



SHALE GAS BASELINE SAMPLING WITH EQUIS™

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Agenda

- Baseline Sampling Overview
- A History of Baseline Sampling with EQuIS
- Baseline Sampling Workflow
 - Planning
 - Field Sampling Management
 - Data Delivery
 - Completeness Reporting
- Summary of Operator and Consultant Tasks

Baseline Sampling Overview

Baseline (Pre-drill) water supply sampling

The collection of water quality data for a given area prior to drilling activities. This service is commonly provided at no cost to the property owner.

Why Baseline water supply sampling important?

Baseline water supply sampling provides important information to water supply owners on their water quality. Water supply owners are strongly encouraged to participate in the program. The sampling provides a snapshot of water quality establishing baseline conditions of a landowners water source prior to oil or gas drilling related activities.



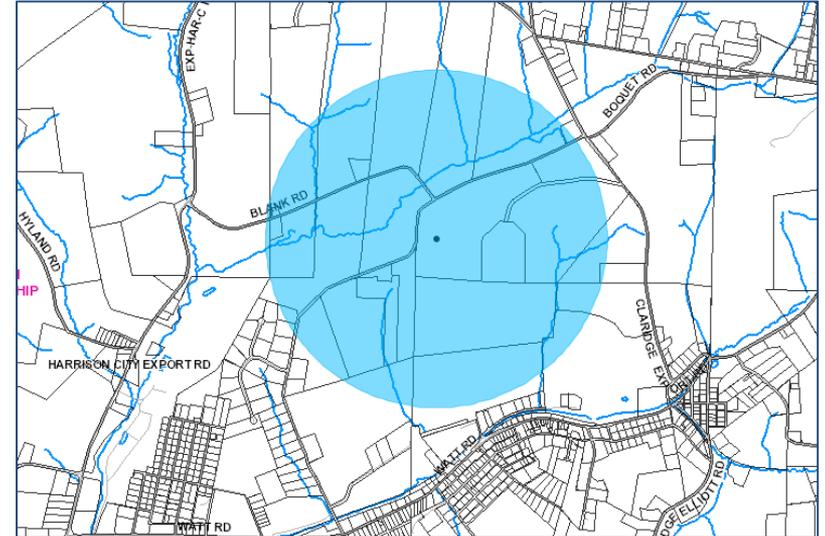
Wall Street Journal Online

A shale gas well in Shreveport, La. Associated Press/The Shreveport Times,

Baseline Sampling Overview

Included Water Sources

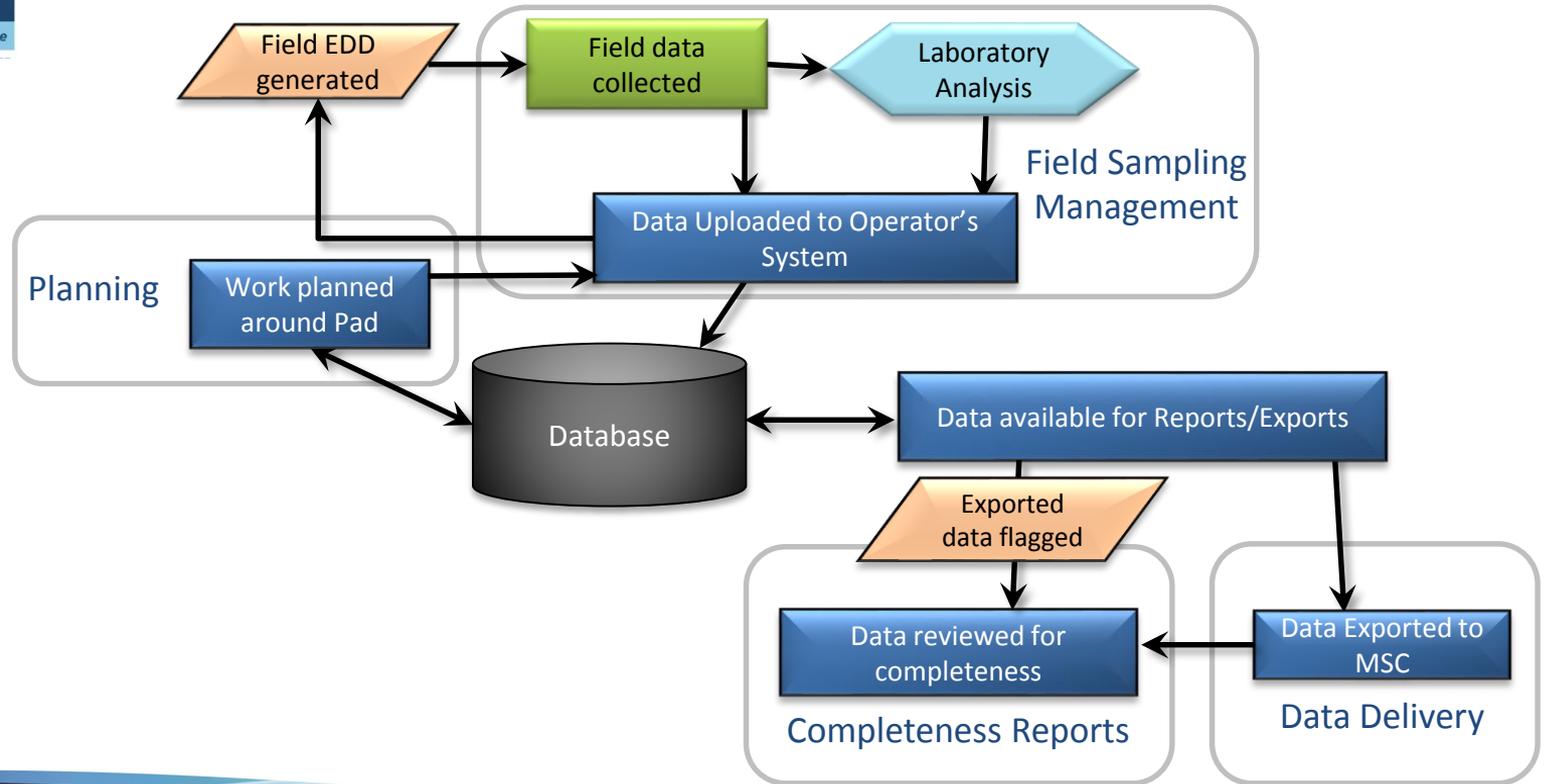
Potential water supplies that are within a certain radius of the oil and gas development activities may be sampled. Some examples of water supplies that may be evaluated include: wells, springs; in some instances additional samples (e.g. ponds used for domestic or agricultural purposes) may be collected



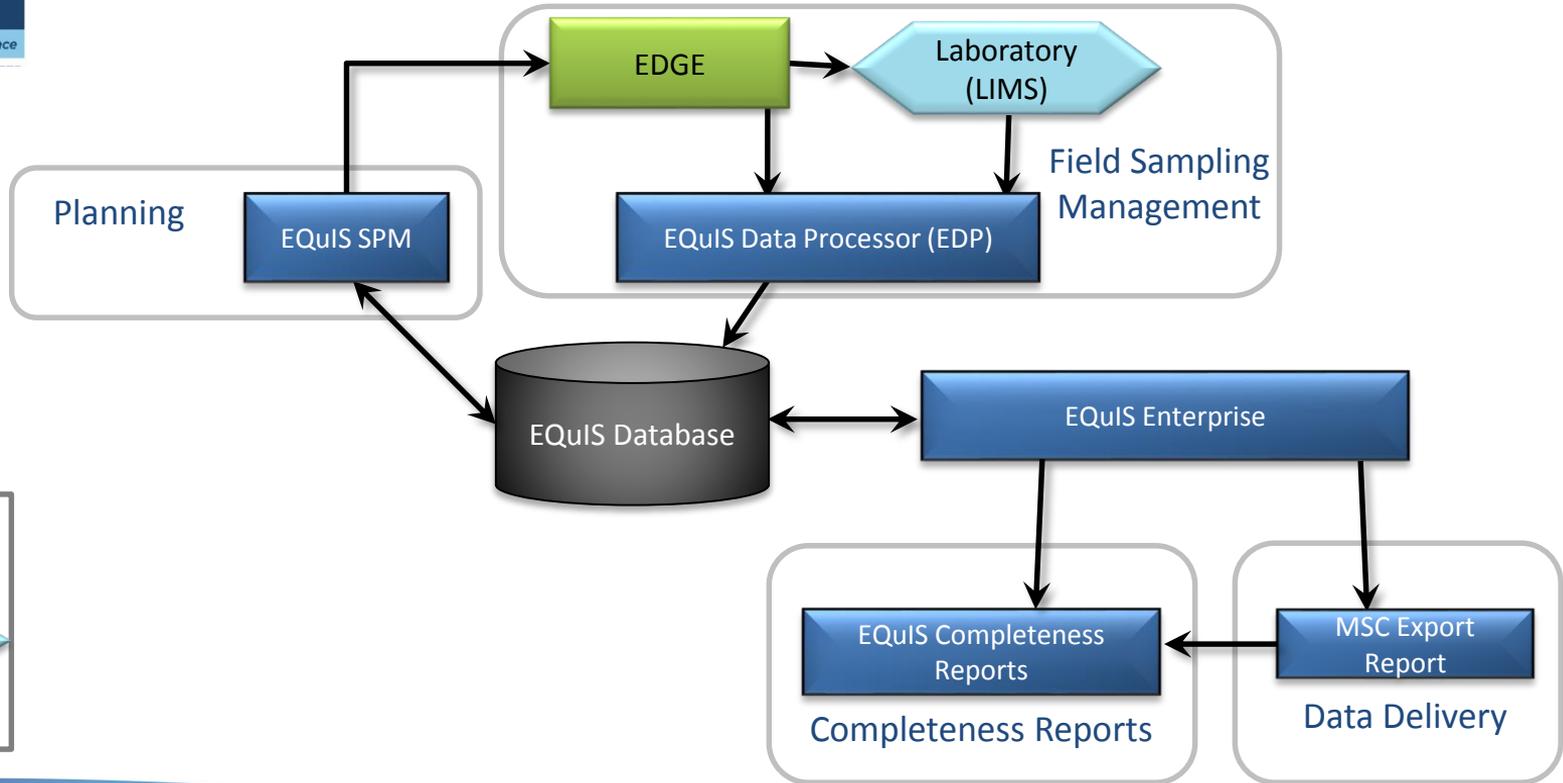
A History of Baseline Sampling with EQuIS™

- **Marcellus Shale Coalition**
 - Using EQuIS since 2011
 - The EDGE Site Visit Form was developed by EarthSoft for Marcellus Shale Coalition. This application was developed to aid in data submissions by consultants/laboratories
 - Using EQuIS provides PADEP access to baseline data shared by operators
- **Chesapeake Energy**
 - Using EQuIS since 2010
 - Using the EQuIS Baseline module since 2012
 - Leveraging other standard and custom EQuIS features for data verification and reporting
- **Chevron AMBU**
 - Using EQuIS and the Baseline module since 2014
 - Also managing Post-Drill and Confirmatory Sampling and Reporting in EQuIS
- **Other Operators**

Baseline Sampling General Workflow



Baseline Sampling with EQuIS

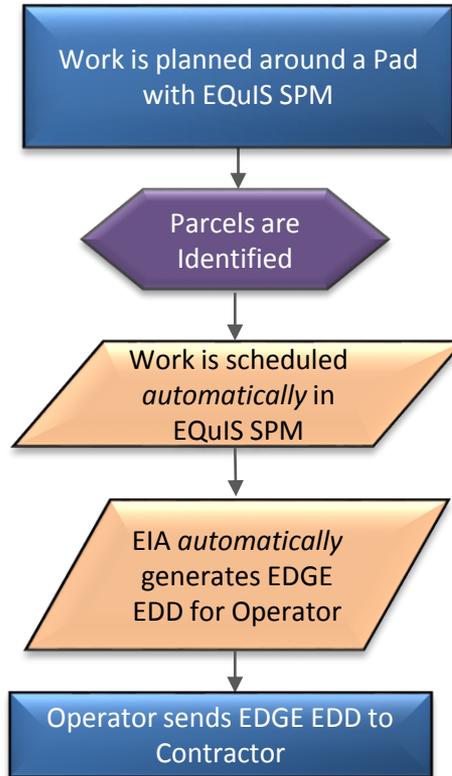
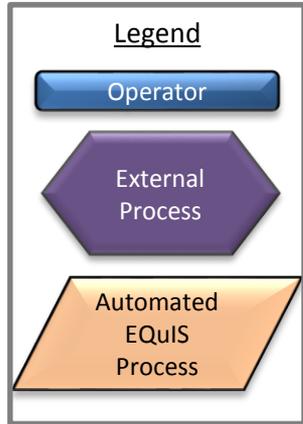


Baseline Sampling Workflow

Operators with EQUS may utilize the Baseline Sampling workflow, which includes:

- **Planning**
 - EQUS Sample Planning Module (SPM) runs in the background
 - Pad Assignments and automated Field Electronic Data Deliverable (EDD) generation
- **Field Sampling Management** with the Site Visit Form in EDGE
- **Data Delivery** with EDDs and the MSC Export report
- **Completeness Reporting** with EDDs and SPM Completeness Reports

Baseline Sample Planning



- Work is planned around a Pad (typically by the Operator) with EQiS SPM.
- Parcels are identified by the Operator or the Contractor and related data are imported into EQiS via the EQiS Data Processor (EDP).
- EQiS SPM *automatically* creates the Locations for each Parcel when Parcel data are imported into the EQiS database.
- EQiS Enterprise *automatically* creates an “EDGE EDD” for the Field crew(s) via an EQiS Information Agent (EIA) and the EDDs are received by the Operator.
- The Operator sends the EDGE EDD to the Contractors.



Work is planned around a Pad
with EQUIS SPM

EQUIS Sample Planning Module (SPM) 6.3.0

Plan Calendar Reports

New Plan Details Contracts Schedule Optimization Plan COCs Land Access Status Commitment Manager

Planned Tasks Tools Forms

Plan Information

Plan Code: Pre-Drill Baseline

Description: Pre-Drill Baseline Plan

Client: ▾

Start Date: 01/01/2015 End Date: 12/31/2020

Remark:

earthsoft

Plan Overview

Task Filter Planned Tasks

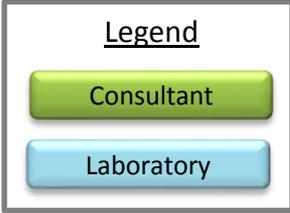
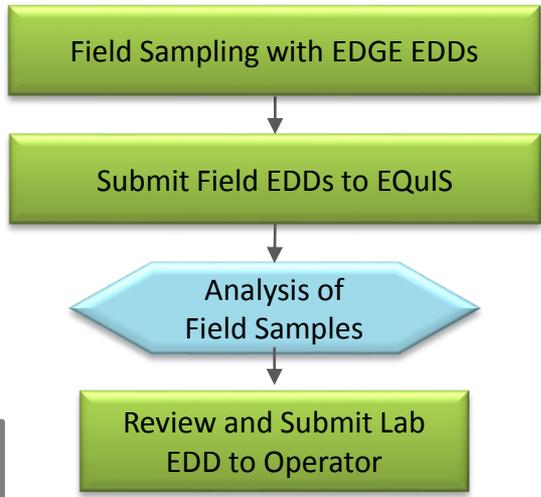
Scheduling Status	Planned Task Code	Task Recurrence	Start Date	End Date	Task Type	Planned Task Name
0 of 1	Pad-01-001-0001_PreDrill	Custom	01/01/2015	12/31/2020	BASELINE	
0 of 1	Pad-02-002-0002_PreDrill	Custom	06/01/2016	12/31/2018	BASELINE	
0 of 1	Pad-03-003-0003_PreDrill	Custom	01/01/2017	12/31/2020	BASELINE	
0 of 1	Pad-04-004-0004_PreDrill-...	Custom	01/01/2015	12/31/2019	BASELINE	

	A	B	C	D	E	F	G
	#method_analyte_group_code	spm_contract_mag_id	contractor_code	cas_nm	chemical_name	analytic_method	total_or_dissolved
2	CHLORINATED_COMPOUNDS	2716123	EarthSoft	71-55-6	1,1,1-TRICHLOROETHANE	SW8260B	N
3	FIELD_PARAMETERS	2716124	EarthSoft	DO_FIELD	DISSOLVED OXYGEN	FIELD MEASURE	N
4	FIELD_PARAMETERS	2716124	EarthSoft	ORP	OXYGEN REDUCTION POTENTIAL	FIELD MEASURE	N
5	FIELD_PARAMETERS	2716124	EarthSoft	PH_FIELD	PH	FIELD MEASURE	N
6	FIELD_PARAMETERS	2716124	EarthSoft	SPECCOND	SPECIFIC CONDUCTANCE	FIELD MEASURE	N
7	FIELD_PARAMETERS	2716124	EarthSoft	TDS	TOTAL DISSOLVED SOLIDS	FIELD MEASURE	N
8	FIELD_PARAMETERS	2716124	EarthSoft	TEMP_FIELD	TEMPERATURE	FIELD MEASURE	N
9	FIELD_PARAMETERS	2716124	EarthSoft	TURB_FIELD	TURBIDITY	FIELD MEASURE	N
10	METALS	2716126	EarthSoft	7429-90-5	ALUMINUM	E200.7	T
11	METALS	2716126	EarthSoft	7439-89-6	IRON	E200.7	T
12	METALS	2716126	EarthSoft	7439-95-4	MAGNESIUM	E200.7	T
13	METALS	2716126	EarthSoft	7439-96-5	MANGANESE	E200.8	T
14	METALS	2716126	EarthSoft	7439-97-6	MERCURY	E245.1	T
15	METALS	2716126	EarthSoft	7440-09-7	POTASSIUM	E200.7	T
16	METALS	2716126	EarthSoft	7440-23-5	SODIUM	E200.7	T
17	METALS	2716126	EarthSoft	7440-24-6	STRONTIUM	E200.8	T
18	METALS	2716126	EarthSoft	7440-38-2	ARSENIC	E200.8	T
19	METALS	2716126	EarthSoft	7440-39-3	BARIUM	E200.8	T
20	METALS	2716126	EarthSoft	7440-70-2	CALCIUM	E200.7	T
21	PETROLEUM_COMPOUNDS	2716127	EarthSoft	74-82-8	METHANE	RSK175	N
22	PETROLEUM_COMPOUNDS	2716127	EarthSoft	74-84-0	ETHANE	RSK175	N
23	PETROLEUM_COMPOUNDS	2716127	EarthSoft	74-98-6	PROPANE	RSK175	N
24	PETROLEUM_COMPOUNDS	2716127	EarthSoft	SGTHEM	SGT-HEXANE EXT. MATERIALS (TPH)	E1664A	N
25	PETROLEUM_COMPOUNDS	2716127	EarthSoft	SURFACT	MBAS DETERGENTS	SM5540C	N
26	RADIOACTIVE_ELEMENT	2716128	EarthSoft	13982-63-3	RADIUM 226	E903.0	N
27	RADIOACTIVE_ELEMENT	2716128	EarthSoft	ALPHA	ALPHA RADIATION	E900	N
28	RADIOACTIVE_ELEMENT	2716128	EarthSoft	BETA	BETA RADIATION	E900	N
29	VOCS	2716129	EarthSoft	100-41-4	ETHYLBENZENE	SW8260B	N
30	VOCS	2716129	EarthSoft	108-88-3	TOLUENE	SW8260B	N
31	VOCS	2716129	EarthSoft	1330-20-7	TOTAL XYLENES	SW8260B	N
32	VOCS	2716129	EarthSoft	71-43-2	BENZENE	SW8260B	N

EIA automatically generates EDGE EDDs for Operators

Example Field (EDGE) EDD

Baseline Field Sampling Management



- The Consultant completes the **Site Visit Forms** in **EDGE** during the Baseline Sampling.
- Once the field work is completed, the Consultant uploads the EDGE EDDs to **EQuS** via Enterprise EDP.
- The Lab prepares lab data and submits EDDs via email to Operators (or to the Consultant) with EQuS Enterprise, using EDP **Sign and Submit**.
- Once the lab data is submitted to EQuS, the Operator can run reports (i.e. Analytical and Completeness reports).

Field Sampling with
EDGE EDD



<http://water.epa.gov/drink/info/well/>

Part A: GENERAL INFORMATION			
Water Source ID*:	MULFORD-001-01-001	O & G Well Name*:	Mulford Unit #01, 02, 03, 04, 05
Pad Name*:	Mulford Unit	Parcel Number*:	MULFORD-001
Tax ID:			
Operator ID*:	001	State Code*:	PA
		County Code*:	001
Sampled By*:	Emily M.	Company Name*:	EarthSoft
Water Sampler Identifier*:	001	Date/Time Sampled*:	08/28/2015 00:00 (24hr)
Sample Frequency*:	1	<input type="checkbox"/> N/A: No Sample	Details:
Person Interviewed*:	Owner	Please specify:	
PROPERTY OWNER		RESIDENT OR OTHER <input checked="" type="checkbox"/> Same as owner	
Name*:	Walter Mulford	Name*:	Walter Mulford
Address*:	001 Main St.	Address*:	001 Main St.
City*:	Everytown	City*:	Everytown
State*:	PA	State*:	
Postal Code*:	12345	Postal Code*:	12345
Phone No*:	541-505-7068	Phone No*:	541-505-7068
Part B: WATER QUALITY			
	Reported Quality	Observed Quality	Treatment*
			Pump Type

EDGE Site Visit Forms

The **Site Visit Form** (or SVF) is required by the Marcellus Shale Coalition, Chesapeake Energy and Chevron. EDGE uses these to collect information on water source locations and field sample collected as part of the baseline sampling events.

Submit Field EDD to EQuIS

EDD Upload

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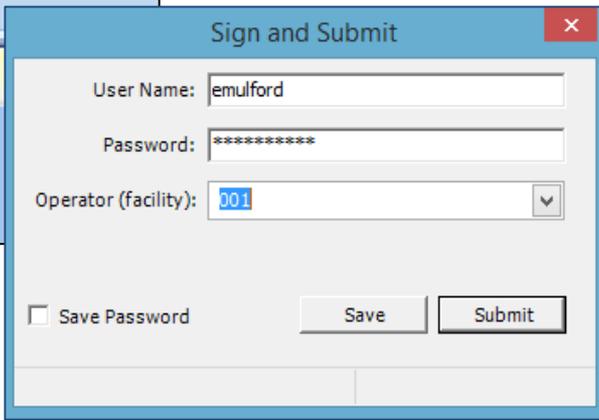
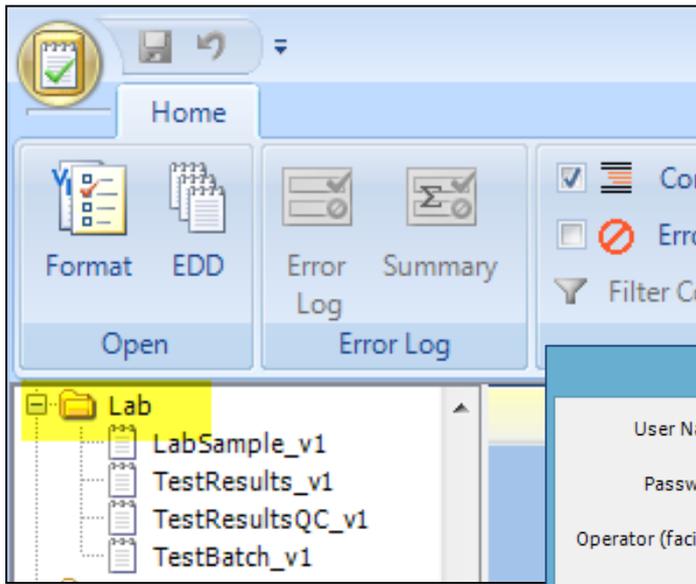
Baseline Confirmation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baseline FieldSubmittals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baseline LabSubmittals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baseline LandAccess	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baseline EDGE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility: Springfield ▼
 Format: EDGE ▼

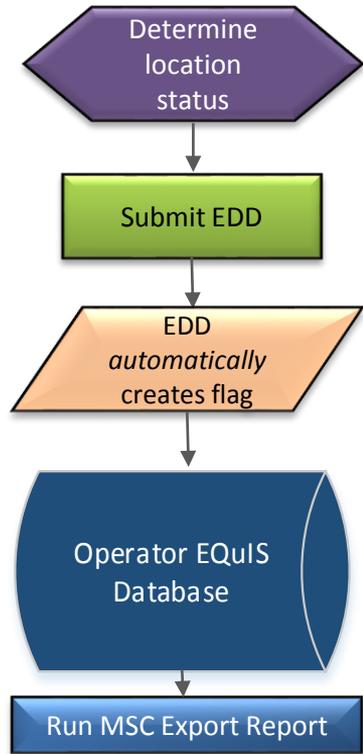
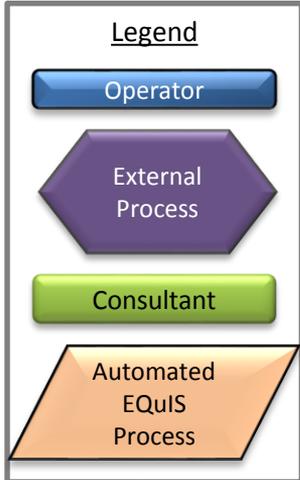
Sign and Submit

User Name:
 Password:
 Operator (facility): ▼
 Save Password

Review and Submit Lab
EDD to Operator



Baseline Sampling Data Delivery



- The Consultant determines the status of the submittals for a location and sends in an **EDD** to the Operator's EQulS database.
- EQulS *automatically* updates the status of the data when the EDDs are submitted.
- The Operator may run the **Operator Export to MSC Report** which records which locations have previously been exported to the MSC Shared Database.



Run MSC Export Report

MSC Export Report

Location

- Location Type Selection:
 - New Locations X
- Individual(s):
 - Pad01-001-0001Pre-Drill

Sample

- Task
 - Task(s):
 -

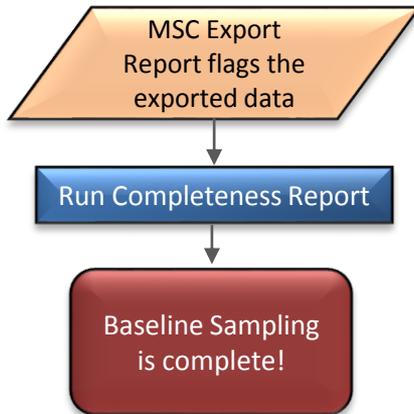
Date Range

- Start:
 - 06/24/2009
- End:
 - 11/06/2012

Sign and Submit?

The **Operator Export to MSC Report** takes the place of the Export from the MSC Internal database.

Baseline Sampling Completeness Reporting



- EQuIS *automatically* flags the data as they are exported.
- The Operator runs the **Completeness Report** to review outstanding orders with consultants.

Legend

Operator

Automated
EQuIS
Process

Run Completeness Report

	A	B	C	D	E	F
1	Facility Code:	AMBU				
2	Plan Code:	Pre-Drill Baseline PA				
3	* Status:	C: Completed I: Incomplete	S: SRN issues	U: Unplanned	N: Not Taken	
4						
5	Task	status	SPM Sample Code	Sample Name	Location Code	Matrix
6	PAD-01-001-0001_PreDrill-001	C	0204201502	0204201502	MULFORD-002-01-002	
7	PAD-01-001-0001_PreDrill-001	C	0204201503	0204201503	MULFORD-003-01-003	
8	PAD-01-001-0001_PreDrill-001	C	0204201507	0204201507	MULFORD-007-01-007	
9	PAD-01-001-0001_PreDrill-001	C	0204201513	0204201513	MULFORD-013-01-015	
10	PAD-01-001-0001_PreDrill-001	C	0204201514	0204201514	MULFORD-013-02-016	
11	PAD-01-001-0001_PreDrill-001	C	0204201515	0204201515	MULFORD-014-01-017	
12	PAD-01-001-0001_PreDrill-001	C	0204201516	0204201516	MULFORD-014-02-018	
13	PAD-01-001-0001_PreDrill-001	C	0204201517	0204201517	MULFORD-014-03-019	
14	PAD-01-001-0001_PreDrill-001	C	0204201518	0204201518	MULFORD-014-04-020	
15	PAD-01-001-0001_PreDrill-001	C	0204201520	0204201520	MULFORD-014-06-022	
16	PAD-01-001-0001_PreDrill-001	I	0204201501	0204201501	MULFORD-001-01-001	
17	PAD-01-001-0001_PreDrill-001	I	0204201504	0204201504	MULFORD-004-01-004	
18	PAD-01-001-0001_PreDrill-001	I	0204201505	0204201505	MULFORD-005-01-005	
19	PAD-01-001-0001_PreDrill-001	I	0204201506	0204201506	MULFORD-006-01-006	
20	PAD-01-001-0001_PreDrill-001	I	0204201508	0204201508	MULFORD-008-01-008	
21	PAD-01-001-0001_PreDrill-001	I	0204201509	0204201509	MULFORD-009-01-009	
22	PAD-01-001-0001_PreDrill-001	I	0204201510	0204201510	MULFORD-010-01-010	
23	PAD-01-001-0001_PreDrill-001	I	0204201511	0204201511	MULFORD-011-01-011	
24	PAD-01-001-0001_PreDrill-001	I	0204201512	0204201512	MULFORD-012-01-012	
25	PAD-01-001-0001_PreDrill-001	I	0204201519	0204201519	MULFORD-014-05-021	
26	PAD-01-001-0001_PREDRILL-001	U		001-PA-001-082815-0930-01-001	MULFORD-007-02-013	WS
27	PAD-01-001-0001_PREDRILL-001	U		001-PA-001-082815-1045-01-001	MULFORD-007-03-014	WG
28	PAD-01-001-0001_PREDRILL-001	U		001-PA-001-082815-1230-01-001	MULFORD-015-01-023	WS

Completeness Reports in EQuIS SPM

Summary of Operator Tasks

- Work is planned around a Pad with EQUIS SPM.

- The EDGE EDDs is sent to the Contractors.

- The Operator may run **MSC Export Report** which records which locations have been exported to the MSC Shared Database.

Summary of Consultant Tasks

- (Optional) Parcels are identified and related data are imported into EQiS via EDP.

- The Consultant completes the **Site Visit Forms** in **EDGE** during the Baseline Sampling.
- The Consultant and/or Laboratory uploads the EDGE and Lab EDDs to **EQiS Enterprise EDP**.

- The Consultant determines the status of the submittals for a location and sends in an **EDD** to the Operator's EQiS database.



Thank You!

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Mark Hollingsworth, Manager- Environmental, Chesapeake Energy