Table 7-1 Summary of Anticipated Impacts of the Primary Design Modifications for Port Delfin: 2016-2024, Port Delfin LNG Project

Impact Assessment Section	System	Modification Summary: A 2015 (2017 ROD) to 2024 Comparison	Evaluation Provided in this EIA
4.1 Reduction in Number of FLNGV Mooring Locations	FLNGV Mooring Locations	Reduction of 4 FLNGV mooring locations to 3 mooring locations.	**Water and Sediment Quality; Marine Environment; Commercial and Recreational Fisheries; Wildlife and Protected Resources; Socioeconomics; Geological Resources; Marine Zone Uses and Aesthetics:** During construction, the duration and magnitude of impacts would be less than those described in the 2016 Final EIS; however, the impact determinations would be consistent with the 2016 Final EIS. During operations and decommissioning, the magnitude of impacts would be equal to or less than those described in the 2016 Final EIS; however, the impact determinations would be consistent with the 2016 Final EIS. **Cultural Resources:** The risk of unanticipated discoveries would be reduced from what has been described in the 2016 Final EIS. **Meteorology, Air Quality, and Noise:** Because multiple FEED updates enable the reduction from 4 to 3 mooring locations/FLNGVs, the net change in air emissions are evaluated for all FEED updates as part of this section. Net reductions in air emissions from all FEED updates vary by pollutant. Overall construction emissions would decrease for GHG and SO_2 but would increase for other pollutants when compared to the 2016 Final EIS; however, final impact determinations would be consistent with the 2016 Final EIS findings. Startup and commissioning would produce emissions during a multiple-stage commissioning phase. Although $PM_{10}/PM_{2.5}$, SO_2, NO_X, CO, and CO_2e levels increased compared to those described for the Project evaluated in the 2016 Final EIS, this is due to including emissions that were previously unaccounted for and differences in calculation methodologies. Impact determinations would be consistent with the 2016 Final EIS. During operations and decommissioning, emissions would be less than those described in the 2016 Final EIS; however, the impact determinations would be consistent with the 2016 Final EIS. **Safety and Security:** Overall risk during operations would be consistent with the nominal case breach study findings when compared to the 2016 Final EIS. No evaluation was warranted for changes in impacts to safety and security (LNG spill consequences) during construction and decommissioning.
	Pre-treatment	Integrated HHC removal with dehydration in pre-treatment, enabling liquefaction to operate at more optimal conditions, with improved efficiency, enhanced production, and lower specific GHG emissions (per produced amount of LNG).	
	Liquefaction	Three liquefaction trains each using a single LM6000 gas turbine replaced by two larger liquefaction trains each using two gas turbine drives. HHC removal moved to pre-treatment facilities upstream of liquefaction. Increased liquefaction capacity from approx. 3.3 MMtpa to approximately 4.0 MMtpa per FLNGV, and overall plant efficiency improvement.	
	Process Cooling	Direct air cooling approach temperature, reduced from 10°C to with 5°C increases the plant efficiency and production.	

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4.2 FLNGV Mooring System	FLNGV Mooring System	Changed from the TYMS to the SSY mooring system.	**Water and Sediment Quality; Commercial and Recreational Fisheries; Geological Resources:** During construction, operation, and decommissioning, duration and magnitude of impacts would be less than those described in the 2016 Final EIS; however, the impact determinations would be consistent with the 2016 Final EIS. **Marine Environment; Marine Zone Uses and Aesthetics:** During construction, operations, and decommissioning, the duration and magnitude of impacts would be equal to or less than those described in the 2016 Final EIS; however, the impact determinations would be consistent with the 2016 Final EIS. **Wildlife and Protected Species:** Construction impacts, specifically related to pile size, would ultimately increase the magnitude of impacts (ZOI) relative to those described in the 2016 Final EIS; however, the impact determinations would be consistent with the 2016 Final EIS, including new analyses that include evaluation of Rice's whale (*Balaenoptera ricei*) critical habitat and proposed green sea turtle (*Chelonia mydas*) critical habitat. During operations and decommissioning, the duration and magnitude of impacts would be equal to or less than those described in the 2016 Final EIS; however, the impact determinations would be consistent with the 2016 Final EIS. **Cultural Resources:** The risk of unanticipated discoveries would be reduced from what has been described in the 2016 Final EIS. **Socioeconomics;** No changes from the 2016 Final EIS impact determinations, conclusions, or recommendations. **Meteorology, Air Quality, and Noise:** During construction, GHG and SO_2 emissions would decrease; other emissions would increase relative to the 2016 Final EIS; however, the impact determinations would be consistent with the 2016 Final EIS. No evaluation was warranted for changes in impacts to air emissions and noise during operations and decommissioning. **Safety and Security:** During operations, specifically during events requiring FLNGV disconnect, the disconnect procedures have been simplified to reduce the timeframe and assistance required in an emergency, thereby reducing the overall risk as compared to the 2016 Final EIS. No evaluation was warranted for changes in impacts to safety and security (LNG spill consequences) during construction and decommissioning.
	FLNGV Mooring System	Changed from 78-inch diameter piles to 96-inch diameter piles.	

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4.3 Power Generation Systems	Electrical Power Generation	Changed from a single gas turbine for power generation to cogeneration of power with refrigerant compression drives: waste heat recovery steam generators on refrigerant compression gas turbine drives combined with a steam turbine generator for power production.	**Meteorology, Air Quality, and Noise:** Because changes to the power generation systems work with other FEED updates, those impacts are discussed within the context of Section 4.1, “Reduction in Number of FLNGVs.” **Water and Sediment Quality; Marine Environment; Commercial and Recreational Fisheries; Wildlife and Protected Species; Cultural Resources; Socioeconomics; Geological Resources; or Marine Zone Uses and Aesthetics; and Safety and Security:** No changes from the 2016 Final EIS impact determinations, conclusions, or recommendations.
	Refrigerant Compression Drives	Changed from three (3) aeroderivative gas turbines with low NOx technology to 4 [redacted] gas turbine drives per FLNGV to reduce NOx emissions to 15 ppm.	
	Essential Generators	Dual-fuel essential generators updated to dual purpose for use as both propulsion power generators for sailing and to supply supplemental power to the facility when in normal production, where previously the design had different power generation for sailing and essential service, respectively. Added SCR and oxidation catalyst for emissions control.	
4.4 Cooling System	Utility Cooling	Replaced the seawater cooling system with an air cooling system for essential dual fuel generators. Apply air cooling for the steam turbine condensers implemented together with cogeneration of power.	**Water and Sediment Quality; Commercial and Recreational Fisheries; and Wildlife and Protected Species**: During operations, there would be a reduction in the magnitude of impacts due to sea water withdrawal as compared to those described in the 2016 Final EIS; however, the impact determinations would be consistent with the 2016 Final EIS. **Marine Environment; Cultural Resources; Socioeconomics; Geological Resources; Marine Zone Uses and Aesthetics; Meteorology, Air Quality, and Noise; and Safety and Security**: No changes from the 2016 Final EIS impact determinations, conclusions, or recommendations.
4.5 Offload Duration	Offloading Duration	Increased offloading capacity from 8,000 or 9,000 m^3/hour to 10,000 m^2/hour reducing offtake time from 36 hours to 31 hours.	**Commercial and Recreational Fisheries; Wildlife and Protected Species; and Meteorology, Air Quality, and Noise:** During operations, there would be a reduction in impacts due to the duration LNG trading carriers are at Port Delfin as compared to those described in the 2016 Final EIS; however, the impact determinations would be consistent with the 2016 Final EIS. **Water and Sediment Quality; Marine Environment; Cultural Resources; Socioeconomics; Geological Resources; Marine Zone Uses and Aesthetics; and Safety and Security**: No changes from the 2016 Final EIS impact determinations, conclusions, or recommendations.

Table 7-1 Summary of Anticipated Impacts of the Primary Design Modifications for Port Delfin: 2016-2024, Port Delfin LNG Project

Impact Assessment Section	System	Modification Summary: A 2015 (2017 ROD) to 2024 Comparison	Evaluation Provided in this EIA
4.6 Cargo Containment System	Cargo Containment System	Total LNG storage capacity reduced from approximately 210,000 m^3 to approximately 180,000 m^3.	**Safety and Security**: Overall risk during operations would be consistent with the nominal case breach study findings when compared to the 2016 Final EIS. **Water and Sediment Quality; Marine Environment; Commercial and Recreational Fisheries; Wildlife and Protected Species; Cultural Resources; Socioeconomics; Geological Resources; Marine Zone Uses and Aesthetics; and Meteorology, Air Quality, and Noise:** No change from the 2016 Final EIS impact determinations, conclusions, or recommendations.
4.7 Inert Gas for Cargo Tanks	Inert Gas for Cargo Tanks	changed from IGG to nitrogen generator which eliminates discharge of inert gas generator scrubber wash water.	**Water and Sediment Quality; and Wildlife and Protected Species:** During operations, there would be a reduction in impact magnitude due to the elimination of the discharge of scrubber wash water as compared to those described in the 2016 Final EIS; however, the impact determinations would be consistent with the 2016 Final EIS. **Marine Environment; Commercial and Recreational Fisheries; Cultural Resources; Socioeconomics; Geological Resources; Marine Zone Uses and Aesthetics; Meteorology, Air Quality, and Noise; and Safety and Security:** No change from the 2016 Final EIS impact determinations, conclusions, or recommendations.
No new evaluation warranted	Hull	FLNGV principal dimensions slightly decreased, mainly driven by the reduced storage volume requirement, from 356 x 65 x 32 [m] to 338 x 64 x 32 [m].	No new evaluation warranted.
No new evaluation warranted	Process Heat	Process heat medium changed from hot oil to steam.	No new evaluation warranted.
No new evaluation warranted	Fuel Oil Tanks	Increase in fuel tank size from approx. 2,260 m3 to 7,200 m^3. Tanks are sized based on fuel consumption for the transit from shipyard to site. No increase in operational fuel oil inventory when on site in the Gulf of Mexico.	No new evaluation warranted.
No new evaluation warranted	Fresh Water Generation and Tanks	Reduction in reverse osmosis fresh water tank capacity from approx. 2,200 m^3 to 2,089 m^3.	No new evaluation warranted.

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No new evaluation warranted	Ballast Water Tanks	Increase inside ballast water tank width to allow even trim and heel for robust process operation in all loading conditions and to manage draft / under keel clearance. Total Project use of ballast water for the DWP (3 x FLNGVs) is expected to be the same as for the 4 x FLNGVs in the 2015 Amended DPLA.	No new evaluation warranted.
No new evaluation warranted	Drain Systems	Closed drains. Open drains with drain pans to capture released hydrocarbons and rainwater, wash water, and other fluids for routing to oily water tank and treatment package. Capacity based on collecting the first ½ inch of rainfall. No modifications in design.	No new evaluation warranted.
No new evaluation warranted	Living Quarters Capacity	Increase in maximum personnel on board from 100 to 120.	No new evaluation warranted.
No new evaluation warranted	Amine recycling	Changed from refilling amine to having an amine tank and recycling. Onboard recycling of amines reduces sending treated amines to shore for disposal.	No new evaluation warranted.
No new evaluation warranted	Mixed Refrigerant Storage	Relocation of Type C tanks from on deck to in hull tanks in compliance with Flag and Class regulations.	No new evaluation warranted.

Key:
°C = degrees Celsius
DWP = deepwater port
EIA = Environmental Impact Assessment
EIS = Environmental Impact Statement
FEED = front end engineering design
FLNGV = floating liquefied natural gas vessels
GHG = greenhouse gas
HHC = heavy hydrocarbons
IGG = inert gas generator
LNG = liquefied natural gas
m = meter
m^2 = square meters
m^3 = cubic meters
MMtpa = million metric tons per annum
N_2 = nitrogen
ROD = Record of Decision
SO_2 = sulfur dioxide
SSY = submerged swivel and yoke
TYMS = tower yoke mooring system
ZOI = zone of influence