

## Physicochemical Characterization of Asphalt Ridge Froth Bitumen

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**Abstract :** Properties and compositions of bitumen and bitumen-derived liquids have significant influences on the selection of recovery, upgrading and refining processes. Optimal process conditions can often be directly related to these properties. The end uses of bitumen and bitumen products are thus related to their compositions. Because it is not possible to conduct a complete analysis of the molecular structure of bitumen, characterization must be made in other terms. The present paper focuses on physico-chemical analysis of two different types of bitumens. These bitumen samples were chosen based on: the original crude oil (sand oil and crude petroleum), and mode of process. The aim of this study is to determine both the manufacturing effect on chemical species and the chemical organization as a function of the type of bitumen sample. In order to obtain information on bitumen chemistry, elemental analysis (C, H, N, S, and O), heavy metal (Ni, V) concentrations, IATROSCAN chromatography (thin layer chromatography-flame ionization detection), FTIR spectroscopy, and <sup>1</sup>H NMR spectroscopy have all been used. The characterization includes information about the major compound types (saturates, aromatics, resins and asphaltenes) which can be compared with similar data for other bitumens, more importantly, can be correlated with data from petroleum samples for which refining characteristics are known. Examination of Asphalt Ridge froth bitumen showed that it differed significantly from representative petroleum pitches, principally in their nonhydrocarbon content, heavy metal content and aromatic compounds. When possible, properties and composition were related to recovery and refining processes. This information is important because of the effects that composition has on recovery and processing reactions.

**Keywords :** froth bitumen, oil sand, asphalt ridge, petroleum pitch, thin layer chromatography-flame ionization detection, infrared spectroscopy, <sup>1</sup>H nuclear magnetic resonance spectroscopy

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