Contaminated Land and Acid Sulfate Soils Impact Assessment

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Contaminated Land and Acid Sulfate Soils Methodology

Outline

• Investigation approach
• Results
• Risk Assessment
• Impact Assessment
• Performance Standards / Requirements
• Reply Evidence
Contaminated Land and Acid Sulfate Soils Methodology

Desktop Review - Preliminary Site Investigation

- Current and historic land uses.
- Site walkover along the Project area.
Contaminated Land and Acid Sulfate Soils Methodology

Detailed Site Investigation - Soil

- **Grid based soil sampling program**:
  - 57 soil bores approximately 1/ km (includes samples from 26 groundwater monitoring bores).

- **Targeted soil sampling program**:
  - 11 soil bores targeting areas identified to have higher potential for contamination
  - 27 additional ASS bores targeting areas that are classified in the CSIRO’s Australian Soil Resource Information System (ASRIS) as High Probability/High Confidence of occurrence
Field Investigation - Groundwater

• Groundwater sampling program (3 Dec 2018 to 30 Jan 2019)
  • Installation of 4 groundwater monitoring wells, at locations where groundwater is expected to be encountered.
  • Groundwater gauging and sampling as part of the Groundwater Impact Assessment (26 wells in total of which 15 were gauged and sampled)
Field Investigation - Sediment

• Sediment sampling program – Preliminary and Secondary (undertaken by CEE Pty Ltd)
  • To establish baseline characteristics
  • Twelve sediment samples, from four locations:
    o Berth 1
    o Berth 2
    o Reference site 500 metres north
    o Reference site 500 metres south.
• Detailed assessment nine sediment samples, from across Berth 2
Contaminated Land and Acid Sulfate Soils Results – Desktop Review

• Land use primarily non intensive agriculture. Relatively low potential for soil and groundwater contamination with the exception of:
  • Former BP Western Port refinery and import jetty facilities
  • Tyabb Resource Recovery Centre (former Tyabb landfill)
  • Commercial/industrial areas, service stations, railway corridor, and market gardens.
Contaminated Land and Acid Sulfate Soils
Results – Field Investigation

Soil
Concentration of potential contaminants below investigation limits in the vast majority of soil samples collected and analysed

Crib Point Receiving Facility
• Zinc exceeded the EILs for Commercial/Industrial land use within imported crushed rock. Zinc has not leached into the underlying sample at 0.4 mbgl

• Benzo(a)pyrene exceeded ESLs for Coarse Soil, Commercial/Industrial land use. B(a)P is not a leachable compound

• Contamination identified considered unlikely to present risk to on or off-site receptors.
Soil

The Esplanade (former BP Western Port refinery)

- Benzo(a)pyrene exceeded ESLs for Coarse Soil, Commercial/Industrial land use in one sample

- The contamination was detected within gravelly sand fill soil, likely to be associated with asphalt and roadmaking materials

- B(a)P is not a leachable compound

- Unlikely to present risk to on or off-site receptors.
Contaminated Land and Acid Sulfate Soils Results – Field Investigation

Soil

Tyabb Resource Recovery Centre (former Tyabb landfill)

- Arsenic exceeded EILs for areas of ecological significance
- Samples collected within sandy clay material at depth
- Concentrations are higher than the median concentration (2.5 mg/kg) calculated for the entire Project
- Considered likely to be naturally elevated for this area, based on distribution and leachability.
Groundwater

- 15 wells sampled

- Compounds exceeded adopted criteria for potential contaminants such as TDS, selected metals, sulfate, phosphorous, and calcium, however they are considered likely to be naturally sourced/background.

- At GW05, PFOS exceeded Aquatic ecosystems: freshwater and marine water guideline values for 99% species protection – high ecosystem value systems
Acid Sulfate Soil

- Presence of existing acidic soils throughout the Project area.
- Net acidity in 85 samples of total 170 samples exceeded the ‘Action Criteria’ of 0.03%S for disturbance exceeding 1,000 tonnes.
- PASS identified at five sampling points
Sediment
• No contamination in project area.

• TBT identified in Berth 1 above dredging guidelines.

• Arsenic detected in Berth 1 and northern reference point above guidelines. May be indicative of background.
<table>
<thead>
<tr>
<th>Risk ID</th>
<th>Works area</th>
<th>Risk name</th>
<th>Risk pathway</th>
<th>Initial risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Gas Import Jetty Works and Pipeline Works</td>
<td>Contaminated soil and/or ASS</td>
<td>Contaminated soil and/or acid sulfate soils are encountered during excavation and drilling. Inappropriate handling, storage and disposal affects human health and the environment</td>
<td>Moderate</td>
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<tr>
<td>C2</td>
<td>Pipeline Works</td>
<td>PASS activation</td>
<td>Generation of acid leachate through oxidation of previously submerged soils (dewatering from trenches and bell holes) leads to generation of acidic waters that affects surface water and/or groundwater quality</td>
<td>Minor</td>
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<tr>
<td>C3</td>
<td>Gas Import Jetty Works and Pipeline Works</td>
<td>Contaminated soil or groundwater containing PFAS</td>
<td>PFAS contaminated soil and/or groundwater are encountered during excavation and drilling. Inappropriate handling, storage and disposal affects human health and the environment.</td>
<td>Minor</td>
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<tr>
<td>C4</td>
<td>Pipeline Works</td>
<td>Discharge/disposal of acidic, brackish and/or contaminated groundwater</td>
<td>Discharge of abstracted groundwater affects human health, soil, and/or surface water quality</td>
<td>Minor</td>
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<tr>
<td>C5</td>
<td>Pipeline Works</td>
<td>Contaminant migration</td>
<td>Dewatering (during trenching and thrust-boring works) results in intersection of contaminated groundwater and/or mobilisation of contaminant plumes impacting on beneficial uses.</td>
<td>Minor</td>
</tr>
<tr>
<td>C6</td>
<td>Pipeline Works</td>
<td>Drilling Mud</td>
<td>Inappropriate management, handling and disposal of drilling mud affects human health and the environment</td>
<td>Minor</td>
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<tr>
<td>C7</td>
<td>Pipeline Works</td>
<td>Contaminated hydrostatic test water</td>
<td>Inappropriate handling, storage and disposal of water from hydrostatic test affects human health and the environment</td>
<td>Minor</td>
</tr>
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<tr>
<td>C8</td>
<td>Gas Import Jetty Works and Pipeline Works</td>
<td>Unknown contamination</td>
<td>Unknown contamination encountered during construction results in impact to human health and the environment</td>
<td>Minor Possible Low</td>
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<td>C9</td>
<td>Gas Import Jetty Works and Pipeline Works</td>
<td>Dust from contaminated stockpile</td>
<td>Dust from contaminated soil/stockpile blown by wind affects human health and the environment</td>
<td>Minor Unlikely Low</td>
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<tr>
<td>C10</td>
<td>Gas Import Jetty Works and Pipeline Works</td>
<td>Spill (construction)</td>
<td>Leaks or spillages during construction from machinery/plant, fuel and chemical storage impact human health and the environment</td>
<td>Minor Possible Low</td>
</tr>
<tr>
<td>C11</td>
<td>Gas Import Jetty Works and Pipeline Works</td>
<td>Spill (operation)</td>
<td>Leaks or spillages from fixed machinery/plant, fuel and chemical storage impact human health and the environment</td>
<td>Minor Possible Low</td>
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<td>C12</td>
<td>Gas Import Jetty Works and Pipeline Works</td>
<td>Other waste streams (construction)</td>
<td>Management of other waste streams (solid inert, liquid, organic, packaging etc.) affects aesthetics and the environment</td>
<td>Negligible Possible Low</td>
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<tr>
<td>C13</td>
<td>Gas Import Jetty Works and Pipeline Works</td>
<td>Other waste streams (operation)</td>
<td>Management of other waste streams (solid inert, liquid, organic, packaging etc.) affects aesthetics and the environment</td>
<td>Negligible Possible Low</td>
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</table>
Contaminated Land and Acid Sulfate Soils Impact Assessment

Impact – Contaminated soil, dusts

- Minor quantity of contaminated soil expected to be encountered during excavation and/or trenching, low concentrations of contaminants of concern.
- Low risk to human health and environment.
- Standard construction management practices to be adopted.

Impact – Acid sulfate soils / PASS Activation

- Conservatively identify all soils as ASS.
- Manage risk as per CASS BPMG strategies.
- Low risk to human health and the environment.
- Standard construction management practices to be adopted.
Impact – Discharge/Disposal of acidic, brackish and/or contaminated groundwater

- Low risk of impact due to the low concentration of contaminants detected (naturally occurring compounds may preclude some uses).
- On site disposal - treat water to meet relevant criteria prior to discharge (with permission/approval from relevant landholder (where appropriate) and Authority)
- Off site disposal - to an EPA Victoria licensed facility.

Impact – Groundwater containing PFAS

- Trenching on the eastern side of the former Tyabb landfill will intersect groundwater contaminated with low concentrations of PFAS (exceeds adopted criteria)
- Lay down pipeline without dewatering the trench
- Minimise disturbance of existing contaminated groundwater
Contaminated Land and Acid Sulfate Soils Impact Assessment

Impact – Contaminant migration (groundwater)

- No groundwater contaminant plume identified (excluding former Tyabb Landfill) and drawdown very limited, temporary extent

Impact – Drilling mud / Hydrostatic test water

- HDD Management Plan endorsed by Pipeline Regulator – standard construction disposal
- Muds to be disposal in accordance with *Environment Protection (Industrial Waste Resource) Regulations 2009* and EPA Victoria Industrial Waste – Classification for Drilling Mud
- Avoid the use of chemical additives such as biocides, corrosion inhibitors, detergents, antifreeze, oxygen scavengers, and leak detection dyes or tracers
- Hydrostatic test water will be sampled and analysed to establish an adequate method of disposal, with approval from the relevant authority and in consultation (if appropriate) with the relevant landholder prior to discharge
Contaminated Land and Acid Sulfate Soils
Impact Assessment

Impact – Unknown contamination
• Unlikely but possible.
• Managed as per standard construction approach - cessation of ground disturbance at the location (and within the immediate vicinity), followed by environmental assessment and determination of appropriate remedial action.

Impact – Spill / Waste Streams
• Leaks or spills may occur during construction from machinery/plant, fuel and chemical storage.
• Low risk to the human health and the environment, and will be managed under the Gas Import Jetty and Pipeline Environmental Management Plans.
Contaminated Land and Acid Sulfate Soils Impact Assessment

Impacts to be managed as per the following:
Appendix J – Pipeline CEMP - Performance Standards

Appendix K – Pipeline CEMP - ASS Management Protocol

Environmental Performance Requirements (Crib Point Gas Import Jetty Works : Incorporated Document)
Appendix J Pipeline CEMP – Performance Standards

Applicable performance standards include:

- F8 to F10 Fuels and chemicals
- W1 to W6 Wastes
- T9 Imported soils IWRG,
- T10 Unknown contamination,
- T11 Contaminated soil management,
- T12 Contaminated groundwater / trench water,
- T13 ASSMP (Appendix K CEMP)
- D1 to D7 HDD and Horizontal Boring – Drilling mud management
- H1 to H10 Hydrostatic test water management

- In addition to the performance standards I support the proposed revisions:
  - Assessment of landfill gas in proximity to the Former Tyabb landfill.
  - Sampling of PFAS in soils between KP7.3 and KP7.9
  - Backfill trenches with soils of similar hydraulic conductivity
Appendix K – Acid Sulfate Soil Management Protocol

• Management Protocol included in the Pipeline Works CEMP, which will be approved in accordance with Pipeline Act 2005, in consultation with EPA Victoria.

• The main purpose of the ASS Management Protocol is to mitigate or control potential impacts relating to the disturbance of ASS associated with the proposed earthworks and construction of the Project.

• ASSMP outlines the approach to manage topsoil, trench spoil and dewatering in accordance with the order of priority specified in the Coastal Acid Sulfate Soil Best Practice Management Guidelines.

• In addition to the guidance presented as part of the ASSMP I support the changes proposed including:
  • Specific guidance regarding implementation of Level 1 – National Dewatering Guidelines
Environment Performance Requirements

- Applicable performance standards include:
  - EPR-C01 Contaminated soils
  - EPR-C03 Acid sulfate soil management plan
  - EPR-C04 Contaminated groundwater
  - EPR-C07 Unknown contamination
  - EPR-C08 Fuel and chemical leaks
  - EPR-C09 Construction waste management
  - EPR-C10 Operational waste management

- In addition to the above I support changes to the EPRs including:
  - Requirement for low hydraulic conductivity of backfill materials
Other Evidence

• Evidence of Dr Wong -
  • Questioned the sampling approach and density to characterise the area.
  • I consider that the density and distribution of sampling is satisfactory to assess the nature of ASS likely to be encountered, based on the proposed pipeline construction methodology as discussed in the EES.

• Evidence of Christopher Smitt
  • Questioned the extent of groundwater PFAS analysis and the necessity to sample adjacent to a meat packing facility.
  • The analytical program is consistent with guidance provided in the National Environment Protection (Assessment of Site Contamination) Measure (Amended 2013) where analytes are based on the site history. I do not consider it appropriate or necessary to analyse for PFAS at other locations.
  • Based on the potential for contamination associated with this facility, subsurface conditions and the distance to between the lagoons (the nearest possible source) and the proposed pipeline, the scope did not include the requirement to assess groundwater quality in this area. I consider this approach to be appropriate.