Cold Ironing BP's Alaskan Class Tankers at BP's Berth 121 in the Port of Long Beach

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Cold Ironing BP's Alaskan Class Tankers at Berth 121

Agenda –

- Summary
- Background
- Why cold ironing makes sense at B-121
- How it will work
- Emissions Reductions
- Schedule
- Summary

Cold Ironing BP's Alaskan Class Tankers at Berth 121

Summary –

- Unique opportunities makes application of cold ironing at B-121 feasible
  - Berth infrastructure
  - Vessel design
  - Vessel visit frequency
  - POLB support
- Cold ironing is not a universal solution to reduce oil tanker emissions
- Regulations should not dictate which technology is used to achieve emission reductions
- Cold ironing is more expensive, making voluntary participation less likely without incentives such as emission reduction credits

Why Cold Ironing Makes Sense at Berth 121

Shoreside Booster Pumps – existing infrastructure

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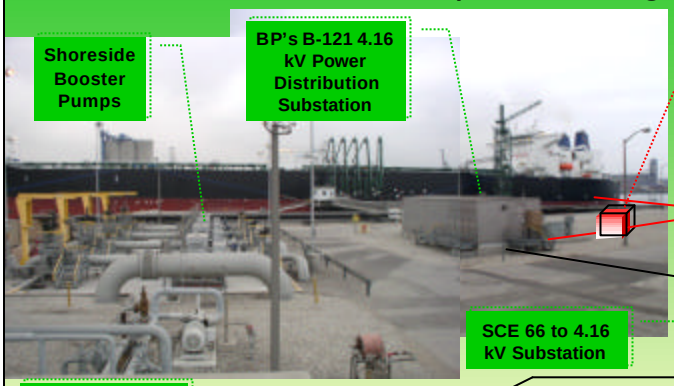
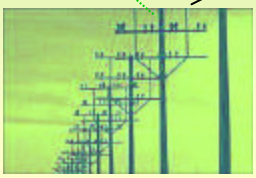




Vessel Design

- **Potential emission savings vary by tanker type**
  - During discharge cargo operations:
    - ✓ Steam ships and motor ships derive nominally 5% of their energy from electricity
    - ✓ Diesel electric vessels derive nearly 100% of their energy from electricity
    - ✓ Since 1998, Berth 121 has had 1143 ship calls – less than 10 of these have been from diesel electric vessels
      - 3 of these ship calls have been the Alaskan Frontier over the last 2 months

Vessel Dimensions

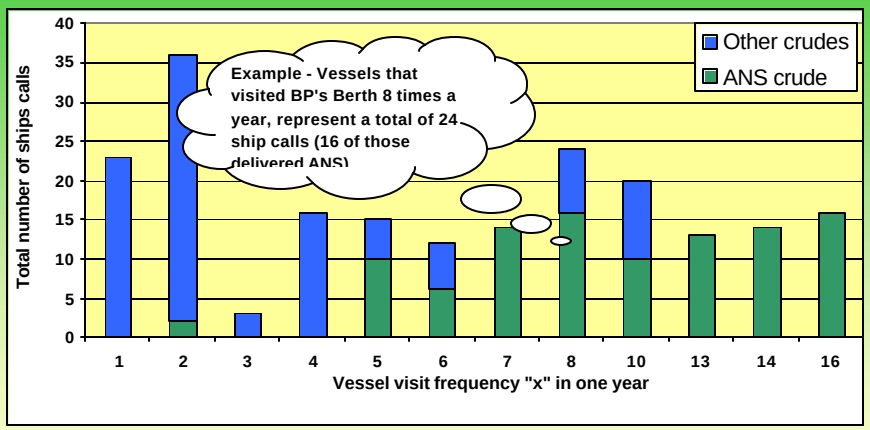
- Actual B-121 vessel Length Over All (LOA) can vary from 700 to 1100 feet
- Alaskan Class LOA is 950 feet
- Simple issue – our design is focused around meeting a +/- 11 feet location of the ship's electrical connections

Vessel Dimensions

Voltage Level on Tankers

- ✓Our design is set to deliver 6.6 kV power consistent with the electrical level onboard the Alaskan Class vessels.
- ✓Other vessels operate at voltage levels from 480 V up to 6.6 kV

Vessel Visit Frequency to Berth 121

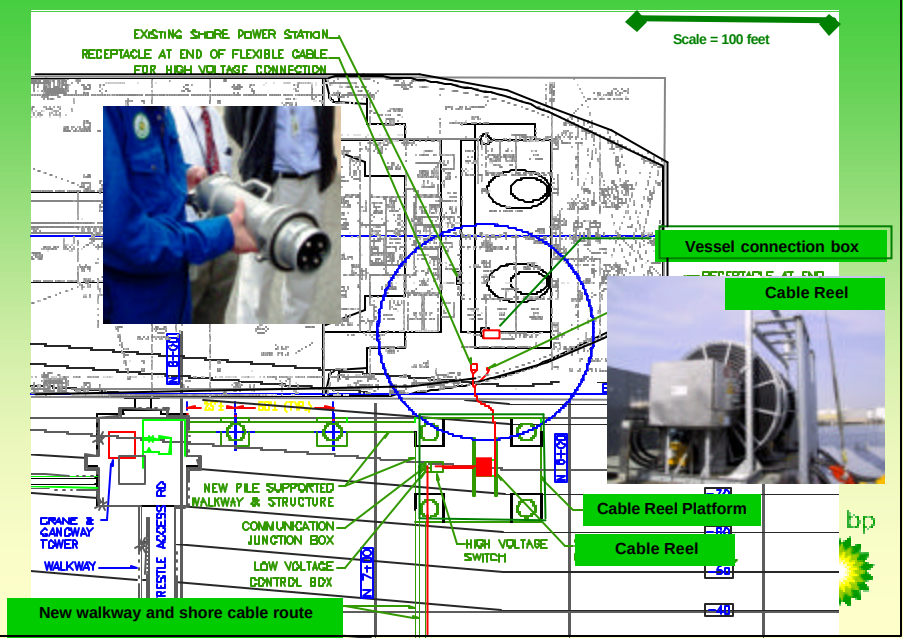


How it will work

Design Requirements

- SAFETY, SAFETY, SAFETY!
- No impact to berth operations :
  - During construction or from final design
- Connection basics :
  - Plugs and cables must be suitable for marine environment
  - Vessel alignment for initial connection capable of +/- 11 feet fore and aft
- Connection must be sufficiently automated to :
  - Minimize vessel crew / Require only 1 terminal employee to deliver cables
  - Enable connection & energizing process in < 2 hours
  - Allow for bumpless transfer (no blackout)
- During cargo operations the system must allow for :
  - Overall change in height of 46 feet
  - Limited movement – 4 feet in either direction
  - Support of cables throughout discharge; no tension on plugs
  - Emergency shut down of power supply and disconnect

How it will Work



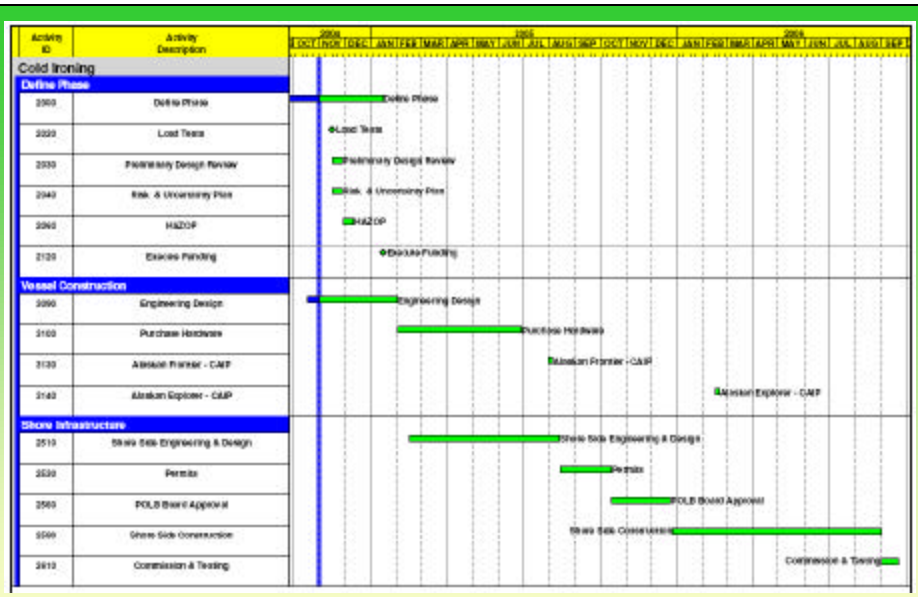
Vessel Generators MAN B&W 6L48/60 – 6.3MW

Emissions Reductions to be Achieved

Expected Emission Savings

Scenario	Estimated Emission Reductions (short tons/ship call) Incremental to base case					
	Net GHG	NOx	CO	PM	ROG	SOx
BASE CASE: No changes No SSP's	0	0	0	0	0	0
COLD IRONING – 2 Alaskan Class Vessels No SSP's	78.3	2.2	0.27	0.08	0.40	1.6

Project Schedule



Project Schedule

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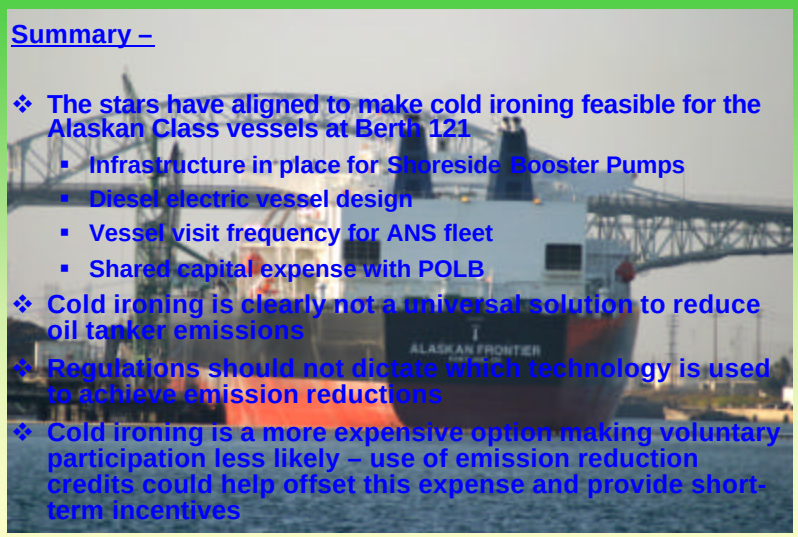

Summary –

- **The stars have aligned to make cold ironing feasible for the Alaskan Class vessels at Berth 121**
  - **Infrastructure in place for Shoreside Booster Pumps**
  - **Diesel electric vessel design**
  - **Vessel visit frequency for ANS fleet**
  - **Shared capital expense with POLB**
- **Cold ironing is clearly not a universal solution to reduce oil tanker emissions**
- **Regulations should not dictate which technology is used to achieve emission reductions**
- **Cold ironing is a more expensive option making voluntary participation less likely – use of emission reduction credits could help offset this expense and provide short-term incentives**

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