Azeri Central East Project

Environmental and Social Impact Assessment

Non-Technical Summary

January 2019

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Non-Technical Summary

This Non-Technical Summary presents a concise overview of the Environmental and Social Impact Assessment (ESIA) prepared for the proposed Azeri Central East (ACE) Project located in the Azeri Chirag Gunashli (ACG) Contract Area. It is intended to provide a summary of the project design and activities, the issues considered in the ESIA and of the main conclusions with respect to the potential environmental and social impacts and their mitigation. Detailed technical descriptions of modelling studies, proposed mitigation and monitoring activities are presented in the main sections of the ESIA.

A.1 Introduction

The ACG Contract Area, which covers an area of approximately 432 square kilometres (km^2), is located approximately 120 kilometres (km) east of Baku (refer to Figure N.1). The development of the Contract Area has been pursued in phases which, to date, has included:

- Early Oil Project (EOP);
- ACG Phase 1;
- ACG Phase 2;
- ACG Phase 3; and
- Chirag Oil Project (COP).

Operations at the ACG field started in November 1997 with the start-up of production from the Chirag-1 platform (EOP). The Central, West and East Azeri facilities (including the EA, WA and CA compression and water injection (CA-CWP) and production drilling and quarters (CA-PDQ) platforms) were developed under Phases 1 and 2, and Deepwater Gunashli (DWG) portion was developed under Phase 3. The Chirag Oil Project (COP) was developed in 2014, with the installation of West Chirag PDQ platform (denoted WC-PDQ).

The ACE Project represents the next stage of development in the ACG Contract Area. Figure N.1 shows the location of the existing ACG and Shah Deniz (SD) facilities and the proposed ACE Project offshore facilities within the ACG Contract Area in addition to the subsea pipeline network, connecting the facilities to the onshore processing facilities at Sangachal Terminal.

A.2 Project Overview

The ACE Project represents the next stage of development in the ACG Contract Area. The ACE-PDQ platform will be located mid-way between the CA and EA platforms in a water depth of approximately 137 metres (m). Infield pipelines will be installed for the transfer of produced oil and gas from the ACE-PDQ platform to the existing ACG Phase 2 oil and gas export pipeline. In addition, there will be a water injection pipeline installed between the EA-PDQ and ACE-PDQ platforms to supply injection water from the CA-CWP platform to the ACE-PDQ. A combined power (to supply back up power) and telecommunications subsea cable will also be installed on the seabed from EA-PDQ to ACE-PDQ.

Figure N.1 shows the location of the proposed offshore ACE facilities and the routing of the infield pipelines between the ACE-PDQ and CA and EA platforms. The locations of the potential onshore construction yards where the platform topside and jacket will be constructed are also shown. The candidates include the Baku Deep Water Jacket Factory (BDJF) and Bayil (formerly known as the Amec-Tekfen-Azfen (ATA) yard) yards which were used for previous ACG development phases.

The key subsea and offshore elements of the ACE Project Base Case are shown in Figure N.2, which indicates the production fluids from the wells are received on the ACE-PDQ platform where they are separated into two primary streams: oil (comingled with produced water) and gas. The separated oil is transferred from the ACE-PDQ platform via a new 30” infield pipeline to a tie-in with the existing ACG Phase 2 30” oil export pipeline near the CA platform. The ACE produced oil is then sent to the Sangachal Terminal with other ACG produced oil where it is processed to meet export specifications. A portion of the separated gas will be used as fuel gas on the ACE-PDQ platform. Gas will also be used as lift gas to maximise well productivity and sent to dedicated ACE gas injection wells to improve resource recovery. Excess gas not required for gas lift, gas injection or fuel gas on ACE will be exported to CA via the new ACE 18” infield gas pipeline to the existing ACG Phase 2 22” gas export pipeline.

Figure N.1 Location of ACG Contract Area, Existing ACG and SD Offshore Facilities and Planned ACE Project Facilities

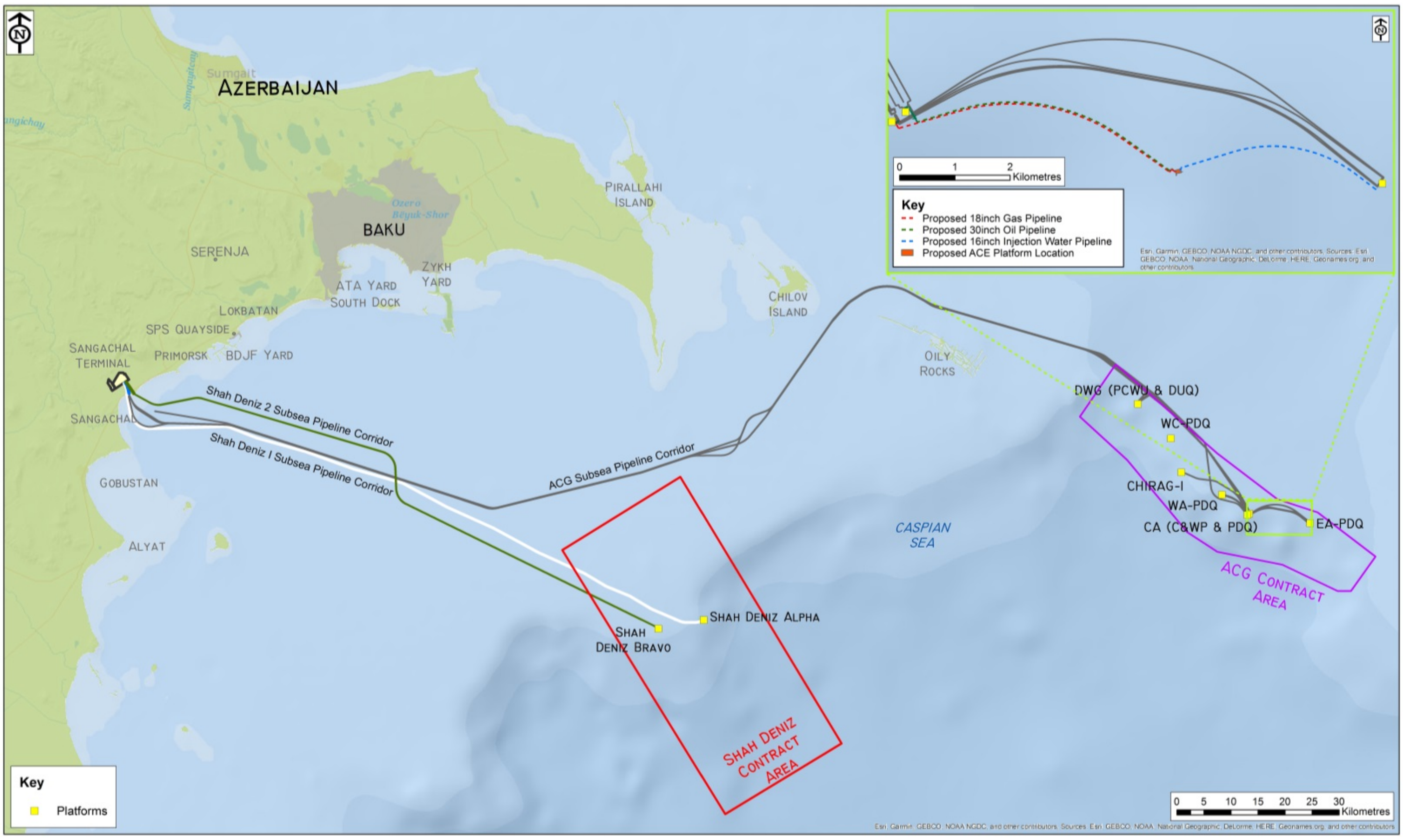
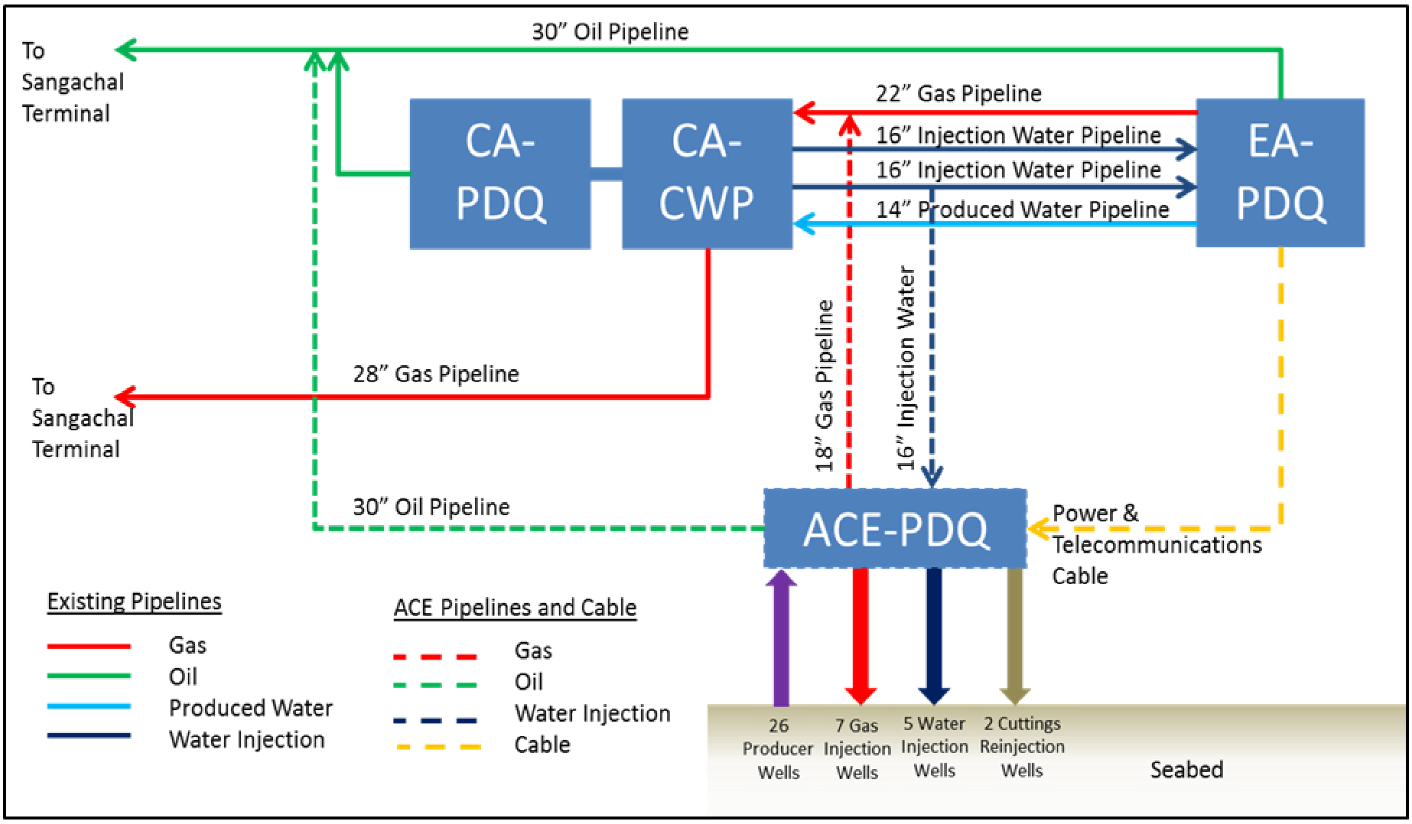


Figure N.2 Overview of Azeri Central East Project

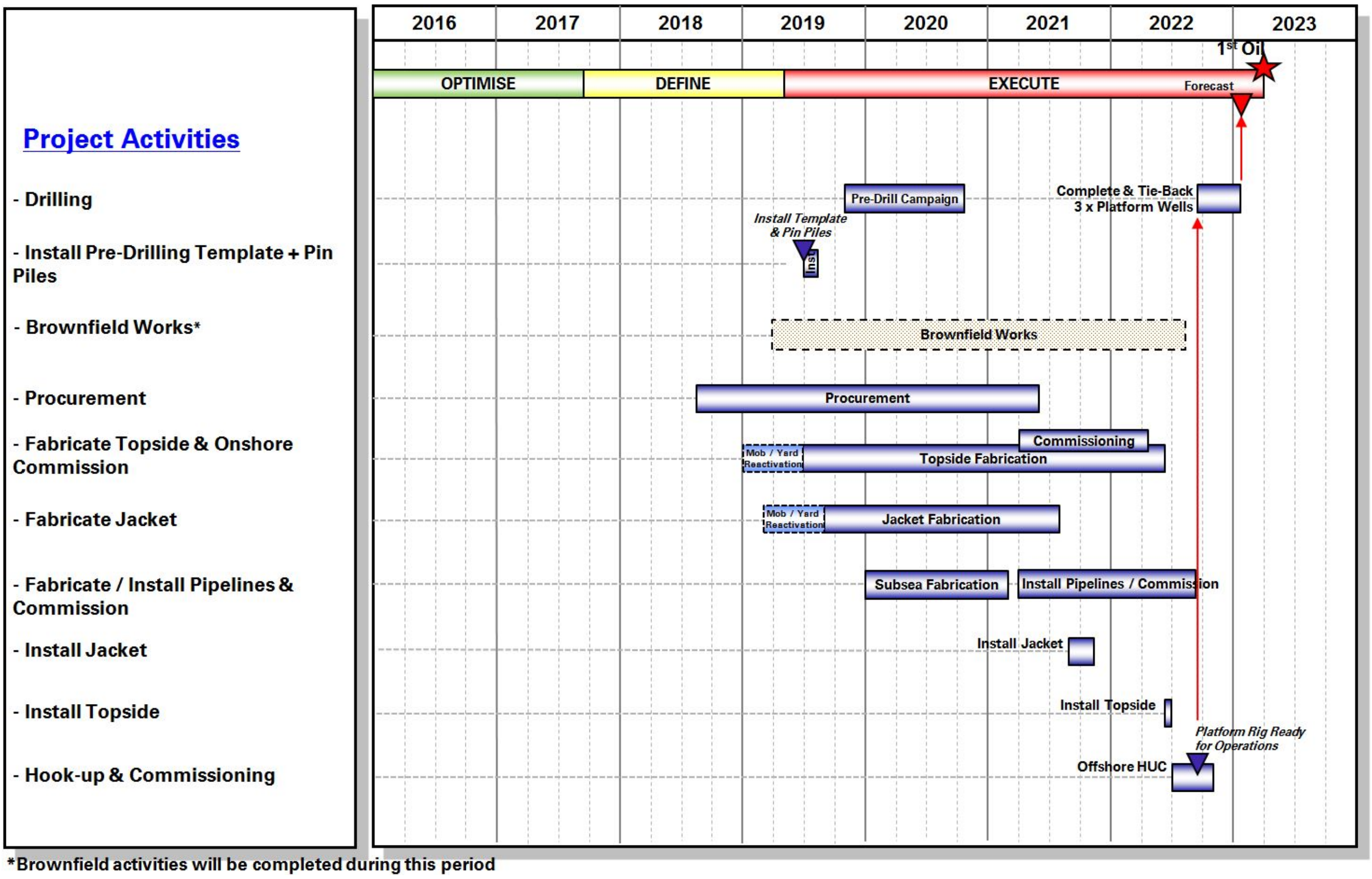


The ACE Project offshore facilities have been designed to process:

- Up to 100 thousand barrels per day (Mbpd) oil (commingled with produced water); and
- Up to 350 million standard cubic feet per day (MMscfd) gas.

Figure N.3 shows the anticipated schedule for the predrilling, construction, installation and commissioning, and operations phase activities. As the figure indicates, the majority of the onshore construction and commissioning activities at the construction yards are expected to occur between mid 2019 and mid 2022 based on the current schedule. It is anticipated that first oil will be achieved in 2023 following completion of installation, tie-back of the predrill wells and start up activities.

Figure N.3 Estimated ACE Project Schedule to First Oil



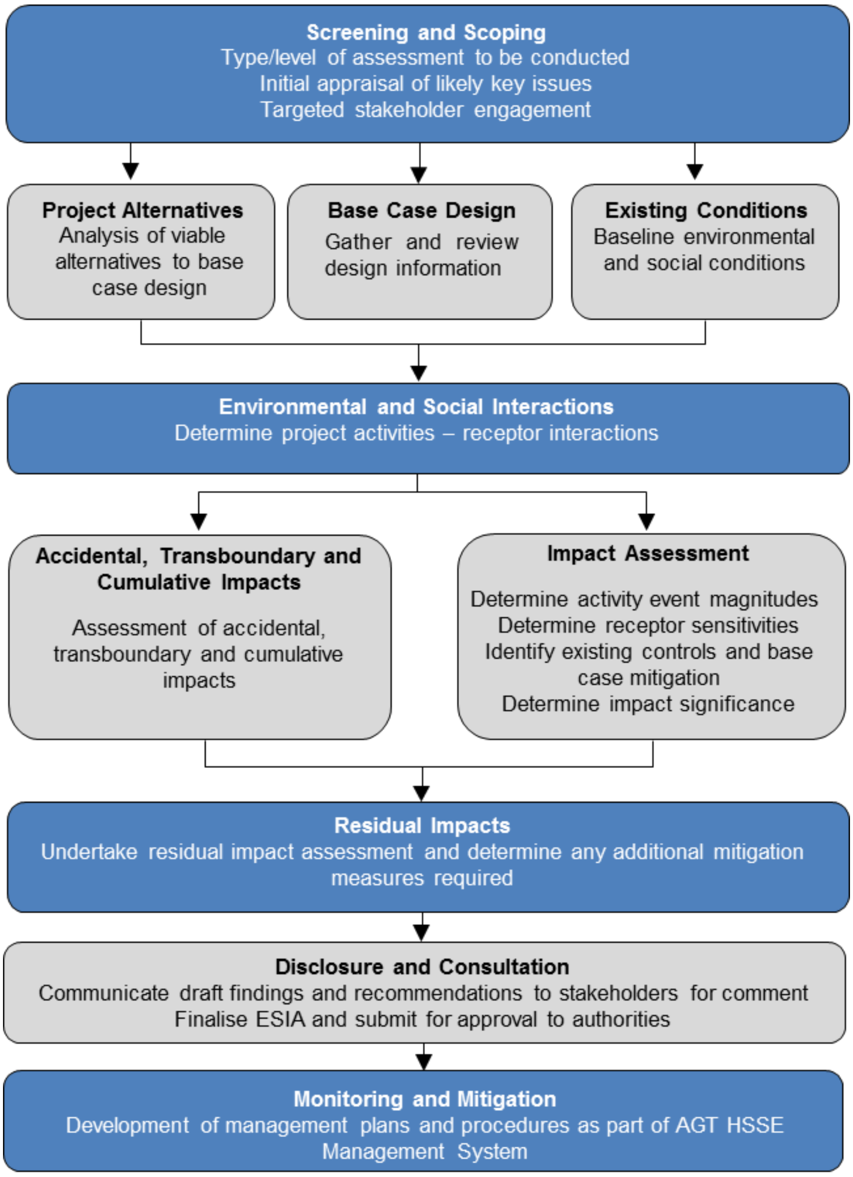
*Brownfield activities will be completed during this period

The environmental and social impacts associated with each project phase were assessed in accordance with the ESIA methodology presented below. The volumes of emissions, discharges and waste associated with each phase were also estimated.

A.3 Assessment Methodology

The ESIA has been conducted in accordance with the legal requirements of Azerbaijan as well as BP Azerbaijan's Health, Safety, Security and Environment (HSSE) Policy. The ESIA process (illustrated in Figure N.4) constitutes a systematic approach to the evaluation of a project and its associated activities throughout the project lifecycle. The overall aim of the ESIA process is to identify, reduce and effectively manage potential negative environmental and social impacts arising from the ACE Project activities.

Figure N.4 The ESIA Process



Assessment of ACE Project environmental impacts have been undertaken based on identified ACE Project activities and events for each phase that have the potential to interact with the environment. The expected significance of the impact has been assessed taking into account:

- **Event Magnitude**: Determined based on the following parameters:
    - ***Extent*** – the size of the area that is affected by the activity being undertaken;
    - ***Duration*** – the length of time that the activity occurs;
    - ***Frequency*** – how often the activity occurs; and
    - ***Intensity of the impact*** - concentration of an emission or discharge with respect to standards of acceptability that include applicable legislation and international guidance, its toxicity or potential for bioaccumulation, and its likely persistence in the environment.
- **Receptor Sensitivity**: Determined based on:
    - ***Presence*** – whether species/people are regularly present/transient, and whether species present are unique, threatened or protected; and
    - ***Resilience*** – how vulnerable people/species are to the change or disturbance associated with the environmental interaction with reference to existing baseline conditions and trends (e.g. trends in ecological abundance/diversity/status, ambient air quality etc.).

The ACE Project impact assessment process has benefited from the fact that offshore ACG and SD Contract Area discharges and emissions have been comprehensively studied and characterised during the operational phases of the existing ACG and SD facilities. As a result, impacts have been evaluated and understood to a far greater extent than is typically possible.

The evaluation of impacts has been based on three principal sources of information:

- Previous environmental risk assessments, including results of toxicity tests and modelling studies which are applicable to the ACE Project;
- Modelling studies, including discharge and spill modelling, onshore and offshore air dispersion modelling, underwater sound modelling and onshore noise assessments, undertaken specifically for the ACE Project; and
- Results from the BP Azerbaijan Georgia and Turkey (AGT) Region Environmental Monitoring Programme (EMP), which included systematic and regular offshore monitoring at all new and operational platforms and which regularly carried out ‘regional’ monitoring to identify and quantify natural environmental trends, and with onshore surveys including ecological and air quality monitoring in and around Sangachal Terminal.

The EMP has provided a clearer picture of the composition and sensitivity of benthic biological communities in both the ACG and SD Contract Areas and of the effect of platform and pipeline installation, drilling activities and platform operations on these receptors. With ACG Phases 1, 2 and 3, COP and SD1 now in operation, the EMP demonstrates that the control measures (design and operation) included in previous ESIAs have adequately mitigated impacts on the marine environment.

A.4 Policy, Regulatory and Administrative Framework

The assessment has also included examination of how agreements, legislation, standards and guidelines apply to the project.

The detailed legal regime for the joint development and production sharing of the ACG field is set out within the Production Sharing Agreement (PSA) signed by BP and the Contractor Parties and the State Oil Company of the Azerbaijan Republic (SOCAR) in June 1994, and passed into Azerbaijan law in December 1994. An amended and restated PSA effective until the end of 2049 was enacted into Azerbaijan law in 2017.

The PSA states that the *“Contractor shall conduct the Petroleum Operations in a diligent, safe and efficient manner in accordance with Good International Petroleum Industry Practice...”* and requires the Contractor to *“comply with present and future Azerbaijani laws or regulations of general applicability with respect to public health, safety and protection and restoration of the environment to the extent that such laws and regulations are no more stringent than the then current Good International Petroleum Industry Practice…”.*

The ACE Project also takes account of a wide range of international and regional environmental conventions and commits to comply with the intent of current national legal requirements where those requirements are consistent with the provisions of the PSA, and do not contradict, or are otherwise incompatible with, international petroleum industry standards and practice. The ACE Project will also adhere to the framework of environmental and social standards within the ESIA approved by the Ministry of Ecology and Natural Resources (MENR). The PSA also makes reference to international petroleum industry standards and practices with which the Project will comply.

A.5 Options Assessed

The key options assessed during the ACE Project design development have focused on:

- Concept selection and definition;
- The selection of a suitable location within the ACG Contract Area to site the offshore facilities;
- Platform design and the extent of integration with existing ACG offshore facilities; and
- Efficiency and performance improvements offered by technology alternatives.

The environmental evaluation of project options was undertaken alongside technical and economic evaluation and consultation with stakeholders including SOCAR and PSA Contractor Parties. The concept selection was primarily informed by drilling conditions, seabed depths and reservoir characteristics.

The option of not developing the ACE Project has also been considered. The decision to not proceed would result in a reduction of potential revenues to the Azerbaijan government with a resultant inability to deliver the associated benefits to the Azerbaijan economy. Pursuing the ACE Project will result in employment creation for national citizens during the design, construction and operational phase of the development, as well as increased use of local facilities, infrastructure and suppliers. The option of not proceeding was therefore disregarded when considered against these socio-economic benefits.

A.6 Environmental Impact Assessment

The environmental assessment draws on a wide range of surveys principally from 1995-2004, and the survey data collected from the EMP from 2004 to date, in which survey work was overseen by stakeholder representatives including SOCAR, ministerial bodies and the Azerbaijan National Academy of Sciences. An Environmental Baseline Survey of the proposed ACE platform location was carried out in 2017.

Environmental impact was assessed for each of the three main phases of the ACE Project:

- **Predrill:** The Project has adopted the established ACG practice of using a Mobile Offshore Drilling Unit (MODU) to predrill a number of producer and water injection wells and a cuttings reinjection well prior to ACE-PDQ platform installation to accelerate early production once the platform is in place;
- **Construction, installation, hook up and commissioning:** Includes all onshore construction and commissioning activities at the construction yards, offshore pipelay and pipeline commissioning and connection to the platform and existing ACG export pipeline network; and
- **Operations:** Platform production drilling and onshore hydrocarbon processing using the existing Sangachal Terminal facilities.

A.6.1 Predrill Activities

Table N.1 presents the residual impacts of the environmental assessment for the predrill phase of the ACE Project. As the table shows, the impacts of all aspects of the predrill phase were predicted to be of minor negative significance, with adequate control, monitoring and mitigation measures in place.

Table N.1 Summary of Residual Environmental Impacts for ACE Predrill Activities

	Event/Activity	Magnitude				Sensitivity		Overall Score		
		Extent/ Scale	Frequency	Duration	Intensity	Human	Ecological	Event Magnitude	Receptor Sensitivity	Impact Significance
Atmosphere	MODU Power Generation	1	3	3	1	2	2	Medium	Low	Minor Negative
	Support Vessel Engines	1	3	3	1	2	2	Medium	Low	Minor Negative
Marine Environment	Underwater Sound (MODU Drilling)	1	1	3	1	-	2	Medium	Low	Minor Negative
	Underwater Sound (Support Vessels)	1	1	3	1	-	2	Medium	Low	Minor Negative
	Drilling Discharges to Sea	1	2	2	1	-	2	Medium	Low	Minor Negative
	Cement Discharges to Seabed	1	3	1	2	-	2	Medium	Low	Minor Negative
	Cement Unit Wash Out Discharges	1	2	1	2	-	2	Medium	Low	Minor Negative
	BOP Testing	1	3	1	1	-	2	Medium	Low	Minor Negative
	MODU Cooling Water Discharges to Sea	1	1	3	1	-	2	Medium	Low	Minor Negative
	MODU and Vessels Ballast Water Discharge	1	2	1	1	-	2	Medium	Low	Minor Negative
	MODU and Vessels Treated Black Water Discharge	1	1	3	1	-	2	Medium	Low	Minor Negative
	MODU and Vessels Grey Water Discharge	1	1	3	1	-	2	Medium	Low	Minor Negative
	MODU and Vessels Drainage Discharges	1	1	3	1	-	2	Medium	Low	Minor Negative

Emissions associated with MODU power generation, and support vessel activity will all occur offshore and disperse into the atmosphere. Modelling has been undertaken to determine the increase in the concentrations of key pollutants due to the MODU activities at receptor locations (i.e. onshore). Based on existing onshore air quality which meets the applicable EU air quality limit values (with the exception of particulate matter[1]), receptor sensitivity was considered to be low. The modelling indicated that the activities would be unlikely to result in a discernible increase in emissions onshore. As such the impact of atmospheric emissions due to MODU and support vessel activities to onshore communities was considered to be of minor negative significance.

Underwater sound associated with the drilling and support vessel activities was assessed and modelling was undertaken to estimate the distances at which various impacts on the marine species known to be present in Caspian Sea may occur. The results showed that for drilling activities, seals and fish would only suffer potential hearing injury from underwater sound at very short distances (<2m) from the drilling location. Vessel noise is expected to cause potential hearing injury to seals within 505m of the vessel and recoverable injury up to 10.9km from the vessel. However, these distances do not account for movement of either the vessels or the seals. It is considered that when exposed to vessel noise there is a low risk of mortality for fish of all hearing abilities and a moderate risk of recoverable injury in hearing generalist fish at short distances. The local underwater sound environment is known to be dominated by existing commercial and oil industry shipping noise and there would be a minimal relative increase to existing levels of disturbance on seals and fish species from vessel movements. Although there may be some behavioural disturbance, it has been shown that Caspian seals utilise a wide area of the Caspian Sea year round, and would be largely habituated to vessel noise and can easily move if necessary. Based on the predicted event magnitude, receptor

[1]The semi-arid environment gives rise to dust which naturally increases the concentration of particulate matter in the atmosphere, leading to concentrations that are naturally higher than EU limit values.

characteristics and observed sensitivities the impact was assessed as being of minor negative significance.

During predrilling, the largest discharges to the marine environment by volume are drilling discharges; specifically the discharge of drill cuttings and water based drilling mud, and the discharge of cooling water from the mobile drilling rig cooling water system. Modelling has shown that such discharges, which are required to meet applicable standards prior to discharge, have a very limited ecological impact to marine receptors. Based on the predicted event magnitude, receptor characteristics and observed sensitivities the impact significance was assessed as minor negative. Cooling water modelling similarly indicated impacts would be very limited in scale (a few metres) and an impact upon biological receptors in the water column (i.e. zooplankton, phytoplankton, seals and fish) would be of no more than minor negative significance.

Small quantities of cement may be discharged to the seabed whilst cementing well casings into place. These will remain close to the wellhead in the same area as drill cuttings are deposited. The impact to benthic invertebrates, which were evaluated as having a low sensitivity to cement discharges, was therefore assessed as being of minor negative significance. The discharge of residual diluted cement at the end of well casing cementing activities was also assessed and found to be of minor adverse significance.

Modelling discharges from hydraulic fluids associated with the routine testing of the blowout preventer (BOP) to be used on the wells during predrilling showed a maximum extent of the dilution plume during summer is approximately 28m long, 6m wide and the plume will completely disperse in the water column to the no effect concentration within 15 minutes. The impact to benthic invertebrates and seals, fish and plankton, which were evaluated as having a low sensitivity to BOP fluid discharges, was therefore assessed as being of minor negative significance.

The remaining discharges to sea (ballast water, black water, grey water and deck drainage) are all small in volume (relative to drilling and cooling water discharges) and do not contain components of high environmental concern. These discharges, which are monitored in accordance with existing procedures to ensure applicable project standards are met, will be rapidly diluted and are all assessed as having a minor impact upon biological receptors in the water column.

For all predrill phase environmental impacts assessed it has been concluded that impacts are minimised as far as practicable and necessary through the implementation of the existing control measures and no additional mitigation is required.

A.6.2 Construction, Installation and Hook-Up and Commissioning Activities

Table N.2 presents the residual impacts of the environmental assessment for the Construction, Installation and Hook-Up and Commissioning (HUC) phase of the ACE Project, which includes:

- Onshore Construction and Commissioning of Offshore Facilities;
- Infield Pipeline Installation, Tie-in and Commissioning; and
- Platform Installation, HUC.

Table N.2 Summary of Residual Environmental Impacts for ACE Construction, Installation and HUC Activities

	Event/ Activity	Magnitude				Sensitivity		Overall Score		
		Extent/ Scale	Frequency	Duration	Intensity	Human	Ecological	Event Magnitude	Receptor Sensitivity	Impact Significance
Atmosphere	Construction Yard Plant and Vehicles	1	1	3	1	2	-	Medium	Low	Minor Negative
	Onshore Commissioning of Main Platform Generator and Topside Utilities	1	3	2	1	2	-	Medium	Low	Minor Negative
	Vessel Engines	1	1	3	1	2	-	Medium	Low	Minor Negative
Terrestrial Environment (Noise)	Construction Yard Plant and Vehicles	1	1	3	1	2	-	Medium	Low	Minor Negative
	Onshore Commissioning of Main Platform Generators and Topside Utilities	3	2	1	1	2	-	Medium	Low	Minor Negative
Marine Environment	Construction Yard Cooling Water Discharge	1	1	3	1	-	2	Medium	Low	Minor Negative
	Pipeline Cleaning and Pre-commissioning Discharges (Treated seawater)	3	2	1	1	-	2	Medium	Low	Minor Negative
	Pipeline cleaning and Pre-commissioning Discharges (MEG)	1	1	1	1	-	2	Low	Low	Negligible
	Subsea Infrastructure and Spool Tie-in Discharges (Treated seawater)	1	2	1	1	-	2	Medium	Low	Minor Negative
	Other Discharges to Sea: Ballast Water (Vessels)	1	2	1	1	-	2	Medium	Low	Minor Negative
	Other Discharges to Sea: Treated Black Water (Vessels)	1	1	3	1	-	2	Medium	Low	Minor Negative
	Other Discharges to Sea: Grey Water (Vessels)	1	1	3	1	-	2	Medium	Low	Minor Negative
	Other Discharges to Sea: Drainage (Vessels)	1	1	3	1	-	2	Medium	Low	Minor Negative
	Jacket pin and skirt piling (underwater sound)	3	3	1	2	-	2	High	Low	Moderate Negative
	Vessel movements (underwater sound)	1	1	3	1	-	2	Medium	Low	Minor Negative

Emissions and noise associated with onshore construction and commissioning activities at the construction yards were assessed. Air quality dispersion modelling and noise modelling screening assessments demonstrated that potential impacts to nearby onshore receptors were considered to be minor and additional mitigation was not required.

During onshore commissioning of the platform generators and topside utilities at the construction yard, a temporary cooling water system will abstract and discharge water at the quayside. The thermal impact of the discharge was modelled, and indicated that the discharged water (at a worst-case temperature of 50ºC) would not exceed ambient temperature by more than 3ºC at a distance beyond 4m from the point of discharge. Thermal impact is therefore considered minimal, with no need for further mitigation. The cooling water will be treated to inhibit marine fouling and will be neutralised prior to discharge. The discharge will contain no harmful persistent materials.

Following installation of the pipelines, they will be filled with seawater containing preservation chemicals (to prevent corrosion and biological growth). The pipelines will be tied-in and additional testing will be undertaken also using treated seawater. Discharges to sea of treated seawater associated with these activities are anticipated to vary in volume between 2 and 2545 cubic metres (m^3). Aquatic toxicity tests have been carried out on the preservation chemicals, and no-effect concentrations have been estimated for the treated seawater. Dispersion modelling has been conducted for a representative range of discharges, in order to estimate the point at which the discharges will be diluted to the no-effect concentration. Many of the smaller (hydrotest and leak test) discharges are predicted to be diluted almost immediately to a no-effect concentration. Modelling of the largest discharges (associated with the cleaning and gauging and dewatering of the existing 22” gas export pipeline between the EA and CA platforms) predicted a narrow plume of 4.3 to 10.1km long. In no instance did the modelling predict a plume that reached the seabed or the sea surface. The volumes of water occupied by the discharge plumes are small relative to the receiving environment, and the discharge durations are short.

Mono ethylene glycol (MEG) is planned to be used to dehydrate and condition the new infield gas pipeline. While the base case is to recover all the MEG used, it is possible that up to three discharges of up to 10 m^3 of MEG may be discharged to sea. Modelling has indicated the impact would be limited to a very small area within the immediate vicinity of the release. Additionally, approximately 40 discharges of treated seawater associated with the tie-in of spools and subsea structures, varying between 1 to 16m^3, are anticipated. Modelling of these discharge events has confirmed the discharge plumes will rapidly disperse in the water column in the vicinity of the discharge location. The preservation chemicals are non-persistent, and it is considered that there will be no cumulative effects from successive events.

Aqueous discharges from installation vessels (ballast water, grey water, treated black water and drainage) will also be similar in magnitude and impact to those for the predrill programme and were assessed as having a minor impact upon biological receptors.

Propagation of underwater sound from installation of the jacket pin and skirt piles was calculated to estimate distances at which various impacts on marine species may occur. For piling, the modelling results show that seals may experience permanent hearing damage 2.3km from the piling while temporary hearing damage may arise up to 23.5km if exposed to the noise for an hour or more. For fish exposed to piling sound, mortality could occur up to 80m from the piling location whilst the recoverable injury zone extends to 148m from the centre of piling if exposed to the sound for an hour or more. For the pipelay barge, the modelling predicts permanent hearing injury may arise in seals at distances up to 2km from the vessel over an exposure duration of 1 hour while temporary injury could occur at distances up to 43km for the same exposure period. However, these distances do not account for the movement of either vessel or seal. The Caspian seal is a highly intelligent and mobile animal. The seals are habituated to vessel noise associated with routine commercial traffic and vessels associated with the oil and gas industry, and will take action to avoid the associated sound from this activity. Similarly, the use of an Acoustic Deterrent Device (ADD) (specifically set for the hearing range of pinniped seals) during piling activities will alert any seals present to the activity, allowing them to leave the area as soon as they detect the sound source. Risk of injury to individuals and detectable effects on the seal population as a whole is therefore considered very unlikely. Further, it is expected any individual fish in the vicinity will move away as soon as they detect the sound source and there is very low injury risk to individual fish and to fish populations.

Overall, the majority of the residual impacts were assessed as minor or negligible. The only moderate impact was underwater sound generated from piling activities. It is considered that impacts are minimised as far as practicable and necessary through the implementation of the existing control measures.

A.6.3 Operational Activities

Table N.3 presents the residual impacts of the environmental impact assessment for the Operations phase associated with the ACE Project.

Table N.3 Summary of Residual Environmental Impacts for ACE Operations Phase

	Event/ Activity	Magnitude				Sensitivity		Overall Score		
		Extent/ Scale	Frequency	Duration	Intensity	Human	Ecological	Event Magnitude	Receptor Sensitivity	Impact Significance
Atmosphere	Operation of offshore combustion sources under routine operations	1	1	3	1	2	2	Medium	Low	Minor Negative
	Operation of offshore combustion sources under non routine operations (maintenance)	1	2	1	1					
	Operation of offshore combustion sources under emergency depressurisation conditions	1	1	1	1			Low	Low	Negligible
Marine Environment	Underwater Sound (Hydraulic Hammering)	3	2	1	2	-	2	Medium	Low	Minor Negative
	Underwater Sound (Platform Drilling)	1	1	3	1					
	Underwater Sound (Vessels)	1	1	3	1					
	Drilling Discharges to Sea	1	2	2	1	-	2	Medium	Low	Minor Negative
	Cement Wash Out Discharges	1	2	1	1	-	2	Medium	Low	Minor Negative
	Cooling Water System Intake and Discharge	1	1	3	1	-	2	Medium	Low	Minor Negative
	Offshore Operation: Other Discharges to Sea: Treated Black Water	1	1	3	1	-	2	Medium	Low	Minor Negative
	Offshore Operation: Other Discharges to Sea: Grey Water	1	1	3	1	-	2			
	Offshore Operation: Other Discharges to Sea: Drainage	1	1	3	1	-	2			
	Offshore Operation: Other Discharges to Sea: Galley Waste	1	1	3	1	-	2			
	Offshore Operation: Other Discharges to Sea: Freshwater Maker Saline Effluent	1	1	3	1	-	2			
	Injection Water Pipeline Pigging Discharges	2	2	1	2	-	2	Medium	Low	Minor Negative

The impact of emissions to atmosphere from routine and non routine offshore operations was assessed using dispersion modelling. Sources included the offshore platform generators during routine operations and the flare during non routine events or emergency depressurisation. For all scenarios assessed, a minor impact to onshore receptors was predicted.

Propagation modelling of underwater sound generated during driving of the 30” conductor into the seabed using a hydraulic hammer was undertaken to estimate distances at which various impacts on marine species may occur. The sound generated during installation of the 30” conductor section using a hydraulic hammer will be similar in nature to the piling noise generated during the installation of the jacket pin and skirt piles activities described in Section N.6.2 above. However, in the case of the conductor installation the hydraulic hammer will be located on the platform topside meaning the sound will be mainly emitted above water, with low transmission into the water from air, however some sound will be emitted directly into the water. For the purposes of this ESIA, it is conservatively assumed the sound level within the water column from conductor hammering is similar to the levels associated with the installation of the jacket pin and skirt piles described in Section N.6.2 above. Similarly, the sound levels generated and the potential impacts from platform drilling and vessel movements during offshore operations will be similar to the results presented for predrilling in Section N.6.1 above. Overall, the risk of injury to individuals and detectable effects on the seal population and fish as a whole is considered very unlikely and impacts are assessed as being of no more than minor negative significance.

Modelling of the platform drilling discharges was undertaken to confirm the extent and scale of water based mud and cuttings predicted to be deposited on the seabed during ACE platform drilling. The modelling has shown that such discharges have a very limited ecological impact on marine receptors. Based on the predicted event magnitude, receptor characteristics and observed sensitivities and monitoring of impacts on benthic communities at existing ACG and SD drill sites, the impact was assessed as being of minor negative significance.

Cementing discharges will occur from wash out activities where cement remaining in the platform cement system will be slurrified with seawater, and will be discharged from the platform via the cuttings caisson. Modelling of the cement washout discharges predict that the discharge plume will dilute rapidly and a very small amount of the cement solids would be deposited on the seabed under worst case conditions. Therefore, the impact to benthic invertebrates and seals, fish and plankton, which were evaluated as having a low sensitivity to cement discharges, was assessed as being of minor negative significance.

The effects of the cooling water intake and discharge on the water column associated with the ACE-PDQ platform were assessed. Based on earlier modelling work for a similar intake it was determined that effects on water velocities in the vicinity of the intake will be such that fish are able to detect and avoid the intake. The ACE platform cooling water discharge was modelled to determine the extent of the thermal plume. The distance from the discharge point to where the water temperature is estimated to be 3°C above ambient temperature is predicted to be within 12m during summer conditions and 3m in winter conditions. Thus it is concluded that the discharge will have a very small zone of influence (i.e., where the temperature of the discharge is greater than the ambient water temperature). Impacts upon biological receptors in the water column (i.e. zooplankton, phytoplankton, seals and fish) were assessed as being of minor negative significance.

The remaining discharges to sea from offshore operations (treated black water, grey water, galley waste, drainage and saline effluent) are all small in volume (relative to cooling water discharges) and do not contain components of high environmental concern. These discharges, which are monitored in accordance with existing procedures to ensure applicable project standards are met, will be rapidly diluted and are all assessed as having an impact of minor adverse significance upon biological receptors in the water column.

Pigging of the 16” infield injection water pipeline will be carried out from the CA-PDQ platform to the ACE-PDQ platform as required to maintain pipeline integrity. The water injection pipeline will be flushed with seawater prior to pigging. It is estimated up to 950m^3 of water (primarily seawater with some injection water from CA) will be discharged every three months during operations comingled with the ACE seawater returns (up to 3,410m^3/hr). Recent modelling for a similar discharge at the CA platform comprising 100% injection water, and hence not taking into account the dilution afforded by the seawater returns, estimated that the relevant no effect concentration (derived from the most conservative ecotoxicity test sample results obtained for produced and injection water across the ACG offshore facilities) would be reached within 9.5km of the discharge with the plume dispersing within an area of approximately 0.77km^2. The discharge of pigging water is predicted to have a minor impact to the marine environment since the discharges will be infrequent; the volumes will be small and have a low toxicity and do not require additional mitigation beyond the existing controls.

Overall, the majority of residual impacts from operations are assessed as being of minor adverse or negligible significance. All activities will be managed in accordance with previously established practice and BP Azerbaijan Georgia Turkey (AGT) Region procedures, and impacts are considered to be controlled and mitigated to an acceptable level.

A.7 Social Impact Assessment

The majority of ACE Project related activities occur offshore with the exception of the onshore construction and commissioning activities. It is currently planned to use a number of existing onshore construction yards for the ACE Project with candidate yards including the BDJF and Bayil Yard. With reference to the experience gained from previous ACG Phases 1-3, COP and SD projects, the following key social issues were assessed:

- Employment creation and subsequent demanning of the construction workforce, after peak employment has been reached;
- Training and skills development opportunities provided to the workforce;
- Procurement of goods and services by the main construction and installation contractors through internal supply chains; and
- Potential social conflict from (perceived or actual) competition between individuals seeking jobs.

The assessment concluded that the national workforce to be employed during the ACE Project construction phase is likely to peak at approximately 3,700 in 2021. Additional and new employment during the operations phase will be less in terms of new positions. Employment impacts are likely to be distributed within the local area with the majority of employees expected to be recruited from the Baku City economic region (which includes the Sabayil and Garadagh Districts). It is anticipated that employment will not require establishment of workforce accommodation or significant migration of populations to the construction areas.

Every effort will be made to re-hire workers who have demonstrated competence whilst working on previous oil and gas construction projects. Upon hiring workers, a gap analysis will be undertaken by the main construction and installation contractors between relevant competence criteria and the contractor's Training and Development Plan. Where gaps are identified training will be provided to bring each worker up to at least the minimum standards for the role expressed in the Training and Development Plan. It is expected that the employment generated by the ACE Project will result in positive impacts to individuals and their households.

As the construction phase will generate temporary employment opportunities, planning for the conclusion of construction workforce contracts will be carefully considered from the start of the ACE Project. Measures to mitigate this will include adequate staff communications between the main construction and installation contractors and their workforce which will inform the workforce of project progress and expected completion dates.

The overall social impacts of the ACE Project, particularly from employment creation throughout the construction, installation and HUC phases were assessed as positive.

A.8 Cumulative, Transboundary and Accidental Events

Potential cumulative and transboundary impacts were assessed taking into account potential for inter project impacts as well as other potentially significant projects where the associated impacts may overlap geographically or temporally with ACE Project impacts. The most significant project where this potential exists is the Shah Deniz Stage 2 (SD2) Project, which achieved first gas during 4Q 2018[2].

With regard to discharges, the majority of the ACE Project discharges are small, and are comparable to discharges associated with previous projects and existing operations. The largest discharges will either be confined to a small area of seabed (drilling discharges) or will be short in duration and have transient impact (discharge of treated seawater during pipeline cleaning and pre-commissioning). All of the discharges associated with construction, installation, HUC and operation, have been assessed, and it is concluded that there will be no cumulative or additive interactions between the impacts.

With regard to emissions to atmosphere, the most significant air quality pollutant in terms of health impacts is nitrogen oxide (NO_2). It has been demonstrated that emissions associated with the ACE Project activities alone and emissions from worst-case cumulative SD2 Project offshore activities are not expected to result in any discernible changes in NO_2 concentrations at onshore receptors.

For both onshore construction and commissioning and offshore activities, the volumes of atmospheric emissions released (including visible particulates) due to the ACE Project are expected to result in

[2] While the SD2 Project achieved first gas in Q4 2018 the effects of the SD2 Project are not captured within the existing baseline conditions against which the ACE Project impacts have been assessed. Therefore, for the purposes of the ESIA, the SD2 Project activities and impacts have been considered within the ACE ESIA cumulative assessment.

very small increases in pollutant concentrations in the atmosphere and in any washout from rainfall, which will not be discernible to biological/ecological receptors.

Based on the limited geographic scope of pollutant species, which will disperse rapidly in the atmosphere, no transboundary impacts associated with air quality and human health are predicted from the ACE Project.

Greenhouse gases (GHG) have the potential to give rise to transboundary impacts. The majority (86%) of greenhouse gases (GHG) estimated to be generated by the ACE Project are predicted to result from offshore activities during the ACE Project operations phase while onshore emissions from ACE Project operational activities will contribute approximately 5%. Activities associated with predrilling are predicted to contribute 0.6%, while onshore construction and commissioning and installation and HUC activities are estimated to contribute approximately 8.6% of the total volume of GHG emissions produced by the ACE Project. The annual contribution of ACE GHG emissions in the year 2030 to the predicted national Azerbaijan forecast GHG emissions was estimated to be approximately 0.5%.

To support the assessment of accidental events, modelling of potential hydrocarbon spill scenarios was undertaken to predict the behaviour of the spilled hydrocarbon in the water column and on the sea surface, and to estimate where and how much spilled hydrocarbon may come ashore. It must be noted that modelling has not taken into account any response mitigation measures such as dispersant application, containment or recovery, meaning that the results should only be interpreted as indication of theoretical spill consequences without implementation of the oil pollution prevention strategy. The key accidental event scenarios modelled and assessed included:

- Scenario 1: A loss of 92 cubic metres (m^3) of diesel from the platform;
- Scenario 2: A blowout of crude oil (3,195,000 barrels (bbls)) over 90 days duration; and
- Scenario 3: A rupture of the ACE 30” oil export pipeline resulting in the release of 962 tonnes of crude oil.

The 92m^3 of diesel released from the ACE platform is predicted to rapidly spread out to form a thin sheen on the sea surface. The modelling indicates that the maximum extent of sea surface covered by a diesel sheen of 0.04 micrometres (µm) or thicker from this spill would be approximately 20.1km in summer and 52.3km in winter. The majority of the volume of the released diesel is rapidly lost to the air by evaporation or naturally dispersed into the water column and then biodegraded with no diesel predicted to reach the shore. No significant ecological damage would be anticipated from a spill of this magnitude.

Based on worst case estimates, a blowout of crude oil from an ACE well could continue for an estimated 90 days, which is the time that would be required to mobilise a drilling rig and to drill a relief well. During this time, approximately 35,500 bbls of crude oil would be released per day. The majority of the oil would initially be present on the sea surface following the release, while 15% evaporates almost immediately and 5% is dispersed into the water column. The amount of evaporation stabilises at just over 30% while the amount biodegraded rises steadily to 38% by the end of the simulation. Ultimately, 32% evaporates, 38% is biodegraded, 13% remains in the water column, 15% is deposited in sediments and approximately 2% is deposited on the shoreline, with less than 1% remaining on the surface. The crude oil on the sea surface is predicted to travel around 400-500km before it drops below the lowest recognised visible thickness under ideal viewing conditions. Although the precise movement of the surface oil is dependent on the exact metocean conditions at the time, the analysis of over 100 different sets of metocean data suggest that the most likely locations to receive oil on shore are southern Azerbaijan, northern Iran and the tip of the Absheron Peninsula. The extent of oil in the water column above the 58 parts per billion (ppb) threshold tracks the path of the surface release and can extend over 200km from the source. The modelling predicts that a blowout under summer conditions could result is a worst case of 18,295 tonnes of oil reaching the coastline and that this would mainly impact three areas: southern Azerbaijan, northern Iran and the Absheron Peninsula. The eastern coastline of the Caspian Sea is unaffected. A mixture of areas of very light, light (0.1-1mm), moderate (1-10mm) and heavy (>10mm) oil deposition are predicted in these areas.

In the event of a rupture of the ACE 30” oil export pipeline midway between the ACE and CA platforms it is anticipated that approximately 962 tonnes of oil and 12 tonnes of associated gas would be released into the marine environment. Following the release, the majority of the oil would initially be present on the sea surface, while 10% evaporates almost immediately and 15% is dispersed into the water column. Oil travels through the water column and takes just under two minutes to reach the surface. After around 6 days, oil has moved into shallower waters and begins to deposit in sediments. Ultimately, 36% evaporates, 29% is biodegraded, 7.5% remains in the water column, 24% is deposited in sediments, approximately 2.5% is on the shoreline and less than 1% remains on the sea surface. Crude oil on the sea surface is predicted to travel up to 340km before it drops below the lowest recognised visible thickness under ideal viewing conditions. The thickest areas of oil (> 0.2 mm) are present within around 10-20 km of the release but are short term (lasting up to 2 days) and occupying an area of up to 2km^2. The area of water column affected is relatively small, partly because of the size of the release, the low gas content and the low energy conditions towards the end of the release. The extent of oil in the water column above the 58ppb threshold tracks the path of the surface release and can extend around 30-40km from the source. Oil deposition on the shoreline is spread out given the distance and time separating the source from the shore, and the mass of oil involved is relatively small. The summer case release results in oil mainly reaching three areas: southern Azerbaijan, northern Iran and Turkmenistan. A mixture of areas of very light and light (0.1-1mm) oil deposition is predicted in these areas.

For both the blowout and pipeline rupture scenarios species in the immediate vicinity of the spill that cannot actively avoid the oil such as plankton, benthic invertebrates, birds and seals are likely to suffer the greatest impacts. Highly mobile species such as fish are anticipated to avoid the spilled oil areas. The modelling of the blowout scenario shows that a number of Important Bird and Biodiversity (IBAs) and Key Biodiversity Areas (KBAs), and associated bird species, may be exposed to elevated hydrocarbon concentrations as a result of surface or dispersed / dissolved oil beaching on the shoreline following a blowout. Given the persistence and volume of oil predicted to beach in some IBAs and KBAs, the potential impact on these areas (and the birds present there) could have a potentially significant impact, especially if the release occurs during the bird nesting period (April to July). In the event of a blowout or pipeline rupture, the potential impacts are assumed to be significant for the areas impacted by the spill and it is anticipated that recovery would take a period of time in the medium to long term. The impact on fisheries would be reflected by the impact on fish and the presence of juvenile stages at the time of a spill as they are more susceptible to relatively low levels of oil within the water column and are less likely to be able to move away. Fish can become tainted and contaminated with hydrocarbons. If there are signs of fish oil tainting or contamination as a consequence of a hydrocarbon spill event, any resultant imposed authority restrictions on fishing activities could result in a detrimental financial impact upon local fisheries. Equally, a lack of timely restrictions, or illegal fishing, can create a risk to human health from contaminated product consumption. Therefore, the impact to the commercial fishing industry in the unlikely event of a blowout or pipeline rupture is considered to be potentially significant.

An Offshore Facilities Oil Spill Contingency Plan (OSCP) has been developed, which provides guidance and actions to be taken during a hydrocarbon spill incident associated with all ACG and SD offshore operations including MODUs, platforms, subsea pipelines and marine vessels. It is authoritative for spills that may occur during commissioning, operation, and decommissioning of the systems.

A.9 Environmental and Social Management

Each phase of the ACE Project will be subject to formal environmental and social management planning. During predrilling, construction, installation and HUC, the main contractor companies will be contractually required to develop and implement environmental and social management systems (ESMS). An Environmental and Social Management and Monitoring Plan (ESMMP) will also be prepared to manage the specific environmental and social requirements associated with the construction, HUC and start up phase activities. To support the ESMMP, environmental and social management plans will be developed to present the ACE Project environmental and social requirements by subject matter. BP will operate the ACE facilities using an Operations Phase Environmental Management System (EMS) that is aligned with the requirements of the ISO 14001 EMS and will be based on the ‘plan-do-check-act’ cycle. Prior to commencement of ACE operations, a transition plan will be developed to support the movement of ACE from the Construction Phase ESMS to the Operations Phase EMS.

BP's has implemented an Environmental Monitoring Programme (EMP) in Azerbaijan, designed to provide a consistent, long-term set of data, with the objective of developing an accurate picture of potential impacts on the surrounding environment, so that they can be managed and mitigated as effectively as possible. The EMP will be expanded for the ACE Project, to integrate operational monitoring of key discharges and emissions. The aim of regular monitoring is to establish an understanding of trends over time, taking account of the results from concurrent regional surveys and initial baseline data. Combined with operational discharge and emissions monitoring, this approach provides a robust method for assessing the impact of ACE Project operations based on actual monitoring data.

A.10 ESIA Consultation and Disclosure

Stakeholder consultation is an important element of the ESIA process, ensuring that the opinions of potentially affected people and interested parties are solicited, collated and documented. The stakeholder engagement and consultation process has:

- Made use of the consultation framework and methods established for other BP projects in Azerbaijan;
- Been developed with reference to accepted guidance on expectations of ESIA consultation and disclosure;
- Considered the extent of consultation and disclosure processes undertaken in recent years; and
- Acknowledged the requirement to engage with state bodies and academic institutions.

The scope of the ESIA was agreed with the MENR and the Monitoring and Technical Advisory Group (MTAG) at a scoping meeting held in Baku in February 2018.

The Draft Final ESIA Report and Non-Technical Summary, in English and Azerbaijani, were made available (along with feedback forms) for a period of 60 days at the following locations and via the Internet:

- BP website;
- BP Xazar Centre Office Reception, 153, Neftchilar Avenue, Baku;
- Umid Settlement, Secondary School No. 294;
- Umid Settlement, Secondary School No. 7;
- Public Library at Sangachal Settlement, Qaradag District, M. A. Sabir Street 1, Centralized Library No. 5;
- Public Library at Sahil Settlement, E. Guliyev Street, Centralized Library No. 2;
- M.F. Akhundov Public Library, 29 Khagani Street, Baku;
- Central Library of the Azerbaijan National Academy of Sciences, 31 Huseyn Javid Street, Baku;
- Library of the Azerbaijan State University of Oil and Industry, 20 Azadlig Avenue, Baku; and
- Aarhus Environmental Information Centre, MENR, 100a B. Agayev Street, Baku.

As part of the Draft Final ESIA consultation process the following meetings were held:

- MENR, Baku, 30th October 2018;
- MTAG, Baku 30th October 2018; and
- Public meeting, Baku 31st October 2018.

Comments received on the Draft ESIA were collated, analysed with responses issued where relevant. The ESIA was subsequently revised and finalised for MENR approval.

The Final Non-technical Summary and ESIA are available at:

www.bp.com/caspian