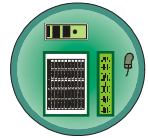**The CEDRA Corporation's**

COMMAND OF THE MONTH

A monthly information bulletin   **December 2010**

FEATURED COMMAND
CEDRA-DataEditor
Break and Add Tools

Application Description

Those of you who are involved with mapping applications have invariably come across the need to break a line or curve at a point along the feature. Recently we were asked for a slight variation of this functionality.

Specifically, it was desired to not just break the feature at a point, but also have the ability to introduce a new line or point feature at the break point. Additionally, it was desired to transfer certain information from the feature being broken to the new feature that was created.

As usual, we investigated the effort that would be required to implement this new functionality and found that in a short period of time we could satisfy this request by combining existing functionality within the software.

The CEDRA Solution

To address the application described above, The CEDRA Corporation recently created two new tools, which have been added to the CEDRA-DataEditor-Tools toolbar (see Figure 1). These new tools appear on the far right of the toolbar.

The [Break and Add Line] tool, enables the user to break a line or curve and create a new line feature whose start point is the break point.

The [Break and Add Point] tool, enables the user to break a line or curve and create a new point feature whose coordinates are those of the break point.


Figure 1
CEDRA-DataEditor-Tools Toolbar

Furthermore, both of these new tools enable the user to transfer attribute information from the feature being broken to the new feature that is created.

> ***Command Of The Month bulletin***
>
> *This month's issue discusses the Break and Add Line and Break and Add Point tools which enable the user to break a line or curve and create a new line or point feature.*

Break and Add Line Tool Overview

The [Break and Add Line] tool, enables the user to break a line or curve and create a new line feature whose start point is the break point. Additionally, the tool provides the ability to transfer attribute information from the feature being broken to the new line feature that is created. The Rule Definition File is used in transferring the attribute information for the feature being broken, as well as the new feature that is created.

Similar to the *Break a line or curve at a specific point* tool, the [Break and Add Line] tool, initially prompts the user to select the line or curve feature
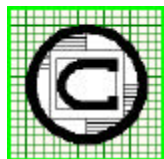
to be broken. Upon confirmation of the feature, a modeless dialog box is displayed from which the user can specify the layer in which the new feature is to be added to.

In addition to the modeless dialog box being displayed, the user will notice a red square appearing at the start point of the feature being broken. As the user moves the cursor, the red square moves along the feature being broken. The red square denotes the break point. If the user stops moving the cursor, the tool displays in the low left corner of the application window (the status bar area), the distance from the start point of the feature being broken, as well as the total length of the feature.

To fix or set the break point, the user clicks the left mouse button. Once the break point has been set, the user can modify the break point in one of two ways.

The *first* is to depress the **M** or **m** key on the keyboard which will set the break point at the midpoint of the feature being broken.

The *second* is to depress the **D** or **d** key which results in an input dialog box being displayed from which the user can explicitly enter a distance from the start point. In addition to explicitly entering a distance, the user has the ability to specify an equation to define the distance. For example, the user could enter **L / 3** where L is a keycode denoting the length of the feature being broken. In this example, the distance value is

computed by taking the length of the feature being broken and dividing it by 3.

Once the break point has been set, the user is able to make picks in the map area denoting the vertices that are to comprise the new line feature. As the picks are made, the tool will display blue graphic line elements denoting the line segments comprising the new line feature.

Should the user wish to start the process over without having to abort the command and re-select the feature. The user can select the Reset button which results in the red square being displayed at the start point of the feature to be broken. If the command is to be aborted or terminated, the Cancel button can be selected. Clicking the OK button results in a new line feature being added to the specified layer.

Break and Add Line Tool Operation

To use this tool, the user should:

➤ **1**   **Click** at the ⟋ [Break and Add Line] tool to activate it.

➤ **2**   **Click** in the *ArcMap* map area on top of the feature to be processed.

➤ **3**   **Confirm**, **or not** the selection, see Figure 2. Once the feature has been confirmed the modeless dialog box shown in Figure 3 will appear.
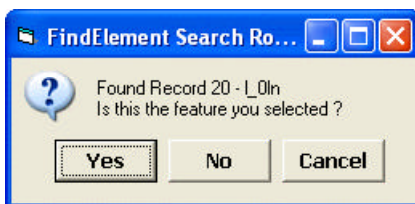
Figure 2
Feature Confirmation Query

➤ **4**   **Move** the cursor until the desired break point position is achieved.

In the status bar area of the application, the tool will display the distance from the start point of the feature being broken to the break point, as well as, the total length of the feature being broken, see Figure 4.

➤ **5**   **Click** the left mouse button to set or fix the break point.

To modify the break point position, the user is able to **depress** the **M** or **m** key to set the break point to be the mid point of the feature being broken, or the **D** or **d** key to explicitly set the distance from the start point of the feature being broken.

Figure 4
Display of Distance along Feature and Total Feature Length
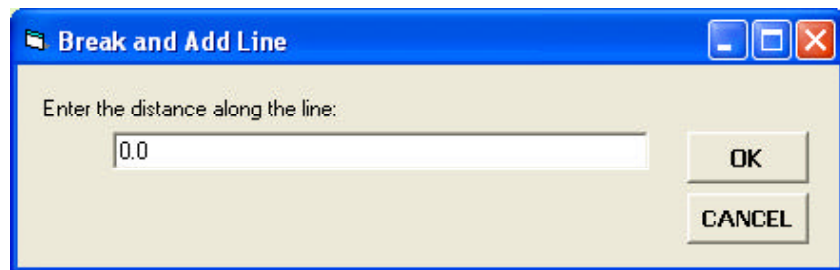
Figure 5
Distance along Feature Input Dialog Box

If the **D** or **d** key is depressed, the input dialog box shown in Figure 5 will appear.

The user is now able to: (a) explicitly specify the distance from the start point, or (b) specify an equation that will be evaluated to set the distance.

Once the distance or equation has been specified, **click** the **OK**
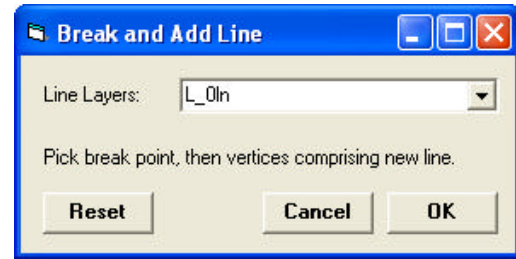
Figure 3
Modeless Break and Add Line Dialog Box

button to confirm or the **Cancel** button to abort the distance entry process.

➤ **6**   **Click** in the *ArcMap* map area at the vertices to comprise the new line feature to be created. If a two-point line is to be created, simply click at the end point of the new line. As the clicks are made, the

tool will display blue graphic line elements denoting the line segments comprising the proposed new line feature, see Figure 6.

➤ **7**   **Scroll** down in the drop-down list to the right of the Line Layers: label and **select** the layer in which the new line feature is to be added to.
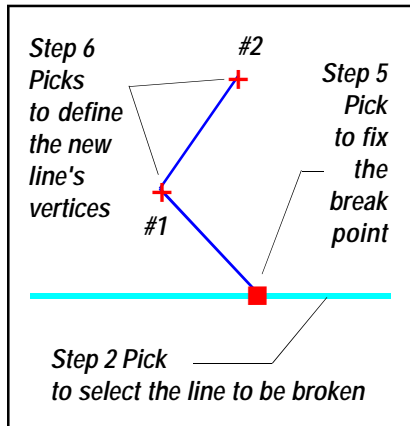
Figure 6
Break and Add Line Picks

➤ **8**   **Click** the **OK** button to break the selected feature and add the new line, the **Reset** button to start the process over commencing from Step 4, or the **Cancel** button to terminate the operation of the tool.

If the OK button is selected, the graphic marker and line elements are deleted and a new line feature is created and added to the specified layer, after which, the tool remains active and the process repeats commencing from Step 2. If the OK button has been selected and no vertices have been defined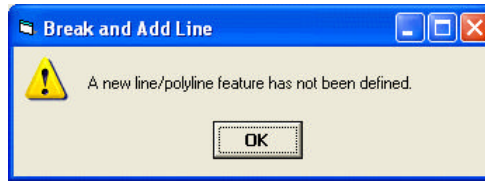 to comprise the new line, the error message shown in Figure 7 will be displayed. In this case, click the OK button and continue with the operation of the tool.

If the Cancel button is selected, the modeless dialog box shown in Figure 3 is removed from the display and the user is able to select another tool or command.

Figure 7
No New Line Feature Defined Error Message

Tool Customization

It is possible for the user to customize the modeless dialog box shown in Figure 3. In the CEDRA distribution directory, specifically the directory **c:\cedra\avprjs**, there is a file called **dataddln.txt** which enables the user to control the:

a.   layer list label,
b.   prompt and
c.   list of available line layers that appear in the drop-down list.

The **dataddln.txt** file is an ASCII based file which the user can modify with any word processor or text editor. Shown in Table 1 are the contents of the file.

The lines shown in bold are the lines which the user is able to modify. The lines which begin with the **/*** characters denote a comment line and are ignored by the tool. Note that there is no limit to the number of line layer names that can appear. The file simply contains 3 names as a starting point which can easily be increased by the user. The order in which the layer names appear in the **dataddln.txt** file controls the order in which the names appear in the drop-down list shown in Figure 3. If the name of the current active layer does not appear in the list of available line layers specified in the **dataddln.txt** file, the tool adds the current active layer name to the drop-down list as the last layer name in the drop-down list.

Rule Definition File

Should the user wish to control how attributes are assigned when a feature is broken, as well as the attributes that are assigned to the new feature that is created, the user can employ a **Rule Definition File**. A brief explanation is provided below.

The **Rule Definition File** is an ASCII based file whose root name matches that of the ArcView GIS project file or

```
/*
/* This file allows the user to specify the list of available
/* layers that a new line can be added to.
/*
/* This file is used by the CEDRA-DataEditor Break 1 tool,
/* which is also referred to as the Break and Add Line tool.
/*
/*
/* Specify the Label for the Break and Add Line tool
Line Layers:
/*
/* Specify the Prompt for the Break and Add Line tool
Pick break point, then vertices comprising new line.
/*
/* Specify the names of the available line layers that will
/* appear in the drop-down list
L_0ln
L_1ln
L_2ln
```

Table 1 - The dataddln.txt File

ArcMap document file. For example, if the user is working in an ArcMap document file called **proj1.mxd**, the name of the Rule Definition File must be **proj1.txt**.

The Rule Definition File is read after a feature has been selected for processing. If the user wishes to modify the Rule Definition File during an ArcMap session, it should be done prior to activating the tool. Furthermore, the Rule Definition File must reside in the current working directory as specified with the [Set Working Directory] command..

Shown in Table 2 under the Rule Definition File Structure column, the **Layer_Name** text denotes the name of the layer to be processed. The **99999** data line denotes the end of a layer definition. The **Field_1**, **Field_2**, **Field_n** text denote the names of the attributes within the layer that are to be defined.

There is no limit to the number of attributes that can have a rule assigned to them. The name that is specified for the **Field** may be either the source name of the field or its alias name. Below the name of the **Field** is the **Operator** code which denotes the rule to be applied to the attribute. The **Operator** code is a numeric value between 0 and 5, inclusive.

The file structure described above is repeated for each desired layer. The /* characters can be inserted into the file to denote a comment line. Comment lines have no effect upon the files and should be included to improve the readability of the file.

The available **Operator** codes are shown below. Note that the term base feature pertains to the feature being processed, while the term new feature pertains to the new feature(s) that are created.

0   Store zero for numeric fields or blank for string fields for the base feature, and the new feature if any is created.

1   Maintain the base feature original value, and store zero, or blank for

Rule Definition File Structure	Sample Rule Definition File
Layer_Name	L_0ln
Field_1	CLR
Operator	1
Field_2	PEN
Operator	2
.	FeatureID
.	5 FID 1
.	UPS_ELV
.	3 LEN UPS_ELV DWN_ELV
Field_n	DWN_ELV
Operator	3 LEN UPS_ELV DWN_ELV
99999	99999

Table 2 - Rule Definition File

the new feature, if any, that is created. Note zeroes are stored for numeric fields and blanks for string fields.

2   Maintain the base feature original value, and store the base feature original value for all new features, if any, that are created. In essence, copy the base feature attribute value into all new features created.

3   Interpolate an elevation at the break point given the length and elevation fields. The elevation fields are specified in the order of the direction of the feature being broken.

If the feature is defined upstream to downstream, the upstream elevation field is specified first. An example of using the Operator 3 code is:

```
up_elev
3 LENGTH up_elev dn_elev
```

Note that the field names which are specified after the operator code 3 must be the source field names and not the alias name

4   Store the geometric length in both the original feature and new feature, if any is created.

5   Compute a number by adding a user-specified value to the largest value in a field for the new features that are created. The attribute value for the base feature is maintained. The field that is specified must be a field in the theme (layer) in which the base feature being processed resides in. An example of using the Operator 5 code is:

```
FeatureID
5 OID 1
```

If the user wishes to control the number of digits to the right of the decimal point then the incremental value should include the decimal point and the desired number of digits to the right of the decimal point. In the example below it is desired to have three digits to the right of the decimal point appear in the FeatureID field.

```
FeatureID
5 OID 2.500
```

Note that the field name which is specified after the operator code 5 must be the source field name and not the alias name

Note the following:

1. Rules for reserved fields of ArcView GIS or ArcGIS such as, OID, FID, OBJECTID, any geometric attributes and SHAPE should not be specified.

2. If a field:
   a. Is omitted from the **Rule Definition File**, blanks or zeroes will be assigned to the first feature created and any subsequent features, if any, that are created.

   b. Is miss-spelled, the field will be treated as having been omitted.

Break and Add Point Tool Overview

The [Break and Add Point] tool, ◼, enables the user to break a line or curve and create a new point feature whose coordinates are those of the break point. Additionally, the tool provides the ability to transfer attribute information from the feature being broken to the new point feature that is created. The **Rule Definition File** is used in transferring the attribute information for the feature being broken, as well as the new feature that is created. This tool is similar to the [Break and Add Line] tool, ⟋, with the exception that a point feature is created, not a line feature.

Similar to the ⊡ *Break a line or curve at a specific point* tool, the [Break and Add Point] tool, ◼, initially prompts the user to select the line or curve feature to be broken. Upon confirmation of the feature, a modeless dialog box is displayed from which the user can specify the layer in which the new feature is to be added to.

In addition to the modeless dialog box being displayed, the user will notice a red square appearing at the start point of the feature being broken. As the user moves the cursor, the red square

moves along the feature being broken. The red square denotes the break point. If the user stops moving the cursor, the tool displays in the low left corner of the application window (the status bar area), the distance from the start point of the feature being broken, as well as the total length of the feature.

To fix or set the break point, the user clicks the left mouse button. Once the break point has been set, the user can modify the break point in one of two ways.

The *first* is to depress the **M** or **m** key on the keyboard which will set the break point at the midpoint of the feature being broken.

The *second* is to depress the **D** or **d** key which results in an input dialog box being displayed from which the user can explicitly enter a distance from the start point. In addition to explicitly entering a distance, the user has the ability to specify an equation to define the distance. For example, the user could enter **L / 3** where L is a keycode denoting the length of the feature being broken. In this example, the distance value is computed by taking the length of the feature being broken and dividing it by 3.

Should the user wish to start the process over without having to abort the command and re-select the feature. The user can select the **Reset** button which results in the red square being displayed at the start point of the feature to be broken. If the command is to be aborted or terminated, the **Cancel** button can be selected. Clicking the **OK** button results in a new point feature being added to the specified layer.

Break and Add Point Tool Operation

To use this tool, the user should:

➤ 1   **Click** at the ◼ [Break and Add Point] tool to activate it.

➤ 2   **Click** in the *ArcMap* map area on top of the feature to be processed.

➤ 3   **Confirm**, **or not** the selection, see Figure 8. Once the feature has been confirmed the modeless dialog box shown in Figure 9 will appear.

➤ 4   **Move** the cursor until the desired break point position is achieved. In the status bar area of the application, the tool will display the distance from the start point of the feature being broken to the break point, as well as, the total length of the feature being broken, see Figure 10.

Figure 8
Feature Confirmation Query

Figure 9
Modeless Break and Add Point Dialog Box

Figure 10
Display of Distance along Feature and Total Feature Length
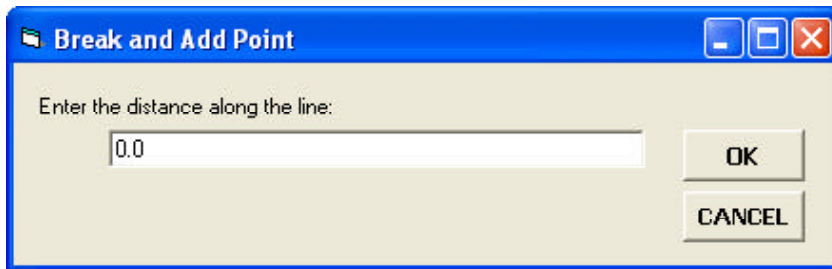
Figure 11
Distance along Feature Input Dialog Box

➤ **5**   **Click** the left mouse button to set or fix the break point.

To modify the break point position, the user is able to **depress** the **M** or **m** key to set the break point to be the mid point of the feature being broken, or the **D** or **d** key to explicitly set the distance from the start point of the feature being broken. If the **D** or **d** key is depressed, the input dialog box shown in Figure 11 will appear. The user is now able to: (a) explicitly specify the distance from the start point, or (b) specify an equation that will be evaluated to set the distance. Once the distance or equation has been specified, **click** the **OK** button to confirm or the **Cancel** button to abort the distance entry process.

➤ **6**   **Scroll** down in the drop-down list to the right of the Point Layers: label and **select** the layer in which the new point feature is to be added to.

➤ **7**   **Click** the **OK** button to break the selected feature and add the new point, the **Reset** button to start the process over commencing from Step 4, or the **Cancel** button to terminate the operation of the tool.

If the OK button is selected, the graphic marker is deleted and a new point feature is created and added to the specified layer, after which, the tool remains active and the process repeats commencing from Step 2.

If the Cancel button is selected, the modeless dialog box shown in Figure 9 is removed from the display and the user is able to select another tool or command.

Tool Customization

It is possible for the user to customize the modeless dialog box shown in Figure 9. In the CEDRA distribution directory, specifically the directory **c:\cedra\avprjs**, there is a file called **dataddpn.txt** which enables the user to control the:

a.   layer list label,
b.   prompt and
c.   list of available point layers that appear in the drop-down list.

The **dataddpn.txt** file is an ASCII based file which the user can modify with any word processor or text editor. Shown in Table 3 are the contents of the file.

The lines shown in bold are the lines which the user is able to modify. The lines which begin with the **/*** characters denote a comment line and are ignored by the tool. Note that there is no limit to the number of point layer names that can appear. The file simply contains 3 names as a starting point which can easily be increased by the user. The order in which the layer names appear in the **dataddpn.txt** file controls the order in which the names appear in the drop-down list shown in Figure 3. If the name of the current active layer does not appear in the list of available line layers specified in the **dataddpn.txt** file, the tool adds the current active layer name to the drop-down list as the last layer name in the drop-down list.

```
/*
/* This file allows the user to specify the list of available
/* layers that a new point can be added to.
/*
/* This file is used by the CEDRA-DataEditor Break 2 tool,
/* which is also referred to as the Break and Add Point tool.
/*
/*
/* Specify the Label for the Break and Add Point tool
Point Layers:
/*
/* Specify the Prompt for the Break and Add Point tool
Pick break point, then click OK to confirm.
/*
/* Specify the names of the available point layers that will
/* appear in the drop-down list
L_0pn
L_1pn
L_2pn
```

Table 3 - The dataddpn.txt File

Rule Definition File

As mentioned at the beginning of this tool description, the user is able to control how attributes are assigned to the features created as a result of this tool's operation via the Rule Definition File. The reader is referred to the Rule Definition File description provided in the [Break and Add Line] tool discussion for more information.

Note

a. The [Break and Add Line] and [Break and Add Point] tools process multipart features in the identical way as the *Break a line or curve at a specific point* tool. That is, the part within the multipart feature that is to be processed must be decomposed into a single part feature in order for the user to be able to select a break point.

b. The object identification number (OID, FID, OBJECTID, etc.) and direction of the feature being broken by the [Break and Add Line] and [Break and Add Point] tools are maintained.

c. When creating the **Rule Definition File**, only those attributes that are to have rules assigned to them need appear in a layer definition. That is to say, the user does not need to specify a rule for all of the attributes associated with the layer.

Summary

For mapping applications which involve electrical and telephone utilities, the [Break and Add Line] and [Break and Add Point] tools are efficient and accurate tools for breaking and creating features. When used in conjunction with the Rule Definition File these tools ensure the proper population and transference of attribute data.

Note that the tools discussed in this issue are recent additions. Users with a software support agreement should check with The CEDRA Corporation on how to obtain a software update so as to be able to utilize this new functionality.

As always, users who have a need for functionality that is not presently available in CEDRA software should feel free to forward these requests to CEDRA, as well as, any other comments or suggestion you may have.

If you have a request for Command Of The Month, feel free to phone, fax or e-mail your request to The CEDRA Corporation.