

Using PEAC-WMD Shapefiles

I've discussed and given examples in recent newsletter articles of how shapefiles are displayed on the PEAC Mapping Tool that is integrated into the PEAC-WMD application. This month I'll discuss a few more details that may be useful for those users that have access to other mapping or GIS (Geographic Information Systems) tools that can import shapefiles.

With the release of PEAC-WMD software (version 5.5), AristaTek added a useful resource integrated into several computational tools in the application - the ability to display a calculated exclusion zone or standoff distance on a street map. The result was a graphical representation of a hazard zone, represented by the appropriate polygon (circle or multi-sided figured) laid over a street map.

The PEAC Mapping Tool was designed to provide very basic features and was not intended to be a user's primary mapping or GIS application. Rather the tool was to provide the user with a quick representation of the calculated hazard zone displayed to scale on a street map without the user having to exchange or transport information between multiple applications. Nevertheless AristaTek has had numerous requests on how can the hazard polygon be captured or the information ported to another application?

Shapefiles Background

I'm not an expert on shapefiles but I can provide some very basic information on what they contain and how they are organized or stored within the PEAC-WMD application.

The shapefiles and their format were developed and established by Environmental Systems Research Institute, Inc. (ESRI), 380 New York Street, Redlands, CA 92373-8100 USA, which is a major commercial developer of GIS and mapping applications. The information stored in the shapefiles is not related to topological features but is related to some multi-sided geometrical figure (polygon) that represents a point, line or area feature to be displayed on a map. ESRI provides a white paper written in 1998 that describes the format of the shapefiles and can be found at: <http://www.esri.com/library/whitepapers/pdfs/shapefile.pdf>.

As described in the white paper, an ESRI shapefile consists of:

1. A main file in which each record describes a shape with a list of its vertices.
2. An index file where each record contains the offset of the corresponding main file record from the beginning of the main file
3. A dBASE table that contains feature attributes with one record per feature.

The prefix name for all three files is the same and the suffix for the main file is ".shp," the suffix for the index file is ".shx," and the suffix for the dBASE table is ".dbf."

Many mapping and GIS application allow importation of a shapefile via an import or other utility provided in the application. If a reader has a separate mapping or GIS application, then the User's Manual or Help topics should provide some guidance to how this feature is accessed.

When the shapefiles are written to the local hard drive, all three files are typically displayed, e.g., *prefix_name.shp*, *prefix_name.shx* and *prefix_name.dbf*. Most mapping or GIS applications will allow the user to import the shapefile by providing a browser window that searches the available network folders and selects the desired file to be imported. Sometimes the browser will only display the *.shp files in the folder and not display the associated *.shx or

*.dbf files, while others will display all three associated files. Typically the user selects the *prefix_name.shp* to specify which shape file is to be imported and the mapping or GIS application will automatically access the required information from the other two associated files. Usually there is no need or requirement to copy or move the files to a new folder location, at least that has been my experience.

The PEAC-WMD shapefile organization

To help the user find the specific shapefile they want to import to the separate mapping or GIS application the following discussion will explain how the PEAC-WMD application names and stores the shapefiles it automatically generates when the computational tools are executed.

The shapefiles are all automatically stored in the following folder:

C:\Documents and Settings\USER_NAME\My Documents\PEAC\Results\Shapes

Your path will vary slightly, depending on your USER_NAME.

Figure 1 is a screen capture of the Windows Explorer for this folder on my PC.

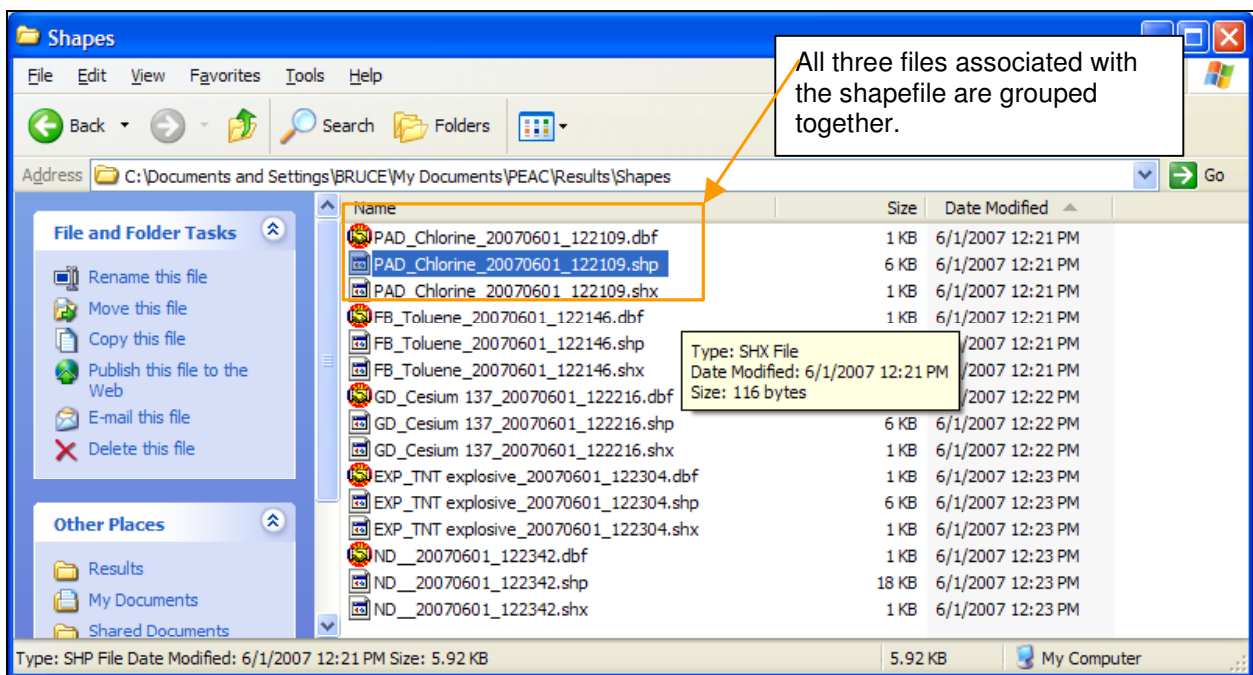


Figure 1 – Windows Explorer screen capture for some shapefiles on the author’s PC

I’ve intentionally created five (5) different shapefiles that correspond to the current five computational tools provided in the PEAC-WMD application that generate shapefiles as part of their calculations. The reader should notice that for the three files in the box in Figure 1 all have the same prefix name “PAD_Chlorine_20070601_122109”, and there are the three (3) separate files discussed earlier, the *.shp, *.shx and the *.dbf files.

The individual computation tools and the protocols they use to create the prefix name are as follows:

1. The Protective Action Distance or PAD Calculator (plume modeling) use the “PAD_” to start all prefix names. Then the first 19 alphanumeric characters for the hazardous substance name are added, then the time stamp as date (yyyymmdd) separated by “_” from the time (hhmmss) to complete the prefix name.
2. The Fireball Calculator uses the same naming protocol as the PAD but uses “FB_” rather than the “PAD_” beginning.
3. The Gamma Dose Calculator uses the same naming protocol as the PAD but uses “GD_” rather than the “PAD_” beginning.
4. The Explosion Calculator uses the same naming protocol as the PAD but uses “EXP_” rather than the “PAD_” beginning.
5. The Nuclear Detonation Calculator doesn’t use a hazardous substance name and only has the time stamp but uses “ND_” rather than the “PAD_” beginning.

As shown in Figure 1, when there are a limited number of shapefiles in the folder, it is pretty easy to pick out the desired polygon to import into another application but if there are a large number, then finding the proper shapefile requires the user to be “on their toes.”

The simplest method is to sort the list of associated shapefiles by date if you know when the computational tool was executed and the shapefile was created. Then select the specific shapefile and import it to the separate mapping or GIS application.

If readers have questions regarding accessing the shapefiles, please contact AristaTek Technical Support at (toll free) 877-912-2200 or 307-721-2126 or via e-mail at support@aristatek.com.