To	ConocoPhillips	Reference number	GT
cc		File reference	
From	Arup / Foster Wheeler	Date	December 2, 2004
Subject	Project: Beacon Port - Decommissioning Strategy		

The following discusses the decommissioning strategy for the LNG Tanks and Marine Structures. This has been prepared for inclusion in section 46 of the permit application. Similar text will be included in the CGC Conceptual Design Report.

1. DECOMMISSIONING

The terminal will be decommissioned at the end of its life. Decommissioning is to include the removal from the site of all structures to a level below seabed that will not become a future hazard. It has been assumed that structures would be returned to onshore for recycling or disposal.

1.1 General

This discussion on decommissioning is limited to activities directly related to the CGC LNG tanks and the marine structures.

Inclusions:

- Removal of CGC units
- Removal of access bridges and pipe-racks
- Removal of all piled structures above seabed (including berthing jackets, intermediate jackets, process jacket, quarters jacket, flare tower jacket)
- Final removal of all dropped objects from sea-floor

Exclusions:

- Decommissioning of terminal, including decommissioning of facility, warm-up and purging of LNG tanks
- Purging of all process pipework
- Decommissioning and removal of riser and abandonment of pipeline
- Removal of process platform topsides, quarters platform topsides and flare tower (note: substructure removal included above)
- Removal of any contaminated liquids or solids on the facilities or spilled into the surrounding environment
- Removal of buried structures such as piles (assumed not to be required)

1.1.1 Facility Decommissioning

Decommissioning will occur after re-gasification of the last LNG shipment to the terminal.

The following activities will occur during decommissioning.

- Removal of LNG from tanks using process pumps. The LNG will be drawn down to the lowest operating level using the process pumps. The LNG will be re-gasified and exported through the existing pipeline system.
- Removal of LNG using stripping pumps. The remaining LNG will be removed using temporary stripping pumps. The pumps will be installed in the LNG tanks as required. The LNG will be re-gasified using the process equipment and exported through the existing pipeline system.
- Removal of remaining LNG by boil-off. The boil-off gases will be fed to the boil-off gas compressors and exported through the existing pipeline system.
- Purging of the LNG tanks. The LNG tanks will be purged using nitrogen. Purged gas will be directed to atmospheric vents located in a safe area. Once the tanks are purged of gas, forced ventilation will be applied until the inner tank atmosphere is deemed acceptable. Continuous gas monitoring of the tanks will occur until the tanks are demolished.
- Purging of process pipework. Pipework will be purged, decommissioned and disassembled to ensure gas concentrations cannot occur.
- Pipeline decommissioning. The pipeline will be decommissioned, and then purged prior to its removal. The riser connection to the process jacket will be removed.
- CGC decommissioning and removal. The CGC will be re-floated, towed to an onshore casting basin and demolished. The adjoining sections of the access bridges will be removed prior to CGC removal. Refer to Section 1.2 for further details.
- Access bridges and pipe-rack removal. Access bridges and pipe racks will be lifted from their supports, placed on barges and shipped to onshore fabrication yards for demolition. Refer to Section 1.3 for further discussion.
- Process platform, quarters platform and jacket platform decommissioning and removal. These items will be decommissioned and lifted off their jackets. The structures will be placed on barges and shipped to onshore fabrication yards for demolition.
- Substructure removal. All remaining substructures will be cut from their piles at sea bed level and lifted onto barges. The substructures will be shipped to an onshore fabrication yard for demolition. Refer to Section 1.3 for further discussion.
- Final clean up of exposed obstructions and handover to owner. Refer to Section 1.3 for further discussion.

1.1.2 Decommissioning Schedule

Decommissioning of a facility is generally not schedule driven. The following is an estimate of the offshore durations for removal of the terminal.

- Terminal decommissioning (including pipeline decommissioning) – 4 Months
- CGC removal – 1 Month per CGC
- Marine structures removal – 5 Months
- Final clean-up – 1 Month

The total offshore decommissioning schedule is estimated to be 12 months.

Demolition of the CGC structures is expected to take between 6-12 months depending of whether the CGC

can be demolished in a dry-dock or whether it must be partially demolished while still floating.

A level 1 schedule is included in Appendix C of this report.

1.2 CGC Decommissioning

It is assumed that a contract will be awarded for removal of the CGC units, and will include engineering, CGC removal and CGC demolition. This section discusses in detail the proposed CGC Decommissioning activities:

- Engineering of the removal sequence will be carried out. The works would be carried out in accordance with prevailing regulatory standards, codes of practices and permitting requirements.
- A dock will be leased or constructed for the dry demolition of the structure. The depth of the dock will depend on the draft of the structure. It may be possible to carry out some demolition with the structure afloat if draft is critical. It is assumed that the demolition dock will be similar to the proposed CGC construction docks.
- Vessel Mobilization. It is assumed that at least four large offshore tugs and one construction support vessel (CSV) will be mobilized for CGC float-up.
- After LNG tank purging, all mechanical equipment on the CGC will be disconnected. The construction support vessel will be used to remove the adjoining access bridge span. The structure will be placed on the deck of the CSV for return to shore.
- Solid ballast will be removed from CGC using suction or airlift devices. Solid ballast will be placed on barges and shipped to an onshore disposal location.
- The water contained in the CGC lower ballast cells will be drained using submersible pumps. It is likely that the water will not be suitable for discharge to sea, and therefore should be transferred to a tanker for disposal onshore.
- The CGC should be floating with a draft of approximately 12m. If significant weight of soil were to remain attached to the underside of the CGC, it would be removed by water jetting.
- The CGC will be towed into a dry dock and ballasted until grounded. The second CGC would also be re-floated and towed into the same dry dock.
- A bund wall or similar will be installed across the front of the dock. The dock will be dewatered and hard standing material placed on the base of the dock.
- The CGC will be demolished using hydraulic breakers and other conventional demolition equipment. The steel and concrete would be separated and recycled as appropriate. Material that cannot be recycled such as tank insulation would be disposed of at a certified disposal location.

1.3 Marine Structures Decommissioning

Decommissioning of the marine structures include:

- Process jacket
- Quarters jacket
- Flare tower jacket
- 6 No. access bridges
- 11 No. berthing structures
- 10 No. cat-walks for berthing structure
- 1 No. small intermediate jacket structure (Riser Platform)

A marine spread consisting of a construction support vessel (CSV) with a large crane will be mobilized to the terminal site. The CSV will also be installed with diving facilities for underwater cutting and seabed survey. Anchor handling vessels and transport barges will also be mobilized.

All offshore structures will be stripped and cut-up into manageable pieces. Underwater cutting techniques will be used if required to break larger jacket structures into smaller pieces. Lifting attachments will be attached to the structural pieces and tested if required. Prior to lifting jacket structures, they will be cut from the installed piles. Piles will be cut a short distance below the seabed to ensure that exposed obstructions do not remain on the seafloor.

All items will be lifted onto barges and shipped to an onshore fabrication yard, where they would be stripped of all non-recyclable material and cut into smaller pieces suitable for recycling.

Sonar and ROV sweeps of the terminal footprint will be made to ensure that no exposed obstructions remain on the seafloor.

LEVEL 1 Schedule for Terminal Decommissioning

ENSR INTERNATIONAL

Memorandum

To:	Compass Port	Date:	December 2, 2004
From:	Jamey Hollingsworth	File:	
RE:	Pipeline Decommissioning	CC:	Kirk Meyer, Jon Schmidt

Please find the attached information regarding pipeline decommissioning anticipated for the proposed Beacon Port.

Beacon Port Pipeline Decommissioning Procedures

The offshore pipeline shall be abandoned in place in accordance with 49 CFR, Part 192 and 30 CFR, Part 250, Subpart J. Pipelines to be abandoned in place will be disconnected from all sources and supplies of gas, flushed, filled with seawater, cut, and plugged with the ends buried at least three (3) feet. The offshore pipeline will be cut at or near the base of the riser at the Beacon Port Terminal Regas platform and at or near the base of the Riser at the WC 167 Riser Platform. The riser will be abandoned with the platform facility.

The pipeline will be disconnected from all sources and supplies of gas and purged of gas, and sealed at the ends. Mainline valves and any above ground facilities shall be cut out of the pipeline and removed from the site. Above ground facility sites and pipeline right-of-way or easement shall be returned to its prior use.

Data on the abandoned pipeline facilities shall be submitted to the Department of Transportation, Research and Special Program's National Pipeline Mapping System (NPMS) in accordance with 49 CFR, Part 192, §192.727(g)(1).