ENVIRONMENT PLAN SUMMARY

GORGON GAS DEVELOPMENT DRILLING AND COMPLETION PROGRAM

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1.0 INTRODUCTION

This document summarises the Environment Plan: Gorgon Gas Development Drilling and Completion Program (Doc Id: G1-NT-PLNX0001023). This plan was accepted by the National Offshore Petroleum Safety Environment Management Authority (NOPSEMA) on 12 November 2013.

1.1 Overview

Chevron Australia Pty Ltd (Chevron Australia) is the proponent (appointed Operator) and the person taking the action for the Gorgon Gas Development on behalf of the Gorgon Joint Venturers. Chevron has developed this Environment Plan (EP) to document the environmental impact assessment for drilling and completion activities associated with the Gorgon Permit area which incorporates information required for assessment of this EP by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) under the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009*.

This EP covers the drilling and completion activities undertaken by a semi-submersible drill rig and support vessels for a total of eight production wells within the permit areas (Table 1.1).

Table 1.1: Permits within scope of this EP

Permits
WA-37-L

1.2 Location

Table 1.2 details the approximate locations of the proposed production wells.

Table 1.2: Well Locations

Well	Latitude (south)			Longitude (east)			Water Depth
	Degrees	minutes	seconds	degrees	minutes	seconds	
GOR-1C	20°	24’	28.372	114°	50’	56.841	215 m
GOR-1D	20°	24’	28.611	114°	50’	57.734	215 m
GOR-1E	20°	24’	29.171	114°	50’	58.313	215 m
GOR-1F	20°	24’	30.019	114°	50’	58.543	215 m
GOR-2B	20°	27’	36.535	114°	50’	31.386	199 m
GOR-2C	20°	27’	37.095	114°	50’	31.964	199 m
GOR-3B	20°	31’	11.275	114°	49’	25.845	199 m
GOR-3C	20°	31’	11.835	114°	49’	26.424	199 m

1.3 Timeframe

Drilling activities associated with the eight Gorgon development wells within production permit WA-37-L commenced in June 2011 and was completed in June 2012. Well completion activities commenced in April 2013 with operations anticipated to be finalised by mid-2014.

Following completion and well perforations, the wells are to be suspended until the Operations phase of the Gorgon Gas Development. It is anticipated that gas will flow from the Gorgon development wells by the end of 2014 or early 2015.

1.4 Operator Details

Chevron Australia Pty Ltd (Chevron Australia) is the instrument holder and proponent (appointed Operator) and the person taking the action for the Gorgon Gas Development on behalf of the Gorgon Joint Venturers.

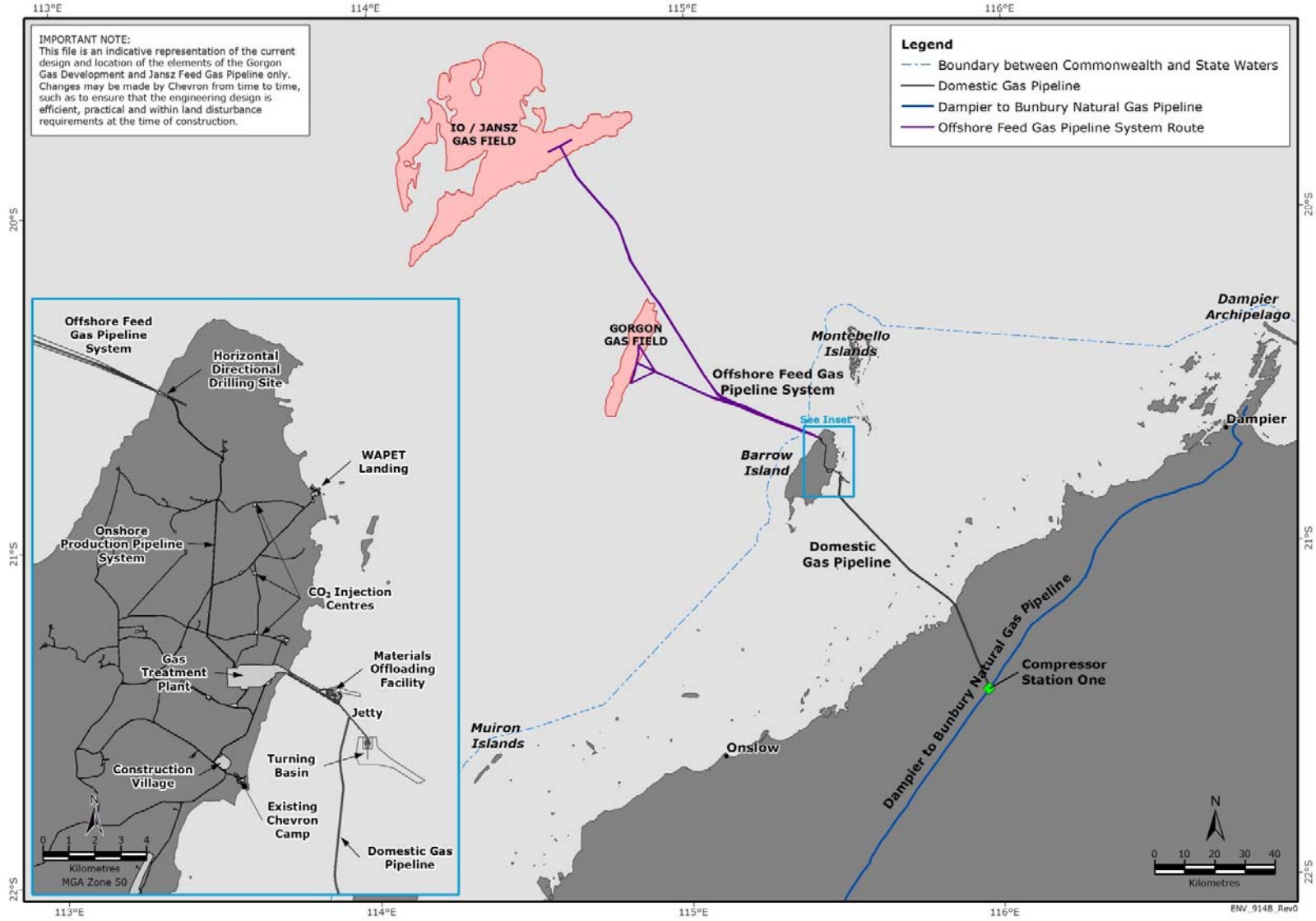

Figure 1.1: Permit Areas and Well Locations

2.0 ACTIVITY DESCRIPTION

2.1 Planned Activity Summary

The following activities are associated with this drilling program:

- Rig Mobilisation / Positioning
- Drilling
- NADF and Cuttings Handling and Disposal
- Cementing Operations
- BOP Installation and Function Testing
- Logging (vertical Seismic Profiling)
- Installation of Liner
- Displacement of NADF to Kill Weight Brine
- Well Suspension Following Drilling
- Horizontal Subsea Tree Installation
- Well Surveillance
- Well Intervention
- Support Operations

2.2 Emergency Condition Summary

Credible hydrocarbon spill scenarios were identified and assessed; with the credible worst case scenarios identified and modelled. The credible worst case spill scenarios (or emergency conditions) for this program were identified to be:

- Diesel spill resulting from a vessel collision, and
- Gas condensate spill resulting from a loss of well control.

Modelling of these scenarios determined the environment that may be affected in the event of an unplanned emergency condition.

2.3 Emergency Response Arrangements Summary

Response strategies were assessed for both credible worst-case spill scenarios and categorised as either 'Recommended' or 'Not Recommended'. The response strategies recommended for this program in the event of an emergency condition include:

- Source Control
- Monitor and Evaluate
- Natural Recovery
- Shoreline Clean-up
- Oiled Wildlife Response

3.0 DESCRIPTION OF ENVIRONMENT

The environment that may be affected by the petroleum activity (including in the event of an emergency) is described below.

3.1 Physical Environment

The region is generally characterised by two seasons; winter (May–August) and summer (September–April). The seasons include a transitional period where the climate can be a mixture of both seasons. The winter climate is dominated by intense anti-cyclonic belts (high pressure systems) which generate strong winds (predominantly from the east and south-east) and infrequent rain. Summer conditions are more variable, with shifting wind directions although south-westerly winds are the most common.

Salinity and temperature varies spatially and temporally within the waters across the North West Shelf. Near-surface water temperatures of the North-west Province range from 31°C maximum in summer to 22°C minimum in winter, whilst the mean temperature for depths between 200 and 250 m is approximately 10 °C.

The major surface currents in the North-west Shelf region, flow towards the poles away from the equator. The major surface currents influencing the region include the Indonesian Throughflow, the Leeuwin Current, the South Equatorial Current, and the Eastern Gyral Current. Below these surface currents, there are a number of subsurface currents the most important of which are the Leeuwin Undercurrent and the West Australian Current. These subsurface currents flow towards the equator, in the opposite direction to the surface currents. The Leeuwin Undercurrent and the West Australian Current are derived from waters in the seas to the south of Australia, known as the Subantarctic Mode Water Body.

3.2 Ecological and Socio-economic Environment

A search for matters of National Environmental Significance under the *Environmental Protection and Biodiversity Conservation Act 1999* was undertaken for the entire environment that may be affected to identify any matters of national environmental significance (both marine and terrestrial). The search identified 65 threatened species and 76 migratory species as having the potential to occur within the environment that may be affected.

The protected matters search also identified 155 marine species listed under the *EPBC Act 1999*, including pipefish, sea snakes marine avifauna and cetaceans. No ‘critical habitats’ for listed marine species were identified within the environment that may be affected or other areas which have the potential to be affected by the drilling program. Due to the extent of the environment that may be affected, it was divided into ‘areas’ of similar values and sensitivities to enable a systematic description of ecological, socio-economic, cultural and heritage values and sensitivities. For the purposes of this document, regionally important ecological, socio-economic / heritage features within the environment that may be affected (including important aggregations or habitat areas for marine fauna) have been described and detailed within Table 3.1.

Table 3.1: Description of Particular environmental values within the EMBA

Value	Description	Location
Marine Values		
Humpback whale migration route	The migration route of the humpback whale and pygmy blue whales inhabits the Western Australian coast and subsequently is a value across all locations within the environment that may be affected	Offshore permit areas and surrounding offshore area
		Shark Bay area
		Barrow and Montebello Islands area
		Ningaloo Marine Park area
		Abrolhos Islands area
Whale shark aggregation	A known foraging overlaps is located within the Ningaloo Marine Park	Ningaloo Marine Park area
Gascoyne Commonwealth Marine Reserve	These area provides important foraging habitat for threatened and / or migratory marine fauna including marine fauna including seabirds, marine turtles and whale sharks	Offshore permit areas and surrounding offshore area
Seabed Values		
KEF	Several KEF's occur within the environment that may be affected. Specifically continental slope demersal fish communities are unique as they have a high species diversity and endemism.	Offshore permit areas and surrounding offshore area
Coral reefs	Coral Reefs are prevalent along the Western Australian coast, however the Ningaloo reefs represents one of the largest and structurally complex fringing reefs in the world.	Shark Bay area
		Barrow and Montebello Islands area
		Ningaloo Marine Park area
		Abrolhos Islands area
Seagrass meadows	Seagrass meadows within Shark bay are the largest reported in the world and provide important habitat and nursery areas for fish and invertebrates. Dugongs and green turtles.	Shark Bay area
Shoreline Values		
Avifauna nesting	Many of the islands and coastal areas within the Western Australian Coast support breeding populations of avifauna. Specifically significant rookeries are located within the Montebello Islands and Abrolhos Islands.	Offshore permit areas and surrounding offshore area
		Shark Bay area
		Barrow and Montebello Islands area
		Ningaloo Marine Park area
		Abrolhos Islands area
Reptile nesting	Significant nesting habitat for marine reptiles is generally associated with islands, shorelines and near shore within North-West WA.	Offshore permit areas and surrounding offshore area
		Shark Bay area
		Barrow and Montebello Islands area
		Ningaloo Marine Park area
Sea lions	A colony of Australian sea lions live and breed on the Abrolhos's shorelines	Abrolhos Islands area
Mangrove	Mangrove communities are located within North-West WA. Specifically the largest mangal community within the Ningaloo Marine Park is approximately 31 ha which is characterised by established trees to 5 m in height.	Offshore permit areas and surrounding offshore area
		Shark Bay area
		Barrow and Montebello Islands area
		Ningaloo Marine Park area
		Abrolhos Islands area
Socioeconomic Values		
Commonwealth Fisheries	Several important fisheries occur within the EMBA.	All
World Heritage / Tourism	The marine environment is the major focus of tourism in Shark Bay with around 100,000 people visit the area each year. Tourism is a major component of the local economy and the area is classed as a world heritage area predominately for its ecological values.	Shark Bay area
	Ningaloo Reef and the Murion islands offer a wide variety of	Ningaloo Marine Park area

Value	Description	Location
	wildlife in a very natural setting of land and seascapes that presents a major drawcard for the region's nature-based tourism. It is estimated that approximately $127 million is spent per year by visitors to the Ningaloo Marine Park and Cape Range National Park.	
Recreational Fishing / Tourism	Recreational fishing and tourism is prevalent within small pockets along the Western Australian coast. The majority of these pockets are within vast areas comprised of world heritage and natural environment values such as Abrolhos Islands, Shark Bay, Ningaloo Reef, and Montebello islands.	Shark Bay area
		Barrow and Montebello Islands area
		Abrolhos Islands area
		Ningaloo Marine Park area
Petroleum Activities	Barrow Island is the location of the Gorgon Gas Project and LNG plant.	Barrow and Montebello Islands area

4.0 MAJOR ENVIRONMENTAL HAZARDS AND CONTROLS

All aspects of the drilling program have been subjected to a comprehensive impact and risk assessment. The main environmental values, impacts and potential risks are detailed in Table 4.1. To ensure the potential environmental risks identified through the risk assessment are managed appropriately, Chevron has developed a range of performance standards (controls) that will be implemented throughout the course of the program. A summary of the main strategies is detailed in Table 4.1.

Table 4.1: Summary of the major Hazards, potential impacts and controls for the program

Aspect	Hazards	Potential Impact	Controls
Marine Values	Noise	• Changes to behaviour of species sensitive to noise.	**Preventative** • Helicopter must not fly lower than 500 m or within a 500 m radius of a cetacean or whale shark, if safety is not compromised, in accordance with EPBC Regulations 2000 Division 8.1. **Mitigation** • EPBC Act Policy Statement 2.1– Interaction between Offshore Seismic Exploration and Whales (DEWHA, 2008) Part A Standard Management Procedure will be implemented when acquiring VSP data throughout the drilling program.

	Planned Discharge	Reduction in water quality through:
		• Potential increased toxicity
		• Potential increased turbidity
			Mitigation
			• The following will be assessed prior to use in accordance with Chevron's Chemical Environmental Risk Assessment Process:
			  • All drilling fluid products
			  • All completion fluids
			  • All function testing and hydrate management fluids
			  • All cementing products
			• Water based drill fluids will be utilised exclusively during riserless drilling operations.
			• Upon installation of riser, cuttings will be treated with solids control equipment to minimise residual fluids prior to discharge.
			• Dispersion / dilution will be maximised by discharging treated cuttings from surface waters.
			• Function testing of the blow out preventer will be undertaken on a 7 day frequency whenever the blow out preventer is installed and operations allow.
			• All produced fluid discharge to sea will have hydrocarbon concentrations less than 15 ppm.
			• Putrescibles waste will be macerated prior to discharge to <25 mm.
			• Grey water and treated sewage will only be discharged when > 12 nm from land.
			• Oily water will either be contained onboard and disposed at a licensed facility; or discharged to marine environment only when concentration <15 ppm.
			• Sewage will be treated by a treatment plant prior to discharge as per in accordance with MARPOL 73/78.

	Unplanned Discharge	Reduction in water quality through: • Potential increased toxicity	**Preventative** • Hazardous materials will be stored within contained areas to prevent discharge to sea. • Spill kits will be maintained onboard and kept fully stocked. • A rig hydraulic hose register will be maintained for the duration of the program.

Aspect	Hazards	Potential Impact	Controls

			• Bulk hydrocarbon transfers will be undertaken in accordance with contractor's bulk transfer procedures including:
			  • Drilling fluid transfers limited to daylight hours commencement where possible
			  • Dry-break couplings, safety breakaway fittings and floating hoses utilised
			  • Overboard valves locked during transfer
			Mitigation
			• Should a loss of well control occur, the following will be implemented:
			  • The drilling program's Operational and Scientific Monitoring Program.

Sea Bed Values	Physical Presence	• Localised physical damage to sensitive subsea habitat	**Preventative** • Analysis and documentation will be developed and implemented for the program to minimise potential for anchor drag
	Planned Discharge	• Localised physical damage to sensitive subsea habitat • Localised damage to sensitive subsea habitat through reduction in water quality	**Mitigation** • Upon installation of riser, cuttings will be treated with solids control equipment to minimise residual fluid prior to discharge. • Dispersion / dilution will be maximised by discharging treated cuttings from surface waters.
	Unplanned discharge	• Localised physical damage to sensitive subsea habitat • Localised damage to sensitive subsea habitat through reduction in water quality	**Preventative** • An inspection and if required servicing of the slip joint packer will be undertaken at the end of every well.
Air Values	Planned Discharge	• Temporary reduction in local air quality • Contribution to global atmospheric concentrations of greenhouse gases	**Mitigation** • Well test design will be developed prior to flaring to maximise efficiency and minimise test durations • Maintenance schedule for electricity generators will be included within the rig maintenance system.
Socioeconomic values	Physical Presence	• Interference with other users	**Preventative** • Prior to rig move the Australian Maritime Safety Authority will be notified of the rig move.

Aspect	Hazards	Potential Impact	Controls
			• A 500 m radius exclusion zone will be established around the drilling rig at well location.
Shoreline Values	Physical Presence (should a loss of well control occur)	• Injury to marine fauna • Changes to behaviour of species	**Mitigation** • Inspection of exclusion barriers to ensure no fauna entanglement, and integrity. • Inspection of continuous hazing or deterrent activities to ensure no direct injury to fauna. • Personnel handling oiled fauna will have fauna handling training or will be supervised by a trained fauna hander with guidance from oiled wildlife trained personnel. • Fauna will be transported using appropriate equipment
	Unplanned discharge	• Injury to fauna • Changes to habitat	**Preventative** • Installation of a Blow out Preventer (minimum 5 ram stack) • Wells to be designed to include a minimum 'two-barrier' design • A shallow formation evaluation will be undertaken for each location prior to commencing the drilling program • Specific relief well plans and well control procedures developed an in place prior to commencing the drilling program **Mitigation** • Should a loss of well control occur, the following will occur: • The drilling program's Operational and Scientific Monitoring Program will be implemented. • Chevron will develop a shoreline remediation strategy.

5.0 MANAGEMENT APPROACH

Chevron has developed a tiered series of Systems, Plans, Procedures and Work Instructions to ensure that appropriate management measures are implemented as required to minimise the risk of environmental disturbance from operations.

- Operational Excellence Management System; and
- Australian Business Unit Emergency Management Process

The Implementation Strategy is to be enacted in accordance with Chevron Australia's Operational Excellence Management System. Chevron's Operational Excellence Management System is aligned to ISO 14001:2004 and key components of the management system are described in the subsections below.

5.1 Roles and Responsibilities

Accountabilities and responsibilities are defined for personnel involved in the projects implementation for both planned activities and unplanned events.

5.2 Training and Competency

Training is required for the drilling program to ensure petroleum activities are implemented in accordance with this plan. As the plan covers well activities until the operations phase of the Gorgon Project, training frequencies have been assigned. Assigning frequencies will ensure that new personnel are captured, and old personnel are refreshed of their responsibilities under the plan. Records of these training events will be maintained, and will include training required, training conducted, and copies of certificates and attendance sheets.

5.3 Monitoring and Reporting

Routine reporting to external agencies are detailed within the EP. The Chevron Drilling Superintendent is for responsible for ensuring these reports are submitted to the regulators within defined timeframes. Routine reporting includes:

- Monthly Reporting
- Annual Reporting
- Close-Out Report

5.4 Compliance Assurance

Routine audits and inspections will be undertaken of the drilling rig to determine compliance with the approved EP. The audits and inspections are to be undertaken in accordance with Chevron's Compliance Assurance Process OE-12.01.01.

Audits and inspections will be scheduled and tracked in the Drilling and Completions Audit Schedule. Where non-conformances are identified, corrective actions are to be developed and assigned to a responsible person with a due date and tracked to closure.

Implementing the audit and inspection program helps ensure that risks and impacts associated with the program are continually reduced to as low as reasonably practicable.

5.5 Documentation and Records

Chevron's system for recording information associated with the petroleum activity is a program called Well View. Well View is a complete corporate well file that tracks all changes and

operations from well planning to well abandonment. All the discharges and emissions associated with the program are recorded within this system.

Records will be kept for all discharges to air and the marine environment during planned operations and for compliance against management criteria as outlined within the EP.

5.6 Environment Plan Review

Chevron will review the approved EP including the spill response arrangements within one year of the commencement of drilling activities and then approximately annually thereafter until completion of the drilling program. The results of the review and any recommended improvements, including feedback from NOPSEMA, is to be incorporated into the EP. This ensures that there is continual improvement and that environmental impacts and risks associated with the activity are continually reduced to as low as reasonably practicable.

6.0 CONSULTATION PROCESS

Chevron has prepared a Stakeholder Consultation Plan specific for this program. The Stakeholder Consultation Plan describes:

- stakeholder identification and analysis
- communication engagement plan, comprising the level and trigger of engagement, type of engagement, and frequency
- stakeholder engagement log, including any issues raised and Chevron responses
- full text of consultation.

6.1 Stakeholder Identification and Analysis

Relevant stakeholders have been identified through a stakeholder analysis process to ensure persons or organisations that may be affected by the drilling program activities (planned and unplanned) have been consulted. Stakeholders that may be potentially affected were identified by reviewing:

- social receptors within the environment that may be affected
- applicable legislation to identify regulatory agencies
- correspondence received from writing to all commercial fishing license holders in State and Commonwealth fisheries which overlap the Chevron active permit areas.
- relevant agencies or organisations who may be involved in the event of a spill.

6.2 Communication Engagement Plan

Once the stakeholder analysis was completed, a Communication Engagement Plan was developed to determine the following, for each stakeholder:

- the level of engagement required;
- the type of engagement required;
- when engagement would be undertaken; and
- the frequency of communication.

The Communication Engagement Plan covers both initial and ongoing stakeholder engagement and covers both planned activities and unplanned events. Chevron is to maintain communications with identified stakeholders as required, ensuring that they are informed of any aspects of the drilling program that may affect their respective activities within the area.

7.0 CONTACT DETAILS

Further information associated with the proposed activities may be obtained from:

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