DESIGN OF A SMALL-SCALE LNG PLANT FOR REMOTE APPLICATIONS
AN ALTERNATIVE TO DIESEL FUEL

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Objectives

1. Design a small-scale natural gas liquefaction unit for implementation at a remote mining site in Northeastern BC
2. Determine the economic feasibility of replacing diesel fuel with LNG to fuel mine-haul trucks
3. Meet environmental emission limits

Novelty

- Monetization of small/remote gas reserves
- Easy to scale skid-mounted design
- Minimal land impact
- Combined contaminant removal
- Replaces diesel in hybrid fuel mine-haul trucks
- Produce LNG in proximity of end-user

Emissions

- SO₂: 45% Lower than emissions limit
- CO₂: 61% Lower than emissions limit
- NO₂: 10% Lower than emissions limit

Process Flow

- INLET GAS PRETREATMENT
  - Filter Coalescer
- PIPELINE GAS
  - 12,370 kg/day
- MERCURY REMOVAL
  - Non-regenerative Sorbent
- ACID GAS & MERCAPTANS REMOVAL
  - Diglycolamine (DGA) Solvent
- DEHYDRATION
  - Molecular Sieves
- HEAVY HYDROCARBON REMOVAL
  - Cryogenic Expansion
- LIQUEFACTION
  - Single-mixed refrigerant
- STORAGE
  - 11,110 kg/day

Sustainable Features

- Compact 2.47 acre facility
- Recovered natural gas liquids sold for use in other applications
- Reduced water consumption through use of air coolers

Economics

- Total Capital Investment: $38.20 M CAD
- Manufacturing Cost: $2.87 M CAD/year
- Annual Cost Savings: $4.04 M CAD/year
- Incremental Rate of Return: 8.6%
- Payback Period: 9.4 years