

DRIVE TO PRODUCE HEAVY CRUDE PROMPTS VARIETY OF TRANSPORTATION METHODS

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Increasing oil demand has been driving development of the world's large resources of heavy oil and bitumen, more than 70% of which are in Canada and Venezuela.

Moving these heavy crudes and bitumens to market requires alternative pipeline transportation methods.

Those methods are discussed here, along with the general problems which industry faces in transporting and marketing heavy crudes and alternatives currently available for dealing with them. Environmental aspects are also considered.

Methods for dealing with the problems of heavy-oil transportation include the use of diluents, crude up-

grading prior to transportation, and use of other types of pipeline systems, such as hot-oil pipelines, oil-in-water emulsion systems, oil/water core annular flow, and Orimulsion.

Also presented here are the advantages and disadvantages of the various technologies and how they might fit into the future of heavy oil in Venezuela.

The technologies and experiences reviewed confirm that heavy oil and bitumen pipelines can be designed and operated with confidence. Economic aspects must be considered in the ranking of technical options.

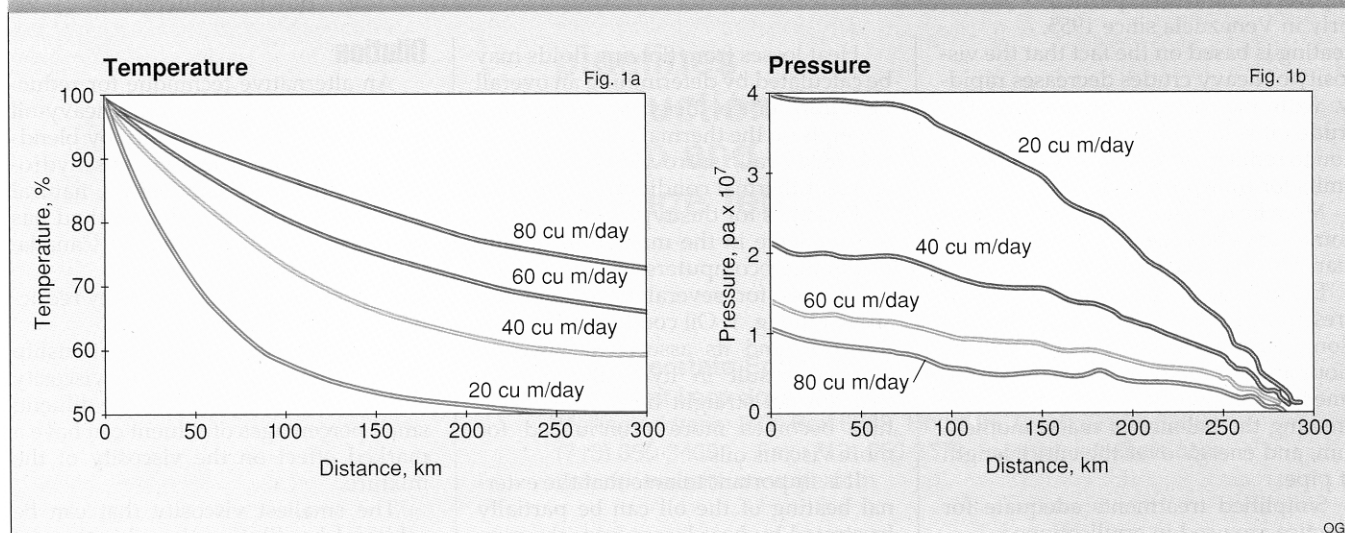
Demand drivers

World heavy and extra heavy oil and natural bitumen proved reserves amount to 98.8 billion cu m (620.5 billion bbl).¹ Recent interest in developing these large world resources stems from projections of oil demand and new technologies that influence the economic balance of the heavy hydrocarbon business.

For many years, research in heavy oil has been biased toward increased recovery and upgrading. This situation has made available modern lifting techniques and upgrading processes that have improved the entire value chain of heavy-oil projects, thus making them more attractive.

Fig. 1

DISTRIBUTIONS ALONG TYPICAL HEATED-OIL LINE



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