1. Abstract
The Ocean plug-in, Oil Shale, analyzes and compares the confusing data on well logs, by using some of the most important and common measurements from bore holes such as gamma ray, neutron porosity, density, caliper, deep and medium resistivity, and photoelectric effect to automate shale strata identification. The plug-in uses the Fast Fourier Transformation to filter and signal deconvolution to minimize the effect of noise, by removing the high frequencies to sharpen the data and create a smoother line for analysis. An interface was created to give the user the flexibility to adjust the selection criteria assigned to the logs if needed, but also allows a default of reliable values for fast and efficient analysis. An additional separate track was added and color coded to the standard well log that allows businesses to quickly and effectively determine where the shale strata is, within a 75 percent or greater probability. This makes the difficult task of reading these complicated well logs quick and easy, reducing the time to minutes. In turn, this will save businesses valuable time and money when it comes to the expense of outside consultation and make well logs and their interface more user-friendly.

2. Introduction
Clean Data Puzzle
In Figure 1, you will see several well logs that are difficult to interpret and could potentially present a problem for companies when searching for profitable oil shale reservoirs. They show noise from the equipment, which is represented by spikes and leads to possible errors from the inexperienced eye. We created an interface using Petrel/Ocean software from Schlumberger.

3. The Bakken
We were provided with the data specific to the Bakken oil shale of North Dakota that can be seen in Figure 2. This data is unique as it is currently in the process of converting from oil shale (non traditional oil) to crude oil (Traditional). Therefore, making the measurements for the oil shale unique and different to standard oil shale.

4. Methods
We removed the high frequencies by using a low pass Fast Fourier Transformation filter algorithm with deconvolution to create a smoother line for analysis and enhancement of the steps in the logs. To get an automatic solution we chose a sharp boundary approach by analyzing a point by point reference, by depth, to calculate probability for oil shale. In figure 3 you will see the most common measurements used by the majority of companies and assigned a percentage with a common measurement of each variable. (This is customizable for different lithology's):
- Gamma Ray: 40%
- RHOF (Density): 15%
- Deep Resistivity: 15%
- Medium Resistivity: 15%
- NPHI (Neutron Porosity): 10%
- Caliper: 4%
- PEF (Photoelectric Effect): 1%

5. Results
Figure 5 shows how the filtering and deconvolution made analysis easier and Figure 4 shows how enhanced the clarity of the presence of gas as well as showed a more accurate volume of gas and oil shale.

6. Conclusion
Future Plans
- Well logs put out “noisy” data that can lead to errors during interpretation.
- Program quickly and efficiently identifies oil shale.
- Makes a company more economically competitive in today’s market.

7. References

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