Creating an RPI Compliant Geodatabase using SDSFIE Release 2.600

PURPOSE: Release 2.600 of the SDSFIE specifically targets the addition of two content areas. These are Real Property Inventory and Levee Database. The Real Property Inventory (RPI) is an initiative of the Defense Installation Spatial Data Infrastructure (DISDI) and couples a geospatial component into the Business Enterprise Architecture (BEA) for Property Management within the DoD.

The model requirements for the spatial component of RPI have been incorporated into the SDSFIE for Release 2.600 and the ESRI Geodatabase Tools included in the SDSFIE Toolbox can now create the required Feature and Object Classes to begin loading RPI data. This document is intended to provide detailed, step by step instructions on the creation of the Geodatabase, the addition of Metadata, the construction of the Relationship Classes, the tailoring of Domain Enumerations, and the coding of the Topology Rules using any of the ArcGIS© 9.x series software by ESRI.

REQUIREMENTS: While Release 2.500 SDSFIE Tools will construct the Geodatabase for RPI using a Release 2.600 Library, several new capabilities and constructs within the SDSFIE Library and Tools permit greater flexibility in producing a Geodatabase that more specifically matches RPI Specifications. These include:

A New SDSFIE Alias: Earlier Releases of the SDSFIE used an alias structure derived from an SDSFIE property called COMMON NAME. This COMMON NAME adhered to some very rigorous constraints and produced aliases that were less user friendly and, in some cases, unwieldy. It was always possible to repeat the ATTRIBUTE NAME as the alias, but this provided little additional information, since ATTRIBUTE NAMEs were constrained to 10 characters. The new alias property matches the field names provided in the DISDI model, helping to clearly identify and correlate fields to the BEA.

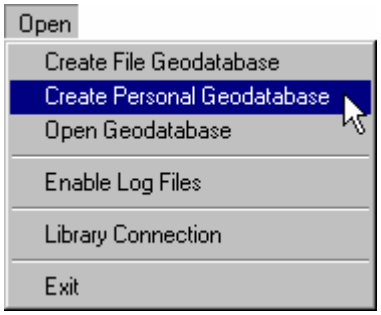
Tailored List Domains: Prior to Release 2.600, it was never possible to automatically modify the contents of a List Domain to restrict certain List Domain Values. Because the RPI enumerations restricted the List Domain Values, it was desirable to allow the SDSFIE Toolbox to limit the List Domain values to a subset of the entire domain. Thus, the d_boolen List Domain for RPI contains ONLY "Y" and "N", rather than the complete list of permissible Boolean values; e.g. "T", "F", "Yes", etc.

Thus, while the Release 2.500 Tools will create the fundamental structures required of RPI, a number of additional manual manipulations of those Geodatabases is still required. The first part of this document will describe how to perform the operation using the Release 2.600 Tools, an addendum will provide the steps to modify that Geodatabase using a combination of a Release 2.600 Library and Release 2.500 tools.

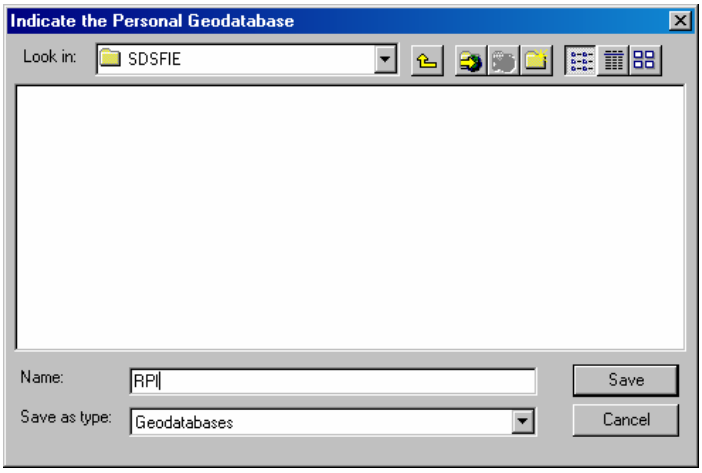
CREATING AN RPI GEODATABASE: These steps make the assumption that Release 2.600 has already been installed and that the user has some familiarity with the terminology associated with the SDSFIE, including the names and general functionality of the SDSFIE Tools. In order for the Geodatabase Builder to function correctly, ArcGIS must be installed (ArcGIS 9.n) and the license level must be ArcInfo or ArcEditor.

Step 1 – Creation of a Geodatabase (Use SDSFIE Tool Geodatabase Builder)

Step 1a: Create the Geodatabase



From the Master Menu, select Open -> Create Personal Geodatabase as indicated (right). This menu item is used for creation of a Geodatabase. Because of changes in ArcGIS 9.2, an option has been added to "Create File Geodatabase". If using an older version, this option will be diabled. A dialog similar to the one below is shown to navigate to the directory desired and allows from input of a Geodatabase Name ("Sample RPI" shown).

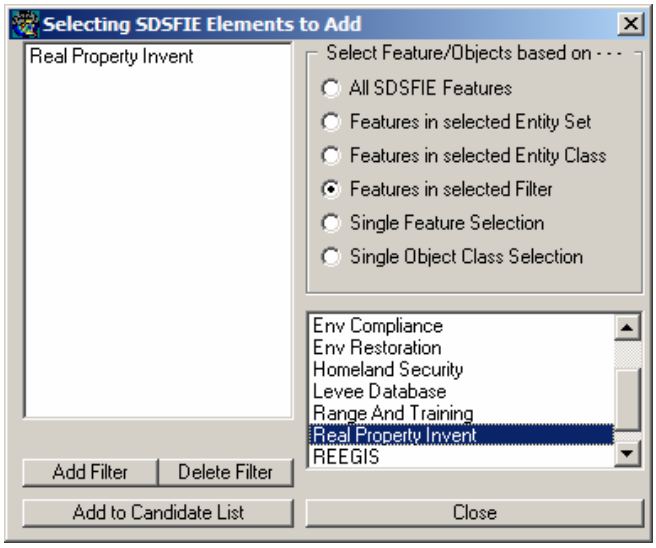


Clicking the Save button will create the Personal Geodatabase indicated. For creation in an SDE environment, have your SDE Administrator create the Owner (and Database if required), then create a connection in ArcCatalog. This connection can then be used in the dialog (left) to connect to SDE.

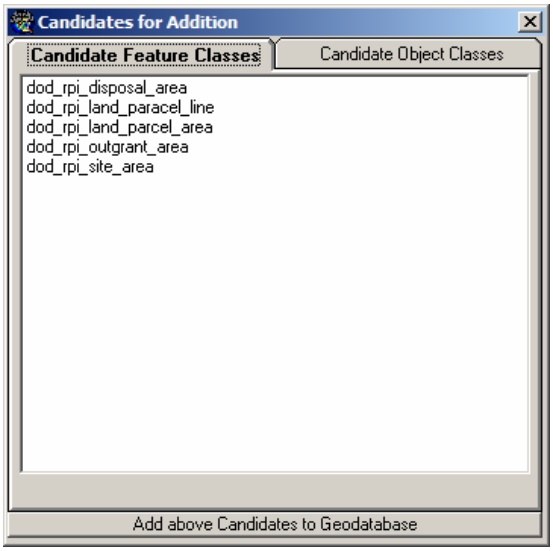
Step 1b - Select the RPI Elements to Add

Following creation of the Geodatabase, the Geodatabase Builder will display the dialog (right). This dialog is used to select the desired RPI features. In Release 2.600, these have all been coded in a SDSFIE Filter called "Real Property Inventory".

Select Real Property Inventory (as shown) and either DoubleClick on the entry, or click the button <Add Filter>. The Entry will be moved to the list on the left as shown.
Click <Add to Candidate List> to select.



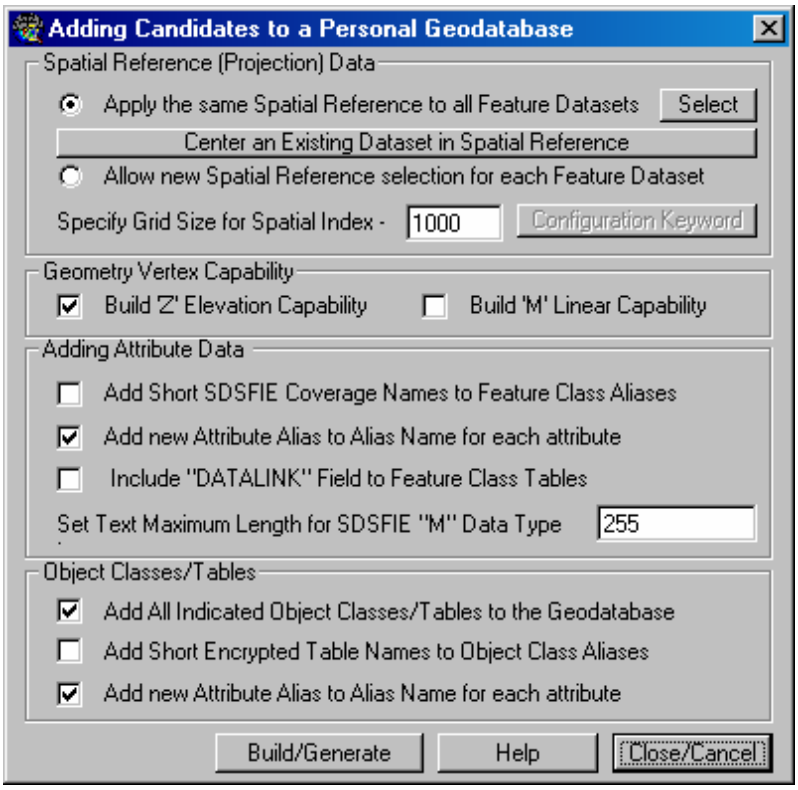
Step 1c - Finalize the Candidate List



The Candidate Feature Class and Object Class dialog will be displayed as indicated. The Feature Class list should show the five RPI Feature Classes indicated. The Object Class list (select the tab) should show ONLY the SDSFIE Object Class FEATURE_METADATA.

Once verified, click <Add above Candidates to Geodatabase>. The "Candidates for Addition" dialog box remains open.

Step 1d – Create the Personal Geodatabase



The Geodatabase Builder displays the dialog box (left). The most commonly used options have already been selected. Click the <Select> button to choose the Spatial Reference (Projection) Data.

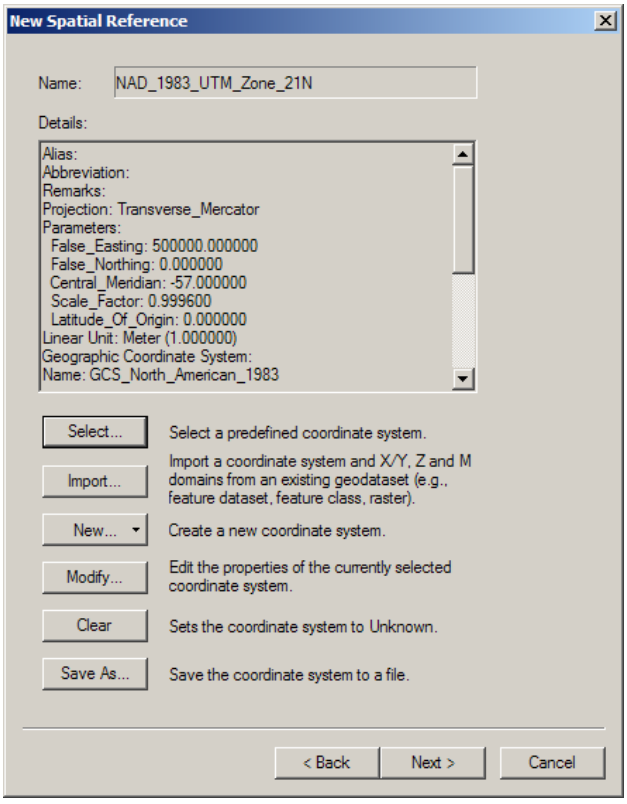
Choosing "Build 'Z' Elevation Capability" will generate the option to chose a vertical coordinate system. 'M' Linear Capability will use the coordinate system of the XY values.
The length of the Memo field can be altered as well. By default, the maximum length is 255.

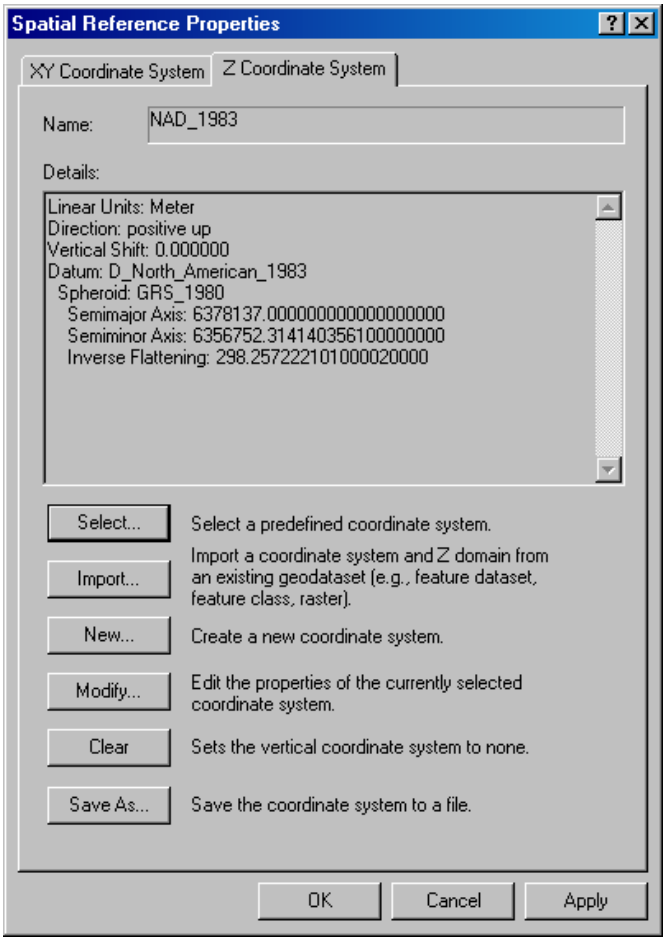
Details of the options indicated are available in the Builder Help File.

The ESRI Spatial Dialog appears (right). Choose and configure the appropriate Spatial Reference, using Select, Import, or New according to ESRI Instructions.

Press <Next>. The remainder of the wizard allow the user to select the Spatial Domain, the Precision, and Z and M information.

In ArcGIS 9.2, a new dialog (below) will appear, giving the option to chose a vertical coordinate system. This dialog only appears if "Build 'Z' Coordinate System" is checked on the options screen. This is an ESRI dialog, and uses either a predefined projection, or imports a coordinate system from an existing dataset. Click OK once a spatial reference is chosen.



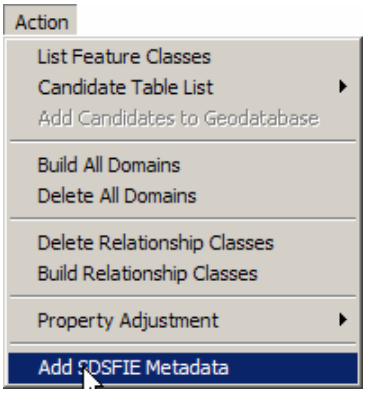


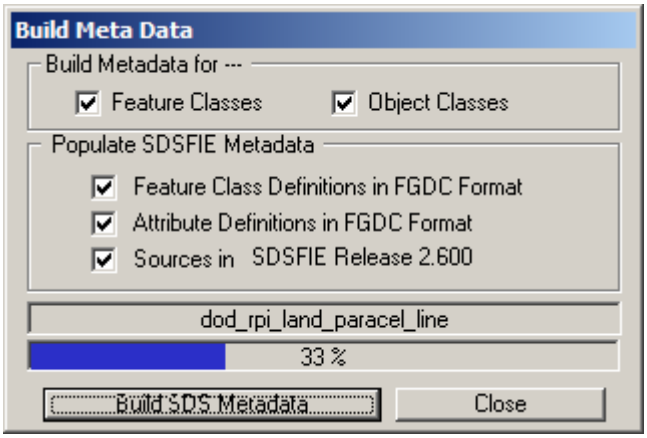
Once all selections have been made, click <Build/Generate>.

It may take several seconds to build the Geodatabase. This main dialog box will close and the "Candidates for Addition" box will confirm each feature that is added to the Geodatabase. A status bar is shown at the bottom of the Master Form, along with a Progress Bar. Once all features have been added successfully, the Geodatabase has been created.

Step 2 – Adding SDSFIE Metadata

Metadata can be added to the Geodatabase by clicking on the <Action> option at the top of the builder and selecting "Add SDSFIE Metadata" as show in the dialog box (right).

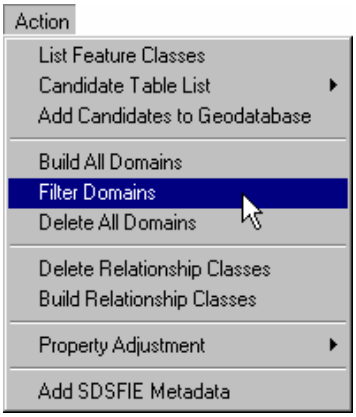


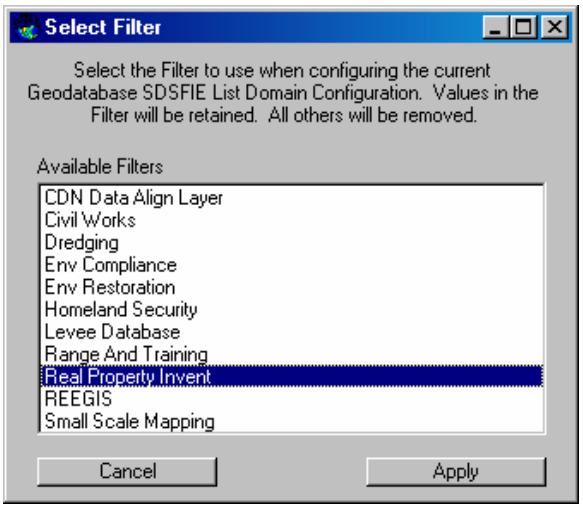


A new dialog box appears (left). The Geodatabase Builder pre-selects all categories, but the user has the option to customize the selections. Select <Build SDS Metadata>. A progress bar is displayed at the bottom of the dialog box. Once all Metadata is Built, the dialog box closes and the user is returned to the Master Form.

Step 3 – Tailoring List Domains

This step allows the user to modify the contents of a List Domain to reflect only RPI Domain Values. First click on the **Domains** tab to display all domain tables. From the Master Menu, select Action -> Filter Domains as indicated (right).



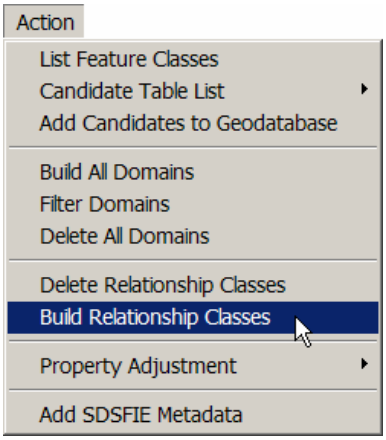


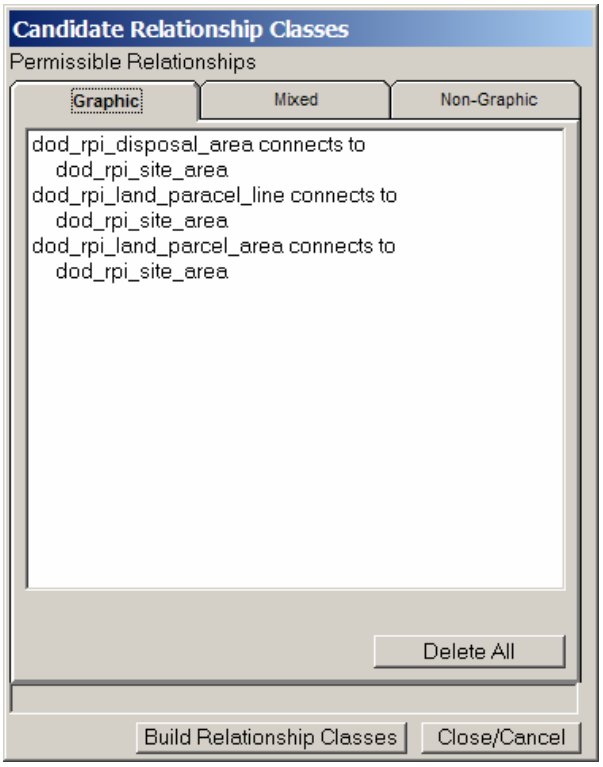
A new dialog box appears as indicated (left). Click on the <Real Property Invent> filter and press <Apply>. This dialog box will close. The Geodatabase Builder will begin to select only the RPI domain values for each domain table in the Geodatabase, listed on the Domains Tab.

Step 4 – Building Relationships

Creating Relationship Classes within the Personal Geodatabase requires either an ArcInfo or ArcEditor level license.

Select Menu Item Action -> Build Relationship Classes as shown in the dialog box (right). This command will create joins between the primary key of a graphic or non-graphic class to the foreign key of another class.





The tool organizes Relationship Classes into three categories. These are Graphic (Feature Classes to Feature Classes), Mixed (Feature Classes to Object Classes) and non-Graphic (Object Classes to Object Classes). There are none of the last category in the RPI model.

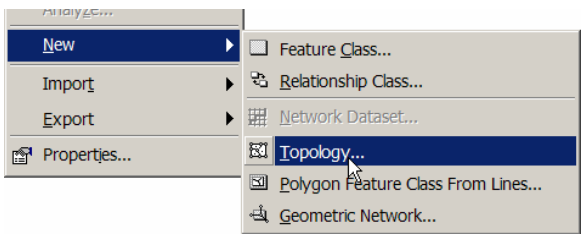
Clicking on <Build Relationship Classes> will create all the required RPI Relationships.

A Progress bar will display the status of creation of the Relationship Classes. This process may take some time, even though there are only a couple Relationships.

Step 5 – Apply Topology Rules

The Geodatabase now has all of the required classes, domains and relationships. To apply topology rules, exit the Geodatabase Builder, and open ArcCatalog. Topology requires at least an ArcEditor level license; e.g. ArcInfo, or ArcEditor. An ArcView level license, like relationships, will cause problems. In ArcCatalog, select the cadastre Feature Dataset which was constructed by the Geodatabase Builder.

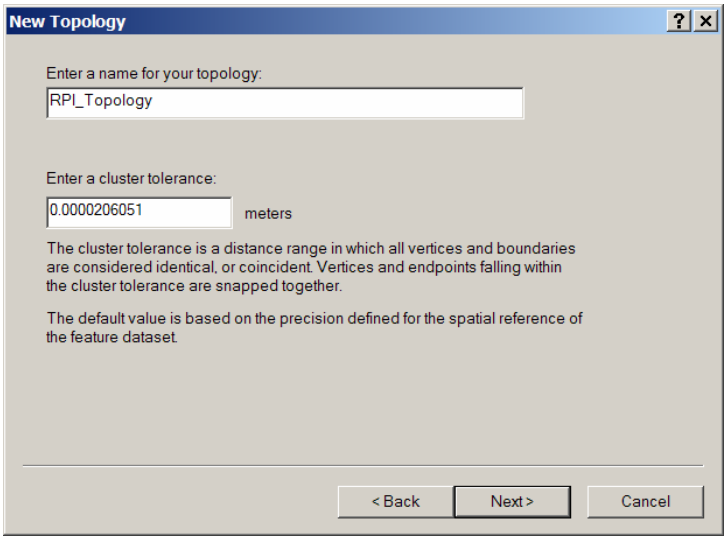
Right click, and select New -> Topology.

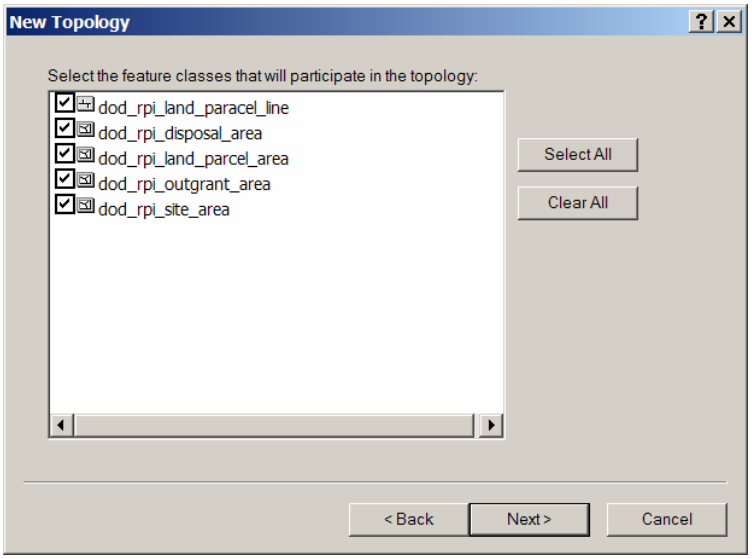


The Topology Wizard will appear.

Following the Topology Intro Screen, the Dialog (right) will appear. Select the Topology Name and the desired Cluster tolerance. See the ESRI Documentation or Helps for detailed information.

Click <Next>





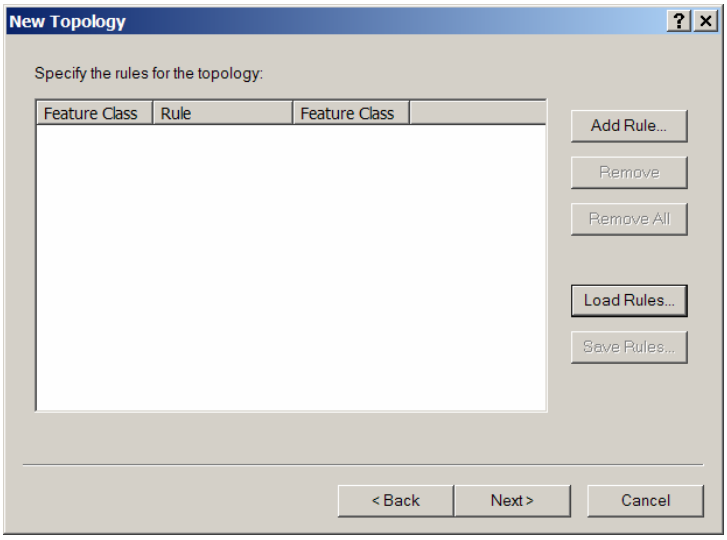
Select All Feature Classes to participate in the Topology. Click <Select All> and then click <Next>.

The "rules" for the Topoology Assignment have already been defined.

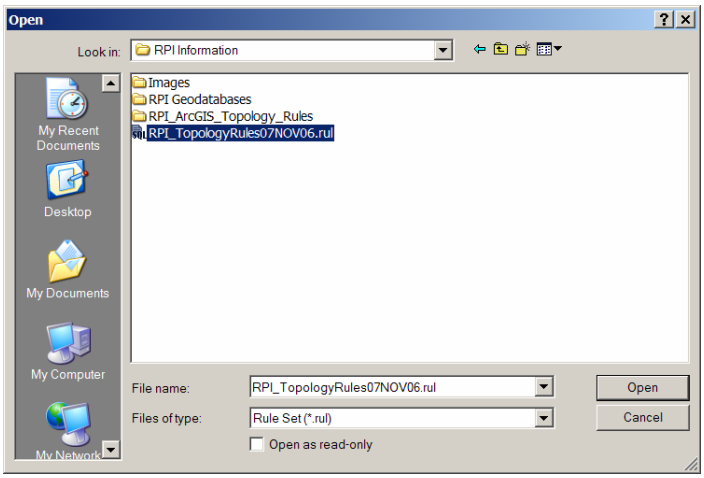
However, since the SDSFIE does not formally contain topology, these must be "Loaded" from a .rul file. The file is available for Download at:

http://www.sdsfie.org/Downloads/Release_260/RPI_ArcGIS_Topology_Rules.zip

Download the .rul file and click <Load Rules> on the Form.



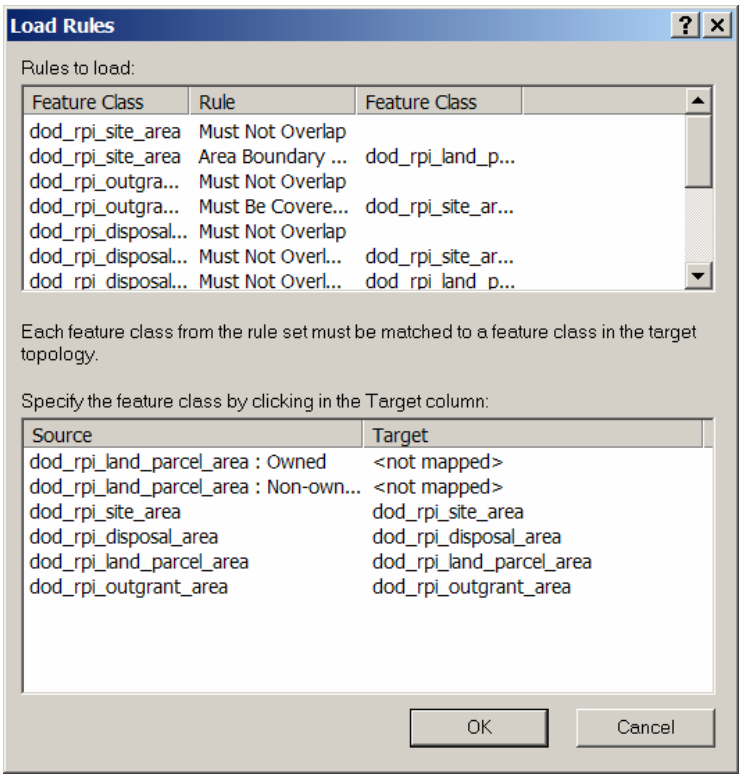
Locate the rule file using the standard "Open File" dialog shown at right.



The Dialog will show only *.rul files be default. Clicking <Open> will load the topology rules for RPI.

NOTE: The rules have been constructed based on the Feature Class Names, Geometries, and Subtypes. Any modification to these names will cause problems with the rules, and they will have to be constructed manually.

Once the rules have been loaded, the Dialog will appear as shown below.



Clicking <OK> will create a Topology Class within the Feature Dataset Cadastre and perform an initial check of the Topology. Since no Features have yet been loaded, a warning will be displayed indicating that no features have been checked for topology.

Once complete, a summary will appear showing the applied rules. Click <Finish> to complete the construction of the Geodatabase for RPI.