Merging Lithology & Stratigraphy Models with RockWorks2022

2/11/22

Consider a lithology model that represents laterally discontinuous overburden such as interfingered sands, gravels, and clays (Figure 1-A). The voxel colors are determined by the ***Lithology Types Table*** (Figure 1-B). Now, consider a stratigraphic block model that represents bedrock – a sequence of laterally continuous carbonates, sandstones, shales, and an underlying meta-diorite (Figure 1-C). The voxel colors are determined by the ***Stratigraphy Types Table*** (Figure 1-D). These two models can be merged by selecting the ***ModOps / Solid / Filters / Merge*** program (Figure 1-E). This program will replace all of the voxels within an existing model (Lithology) below a specified surface (Epikarst Top) with the voxels from another model (Fractured Stratigraphy).

When specifying the options for the ***3D Solid Diagram,*** specify a ***Custom Color Scheme*** (Figure 1-F) and select the new "***Merge Lithology & Stratigraphy Tables***" option (Figure 1-G). This will create a custom color table that includes all of the G-Values and associated colors for both the lithology types and the stratigraphy types. Please note that this assumes that the ***G-Values*** within the ***Lithology Types Table*** are unique relative to the ***Order Values*** (which define the stratigraphic block model G-Values) within the ***Stratigraphy Types Table***.

The net result (Figure 1-H) is a numeric geologic block model and diagram that represents a combination of lithology and stratigraphy.

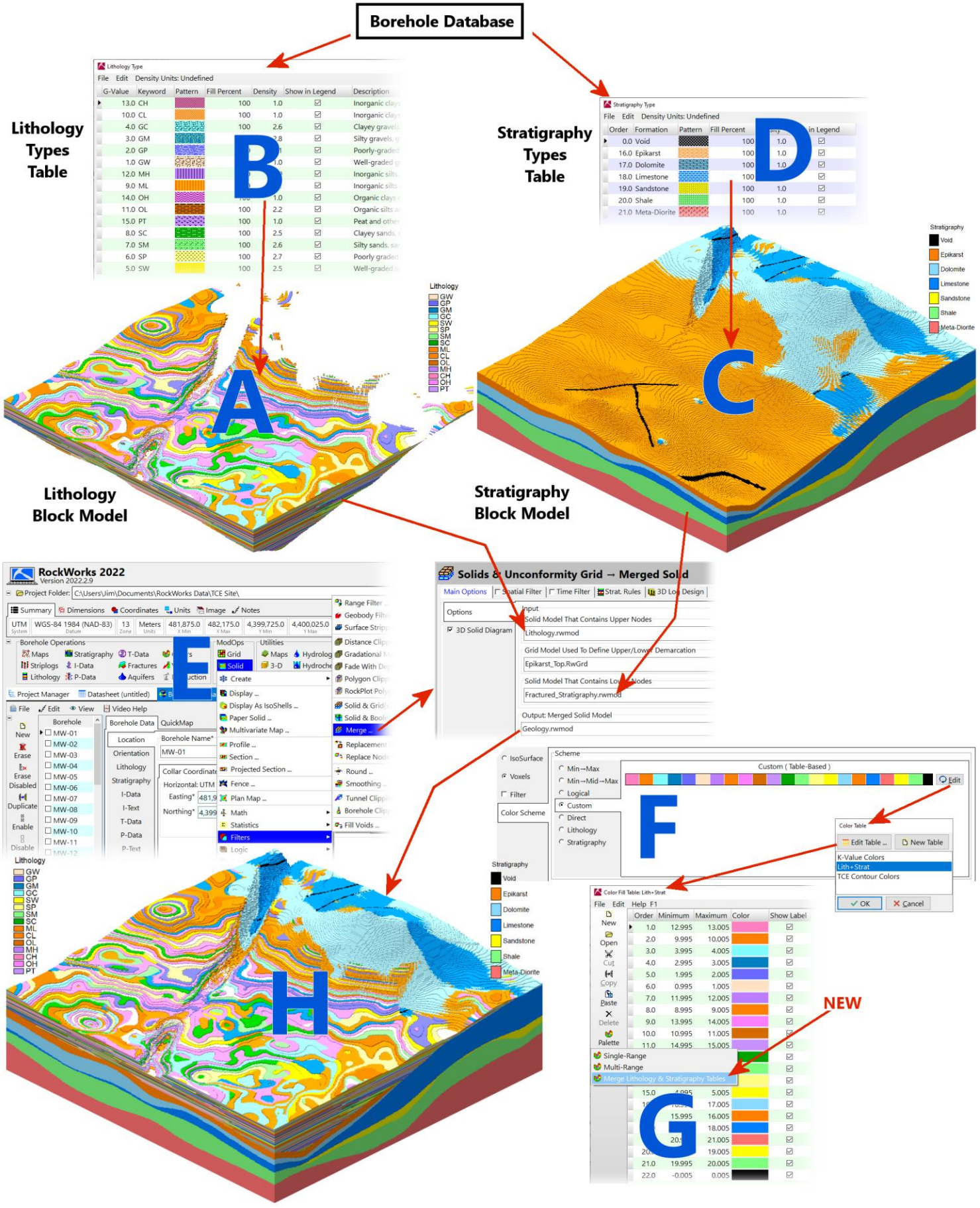
Borehole Database
Lithology Types Table
B
Stratigraphy Types Table
D
A
C
Lithology Block Model
Stratigraphy Block Model
RockWorks 2022
Version 2022.2.9
E
Solids & Unconformity Grid → Merged Solid
F
H
NEW
G

Figure 1

Filtering this composite model in combination with the custom color table will produce diagrams that show both the lithology and the stratigraphy. For example, Figure 2 depicts a combination of a cutaway of the model shown within Figure 1 with a planned spiral mining decline drift model. The decline model was created by using the ModOps / Solid / Filter / Tunnel Clipping program to "nullify" all of the voxels within the geologic model that are outside of the decline tube diameter thereby rendering them invisible. Note how the decline model shows not just the soil and rock types but also where to expect fractures that may require dewatering.

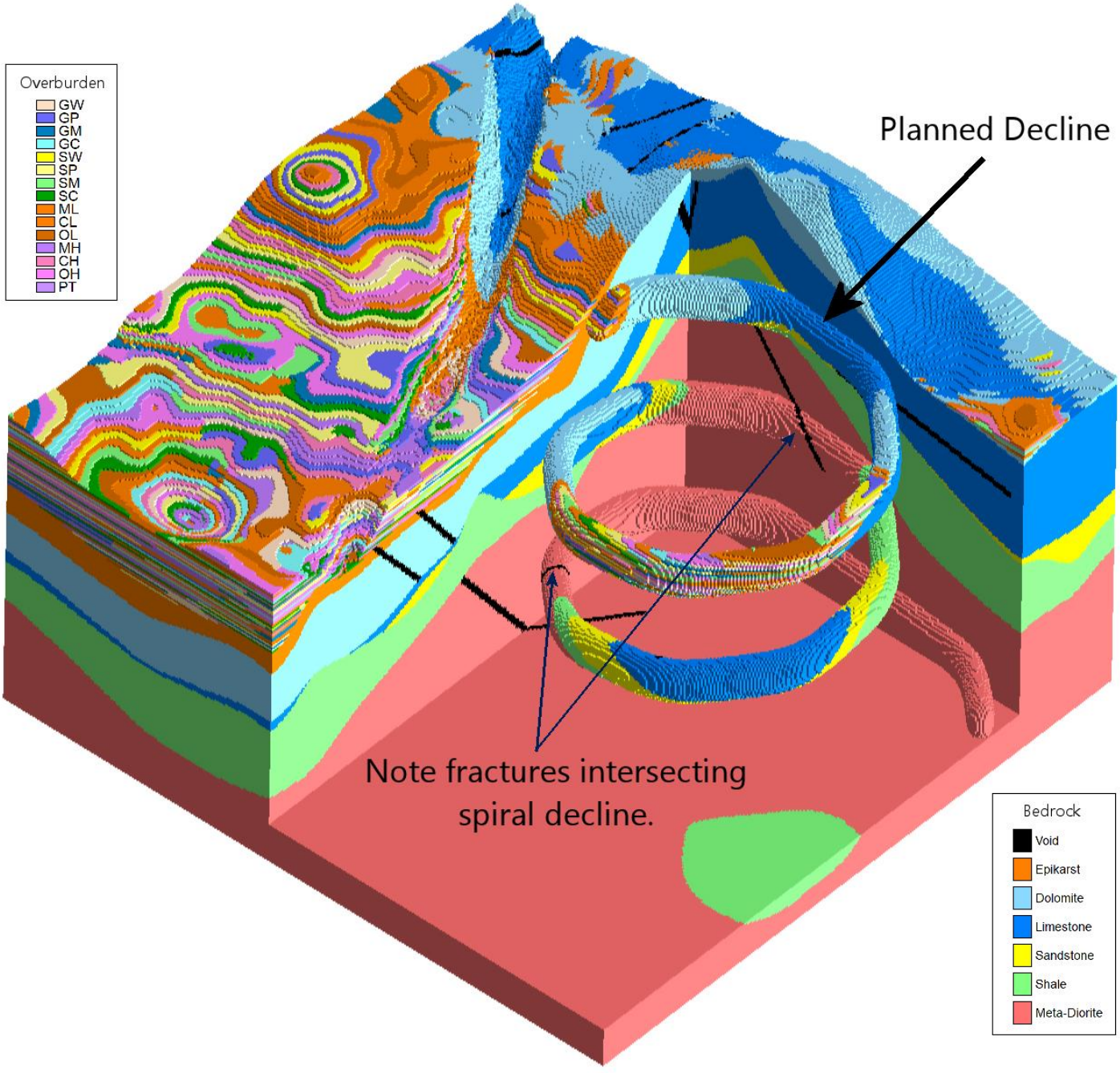

Figure 2