Large Scale Emissions Inventory

San Diego, CA

Stephen S. Koo, B.A.Sc.

May 1 / 2003

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Acknowledgement

- Sarah Kelly – ITEP
- Doug Solomon – EPA OAQPS

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Agenda

- Objectives
- System Modules & Architecture
- Database Structure
- Data Entry Facilitation
- QA / QC
- Questions

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Who is Lakes Environmental

Lakes
Environmental

Environmental Software

- ISC-AERMOD View
- AUSTAL View
- IRAP-h View
- Eco-Risk View

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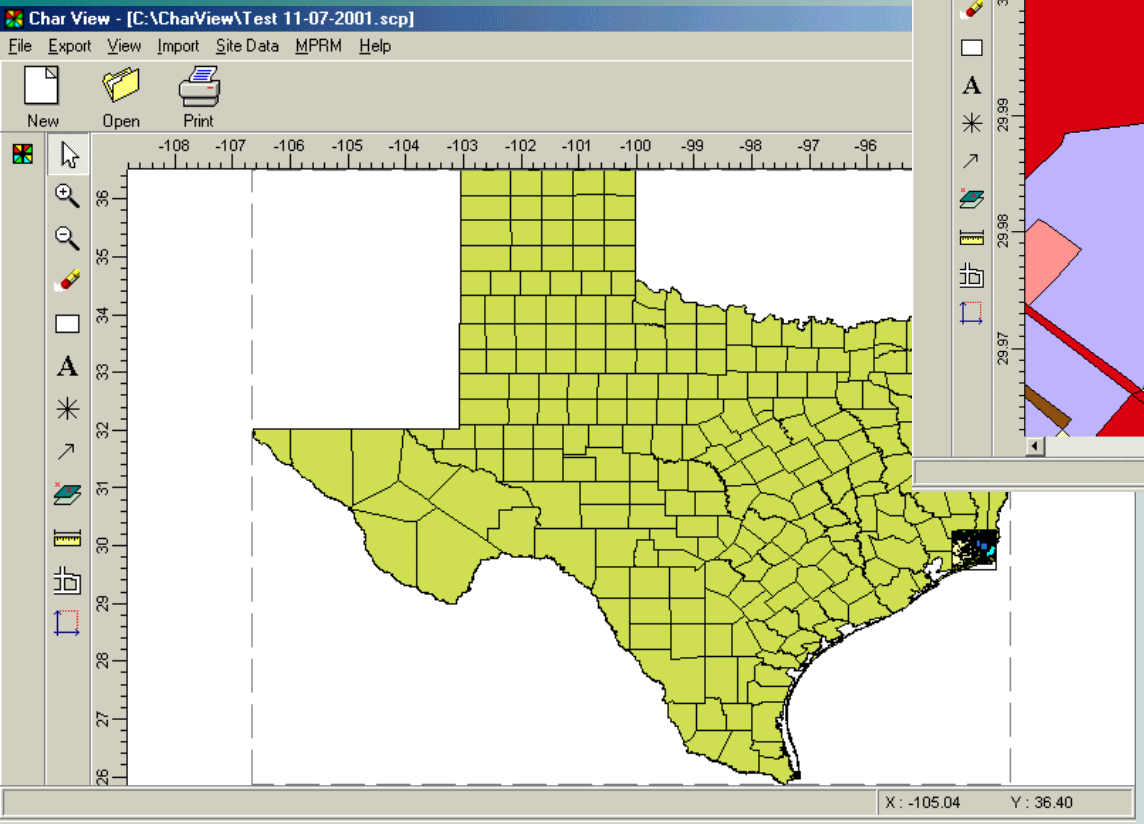
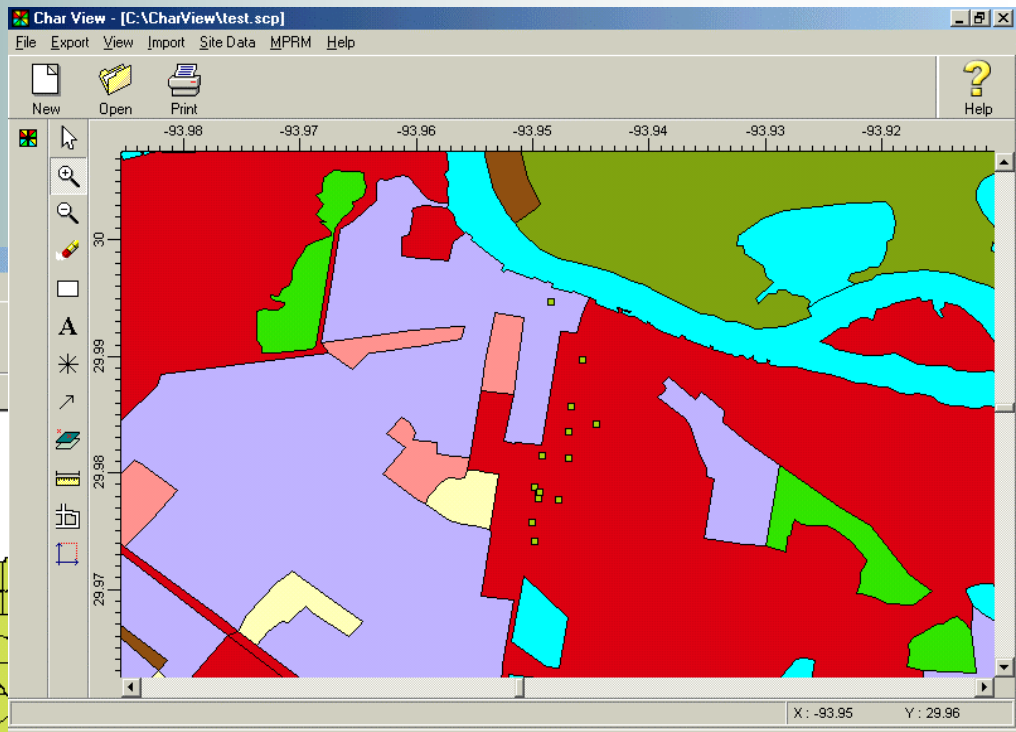
Cumulative Risk Assessment





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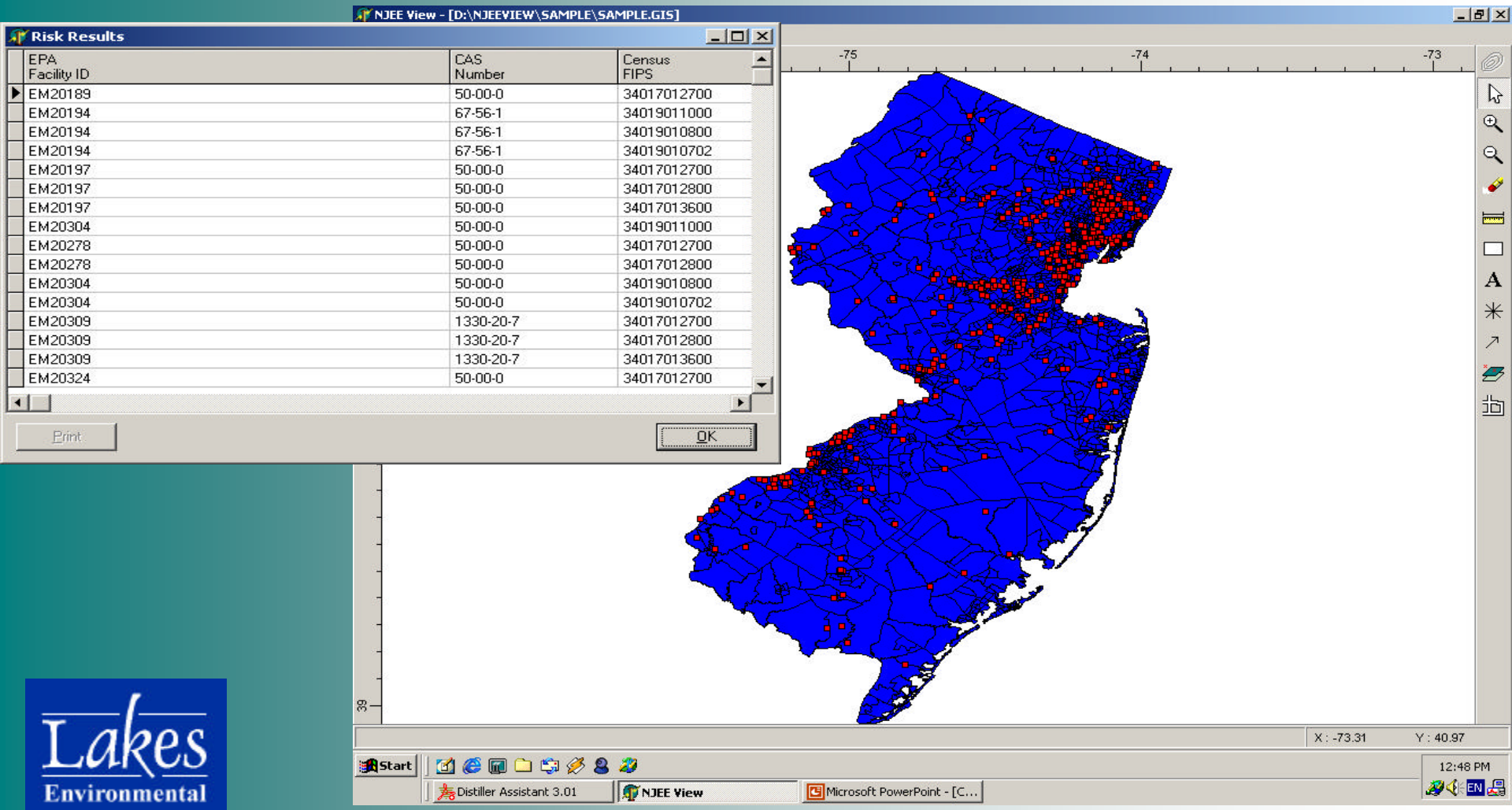
NJEE View



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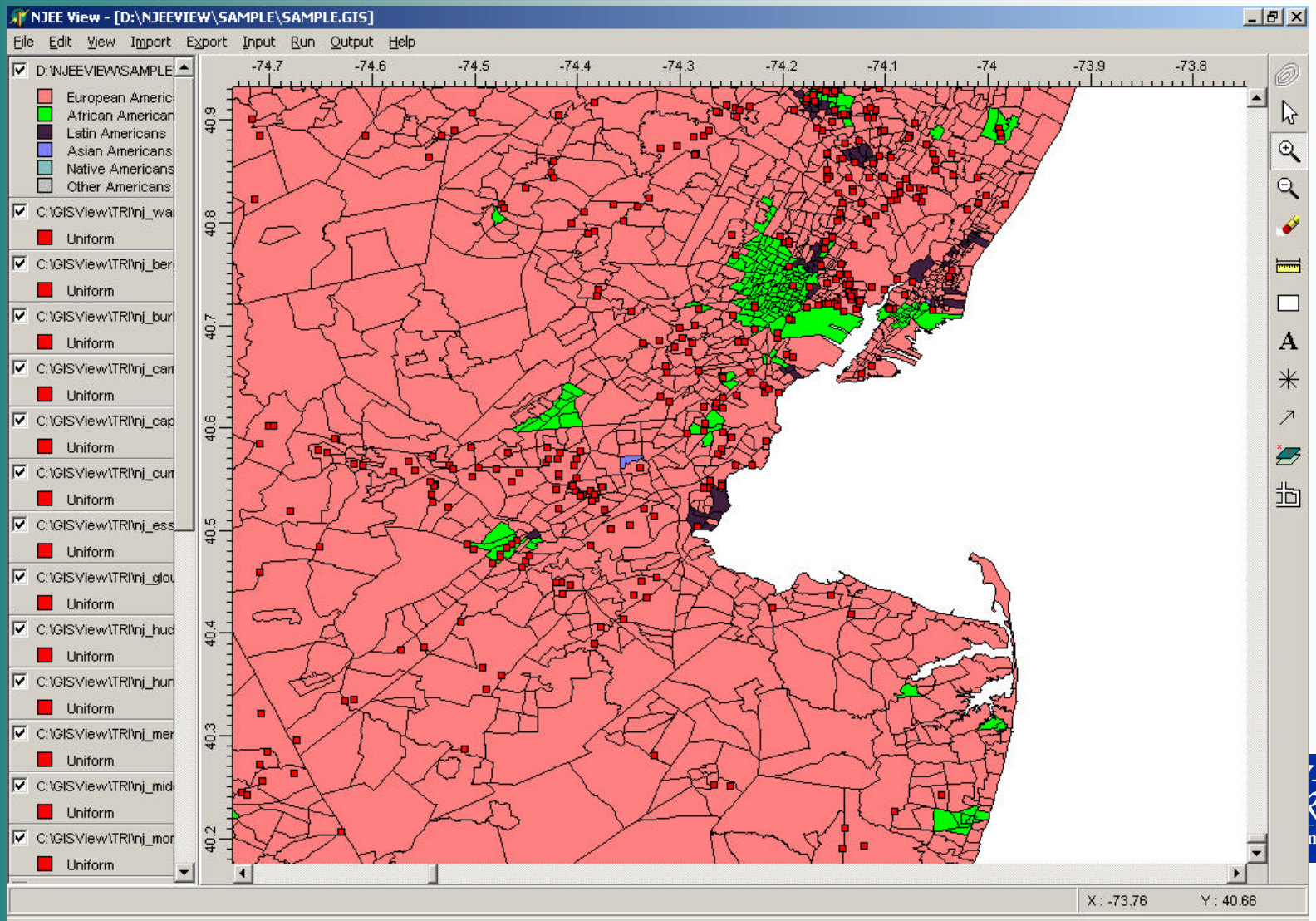
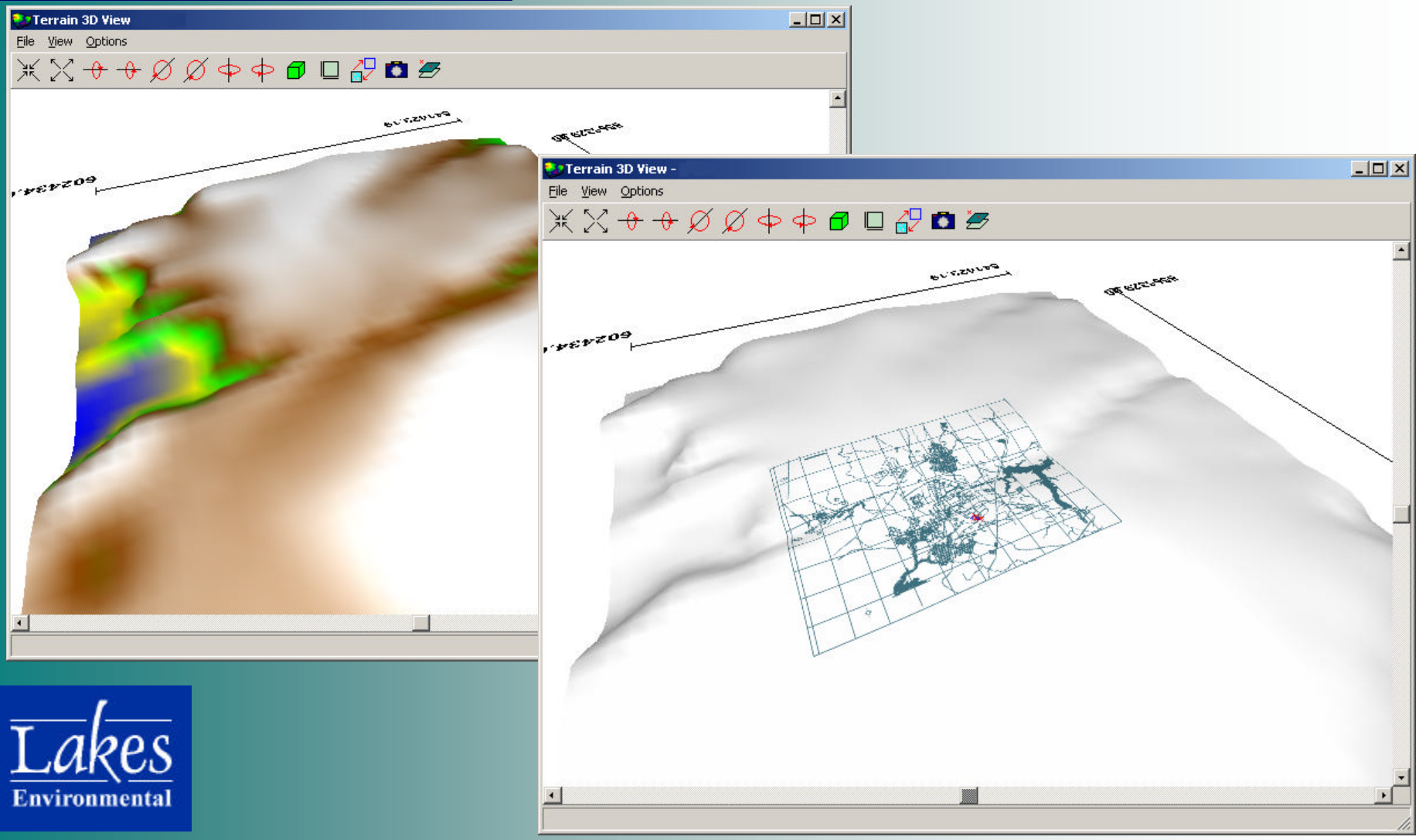
NJEE View


NJEE View - [D:\NJEEVIEW\SAMPLE\SAMPLE.GIS]
File Edit View Import Export Input Run Output Help
European Americ
African American
Latin Americans
Asian Americans
Native Americans
Other Americans
Uniform
-74.7 -74.6 -74.5 -74.4 -74.3 -74.2 -74.1 -74 -73.9 -73.8
40.9 40.8 40.7 40.6 40.5 40.4 40.3 40.2
X : -73.76 Y : 40.66

3D Visualization



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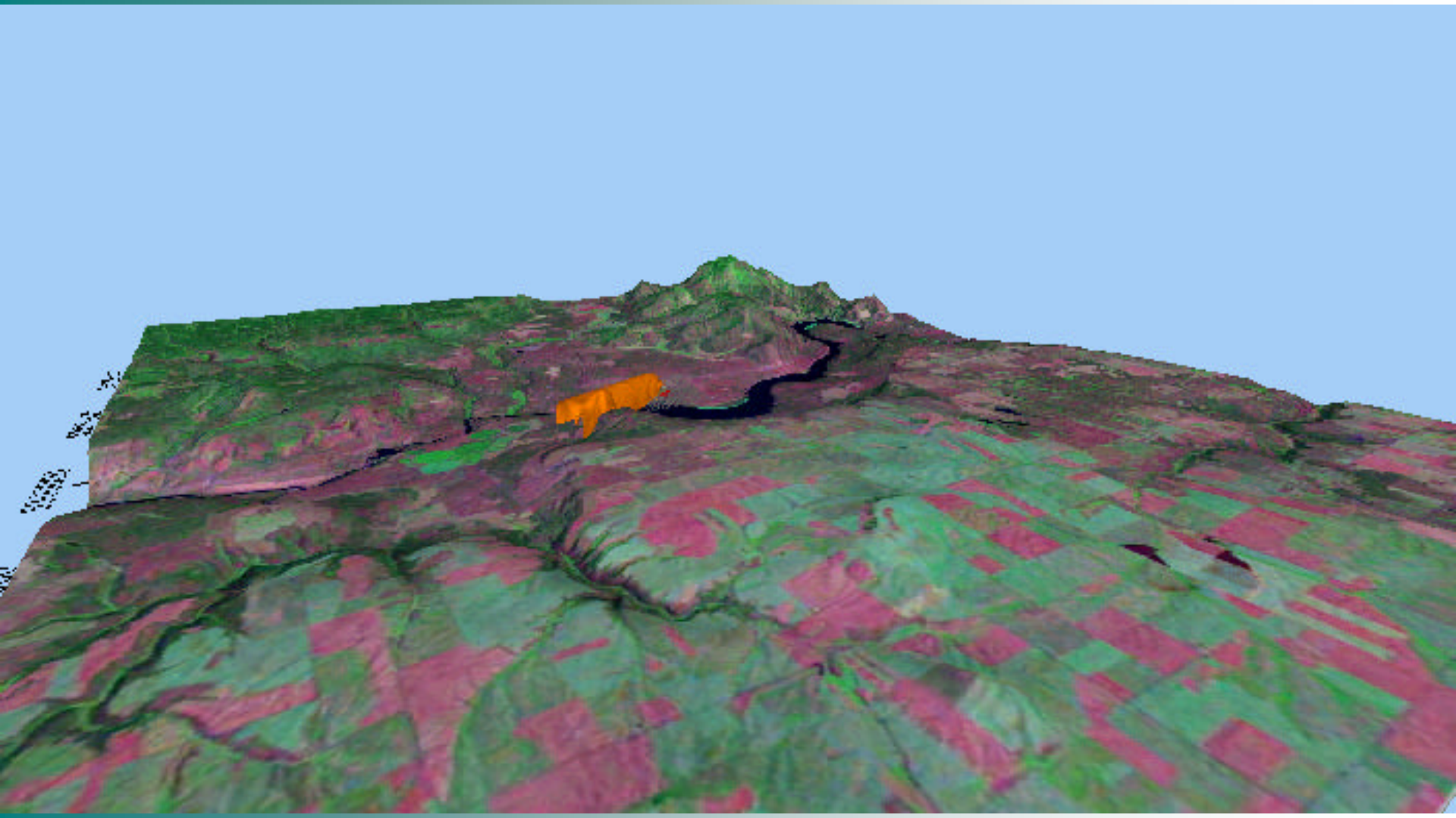

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Data Availability

- WWW.WEBGIS.COM
- WWW.WEBMET.COM
- WWW.WEBLAKES.COM
- WWW.WEBCPI.COM
- WWW.WEBTHERMAL.COM

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System Objectives

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Objectives

- Emission inventory software with a very user-friendly interface
- Facilitate emission inventories by environmental professionals
- Emission estimates technically defensible

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Requirements

- Requirement Specification
- User Feedback
- QA \ QC Procedures
- Consistent Interface
- Documentation
- Training

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System Modules

System Modules

- GIS
- Calculators
- MOBILE6
- NON-ROAD
- Other Functions

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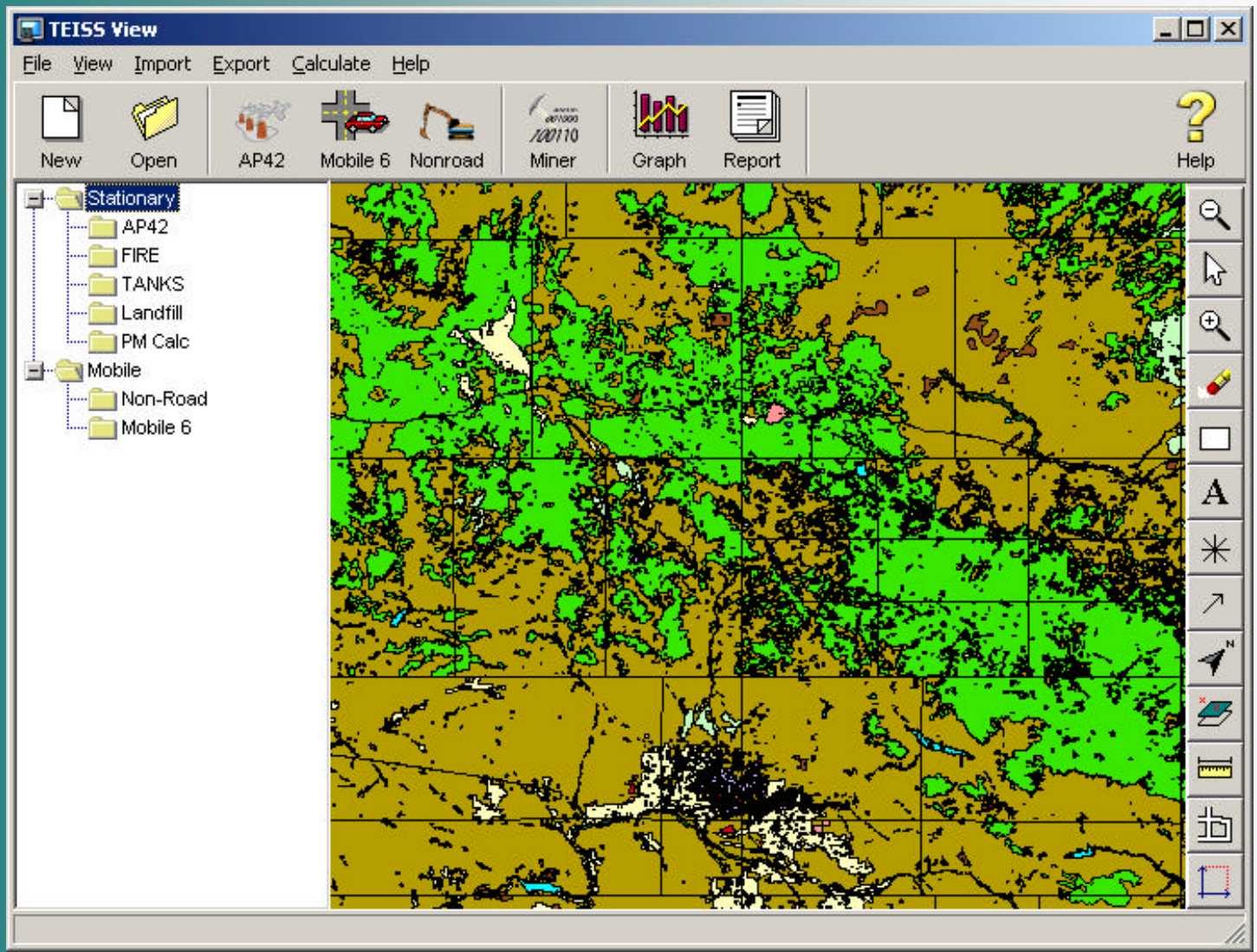
Mapping



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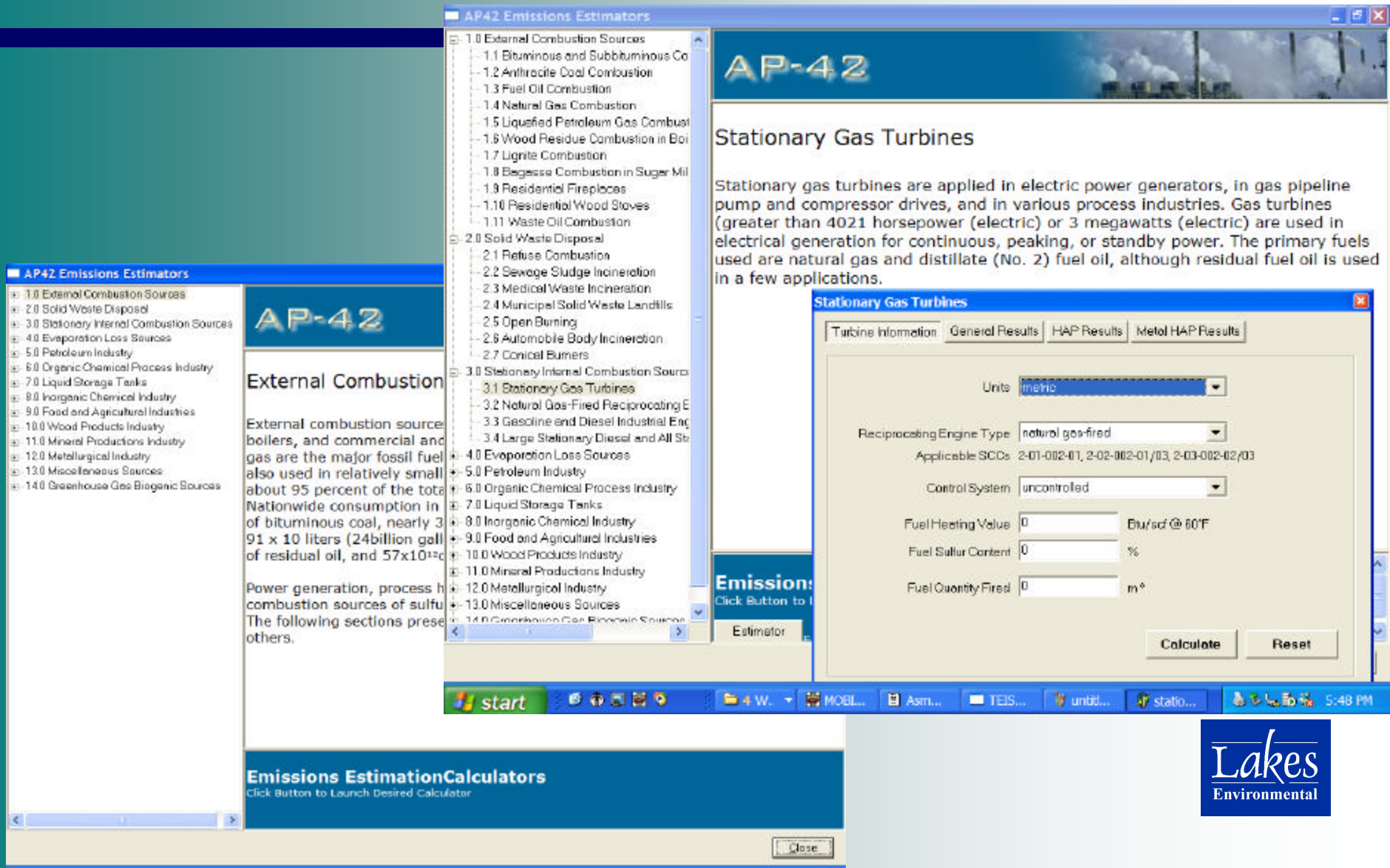
Calculators



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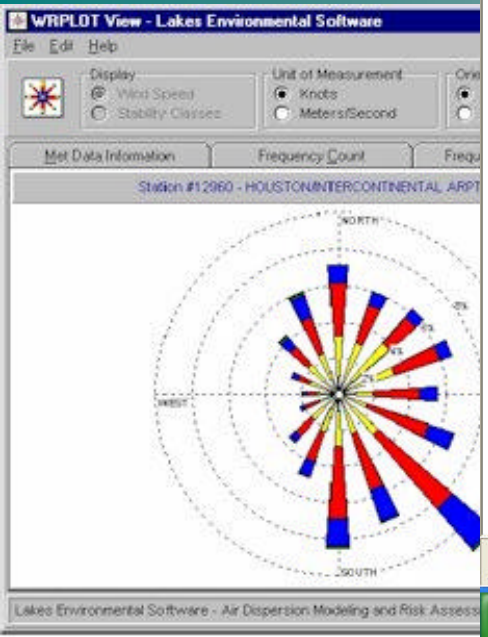
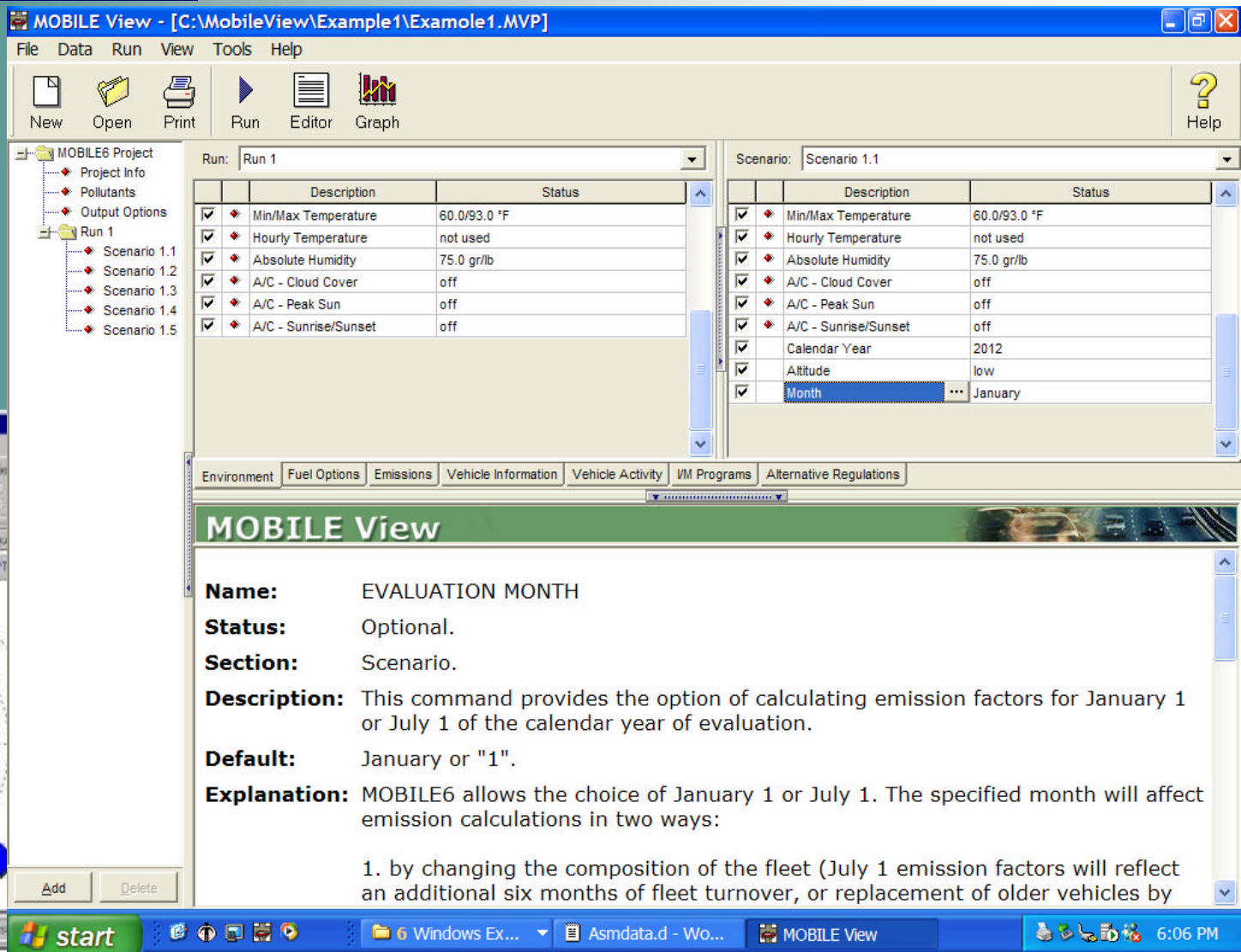
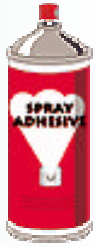
Mobile 6

- Min / Max Temperature
- Vehicle Speed
- Distributions
- Fuel RVPs

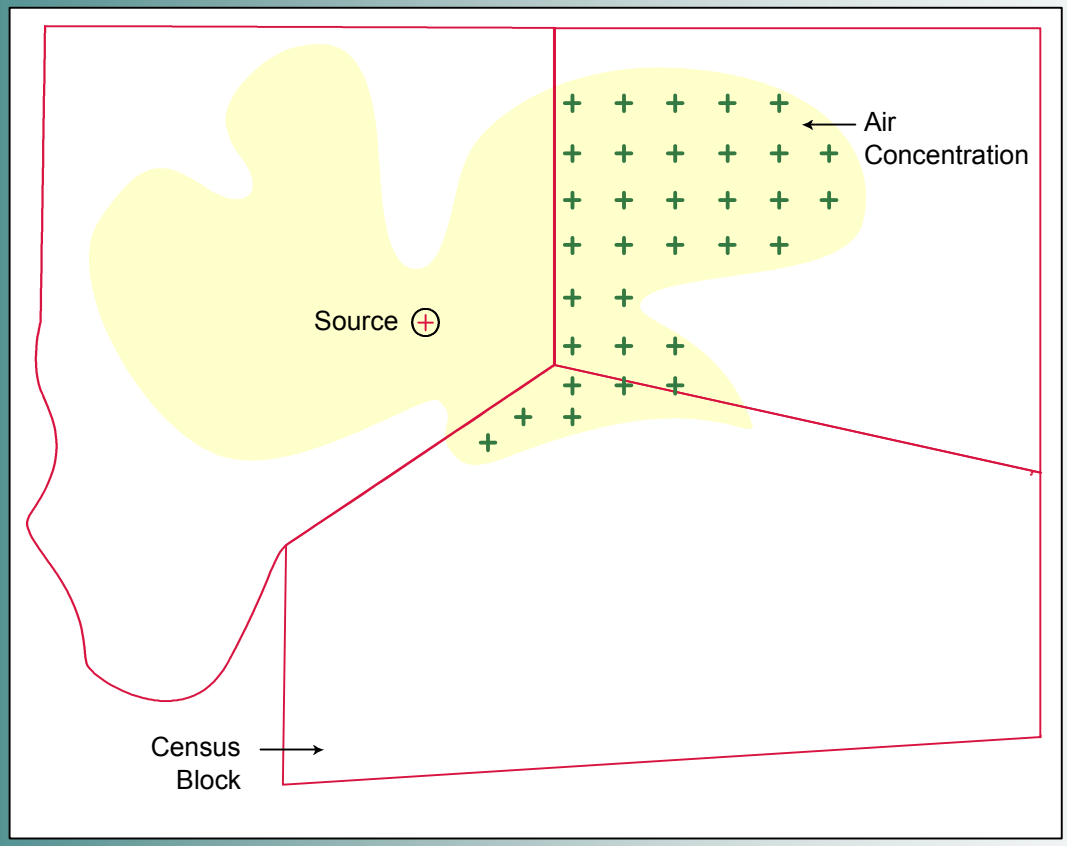




Area Source Allocations



- Polygon Intersection
- GIS Area Allocation



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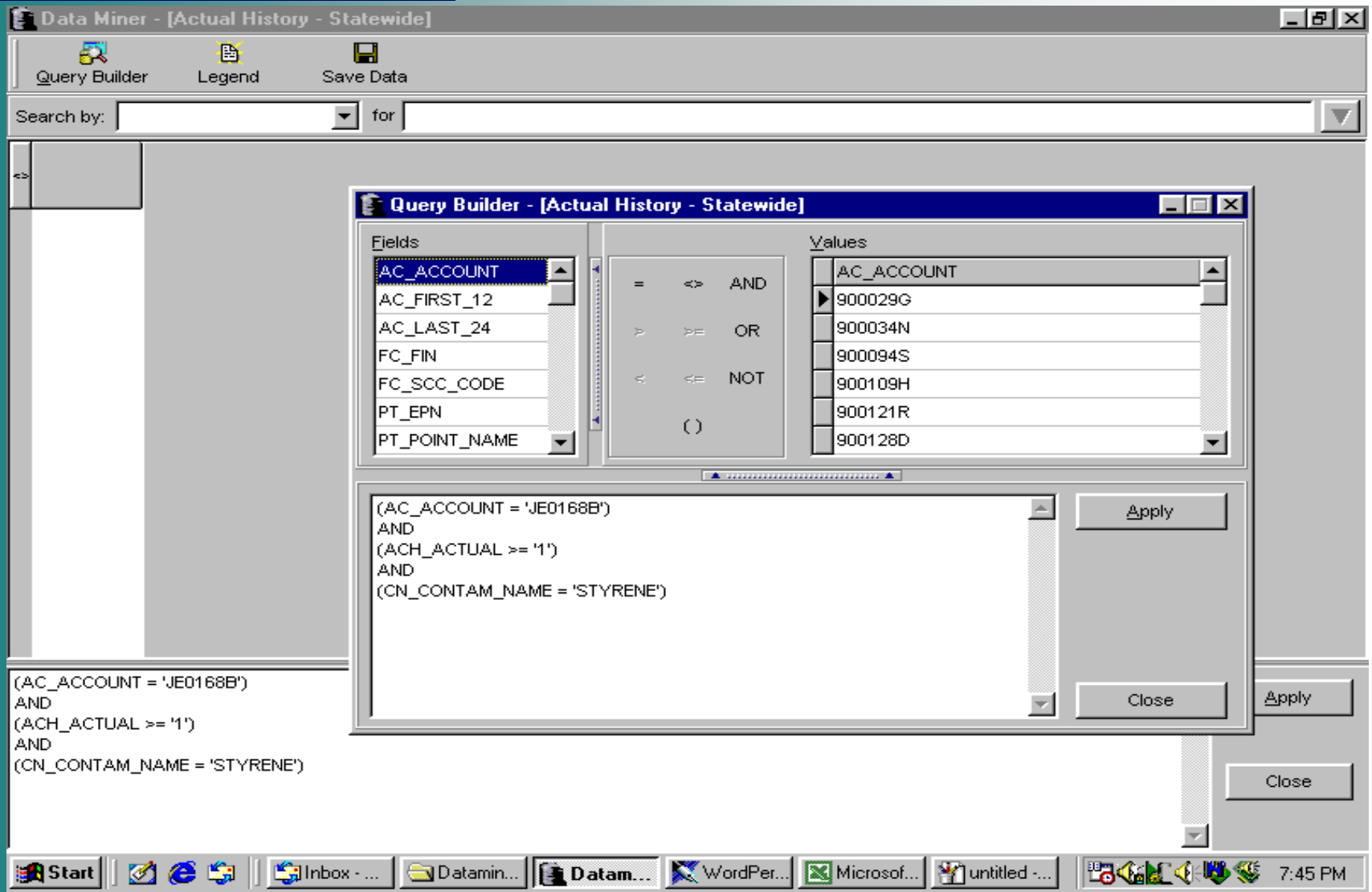
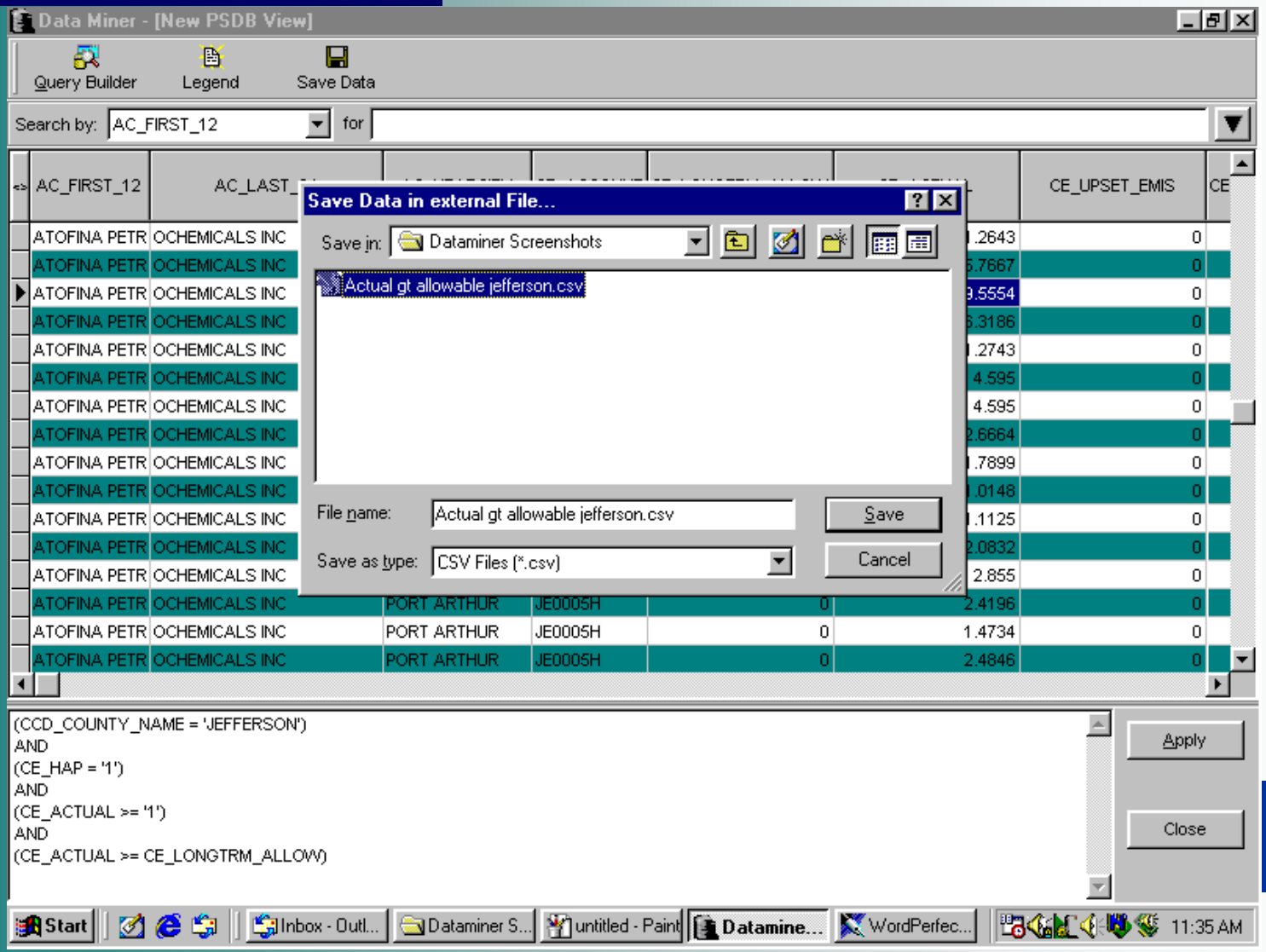
DataMiner – Query Builder



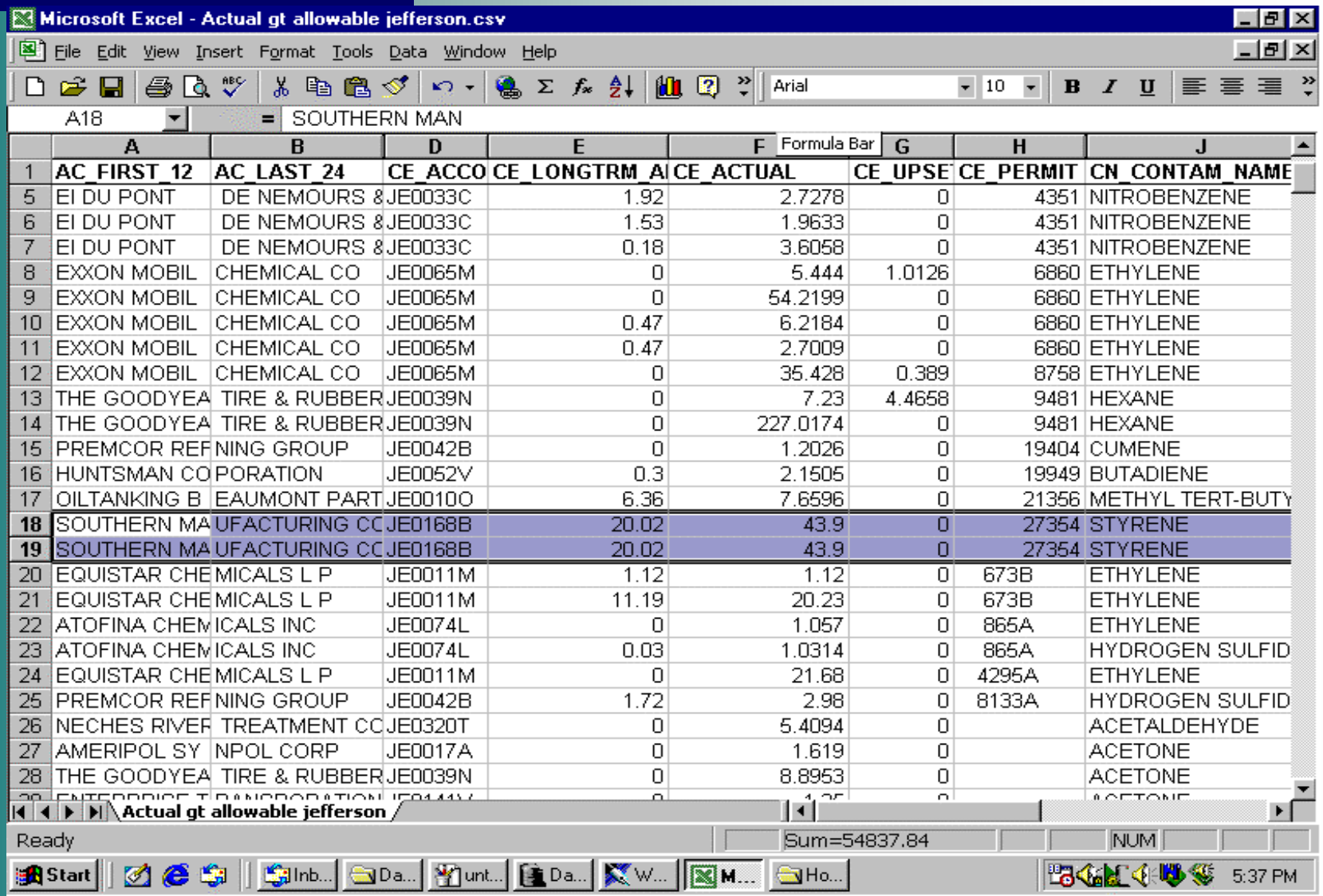
Data Miner


Data Mining
Memory Restriction
300 Gbyte
3 Gbyte
1 Gbyte
SQL
Query
Original
PSDB
Dataminer
Query

DataMiner – Saving Results



DataMiner – Excel Review



Microsoft Excel - Actual gt allowable jefferson.csv

File Edit View Insert Format Tools Data Window Help

Arial 10 B I U

A18 = SOUTHERN MAN

Formula Bar

	A	B	D	E	F	G	H	J
1	AC_FIRST_12	AC_LAST_24	CE_ACCO	CE_LONGTRM_A	CE_ACTUAL	CE_UPSE	CE_PERMIT	CN_CONTAM_NAME
5	EI DU PONT	DE NEMOURS &	JE0033C	1.92	2.7278	0	4351	NITROBENZENE
6	EI DU PONT	DE NEMOURS &	JE0033C	1.53	1.9633	0	4351	NITROBENZENE
7	EI DU PONT	DE NEMOURS &	JE0033C	0.18	3.6058	0	4351	NITROBENZENE
8	EXXON MOBIL	CHEMICAL CO	JE0065M	0	5.444	1.0126	6860	ETHYLENE
9	EXXON MOBIL	CHEMICAL CO	JE0065M	0	54.2199	0	6860	ETHYLENE
10	EXXON MOBIL	CHEMICAL CO	JE0065M	0.47	6.2184	0	6860	ETHYLENE
11	EXXON MOBIL	CHEMICAL CO	JE0065M	0.47	2.7009	0	6860	ETHYLENE
12	EXXON MOBIL	CHEMICAL CO	JE0065M	0	35.428	0.389	8758	ETHYLENE
13	THE GOODYEA	TIRE & RUBBER	JE0039N	0	7.23	4.4658	9481	HEXANE
14	THE GOODYEA	TIRE & RUBBER	JE0039N	0	227.0174	0	9481	HEXANE
15	PREMCOR REF	NING GROUP	JE0042B	0	1.2026	0	19404	CUMENE
16	HUNTSMAN CO	PORATION	JE0052V	0.3	2.1505	0	19949	BUTADIENE
17	OILTANKING B	EAUMONT PART	JE0010O	6.36	7.6596	0	21356	METHYL TERT-BUTY
18	SOUTHERN MA	UFACTURING CC	JE0168B	20.02	43.9	0	27354	STYRENE
19	SOUTHERN MA	UFACTURING CC	JE0168B	20.02	43.9	0	27354	STYRENE
20	EQUISTAR CHE	MICALS L P	JE0011M	1.12	1.12	0	673B	ETHYLENE
21	EQUISTAR CHE	MICALS L P	JE0011M	11.19	20.23	0	673B	ETHYLENE
22	ATOFINA CHEM	ICALS INC	JE0074L	0	1.057	0	865A	ETHYLENE
23	ATOFINA CHEM	ICALS INC	JE0074L	0.03	1.0314	0	865A	HYDROGEN SULFID
24	EQUISTAR CHE	MICALS L P	JE0011M	0	21.68	0	4295A	ETHYLENE
25	PREMCOR REF	NING GROUP	JE0042B	1.72	2.98	0	8133A	HYDROGEN SULFID
26	NECHES RIVER	TREATMENT CC	JE0320T	0	5.4094	0		ACETALDEHYDE
27	AMERIPOL SY	NPOL CORP	JE0017A	0	1.619	0		ACETONE
28	THE GOODYEA	TIRE & RUBBER	JE0039N	0	8.8953	0		ACETONE

Actual gt allowable jefferson

Ready Sum=54837.84 NUM

Start Inb... Da... unt... Da... W... M... Ho... 5:37 PM

System Architecture

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Software Engineering

- Integration Problem
- Modularity
- Cost
- Development Time
- Maintenance
- Changing Data Formats
- Scalability

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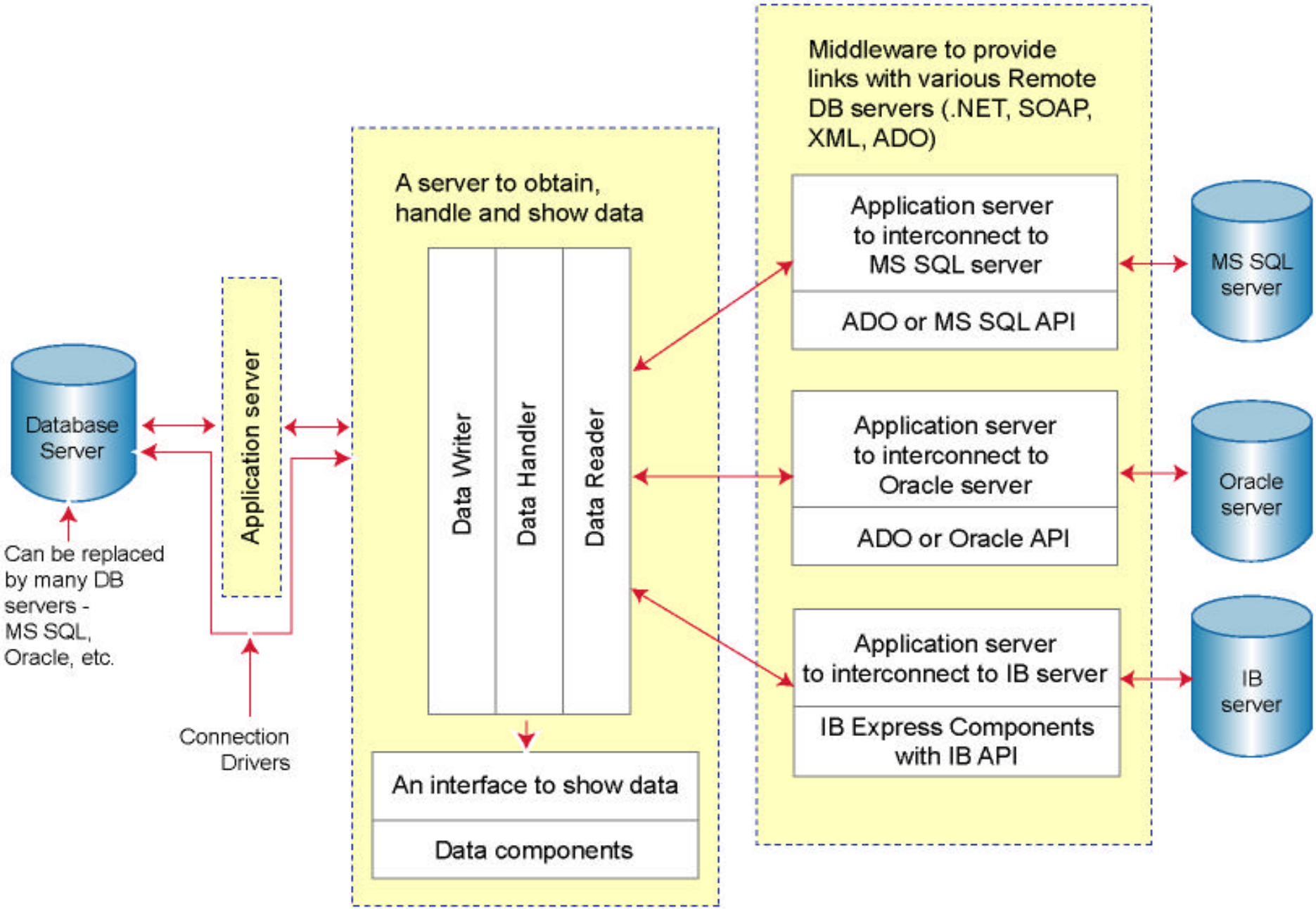
Middleware to provide links with various Remote DB servers (.NET, SOAP, XML, ADO)
A server to obtain, handle and show data
Application server to interconnect to MS SQL server
ADO or MS SQL API
MS SQL server
Application server to interconnect to Oracle server
ADO or Oracle API
Oracle server
Application server to interconnect to IB server
IB Express Components with IB API
IB server
Data Writer
Data Handler
Data Reader
An interface to show data
Data components
Application server
Database Server
Can be replaced by many DB servers - MS SQL, Oracle, etc.
Connection Drivers

Lan / Web Based

- Spatial and Temporal Database
- 100% Arc View Compatible
- Thick and Thin Clients

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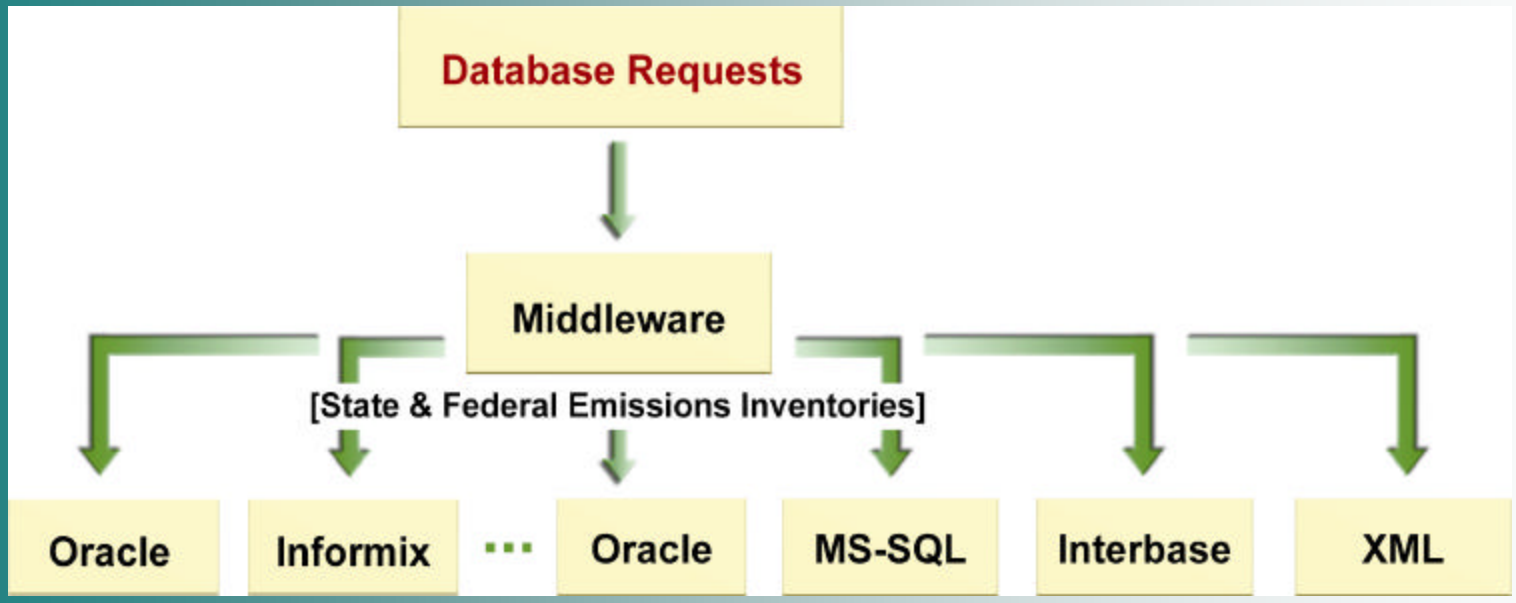
Scalable Architecture

- Desktop / Stand-Alone App
  - Client / Server DBMS Independence
  - Web & .NET
  - XML



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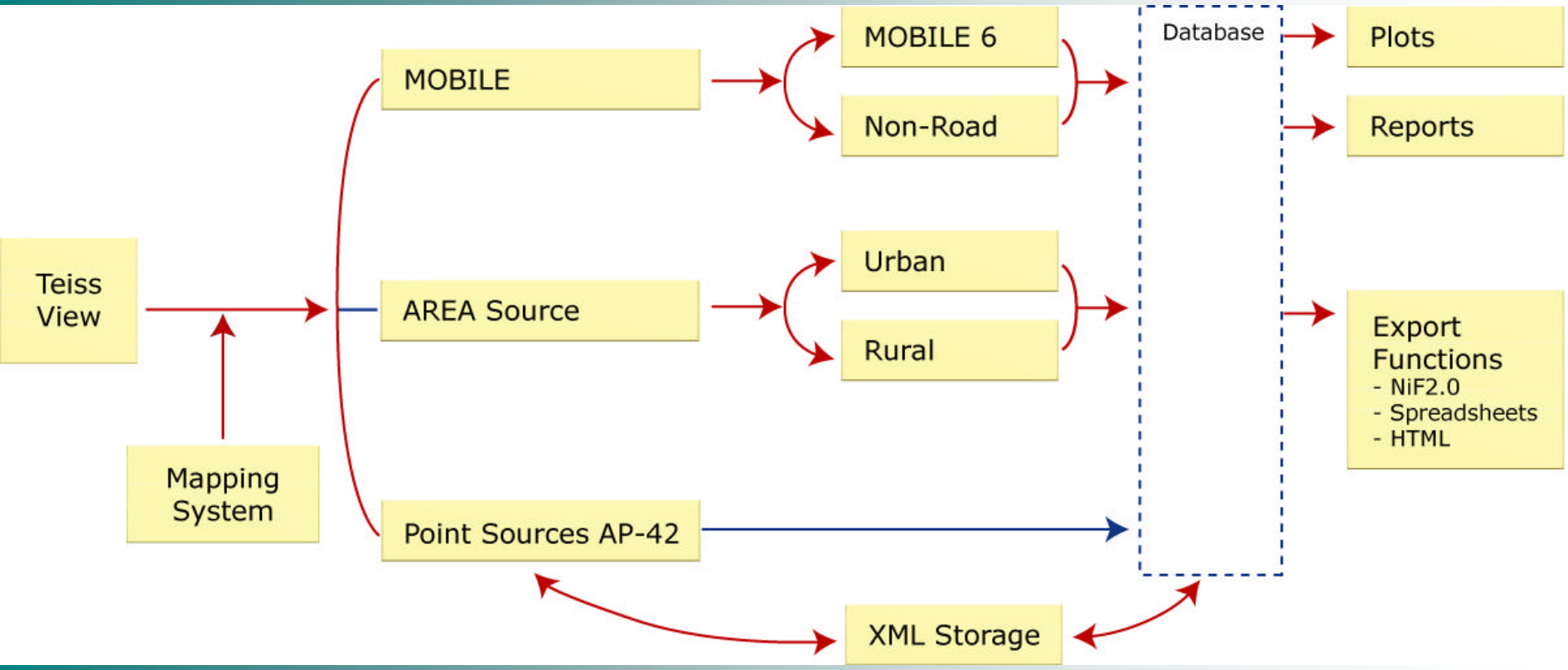
TEISS Software Components



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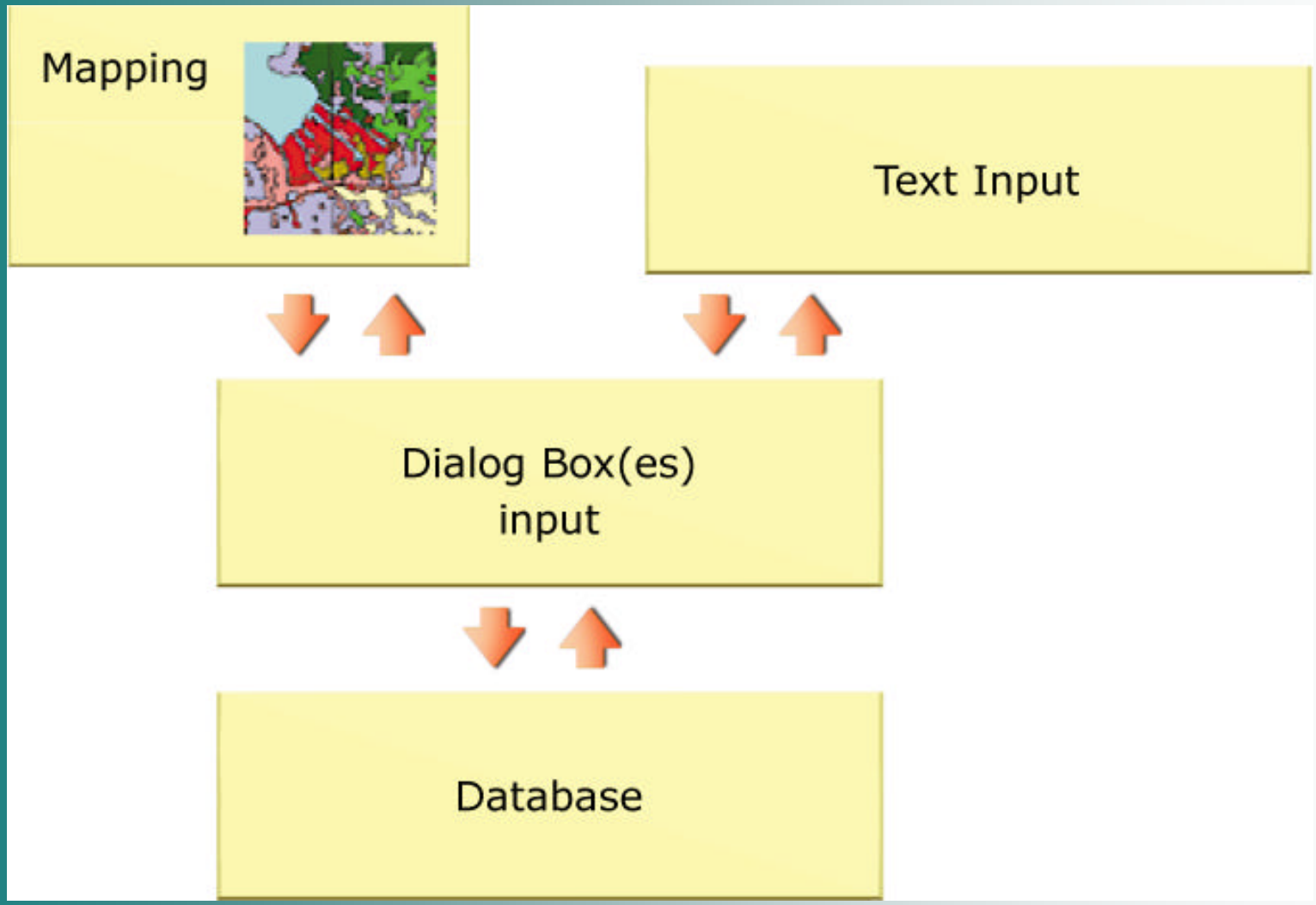
GIS and text input integration



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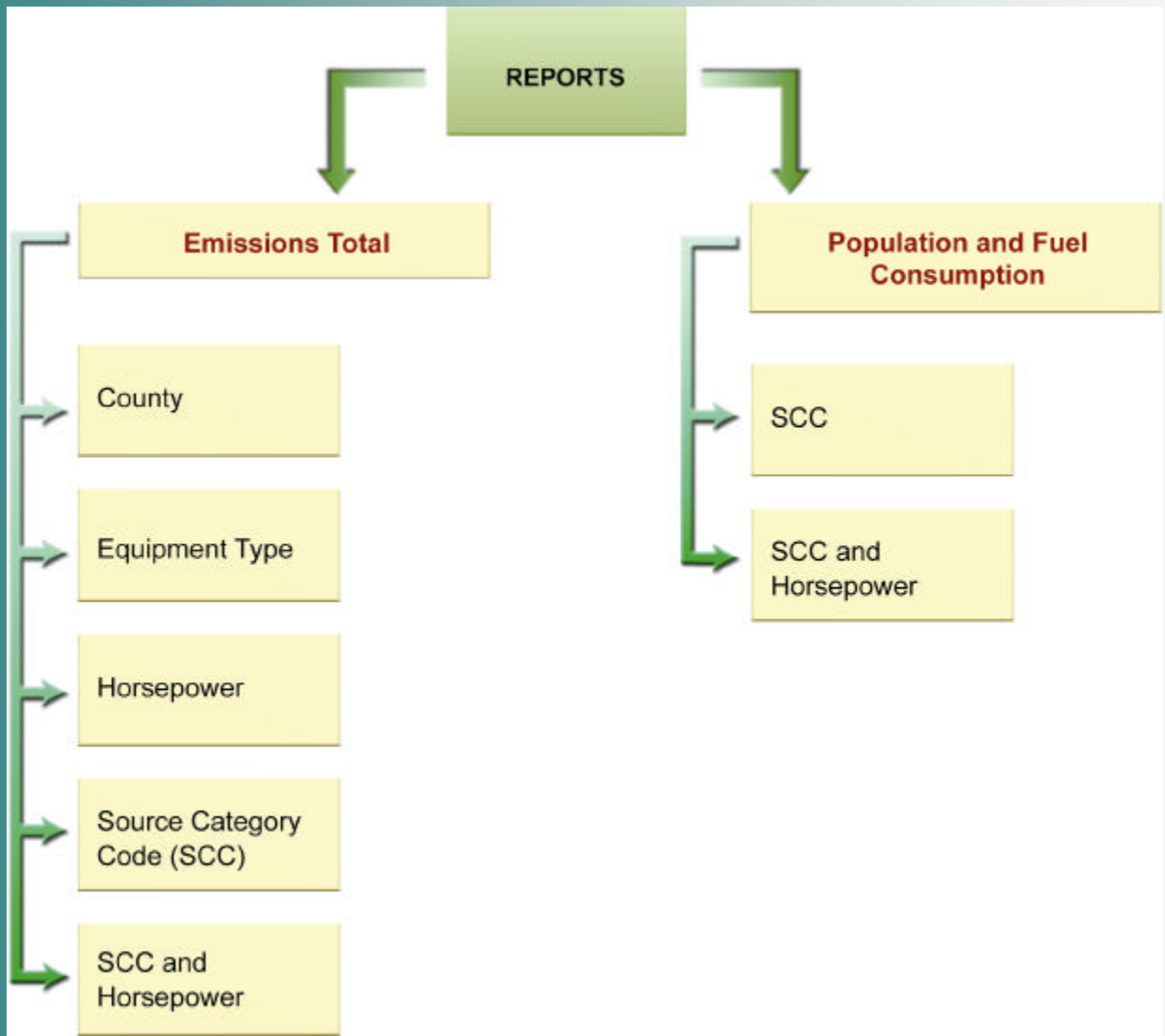
Reports



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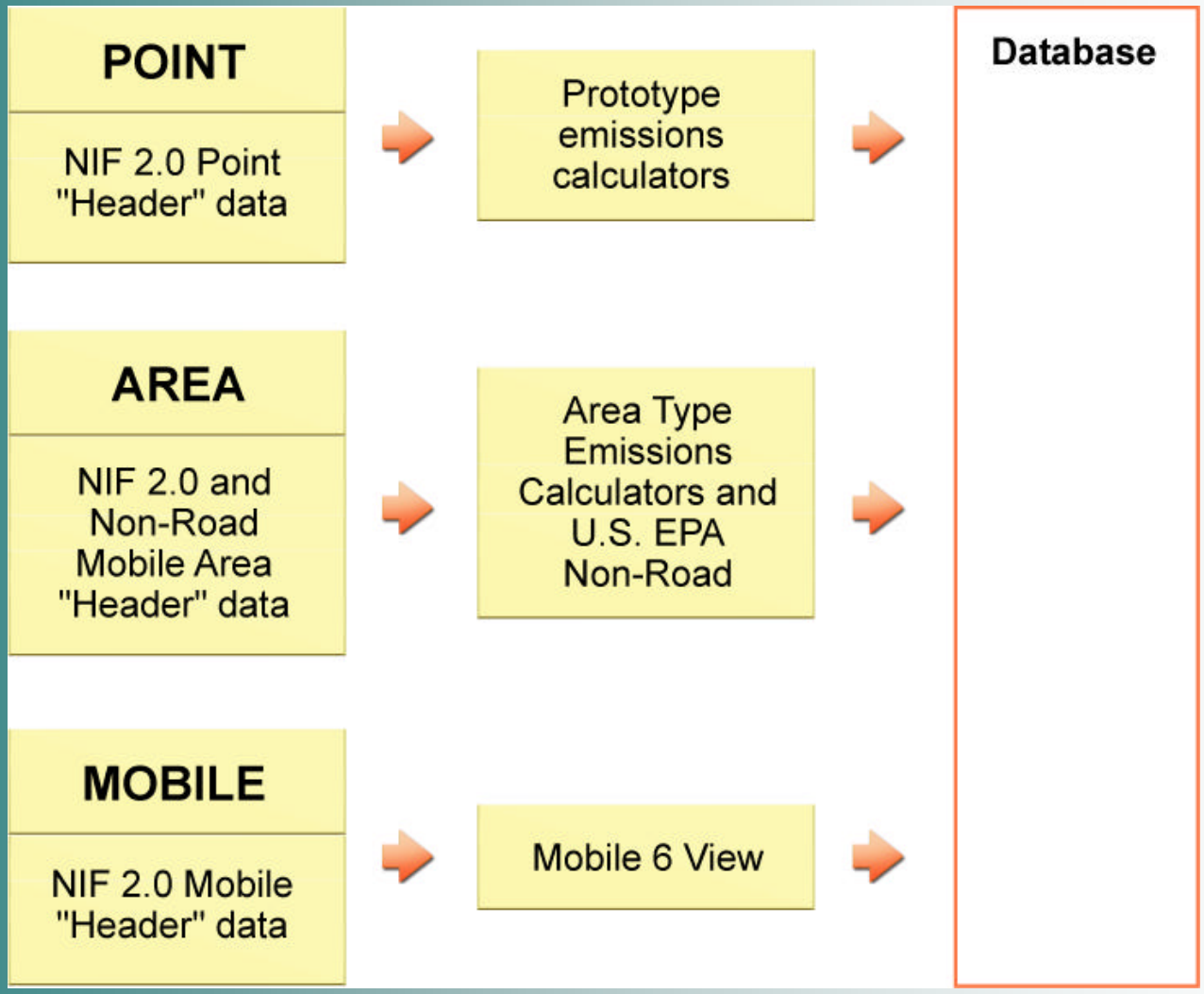
Database Structure

General Database Structure



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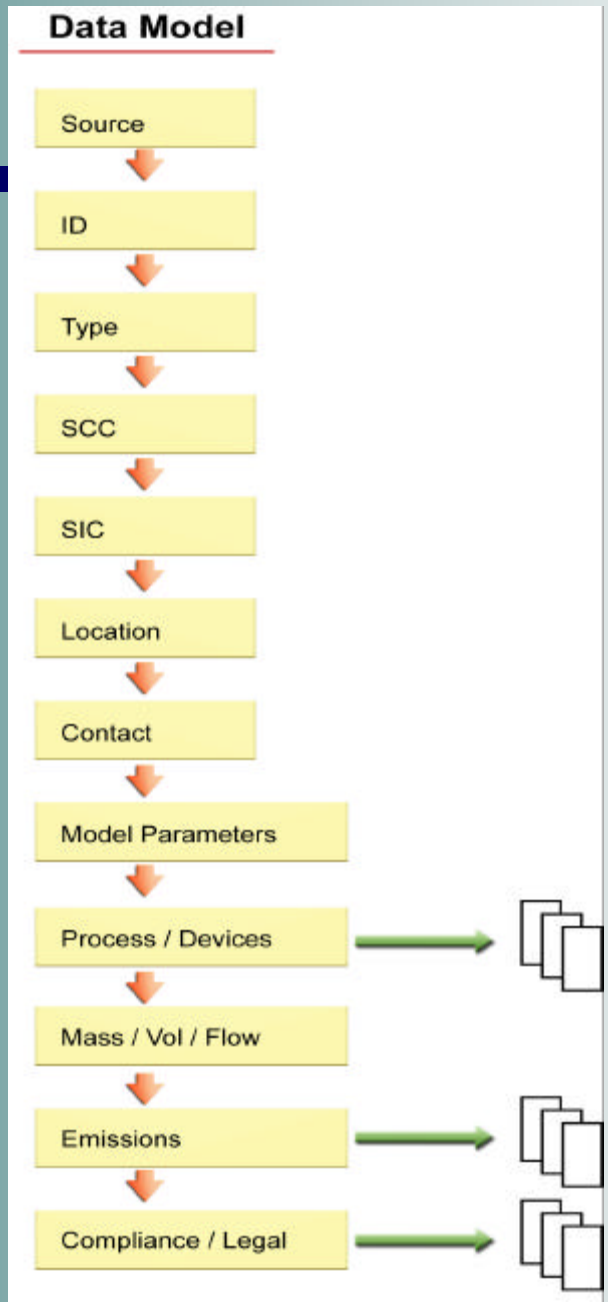
General Database Structure



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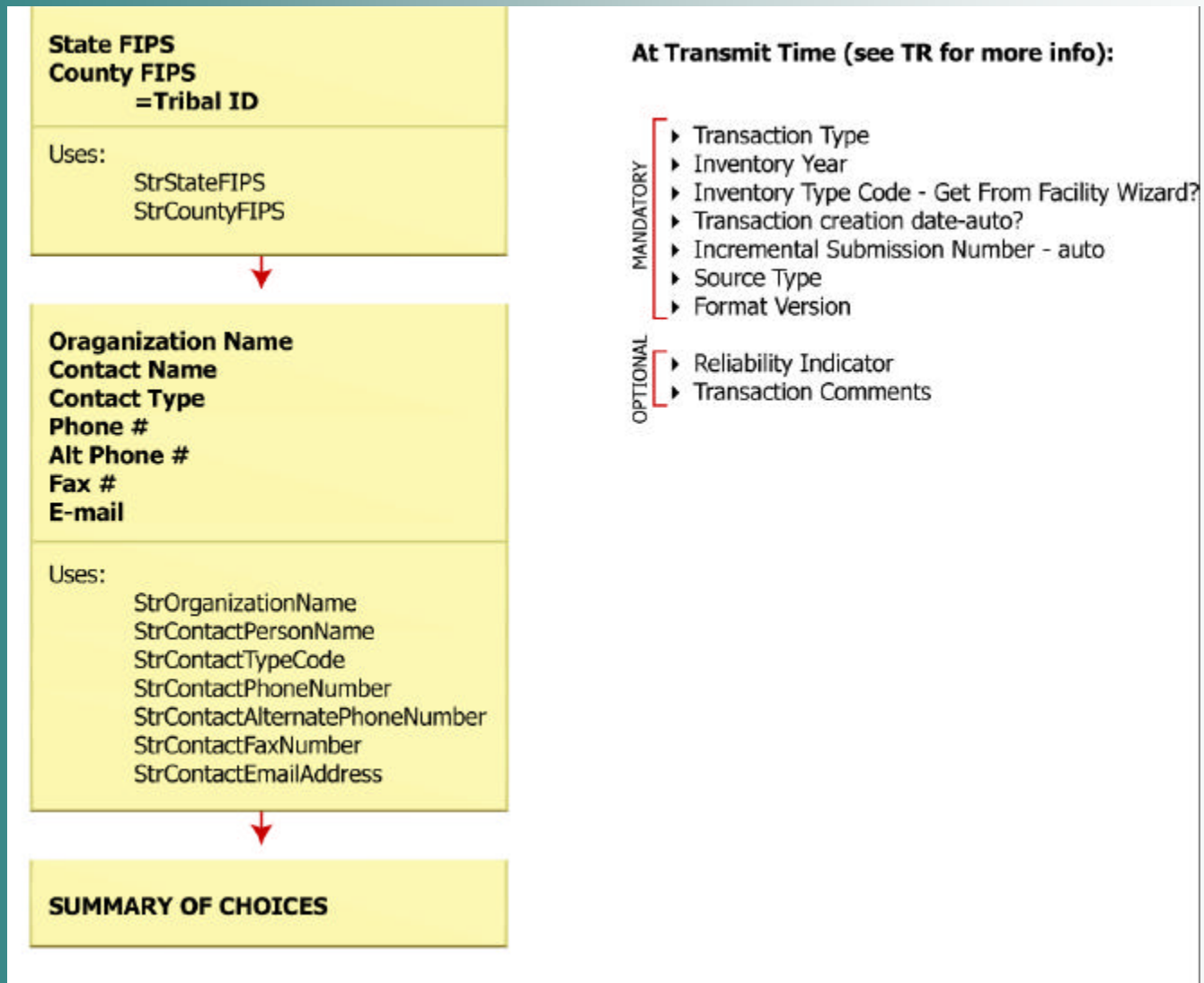
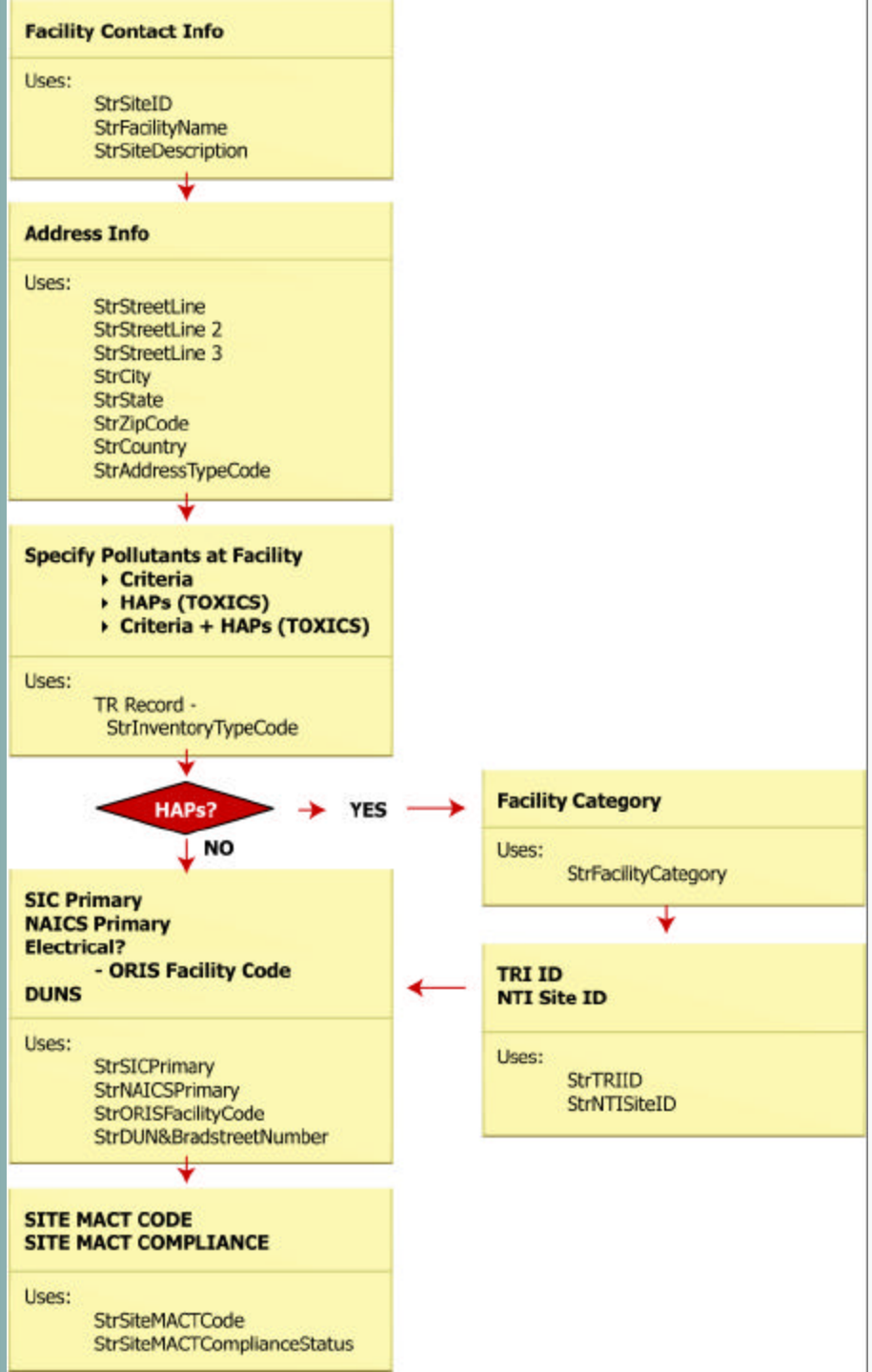
Tribal Land Data Flowchart



Facility Data



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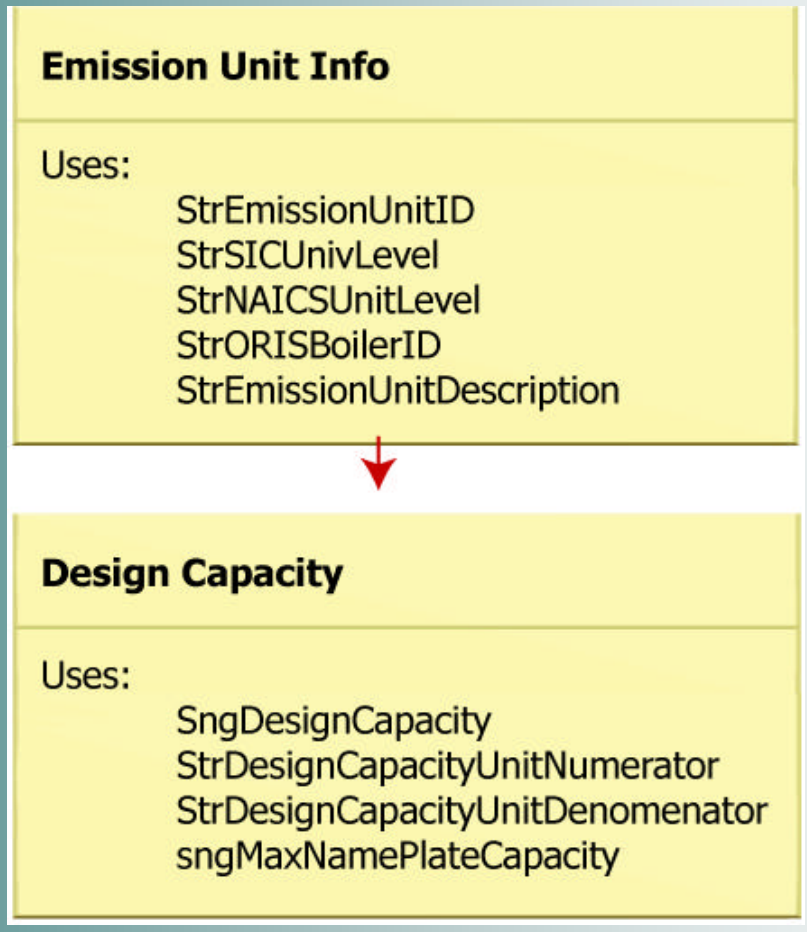
Emission Unit Data



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QA / QC

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QA / QC - Input

- Range Checks
- Missing Value Checks
- Statistical Checks
- Referential Integrity Guarantee

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QA / QC - Code

- Unit Testing – Automated
- Dedicated Software Testers
- Various "Code Checking" Products

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Data Entry Facilitation

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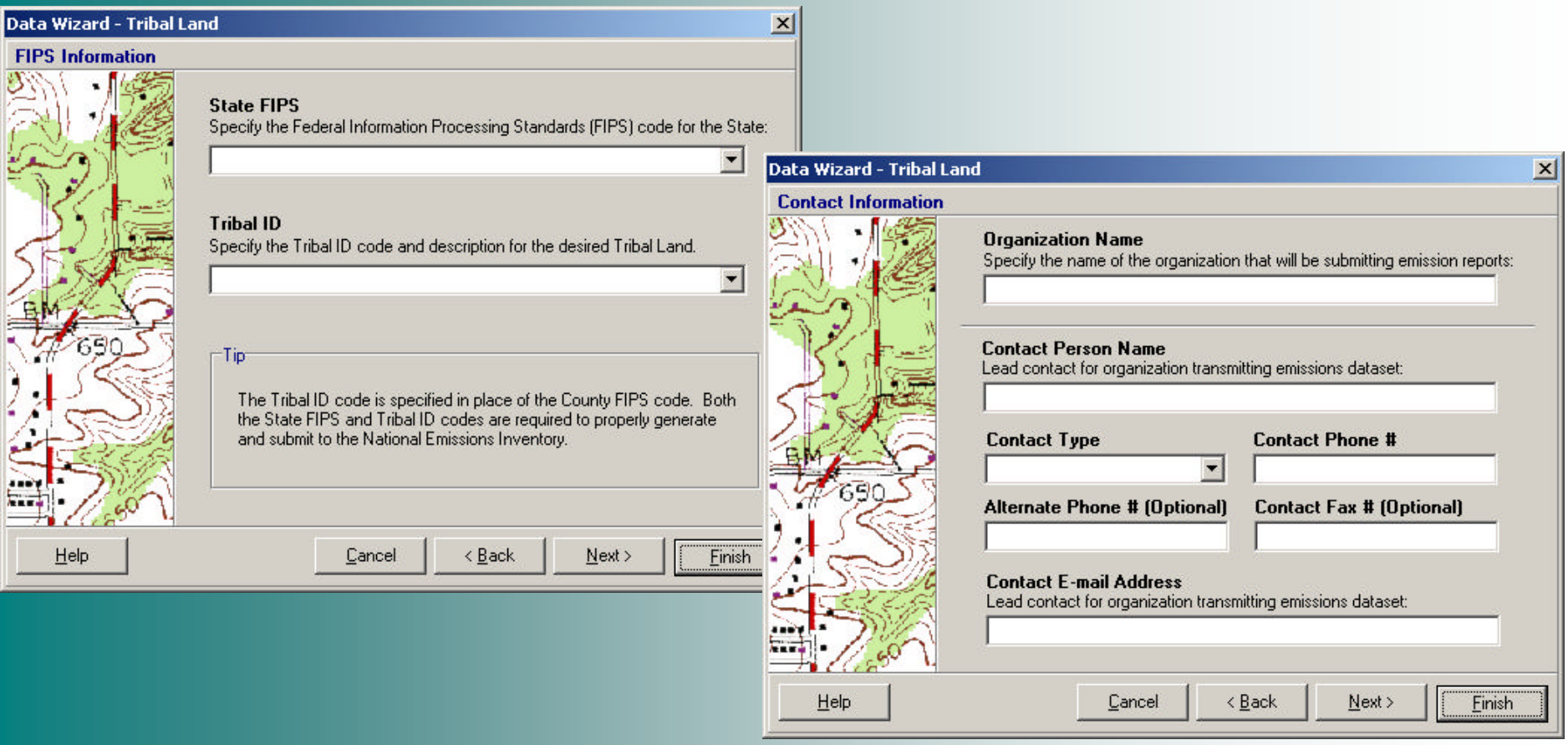
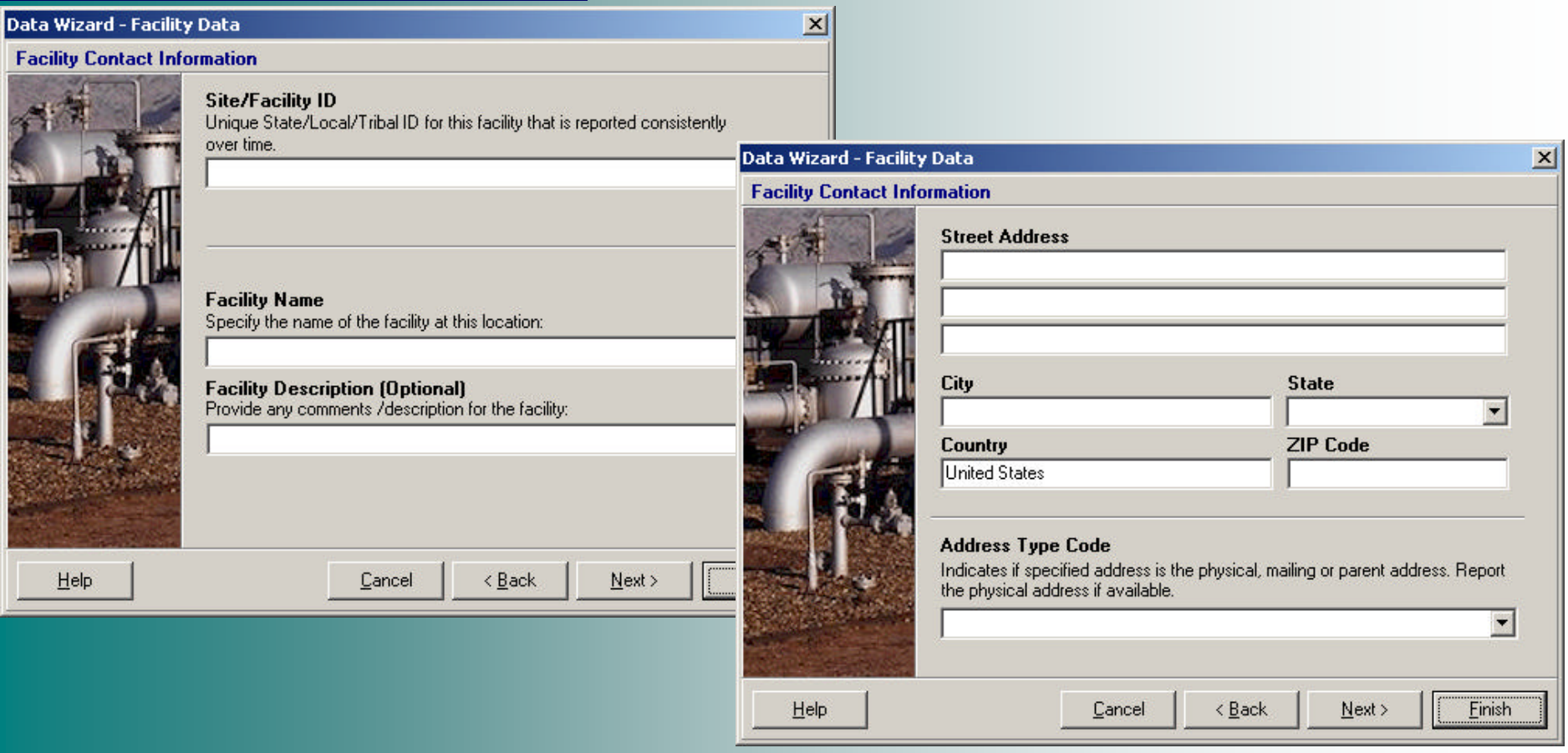
Tribal Land Wizard



Facility/Site Data Wizard



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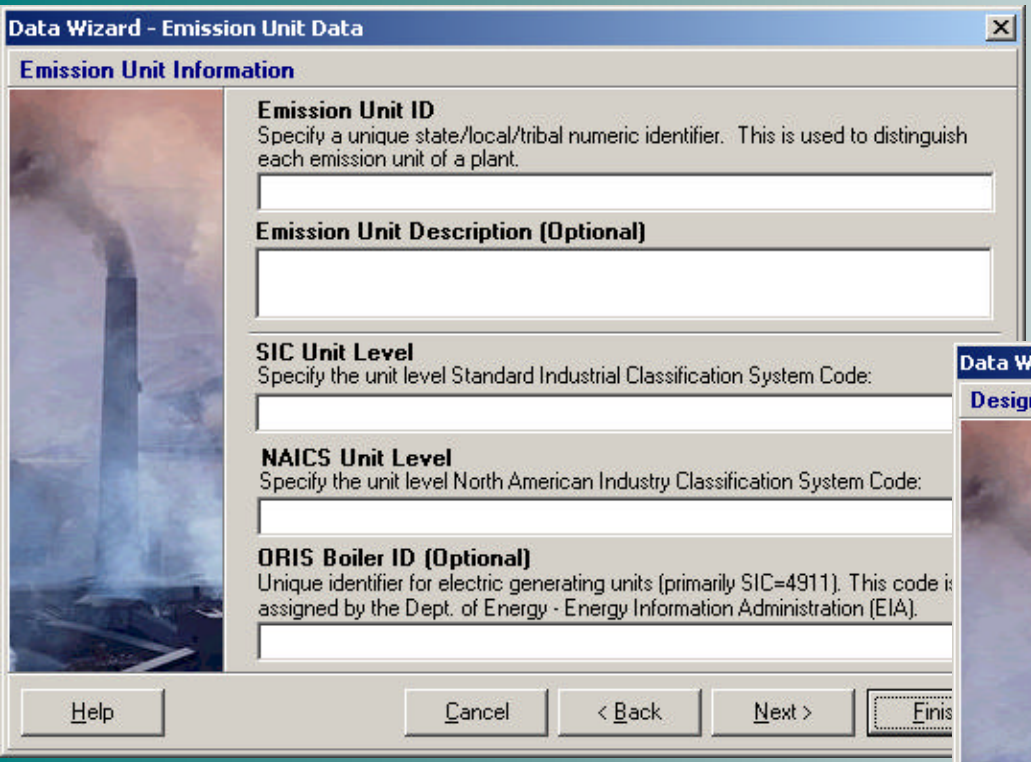
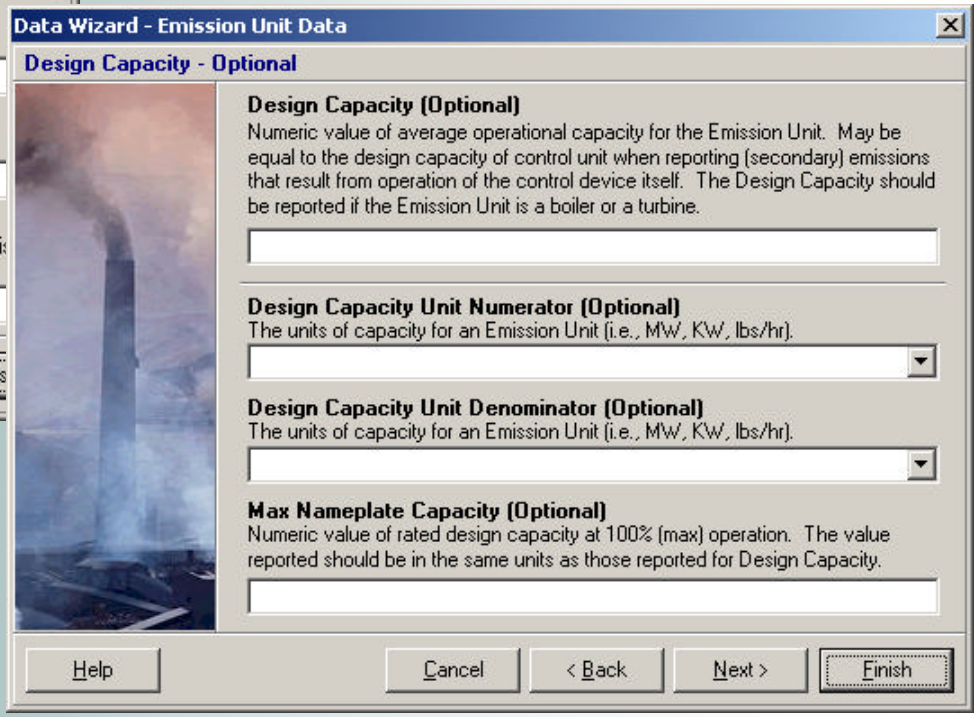
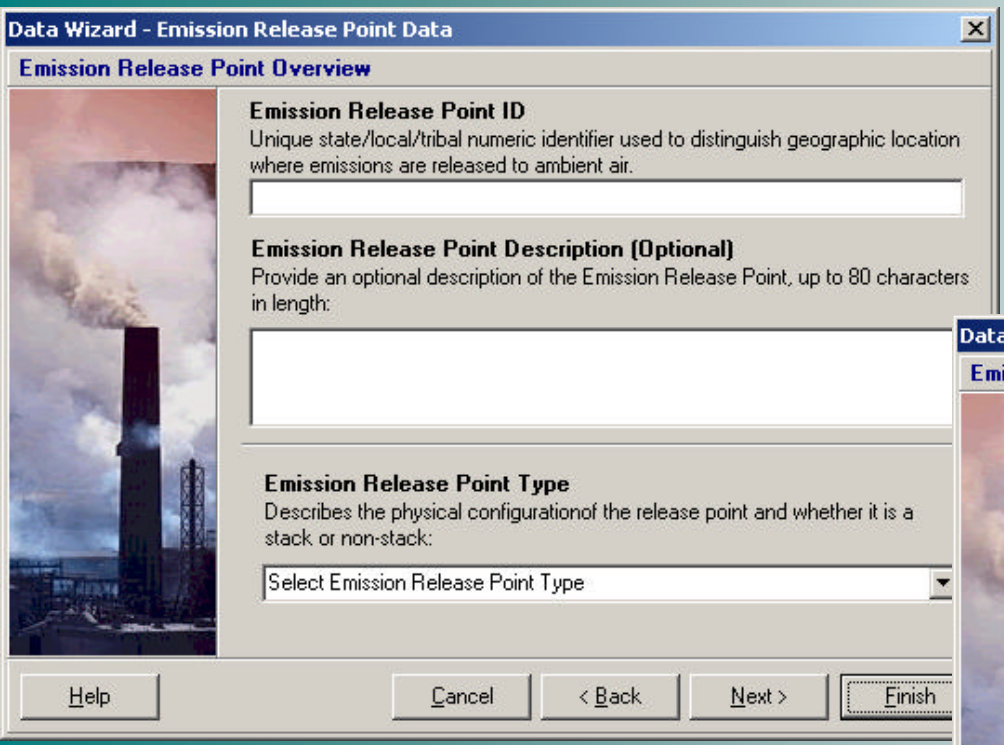
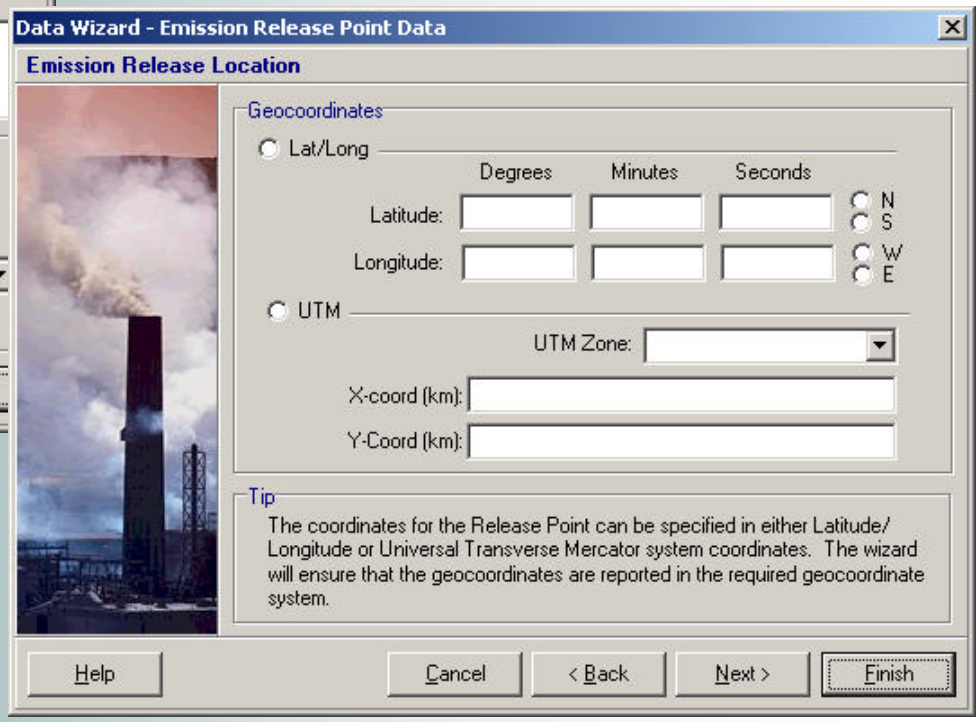
EMISSIONS UNIT WIZARD



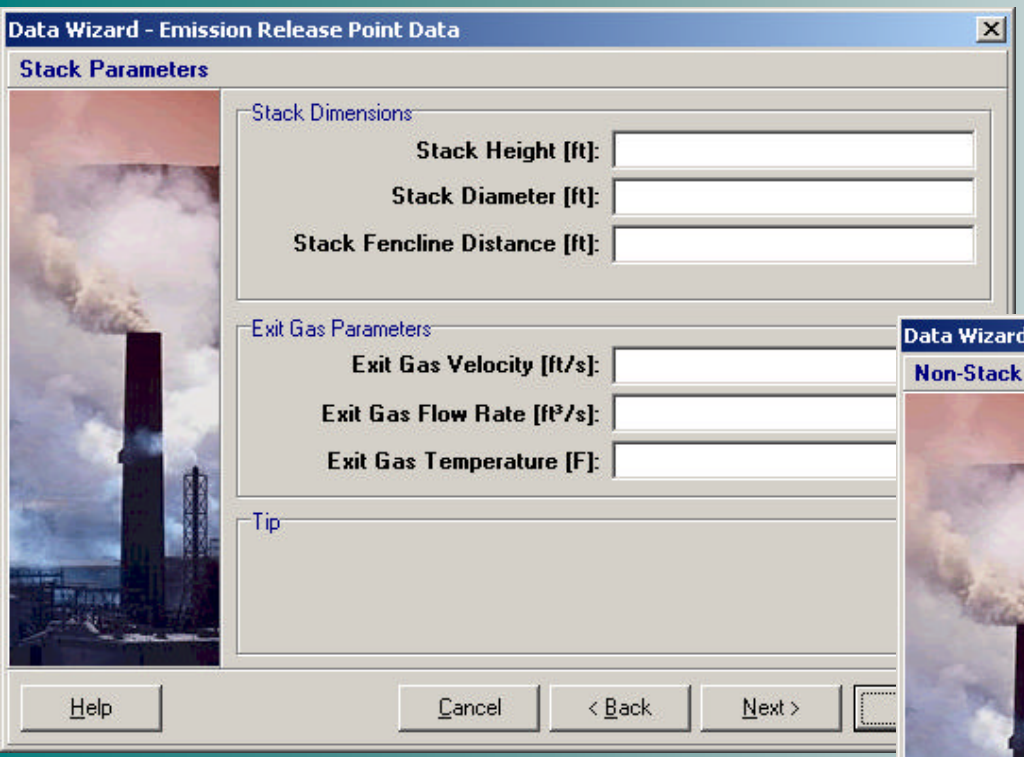


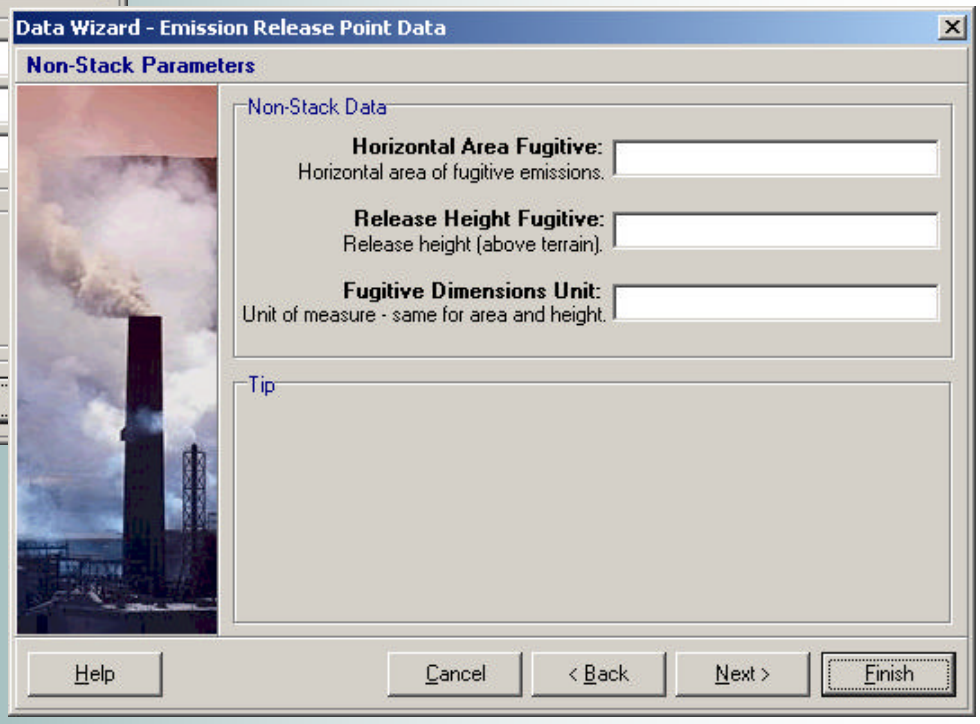
EMISSIONS RELEASE POINT WIZARD



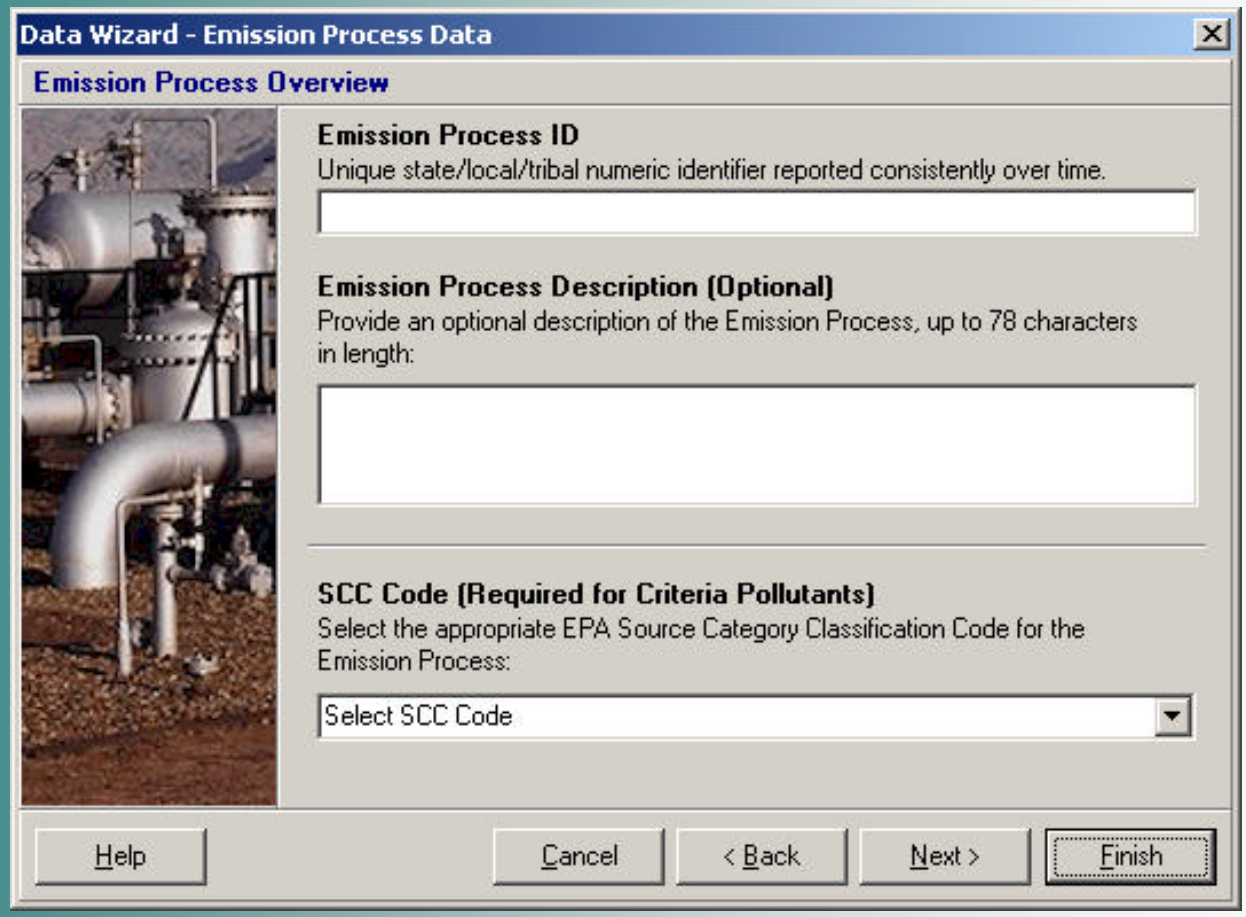


EMISSIONS RELEASE POINT WIZARD





EMISSION PROCESS WIZARD



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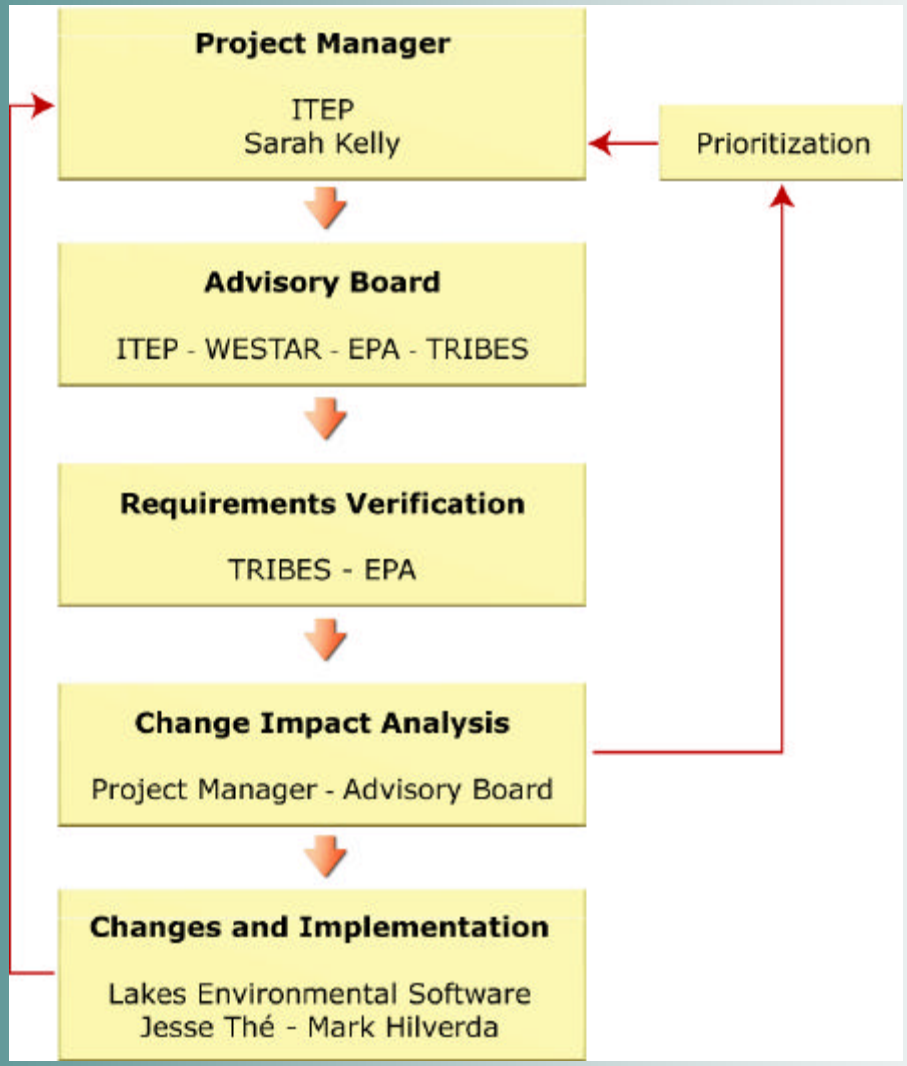
Change Management

Changes Initiated by ITEP



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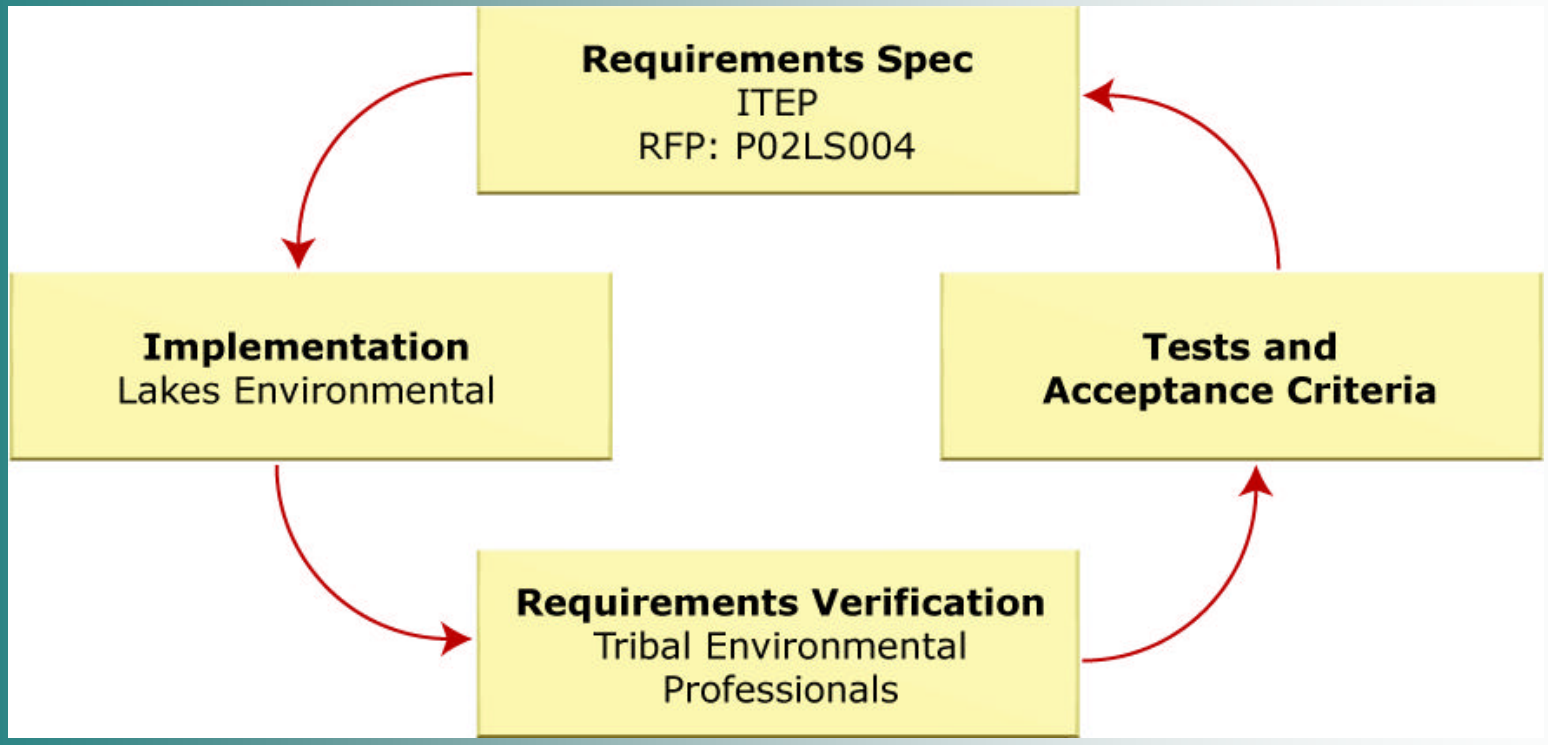
Acceptance of Specs Changes



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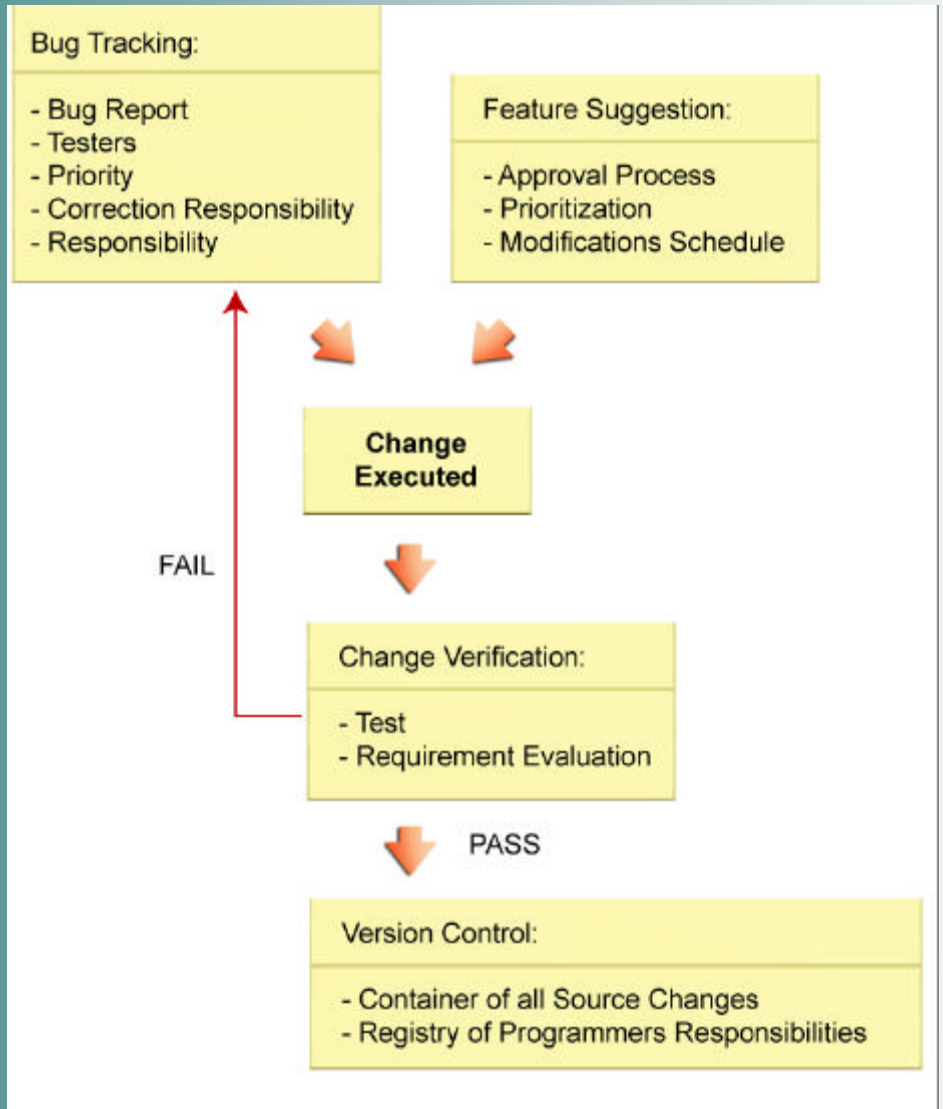
Corrections and Usability Enhancements



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Hands-On

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Closure

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Closure

- **Thank you for your time**

- **Steve@WebLakes.com**
- **Tel: (519) 746-5995**

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