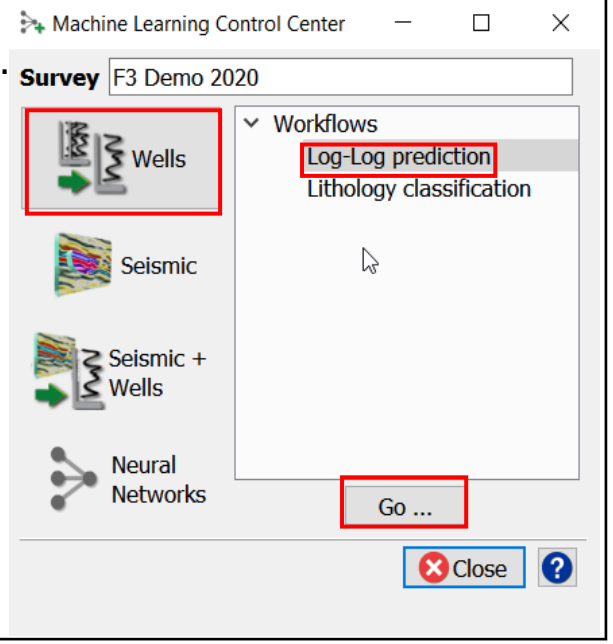
Exercise objective:

To predict missing logs using the log-log prediction tool, which is part of the machine learning plugin. In this case we want to predict the Porosity log.

Well data Preparation
Well(s) need to be available in the survey. If they are not available: **import** wells (track, logs, markers, optionally time-depth curve or checkshot).

Workflow:

1. **Open** the Machine Learning Control Center with the  icon.
2. **Click** on Wells.
3. **Select** Log-Log prediction and **Hit** Go.



Workflow cont'd:

4. "Log-log prediction'' window pops up.

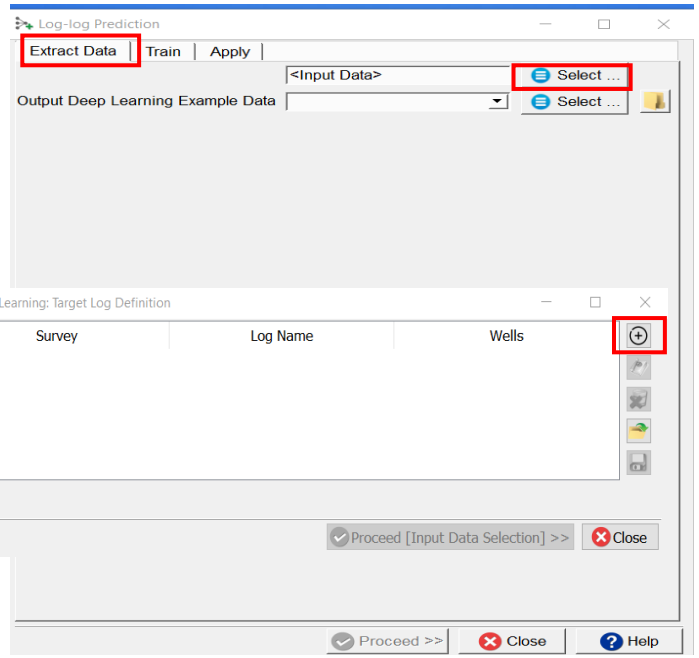
5. **Press** Select - Input Data in the ''Log-log prediction'' window. **Select**  icon in the ''Target Log Definition''.

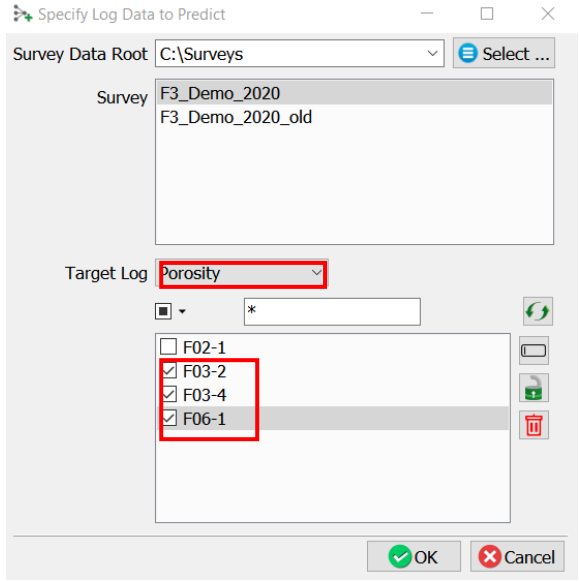
6. *''Log Data to predict" window pops up.*

7. In the *"Specify Log Data to predict" window,* **Select** *Survey*, Target Log (e.g. Porosity),* and the *Wells that will be used for the data extraction.*

   Well F02-1 is not selected, and will be used as a blind well.

8. **Press** OK.

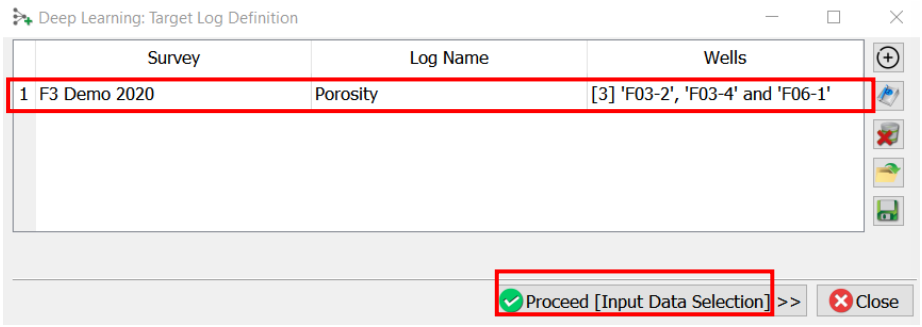




* The option to select data from other surveys is available only in commercial projects

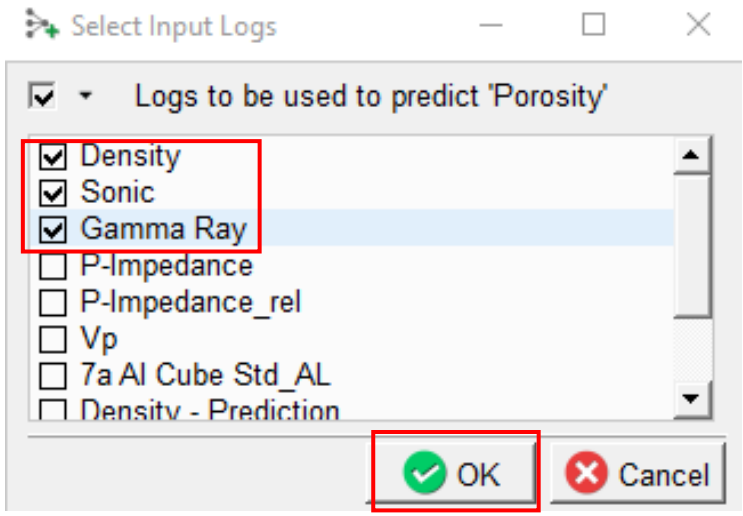
Workflow cont'd:

9. **"***Deep Learning Target Log definition"* window pops up.



10. **Keep** the default parameters and **Press** Proceed [Input Data Selection].

11. *Select Input Logs* window pops up.



12. **Select** the Density, *Sonic* and *Gamma Ray* logs that will be used to predict the 'Porosity' log.

13. **Press** OK.

Workflow cont'd:

14. *Input Log Selection* window pops up.

Input Logs can be modified. Keep the default parameters as indicated in this window.

15. **Type** a new name for the *Output Deep Learning Example Data (e.g. DL_Example_Data_Porosity_st10).*

16. **Press** Proceed.

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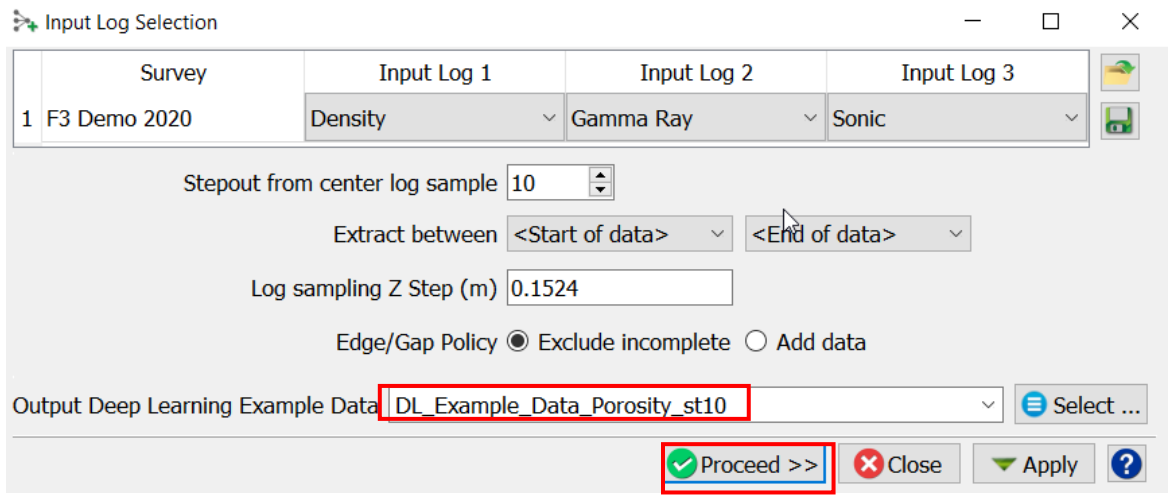
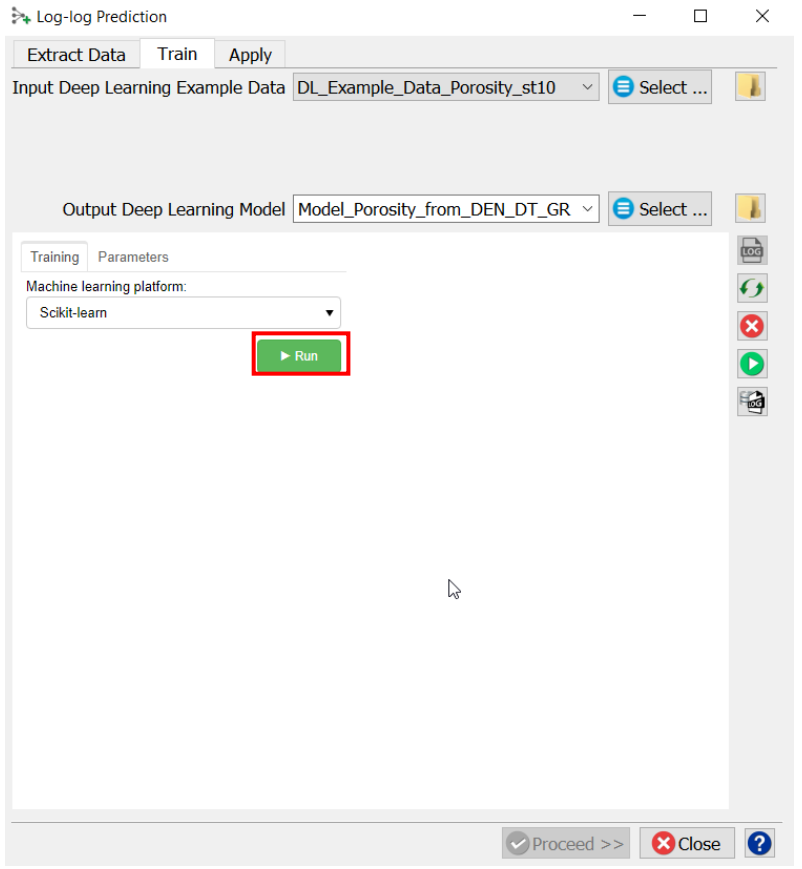


Workflow cont'd:

17. The *Train* tab opens. Select the Machine learning platform: Scikit-learn (Random Forests).

Different machine learning platforms and parameters can be tested.



18. **Keep** the defaults parameters. **Enter** new *Output mode*l name (e.g. Model_Porosity_from_DEN_DT_GR).

19. **Press** Run.

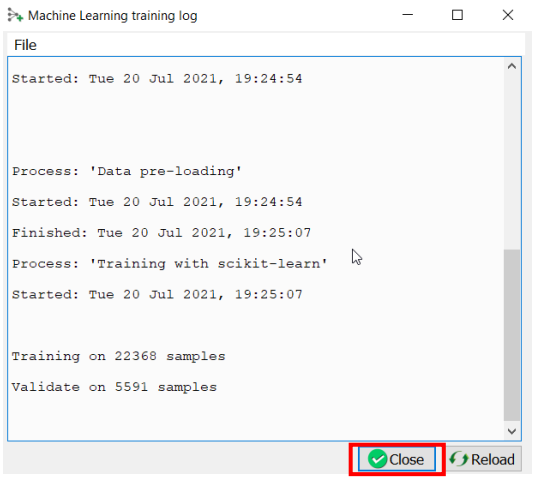
Workflow cont'd:

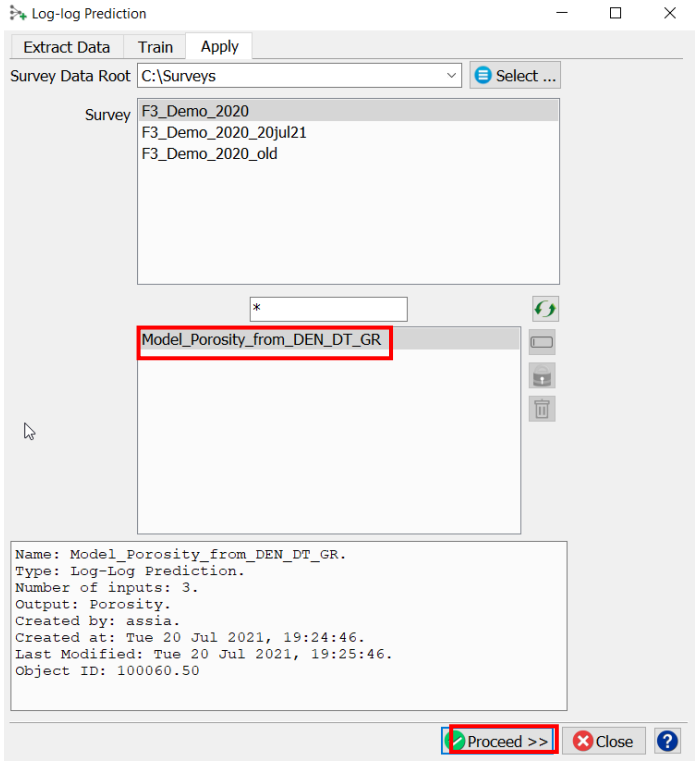
20. The 'ML training log' window pops up. When the process finish, **Click** Close.

21. In the 'Apply tab' of the Log-log Prediction window, verify all defaults selected data are correct.

    The Survey and the Training Model can be modified in this window.

22. **Press** Proceed.





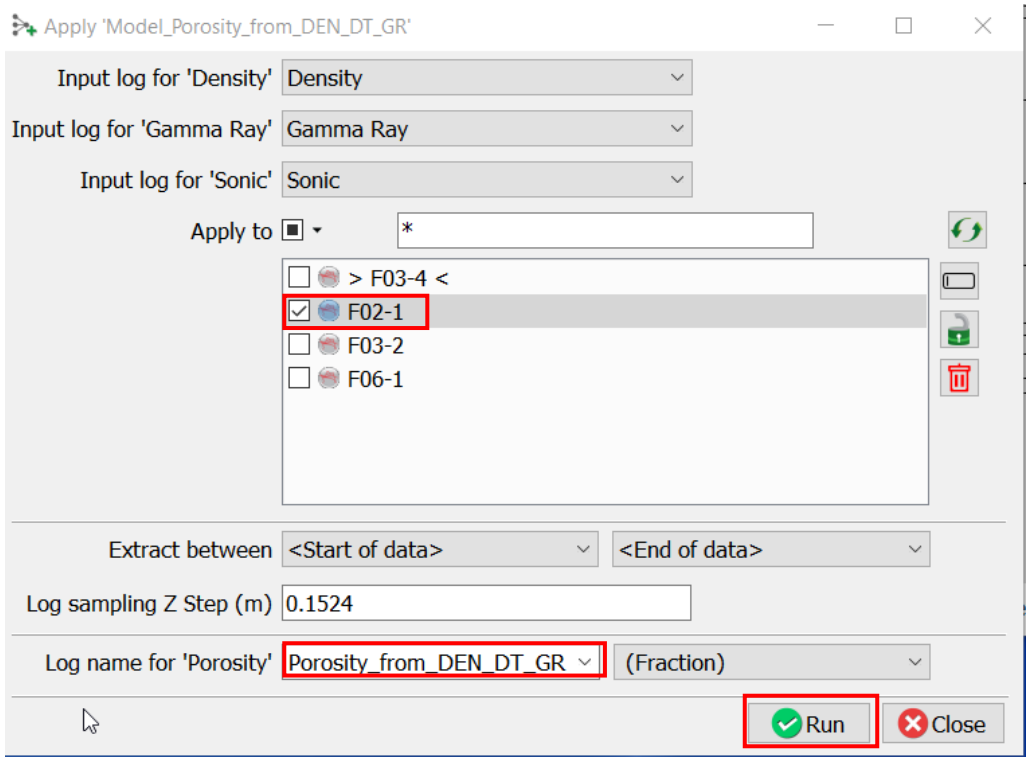
Workflow cont'd:

23. The 'Apply' created training model window pops up.

24. **Apply** the trained model to a blind well (not used in the training process). **Select** F02-1.

25. **Keep** default parameters and **Press** Run to continue.

26. When the computation finishes, **Press** Close.



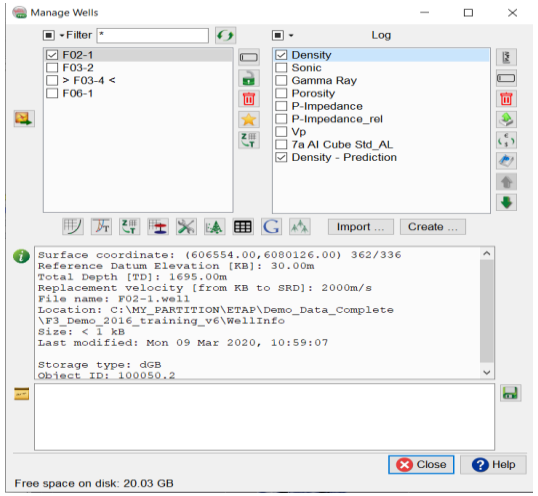
Workflow cont'd:

QC results by displaying the predicted log adjacent to the recorded log.

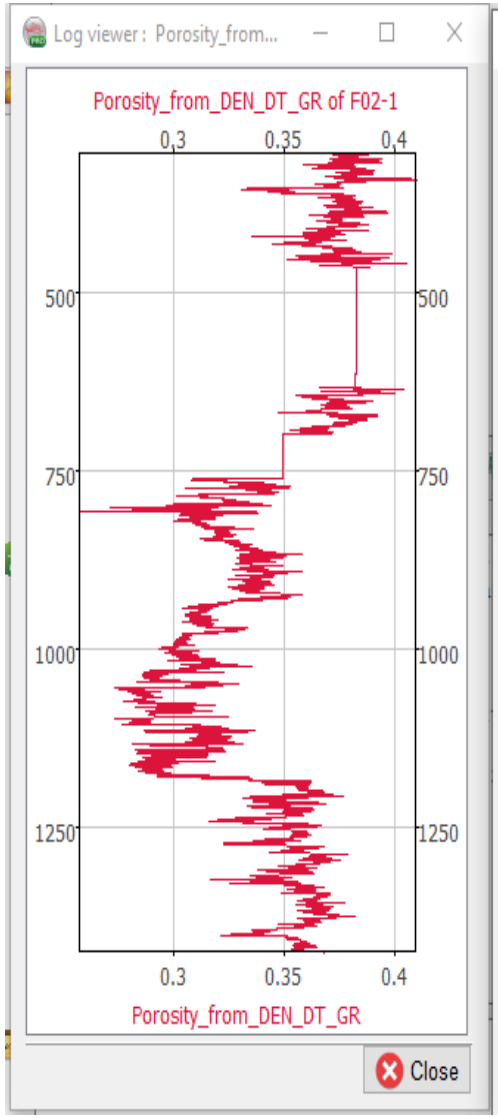
27. **Click** on the Well Manager  icon.

28. **Select** the well F02-1, and the logs Porosity and predicted porosity: Porosity-from_DEN_DT_GR.

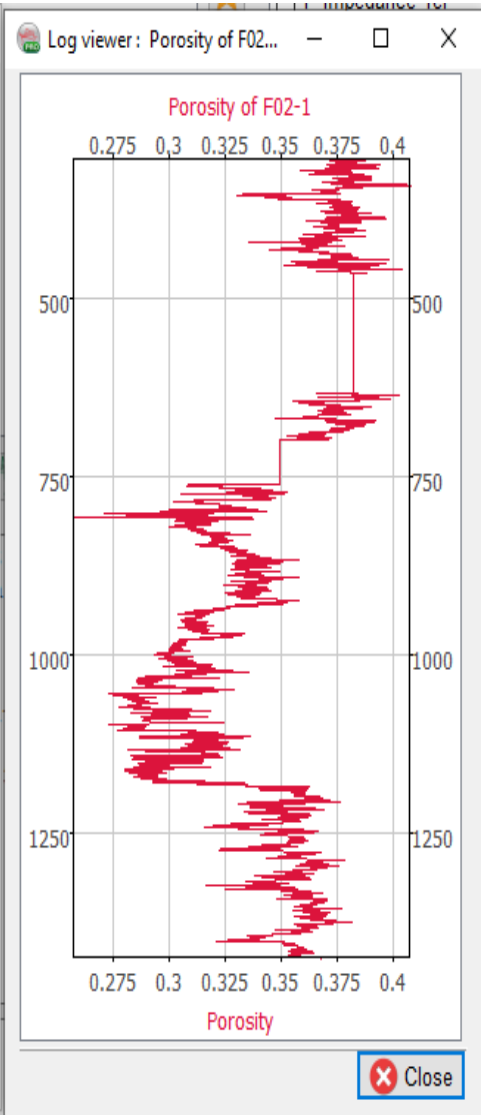
29. **Click** on view logs.



Porosity



Predicted-Porosity



Workflow cont'd:

If result is satisfactory, go back to the previous Step "Apply Training Model".

30. **Select** all wells where you want to predict porosity.

31. **Keep** default parameters and **Press** Run to continue.

32. **QC** the predicted well porosity logs as in the previous step.