Chapter 12: Examining Calculations and Validations

Examining Calculations

Several data elements in the map unit tables and pedon tables can be calculated from information entered in other data elements. Some of the calculations concatenate manually entered fields to populate group names. For example, the taxonomic class calculation concatenates manually entered taxonomic fields (order, suborder, great group, etc.) to create a taxonomic class for a given component. Other calculations populate specific property fields based on algorithms developed using regression analysis from soil properties within the National Soil Survey Laboratory database.

Calculations are available to populate fields. It is the responsibility of the user to verify the quality of the calculated data. **Anyone running a calculation is required to take the necessary time to review the calculated data.**

Calculable columns contain a superimposed source field (graphical image) that indicates whether the column was calculated (C), entered manually (M), or populated prior to a previous conversion (P).

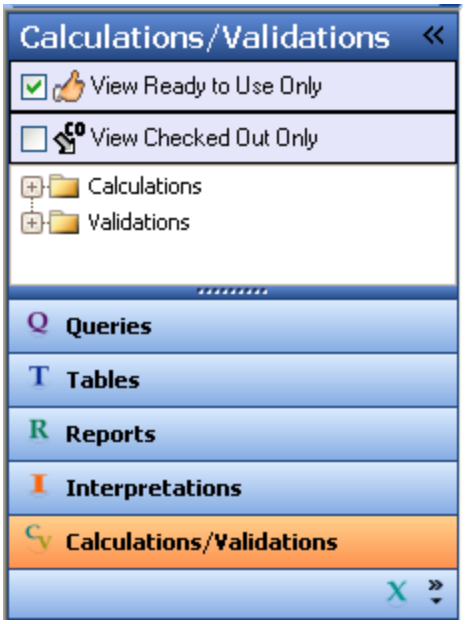
All current calculations and validations are preloaded into the local database at the time of database initialization and are updated when the local database is refreshed. There is no need to query for calculations or validations. They are viewed in the Calculations/Validations Object.

All users can view calculations and validations to better understand the logic and algorithms used to calculate a field. Users belonging to the Pangaea site and Standard Calculations group are the only persons who can create or modify calculations.

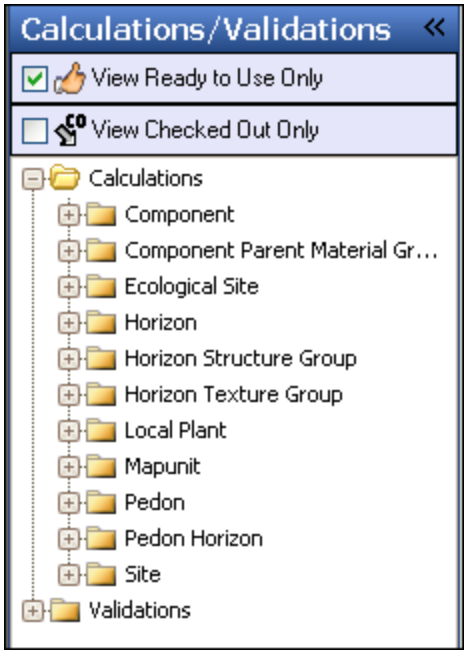
A few calculations populate the Low, RV, and High columns for a given soil property. **For those calculations that populate only the RV field, it is the user's responsibility to review and verify calculated fields and to complete the population of the Low and High fields for that given property.**

Calculations are used to populate a field in NASIS. Before a calculation can be activated, the user must have permission to edit the data and the data must be checked out from the national database.

1. On the Explorer Panel, click the Calculations/Validations Object.



2. Notice the two filters available for viewing the calculations and validations. The thumbs up symbol identifies those that are ready to use. For those who author calculations and validations, the "View Check Out Only" option is available for managing the list.

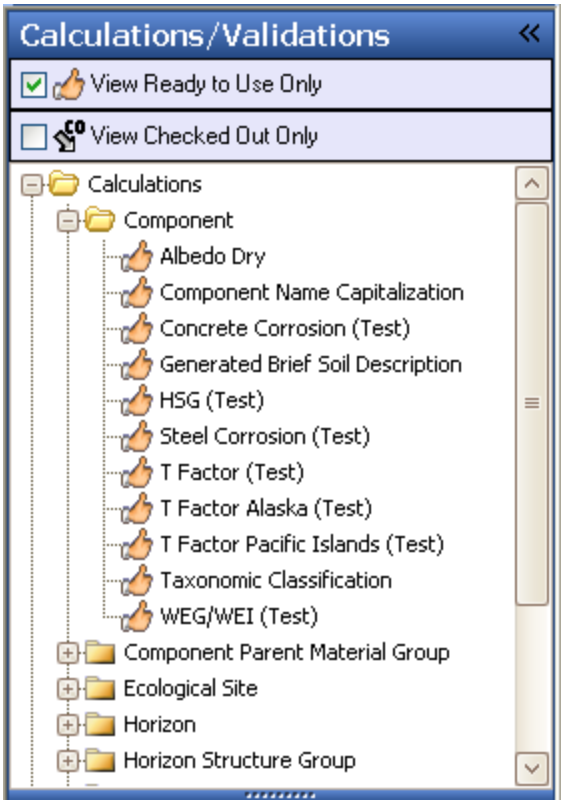


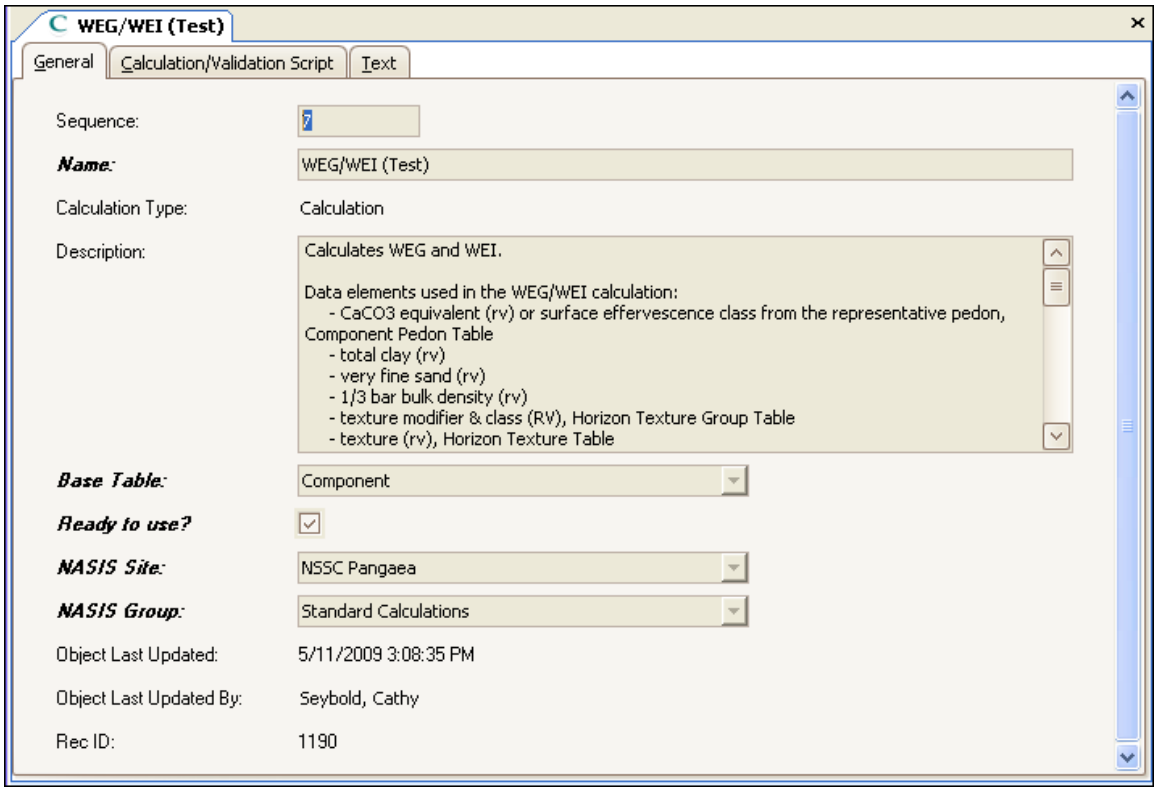
3. Click on the plus sign to open the Calculations tree. Notice that all calculations are grouped by the affected table.

4. Open the Component table tree by clicking on the plus sign.

5. Each table subfolder can be opened to view the various calculations available.

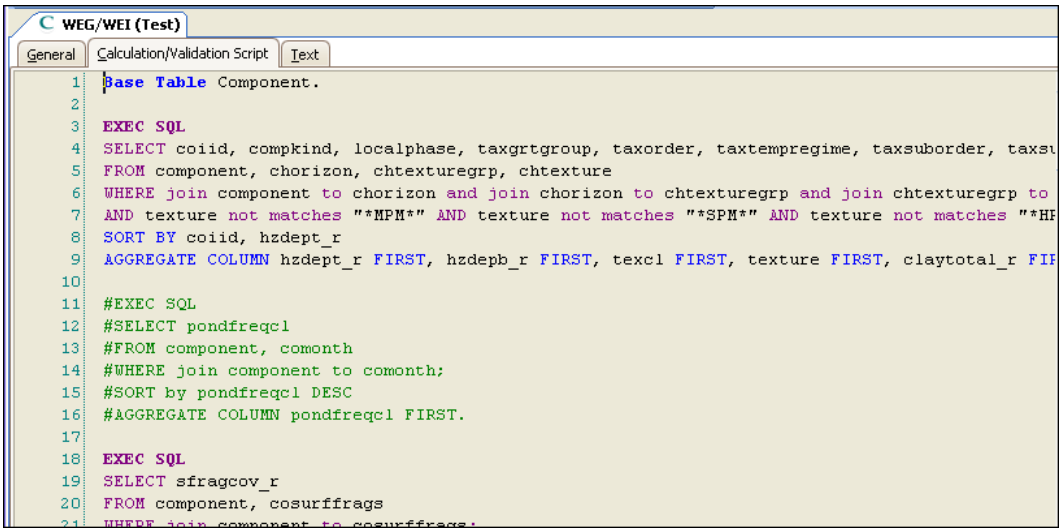
6. To view a calculation, double click on the specific calculation or right click and open.





7. Notice the three tabs providing general information, script notes, and text notes. The General tab provides the name and description along with base table and ownership information.

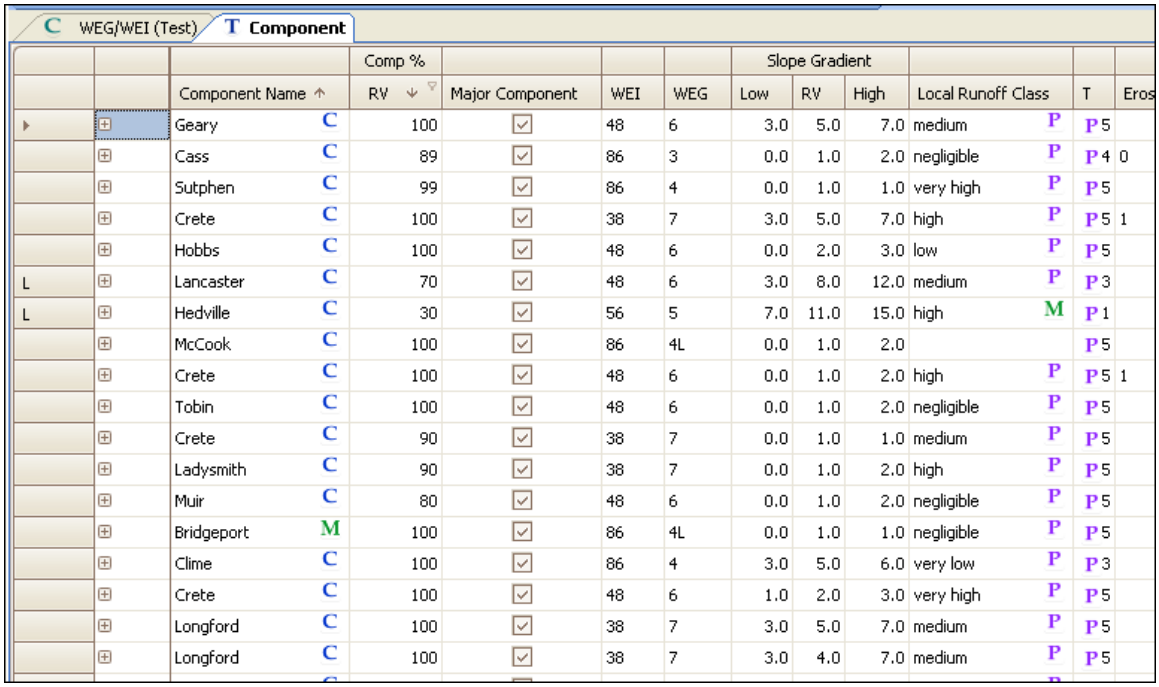
8. The Script tab contains the literal SQL scripting necessary for the calculation.



NOTE: Calculations are written using the structured query language. The “Base Table” in line 1 signifies that the calculation is used in the Component table.

Running Calculations

1. Load data into the table required by the calculation. In this example, data is loaded into the Component table. Notice the superimposed images of C, M, and P (explained at the beginning of this chapter).

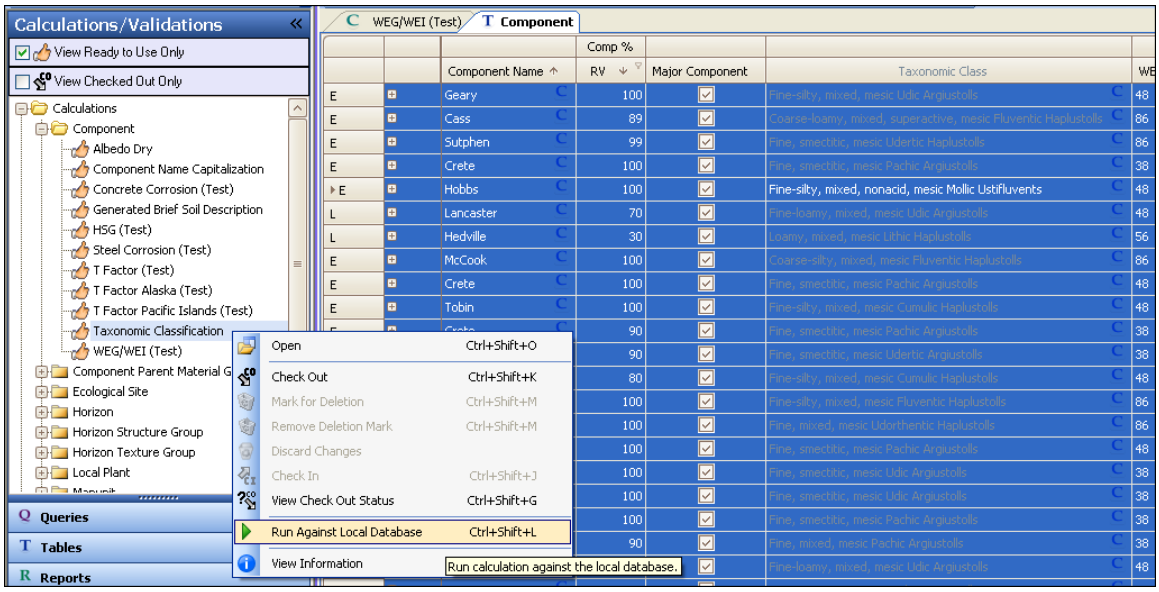


C WEG/WEI (Test) | T Component

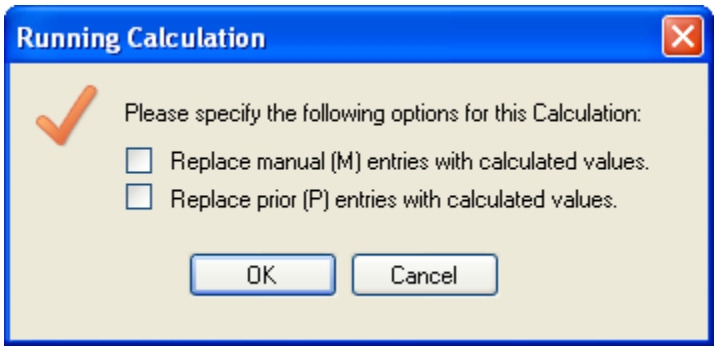
		Component Name		Comp % RV	Major Component	WEI	WEG	Slope Gradient Low	Slope Gradient RV	Slope Gradient High	Local Runoff Class		T	Eros
	⊞	Geary	C	100	☑	48	6	3.0	5.0	7.0	medium	P	P 5	
	⊞	Cass	C	89	☑	86	3	0.0	1.0	2.0	negligible	P	P 4	0
	⊞	Sutphen	C	99	☑	86	4	0.0	1.0	1.0	very high	P	P 5	
	⊞	Crete	C	100	☑	38	7	3.0	5.0	7.0	high	P	P 5	1
	⊞	Hobbs	C	100	☑	48	6	0.0	2.0	3.0	low	P	P 5	
L	⊞	Lancaster	C	70	☑	48	6	3.0	8.0	12.0	medium	P	P 3	
L	⊞	Hedville	C	30	☑	56	5	7.0	11.0	15.0	high	M	P 1	
	⊞	McCook	C	100	☑	86	4L	0.0	1.0	2.0			P 5	
	⊞	Crete	C	100	☑	48	6	0.0	1.0	2.0	high	P	P 5	1
	⊞	Tobin	C	100	☑	48	6	0.0	1.0	2.0	negligible	P	P 5	
	⊞	Crete	C	90	☑	38	7	0.0	1.0	1.0	medium	P	P 5	
	⊞	Ladysmith	C	90	☑	38	7	0.0	1.0	2.0	high	P	P 5	
	⊞	Muir	C	80	☑	48	6	0.0	1.0	2.0	negligible	P	P 5	
	⊞	Bridgeport	M	100	☑	86	4L	0.0	1.0	1.0	negligible	P	P 5	
	⊞	Clime	C	100	☑	86	4	3.0	5.0	6.0	very low	P	P 3	
	⊞	Crete	C	100	☑	48	6	1.0	2.0	3.0	very high	P	P 5	
	⊞	Longford	C	100	☑	38	7	3.0	5.0	7.0	medium	P	P 5	
	⊞	Longford	C	100	☑	38	7	3.0	4.0	7.0	medium	P	P 5	

2. Data must be checked out in order to run a calculation.

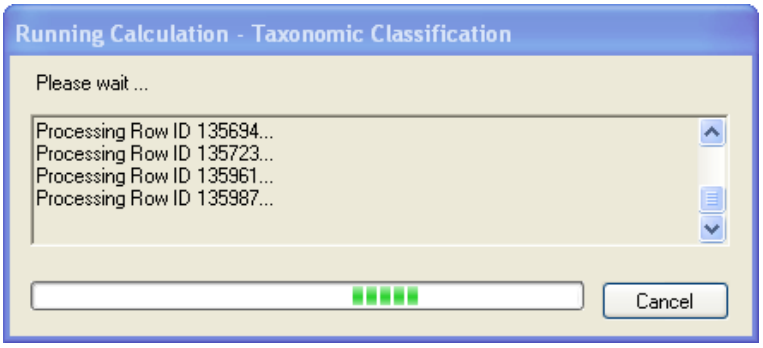
3. Highlight those rows to be calculated. If all rows are to be calculated, then use the "Ctrl + A" keystroke to highlight all rows. Then right click on the calculation and choose "Run Against Local Database."



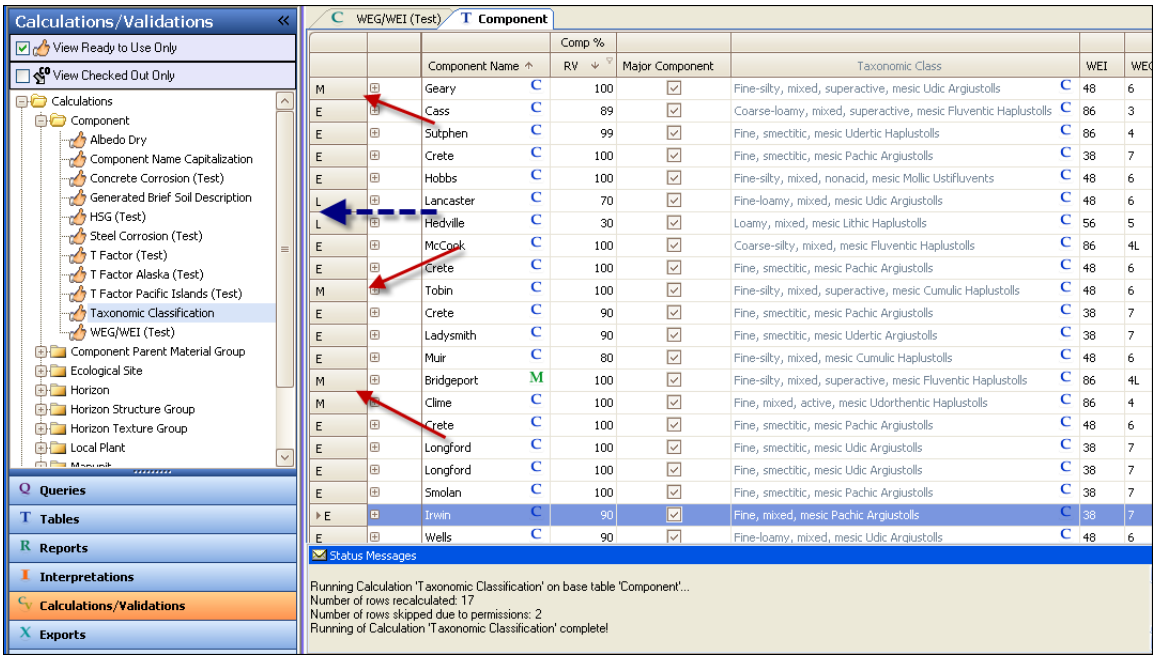
4. The parameter box appears, allowing calculation options for replacing M or P entries.



5. The calculation tracks the rows being affected.



6. The result identifies those rows that were modified by the calculation. Note the row status of M, meaning modified (red arrows in image below). Notice the messages that appear during the course of the calculation in the Status Messages Panel. Locked records are not calculated (blue arrow).



7. Select the “Uploaded All Changes to the National Database” option.

8. The data is now checked in to the national database.

9. There is a logical progression to running calculations. For instance, to calculate the taxonomic classification, the individual taxonomy data elements must first be populated.

10. The calculation order for the Horizon table:

    1. Texture group name
    2. Horizon designation
    3. ~~Particle size estimator~~
       (Use lab data or estimated amounts of sand, silt, and clay)
    4. Particle density
    5. Total Fragment Volume RV Sum (“Low” and “High” are manual entries)
    6. Percent passing sieves/rock fragments
    7. Water content - oven-dry bulk density
    8. CEC/ECEC
    9. Liquid Limit and PI (Atterberg limits)
    10. Unified (report)
    11. AASHTO (report)
    12. AASHTO group index
    13. AWC
    14. Albedo (requires a linked pedon)
    15. Kf and Kw (Test) (Verify sand fractions and silt before running)

Examining Validations

Validations are used to verify data that is populated in the database. SQL scripts are written to compare the data populated in a field to the expectations. Like calculations, validations are preloaded during the initialization or refresh of the database. The validation is table dependent. Scroll down in the Calculations/Validations Explorer Panel to view the current validations. Users belonging to the Pangaea site and Standard Calculations group can enter or modify calculations. Other users, however, may view them to better understand how data for a field is calculated.

1. On the Explorer Panel, click the Calculations/Validations Object.

2. Notice the two filters available for viewing the calculations and validations.

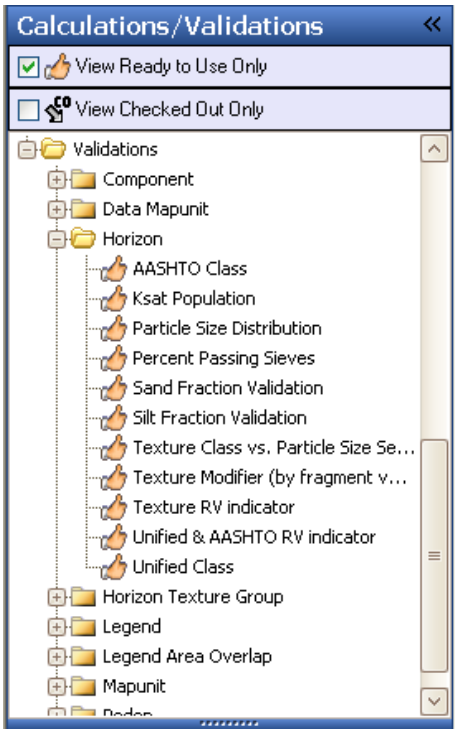
3. Click on the plus sign to open the Validations tree. Notice that all validations are grouped by table.

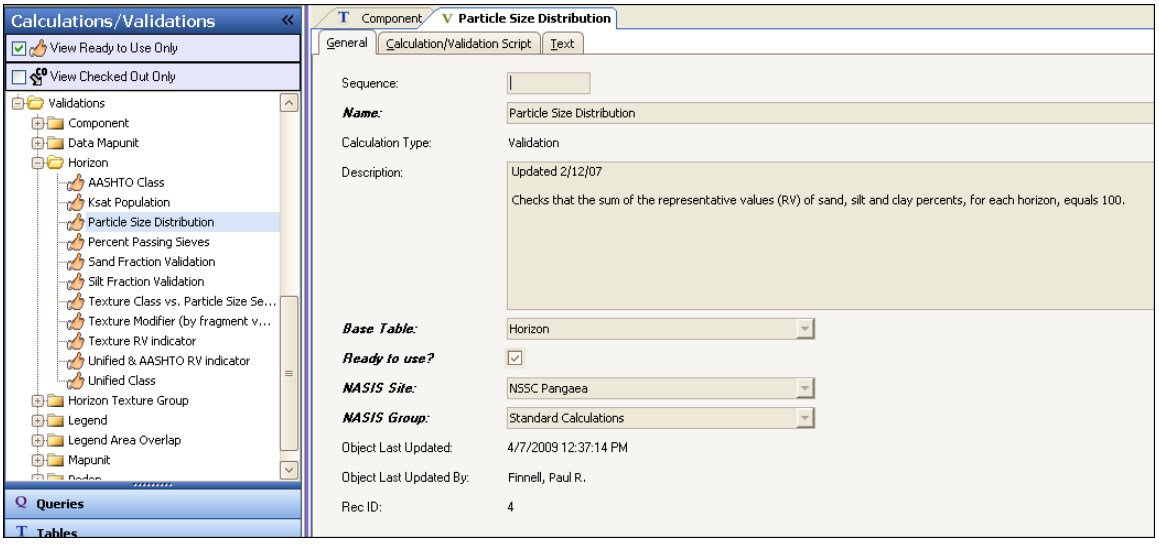
4. Each table can be opened to view the validations available.

5. Open the Horizon table tree by clicking on the plus sign.

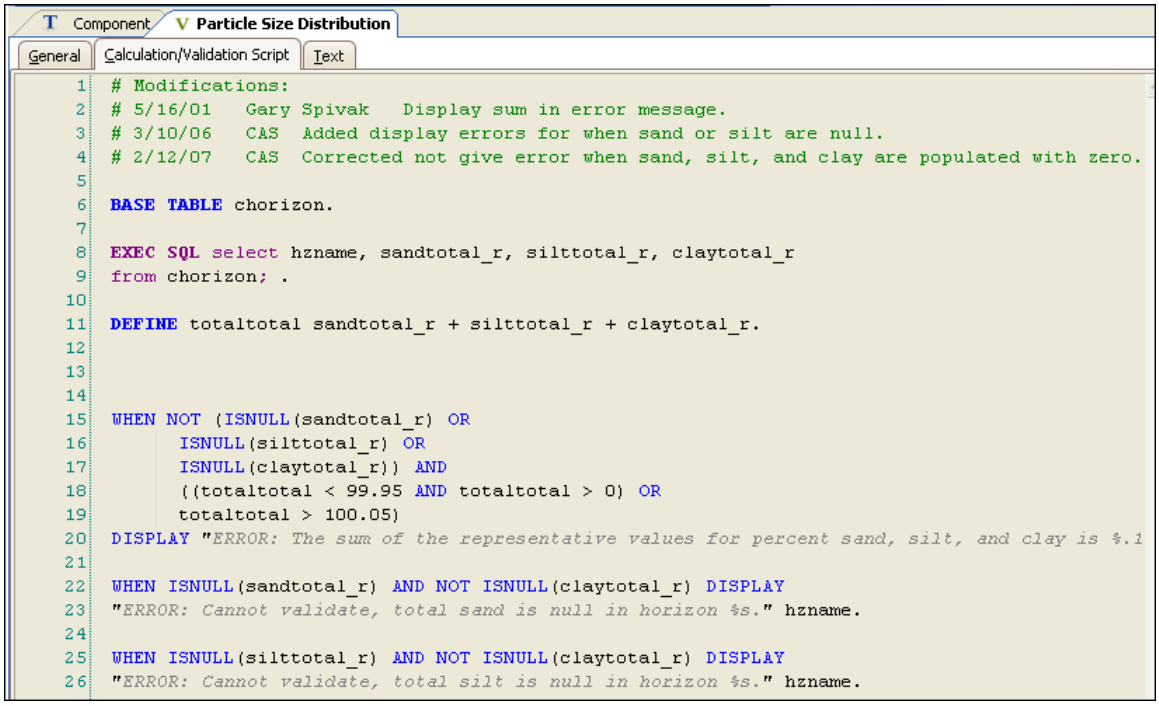
6. To open a validation into the Editor Panel, double click on the specific validation or right click and open.

7. Once again, the three tabs provide general information and the script and text notes. The General tab provides the name and description along with base table and ownership information.

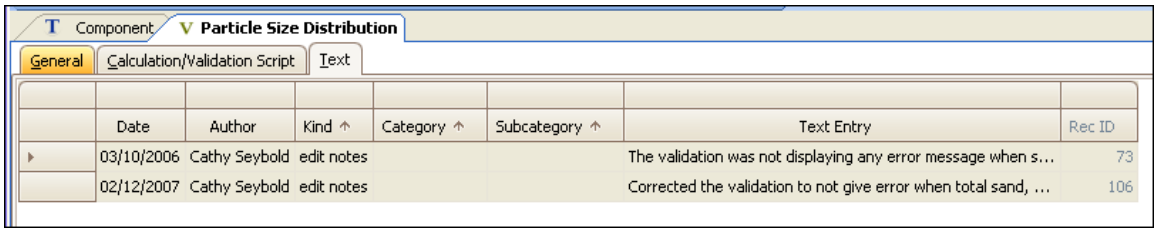




8. The validation is an SQL script.



9. The Text table is used to identify any edit or documentation supporting the validation.

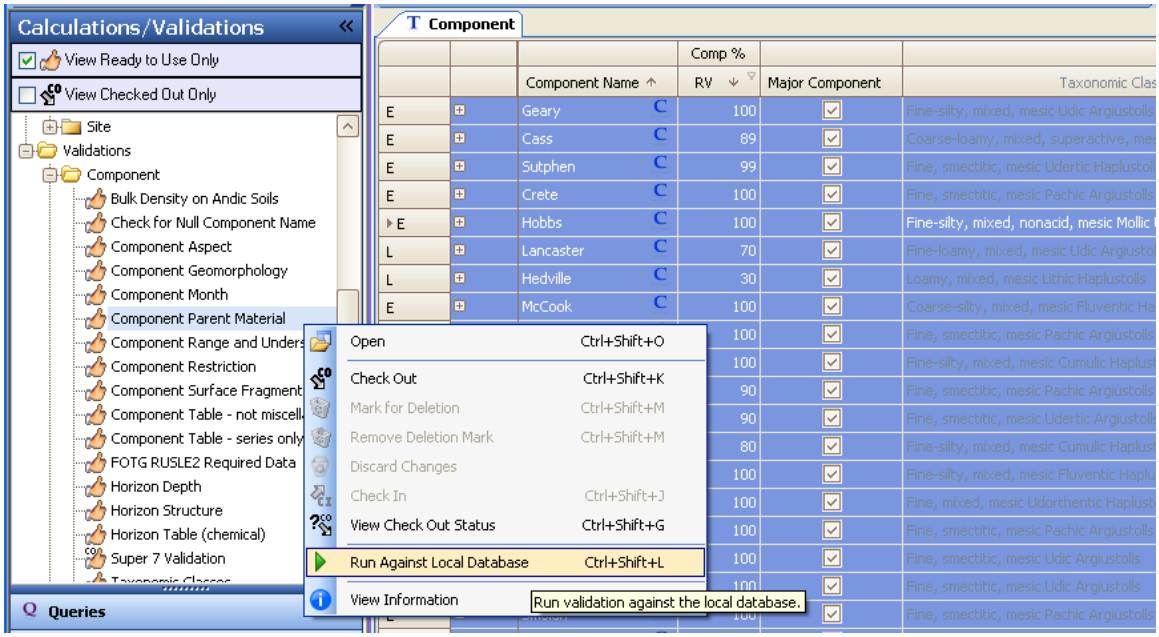


Running Validations

1. Load data into the table to be validated. In this example, data is loaded into the Component table.

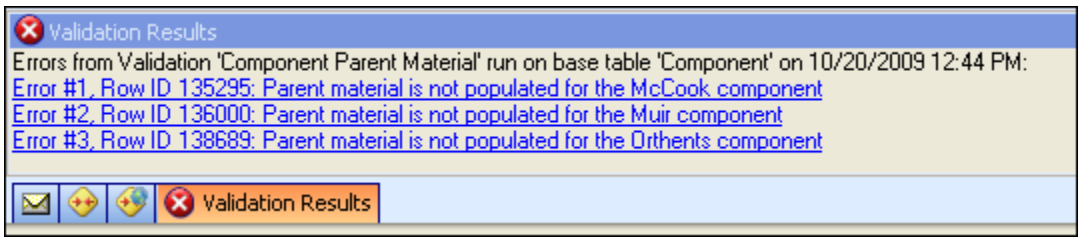
2. The validation will be run against the previous dataset in the Component table.

3. The Component table is opened and the rows are highlighted (use “Ctrl + A”).



4. The Validation tree is opened to the Component table, a validation is selected, and the validation is run against the local database. It is NOT required to check out data to run a validation.

5. The validation results are available for review in the Status Messages Panel.



6. The link is clicked to go to the specific record.

7. Data that is faulty must be checked out before editing.

Summary

1. Calculations and validations are written by, and owned by, the Pangaea site and the Standard Calculations or Standard Validations group.

2. Calculations and validations are available in the local database. They are downloaded from the national server upon database initialization or database refresh.

3. Calculations and validations are table specific.

4. Calculations are used to populate specific data elements based on other data elements.

5. The results of a calculation must be verified by the user before the data is saved.

6. Validations are used to verify populated data.

7. The data that failed validation must be checked out in order to edit.