DIGITAL FORMATION

Minerva
Petrophysical Inversion Modeling

What is *Minerva*?

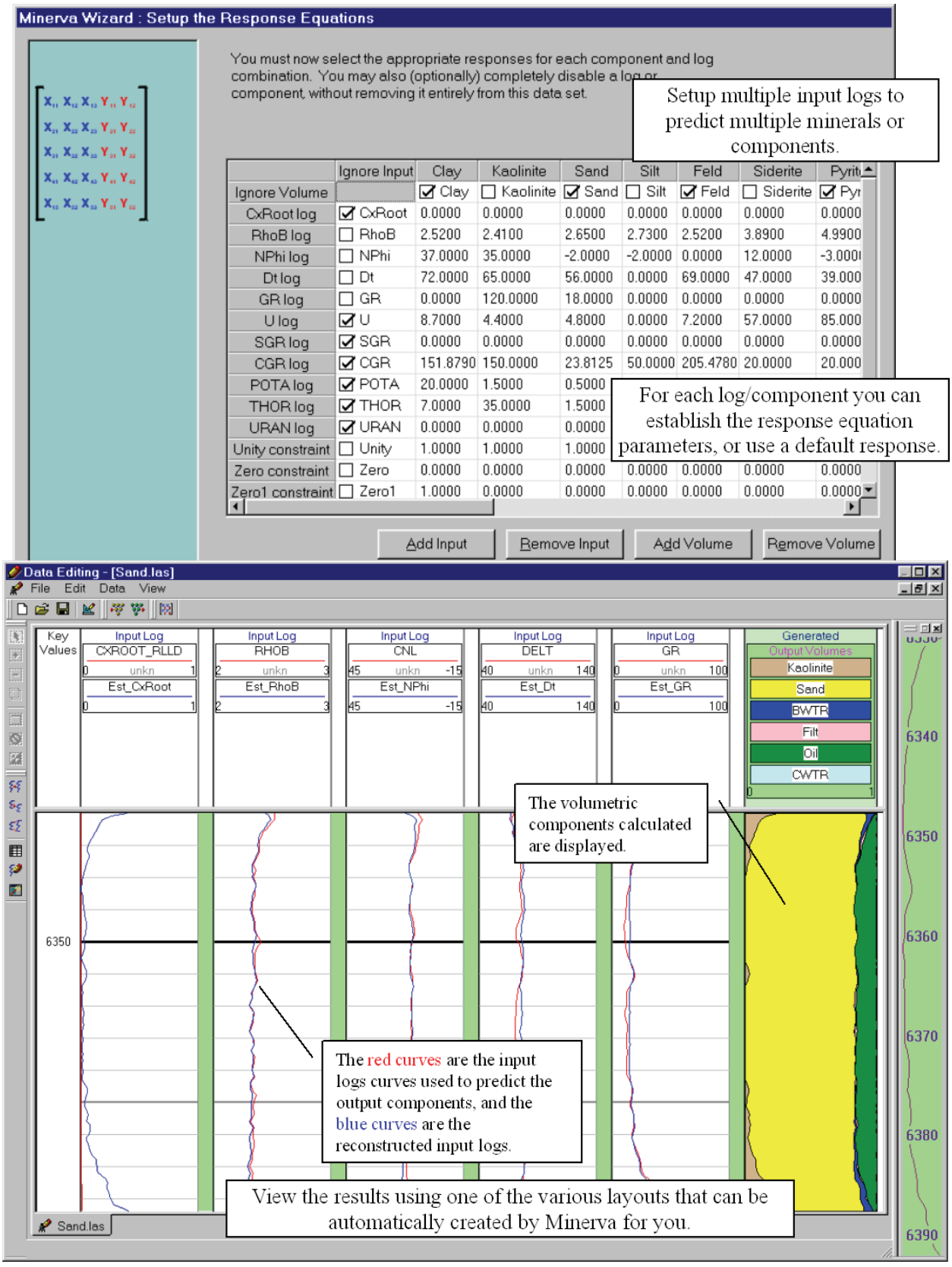
Minerva is a module to the Windows® based software ***LESA*** that can be used to perform a simultaneous solution of a series of response equations. The technique may be applied to a series of logs to solve for mineral and fluid components using inverse modeling.

The theory behind ***Minerva*** is that the user provides a series of log inputs, with associated linear response equations, and then chooses the number of output components to solve. The number of components to be solved must be equal to or less than the number of input logs. If the number is equal, then ***Minerva*** can directly determine the number of output components using a matrix inversion. If there are more inputs than outputs, ***Minerva*** uses a minimization of an appropriate cost function using an appropriate optimization method.

Minerva also automatically calculates a series of reconstructed logs based on the inversion, which may be used to detect uncertainties or areas in the logs where the inversion does not work, and may require separate treatment.

How to Order *Minerva*

Minerva is sold as an add-on to ***LESA***. If you do not already own ***LESA***, you will need to purchase it prior to being able to run ***Minerva***. Multiple copy discounts and network licenses are available – Please contact either Digital Formation your local reseller for details – Digital Formation may be reached at **888-747-5372** (US & Canada), or **303-770-4235**.


Minerva Wizard : Setup the Response Equations
You must now select the appropriate responses for each component and log combination. You may also (optionally) completely disable a log or component, without removing it entirely from this data set.
Setup multiple input logs to predict multiple minerals or components.
Ignore Input
Clay
Kaolinite
Sand
Silt
Feld
Siderite
Pyrit
Ignore Volume
CxRoot log
RhoB log
NPhi log
Dt log
GR log
U log
SGR log
CGR log
POTA log
THOR log
URAN log
Unity constraint
Zero constraint
Zero1 constraint
For each log/component you can establish the response equation parameters, or use a default response.
Add Input
Remove Input
Add Volume
Remove Volume
Data Editing - [Sand.las]
File Edit Data View
Key Values
Input Log
CXROOT_RLLD
RHOB
CNL
DELT
GR
Est_CxRoot
Est_RhoB
Est_NPhi
Est_Dt
Est_GR
Generated Output Volumes
Kaolinite
Sand
BWTR
Filt
Oil
CWTR
6340
6350
6360
6370
6380
6390
The volumetric components calculated are displayed.
The red curves are the input logs curves used to predict the output components, and the blue curves are the reconstructed input logs.
View the results using one of the various layouts that can be automatically created by Minerva for you.
Sand.las