



Pipeline Technology

The proposed pipeline will be modeled after the Trans-Alaskan Pipeline System (TAPS) which features the following technologies:

- sideways maneuverability: horizontal shifting along pylons and zigzag formation; together, these will allow for thermal expansion from the transport of heated fluids and motion during seismic activity; these features help ensure the structural integrity of the pipeline

-internal heating and insulation: to keep the oil within the pipelines liquid in an arctic environment while minimizing thermal radiation to the environment at large

-leak control system: series of valves, automated control, for shutoff in case of detected leaks; these valves limit the maximum volume of oil that can be spilled; there are also manned routine maintenance trips along pipeline

-pigs: automated vehicals which travel up and down the inside of the pipe which are used to 1) clean the inside of the pipeline by scraping, 2) sense/detect pipeline cracks/ deformations; small enough to fit in pipe but big enough to maintain one-way orientation (i.e. won't turn around/rotate inside the pipe)

-vertical loops: used at the Alpine field, artificial high points in pipeline system which create a vacuum/siphon at top of a "loop" (really, just vertical zigzags) in case of leak; replaces the need for most valves, which themselves leak

-coating: protective coating along pipeline to guard against corrosion; different coatings for above and below ground pipes; often pipes manufactured pre-coated

-sacrificial anodes: when pipes underground, sacrificial anodes in place to corrode it instead of pipe

-elevated pipe to allow animals to cross; TAPS buried almost 1/2 of the pipes because to not disturb animals

-if buried, pipes should be buried in stable permafrost; in the past, this has been done by traditional burying, with no refrigeration systems; refrigeration systems only used when pipelines buried in unstable permafrost; either way, the permafrost melts, but having a refrigeration system is better than not having one

-geographical obstacles, like rivers, can be crossed by either 1) constructing a bridge, or 2) digging under it with directional drilling

