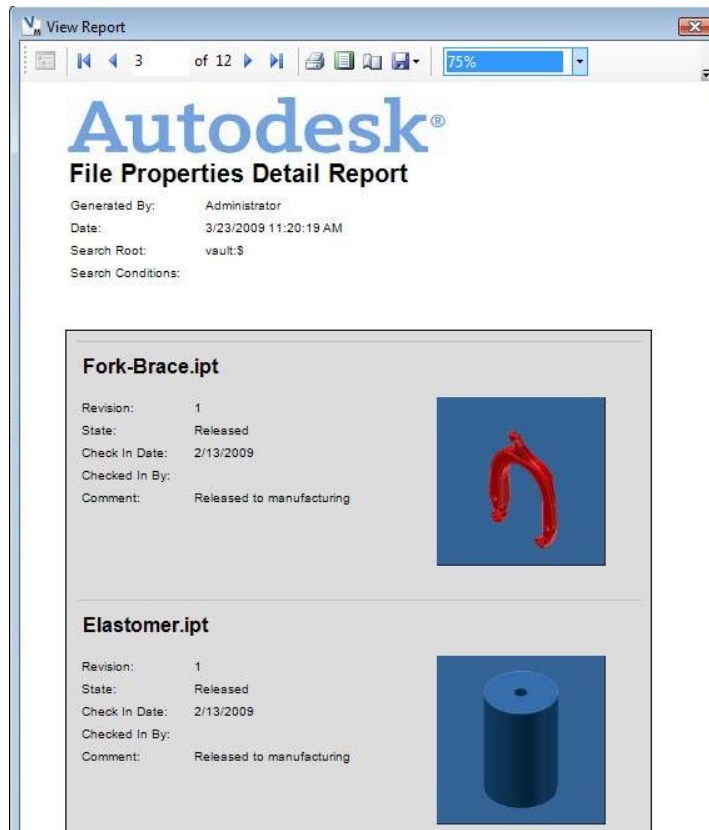


Overview

Vault Collaboration and Vault Manufacturing 2010 provide the ability to generate formatted reports representing data contained in a vault. You can generate reports for files, items, or change orders, and organize them based on specific properties. For example, a report can display files grouped by a category, summarize currently open change orders, or show the distribution of lifecycle states across a model. Reports can display the data in a variety of ways, including charts, tables, and data sheets. You can also format data using dozens of pre-defined operators.



A sample report

Search options specified in the Advanced Find dialog determine which vault objects appear in a report. The properties displayed in the report, as well as the report layout, are specified in a report template file that is selected during the report generation. Through the report template, you have complete control of the report content, layout, and format.

This white paper explains how to create and modify report templates so that you can customize Vault reports that contain information relevant to your business, in a format that suits your needs.

Vault use of Microsoft Report Viewer

Vault uses the Microsoft Report Viewer to generate and display reports. Microsoft Report Viewer contains a full-featured, highly customizable reporting engine to display reports for SQL Server Reporting Services. However, the report viewer can also be run in "local mode" - allowing applications like Vault to provide data for report rendering without requiring the overhead of SQL Server Reporting Services. Vault runs the report viewer in local mode.

REPORT TEMPLATE AUTHORIZING

Report Viewer uses the Microsoft-proposed standard Report Definition Language (RDL) to describe the format of the report. RDL is an XML schema that can contain:

- Formatting descriptions for tables, charts, images, headers, footers, and so on
- Data field definitions
- Report parameters

There are two types of RDL files supported by Report Viewer – one each for the server and local report processing mode. Vault uses the local processing mode, so we will be using the local types of RDL file – which, by convention, is stored in files with the .rdlc extension. RDL and RDLC files have the same XML schema, but RDLC files do not contain database connection information since the client application (in this case Vault) provides the data.

Even though RDLC files contain XML, no knowledge of XML is required to create and edit them. Microsoft provides tools for creating and editing RDLC files in *Microsoft Visual Studio 2008*. If you do not own *Microsoft Visual Studio 2008*, *Microsoft Visual Web Developer Express* is capable of RDLC editing with an available Report Designer add-in. *Microsoft Visual Web Developer Express* can be downloaded for free from:

<http://www.microsoft.com/express/> . The *Microsoft Report Viewer Add-on for Visual Web Developer 2008 Express Edition* can be downloaded (also free) from: <http://www.microsoft.com/downloads/details.aspx?FamilyID=b67b9445-c206-4ff7-8716-a8129370fa1d&displaylang=en> .

Detailed information on the editing of RDL files is outside the scope of this document, but Microsoft provides a good overview here: <http://msdn.microsoft.com/en-us/library/ms159267.aspx> , and a tutorial here: <http://msdn.microsoft.com/en-us/library/ms167305.aspx> . There are also a number of books available on the subject of SQL Server Reporting Services that have sections covering RDLC report template creation and editing.

Vault Report Templates

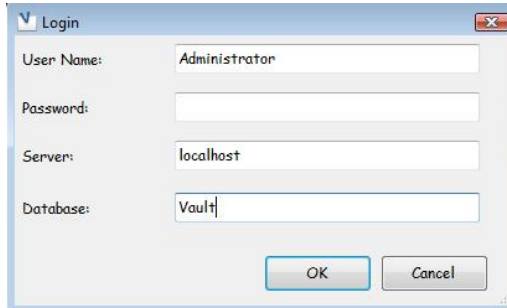
Report descriptions for Vault reports are contained in RDLC files stored on the Vault client machine. These report description files are referred to as report templates. Vault report templates are fully RDLC compliant, but Vault requires certain naming conventions in the <DataSet> section of the template for integrating Vault data into the report. To make it easy for template authors to comply with these conventions, the Autodesk Report Template Utility was created.

The Autodesk Report Template Utility is a program used to create an initial RDLC report template that contains all of the required Vault data binding information, but no formatting. You can open the RDLC file created by the Autodesk Report Template Utility in Visual Studio to specify the layout and formatting of the report.

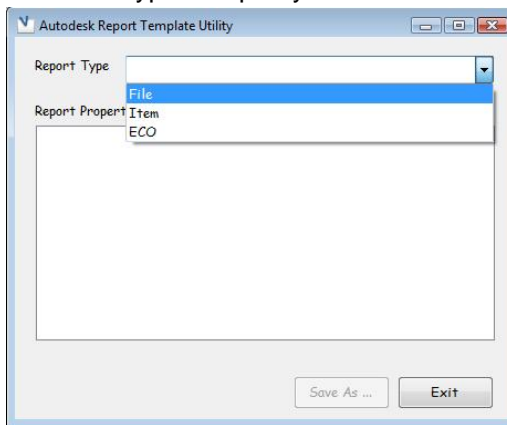
REPORT TEMPLATE AUTHORIZING

Step by Step: Create a Vault Report Template

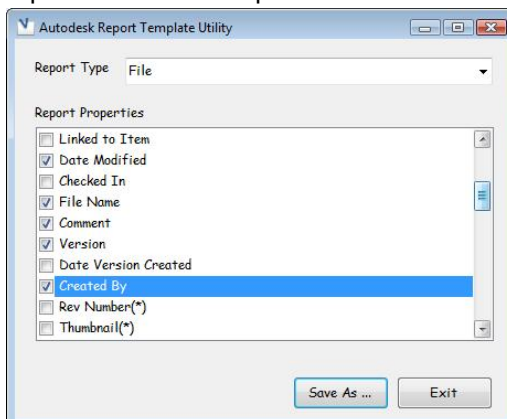
- 1) Create a Vault-compliant RDLC file using the *Autodesk Report Template Utility*.
 - a. Start the *Autodesk Report Template Utility*. Click Start>Autodesk>Vault Manufacturing 2010>Tools>Autodesk Report Template Utility.
 - b. Log into the data management server and then click OK.



- c. Select the type of report you want to create: File, Item, or ECO.



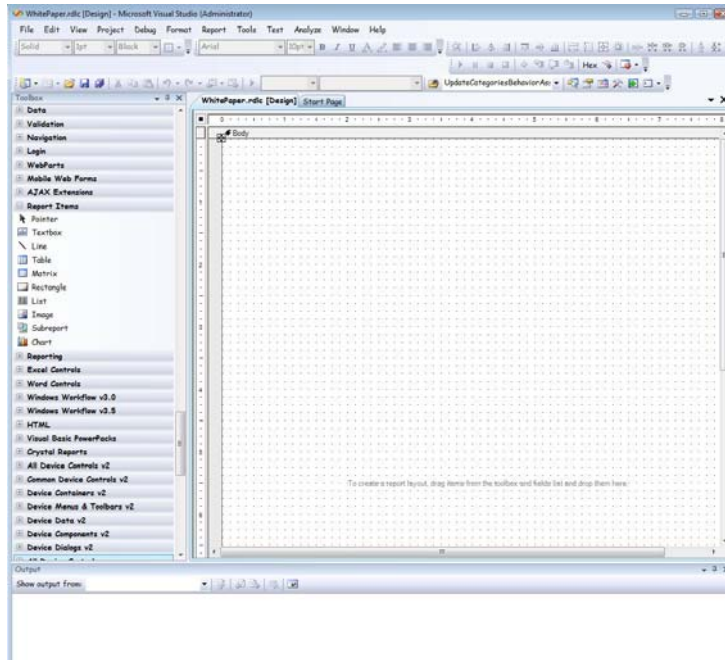
- d. A list of properties associated with the selected report type is displayed. Use the check boxes to select the properties to include in the report. It is important to leave properties that will not be included in the report unchecked, as this will cause the report engine to request more data from the server than necessary. This request for additional data could impact overall server performance when the report is generated.



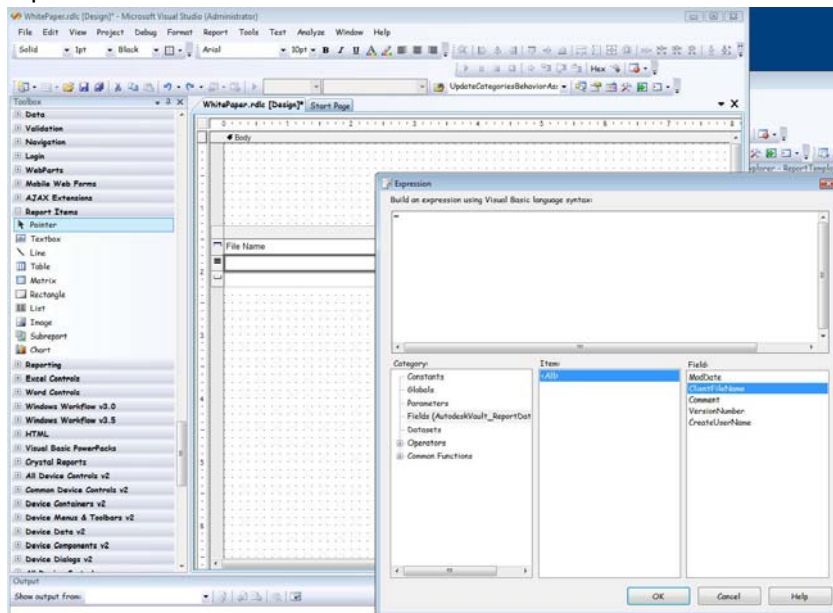
- e. Click Save As... to save the report to a local folder.

REPORT TEMPLATE AUTHORING

- 2) Add layout and formatting in Visual Studio.
 - a. Open Visual Studio and load the RDLC file generated in step (1). The report template is blank as the *Autodesk Report Template Utility* did not add any layout or format information to the RDLC file.

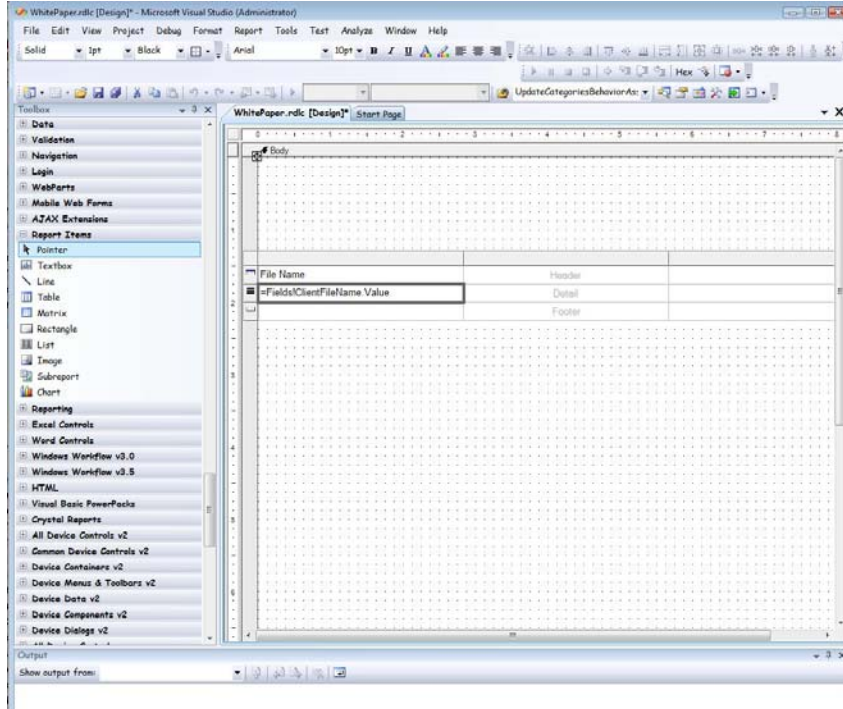


- b. Add controls from the toolbox to the report template.
 - c. Once a control is placed in a report template the control can be configured to display the value of a vault property. Right-click the control and then select Expression... from the context menu. In the Expression dialog, select Fields from the Category list to display all of the property names checked in step 1. Double-click a property name to fill in the expression text box. Click OK.



REPORT TEMPLATE AUTHORING

- d. The field expression is now associated with the report control. When the report is generated, this control will be filled with the specified property for each Vault object processed.



- e. Save the template as an .rdlc file.

3) Test the Report in Vault.

- a. Without exiting Visual Studio, start Vault and then run a report.
- b. Specify the new created template in the report template dialog.
- c. View the results.
- d. Modify the template in Visual Studio as needed.
- e. Save the template.
- f. Repeat as necessary.

Including Non-property Vault Data in a Report

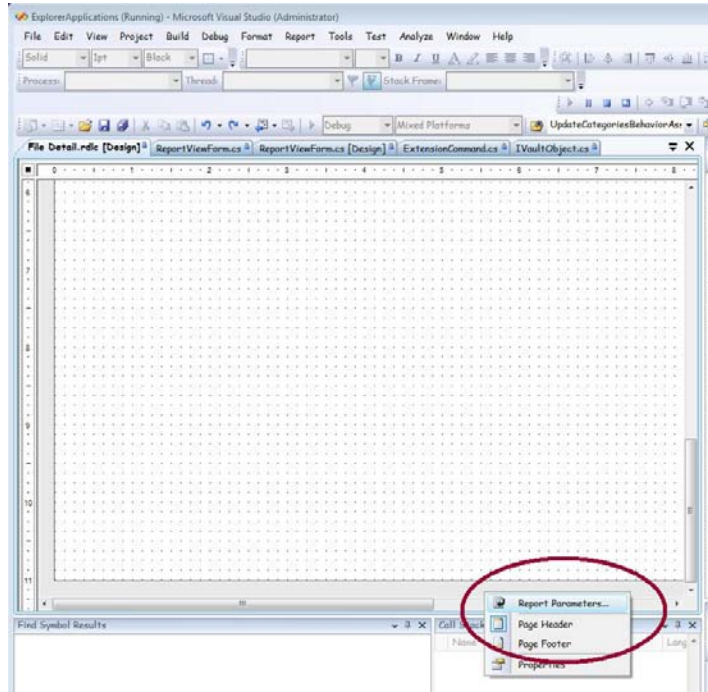
There is information relevant to a report that is not stored as properties in Vault. To allow this information to display in a report, a number of RDL-defined parameters must be supplied with values by the Vault prior to report processing. This process allows the template author to place and format these values in a report.

The following report parameters are supplied with values by Vault:

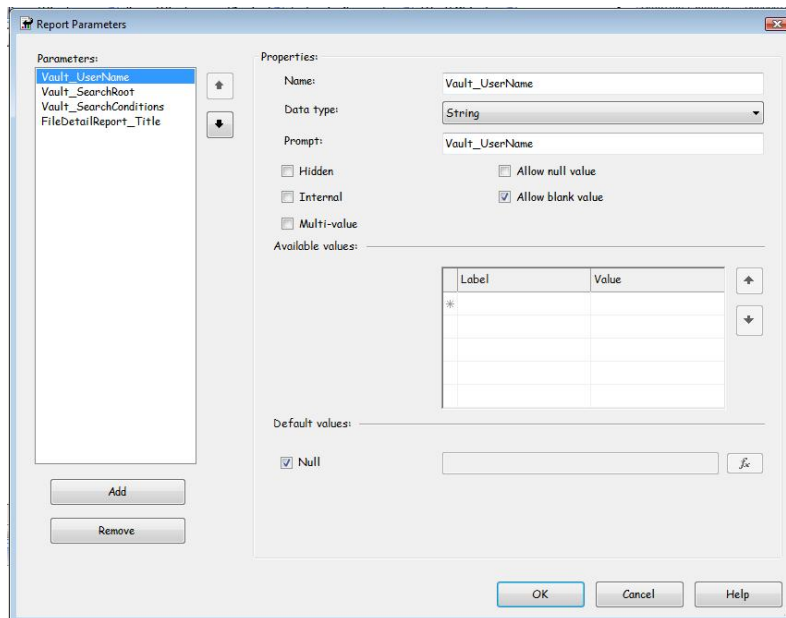
Template Parameter Name	Value
<code>Vault_UserName</code>	The name of the Vault user who generated the report.
<code>Vault_VaultName</code>	The name of the vault that provided data for the report. This is the vault that the user who generates the report is logged into.
<code>Vault_SearchRoot</code>	The name of the folder(s) specified in the Look in control located on the Find dialog in Vault.
<code>Vault_LatestVersionOnly</code>	The state of the Find latest versions only checkbox on the Options tab of the Find dialog in Vault.
<code>Vault_SearchSubFolders</code>	The state of the Search Subfolders” checkbox on the Options tab of the Find dialog in Vault
<code>Vault_SearchFileContent</code>	The state of the Search file content check box on the Basic tab of the Find dialog in Vault.
<code>Vault_SearchConditions</code>	A string representation of the search conditions specified on the Advanced tab of the Find dialog in Vault

REPORT TEMPLATE AUTHORING

To use one or more of these parameters in your report, create a parameter of the same name in your template by loading the template in Visual Studio, right-clicking outside of the report template, and then selecting Report Parameters.

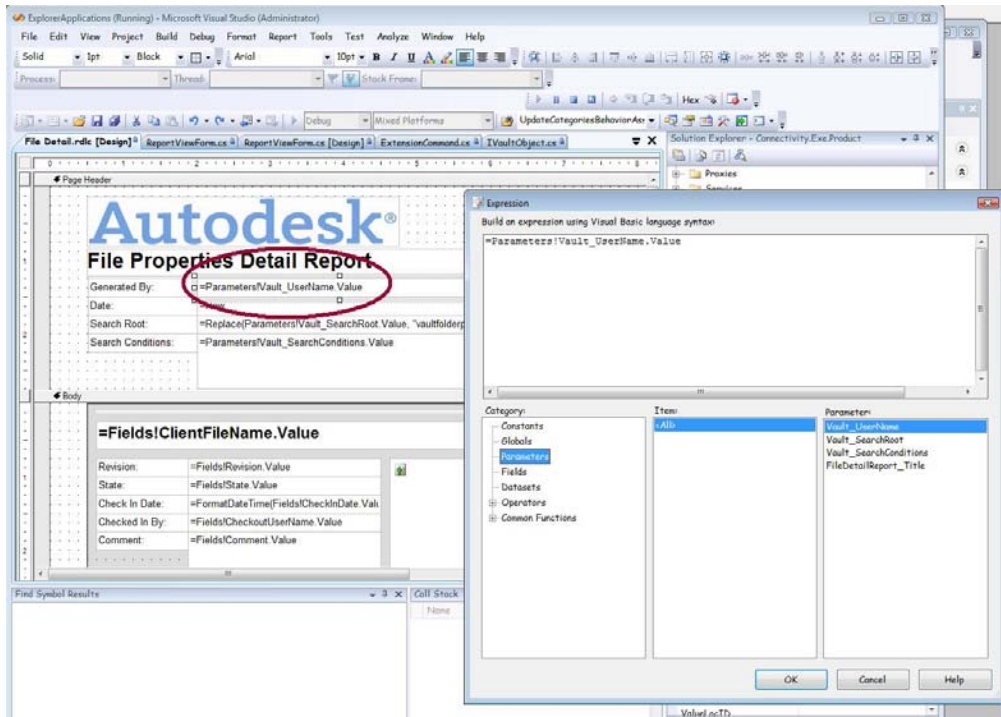


In the Report Parameters dialog, you will specify the parameters you want to include in your report. If you specify any of the reserved report parameter names listed above, the Vault reporting engine will supply a value for that parameter at runtime. Reserved parameter names must be spelled exactly as they appear in the table for the report engine to find them. Parameter names are case sensitive. The remainder of the fields in the Report Parameters dialog can retain their default values as shown in the example below.



REPORT TEMPLATE AUTHORING

Placing a parameter value in a report is similar to placing property values: right-click on a control and then select Expression... from the context menu. In the Expression dialog, double-click on a property name to specify that the parameter value to be used for this control.



You can use parameter values in expressions just like field value. All of the sample templates included with Vault do parameter formatting in this way.

Resources

- To become familiar with RDL and report template formatting, examine the sample templates that come with Vault Collaboration and Vault Manufacturing. These templates will open directly in Visual Studio or any third party RDL editor.
- There are a number of books on SQL Server Reporting Services, nearly all of which have a section on authoring RDLC report templates. We recommend *SQL Server 2005 Reporting Services in Action* (ISBN: 1-932394-76-1). Note, however, that Vault is using the Report Viewer 2008 control, so this is not the most recent book on the topic.
- The web site www.gotreportviewer.com includes links to the free Microsoft RDL editing tools, sample .rdlc templates, and how-to articles on many aspects of template authoring. It also has general information on the Report Viewer control for the curious.

Sample *Autodesk Report Template Utility* RDL Output

The *Autodesk Report Template Utility* creates an .rdlc file and populates the <DataSources> and <DataSets> elements with values that are both RDL-legal and conform to Vault report property naming conventions.

The following RDL snippet shows a typical data section as generated by the *Autodesk Report Template Utility*:

```
<?xml version="1.0" encoding="utf-8"?>
<Report
xmlns="http://schemas.microsoft.com/sqlserver/reporting/2005/01/reportdefinition"
xmlns:rd="http://schemas.microsoft.com/SQLServer/reporting/reportdesigner">
  <Width>8.5in</Width>
  <Body>
    <Height>11in</Height>
  </Body>
  <DataSources>
    <DataSource Name="ReportAuthoringDataSourceConnectionString">
      <rd:DataSourceId>69ef673a-4e65-4b13-b2a1-a103c8ce2b6e</rd:DataSourceId>
      <ConnectionProperties>
        <DataProvider>OLEDB</DataProvider>
        <ConnectionString>Provider=Microsoft.Jet.OLEDB.4.0;Data Source="C:\My
Documents\SampleVaultProDataSet.mdb"</ConnectionString>
      </ConnectionProperties>
    </DataSource>
  </DataSources>
  <DataSets>
    <DataSet Name="AutodeskVault_ReportDataSource">
      <Fields>
        <Field Name="CheckoutUserName">
          <DataField>2!4b42be8a-137a-401c-b9b2-2eaf8619224a!nvarchar</DataField>
          <rd:TypeName>System.String</rd:TypeName>
        </Field>
        <Field Name="ClientFileName">
          <DataField>0!84f067ca-dcfb-4864-b2bd-7a5671bf553a!nvarchar</DataField>
          <rd:TypeName>System.String</rd:TypeName>
        </Field>
        <Field Name="VersionNumber">
          <DataField>0!6da2a644-4bdd-411b-aeb5-972e2ca1504c!int</DataField>
          <rd:TypeName>System.Int32</rd:TypeName>
        </Field>
        <Field Name="CreateUserName">
          <DataField>0!4f7c80a7-9a91-4be9-bddb-23bb47183ad0!nvarchar</DataField>
          <rd:TypeName>System.String</rd:TypeName>
        </Field>
        <Field Name="State">
          <DataField>LCState!89562930-aa40-41d3-a671-
132f42cb6ab6!nvarchar</DataField>
          <rd:TypeName>System.String</rd:TypeName>
        </Field>
      </Fields>
      <Query>

<DataSourceName>ReportAuthoringDataSourceConnectionString</DataSourceName>
  <CommandText>SELECT * FROM ReportDataSet</CommandText>
  </Query>
</DataSet>
</DataSets>
</Report>
```

It is expected that there will be times where it is beneficial to edit an .rdlc file using a text editor. However, there are a few guidelines you should follow when doing so:

REPORT TEMPLATE AUTHORIZING

- Edit the names of the fields displayed in the `<Field Name="State">` tag to whatever label you want to use when authoring the report. Know that this field name is what is used to associate a field with a particular control, so changing the field name after associating values with controls will likely break this association.
- Copy the entire contents of the `<Field> ... </Field>` element to add properties to your report that you forgot to specify when running the *Autodesk Report Template Utility* initially.
- Do **not** edit the `<DataField>` tags (`<DataField>LCState!89562930-aa40-41d3-a671-132f42cb6ab6!nvarchar</DataField>`) as it is difficult to provide the correct value. Use the Autodesk Report Template Utility to generate these for you.
- Do **not** edit the `<DataSourceName>` or any sub element of the `<DataSources>` tag. The Autodesk Report Template Utility generates these values exactly as the Vault reporting engine expects them.

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