

MANAGING ELECTRONIC DATA

Purpose

This Water Quality and Hydrology Group (ENV-WQH) procedure describes the management processes and responsibilities for the Water Quality Database (WQDB).

Scope

This procedure applies to ENV-WQH personnel, contractors, and students who participate in the management of ENV-WQH electronic data.

In this procedure

This procedure addresses the following major topics:

Topic	See Page
General Information About This Procedure	2
Who Requires Training to This Procedure?	2
Data Management in Water Quality Database	6
Maintenance of Location Data	9
Maintenance of Well Construction Data	10
Maintenance of Sampling Plans and Scheduled Samples	12
Maintenance of Sample Information from Non-scheduled Events	13
Maintenance of Chemistry Data	15
Maintenance of Water Level Data	17
Maintenance of Gage Discharge Data	18
Web Publication	19
Records Resulting from this Procedure	20

Signatures

First authorization review date is one year from Group Leader signature below; subsequent authorizations are on file in the group office.

Prepared and approved by: Signature on file _____ K. Mullen, ENV-WQH IM Team Leader	Date: 6/30/05 _____
Approved by: Signature on file _____ S. Rae, ENV-WQH Group Leader	Date: 6/30/05 _____

CONTROLLED DOCUMENT

This copy is uncontrolled if no signatures are present or if the copy number stamp is black. Users are responsible for ensuring they work to the latest approved revision.

General information about this procedure

This procedure has the following attachments:

Attachments

Number	Attachment Title	No. of pages
1	List of Acceptable Values	1
2	Process Flow Diagrams	1
3	Well Construction Information	10

This table lists the revision history and effective dates of this procedure.

History of revisions

Revision	Date	Description Of Changes
0	9/03	New document
1	10/04	Updated document
2	7/05	Incorporated requirements in ENV-IMP

Who requires training to this procedure

All ENV-WQH group personnel, including contract employees, who conduct data and software management activities for the group are required to train to this procedure.

Training method

The training method for this procedure is “self-study” (reading) and is documented in accordance with ENV-WQH-QP-024, *Personnel Training*.

General information about this procedure, continued

Definitions to this procedure Coordinate System: Coordinate systems (State Plane NM Central) are defined by three basic components: datum (NAD83), ellipsoid (GRS80), and projection (Transverse Mecator). The datum is a reference point, or set of points (the North American Datum of 1983 is located at the center of mass for the earth) that the corresponding ellipsoid and projection are aligned to. The ellipsoid (sometimes called spheroid) is the model that describes the shape of the earth's surface (WGS84 and GRS80 are used most frequently used with the NAD83). The projection is a mathematical transformation from a real three dimensional location in space to a flat, two dimensional location contained in a model (e.g. map). The projection associated with our locations is the Transverse Mercator.

Data: Information translated into a format that can be processed on a computer.

Data Steward: The subject matter expert that manages the development, approval, creation, and use of data associated with a logical data grouping managed within a specified functional area. It is the data steward's responsibility to support cross-function and review of the data so they can be used to satisfy data requirements throughout the enterprise. The data steward's responsibilities include:

- Maintains subject matter expertise for the data being managed.
- Defines the overall requirements for the database and the relevance of data entities in the database structure.
- Maintains authority over development and execution of policies and procedures for data gathering protocols, data validation, and the migration of data to the production environment.
- Controls the degree of quality assurance applied to the data entities, and quality control applied to entry and validation processes.
- Committee of data stewards work to establish read, write, and edit access limitations (DBA implements these restrictions).
- Authorizes client access to sensitive data.
- Cooperates with other data stewards to establish standards for shared attributes and links.

Database: A database is a data repository that is accessed by multiple personnel or that has been identified as an official source for reporting. This may range from a simple spreadsheet to a complex database system maintained in software such as Oracle or ArcGIS.

Database Management System: A program that lets one or more computer users create and access data in a database.

General information about this procedure, continued

Definitions, con't

Data Package: A hardcopy or an electronic report from an analytical laboratory on a single set of chemical analyses. A data package contains the information specified in the SOW and sufficient documentation to allow an appropriate professional, at a substantially different time and location, to ascertain:

- What analyses were performed, and what results were obtained
- That the data had acceptable properties (such as accuracy, precision, MDA)
- Where, when, and by whom the analyses were performed
- That the analyses were done under acceptable conditions (such as calibration, control, custody, using approved procedures, and following generally approved good practices) and
- That the DOE-AL Model Statement of Work for Analytical Laboratories was followed.

Database Administrator (DBA): The person responsible for the environmental aspects of a database. In general, these include:

- Recoverability - Creating and testing Backups
- Integrity - Verifying or helping to verify data integrity
- Security - Defining and/or implementing access controls to the data
- Availability - Ensuring maximum uptime
- Performance - Ensuring maximum performance given budgetary constraints
- Development and testing support - Helping programmers and engineers to efficiently utilize the database.

Electronic Data Deliverable: A file containing data that can be directly imported into a database using a software program known as a parser.

Parser: A program that receives input in the form of sequential source program instructions, interactive online commands, markup tags, or some other defined interface and breaks them up into parts and inserted into a database. A parser may also check to see that all input has been provided that is necessary.

Statement of Work (SOW): A list of specifications and requirements that analytical laboratories must meet in order to do work for ENV-WQH.

General information about this procedure, continued

Definitions, con't

Validation: Quality of data is assessed utilizing standardized models and procedures. This may incorporate specific samples and analyses to measure accuracy and precision of techniques and instruments.

Verification: Comparison of the electronic data and that in hard copy assures accuracy of data entry.

Water Quality Database (WQDB): An Oracle database used as a repository of water and sediments related data.

References

The following documents are referenced in this procedure:

- ENV-IMP, *Integrated Management Plan*
 - ENV-WQH-QMP, *ENV-WQH Quality Management Plan*
 - RRES-WQH-QP-025, *Records Management*
 - RRES-WQH-QP-029, *Generating and Maintaining Chain of Custody*
 - DOE-AL Model Statement of Work
-

Note

Actions specified within this procedure, unless preceded with “should” or “may,” are to be considered mandatory guidance (i.e., “shall”).

Data management in Water Quality Database

Policy

Data in the Water Quality Database (WQDB) provide the basis for compliance, surveillance, and stakeholder reporting. Data procedures must ensure that the data is legally defensible and prevent corruption or data loss.

Data security

Access to WQDB

The **user** must obtain access to view data in WQDB by requesting a user account from the ENV-WQH IM Team. The user must perform the following steps to obtain access to WQDB:

Step	Action
1	Send an email to wqh_im_support@lanl.gov specifying user z number and the type of data to view. The database administrator is notified by the ENV-WQH IM Team of the request for privileges required for viewing data.
2	Notice will be received via email once an account has been created. A user name (z number) and a temporary password will be indicated.
3	Change the temporary password via a web browser at http://wqdb.lanl.gov .

Privileges

The **user** must request privileges from the ENV-WQH IM Team to add new data or edit existing data in WQDB.

Data records

All data records in WQDB are associated with the organization generating the samples and responsible for the data. An individual responsible for the data is designated as the data steward.

All data entered into the database or modified is stamped with the following information:

- Username of the individual creating the record
 - Date the record is created
 - Username of the individual modifying a record
 - Date of the modification
-

Data management in Water Quality Database, continued

Archive data

Data security, con't All data records entered, edited, or deleted by ENV-WQH personnel will be archived into audit tables retaining all old values and the specific action taken for the record.

- Only ENV-WQH IM Team members have access to archived data
- Retrieval of archived data requires specialized programming
- Requests for such retrieval must be sent via email to ENV-WQH IM, with a justification from a Team Leader.

Back up

Database administrator shall back up the WQDB every night.

Inserting new data

Personnel generating data (**users**) will insert individual records using data entry screens or will import data from an electronic data deliverable (EDD). Access the data entry screens is through a web browser at <http://wqdbforms.lanl.gov>.

Editing existing data

User may edit individual records with the appropriate permissions using data entry forms accessible at <http://wqdbforms.lanl.gov>. A **User** must request privileges to edit data from ENV-WQH IM. Reference "Data security, Privileges" in this document.

Exchanging data with other organizations

Organizations external to ENV-WQH or even external to LANL may provide data to be loaded into the WQDB. These data must be submitted in a set of files conforming to the WQDB table structure. A parser will load these data.

To prevent the alteration of any data and duplication of data in the database tables, the **ENV-WQH IM Team** shall maintain the following criteria:

- All tables contain a primary key that ensures the uniqueness of the record.
 - Each organization wishing to import data into WQDB will have a specific series of numbers to identify its data records. ENV-WQH IM Team will assign a starting number at the time of the first request to import data.
 - Each series begins with a unique integer and increments by ten.
-

Data management in Water Quality Database, continued

**Common list
of standard
terms**

In order to preserve the ability for comparison of data records among groups within ENV Division, all organizations utilizing ENV-WQH data storage facilities will collaborate with ENV-WQH data stewards to determine standard terms for referring to data element values used in common.

Maintenance of location data

Overview

Location data identify and characterize each sampling station that is recorded in the WQDB. These data records include a unique station identifier, name, type, location (in X, Y coordinates), and other characterizing information.

Data collection

Location information will be collected by WQH field personnel during sampling events as needed using GPS equipment. This data will be forwarded to **wqh_im_support@lanl.gov** as soon after the sampling event is completed as reasonably possible.

Data entry and editing

ENV-WQH IM personnel insert or modify individual records in the database.

Data Stewards or Users authorized by the data stewards may submit requests for additions or changes to location information to **wqh_im_support@lanl.gov**. The request must contain the following information:

- Name of the location
- Type of location, (see Location Information in Attachment 1 for a list of acceptable values)
- Geographical coordinates and elevation, if available
- Method by which coordinates and elevation were obtained (see Location Information in Attachment 1 for a list of acceptable values)
- Organization responsible for information about the location
- Individual responsible for information about the location.

All coordinates will be stored in the State Plane NAD 83 coordinate system. The unit of measure for all coordinates and elevations must be in “FT”.

The ENV-ECR GIS Team is responsible for converting location data into GIS format for maps requested by Users. The ENV-ECR GIS Team assigns metadata to GIS data created.

Data security

Only **ENV-WQH IM Team personnel** will be allowed to add or edit location data.

Maintenance of well construction data

Overview

Well construction data includes, but is not limited to:

- drilling activities
- description of well components
- completion information
- information about well development methods, pump installation, and surface completion

Data collection

The **well construction subcontracting company** is responsible for completing the necessary Information Management Data Sheets and submitting the completed sheets to the ENV-WQH IM. The data sheets summarize drilling related information for each well in a form that can be captured by the WQDB. Data sheets shall be included in a controlled logbook maintained by the well construction subcontracting company. The table below lists the seven Information Management Data Sheets. Examples of the data sheets are provided in Attachment 3, Well Construction Data Sheets.

Name of Form	Description
Drilling Associated Activities	Captures all drilling, drill casing, and surface casing related information.
Borehole Status	Captures status of the borehole at the time of geophysical logging runs.
Log Header	Captures logging detail. A new form should be filled out for each logging run.
Well Construction	Captures all production casing, centralizer, steel tab, screen, and annular information associated with well construction.
Well Development	Captures all well-development activities, including methods and field-parameter measurements.
Pump Installation	Captures all non-Westbay pump installation information.
Surface Completion	Captures all surface completion information.

Maintenance of well construction data, continued

Data entry

Field personnel shall submit all datasheets to ENV-WQH IM for entry into the WQDB. The table below displays the individuals accountable for delivery of information to ENV-WQH IM. Refer to **Error! Reference source not found.** (Attachment 3) for the lists of acceptable values for well construction records.

Responsible Party	Action
Field Geologist	Complete all datasheets as work progresses.
Field Geologist	Submit all forms to Field Drilling Supervisor no later than two days after each form is completed.
Field Drilling Supervisor	Review all forms for completeness and accuracy.
Field Drilling Supervisor	Submit completed forms electronically to ENV-WQH IM no later than one week after form completion.
Field Drilling Supervisor	Submit paper borehole geophysical logs to ENV-WQH IM within one week of logging.
Field Drilling Supervisor	Notify ENV-WQH IM via e-mail when electronic geophysical logs become available.
Field Drilling Supervisor	Submit hardcopy of Well Development Form to ENV-WQH IM and Hydrology Lead.
Hydrology Lead	Evaluate Well Development Form, identify the representative data to be inserted into WQDB and notify ENV-WQH IM.
ENV-WQH IM Team	Insert all data into WQDB
ENV-WQH IM Team	Verify accuracy of data entry and make any required corrections
ENV-WQH IM Team	Release all data to WQDB Users

Data security Only **ENV-WQH IM Team personnel** shall enter or edit data in WQDB.

Maintenance of sampling plans and scheduled samples

Overview Monitoring activities are scheduled via a sampling plan. This plan is stored in WQDB and field paperwork is created based on the stored information.

Data entry, editing, verification The maintenance of these data includes data entry as well as loading of data by batch. The table below describes the process for loading the sampling plans.

Step	Responsible Party	Action
1	Data Steward	Submit written sampling plan including locations, analytes, sampling periods and frequency, and analytical methods.
2	ENV-WQH IM Team	Translate written plan into database format and enter sampling plan into WQDB.
4	Project Leaders and/or Data Steward	Review sampling plans via Discoverer.
5	Project Leaders and/or Data Steward	Submit corrections or changes to ENV-WQH IM
6	ENV-WQH IM Team	Apply changes and Corrections to database

Data security Access to the sampling plan information is provided to users through a Discoverer interface. Discoverer does not allow users to modify any of the sampling plan information.

Maintenance of sample information from non-scheduled events

Overview

Samples may be taken in response to unusual events or in response to requests from organizations outside ENV-WQH. These events may not be included in the sampling plans created by ENV-WQH. In some cases it is desired that the analytical results be stored in WQDB. In those cases the following procedure should be followed. Those cases where WQH Group members do not desire the data to be stored in WQDB are outside the scope of this document.

Data entry, editing, verification

Sampling of unscheduled events must be coordinated between ENV-WQH Operations Team and ENV-WQH IM Team. This facilitates communication and assures that all required paperwork is distributed and completed, and identifies individuals responsible for entering data into WQDB.

Field personnel will collect samples and submit the Analytical Request form to the ENV-WQH IM project/team leader for entry into the WQDB. Please refer to RRES-WQH-QP-29 for procedures for maintaining a chain of custody (CoC). The table below outlines the steps for recording and verifying non-scheduled event data in the WQDB.

Step	Responsible Party	Action
1	Operations Personnel	<p>To insert sampling information from non-scheduled events:</p> <p>Determine and name the locations.</p> <p>Send email including the following information to wqh_im_support@lanl.gov:</p> <ul style="list-style-type: none"> • Name of the location • Type of location. See Location Information for a list of acceptable values. • XY coordinates, and elevation if available • Method by which coordinates and elevation were obtained. See Location Information for a list of acceptable values. • Organization responsible for information about the location • Individual responsible for information about the location

Continued on next page.

Maintenance of sample information from non-scheduled events, continued

Data entry,
editing,
verification,
con't

Step	Responsible Party	Action
2	ENV-WQH IM Team	Insert the location information into WQDB
3	Operations Team	Produce blank analytical request forms and insert sample information following these conventions: <ul style="list-style-type: none"> • Use one CoC for each location for each day. • Produce container labels.
4	Operations Team	Refer to RRES-WQH-QP-29 for maintenance of chain of custody. Add sample information to CoC: <ul style="list-style-type: none"> • Assign a sample id to each sample • Be certain that the assigned sample id is not the same as sample id that is already in use. Ask the ENV-WQH-IM Team for assistance as necessary. • Samples from different depths or taken at different times must have their own sample identifier • Record the depth of the sample if applicable • Record the date and time the sample was obtained • Identify the order suite for the requested analysis
5	ENV-WQH IM Team	Enter the information from the CoC into WQDB via the data entry forms entry in accordance with RRES-WQH-QP-29.
6	Operations Team	Verify and release data entry in accordance with RRES-WQH-QP-29.

Maintenance of chemistry data

Overview

Analytical laboratory-generated data shall be reported in electronic and/or hard copy data report packages. All analytical laboratory data report packages for each type of analysis shall contain a case narrative that summarizes the laboratory analysis for the given set of samples. Complete data packages, including raw sample and calibration data, may be required based on the use of the data. Analytical laboratory reporting requirements and report format shall be in accordance with DOE-AL Model Statement of Work (SOW).

Opening the packages

The analytical laboratory will ship data packages or CD with pdf of data package, via Fed Ex. **ENV-WQH IM Team** will perform the steps for handling the data packages:

Step	Action
1	<p>Open the boxes.</p> <ul style="list-style-type: none"> • There should be one copy of a data package enclosed. Depending on the program, there will either be a hard copy package, a CD with a pdf file of the package or both. • The data will usually have a cover letter on top of the package or included with the CD. • If a hard copy package is submitted, the original COC that was sent with the samples will be included. If only a CD is provided the scanned image of the original COC will be on the pdf file.
2	Write the date, the 5-digit SDG number from the package, and initial the cover sheet.
3	Write the word 'ORIGINAL' on the package
4	Verify that each package includes two CDs (electronic pdf file of the package and an Electronic Data Deliverable (EDD)). The EDD is a loadable CD with data results, which is to be loaded into the Water Quality Database
5	Copy the pdf file onto Stryker on (S:), Data Packages, File with lab's name
6	Load the EDD into the database using the generic_edd parser.
7	<p>Using Chemistry/Data Packages data entry form at http://wqdbforms.lanl.gov, enter:</p> <ul style="list-style-type: none"> • COC number • Data package SDG • Date the hardcopy and/or CD was received • Note in the comments section what came with the data package, such as 2 CDs, one pdf and one EDD

Maintenance of chemistry data, continued

Data verification

A portion of all data uploaded through electronic means into the WQDB will be verified against the data package. Initially 20% percent of the data are to be verified in this way. This may be reduced to 10%, consistent with the ENV-IMP if very few problems are noticed. “Correcting Errors in Analytical Chemistry EDD” in Attachment 2 describes the process for correcting data import errors revealed during data verification.

Data Stewards will review the data after it is loaded into WQDB. The Data Stewards are responsible for comparing new data to historic data to verify that the data is reasonable based on historic data and their knowledge of the site. If the Data Steward determines that the data are inconsistent with historic data or with their site knowledge they may request additional validation, repeat sampling, or reanalysis by the analytical laboratory.

Data validation

External data validators will validate data according to the NNSA Service Center (former DOE Albuquerque Operations Office) Model Data Validation Procedure Revision 3. This procedure may be obtained from the ENV-WQH IM Team Leader. Analytical Quality Associates developed this procedure. LANL should respect the proprietary nature of this document. After validating the data the external validator enters the validation qualifiers into WQDB through a web based form. Data entry of validation data qualifiers will be checked by a second data validator.

Maintenance of water level data

Overview

Water level measurements for wells are stored in WQDB. Examples of this data include, but are not limited to, date and time measurement was taken, person taking measurement, associated screened interval, measurement method, measurement point of reference, depth to water, and elevation above mean sea level.

Data entry and editing

The water level **Data Steward** compiles the water level data into an EDD. ENV-WQH IM personnel will load the EDD file into the database using a parser.

Data security

Only **ENV-WQH-IM Team personnel** may edit water level data upon request of the data steward.

Data verification

After data is loaded into WQDB, the **Data Steward** will use Oracle Discoverer to verify the data entry. If errors are found, the data steward will send an email to wqh_im_support@lanl.gov that will identify the following:

- which data to remove
- well name
- start and end dates of the data in error

The Data Steward shall submit a new EDD for import into the database.

Maintenance of gage discharge data

Overview

The gage discharge data identify and characterize flow through gaging stations.

Data entry and editing

The **Data Steward** submits gage discharge data periodically to the ENV-WQH IM Team. The **ENV-WQH IM Team** loads the gage discharge data into the database using a software program known as a parser.

Data security

In the event of error, **ENV-WQH IM Team** shall remove gage discharge data. Corrected data must be sent to the ENV-WQH IM Team for import into the database.

Data verification

The **Data Steward** analyzes, summarizes, and reviews gage discharge data prior to entry into WQDB.

Web Publication

Overview

Data and documents in a variety of formats may be placed on the internal website (<http://waterquality.lanl.gov>). An internal web site (<http://wqdb.lanl.gov>) allows data entry and data viewing for WQDB. An external web site (<http://wqdbworld.lanl.gov>) allows public viewing of data from WQDB.

Data categorization

There are two levels of data generated by ENV-WQH:

- Green - information that can be shared with outside users external to the laboratory. This type of data is placed on the external web site. Please note your document will require S-7 review. See ENV Organization Safeguards and Security Plan for additional information on what can be posted on a green server.
 - Yellow – information viewable by everyone internal to the laboratory or with equivalent authority. This type of data is placed on the internal web page. This type of document must be reviewed by a local Authorized Derivative Classifier.
-

Requesting documents on the web

To request documents to be placed on the web, **requestor** shall complete the following steps:

- Obtain the appropriate security review for the document.
- Send the document or information and the review information to ENV-WQH_im_support@lanl.gov. Your document should be in a format that can be easily viewed by others. Consider using a pdf format or choosing Microsoft or other application most people own. Indicate if you need assistance converting your document to a pdf format.
- Specify where the information should reside (internal web page, external web page, or both)
- Specify the placement, look, and feel of the document. A meeting with the web designer to discuss the document is an option.

The employee that requests that a document be placed on the web is responsible for ensuring that the appropriate security review is completed. The **ENV-WQH IM Team** will place the document on the web page with appropriate links.

Records resulting from this procedure

The following records are generated as a result of this procedure:

Records

- Log files from data imports
- Well Construction Field Documentation forms

[Click here to record self-study training to this document.](#)

LISTS OF ACCEPTABLE VALUES

Location Information

LOCATION TYPES

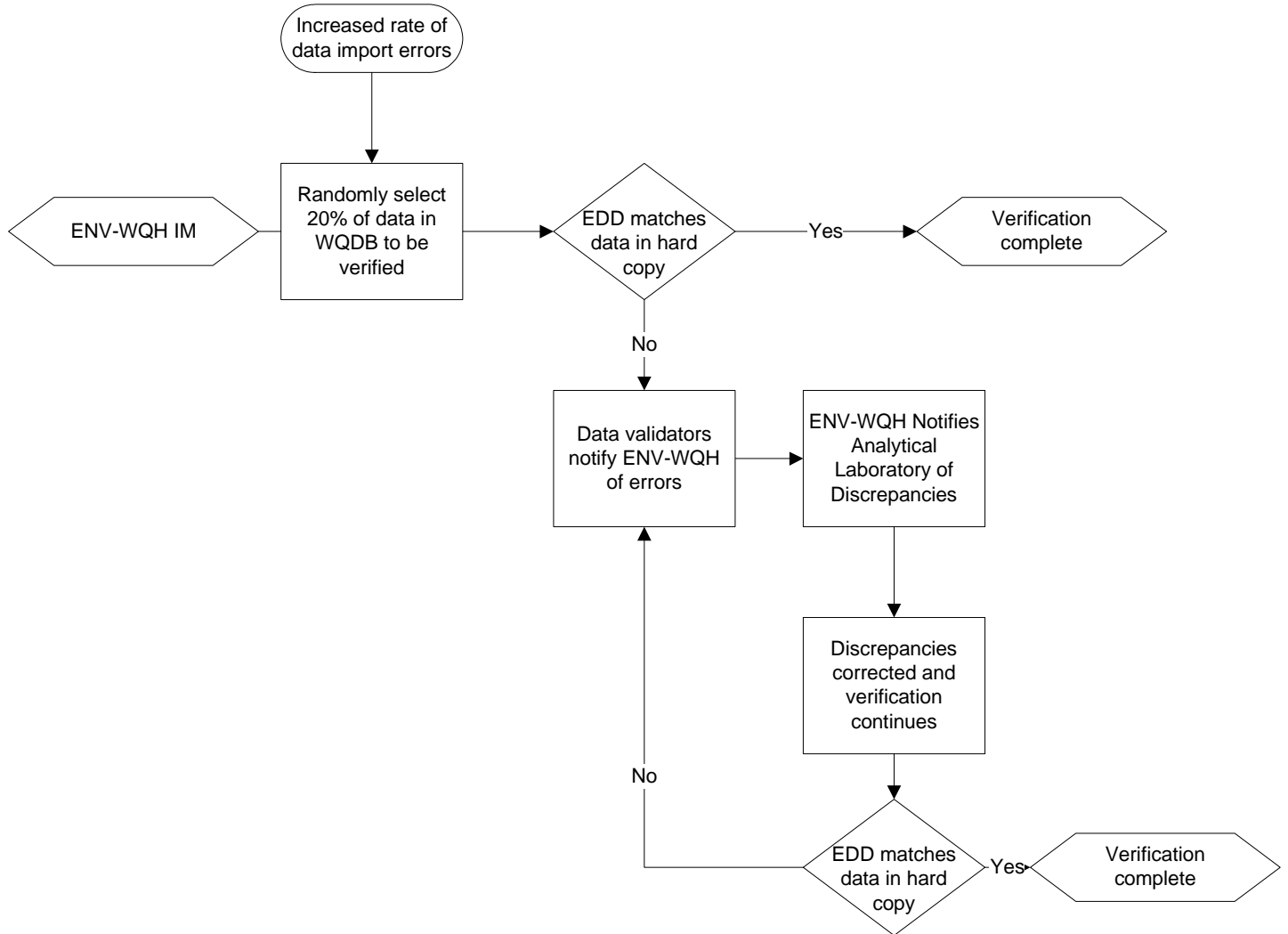
Code	Description
AMS	Air Monitoring Station
BH	Borehole
GENERIC	Generic
MON	Monitoring Well
NOC	Well Not Otherwise Classified
OUT	Outfall
SPR	Spring
SUP	Supply Well
UNK	Unknown
WCS	Watercourse
UA	Unassigned
WTF	Water Treatment Facility

LOCATION METHODS

Code	Description
A	Altimeter
DEM	Digital Elevation Model
DGPS	Differentially Corrected GPS
E	Estimated
M	Measured from a known point
MNT	LANL Survey Control
S	Surveyed
UA	Unassigned
UGPS	Uncorrected GPS
UNK	Unknown Method
GISAI	Calculated using GIS ArcInfo software

PROCESS FLOW DIAGRAMS

Correcting Errors in Analytical Chemistry EDD



Well Construction Data Sheets

DRILLING ASSOCIATED ACTIVITIES

Provide all depth measurements with respect to ground surface

WELL NAME: _____ Submittal Date _____
 Drilling Company _____ Field Geologist/Info Source _____
 Field Support Company _____ QAed By _____

DRILLING

Each column represents a new drilling phase. A new drilling phase is defined by change in drilling method, rig type, bit diameter, and/or fluid type. Please refer to the attached list for drilling method, rig type and fluid type options.

Begin Date/Time						
End Date/Time						
Top Depth(ft)						
Bottom Depth(ft)						
Drilling Method ¹						
Rig Type ²						
Bit Diameter(in)						
Fluid Type ³						

CASING (Drill Casing and Surface Casing)

Each column represents different casing. Please refer to the attached list for casing type and joint type options.

Begin Install Date						
End Install Date						
Begin Removal Date						
End Removal Date						
Casing Type ⁴						
Top Depth(ft)						
Bottom Depth(ft)						
Joint Type ⁵						

For Surface Casing: Material used to case it in _____
 Top Depth _____ ft Bottom Depth _____ ft
 Hole Diameter _____ in
 Material installation Begin Date _____ End Date _____

Comments:

BOREHOLE STATUS FORM

To be filled out by drilling engineer or site geologist

Logging Date: ___ / ___ / ___ Borehole /
Well Name:

Contractor: _____

Well Status: Open Hole
Completed Other _____

Number of Concentric Casing(s): _____
Current Borehole Depth _____ ft

Casing Top Depth						
Casing Bottom Depth						
Casing Inside Diameter						
Casing Wall Thickness						
Casing Type/Material						
Bit Size						
From						
To						
Cement Plugs						
From						
To						

Type of Fluid in Hole: _____ Fluid Level: _____ ft.

Casing Collars: Yes

 Average Spacing: _____ ft.

Shoes: Yes

Other Materials in Hole:

_____ From _____ To _____ ft.

_____ From _____ To _____ ft.

_____ From _____ To _____ ft.

Reason for running log:

Comment:

WELL CONSTRUCTION

Provide all depth measurements with respect to ground surface

All information required except where italicized

WELL NAME: _____ Submittal Date _____
 Drilling Company _____ Field Geologist/Info Source _____
 Field Support Company _____ QAed By _____

PRODUCTION CASING

Each column represents different casing. *Provide removal dates only if applicable.*
 Please refer to the attached list for casing type and joint type options.

Begin Install Date						
End Install Date						
<i>Begin Removal Date</i>						
<i>End Removal Date</i>						
Casing Type ⁴						
Top Depth(ft)						
Bottom Depth(ft)						
Inner Diameter(in)						
Outer Diameter(in)						
Casing Material ⁵						
Joint Type ⁵						

CENTRALIZER or STEEL TAB

Each column represents centralizer or tab information.

	Centralizer					
Provide all depths (ft)						
Material (S or SS)						
	Steel Tab					
Provide all depths (ft)						
Material (S or SS)						

SCREEN

Each column represents different screen. Please refer to the attached list for screen type, screen material, and joint type options.

Screen Common Name						
Install Date						
Screen Type ⁶						
Screen Material ⁷						
Open Top Depth(ft)						
Open Bottom Depth(ft)						
Inner Diameter(in)						
Outer Diameter(in)						
Slot Size(in)						
% Open Area Per Ft						
Joint Type ⁵						

ANNULAR FILL

Each column represents different annular fill. Provide geophysics depths only if applicable.
 Please refer to the attached list for annular material and annular material function options.

Tagged Top Depth(ft)						
Tagged Bottom Depth(ft)						
<i>Geophysics Top Depth(ft)</i>						
<i>Geophysics Bottom Depth(ft)</i>						
Annular Material ⁸						
Annular Material Function ⁹						
Hole Diameter(in)						
Begin Date						
End Date						
Calculated Volume (ft ³)						
Actual Volume (ft ³)						

Comments:

PUMP INSTALLATION

Provide all depth measurements with respect to ground surface

WELL NAME: _____ Submittal Date _____

Field Support Company _____ Field Geologist/Info Source _____

QAed By _____

Installation Company _____

Installation Start Date/Time _____

Installation End Date/Time _____

Intake Depth (Ft) _____

Manufacturer _____

Model _____

Horsepower _____

Pump Capacity (gal/min) _____

Power Source _____

Riser Diameter (in) _____

Comments:

Well Construction Information

ANNULAR FILL MATERIAL

Code	Description
20/40	Coarse Sand (20/40)
30/70	Fine Sand (30/70)
6/9	Sand (6/9)
6/9+8/12	Sand Combination (6/9+8/12)
8/12	Sand (8/12)
B	Bentonite
BA	Bentonite - All
BP	Bentonite - Pellets
BS	Bentonite - Slurry
BSS	Bentonite with sand
C	Cement
CB	Cement with Bentonite (Normally approximately 2% Bentonite)
S	Mixed fine and coarse sand
SL	Slough
W/G	Ungraded washed gravel upto 3/8
6/9-B	6/9 sand and bentonite
BWG	Bentonite chips and washed gravel (50/50 mix)
GRT	Grout
20/40-B	20/40 sand and bentonite
6/9GC	6/9 sand and coarse gravel/cobble
8/12-B	8/12 sand and bentonite
6/9+20/40	Sand Combination (6/9+20/40)
W/G-B	Ungraded washed gravel upto 3/8 and bentonite

ANNULAR FILL MATERIAL FUNCTION

Code	Description
B	Backfill
FP	Filter Pack
S	Seal
NONE	No function

CASING MATERIAL

Code	Description
MS	low-carbon steel
N80	High grade tempered carbon steel, N80 grade
NA	Not Applicable
P110	High grade tempered carbon steel, P110 grade
PVC	Polyvinylchloride
SS	stainless steel
UA	Unassigned
UNK	Unknown

CASING TYPE

Code	Description	Inner Diameter	Outer Diameter	Diameter Units	Casing Material Code
10-3/4UR	10-3/4" Under Reaming ODEX Pipe	9.75	10.75	IN	N80
11-3/4DC	11-3/4" Drill Casing	10.75	11.75	IN	MS
11-3/4UR	11-3/4" Under Reaming ODEX Pipe	10.50	12.00	IN	N80
12-3/4UR	12-3/4" Under Reaming ODEX Pipe	12.00	12.75	IN	N80
13-3/8DC	13-3/8" Drill Casing	12.37	13.37	IN	MS
13-5/8DC	13-5/8" Drill Casing	12.62	13.62	IN	N80
14UR	14" Under Reaming ODEX Pipe	13.27	14.00	IN	N80
6-5/8UR	6-5/8" Under Reaming ODEX Pipe	5.62	6.62	IN	P110
8-5/8UR	8-5/8" Under Reaming ODEX Pipe	7.62	8.62	IN	P110
9-5/8UR	9-5/8" Under Reaming ODEX Pipe	8.37	9.87	IN	N80
API L/T 8	SS 5 inch API 8 round long thread	4.50	5.00	IN	SS
MP55	Plastic MP55 System	2.25	2.75	IN	PVC
MS5	Mild Steel 5in OD, 40 low-carbon steel	4.30	5.00	IN	MS
MS5.56	5.56"OD, Schedule 40 low-carbon steel production casing	5.00	5.56	IN	MS
NA	Not Applicable	0.00	0.00	IN	NA
PVC4.5	4-1/2" PVC	4.00	4.50	IN	PVC
PVC4.5Sump	4-1/2" PVC sump	4.00	4.50	IN	PVC
S16	Surface Casing - 16 inch OD	15.50	16.00	IN	MS
SS304	304 Stainless Steel, Schedule 40	4.50	5.00	IN	SS
SS5.56	304 Stainless Steel, 5.563-inOD	5.00	5.56	IN	SS
Sump5	5" SS Sump	4.50	5.00	IN	SS
UA	Unassigned	0.00	0.00	IN	UA
UNK	Unknown	0.00	0.00	IN	UNK
9-5/8DC	9-5/8" Drill Casing	8.37	9.87	IN	N80
S18	Surface casing - 18 inch OD	17.50	18.00	IN	MS
SS312	ASTM A 312 Standard Stainless Steel	4.50	5.00	IN	SS

DRILLING METHOD

Code	Description
A	Auger
C	Coring
CA	Casing Advance
OH	Open-Hole
AC	Auger Coring
CS	Continuous Sampler

FLUID TYPE

Code	Description
A	Air
AW	Air with Water
AWB	Air with Water and Bentonite
AWE	Air with Water and E-Z Mud
AWQ	Air with Water and Quick Foam
AWQE	Air with Water, Quick Foam and E-Z Mud
AWQET	Air with Water, Quick Foam, E-Z Mud and Tork Ease
AWT	Air with Water and Tork Ease
AWBTF	Air with Water, Bentonite, Tork Ease, and Fibrous material
AWBTQ	Air with Water, Bentonite, Tork Ease, Quick Foam, E-Z- Mud, & Fibrous material
AWTE	Air with Water, TORKease ploymer, and EZ-MUD
NONE	None
W	Water
WB	Water and Bentonite
AWBLA	Air with Water, Bentonite, Liqui-Trol, & Attack Foam

JOINT TYPE

Code	Description
20W	20FT Welded
API L/T	API Long Thread, external collar
FC	Flush Coupled
FJT	Flush Joint Threaded
M3	Matrix 3 lead
PE	Plain End
RC	Regular Coupling
UNK	Unknown

RIG TYPE

Code	Description
CME750	Central Mining Equipment 750
DR24D	Dual Rotary 24D Foremost
T-4	T-4 Ingersol Rand
T685	Schramm T685
UDR1000	Universal Drill Rig 1000
F-10	Failing - 10 (Core/Auger Rig)
F-2500	Failing-2500 (Rotary air/mud Rig)
Soilmec-312	Bucket auger rig
SS-15	StrataStar brand, can core and auger shallow depth
T70-W	Dresser rotary rig - air/mud/Stratex casing adv

SCREEN MATERIAL

Code	Description
PVC	Polyvinylchloride
SS304	304 Stainless steel
SS312	312 Stainless steel

SCREEN TYPE

Code	Description
MSPVC	Machine Slotted PVC
PB	Pipe based
WR	wire wrapped, 304 stainless steel
NA	Not applicable