Project Title / Location	MeyGen Tidal Energy Project, Phase 1a. Inner Sound
Date:	29/07/2016

MeyGen Tidal Energy Project Phase 1a

Operations & Maintenance Programme

MEYGEN
THE TIDE OF CHANGE IN CAITHNESS

Rev	Prepared by	Sign Off	Checked by	Sign Off	Approved by	Sign Off	Date of Issue
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Executive Summary

This Operations and Maintenance Programme (OMP) has been prepared by MeyGen Ltd. (MeyGen) to discharge Condition 15 of the Section 36 Consent for the Development.

The purpose of the OMP is to provide details of the operational and maintenance activities that will be undertaken at the MeyGen Site, including vessel requirements, roles and responsibilities, planning, and safeguard environmental interests at the offshore generating station.

The OMP describes procedures and good working practices that will be adopted during the operation and maintenance of Phase 1a of the Project. Operations and Maintenance activities include:

- Day-to-day operation and monitoring of Tidal Turbine Generators (TTGs) and electrical infrastructure, including onshore conversion equipment and switchgear;
- Operation and monitoring of TTG array's subsea environmental monitoring equipment;
- Inspection and maintenance of TTGs and Turbine Support Structures (TSSs), including marine operations for recovery and redeployment of the TTG;
- Inspection and maintenance of the array's electrical infrastructure including onshore conversion equipment, switchgear and Turbine Subsea Cables (TSCs);
- Planning of onshore maintenance activities including storage, management and maintenance of spare parts, tools and other equipment;
- Management and maintenance of onshore buildings and infrastructure including the onshore control centre.

This OMP forms part of MeyGen's Asset Management plans, and represents a high-level summary of the operations and maintenance activities with an emphasis on the environmentally-related elements of these activities.

The OMP presented within this document is considered sufficient to satisfy Condition 15 and enable the operation and maintenance of the Development to progress, subject to the OMP being implemented.

The OMP will be presented to the Scottish Ministers, SNH and any other advisors as may be required at the discretion of Scottish Ministers.

1 Introduction

The MeyGen Tidal Energy Project Phase 1 ("the Development") received consent under Section 36 of the Electricity Act 1989 from the Scottish Ministers on 9th October 2013 ("the S.36 Consent"). This OMP is prepared to enable Condition 15 of the S.36 Consent ("the Condition") to be discharged. Condition 15 states:

> *The Company must, prior to the Final Commissioning of Stage One of the Development, submit an Operations and Maintenance Programme, in writing, to the Scottish Ministers for their approval, in consultation with SNH and any other advisors as may be required at the discretion of Scottish Ministers. The Operations and Maintenance Programme must include, but is not limited to, the following issues:*
>
> *a) Timing of Operations and Maintenance activities;*
>
> *b) Operations and Maintenance vessel requirements and management;*
>
> *c) All contractors' roles and responsibilities during Operations and Maintenance;*
>
> *d) Maintenance plan for grid export cable(s) and landfall site.*
>
> *The Development must be operated and maintained at all times in accordance with the Operations and Maintenance Programme.*
>
> ***Reason:** To mitigate the impacts of operations and maintenance and to fully inform any mitigation and monitoring requirements for natural heritage interests.*

This OMP demonstrates how MeyGen has addressed the matters required by the Condition. Where applicable, it references other documents addressing Conditions of the Consent where these contain information on the implementation of mitigation.

The document contains the following sections:

- Introduction;
- Scope of OMP;
- Timing of Operations and Maintenance Activities;
- Operations and Maintenance Vessel Requirements and Management;
- Roles and Responsibilities for Operations and Maintenance;
- Maintenance of Grid Connection and Power Conversion Utility Building (PCUB);
- Environmental Considerations;
- Health, Safety and Environment.

2 Scope of OMP

The OMP (this document) covers Phase 1a of the Development, which is a 6MW array of 4 tidal turbines, to be operated in accordance Condition 15 of the S.36 Consent. The OMP will be updated to cover changes associated with future phases of the MeyGen project.

The OMP has been prepared to demonstrate MeyGen's approach to discharging Condition 15. It forms part of a suite of documents related to the consent conditions that MeyGen seeks to discharge, including the:

- Environmental Management Plan (EMP) (S.36 Consent, Condition 11), which includes the Marine Pollution Contingency Plan (MPCP) (Marine Licence, Condition 3.2.13), and the Reporting Protocol for the Discovery of Marine Archaeology (S.36 Consent, Condition 16);
- Project Environmental Monitoring Programme (PEMP) (S.36 Consent, Condition 12);
- Construction Method Statement (CMS) (S.36 Consent, Condition 9);
- Vessel Management Plan (VMP) (S.36 Consent, Condition 14);
- Navigation Safety Plan (NSP) (S.36 Consent, Condition 17);
- Electromagnetic Fields Best Practice Report (Marine Licence, Condition 3.2.1.1).

The OMP is drawn from MeyGen's overarching Asset Management Strategy. MeyGen employs a dedicated Operations and Maintenance (O&M) Manager, whose role is to develop the organisation's Asset Management System (AMS) in accordance with BS ISO 55000. The AMS defines MeyGen's asset management policy and objectives, and the asset-related decisions, plans and activities required to fulfil the objectives. O&M plans are a fundamental element of the AMS, and detailed documentation is being developed for every aspect of the Development.

The purpose of this OMP is to provide a high-level overview of the O&M activities defined within the MeyGen Asset Management Plans for the Phase 1a infrastructure, which consists of 4 x TTG, 4 x TSS and 4 x TSC. It supports the Section 36 Consent for the Development, and summarises MeyGen's approach to:

- Setting up the procedures and good working practices for the O&M activities for the TTG, TSS and TSC;
- Safeguarding environmental interests during operation and maintenance of the Development.

Where practicable and relevant this OMP will make reference to best practice guidance and relevant reports in respect of safeguarding environmental interests.

The Environmental Statement (ES) and Supplementary Environmental Information Statement (SEIS) only identified five receptors to be potentially negatively impacted during the operational phase of the Project, namely marine mammals; fish; non-native species; accidental events; and navigational safety.

MeyGen intends that the OMP is consistent in approach with the EMP and PEMP, whereby MeyGen commits to safeguarding the environment through the identification, avoidance and mitigation of the potential negative environmental impacts associated with the operation and maintenance of the Development.

Where reasonably practicable the OMP will be consistent with the VMP and the NSP.

The Development shall be operated in accordance with the approved OMP (as updated and amended from time to time by MeyGen). Any updates or amendments made to the OMP by MeyGen must be submitted, in writing, by MeyGen to the Scottish Ministers for their written approval. The OMP has been prepared in accordance with the ES and SEIS.

3 Timing of Operations and Maintenance Activities

The O&M activities that form part of this OMP are as follows:

- Operation of the TTG array on a day-to-day basis, including the TTG array electrical equipment within the PCUB;
- Operation and maintenance of the TTG subsea environmental monitoring equipment;
- Inspection and maintenance of the TTG, TSS and TSC;
- Recovery of a TTG (routine and non-routine);
- Redeployment of a TTG;
- Maintenance of the TTG array electrical equipment within the PCUB;
- Operation and maintenance of the Grid Connection electrical equipment and onshore Grid export cable.

Further details of the O&M-related activities and an overview of the project are provided in Appendix B.

The scope and frequency of key O&M activities envisaged at the Site are detailed in Table 1. Roles listed under Responsibility are detailed in Section 5.

O&M Task	Frequency	Responsibility
Monitor automatic operation of TTGs and onshore electrical equipment and respond to SCADA alerts	• twice daily	Site Operations Contractor (SOC)
Respond to National Grid instructions within 2 minutes and perform associated reporting requirements	• 24/7	Specialist Control Point service provided by SOC
Monitor subsea environmental monitoring equipment and data output	• Weekly	Head of Environmental Consents (HEC)
Inspect subsea environmental monitoring equipment	• 6 monthly	Offshore Maintenance Contractor (OffMC)
Remove / redeploy subsea environmental monitoring equipment	• yearly (replacement TBC)	OffMC
TTG inspection (non-routine, driven by relevant SCADA alerts)	• 2-3 yearly	OffMC
TSS inspection	• 5 yearly (routine) • 2-3 yearly (non-routine)	OffMC
TTG removal or redeployment	• 5 yearly (routine) • 2-3 yearly (non-routine)	OffMC
TTG maintenance and repair (onshore or offshore as appropriate)	• 5 yearly (routine) • 2-3 yearly (non-routine)	Turbine Maintenance Contractor (TMC)

O&M Task	Frequency	Responsibility
TSC inspection	• 5 yearly (routine) • 2-3 yearly (non-routine)	OffMC
TSC export cable repair or replacement	• not anticipated to be necessary during operational lifetime of the Development	OffMC
PCUB inspection and maintenance (landfall site)	• weekly (inspection) • yearly (routine maintenance)	Onshore Maintenance Contractor (OnMC)
High Voltage (HV) switching as required for onshore (electrical equipment) and offshore (TTG) maintenance, and in response to Distribution Network Operator (DNO) demands	• yearly (routine TTG maintenance) • 2-3 yearly (non-routine TTG maintenance) • twice yearly (non-routine onshore maintenance) • as required (DNO)	HV Senior Authorised Person (SAP) provided by OnMC
Grid export cable inspection	• yearly	DNO
Grid export cable repair or replacement	• not anticipated to be necessary during operational lifetime of the Development	DNO

Table 1 - Scope and frequency of key O&M activities

4 Operations and Maintenance Vessel Requirements and Management

This section details the vessels that may be employed during both operation and maintenance of the Project, including the vessel management procedures to be adopted.

Maintenance of the TTGs will take place both onshore and offshore. Various onshore facilities are available in Northern Scotland that can be utilised for activities requiring significant dismantling of the TTGs. Maintenance will be carried out offshore if it is straightforward and can be carried out quickly via access hatches on the TTGs.

To support offshore activities, MeyGen anticipates utilising a Dynamic Positioning (DP) Offshore Construction Vessel (OCV), a Jack-Up Vessel (JUV) or Moored Barge as appropriate. Routine and non-routine maintenance activities are expected to be similar to construction activities in terms of vessel types and numbers involved in the transit, recovery and re-deployment of the TTGs. This includes activities such as Remotely-Operated Vehicle (ROV) inspections of TSSs and TSCs. However, the frequency of maintenance activities, and therefore the associated vessel movements, is expected to be reduced in comparison to the construction activities.

The O&M activities likely to require a vessel deployment, the associated vessel and duration of the task are detailed in Table 2.

O&M Task	Typical Vessel Requirement	Duration of task
TTG inspection	• Workboat with ROV • Diving support vessel	2-3 days per TTG
TTG repair, removal or redeployment	• DP OCV, JUV or Moored Barge	3 - 5 days per TTG

O&M Task	Typical Vessel Requirement	Duration of task
TSS inspection	• Workboat with ROV • Diving support vessel	2-3 days per TSS
Environmental monitoring equipment inspection	• Workboat with ROV	1 day
Environmental monitoring equipment removal or redeployment	• Workboat with ROV, DP OCV or Moored Barge	3 - 5 days
TSC inspection	• Workboat with ROV	4-5 days
TSC repair or replacement	• DP OCV or Moored Barge	2-3 weeks depending on severity of problem

Table 2 - O&M activities requiring vessels

The vessels deployed for maintenance activities will be the same as those deployed for construction activities, and the tasks undertaken will be similar. However, the frequency of the deployments for O&M is expected to be reduced in comparison to construction activities.

All vessels deployed for O&M activities will therefore be controlled and managed in accordance with the Vessel Management Plan (VMP) proposed to support S.36 Condition 14 during installation and commissioning of the Development.

Vessels engaged in operational and maintenance activities will comply with the environmental mitigation and management measures set out in the EMP, VMS and NSP. Where appropriate vessel will also comply with the PEMP. These mitigation and management measures have not been reproduced within this OMP document.

Detailed information on environmental considerations relating to maintenance activities is provided in Section 7, and emergency responses relating to on and offshore operations are detailed in Section 9.3.

5 Roles and Responsibilities for Operations and Maintenance

This section summarises the MeyGen O&M Team, O&M contractor and subcontractor roles, responsibilities and lines of communication that will be in place for the operation and maintenance of the Development from commissioning to end of life.

Detailed descriptions of the responsibilities for the key O&M roles are provided in Appendix C.

5.1 MeyGen

5.1.1 O&M Manager

As described above, MeyGen employs a dedicated O&M Manager, who maintains the organisation's Asset Management System. The O&M Manager will have the ultimate responsibility for ensuring the implementation of the OMP as part of MeyGen's overall Asset Lifetime Plan.

The subsea environmental monitoring equipment is considered to be part of MeyGen's assets, and O&M relating to the equipment will also be the responsibility of the O&M Manager.

5.1.2 Head of Environment and Consents (HEC)

The Head of Environment and Consents will provide guidance and advice on all environmental and consenting matters referred to in the OMP.

Any updates to the OMP by the O&M Manager will be checked by the HEC for compliance with current legislation, consent conditions and related documents. The updated OMP will then be submitted to Scottish Ministers for approval.

5.2 Contractors

5.2.1 Site Operations Contractor (SOC)

The Site Operations Contractor (SOC) will be responsible for the Grid Control Point, day-to-day operation, monitoring and reporting for the TTGs and onshore electrical equipment, and for general onshore site management. The SOC will liaise will all other contractors employed at the Site to ensure all health, safety and environmental aspects of the Development are suitably managed.

5.2.2 Onshore Maintenance Contractor (OnMC)

The Onshore Maintenance Contractor (OnMC) will be responsible for the maintenance activities at the Onshore Site, including the PCUB. The OnMC will be in regular contact with the SOC to respond to and ensure that scheduled maintenance activities are hold a close relationship with the OnMC will also work closely with the Distribution Network Operator (DNO) Scottish Hydro Electric Power Distribution (SHEPD) when any maintenance activities are undertaken on the Grid export cable or SHEPD equipment located within the PCUB.

5.2.3 Turbine Maintenance Contractor (TMC)

The Turbine Maintenance Contractor (TMC) will be responsible for activities relating to maintenance and repair of the TTGs, which will generally be carried out at a remote maintenance facility. Where safe and possible to do so, straightforward maintenance may be carried out on board the recovery vessel.

5.2.4 Offshore Maintenance Contractor (OffMC)

The Offshore Maintenance Contractor (OffMC) will be responsible for the maintenance activities at the Offshore Site, including the marine operations carried out under the OMP by the Marine Subcontractor. The OffMC will work closely with the TMC during recovery of the TTGs for maintenance, particularly when offshore maintenance is to be undertaken.

5.3 Distribution Network Operator (DNO)

The DNO, SHEPD, will own and operate the Grid export cables. These onshore cables are not owned by MeyGen and the project is granted access to the grid via a Connection Agreement between MeyGen and SHEPD. SHEPD will be responsible for the maintenance activities on the Grid export cable or SHEPD electrical equipment located within the PCUB. SHEPD will carry out their maintenance activities in accordance with their own HV Safety Rules. Any grid connection outages required will be organised following SHEPD's standard operational procedures, and MeyGen's other O&M contractors will be informed accordingly.

5.4 Organisational Charts

An organisational chart for O&M activities is provided in Figure 1, showing the MeyGen O&M Team, O&M contractors and subcontractors, and the key interfaces and lines of communication between them.

Figure 2 is related to Figure 1 and shows the key roles within the O&M team and their lines of reporting for environmental issues in relation to O&M activities. Further detail around reporting requirements is presented in Appendix D.

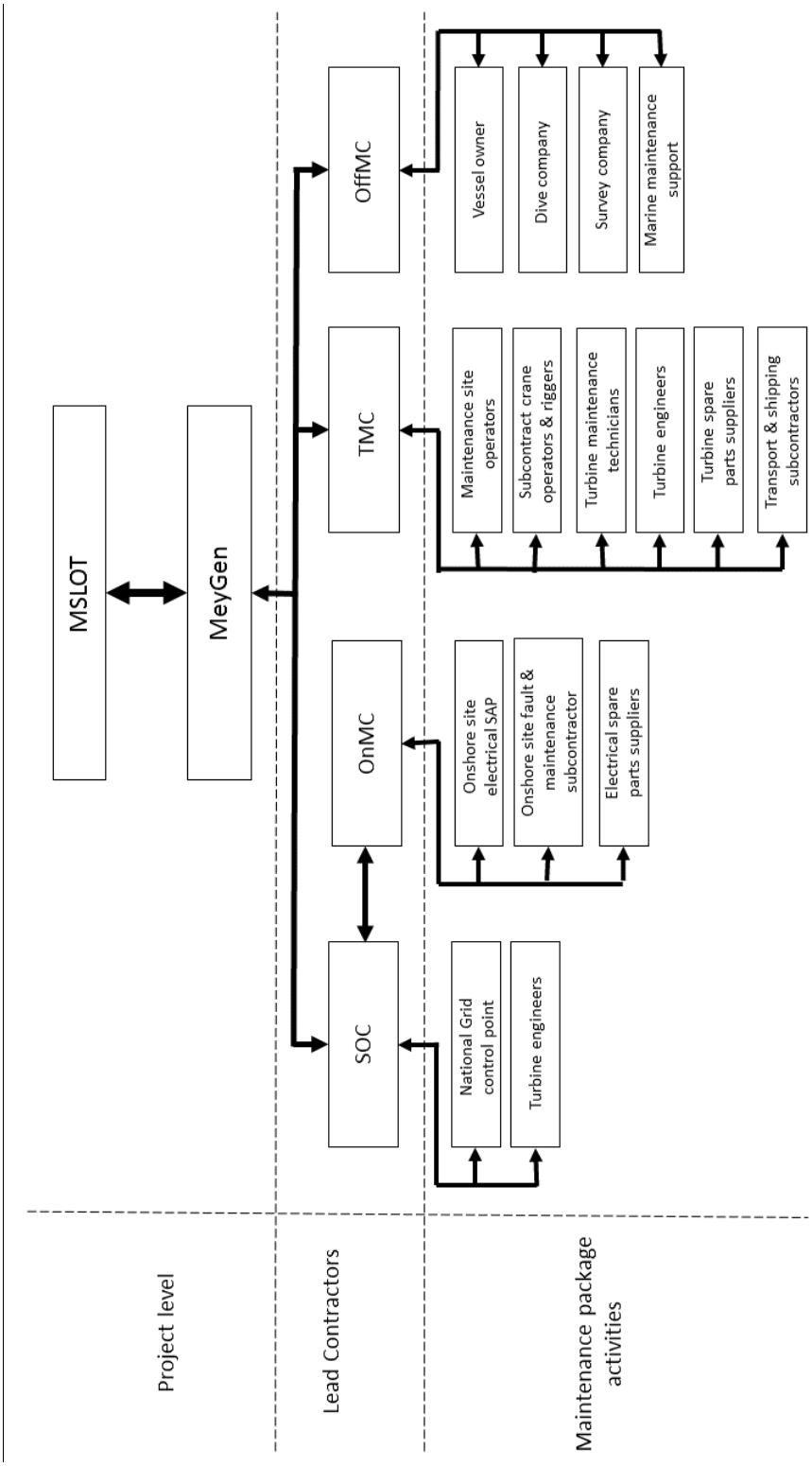

Figure 1 - O&M activity organisational chart

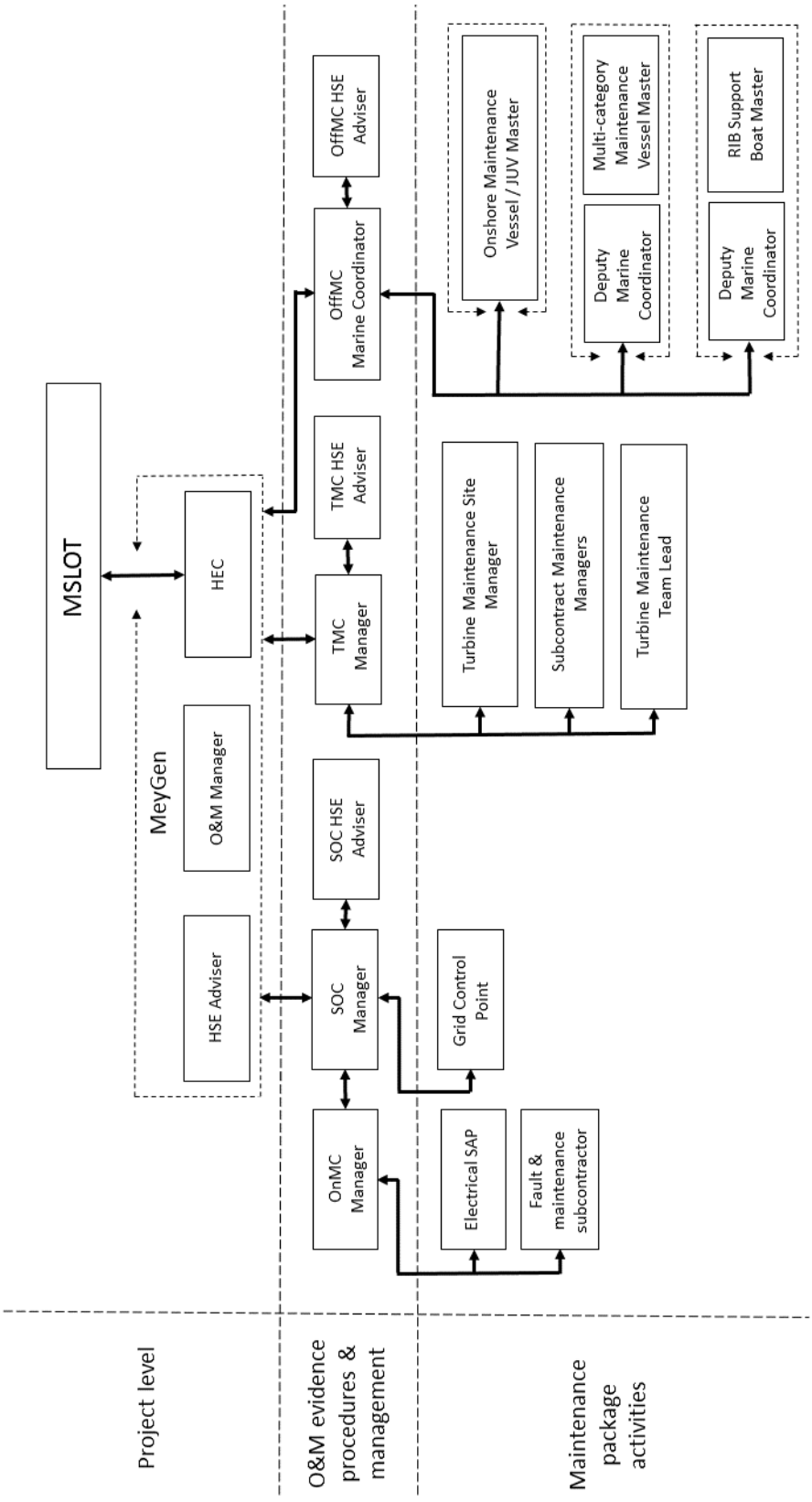

Figure 2 - Key O&M team roles and lines of environmental reporting

6 Maintenance of Grid Export Cables and Landfall Site (PCUB)

A summary of key O&M activities, and responsibilities for delivering them, has been laid out in Sections 3 and 5.

The PCUB itself contains:

- Splitter boxes to divide the TSC into the three components of TTG HV electricity generation cables, TTG auxiliary power cables, and fibre-optic data cables.
- Converters, converter coolers and transformers to convert the frequency, phase, and voltage electricity generated by the TTGs to Grid conditions.
- HV switchgear to permit electrical isolation of the TTGs and conversion equipment.
- SHEPD's Grid Connection switchgear and metering equipment.
- LV switchgear and transformers to provide auxiliary power to the PCUB and TTGs.
- A diesel generator to provide backup auxiliary power in the circumstances when the TTGs are not generating.
- A room to contain turbine control equipment, SCADA hardware and environmental monitoring control and logging equipment.
- A for turbine and electrical engineers to log in to SCADA systems.
- Welfare facilities for Project staff, a meeting room and storage space.

The PCUB contents and PCUB itself will be maintained by the SOC and OnMC, working to a maintenance programme defined by the O&M Manager, and using O&M manuals from the MeyGen Asset Management System. The SOC will be responsible for monitoring the TTG performance and Grid connection, and for liaising with the OnMC to carry HV switching for various needs, and maintenance on the electrical equipment. The OnMC will also manage the inspection and routine maintenance of the PCUB structure. The OnMC will also be responsible for maintaining security, ensuring that access is controlled according to MeyGen processes, and that the PCUB is locked when unattended.

SHEPD's Grid Connection switchgear and metering equipment is contained inside a lockable room, integral to the PCUB. SHEPD control access to this room, which is out of bounds to all Project staff. Cables carry TTG electricity, via HV circuit breakers, at the correct frequency, phase and voltage for the Grid, from the electrical converters, to the SHEPD room. The Grid export cables then connect to the Grid, exiting the SHEPD room through PVC plastic cable ducts.

7 Environmental Considerations

Environmental considerations associated with the O&M activities to be undertaken as part of the Development are provided in the ES and SEIS. These documents include detailed assessments of the O&M activities on the sensitivities of the receptors, and their potential environmental impacts. Information on the monitoring programme for marine mammals and other marine wildlife is provided the Project Environmental Monitoring Programme (PEMP) (MEY-1A-70-HSE-018-I-PEMP).

To ensure compliance with the Section 36 consent and Marine Licence conditions, all offshore activities will be carried out in accordance with the following documents as appropriate. Note

that while these documents were prepared for the construction activities, the key environmental sensitivities, mitigation and management measures addressed are applicable to routine and non-routine maintenance activities.

- Environmental Management Plan (EMP) (RHK-1A-40-HSE-002-F-EMPConstructionWorks);
- Vessel Management Plan (VMP) (MEY-1A-40-HSE-006-F-VMPConstructionWorks);
- Navigation Safety Plan (NSP) (MEY-1A-40-HSE-005-F-NSPConstructionWorks).

Accidental events during offshore O&M activities will be managed in accordance with the EMP and the Emergency Response Co-operation Plan (ERCoP).

- Environmental Management Plan (EMP) (RHK-1A-40-HSE-002-F-EMPConstructionWorks), which includes the Marine Pollution Contingency Plan;
- Emergency Response Co-operation Plan (ERCoP) (FSH-1A-40-HSE-013-F-ConstructionPhaseEmergencyResponseCooperationPlan).

Accidental events during onshore O&M activities will be manged in accordance with the onshore Emergency Response Plan (ERP).

- Emergency Response Plan (ERP) (RHK-10-70-HSE-006-F-EnvironmentalEmergencyResponsePlan).

8 Environmental Commitments

8.1 Legal Requirements and Licences

The OMP has been prepared in accordance with the principles of ISO 14001, Environmental Management Systems, and the relevant consent commitments and conditions listed in Table 3.

Licence / Consent	Legislation	Granted
S.36 Consent	Electricity Act 1989	09/10/2013
Marine Licence (licence number 04577/14/0)	Marine (Scotland) Act 2010	31/01/2014
Decommissioning Programme	Energy Act 2005	Submitted

Table 3 - Legal requirements and licences

8.2 Nature Conservation Legislation

This OMP has also been prepared in accordance with the following national and international nature conservation legislation with respect to the protection of marine mammals and fish:

- Habitats Directive (Directive 92/43/EEC);
- Conservation (Natural Habitats, &c.) Regulations 1994 (as Amended in Scotland);
- Wildlife and Countryside Act (1981);
- Nature Conservation (Scotland) Act 2004;

- Marine (Scotland) Act 2010.

A description of these key pieces of legislation is provided in the EMP.

9 Health, Safety and Environmental Management

9.1 MeyGen Health and Safety Policy

As a subsidiary of Atlantis Resources Ltd (Atlantis), MeyGen conducts its activities in accordance with the Atlantis Health and Safety Policy.

The Health and Safety Policy Statement is part of the overarching Atlantis Health and Safety Management System (HSMS). This is a guidance document, setting out the framework and arrangements that Atlantis has put in place to assure effective leadership and deliver its Health and Safety management objectives.

It provides a guide to specific Health and Safety arrangements and is designed for use by all directors, governors, trustees, officers, managers and staff.

To ensure the protection of the health and safety of employees, contractors or members of the public who may be affected by MeyGen's activities, the management system encompasses the following principles:

- Providing effective management of health and safety with delegated responsibility, accountability, and the appointment of suitable health and safety representatives;
- Maintaining a safe and healthy working environment, and providing and monitoring control measures to prevent accidents and cases of workplace-related ill health;
- Providing arrangements to identify and evaluate the hazards associated with the O&M activities and providing adequate control of the health, safety and security risks arising from them;
- Actively engaging, consulting and communicating with employees, contractors and stakeholders on health and safety matters as part of the continual improvement process;
- Maintaining a register of health and safety statistics and benchmarking the company against industry best practice;
- Ensuring that measures put in place to deal with any emergency situations are suitable for and minimise the impact on the business requirements;
- Ensuring the selection of contractors maintains the required high level of health and safety management, which is focused on competency, capability and compliance.

Additionally, MeyGen's Asset Management System is the mechanism by which the organisation integrates its overarching health, safety and environmental values and standards with its asset management and associated O&M activities.

9.2 Environmental Management

MeyGen will plan and control the O&M activities such that the environmental impacts are minimised, and will ensure that MeyGen's employees and contractors comply with the environmental requirements of the S.36 Consents and Marine Licence.

Key documentation relating to environmental management is provided in Figure 3, arranged hierarchically to correspond with the associated level of the O&M organisational chart in Figure 1. O&M-related environmental information and policies flowing down from the higher-level documents will to be communicated to the wider Phase 1a Project team at the appropriate level.

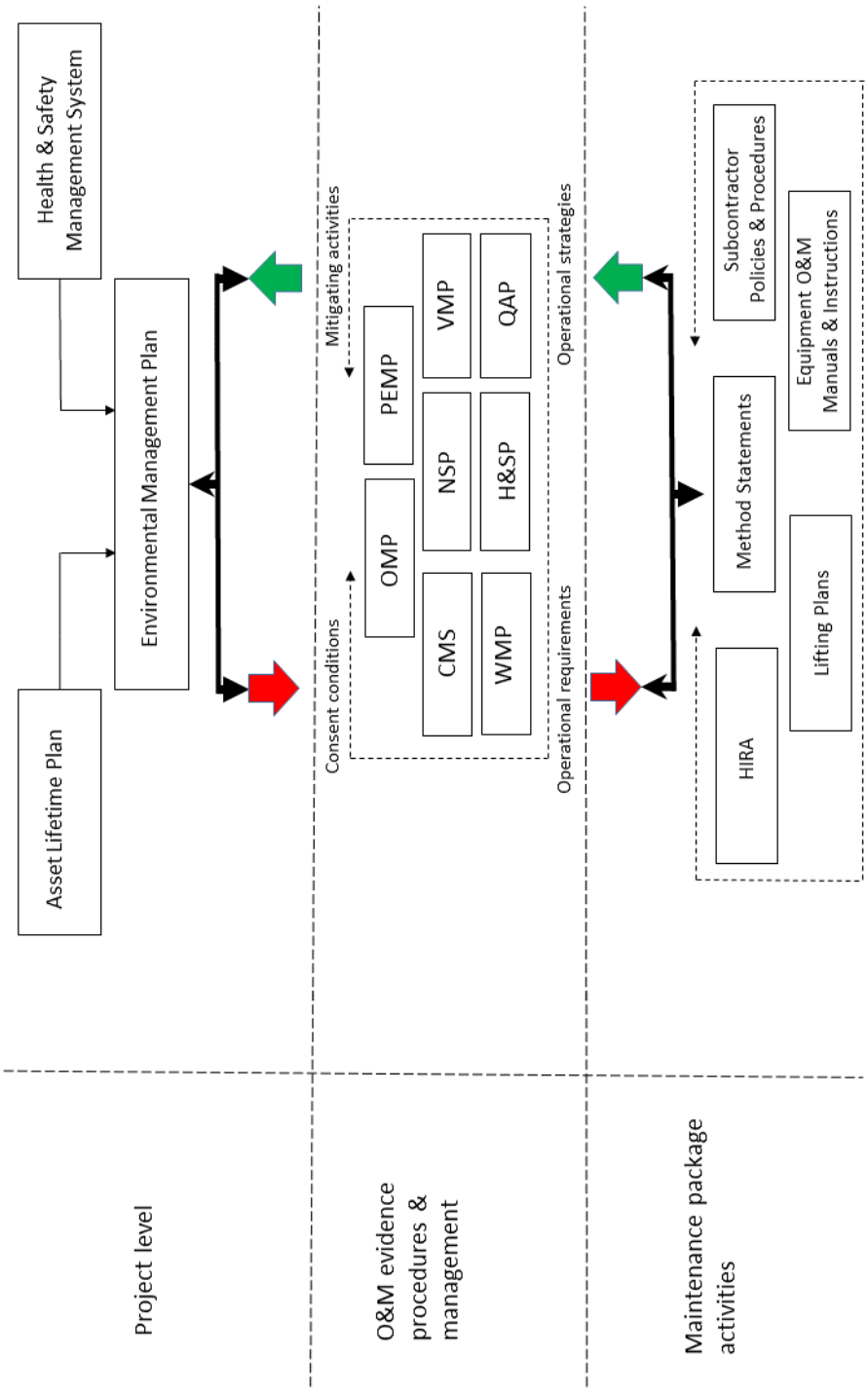

Figure 3 - Key environmental management documentation

9.3 Training

Health, safety and environmental training shall be provided as appropriate to ensure that all personnel have the knowledge to implement successfully the health, safety, and environmental requirements of the Site O&M activities.

All personnel working on the Site or Vessels shall be competent and trained sufficiently to undertake their work in a safe and efficient manner. Each contractor shall ensure that their personnel maintain the necessary level of competence for their work. They shall maintain the training records and make them available for review and audit. Table 4 describes the training approaches that may be employed.

Training	Target Personnel
Job specific training e.g.: • IOSH Working with Environmental Responsibilities / IOSH Managing Environmental Responsibilities • Use of Pollution Prevention Equipment • Site Waste Management	Personnel with environmental responsibilities
Special briefings on Project specific information, including relevant elements of: • the EMP, CMS, NSP, VMP • Consent Conditions	All Project staff as appropriate. May be conducted as part of Site / Vessel Induction Briefings.

Table 4 - Health, safety and environmental training

9.4 Communication and Updates

In addition to training, updates that address health, safety and environmental issues or concerns relating to the O&M activities shall be communicated to all O&M staff using the various methods summarised in Table 5.

Meeting / Briefing	Frequency	Attendees
Operational Safety, Health, Environment (SHE) Meeting	Monthly	Mandatory: O&M Team Optional: all other parties
Site / Vessel induction	On first attendance at the Site / Vessel BEFORE any work is undertaken	All personnel attending Site / Vessel
Pre-job briefs, including environmental practices and mitigation measures	Before mobilisation to marine operations, equipment or TTG maintenance	All personnel involved at site
Site team meetings	Daily when marine operations, equipment or TTG maintenance are occurring	All personnel involved at site
Toolbox Talks: Risk Assessment & Method Statement briefings	Each self-contained task	All members of the working party
Post-task debriefs	After completion of each self-contained task	All members of the working party
Site / Vessel notice boards & signage	To be maintained in line with current information	N/A but positioned prominently and visible to all

Table 5 - Health, safety and environmental meetings/briefings

9.4.1 Operational SHE Meeting

The SOC shall convene monthly meetings with the O&M Manager and HEC to communicate, discuss and consult any change in conditions, working practices and environmental arrangements, procedures and overall environmental performance.

Representatives from MeyGen, the OnMC, OffMC and TMC, and other interested third parties shall have an open invitation to attend these monthly meetings.

Minutes of all such meetings shall be produced and held on file for record purposes, with copies supplied to the HEC.

Additional meetings may be held in order to deal with special environmental issues that may arise during the Project such as environmental incidents. These meetings shall be organised by the appropriate HSE Advisor with the aim of ensuring a timely response and resolution to any identified issues.

9.4.2 Site / Vessel Inductions

Inductions shall be conducted before any personnel commence work on any Site, onshore or offshore. The aim of these inductions is to ensure personnel are aware of the relevant onshore or offshore maintenance site or vessel rules. Inductions will include briefings on environmental aspects such as environmental sensitivities and controls, pollution prevention, waste management and emergency preparedness and response.

9.4.3 Pre-Job Briefing

Prior to mobilisation for a continuous period of marine operations or TTG maintenance, a Pre-Job Briefing shall be held. The briefing shall pertain to all of the tasks planned during the operations and shall include a session on environmental practices and mitigation measures.

9.4.4 Site Team Meetings

For each continuous period of marine operations and TTG maintenance activities, daily site team meetings shall take place at the associated site. This meeting shall review all the tasks planned for the day. Any environmental concerns shall be addressed at this meeting.

9.4.5 Toolbox Talks: Risk Assessment & Method Statement Briefings

Toolbox Talks will take place before each self-contained task for which a method statement has been written (or could be written, in the case of simple tasks). Toolbox Talks shall be attended by all personnel directly involved in the task. Environmental requirements particular to the task shall be reviewed.

9.4.6 Post-Task Debriefs

Post-Task Debriefs will be held on the completion of each self-contained task. They shall be attended by all personnel directly involved in the task. The process involves an open assessment of how well the task was performed against the plan, and offers an opportunity to highlight issues and process improvements in all aspects, including the environmental requirements.

9.4.7 Site / Vessel Notice Boards and Signage

Site and vessel notice boards will contain relevant site / vessel information relating to health, safety and environmental issues such as Environmental Bulletins, Legislation Briefings and

Best Practice Briefings. The Site and vessel will also have appropriate signage in place to highlight awareness of environmental hazards. Other communications media, such as newsletters and posters will also be posted on notice boards to communicate awareness of environmental matters.

10 Linkages with Other Conditions

The OMP is part of a suite of consent related documents. Table 6 lists the documents and related conditions that are relevant to the OMP.

Con	Condition summary	Document
S.36 11	-	Environmental Management Plan
S.36 12	-	Project Environmental Monitoring Programme
S.36 13	-	Advisory Group
S.36 14	-	Vessel Management Plan
S.36 15	-	Operations and Maintenance Plan (this document)
S.36 16	Reporting Protocol for the Discovery of Marine Archaeology	Environmental Management Plan
S.36 17	-	Navigation Safety Plan
ML 3.1.3	Notification of Vessels	Construction Method Statement / Vessel Management Plan
ML 3.2.1.3	Marine Pollution Contingency Plan	Environmental Management Plan
ML 3.2.1.6	Promulgation of navigation warnings	Navigation Safety Plan
ML 3.2.1.7	Marine Mammal Observer	Environmental Management Plan
ML 3.2.1.8	TSC Installation Plan	Construction Method Statement
ML 3.2.1.9	TSC Protection Plan	Construction Method Statement
ML 3.2.2.1	Transport Audit Sheets	Construction Method Statement
ML 3.2.2.2	Notification of Deposits	Construction Method Statement

Table 6 - Linkages with other conditions

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Appendix A List of Abbreviations and Definitions

Abbreviation / Definition	Meaning
ADCP	Acoustic Doppler Current Profiler
ADV	Acoustic Doppler Velocimeter
AHH	Andritz Hydro Hammerfest Ltd.
AMS	Asset Management System
AOUL	Atlantis Operations UK Ltd.
CMS	Construction Method Statement
DNO	Distribution Network Operator
DP	Dynamic Positioning
ECoW	Ecological Clerk of Works
EIA	Environmental Impact Assessment
EMF	Electromagnetic Fields
EMP	Environmental Management Plan
EPS	European Protected Species
ERCoP	Emergency Response Co-operation Plan
ERP	Emergency Response Plan
ES	Environmental Statement
GT	Gross Tonnage
HEC	Head of Environment and Consents
HSMS	Health and Safety Management System
HV	High Voltage
IMO	International Maritime Organisation
IOSH	Institution of Occupational Safety and Health
JUV	Jack-Up Vessel
MARPOL	International Convention for the Prevention of Pollution from Ships
MHWS	Mean High Water Springs
ML	Marine Licence
MMO	Marine Mammal Observer
MOB	Man Overboard
MPCP	Marine Pollution Contingency Plan
MSLOT	Marine Scotland Licensing Operations Team
MSS	Marine Scotland Science
MW	Megawatt
NSP	Navigation Safety Plan
O&M	Operations and Maintenance
OCV	Offshore Construction Vessel
OffMC	Offshore Maintenance Contractor
OMP	Operations and Maintenance Programme

Abbreviation / Definition	Meaning
OnMC	Onshore Maintenance Contractor
PAM	Passive Acoustic Monitoring
PCUB	Power Conversion Utility Building
PEMP	Project Environmental Monitoring Programme
PVC	Poly Vinyl Chloride
RAMS	Risk Assessments and Method Statements
ROV	Remotely Operated Underwater Vehicle
S.36	Section 36 (of the Electricity Act 1989)
SAP	Senior Authorised Person
SCADA	Supervisory Control and Data Acquisition System
SDM	Survey, Deploy and Monitor
SEIS	Supplementary Environmental Information Statement
SGDS	Scottish Government Demonstration Strategy
SHE	Safety, Health & Environment
SHEPD	Scottish Hydro Electric Power Distribution
SNH	Scottish Natural Heritage
SOC	Site Operations Contractor
SOPEP	Shipboard Oil Pollution Emergency Plan
TMC	Turbine Maintenance Contractor
TSC	Turbine Subsea Cable
TSS	Turbine Support Structure
TTG	Tidal Turbine Generator
VMP	Vessel Management Plan

Table 7 - List of abbreviations and definitions

Appendix B Detailed O&M Background

This Appendix provides further background to Section 3, detailing how the TTG and electrical infrastructure controllers are configured and operated, and how inspection and maintenance activities will be conducted. Further detail will be available from the MeyGen Asset Management System.

B.1 TTG Array and Electrical Infrastructure: Overview and Operation

B.1.1 TTG Array Control Overview

The Phase 1a Array consists of four TTGs, three of which will be provided by Andritz Hydro Hammerfest Ltd. (AHH), and one of which will be provided by Atlantis Operations UK Ltd. (AOUL). The AAH and AOUL TTGs are of a similar design.

Both AHH and AOUL have developed dedicated Dynamic Controllers for their TTGs, which are located on board the TTG. The Dynamic Controller automatically controls the TTG when it is operating, adjusting the blade pitch angle and the generator torque to maintain operation appropriate to the flow conditions. The Dynamic Controller also processes data from sensors and returns this operational data to shore.

A duplicate, redundant Dynamic Controller is based onshore and can be used in the event that the TTG onboard controller becomes unserviceable.

A second, higher-level TTG-dedicated Supervisory Controller is based onshore. This controller interfaces with the TTG Dynamic Controllers (primary and redundant) and the onshore TTG electrical conversion equipment. The Supervisory Controller starts and stops the TTG, yaws the TTG, and monitors the data from the TTG-based sensors.

Communication between the onshore and offshore Controllers is achieved via fibre-optic cables incorporated in the TSCs between the PCUB and the TTGs.

A set of safety-dedicated, dual-redundant, robust Safety Controllers is also located in each TTG. The Dynamic Controllers are set up to monitor key safety-related parameters and automatically control the TTG to prevent these safety-related parameters from moving outside safe limits. The Safety Controller provides a backup in case of failure of the Dynamic Controller. The Safety Controller's sole function is to instigate an emergency shutdown of the turbine if the safety-related parameters move out of safe limits. The Safety Controller will also override the Dynamic Controller in the event of a control system malfunction.

B.1.2 TTG Array Electrical Infrastructure Control Overview

The electrical infrastructure consists of the electrical conversion equipment and switchgear located in the PCUB, and the TSCs between the TTGs and the PCUB.

The TTG Dynamic Controller also interfaces with the conversion equipment and switchgear. It controls the performance of the conversion equipment and switchgear in response to the power output from the TTGs to meet Grid codes. The Dynamic Controller also processes data from sensors and returns this operational data.

The TTG Supervisory Controller coordinates operation of the TTG and the electrical conversion equipment to start and stop the TTG.

B.1.3 Operation of TTG Array and Electrical Infrastructure

To provide an operator interface with the TTG controllers, both suppliers have developed a Supervisory Control and Data Acquisition (SCADA) system. The SCADA systems provide a user-friendly interface to the controllers, and provide high-level performance and system "health" information. The SCADA systems also enable TTG engineers to override automatic operation, adjust control parameters, and interrogate detailed operational and performance data.

An array-wide SCADA system has also been developed to monitor the high-level performance and system "health" data of the individual TTGs. It controls certain aspects of the individual TTGs to achieve array level outputs such as the total array power or the array reactive power, and it enables simple shutdown and restart of each. The array-wide SCADA interfaces with the dedicated AHH and AOUL SCADA systems, from which the overall array "health" data will be read and displayed.

Day-to-day monitoring and control of the array-wide SCADA system will be managed by operators provided by the SOC. The array-wide SCADA system will be configured to notify operators (alarms) if system" health" issues arise, including environmental issues. Whilst in operation the TTGs can be remotely monitored from either the SOC remote Control Room or the PCUB as appropriate. It will also be possible to log in to the SCADA systems via a remote internet connection.

Should the array-wide SCADA system raise alarms, the operator will respond as appropriate within the options available to them through the array-wide SCADA system, including initiating shutdown of the TTGs if necessary. When intervention with the dedicated TTG controller is necessary, the operator will inform the O&M Manager, who will coordinate the necessary technical activities and responses.

As a requirement of the Grid Connection Agreement, a formal Control Point will be established, providing 24/7 monitoring and control of the TTGs, electrical conversion equipment and switchgear, and the ability to react immediately to short-notice Grid-related demands. The SOC will provide this Control Point responsibility.

When electrical isolation of the TTGs is required during any maintenance activities this isolation will be achieved via the onshore switchgear, and controlled via the array-wide SCADA system.

B.2 O&M of Subsea Environmental Monitoring Equipment

A suite of environmental monitoring equipment will be installed on the AOUL TSS, which will be commissioned as part of the commissioning of the AOUL TTG. Data acquired from this environmental monitoring equipment will be relayed to shore via the fibre-optic cables incorporated in the TSCs between the onshore control centre and the TTG.

Control of the environmental monitoring equipment and data generated will not be managed by the TTG array control and SCADA systems. The O&M manager and HEC will control the equipment, and obtain the necessary environmental data to monitor and report.

B.3 Inspection and Maintenance Overview

B.3.1 TTG Array Inspection and Maintenance

The planned maintenance programme is based on a 5-yearly service for the AHH TTGs, and a 6-yearly service for the AOUL TTG. TTG maintenance activities will be coordinated by the TMC, using the MeyGen Asset Management System.

Subject to the performance of the TTGs and the data available from the SCADA systems, TTG inspection may be considered necessary. Given the challenging operating environment, the options for offshore inspection of the TTGs are very limited. If TTG inspection is required, it will be attempted to conduct it from a workboat using a ROV. If a visual inspection surpassing the capabilities of the ROV camera is required, a suitably-qualified diver may be deployed from a diving support vessel. If neither of these options is appropriate, further inspection of the TTGs will require the TTG to be removed from the TSS and lifted on-board a recovery vessel. Offshore inspection activities will be coordinated by the OffMC.

Maintenance will be carried out offshore if it is straightforward and can be carried out quickly via access hatches on the TTGs. More complex maintenance, for example activities requiring significant dismantling of the TTGs, will be carried out onshore. Various onshore facilities are available such as Nigg Energy Park and Scrabster Harbour. For Phase 1a, the onshore maintenance facility will be rented.

B.3.2 Marine Operations for TTG Recovery and Redeployment

Marine operations will be carried out by the OffMC

Routine and non-routine maintenance activities are expected to be similar to construction activities in terms of vessel types and numbers involved in the transit, recovery and re-deployment of the TTGs (DP OCV or JUV) and activities occurring at the MeyGen site (e.g. ROV inspections of TSSs and TSCs).

Removal of a TTG for inspection and maintenance will essentially be a reversal of the installation process. Redeployment of the TTGs following maintenance will be virtually identical to those utilised during installation of the TTG, and detailed in the CMS. In the interest of avoiding duplication, these activities are not reproduced here.

Environmental considerations for recovery and redeployment are similar.

B.3.3 Inspection and Maintenance of Electrical Infrastructure

Inspection and maintenance of the shore-based electrical infrastructure will be carried out by the OnMC.

Inspection and maintenance of the offshore section of the TSCs will be carried out by the OffMC under marine operations.

B.3.4 Management and Maintenance of PCUB and Infrastructure

Inspection and maintenance of the PCUB and infrastructure will be carried out by the OnMC.

B.4 Spare Parts Strategies and Maintenance Plans

Both TTG manufacturers have provided detailed predictions of the availability of their TTGs, which has been based on an assessment of the reliability of each of the sub-elements.

Incorporating data from the TTG manufacturers, MeyGen has developed a sophisticated mathematical availability model. This model facilitates the investigation of different scenarios to calculate the most appropriate spares strategy. The model takes into account, for instance, the time required for marine operations, the influence of tide and weather patterns, cost and lead time of spare parts.

As more and more reliability data is accumulated over the life of the Project, the Site availability model will continue to be developed and refined, which will support the evolution of spare a parts strategy and maintenance plan that together minimise waste and expenditure of energy. This approach supports the minimisation of environmental impact of the Development over its life.

Appendix C Detailed O&M Roles and Responsibilities

This appendix contains detailed descriptions of the roles and responsibilities of the O&M team, including contractors engaged in the O&M activities. It supports the overviews provided in Section 5.

C.1 MeyGen O&M Team

C.1.1 MeyGen O&M Manager

- Own and manage updates to the MeyGen Asset Lifetime Plan, of which this OMP is an element.
- Plan TTG maintenance schedule to minimise environmental impact.
- Integrate O&M manuals and instructions provided by TTG manufacturers and electrical equipment manufacturers into OMP to facilitate SOC / OnMC / OffMC / TMC planning and delivery of O&M activities effectively to minimise their environmental impact.
- Plan site activities to minimise their environmental impact.
- Manage the operation and monitoring of the subsea environmental monitoring equipment and onshore data collection systems and report any environmental issues apparent in the data, in line with the PEMP and working closely with the HEC.
- Review TTG operational and subsea environmental monitoring equipment data with HEC and monitor environmental impact, and assess potential adjustments to operations to optimise environmental performance.
- Ensure project-related equipment is stored and maintained in such a way to minimise environmental impact.
- Liaise with OffMC to ensure that marine support is available for both routine and non-routine maintenance activities, mindful of potential environmental impacts.
- Maintain under review decommissioning options and their environmental impact.

C.1.2 Head of Environment and Consents (HEC)

- Review and approve all consent-related documents (S.36 Condition 15).
- Review maintenance instructions / manuals, provided by TTG manufacturers and electrical equipment manufacturers and liaise with O&M Manager to identify potential adjustments to optimise environmental performance.
- Review / comment on content of Site Inductions and Toolbox Talks provided by SOC / OnMC / OffMC / TMC.
- Review/comment on Risk Assessments and Method Statements (RAMS) provided by SOC / OnMC / OffMC / TMC as and where necessary with respect to environmental impacts and controls.
- Inspect on a regular basis the vessel(s) employed during marine operations to ensure effective implementation and operation of all environmental mitigation measures.

- Inspect the TTGs and maintenance site during maintenance activities to ensure effective implementation / operation of all environmental mitigation measures.
- Audit SOC / OnMC / OffMC / TMC procedures, inspections, investigation and reporting.
- Ensure compliance with approve consent-related documents, environmental legislation and requirements and address any shortfalls with the SOC, OnMC or OffMC (S.36 Condition 15).
- Review environmental incidents/near misses and SOC / OnMC / OffMC / TMC investigations.
- Report compliance and incidents to the licensing authority and other necessary regulatory authorities.
- Notify the licensing authority of vessel(s) details (ML Condition 3.1.3).
- Notify the licensing authority of the commencement date of any maintenance (ML Condition 3.2.1.4).
- Provide Transport Audit Sheets for works to the licensing authority (ML Condition 3.2.2.1).
- Notify the licensing authority of deposits by MHWS (ML Condition 3.2.2.2).
- Ensure any protected species licenses are in place for the Development (S.36 Condition 15).
- Monitor and report data from subsea environmental monitoring equipment, and highlight any action required to O&M Manager.
- Review O&M related environmental reporting from SOC / OnMC / OffMC / TMC and liaise with MeyGen O&M Manager to identify potential adjustments to optimise environmental performance.

C.2 Site Operations Contractor (SOC)

C.2.1 SOC Manager

- Facilitate dissemination of specific environmental requirements to the SOC manager.
- Oversee the implementation and review of environmental procedures for TTG operation and onshore site management activities.
- Operate and monitor TTGs and onshore electrical equipment in accordance with environmental requirements and report any environmental issues apparent in the data.
- Monitor the environmental performance of TTG operation and onshore site management activities through maintaining an overview of incidents, inspections and audits.
- Ensure that environmental considerations form an integral part of TTG operation and onshore site management activities.
- Review and approve Risk Assessments and Method Statements (RAMS) as and where necessary with respect to environmental impacts and mitigation.

- Ensure that all environmental incidents are reported to the HEC and O&M Manager in accordance with detailed reporting requirements and the respective regulatory bodies (where required) as soon as possible.
- Review environmental matters with the HEC, O&M Manager and respective regulatory bodies on a regular basis and as per Project requirements.
- Ensure that arrangements for liaison with Project-specific regulatory bodies on all environmental issues are appropriate and maintained.
- Implement and maintain a communications strategy to manage Project public relations and complaints.
- Produce report for each maintenance operation and submit to O&M Manager and HEC.
- Ensure OnMC and subcontractors are approved and operate a Safety Management System. Confirm that they are suitably qualified in their line of work and have undertaken suitable environmental training to cover tasks to be undertaken.

C.2.2 SOC HSE Advisor

- Verify compliance with relevant legislation.
- Advise the SOC Team and OnMC Team on environmentally-related decision making.
- Review Risk Assessments and Method Statements (RAMS) as and where necessary with respect to environmental impacts and mitigation.
- Approve Toolbox Talks and onshore operations site inductions and ensure content promotes effective environmental management, and communicate associated lessons learnt to the O&M Manager.
- Provide support to the SOC Team on any environmental matters that may arise.
- Audit subcontractors to confirm that they are suitably qualified in their line of work and have undertaken suitable environmental training to cover tasks to be undertaken.
- Inspect and audit the onshore operations site and equipment on a regular basis to ensure effective implementation / operation of any environmental mitigation measures.
- Ensure compliance with environmental requirements and address any shortfalls.
- Provide inspection reports to the O&M Manager detailing any issues that must be addressed.
- Undertake investigations into environmental incidents or near misses to determine the root cause and present the findings, recommendations and lessons learnt.
- Monitor hazardous observations and incidents trends in relation to environmental aspects and impacts and initiate actions as required to minimise the potential environmental impacts and reduce risk in a timely and effective manner.

C.3 Onshore Maintenance Contractor (OnMC)

C.3.1 OnMC Manager

- Facilitate dissemination of specific environmental requirements to the OnMC Team.
- Support the SOC in its review and implementation of environmental procedures for onshore site management activities.
- Maintain onshore electrical equipment in accordance with environmental requirements and report any environmental issues apparent in the data.
- Monitor the environmental performance onshore site management activities through maintaining an overview of incidents, inspections and audits.
- Ensure that environmental considerations form an integral part of onshore site management activities.
- Review and approve Risk Assessments and Method Statements (RAMS) as and where necessary with respect to environmental impacts and mitigation.
- Ensure that all environmental incidents are reported to the SOC in accordance with detailed reporting requirements and the respective regulatory bodies (where required) as soon as possible.
- Review environmental matters with the SOC on a regular basis and as per Project requirements.
- Produce report for each onshore maintenance operation and submit to SOC.
- Ensure subcontractors are approved by SOC.

C.4 Turbine Maintenance Contractor (TMC)

C.4.1 TMC Maintenance Manager

- Facilitate dissemination of specific environmental requirements to the TMC Manager.
- Oversee the implementation and review of environmental procedures for TTG maintenance activities.
- Monitor the environmental performance of TTG maintenance activities through maintaining an overview of incidents, inspections and audits.
- Ensure that environmental considerations form an integral part of TTG maintenance activities.
- Review and approve Risk Assessments and Method Statements (RAMS) as and where necessary with respect to environmental impacts and mitigation.
- Ensure that all environmental incidents are reported to the HEC and O&M Manager in accordance with detailed reporting requirements and the respective regulatory bodies (where required) as soon as possible.
- Review environmental matters with the HEC, O&M Manager and respective regulatory bodies on a regular basis and as per Project requirements.
- Ensure that arrangements for liaison with Project-respective regulatory bodies on all environmental issues are appropriate and maintained.

- Implement and maintain a communications strategy to manage Project public relations and complaints.
- Produce report for each maintenance operation and submit to O&M Manager and HEC.
- Ensure subcontractors are approved and operate a Safety Management System. Confirm that they are suitably qualified in their line of work and have undertaken suitable environmental training to cover tasks to be undertaken.

C.4.2 TMC HSE Advisor

- Verify compliance with relevant legislation.
- Advise the TMC Team on environmentally-related decision making.
- Review Risk Assessments and Method Statements (RAMS) as and where necessary with respect to environmental impacts and mitigation.
- Approve Toolbox Talks and maintenance site inductions and ensure content promotes effective environmental management, and communicate associated lessons learnt to the O&M Manager.
- Provide support to the TMC Team on any environmental matters that may arise.
- Audit subcontractors to confirm that they are suitably qualified in their line of work and have undertaken suitable environmental training to cover tasks to be undertaken.
- Inspect and audit the maintenance site and equipment on a regular basis to ensure effective implementation / operation of any environmental mitigation measures.
- Ensure compliance with environmental requirements and address any shortfalls.
- Provide inspection reports to the O&M Manager detailing any issues that must be addressed.
- Undertake investigations into environmental incidents or near misses to determine the root cause and present the findings, recommendations and lessons learnt.
- Monitor hazardous observations and incidents trends in relation to environmental aspects and impacts and initiate actions as required to minimise the potential environmental impacts and reduce risk in a timely and effective manner.

C.5 Offshore Maintenance Contractor (OffMC)

C.5.1 OffMC Manager

- Facilitate dissemination of specific environmental requirements to the OffMC team.
- Oversee the implementation and review of environmental procedures for marine operations throughout the Project.
- Review and approve all consent-related documents, including VMP and NSP.
- Specify and provide of suitable vessels for carrying out offshore operations, with final approval from the O&M Manager and HEC.
- Monitor the environmental performance of marine operations through maintaining an overview of incidents, inspections and audits.

- Ensure that environmental considerations form an integral part of marine operations relating to the Development and to include environmental reviews as part of regular Project meetings.
- Review and approve Risk Assessments and Method Statements (RAMS) as and where necessary with respect to environmental impacts and mitigation.
- Ensure that all environmental incidents are reported to the HEC and MeyGen in accordance with detailed reporting requirements and the respective regulatory bodies (where required) as soon as possible.
- Review environmental matters with the HEC and MeyGen and respective regulatory bodies on a regular basis and as per Project requirements.
- Ensure that arrangements for liaison with Project-respective regulatory bodies on all environmental issues are appropriate and maintained.
- Implement and maintain a Project communications strategy to manage Project public relations and complaints.
- Produce reports for each operation relating to TTG recovery and redeployment and submit to O&M Manager and HEC.
- Ensure subcontractors are approved and operate a Safety Management System. Confirm that they are suitably qualified in their line of work and have undertaken suitable environmental training to cover tasks to be undertaken.

C.5.2 OffMC HSE Advisor

- Verify compliance with relevant legislation.
- Prepare, implement, review and update consent-related documents (in conjunction with the O&M Manager and HEC) in accordance with consent conditions, OffMC procedures and current legislation.
- Advise the OffMC Team on environmentally-related decision making.
- Review Risk Assessments and Method Statements (RAMS) as and where necessary with respect to environmental impacts and mitigation.
- Approve Toolbox Talks and site / vessel inductions and ensure content promotes effective environmental management, specific works and site / vessel sensitivities and communicate associated lessons learnt.
- Provide support to the OffMC Marine Coordinator and workforce on any environmental matters that may arise.
- Audit subcontractors to confirm that they are suitably qualified in their line of work and have undertaken suitable environmental training to cover tasks to be undertaken.
- Ensure suitable consideration is given to the period and frequency of environmental monitoring (particularly with respect to higher risk areas).
- Inspect and audit the vessels on a regular basis to ensure effective implementation / operation of any environmental mitigation measures.
- Ensure compliance with environmental requirements and address any shortfalls.

- Provide inspection reports to the O&M Manager detailing any issues that must be addressed.
- Undertake investigations into environmental incidents or near misses to determine the root cause and present the findings, recommendations and lessons learnt.
- Monitor hazardous observations and incidents trends in relation to environmental aspects and impacts and initiate actions as required to minimise the potential environmental impacts and reduce risk in a timely and effective manner.

C.5.3 OffMC Marine Coordinator

- Responsible for coordination of marine operations including site / vessel HSE during TTG maintenance operations.
- Ensure that all subcontractors have received and understood the site / vessel induction.
- Undertake Toolbox Talks to promote effective environmental management and communicate associated lessons learnt.
- Monitor and disseminate weather information and forecasts
- Production of marine safety alerts including issuing Notice to Mariners to agreed stakeholder list.
- Responsible for collating, communicating and responding to statutory navigation notices.
- Liaise with port authorities.
- Implement / operate environmental mitigation measures as approved in the consent-related documents at the site / vessel.
- Coordinating, ensuring compliance for and recording all vessel movements and personnel movements offshore.
- Emergency response coordination.
- Produce daily reports during marine operations and submit to the OffMC Manager, O&M Manager and HEC.
- Keep Transport Audit Sheets for all materials listed in the licence to be deposited as part of the works
- Keep audit reports stating the nature and quantity of all substances and objects deposited below MHWS under the authority of the licence.

C.5.4 Marine Subcontractor

Vessel Master

- Overriding authority and responsibility to make decisions with respect to safe navigation of the vessel and matters related to HSE.
- Dedicated watch-keeper on board the vessel, or nominate suitable qualified deputy.
- The persons present on board must adhere to the Vessel Master's instructions.
- Adhere to IMO International Regulations for the Prevention of Collisions at Sea.

- Ensure that all subcontractors have received and understood the Vessel Induction.

Other Marine Subcontract Staff

- To understand and implement procedures relevant to their role as laid out.
- To conduct their work with a view to eliminating / reducing the environmental impact of the Site and to raise any environmental concerns with OffMC Marine Coordinator or O&M Manager.
- To report all environmental incidents to the OffMC Marine Coordinator and Vessel Master as soon as possible.

Appendix D Detailed Reporting Requirements

This appendix contains details of the reporting requirements relating to the roles of the O&M team, including contractors engaged in the O&M activities. It supports the information provided in Section 5.

D.1 Reporting During Maintenance Activity (All Contractors)

The following requirements shall apply to all contractors engaged in operations and maintenance activities. Each contractor shall communicate the following to the O&M Manager and subcontractors engaged in associated activities:

- Details of audits and inspections.
- Details and statistics for environmental incidents and near misses.
- Details of any pending and actual enforcement action in respect of any environmental incidents.
- Any other pertinent environmental issues identified that do not fall under the above.

Contractors shall provide this information via:

- Daily logs and reports when maintenance activities are taking place.
- Weekly progress reports.
- Monthly reports (additionally, confirming the status of the Project, implementation of environmental commitments and mitigation measures, monthly and cumulative statistics, training delivered, environmental initiatives undertaken, amendments to the any of the consents related documents).

D.2 Reporting During Marine Operations (OffMC)

When maintenance activity involves marine operations, the following reports shall be provided by the Offshore Maintenance Contractor:

- Transport Audit Sheets at the beginning of each month and at the conclusion of marine operations (MEY-1A-40-HSE-004-D-TransportAuditSheet);
- Audit reports at the conclusion of each operation (or every 6 months if extended marine operations take place) for the nature and quantity of all substances and objects deposited below MHWS (MEY-1A-70-HSE-005-D-DepositAuditSheet);
- Marine Mammal reports daily during marine operations (MEY-1A-70-TEM_009-MarineMammalReport).

D.3 External Communications

The HEC is responsible for:

- Notification to the licensing authority as detailed in Consent condition.
- Reporting as necessary to the licensing authority:
    - Details of audits and inspections.

  - Details and statistics for environmental incidents and near misses.
  - Details of any pending and actual enforcement action in respect of any environmental incidents.
  - Any other pertinent environmental issues identified.
- Reporting to the licensing authority during Marine Operations:
  - Transport Audit Sheets.
  - Audit reports for the nature and quantity of all substances and objects deposited below MHWS.
  - Marine Mammal Monitoring Reports.
- Meeting(s) with the licensing authority, statutory agencies and the local community.
- Receiving, documenting and responding to any environmental communication from third parties.

In relation to Marine Operations, the OffMC Marine Coordinator is responsible for:

- Documenting, issuing, communicating and responding to statutory navigation notices for the Development.
- Emergency Response and Co-operation Procedures are in place for such events. The communication and reporting protocols for such an event can be found in the ERCoP.