Data Management in Support of Stage 2 PCB TMDL Efforts

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Data Issues Associated with the Stage 1 Total Maximum Daily Load (TMDL) for PCBs

- Differences in analytical methodologies
- Variations in reporting conventions
- Subset of PCBs congeners were analyzed using EPA Method 1668A or Method 8082A
  - 82 of the 209 congeners
- Reporting criteria loosely defined
- Overall, the usefulness of the data was limited

Data Management Objectives for the Stage 2 PCB TMDL

To develop and support more accurate TMDLs by requiring better quantification of the concentrations from the various PCB source categories.

These objectives are met through the establishment of data quality objectives (DQOs)

- Uniformity of data collected from various sources sources
- Lower detection limits
- Incorporation of all data into an Access database (2002)

Benefits

- Comparability of analytical results
- Reduced analytical uncertainty
- Greater accuracy in estimated loadings
- Increased modeling accuracy
- More accurate long-term trends analysis
- Better temporal and spatial evaluation of data
- Data reliability and transferability

Complications in Achieving DQOs

- Variable sampling, analytical and reporting protocols
- 209 PCB congeners
- Multiple samples > 1,000
- Multiple sources, discharges, ambient, tributaries and sediment
- Large amounts of data >100MBto ~1 GB

What is specified in the Data Quality Objectives?

- Sample identification protocols
- Sample size and collection methods
- Analytical methodology (EPA Method 1668A), including project specific modifications
- Electronic data formatting and reporting requirements for:
  - Location table
  - Chain of custody
  - Analytical results

http://www.state.nj.us/drbc/PCB_info.htm

DRBC Web page for PCB Monitoring

http://www.state.nj.us/drbc/PCB_info.htm

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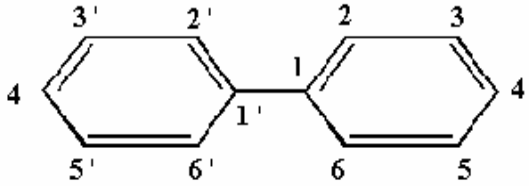
DRBC - PCB Monitoring Information

Delaware River Basin Commission

DELAWARE · NEW JERSEY
PENNSYLVANIA · NEW YORK
UNITED STATES OF AMERICA

Monitoring for PCBs



A generalized PCB structure showing bonding locations.

The United States Environmental Protection Agency (EPA) Regions II and III established Stage 1 Total Maximum Daily Loads (TMDLs) for polychlorinated biphenyls (PCBs) for Zones 2 through 5 of the Delaware Estuary on December 15, 2003. The EPA has provided that the Stage 1 TMDLs will be replaced by more refined Stage 2 TMDLs based upon modeling for all ten PCB homologs and additional characterization of sources of PCBs. At the request of EPA Regions II and III and the States of New Jersey, Delaware and Pennsylvania, the Delaware River Basin Commission is in the process of developing the Stage 2 TMDLs. Point source discharges are one of the several PCB source categories being evaluated as part of this effort.

In order to better characterize loadings of PCBs to the estuary and to develop and calibrate the additional PCB homolog models, additional data must be collected.

The following information has been assembled to assist permittees in completing their PCB sampling requirements.
Most of these documents require the free Adobe reader to view.

Get Adobe Reader

Specific Elements

Sample Labeling Protocol

http://www.state.nj.us/drbc/PCB-SampleID.pdf

Page Tools

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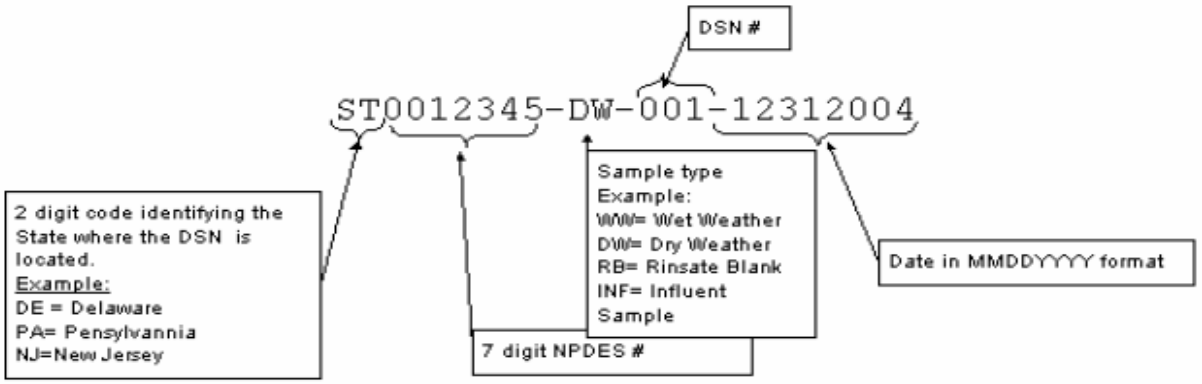
Sample Labeling and Identification

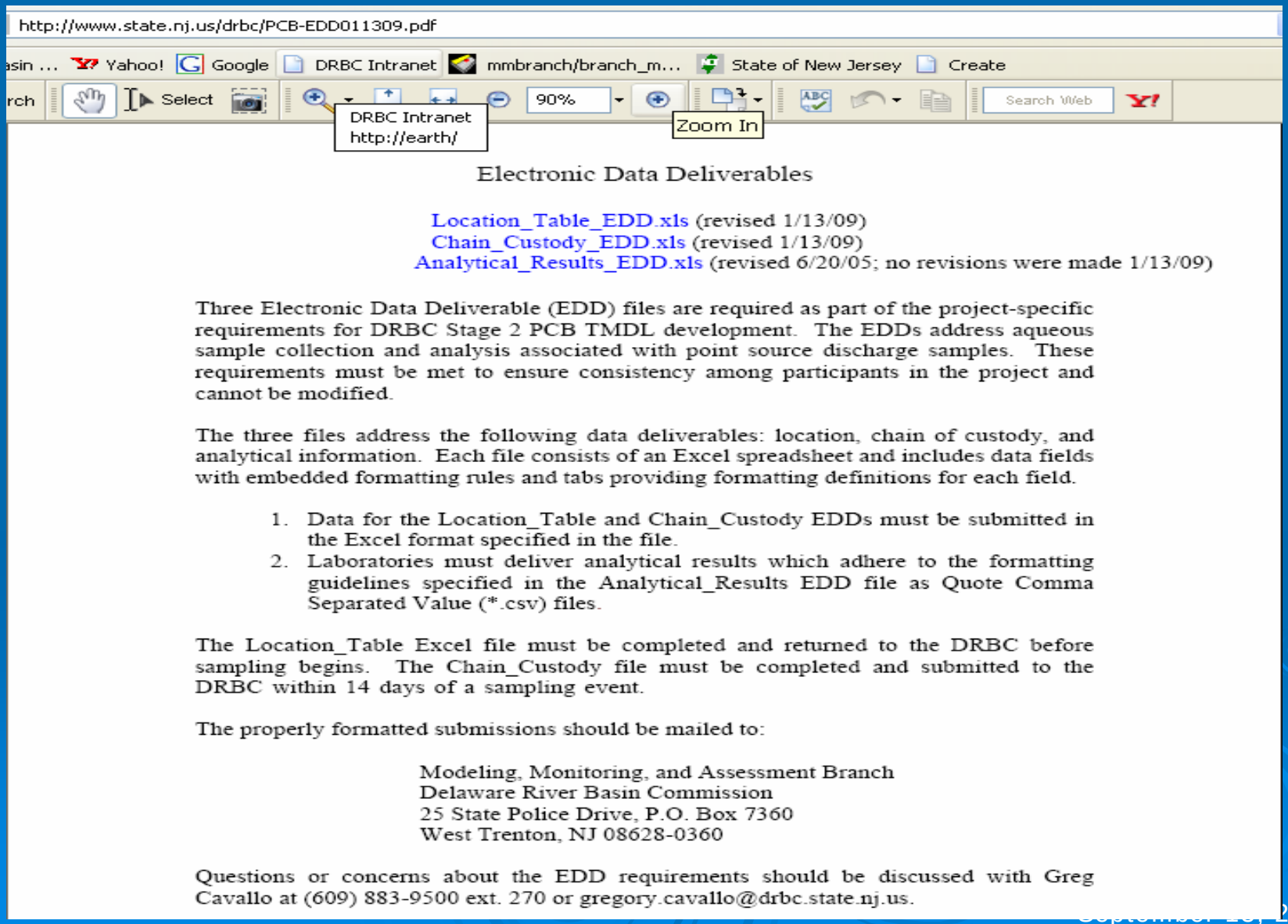
Each sample will be uniquely identified using the following labeling criteria:

1. NPDES# (9 -digit number including the state prefix (DE, NJ, PA))
2. Dry/Wet Weather Effluent Sample, Rinsate Blank, Influent Sample (DW, WW, RB, INF)
3. DSN# (three digit number)
4. Sample date (MMDDYYYY format)

An illustration is supplied below.



Electronic data Deliverables (EDD)



Electronic Data Deliverables

Location_Table_EDD.xls (revised 1/13/09)
Chain_Custody_EDD.xls (revised 1/13/09)
Analytical_Results_EDD.xls (revised 6/20/05; no revisions were made 1/13/09)

Three Electronic Data Deliverable (EDD) files are required as part of the project-specific requirements for DRBC Stage 2 PCB TMDL development. The EDDs address aqueous sample collection and analysis associated with point source discharge samples. These requirements must be met to ensure consistency among participants in the project and cannot be modified.

The three files address the following data deliverables: location, chain of custody, and analytical information. Each file consists of an Excel spreadsheet and includes data fields with embedded formatting rules and tabs providing formatting definitions for each field.

1. Data for the Location_Table and Chain_Custody EDDs must be submitted in the Excel format specified in the file.
2. Laboratories must deliver analytical results which adhere to the formatting guidelines specified in the Analytical_Results EDD file as Quote Comma Separated Value (*.csv) files.

The Location_Table Excel file must be completed and returned to the DRBC before sampling begins. The Chain_Custody file must be completed and submitted to the DRBC within 14 days of a sampling event.

The properly formatted submissions should be mailed to:

Modeling, Monitoring, and Assessment Branch
Delaware River Basin Commission
25 State Police Drive, P.O. Box 7360
West Trenton, NJ 08628-0360

Questions or concerns about the EDD requirements should be discussed with Greg Cavallo at (609) 883-9500 ext. 270 or gregory.cavallo@drbc.state.nj.us.

How does the Access database work?

Receipt of DATA

- Tributary
- Ambient
- Sediment
- Discharge

Does the submission pass the automated data checker and visual inspection (Does it meet the DQOs)?

- Location information
- Sample ID
- Specified sample date / time
- Analytical results
  - Coelution
  - MB, CCV, OPR

Yes

The data is loaded into the Microsoft Access database!!

- Duplicate samples
- Analytical results
  - Consistent with C-O-C
  - Parameters

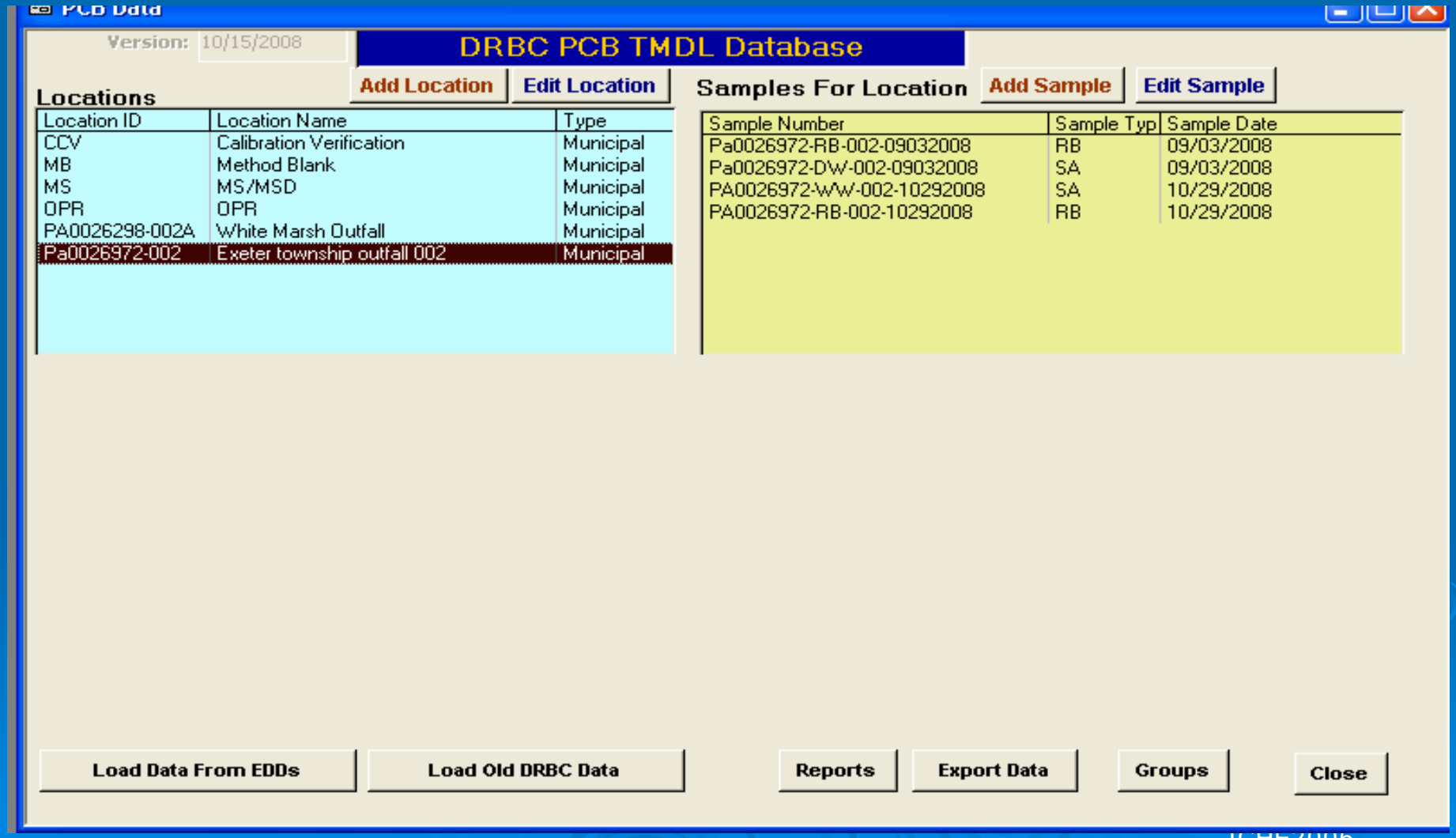
No

The submitter is contacted and the data is resubmitted, or DRBC staff revised with the concurrence of the discharger

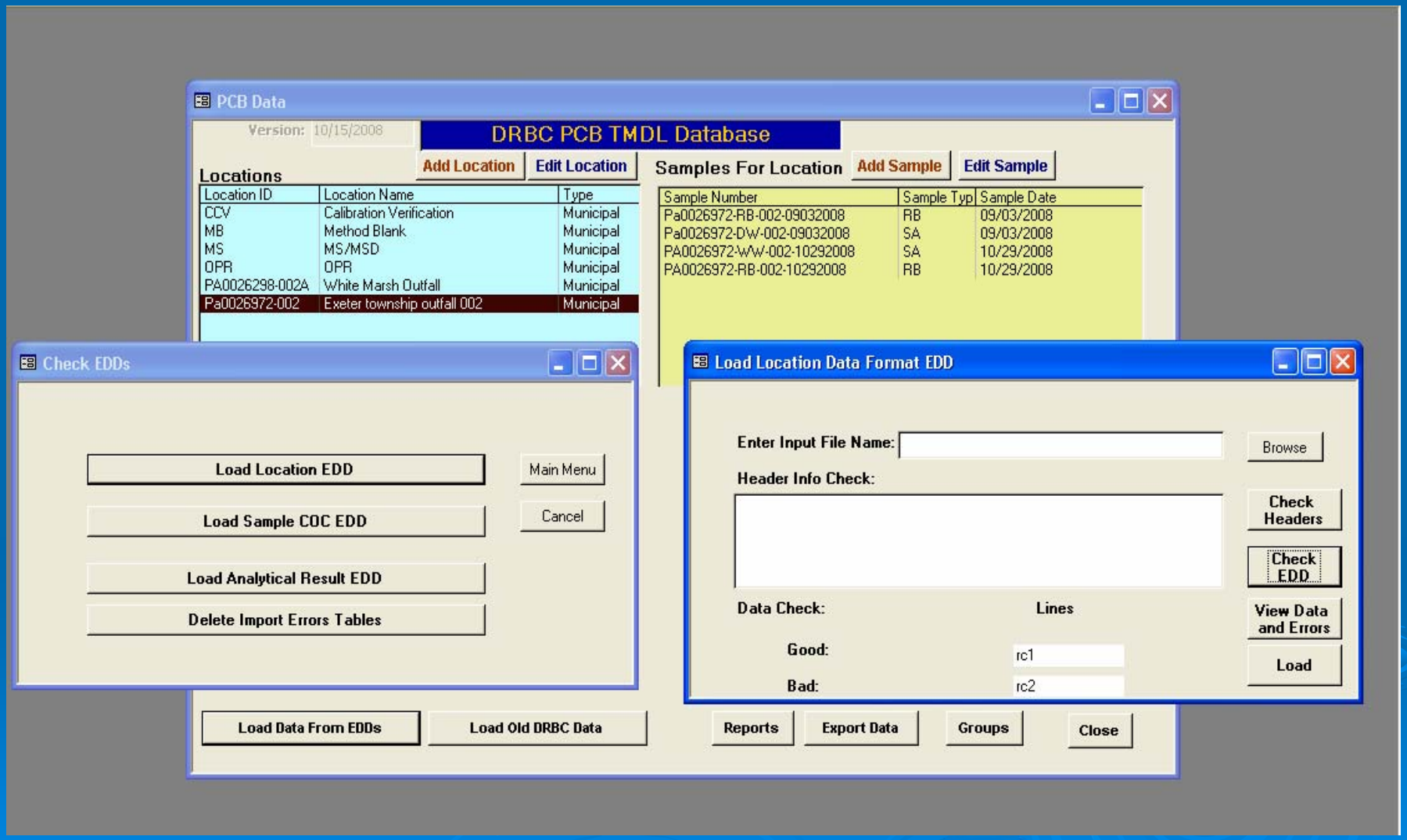
Database Structure

- A Microsoft Access database consisting of two elements
  - Front End
    - A point and click user interface was developed primarily for data input and review. Using the visual basic programming available in the Access database, submitted data sets are screened for adequacy of formats and other requirements prior to incorporation into the database.
  - Back End
    - Data storage. Provides for more efficient database management

What does the database look like?

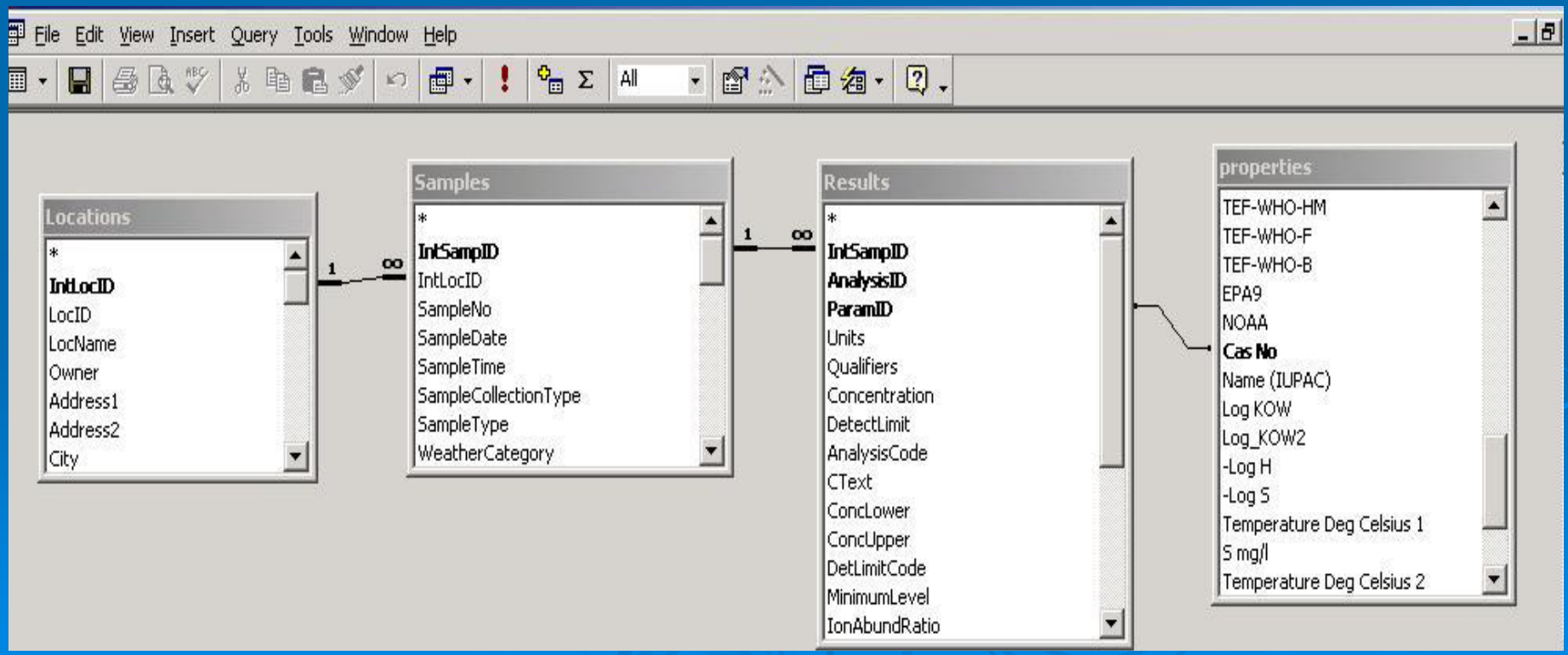


Step 1- Load Data

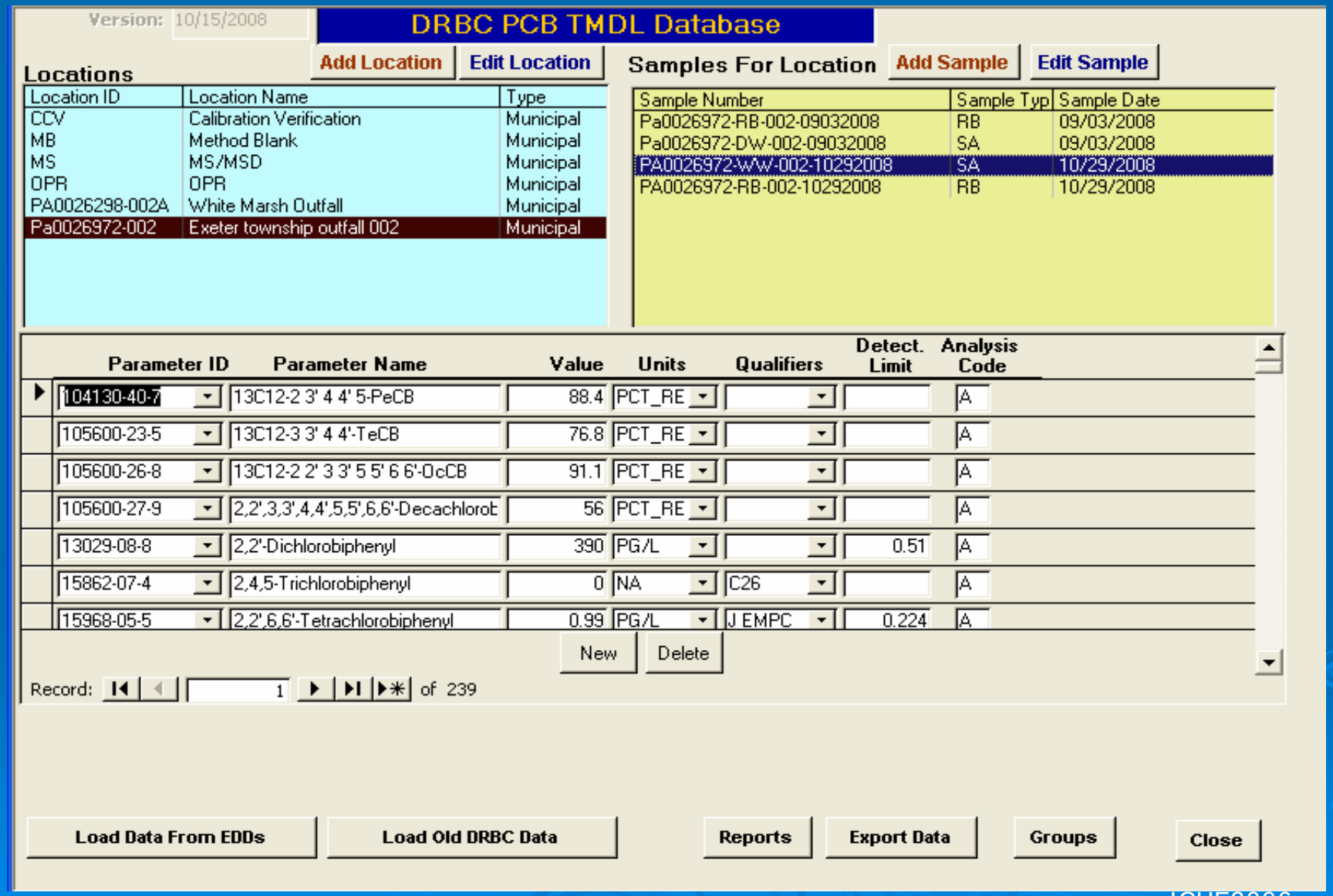


Step 2- Data Linked Automatically in Access

- Chain of Custody, Location information and Analytical data are all linked via the sample id and location id codes. Additionally, DRBC links a properties database to the results.



Summary Results



The database contains location, analytical and physical property information linked together

QRY_DK92506_CONC_ALL_FOR_SA_Test : Select Query

Location ID	Location Name	Type	Sample Number	Sample Type	Weather	Parameter ID	Concen	Qualifiers	Units	homol
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	61798-70-7	1.39	J EMPC	PG/L	hexa
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	55720-44-0	0	U	PG/L	tri
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	56030-56-9	2.65	J EMPC C	PG/L	hexa
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	56558-16-8	0	U	PG/L	penta
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	56558-18-0	0	U	PG/L	penta
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	57465-28-8	0	U	PG/L	penta
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	60145-20-2	6.74		PG/L	penta
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	60145-21-3	1.15	J	PG/L	penta
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	60145-22-4	0	U	PG/L	hexa
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	68194-09-2	0	U	PG/L	hexa
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	60233-25-2	0	U	PG/L	penta
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	55702-45-9	4.04	J	PG/L	tri
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	62796-65-0	21.2	C	PG/L	tetra
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	65510-44-3	3.16	J	PG/L	penta
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	65510-45-4	23.8	C	PG/L	penta
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	68194-04-7	6.58		PG/L	tetra
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	68194-05-8	16.9		PG/L	penta
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	68194-06-9	4.32		PG/L	penta
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	68194-07-0	150	B C	PG/L	penta
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	76842-07-4	0	U	PG/L	penta
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	60145-23-5	0	U	PG/L	hepta
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	52663-79-3	1.3	J	PG/L	nona
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	52663-68-0	36.8		PG/L	hepta
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	52663-69-1	11		PG/L	hepta
Pa0026972-002	Exeter township outfall	Municipal	Pa0026972-DW-002-09032008	SA	DW	52663-70-4	12.1		PG/L	hepta

Record: 1 of 865

Summary of Analytical Results

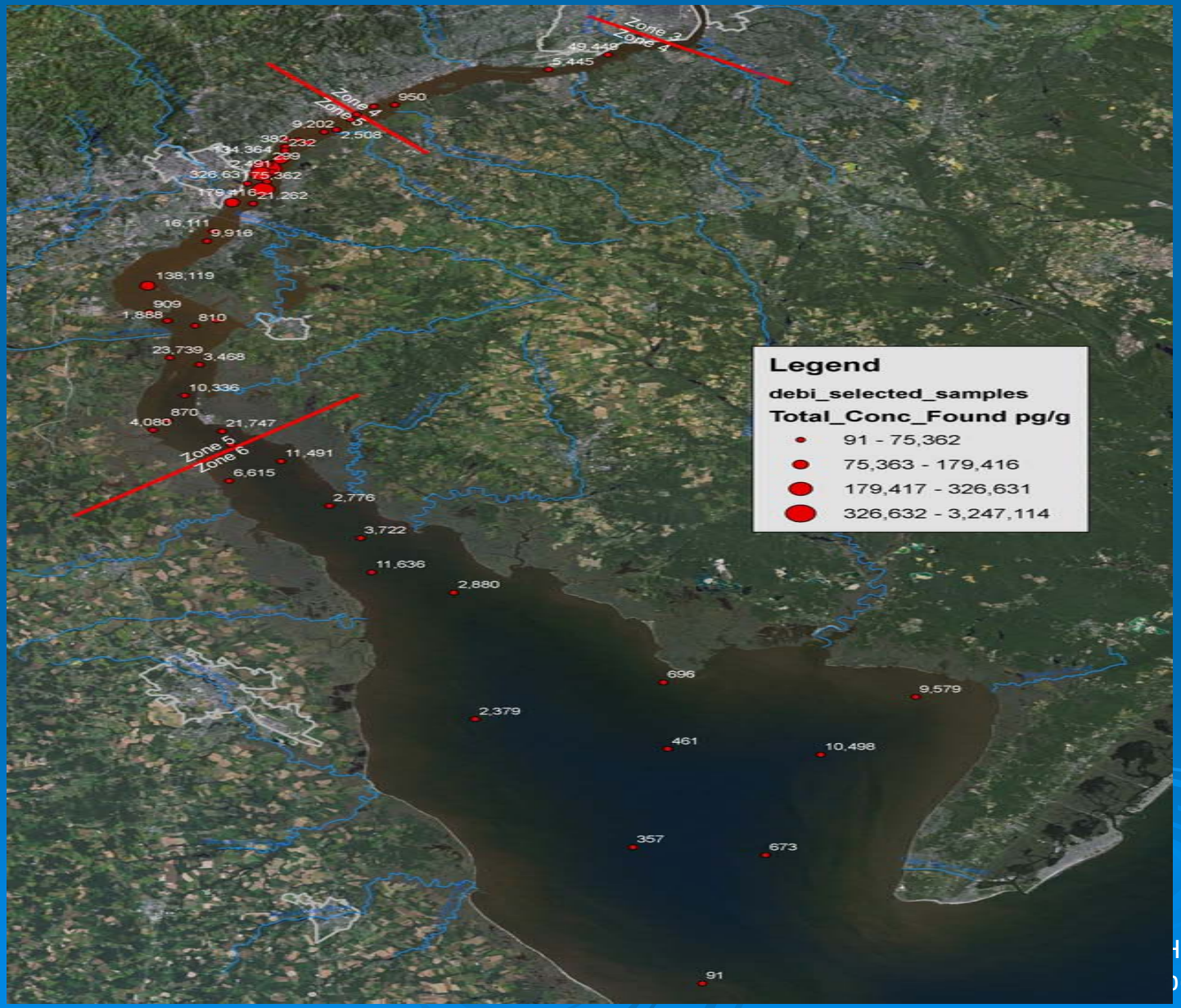
QRY_DK92506_CONC_ALL_SA_XTAB_Homolog_Order : Select Query

PermitNo	LocName	SampleType	LocType	WeatherCategory	DischargeID	SampleNo	Total Of Concer	mono
PA0026298	White Marsh Outfall	SA	Municipal	WW	002A	PA0026298-WW-002A-11252008	9,786	18
PA0026298	White Marsh Outfall	SA	Municipal	DW	002A	PA0026298-DW-002A-08062008	15,048	48
PA0026298	White Marsh Outfall	SA	Municipal	DW	002A	PA0026298-DP-002A-08062008	16,037	31
PA0026298	White Marsh Outfall	RB	Municipal	WW	002A	PA0026298-RB-002A-11242008	359	5
PA0026298	White Marsh Outfall	RB	Municipal	DW	002A	PA0026298-RB-002A-08052008	322	8
PA0026298	White Marsh Outfall	RB	Municipal	DW	002A	PA0026298-DP-002A-08052008	213	12
Pa0026972	Exeter township outfall 002	SA	Municipal	WW	002,	PA0026972-WW-002-10292008	4,758	4
Pa0026972	Exeter township outfall 002	SA	Municipal	DW	002,	Pa0026972-DW-002-09032008	4,353	3
Pa0026972	Exeter township outfall 002	RB	Municipal	WW	002,	PA0026972-RB-002-10292008	61	12
Pa0026972	Exeter township outfall 002	RB	Municipal	DW	002,	Pa0026972-RB-002-09032008	81	0

Data Analysis and Presentation

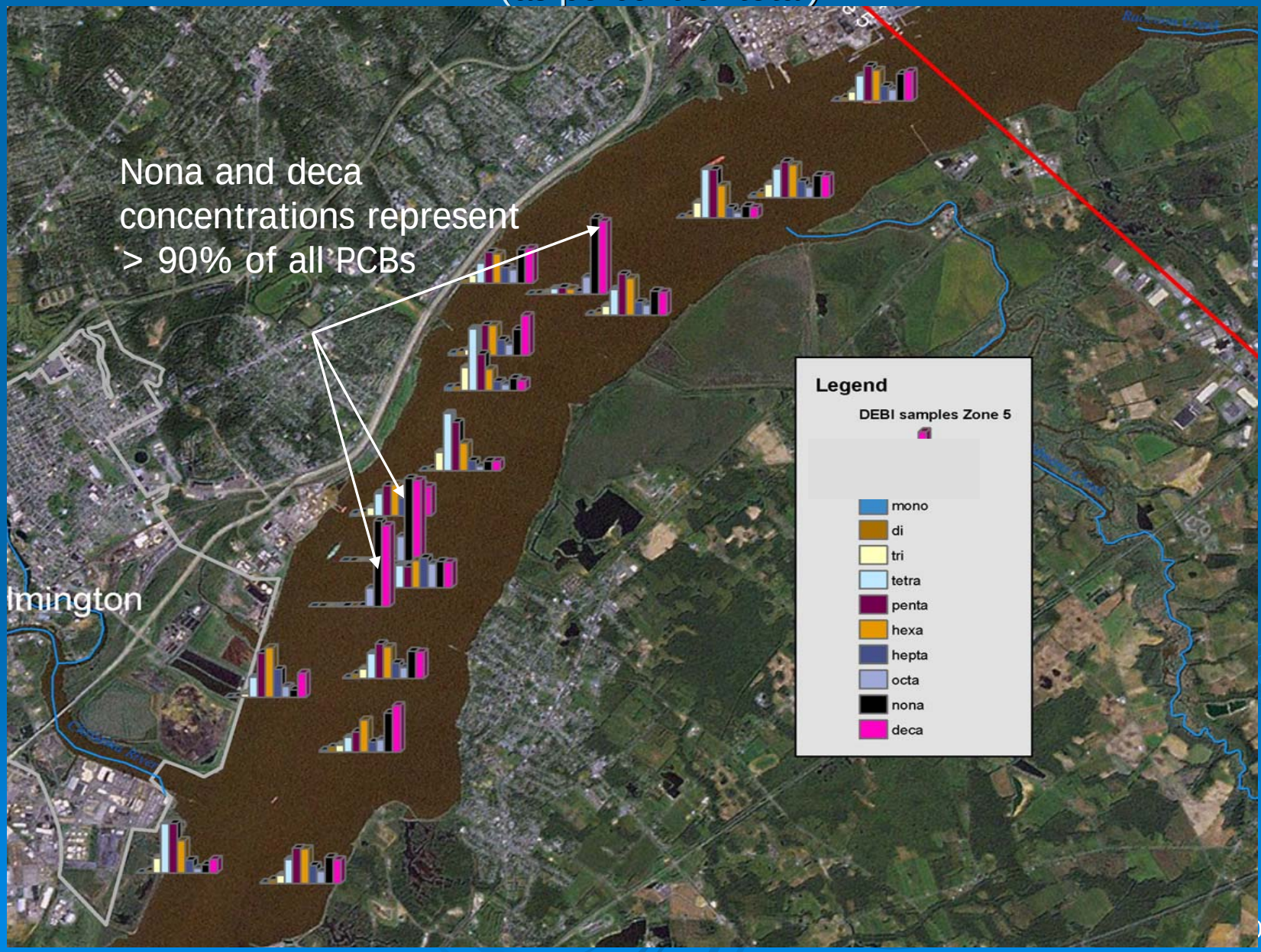
- Data can be copied to Excel for graphing purposes.
  - Select portion or entire data set and copy into Excel as a .csv file
- Associated flow data can be linked in Excel and loadings calculated.
- Data can be exported for entry in GIS.

51 DEBI (2008) Sediment Sample Locations and Total PCB Concentrations



DEBI (2008) Upper Zone 5 Homolog Distribution

(as percent of total)



Benefits

- ✓ Reduced analytical uncertainty
- ✓ Greater accuracy in estimated loadings
- ✓ Comparability of analytical results
- ✓ More accurate long-term trend analysis
- ✓ Data reliability and transferability
- ✓ Better temporal and spatial evaluation of data
- ✓ Transferability of data management system

Conclusions

- A open and transparent database will provide for direct and candid communication between the regulated community and the regulatory agencies
- Provide a basis for determining effectiveness of Pollutant Minimization Plans (PMPs)
- The database is dynamic and can readily be amended to include new information