Data Management in Support of Stage 2 PCB TMDL Efforts

Gregory J. Cavallo
N. Rao Sankarmanchi
Dawn M. Kaczorowski
Lawrence R. Sandeen

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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
  - 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 a more accurate TMDLs by requiring better quantification of the concentrations from the various PCB source categories.
- Incorporation of all data into an Access database

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

Benefits:

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

Complications in Achieving DQOs

- Variable sampling, analytical and reporting protocols
- 209 PCB congeners
- Multiple samples > 600
- 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, including project specific modifications
- Electronic data formatting and reporting
  - Location table
  - Chain of custody
  - Analytical results

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

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!!

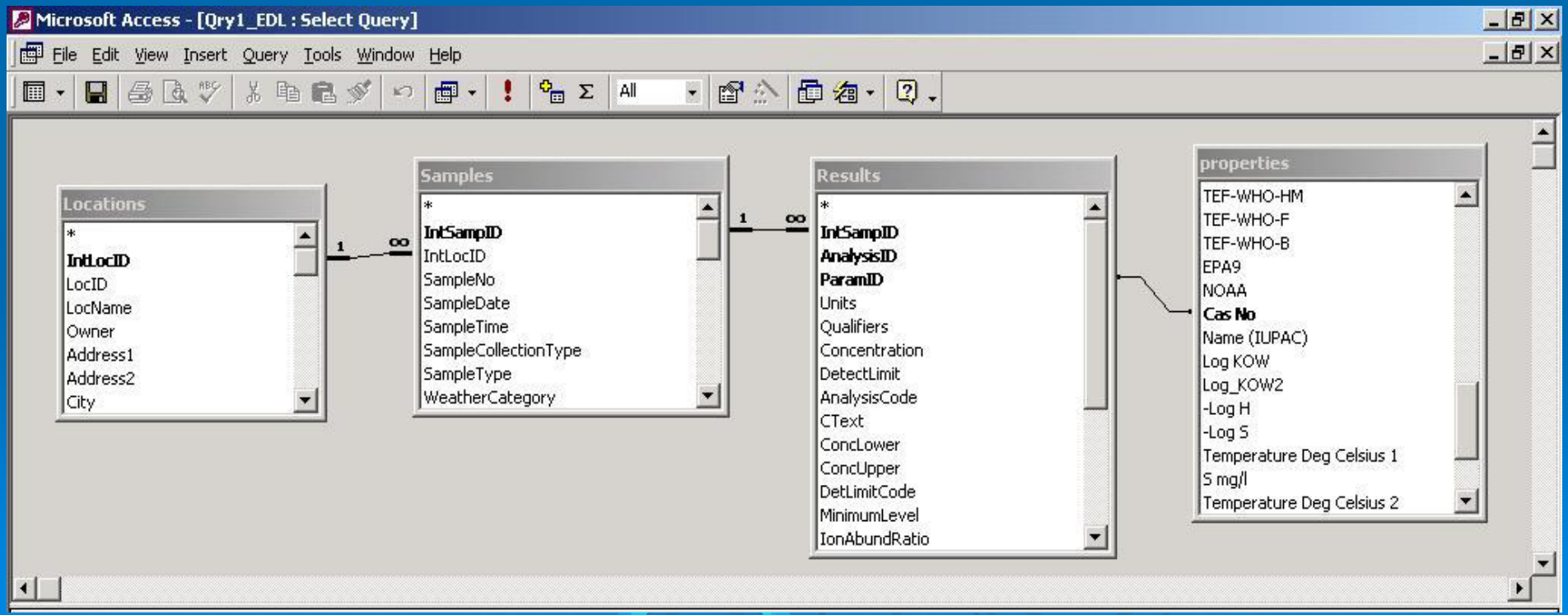
- Duplicate samples
- Analytical results
  - Consistent with C-O-C
  - Parameters

No

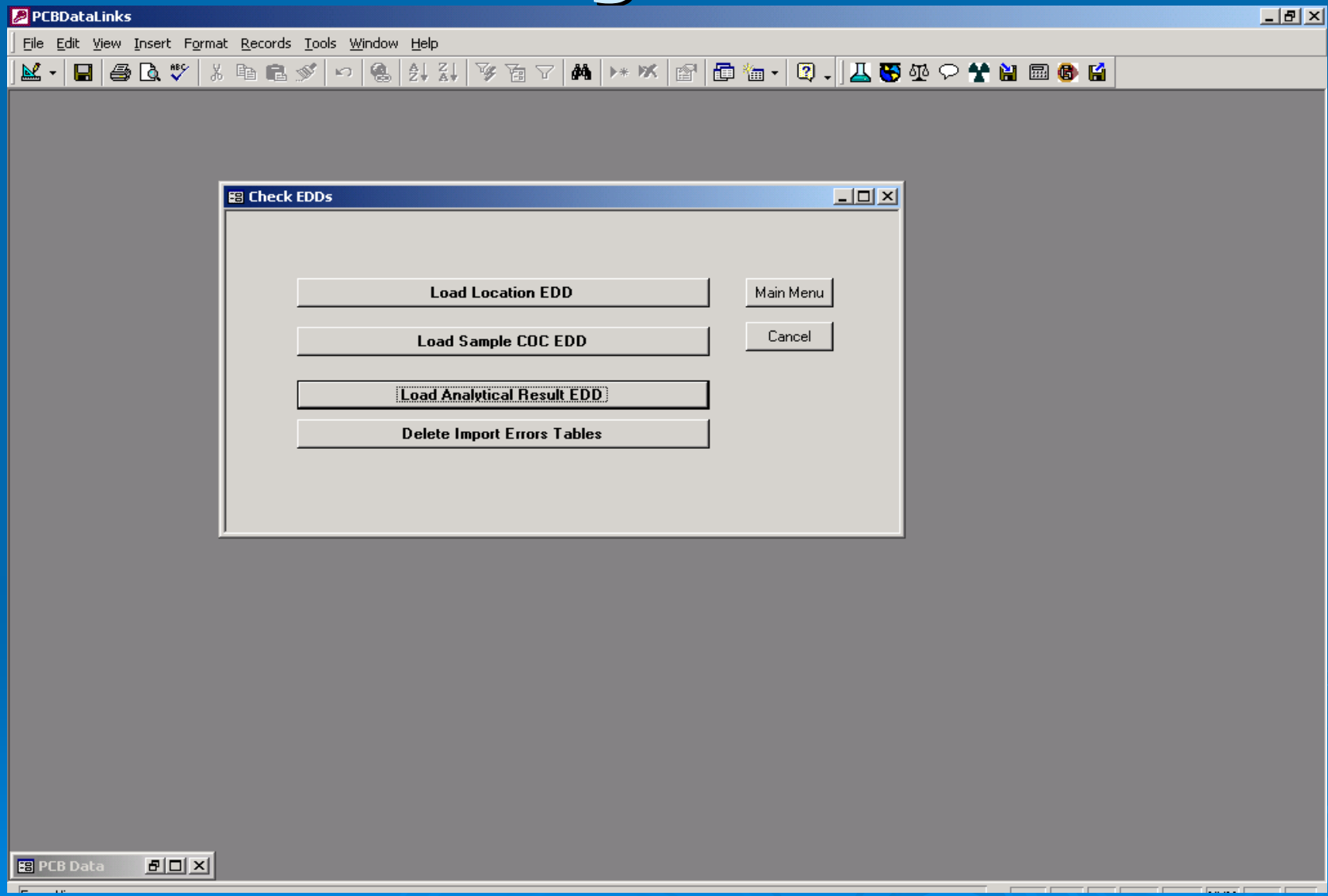
The submitter is contacted and the data is resubmitted, or DRBC staff revised with the concurrence of the discharger

Access Tables

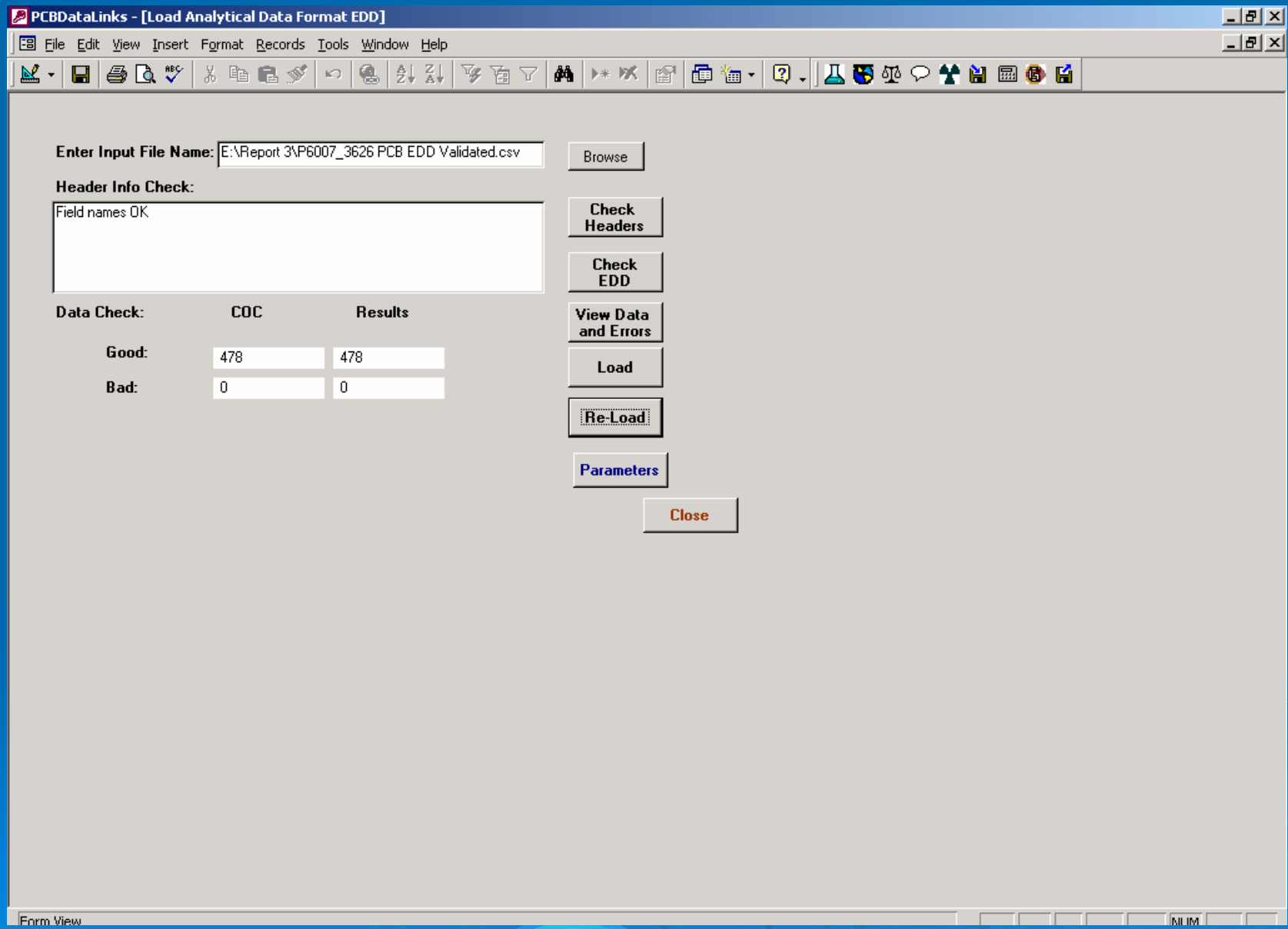
- Chain of Custody, Location information and Analytical data are all linked via the sample id and location id codes. Additionally, DRBC links a properties database to the results.



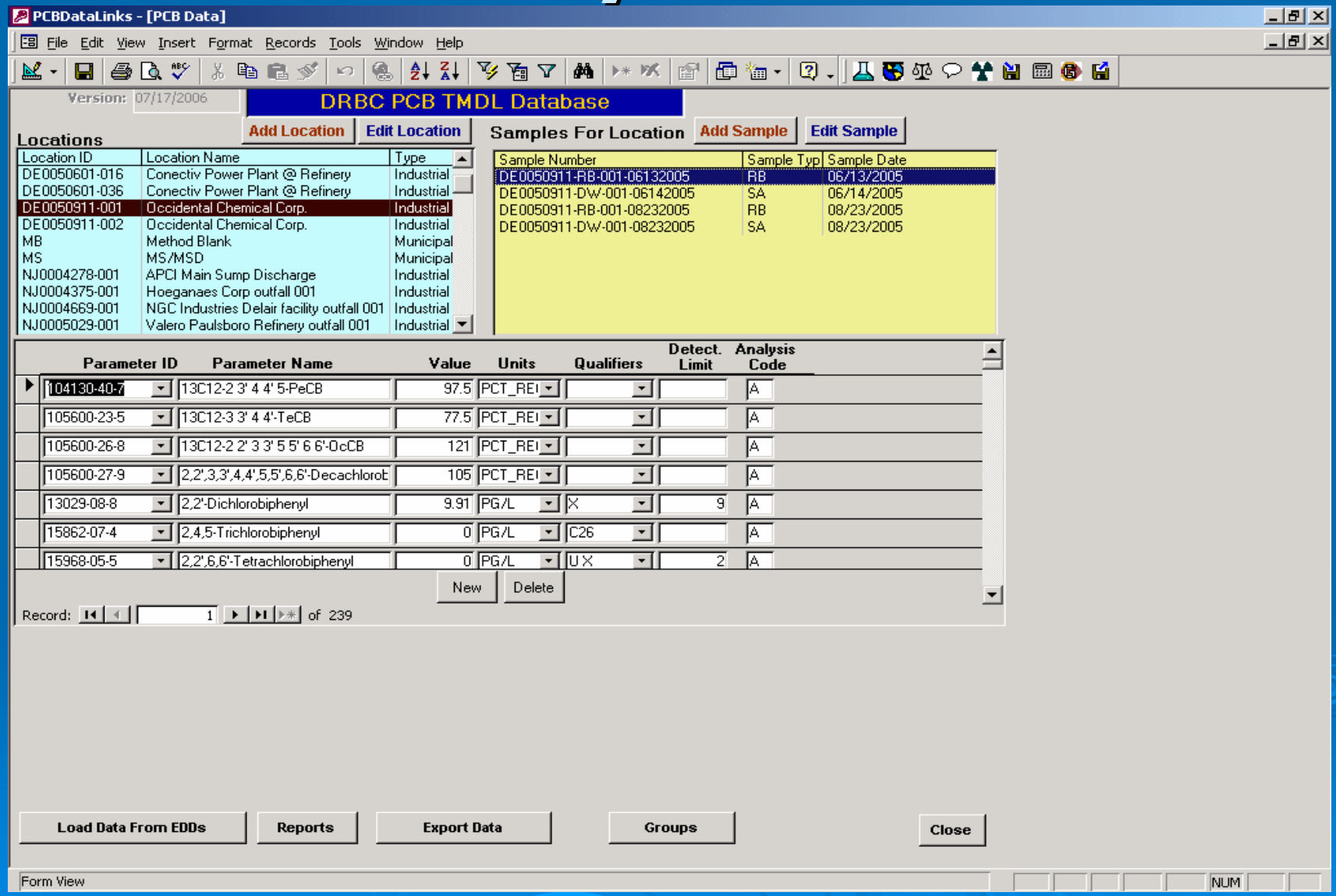
Loading Screen



Data Check Screen



Summary Results



The completed database contains location, analytical and physical property information

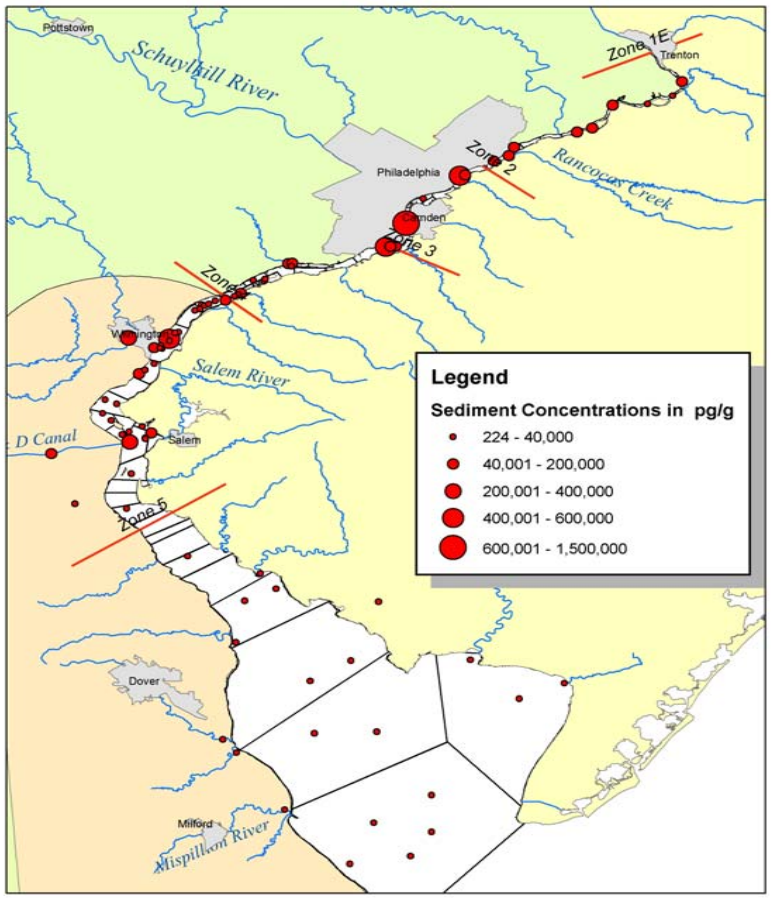
Location Name	Decimal Latit	Decimal Long	Sample Number	Sample Type	Concentration	Units	homologue
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	2.11	PG/L	tri
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	10.2	PG/L	di
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	187	PG/L	deca
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	14.6	PG/L	octa
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	18.3	PG/L	penta
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	2.89	PG/L	tetra
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	1.89	PG/L	tetra
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	9.8	PG/L	penta
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	6.77	PG/L	tetra
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	36.7	PG/L	hexa
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	23.5	PG/L	hepta
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	10.4	PG/L	hepta
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	16.7	PG/L	tetra
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	3.36	PG/L	hexa
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	11.4	PG/L	octa
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	1.89	PG/L	tri
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	49.8	PG/L	penta
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	12.9	PG/L	penta
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	69.6	PG/L	penta
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	21.8	PG/L	hexa
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	10.6	PG/L	hexa
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	6.51	PG/L	hexa
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	7.5	PG/L	hexa
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	11.3	PG/L	hepta
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	1.12	PG/L	tri
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	2.89	PG/L	tri
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	2.11	PG/L	tetra
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	3.88	PG/L	octa
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	170	PG/L	nona
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	2.17	PG/L	hepta
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	6.03	PG/L	tetra
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	3.34	PG/L	tetra
Sunoco Eagle Point Refinery Outfall 001A	39.876778	-75.164583	NJ0005401-DW-001A-01272006	SA	9.91	PG/L	octa

Record: 1 of 48249

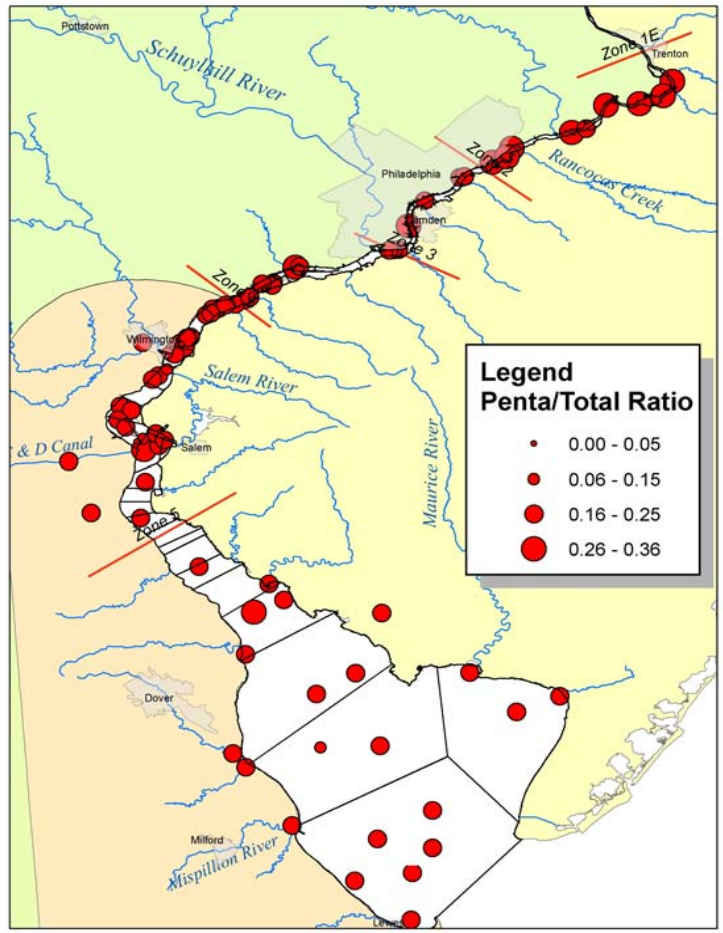
~ 48,000 lines of data for rinsate blanks and samples alone!!!!

Summary of PCB Sediment Concentrations

Sediment Concentrations for Total PCBs

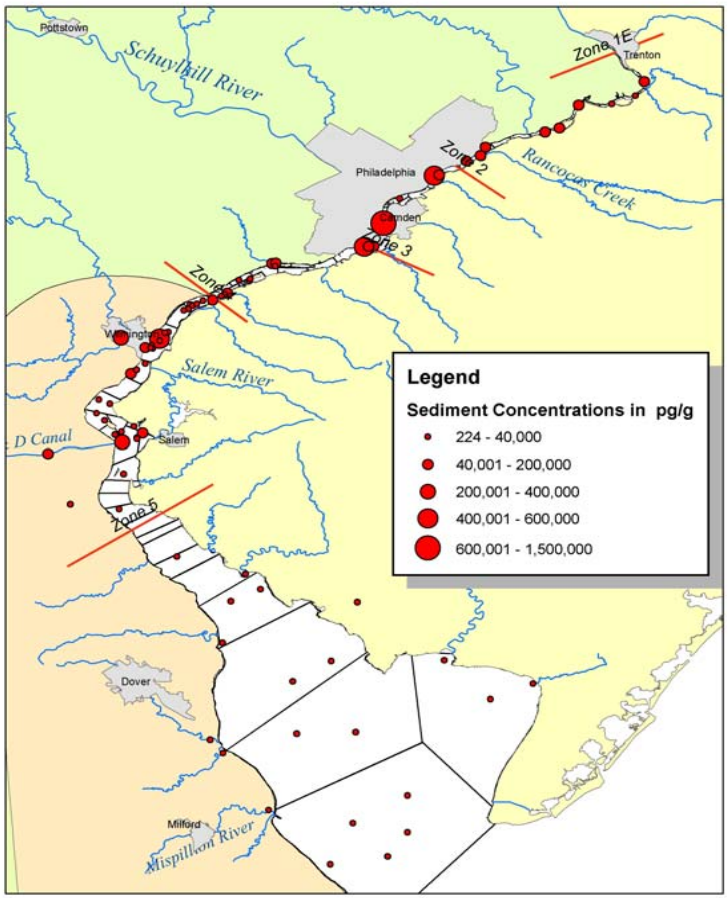


Sediment Penta Homolog/Total PCB Ratio

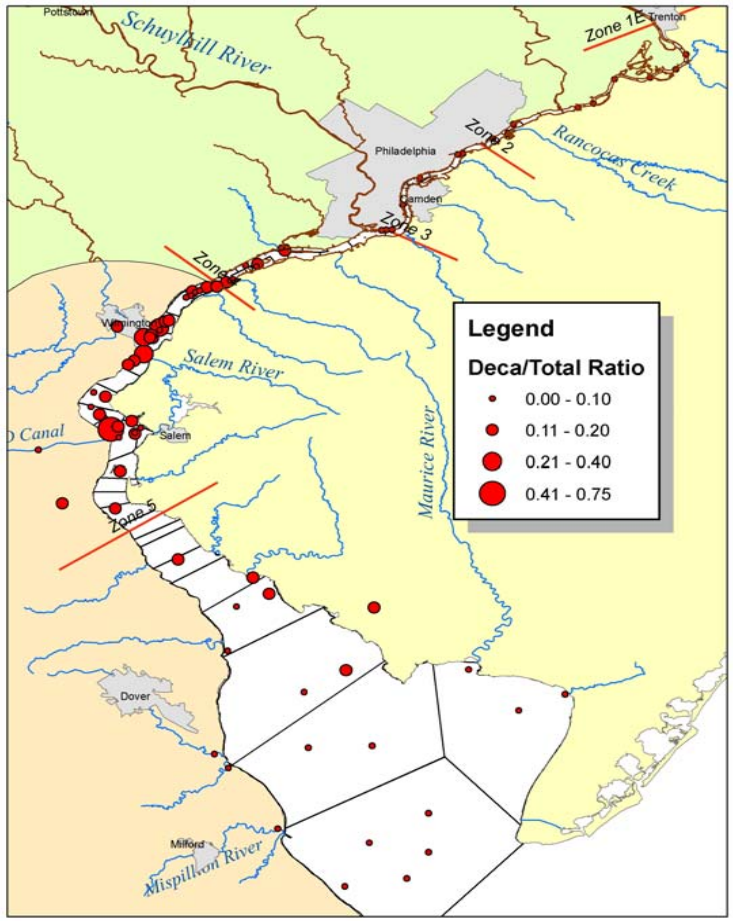


Summary of PCB Sediment Concentrations

Sediment Concentrations for Total PCBs



Sediment Deca Homolog/Total Ratio PCB



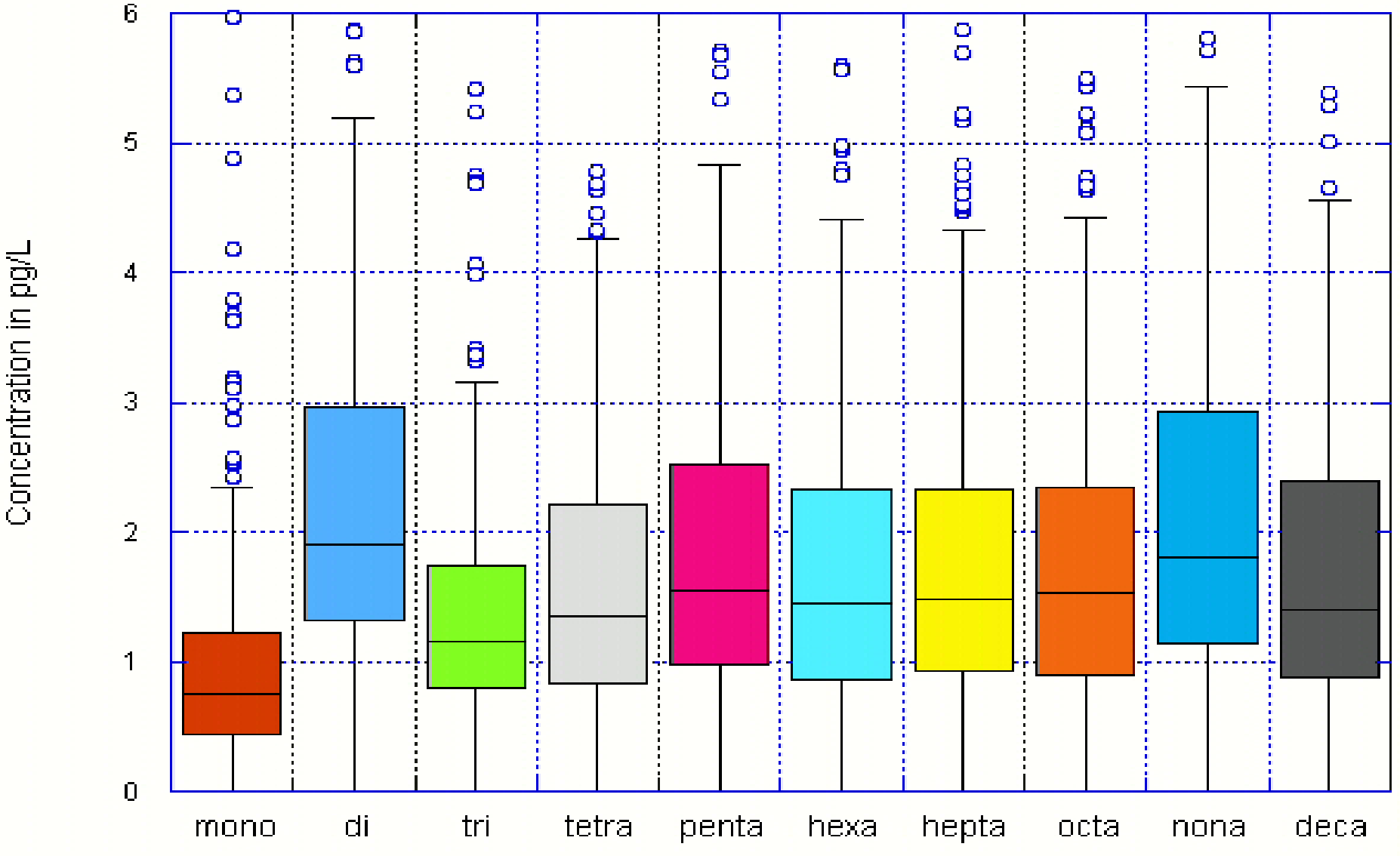
Benefits

- ✓ 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

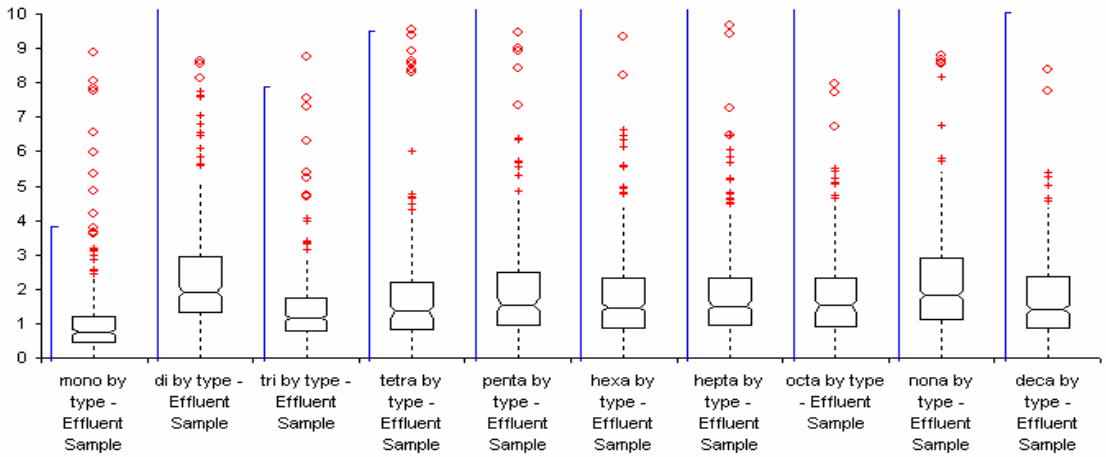
- A open and transparent database will provide for direct and candid communication between the regulated community and the regulatory agencies
- Provide a basis for determining effectiveness of pollutant reduction initiatives
- The database is dynamic and can readily be amended to include new information

EMDLS for Effluent Samples by Homolog n=386



EMDLS for Effluent Samples by Homolog n=386

Microsoft Excel + Analyse-it - QRY_GJC103006_EMDL_SA_Homolog_Crosstab.xls



	n	Mean	SD	SE	95% CI of Mean	Median	IQR	95% CI of Median
mono by type - Effluent Sample	386	1.115	1.6409	0.0835	0.951 to 1.279	0.751	0.765	0.673 to 0.836
di by type - Effluent Sample	386	3.211	7.0045	0.3565	2.511 to 3.912	1.904	1.633	1.796 to 2.066
tri by type - Effluent Sample	386	1.917	3.6387	0.1852	1.553 to 2.281	1.154	0.945	1.068 to 1.239
tetra by type - Effluent Sample	386	2.323	4.3736	0.2226	1.885 to 2.760	1.357	1.394	1.159 to 1.504
penta by type - Effluent Sample	386	2.806	5.9414	0.3024	2.211 to 3.400	1.546	1.531	1.353 to 1.758
hexa by type - Effluent Sample	386	2.988	6.9545	0.3540	2.292 to 3.684	1.451	1.452	1.354 to 1.583
hepta by type - Effluent Sample	386	2.635	5.4023	0.2750	2.095 to 3.176	1.483	1.383	1.391 to 1.665
octa by type - Effluent Sample	386	2.566	4.9276	0.2508	2.073 to 3.059	1.525	1.444	1.323 to 1.660
nona by type - Effluent Sample	386	2.977	5.2164	0.2655	2.455 to 3.499	1.810	1.762	1.700 to 1.957
deca by type - Effluent Sample	386	2.489	4.5850	0.2334	2.030 to 2.948	1.395	1.460	1.290 to 1.550

Descriptives 2 | QRY_GJC103006_EMDL_SA_Homolog_1

Ready