24 ACCIDENTAL EVENTS

24.1 There were no supporting studies which directly relate to the Accidental Events impact assessment.

24.1 Introduction

24.2 This section assesses the potential for accidental events related to the Project and potential impacts associated with these events. The Environmental Impact Assessment (EIA) process is concerned with "likely significant effects". Accidental events are by their nature not likely. However, although unlikely they have been considered as part of this EIA process as they may have a significant effect. The probability or likelihood of such as event must be taken into account when assessing the significance of an accidental event in the context of EIA. It covers all stages of the Project from installation to operations and maintenance through to decommissioning. After detailing the nature and potential occurrence for these events, mitigation and management is identified which will remove or reduce the identified impacts. This assessment has been undertaken by Xodus.

24.2 Assessment Parameters

24.2.1 Rochdale Envelope

24.3 In line with the Rochdale Envelope approach, this assessment considers the maximum ('worst case') Project parameters in relation to a specific receptor or group of receptors. However, given the nature of an accidental event i.e. non routine and the fact that an accidental event will have effects on all receptors considered the Rochdale Envelope for Accidental Events covers all the potentially extreme events that may occur. Some of these have been considered in individual sections (Table 24.1). Major events in terms of pollution and fire which may affect a number of different receptors are considered in this section and are outlined in Table 24.1. Further descriptions of the volume of substances involved are provided in the relevant impact. The potential impacts associated with alternative Project parameters have been considered in Section 24.9.

24.4 Accidental and non routine events that are relevant to this Project are detailed in Table 24.1 and were identified during the Environmental Issues Identification (ENVID) process (Section 8). Some events have been detailed in other sections of this Environmental Statement (ES) and are therefore not repeated in this section. However, the section in which these aspects are dealt with is provided in Table 24.1.

Accidental or non routine event	Section the event is covered
All events that are deemed to pose a navigational hazard, relating to installation, maintenance and decommissioning. Vessel collision. Loss of equipment including parts of the turbine.	Shipping and Navigation (Section 15)
Pollution events associated with onshore construction resulting from the loss of leakage of potential pollutants including fuel, lubricants, oils, chemicals, unset concrete, grout and drilling fluids.	Geology, Hyrdrogeology and Hydrology (Section 17)
Oil spills from vessels.	Sections 24.6.1 and 24.7.1 Marine Mammals (Section 11) Ornithology (Section 12) Fish Ecology (Section 13) Commercial Fisheries (Section 14) Terrestrial Habitats and Ecology (Section 18)
Fluid leaks during support structure installation.	Section 24.6.2
Vehicle collision.	Section 24.6.3
Fluid leaks from turbines.	Section 24.7.2
Fire risk at the Power Conversion Centre (PCC).	Section 24.7.3

Table 24.1: Accidental and non routine events applicable to the Project

24.5 The focus of the accidental events impact assessment is potential impacts on the ecology of the offshore and onshore Project areas and adjacent sea, coastal and land areas.

24.3 Legislative Framework and Regulatory Context

24.6 There is no specific legislation or published guidance regarding accidental and non routine events associated with marine renewable energy developments. However the following apply to the Project:

- The International Convention for the Prevention of Pollution from ships (MARPOL) covers pollution of the marine environment by ships from operational or accidental causes;
- Regulation 37 of Annex I of MARPOL requires that all ships of 400 gross tonnage (GT) or more carry an approved Shipboard Oil Pollution Emergency Plan (SOPEP);
- Scottish Environment Protection Agency (SEPA) Pollution Prevention Guidelines (PPG) 1 covers general guidance on the prevention of Pollution, PPOG 5 provides guidelines for construction and maintenance work, on, in or near water, PPG 21 For producing emergency pollution incident response plans to deal with accidents, spillages and fires and PPG 22 for incident response and dealing with spills; and
- The Fire Safety (Scotland) Regulations 2006.

24.4 Assessment Methodology

24.4.1 Scoping and consultation

24.7 Since the commencement of the Project, consultation on accidental events issues has been ongoing Table 24.2 summarises all consultation relevant to accidental events. In addition, relevant comments from the EIA Scoping Opinion are summarised Table 24.3 together with responses to the comments and reference to the ES sections relevant to the specific comment.

Date	Stakeholder	Consultation	Topic/specific issue
7th April 2011	Marine Scotland and Scottish Natural Heritage (SNH)	Pre-Scoping meeting	EIA surveys and studies required and the data needs for each EIA study.
27th May 2011	Marine Scotland, statutory consultees and non statutory consultees	Submission of EIA Scoping Report	Request for EIA Scoping Opinion from Marine Scotland and statutory consultees and request for comment from non statutory consultees.
30th June – 2nd July 2011	Local stakeholders	Public Event - EIA Scoping	Public event to collate information/opinions on proposed EIA scope.
14th September 2011	The Highland Council (THC)	Meeting	Planning pre application meeting. Presentation on overall Project and results of EIA studies to date.
31st September 2011	Marine Scotland, THC, statutory consultees and non statutory consultees	Receipt of EIA Scoping Opinion	Receipt of response to EIA Scoping Report and other comments from non statutory consultees.
10th October 2011	THC	Receipt of pre application advice	Receipt of pre application advice from The Highland Council.
6th – 7th December 2011	Local stakeholders	Public Event – pre application consultation	Public event to communicate the findings of the EIA to local stakeholders.

Table 24.2: Consultation relevant to accidental events

Name of organisation	Key concerns	Response	ES section within which the specific issue is addressed
Marine Scotland	SEPA's Pollution Prevention Guidelines should be used in the ES preparation and during Project development Developers should be aware of available Construction Industry Research and Information Association (CIRIA) guidance on the control of water pollution from construction sites and environmental good practice	Relevant SEPA Guidelines have been consulted throughout the development of the ES. Relevant CIRIA guidance has been considered	Geology, Hydrogeology and Hydrology (Section 17) Section 24.6.2 Impact Assessment
SEPA	The ES should systematically identify all aspects of site work that might impact upon the environment, potential pollution risks and should identify the principles of preventative measures and mitigation.	All potential pollution risks have been considered	Sections 24.6, 24.7 and 24.8 Impact Assessment

Table 24.3: Scoping relevant to accidental and non routine events

24.4.2 Desk based study

24.8 Identification of potential accidental events focussed on a detailed study of the Project Description for the Project (Section 5) and discussion with the Project team.

24.4.3 Significance criteria

24.9 Where appropriate the methodology used follows that outlined in Section 8. Variations from this are explained below.

24.10 The sensitivity of the receptor and magnitude of impact are defined in Table 24.4 and Table 24.5. There is not one standard receptor that can be impacted by accidental events, therefore definitions refer generally to all possible receptors.

Sensitivity of receptor	Definition
Very high	▪ Very sensitive receptors with very little ability to absorb change caused by an accidental event without fundamentally altering its present character and or receptor is of very high environmental value or of international importance.
High	▪ Receptor has little ability to absorb change caused by an accidental event without significantly altering its present character and or receptor is of high environmental value or national importance.
Medium	▪ The receptor has moderate ability to absorb change caused by an accidental event without significantly altering its present character and or receptor is of moderate environmental value or of regional importance.
Low	▪ The receptor is tolerant of change caused by an accidental event with only minor detriment to its present character and or receptor is of low environmental importance or of local importance.
Negligible	▪ The receptor is tolerant of change caused by an accidental event without perceptible detriment to its present character and or receptor is of negligible environmental value.

Table 24.4: Definitions for sensitivity of receptor

Magnitude of impact	Definition
Severe	▪ Severe alteration to key elements or features of the baseline conditions resulting in a fundamental change in character/composition or other attributes.
Major	▪ Major alteration to key elements or features of the baseline conditions resulting in a major change in character/composition or other attributes.
Moderate	▪ Alteration to one or more key elements or features of the baseline conditions such that post event character/composition or other attributes will be partially changed.
Minor	▪ Minor alteration in baseline conditions. Change arising from the loss or alteration will be discernible but underlying character/ composition or other attributes of baseline conditions will be similar to pre event circumstances and patterns.
Negligible	▪ Very slight change from baseline conditions. Change barely distinguishable, approximating to the no change situation.

Table 24.5: Definitions for magnitude of impact

24.4.4 Frequency / probability of events

24.11 For the assessment of accidental events the application of frequency / probability is not applied to the magnitude of an impact but is applied after the consequence of an impact has been assessed. This allows the consequence of the impact to be fully understood before the likelihood of the event occurring is applied to the impact. This is particularly important for impacts where the consequence is very high but the probability of such an event occurring is extremely low (i.e. a major oil spill is a high consequence event which has a very low probability of occurrence). In this instance, the magnitude considers the duration, timing, scale and size of an impact. This is then combined with the sensitivity of receptor in the same manner as in Section 8 to provide an environmental consequence.

24.12 In order to assess the overall impact significance, the consequence is combined with a frequency/probability of the impact occurring as defined in Table 24.6.

Frequency / likelihood category	Accidental event (probability)
Continuous / Likely	▪ 10^{-1} to >1 events per year ▪ Event likely to occur more than once on the facility.
Regular / Possible	▪ 10^{-2} – 10^{-1} events per year ▪ Could occur within the lifetime of the development.
Intermittent / Unlikely	▪ 10^{-3} – 10^{-2} per events per year ▪ Event could occur within the life of 10 similar facilities. Has occurred at similar facilities.
One off Event / Remote	▪ 10^{-5} – 10^{-3} events per year ▪ Similar even has occurred somewhere in industry or similar industry but not likely to occur with current practices and procedures.
One off Event / Extremely remote	▪ $<10^{-5}$ events per year ▪ Has never occurred within industry or similar industry, but theoretically possibly.

Table 24.6: Probability and/or frequency definitions

24.13 The overall impact significance ranking is derived by combining consequence and likelihood via the matrix presented in Table 24.7.

Consequence	Likelihood / frequency					
	Continuous / likely	Regular / Possible	Intermittent / Unlikely	One off Event / Remote	One off Event / Extremely Remote	Will not occur
Severe	Severe	Severe	Major	Moderate	Minor	Negligible
Major	Severe	Major	Moderate	Minor	Negligible	Negligible
Moderate	Major	Moderate	Minor	Minor	Negligible	Negligible
Minor	Moderate	Minor	Minor	Negligible	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible	Negligible	Negligible
Positive	Positive	Positive	Positive	Positive	Positive	Positive

Table 24.7: Significance rankings

24.4.5 Data Gaps and uncertainties

24.14 Given the nature of an accidental event (i.e. non routine) there are a number of uncertainties associated with assessing the impact of these events. There are data available on the frequency of certain events (i.e. vessel collisions) and the consequences of such events to the environment. Where these data are available they have been used in assessing the impact of an accidental event. In addition available project data on the inventory of vessels that may be used during Project installation and maintenance activities and the inventory of the turbines themselves have also been used to provide suitable information on what volumes might be spilled in the event of an accident. Similar data sources where available have been used to quantify potential impacts from fire at the PCC. Where uncertainty remains over an impact this has been accounted for in the likelihood of an event occurring. However, for most impacts the measures in place to prevent accidents from happening and the frequency of such accidents is well understood.

24.5 Baseline Description

24.15 The Project is located within the Inner Sound of the Pentland Firth, with the associated onshore infrastructure situated on the coastal section of Caithness immediately south of the offshore area. Details of the Project and the local environment are provided in Sections 5 and 7 respectively.

24.6 Impacts during Construction and Installation

24.6.1 Impact 24.1: Oil spills from vessels

24.16 Oil spills can have a number of environmental impacts. Actual effects will vary depending on a wide range of factors including the volume and type of oil spilt and the sea and weather conditions at the time of the spill. Effects will also be dependant on the presence of environmental sensitivities in the path of the spill. In a highly dynamic environment such as that within the Inner Sound, oil spills will be rapidly dispersed although a spill will never be far from the coast and therefore beaching could occur. Sources of data on offshore support vessels are few (i.e. the types of vessel that will be used for installation and operation). However the best available data indicates that the most frequently recorded spills from vessels offshore is associated with upsets in the bilge treatment systems and the losses are usually small (UKOOA, 2006). This type of loss is likely to result in 10's of litres being lost to the receiving environment.

24.17 The total oil inventory for large dynamic positioning (DP) installation vessels is likely to be in the region of 6,000,000 to 8,000,000 litres of marine diesel stored in a number of separate tanks. The worse case spill from a single tank rupture is likely to be in the region of 600,000 litres of marine diesel released into the marine environment.

Impact significance

24.18 The sensitivity of the marine environment (sea and coast) is described as high. The magnitude of impact is considered minor for a total loss of inventory and negligible for a small loss of oil. The likelihood of the loss of a small (10's of litres) amount of oil being leaked from a vessel associated with the Project is described as unlikely. The likelihood of a large oil spill from a vessel associated with the Project is even less, based on best available data for offshore installation and support vessels gives the incidence rate as one per 13,067 vessel years (DETR, 1999). Therefore the likelihood is described as extremely remote. A total loss of inventory is considered to have a moderate and therefore significant impact, whereas loss of a small amount of oil is considered to have a minor impact and therefore not significant impact.

Impact	Sensitivity of receptor	Magnitude of impact	Consequence	Likelihood / frequency	Impact significance	Significance (EIA Regs)
Oil spill from vessel (total inventory)	High	Severe	Severe	Extremely remote	Minor	Significant
Oil spill from vessel (small loss of 10s litres)	High	Minor	Moderate	Unlikely	Minor	Significant

MITIGATION IN RELATION TO IMPACT 24.1

- Despite no significant impact being identified, mitigation measures are still proposed due to the potential consequence of events.
- Vessels associated with all Project operations will comply with IMO/MCA codes for prevention of oil pollution and any vessels over 400GT will have onboard SOPEP's.
- Vessels associated with all Project operations will carry onboard oil and chemical spill mop up kits.
- Where possible vessels with a proven track record for operating in similar conditions will be employed.
- Vessel activities associated with installation, operation, routine maintenance and decommissioning will occur in suitable conditions to reduce the chance of an oil spill resulting from the influence of unfavourable weather conditions.

24.6.2 Impact 24.2: Leaks/pollution during support structure installation

24.19 A decision is yet to be made on which support structure will be used, therefore consideration is given to potential impacts associated with the drilled support structure types which require grout and where there is potential for a fluid leak.

24.20 Both the monopile and pin piled TSSs will involve drilling during the installation phase of the Project. The drilling equipment used will have a relatively small inventory of oil used for lubricating purposes. For pin pile drilling equipment the oil inventory will be approximately 60 litres and for monopile drilling equipment approximately 150 litres.

24.21 High strength cement will be used to grout the piles in place. The cement is stored in dry form in large bags with an approximate capacity of 1 ton. The worst case scenario for the amount of cement that will be carried onboard a vessel at any one time is a maximum of 100 tons (enough for the installation of one monopile). There is the potential dry cement could be lost overboard.

24.22 In addition, there is the potential during the pile installation operations that liquid cement could be lost to the marine environment. A conductor casing will separate the liquid cement from the open sea. If the

coupling were to fail this could result in an approximate maximum loss of cement to the marine environment of 500 litres.

24.23 A loss of oil from the drilling equipment will have a localised impact, and be rapidly dispersed in the dynamic conditions of the Inner Sound. The potential loss of cement into the marine environment will also have a localised impact but would also be expected to be rapidly diluted and dispersed in the dynamic conditions of the Inner Sound.

24.24 The sensitivity of the receptor is considered high. Due to the relatively small inventories, the magnitude of impact is considered minor. Given the novel nature of this technology and therefore the relatively limited experience of using pin piling and monopiling in relation to this type of installation, the likelihood of a leak from the drilling equipment is considered possible. The likelihood of a total loss of cement inventory either overboard or during drilling operations, is however considered remote.

Impact significance

Impact	Sensitivity of receptor	Magnitude of impact	Consequence	Likelihood / frequency	Impact significance	Significance (EIA Regs)
Leaks during installation – loss of oil inventory from pile drilling equipment	High	Minor	Moderate	Possible	Moderate	Significant
Leaks during installation - loss of cement inventory	High	Minor	Moderate	Remote	Minor	Not Significant

MITIGATION IN RELATION TO IMPACT 24.2

- Operations will only take place during suitable weather windows.
- Vessels over 400GT will have onboard SOPEP's that will be activated in the event of any pollution incident.
- Only recognised marine standard fluids and substances will be used in the drilling equipment.
- Consideration will be given to CIRIA guidance on the use of concrete in maritime engineering – a good practice guide.
- A fibre optic cable will be used to monitor the level of cement, when the cement reaches seabed level pumping of cement will cease immediately.
- During cementing operations the cement will be separated from the open sea conductor casing which is only removed once the cement has reached sufficient strength to withstand current forces.
- Dry cement will be stored in strong bags made of appropriate material to avoid loss of any kind; empty bags will be stored in an appropriate container and disposed of accordingly onshore.

Residual impact

24.25 Although the receiving environment is considered to be sensitive, the mitigation measures proposed will ensure impacts are minimised and therefore the residual impact is considered to be negligible.

Impact	Sensitivity of receptor	Magnitude of impact	Consequence	Likelihood / frequency	Impact significance	Significance (EIA Regs)
Leaks during installation – loss of oil inventory from pile drilling equipment	High	Negligible	Minor	Possible	Minor	Significant

24.6.3 Impact 24.3: Vehicles associated with onshore construction

24.26 A number of vehicles will be involved with the onshore construction and installation phase of the Project. Accidental events associated with vehicle activity could include collision and loss of fluid. The direct impact on watercourses is covered in the Geology, Hydrogeology and Hydrology section (Section 17) and is therefore not considered here. Other potential receptors include onshore habitats and ecology and other road users.

Impact significance

24.27 The sensitivity of the potential receptors is considered the same i.e. they all have a moderate ability to withstand change caused by an accidental collision event and associated loss of fluid. No vehicle will be carrying a large amount of fuel/oil or other harmful fluid therefore the magnitude of impact is considered minor. The likelihood is considered to be remote.

Sensitivity of receptor	Magnitude of impact	Consequence	Likelihood / frequency	Impact significance	Significance (EIA Regs)
Medium	Minor	Minor	Remote	Negligible	Not Significant

MITIGATION IN RELATION TO IMPACT 24.3

- Although no significant impact has been identified mitigation will be put in place to ensure this remains the case.
- All vehicles used will have up to date MOTs and will be operated by suitably qualified personnel.
- Due attention will be given to weather conditions and appropriate action will be taken i.e. vehicles will not be used when the weather is deemed to present dangerous conditions e.g. severe ice and snow.
- The plan for the construction phase will take into the account the capacity of the local road network.

24.6.4 Impact 24.4: Total loss of inventory from Horizontal Direction Drill boreholes

24.28 The majority of drill cuttings generated from the drilling of the Horizontal Directional Drill (HDD) bores will be returned to shore and not discharged to sea. It is estimated that the contents of the last 10m of each bore could be discharged to sea at the seabed breakthrough. During normal operations it is expected that the greatest potential discharge to sea at breakthough will result in a total volume of 82m^3 of drill cuttings. However, in the event that the entire inventory of a bore was lost the total volume of drill cuttings that could be discharged to sea is 141m^3 per bore. The inventory of a bore is considerably less than the volume generated during normal drilling operations for the monopile foundations (which is 17,200m^3) and based on the assessment of the potential impacts from these discharges (Section 10) significant impacts

are not expected. The dynamic environment will ensure that any cuttings are dispersed rapidly so that any increases in suspended sediment concentrations are likely to be short lived. In addition it is unlikely that drill cuttings will settle where they are discharged and the strong currents in the area will redistribute the cuttings rapidly away from the Project area.

Impact significance

24.29 The sensitivity of the marine environment is described as medium (see Section 10). Although increased turbidity/suspended sediment levels may occur in the localised area of the drilling operations the impact is not expected to extend outwith the immediate footprint of the wider Project area and recovery is expected to be rapid. Due to the potential inventories of releases involved; the magnitude of impact is considered negligible for loss of the inventory of a single bore. The likelihood of the loss of drill cuttings is considered unlikely.

Impact	Sensitivity of receptor	Magnitude of impact	Consequence	Likelihood / frequency	Impact significance	Significance (EIA Regs)
Loss of single bore inventory	Medium	Negligible	Negligible	Unlikely	Negligible	Not Significant

MITIGATION IN RELATION TO IMPACT 24.4

- In the event of any unplanned discharge to sea during HDD activities, the drilling contractor would activate its emergency response plan to ensure discharges were minimised.

24.7 Impacts during Operations and Maintenance

24.7.1 Impact 24.5: Oil spills from vessels

24.30 Vessels will be used for the maintenance of the turbines. These vessels will be the same size or smaller than those used for installation and will therefore have similar oil inventories. Likelihood of event, residual impact and mitigation measures are the same as for spills from vessels during installation (Section 24.6.1).

24.7.2 Impact 24.5: Leak of fluid from turbines

24.31 The tidal turbines will contain an inventory of fluids including oil, hydraulic fluid and coolant. The impact from loss of fluids from the tidal turbines will be limited. Leaks will be localised to the immediate vicinity of the turbine and will be rapidly dispersed in the tidal conditions present in the Inner Sound. The quantities and types of fluids to be used will also be a limiting factor to the overall impact, based on the candidate technologies being considered largest turbine inventories will be 645 – 1,500 litres. The fluids will be mostly water based, biodegradable and have low aquatic toxicity.

Impact significance

24.32 The sensitivity of the receptor is considered high. Due to the limited inventories involved, even in the event of a loss of the entire inventory from a single turbine, the magnitude of the impact is considered negligible. Given the novel nature of this technology a leak from a turbine is considered possible.

Sensitivity of receptor	Magnitude of impact	Consequence	Likelihood / frequency	Impact significance	Significance (EIA Regs)
High	Negligible	Minor	Possible	Minor	Not Significant

MITIGATION IN RELATION TO IMPACT 24.5

- Although no significant impact has been identified, given the novel technology involved and the high sensitivity of the receptor, mitigation is detailed to ensure that the impact remains not significant.
- Only recognised marine standard fluids and substances will be used in the turbine hydraulic systems.
- Hydraulic fluids will be mostly water based, biodegradable and be of low aquatic toxicity.
- Turbine sensors will detect loss of fluid pressure and leaks; enabling maintenance operatives to reduce the risk of further leaks.

24.7.3 Impact 24.6: Fire risk at PCC

24.33 The PCC will contain a significant amount of electrical infrastructure including 33Kv transformers, power converters and back up batteries. The presence of this amount of electrical infrastructure and the potential for some fuel to be on site presents the potential for a fire hazard. Careful consideration will be given to fire safety in the design of the PCC. In the event of a fire, early detection and mitigation is key to reducing the potential impact. The presence of sensitive alarms will ensure that any fire is dealt with quickly and efficiently.

24.34 In the event of a fire potential impacts include fire chemical release and atmospheric pollution, however even if the fire was major, given the scale of the PCC this would be limited. Potential receptors include terrestrial habitats and ecology, watercourses, the atmosphere and anyone present at the PCC at the time of a fire.

Impact significance

24.35 The potential receptors have varying levels of sensitivity which are indicated below. Any fire impact will be short lived and is extremely likely to be contained within the PCC boundary, in addition the likelihood associated with a fire at the PCC is extremely remote, therefore impact significance is considered as minor or below.

Sensitivity of receptor	Magnitude of impact	Consequence	Likelihood / frequency	Impact significance	Significance (EIA Regs)
Low (atmosphere, terrestrial habitats and ecology)	Minor	Minor	Extremely remote	Negligible	Not Significant
Medium (Water courses and ground)	Minor	Minor	Extremely remote	Negligible	Not Significant
Very high (people present at the PCC)	Severe	Severe	Extremely remote	Minor	Not Significant

MITIGATION IN RELATION TO IMPACT 24.6

- Despite no significant impact being identified, mitigation measures are still proposed due to the potential consequence of events.
- The design of the building which be such to allow good ventilation.
- Due regard will be given to the Fire Safety Scotland (Regulations) 2006 and Part 3 of the Fire Scotland Act 2005 which details the provision for fire safety in non domestic premises.

- Alarms and fire detection measures will be included in the design of the PCC.
- A fire risk assessment should be carried out for the PCC.
- In regard to the storage of fuel, SEPA PP2 'above ground storage tanks' will be followed. In particular the fuel tank will be chosen and positioned with fire risk in mind and will be located with sufficient space around it or a physical fire barrier. The base will also be suitably designed as to minimise fire risk.
- The power conversion equipment will be water or air cooled to avoid overheating and will contain very little combustible material. The equipment will be self-extinguishing and a fire/smoke alarm system will be installed in each power conversion container.
- Industry standard switches will be used to turn off source of energy in the event of fire detection and there will be a container provided fire and smoke containment.
- The transformer is F1 certified and meets standard IEC 60076-11. A vacuum cast dry type transformer (significantly lower risk of fire compared to oil filled transformers) will be used. The transformers will be self-extinguishing.
- The gas insulated switch gear (virtually no fire risk) meets requirements of standard IEC 60694.

24.8 Impacts during Decommissioning

24.36 Impacts during decommissioning are considered to be the same as for some of the impacts considered for installation and construction, namely oil spills from vessels and vehicle collision risk. The same likelihood, mitigation and residual impacts are therefore predicted and reference should be made to Sections 24.6.1 and 24.6.3 for the details of these impacts.

24.9 Potential Variances in Environmental Impacts

24.37 The assessment has identified all potential accidental events associated with the installation, construction, operation, maintenance and decommissioning of the Project. Although project design is ongoing and contractors still to be appointed (e.g. vessels, onshore construction) and therefore details of oil/fluid inventories etc may vary to those quoted here, any variances are not expected to significantly influence the impact predictions made in this assessment.

24.10 Cumulative Impacts

24.38 MeyGen has in consultation with Marine Scotland and The Highland Council identified a list of other projects (MeyGen, 2011) which together with the Project may result in potential cumulative impacts. The list of these projects including details of their status at the time of the EIA and a map showing their location is provided in Section 8; Table 8.3 and Figure 8.1 respectively.

24.39 Having considered the information presently available in the public domain on the projects for which there is a potential for cumulative impacts, Table 24.8 below indicates those with the potential to result in cumulative impacts from an Accidental Events perspective. The consideration of which projects could result in potential cumulative impacts is based on the results of the Project specific impact assessment together with the expert judgement of the specialist consultant.

Project title	Potential for cumulative impact	Project title	Potential for cumulative impact	Project title	Potential for cumulative impact
MeyGen Limited, MeyGen Tidal Energy Project, Phase 2	✓	SHETL, HVDC cable (onshore to an existing substation near Keith in Moray)	✗	OPL, Ocean Power Technologies (OPT) wave power ocean trial	✗
ScottishPower Renewables UK Limited, Ness of Duncansby Tidal Energy Project	✓	Brough Head Wave Farm Limited, Brough Head Wave Energy Project	✗	MORL, Moray Offshore Renewables Ltd (MORL) offshore windfarm	✗
Pelamis Wave Power, Farr Point Wave Energy Project	✗	SSE Renewables Developments (UK) Limited, Costa Head Wave Energy Project	✗	SSE and Talisman, Beatrice offshore Windfarm Demonstrator Project	✗
Sea Generation (Brough Ness) Limited, Brough Ness Tidal Energy Project	✓	EON Climate & Renewables UK Developments Limited, West Orkney North Wave Energy Project	✗	BOWL, Beatrice Offshore Windfarm Ltd (BOWL) offshore windfarm	✗
Cantick Head Tidal Development Limited, Cantick Head Tidal Energy Project	✓	EON Climate & Renewables UK Developments Limited, West Orkney South Wave Energy Project	✗	Northern Isles Salmon, Chalmers Hope salmon cage site	✗
SSE, Caithness HVDC Connection - Converter station	✗	ScottishPower Renewables UK Limited, Marwick Head Wave Energy Project	✗	Northern Isles Salmon, Pegal Bay salmon cage site	✗
SSE, Caithness HVDC Connection - Cable	✗	SSE Renewables Developments (UK) Limited, Westray South Tidal Energy Project	✗	Northern Isles Salmon, Lyrawa salmon cage site	✗
RWE npower renewables, Stroupster Windfarm	✗	EMEC, Wave Energy test site (Billia Croo, Orkney)	✗	Scottish Sea Farms, Bring Head salmon cage site	✗
SSE, Gills Bay 132 kV / 33 k V Substation Phase 1: substation and overhead cables (AC)	✓	EMEC, Tidal energy test site (Fall of Warness, Orkney)	✗	Northern Isles Salmon, Cava South salmon cage site	✗
SSE, Gills Bay 132 kV / 33 k V Substation Phase 2: HVDC converter station and new DC buried cable	✓	EMEC, Intermediate wave energy test site (St Mary's Bay, Orkney)	✗	Scottish Sea Farms, Toyness salmon cage site	✗
SHETL, HVDC cable (offshore Moray Firth)	✗	EMEC, Intermediate tidal energy test site (Head of Holland, Orkney)	✗	Northern Isles Salmon, West Fara salmon cage site	✗

Table 24.8: Summary of projects with potential cumulative impacts

24.40 Given the nature of an accidental event i.e. non routine, the likelihood for cumulative impacts caused by accidental events (i.e. an accidental event occurring in the same time period as one or more projects and this Project) is considered to be extremely remote. However, given that operations may be ongoing simultaneously there will be a slight increase in the risk of some events occurring (e.g. oil spills). Other projects will also have management and mitigation in place to reduce the likelihood of an accidental event and have emergency plans which will be activated to ensure impacts are minimised.

24.11 Proposed Monitoring

24.41 None is required as part of routine operation of the Project, however in the unlikely event of a pollution incident, appropriate post incident monitoring will be implemented as required and agreed with the regulator and their advisors.

24.12 Summary and Conclusions

24.42 An assessment has been carried out into the potential accidental and non routine events that may occur as a result of the Project. The assessment covered all stages of the Project from installation and construction through to operations and maintenance and finally decommissioning. The worst case scenarios were considered for all potential impacts. The events covered in this section were:

- Oil spills from vessels;
- Fluid leaks from turbine support structure installation;
- Vehicle collision;
- Leaks from the turbines; and
- Fire risk at the PCC.

24.43 A number of mitigation measures and management plans have been put in place to minimise the potential for these impacts to occur and in the event they do occur, measures to minimise impacts.

24.13 References

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