

# Chapter 20: Reporting Interpretations

Chapter 20 introduces custom interpretation reports. NASIS allows reports of interpretations based on current data and on calculations automatically performed by NASIS. This provides the capability of applying new interpretive criteria to soil data.

Interpretive criteria in NASIS are based on the concept of fuzzy logic (also known as approximate reasoning). This fundamental concept is explained and demonstrated in detail in Chapter 19, an important foundation for this lesson in Chapter 20. This chapter will discuss the special report parameters for custom interpretations and learn how to run the soils data through a set of existing criteria.

## Understanding the Interpretation Reports

This lesson uses the same selected set built in Chapter 13. The data in the selected set are the basis of reports, not the permanent database. Refer to pages 13.1-3 to reload the data.

1. Choose the **Reports Explorer**. This is the same report manager used for printing other NASIS reports.

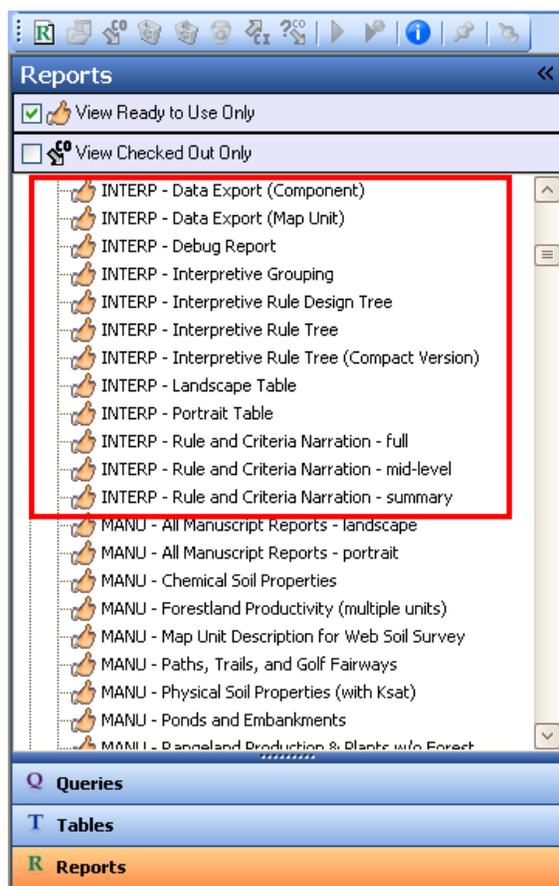
2. On the Report Explorer, choose **NSSC Pangaea**.

**Note:** There are several interpretation report formats available. They are indicated on the Report Explorer Panel by the INTERP prefix.

3. Double click each interpretation report to open into the Editor panel. Then read its' description.

4. The reports are grouped with each group having a specific purpose. The first two reports provide unformatted results based on either the component or the map unit. The Debug report is used when writing interpretations. The Grouping report displays the interpretation results based on the rating class. The Interpretative Rule reports provide the elements of each interpretation. The Landscape and Portrait are formatted reports providing the interpretation ratings and restrictions. And the "Rule and Criteria" reports provide the metadata in a variety of formats.

**Note:** The Report Explorer dialog displayed contains several reports unique to interpretations. The INTERP and MANU reports are able to print interpretation results. Become familiar with the reports by opening the reports and reading the descriptions.



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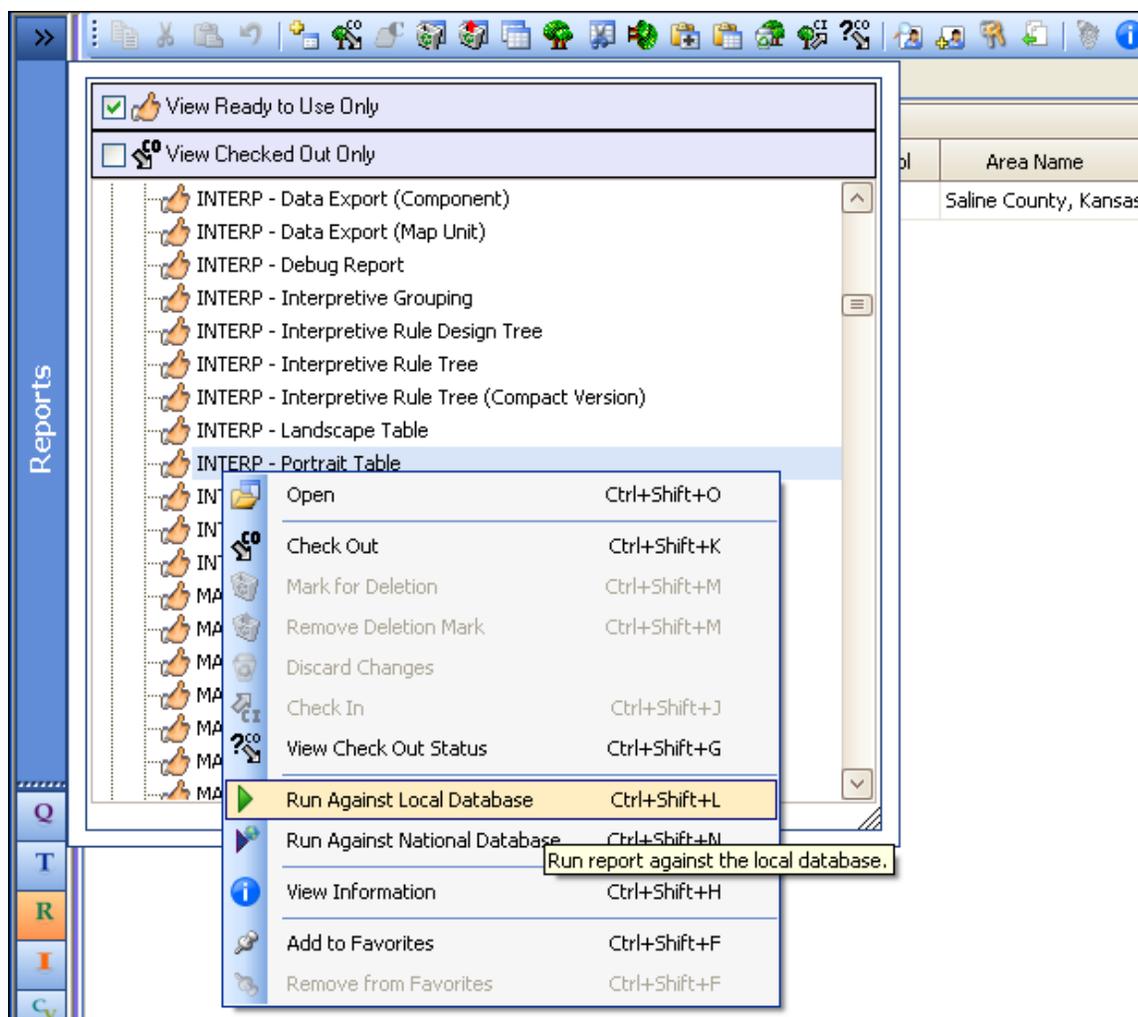


Figure 20-1 Using the right click short cut menu to run reports

**Note:** NASIS provides pre-defined interpretation criteria within some reports. Selecting NSSC Pangaea on the Report Explorer displays the “national” interpretation reports. This set of “national” interpretation reports reflect the soil rating criteria documented in various national handbooks and manuals (National Soil Survey Manual, National Forestry Manual, National Range and Pasture Handbook, etc.).

The ultimate responsibility of interpretive certification lies with the States, therefore these “national” interpretations should be regarded as “templates” which the states may decide to use as is or modify to reflect local criteria. When selecting “national” interpretations make certain the “Ready to use” box is marked. Some “national” interpretations stored in the system may be currently under development. These incomplete or un-tested interpretations should not be used to produce interpretations except for internal testing purposes.

A naming convention identifies interpretations, which appear at the beginning of the list in the NASIS Report Parameters dialog. As shown in Table 20.2 below, interpretations are named with a 3-letter code for the technical discipline, followed by the interpretation name. Table 20-2 shows a sample of the interpretations owned by the NSSC Pangaea site.

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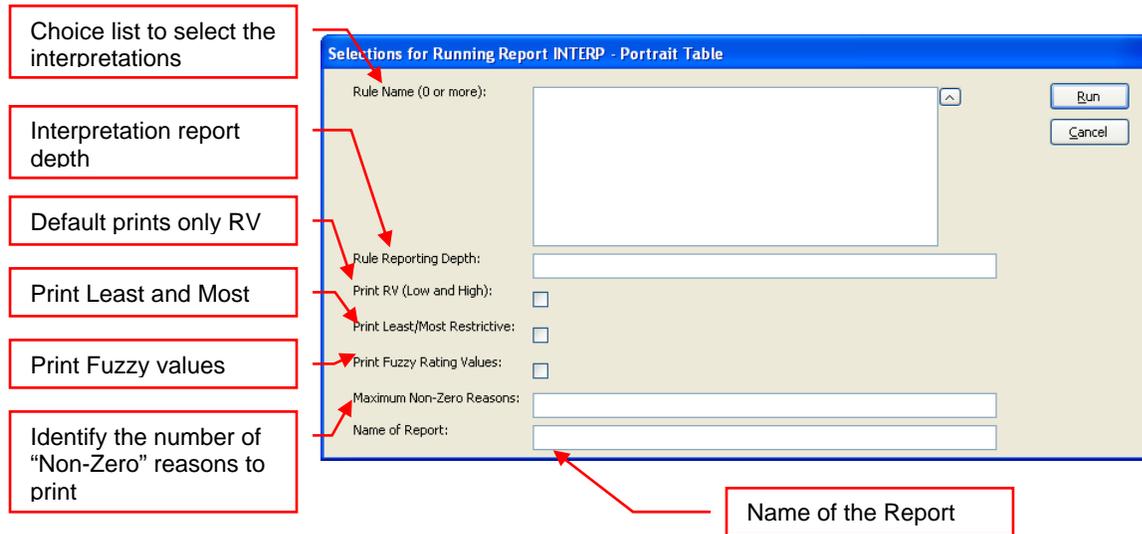
3-Letter Code	Interpretation
ENG	Septic Tank Absorption Fields
ENG	Sewage Lagoons
ENG	Sanitary Landfill (Trench)
AWM	Land Application of Ag Wastes
AWM	Land Application of Municipal Sewage Sludge
AWM	Irrigation Disposal of Wastewater
FOR	Potential Erosion Hazard (Road/Trail)
FOR	Potential Erosion Hazard (Off-Road/Off-Trail)
FOR	Soil Rutting Hazard

Table 20-2. Naming Convention for Interpretations

## Examining Reporting Options

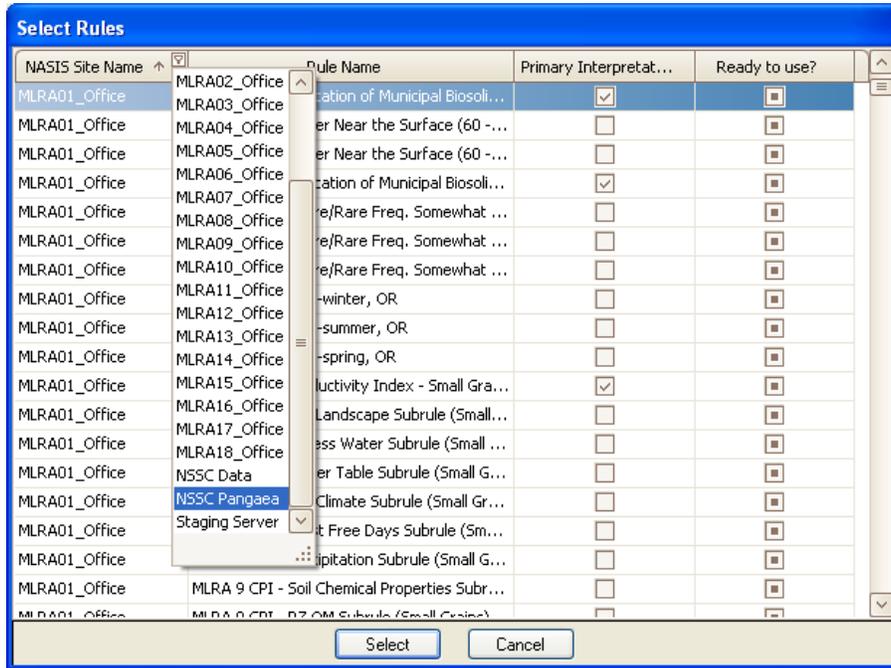
There are several different options on the Report Parameters dialog for previewing reports. The type of reports and the selections will be reviewed.

1. On the Report Explorer panel, select the NSSC Pangaea folder and the **Interpretation (portrait)** report name. Refer to Figure 20-1.
2. Click **Run Against local Database**.

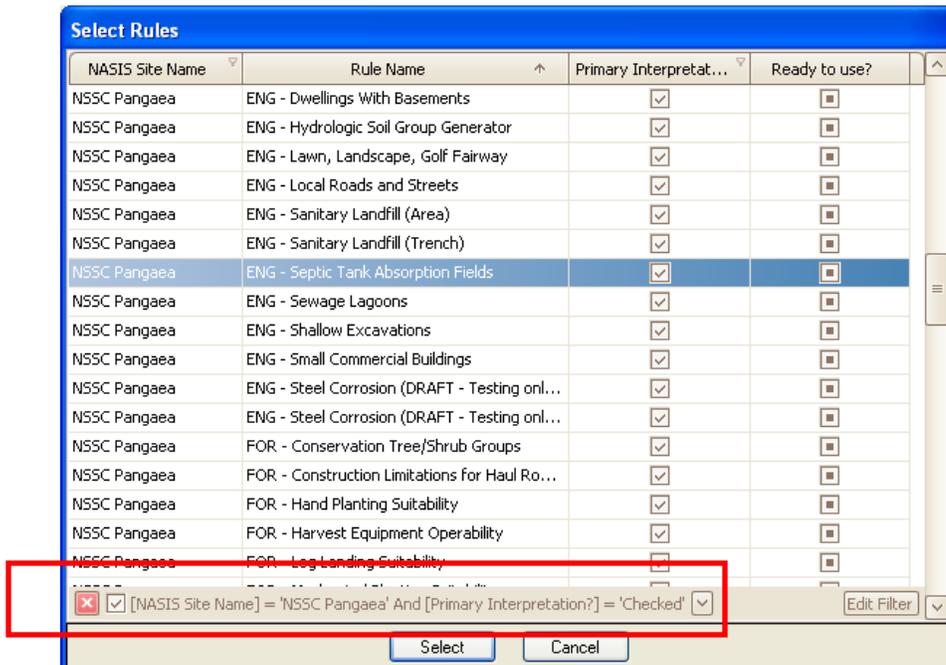


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The Rule Name choice list has the same filtering capabilities of other NASIS6 tables. The choice list can be sorted and filtered based on the users' needs. Notice the ability to filter to select only those "NSSC Pangaea" Rules.



3. Notice the filter assigned in the window lower left hand corner. This list is now filtered for Primary Interpretations on the NSSC Pangaea site. Choose ENG – Septic Tank Absorption Fields and choose the "Select" button:



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4. Complete the Interpretation Parameter box as shown below.

Selections for Running Report INTERP - Portrait Table

Rule Name (0 or more): NSSC Pangaea:ENG - Septic Tank Absorption Fields

Rule Reporting Depth: 2

Print RV (Low and High):

Print Least/Most Restrictive:

Print Fuzzy Rating Values:

Maximum Non-Zero Reasons: 5

Name of Report: Septic Tank Absorption Fields (Reporting Depth = 2)

Run Cancel

5. The parameters assigned in this specific report are:

- a. The interpretation ENG – Septic Tank Absorption Field
- b. The interpretation rule depth is set to 2 levels of Rule reporting. This is the number of rules and sub rules that will be reported:
  0. Interpretation (Rating),
    1. Sub rule (Reason),
    2. Sub rule (Reason)
- c. Print only the RV results, not the Low, RV and High.
- d. Do not print the Least and Most Restrictive interpretation results
- e. Print the Interpretation Restriction Fuzzy Value (0 through 1).
- f. Print a maximum of 5 interpretive reasons (restrictions)
- g. Print a name on the report.

6. Generate the report by clicking the **Run** button.

**Note:** The actual processing of this report is using the local computer. This may take a couple of minutes.

7. The Report Viewer appears, displaying the report.

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The screenshot shows a Notepad window titled "INTERP - Portrait Table.txt - Notepad" with the following content:

```

10/29/2009
Mapunit                               Septic Tank Absorption Fields Report
                                       Saline County, Kansas: Detailed Soil Map Legend
-----
Map symbol and soil name              ENG - Septic Tank Absorption
                                       Fields
-----
2177:
Mccook----- 1.000 Somewhat limited
               1.000 Flooding
               0.500 Slow water movement
Aquolls----- Not rated +
               Not rated; Slope
               Not rated; Fragments > 75mm
               1.000 Flooding
               1.000 Depth to saturated zone
               0.980 Slow water movement
Solomon----- 1.000 Somewhat limited +
               1.000 Flooding
               1.000 Ponding
               1.000 Depth to saturated zone
               1.000 Slow water movement
2179:
Mccook----- 1.000 Somewhat limited +
               1.000 Flooding
               0.500 Slow water movement
Aquolls----- Not rated +
               Not rated; Slope
               Not rated; Fragments > 75mm
               1.000 Flooding
               1.000 Depth to saturated zone

```

Callouts in the image:

- Component:** Points to the "Mapunit" header.
- Rating Values:** Points to the numerical ratings (e.g., 1.000, 0.500) in the sub-rule descriptions.
- Level 1: Overall rating for Interpretation (parent rule):** Points to the "ENG - Septic Tank Absorption Fields" header.
- Level 2: Ratings for sub rules:** Points to the sub-rule descriptions for "Mccook" and "Aquolls".
- Rating classes (defuzzified adjective ratings):** Points to the descriptive text like "Somewhat limited", "Flooding", "Ponding", "Depth to saturated zone", "Slow water movement", "Seepage, bottom layer", and "Not aridic environment".
- Asterisk indicates the result is based on null values in the database:** Points to the "+" sign in "Somewhat limited +".
- Plus "+" sign indicates default values were used:** Points to the "+" sign in "Somewhat limited +".

8. Use the scroll bars on the Report Viewer to scroll through the report.
9. Refer to the callouts to identify the significant features of this report.
10. Refer below for an illustration of the various levels or depths.

Map symbol and soil name	ENG - Septic Tank Absorption Fields
5505: Kisiwa, occasionally flooded-----	1.000 Very limited 1.000 Flooding 1.000 Ponding 1.000 Depth to saturated zone 1.000 Slow water movement 1.000 Seepage, bottom layer 1.000 Not aridic environment

Callouts in the image:

- Reporting Depth 0:** Points to the "1.000 Very limited" rating.
- Reporting Depth 1:** Points to the "1.000 Flooding", "1.000 Ponding", and "1.000 Depth to saturated zone" ratings.
- Reporting Depth 2:** Points to the "1.000 Slow water movement", "1.000 Seepage, bottom layer", and "1.000 Not aridic environment" ratings.

**Note:** On the report parameters, a reporting depth of 2 was used.

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**Note:** Because sub rules can be aggregated into other rules as well as into an interpretation, NASIS provides the capability of reporting up to ten Rule Depths.

**Note:** A *sub rule* is a logical statement about one limiting feature. A sub rule says nothing about the land use; therefore, the same sub rule can be used in building different interpretations. Sub rules are aggregated into an interpretation and are considered the basis, or building blocks, of an interpretation. Sub rules have at least one evaluation linked to them.

For additional discussion of interpretive criteria, see Chapter 19.

11. The report can be printed using the menu File, Print options.
12. When finished looking at this report, return to the Reports Explorer and run the same report, again. The second run will select a different set of options on the Report Parameters dialog.
13. Click **Run Against Local Database** to redisplay the Report Parameters dialog.

**Selections for Running Report INTERP - Portrait Table**

Rule Name (0 or more): NSSC Pangaea:ENG - Septic Tank Absorption Fields

Rule Reporting Depth: 0

Print RV (Low and High):

Print Least/Most Restrictive:

Print Fuzzy Rating Values:

Maximum Non-Zero Reasons: 0

Name of Report: Septic Tank Absorption Field Reporting Depth = 0 and 0 Reasons

Run Cancel

14. In the Report Parameters,
  - a. change **Reporting Depth** to **0**,
  - b. select **Print RV (Low and High)**,
  - c. select **Print Fuzzy Rating Values**, and
  - d. change **Maximum Non-Zero Reasons** to **0**.
15. Click the **Run** button and examine this report.

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16. **Note:** Level one reporting depth and 0 “Non-Zero” reasons returns only the interpretation rating.

Septic Tank Absorption Field Reporting Depth = 0 and 0 Reasons

Las Animas County Area, Colorado, Parts of Huerfano and Las Animas Counties: Detailed Soil Map Legend

Map symbol and soil name	ENG - Septic Tank Absorption Fields
A1A: Trementina, cool	1.000 Very limited
Capulin-----	0.500 (0.000-1.000) Somewhat limited (Not limited to Very limited) +
Mauricanyon-----	0.500 (0.400-1.000) Somewhat limited (Somewhat limited to Very limited) +
A1W:	
Furia-----	1.000 Very limited +
Bandarito-----	1.000 Very limited +
Collegiate-----	1.000 Very limited +
Molinaro-----	0.500 (0.000-1.000) Somewhat limited (Not limited to Very limited) +
AA:	
Ayon-----	0.760 (0.010-1.000) Somewhat limited (Somewhat limited to Very limited) +

Result of choosing "Print Least/Most Restrictive"

17. When finished reviewing the report, close the Notepad and return to NASIS

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18. Rerun the report, this time, change the **Reporting Depth** to **2**, select **Print RV**, **Print Least/Most Restrictive**, **Print Fuzzy Rating Values** and the **Maximum Non-Zero Reasons** to **10**.

**Selections for Running Report INTERP - Portrait Table**

Rule Name (0 or more): NSSC Pangaea:ENG - Septic Tank Absorption Fields

Rule Reporting Depth: 2

Print RV (Low and High):

Print Least/Most Restrictive:

Print Fuzzy Rating Values:

Maximum Non-Zero Reasons: 10

Name of Report: Septic Tank Absorption Field 10 Reasons

19. Click the **Run** button to generate the report.

INTERP - Portrait Table.txt - Notepad

File Edit Format View Help

10/30/2009

Septic Tank  
Saline County, Kansas: Detailed Soil Map Legend

Map symbol and soil name	ENG - Septic Tank Absorption Fields
2177: McCook-----	1.000 Somewhat limited + 1.000 Flooding 0.500 (0.000-1.000) Slow water movement (Ksat not restrictive to Slow water movement)
Aquolls-----	Not rated + Not rated; Slope Not rated; Fragments > 75mm 1.000 Flooding 1.000 Depth to saturated zone 0.980 (0.320-1.000) Slow water movement
Solomon-----	1.000 Somewhat limited + 1.000 Flooding 1.000 Ponding 1.000 Depth to saturated zone 1.000 Slow water movement
2179: McCook-----	1.000 Somewhat limited + 1.000 Flooding 0.500 (0.000-1.000) Slow water movement (Ksat not restrictive to Slow water movement)
Aquolls-----	Not rated +

**Note:** Realize that although the request is for a maximum of 10 reasons, it is for the “Non-Zero” reasons. The report will only print those reasons with a fuzzy value greater than 0, up to a maximum of 10.

# Examining Report Writing

Creating a report to display interpretations contains code that will run the Interpretation and feeds the results into the report for formatting. The manuscript reports are commonly written to include specific interpretations, specific parameters and specific formatting. The Calculations/Validations/Interpretations/Reports (CVIR) document provides greater details on this information. The objective here is to identify the sections of the report and the purpose of each section.

**First section** – Identify the “Base table” or the table that must be within each SQLs.

**BASE TABLE component.**

**Second section** – Run the interpretations and gather the results. This section is designed to set the Rule Depth (RULEDEPTH), set the Maximum non-zero Reasons (REASONS), set the crosstab if more than one interpretation is used (CROSSTAB), identify the values for each crosstab (VALUES), identify the column labels (LABELS), and identify the data to be entered into each column (CELLS).

```
INTERPRET "NSSC Pangaea": "ENG - Septic Tank Absorption Fields",  
          "NSSC Pangaea": "ENG - Sewage Lagoons"  
MAX RULEDEPTH 1  
MAX REASONS 5  
AGGREGATE CROSSTAB BY PrimaryRuleInterpRuleName  
VALUES ("ENG - Septic Tank Absorption Fields", "ENG - Sewage Lagoons")  
LABELS "Septic Tanks", "Sewage Lagoons"  
CELLS RatingValueHighRV, InterpRuleDepth, RatingClassNameHighRV.
```

**Third section** – create the structured query language to retrieve the necessary data to build the report.

```
EXEC SQL select areaname, legenddesc, liid, musym, Imapunitid, Imapunit.seqnum,  
             compname, component.seqnum, comppct_r, coiid, localphase  
FROM real area, legend, Imapunit, mapunit, correlation, datamapunit, component  
WHERE join area to legend and  
      join legend to Imapunit and  
      join Imapunit to mapunit and  
      join mapunit to correlation and  
      join correlation to datamapunit and repdmu=1 and  
      join datamapunit to component;  
SORT BY liid, Imapunit.seqnum, musym SYM, component.seqnum, comppct_r DESC,  
       compname, coiid.
```

**Fourth section** – is used to format the results of the report.

Specific terminology is used in interpretation reports. The terminology of “PrimaryRuleInterpRuleName”, “RatingValueHighRV”, “InterpRuleDepth”, “RatingClassNameHighRV” along with many others are explained in the CVIR manual in greater detail.