

The Alberta Taciuk Process (ATP) Technology ATP Technology Pilot Program for Jordan Oil Shales

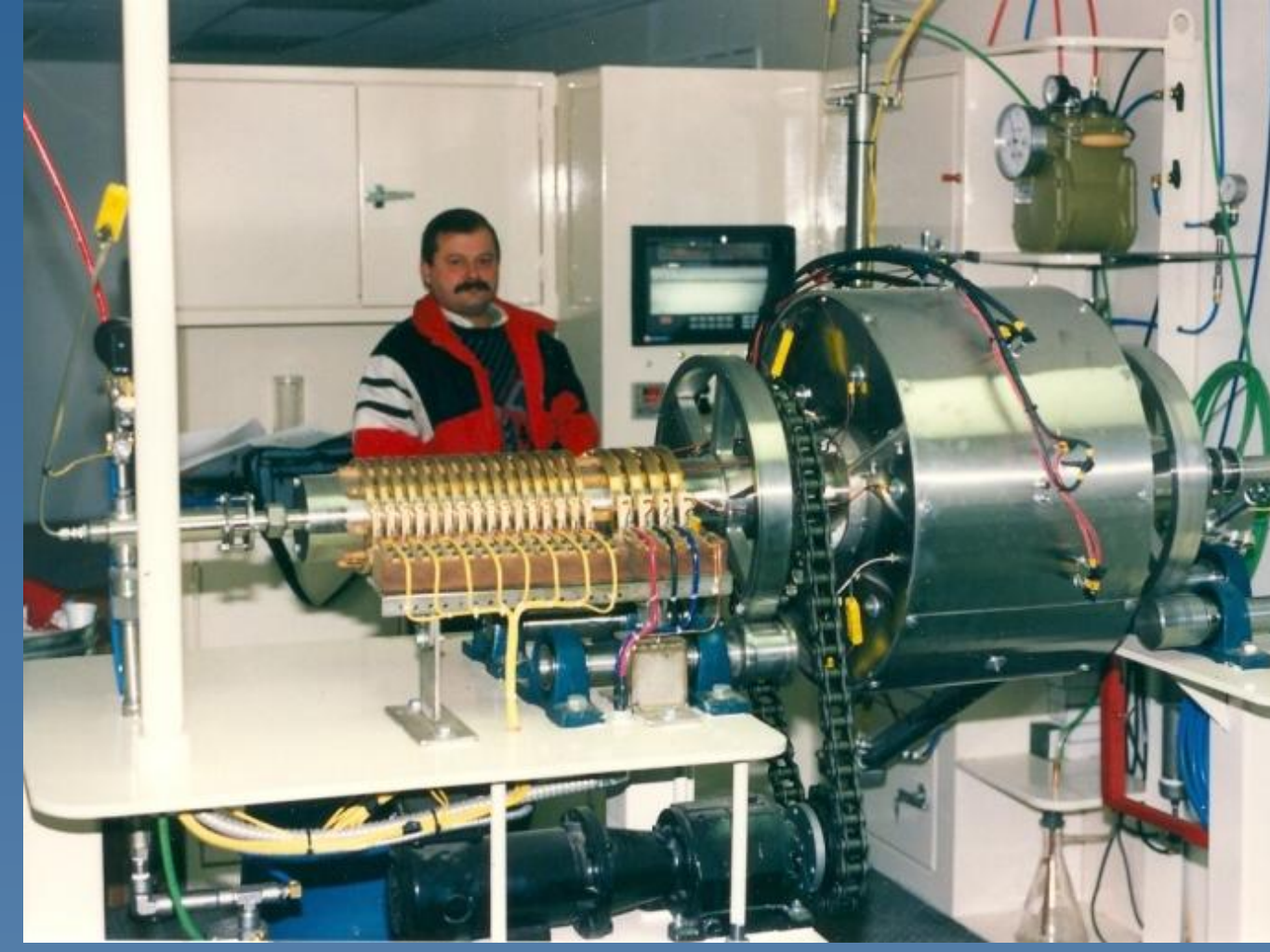


UMATAC Oil Shale Testing Equipment and Project Development Stages



Modified Fischer Assay (MFA)

- First stage of testing.
- 100 g of feed per test.
- Small scale, quick, and inexpensive.
- Provides pyrolysis yield characterization and preliminary ore grade assessment.
- Industry standard assay.



UMATAC Batch Retort Unit

- Second stage of testing.
- 2500 g of feed per test.
- Small scale, quick, and inexpensive.
- Provides pyrolysis yield sensitivity information and aids in combustion and drying studies.
- Larger product samples.



UMATAC's ATP60 Pilot System

- Third stage of testing.
- Up to 5 t/h feed (60 bbl/d oil sands equivalent feed rate).
- Designed to gather the final data necessary for design of a commercial plant.
- Produces representative oil, water, off gas, flue gas, and solids products for analysis.

ATP60 Performance Tests and Bulk Oil Sample Collection



Oil Recovery System

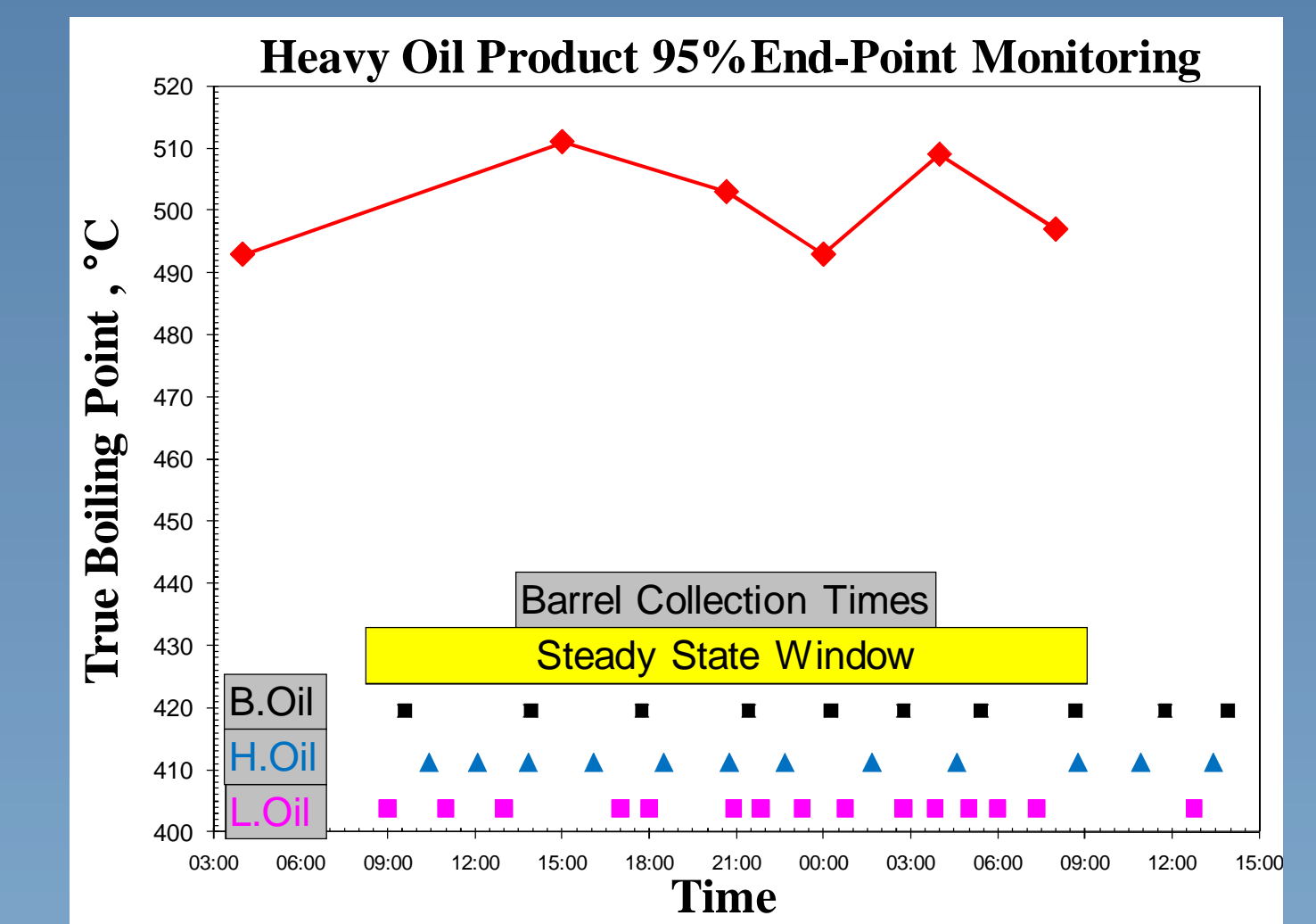
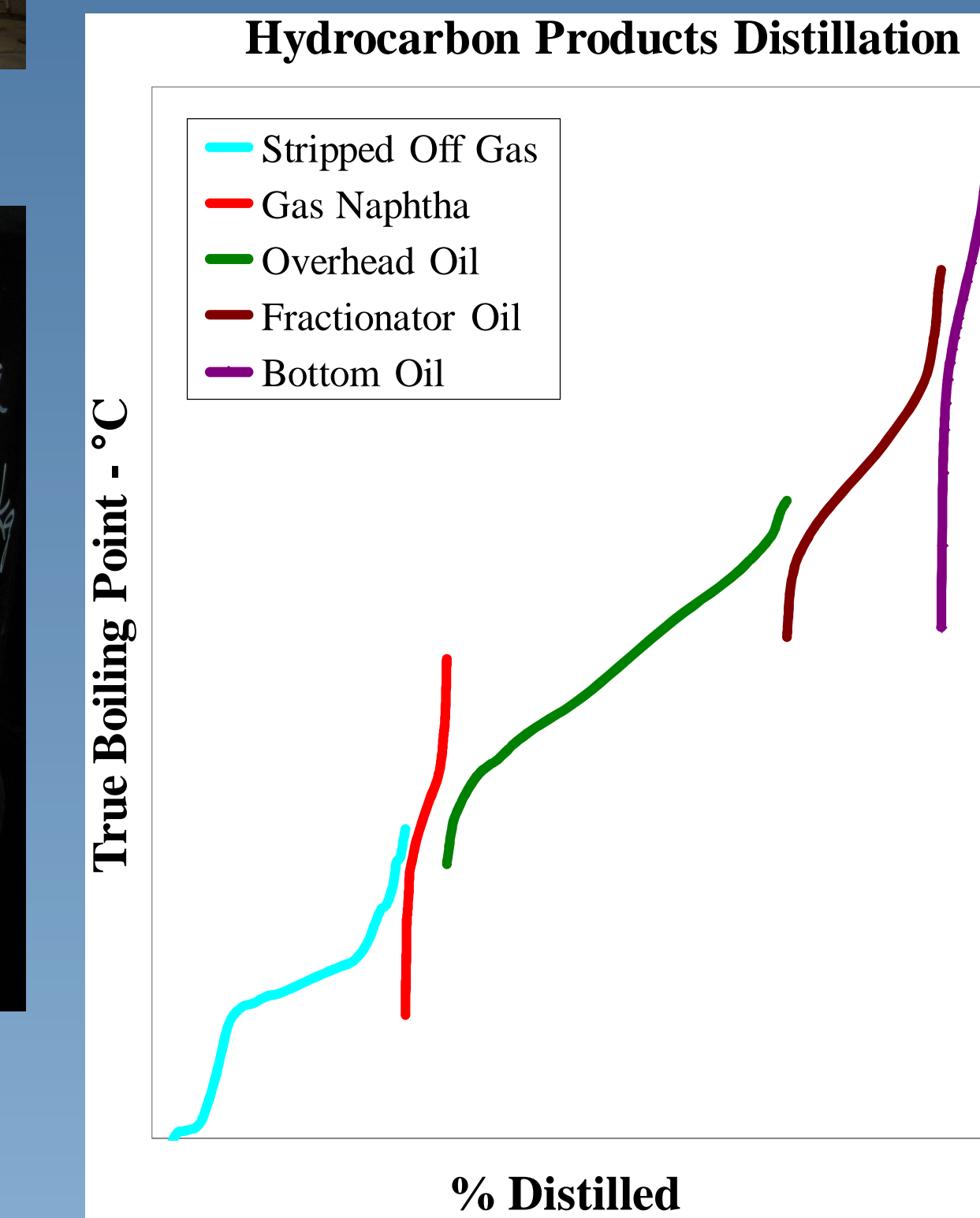
Two performance tests with bulk oil collection and comprehensive flue gas testing were done. The bulk oil sample met hydrotreating licensor specifications.



In-House Oil Analysis Laboratory



Bulk Oil Sample



Distillations and FBP Monitoring of Oil Product

An ATP Technology Pilot Program for Jordan Energy and Mining Ltd.

- Bulk sample site selection (JEML).
- Sample collection & crushing (JEML).
- Sample analysis & scoping studies.
- ATP60 scoping test.
- ATP60 performance runs & bulk sample collection.
- Mass & energy balances & reporting.
- 3rd party testing (eg. hydrotreating).

Testing Results

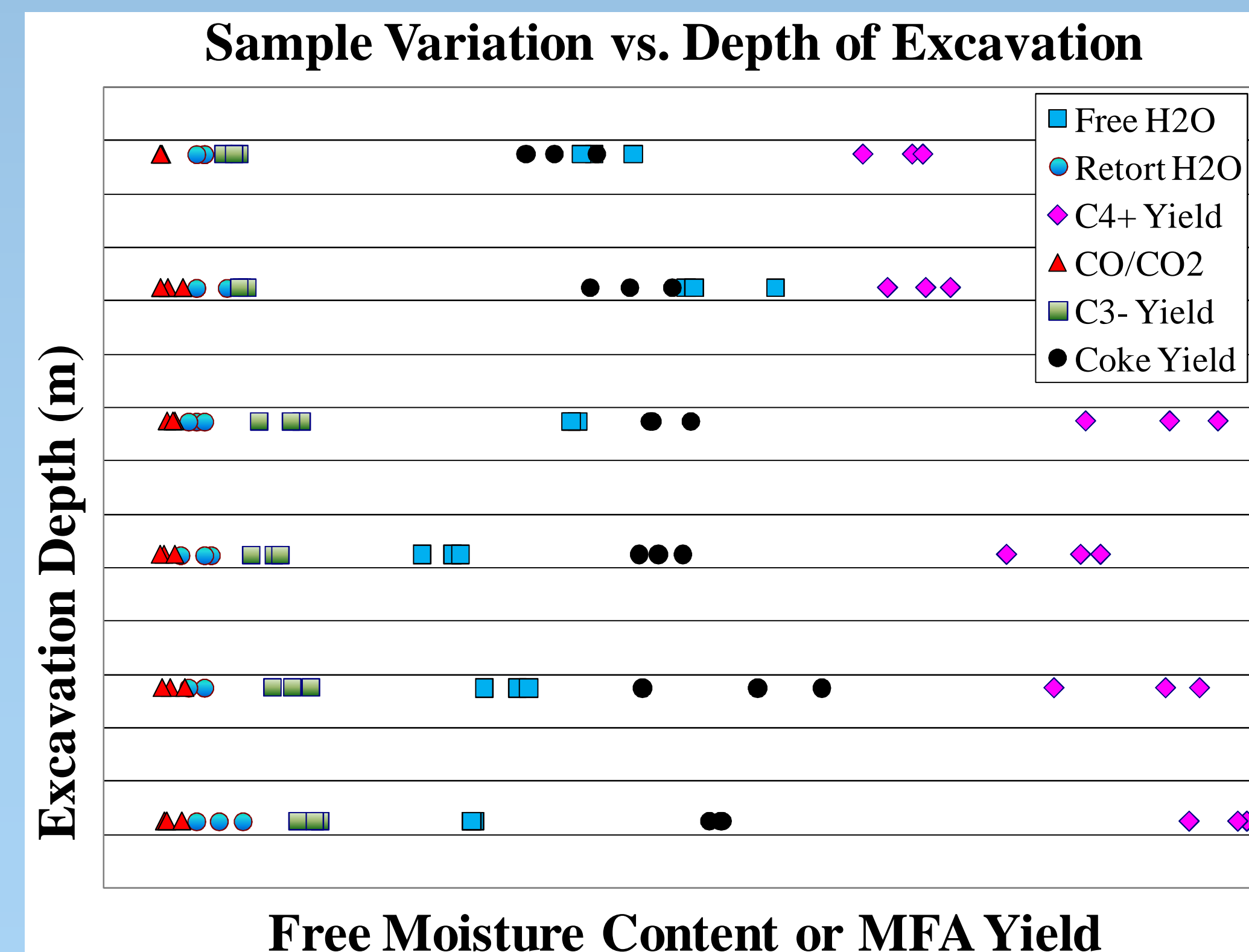
- 500 tonne bulk ore sample.
- No operational problems.
- Hydrocarbon yield verified & consistent with previous testing.
- Product oils characterized.
- All sub-streams measured and analyzed.
- Flue gas emissions identified and quantified, CO₂ emission reduction opportunity identified.

Bulk Sample Collection and Scoping Studies



Photograph Courtesy of Marston Canada Ltd.

Bulk Sample Excavation, Al Lajjun, Jordan



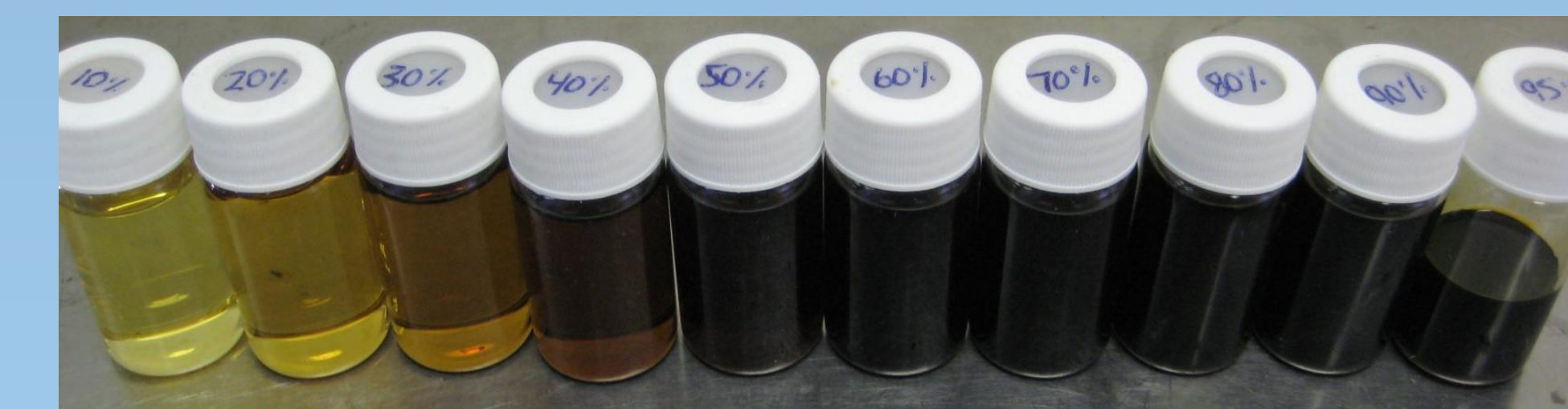
Scoping Study - Ore Sample Variability

Third Party Pilot Testing and Analysis

- Hydrotreating tests confirmed high sulphur Jordan shale oil can be hydrotreated using conventional, but severe, hydrotreating technologies.
- Environmental and geotechnical analysis of spent shale.

Engineering Studies

- Feasibility study completed in 2009.
- ATP60 test results available for front end engineering (FEED) and detailed engineering work in 2010/2011.



Boiling Point Fractions Prior to Hydrotreating



Boiling Point Fractions After Pilot Hydrotreating - Naphtha, Jet/Kero, Diesel, Gas Oil, Light Oil -