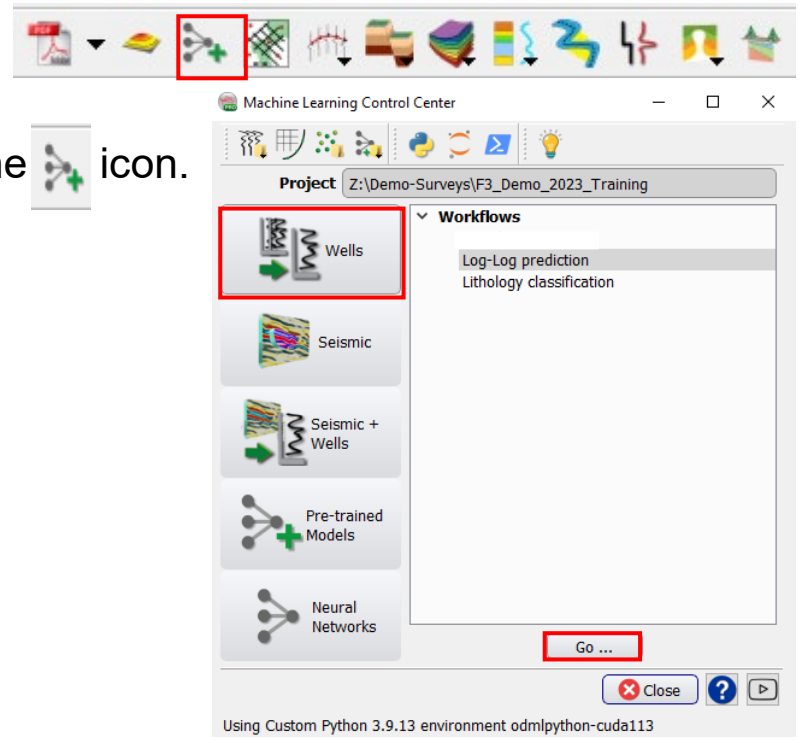
Exercise objective:

We can predict missing logs using the log-log prediction tool, which is part of the machine learning plugin. In this exercise, we want to predict the Density log.

Well data Preparation
Well(s) used as input data need to be available in the survey. If they are not: **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.

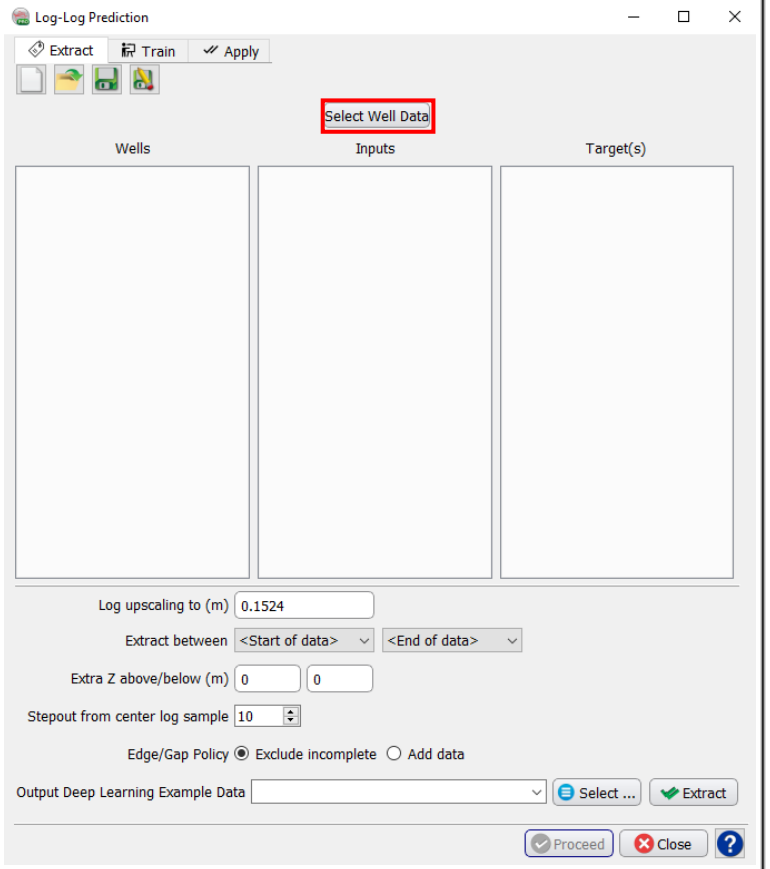


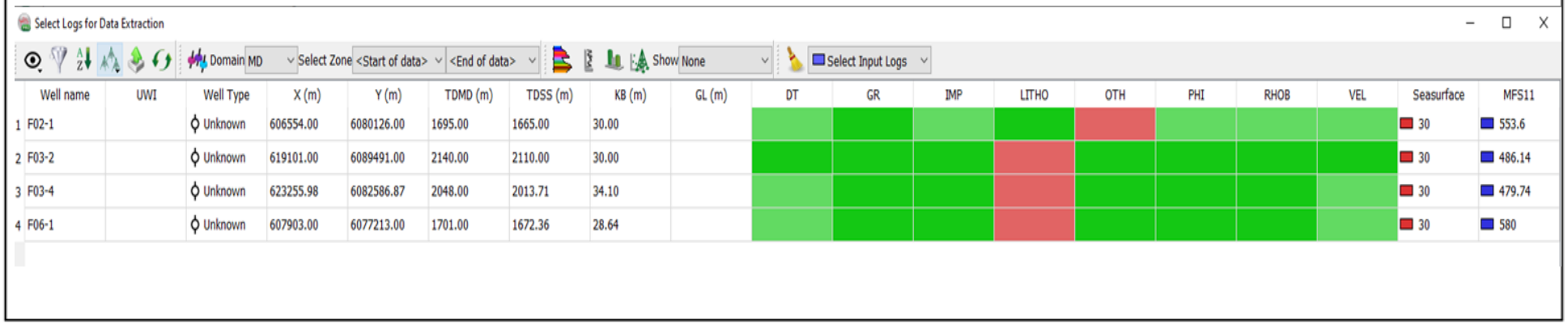
Workflow cont'd:

In the **Extract** Data tab

4. **Press** Select - <Select Well Data>

5. New window will pop up <Select logs for data extraction





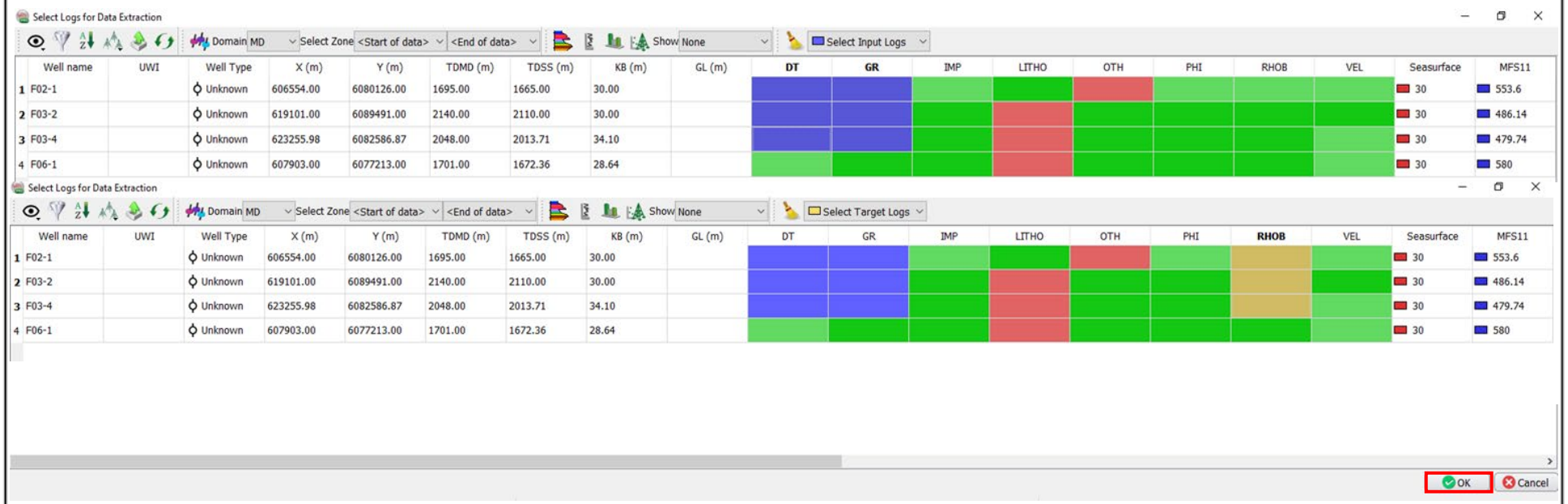
	Well name	UWI	Well Type	X (m)	Y (m)	TDMD (m)	TDSS (m)	KB (m)	GL (m)	DT	GR	IMP	LITHO	OTH	PHI	RHOB	VEL	Seasurface	MFS11
1	F02-1		Unknown	606554.00	6080126.00	1695.00	1665.00	30.00										30	553.6
2	F03-2		Unknown	619101.00	6089491.00	2140.00	2110.00	30.00										30	486.14
3	F03-4		Unknown	623255.98	6082586.87	2048.00	2013.71	34.10										30	479.74
4	F06-1		Unknown	607903.00	6077213.00	1701.00	1672.36	28.64										30	580

Workflow cont'd:

6. In the select logs for data extraction window, select the Input logs that will be used (GR and Sonic). The color of the selected logs cells will turn to blue

7. Select the target logs (RHOB), the color of the targeted log cells will turn to orange

8. Press on Ok



Workflow cont'd:

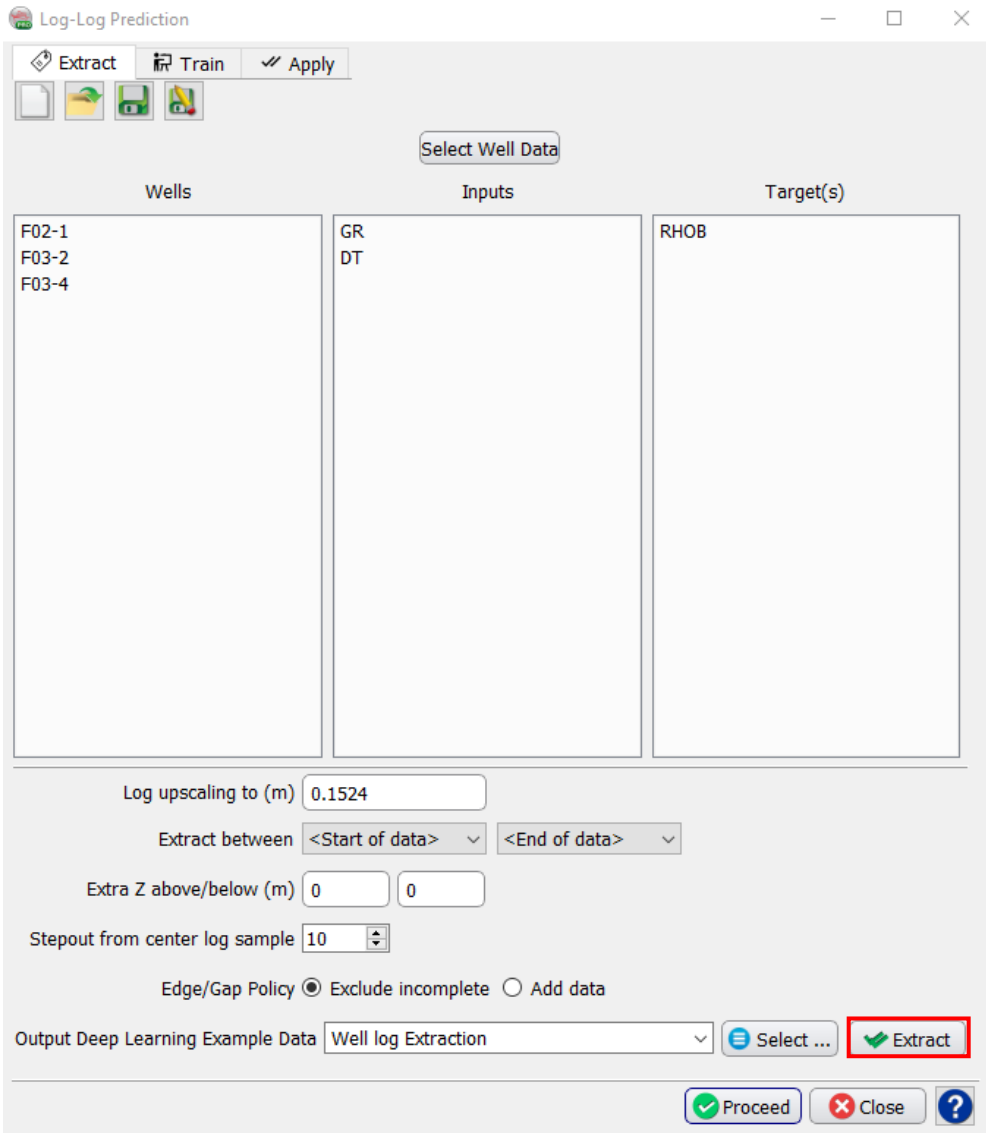
9. In the Log-Log prediction window, All wells, input logs, and Targets should be listed each at the appropriate column

10. Set the level of extraction

11. Give a name to the extracted example

12. **Press** on Extract

.



Workflow cont'd:

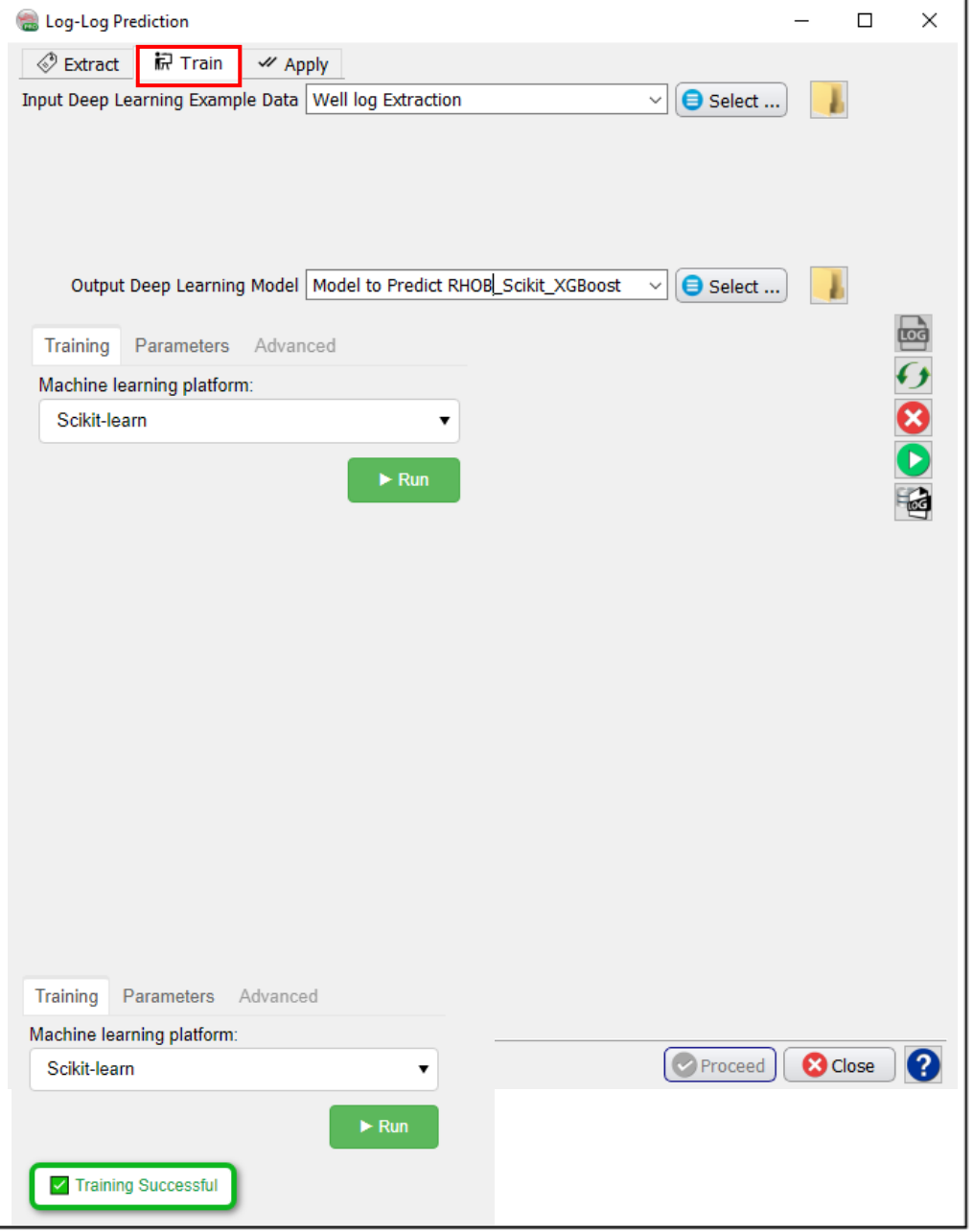
13. The *Train* tab get activated. Train the extracted examples data using suitable learning algorithm. **Select** Scikit-learn / XGBoost.

Different machine learning platforms and parameters can be tested. Keep the defaults parameters.

14. Specify a new *Output mode*l name (e.g. Model_to Predict RHOB_Scikit_XGBoost).

15. **Press** Run.

16. You should see " Training Successful "



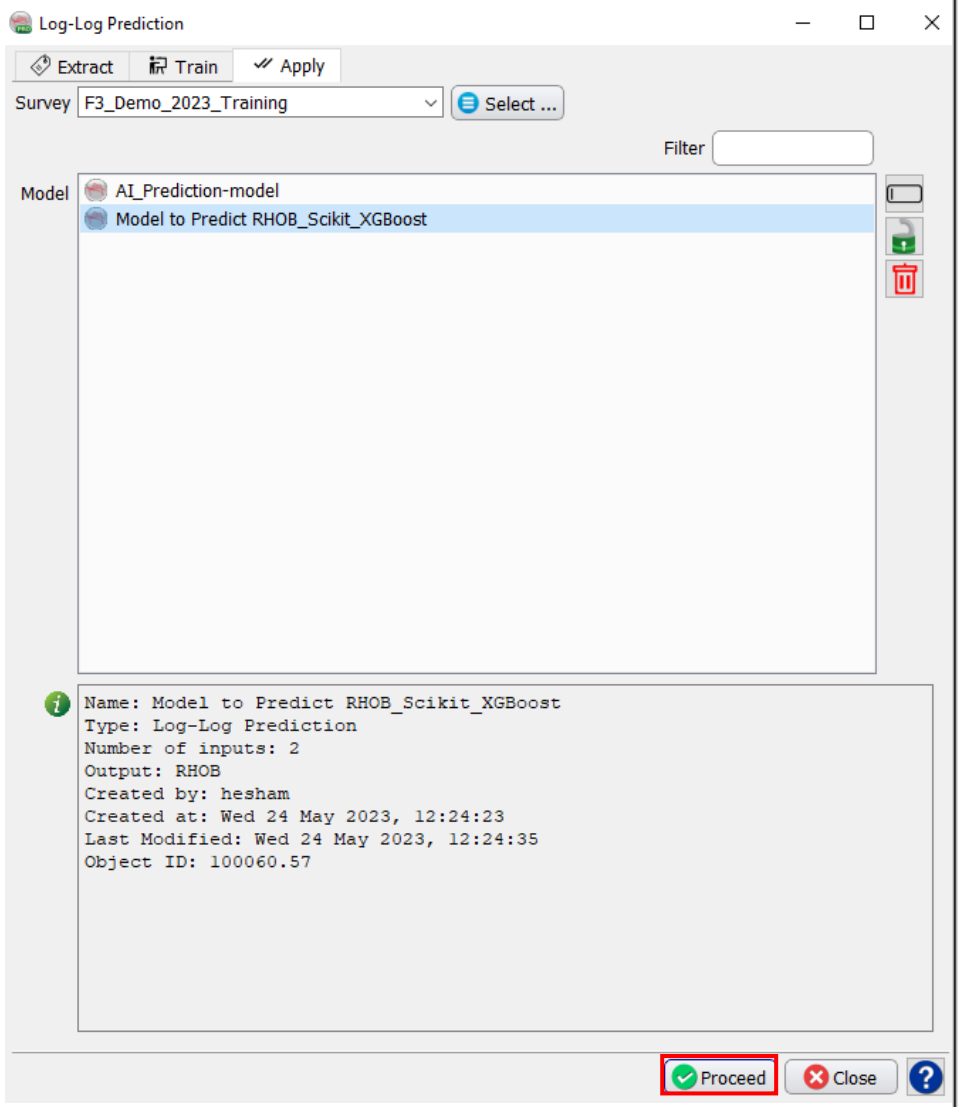
Workflow cont'd:

17. Select the "Apply'' tab

18. Highlight the model name

The Survey and Training model can be modified in here.

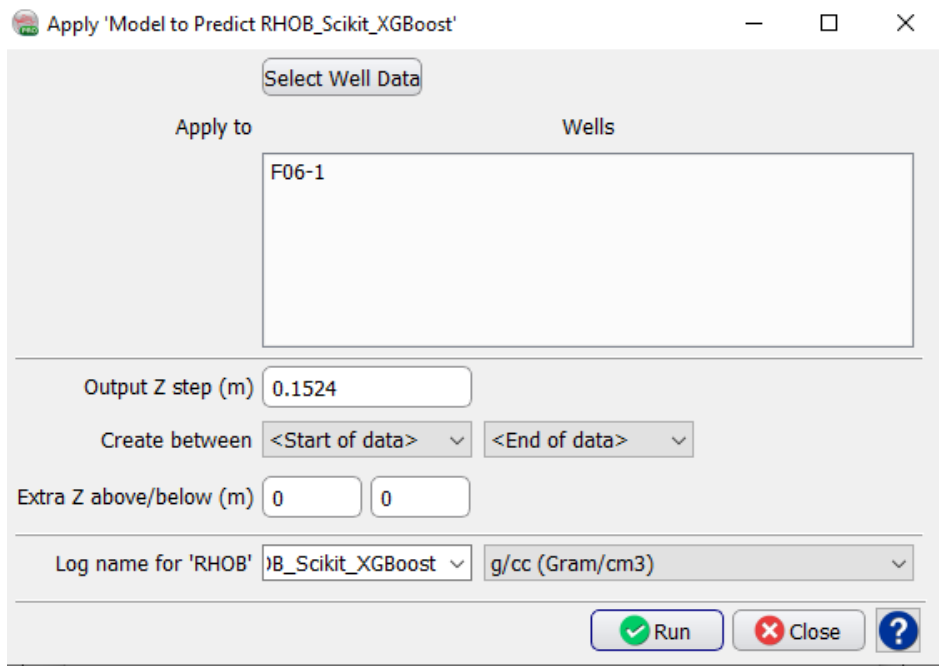
19. Press Proceed.



Workflow cont'd:

20. The "Apply" training model' window pops up.

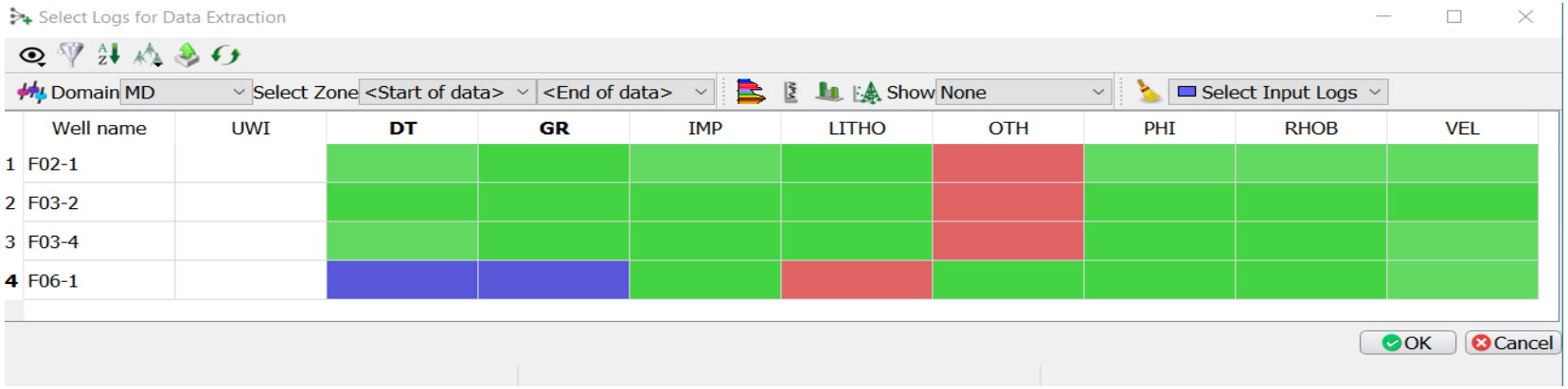
In this window we will **Select** the input logs (GR and Sonic) for the blind well F06-1, on which we will apply the trained model and predict the target log (RHOB). Then **Press** OK.



21. Apply the trained model to a blind well.

22. **Type** a new name for the predicted log

23. **Press** Run to continue.



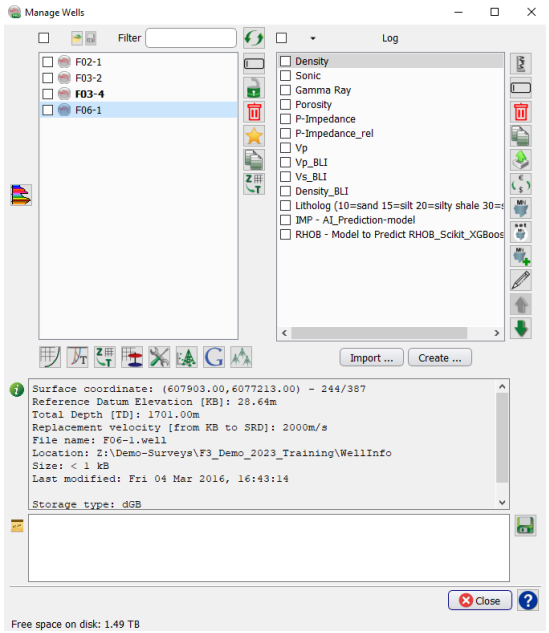
Workflow cont'd:

We can QC prediction results by displaying the predicted log adjacent to the recorded input log:

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

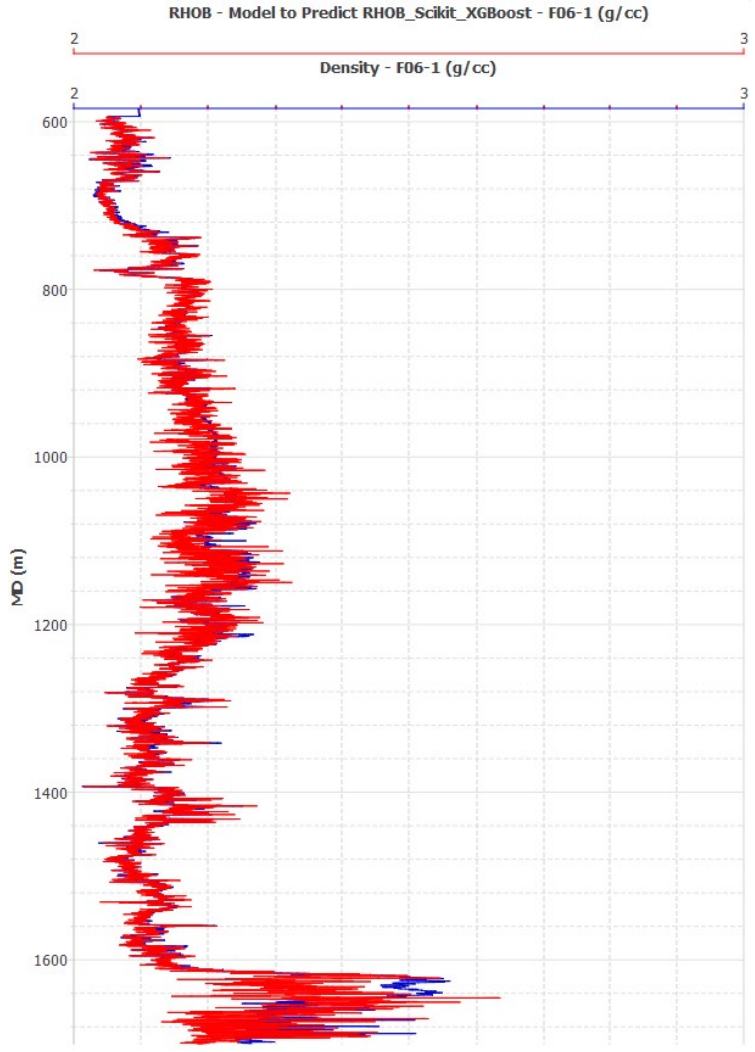
25. **Select** the well ''F06-1'' and the logs ''Density'' and ''Density-Predicted''.

26. **Click** on view logs icon .



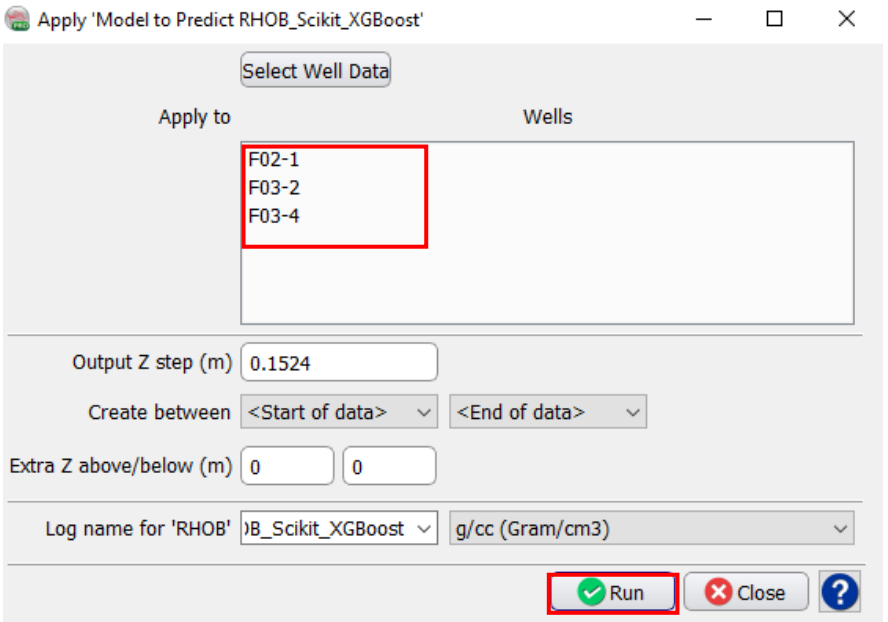
Density

Density-Predicted



Workflow cont'd:

If the results are satisfactory, go back to the ''Apply training'' window, and apply the trained model to the rest of the wells where you want to predict density log.

27. **Select** all wells.

28. **Type** a new name and **Press** Run to continue.