HEM to NHDEvent XML (HEM2XML) Conversion Tool

User Guide

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1. INTRODUCTION

1.1 PURPOSE

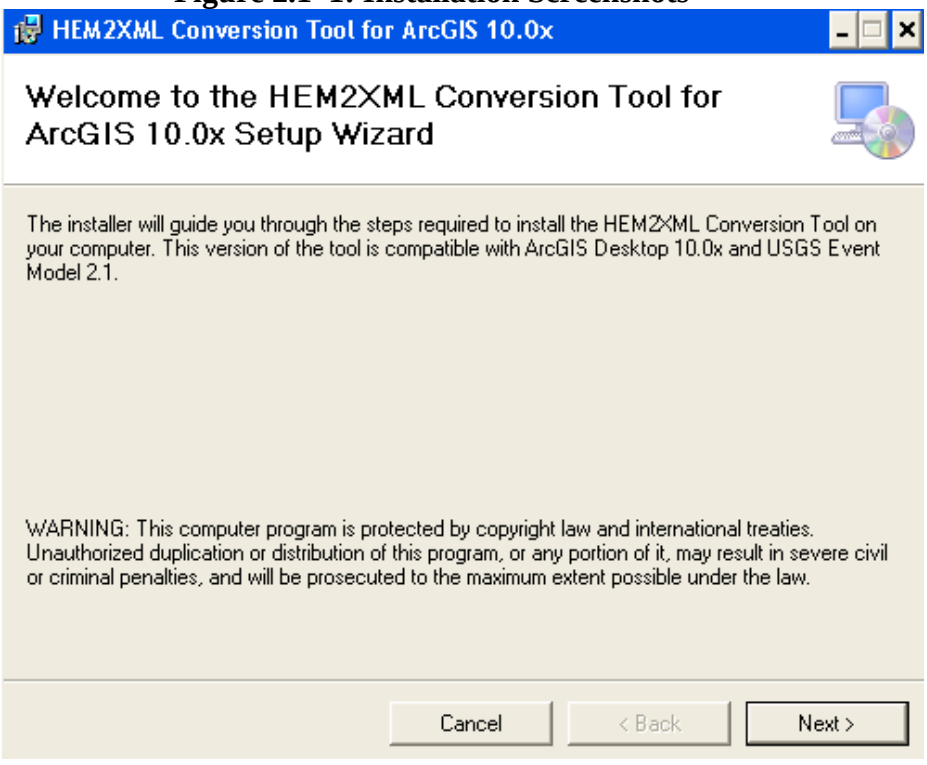
The *HEM to NHDEvent XML Conversion Tool* takes a Hydrography Event Management (HEM) 2.2 (or higher) created file geodatabase and exports the events to an Extensible Markup Language (XML) file that matches the Exchange Network hosted NHDEvent 2.1 schema format. The tool also compresses the XML file for efficient Exchange Network submission.

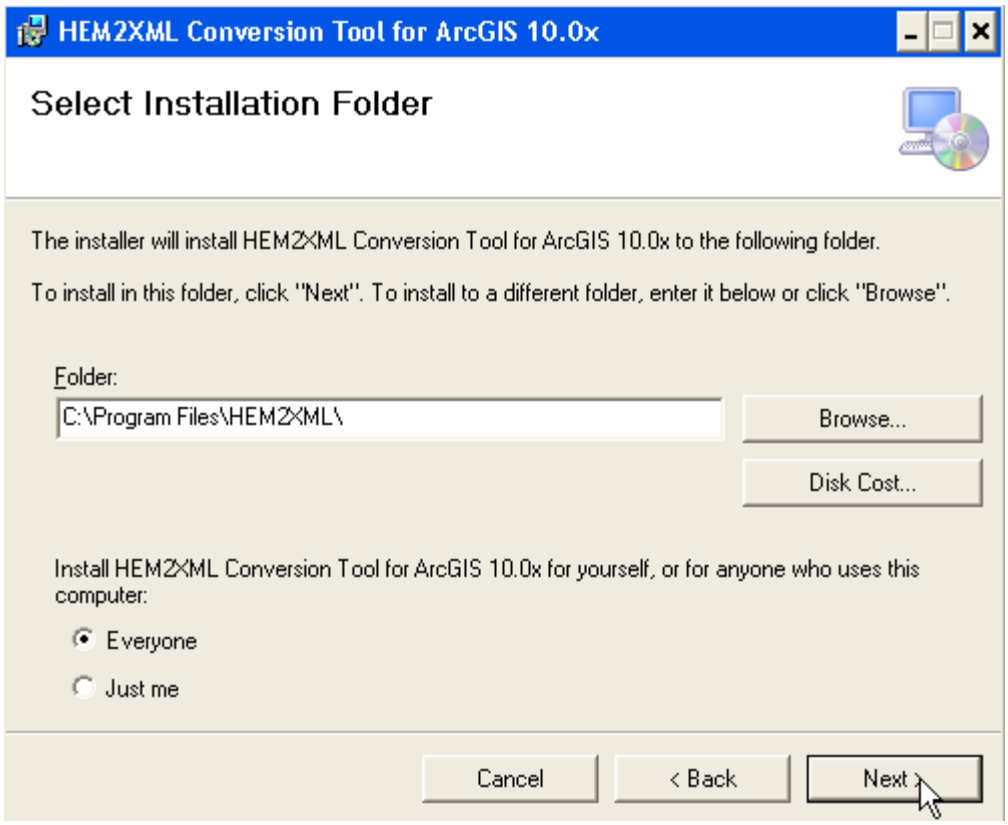
2. INSTALLATION

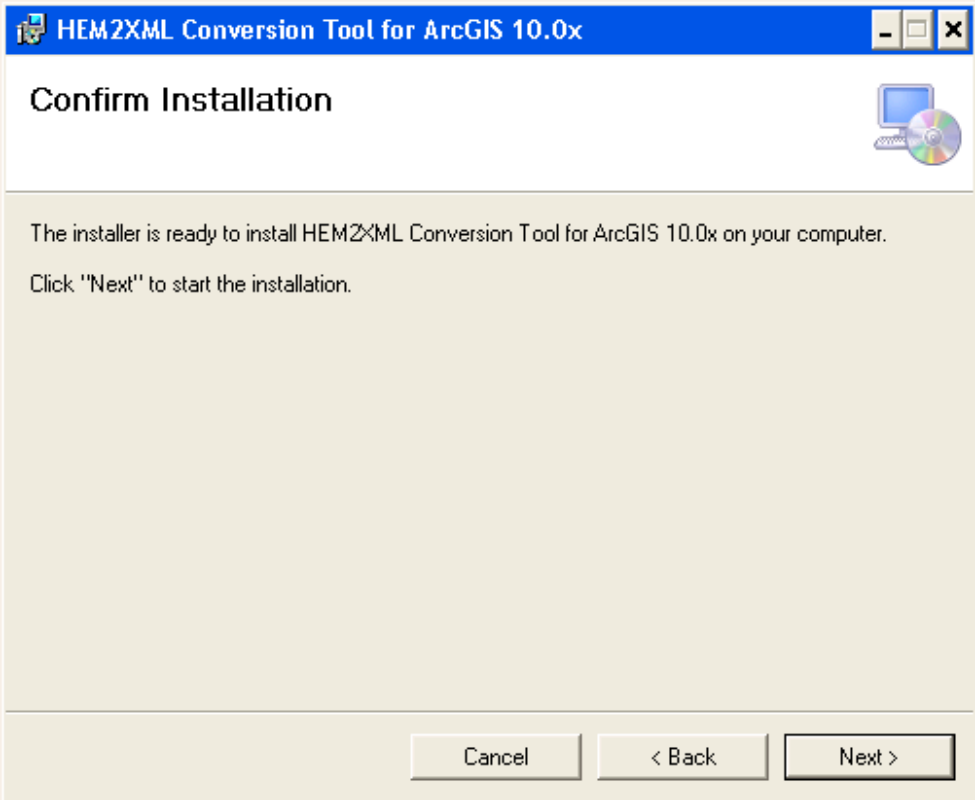
2.1 INSTALLATION

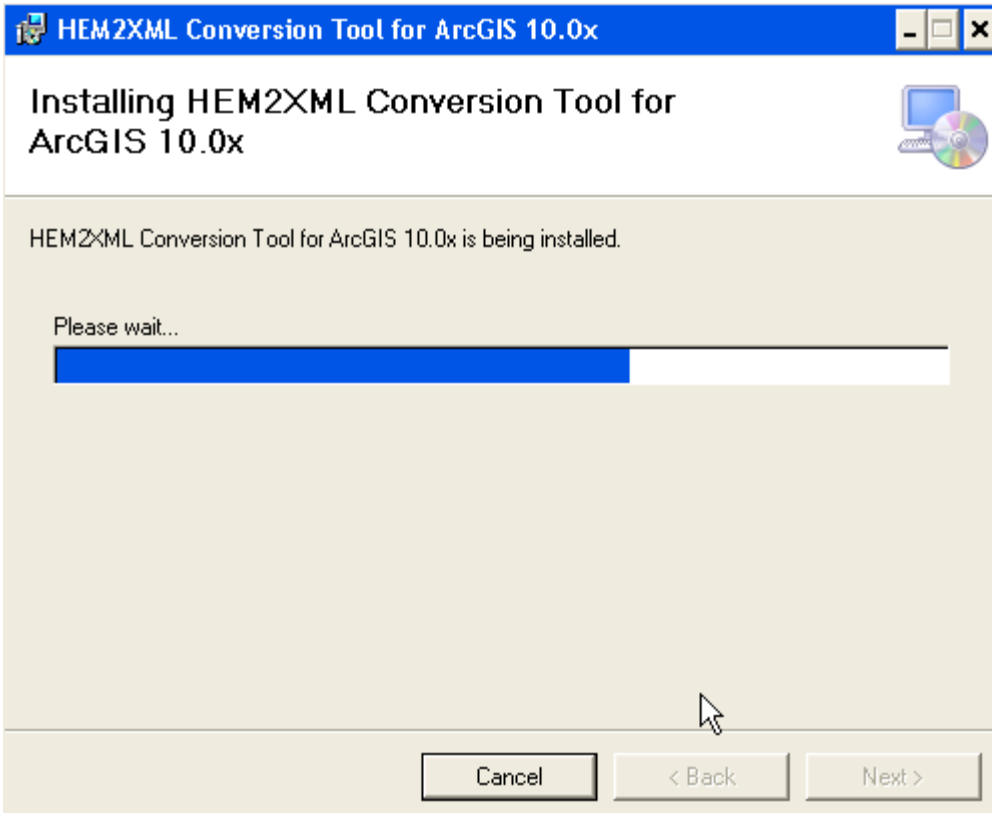
Download the tool from http://www.epa.gov/waters/tools/HEM2XML/HEM2XML.html and unzip the setup package. If you have a previous version of the tool installed, please uninstall that version using the **Add or Remove Programs** in the **Control Panel**. Double click on the setup.exe executable to launch the installation process. The setup.exe file executes the msi file during installation. The following are screenshots of the process. This tool has been developed and tested with HEM 2.2 and ArcGIS Desktop 9.3.1. It has not been tested on ArcGIS 9.2.x and is not for use in ArcGIS 10.

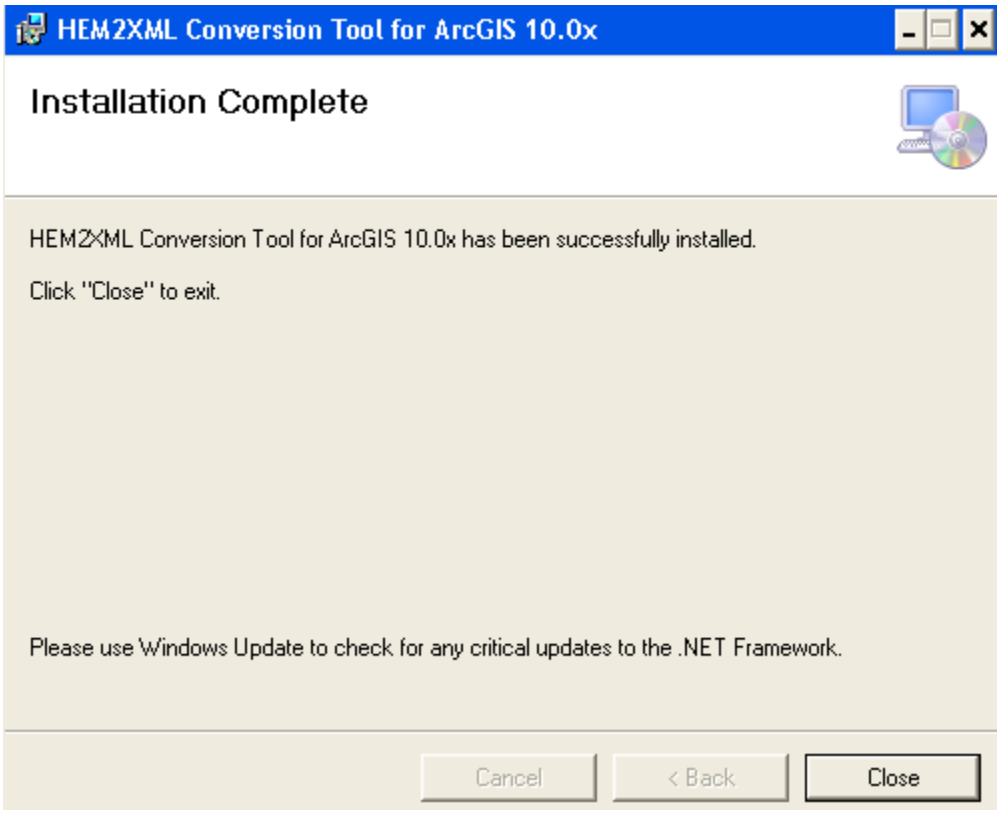
Figure 2.1–1: Installation Screenshots




HEM2XML Conversion Tool for ArcGIS 10.0x
Select Installation Folder
The installer will install HEM2XML Conversion Tool for ArcGIS 10.0x to the following folder.
To install in this folder, click "Next". To install to a different folder, enter it below or click "Browse".
Folder:
C:\Program Files\HEM2XML\
Browse...
Disk Cost...
Install HEM2XML Conversion Tool for ArcGIS 10.0x for yourself, or for anyone who uses this computer:
Everyone
Just me
Cancel
< Back
Next >

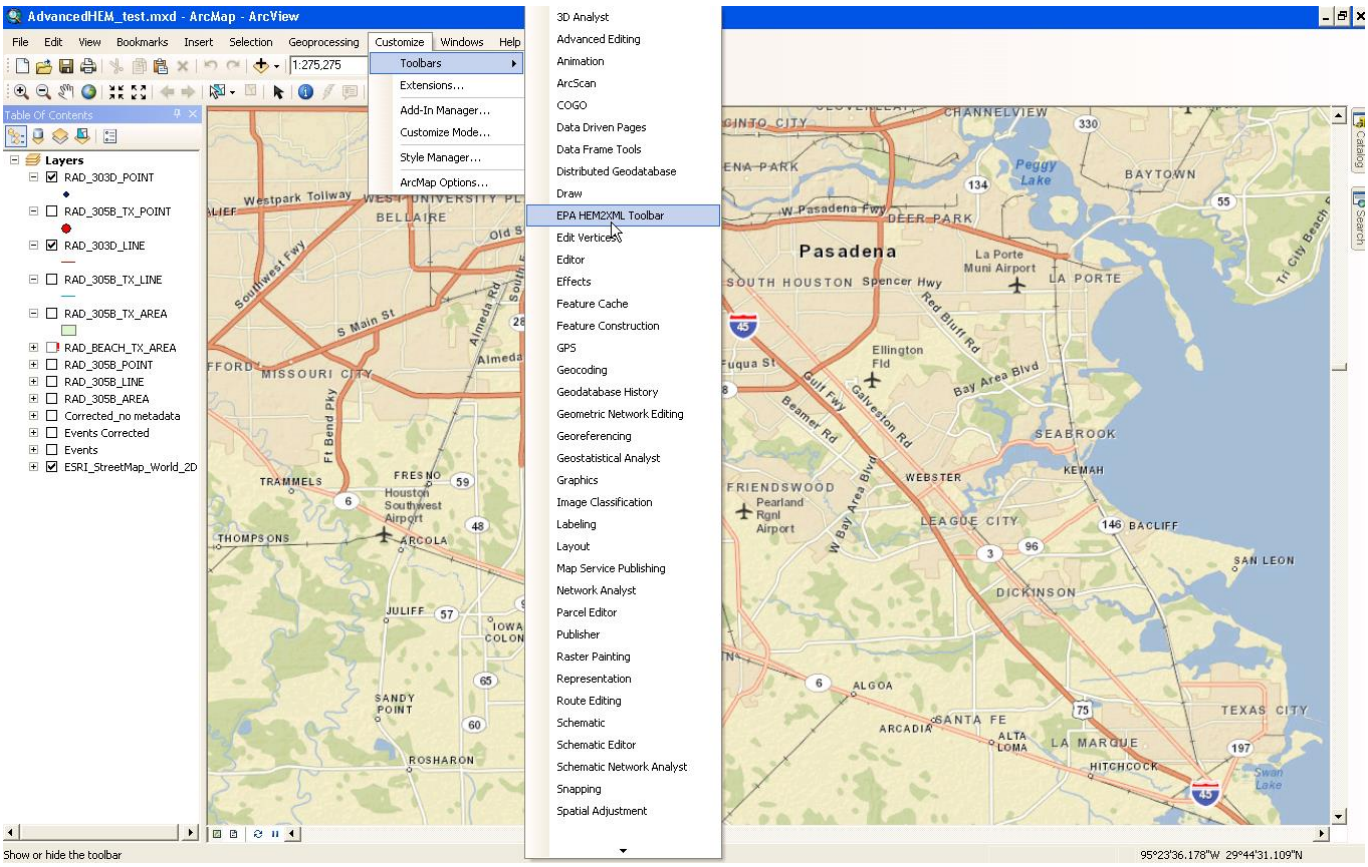

HEM2XML Conversion Tool for ArcGIS 10.0x
Confirm Installation
The installer is ready to install HEM2XML Conversion Tool for ArcGIS 10.0x on your computer.
Click "Next" to start the installation.
Cancel
< Back
Next >


HEM2XML Conversion Tool for ArcGIS 10.0x
Installing HEM2XML Conversion Tool for ArcGIS 10.0x
HEM2XML Conversion Tool for ArcGIS 10.0x is being installed.
Please wait...
Cancel
< Back
Next >


HEM2XML Conversion Tool for ArcGIS 10.0x
Installation Complete
HEM2XML Conversion Tool for ArcGIS 10.0x has been successfully installed.
Click "Close" to exit.
Please use Windows Update to check for any critical updates to the .NET Framework.
Cancel
< Back
Close

To Add the Tool to ArcMap:
Start an ArcMap session, add the HEM2XML Toolbar by clicking **View, Toolbars** then select the **HEM2XML Toolbar** (Figure 2.1-2). A HEM2XML toolbar will display; drag it to the ArcMap Toolbar frame to dock it.

Figure 2.1–2: Toolbar Install Location in ArcMap

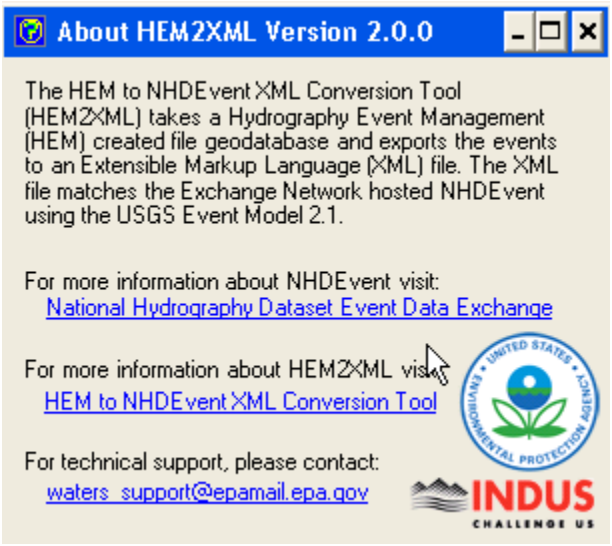


3. USING THE HEM2XML TOOL

3.1 ABOUT THE HEM2XML TOOL

Links have been added to the **About HEM2XML** window of the tool to provide access to more information on the NHDEvent data exchange, the HEM2XML tool, or to contact technical support.

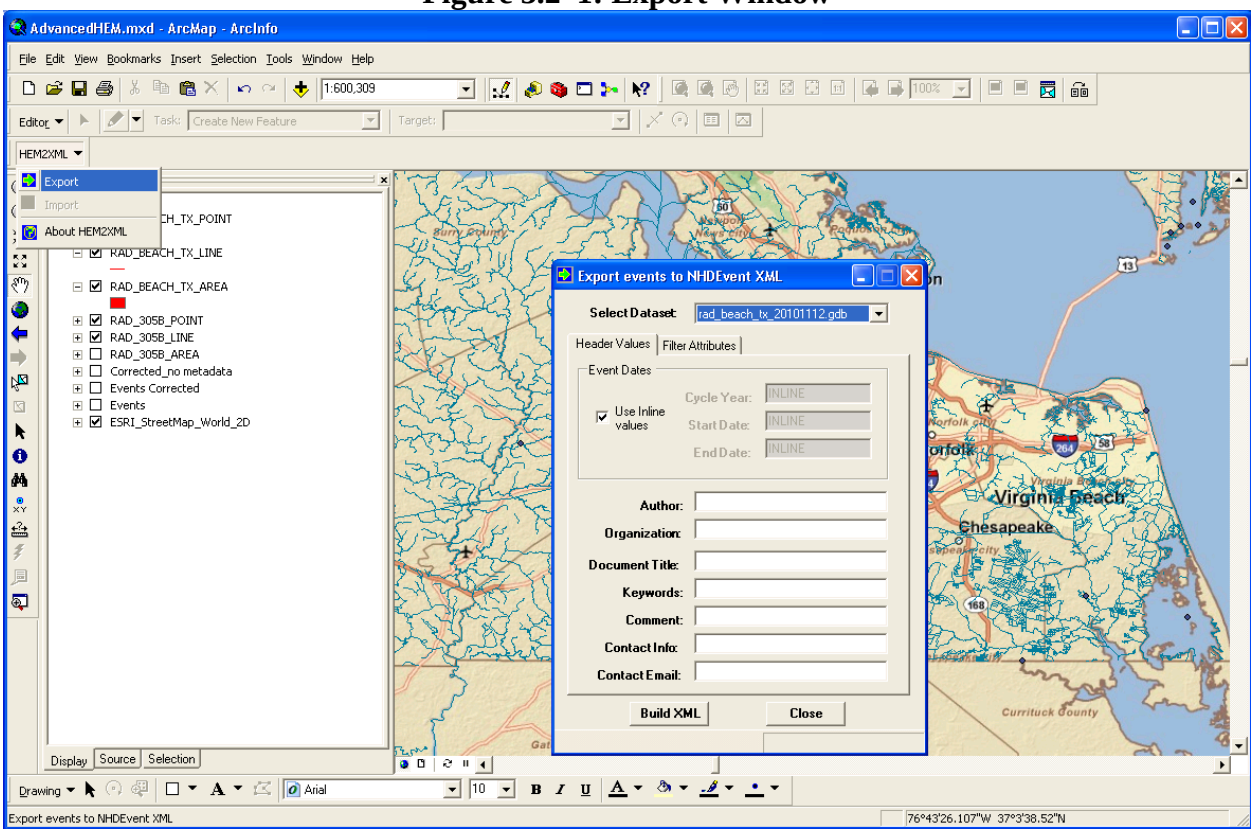
Figure 3.1–1: About Window



3.2 USING THE HEM2XML TOOL

The tool requires HEM 2.2 or higher. Click Export in the dropdown menu to open the "Export events to NHDEvent XML" dialog form. In this dialog, choose the file geodatabase in the "Select Dataset" dropdown list that you wish to build the xml submission for.

Figure 3.2–1: Export Window



3.2.1 Header Values Tab

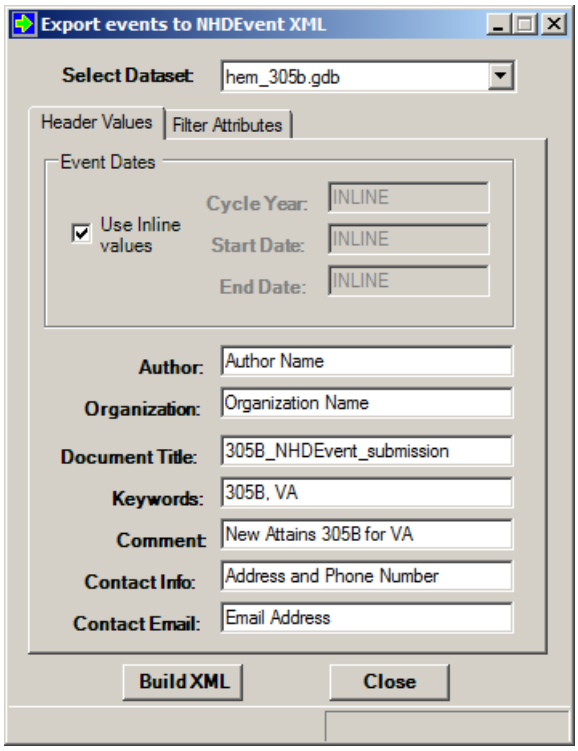
Complete the Author, Organization, Document Title, Keywords, Comment, Contact Info, and Contact Email fields. This information will be written to the header of the XML file for proper identification of the sender.

3.2.1.1 Event Dates

When the XML file is built, the Cycle Year, Start Date, and End Date values can either be read from the feature record attributes referred to as "Use Inline values" or the user can enter one date for each of the three fields to be used for all the records in the submission. The default is to use the Inline values.

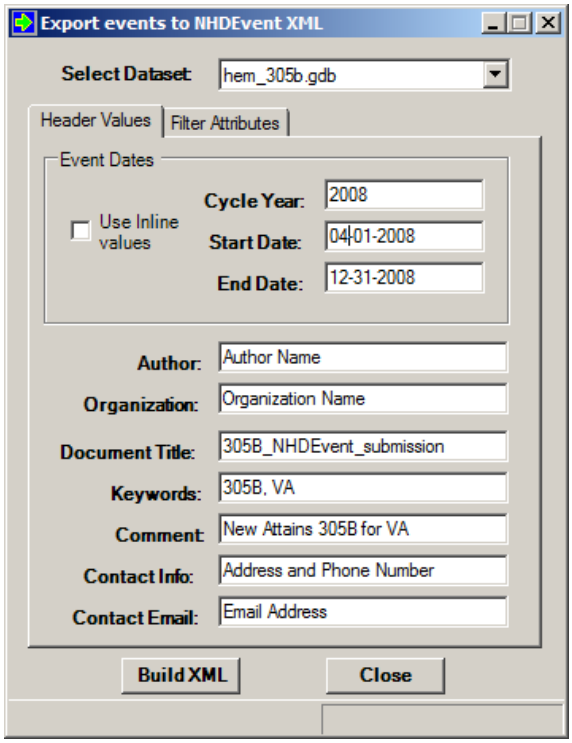
Check the box "Use Inline values", as pictured in Figure 3.2.1.1-1, to have the tool write the dates out to file for each individual record. If you open the XML file in a text editor, you will see that the Header tags in the XML file for these three fields will contain the word INLINE and each feature in the body of the XML will have these fields and their associated values.

Figure 3.2.1.1–1: Header Values Tab in the Export Window



Uncheck the box "Use Inline Values" and enter the dates for Cycle Year, Start Date, and End Date so that the same dates are used for all features written to the XML file (Figure 3.2.1.1-2). If you open the XML file in a text editor, you will see that the Header tags in the XML file will contain the dates and none of the features will have these fields in the body of the XML. The application does not have the ability to write a combination of Event Dates to the header and the remainder inline. If the "Use Inline Values" box is left unchecked, none of the three date tags will be written in the body of the xml using the attributes from the feature records. These three date fields are free text entry fields, there are no validation checks applied.

Figure 3.2.1.1–2: User-Entered Event Dates in Header Values Tab



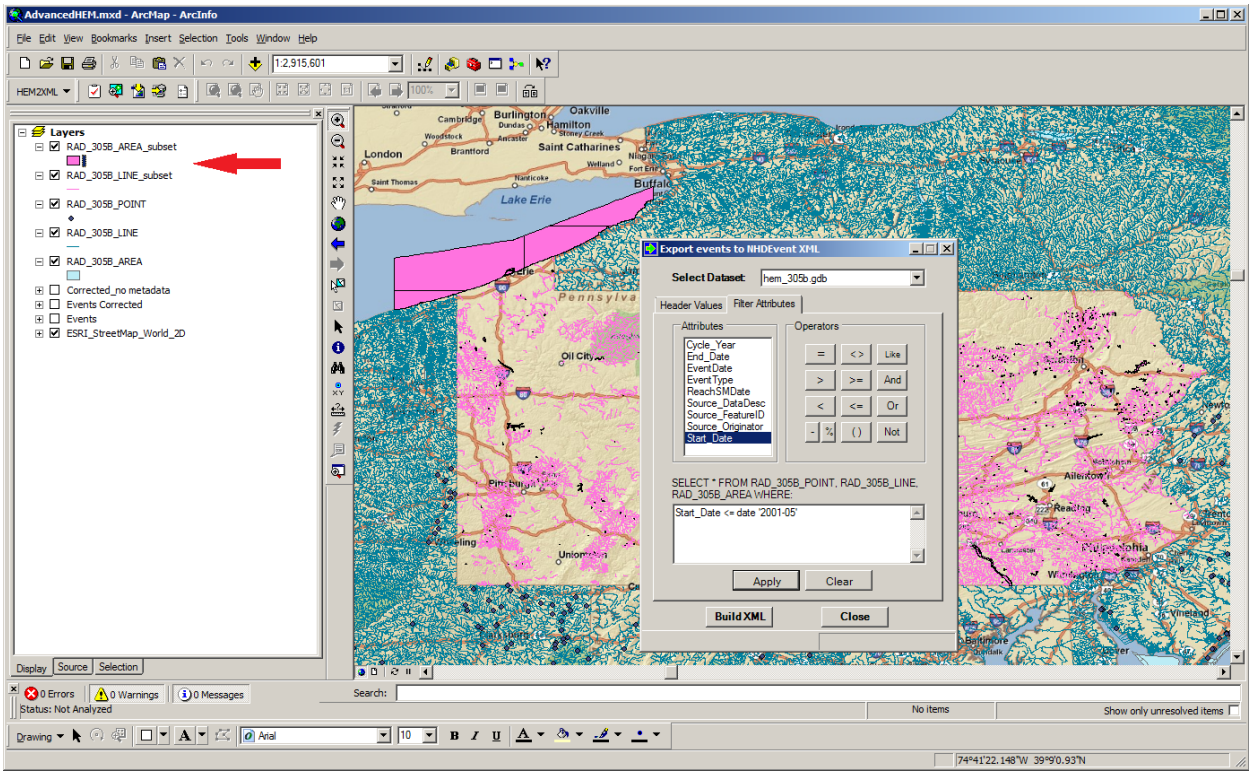
3.2.2 Filter Attributes Tab

Using the Filter Attributes tab, you can create a subset of the event features in a file geodatabase. The file geodatabase to be used for the query is the one that is selected in the "Select Dataset" dropdown list.

The query interface functions similar to the Query Builder window of a feature class which is accessed through the Query Definition tab of the Properties menu. The same SQL rules for the WHERE clause apply when creating this query. The WHERE clause is written in the textbox at the bottom of the form. The difference with this query is that you are selecting a subset from multiple feature classes. The SELECT statement above the query textbox will indicate which layers in the file geodatabase will be queried.

Clicking the "Apply" button will execute the query, add the subset feature classes to the map's Layers list on the left side of ArcMap where they can be reviewed, and write the subsets to a scratch file geodatabase. If you have a large file geodatabase, it may take a while to write out the selection set to the scratch database. Do not make edits to the scratch database directly. The recommended procedure is to clear the selected records by clicking the "Clear" button and reapplying a new query. All edits should be made to the original file geodatabase.

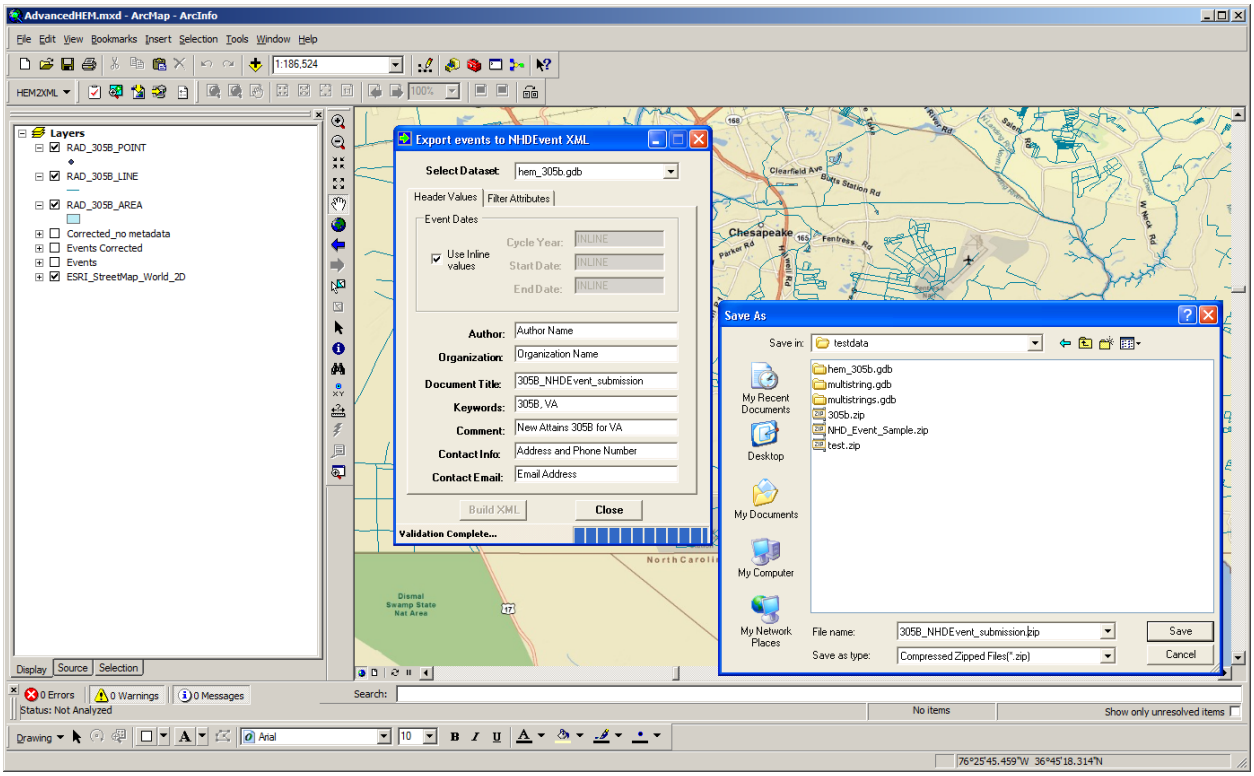
Figure 3.2.2–1: Filter Attributes Tab in the Export Window



3.2.3 Building the XML file

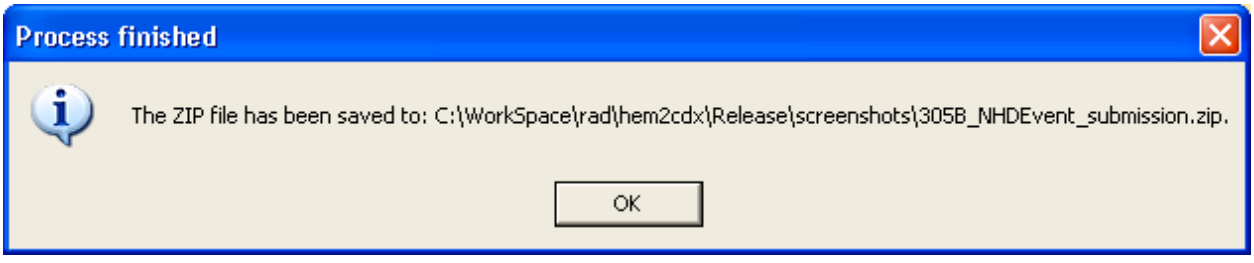
Click the "Build XML" button to start the process. Before the features are written to the XML file, a series of validation checks (Section 4 of this guide) will be performed. You cannot cancel the process or close the dialog box at this point. After successful validation of the events, a Save As dialog box will prompt you for the location to save the zipped xml file. The default name of the file will be the name entered in the Document Title field however this can be changed. At this point you can either save the zip file or cancel the process. If you save the zip file, a new process will start that builds the xml file that is saved to the zip file. The bottom of the window will be updated with the progress of the process.

Figure 3.2.3–1: Save As Dialog after Validation Checks



Once the XML file has been written to the zip file, a pop up window will display the location of the saved file.

Figure 3.2.3–2: Successful XML Build Written to the Zip File



4. VALIDATION CHECKS

4.1 VALIDATION CHECKS PERFORMED BY THE USER

4.1.1 Attribute Checks

Ensure that the event tables have the following characteristics:

a. The text in the MetadataStandardName field is shorter than 30 characters (use this text: Version 2 - 1998 FGDC-STD-001)
b. The EventType field is populated for all records
c. If using INLINE values for the event dates, the Start_Date column is included in the attribute table and populated with a date
d. If using INLINE values for the event dates, the Cycle_Year column is included in the attribute table and populated with a cycle
e. The Source_Originator field is populated with the State abbreviation
f. The Source_DataDescr is populated with the EPA Program
g. The values in the ReachCode column for custom events is <NULL> and not just blank*
h. The values in the ReachSMDate column are <NULL> for all custom events*
i. The values in the ReachResolution column are <NULL> for all custom events*
j. The ReachSMDate for all non-custom events is populated with 1/1/1990

* Custom events created with the current version of the HEM EPA Add-on tools (2.3.1) do not populate the values in these fields with <NULL> so new fields have to be added and populated accordingly for custom event records.

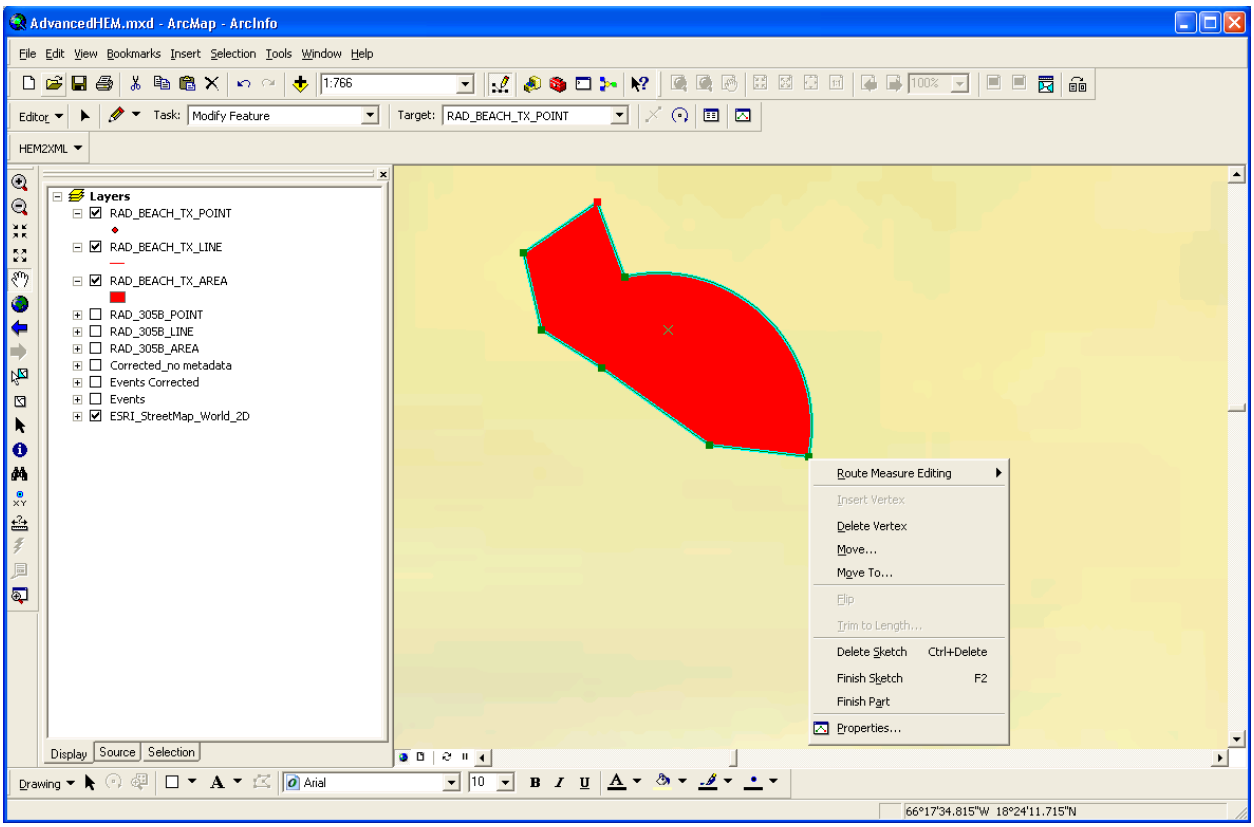
4.1.2 Geometry Checks

The NHDModel does not support curves nor does it support multistring reached events unless they are custom events.

Curves

Ensure that the line and polygon events do not contain curves by using the ArcMap Editor toolbar to remove and replace the curve with a line segment. Pictured in Figure 4.1.2-1 is an example of a curve segment on an area event.

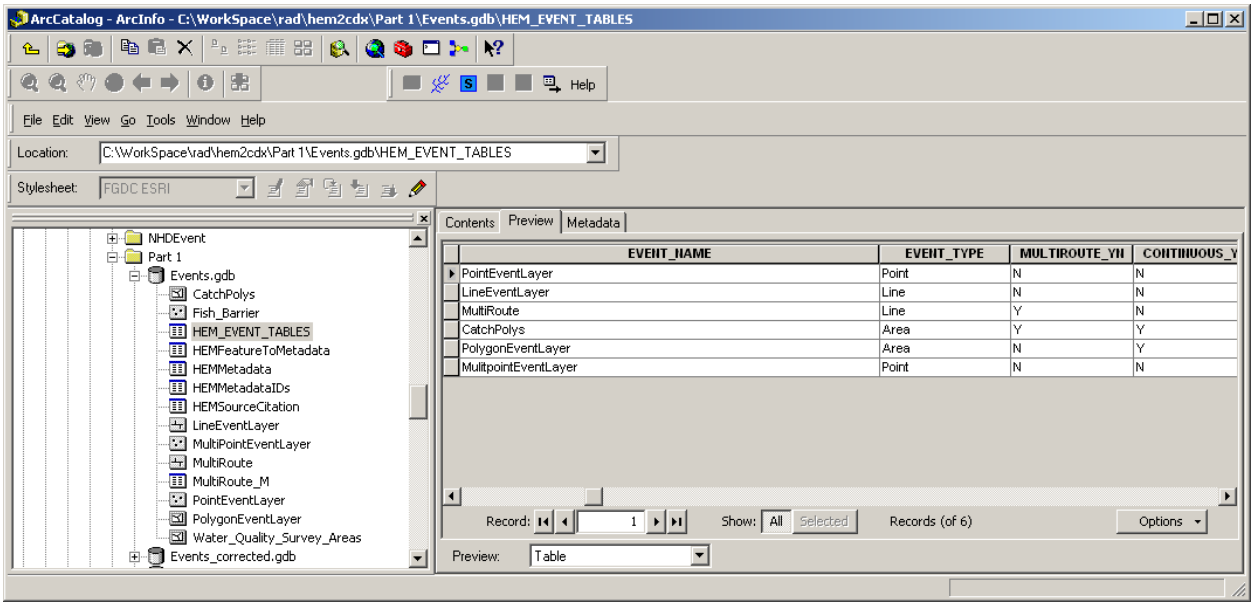
Figure 4.1.2–1: Curved segment in a Polygon



4.2 VALIDATION CHECKS PERFORMED BY THE HEM2XML TOOL

The HEM2XML tool will perform several validation checks to ensure that the xml will validate when submitted through the exchange node. The HEM_EVENT_TABLES as pictured in Figure 4.2-1 is used to determine which events to export to the XML file. Only events where the MULTIROUTE_YN field is marked as N will be exported. If errors are found, a message box displays indicating the items that need to be fixed (Figure 4.2-2).

Figure 4.2–1: HEM_EVENT_TABLES File Geodatabase Table



For each Event Feature feature class listed in the EVENT_NAME field of the HEM_EVENT_TABLES, the following checks are performed. If any errors are found, a message box will pop up indicating the errors found in each Event Feature feature class.

1. The HEM_EVENT_TABLES is a required table.

2. Only point, multipoint, line, and polygon (with the exception of annotation and dimension feature classes) geometries can be submitted. Feature classes with non-valid geometries must be removed from the HEM_EVENT_TABLES or an error message will be displayed upon validation.

3. The following are required fields:

    a. EventType, SourceOriginator, and SourceFeatureID cannot be null or blank for Event Features
    b. EventType must be a positive integer (> 0)
    c. EventType must be the same value for each of the Event Features

4. The FeaturetoMetadata records must be equal to or greater than the total feature records.

5. The Permanent_Identifier field in the event feature classes cannot be null. It also must be unique and a valid Global Unique Identifier (GUID) format.

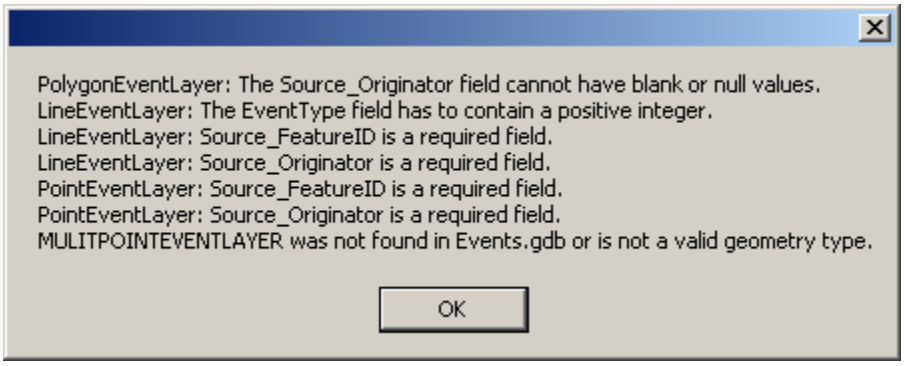
6. The Meta_ProcessID field in the HEMMetadata table cannot be null. It also must be unique and a valid GUID format.

7. The Source_DatasetID field in the HEMSourceCitation table cannot be null. It also must be unique and a valid GUID format.

8. The Meta_ProcessID field in the HEMSourceCitation table cannot be null. It also must a valid GUID format.

9. The Meta_ProcessID and Permanent_Identifier together comprise the primary key for the HEMFeatureToMetadata table. Neither can be null, both must be proper GUIDs and their combination must be unique.

Figure 4.2-2: Sample Error Message After Unsuccessful Validation

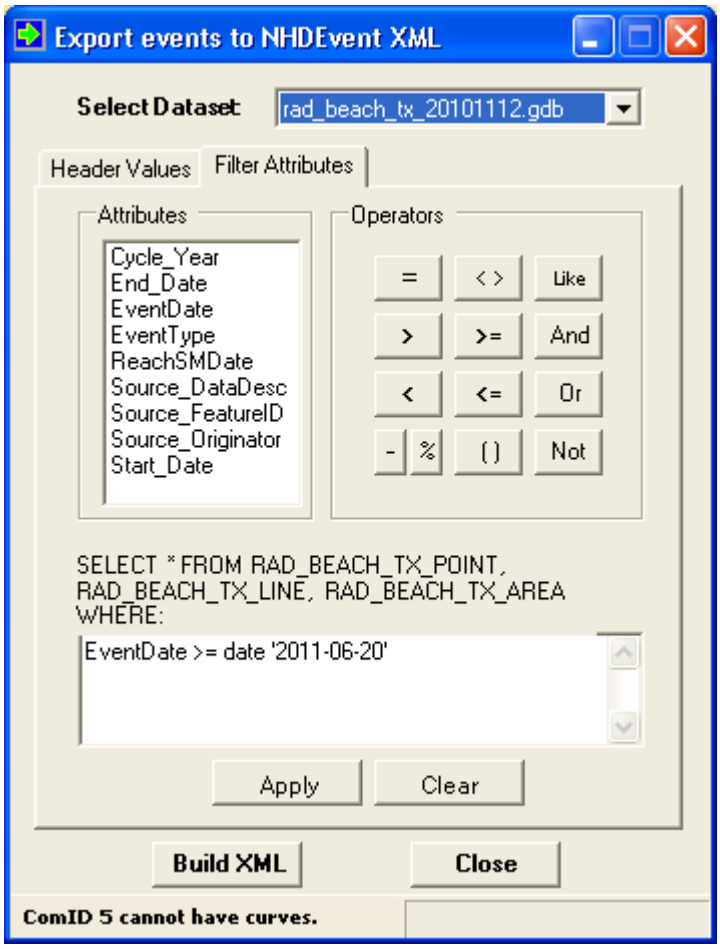


4.3 EXCEPTIONS

1. W3C has defined a set of illegal characters for use in XML. Please refer to http://www.w3.org/TR/2006/REC-xml-20060816/#charsets for XML 1.0. If any of these incompatible characters are used, it is not guaranteed that these characters will be transmitted validly to the database through the CDX process.

2. Curves cannot be directly entered as part of a line or area event using the HEM 2.2 Tool. If features that contain curves are copied and pasted into the event feature class to be submitted, you will not be able to build the XML file successfully. As soon as one of these features is encountered, the process will stop and an error message will appear on the progress bar at the bottom of the dialog box. The error message contains the ComID and the geometry type (Figures 4.3-1).

Figure 4.3-1: Sample Error Message When Curve is Found



5. SUBMIT CHANGES TO THE EPA CDX NODE

5.1 SUBMITTING EVENTS VIA THE EXCHANGE NETWORK WEB CLIENT

Please note, CDX requires users to submit at least one successful test submission to the CDX test node before being granted production node access. Once you have access to production, you should only submit "production submissions (ready to load into the RAD)" to the production CDX node. There is no need to submit to the test node every time you submit a file.

5.1.1 Directions for submitting to the Test Node

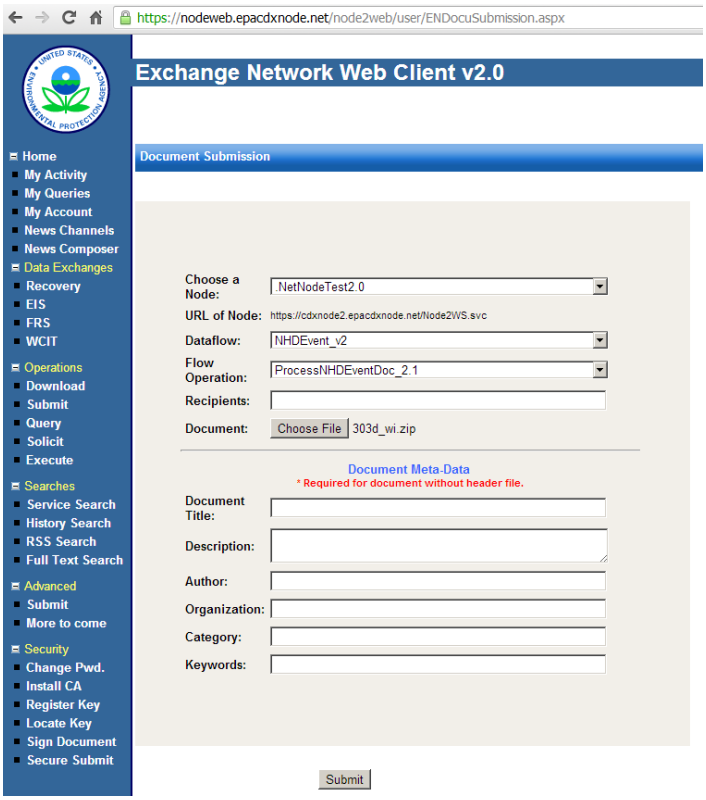
1. Navigate to https://nodewebrss.epa.gov/ in your web browser.

2. Log in with your Network Authentication and Authorization Server (NAAS) account credentials. The ID is your email address and the password is created and sent to you by the Central Data Exchange (CDX) User Support. If you need a NAAS account, send an email to nodehelpdesk@epacdx.net requesting a NAAS account for access to the NHDEvent data flow for both test and production environments.

3. Once you are logged in to the Exchange Network, click **Submit** under the Operations heading in the sidebar on the left hand side of the page. CDX requires users to submit at least one test submission to the test node before they will grant production node access. After you have successfully submitted to the Test node, send an email to nodehelpdesk@epacdx.net and request submit rights for the Production node. The CDX Helpdesk will then contact EPA Headquarters to authorize production node access.

4. Fill in the form as shown below. Click the "Browse…" button to navigate to and upload the XML or Zipped XML file that contains the data. The Document Meta-Data fields are not required to be filled out for the NHDEvent dataflow.

Figure 5.1.1-1: Exchange Network Submission Form for Test Node



Definitions of each field:

- **Node Name**: The name of the target Network Node.
- **Dataflow**: The name of a dataflow. A node categorizes inflow documents into dataflows, and dataflow typically determines how the document will be processed. The parameter is required.
- **Flow Operation**: The name of a flow operation. The parameter further specify how a document is processed. It is optional if the dropdown box contains no entries.
- **Recipients**: A list of ultimate recipients' email addresses. A notification will be sent to these recipients regarding your submission if provided. The parameter is optional.
- **Document**: The document to be submitted. You must select a file from your computer.

5. Click the **Submit** button. You should receive an automated email stating that the transaction is Pending. Soon after, depending on the size of the file submitted, you should receive another email stating the transaction is Complete.

   At this point, you have successfully completed a test submission through the Exchange Network to the *Test* Node of the NHDEvent data flow.

5.1.2 Directions for submitting to the Production Node

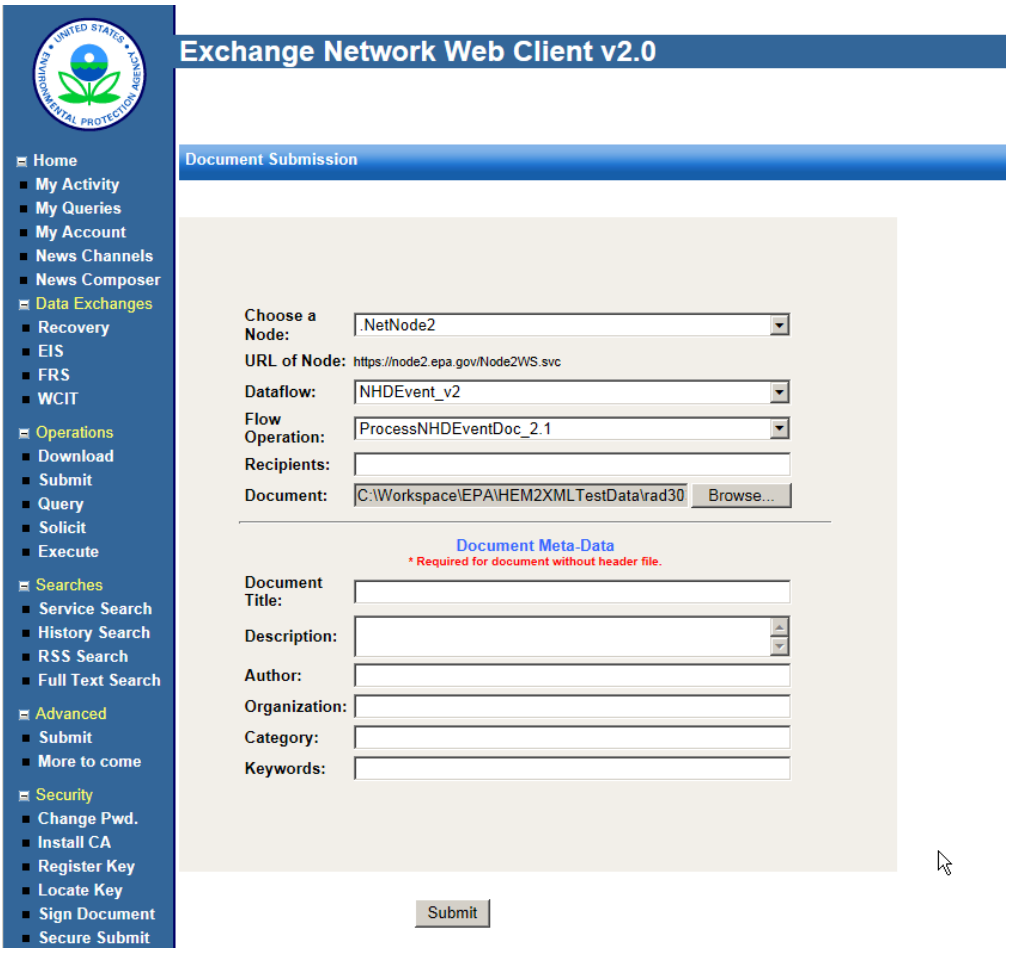
1. Navigate to https://nodewebrss.epa.gov/user/default.aspx in your web browser.

2. Log in with your NAAS account password. The ID is your email address and the password is created and provided by the Central Data Exchange (CDX) User Support center.

3. Once you are logged in to the Exchange Network, click on **Submit** under the Operations heading in the sidebar on the left hand side of the page.

4. Fill in the form as shown below. Click the "Browse…" button to navigate to and upload the XML or Zipped XML file that contains the data. The Document Meta-Data fields are not required to be filled out for the NHDEvent dataflow.

Figure 5.1.1-2: Exchange Network Submission Form for Production Node



5. Click the **Submit** button. You should receive an automated email stating that the transaction is Pending. Soon after, depending on the size of the file submitted, you should receive another email stating the transaction is Complete.
    a. NOTE: If the Submit button is Grayed/Disabled, please refer to the "Directions for submitting to the Test Node" section of this document.

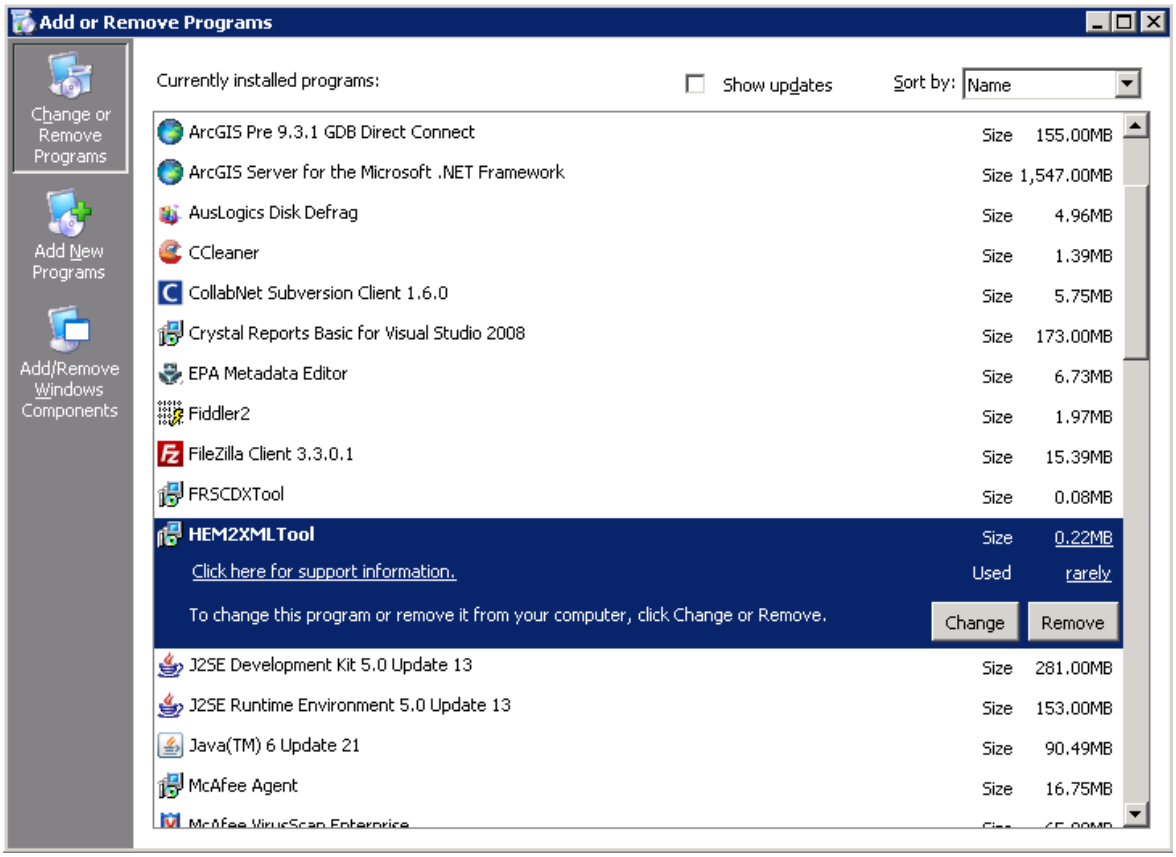
At this point, you have successfully completed a production submission through the Exchange Network to the WATERS System via the NHDEvent data flow.

6. UNINSTALLING

6.1 UNINSTALLING

To uninstall the tool navigate to the Control Panel, select **Add or Remove Programs**, locate the tool in the list of programs and then click the **Remove** button.

Figure 6.1-1: Uninstall HEM2XML from Control Panel



Please note, if you uninstall ArcGIS, during a service pack upgrade, you must uninstall any custom components such as this tool before you attempt to uninstall ArcGIS.