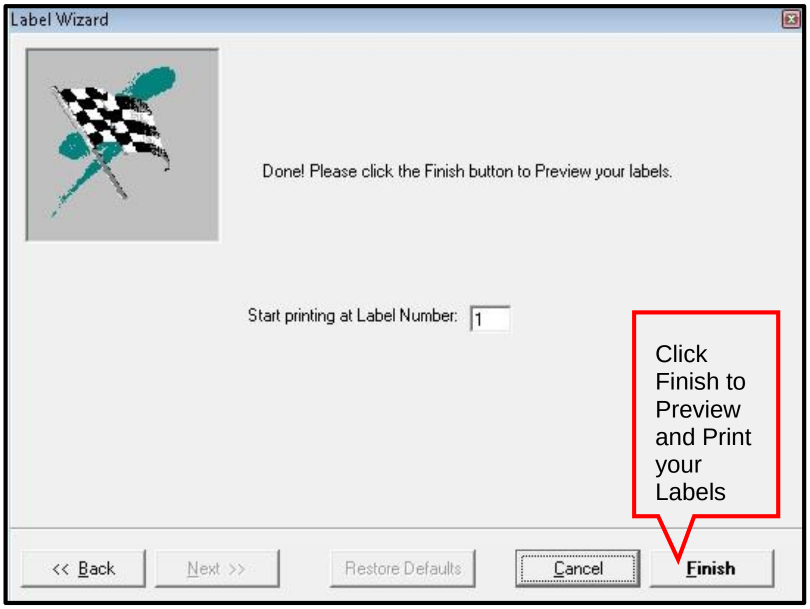
Prior to creating a Label Layout, you must first save a new Grid Layout. Labels are tied to grid layouts. Once you save a new grid layout, labels for that layout can be configured from the Print Labels button. Once the fields have been selected, that Label Layout will be available any time you select the custom grid layout it was designed under. ***Note:*** *Layouts are only saved to the section of Scribe you are in. For example, if you are creating a Label layout under the Samples section, that layout is only available in that section.*

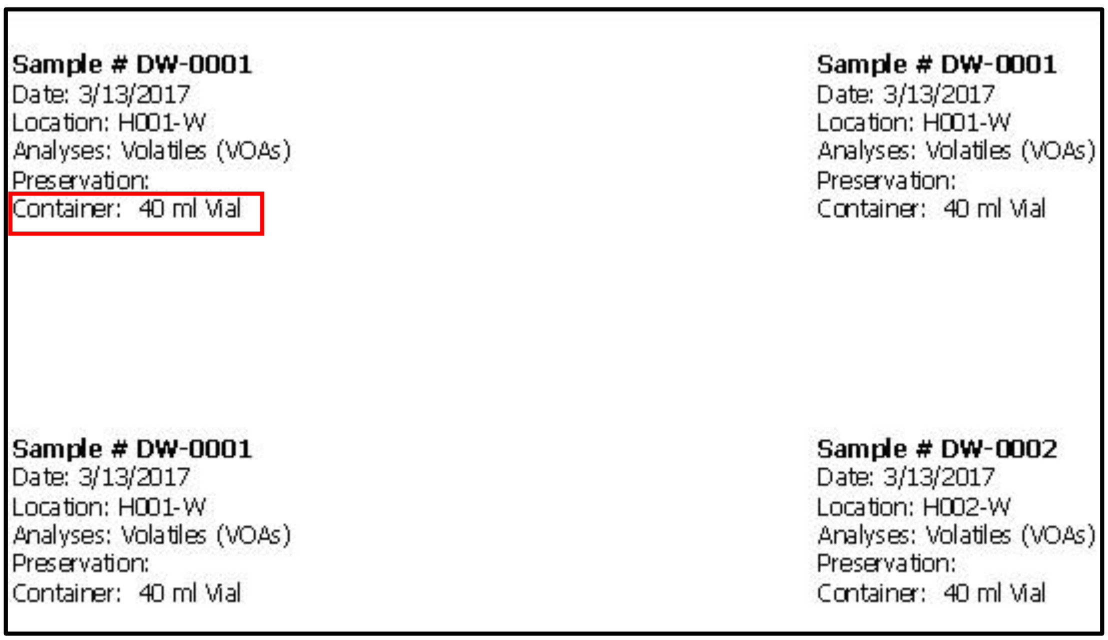



Label Wizard
Select a predefined label in the list or create a new one
Number | Description | Number across
5163 | 2 x 4 | 2
5164 | 3 1/3 x 4 | 2
5165 | 8 1/2 x 11 | 1
5167 | 1/2 x 1 3/4 | 4
Measure
Inch
Cm
Sheet
One page
Continuous
Show labels
Predefined
Custom
Customize ...
<< Back
Next >>
Restore Defaults
Cancel
Finish
Select your label type
Create/ Customize a new label
Click Next


Label Wizard
Design the Label Layout. Select fields to put on the label. To add a new line, Drag a field from the list and Drop it on the label designer. To change a line's font attributes, Double Click on a line.
** To add a New Label Line, Drag and Drop a field. **
Activity
Analyses
CLP_Sample_No
COC
Coll_Method
Collection
Color
Concentration
Conductivity
Conductivity Units
Container
Container_No
Depth From
Depth To
Depth to Water
Sample # [Sample #]
Date: [Sample Date]
Location: [Location]
Analyses: [Analyses]
Preservation: [Preservation]
Drag and Drop field(s)
Click to Restore back to Default Label
<< Back
Next >>
Restore Defaults
Cancel
Finish


Label Wizard
Highlight field and select to add/remove fields
Move fields up/down
Activity
Analyses
CLP_Sample_No
COC
Coll_Method
Collection
Color
Concentration
Conductivity
Conductivity Units
Container
Container_No
Depth From
Depth To
Depth to Water
[Sample #]
Date: [Sample Date]
Location: [Location]
Analyses: [Analyses]
Preservation: [Preservation]
Container: [Container]
Enter a Caption
Click Next
<< Back
Next >>
Restore Defaults
Cancel
Finish





Custom Label Layout Preview

Custom Import

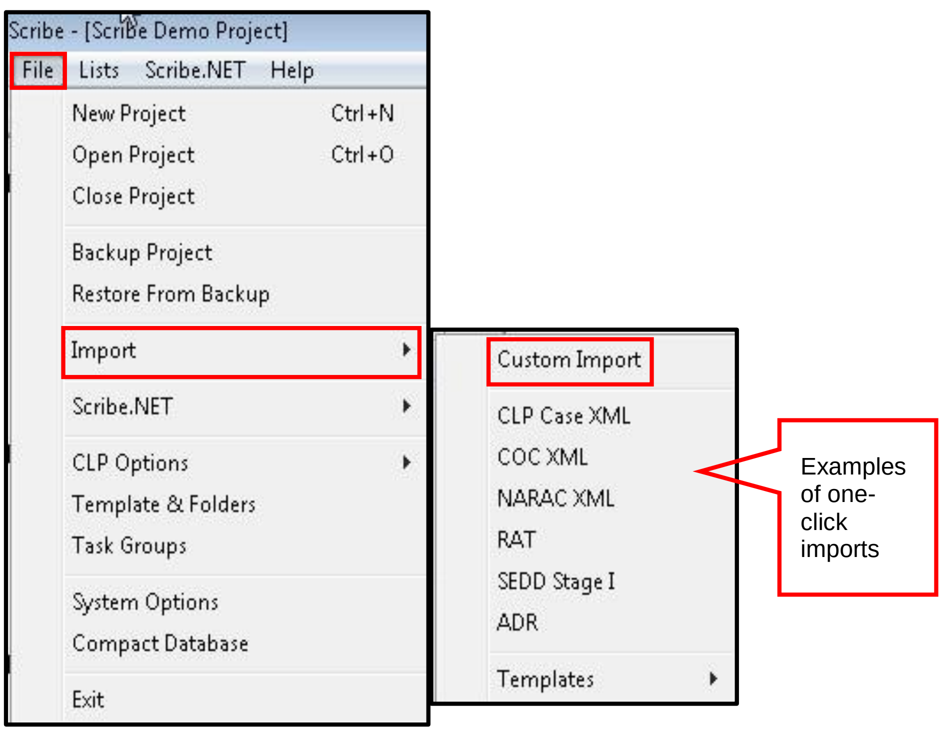
The File Menu contains several of the features described above. This section will address some of the more advanced features included with Scribe.

Import a File

Scribe supports importing of data to facilitate data entry. Rather than re-typing data into Scribe from another source (e.g., spreadsheet), the data can be imported into Scribe, thereby reducing the level of effort and transcription errors. It is very important to be familiar with the data you are importing. Column headings in your import source may differ significantly from the Column headings in Scribe.

NOTE: All file imports go through an Import Wizard that are similar in execution. This guide will only illustrate the Import process using an Electronic Data Deliverable (EDD) containing lab results. All EDDs need to be in a .csv or .txt format to go through the import process. If you are supplied with an .xlsx format, you can open it up on Excel and save it as a .csv file. PDFs are NOT Electronic Data Deliverables.

Click on File | Import | Custom Import

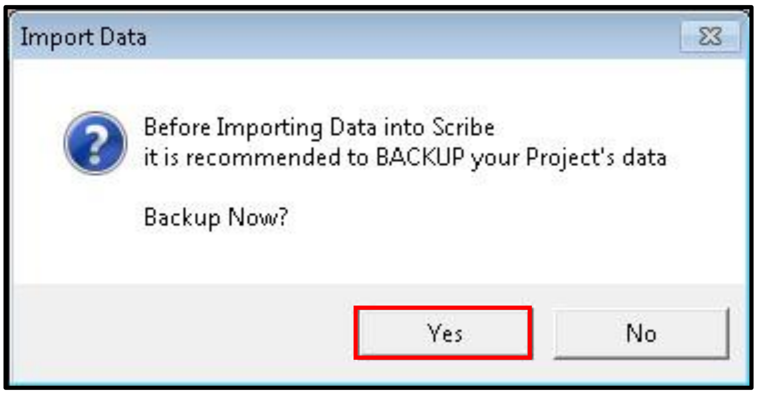


Backup Project

When doing any type of Import, Scribe will prompt you to Backup your projects data. It's always a good idea to make a backup of the project. The Backup will take a snapshot of your existing project, prior to the import. In the event something is wrong with the import data, you will be able to Restore your project prior to the import.

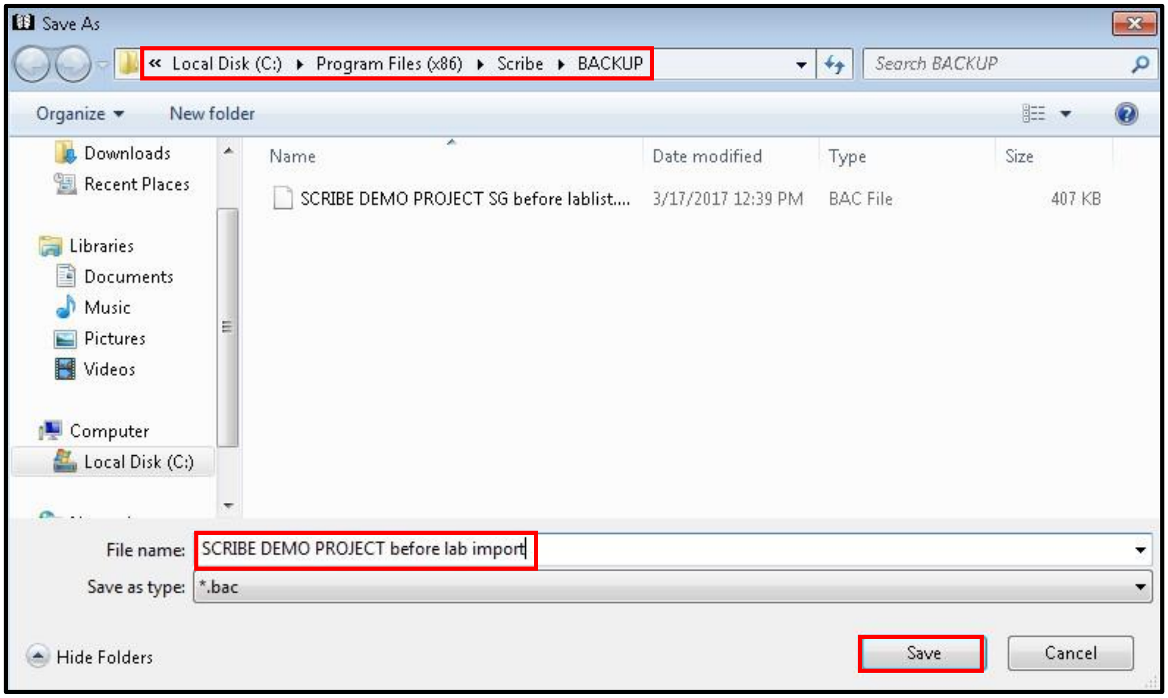
In addition to backing up your project prior to an import, you can Backup your project at anytime.

Under the File Menu select Backup Project. The following prompts remain the same throughout any backup process.



By default, Scribe will save your backup file to the BACKUP directory. BACKUPs, as well as your PROJECT files and TEMPLATE files, can be saved wherever you choose. Under the File Menu | Template and Folder, you can change your default directory or browse to another location at this screen.

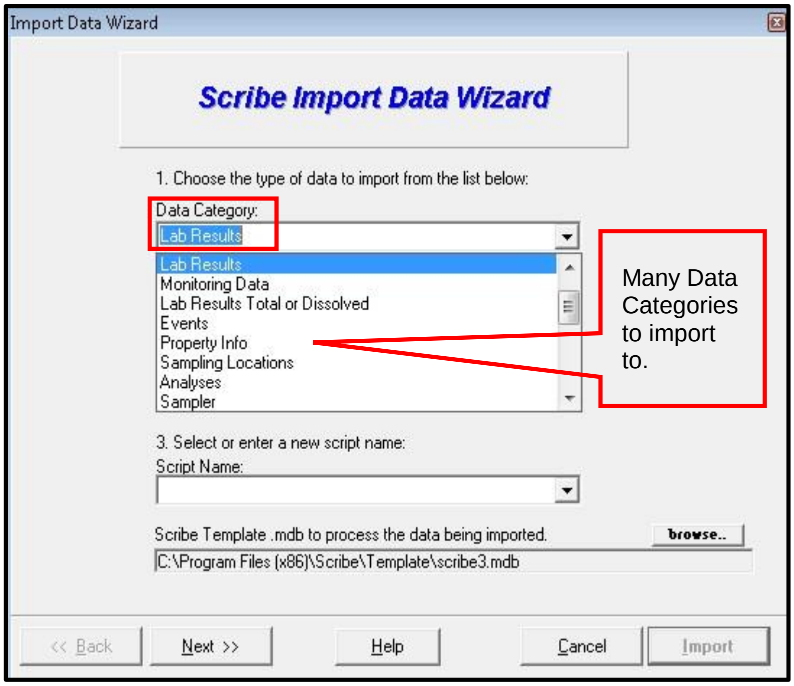
Naming your Backup file is important. By default, Scribe will stamp it with just the File Name of your project, with a .bac extension. Additional information in the file name (e.g., before import or date) is very helpful in the event there is an issue with the import and you want to restore your project prior to the import.


Save As
« Local Disk (C:) ▸ Program Files (x86) ▸ Scribe ▸ BACKUP
Search BACKUP
Organize
New folder
Downloads
Recent Places
Libraries
Documents
Music
Pictures
Videos
Computer
Local Disk (C:)
Name
Date modified
Type
Size
SCRIBE DEMO PROJECT SG before lablist....
3/17/2017 12:39 PM
BAC File
407 KB
File name:
SCRIBE DEMO PROJECT before lab import
Save as type:
*.bac
Hide Folders
Save
Cancel

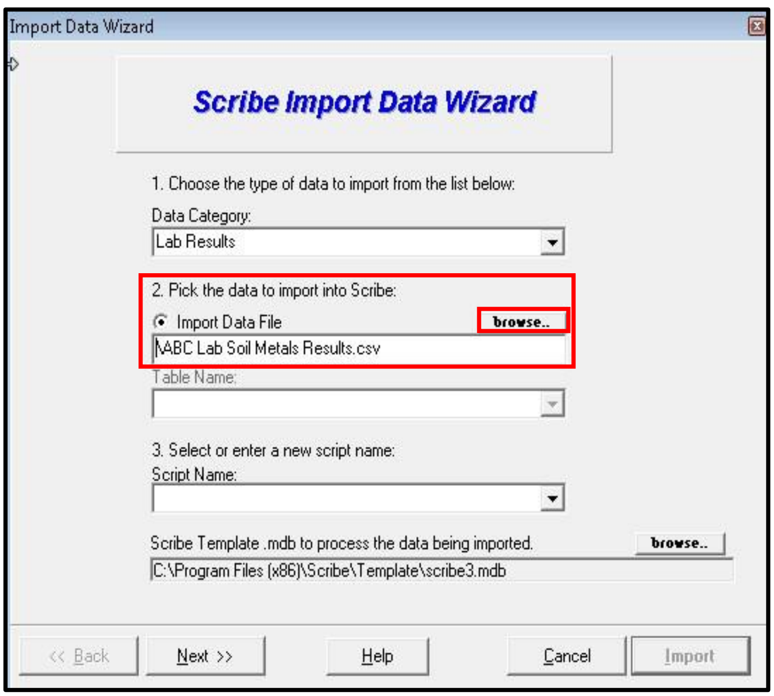

Backup
Backup To:
C:\PROGRAM
(X86)\SCRIBE
PROJECT
SCRIBE
DB
Backup
Backup Completed
OK

Scribe Import Data Wizard

The Scribe Import Data Wizard will launch. Click on the Data Category dropdown box and select the specific category you will be importing data to. In this example, we've selected Lab Results.

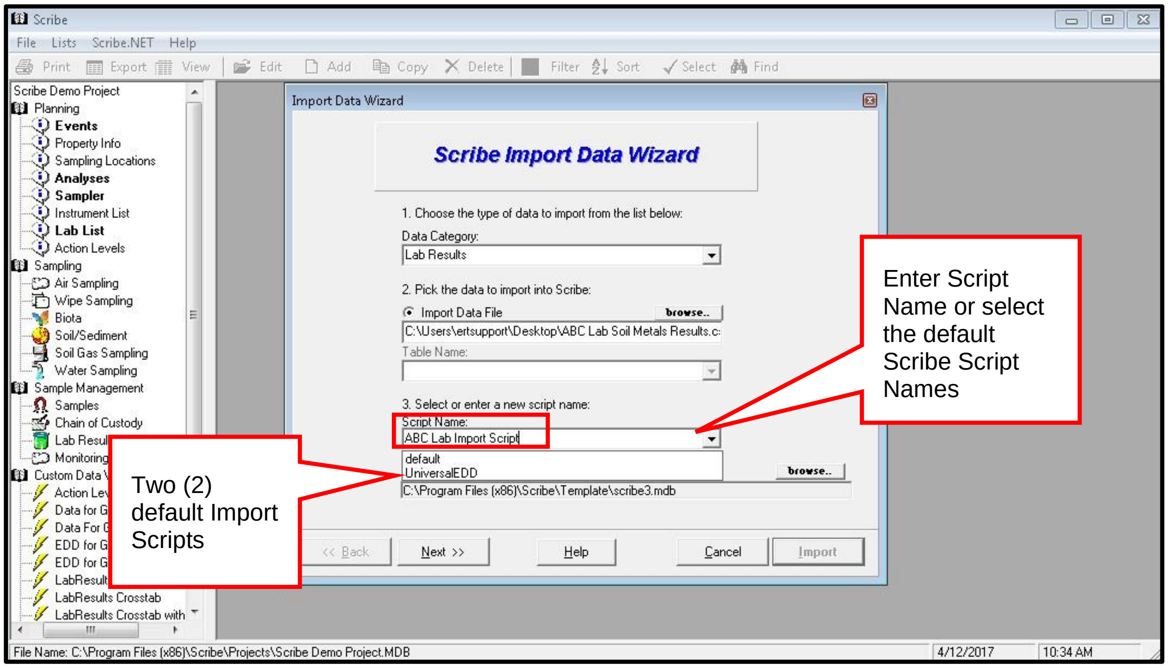


Use the 'browse' button to locate the file you want to import.

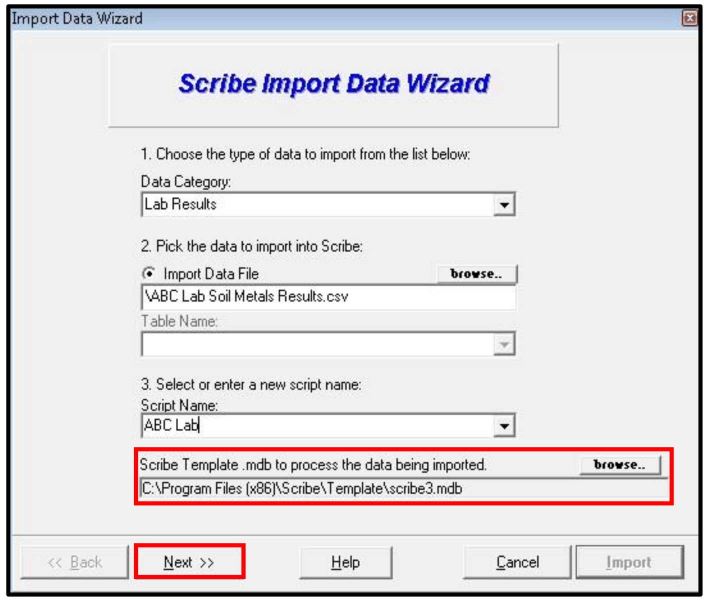


Import Scripts

Script Names provide a way to save your data mappings for a specific EDD format to avoid having to re-map future imports of similar files. For example, if you regularly get import files from a lab, you can save the data mappings to a Script Name (e.g., ABC Lab). Subsequent files from ABC Lab would not require re-mapping the data fields when importing. **Note:** *Script Names must be entered **prior** to mapping the fields. In this example, we are creating a Script Name for our ABC Lab Import.*

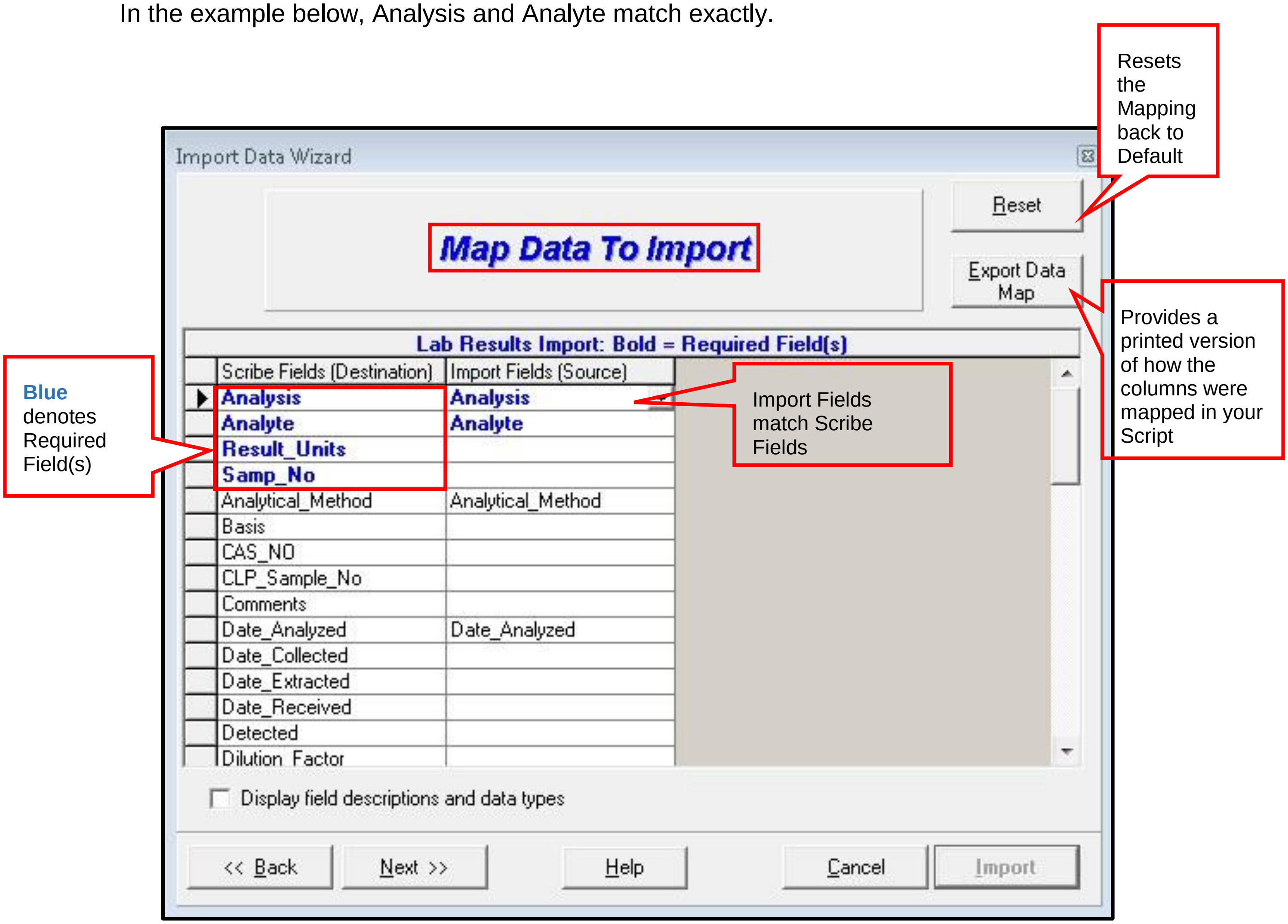


By default, Scribe uses the scribe3.mdb template file. If you are using a site/region specific template file, browse to where the file is stored. In this example, we will use the default Scribe template. When completed, click on Next.

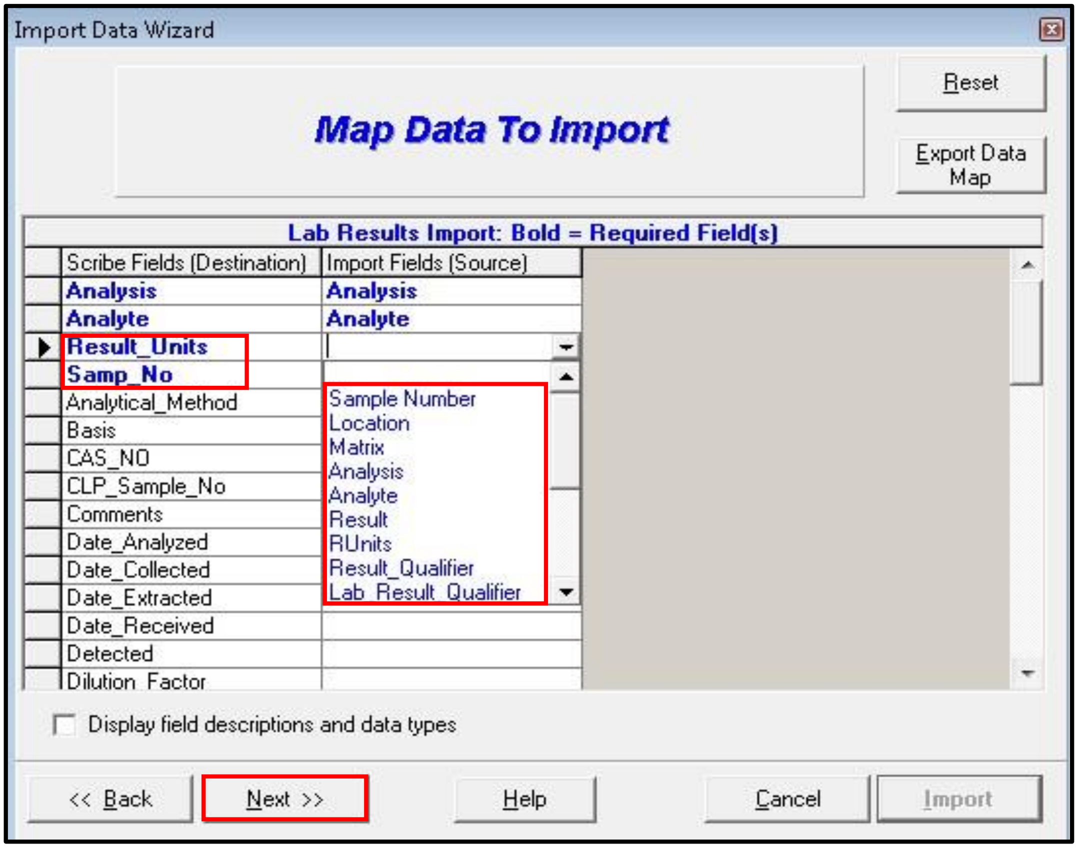


Map Data To Import

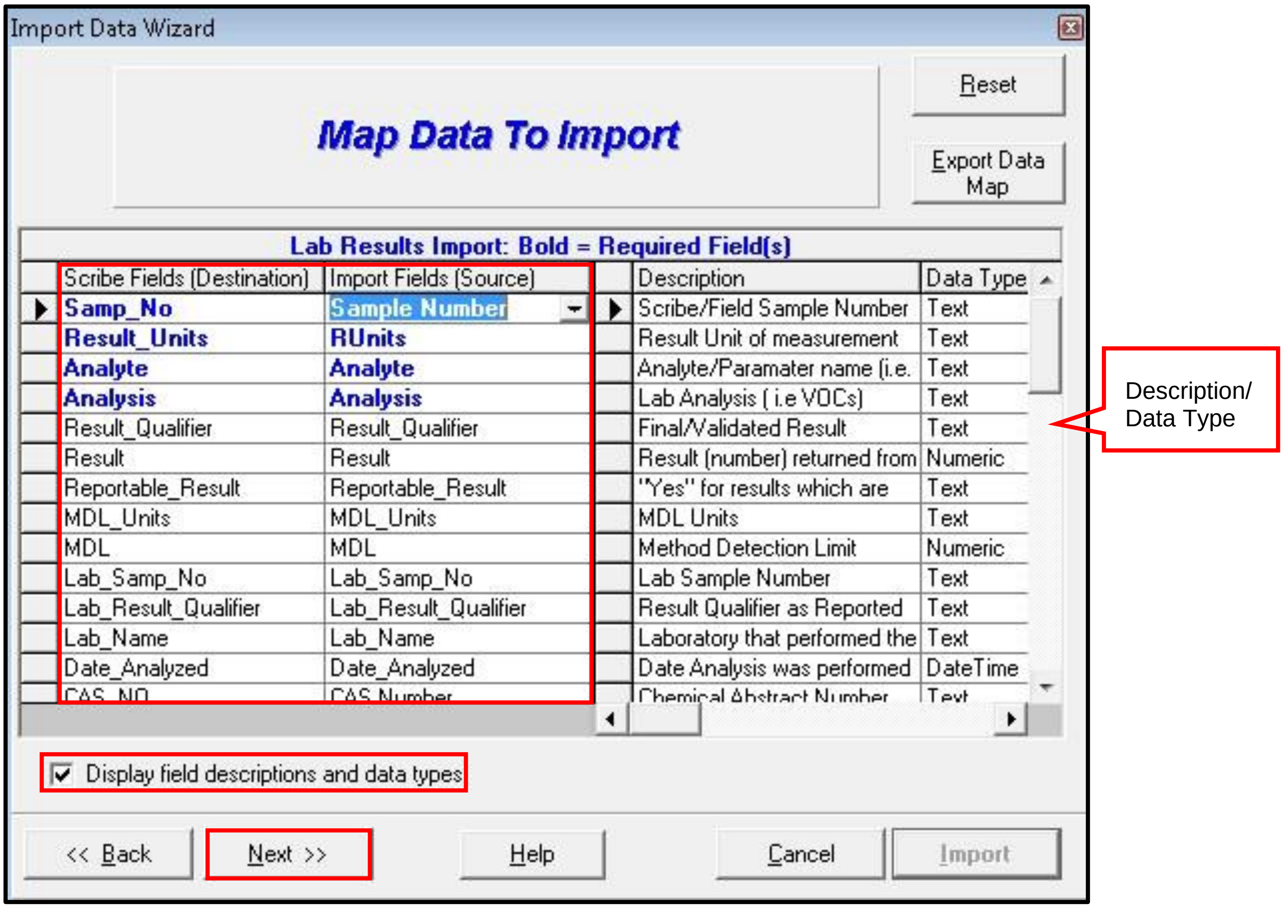
The ‘Map Data To Import’ window allows you to correlate Scribe data headings with the information contained in the EDD file. Any fields highlighted in **Blue** are required fields and must be mapped for the data to be imported. If the EDD (Import Fields (Source)) column headers match the Scribe Fields Destination, they will be mapped automatically. In the example below, Analysis and Analyte match exactly.



If headings do not match (e.g. Result_Units and Samp_No), click on the dropdown arrow in the cell to view the list of column headings in your EDD. Select the correct field in the EDD to map. Only data in the mapped fields will be imported into Scribe. Any heading that is not mapped will not be imported. ***NOTE**: As indicated earlier, it is very important to be familiar with your EDD. Knowing what your column headings are and what data is contained in them before the import will help eliminate any errors of data being mapped incorrectly.*

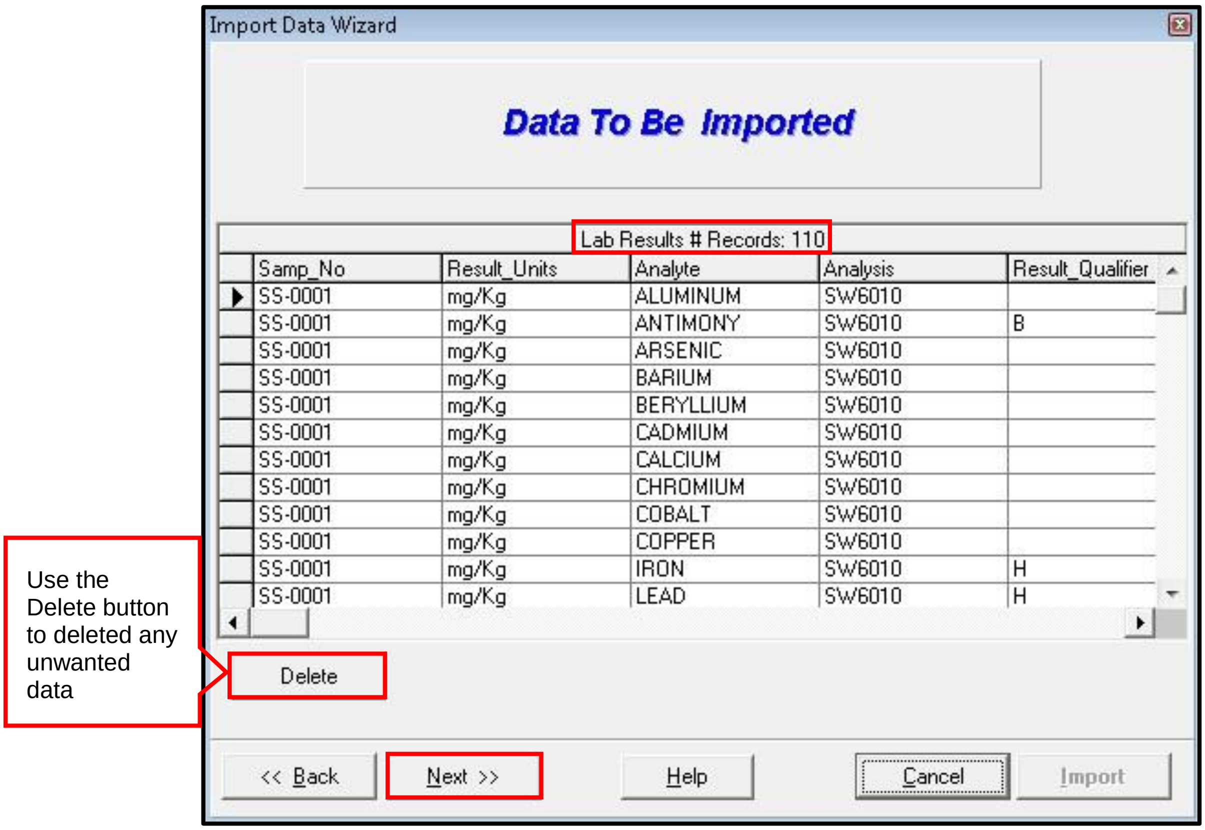


Continue mapping all other fields, as needed. ***NOTE:*** *To view the Scribe Field Description and Data Types, place a checkmark in the Display field descriptions and data types.* When all of the fields have been mapped, click Next.



Data To Be Imported

All data to be imported is displayed for you to review **before** the import process begins. ***NOTE****: As indicated earlier, it is very important to be familiar with your EDD. This screen will give you a preview of how many records will be imported and how you mapped your data. If something is mapped incorrectly, use the Back button to get back to the Map Data To Import screen.* Click the Next button to continue.



Samp_No	Result_Units	Analyte	Analysis	Result_Qualifier
SS-0001	mg/Kg	ALUMINUM	SW6010	
SS-0001	mg/Kg	ANTIMONY	SW6010	B
SS-0001	mg/Kg	ARSENIC	SW6010	
SS-0001	mg/Kg	BARIUM	SW6010	
SS-0001	mg/Kg	BERYLLIUM	SW6010	
SS-0001	mg/Kg	CADMIUM	SW6010	
SS-0001	mg/Kg	CALCIUM	SW6010	
SS-0001	mg/Kg	CHROMIUM	SW6010	
SS-0001	mg/Kg	COBALT	SW6010	
SS-0001	mg/Kg	COPPER	SW6010	
SS-0001	mg/Kg	IRON	SW6010	H
SS-0001	mg/Kg	LEAD	SW6010	H

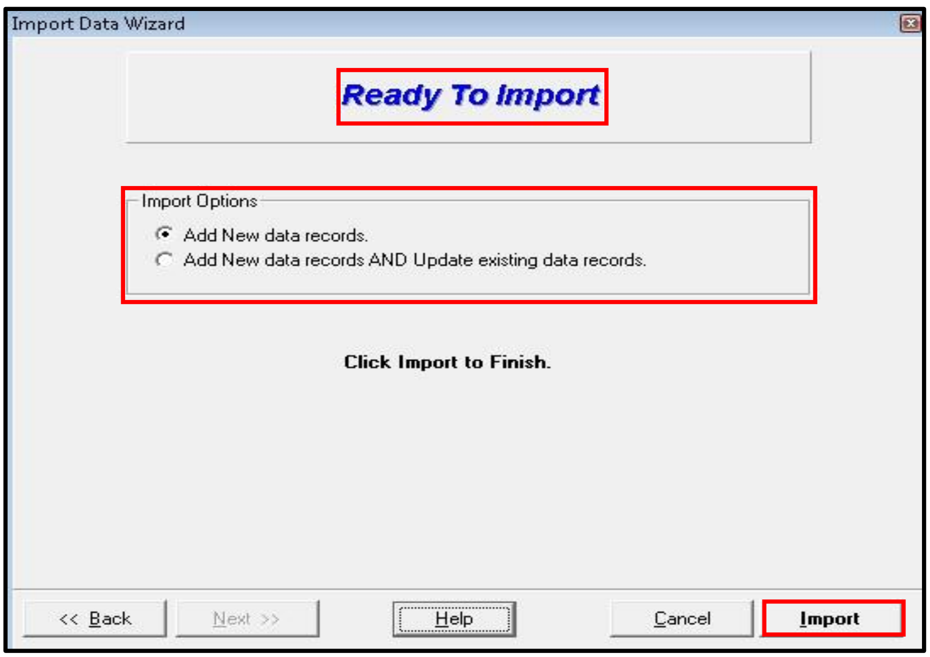
Ready To Import

The 'Ready to Import' screen opens. You are presented with two (2) Import Options:

- Add New data records
- Add New data records AND update existing data records

Add New data records is on by default. If this is the first time bringing this data set into Scribe, you would select this option.

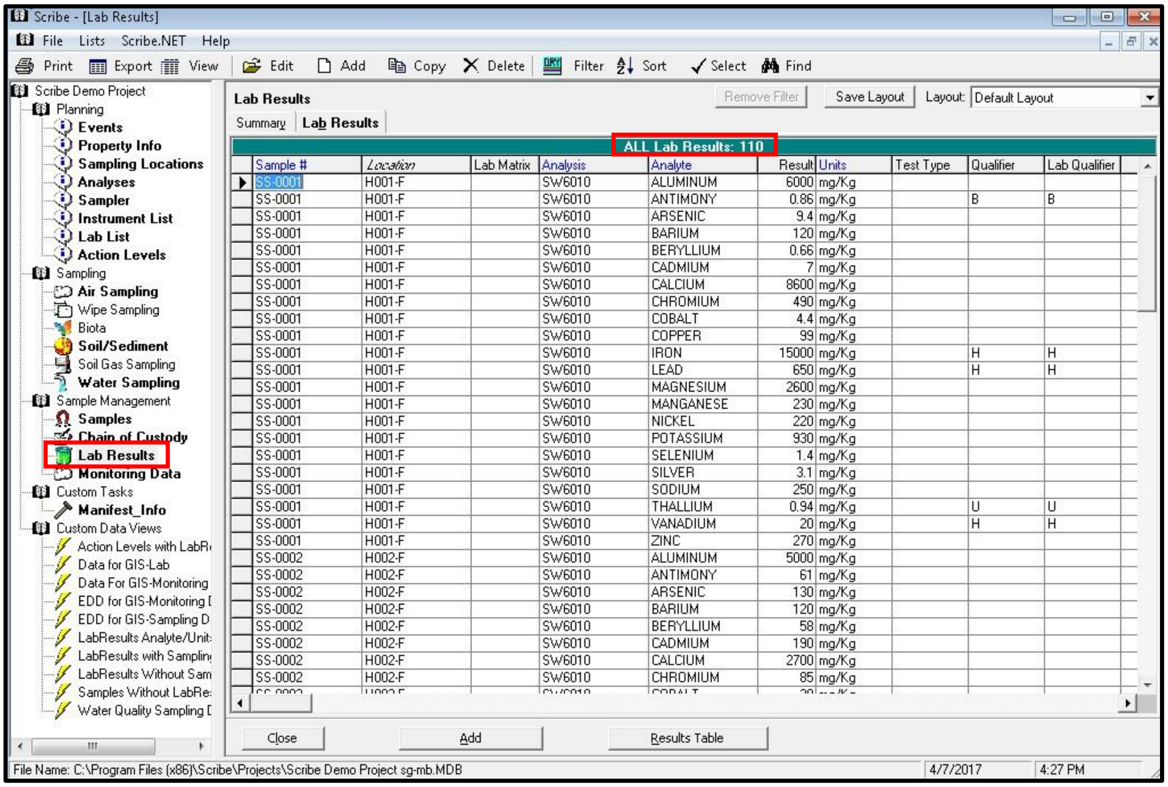
Add New data records AND Update existing data records. Use this option if updates need to be made to data already loaded or if additional information needs to be added to data already loaded.



Once the import is complete, a prompt appears asking if you wish to import more data. If no more data is to be imported, click No.

Displays # of records added

In this Import example, Lab Results were imported. Clicking on 'Lab Results' in the Navigation Pane will open the Lab Results window and display the imported records. 110 LabResult Records were imported and are displayed. ***NOTE:*** *To manually add Lab Results, please refer to Field Use Basics – Part 2 Guide.*



Export Data Map Example

A	B
Scribe Fields (Destination)	Import Fields (Source)
Samp_No	Sample Number
Result_Units	RUnits
Analyte	Analyte
Analysis	Analysis
Result_Qualifier	Result_Qualifier
Result	Result
Reportable_Result	Reportable_Result
MDL_Units	MDL_Units
MDL	MDL
Lab_Samp_No	Lab_Samp_No
Lab_Result_Qualifier	Lab_Result_Qualifier
Lab_Name	Lab_Name
Date_Analyzed	Date_Analyzed
Analytical_Method	Analytical_Method
Basis	
CAS_NO	
CLP_Sample_No	

Custom Data

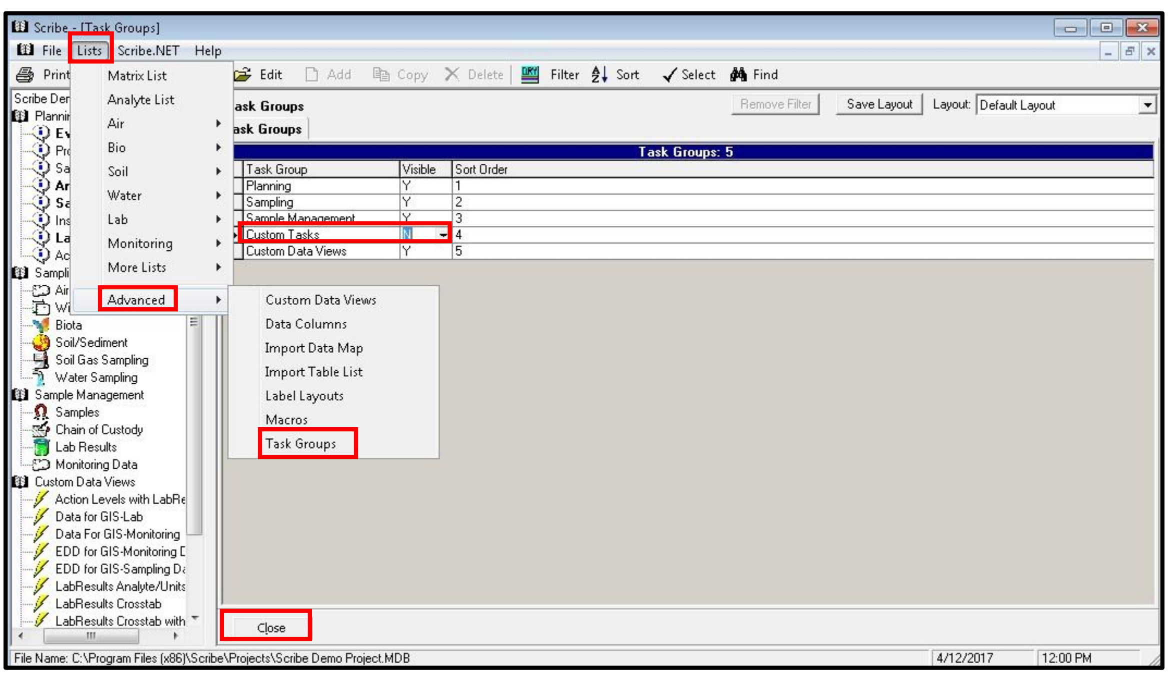
Custom Tasks and Custom Data Views are Scribe advanced features that allow users to either import or reference data external to the Scribe database. It can also be used for providing a one-click access to commonly used queries. The user must possess an understanding of Microsoft Access to create new tables for use in Custom Tasks or write a query that Scribe can then use in Custom Data Views. Scribe is the User Interface (UI) for the new database elements. Once created, the new database elements can be imported into Scribe as a new table (Custom Task) or query (Custom Data View). Below describes how to add these database elements to your Scribe project.

For additional information on creating Custom Tasks and Custom Data Views please refer to the Custom Tasks Guide and Custom Data Views Guide or contact ertsupport at 1-800-999-6990 or ertsupport@epa.gov.

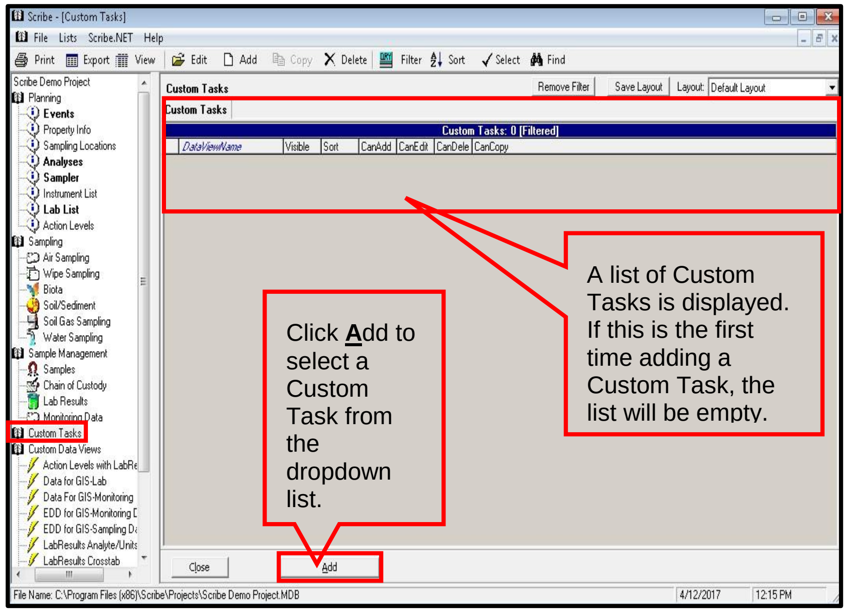
Adding Custom Tasks

When users have identified data that needs to be captured in their Scribe Project that is not native to the Scribe Database, it may be necessary to add a new table (Custom Task) to the database using MS Access. By adding this table to the database and exposing it in the Scribe User Interface (UI), users will be able to utilize many of the data functions available in Scribe (e.g., Data Entry, Import, Find, Filter and Sort). ***Note: To expose the Custom Task in your Scribe project, you must have already created the table, through MS Access in the Scribe project.***

Click on 'Lists' from the top menu bar and select the 'Advanced' option.
Then select the 'Task Group's option. A list of Task Groups is displayed.
Modify the Visibility of the Custom Tasks Column to **'Y'** by clicking on the down arrow.
Click Close.

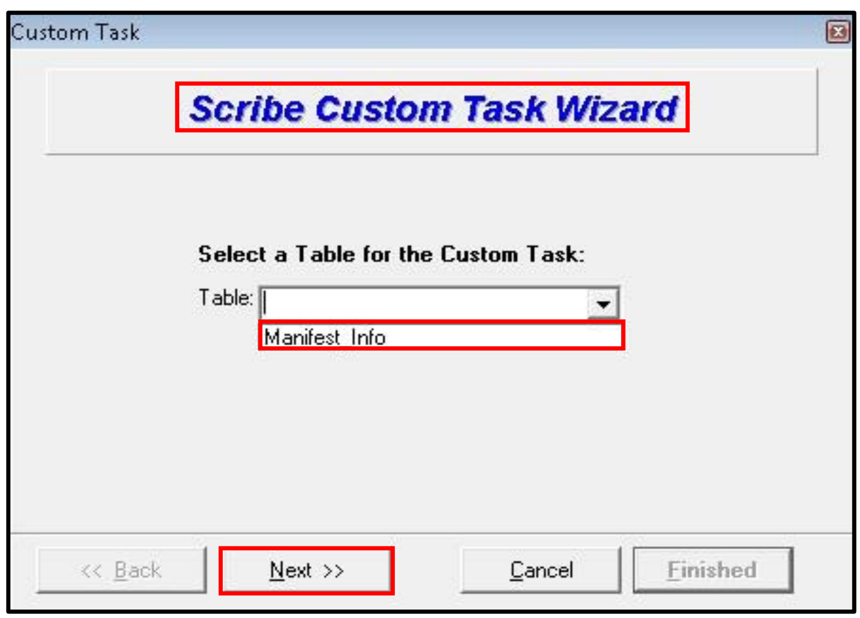


The Custom Tasks option will now be available in the Navigation Pane, below Sample Management. Click Add



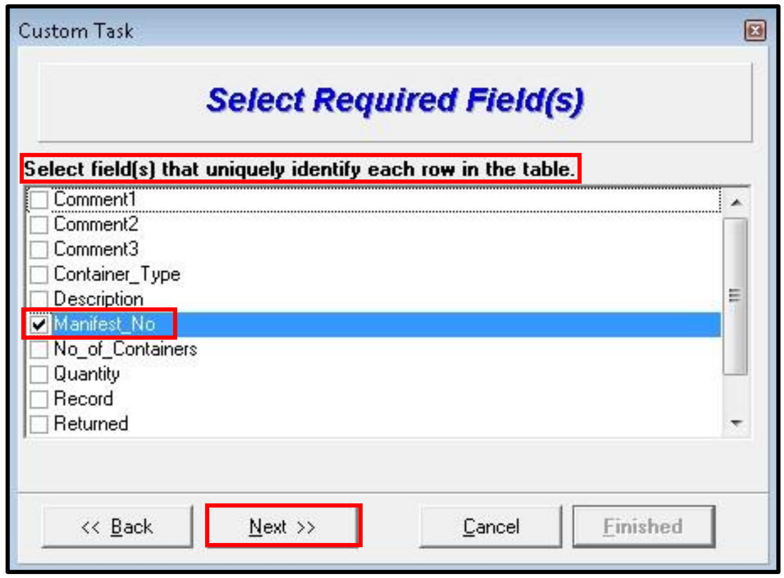
In this example, we created a Manifest table in MS Access to track Manifest data for the project. ***NOTE:*** *After adding a new database element to a Scribe project .mdb, the associated Scribe template file must also be updated with the new database element if additional data will be added using Scribe's Import wizard. If the default Scribe3.mdb template is updated, the new database element will appear in every subsequent new Scribe project created with that template.* **See Modify Scribe Template section**.

The Scribe Custom Task Wizard will display. Select the Manifest_Info table and click Next

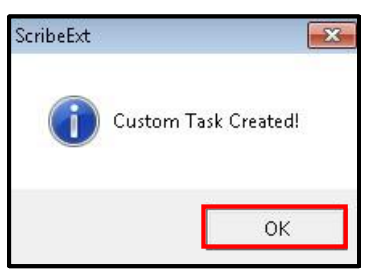


In our example, the Primary Key in the Manifest table was defined with an AutoNumber field in MS Access. Scribe, however requires that the table be defined with unique fields other than the Primary Key. The field/fields that make up a unique record in the custom table must be defined before the table is added to Scribe's user interface.

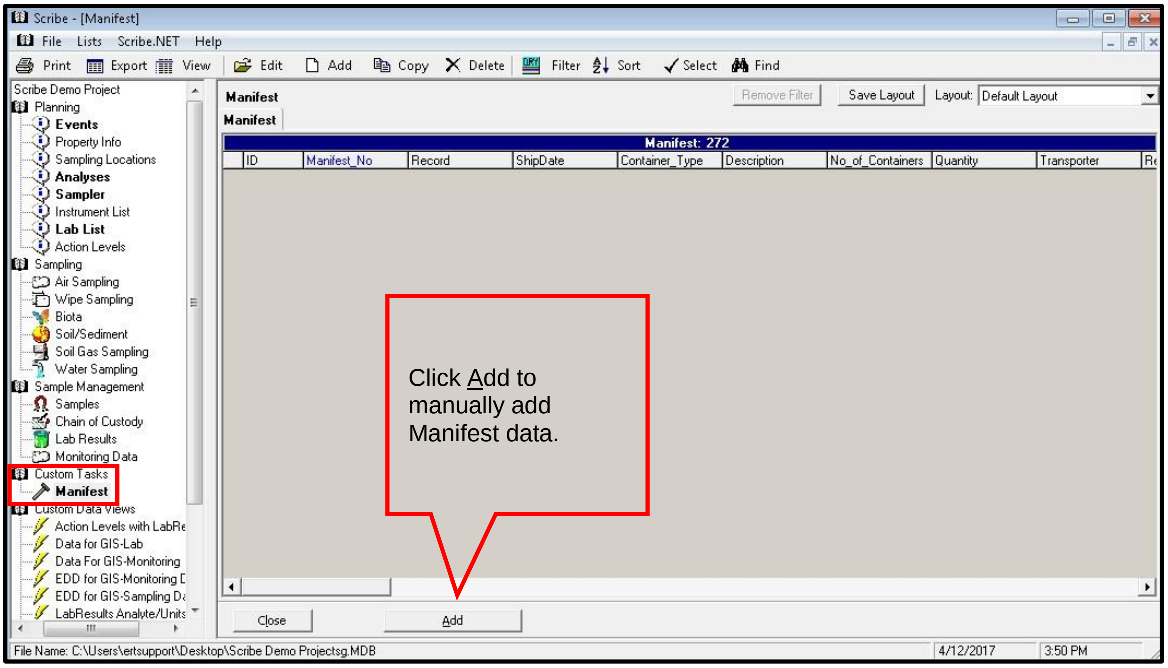
Check the 'Manifest_No" field to uniquely identify each row in the table. Click the Next button to continue.



Enter a name for the Custom Task and Click Finished. Click OK.



The Manifest Task is now listed under Custom Tasks. Access to the Manifest table is now available in the Scribe UI by clocking on Manifest under Custom Tasks. The field from the Manifest table are displayed, but there are no records in the table yet.



If additional data will be added using Scribe's Import wizard, the Scribe template file must be updated with the new database element. **Please see Update Scribe Template section of this guide.**

Add a Custom Data View

When users have identified data that needs to be provided over and over again and creating filters and sorts become cumbersome, an advanced feature would be to create a Custom Data View (query) that would provide a one-click option to answer the same commonly asked question over and over again. The user must possess an understanding of Microsoft Access to write a query that Scribe can use in Custom Data Views. Scribe is the User Interface (UI) for the new database elements. Once created, the new database elements can be imported in Scribe as a new query (Custom Data View). Below describes how to add these database elements to your Scribe project. ***Note: To expose the Custom Data View in your Scribe project, you must have already created the query, through MS Access in the Scribe project.***

For additional information on creating Custom Tasks and Custom Data Views please refer to the Custom Tasks Guide and Custom Data Views Guide or contact ertsupport at 1-800-999-6990 or ertsupport@epa.gov.

Update/Modify Scribe Template

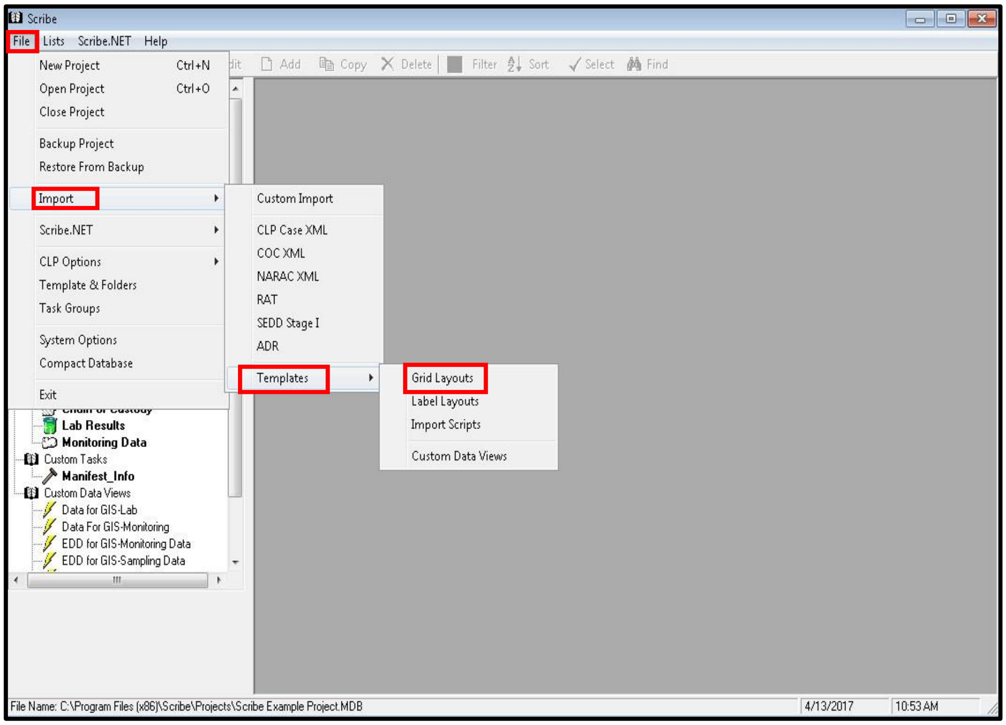
After adding a new table (Custom Task) or adding new database elements to an existing Scribe project table. The associated Scribe template file must also be updated if additional data will be added using Scribe's Import wizard.

Import Templates

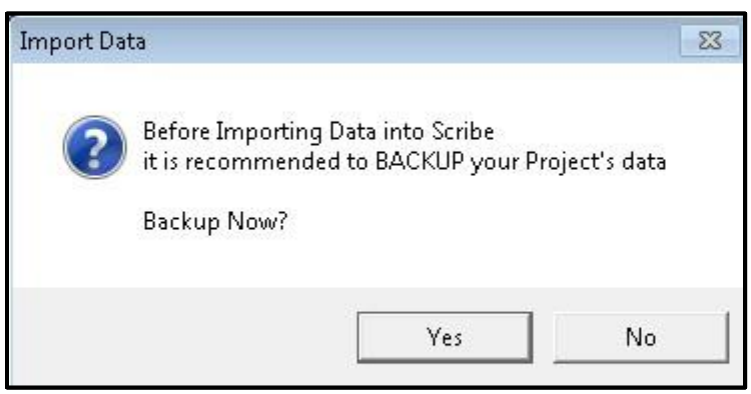
Customized layouts that were saved in previous Scribe projects can be imported into other Scribe projects. This section will describe how to import your Grid and Label layouts, Import Scripts and Custom Data Views into other Scribe projects.

Grid Layout

Click on File | Import | Templates and select Grid Layouts



A prompt to Backup your project will display. Click Yes or No. *(See Custom Import | Backup your Project)*

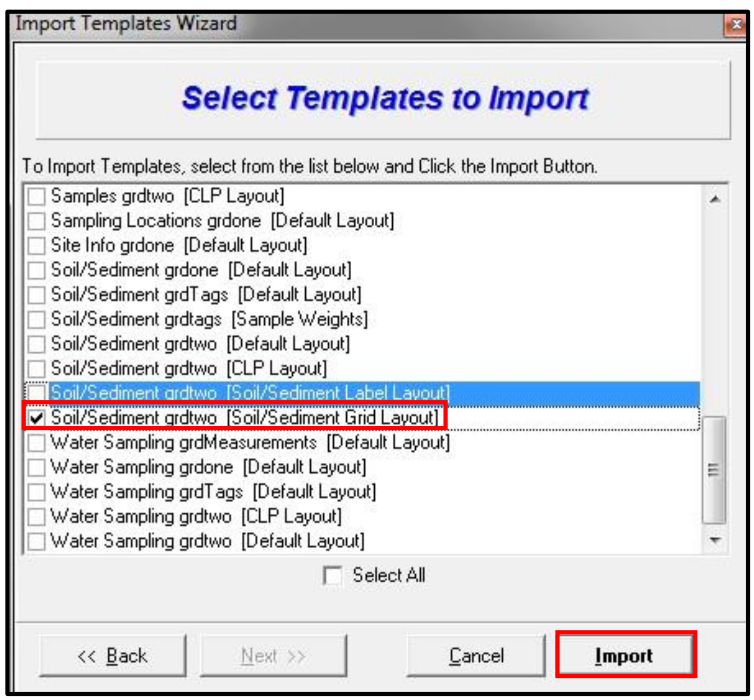


The Scribe Import Templates Wizard will display.

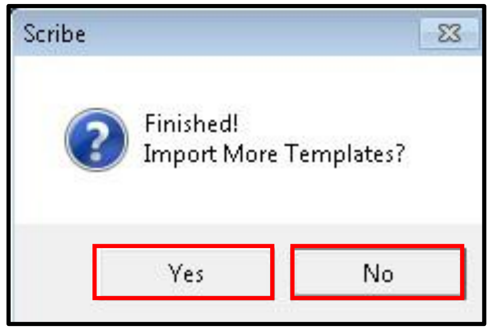
Browse to the Scribe project that you are importing templates from.

Click Next.

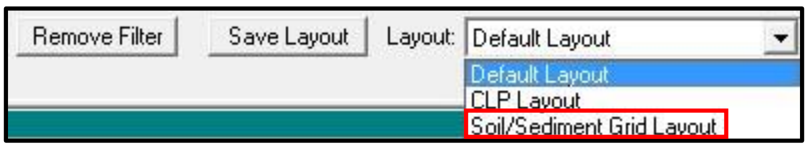
Select the Grid Layout(s) to be imported. Click Import.



When finished, you will be prompted to Import More Templates? Click Yes or No.



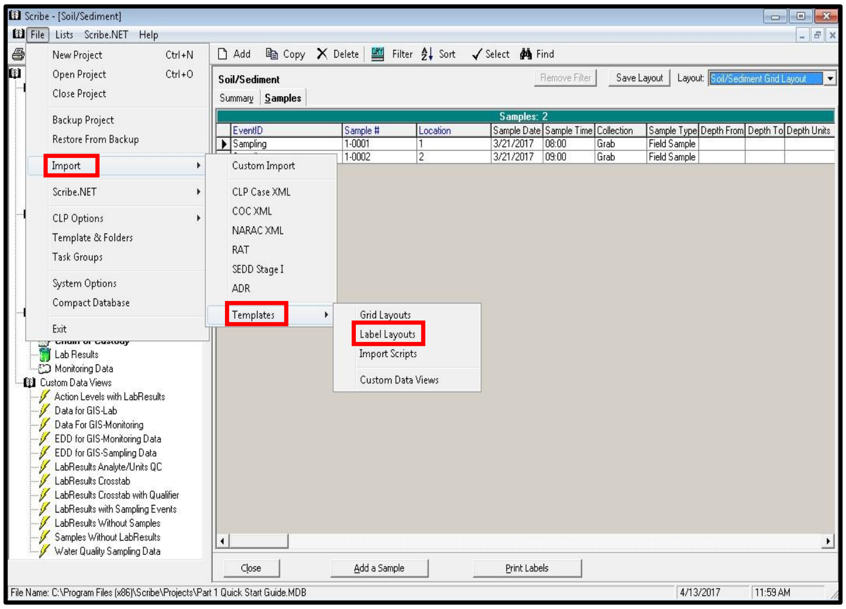
The Grid Layout is now available in the dropdown.



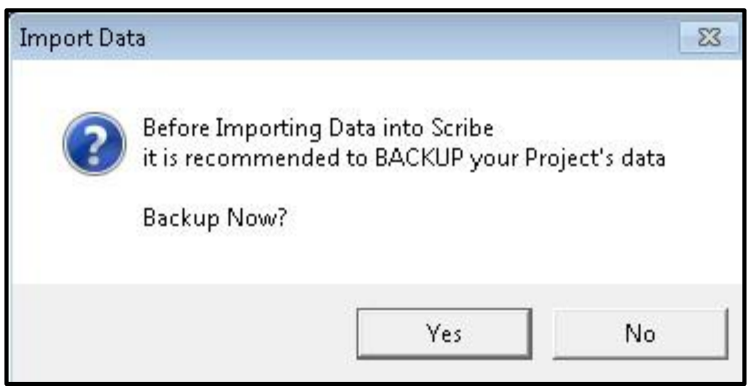
***Note:** Layouts (Grid and Labels) are only imported to the section of Scribe they were created in. In this example, we are importing the Soil/Sediment Grid Layout that will import to the Soil/Sediment section in Scribe.*

Label Layout

Click on File | Import | Templates and select Label Layouts



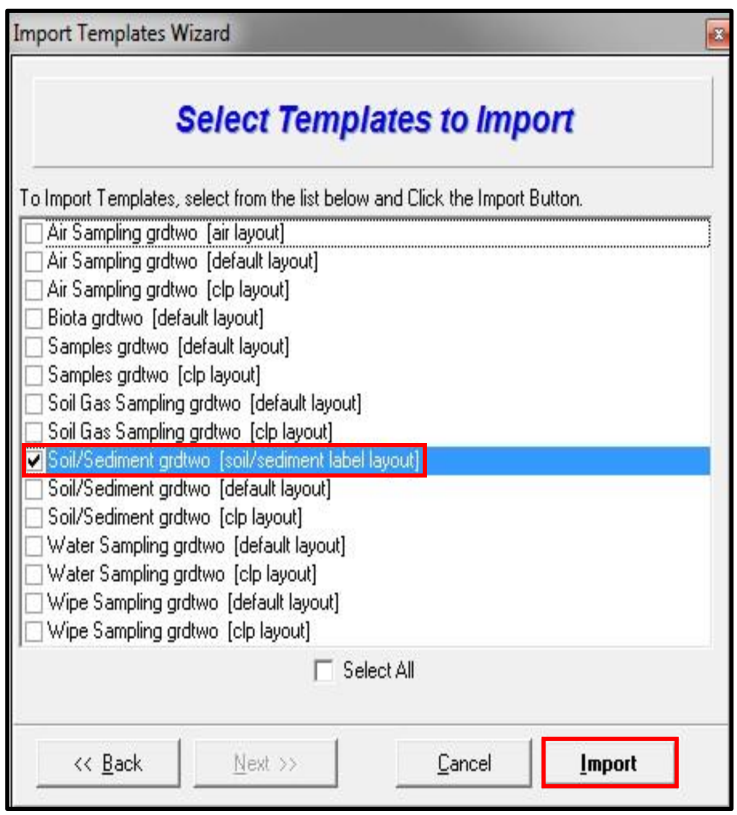
A prompt to Backup your project will display. Click Yes or No. See Custom Import | Backup your Project.



The Scribe Import Templates Wizard will display.

Browse to the Scribe project that that you are importing templates from.

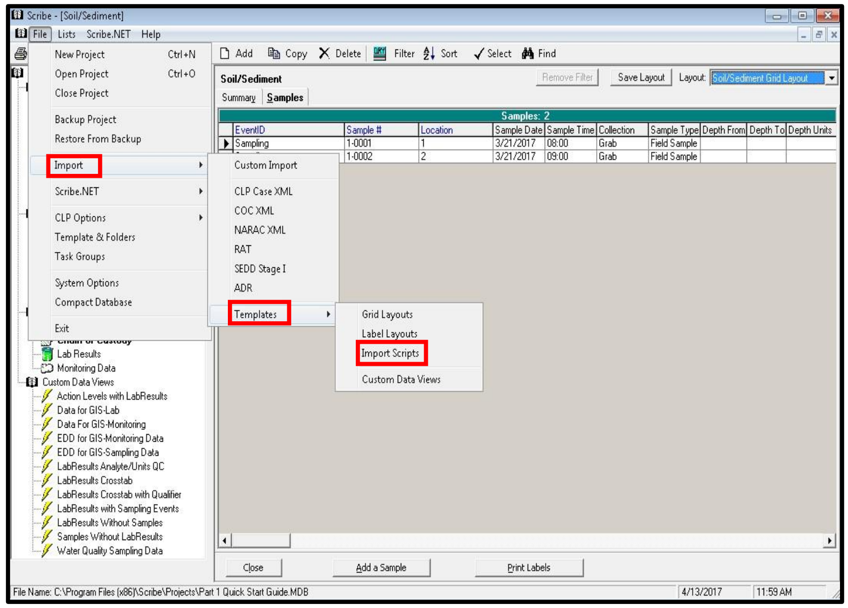
Click Next.



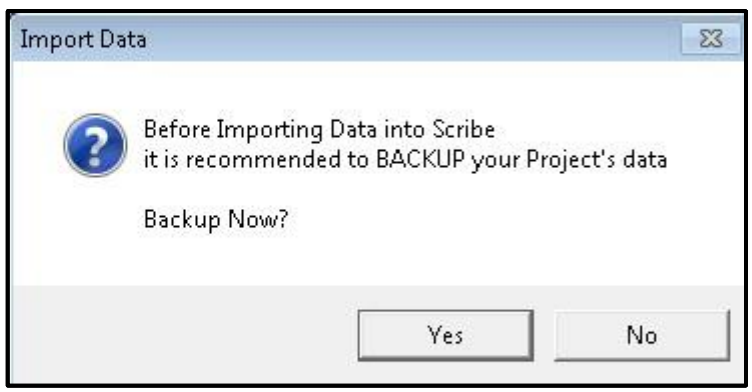
Select the Label Layout(s) to be imported. ***Note:*** *Layouts (Grid and Labels) are only imported to the section of Scribe they were created in. In this example, we are importing the Soil/Sediment Grid Layout that will import to the Soil/Sediment section in Scribe.* Click Import

Import Scripts

Click on File | Import | Templates and select Import Scripts



A prompt to Backup your project will display. Click Yes or No. See Custom Import | Backup your Project.

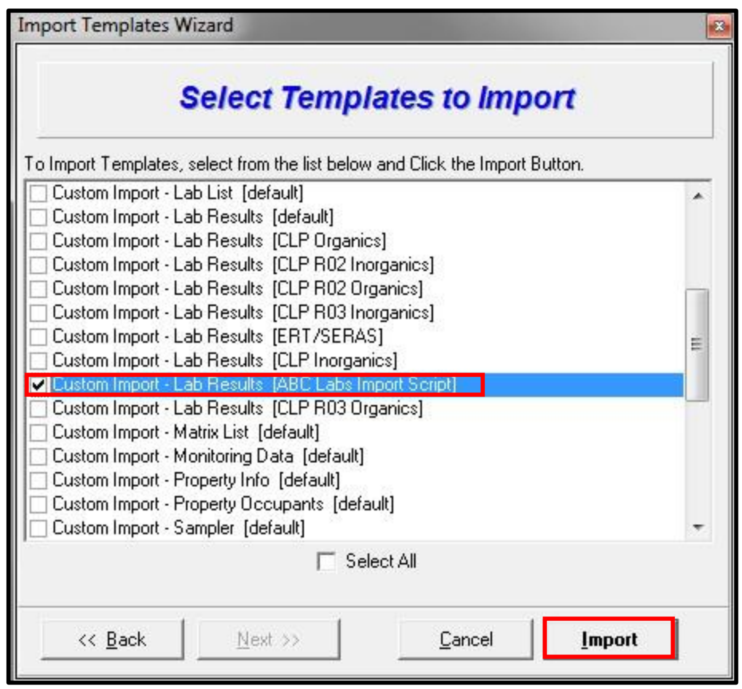


The Scribe Import Templates Wizard will display.

Browse to the Scribe project that that you are importing templates from.

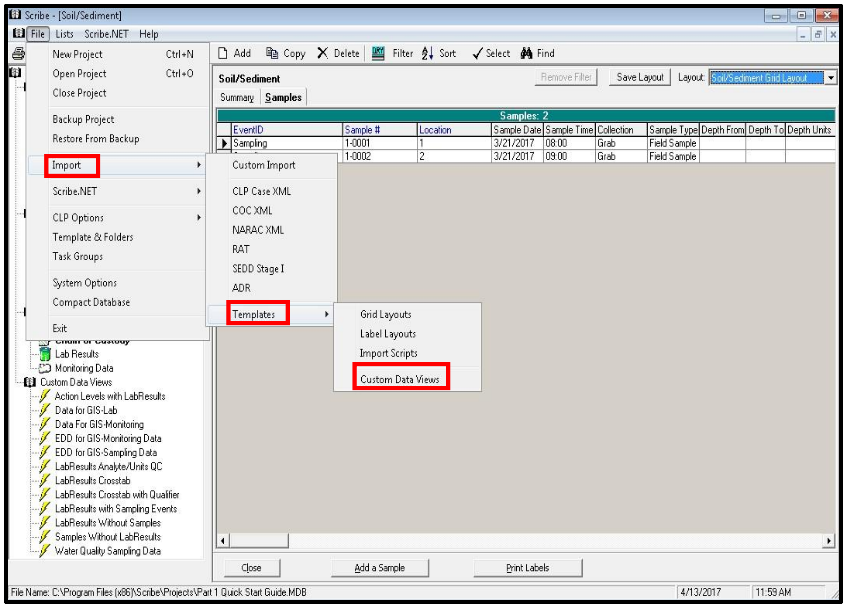
Click Next.

Select the Import Script(s) to be imported. Click Import

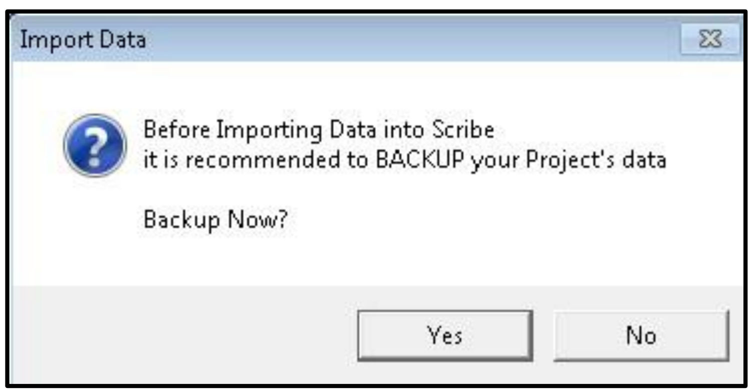


Custom Data Views

Click on File | Import | Templates and select Label Layouts



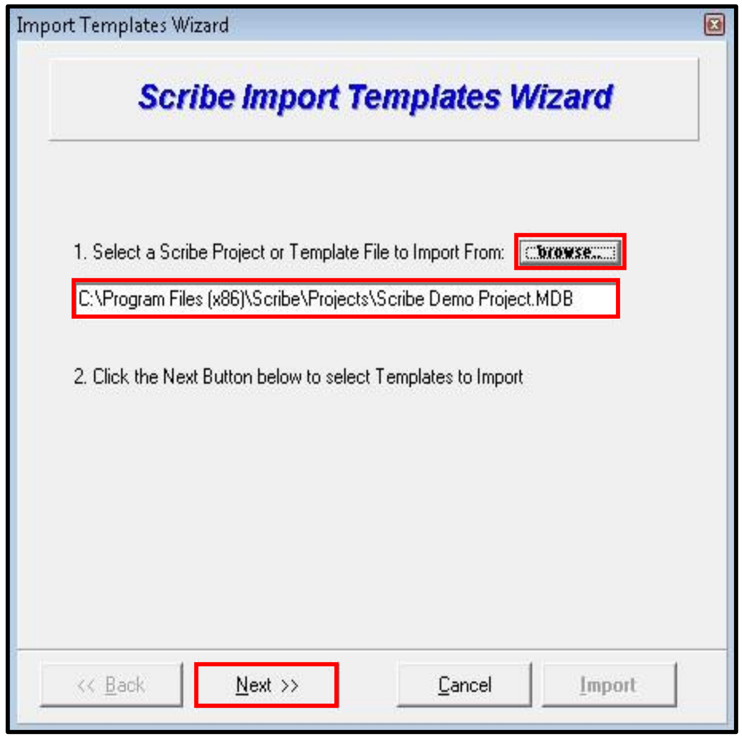
A prompt to Backup your project will display. Click Yes or No. See Custom Import | Backup your Project.



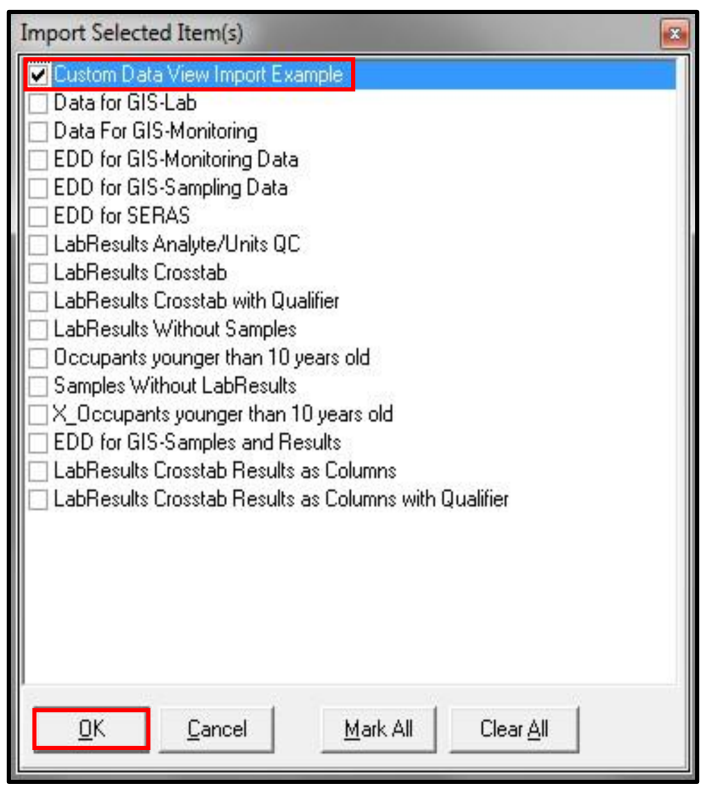
The Scribe Import Templates Wizard will display.

Browse to the Scribe project that that you are importing templates from.

Click Next.



Select the Custom Data View(s) to be imported. Click OK.



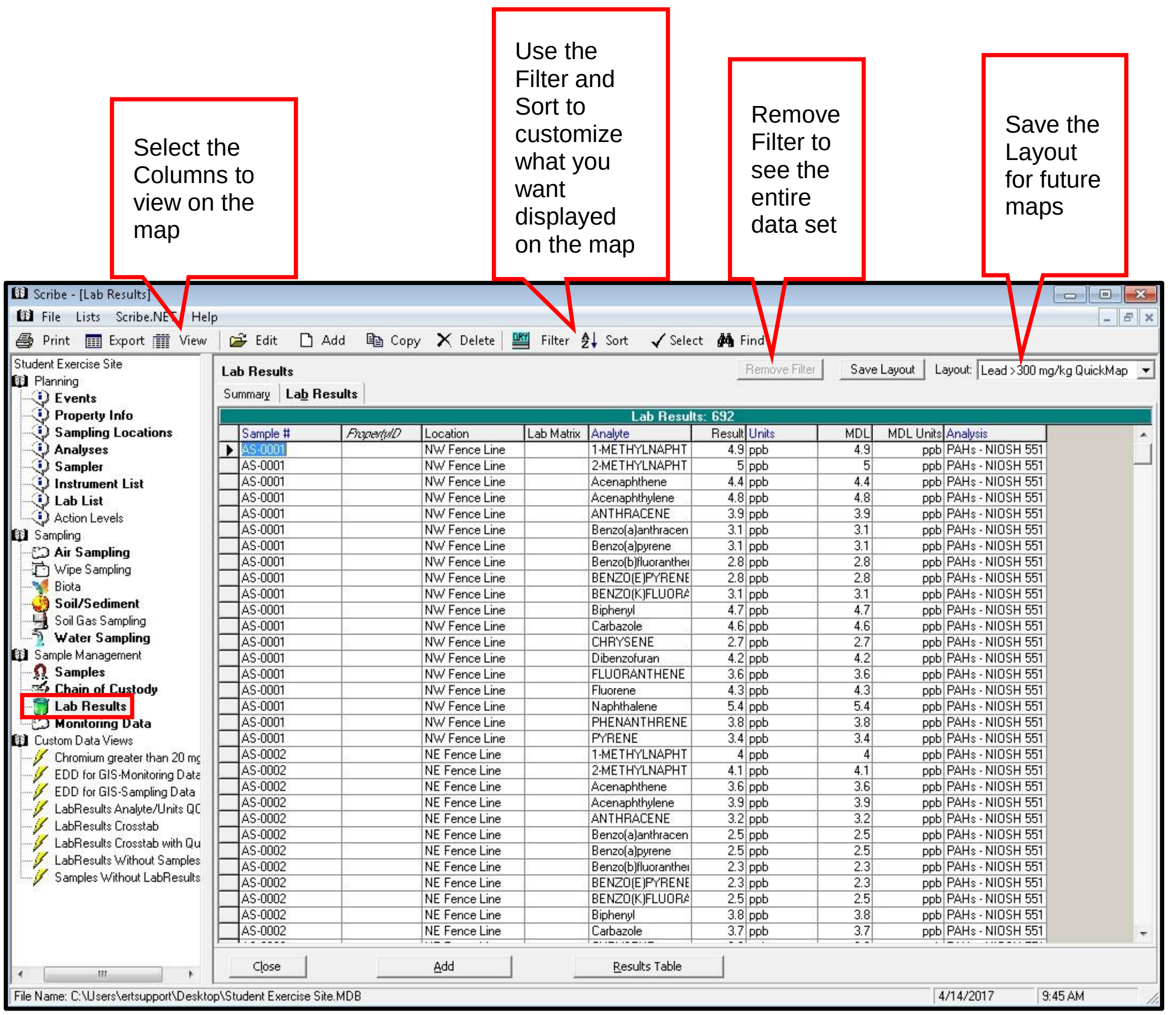
QuickMap

The option to export to a Quickmap (powered by Google Earth) is available in any section of Scribe than can display (view) longitude and latitude (e.g. Sampling Locations, Property Info, Samples task and the EDD to GIS custom data views). To use the Quickmap option an internet connection is required. To download Google Earth visit http://earth.google.com/download-earth.html.

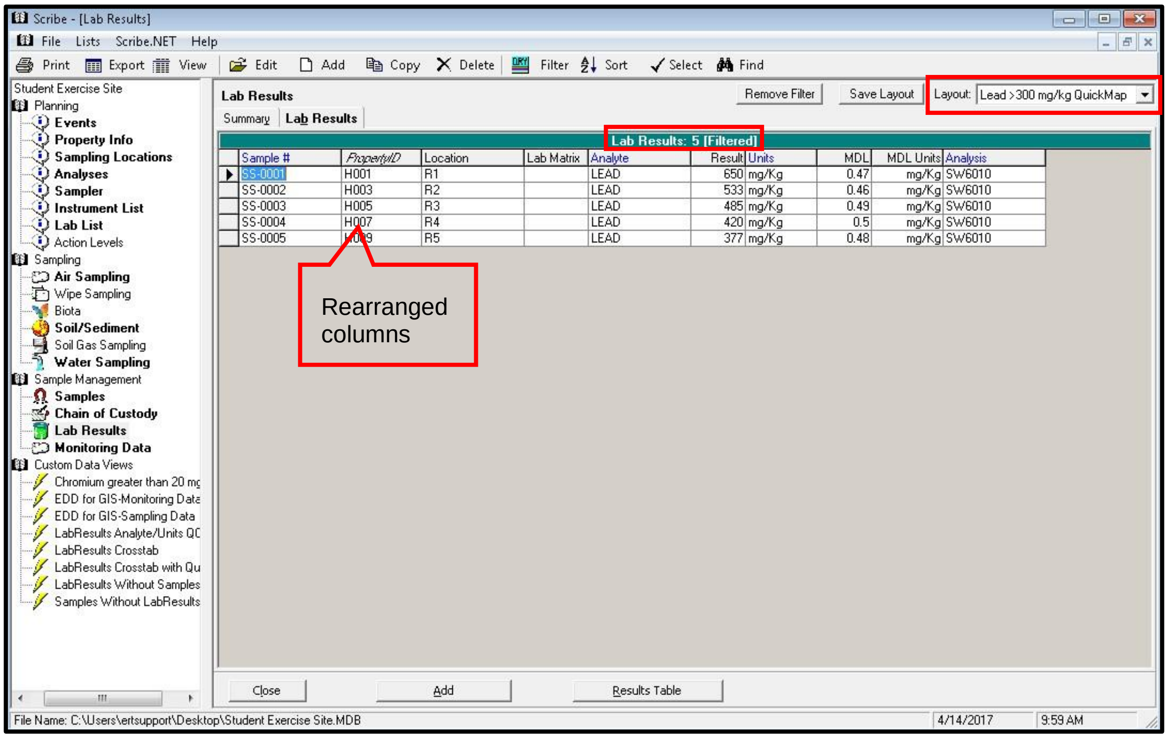
Creating a QuickMap

The Scribe grid screens are ideal for creating QuickMaps for reporting purposes. In the example below, a grid layout will be created for all Lead Levels above 300 and generate a QuickMap to display the data in Google Earth. The QuickMap will be generated from the Lab Results table of our project.

Click on Lab Results and click the 'Remove Filter' button so the entire data set is available. Use Scribes Filter, Sorts, etc. to display the data that will be displayed on the QuickMap.



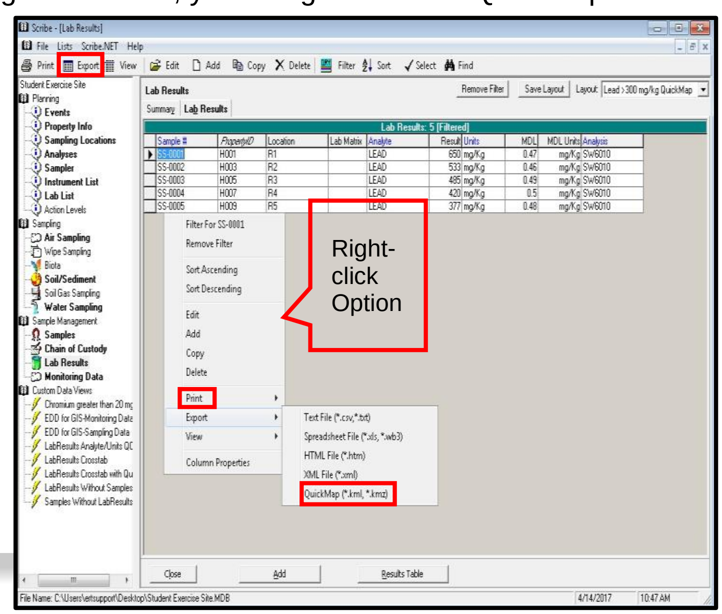
In this example, we Filtered for Lead >300 mg/kg in Ascending Sort order, limited our view to specific columns, moved (rearranged) the column order and created a Layout.



Generate a QuickMap

If your data contains latitude and longitude values, you can generate the QuickMap to display in Google Earth.

Click the Export button from the Toolbar (or use the right-click option). Select QuickMap (*.kml, *.kmz)

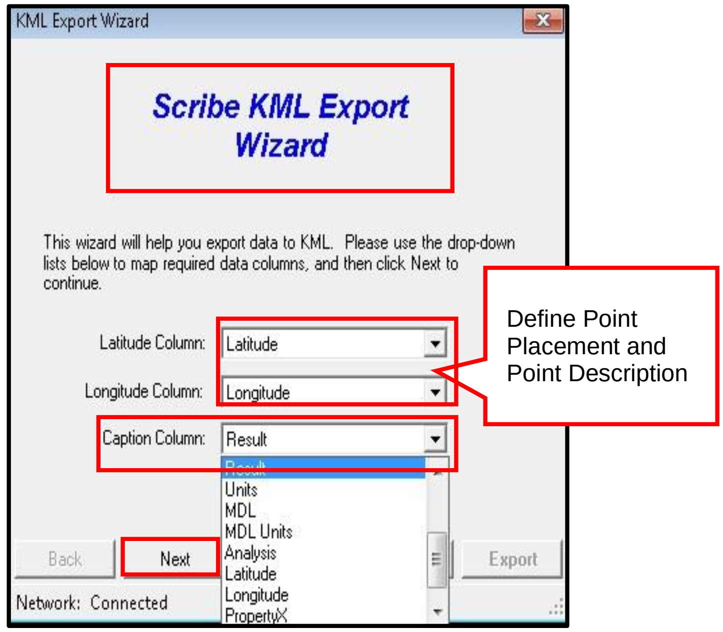


The Scribe KML Export Wizard will launch. Latitude and Longitude fields are mapped automatically.

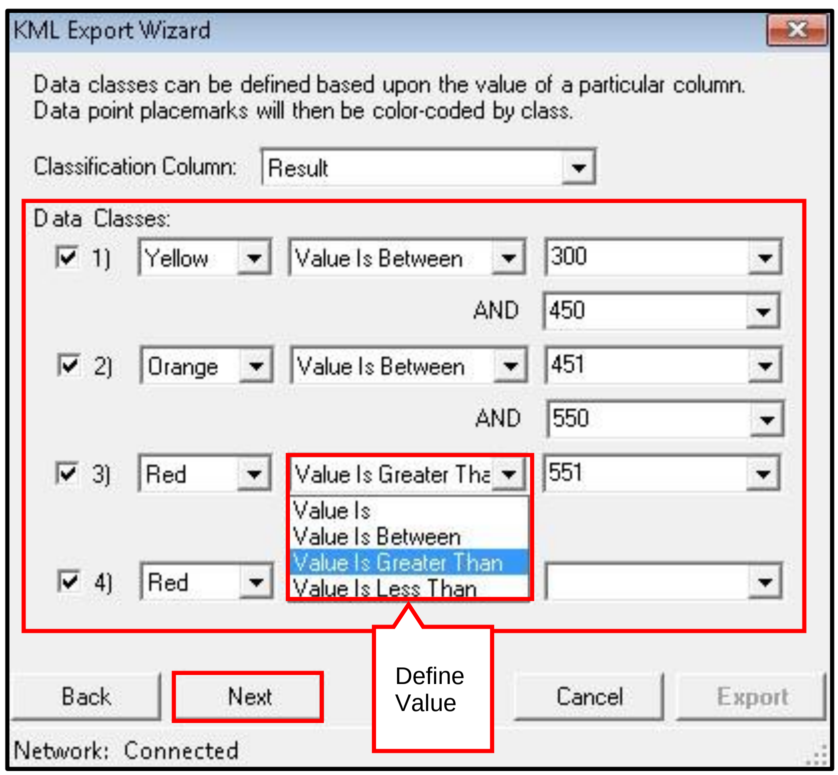
Click the down arrow to display a picklist of fields available based on your grid data (discussed above).

Select the field that will be used to identify (label) the individual data points on the map (e.g. Result or SampleID). In this example, we are using the Result field.

Click Next.

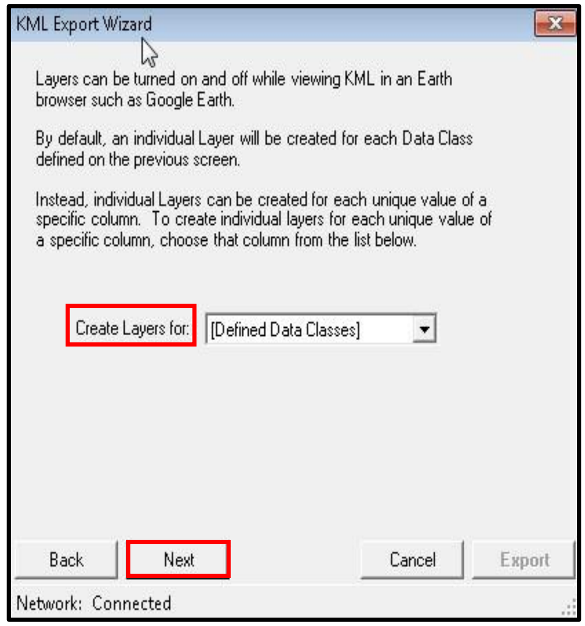


Define the Data classes of the data points. When the map is displayed, the property colors will be based on the result value. In this example, we've classified each data point based on the Results value greater than.
Click Next.



This screen allows you to create additional layers to turn on and off in Google Earth.

For example, if you used Sublocation to define front yards and backyards, you could define a layer for Sublocation and turn the yard info on and off in Google Earth.
Click Next.

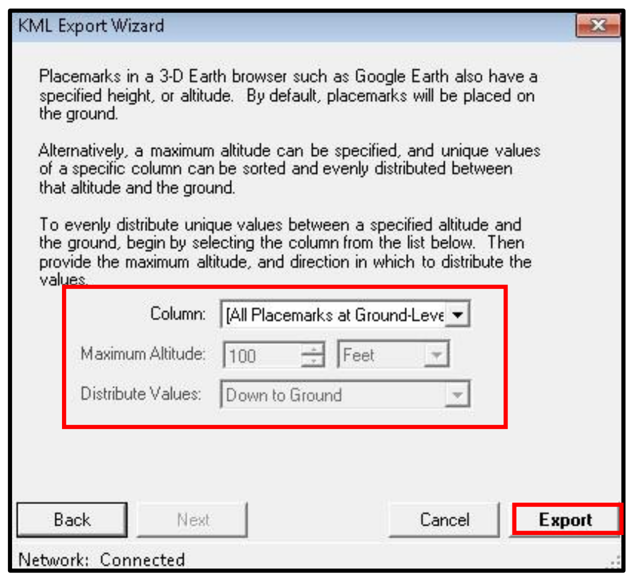


This screen allows you to define Placemarks. Datapoints can be displayed in a 3D format based on a value allowing the user to stack data points.

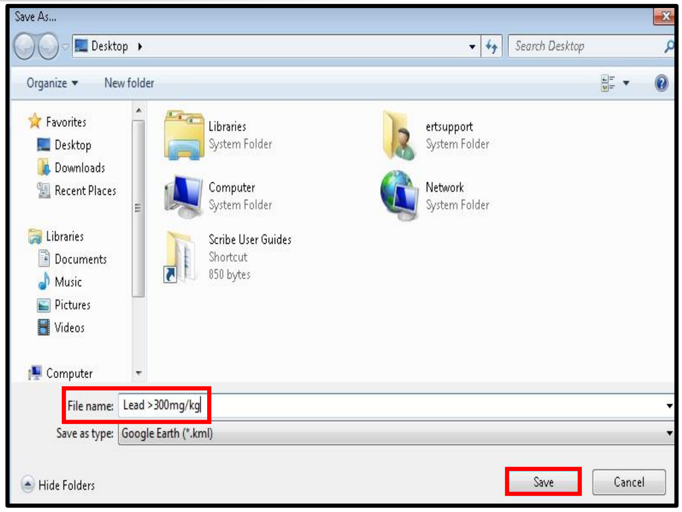
By default, all data points will be placed at ground level. To stack datapoints, select the field on which to base the stacked points i.e. Depth or Result.

Define the Maximum Altitude and Distribute Values. Data in Google Earth based on altitude.

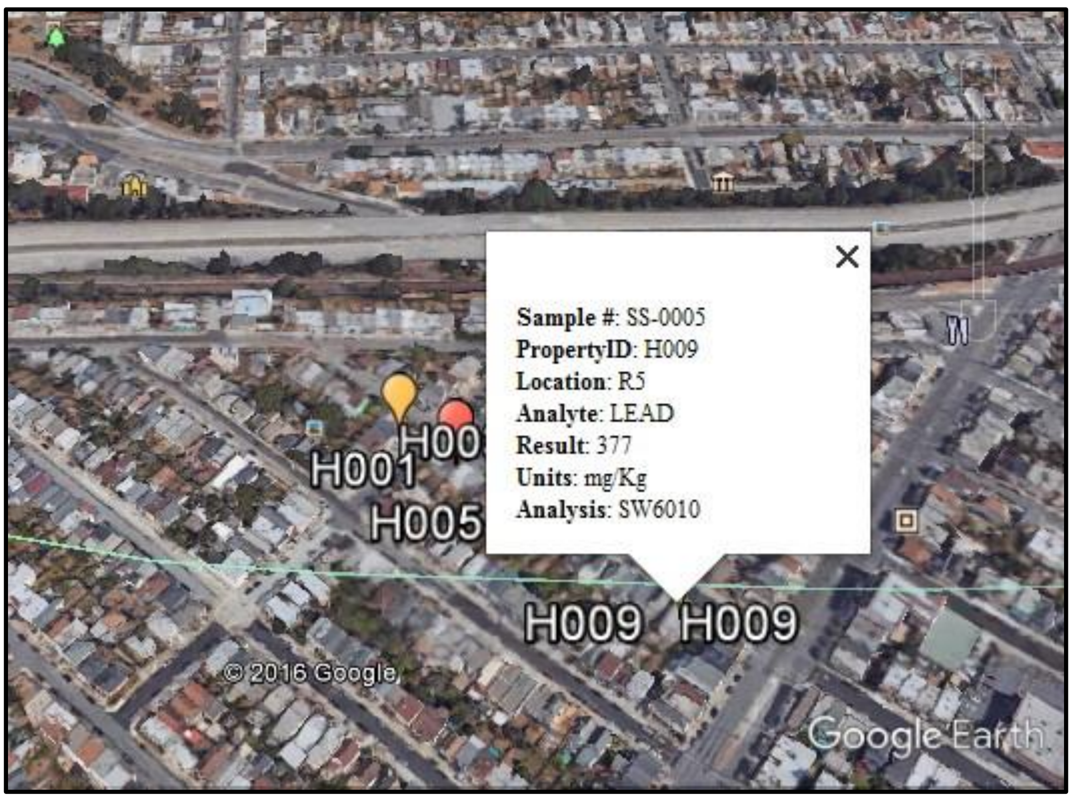
Click Export.



Name the *.kml file and click ‘Save’.
If Google Earth does not automatically launch and display the lab results, run Google Earth and open the .kml file.



An image similar to the one below should display in Google Earth. Notice the Property IDs are displayed by color using the value ranges specified in the Wizard. Also notice the additional information displayed when a pin is selected. Additional pin information could be displayed by turning those columns on in Scribe before creating the QuickMap export.



Scribe.NET

Scribe.NET provides a method of storing and sharing Scribe projects in a controlled environment. Using Scribe.NET, Scribe projects can be shared between Scribe desktop clients and/or enterprise Oracle/SQL database clients. Scribe projects are "Published" from the Scribe desktop client, and other desktop/enterprise users "Subscribe" to the published projects. Users can subscribe to individual or multiple projects. Regional or global subscriptions can also be created for sharing entire sets of published projects.

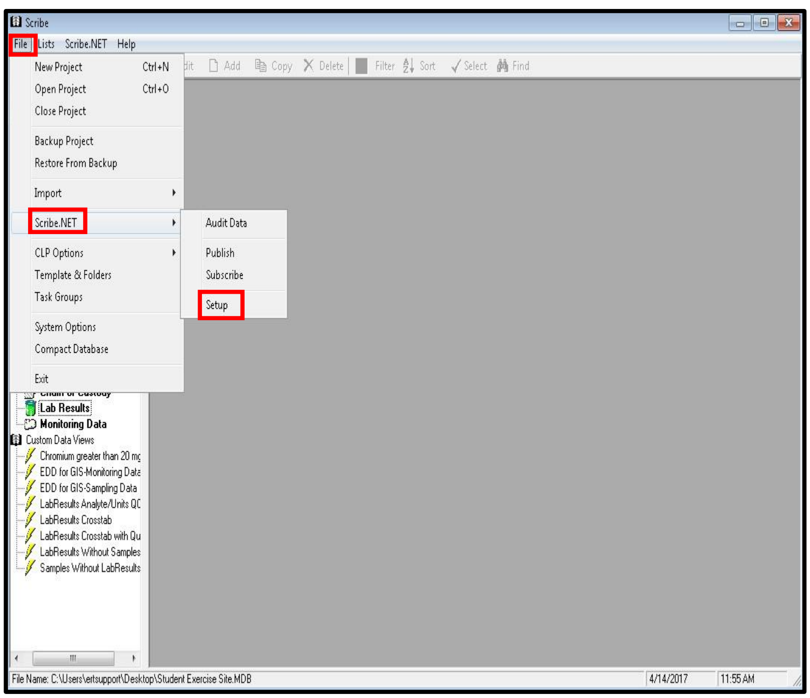
By default, Scribe desktop clients have access to generic publisher accounts in order to quickly and easily publish their project to Scribe.NET. Subscriptions, however, are managed on the server to provide secure access to the published data. An end user must have the subscription ID and Password before they can access the published project(s). The configuration of the subscription will determine which projects a user will acquire when they use a particular subscription ID. Subscriptions function differently for desktop clients than enterprise SQL clients.

An Internet Connection is required to Publish or Subscribe.

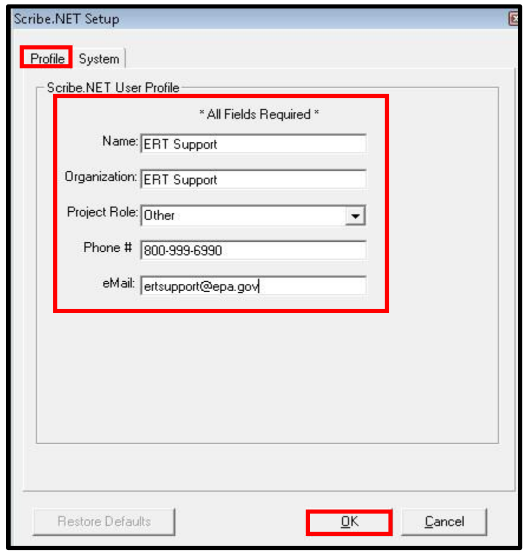
Scribe.NET Setup

The first time you use Scribe.NET, you will be prompted for some basic user identification information. This data is only used to attach ownership of the project and to ensure data integrity of published project files and is not publicly displayed.

Click on File | Scribe.NET | Setup



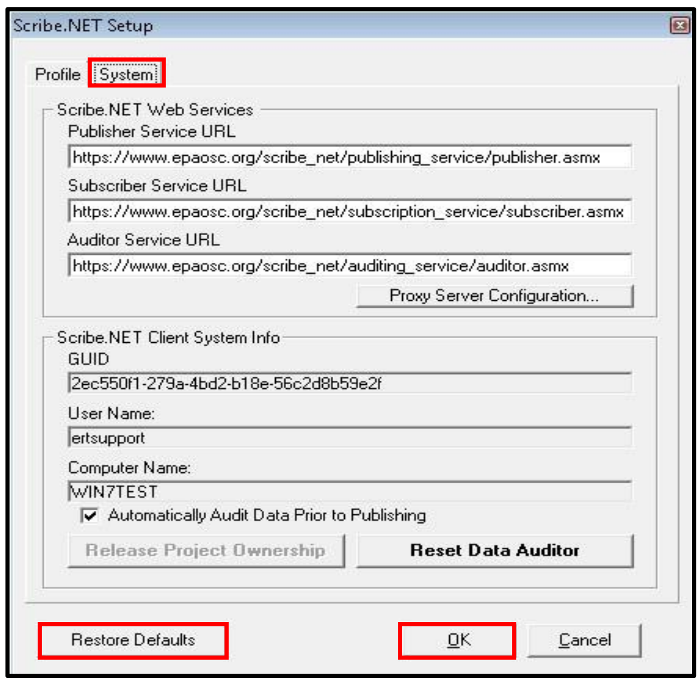
Fill in the fields on the Profile tab and click OK



The information on the System tab does not need to be modified.

To restore system default settings, click on the ‘Restore Default’s’ button.

Click OK

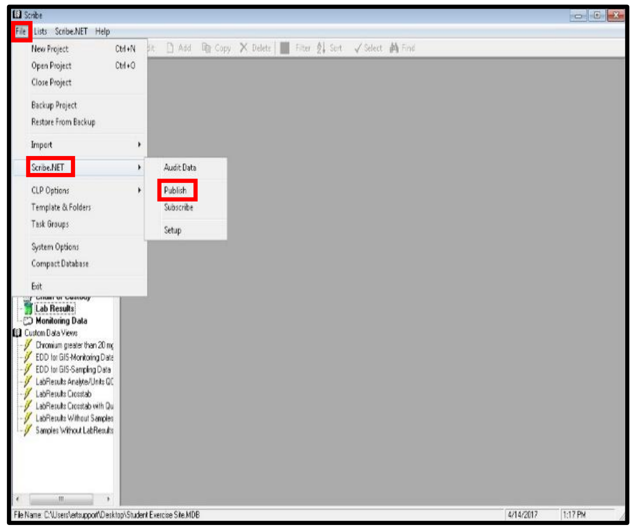


Publish to Scribe.NET

Publishing a project(s) to Scribe.NET stores your project(s) on a secure web server. By Publishing, your data can then be shared through a Subscription. By publishing to Scribe.NET, you have a backup of your project in the event something happens to the data (hard drive crash, lost computer, etc.). Scribe.NET updates the Scribe project each time the project is published.

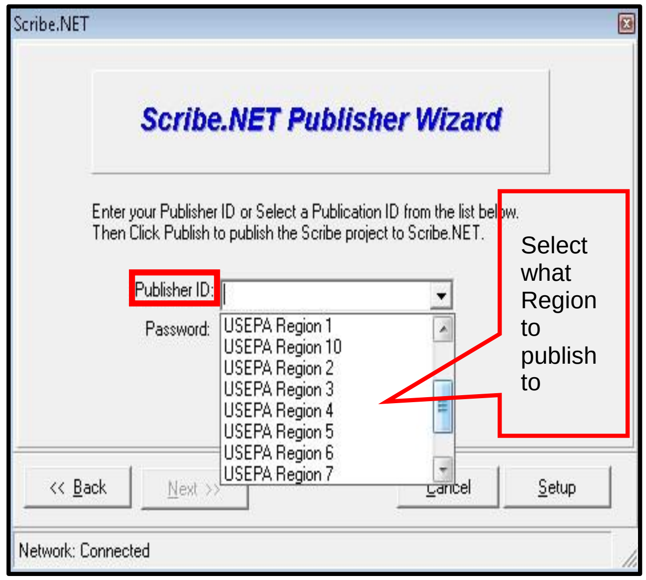
Once your project has been published to Scribe.NET, the computer it was published from becomes the 'owner' of the project. Any subsequent publishing of the project must be done from that computer. In the event the computer is damaged or the owner is no longer responsible for the project and publishing, ownership will need to be released. ***See Release Project Ownership***.

To publish a project to Scribe.NET, click on File | Scribe.NET | Publish

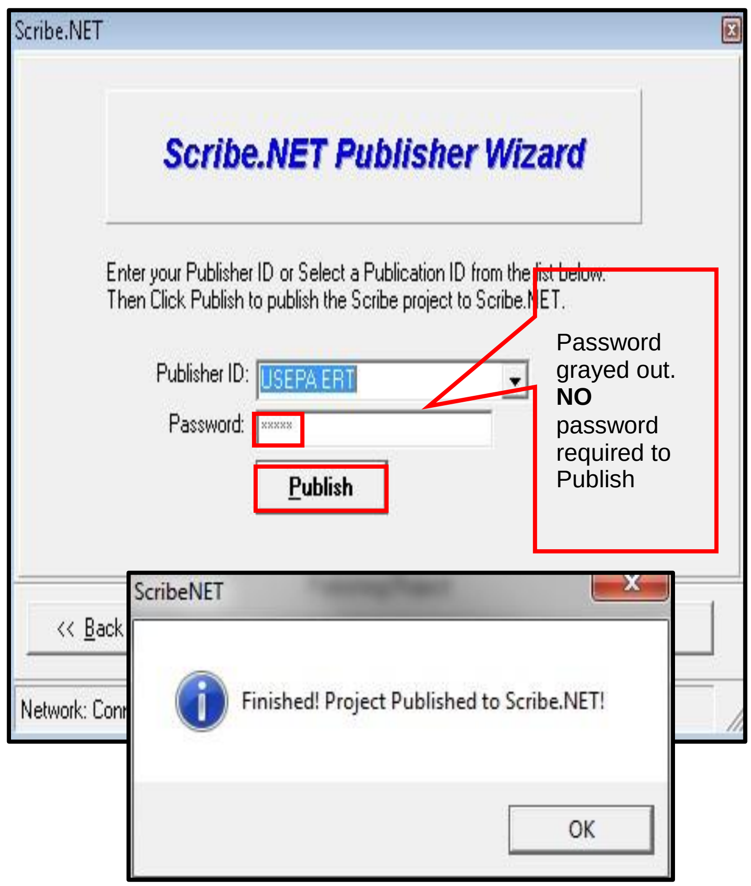


The Scribe.NET Publisher Wizard screen is displayed. Click Next.

Click the dropdown arrow and select the Publisher ID (which Region to publish it to).
Note: You must have an Internet Connection to publish toScribe.NET.

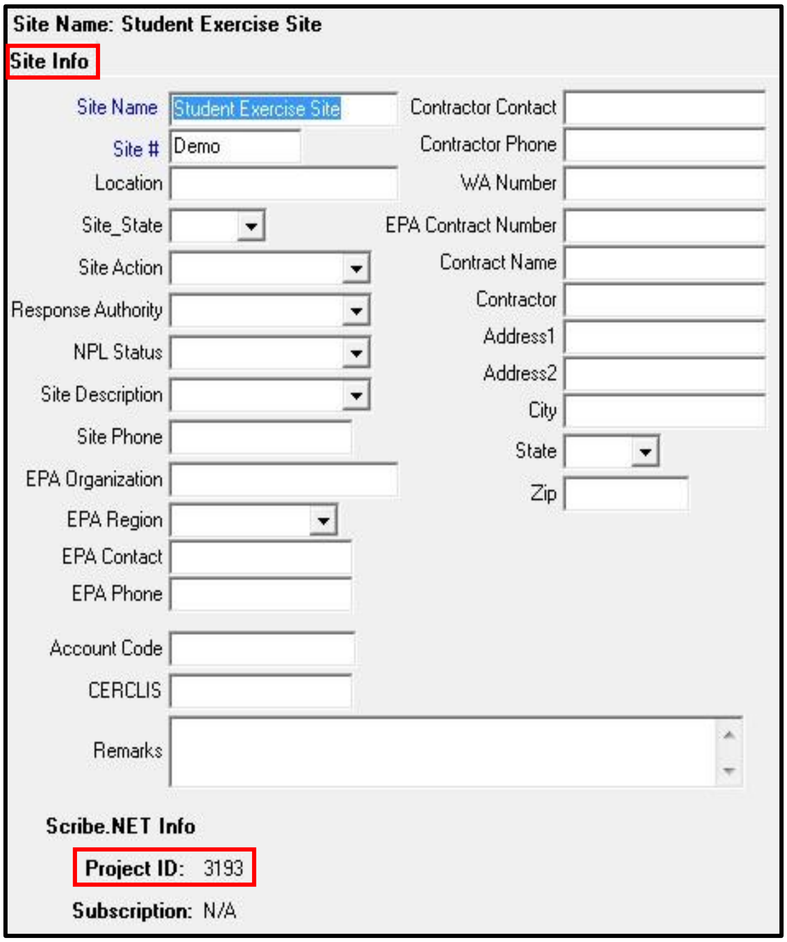


Click Publish. *Note: The password box is grayed out.* ***NO*** *password is required to publish a project to Scribe.NET*



Your project has now been Published to Scribe.NET. When a project has been Published, the project will be stamped with a ProjectID Number which can be located in the Site Info table in your Scribe project.

To request a Subscription, please email ertsupport@epa.gov with the Project ID.

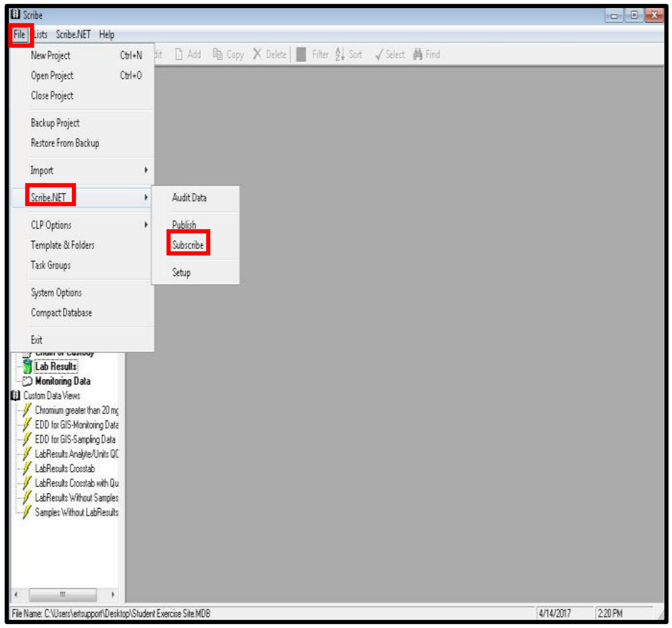


Subscribe to a Project

Subscribing/downloading a published project(s) from Scribe.NET requires a Subscription ID and password. To request a SubscriptionID and password, please contact **ERT Support at 1-800-999-6990 or via email at ertsupport@epa.gov.**

Note: There are several types of Subscriptions that can be setup (database subscription, multiple project subscriptions, etc**.). Please contact ERT Support at 1-800-999-6990 or email at ertsupport@epa.gov for additional information**

To Subscribe to a project from Scribe.NET, click on File | Scribe.NET | Subscribe

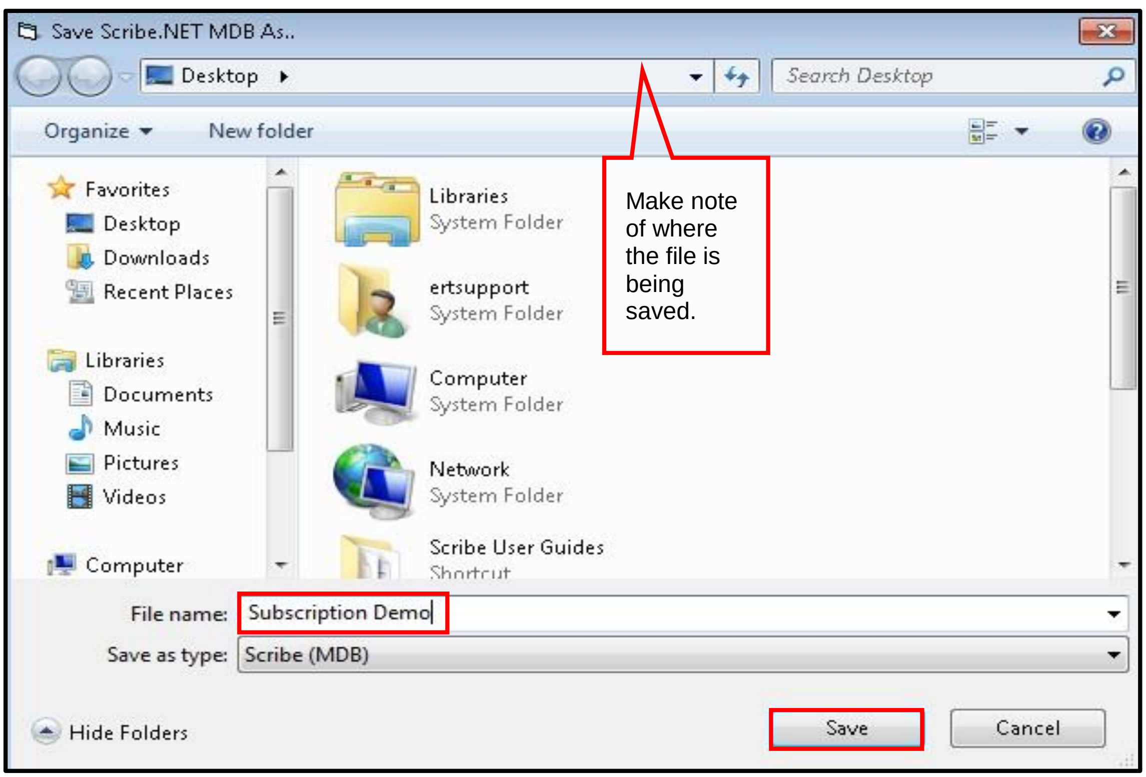


The Scribe.NET Subscriber Wizard screen is displayed. Click Next.

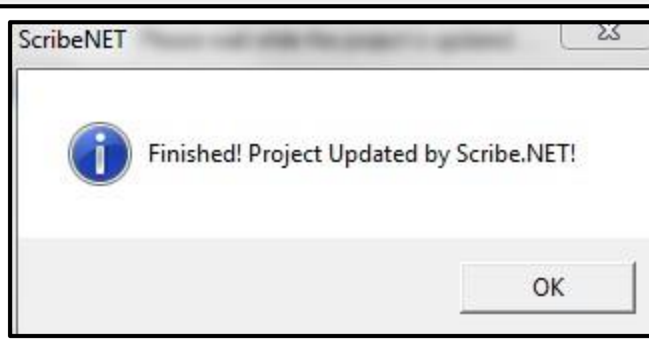
Enter the SubscriptionID and password. Click on the Subscribe button to begin downloading. **Note: You must have an Internet Connection to subscribe to a Scribe.NET project.**

First Time Subscribing

If this is the first time subscribing to this project, you will be prompted to enter a file name. Enter a filename and click Save.



Below are some screenshots of the Subscribing process

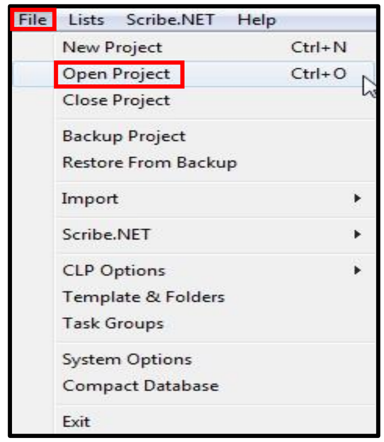


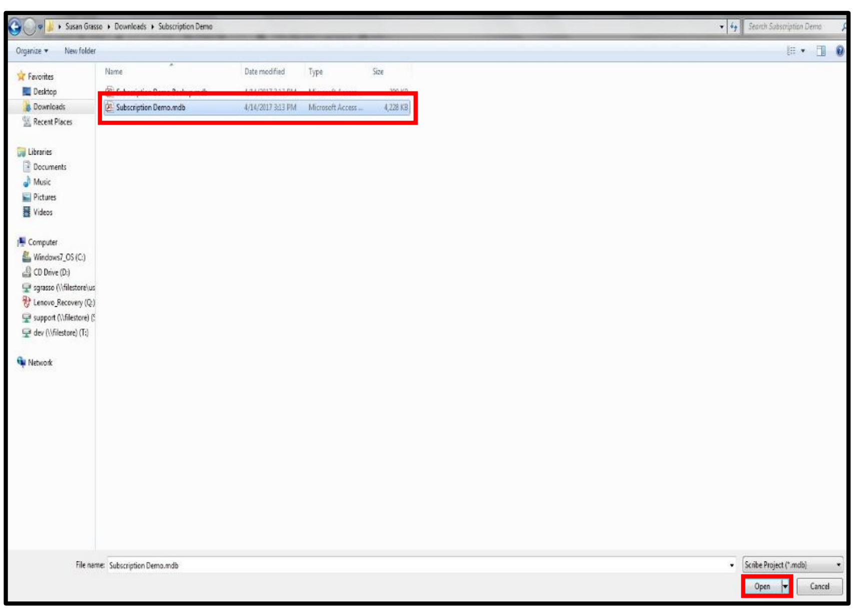
Updating Existing Subscriptions

When Scribe projects have been updated and republished to Scribe.NET, the subscription is automatically updated. A user must **re-subscribe** to update the existing local project file.

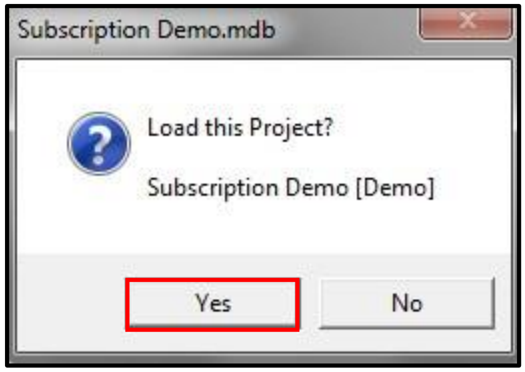
Prior to re-subscribing, open Scribe and **Open** the Scribe project that you will be updating/replacing.

File | Open Project. Browse to the project and Click Open

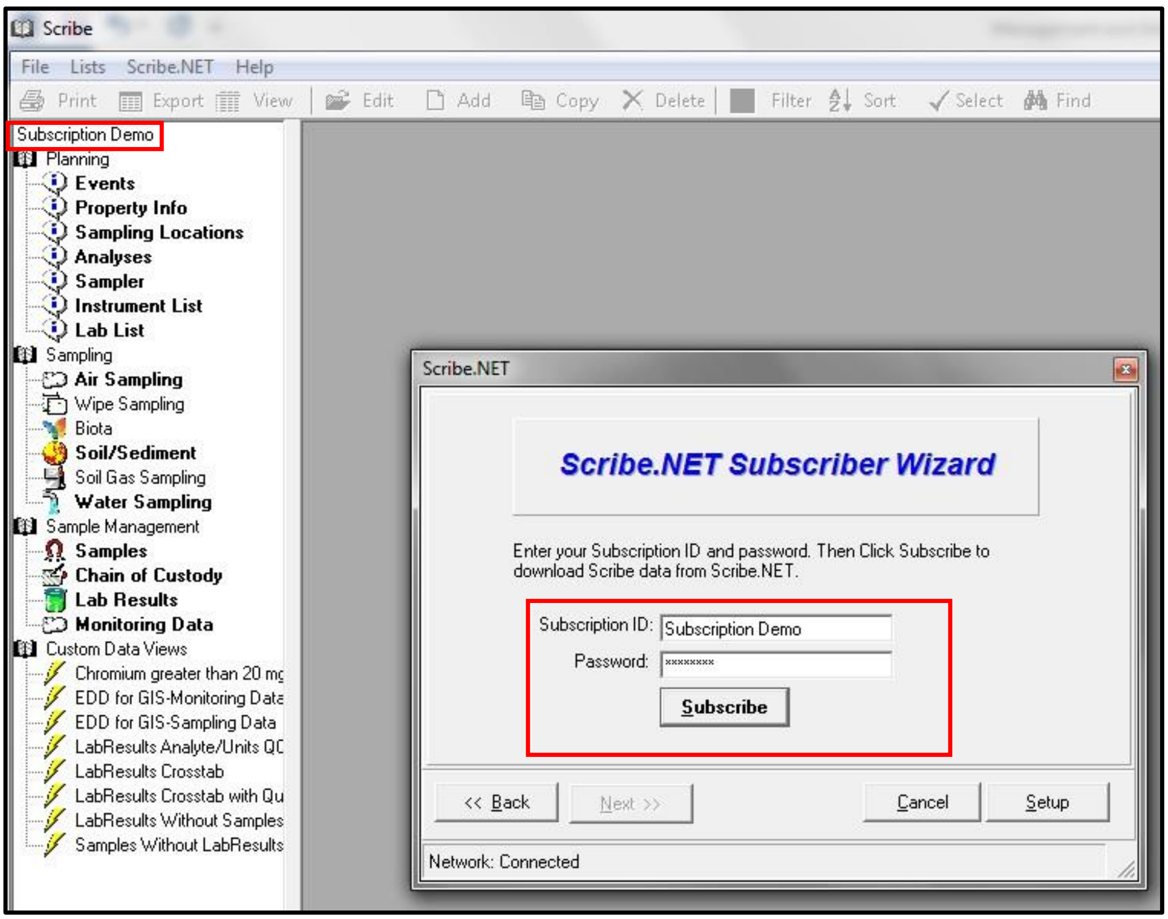




Click Yes to Load this Project.



Verify that you are in the project and click on File | Scribe.NET | Subscribe.
Enter the SubscriptionID and Password.
Click Subscribe.

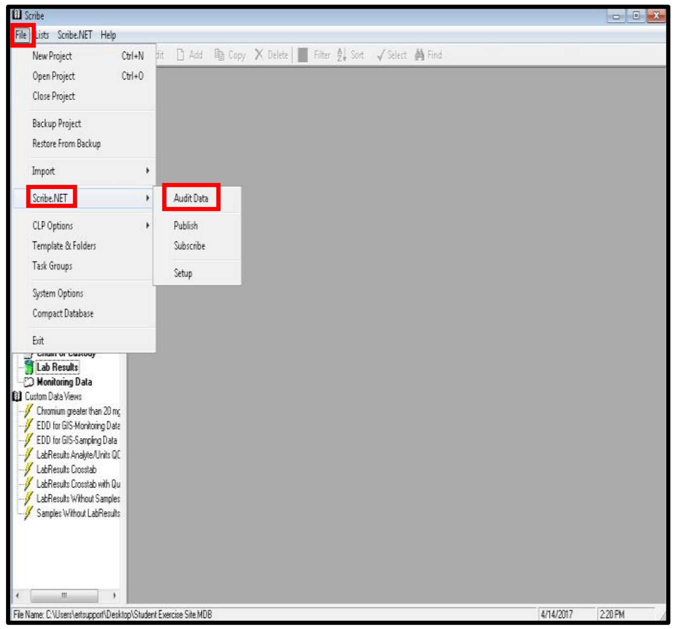


Audit Data

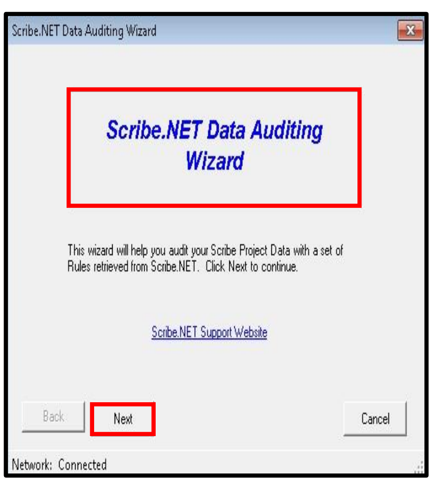
The data Auditor is a tool that allows you to audit the data in a Scribe project against a set of valid values. Valid Values can be established on a site specific basis, as a regionally based set or on a national level. Auditing is done by comparing the data in Scribe project to one or many 'rules'. A Scribe project can be audited against any set of rules uploaded to Scribe.NET. In order to audit a Scribe project, the Scribe project must be open in Scribe and the computer must have an active internet connection.

Please contact ERT Support at 1-800-999-6990 or ertsupport@epa.gov for additional information on creating an Auditor Ruleset. Users must have a working knowledge of creating queries in MS Access, as well as knowledge of the table names and field names in their Scribe Projects.

To Audit a Scribe project, click on File | Scribe.NET | Audit Data



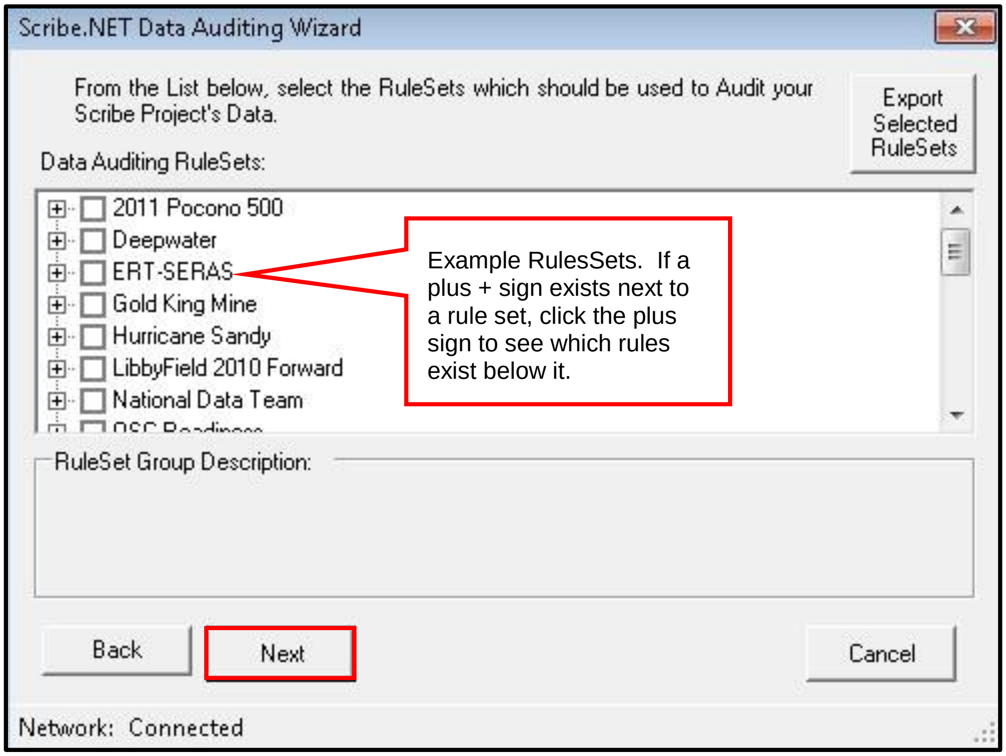
The Scribe.NET Data Auditing Wizard will display. Click Next. The RuleSets will begin downloading.

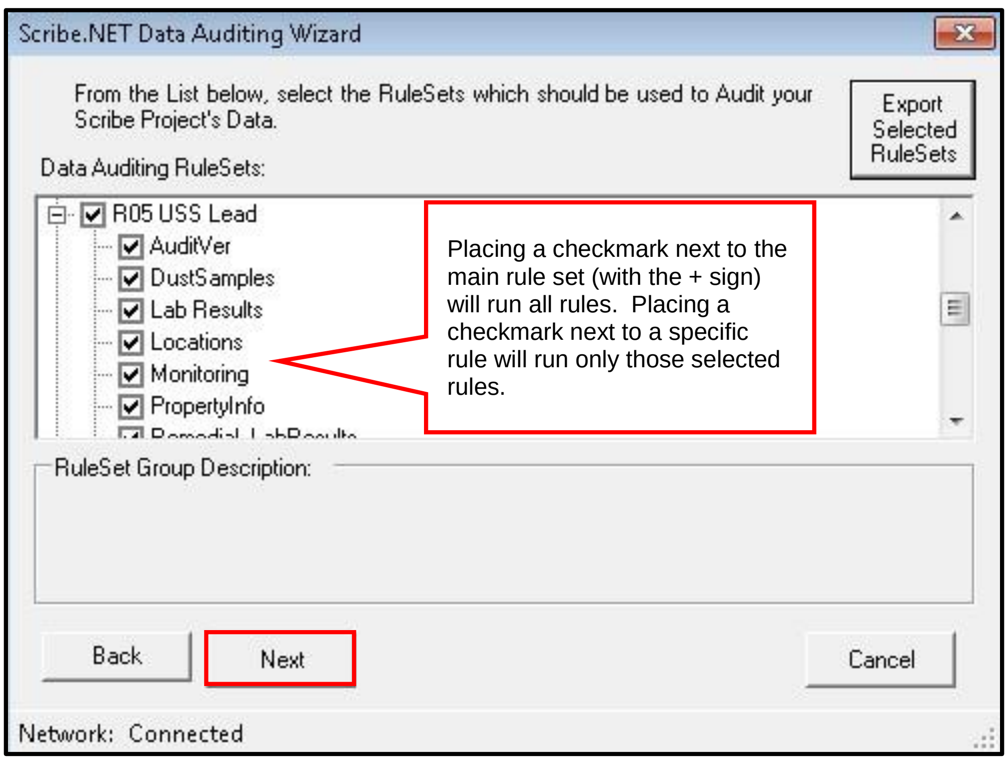


A list of all the RuleSets that have been uploaded to Scribe.NET will display.

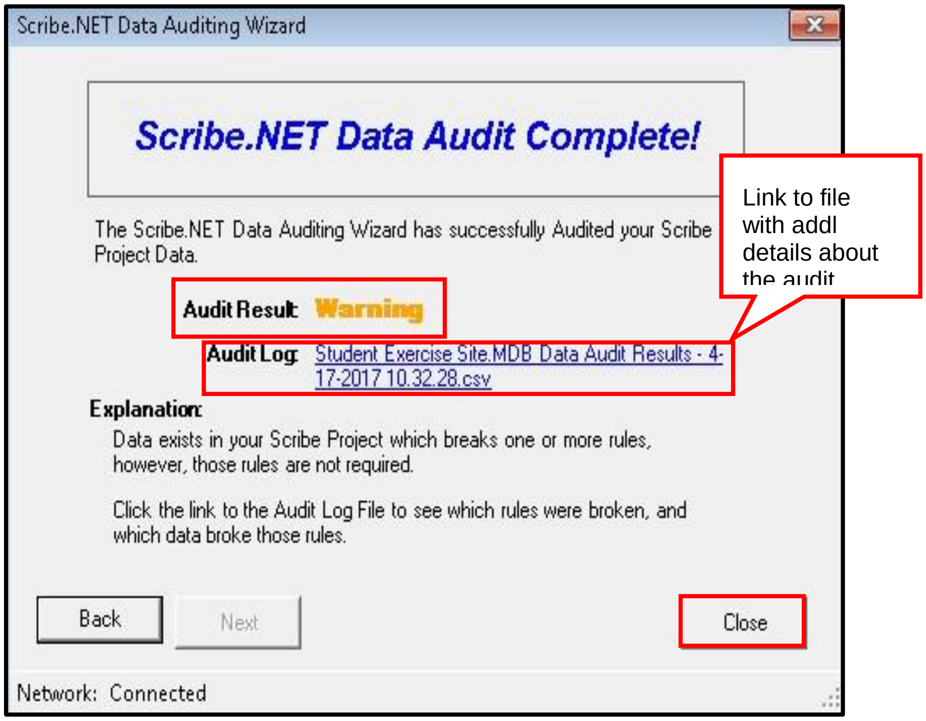
Select which RuleSet and which Rule(s) will be used to Audit your Scribe Project's Data.

Click Next.





When auditing is complete, a dialog box will display. This dialog box will indicate the error severity (Warning or Error) of any issues found and will provide a link to a file containing additional details about the audit results.



Note: *The error severity determines if a Scribe project can be published to Scribe.NET. An Audit Result of Warning indicates that some records don't meet the data requirement, but* ***can*** *be published to Scribe.NET.*

An Audit Result of Error indicates that some records don't meet the data requirements and ***cannot*** *be published to Scribe.NET until the issues are corrected.*

Scribe.NET Data Audit - 4/17/2017 10:50:02 AM

ProjectFilePath: C:\Users\sgrasso.CAMELOT\Downloads\Subscription Demo\Subscription Demo.mdb

Auditing Data Against RULESET "[551]Location Table" - RULE "[3725]Location_Lat_Long_Blank":

Warning: The following records do not contain Latitude and/or Longitude

LocationID	Site_No	Location	PropertyII	LocationD	LocationZ	Latitude	Longitude	Altitude	GPS_PDOI
21	Demo	B1							
22	Demo	B2							
23	Demo	B3							
24	Demo	B4							
25	Demo	B5							
6	Demo	NE Fence Line							
7	Demo	NW Fence Line							
8	Demo	SE Fence Line							
9	Demo	SW Fence Line							

Example of data not containing a Latitude and/or Longitude. These records don't meet the data requirements.

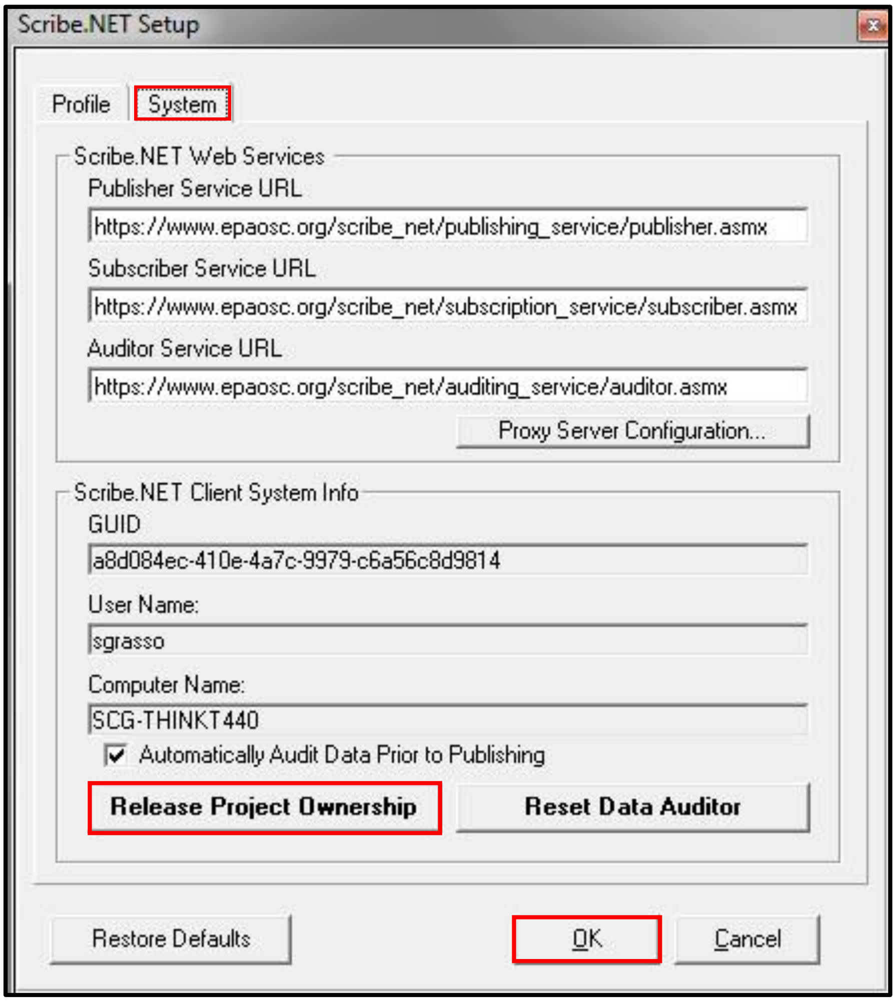
Auditing Data Against RULESET "[552]Samples Table" - RULE "[3726]Samples_Matrix_Blank": Data OK.

Example of how data is displayed in the audit report

Release Project Ownership

Once a Scribe project has been published to Scribe.NET, the computer it was published from becomes the 'owner' of the project. Any subsequent publishing of the project must be done from that computer. In the event the computer is damaged or the owner is no longer responsible for the project and publishing, ownership will need to be released.

Click on File | Scribe.NET | Setup. Click on the System tab. Click on Release Project Ownership.



Note: *If Project Ownership cannot be released from the computer, please contact ERT Support at 1-800-999-6990 or email at ertsupport@epa.gov.*

APPENDIX D

LABORATORY ANALYTICAL DATA PACKAGE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 2 Laboratory
2890 Woodbridge Avenue
Edison , New Jersey 08837
732-906-6886 Phone
732-906-6165 Fax

September 27, 2022

Robert Finke
Hazardous Waste Support Branch
LSASD/HWSB
Edison, NJ 08837

RE: Olean Well Field - 2208010

Enclosed are the results of analyses for samples received by the laboratory on 08/17/2022. The signature below reflects the laboratory's approval of the reported results. If you have any questions concerning this report, please refer to Project Number 2208010 and contact the laboratory.

Sincerely,

John R. Bourbon
Chief, LSASD/LB

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 2 Laboratory

Final Report

Project: Olean Well Field - 2208010

Project Number: 2208010

Project Narrative:

The National Environmental Laboratory Accreditation Conference Institute (TNI) is a voluntary environmental laboratory accreditation association of State and Federal agencies. TNI established and promoted a National Environmental Laboratory Accreditation Program (NELAP) that provides a uniform set of standards for the generation of environmental data that are of known and defensible quality. The EPA Region 2 Laboratory is NELAP accredited. The Laboratory tests that are accredited have met all the requirements established under the TNI Standards.

Condition Comments

None

Comment(s):

The "Sample Analysis Date and Time" is included in the results section for any analyte with a prescribed holding time of 72 hours or less.

Re-analysis of Tetratchloroethene for samples #2208010-#02, #04 and #06 were run outside of the holding time and qualified with "J".

Data Qualifier(s):

U- The analyte was not detected at or above the Reporting Limit.
J- The identification of the analyte is acceptable; the reported value is an estimate.
K- The identification of the analyte is acceptable; the reported value may be biased high.
L- The identification of the analyte is acceptable; the reported value may be biased low.
NJ- There is presumptive evidence that the analyte is present; the analyte is reported as a tentative identification. The reported value is an estimate.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 2 Laboratory

Final Report

Project: Olean Well Field - 2208010

Project Number: 2208010

Reporting Limit(s):

The Laboratory was able to achieve the appropriate limit for each analyte requested.

SUMMARY REPORT FOR SAMPLES

Field ID	Laboratory ID	Matrix	Date Sampled	Date Received
BFYY4	2208010-01	Aqueous	08/16/2022 10:45	08/17/2022 19:30
BFYY5	2208010-02	Aqueous	08/16/2022 12:20	08/17/2022 19:30
BFYY6	2208010-03	Aqueous	08/16/2022 15:00	08/17/2022 19:30
BFYY7	2208010-04	Aqueous	08/16/2022 14:45	08/17/2022 19:30
BFYY8	2208010-05	Aqueous	08/16/2022 15:45	08/17/2022 19:30
BFYY9	2208010-06	Aqueous	08/16/2022 14:45	08/17/2022 19:30
BFYZ0	2208010-07	Aqueous	08/16/2022 09:15	08/17/2022 19:30
BFYZ1	2208010-08	Aqueous	08/16/2022 09:00	08/17/2022 19:30
BFYZ2	2208010-09	Aqueous	08/16/2022 10:00	08/17/2022 19:30
BFYZ3	2208010-10	Aqueous	08/16/2022 10:05	08/17/2022 19:30
BFYZ4	2208010-11	Aqueous	08/16/2022 10:10	08/17/2022 19:30
BFYZ5	2208010-12	Aqueous	08/16/2022 10:15	08/17/2022 19:30
BFYZ6	2208010-13	Aqueous	08/16/2022 10:20	08/17/2022 19:30

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 2 Laboratory

Final Report

Project: Olean Well Field - 2208010

Project Number: 2208010

SUMMARY REPORT FOR METHODS

Analysis	Method	Certification	Matrix
E-Metals ICPMS TAL	EPA 200.8 SOP C-112 Rev 3.8	NELAP	Aqueous
VOA Trace/SF	EPA DW-1 Rev 2.7	NELAP	Aqueous

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 2 Laboratory

Final Report

Project: Olean Well Field - 2208010

Project Number: 2208010

Analyte	Result	Qualifier	Reporting Limit	Units	Batch	Date and Time of Analysis*
Field ID: BFYY4				**Sample ID: 2208010-01**		
VOA-TRACE GCMS						
Dichlorodifluoromethane	---	U L	0.500	ug/L	B208160	
Chloromethane	---	U L	0.500	ug/L	B208160	
Vinyl Chloride	15.8		0.500	ug/L	B208160	
Bromomethane	---	U	0.500	ug/L	B208160	
Chloroethane	0.510		0.500	ug/L	B208160	
Trichlorofluoromethane	---	U	0.500	ug/L	B208160	
1,1-Dichloroethene	---	U	0.500	ug/L	B208160	
1,1,2-Trichloro-1,2,2-Trifluoroethane	---	U	0.500	ug/L	B208160	
Carbon Disulfide	---	U	0.500	ug/L	B208160	
Acetone	---	U	5.00	ug/L	B208160	
Methyl Acetate	---	U	0.500	ug/L	B208160	
Methylene Chloride	---	U	0.500	ug/L	B208160	
trans-1,2-Dichloroethene	---	U	0.500	ug/L	B208160	
Methyl tert-Butyl Ether	---	U	0.500	ug/L	B208160	
1,1-Dichloroethane	---	U	0.500	ug/L	B208160	
cis-1,2-Dichloroethene	8.94		0.500	ug/L	B208160	
2-Butanone	---	U	5.00	ug/L	B208160	
Bromochloromethane	---	U	0.500	ug/L	B208160	
Chloroform	---	U	0.500	ug/L	B208160	
1,1,1-Trichloroethane	---	U	0.500	ug/L	B208160	
Cyclohexane	---	U	0.500	ug/L	B208160	
Carbon Tetrachloride	---	U	0.500	ug/L	B208160	
Benzene	---	U	0.500	ug/L	B208160	
1,2-Dichloroethane	---	U	0.500	ug/L	B208160	
Trichloroethene	---	U	0.500	ug/L	B208160	
1,2-Dichloropropane	---	U	0.500	ug/L	B208160	
Bromodichloromethane	---	U	0.500	ug/L	B208160	
cis-1,3-Dichloropropene	---	U	0.500	ug/L	B208160	
4-Methyl-2-Pentanone	---	U	5.00	ug/L	B208160	

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Project: Olean Well Field - 2208010

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Analyte	Result	Qualifier	Reporting Limit	Units	Batch	Date and Time of Analysis*
Field ID: BFYY4				**Sample ID: 2208010-01**		
VOA-TRACE GCMS						
Toluene	---	U	0.500	ug/L	B208160	
trans-1,3-Dichloropropene	---	U	0.500	ug/L	B208160	
1,1,2-Trichloroethane	---	U	0.500	ug/L	B208160	
Tetrachloroethene	---	U	0.500	ug/L	B208160	
Methylcyclohexane	---	U	0.500	ug/L	B208160	
Dibromochloromethane	---	U	0.500	ug/L	B208160	
1,2-Dibromoethane	---	U	0.500	ug/L	B208160	
2-Hexanone	---	U	5.00	ug/L	B208160	
Chlorobenzene	---	U	0.500	ug/L	B208160	
Ethylbenzene	---	U	0.500	ug/L	B208160	
m,p-Xylene	---	U	0.500	ug/L	B208160	
o-Xylene	---	U	0.500	ug/L	B208160	
Styrene	---	U	0.500	ug/L	B208160	
Bromoform	---	U	0.500	ug/L	B208160	
Isopropylbenzene	---	U	0.500	ug/L	B208160	
1,1,2,2-Tetrachloroethane	---	U	0.500	ug/L	B208160	
1,3-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,4-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,2-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,2-Dibromo-3-Chloropropane	---	U	0.500	ug/L	B208160	
1,2,4-Trichlorobenzene	---	U	0.500	ug/L	B208160	
1,2,3-Trichlorobenzene	---	U	0.500	ug/L	B208160	
Field ID: BFYY5				**Sample ID: 2208010-02**		
VOA-TRACE GCMS						
Dichlorodifluoromethane	---	U L	0.500	ug/L	B208160	
Chloromethane	0.880	L	0.500	ug/L	B208160	
Vinyl Chloride	522		25.0	ug/L	B208160	
Bromomethane	---	U	0.500	ug/L	B208160	
Chloroethane	---	U	0.500	ug/L	B208160	

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Analyte	Result	Qualifier	Reporting Limit	Units	Batch	Date and Time of Analysis*
Field ID: BFYY5				**Sample ID: 2208010-02**		
VOA-TRACE GCMS						
Trichlorofluoromethane	---	U	0.500	ug/L	B208160	
1,1-Dichloroethene	13.6		0.500	ug/L	B208160	
1,1,2-Trichloro-1,2,2-Trifluoroethane	---	U	0.500	ug/L	B208160	
Carbon Disulfide	---	U	0.500	ug/L	B208160	
Acetone	---	U	5.00	ug/L	B208160	
Methyl Acetate	---	U	0.500	ug/L	B208160	
Methylene Chloride	---	U	0.500	ug/L	B208160	
trans-1,2-Dichloroethene	11.5		0.500	ug/L	B208160	
Methyl tert-Butyl Ether	---	U	0.500	ug/L	B208160	
1,1-Dichloroethane	0.560		0.500	ug/L	B208160	
cis-1,2-Dichloroethene	---	U	0.500	ug/L	B208160	
2-Butanone	---	U	5.00	ug/L	B208160	
Bromochloromethane	---	U	0.500	ug/L	B208160	
Chloroform	---	U	0.500	ug/L	B208160	
1,1,1-Trichloroethane	---	U	0.500	ug/L	B208160	
Cyclohexane	---	U	0.500	ug/L	B208160	
Carbon Tetrachloride	---	U	0.500	ug/L	B208160	
Benzene	---	U	0.500	ug/L	B208160	
1,2-Dichloroethane	---	U	0.500	ug/L	B208160	
Trichloroethene	2640		25.0	ug/L	B208160	
1,2-Dichloropropane	---	U	0.500	ug/L	B208160	
Bromodichloromethane	---	U	0.500	ug/L	B208160	
cis-1,3-Dichloropropene	---	U	0.500	ug/L	B208160	
4-Methyl-2-Pentanone	---	U	5.00	ug/L	B208160	
Toluene	---	U	0.500	ug/L	B208160	
trans-1,3-Dichloropropene	---	U	0.500	ug/L	B208160	
1,1,2-Trichloroethane	---	U	0.500	ug/L	B208160	
Tetrachloroethene	17000	J	500	ug/L	B209001	
Methylcyclohexane	---	U	0.500	ug/L	B208160	

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Analyte	Result	Qualifier	Reporting Limit	Units	Batch	Date and Time of Analysis*
Field ID: BFYY5				**Sample ID: 2208010-02**		
VOA-TRACE GCMS						
Dibromochloromethane	---	U	0.500	ug/L	B208160	
1,2-Dibromoethane	---	U	0.500	ug/L	B208160	
2-Hexanone	---	U	5.00	ug/L	B208160	
Chlorobenzene	---	U	0.500	ug/L	B208160	
Ethylbenzene	---	U	0.500	ug/L	B208160	
m,p-Xylene	---	U	0.500	ug/L	B208160	
o-Xylene	---	U	0.500	ug/L	B208160	
Styrene	---	U	0.500	ug/L	B208160	
Bromoform	---	U	0.500	ug/L	B208160	
Isopropylbenzene	---	U	0.500	ug/L	B208160	
1,1,2,2-Tetrachloroethane	---	U	0.500	ug/L	B208160	
1,3-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,4-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,2-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,2-Dibromo-3-Chloropropane	---	U	0.500	ug/L	B208160	
1,2,4-Trichlorobenzene	---	U	0.500	ug/L	B208160	
1,2,3-Trichlorobenzene	---	U	0.500	ug/L	B208160	
Field ID: BFYY6				**Sample ID: 2208010-03**		
VOA-TRACE GCMS						
Dichlorodifluoromethane	---	U L	0.500	ug/L	B208160	
Chloromethane	---	U L	0.500	ug/L	B208160	
Vinyl Chloride	---	U	0.500	ug/L	B208160	
Bromomethane	---	U	0.500	ug/L	B208160	
Chloroethane	---	U	0.500	ug/L	B208160	
Trichlorofluoromethane	---	U	0.500	ug/L	B208160	
1,1-Dichloroethene	---	U	0.500	ug/L	B208160	
1,1,2-Trichloro-1,2,2-Trifluoroethane	---	U	0.500	ug/L	B208160	
Carbon Disulfide	---	U	0.500	ug/L	B208160	
Acetone	---	U	5.00	ug/L	B208160	

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Analyte	Result	Qualifier	Reporting Limit	Units	Batch	Date and Time of Analysis*
Field ID: BFYY6				**Sample ID: 2208010-03**		
VOA-TRACE GCMS						
Methyl Acetate	---	U	0.500	ug/L	B208160	
Methylene Chloride	---	U	0.500	ug/L	B208160	
trans-1,2-Dichloroethene	---	U	0.500	ug/L	B208160	
Methyl tert-Butyl Ether	---	U	0.500	ug/L	B208160	
1,1-Dichloroethane	---	U	0.500	ug/L	B208160	
cis-1,2-Dichloroethene	17.2		0.500	ug/L	B208160	
2-Butanone	---	U	5.00	ug/L	B208160	
Bromochloromethane	---	U	0.500	ug/L	B208160	
Chloroform	---	U	0.500	ug/L	B208160	
1,1,1-Trichloroethane	---	U	0.500	ug/L	B208160	
Cyclohexane	---	U	0.500	ug/L	B208160	
Carbon Tetrachloride	---	U	0.500	ug/L	B208160	
Benzene	---	U	0.500	ug/L	B208160	
1,2-Dichloroethane	---	U	0.500	ug/L	B208160	
Trichloroethene	15.2		0.500	ug/L	B208160	
1,2-Dichloropropane	---	U	0.500	ug/L	B208160	
Bromodichloromethane	---	U	0.500	ug/L	B208160	
cis-1,3-Dichloropropene	---	U	0.500	ug/L	B208160	
4-Methyl-2-Pentanone	---	U	5.00	ug/L	B208160	
Toluene	---	U	0.500	ug/L	B208160	
trans-1,3-Dichloropropene	---	U	0.500	ug/L	B208160	
1,1,2-Trichloroethane	---	U	0.500	ug/L	B208160	
Tetrachloroethene	57.0		0.500	ug/L	B208160	
Methylcyclohexane	---	U	0.500	ug/L	B208160	
Dibromochloromethane	---	U	0.500	ug/L	B208160	
1,2-Dibromoethane	---	U	0.500	ug/L	B208160	
2-Hexanone	---	U	5.00	ug/L	B208160	
Chlorobenzene	---	U	0.500	ug/L	B208160	
Ethylbenzene	---	U	0.500	ug/L	B208160	

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Analyte	Result	Qualifier	Reporting Limit	Units	Batch	Date and Time of Analysis*
Field ID: BFYY6				**Sample ID: 2208010-03**		
VOA-TRACE GCMS						
m,p-Xylene	---	U	0.500	ug/L	B208160	
o-Xylene	---	U	0.500	ug/L	B208160	
Styrene	---	U	0.500	ug/L	B208160	
Bromoform	---	U	0.500	ug/L	B208160	
Isopropylbenzene	---	U	0.500	ug/L	B208160	
1,1,2,2-Tetrachloroethane	---	U	0.500	ug/L	B208160	
1,3-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,4-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,2-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,2-Dibromo-3-Chloropropane	---	U	0.500	ug/L	B208160	
1,2,4-Trichlorobenzene	---	U	0.500	ug/L	B208160	
1,2,3-Trichlorobenzene	---	U	0.500	ug/L	B208160	
Field ID: BFYY7				**Sample ID: 2208010-04**		
VOA-TRACE GCMS						
Dichlorodifluoromethane	---	U L	0.500	ug/L	B208160	
Chloromethane	0.820	L	0.500	ug/L	B208160	
Vinyl Chloride	14.6		0.500	ug/L	B208160	
Bromomethane	---	U	0.500	ug/L	B208160	
Chloroethane	---	U	0.500	ug/L	B208160	
Trichlorofluoromethane	---	U	0.500	ug/L	B208160	
1,1-Dichloroethene	2.29		0.500	ug/L	B208160	
1,1,2-Trichloro-1,2,2-Trifluoroethane	---	U	0.500	ug/L	B208160	
Carbon Disulfide	---	U	0.500	ug/L	B208160	
Acetone	---	U	5.00	ug/L	B208160	
Methyl Acetate	---	U	0.500	ug/L	B208160	
Methylene Chloride	---	U	0.500	ug/L	B208160	
trans-1,2-Dichloroethene	2.67		0.500	ug/L	B208160	
Methyl tert-Butyl Ether	---	U	0.500	ug/L	B208160	
1,1-Dichloroethane	---	U	0.500	ug/L	B208160	

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Analyte	Result	Qualifier	Reporting Limit	Units	Batch	Date and Time of Analysis*
Field ID: BFYY7					**Sample ID: 2208010-04**	
VOA-TRACE GCMS						
cis-1,2-Dichloroethene	626		25.0	ug/L	B208160	
2-Butanone	---	U	5.00	ug/L	B208160	
Bromochloromethane	---	U	0.500	ug/L	B208160	
Chloroform	---	U	0.500	ug/L	B208160	
1,1,1-Trichloroethane	---	U	0.500	ug/L	B208160	
Cyclohexane	---	U	0.500	ug/L	B208160	
Carbon Tetrachloride	---	U	0.500	ug/L	B208160	
Benzene	---	U	0.500	ug/L	B208160	
1,2-Dichloroethane	---	U	0.500	ug/L	B208160	
Trichloroethene	459		25.0	ug/L	B208160	
1,2-Dichloropropane	---	U	0.500	ug/L	B208160	
Bromodichloromethane	---	U	0.500	ug/L	B208160	
cis-1,3-Dichloropropene	---	U	0.500	ug/L	B208160	
4-Methyl-2-Pentanone	---	U	5.00	ug/L	B208160	
Toluene	---	U	0.500	ug/L	B208160	
trans-1,3-Dichloropropene	---	U	0.500	ug/L	B208160	
1,1,2-Trichloroethane	---	U	0.500	ug/L	B208160	
Tetrachloroethene	4680	J	50.0	ug/L	B209001	
Methylcyclohexane	---	U	0.500	ug/L	B208160	
Dibromochloromethane	---	U	0.500	ug/L	B208160	
1,2-Dibromoethane	---	U	0.500	ug/L	B208160	
2-Hexanone	---	U	5.00	ug/L	B208160	
Chlorobenzene	---	U	0.500	ug/L	B208160	
Ethylbenzene	---	U	0.500	ug/L	B208160	
m,p-Xylene	---	U	0.500	ug/L	B208160	
o-Xylene	---	U	0.500	ug/L	B208160	
Styrene	---	U	0.500	ug/L	B208160	
Bromoform	---	U	0.500	ug/L	B208160	
Isopropylbenzene	---	U	0.500	ug/L	B208160	

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Analyte	Result	Qualifier	Reporting Limit	Units	Batch	Date and Time of Analysis*
Field ID: BFYY7					**Sample ID: 2208010-04**	
VOA-TRACE GCMS						
1,1,2,2-Tetrachloroethane	---	U	0.500	ug/L	B208160	
1,3-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,4-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,2-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,2-Dibromo-3-Chloropropane	---	U	0.500	ug/L	B208160	
1,2,4-Trichlorobenzene	---	U	0.500	ug/L	B208160	
1,2,3-Trichlorobenzene	---	U	0.500	ug/L	B208160	
Field ID: BFYY8					**Sample ID: 2208010-05**	
VOA-TRACE GCMS						
Dichlorodifluoromethane	---	U L	0.500	ug/L	B208160	
Chloromethane	---	U L	0.500	ug/L	B208160	
Vinyl Chloride	---	U	0.500	ug/L	B208160	
Bromomethane	---	U	0.500	ug/L	B208160	
Chloroethane	---	U	0.500	ug/L	B208160	
Trichlorofluoromethane	---	U	0.500	ug/L	B208160	
1,1-Dichloroethene	---	U	0.500	ug/L	B208160	
1,1,2-Trichloro-1,2,2-Trifluoroethane	---	U	0.500	ug/L	B208160	
Carbon Disulfide	---	U	0.500	ug/L	B208160	
Acetone	---	U	5.00	ug/L	B208160	
Methyl Acetate	---	U	0.500	ug/L	B208160	
Methylene Chloride	---	U	0.500	ug/L	B208160	
trans-1,2-Dichloroethene	---	U	0.500	ug/L	B208160	
Methyl tert-Butyl Ether	---	U	0.500	ug/L	B208160	
1,1-Dichloroethane	---	U	0.500	ug/L	B208160	
cis-1,2-Dichloroethene	0.530		0.500	ug/L	B208160	
2-Butanone	---	U	5.00	ug/L	B208160	
Bromochloromethane	---	U	0.500	ug/L	B208160	
Chloroform	---	U	0.500	ug/L	B208160	
1,1,1-Trichloroethane	---	U	0.500	ug/L	B208160	

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Analyte	Result	Qualifier	Reporting Limit	Units	Batch	Date and Time of Analysis*
Field ID: BFYY8					**Sample ID: 2208010-05**	
VOA-TRACE GCMS						
Cyclohexane	---	U	0.500	ug/L	B208160	
Carbon Tetrachloride	---	U	0.500	ug/L	B208160	
Benzene	---	U	0.500	ug/L	B208160	
1,2-Dichloroethane	---	U	0.500	ug/L	B208160	
Trichloroethene	1.12		0.500	ug/L	B208160	
1,2-Dichloropropane	---	U	0.500	ug/L	B208160	
Bromodichloromethane	---	U	0.500	ug/L	B208160	
cis-1,3-Dichloropropene	---	U	0.500	ug/L	B208160	
4-Methyl-2-Pentanone	---	U	5.00	ug/L	B208160	
Toluene	---	U	0.500	ug/L	B208160	
trans-1,3-Dichloropropene	---	U	0.500	ug/L	B208160	
1,1,2-Trichloroethane	---	U	0.500	ug/L	B208160	
Tetrachloroethene	1.78	L	0.500	ug/L	B208160	
Methylcyclohexane	---	U	0.500	ug/L	B208160	
Dibromochloromethane	---	U	0.500	ug/L	B208160	
1,2-Dibromoethane	---	U	0.500	ug/L	B208160	
2-Hexanone	---	U	5.00	ug/L	B208160	
Chlorobenzene	---	U	0.500	ug/L	B208160	
Ethylbenzene	---	U	0.500	ug/L	B208160	
m,p-Xylene	---	U	0.500	ug/L	B208160	
o-Xylene	---	U	0.500	ug/L	B208160	
Styrene	---	U	0.500	ug/L	B208160	
Bromoform	---	U	0.500	ug/L	B208160	
Isopropylbenzene	---	U	0.500	ug/L	B208160	
1,1,2,2-Tetrachloroethane	---	U	0.500	ug/L	B208160	
1,3-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,4-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,2-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,2-Dibromo-3-Chloropropane	---	U	0.500	ug/L	B208160	

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Field ID: BFYY8				**Sample ID: 2208010-05**		
VOA-TRACE GCMS						
1,2,4-Trichlorobenzene	---	U	0.500	ug/L	B208160	
1,2,3-Trichlorobenzene	---	U	0.500	ug/L	B208160	
Field ID: BFYY9				**Sample ID: 2208010-06**		
VOA-TRACE GCMS						
Dichlorodifluoromethane	---	U L	0.500	ug/L	B208160	
Chloromethane	---	U L	0.500	ug/L	B208160	
Vinyl Chloride	15.4		0.500	ug/L	B208160	
Bromomethane	---	U	0.500	ug/L	B208160	
Chloroethane	---	U	0.500	ug/L	B208160	
Trichlorofluoromethane	---	U	0.500	ug/L	B208160	
1,1-Dichloroethene	2.48		0.500	ug/L	B208160	
1,1,2-Trichloro-1,2,2-Trifluoroethane	---	U	0.500	ug/L	B208160	
Carbon Disulfide	---	U	0.500	ug/L	B208160	
Acetone	---	U	5.00	ug/L	B208160	
Methyl Acetate	---	U	0.500	ug/L	B208160	
Methylene Chloride	---	U	0.500	ug/L	B208160	
trans-1,2-Dichloroethene	2.84		0.500	ug/L	B208160	
Methyl tert-Butyl Ether	---	U	0.500	ug/L	B208160	
1,1-Dichloroethane	---	U	0.500	ug/L	B208160	
cis-1,2-Dichloroethene	874		25.0	ug/L	B208160	
2-Butanone	---	U	5.00	ug/L	B208160	
Bromochloromethane	---	U	0.500	ug/L	B208160	
Chloroform	---	U	0.500	ug/L	B208160	
1,1,1-Trichloroethane	---	U	0.500	ug/L	B208160	
Cyclohexane	---	U	0.500	ug/L	B208160	
Carbon Tetrachloride	---	U	0.500	ug/L	B208160	
Benzene	---	U	0.500	ug/L	B208160	
1,2-Dichloroethane	---	U	0.500	ug/L	B208160	
Trichloroethene	599		25.0	ug/L	B208160	

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Analyte	Result	Qualifier	Reporting Limit	Units	Batch	Date and Time of Analysis*
Field ID: BFYY9				**Sample ID: 2208010-06**		
VOA-TRACE GCMS						
1,2-Dichloropropane	---	U	0.500	ug/L	B208160	
Bromodichloromethane	---	U	0.500	ug/L	B208160	
cis-1,3-Dichloropropene	---	U	0.500	ug/L	B208160	
4-Methyl-2-Pentanone	---	U	5.00	ug/L	B208160	
Toluene	---	U	0.500	ug/L	B208160	
trans-1,3-Dichloropropene	---	U	0.500	ug/L	B208160	
1,1,2-Trichloroethane	---	U	0.500	ug/L	B208160	
Tetrachloroethene	4450	J	50.0	ug/L	B209001	
Methylcyclohexane	---	U	0.500	ug/L	B208160	
Dibromochloromethane	---	U	0.500	ug/L	B208160	
1,2-Dibromoethane	---	U	0.500	ug/L	B208160	
2-Hexanone	---	U	5.00	ug/L	B208160	
Chlorobenzene	---	U	0.500	ug/L	B208160	
Ethylbenzene	---	U	0.500	ug/L	B208160	
m,p-Xylene	---	U	0.500	ug/L	B208160	
o-Xylene	---	U	0.500	ug/L	B208160	
Styrene	---	U	0.500	ug/L	B208160	
Bromoform	---	U	0.500	ug/L	B208160	
Isopropylbenzene	---	U	0.500	ug/L	B208160	
1,1,2,2-Tetrachloroethane	---	U	0.500	ug/L	B208160	
1,3-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,4-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,2-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,2-Dibromo-3-Chloropropane	---	U	0.500	ug/L	B208160	
1,2,4-Trichlorobenzene	---	U	0.500	ug/L	B208160	
1,2,3-Trichlorobenzene	---	U	0.500	ug/L	B208160	
Field ID: BFYZ0				**Sample ID: 2208010-07**		
VOA-TRACE GCMS						
Dichlorodifluoromethane	---	U L	0.500	ug/L	B208160	

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Analyte	Result	Qualifier	Reporting Limit	Units	Batch	Date and Time of Analysis*
Field ID: BFYZ0				**Sample ID: 2208010-07**		
VOA-TRACE GCMS						
Chloromethane	---	U L	0.500	ug/L	B208160	
Vinyl Chloride	---	U	0.500	ug/L	B208160	
Bromomethane	---	U	0.500	ug/L	B208160	
Chloroethane	---	U	0.500	ug/L	B208160	
Trichlorofluoromethane	---	U	0.500	ug/L	B208160	
1,1-Dichloroethene	---	U	0.500	ug/L	B208160	
1,1,2-Trichloro-1,2,2-Trifluoroethane	---	U	0.500	ug/L	B208160	
Carbon Disulfide	---	U	0.500	ug/L	B208160	
Acetone	---	U	5.00	ug/L	B208160	
Methyl Acetate	---	U	0.500	ug/L	B208160	
Methylene Chloride	---	U	0.500	ug/L	B208160	
trans-1,2-Dichloroethene	---	U	0.500	ug/L	B208160	
Methyl tert-Butyl Ether	---	U	0.500	ug/L	B208160	
1,1-Dichloroethane	---	U	0.500	ug/L	B208160	
cis-1,2-Dichloroethene	---	U	0.500	ug/L	B208160	
2-Butanone	---	U	5.00	ug/L	B208160	
Bromochloromethane	---	U	0.500	ug/L	B208160	
Chloroform	---	U	0.500	ug/L	B208160	
1,1,1-Trichloroethane	---	U	0.500	ug/L	B208160	
Cyclohexane	---	U	0.500	ug/L	B208160	
Carbon Tetrachloride	---	U	0.500	ug/L	B208160	
Benzene	---	U	0.500	ug/L	B208160	
1,2-Dichloroethane	---	U	0.500	ug/L	B208160	
Trichloroethene	---	U	0.500	ug/L	B208160	
1,2-Dichloropropane	---	U	0.500	ug/L	B208160	
Bromodichloromethane	---	U	0.500	ug/L	B208160	
cis-1,3-Dichloropropene	---	U	0.500	ug/L	B208160	
4-Methyl-2-Pentanone	---	U	5.00	ug/L	B208160	
Toluene	---	U	0.500	ug/L	B208160	

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Analyte	Result	Qualifier	Reporting Limit	Units	Batch	Date and Time of Analysis*
Field ID: BFYZ0				**Sample ID: 2208010-07**		
VOA-TRACE GCMS						
trans-1,3-Dichloropropene	---	U	0.500	ug/L	B208160	
1,1,2-Trichloroethane	---	U	0.500	ug/L	B208160	
Tetrachloroethene	4.21		0.500	ug/L	B208160	
Methylcyclohexane	---	U	0.500	ug/L	B208160	
Dibromochloromethane	---	U	0.500	ug/L	B208160	
1,2-Dibromoethane	---	U	0.500	ug/L	B208160	
2-Hexanone	---	U	5.00	ug/L	B208160	
Chlorobenzene	---	U	0.500	ug/L	B208160	
Ethylbenzene	---	U	0.500	ug/L	B208160	
m,p-Xylene	---	U	0.500	ug/L	B208160	
o-Xylene	---	U	0.500	ug/L	B208160	
Styrene	---	U	0.500	ug/L	B208160	
Bromoform	---	U	0.500	ug/L	B208160	
Isopropylbenzene	---	U	0.500	ug/L	B208160	
1,1,2,2-Tetrachloroethane	---	U	0.500	ug/L	B208160	
1,3-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,4-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,2-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,2-Dibromo-3-Chloropropane	---	U	0.500	ug/L	B208160	
1,2,4-Trichlorobenzene	---	U	0.500	ug/L	B208160	
1,2,3-Trichlorobenzene	---	U	0.500	ug/L	B208160	
Field ID: BFYZ1				**Sample ID: 2208010-08**		
VOA-TRACE GCMS						
Dichlorodifluoromethane	---	U L	0.500	ug/L	B208160	
Chloromethane	---	U L	0.500	ug/L	B208160	
Vinyl Chloride	---	U	0.500	ug/L	B208160	
Bromomethane	---	U	0.500	ug/L	B208160	
Chloroethane	---	U	0.500	ug/L	B208160	
Trichlorofluoromethane	---	U	0.500	ug/L	B208160	

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Analyte	Result	Qualifier	Reporting Limit	Units	Batch	Date and Time of Analysis*
Field ID: BFYZ1				**Sample ID: 2208010-08**		
VOA-TRACE GCMS						
1,1-Dichloroethene	---	U	0.500	ug/L	B208160	
1,1,2-Trichloro-1,2,2-Trifluoroethane	---	U	0.500	ug/L	B208160	
Carbon Disulfide	---	U	0.500	ug/L	B208160	
Acetone	---	U	5.00	ug/L	B208160	
Methyl Acetate	---	U	0.500	ug/L	B208160	
Methylene Chloride	---	U	0.500	ug/L	B208160	
trans-1,2-Dichloroethene	---	U	0.500	ug/L	B208160	
Methyl tert-Butyl Ether	---	U	0.500	ug/L	B208160	
1,1-Dichloroethane	---	U	0.500	ug/L	B208160	
cis-1,2-Dichloroethene	---	U	0.500	ug/L	B208160	
2-Butanone	---	U	5.00	ug/L	B208160	
Bromochloromethane	---	U	0.500	ug/L	B208160	
Chloroform	---	U	0.500	ug/L	B208160	
1,1,1-Trichloroethane	---	U	0.500	ug/L	B208160	
Cyclohexane	---	U	0.500	ug/L	B208160	
Carbon Tetrachloride	---	U	0.500	ug/L	B208160	
Benzene	---	U	0.500	ug/L	B208160	
1,2-Dichloroethane	---	U	0.500	ug/L	B208160	
Trichloroethene	---	U	0.500	ug/L	B208160	
1,2-Dichloropropane	---	U	0.500	ug/L	B208160	
Bromodichloromethane	---	U	0.500	ug/L	B208160	
cis-1,3-Dichloropropene	---	U	0.500	ug/L	B208160	
4-Methyl-2-Pentanone	---	U	5.00	ug/L	B208160	
Toluene	---	U	0.500	ug/L	B208160	
trans-1,3-Dichloropropene	---	U	0.500	ug/L	B208160	
1,1,2-Trichloroethane	---	U	0.500	ug/L	B208160	
Tetrachloroethene	3.14		0.500	ug/L	B208160	
Methylcyclohexane	---	U	0.500	ug/L	B208160	
Dibromochloromethane	---	U	0.500	ug/L	B208160	

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Analyte	Result	Qualifier	Reporting Limit	Units	Batch	Date and Time of Analysis*
Field ID: BFYZ1				**Sample ID: 2208010-08**		
VOA-TRACE GCMS						
1,2-Dibromoethane	---	U	0.500	ug/L	B208160	
2-Hexanone	---	U	5.00	ug/L	B208160	
Chlorobenzene	---	U	0.500	ug/L	B208160	
Ethylbenzene	---	U	0.500	ug/L	B208160	
m,p-Xylene	---	U	0.500	ug/L	B208160	
o-Xylene	---	U	0.500	ug/L	B208160	
Styrene	---	U	0.500	ug/L	B208160	
Bromoform	---	U	0.500	ug/L	B208160	
Isopropylbenzene	---	U	0.500	ug/L	B208160	
1,1,2,2-Tetrachloroethane	---	U	0.500	ug/L	B208160	
1,3-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,4-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,2-Dichlorobenzene	---	U	0.500	ug/L	B208160	
1,2-Dibromo-3-Chloropropane	---	U	0.500	ug/L	B208160	
1,2,4-Trichlorobenzene	---	U	0.500	ug/L	B208160	
1,2,3-Trichlorobenzene	---	U	0.500	ug/L	B208160	
Field ID: BFYZ2				**Sample ID: 2208010-09**		
Metals ICPMS						
Aluminum	---	U	20.0	ug/L	B208163	
Antimony	---	U	1.00	ug/L	B208163	
Arsenic	---	U	1.00	ug/L	B208163	
Barium	---	U	1.00	ug/L	B208163	
Beryllium	---	U	1.00	ug/L	B208163	
Cadmium	---	U	1.00	ug/L	B208163	
Calcium	---	U	200	ug/L	B208163	
Chromium	---	U	1.00	ug/L	B208163	
Cobalt	---	U	1.00	ug/L	B208163	
Copper	---	U	1.00	ug/L	B208163	
Iron	---	U	20.0	ug/L	B208163	

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Analyte	Result	Qualifier	Reporting Limit	Units	Batch	Date and Time of Analysis*
Field ID: BFYZ2				**Sample ID: 2208010-09**		
Metals ICPMS						
Lead	---	U	1.00	ug/L	B208163	
Magnesium	---	U	200	ug/L	B208163	
Manganese	---	U	1.00	ug/L	B208163	
Nickel	---	U	1.00	ug/L	B208163	
Potassium	---	U	200	ug/L	B208163	
Selenium	---	U	1.00	ug/L	B208163	
Silver	---	U	1.00	ug/L	B208163	
Sodium	---	U	200	ug/L	B208163	
Thallium	---	U	1.00	ug/L	B208163	
Vanadium	---	U	1.00	ug/L	B208163	
Zinc	2.82		2.00	ug/L	B208163	
Field ID: BFYZ3				**Sample ID: 2208010-10**		
Metals ICPMS						
Aluminum	---	U	20.0	ug/L	B208163	
Antimony	---	U	1.00	ug/L	B208163	
Arsenic	---	U	1.00	ug/L	B208163	
Barium	---	U	1.00	ug/L	B208163	
Beryllium	---	U	1.00	ug/L	B208163	
Cadmium	---	U	1.00	ug/L	B208163	
Calcium	---	U	200	ug/L	B208163	
Chromium	1.42		1.00	ug/L	B208163	
Cobalt	---	U	1.00	ug/L	B208163	
Copper	---	U	1.00	ug/L	B208163	
Iron	---	U	20.0	ug/L	B208163	
Lead	---	U	1.00	ug/L	B208163	
Magnesium	---	U	200	ug/L	B208163	
Manganese	---	U	1.00	ug/L	B208163	
Nickel	1.04		1.00	ug/L	B208163	
Potassium	---	U	200	ug/L	B208163	

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Analyte	Result	Qualifier	Reporting Limit	Units	Batch	Date and Time of Analysis*
Field ID: BFYZ3					**Sample ID: 2208010-10**	
Metals ICPMS						
Selenium	---	U	1.00	ug/L	B208163	
Silver	---	U	1.00	ug/L	B208163	
Sodium	---	U	200	ug/L	B208163	
Thallium	---	U	1.00	ug/L	B208163	
Vanadium	---	U	1.00	ug/L	B208163	
Zinc	4.12		2.00	ug/L	B208163	
Field ID: BFYZ4					**Sample ID: 2208010-11**	
Metals ICPMS						
Aluminum	---	U	20.0	ug/L	B208163	
Antimony	---	U	1.00	ug/L	B208163	
Arsenic	---	U	1.00	ug/L	B208163	
Barium	---	U	1.00	ug/L	B208163	
Beryllium	---	U	1.00	ug/L	B208163	
Cadmium	---	U	1.00	ug/L	B208163	
Calcium	---	U	200	ug/L	B208163	
Chromium	1.60		1.00	ug/L	B208163	
Cobalt	---	U	1.00	ug/L	B208163	
Copper	---	U	1.00	ug/L	B208163	
Iron	---	U	20.0	ug/L	B208163	
Lead	---	U	1.00	ug/L	B208163	
Magnesium	---	U	200	ug/L	B208163	
Manganese	---	U	1.00	ug/L	B208163	
Nickel	1.46		1.00	ug/L	B208163	
Potassium	---	U	200	ug/L	B208163	
Selenium	---	U	1.00	ug/L	B208163	
Silver	---	U	1.00	ug/L	B208163	
Sodium	---	U	200	ug/L	B208163	
Thallium	---	U	1.00	ug/L	B208163	
Vanadium	---	U	1.00	ug/L	B208163	

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Analyte	Result	Qualifier	Reporting Limit	Units	Batch	Date and Time of Analysis*
Field ID: BFYZ4				**Sample ID: 2208010-11**		
Metals ICPMS						
Zinc	11.2		2.00	ug/L	B208163	
Field ID: BFYZ5				**Sample ID: 2208010-12**		
Metals ICPMS						
Aluminum	---	U	20.0	ug/L	B208163	
Antimony	---	U	1.00	ug/L	B208163	
Arsenic	---	U	1.00	ug/L	B208163	
Barium	---	U	1.00	ug/L	B208163	
Beryllium	---	U	1.00	ug/L	B208163	
Cadmium	---	U	1.00	ug/L	B208163	
Calcium	---	U	200	ug/L	B208163	
Chromium	1.20		1.00	ug/L	B208163	
Cobalt	---	U	1.00	ug/L	B208163	
Copper	---	U	1.00	ug/L	B208163	
Iron	---	U	20.0	ug/L	B208163	
Lead	---	U	1.00	ug/L	B208163	
Magnesium	---	U	200	ug/L	B208163	
Manganese	---	U	1.00	ug/L	B208163	
Nickel	---	U	1.00	ug/L	B208163	
Potassium	---	U	200	ug/L	B208163	
Selenium	---	U	1.00	ug/L	B208163	
Silver	---	U	1.00	ug/L	B208163	
Sodium	---	U	200	ug/L	B208163	
Thallium	---	U	1.00	ug/L	B208163	
Vanadium	---	U	1.00	ug/L	B208163	
Zinc	7.39		2.00	ug/L	B208163	
Field ID: BFYZ6				**Sample ID: 2208010-13**		
Metals ICPMS						
Aluminum	---	U	20.0	ug/L	B208163	

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Analyte	Result	Qualifier	Reporting Limit	Units	Batch	Date and Time of Analysis*
Field ID: BFYZ6				**Sample ID: 2208010-13**		
Metals ICPMS						
Antimony	---	U	1.00	ug/L	B208163	
Arsenic	---	U	1.00	ug/L	B208163	
Barium	---	U	1.00	ug/L	B208163	
Beryllium	---	U	1.00	ug/L	B208163	
Cadmium	---	U	1.00	ug/L	B208163	
Calcium	---	U	200	ug/L	B208163	
Chromium	---	U	1.00	ug/L	B208163	
Cobalt	---	U	1.00	ug/L	B208163	
Copper	---	U	1.00	ug/L	B208163	
Iron	---	U	20.0	ug/L	B208163	
Lead	---	U	1.00	ug/L	B208163	
Magnesium	---	U	200	ug/L	B208163	
Manganese	---	U	1.00	ug/L	B208163	
Nickel	---	U	1.00	ug/L	B208163	
Potassium	---	U	200	ug/L	B208163	
Selenium	---	U	1.00	ug/L	B208163	
Silver	---	U	1.00	ug/L	B208163	
Sodium	---	U	200	ug/L	B208163	
Thallium	---	U	1.00	ug/L	B208163	
Vanadium	---	U	1.00	ug/L	B208163	
Zinc	4.08		2.00	ug/L	B208163	

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VOA-TRACE GCMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B208160									
Blank (B208160-BLK1)									
Dichlorodifluoromethane	--- U	0.500	ug/L						
Chloromethane	--- U	0.500	ug/L						
Vinyl Chloride	--- U	0.500	ug/L						
Bromomethane	--- U	0.500	ug/L						
Chloroethane	--- U	0.500	ug/L						
Trichlorofluoromethane	--- U	0.500	ug/L						
1,1-Dichloroethene	--- U	0.500	ug/L						
1,1,2-Trichloro-1,2,2-Trifluoroethane	--- U	0.500	ug/L						
Carbon Disulfide	--- U	0.500	ug/L						
Acetone	--- U	5.00	ug/L						
Methyl Acetate	--- U	0.500	ug/L						
Methylene Chloride	--- U	0.500	ug/L						
trans-1,2-Dichloroethene	--- U	0.500	ug/L						
Methyl tert-Butyl Ether	--- U	0.500	ug/L						
1,1-Dichloroethane	--- U	0.500	ug/L						
cis-1,2-Dichloroethene	--- U	0.500	ug/L						
2-Butanone	--- U	5.00	ug/L						
Bromochloromethane	--- U	0.500	ug/L						
Chloroform	--- U	0.500	ug/L						
1,1,1-Trichloroethane	--- U	0.500	ug/L						
Cyclohexane	--- U	0.500	ug/L						
Carbon Tetrachloride	--- U	0.500	ug/L						
Benzene	--- U	0.500	ug/L						
1,2-Dichloroethane	--- U	0.500	ug/L						
Trichloroethene	--- U	0.500	ug/L						
1,2-Dichloropropane	--- U	0.500	ug/L						
Bromodichloromethane	--- U	0.500	ug/L						
cis-1,3-Dichloropropene	--- U	0.500	ug/L						
4-Methyl-2-Pentanone	--- U	5.00	ug/L						
Toluene	--- U	0.500	ug/L						
trans-1,3-Dichloropropene	--- U	0.500	ug/L						
1,1,2-Trichloroethane	--- U	0.500	ug/L						
Tetrachloroethene	--- U	0.500	ug/L						
Methylcyclohexane	--- U	0.500	ug/L						

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VOA-TRACE GCMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B208160									
Blank (B208160-BLK1)									
Dibromochloromethane	--- U	0.500	ug/L						
1,2-Dibromoethane	--- U	0.500	ug/L						
2-Hexanone	--- U	5.00	ug/L						
Chlorobenzene	--- U	0.500	ug/L						
Ethylbenzene	--- U	0.500	ug/L						
m,p-Xylene	--- U	0.500	ug/L						
o-Xylene	--- U	0.500	ug/L						
Styrene	--- U	0.500	ug/L						
Bromoform	--- U	0.500	ug/L						
Isopropylbenzene	--- U	0.500	ug/L						
1,1,2,2-Tetrachloroethane	--- U	0.500	ug/L						
1,3-Dichlorobenzene	--- U	0.500	ug/L						
1,4-Dichlorobenzene	--- U	0.500	ug/L						
1,2-Dichlorobenzene	--- U	0.500	ug/L						
1,2-Dibromo-3-Chloropropane	--- U	0.500	ug/L						
1,2,4-Trichlorobenzene	--- U	0.500	ug/L						
1,2,3-Trichlorobenzene	--- U	0.500	ug/L						
Surrogate: 1,2-Dichloroethane-D4	*5.06*		ug/L	*5.000*		*101*	*70-130*		
Surrogate: 4-Bromofluorobenzene	*5.07*		ug/L	*5.000*		*101*	*70-130*		
LCS (B208160-BS1)									
Dichlorodifluoromethane	4.82		ug/L	5.000		96.4	23-117		
Chloromethane	4.34		ug/L	5.000		86.8	15-152		
Vinyl Chloride	4.87		ug/L	5.000		97.4	41-147		
Bromomethane	6.38		ug/L	5.000		128	31-157		
Chloroethane	5.00		ug/L	5.000		100	57-125		
Trichlorofluoromethane	5.02		ug/L	5.000		100	68-153		
1,1-Dichloroethene	4.71		ug/L	5.000		94.2	68-140		
1,1,2-Trichloro-1,2,2-Trifluoroethane	4.46		ug/L	5.000		89.2	78-139		
Carbon Disulfide	4.94		ug/L	5.000		98.8	65-135		
Acetone	35.4		ug/L	40.00		88.4	39-154		
Methyl Acetate	4.99		ug/L	5.000		99.8	49-141		
Methylene Chloride	4.79		ug/L	5.000		95.8	70-175		
trans-1,2-Dichloroethene	5.08		ug/L	5.000		102	74-136		
Methyl tert-Butyl Ether	5.11		ug/L	5.000		102	61-128		

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VOA-TRACE GCMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B208160									
LCS (B208160-BS1)									
1,1-Dichloroethane	5.00		ug/L	5.000		100	80-133		
cis-1,2-Dichloroethene	4.92		ug/L	5.000		98.4	77-141		
2-Butanone	37.3		ug/L	40.00		93.2	68-157		
Bromochloromethane	5.15		ug/L	5.000		103	64-151		
Chloroform	5.30		ug/L	5.000		106	74-137		
1,1,1-Trichloroethane	4.86		ug/L	5.000		97.2	78-130		
Cyclohexane	4.75		ug/L	5.000		95.0	83-138		
Carbon Tetrachloride	4.90		ug/L	5.000		98.0	82-137		
Benzene	4.92		ug/L	5.000		98.4	76-131		
1,2-Dichloroethane	4.93		ug/L	5.000		98.6	70-133		
Trichloroethene	5.39		ug/L	5.000		108	81-120		
1,2-Dichloropropane	5.10		ug/L	5.000		102	84-123		
Bromodichloromethane	5.31		ug/L	5.000		106	79-119		
cis-1,3-Dichloropropene	5.23		ug/L	5.000		105	79-126		
4-Methyl-2-Pentanone	37.7		ug/L	40.00		94.2	84-145		
Toluene	5.15		ug/L	5.000		103	83-118		
trans-1,3-Dichloropropene	5.58		ug/L	5.000		112	74-126		
1,1,2-Trichloroethane	5.10		ug/L	5.000		102	80-125		
Tetrachloroethene	5.25		ug/L	5.000		105	85-122		
Methylcyclohexane	4.73		ug/L	5.000		94.6	82-127		
Dibromochloromethane	5.19		ug/L	5.000		104	79-122		
1,2-Dibromoethane	5.07		ug/L	5.000		101	76-128		
2-Hexanone	38.1		ug/L	40.00		95.3	82-150		
Chlorobenzene	5.31		ug/L	5.000		106	84-118		
Ethylbenzene	5.07		ug/L	5.000		101	85-115		
m,p-Xylene	10.2		ug/L	10.00		102	86-118		
o-Xylene	5.27		ug/L	5.000		105	84-120		
Styrene	5.30		ug/L	5.000		106	87-112		
Bromoform	5.26		ug/L	5.000		105	75-125		
Isopropylbenzene	5.24		ug/L	5.000		105	85-117		
1,1,2,2-Tetrachloroethane	4.39		ug/L	5.000		87.8	73-124		
1,3-Dichlorobenzene	5.42		ug/L	5.000		108	87-119		
1,4-Dichlorobenzene	5.20		ug/L	5.000		104	86-121		
1,2-Dichlorobenzene	5.31		ug/L	5.000		106	82-123		
1,2-Dibromo-3-Chloropropane	4.98		ug/L	5.000		99.6	58-130		

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B208160									
LCS (B208160-BS1)									
1,2,4-Trichlorobenzene	5.17		ug/L	5.000		103	76-124		
1,2,3-Trichlorobenzene	4.98		ug/L	5.000		99.6	64-145		
1,2,3-Trichloropropane	4.25		ug/L	5.000		85.0	68-122		
1,2,4-Trimethylbenzene	5.14		ug/L	5.000		103	82-129		
1,3,5-Trimethylbenzene	5.02		ug/L	5.000		100	80-110		
Surrogate: 1,2-Dichloroethane-D4	*4.95*		ug/L	*5.000*		*99.0*	*70-130*		
Surrogate: 4-Bromofluorobenzene	*5.07*		ug/L	*5.000*		*101*	*70-130*		
LCS Dup (B208160-BSD1)									
Dichlorodifluoromethane	4.88		ug/L	5.000		97.6	23-117	1.24	20
Chloromethane	4.16		ug/L	5.000		83.2	15-152	4.24	20
Vinyl Chloride	4.79		ug/L	5.000		95.8	41-147	1.66	20
Bromomethane	6.23		ug/L	5.000		125	31-157	2.38	20
Chloroethane	4.74		ug/L	5.000		94.8	57-125	5.34	20
Trichlorofluoromethane	4.84		ug/L	5.000		96.8	68-153	3.65	20
1,1-Dichloroethene	4.57		ug/L	5.000		91.4	68-140	3.02	20
1,1,2-Trichloro-1,2,2-Trifluoroethane	4.47		ug/L	5.000		89.4	78-139	0.224	20
Carbon Disulfide	4.95		ug/L	5.000		99.0	65-135	0.202	20
Acetone	34.7		ug/L	40.00		86.8	39-154	1.85	20
Methyl Acetate	4.88		ug/L	5.000		97.6	49-141	2.23	20
Methylene Chloride	4.56		ug/L	5.000		91.2	70-175	4.92	20
trans-1,2-Dichloroethene	4.79		ug/L	5.000		95.8	74-136	5.88	20
Methyl tert-Butyl Ether	5.10		ug/L	5.000		102	61-128	0.196	20
1,1-Dichloroethane	4.98		ug/L	5.000		99.6	80-133	0.401	20
cis-1,2-Dichloroethene	5.02		ug/L	5.000		100	77-141	2.01	20
2-Butanone	37.5		ug/L	40.00		93.7	68-157	0.482	20
Bromochloromethane	5.04		ug/L	5.000		101	64-151	2.16	20
Chloroform	5.14		ug/L	5.000		103	74-137	3.07	20
1,1,1-Trichloroethane	4.74		ug/L	5.000		94.8	78-130	2.50	20
Cyclohexane	4.68		ug/L	5.000		93.6	83-138	1.48	20
Carbon Tetrachloride	4.72		ug/L	5.000		94.4	82-137	3.74	20
Benzene	4.85		ug/L	5.000		97.0	76-131	1.43	20
1,2-Dichloroethane	4.96		ug/L	5.000		99.2	70-133	0.607	20
Trichloroethene	5.63		ug/L	5.000		113	81-120	4.36	20
1,2-Dichloropropane	5.19		ug/L	5.000		104	84-123	1.75	20

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Batch B208160									
LCS Dup (B208160-BSD1)									
Bromodichloromethane	5.07		ug/L	5.000		101	79-119	4.62	20
cis-1,3-Dichloropropene	5.05		ug/L	5.000		101	79-126	3.50	20
4-Methyl-2-Pentanone	37.5		ug/L	40.00		93.6	84-145	0.559	20
Toluene	5.04		ug/L	5.000		101	83-118	2.16	20
trans-1,3-Dichloropropene	5.73		ug/L	5.000		115	74-126	2.65	20
1,1,2-Trichloroethane	5.09		ug/L	5.000		102	80-125	0.196	20
Tetrachloroethene	5.05		ug/L	5.000		101	85-122	3.88	20
Methylcyclohexane	4.74		ug/L	5.000		94.8	82-127	0.211	20
Dibromochloromethane	5.22		ug/L	5.000		104	79-122	0.576	20
1,2-Dibromoethane	5.09		ug/L	5.000		102	76-128	0.394	20
2-Hexanone	38.3		ug/L	40.00		95.8	82-150	0.445	20
Chlorobenzene	5.17		ug/L	5.000		103	84-118	2.67	20
Ethylbenzene	5.05		ug/L	5.000		101	85-115	0.395	20
m,p-Xylene	10.2		ug/L	10.00		102	86-118	0.0978	20
o-Xylene	5.23		ug/L	5.000		105	84-120	0.762	20
Styrene	5.28		ug/L	5.000		106	87-112	0.378	20
Bromoform	5.22		ug/L	5.000		104	75-125	0.763	20
Isopropylbenzene	5.18		ug/L	5.000		104	85-117	1.15	20
1,1,2,2-Tetrachloroethane	4.52		ug/L	5.000		90.4	73-124	2.92	20
1,3-Dichlorobenzene	5.41		ug/L	5.000		108	87-119	0.185	20
1,4-Dichlorobenzene	5.10		ug/L	5.000		102	86-121	1.94	20
1,2-Dichlorobenzene	5.31		ug/L	5.000		106	82-123	0.00	20
1,2-Dibromo-3-Chloropropane	5.03		ug/L	5.000		101	58-130	0.999	20
1,2,4-Trichlorobenzene	5.09		ug/L	5.000		102	76-124	1.56	20
1,2,3-Trichlorobenzene	4.95		ug/L	5.000		99.0	64-145	0.604	20
1,2,3-Trichloropropane	4.25		ug/L	5.000		85.0	68-122	0.00	20
1,2,4-Trimethylbenzene	5.10		ug/L	5.000		102	82-129	0.781	20
1,3,5-Trimethylbenzene	5.03		ug/L	5.000		101	80-110	0.199	20
Surrogate: 1,2-Dichloroethane-D4	*4.80*		ug/L	*5.000*		*96.0*	*70-130*		
Surrogate: 4-Bromofluorobenzene	*5.10*		ug/L	*5.000*		*102*	*70-130*		

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B208160									
Matrix Spike (B208160-MS1)	**Source: 2208010-05**								
Dichlorodifluoromethane	5.09		ug/L	5.000	0.00	102	23-117		
Chloromethane	4.50		ug/L	5.000	0.00	90.0	15-152		
Vinyl Chloride	4.71		ug/L	5.000	0.00	94.2	41-147		
Bromomethane	5.87		ug/L	5.000	0.00	117	31-157		
Chloroethane	5.06		ug/L	5.000	0.00	101	57-125		
Trichlorofluoromethane	5.22		ug/L	5.000	0.00	104	68-153		
1,1-Dichloroethene	4.28		ug/L	5.000	0.00	85.6	68-140		
1,1,2-Trichloro-1,2,2-Trifluoroethane	4.66		ug/L	5.000	0.00	93.2	78-139		
Carbon Disulfide	3.58		ug/L	5.000	0.00	71.6	65-135		
Acetone	36.4		ug/L	40.00	1.28	87.7	39-154		
Methyl Acetate	4.19		ug/L	5.000	0.00	83.8	49-141		
Methylene Chloride	4.42		ug/L	5.000	0.00	88.4	70-175		
trans-1,2-Dichloroethene	4.42		ug/L	5.000	0.00	88.4	74-136		
Methyl tert-Butyl Ether	4.78		ug/L	5.000	0.00	95.6	61-128		
1,1-Dichloroethane	4.69		ug/L	5.000	0.00	93.8	80-133		
cis-1,2-Dichloroethene	5.04		ug/L	5.000	0.530	90.2	77-141		
2-Butanone	37.9		ug/L	40.00	0.00	94.8	68-157		
Bromochloromethane	5.22		ug/L	5.000	0.00	104	64-151		
Chloroform	4.97		ug/L	5.000	0.00	99.4	74-137		
1,1,1-Trichloroethane	4.86		ug/L	5.000	0.00	97.2	78-130		
Cyclohexane	4.17		ug/L	5.000	0.00	83.4	83-138		
Carbon Tetrachloride	4.48		ug/L	5.000	0.00	89.6	82-137		
Benzene	4.67		ug/L	5.000	0.00	93.4	76-131		
1,2-Dichloroethane	4.81		ug/L	5.000	0.00	96.2	70-133		
Trichloroethene	6.11		ug/L	5.000	1.12	99.8	81-120		
1,2-Dichloropropane	4.97		ug/L	5.000	0.00	99.4	84-123		
Bromodichloromethane	5.15		ug/L	5.000	0.00	103	79-119		
cis-1,3-Dichloropropene	4.69		ug/L	5.000	0.00	93.8	79-126		
4-Methyl-2-Pentanone	41.0		ug/L	40.00	0.00	103	84-145		
Toluene	4.90		ug/L	5.000	0.00	98.0	83-118		
trans-1,3-Dichloropropene	4.79		ug/L	5.000	0.00	95.8	74-126		
1,1,2-Trichloroethane	4.91		ug/L	5.000	0.00	98.2	80-125		
Tetrachloroethene	5.80		ug/L	5.000	1.78	80.4	85-122		
Methylcyclohexane	4.30		ug/L	5.000	0.00	86.0	82-127		
Dibromochloromethane	5.00		ug/L	5.000	0.00	100	79-122		

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B208160									
Matrix Spike (B208160-MS1)		**Source: 2208010-05**							
1,2-Dibromoethane	4.78		ug/L	5.000	0.00	95.6	76-128		
2-Hexanone	39.6		ug/L	40.00	0.00	99.0	82-150		
Chlorobenzene	4.83		ug/L	5.000	0.00	96.6	84-118		
Ethylbenzene	4.83		ug/L	5.000	0.00	96.6	85-115		
m,p-Xylene	9.70		ug/L	10.00	0.00	97.0	86-118		
o-Xylene	4.87		ug/L	5.000	0.00	97.4	84-120		
Styrene	4.79		ug/L	5.000	0.00	95.8	87-112		
Bromoform	4.75		ug/L	5.000	0.00	95.0	75-125		
Isopropylbenzene	4.97		ug/L	5.000	0.00	99.4	85-117		
1,1,2,2-Tetrachloroethane	4.73		ug/L	5.000	0.00	94.6	73-124		
1,3-Dichlorobenzene	5.09		ug/L	5.000	0.00	102	87-119		
1,4-Dichlorobenzene	4.79		ug/L	5.000	0.00	95.8	86-121		
1,2-Dichlorobenzene	5.05		ug/L	5.000	0.00	101	82-123		
1,2-Dibromo-3-Chloropropane	5.06		ug/L	5.000	0.00	101	58-130		
1,2,4-Trichlorobenzene	4.77		ug/L	5.000	0.00	95.4	76-124		
1,2,3-Trichlorobenzene	4.90		ug/L	5.000	0.00	98.0	64-145		
1,2,3-Trichloropropane	4.29		ug/L	5.000	0.00	85.8	68-122		
1,2,4-Trimethylbenzene	5.03		ug/L	5.000	0.00	101	82-129		
1,3,5-Trimethylbenzene	4.80		ug/L	5.000	0.00	96.0	80-110		
Surrogate: 1,2-Dichloroethane-D4	*4.99*		ug/L	*5.000*		*99.8*	*70-130*		
Surrogate: 4-Bromofluorobenzene	*4.87*		ug/L	*5.000*		*97.4*	*70-130*		
Batch B209001									
Blank (B209001-BLK1)									
Dichlorodifluoromethane	--- U	0.500	ug/L						
Chloromethane	--- U	0.500	ug/L						
Vinyl Chloride	--- U	0.500	ug/L						
Bromomethane	--- U	0.500	ug/L						
Chloroethane	--- U	0.500	ug/L						
Trichlorofluoromethane	--- U	0.500	ug/L						
1,1-Dichloroethene	--- U	0.500	ug/L						
1,1,2-Trichloro-1,2,2-Trifluoroethane	--- U	0.500	ug/L						
Carbon Disulfide	--- U	0.500	ug/L						
Acetone	--- U	5.00	ug/L						

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B209001									
Blank (B209001-BLK1)									
Methyl Acetate	--- U	0.500	ug/L						
Methylene Chloride	--- U	0.500	ug/L						
trans-1,2-Dichloroethene	--- U	0.500	ug/L						
Methyl tert-Butyl Ether	--- U	0.500	ug/L						
1,1-Dichloroethane	--- U	0.500	ug/L						
cis-1,2-Dichloroethene	--- U	0.500	ug/L						
2-Butanone	--- U	5.00	ug/L						
Bromochloromethane	--- U	0.500	ug/L						
Chloroform	--- U	0.500	ug/L						
1,1,1-Trichloroethane	--- U	0.500	ug/L						
Cyclohexane	--- U	0.500	ug/L						
Carbon Tetrachloride	--- U	0.500	ug/L						
Benzene	--- U	0.500	ug/L						
1,2-Dichloroethane	--- U	0.500	ug/L						
Trichloroethene	--- U	0.500	ug/L						
1,2-Dichloropropane	--- U	0.500	ug/L						
Bromodichloromethane	--- U	0.500	ug/L						
cis-1,3-Dichloropropene	--- U	0.500	ug/L						
4-Methyl-2-Pentanone	--- U	5.00	ug/L						
Toluene	--- U	0.500	ug/L						
trans-1,3-Dichloropropene	--- U	0.500	ug/L						
1,1,2-Trichloroethane	--- U	0.500	ug/L						
Tetrachloroethene	--- U	0.500	ug/L						
Methylcyclohexane	--- U	0.500	ug/L						
Dibromochloromethane	--- U	0.500	ug/L						
1,2-Dibromoethane	--- U	0.500	ug/L						
2-Hexanone	--- U	5.00	ug/L						
Chlorobenzene	--- U	0.500	ug/L						
Ethylbenzene	--- U	0.500	ug/L						
m,p-Xylene	--- U	0.500	ug/L						
o-Xylene	--- U	0.500	ug/L						
Styrene	--- U	0.500	ug/L						
Bromoform	--- U	0.500	ug/L						
Isopropylbenzene	--- U	0.500	ug/L						
1,1,2,2-Tetrachloroethane	--- U	0.500	ug/L						

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B209001									
Blank (B209001-BLK1)									
1,3-Dichlorobenzene	--- U	0.500	ug/L						
1,4-Dichlorobenzene	--- U	0.500	ug/L						
1,2-Dichlorobenzene	--- U	0.500	ug/L						
1,2-Dibromo-3-Chloropropane	--- U	0.500	ug/L						
1,2,4-Trichlorobenzene	--- U	0.500	ug/L						
1,2,3-Trichlorobenzene	--- U	0.500	ug/L						
Surrogate: 1,2-Dichloroethane-D4	*5.32*		ug/L	*5.000*		*106*	*70-130*		
Surrogate: 4-Bromofluorobenzene	*5.10*		ug/L	*5.000*		*102*	*70-130*		
LCS (B209001-BS1)									
Dichlorodifluoromethane	4.70	0.500	ug/L	5.000		94.0	23-117		
Chloromethane	4.19	0.500	ug/L	5.000		83.8	15-152		
Vinyl Chloride	4.79	0.500	ug/L	5.000		95.8	41-147		
Bromomethane	5.98	0.500	ug/L	5.000		120	31-157		
Chloroethane	4.42	0.500	ug/L	5.000		88.4	57-125		
Trichlorofluoromethane	5.02	0.500	ug/L	5.000		100	68-153		
1,1-Dichloroethene	5.02	0.500	ug/L	5.000		100	68-140		
1,1,2-Trichloro-1,2,2-Trifluoroethane	4.95	0.500	ug/L	5.000		99.0	78-139		
Carbon Disulfide	5.12	0.500	ug/L	5.000		102	65-135		
Acetone	40.4	5.00	ug/L	40.00		101	39-154		
Methyl Acetate	4.82	0.500	ug/L	5.000		96.4	49-141		
Methylene Chloride	4.90	0.500	ug/L	5.000		98.0	70-175		
trans-1,2-Dichloroethene	5.13	0.500	ug/L	5.000		103	74-136		
Methyl tert-Butyl Ether	4.91	0.500	ug/L	5.000		98.2	61-128		
1,1-Dichloroethane	5.08	0.500	ug/L	5.000		102	80-133		
cis-1,2-Dichloroethene	5.06	0.500	ug/L	5.000		101	77-141		
2-Butanone	41.4	5.00	ug/L	40.00		104	68-157		
Bromochloromethane	5.06	0.500	ug/L	5.000		101	64-151		
Chloroform	5.25	0.500	ug/L	5.000		105	74-137		
1,1,1-Trichloroethane	5.04	0.500	ug/L	5.000		101	78-130		
Cyclohexane	5.05	0.500	ug/L	5.000		101	83-138		
Carbon Tetrachloride	5.27	0.500	ug/L	5.000		105	82-137		
Benzene	4.94	0.500	ug/L	5.000		98.8	76-131		
1,2-Dichloroethane	5.11	0.500	ug/L	5.000		102	70-133		
Trichloroethene	5.69	0.500	ug/L	5.000		114	81-120		

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VOA-TRACE GCMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B209001									
LCS (B209001-BS1)									
1,2-Dichloropropane	5.15	0.500	ug/L	5.000		103	84-123		
Bromodichloromethane	5.19	0.500	ug/L	5.000		104	79-119		
cis-1,3-Dichloropropene	5.14	0.500	ug/L	5.000		103	79-126		
4-Methyl-2-Pentanone	41.3	5.00	ug/L	40.00		103	84-145		
Toluene	5.25	0.500	ug/L	5.000		105	83-118		
trans-1,3-Dichloropropene	5.49	0.500	ug/L	5.000		110	74-126		
1,1,2-Trichloroethane	5.12	0.500	ug/L	5.000		102	80-125		
Tetrachloroethene	5.77	0.500	ug/L	5.000		115	85-122		
Methylcyclohexane	4.93	0.500	ug/L	5.000		98.6	82-127		
Dibromochloromethane	5.17	0.500	ug/L	5.000		103	79-122		
1,2-Dibromoethane	5.18	0.500	ug/L	5.000		104	76-128		
2-Hexanone	41.9	5.00	ug/L	40.00		105	82-150		
Chlorobenzene	5.26	0.500	ug/L	5.000		105	84-118		
Ethylbenzene	5.01	0.500	ug/L	5.000		100	85-115		
m,p-Xylene	10.1	0.500	ug/L	10.00		101	86-118		
o-Xylene	5.12	0.500	ug/L	5.000		102	84-120		
Styrene	5.02	0.500	ug/L	5.000		100	87-112		
Bromoform	5.41	0.500	ug/L	5.000		108	75-125		
Isopropylbenzene	5.23	0.500	ug/L	5.000		105	85-117		
1,1,2,2-Tetrachloroethane	4.68	0.500	ug/L	5.000		93.6	73-124		
1,3-Dichlorobenzene	5.21	0.500	ug/L	5.000		104	87-119		
1,4-Dichlorobenzene	5.13	0.500	ug/L	5.000		103	86-121		
1,2-Dichlorobenzene	5.40	0.500	ug/L	5.000		108	82-123		
1,2-Dibromo-3-Chloropropane	5.32	0.500	ug/L	5.000		106	58-130		
1,2,4-Trichlorobenzene	5.00	0.500	ug/L	5.000		100	76-124		
1,2,3-Trichlorobenzene	5.00	0.500	ug/L	5.000		100	64-145		
1,2,3-Trichloropropane	4.60	0.500	ug/L	5.000		92.0	68-122		
Total Xylenes	--- U	0.500	ug/L				70-130		
1,2,4-Trimethylbenzene	5.07	0.500	ug/L	5.000		101	82-129		
1,3,5-Trimethylbenzene	5.02	0.500	ug/L	5.000		100	80-110		
Surrogate: 1,2-Dichloroethane-D4	*5.13*		ug/L	*5.000*		*103*	*70-130*		
Surrogate: 4-Bromofluorobenzene	*5.13*		ug/L	*5.000*		*103*	*70-130*		

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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Final Report

Project: Olean Well Field - 2208010

Project Number: 2208010

VOA-TRACE GCMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B209001									
LCS Dup (B209001-BSD1)									
Dichlorodifluoromethane	5.01	0.500	ug/L	5.000		100	23-117	6.39	20
Chloromethane	4.33	0.500	ug/L	5.000		86.6	15-152	3.29	20
Vinyl Chloride	5.30	0.500	ug/L	5.000		106	41-147	10.1	20
Bromomethane	6.06	0.500	ug/L	5.000		121	31-157	1.33	20
Chloroethane	4.87	0.500	ug/L	5.000		97.4	57-125	9.69	20
Trichlorofluoromethane	5.23	0.500	ug/L	5.000		105	68-153	4.10	20
1,1-Dichloroethene	5.37	0.500	ug/L	5.000		107	68-140	6.74	20
1,1,2-Trichloro-1,2,2-Trifluoroethane	5.01	0.500	ug/L	5.000		100	78-139	1.20	20
Carbon Disulfide	5.35	0.500	ug/L	5.000		107	65-135	4.39	20
Acetone	39.5	5.00	ug/L	40.00		98.7	39-154	2.45	20
Methyl Acetate	5.14	0.500	ug/L	5.000		103	49-141	6.43	20
Methylene Chloride	4.88	0.500	ug/L	5.000		97.6	70-175	0.409	20
trans-1,2-Dichloroethene	5.35	0.500	ug/L	5.000		107	74-136	4.20	20
Methyl tert-Butyl Ether	5.19	0.500	ug/L	5.000		104	61-128	5.54	20
1,1-Dichloroethane	5.05	0.500	ug/L	5.000		101	80-133	0.592	20
cis-1,2-Dichloroethene	5.23	0.500	ug/L	5.000		105	77-141	3.30	20
2-Butanone	41.8	5.00	ug/L	40.00		105	68-157	0.985	20
Bromochloromethane	5.04	0.500	ug/L	5.000		101	64-151	0.396	20
Chloroform	5.31	0.500	ug/L	5.000		106	74-137	1.14	20
1,1,1-Trichloroethane	5.23	0.500	ug/L	5.000		105	78-130	3.70	20
Cyclohexane	5.29	0.500	ug/L	5.000		106	83-138	4.64	20
Carbon Tetrachloride	5.47	0.500	ug/L	5.000		109	82-137	3.72	20
Benzene	5.17	0.500	ug/L	5.000		103	76-131	4.55	20
1,2-Dichloroethane	5.09	0.500	ug/L	5.000		102	70-133	0.392	20
Trichloroethene	5.84	0.500	ug/L	5.000		117	81-120	2.60	20
1,2-Dichloropropane	5.42	0.500	ug/L	5.000		108	84-123	5.11	20
Bromodichloromethane	5.16	0.500	ug/L	5.000		103	79-119	0.580	20
cis-1,3-Dichloropropene	4.84	0.500	ug/L	5.000		96.8	79-126	6.01	20
4-Methyl-2-Pentanone	40.2	5.00	ug/L	40.00		100	84-145	2.63	20
Toluene	5.20	0.500	ug/L	5.000		104	83-118	0.957	20
trans-1,3-Dichloropropene	5.46	0.500	ug/L	5.000		109	74-126	0.548	20
1,1,2-Trichloroethane	5.04	0.500	ug/L	5.000		101	80-125	1.57	20
Tetrachloroethene	5.90	0.500	ug/L	5.000		118	85-122	2.23	20
Methylcyclohexane	5.19	0.500	ug/L	5.000		104	82-127	5.14	20
Dibromochloromethane	5.38	0.500	ug/L	5.000		108	79-122	3.98	20

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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Project Number: 2208010

VOA-TRACE GCMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B209001									
LCS Dup (B209001-BSD1)									
1,2-Dibromoethane	5.06	0.500	ug/L	5.000		101	76-128	2.34	20
2-Hexanone	41.0	5.00	ug/L	40.00		103	82-150	2.17	20
Chlorobenzene	5.40	0.500	ug/L	5.000		108	84-118	2.63	20
Ethylbenzene	5.23	0.500	ug/L	5.000		105	85-115	4.30	20
m,p-Xylene	10.5	0.500	ug/L	10.00		105	86-118	4.38	20
o-Xylene	5.18	0.500	ug/L	5.000		104	84-120	1.17	20
Styrene	5.30	0.500	ug/L	5.000		106	87-112	5.43	20
Bromoform	5.41	0.500	ug/L	5.000		108	75-125	0.00	20
Isopropylbenzene	5.45	0.500	ug/L	5.000		109	85-117	4.12	20
1,1,2,2-Tetrachloroethane	4.38	0.500	ug/L	5.000		87.6	73-124	6.62	20
1,3-Dichlorobenzene	5.50	0.500	ug/L	5.000		110	87-119	5.42	20
1,4-Dichlorobenzene	4.96	0.500	ug/L	5.000		99.2	86-121	3.37	20
1,2-Dichlorobenzene	5.45	0.500	ug/L	5.000		109	82-123	0.922	20
1,2-Dibromo-3-Chloropropane	5.12	0.500	ug/L	5.000		102	58-130	3.83	20
1,2,4-Trichlorobenzene	5.00	0.500	ug/L	5.000		100	76-124	0.00	20
1,2,3-Trichlorobenzene	4.93	0.500	ug/L	5.000		98.6	64-145	1.41	20
1,2,3-Trichloropropane	4.48	0.500	ug/L	5.000		89.6	68-122	2.64	20
Total Xylenes	--- U	0.500	ug/L				70-130		20
1,2,4-Trimethylbenzene	5.19	0.500	ug/L	5.000		104	82-129	2.34	20
1,3,5-Trimethylbenzene	4.98	0.500	ug/L	5.000		99.6	80-110	0.800	20
Surrogate: 1,2-Dichloroethane-D4	*5.10*		ug/L	*5.000*		*102*	*70-130*		
Surrogate: 4-Bromofluorobenzene	*5.14*		ug/L	*5.000*		*103*	*70-130*		
Matrix Spike (B209001-MS1)	**Source: 2208027-04**								
Chloroform	5.42	0.500	ug/L	5.000	ND	108	74-137		
Bromodichloromethane	5.37	0.500	ug/L	5.000	ND	107	79-119		
Dibromochloromethane	5.89	0.500	ug/L	5.000	0.820	101	79-122		
Bromoform	5.74	0.500	ug/L	5.000	0.900	96.8	75-125		
Surrogate: 1,2-Dichloroethane-D4	*5.16*		ug/L	*5.000*		*103*	*70-130*		
Surrogate: 4-Bromofluorobenzene	*5.00*		ug/L	*5.000*		*100*	*70-130*		

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Project Number: 2208010

VOA-TRACE GCMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B209001									
Matrix Spike Dup (B209001-MSD1)	**Source: 2208027-04**								
Chloroform	5.14	0.500	ug/L	5.000	ND	103	74-137	5.30	20
Bromodichloromethane	5.20	0.500	ug/L	5.000	ND	104	79-119	3.22	20
Dibromochloromethane	5.68	0.500	ug/L	5.000	0.820	97.2	79-122	4.23	20
Bromoform	5.58	0.500	ug/L	5.000	0.900	93.6	75-125	3.36	20
Surrogate: 1,2-Dichloroethane-D4	*5.05*		ug/L	*5.000*		*101*	*70-130*		
Surrogate: 4-Bromofluorobenzene	*5.21*		ug/L	*5.000*		*104*	*70-130*		

Final Report

Project: Olean Well Field - 2208010

Project Number: 2208010

Metals ICPMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B208163									
Blank (B208163-BLK1)									
Aluminum	--- U	20.0	ug/L						
Antimony	--- U	1.00	ug/L						
Arsenic	--- U	1.00	ug/L						
Barium	--- U	1.00	ug/L						
Beryllium	--- U	1.00	ug/L						
Cadmium	--- U	1.00	ug/L						
Calcium	--- U	200	ug/L						
Chromium	--- U	1.00	ug/L						
Cobalt	--- U	1.00	ug/L						
Copper	--- U	1.00	ug/L						
Iron	--- U	20.0	ug/L						
Lead	--- U	1.00	ug/L						
Magnesium	--- U	200	ug/L						
Manganese	--- U	1.00	ug/L						
Nickel	--- U	1.00	ug/L						
Potassium	--- U	200	ug/L						
Selenium	--- U	1.00	ug/L						
Silver	--- U	1.00	ug/L						
Sodium	--- U	200	ug/L						
Thallium	--- U	1.00	ug/L						
Vanadium	--- U	1.00	ug/L						
Zinc	--- U	2.00	ug/L						
LCS (B208163-BS1)									
Aluminum	981	20.0	ug/L	1000		98.1	80-120		
Antimony	51.2	1.00	ug/L	50.00		102	80-120		
Arsenic	50.1	1.00	ug/L	50.00		100	80-120		
Barium	49.8	1.00	ug/L	50.00		99.6	80-120		
Beryllium	52.6	1.00	ug/L	50.00		105	80-120		
Cadmium	48.0	1.00	ug/L	50.00		96.0	80-120		
Calcium	1100	200	ug/L	1000		110	80-120		
Chromium	50.1	1.00	ug/L	50.00		100	80-120		
Cobalt	51.1	1.00	ug/L	50.00		102	80-120		
Copper	50.4	1.00	ug/L	50.00		101	80-120		
Iron	984	20.0	ug/L	1000		98.4	80-120		

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Metals ICPMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B208163									
LCS (B208163-BS1)									
Lead	51.8	1.00	ug/L	50.00		104	80-120		
Magnesium	1030	200	ug/L	1000		103	80-120		
Manganese	47.9	1.00	ug/L	50.00		95.8	80-120		
Nickel	52.4	1.00	ug/L	50.00		105	80-120		
Potassium	966	200	ug/L	1000		96.6	80-120		
Selenium	51.2	1.00	ug/L	50.00		102	80-120		
Silver	53.7	1.00	ug/L	50.00		107	80-120		
Sodium	1130	200	ug/L	1000		113	80-120		
Thallium	52.1	1.00	ug/L	50.00		104	80-120		
Vanadium	49.8	1.00	ug/L	50.00		99.7	80-120		
Zinc	49.6	2.00	ug/L	50.00		99.1	80-120		
LCS Dup (B208163-BSD1)									
Aluminum	970	20.0	ug/L	1000		97.0	80-120	1.12	20
Antimony	51.0	1.00	ug/L	50.00		102	80-120	0.370	20
Arsenic	49.7	1.00	ug/L	50.00		99.4	80-120	0.946	20
Barium	49.3	1.00	ug/L	50.00		98.6	80-120	0.991	20
Beryllium	51.6	1.00	ug/L	50.00		103	80-120	1.94	20
Cadmium	47.9	1.00	ug/L	50.00		95.8	80-120	0.215	20
Calcium	1070	200	ug/L	1000		107	80-120	2.61	20
Chromium	49.9	1.00	ug/L	50.00		99.7	80-120	0.418	20
Cobalt	50.7	1.00	ug/L	50.00		101	80-120	0.807	20
Copper	49.2	1.00	ug/L	50.00		98.5	80-120	2.37	20
Iron	977	20.0	ug/L	1000		97.7	80-120	0.670	20
Lead	51.1	1.00	ug/L	50.00		102	80-120	1.37	20
Magnesium	1020	200	ug/L	1000		102	80-120	1.40	20
Manganese	47.1	1.00	ug/L	50.00		94.3	80-120	1.59	20
Nickel	51.9	1.00	ug/L	50.00		104	80-120	1.09	20
Potassium	950	200	ug/L	1000		95.0	80-120	1.68	20
Selenium	51.3	1.00	ug/L	50.00		103	80-120	0.0644	20
Silver	53.0	1.00	ug/L	50.00		106	80-120	1.28	20
Sodium	1120	200	ug/L	1000		112	80-120	0.940	20
Thallium	50.4	1.00	ug/L	50.00		101	80-120	3.36	20
Vanadium	49.6	1.00	ug/L	50.00		99.2	80-120	0.455	20
Zinc	48.9	2.00	ug/L	50.00		97.8	80-120	1.37	20

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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Project Number: 2208010

Metals ICPMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B208163									
Matrix Spike (B208163-MS1)	**Source: 2208001-01**								
Aluminum	969	20.0	ug/L	1000	12.0	95.7	80-120		
Antimony	52.2	1.00	ug/L	50.00	0.544	103	80-120		
Arsenic	50.3	1.00	ug/L	50.00	ND	101	80-120		
Barium	78.4	1.00	ug/L	50.00	28.5	99.9	80-120		
Beryllium	52.8	1.00	ug/L	50.00	ND	106	80-120		
Cadmium	47.5	1.00	ug/L	50.00	ND	95.1	80-120		
Calcium	15800	200	ug/L	1000	14700	111	80-120		
Chromium	50.1	1.00	ug/L	50.00	0.416	99.3	80-120		
Cobalt	53.6	1.00	ug/L	50.00	3.77	99.7	80-120		
Copper	50.9	1.00	ug/L	50.00	2.64	96.5	80-120		
Iron	1060	20.0	ug/L	1000	84.2	98.0	80-120		
Lead	52.8	1.00	ug/L	50.00	1.12	103	80-120		
Magnesium	7840	200	ug/L	1000	6670	116	80-120		
Manganese	61.6	1.00	ug/L	50.00	14.9	93.4	80-120		
Nickel	55.5	1.00	ug/L	50.00	5.21	101	80-120		
Potassium	3540	200	ug/L	1000	2530	100	80-120		
Selenium	51.6	1.00	ug/L	50.00	1.03	101	80-120		
Silver	51.6	1.00	ug/L	50.00	ND	103	80-120		
Sodium	52800	200	ug/L	1000	51200	160	80-120		
Thallium	51.6	1.00	ug/L	50.00	0.377	102	80-120		
Vanadium	50.6	1.00	ug/L	50.00	0.265	101	80-120		
Zinc	69.5	2.00	ug/L	50.00	21.9	95.2	80-120		

APPENDIX E

LOW-FLOW TEST REPORTS

Low-Flow Test Report:

Test Date / Time: 8/16/2022 10:03:29 AM
Project: Olean Well Field - Loohns Cleaners Source Area MW-1
Operator Name: R.Finke, S. O'Hare

Location Name: MW-01 **Longitude: -78.400160** **Latitude: 42.071951** **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 18 ft** **Total Depth: 28 ft** **Initial Depth to Water: 16.2 ft**	**Pump Type: Grundfos RediFLO2 S.S. Submersible Pump** **Tubing Type: 5/8" O.D. LDPE with 1/2" I.D. Teflon-Lined** **Tubing Inner Diameter: 0.5 in** **Tubing Length: 33 ft** **Pump Intake From TOC: 26 ft** **Estimated Total Volume Pumped: 7800 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 3.5 ft**	**Instrument Used: Aqua TROLL 600 Vented-Unit # 4**

Test Notes:
MW-01

HACH 2100Q Turbidity Kit #2

Weather Conditions:
Clouds ~75°F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.33	
8/16/2022 10:03 AM	00:00	7.89 pH	14.72 °C	1,758.6 µS/cm	1.14 mg/L	224.00 NTU	155.2 mV	16.20 ft	200.00 ml/min
8/16/2022 10:06 AM	03:00	7.94 pH	15.18 °C	1,793.4 µS/cm	0.57 mg/L	92.30 NTU	155.0 mV	18.50 ft	200.00 ml/min
8/16/2022 10:09 AM	06:00	7.95 pH	15.52 °C	1,791.0 µS/cm	0.47 mg/L	57.50 NTU	139.5 mV	19.50 ft	200.00 ml/min
8/16/2022 10:12 AM	09:00	7.97 pH	15.68 °C	1,776.8 µS/cm	0.41 mg/L	44.50 NTU	119.3 mV	19.70 ft	200.00 ml/min
8/16/2022 10:15 AM	12:00	7.98 pH	15.78 °C	1,763.2 µS/cm	0.37 mg/L	34.30 NTU	113.0 mV	19.70 ft	200.00 ml/min
8/16/2022 10:18 AM	15:00	7.99 pH	15.86 °C	1,746.0 µS/cm	0.34 mg/L	30.20 NTU	141.4 mV	19.70 ft	200.00 ml/min
8/16/2022 10:21 AM	18:00	7.99 pH	15.99 °C	1,728.1 µS/cm	0.31 mg/L	21.50 NTU	126.8 mV	19.70 ft	200.00 ml/min
8/16/2022 10:24 AM	21:00	8.01 pH	16.10 °C	1,705.2 µS/cm	0.29 mg/L	14.30 NTU	134.9 mV	19.70 ft	200.00 ml/min
8/16/2022 10:27 AM	24:00	8.01 pH	16.25 °C	1,688.0 µS/cm	0.27 mg/L	14.70 NTU	136.5 mV	19.70 ft	200.00 ml/min
8/16/2022 10:30 AM	27:00	8.01 pH	16.30 °C	1,664.0 µS/cm	0.26 mg/L	13.70 NTU	129.4 mV	19.70 ft	200.00 ml/min

8/16/2022 10:33 AM	30:00	8.01 pH	16.29 °C	1,645.1 µS/cm	0.26 mg/L	12.90 NTU	104.0 mV	19.70 ft	200.00 ml/min
8/16/2022 10:36 AM	33:00	8.03 pH	16.40 °C	1,630.8 µS/cm	0.25 mg/L	11.20 NTU	85.0 mV	19.70 ft	200.00 ml/min
8/16/2022 10:39 AM	36:00	8.03 pH	16.43 °C	1,617.4 µS/cm	0.24 mg/L	11.30 NTU	83.3 mV	19.70 ft	200.00 ml/min
8/16/2022 10:42 AM	39:00	8.03 pH	16.59 °C	1,604.3 µS/cm	0.24 mg/L	11.50 NTU	86.4 mV	19.70 ft	200.00 ml/min

Samples

Sample ID:	Description:
MW-01	VOCs & 1,4 D (for GES) their MS - 1,4-D/PFAS

Low-Flow Test Report:

Test Date / Time: 8/16/2022 12:03:55 PM
Project: Olean Well Field - Loohns Cleaners Source Area MW-02
Operator Name: Finke

Location Name: MW-2 **Longitude: -78.400044** **Latitude: 42.071568** **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 18 ft** **Total Depth: 28 ft** **Initial Depth to Water: 16.02 ft**	**Pump Type: Grundfos RediFLO2 S.S. Submersible Pump** **Tubing Type: 5/8" O.D. LDPE with 1/2" I.D. Teflon-Lined** **Tubing Inner Diameter: 0.5 in** **Tubing Length: 33 ft** **Pump Intake From TOC: 26 ft** **Estimated Total Volume Pumped: 3600 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Vented Unit #: 5** **HACH 2100Q Turbidity Meter #: 3**

Test Notes:
After PFAS samples

Weather Conditions:
Overcast 67F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.33	
8/16/2022 12:03 PM	00:00	8.00 pH	12.72 °C	2,079.7 µS/cm	0.15 mg/L	21.10 NTU	97.0 mV	16.02 ft	200.00 ml/min
8/16/2022 12:06 PM	03:00	8.01 pH	12.96 °C	2,073.3 µS/cm	0.16 mg/L	19.10 NTU	91.5 mV	16.02 ft	200.00 ml/min
8/16/2022 12:09 PM	06:00	8.01 pH	13.16 °C	2,066.5 µS/cm	0.17 mg/L	15.90 NTU	89.1 mV	16.02 ft	200.00 ml/min
8/16/2022 12:12 PM	09:00	8.02 pH	13.15 °C	2,065.9 µS/cm	0.17 mg/L	14.80 NTU	88.4 mV	16.02 ft	200.00 ml/min
8/16/2022 12:15 PM	12:00	8.01 pH	13.22 °C	2,065.5 µS/cm	0.17 mg/L	13.60 NTU	88.7 mV	16.02 ft	200.00 ml/min
8/16/2022 12:18 PM	15:00	8.01 pH	13.19 °C	2,065.7 µS/cm	0.17 mg/L	13.60 NTU	91.3 mV	16.02 ft	200.00 ml/min
8/16/2022 12:21 PM	18:00	8.01 pH	13.35 °C	2,068.1 µS/cm	0.17 mg/L	14.70 NTU	91.1 mV	16.02 ft	200.00 ml/min

Samples

Sample ID: MW-02	Description:

Low-Flow Test Report:

Test Date / Time: 8/16/2022 1:01:54 PM
Project: Olean Well Field - Loohns Cleaners Source Area MW-03
Operator Name: R.Finke, S. O'Hare

Location Name: MW-03 **Longitude: -78.400021** **Latitude: 42.071563** **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 25 ft** **Total Depth: 35 ft** **Initial Depth to Water: 14.87 ft**	**Pump Type: Grundfos RediFLO2 S.S. Submersible Pump** **Tubing Type: 5/8" O.D. LDPE with 1/2" I.D. Teflon-Lined** **Tubing Inner Diameter: 0.5 in** **Tubing Length: 40 ft** **Pump Intake From TOC: 33 ft** **Estimated Total Volume Pumped: 22836.666 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 0.22 ft**	**Instrument Used: Aqua TROLL 600 Vented Unit # 9**

Test Notes:
MW-03

HACH 2100QTurbidity Kit #02

Weather Conditions:
Clouds ~78°F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.33	
8/16/2022 1:01 PM	00:00	6.29 pH	12.89 °C	331.09 µS/cm	0.24 mg/L	285.00 NTU	232.2 mV	14.87 ft	200.00 ml/min
8/16/2022 1:04 PM	03:00	6.18 pH	13.18 °C	330.26 µS/cm	0.21 mg/L	275.00 NTU	230.8 mV	15.09 ft	200.00 ml/min
8/16/2022 1:07 PM	06:00	6.20 pH	13.37 °C	330.52 µS/cm	0.23 mg/L	268.00 NTU	230.3 mV	15.09 ft	200.00 ml/min
8/16/2022 1:10 PM	09:00	6.22 pH	13.40 °C	331.77 µS/cm	0.21 mg/L	260.00 NTU	225.8 mV	15.09 ft	200.00 ml/min
8/16/2022 1:17 PM	15:11	5.90 pH	14.38 °C	0.07 µS/cm	8.99 mg/L	255.00 NTU	246.1 mV	15.09 ft	200.00 ml/min
8/16/2022 1:20 PM	18:11	6.38 pH	13.47 °C	331.61 µS/cm	0.45 mg/L	260.00 NTU	222.1 mV	15.09 ft	200.00 ml/min
8/16/2022 1:23 PM	21:11	6.38 pH	13.30 °C	330.56 µS/cm	0.20 mg/L	271.00 NTU	220.2 mV	15.09 ft	200.00 ml/min
8/16/2022 1:26 PM	24:11	6.39 pH	13.24 °C	331.37 µS/cm	0.19 mg/L	346.00 NTU	219.4 mV	15.09 ft	200.00 ml/min
8/16/2022 1:29 PM	27:11	6.40 pH	13.24 °C	331.71 µS/cm	0.17 mg/L	335.00 NTU	216.0 mV	15.09 ft	200.00 ml/min
8/16/2022 1:32 PM	30:11	6.43 pH	13.21 °C	331.41 µS/cm	0.15 mg/L	330.00 NTU	207.2 mV	15.09 ft	200.00 ml/min

8/16/2022 1:35 PM	33:11	6.45 pH	13.23 °C	332.01 µS/cm	0.16 mg/L	320.00 NTU	203.6 mV	15.09 ft	200.00 ml/min
8/16/2022 1:38 PM	36:11	6.48 pH	13.31 °C	331.50 µS/cm	0.16 mg/L	310.00 NTU	202.9 mV	15.09 ft	200.00 ml/min
8/16/2022 1:41 PM	39:11	6.52 pH	13.41 °C	332.09 µS/cm	0.18 mg/L	287.00 NTU	203.1 mV	15.09 ft	200.00 ml/min
8/16/2022 1:44 PM	42:11	6.55 pH	13.45 °C	331.33 µS/cm	0.17 mg/L	185.00 NTU	200.3 mV	15.09 ft	200.00 ml/min
8/16/2022 1:47 PM	45:11	6.58 pH	13.42 °C	331.78 µS/cm	0.18 mg/L	123.50 NTU	199.0 mV	15.09 ft	200.00 ml/min
8/16/2022 1:50 PM	48:11	6.61 pH	13.38 °C	330.48 µS/cm	0.19 mg/L	90.40 NTU	196.2 mV	15.09 ft	200.00 ml/min
8/16/2022 1:53 PM	51:11	6.63 pH	13.30 °C	331.63 µS/cm	0.19 mg/L	75.40 NTU	194.0 mV	15.09 ft	200.00 ml/min
8/16/2022 1:56 PM	54:11	6.67 pH	13.43 °C	332.23 µS/cm	0.19 mg/L	58.80 NTU	191.8 mV	15.09 ft	200.00 ml/min
8/16/2022 1:59 PM	57:11	6.69 pH	13.41 °C	333.55 µS/cm	0.18 mg/L	56.00 NTU	191.9 mV	15.09 ft	200.00 ml/min
8/16/2022 2:02 PM	01:00:11	6.72 pH	13.40 °C	333.56 µS/cm	0.18 mg/L	54.10 NTU	187.8 mV	15.09 ft	200.00 ml/min
8/16/2022 2:05 PM	01:03:11	6.73 pH	13.33 °C	332.32 µS/cm	0.19 mg/L	48.50 NTU	186.3 mV	15.09 ft	200.00 ml/min
8/16/2022 2:08 PM	01:06:11	6.75 pH	13.36 °C	333.22 µS/cm	0.17 mg/L	44.40 NTU	186.1 mV	15.09 ft	200.00 ml/min
8/16/2022 2:11 PM	01:09:11	6.77 pH	13.37 °C	332.95 µS/cm	0.17 mg/L	42.80 NTU	183.2 mV	15.09 ft	200.00 ml/min
8/16/2022 2:14 PM	01:12:11	6.79 pH	13.42 °C	333.69 µS/cm	0.16 mg/L	40.50 NTU	178.4 mV	15.09 ft	200.00 ml/min
8/16/2022 2:17 PM	01:15:11	6.83 pH	13.57 °C	334.48 µS/cm	0.17 mg/L	39.20 NTU	177.9 mV	15.09 ft	200.00 ml/min
8/16/2022 2:20 PM	01:18:11	6.85 pH	13.53 °C	333.53 µS/cm	0.17 mg/L	38.50 NTU	171.6 mV	15.09 ft	200.00 ml/min
8/16/2022 2:23 PM	01:21:11	6.85 pH	13.58 °C	334.73 µS/cm	0.17 mg/L	36.70 NTU	173.0 mV	15.09 ft	200.00 ml/min
8/16/2022 2:26 PM	01:24:11	6.86 pH	13.38 °C	333.83 µS/cm	0.17 mg/L	34.30 NTU	171.1 mV	15.09 ft	200.00 ml/min
8/16/2022 2:29 PM	01:27:11	6.92 pH	13.87 °C	333.95 µS/cm	0.17 mg/L	33.80 NTU	167.5 mV	15.09 ft	200.00 ml/min
8/16/2022 2:32 PM	01:30:11	6.96 pH	13.95 °C	332.53 µS/cm	0.18 mg/L	33.40 NTU	162.8 mV	15.09 ft	200.00 ml/min
8/16/2022 2:35 PM	01:33:11	6.92 pH	13.57 °C	332.63 µS/cm	0.19 mg/L	33.10 NTU	159.4 mV	15.09 ft	200.00 ml/min
8/16/2022 2:38 PM	01:36:11	6.93 pH	13.55 °C	333.01 µS/cm	0.18 mg/L	32.80 NTU	158.8 mV	15.09 ft	200.00 ml/min
8/16/2022 2:41 PM	01:39:11	6.94 pH	13.63 °C	333.88 µS/cm	0.18 mg/L	32.70 NTU	157.7 mV	15.09 ft	200.00 ml/min
8/16/2022 2:44 PM	01:42:11	6.97 pH	13.79 °C	333.79 µS/cm	0.17 mg/L	32.50 NTU	156.4 mV	15.09 ft	200.00 ml/min
8/16/2022 2:47 PM	01:45:11	6.99 pH	13.94 °C	333.79 µS/cm	0.17 mg/L	32.30 NTU	154.3 mV	15.09 ft	200.00 ml/min
8/16/2022 2:50 PM	01:48:11	7.02 pH	14.07 °C	333.90 µS/cm	0.17 mg/L	32.40 NTU	149.3 mV	15.09 ft	200.00 ml/min
8/16/2022 2:53 PM	01:51:11	7.03 pH	14.17 °C	334.04 µS/cm	0.16 mg/L	32.10 NTU	148.1 mV	15.09 ft	200.00 ml/min
8/16/2022 2:56 PM	01:54:11	7.04 pH	14.20 °C	334.51 µS/cm	0.17 mg/L	32.00 NTU	148.3 mV	15.09 ft	200.00 ml/min

Samples

Sample ID:	Description:
MW-03	Sample collected at 15:00

Low-Flow Test Report:

Test Date / Time: 8/16/2022 1:43:29 PM
Project: Olean Well Field - Loohn's Cleaners Source Area MW-04
Operator Name: Finke

Location Name: MW-04	Pump Type: Grundfos RediFLO2 S.S. Submersible Pump	Instrument Used: Aqua TROLL 600 Vented Unit #: 9
Longitude: -78.400433 Latitude: 42.071655 Well Diameter: 2 in Casing Type: PVC Screen Length: 10 ft Top of Screen: 20 ft Total Depth: 30 ft Initial Depth to Water: 16.4 ft	Tubing Type: 5/8" O.D. LDPE with 1/2" I.D. Teflon-Lined Tubing Inner Diameter: 0.5 in Tubing Length: 35 ft Pump Intake From TOC: 28 ft Estimated Total Volume Pumped: 12000 ml Flow Cell Volume: 130 ml Final Flow Rate: 200 ml/min Final Draw Down: 0 ft	HACH 2100Q Turbidity Meter Unit #: 4

Test Notes:
VOCs and 1,4-D after PFAS

Weather Conditions:
Overcast at 13:45

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.33	
8/16/2022 1:43 PM	00:00	8.43 pH	13.08 °C	871.87 µS/cm	0.21 mg/L	269.00 NTU	89.5 mV	16.40 ft	200.00 ml/min
8/16/2022 1:46 PM	03:00	8.43 pH	13.27 °C	886.71 µS/cm	0.22 mg/L	202.00 NTU	72.6 mV	16.40 ft	200.00 ml/min
8/16/2022 1:49 PM	06:00	8.45 pH	13.38 °C	889.85 µS/cm	0.23 mg/L	180.00 NTU	62.1 mV	16.40 ft	200.00 ml/min
8/16/2022 1:52 PM	09:00	8.44 pH	13.36 °C	906.01 µS/cm	0.23 mg/L	167.00 NTU	55.9 mV	16.40 ft	200.00 ml/min
8/16/2022 1:55 PM	12:00	8.44 pH	13.40 °C	935.14 µS/cm	0.21 mg/L	152.00 NTU	51.2 mV	16.40 ft	200.00 ml/min
8/16/2022 1:58 PM	15:00	8.45 pH	13.37 °C	954.00 µS/cm	0.21 mg/L	150.00 NTU	48.3 mV	16.40 ft	200.00 ml/min
8/16/2022 2:01 PM	18:00	8.44 pH	13.40 °C	978.33 µS/cm	0.20 mg/L	144.00 NTU	46.1 mV	16.40 ft	200.00 ml/min
8/16/2022 2:04 PM	21:00	8.44 pH	13.37 °C	988.25 µS/cm	0.19 mg/L	111.00 NTU	44.2 mV	16.40 ft	200.00 ml/min
8/16/2022 2:07 PM	24:00	8.44 pH	13.36 °C	1,013.7 µS/cm	0.18 mg/L	88.20 NTU	45.0 mV	16.40 ft	200.00 ml/min
8/16/2022 2:10 PM	27:00	8.43 pH	13.34 °C	1,034.2 µS/cm	0.17 mg/L	77.50 NTU	44.6 mV	16.40 ft	200.00 ml/min
8/16/2022 2:13 PM	30:00	8.44 pH	13.34 °C	1,050.4 µS/cm	0.16 mg/L	61.40 NTU	44.3 mV	16.40 ft	200.00 ml/min

8/16/2022 2:16 PM	33:00	8.43 pH	13.36 °C	1,065.8 µS/cm	0.16 mg/L	61.90 NTU	44.5 mV	16.40 ft	200.00 ml/min
8/16/2022 2:19 PM	36:00	8.44 pH	13.48 °C	1,077.1 µS/cm	0.15 mg/L	62.10 NTU	42.3 mV	16.40 ft	200.00 ml/min
8/16/2022 2:22 PM	39:00	8.43 pH	13.51 °C	1,095.0 µS/cm	0.15 mg/L	55.20 NTU	41.2 mV	16.40 ft	200.00 ml/min
8/16/2022 2:25 PM	42:00	8.44 pH	13.37 °C	1,109.6 µS/cm	0.14 mg/L	47.00 NTU	40.4 mV	16.40 ft	200.00 ml/min
8/16/2022 2:28 PM	45:00	8.43 pH	13.39 °C	1,125.4 µS/cm	0.14 mg/L	37.40 NTU	41.3 mV	16.40 ft	200.00 ml/min
8/16/2022 2:31 PM	48:00	8.42 pH	13.59 °C	1,141.3 µS/cm	0.14 mg/L	35.20 NTU	43.4 mV	16.40 ft	200.00 ml/min
8/16/2022 2:34 PM	51:00	8.43 pH	13.43 °C	1,148.4 µS/cm	0.13 mg/L	33.40 NTU	43.8 mV	16.40 ft	200.00 ml/min
8/16/2022 2:37 PM	54:00	8.42 pH	13.79 °C	1,170.8 µS/cm	0.13 mg/L	26.10 NTU	45.9 mV	16.40 ft	200.00 ml/min
8/16/2022 2:40 PM	57:00	8.43 pH	13.82 °C	1,154.0 µS/cm	0.14 mg/L	25.00 NTU	45.1 mV	16.40 ft	200.00 ml/min
8/16/2022 2:43 PM	01:00:00	8.43 pH	14.14 °C	1,140.8 µS/cm	0.14 mg/L	24.90 NTU	43.1 mV	16.40 ft	200.00 ml/min

Samples

Sample ID: MW-04	Description:

Low-Flow Test Report:

Test Date / Time: 8/16/2022 2:48:34 PM
Project: Olean Well Field - Loohns Cleaners Source Area MW-05
Operator Name: R.Finke, S. O'Hare

Location Name: MW-05 **Longitude: -78.400451** **Latitude: 42.071647** **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 39 ft** **Total Depth: 49 ft** **Initial Depth to Water: 16.45 ft**	**Pump Type: Grundfos RediFLO2 S.S. Submersible Pump** **Tubing Type: 5/8" O.D. LDPE with 1/2" I.D. Teflon-Lined** **Tubing Inner Diameter: 0.5 in** **Tubing Length: 54 ft** **Pump Intake From TOC: 47 ft** **Estimated Total Volume Pumped: 10800 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600 Vented Unit # 4.**

Test Notes:
MW-05

Turbidity Kit #4

Weather Conditions:
Sun with clouds ~75°F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.33	
8/16/2022 2:48 PM	00:00	6.85 pH	12.15 °C	387.07 µS/cm	1.06 mg/L	89.00 NTU	207.4 mV	16.45 ft	200.00 ml/min
8/16/2022 2:51 PM	03:00	6.77 pH	13.17 °C	386.49 µS/cm	1.08 mg/L	88.20 NTU	204.5 mV	16.45 ft	200.00 ml/min
8/16/2022 2:54 PM	06:00	6.79 pH	13.12 °C	386.52 µS/cm	1.09 mg/L	77.20 NTU	193.7 mV	16.45 ft	200.00 ml/min
8/16/2022 2:57 PM	09:00	6.81 pH	13.34 °C	385.61 µS/cm	1.11 mg/L	68.30 NTU	185.8 mV	16.45 ft	200.00 ml/min
8/16/2022 3:00 PM	12:00	6.84 pH	13.68 °C	385.36 µS/cm	1.12 mg/L	60.00 NTU	176.1 mV	16.45 ft	200.00 ml/min
8/16/2022 3:03 PM	15:00	6.87 pH	13.74 °C	384.46 µS/cm	1.13 mg/L	51.40 NTU	167.1 mV	16.45 ft	200.00 ml/min
8/16/2022 3:06 PM	18:00	6.90 pH	13.61 °C	384.13 µS/cm	1.13 mg/L	47.60 NTU	157.8 mV	16.45 ft	200.00 ml/min
8/16/2022 3:09 PM	21:00	6.93 pH	13.72 °C	383.77 µS/cm	1.13 mg/L	41.80 NTU	150.1 mV	16.45 ft	200.00 ml/min
8/16/2022 3:12 PM	24:00	6.96 pH	13.66 °C	383.27 µS/cm	1.13 mg/L	37.30 NTU	141.4 mV	16.45 ft	200.00 ml/min
8/16/2022 3:15 PM	27:00	6.99 pH	13.60 °C	382.83 µS/cm	1.12 mg/L	28.70 NTU	132.3 mV	16.45 ft	200.00 ml/min

8/16/2022 3:18 PM	30:00	7.01 pH	13.66 °C	382.47 µS/cm	1.12 mg/L	30.10 NTU	126.4 mV	16.45 ft	200.00 ml/min
8/16/2022 3:21 PM	33:00	7.03 pH	13.90 °C	382.70 µS/cm	1.12 mg/L	27.20 NTU	120.7 mV	16.45 ft	200.00 ml/min
8/16/2022 3:24 PM	36:00	7.07 pH	13.96 °C	382.25 µS/cm	1.12 mg/L	26.70 NTU	114.3 mV	16.45 ft	200.00 ml/min
8/16/2022 3:27 PM	39:00	7.10 pH	13.96 °C	381.92 µS/cm	1.12 mg/L	23.30 NTU	107.7 mV	16.45 ft	200.00 ml/min
8/16/2022 3:30 PM	42:00	7.14 pH	13.72 °C	381.41 µS/cm	1.11 mg/L	21.60 NTU	102.6 mV	16.45 ft	200.00 ml/min
8/16/2022 3:33 PM	45:00	7.15 pH	13.89 °C	381.86 µS/cm	1.12 mg/L	17.60 NTU	96.5 mV	16.45 ft	200.00 ml/min
8/16/2022 3:36 PM	48:00	7.18 pH	13.90 °C	381.53 µS/cm	1.12 mg/L	13.20 NTU	91.4 mV	16.45 ft	200.00 ml/min
8/16/2022 3:39 PM	51:00	7.20 pH	13.89 °C	381.57 µS/cm	1.11 mg/L	13.80 NTU	87.3 mV	16.45 ft	200.00 ml/min
8/16/2022 3:42 PM	54:00	7.22 pH	13.94 °C	381.73 µS/cm	1.11 mg/L	13.90 NTU	88.8 mV	16.45 ft	200.00 ml/min

Samples

Sample ID:	Description:
MW-05 Loohns 8/16/22	NO PFAS here but 1,4-D to NYSDEC thru GES