



COMMONWEALTH OF AUSTRALIA

Section 708

Offshore Petroleum and Greenhouse Gas Storage Act 2006

APPLICATION FOR GRANT OF A PIPELINE LICENCE – CRUX (WA)

I, **GRAEME ALBERT WATERS**, the National Offshore Petroleum Titles Administrator, on behalf of the Commonwealth–Western Australia Offshore Petroleum Joint Authority hereby give notice pursuant to section 708 of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* that an application has been received from

**Shell Australia Pty Ltd
(ACN 009 663 576)**

**SGH Energy WA Pty Ltd
(ACN 113 911 274)**

**Osaka Gas Crux Pty Ltd
(ACN 126 767 093)**

for the grant of a pipeline licence for the conveyance of petroleum in the offshore area of Western Australia, as set out below.

A person may make a written submission to the Titles Administrator about this application within 30 days from the date of this notice.

This notice takes effect on the day in which it appears in the
Australian Government Gazette.

Made under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006*
of the Commonwealth of Australia.

GRAEME ALBERT WATERS
TITLES ADMINISTRATOR
ON BEHALF OF THE COMMONWEALTH-WESTERN AUSTRALIA
OFFSHORE PETROLEUM JOINT AUTHORITY

ROUTE OF THE PIPELINE

The pipeline route is described in the table hereunder and displayed in the attached map (**Attachment 1**), commencing at the boundary of the Territory of Ashmore and Cartier Islands and Western Australia offshore areas to the Upstream Flange Riser Emergency Shutdown Valve (RESDV) on Prelude FLNG. Coordinates are based on Geodetic Datum of Australia (GDA94), UTM Zone 51*.

| Feature ID | Feature Name | KP | Easting (mE) | Northing (mN) | Heading | Radius (m) |
|-------------------|---|-------------------------------|---------------------|----------------------|----------------|-------------------|
| 1 | Boundary of the Territory of Ashmore and Cartier Islands and Western Australia offshore areas | 78.708 | 589 032.93 | 8 526 855.43 | 232.64 | |
| 2 | TP7A | 89.295 | 580 618.17 | 8 520 430.95 | 232.64 | |
| 3 | IP7 | | 580 485.86 | 8 520 329.93 | | 3000 |
| 4 | TP7B | 89.628 | 580 365.53 | 8 520 214.90 | | |
| 5 | TP8A | 114.836 | 562 145.09 | 8 502 795.23 | 226.29 | |
| 6 | IP8 | | 561 905.47 | 8 502 566.13 | | 1500 |
| 7 | TP8B | 115.488 | 561 591.61 | 8 502 459.37 | | |
| 8 | TP9A | 117.780 | 559 422.13 | 8 501 721.35 | 251.21 | |
| 9 | IP9 | | 559 072.26 | 8 501 602.32 | | 1500 |
| 10 | TP9B | 118.504 | 558 817.72 | 8 501 334.39 | | |
| 11 | TP10A | 126.360 | 553 407.38 | 8 495 639.34 | 223.53 | |
| 12 | IP10 | | 553 243.31 | 8 495 466.62 | | 1500 |
| 13 | TP10B | 126.832 | 553 140.81 | 8 495 251.57 | | |
| 14 | TP11A | 129.418 | 552 028.34 | 8 492 917.44 | 205.48 | |
| 15 | IP11 | | 551 910.06 | 8 492 669.26 | | 1500 |
| 16 | TP11B | 129.962 | 551 711.44 | 8 492 479.17 | | |
| 17 | TP12A | 145.832 | 540 245.96 | 8 481 505.31 | 226.26 | |
| 18 | IP12 | | 539 911.48 | 8 481 185.16 | | 3000 |
| 19 | TP12B | 146.751 | 539 496.03 | 8 480 980.76 | | |
| 20 | WA-2-IL Boundary | 151.514 | 535 222.02 | 8 478 877.88 | | |
| 21 | TP13A | 151.721 | 535 037.23 | 8 478 786.96 | 243.80 | |
| 22 | IP13 | | 534 213.72 | 8 478 381.79 | | 1500 |
| 23 | TP13B | 153.368 | 534 199.61 | 8 477 464.11 | | |
| 24 | Prelude PLET SSIV | 154.350 | 534 184.59 | 8 476 486.75 | | |
| 25 | Prelude PLET hub face | 154.360 | 534 184.36 | 8 476 472.05 | 180.88 | |
| 26 | Prelude Flexible Riser | Approximate total length 900m | | | | |
| 27 | Upstream Flange RESDV on Prelude FLNG** | | 534 322.46 | 8 475 877.88 | | |

* Coordinates in the map at Attachment 1 are displayed in GDA2020, UTM Zone 51.

** Coordinates are approximate and based on the Prelude FLNG turret centre nominal position, which may move slightly based on sea states and weather.

SPECIFICATIONS

Design and Construction

The offshore pipeline must be designed and constructed in accordance with Offshore Standard DNVGL-ST-F101 – Submarine Pipeline Systems (Offshore Pipeline), which is incorporated in its entirety in Australian Standard AS2885.4 – Pipelines, Gas and Liquid Petroleum (Part 4: Submarine Pipelines). Specifically, the design and construction phase of the pipeline must comply with DNVGL-ST-F101.

Basis of Design

The pipeline design is based on the following parameters:

| Item | Item Description | Details |
|-------------|--|--|
| 1 | Outside diameter of pipe and riser | 26" Crux export pipeline: 26 inches (660.5 mm) nominal Prelude PLET (including reducer & SSIV): 18 inches (457.2 mm) nominal |
| 2 | Wall thickness of pipe inclusive of riser (only for carbon steel) | 26" Crux export pipeline: 19.1 mm Prelude PLET (including reducer & SSIV): 25.4 mm 16" ID Prelude flexible riser (total of all layers): ~82.5 mm |
| 3 | Length | 76.6 km (approximate) |
| 4 | Design life | 20 years (approximate) |
| 5 | Pipeline Material | Flexible steel |
| 6 | Pipeline and Riser Steel Specification and Grade | DNVGL-ST-F101 SAWL Gr 450 DF API Spec 17J Specification for Unbonded Flexible Pipe API Spec 17J Rough Bore Flexible Pipe Composition |
| 7 | Minimum yield strength of pipe steel | 450 MPa |
| 8 | Maximum Allowable Operating Pressure | 133 barg |
| 9 | Design Capacity | 550 MMscf/d |
| 10 | Maximum Design Temperature | 27" Crux Export Pipeline and Prelude PLET (including reducer & SSIV): 70° C 16" ID Prelude Flexible Riser: 70° C |
| 11 | Minimum Design Temperature | 27" Crux Export Pipeline and Prelude PLET (including reducer & SSIV): -3° C 16" ID Prelude Flexible Riser: -20° C |
| 12 | Maximum Operating Temperature | 27" Crux Export Pipeline and Prelude PLET (including reducer & SSIV): 55° C 16" ID Prelude Flexible Riser: 50° C |
| 13 | Characteristics of substance proposed to be conveyed | Dehydrated gas and condensate |
| 14 | General plans and descriptions of pump stations, tank stations or valve stations and their equipment | N/A |

| | | |
|----|---|---|
| 15 | General plans and description of pigging facilities | Pig launcher is located on Crux platform, and pig received is located on Prelude FLNG, pigging facilities are not within the pipeline licence boundary |
| 16 | Cathodic protection | Al-Zn-In alloy anodes. Bracelet type, full shell, non-tapered. 600mm length x 50mm thickness (163kg) installed at various locations along the pipeline. Anodes attached directly to the PLET structure. Bracelet type at each end of the flexible riser. |

KEY PLAN

NOTES:

- ALL DIMENSIONS, COORDINATES AND WATER DEPTHS ARE IN METRES UNO. ALL HEADINGS ARE IN DEGREES AND ARE RELATIVE TO GRID NORTH.
- KP DISTANCES CALCULATED ON THE PROJECTION GRID. KP 6 REFERS TO CRUX PLET HUB FACE. KP 154.36 REFERS TO PRELUDE PLET HUB FACE. MSL CALCULATED FROM HISTORICAL DATA TO BE 240m ABOVE LAT.
- END OF THE CRUX PIPELINE (OFFSHORE AREA OF THE TERRITORY OF ASHMORE & CARTIER ISLANDS) AND START OF CRUX PIPELINE (WESTERN AUSTRALIA).
- START OF CRUX PIPELINE (TERRITORY OF ASHMORE & CARTIER ISLANDS).
- END OF CRUX PIPELINE (WESTERN AUSTRALIA).

LEGEND:

- PROPOSED 26" OD CRUX EXPORT PIPELINE
- EXISTING FIBRE OPTIC CABLE
- PROPOSED CRUX FIBRE OPTIC BRANCH
- ASHMORE CARTIER / WESTERN AUSTRALIA BOUNDARY
- PERMIT BOUNDARIES
- SEA BED CONTOURS (20m)

SEABED FEATURES LEGEND:

- ROCKY OUTCROP
- SILT
- SAND
- SILTY SAND

ABBREVIATIONS:

- IP INTERSECTION POINT
- KP KILOMETRE POINT
- LP LOWEST ASTRONOMICAL TIDE
- MSL MEAN SEA LEVEL
- OD OUTSIDE DIAMETER
- PLET PIPELINE END TERMINATION
- SSIV SUBSEA ISOLATION VALVE
- TP TANGENT POINT

GEODETIC PARAMETERS

CRUX FEED
PIPELINE LICENCES

26" OD CRUX EXPORT PIPELINE (TERRITORY OF ASHMORE & CARTIER ISLANDS)

| POINT | EASTING | NORTHING | KP | HEADING | RADIUS |
|------------------------------|-----------|-----------|-------|---------|--------|
| LICENCE BOUNDARY START POINT | 656470.10 | 656470.10 | 0.000 | | |
| CRUX RIG RIGID | 656470.10 | 656470.10 | 0.000 | | |
| CRUX PLET HUB FACE | 656470.10 | 656470.10 | 0.000 | | |
| CRUX PLET SSIV | 656470.10 | 656470.10 | 0.000 | | |
| IP1 | 656470.10 | 656470.10 | 0.000 | | |
| IP2 | 656470.10 | 656470.10 | 0.000 | | |
| IP3 | 656470.10 | 656470.10 | 0.000 | | |
| IP4 | 656470.10 | 656470.10 | 0.000 | | |
| IP5 | 656470.10 | 656470.10 | 0.000 | | |
| IP6 | 656470.10 | 656470.10 | 0.000 | | |
| IP7 | 656470.10 | 656470.10 | 0.000 | | |
| IP8 | 656470.10 | 656470.10 | 0.000 | | |
| IP9 | 656470.10 | 656470.10 | 0.000 | | |
| IP10 | 656470.10 | 656470.10 | 0.000 | | |
| IP11 | 656470.10 | 656470.10 | 0.000 | | |
| IP12 | 656470.10 | 656470.10 | 0.000 | | |
| IP13 | 656470.10 | 656470.10 | 0.000 | | |
| IP14 | 656470.10 | 656470.10 | 0.000 | | |
| IP15 | 656470.10 | 656470.10 | 0.000 | | |
| IP16 | 656470.10 | 656470.10 | 0.000 | | |
| IP17 | 656470.10 | 656470.10 | 0.000 | | |
| IP18 | 656470.10 | 656470.10 | 0.000 | | |
| IP19 | 656470.10 | 656470.10 | 0.000 | | |
| IP20 | 656470.10 | 656470.10 | 0.000 | | |
| IP21 | 656470.10 | 656470.10 | 0.000 | | |
| IP22 | 656470.10 | 656470.10 | 0.000 | | |
| IP23 | 656470.10 | 656470.10 | 0.000 | | |
| IP24 | 656470.10 | 656470.10 | 0.000 | | |
| IP25 | 656470.10 | 656470.10 | 0.000 | | |
| IP26 | 656470.10 | 656470.10 | 0.000 | | |
| IP27 | 656470.10 | 656470.10 | 0.000 | | |
| IP28 | 656470.10 | 656470.10 | 0.000 | | |
| IP29 | 656470.10 | 656470.10 | 0.000 | | |
| IP30 | 656470.10 | 656470.10 | 0.000 | | |
| IP31 | 656470.10 | 656470.10 | 0.000 | | |
| IP32 | 656470.10 | 656470.10 | 0.000 | | |
| IP33 | 656470.10 | 656470.10 | 0.000 | | |
| IP34 | 656470.10 | 656470.10 | 0.000 | | |
| IP35 | 656470.10 | 656470.10 | 0.000 | | |
| IP36 | 656470.10 | 656470.10 | 0.000 | | |
| IP37 | 656470.10 | 656470.10 | 0.000 | | |
| IP38 | 656470.10 | 656470.10 | 0.000 | | |
| IP39 | 656470.10 | 656470.10 | 0.000 | | |
| IP40 | 656470.10 | 656470.10 | 0.000 | | |
| IP41 | 656470.10 | 656470.10 | 0.000 | | |
| IP42 | 656470.10 | 656470.10 | 0.000 | | |
| IP43 | 656470.10 | 656470.10 | 0.000 | | |
| IP44 | 656470.10 | 656470.10 | 0.000 | | |
| IP45 | 656470.10 | 656470.10 | | | |