

e-TOOLS Expert Toolbox

A New Initiative



What Are e-TOOLS

A set of engineering/scientific/managerial tools that could be used by OSM/State/Tribal staff to help evaluate SMCRA and AML related tasks.

Tools would use TIPS core software to address such activities as volumetrics, slope analysis, reprojecting geospatial data, plus many other tasks that are repetitive in nature.



What Can I Do With e-TOOLS?

- Volumetrics
- Data reprojection
- Contours from points
- Just about any geospatial function



How Are e-TOOLS Different?

User would not have to be an expert in the TIPS core software

Tools could combine operations from several software into a seamless operation.



E-TOOLS are FAST!!!



They reduce steps, automate repetitive actions and simplify operations

Where Do I Find Them?

The toolbox would exist on the TIPS web page and would contain a user friendly wrapper that would help the user through the process of executing a given tool.



Requirements

The user would need to have appropriate electronic data files to execute a given tool.

Many of the tools would require the user to input parameters needed for the task – i.e. a volumetrics tool would require the user to input the before and after surfaces along with a swell factor for calculating cut/fill volumes.



Requirements cont.

User must understand the process that the tool is performing – i.e. an engineer would have to understand how volumetrics are derived before running the volumetrics tool.

The user must understand and set the various output options that a tool may provide.

Tool would not replace “experience”.



How They Work

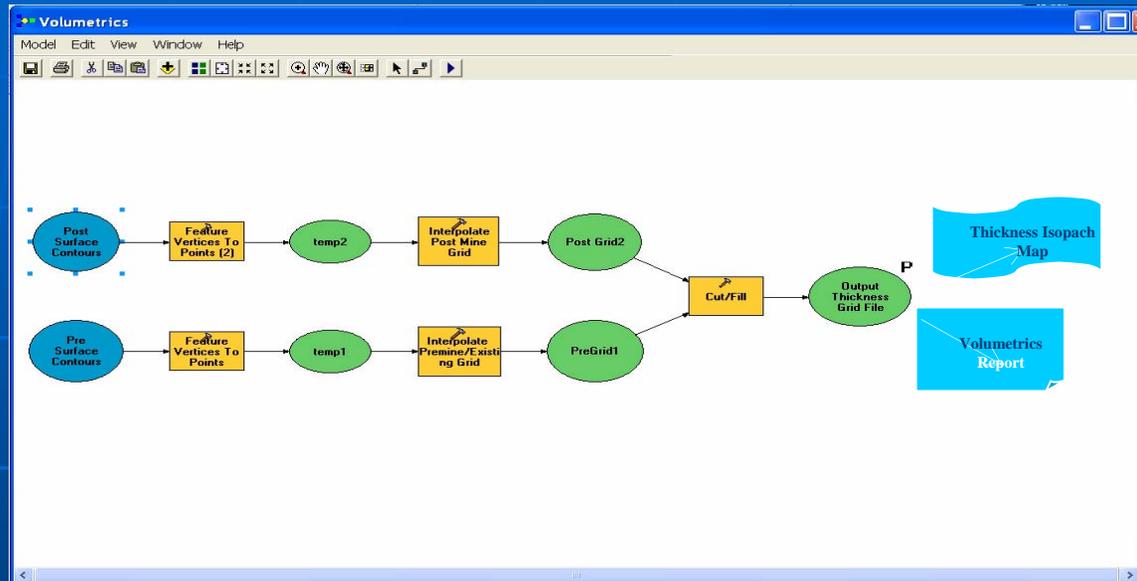
- **A wrapper is programmed in something like Visual Basic which would provide a help option for each tool along with examples.**
- **The tool may be constructed using such ArcMap's ModelBuilder, Scripting languages such as Python, and object orientated programming languages such as Visual Basic**

Basics cont.

- Users would have to standardize on certain methods of performing tasks that the tool would address.
- DATA – DATA – DATA Most if not all of the tools would rely on geospatial data as input. These tools would be greatly simplified and more user friendly if a standard format for the data was adopted.

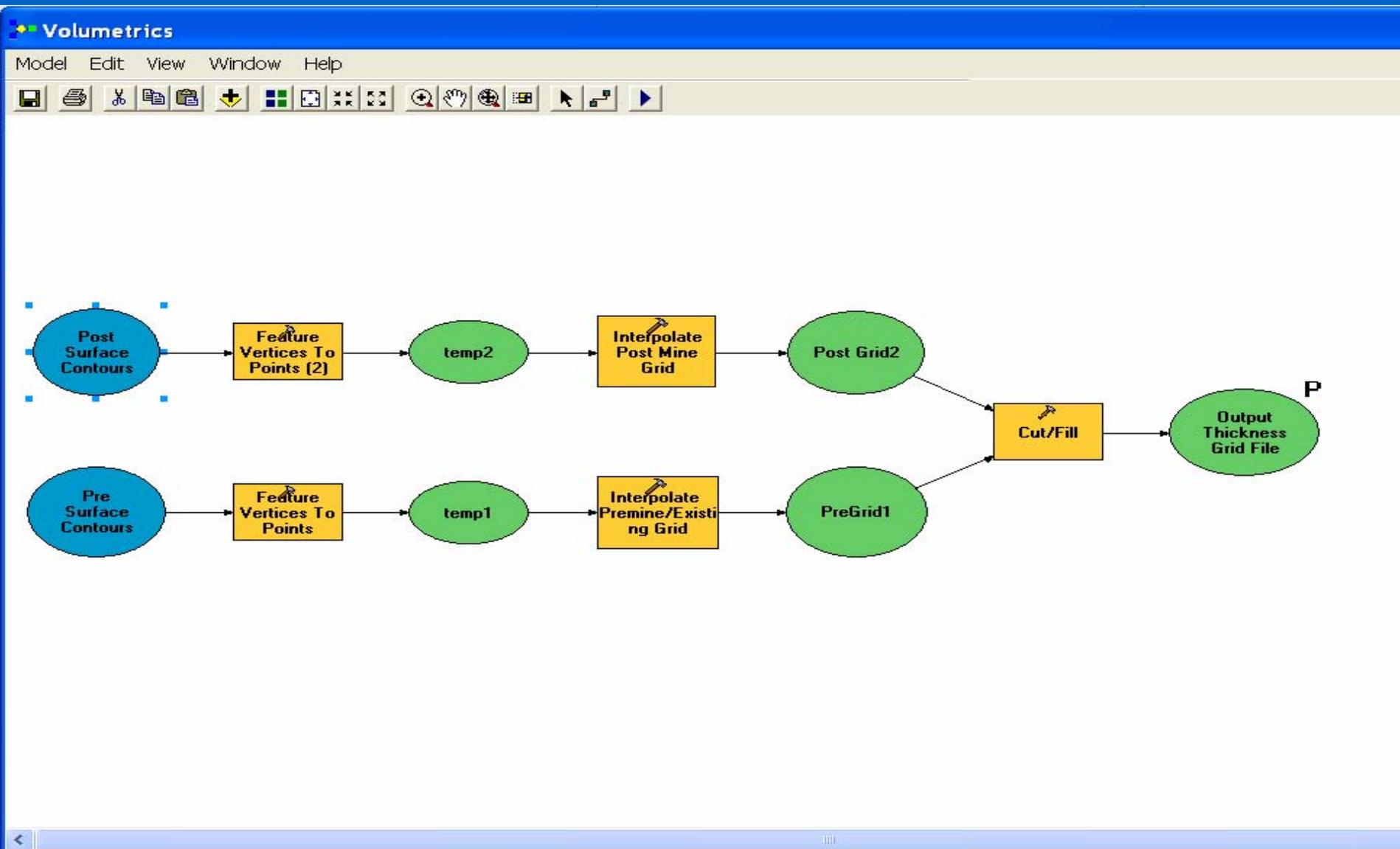
Example of a Tool

Volumetrics Tool



The above tool takes two contour files (before & after surfaces) and converts the contour lines into points. The point files are interpolated into grid files and then a grid-to-grids operation is performed to generate a thickness grid. A display script then generates either/both a cut/fill volumes report and a thickness isopach map.

Volumetrics Tool



A Comparison

(Using a volumetrics tool verses performing volumetrics within ArcGIS)

Major Geoprocessing Steps for Volumetrics using ArcMap and Spatial Analysis

1. Convert contour lines to points (ArcMap)
2. Interpolate grid file using points (Spatial Analysis)
3. Perform cut/fill volume analysis (Spatial Analysis)
4. Report out the cut and fill volumes (ArcMap)
5. Generate Thickness Isopach Map if required (ArcMap)



Steps for Calculating Volumetrics using a Tool

1. Select Volumetric tool from TIPS website
2. Input contour files and swell factor using tool dialog
3. Select output options using tool dialog

The user would not have to fire up ArcGIS and the Spatial Analysis extension as the wrapper would perform this function plus passing ArcGIS & Spatial Analysis the necessary parameters.

Users need less knowledge in Software usage – can concentrate on results and perform more what-if scenarios.



WV DMR & AML navigators

DMR Information Navigator

- A toolbar in ArcGIS/ArcMap
- Customized for DMR users

AML Information Navigator

- A toolbar in ArcGIS/ArcMap
- Customized for AML users

Both are placed in ArcGIS/ArcMap in Citrix servers.



West Virginia ArcGIS Navigator Toolbars

- ❑ Users are not GIS or computer professionals.
- ❑ Navigator toolbars:
 - ❑ Extend ArcMap functionality to incorporate mining business logic
 - ❑ Provide functions non-existent in ArcMap
 - ❑ Simplify geo-spatial operations in ArcMap



NM TAKE-A-MAP Tool

Datasets:

- mine permit boundaries
- areas seeded-by-year polygons
- areas disturbed-by-year polygons
- road networks for reference
- topsoil/topdressing stockpile locations
- sample site point locations
- background image(s) for reference in MrSID format

Standard ArcPad toolbars

Custom MMD Coal Toolbar w/ Proximity, Redlining, Select

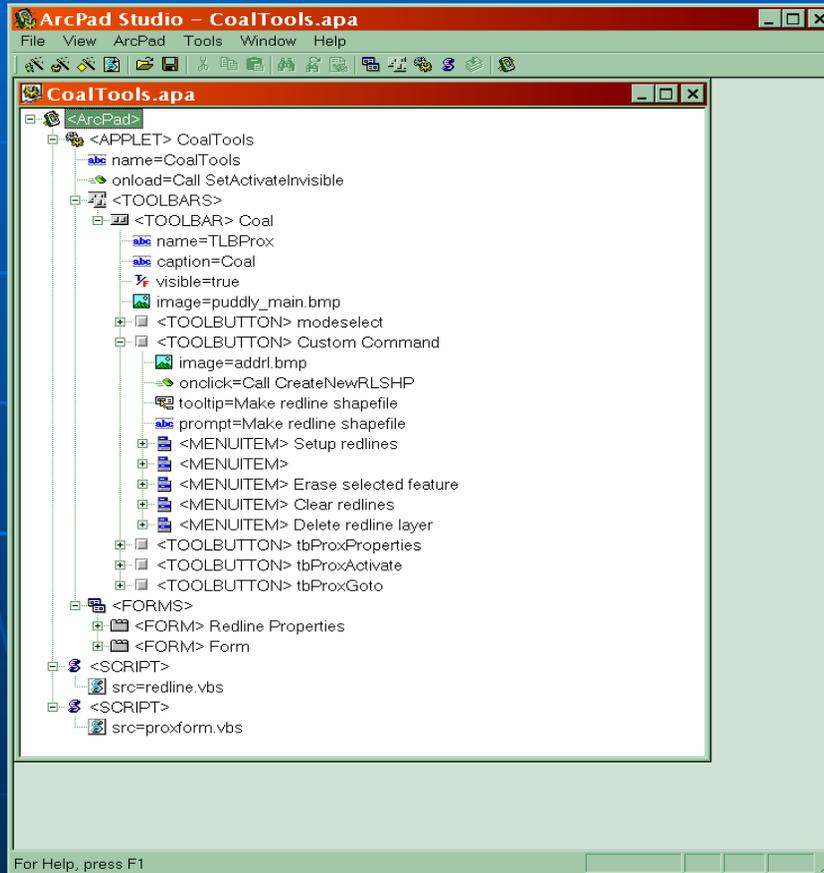
Custom Form associated with soil sample shapefile

Custom Forms & VBS for Proximity and



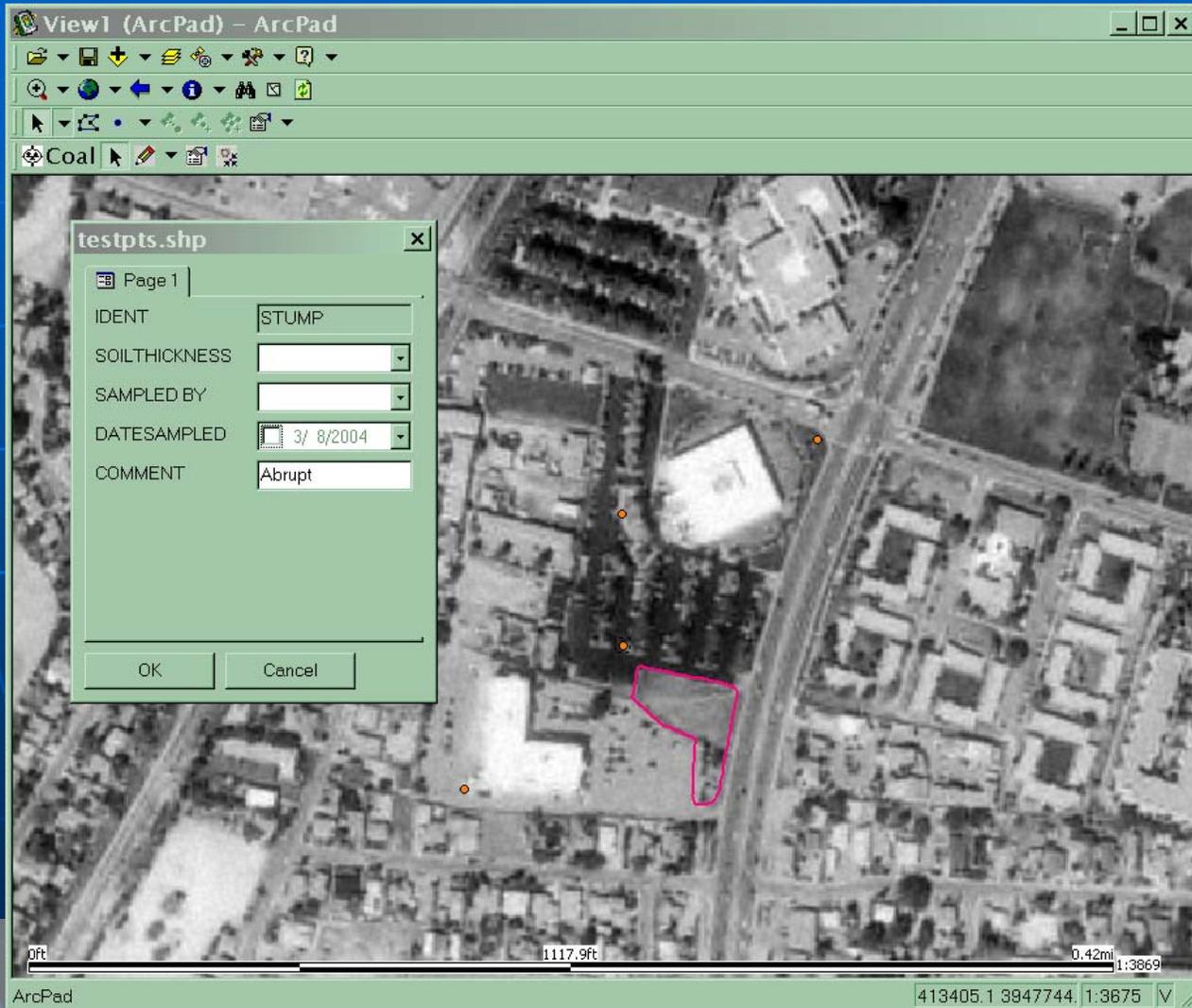
Application Development

Start Development in ArcPad, ArcPad App Builder, etc.

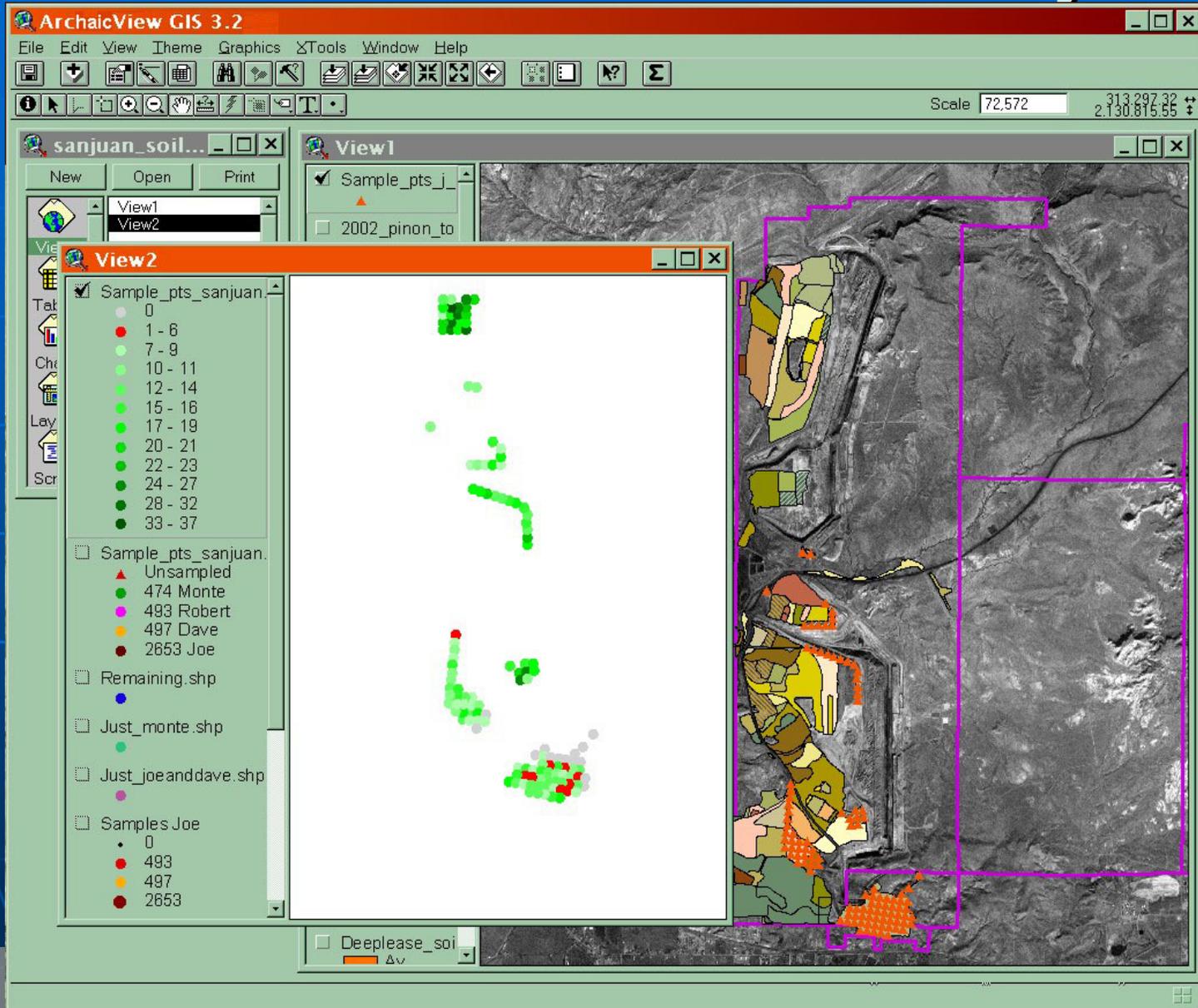


Application Development

Develop custom forms and functions



Results of Field Study



Cleanup” Using AutoCAD Map

A Step-By-Step Guide to performing
“Drawing Cleanup” of Spatial Data in
AutoCAD Map.

No. 3 in a series of NM EMNRD MMD Self-Help
GIS/CAD Guides

Rick Koehler, August 2005



Benefits

1. **User does not have to be an expert in various TIPS core software products in order to accomplish a given task.**
2. **Standardizes the methods used to address SMCRA or AML activities.**
3. **Creates an incentive for developing geospatial data and maintaining (stewardship) of the data**
4. **Creates a central location (TIPS web page) for using the various tools that could be developed.**
5. **Documents the method and provides on-line help in using the tool.**



So Why Am I Telling You This?

We Need You



Who Me?

We Need Folks in Your Organization

- Contribute tools
- Suggest new needs
- Communicate successes



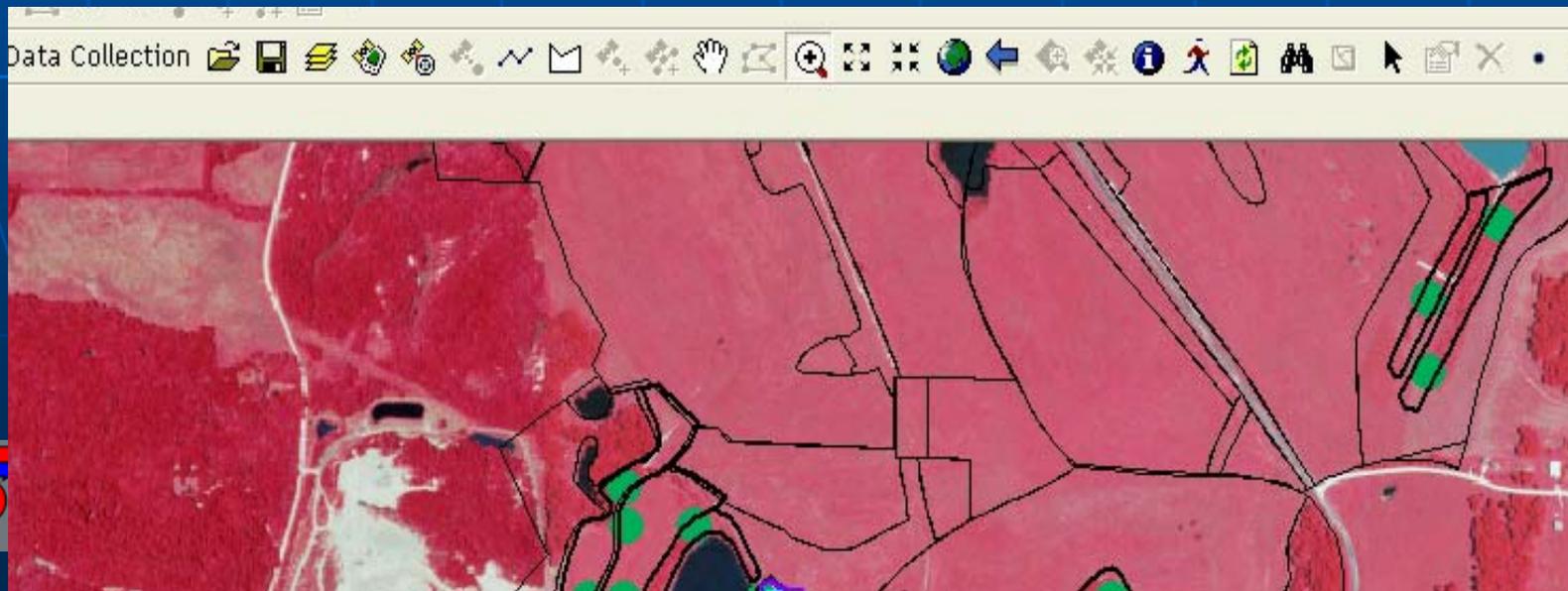
We Need A Team

- Work Through the Idea
- Develop a Web Site
- Evaluate SMCRA Operations
- Work With Peers in States and OSM to get tools in public workspace
- Develop new e-TOOLS
- Make it Happen



Quality Control

- capture tools
- refine them
- test them
- and make public



Questions

