



Legendre Field

Decommissioning Environment Plan (DEP): Public Summary December 2011

This summary has been submitted to comply with Regulation 11(7)(8) of the Offshore Petroleum and Greenhouse Gas Storage (Environment) (OPGGGS(E)) Regulations 2009

Introduction

Apache Energy Limited (Apache), on behalf of its joint venture participants Apache Northwest Pty Ltd and Santos Offshore Pty Ltd, is in the process of decommissioning the Legendre field facilities and equipment located in Commonwealth waters off the coast of Western Australia. The Legendre Decommissioning Environment Plan (EP) (LR-00-RI-063) was prepared to comply with the conditions of environmental approval under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* (OPGGGS(E) Regulations). The EP was approved by the Department of Mines and Petroleum on 2 March 2011.

Apache commenced decommissioning of the Legendre field in Q4 2010, and the majority of the subsea infrastructure was removed in June 2011. As part of the preparatory work for the decommissioning of the offshore Legendre facilities, Apache Energy Ltd (Apache) completed a seabed survey of the area in March 2010. This survey identified the exact location of the Legendre-1 wellhead as well as the presence of seven pin piles around the wellhead, and scattered debris in the area including fishing nets tangled around the pin piles, anchors and anchor chains. Apache proposes to remove and recover the pin piles above seabed level, plus the attached anchor chains and any other local debris such as fishing nets and anchors as part of the decommissioning process in December 2011.

Location

The Legendre Field is located in the offshore Carnarvon Basin, in Commonwealth waters of Western Australia, about 105 km north of Dampier (see **Figure 1**) and approximately 140 km northeast of the Montebello/Barrow islands Marine Conservation Reserves. The Legendre facilities are situated in approximately 50m water depth. The coordinates for the Legendre-1 well head (as a reference point) and the seven pin-piles to be removed, are provided in **Table 1** below. The location of the wellhead with regards to the former location of the MODU, is shown in **Figure 1**.

Table 1: Coordinates of the pin piles to be removed

Location Point	Latitude	Longitude	Latitude (decimal)	Longitude (decimal)	Estimated height above seafloor (m)
Legendre-1 Well	472 351	7 824 706	116° 44' 10.406"	19° 40' 22.022"	3.7
NW Pin Pile (1)	472 148	7 825 130	116° 44' 03.457"	19° 40' 08.229"	3.5
NW Pin Pile (2)	472 190	7 825 092	116° 44' 04.897"	19° 40' 09.467"	1.0
NE Pin Pile (3)	472 733	7 825 082	116° 44' 23.546"	19° 40' 09.494"	3.2
SE Pin Pile (4)	472 603	7 824 428	116° 44' 19.046"	19° 40' 31.090"	0.6
SE Pin Pile (5)	472 636	7 824 356	116° 44' 20.175"	19° 40' 33.434"	4.3
SE Pin Pile (6)	472 161	7 824 378	116° 44' 03.863"	19° 40' 32.694"	1.4
SE Pin Pile (7)	472 109	7 824 261	116° 44' 02.071"	19° 40' 36.498"	0.9

AGD94: Zone 50

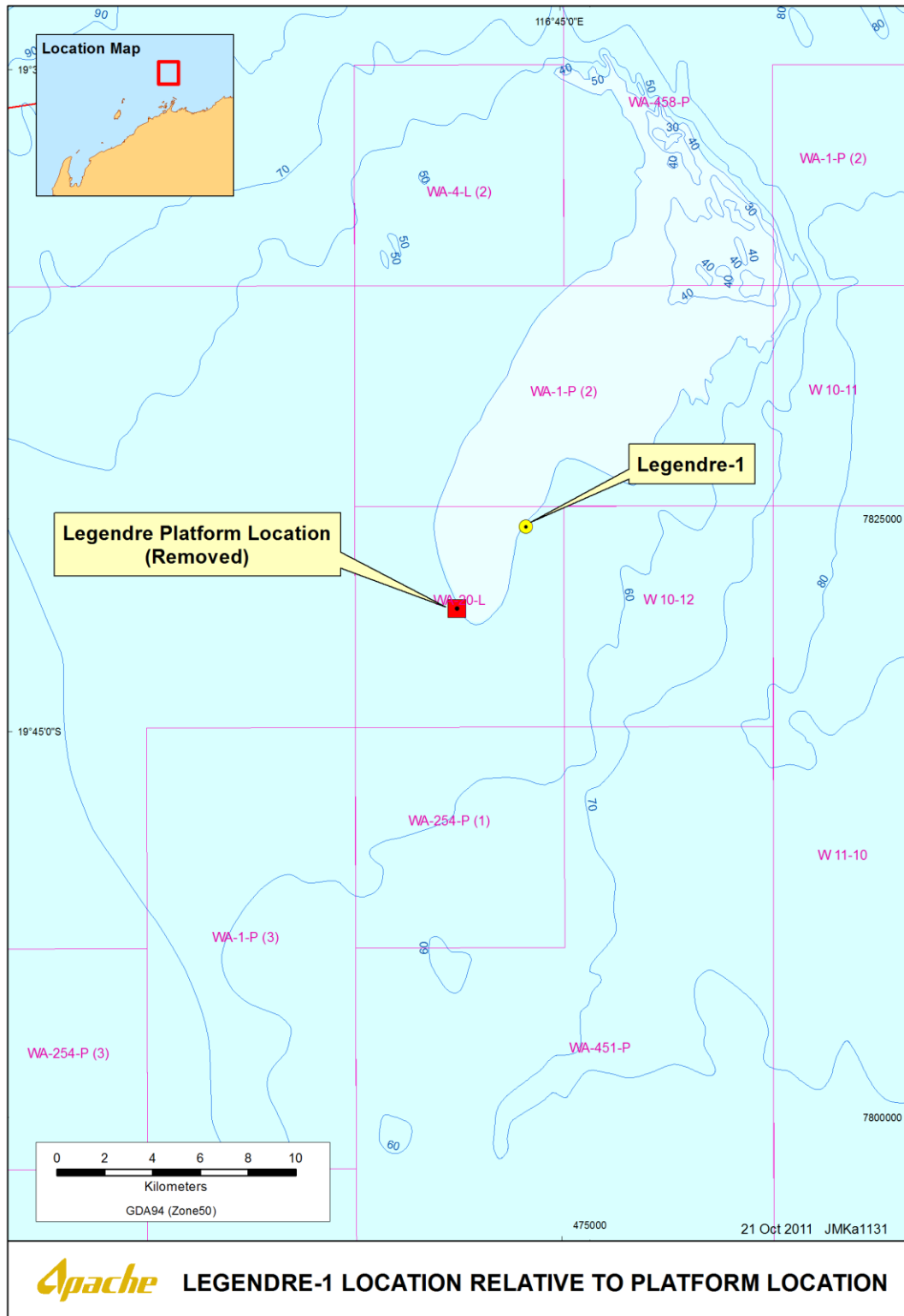


Figure 1: Legendre regional location and habitat map

Project Description

Apache proposes to remove the anchors, anchor chains and debris, and to cut off the pin-piles so that they are level with the sea bed. This will be achieved over approximately two weeks in late November/early December 2011. The water depth at the location is approximately 50 m.

Vessels

Apache proposes to conduct the removal activities using the vessel the MV *Greatships Mamta*. The MV *Greatships Mamta* is owned and operated by company Greatships Pty Ltd. The vessel and contractor has been used previously by Apache for geotechnical surveys in the region. No other vessels will be used for this activity.

Receiving Environment

The following is a brief summary of the information provided in the Decommissioning EP for the Legendre Field Decommissioning.

Physical Environment

The Legendre Facilities are located in the arid tropics experiencing high summer temperatures, periodic cyclones and associated rainfall. Rainfall in the region is generally low with evaporation exceeding rainfall throughout the year. Intense rainfall may sometimes occur during the passage of summer tropical cyclones and thunderstorms (NSR, 1995). Mean air temperatures over the neighbouring ocean area range from a minimum of 11°C in winter to a maximum of 37°C in summer. Due to the arid climate, daytime visibility in the area is generally greater than 5 nautical miles (SSE, 1991).

The summer and winter seasons fall into the periods September-March and May-July, respectively. Winters are characterized by clear skies, fine weather, predominantly strong east to south-east winds and infrequent rain. Summer winds are more variable, with strong south-westerlies dominating. Three to four cyclones per year are typical, primarily between December and March (WNI, 1995).

Wind patterns are monsoonal with a marked seasonal pattern. During October to March, the prevailing non-storm winds are from the south-west, west and north-west at an average speed of less than 10 knots, peak average speeds of 15-25 knots, and maximum speeds of 30 knots. Winds from the south-east to north-east quadrant are experienced at a frequency of less than 10% over these seasons. In June - August, winds are generally lighter and more variable in direction than in spring and summer. Non-storm winds prevail from north-east through to south-east at average speeds of 5-6 knots, peak average speeds of 10-15 knots, and maximum speeds of 20 knots. Transitional wind periods, during which either pattern may predominate, can be experienced in April-May and September of each year.

Extreme wind conditions may be generated in the area by tropical cyclones, strong easterly pressure gradients, squalls, tornadoes and waterspouts. Tropical cyclones generate the most significant storm conditions on the North West Shelf.

The Legendre Production Facility and CALM buoy sites were surveyed using Side Scan Sonar, Sub-bottom Profiling, High Resolution Digital Seismic and gravity coring equipment prior to development and construction in 1998. The results of these surveys indicated that the seafloor is characterised by a thick sequence of carbonate rock that is overlain by unconsolidated fine to medium-grained carbonate sediments with occasional shell or gravel patches.

Marine Environment

A search of the EPBC Act Protected Matters Search Tool identified that a total of nine listed threatened marine species may occur within the Legendre decommissioning area, with 16 species listed as migratory (nine of these being the same as the threatened species). All 16 species, with the exception of the humpback whale (*Megaptera novaeangliae*), are widely distributed and/or oceanic species and would most likely occur as vagrant transients through the Legendre Field area. The decommissioning area is not considered a habitat that is critical to the survival of any listed species. Similarly, there are no listed threatened ecological communities as defined in the EPBC Act in the vicinity of the activities. There are, however, numerous listed marine species and whales and other cetaceans listed as other matters protected by the EPBC Act that may be found within the region.

The fauna listed as threatened or migratory marine species under the EPBC Act may transit through the area during decommissioning activities, however, there are no known breeding or nesting grounds within the Legendre area. The proposed timing of the decommissioning activities is outside of the peak migration periods (**Table 1**) of the humpback whales. Seabirds and turtle species are mostly unlikely, while cetacean and shark species have a higher possibility of being present in the Legendre area.

Table 1: North West Shelf biological resources, breeding cycles and human activity seasons

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Hawksbill turtle nesting	Peak	Low	None	None	None	None	Low	Low	None	Peak	Peak	Peak
Flatback turtle nesting	Peak	Low	None	None	None	None	None	None	None	Low	Low	Peak
Green turtle nesting	Peak	Low	None	None	None	None	None	Low	None	Peak	Peak	Peak
Loggerhead turtle nesting	Low	Low	None	None	None	None	None	None	Low	Low	Low	Low
Whale migration	None	None	None	None	None	Nth	Nth	Low	Low	Sth	Sth	Low
Whale shark aggregation	None	None	Main aggregation period	Main aggregation period	Main aggregation period	None	None	None	None	None	None	None
Seabird nesting	Peak	Low	None	None	None	None	None	None	Low	Peak	Peak	Peak
Legendre Decommissioning	None	None	None	None	None	None	None	None	None	None	None	Low

Key

	Peak activity, presence reliable and predictable
	Low level of abundance/activity/presence
	Activity not occurring within the area

Potential Environmental Hazards, Impacts and Proposed Management Controls

This section provides a summary of the potential environmental hazards and impacts during the decommissioning activities.

Table 2: Summary of Key Hazards Identified

Key Hazard	Source of Impact	Potential Effects/Impacts
Disturbance to artificial habitat and seabed	<ul style="list-style-type: none"> Pin pile and debris removal Dropped objects 	<ul style="list-style-type: none"> Permanent loss of artificial marine habitat. Potential for moderate loss of benthic fauna habitat. Potential for medium term

		<p>decrease in benthic fauna abundance at the decommissioning site.</p> <ul style="list-style-type: none"> • Potential for moderate turbidity effects on benthic communities. • Alteration in the composition of the benthic community in the immediate vicinity due to altered predator-grazing pressures.
Artificial lighting	<ul style="list-style-type: none"> • Marine vessel • ROV 	<ul style="list-style-type: none"> • Attraction of migrating seabirds.
Underwater noise	<ul style="list-style-type: none"> • Marine vessel thrusters. • ROV thrusters. • ROV cutting tools. 	<ul style="list-style-type: none"> • Pathological and physiological effects on marine biota. • Disruption to behaviour pattern of marine fauna. • Avoidance of noise source.
Waste management	<ul style="list-style-type: none"> • Domestic or hazardous wastes discharged or lost overboard 	<ul style="list-style-type: none"> • Localised nutrient enrichment. • Localised and temporary water pollution and injury or death of fauna through ingestion.
Sewage and grey water discharge	<ul style="list-style-type: none"> • Marine vessel 	<ul style="list-style-type: none"> • Localised nutrient enrichment of surrounding waters • Localised oxygen depletion • Toxicity effects to marine biota
Atmospheric emissions.	<ul style="list-style-type: none"> • Engine exhaust for all vessels and helicopters. • Vessel machinery. 	<ul style="list-style-type: none"> • Increase in global concentration of greenhouse gases and consequent global warming potential.
Impacts on other users of the sea	<ul style="list-style-type: none"> • Physical presence of vessels. • Materials left behind on seabed floor. 	<ul style="list-style-type: none"> • Snag potential from subsea equipment – damage to fishing gear. • Collision with support vessels during decommissioning activities.
Spills	<ul style="list-style-type: none"> • Vessels • Machinery operations 	<ul style="list-style-type: none"> • Temporary toxic effects on exposed marine biota. • Temporary water pollution.

Apache's management actions aim to reduce the identified environmental impacts of the proposed decommissioning activities to as low as reasonably practical. Key performance objectives, standards and criteria on which compliance can be assessed are given below.

Table 3: Performance objectives, Standards and Criteria

Objectives	Standards	Criteria
Minimise seabed disturbance.	<ul style="list-style-type: none"> • Apache Environment Policy. • Legendre Decommissioning EP. • Code of Environmental Practice (CoEP) (APPEA, 2008). 	<p>Post-activities ROV survey reveals:</p> <ul style="list-style-type: none"> • No significant seabed damage. • Pin piles are adequately removed to minimise trawling risk to commercial fishers.

Minimise physiological or behavioural impacts to marine fauna, particularly cetaceans.	<ul style="list-style-type: none"> • Apache Environment Policy. • Legendre Decommissioning EP. • CoEP (APPEA, 2008). • EPBC Act 1999 	No obvious impacts to cetaceans and other fauna reported through observations.
Minimise physiological or behavioural impacts to marine fauna, particularly cetaceans.	<ul style="list-style-type: none"> • Apache Environment Policy. • Legendre Decommissioning EP. • CoEP (APPEA, 2008). • EPBC Act 1999. • DSEWPC Whale and Dolphin sighting report 	No obvious impacts to cetaceans and other fauna reported through observations.
<p>No solid waste or redundant materials disposed of overboard.</p> <p>No discharge overboard of OIW levels 30mg/L daily average or 15 mg/L in marine mode.</p>	<ul style="list-style-type: none"> • Apache Environment Policy. • Legendre Decommissioning EP. • CoEP (APPEA, 2008). • Vessel Waste management Plan. • Environmental Requirements for Offshore Marine Vessels Procedure. • MARPOL 73/78 • OPGGS(E) Regulations 2009. • OPGSS Act Schedule 222: Housekeeping. • Marine Notice 24/2010: Discharge of wastes from ships 	<ul style="list-style-type: none"> • Pre-mobilisation audit reveals that all solid wastes are appropriately contained and that waste log is up-to-date. • Post- activities ROV survey reveals no materials have been left <i>in-situ</i> (except for approved items). • No incident report of OIW exceedance received.
Maintain marine water quality.	<ul style="list-style-type: none"> • Apache Environment Policy. • Legendre Decommissioning EP. • CoEP (APPEA, 2008). • MARPOL 73/78 • OPGGS Act Schedule 222(3&4). • OPGGS(E) Regulations 2009 • Marine Notice 24/2010 Discharge of wastes from ships. 	<p>Pre-mobilisation audit reveals:</p> <ul style="list-style-type: none"> • Macerator being correctly used. • Functional sewage treatment plant. • Adequate bunding on vessels. • No biocides or anti-scale chemicals used in the desalination process
To minimise atmospheric emissions to ALARP.	<ul style="list-style-type: none"> • Apache Environment Policy. • Legendre Decommissioning EP. • CoEP (APPEA, 2008). • Maintenance system for machinery. • National Environment Protection (National Pollutant Inventory) Measure 1998 • National Greenhouse and Energy Reporting Act 2007. • Energy Efficiency Opportunities Act 2006 (as amended). 	<p>Pre-mobilisation audit shows:</p> <p>Engine and equipment inspection and maintenance is taking place as per maintenance schedule.</p>
Avoid collision with shipping traffic.	<ul style="list-style-type: none"> • Apache Environment Policy. • Legendre Decommissioning 	Functional navigational lights in place.

	<p>EP.</p> <ul style="list-style-type: none"> • CoEP (APPEA, 2008). • AusCoast/ AMSA regulations. • AMSA Notice to Mariners • Environmental requirements for offshore marine vessels 	<p>Log to show AMSA informed of rig and vessel locations.</p> <p>Logs to show radio monitoring.</p> <p>No incident reports of vessel collisions.</p>
Minimise disturbance to existing marine users.	<ul style="list-style-type: none"> • Apache Environment Policy. • Legendre Decommissioning EP. • CoEP (APPEA, 2008). 	<p>Post-activities ROV survey shows:</p> <ul style="list-style-type: none"> • Marine debris removed • Pin piles are cut off at or near seabed level
Minimise adverse impacts to the marine environment if a spill eventuates.	<ul style="list-style-type: none"> • Apache Environment Policy. • Legendre Decommissioning EP. • CoEP (APPEA, 2008) • OPGGS(E) Regs 2009 • Apache Refuelling Procedure (AE-91-IQ-098). • Apache NWS OSCP (AE-00-EF-008). • Apache Incident Reporting Procedure (AE-91-IF-002). • MARPOL Annexes I & II 	<p>No spill or vessel collision incidents reported.</p> <p>Pre-mobilisation audit reveals:</p> <ul style="list-style-type: none"> • Appropriate communication logs with AMSA and other vessels are maintained • No loss of diesel during refuelling.

Consultation

The Legendre Field is not covered by any Native Title claim, and there are no Aboriginal Heritage areas in the vicinity of the field.

Consultation with relevant stakeholders (e.g. WAFIC, DPA, DSEWPC) has been ongoing since May 2010.

Further Details

For further information about the Legendre Field Decommissioning Environment Plan (LR-00-RI-063) or Bridging Documents, please contact:

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