The application of new scanning technologies to describe core and chips collected from oilsands observation wells is now a key geological input for SAGD development. The tool kit is large, and alters the drilling plans, but is the data collection optimal?

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With the continued importance of maximising the data collected when drilling a well, geoscientists now have a plethora of technologies available to complete the well and analyse the produced core, chips and fluids recovered. It is very important to choose what data is needed prior to drilling the well so that the optimum samples can be collected and data recorded. This includes the type of drilling rig used, muds run and bits chosen. Also, the handling of the rock and fluids recovered must be optimised (temperature requirements, storage time, cleaning technology, rock cutting processes and sampling sizes all have distinct requirements). Petrophysical log choice is also critical, though the resolutions of most basic logging suites are usually too coarse to answer modern engineering questions. Geoscience is commonly asked to determine what clays are present and their distribution, what are the variations in the bitumen saturation and how do the grain size distributions vary between injectors and producers. Also, what is the net to gross, porosity, pay thickness and cap rock strength? As always there is a push from engineers to use cut-offs to generate the results, but are these based on reliable statistically-relevant datasets or just data 'rules of thumb' taken from other wells. The latter is often chosen because the costs to acquire better answers are not budgeted and would take too long to obtain.

Rock analytical techniques which can be used to answer the geoscience questions outlined above include X Ray Diffraction, (XRD), X Ray Fluorescence (XRF), Fourier Transform Infra Red spectroscopy (FTIR), Computed Tomography (CT) scans, Magnetic Resonance Imaging (MRI), Short Wave Infra Red (SWIR), Environmental Scanning Electron Microscope (ESEM), Transmission Electron Microscope (TEM), Long Wave Infra Red (LWIR) to list some of the most common scanning tools. Other techniques include thin section analysis, Dean Stark tests, chip description, particle size measurements, DNA analyses and high-resolution core photography. Each technique needs different requirements which are often contradictory and thus prioritisation is required. Also, the technologies can overlap making the correct selections a potential cost saving. Recent scanning technologies have also speeded up data delivery, are non-destructive and provide statistically relevant results to aid in geomodelling and production

forecasting. The resulting dataset could provide not just porosity, mineralogy and bitumen saturation but permeability data, more accurate pay determination and finally make production history matching achievable with real data inputs!