

Puget Sound Energy – Tacoma LNG
Direct LNG Pipeline Alternatives Considered

August 18, 2015

Pipe rack (with above ground or utilidor crossing of Alexander Ave.)

Pro's: Allowed by code. Visual inspection of all components. Cheapest alternative

Con's: At risk of vehicular damage in terminal (1000+ semi-trucks per week transiting terminal). Footprint in terminal could impact operations. Needs to be very tall to clear trucks transiting underneath. Seismic issues (large moment arm) require extensive ground improvement at each pipe rack support. Vapor dispersion area would be large and possibly not feasible with existing property control.

Pre-formed concrete trench with removable concrete covers (utilidor crossing of Alexander Ave.)

Pro's: Relatively inexpensive. Pipeline can be inspected by using crane to remove concrete cover sections.

Con's: Not gas tight – no way to purge trench area to maintain oxygen-free environment. Potential explosive atmosphere with pipe leak.

Pre-formed concrete trench with grate covering (utilidor crossing of Alexander Ave.)

Pro's: Relatively inexpensive. Pipeline can be visually inspected by removing grate.

Con's: Area over trench becomes an NEC Class 1 Division 1 area – precludes safe operation of vehicles over trench. Not feasible for a shipping terminal.

Direct buried lines (EcoElectrica solution)

Pro's: Design has been approved by PHMSA. Inexpensive. Minimizes impact to terminal operations.

Con's: Risk of third party damage (assuming traditional gas line depth). No visual inspection of pipeline possible. Risk of gas migration in the event of a leak. Unknown lifespan of direct buried VJ pipe. Unknown behavior in seismic event. Unknown vapor dispersion criteria. PSE generally uncomfortable with this design from a safety standpoint.

Pipe rack in casing (proposed design)

Pro's: Depth of installation (11') and 1" thick casing precludes almost any conceivable third party damage. VJ piping is in a dry, inert environment. Nitrogen purge and vent prevents possibility of explosive environment in the event of a pipeline leak. Dual leak detection (temperature sensor and hydrocarbon monitoring in the event of a spill. Pipeline is on rollers inside casing – linear seismic forces do not act on pipeline.

Con's: Highest cost option. Pipeline inspection or maintenance requires the piperack assembly to be disconnected at the terminal side and rolled back out on rails at the facility site – potentially a several week shutdown.