EQuIS Training

EQuIS Workflow and EQuIS Professional

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Introductions

• What is your background?
  ▪ RPMs?
  ▪ Hydros?
  ▪ Risk Assessors?
  ▪ Other?

• Have you ever used EQuIS?
  ▪ EQuIS Professional?
  ▪ EQuIS Enterprise?
  ▪ EQuIS Data Processor (EDP)?

• What software do you use?

• What would you like to get out of this class?
Introduction to EQuIS
Agenda

- Introduction to EQuIS Products and Workflows
- EarthSoft Resources
- Basic EQuIS Concepts and Terminology
- EQuIS Professional
  - Navigation
  - Crosstab Reports
  - Graphs and Charts
- EQuIS for ArcGIS
- EQuIS Data Processor (EDP) Discussion
Objectives

• Understand the difference between EQuIS Professional and EQuIS Enterprise
• Explore EQuIS Workflows
• Review available resources provided by EarthSoft
• Learn how data is organized in the EQuIS database
• Review EQuIS-specific terminology
What is EQuIS?

EQuIS™ is the most widely used environmental data management workflow in the world and helps thousands of organizations manage *environmental, geotechnical, limnological* and “other” sample data.
One Database, Two User Interfaces

EQUIS Schemas

EQUIS Database (Oracle/SQL)

- Data managers, Scientists
- Desktop application (installation)
- Data importing, editing
- Advanced analysis, modeling*
- Ultimate power and flexibility

- Managers, Auditors, Executives
- Web application (no installation)
- Same database, same data
- Simple, quick, easy to use
- Workflow Automation

* May require additional third-party software
Own the workflow, make better decisions
EQuIS Workflow View

- Sensors, Instruments and Data Loggers
- Laboratories (LIMS)
- Process Monitoring
- Inspections
- Field Data Collection (EDGE)
- Electronic Data Deliverables (EDDs)
- EQuIS Data Processing
- EQuIS Database
- EQuIS Enterprise Web Dashboards
- EQuIS Professional Reports
- EQuIS Enterprise Notifications
EQuIS Schematic View

Planning & Input

EDGE (Field Data Collection)

SPM (Task Management)

EDP (Data Processor & Checker)

Laboratory LIMS

Live (Data Loggers)

Enterprise (User Interface)

Powerful Reporting Tools

Professional (User Interface)

DQMS, Alive, LakeWatch, Third Party Interfaces

Dashboards and Widgets (Reports/Alerts/Graphics)

EQuIS Schemas

EQuIS
EPA Region 2
EQuIS Workflow

Data Providers
(Compile field and lab data into an EDD and submits to Region 2)

EDP
(Data Processor & Checker)

EQuIS Schemas

Enterprise
(User Interface)

Dashboards and Widgets
(Reports/Alerts/Graphics)

Validators

Laboratory LIMS

EDGE
(Field Data Collection)

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EQuIS Database

• Schemas for environmental data management

• Oracle, Microsoft Azure, Microsoft SQL Server, SQL Server Express

• One project to thousands of projects within in single database
EDP

EDGE (Field Data Collection)

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Powerful Reporting Tools

EQuIS Schemas

Planning & Input
EDP Purpose

- Check Electronic Data Deliverables, (EDDs) for formatting, logic
- Find, view, and CORRECT errors
- Easily find the “needle in the haystack

Standalone EDP and Professional EDP

Errors highlighted

Highlights EDD sections with errors

Missing required field, make correction

Reference value not found, select correct value from pull down menu
EDP Purpose

- Automated Workflow receives (via ftp, email, or web) and processes EDDs.
- Acceptance and/or rejection notifications are automatically sent.

Enterprise EDP

Successful EDD Submission Notifications
EQuIS Professional Reports

- Contamination plumes
- Groundwater gradients
- Graphs, tabular and crosstab reports,
- Advanced, formatted print-ready reports
EQuIS for ArcGIS

**Purpose**

- Access EQuIS data directly within ArcGIS Desktop
- Add EQuIS layers to an ArcGIS Map
- Link to industry-leading third party applications
EQuIS Enterprise

- **EDGE** (Field Data Collection)
- **SPM** (Task Management)
- **EDP** (Data Processor & Checker)
- **Laboratory LIMS**
- **DQM, Alive, LakeWatch, Third Party Interfaces**
- **Powerful Reporting Tools**
- **Enterprise** (User Interface)
- **Dashboards and Widgets** (Reports/Alerts/Graphics)

**Planning & Input**

- **Live** (Data Loggers)
Enterprise

Highly configurable dashboards and project-specific widgets for endless flexibility.
Enterprise

- Export to Google Earth, Excel, GIS and other popular formats.
- Map directly in EQuIS Enterprise with the Map Widget and ArcGIS Online.
EAI Workflow Automation

Enterprise

EquIS Information Agents (EIAs) automatically send reports when
- New data arrives
- Exceedances occur
- Based on a scheduled event...
Use the Explorer widget in EQuIS Enterprise, to take drawings, graphs, photos, etc. and associate them to a location.
Available EarthSoft Resources
EQuIS Resources

- EarthSoft Community Center- [http://community.earthsoft.com](http://community.earthsoft.com)
  - Online Data Dictionary
  - Online Documentation
  - EQuIS Academy Recordings and other Downloads
  - Discussion Forum

- EarthSoft Website- [http://www.earthsoft.com](http://www.earthsoft.com)
  - Upcoming Training Schedule
  - Additional Product Information and Corporate Overview
  - Upcoming Office Hours and Previous Office Hour Videos
  - Lists of available EDD Formats

- For support, the designated Point of Contact (POC) may contact [support@earthsoft.com](mailto:support@earthsoft.com)
EQuIS Webpages

- EPA Region 2 Format Download Page-

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**US EPA Region 2 EDP Format**

<table>
<thead>
<tr>
<th>Name</th>
<th>Size</th>
<th>Type</th>
<th>Modified</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDP Version 6.4 32 bit (x86)</td>
<td>35.2 MB</td>
<td>.zip</td>
<td>August 07, 2015</td>
</tr>
<tr>
<td>64 bit (x64)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPA Region 2 Format File</td>
<td>741.5 KB</td>
<td>.zip</td>
<td>September 15, 2015</td>
</tr>
<tr>
<td>EPA Region 2 Format Reference Values</td>
<td>226 KB</td>
<td>.zip</td>
<td>April 4, 2016</td>
</tr>
</tbody>
</table>

For guidance and inquiries regarding the EPA Region 2 Format, Reference values, or EDD submittals, please go to: [EPA Region 2 Superfund EDD Information](http://earthsoft.com/products/edp/edp-format-for-epar2/).
EQuIS Webpages

- EPA Region 2 Format Download Page-  
  http://earthsoft.com/products/edp/edp-format-for-epar2/

- EPA Region 2 Superfund Electronic Data Submission Guidance  

- For technical EQuIS support, EPA Region 2 EQuIS users may contact:
  
  Cathy Lai
  
  Lai.Ngateng@epa.gov
  
  Region2_EQUISedd@epa.gov
Basic Concepts and Terminology
What are we going to talk about?

**General Database Terms**
- Relational Databases
- One-to-Many Relationships
- Parent-Child Relationships
- Primary Keys
- Referential Integrity

**EQuIS-specific Terms**
- Data Tables
- Reference Tables
- Facilities
- Locations
- Location Groups

**Environmental Sampling Terms**
- Location Groups
- Analytes
- Analyte Groups
- Action Levels
- Crosstab Reports

**Environmental Sampling Terms**
- CAS RNs
- Sample Types
- Matrices
- EDDs
- E-Data
General Database Terms
Relational Databases

Relational databases stores their data in tables and can enforce restrictions on the data by a set of rules called relationships.
One-to-Many Relationships

One-to-many relationships are relationships in which a record in one table can be related to many records in another table.

There can be many sampling points within a single project site.

For example, “Gas Station X” may contain 8 different monitoring wells.
Parent-Child Relationships

Parent-child relationships are rules that enforce organization in a database by requiring a record in a child table to have a corresponding record in a parent table.

The structure allows repeating information using parent-child relationships: each parent can have many children but each child only has one parent.
A **Primary key** is a field or a set of fields in a table that constitute a unique record within that table.

**Primary Keys**

One primary key field in this table allows for each chemical to be listed only once.

<table>
<thead>
<tr>
<th>cas rn</th>
<th>chemical_name</th>
<th>sort_order</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-66-6</td>
<td>Zinc</td>
<td></td>
</tr>
<tr>
<td>75-35-4</td>
<td>Vinyl Chloride</td>
<td></td>
</tr>
<tr>
<td>75-01-4</td>
<td>Vinyl Chloride</td>
<td></td>
</tr>
<tr>
<td>108-05-4</td>
<td>Vinyl Acetate</td>
<td></td>
</tr>
<tr>
<td>7440-62-2</td>
<td>Vanadium (Fume Or Dust)</td>
<td></td>
</tr>
<tr>
<td>75-69-4</td>
<td>Trichlorofluoromethane</td>
<td></td>
</tr>
</tbody>
</table>

A set of primary key fields this table allows for storage of multiple coordinate systems per sampling point.

Primary keys must be:

1) populated (not null)
2) unique
Referential Integrity

Referential integrity is the collective set of rules that ensures consistent data within the database, including:

- Primary Keys
- One-to-Many Relationships
- Parent-Child Relationships
EQuIS-specific Terms
Data tables contain information acquired from, derived from, or describing some part of a specific project.

Data tables are designated by the prefix `DT_`, as in `DT_SAMPLE`. 
Reference Tables

Reference tables contain lists of reference values, valid values or look-up values.

Reference tables are designated by the prefix RT_, as in RT_ANALYTE.

rt_analyte...

<table>
<thead>
<tr>
<th>Cas_rn</th>
<th>Chemical Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>000056-55-3</td>
<td>Benz(a)anthracene</td>
</tr>
<tr>
<td>000065-85-0</td>
<td>Benzoic Acid</td>
</tr>
<tr>
<td>000067-64-1</td>
<td>Acetone</td>
</tr>
<tr>
<td>000071-43-2</td>
<td>Benzene</td>
</tr>
<tr>
<td>000074-83-9</td>
<td>Bromomethane</td>
</tr>
<tr>
<td>000074-87-3</td>
<td>Chloromethane</td>
</tr>
<tr>
<td>000075-01-4</td>
<td>Vinyl chloride</td>
</tr>
</tbody>
</table>

... ...

[Image of a software interface with a window labeled "Open" and "Reference Tables" with additional columns and rows, likely representing data fields related to analytical methods or parameters.]
Facilities

Facilities are the physical (site) or logical (project) extent of data that is made available for reporting or modeling.
Locations

Locations are uniquely designated sampling points, typically on the ground surface, that can be identified spatially by x, y, and z coordinates.

Stored in EQuIS in DT_LOCATION as a “SYS_LOC_CODE”.
Location Groups

Location Groups are collection of locations for reporting and graphing.
Analytes

‘Analytes’ are defined as the substance you analyze or quantify by an analytical procedure.

Many different names can be used to mean the same thing: analyte, chemical, compound, constituent, contaminant, determinant...
Analyte Groups

Analyte Groups are collections of analytes for reporting and graphing.
Action Levels

Action levels are values against which results or parameter measurements are compared to. Action Levels may also be referred to as standards, comparison criteria, or other names.
Crosstab Reports

Data as contained in a database:

Cross Tabbed data:

Crossed tabbed data is much easier to read and understand.
Environmental Sampling Terms
CAS RNs

CAS RNs are abbreviations for Chemical Abstracts Service Registry Numbers. The CAS RN, often referred to as “CAS number,” is a unique numeric identifier which refers to a chemical substance.

For example, 58-08-2 is the CAS Registry Number for caffeine.

Compare to chemical name synonyms:

661-97-2 ...1,2-Dichloro-1,1,2,3,3,3-hexafluoropropane
also 1,1,1,2,3,3-Hexafluoro-2,3-dichloropropane

CFC-216 vs. Freon 216

To find CAS numbers, visit

- [http://www.cas.org](http://www.cas.org)
- [http://www.chemfinder.com](http://www.chemfinder.com)
Sample Types

“Sample types” refer to the classification of samples based on the sampling purpose and procedure.

Sample types are stored in `RT_SAMPLE_TYPE` and may include:

- **N**  Normal Environmental Sample
- **FB** Field Blank
- **BS** Blank Spike
- **BD** Blank Spike Duplicate
- **TB** Trip Blank
- **RB** Material Rinse Blank
- **MS** Lab Matrix Spike
- ......
Matrices

Matrix describes the media from which the sample was taken.

Matrices are stored in RT_MATRIX and may include:

- Groundwater
- Soil
- Air
- Fish Tissue
- .....
EDDs

EDDs, or Electronic Data Deliverables, are electronic tabular formats for sharing, manipulating, and using data.

An Access database, an Excel spreadsheet, a tab delimited text file, and even zipped files are all examples of EDDs.
E-Data

E-Data refers to data that are available in a usable electronic format.

EDP Checks

Unlike EDDs, E-Data is NOT directly checked by the EQuIS Data Processor
EQuIS Professional
Professional EQuIS Schemas

Planning & Input

EDGE (Field Data Collection)

Laboratory LIMS

SPM (Task Management)

EDP (Data Processor & Checker)

Live (Data Loggers)

Enterprise (User Interface)

DQM, Alive, LakeWatch, Third Party Interfaces

Powerful Reporting Tools

Professional (User Interface)

Dashboards and Widgets (Reports/Alerts/Graphics)

EDP (Data Processor & Checker)

Professional (User Interface)
EQuIS Professional

Purpose:

- Part of an Environmental Data Management Workflow and is used to check, edit, and load data.
- Report, graph, and export the data to a variety of templates and applications.
In every Table and Tabular Report in EQuIS Professional

- Filter
- Pin Columns
- Column Chooser
- Find and Replace
- Refresh
Location Groups

Location Groups are collection of locations for reporting and graphing.
Analyte Groups

Analyte Groups are collections of analytes for reporting and graphing.
Action Levels

Action levels are values against which results or parameter measurements are compared to. Action Levels may also be referred to as standards, comparison criteria, or other names.
EQuIS Reports
The Purpose of EQuIS Reports

EQuIS Professional offers many different types of reports. Reports may be used to build simple queries or create highly formatted output. There are several types of reports available:

- Tabular Reports
- Crosstab Reports
- Time Series Charts
- XYZ Plots (Contours, Surface Plots)
Tabular Reports

- Query data from multiple tables with one report
- Easy to select parameters and save Pick Reports for future use
- Can filter data further and use other tools within tabular reports
# Crosstab Reports

- Build Crosstab Reports with tabular queries to better understand data.
- Apply Microsoft Excel templates and publish designs to the database.
- Publish Crosstab designs to make them visible to all users.

## Crosstab Reports

<table>
<thead>
<tr>
<th>Location</th>
<th>Sample</th>
<th>Cis-1,2-Dichloro</th>
<th>Trichloroethylene</th>
<th>Vinyl Chloride</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-30</td>
<td>E-30_19970315</td>
<td>&lt; 0.005 ug/l</td>
<td>&lt; 0.005 ug/l</td>
<td>&lt; 0.005 ug/l</td>
</tr>
<tr>
<td>E-30</td>
<td>E-30_19970613</td>
<td>&lt; 0.005 ug/l</td>
<td>&lt; 0.005 ug/l</td>
<td>&lt; 0.005 ug/l</td>
</tr>
<tr>
<td>E-30</td>
<td>E-30_19970911</td>
<td>&lt; 0.005 ug/l</td>
<td>&lt; 0.005 ug/l</td>
<td>&lt; 0.005 ug/l</td>
</tr>
<tr>
<td>E-30</td>
<td>E-30_19971210</td>
<td>&lt; 0.005 ug/l</td>
<td>&lt; 0.005 ug/l</td>
<td>&lt; 0.005 ug/l</td>
</tr>
<tr>
<td>E-30</td>
<td>E-30_19980310</td>
<td>&lt; 0.005 ug/l</td>
<td>&lt; 0.005 ug/l</td>
<td>&lt; 0.005 ug/l</td>
</tr>
<tr>
<td>E-30</td>
<td>E-30_19980608</td>
<td>&lt; 0.005 ug/l</td>
<td>&lt; 0.005 ug/l</td>
<td>&lt; 0.005 ug/l</td>
</tr>
<tr>
<td>E-31</td>
<td>E-31_19970315</td>
<td>&lt; 0.005 ug/l</td>
<td>&lt; 0.005 ug/l</td>
<td>&lt; 0.005 ug/l</td>
</tr>
</tbody>
</table>

## TABLE 1

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>2009 Commercial Levels</th>
<th>2009 Residential Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sampling Date</td>
<td>ug/l</td>
</tr>
<tr>
<td>B-30_19970315</td>
<td>37.82</td>
<td>17.27</td>
</tr>
<tr>
<td>B-30_19970613</td>
<td>35.62</td>
<td>45.59</td>
</tr>
<tr>
<td>B-30_19970911</td>
<td>0.005</td>
<td>&lt; 0.005</td>
</tr>
</tbody>
</table>

**Table Description**

- **NASTY VOCs**
  - Benzene: 3.7
  - Methanol: 1.2
- **PRIORITY METALS**
  - Copper: 1000
  - Lead: 15

**Notes**

- The concentration is in parts per billion (ppb).
- Values are in micrograms per liter (µg/l).
- NA: Not available
- Bold indicates exceedance.
Time Series Charts

Create Time Series Charts with tabular queries
XYZ Charts

Create XYZ Charts with tabular queries
Access EQuIS Professional

1. Login to *EQuIS Professional* from Start> All Programs> EarthSoft> EQuIS Professional.

2. Select the Facility into which data will be viewed or reported.
Required Permissions and Software

*EQuIS for ArcGIS*

- EQuIS Professional v6.0 or higher must be installed and registered on the workstation
- .NET Framework v4.0 or higher must be installed
- ArcGIS 10.0 or higher must be installed
- Read permissions are required for the desired facilities for EQuIS for ArcGIS Connection and Layer Building
- Read/write permissions are required for the desired facilities for Adding or Modifying Locations and Location Groups
EQuIS for ArcGIS

Purpose

- Access EQuIS data directly within ArcGIS Desktop
- Add EQuIS layers to an ArcGIS Map
- Link to industry-leading third party applications
Access EQuIS for ArcGIS

1. Launch ArcMap from Start> All Programs> ArcGIS> ArcMap 10.x.

2. From the EQuIS for ArcGIS toolbar, select **Add Facility** and login to the desired facility.
Thank you for attending!

Questions? Comments? Suggestions?

Contact us:
EarthSoft Trainings, training@earthsoft.com
Janet Magurn, President, jmagurn@earthsoft.com
Tinna Chan, Systems Engineer, tinna.chan@earthsoft.com