ES1 Introduction

ES1.1 Project outline

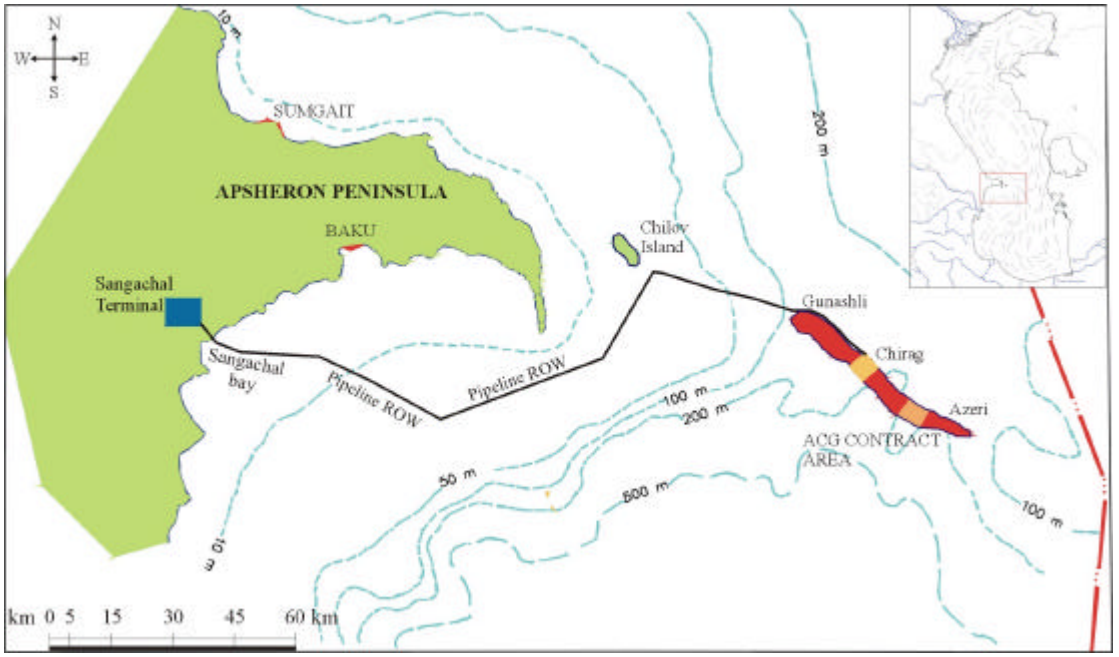
The Azerbaijan International Operating Company (AIOC), operated by BP is planning to begin development of Phase 1 of the Azeri Chirag and Deep Water Gunashli (ACG) Full Field Development (FFD) Project.

The ACG Contract Area has estimated oil reserves of 4.6 billion barrels of oil and 3.5 trillion cubic feet of associated natural gas representing roughly half of the proven oil reserves in Azerbaijan's offshore fields. It lies in the Azerbaijan sector of the Caspian Sea approximately 120 km south east of Baku (Figure ES.1). It is currently proposed that the planned ACG FFD will be achieved by a further three phases of development (Figure ES.2).

The primary objective of the ACG Phase 1 Project is to produce the recoverable reserves in the central part of the Azeri Field. Phase 1 production is anticipated to be over 400,000 barrels of oil per day and the lifetime of the operation is at least 20 years.

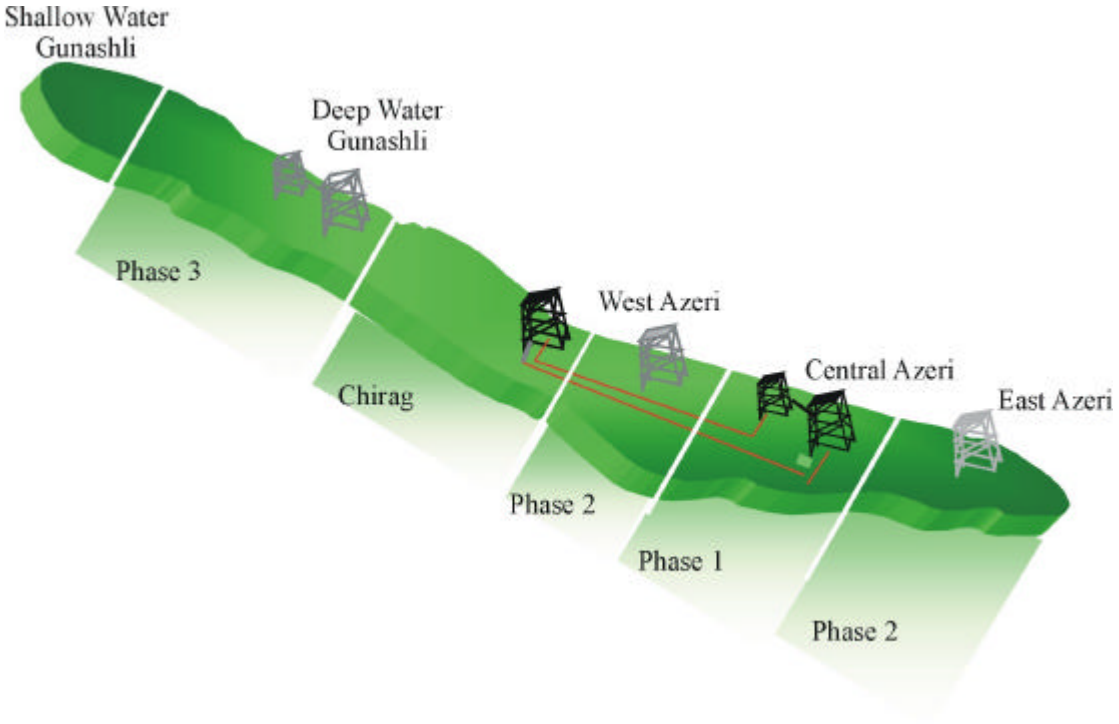
The project will require offshore drilling and production facilities, a means of transferring the produced hydrocarbons to shore and a hydrocarbon reception and processing facility onshore that will also provide storage and onward delivery facilities for the export product.

Figure ES.1 ACG Contract Area Development Location



Under the 1994 Production Sharing Agreement (PSA) signed between AIOC and the State Oil Company of the Azerbaijan Republic (SOCAR), AIOC was required to implement an initial development stage to ensure early production, referred to as the Early Oil Project (EOP) and centres on the Chirag-1 platform. Production from the Chirag-1 platform is transferred by subsea pipeline to an oil reception terminal situated 38 km south of Baku at Sangachal. EOP was in place in 1997 and is currently producing 120,000 barrels per day (bpd) of oil and around 100 million standard cubic feet per day (MMscfd) of gas.

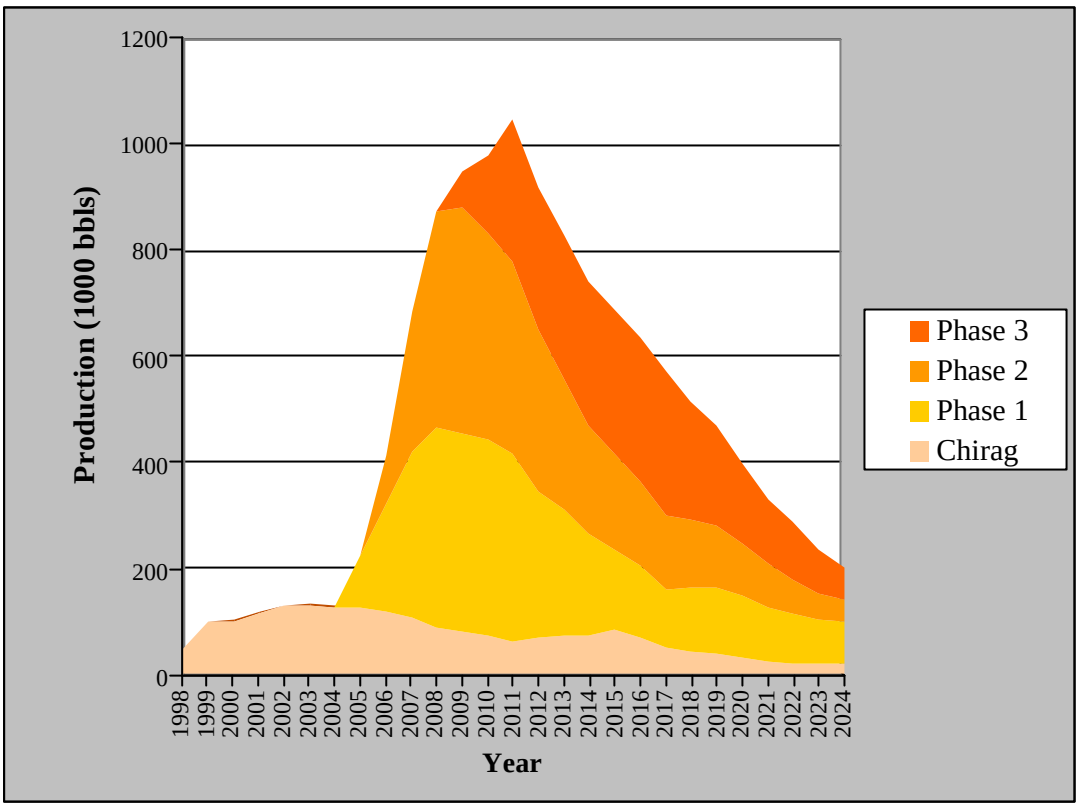
Figure ES.2 ACG Full Field Development (FFD)



Phase 1, as described in this document, represents the first phase of ACG FFD following EOP. Phase 2 plans to develop the remaining part of the Azeri field and Phase 3 plans to develop the deep water Gunashli field (Figure ES.2). Potential oil production rates in excess of one million bpd are anticipated following FFD. The predicted oil production profile for the Phase1 is presented in the context of each subsequent phase of the ACG development in Figure ES.3.

Overall, FFD is expected to cost approximately $10 billion over the phased life of the project representing about 10% of the investment required to extract the Caspian region's anticipated reserves.

Figure ES.3 Predicted oil production profile from ACG FFD



ES1.2 Environmental assessment

This Environment Statement (ES) has been prepared following a detailed Environmental and Socio-economic Impact Assessment (ESIA) of the proposed Phase 1 Project. The ES has been prepared for submission to the Azerbaijan Ministry of Ecology and Natural Resources (MENR) to gain approval for the project and as such, has been conducted in accordance with the legal requirements and policies of Azerbaijan. In addition, the assessment has been carried out to satisfy International Finance Institution (IFI) requirements. The ESIA process has been undertaken in the context of BP's Health, Safety and Environment (HSE) Policy and the HSE policies of the Financing PSA Parties.

The Environmental Statement for the proposed ACG Phase 1 Project represents the latest environmental work programme to be conducted to date. A full list of environmental and socio-economic programmes of work carried out by AIOC to develop a knowledge and understanding of the environments in which their project developments occur, are outlined in Table ES.1. These studies have assisted AIOC in identifying and understanding the potential effects that their proposed activities may have on these environments, enabling the proposed programmes to be designed and planned in a manner that would minimise any adverse effects.

Table ES.1 AIOC Phase 1 Project environmental and social programmes undertaken to date

Environmental / Social Programmes Undertaken	Date
ACG Baseline Assessment	1995
Seismic Survey EIAs	1995
Appraisal Drilling EIAs for GCA Wells 5, 6	1996
Northern Route Export Pipeline EIA	1996
Western Route Export Pipeline EIA	1997
Supsa Terminal EIA	1997
EOP Environmental Impact Assessment	1997
Ongoing monitoring for EOP	1997 - present
ACG Phase 1 Baseline Assessments	1998, 2000 & 2001
FFD consultation with regulators and NGOs	2000 - ongoing
Early Template Well EIA for ACG Phase 1	2001
Sangachal Terminal, Early Civil Engineering Work Programme ESIA (ACG FFD Phase 1 and Shah Deniz Gas Export Stage 1)	2001

ES1.3 Benefits of ACG FFD

The ACG FFD project has the potential to deliver major economic benefits to Azerbaijan. With prudent revenue management, these benefits can lead to positive social and environmental change. The economic assessment for the three phases of development so far indicates that revenues, from oil and gas production and transit, will be significant in Azerbaijan, especially over the ten years between approximately 2007 and 2017. Most of the national share will go to the government rather than to SOCAR. Over the peak period it is likely that these revenues will exceed all other sources of public revenue.

Another indication of the size of project in relation to the economy of Azerbaijan, is that estimated capital spending on oil projects in Azerbaijan on ACG Phase 1 (and the associated Baku-Tblisi-Ceyhan (BTC) Pipeline that will be used to export the oil) could total $US6,000 million. This compares to the agreed potential lending by IMF and the World Bank to Azerbaijan (the major international institutions investing in the country) of around $US400 million over 2000-2002.

The ACG FFD and BTC Pipeline projects represent a very substantial injection of new resources into Azerbaijan.

ACG FFD has the potential to either result in, or create the climate for, the following positive impacts:

- The project will contribute to ending Government budget deficits – assuming that spending remains restrained;
- The project will yield revenues that could be used for investment in the non-oil sector;
- The project should have a positive effect on development and maintenance of a liberal trade regime by removing the need to raise revenues from import duties and by encouraging modernisation of customs procedures;
- The successful completion of the project could create an environment that is domestically more favourable to private sector investment, and set an example making other private sector investors more open to invest;
- Current estimates suggest that between 10% and 30% of spend on oil projects in Azerbaijan goes to local Azerbaijani firms, despite the fact that the rapid construction

schedule militates against development of the bcal supply base. This is exacerbated by the barriers that exist to effective private sector operations (e.g. weak regulatory and legal framework.);

- The project has the potential to add impetus to energy sector reform within Azerbaijan. This in turn should improve the population's access to energy (gas and electricity) and result in the wider use of cleaner fuels, better ambient and indoor air quality and reduced pressure on traditional sources of fuel (and hence forest products and therefore biodiversity);
- The project has the potential to contribute to poverty alleviation and sustainable development via the revenues generated, assuming prudent revenue management;
- The project has and will continue to enhance public awareness and education in the environment; and
- The project will create both direct and indirect employment opportunities.

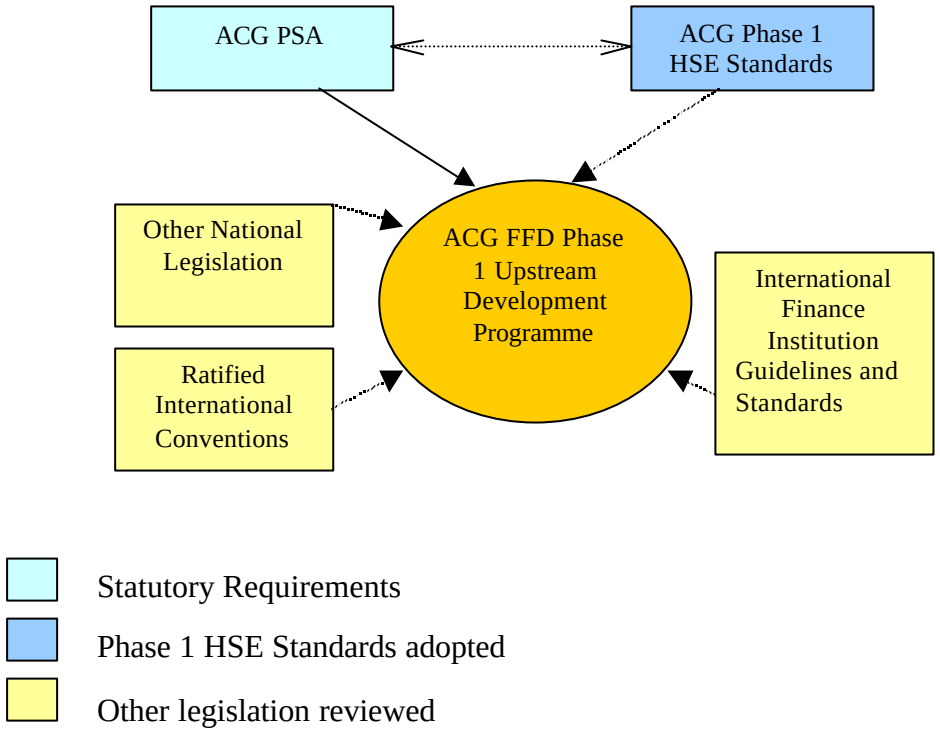
ES2 Policy, legal and administrative framework

The ACG FFD Phase 1 Project is subject to the terms and conditions of the ACG Production Sharing Agreement (PSA). Using the PSA Appendix IX Environmental Standards as a basis, the AIOC partners developed and approved the ACG Phase 1 Project HSE Design Standards in 1999. These were based on and incorporated elements of international standards.

According to Article 26.3 of the PSA, AIOC shall comply with the 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 current international petroleum standards and practices at the execution date of the PSA.

Beyond the framework of the PSAs and ACG Phase 1 HSE standards, the project will also be undertaken with due regard to international conventions as ratified by the Azerbaijan government (Figure ES.4). Applicable national and international guidelines and standards, including the requirements of IFIs, have also been reviewed as part of this ESIA in order to ensure that the development is undertaken in a manner that is compliant with these guidelines and standards.

Figure ES.4 Legislative framework of ACG Phase 1 Project



ES2.1 International Finance Institutions guidelines and standards

As external project finance will be sought on behalf of some shareholders of AIOC, environmental and social standards, practices and guidelines set forth by IFIs have been reviewed in the preparation of this ESIA. Potential IFIs include:

- World Bank Group (WBG) including potentially the International Finance Corporation (IFC) and Multilateral Investment Guarantee Agency (MIGA);
- European Bank for Reconstruction and Development (EBRD);
- United States Export-Import Bank (US ExIm);
- Overseas Private Investment Corporation (OPIC);
- Other Multilateral Lending Agencies (MLAs); and
- Other Export Credit Agencies (ECAs).

ES2.2 National legislation

In Azerbaijan, major private and public developments require the preparation of an ESIA. The objective of the ESIA process is to provide a means whereby adverse impacts can be identified and either avoided or minimised to acceptable levels.

The fundamental principle of the ESIA is applied by the Azerbaijan Ministry of Ecology and Natural Resources (MENR) using the Law of the Azerbaijan Republic on Environmental Protection, August 1999 and the Handbook for the Environmental Impact Assessment Process published in 1996, with the assistance of the United Nations Development Programme (UNDP). The handbook includes requirements for scientific expertise and public consultation. Following its submission to the Ministry, the document is reviewed for up to three months by an expert panel.

ES2.2.1. Azerbaijani regulatory agencies

The main environmental regulatory body is the Ministry of Ecology and Natural Resources (MENR). This body is responsible for the following:

- Development of draft environmental legislation for submission to the Parliament (Milli Mejlis);
- Implementation of environmental policy;
- Enforcement of standards and requirements for environmental protection;
- Suspension or termination of activities not meeting set standards;
- Advising on environmental issues; and
- Expert review and approval of environmental documentation including ESIAs.

In addition, the MENR has responsibility for the implementation of the requirements set out in international environmental conventions ratified by the Azerbaijan Republic.

ES2.3 Ratified international conventions

The Azerbaijan Republic has entered into and ratified a number of international conventions, many within the last year. AIOC will endeavour to assist the government in meeting their obligations with respect to these conventions.

ES3 Environmental and socio-economic impact assessment

The ESIA process incorporates a number of steps. A key element of the Phase 1 ESIA process has been the on-going interaction with the engineering design team with the objective of removing, or at a minimum reducing, as many of the potentially significant environmental impacts as practicable, while enhancing positive benefits of the project wherever possible. This has been achieved by assessing a wide range of options against numerous criteria including environmental and social impact, safety, technical feasibility, cost, ability to meet project needs, and stakeholder concerns.

A critical element of the ESIA process has been the Public consultation and Disclosure Programme carried out with a wide range of stakeholders. The objectives of this process were to inform stakeholders about the project, allow stakeholders to raise key issues and concerns associated with the project, source accurate information, identify potential impacts and offer the opportunity for alternatives or objections to be raised by the potentially affected parties, non-governmental organisations, members of the public and other stakeholders.

The concluding steps of the ESIA process are the public disclosure of a draft ES for which comment is sought from the public and regulatory authorities. After the disclosure period of 60 days, the draft ES is revised and a final ES is submitted to the MENR. A decision as to whether environmental approval will be granted is typically forthcoming from the regulatory authority 30 days after submission.

ES4 Options

ES4.1 Introduction

A number of alternative engineering design options were considered for the development starting at a conceptual level including the "no development option" and subsequently adding detail for each conceptual option through the design and planning process. Project design options were identified and evaluated using a number of screening criteria. Non-viable options were rejected at an early stage in the process and potentially viable options were taken forward for further consideration. The screening criteria used during the option evaluation process are as follows:

- Safety;
- Technical feasibility;
- Logistical feasibility;
- Environmental implications;
- Capital expenditure (CAPEX);
- Schedule and ability to execute the project;
- Operating expenditure (OPEX);
- Availability;
- Operability;
- Partner and government agreement; and
- Reputation.

AIOC also considered Best Available Control Technology (BACT) in its selection process as a mechanism for minimising releases to the environment in a cost effective and legislatively compliant manner. BACT uses a 'top-down' approach to the selection and evaluation of technology, starting with the best technology possible for the application, followed by the next best through to the least appropriate for the requirement. Each technology was considered on a cost benefit basis, taking into account technical and operational limitations. Where potentially significant environmental issues were identified, BACT was determined by using Best Practicable Environmental Option (BPEO) studies.

ES4.2 No development option

The "no development" option would mean that the potentially significant benefits described in Section ES-1.3 (Benefits of ACG FFD) would not be realised as a decision not to proceed with the ACG Phase 1 Project would also mean that subsequent phases of the ACG FFD would not proceed. The ACG FFD and associated projects, particularly the BTC Pipeline export project, represents a unique opportunity for Azerbaijan to develop a stable economy, improve social equity and alleviate poverty. No other currently identified prospect offers this potential.

ES4.3 Selected option

A summary of the different conceptual design alternatives considered, together with an overview of the environmental outcome of the preferred alternative, is summarised in Table ES.2.

Table ES.2 Key options for project design and configuration

Issue	Preferred Option	Environmental Consequence
Number and configuration of drilling and production centres	Single drilling platform and production centre achieved through directional drilling technology.	Minimisation of area impacted by offshore structures, and reduced impact on benthic environment
Reservoir maintenance	Single compression and water injection platform designed to service all Azeri field production (Phase 1 and Phase 2)	Minimisation of area impacted by offshore structures, and reduced impact on benthic environment
Transportation of product to shore via pipeline or shuttle tankers	Pipeline	Reduced risk of oil spill
Hydrocarbon reception	Expansion of the existing EOP terminal at Sangachal	Eliminates the requirement for additional land-take at a separate new location. Commingled oil and gas from Phase 1 and EOP at one location minimising subsea pipeline requirement.

Once the preferred options for the projects main facilities were selected, a project BPEO study was carried out to identify areas of potentially high environmental impact associated with the component and utility configuration options for these facilities. The results of the BPEO study provided recommendations for approaches to reduce impacts. The study was endorsed by AIOC and ultimately led to the development of the ACG Phase 1 Project Design Standards.

ES5 Project description

There are three main components to the ACG Phase 1 Project, each significant engineering undertakings in their own right. These are:

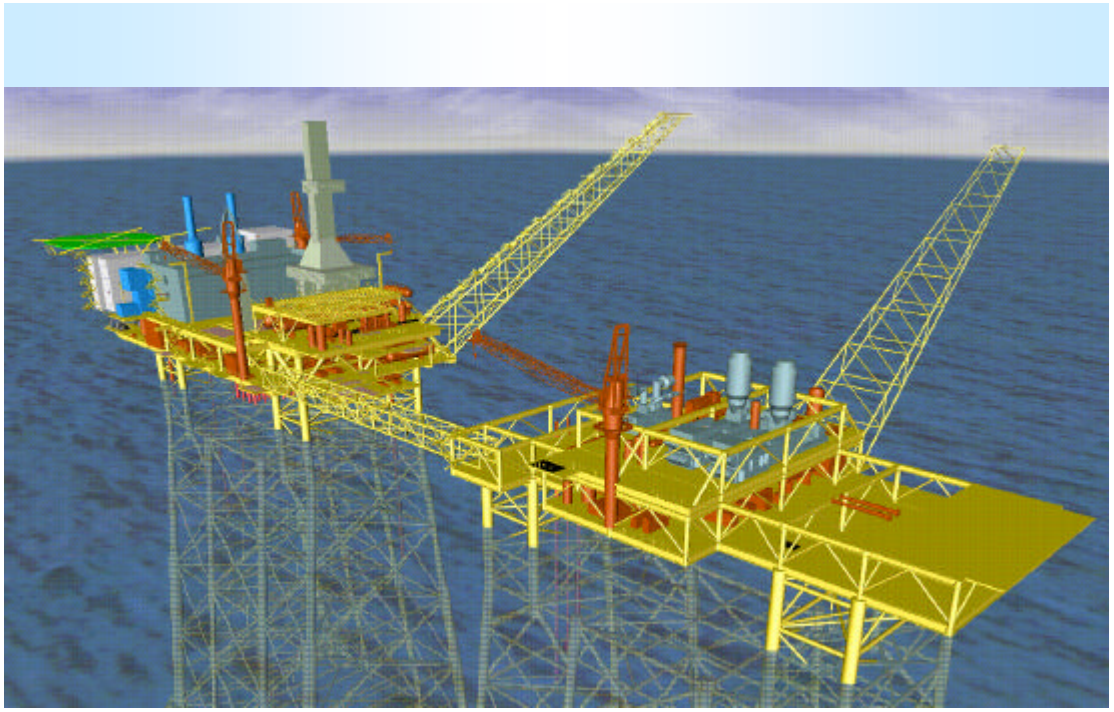
- Offshore drilling, production and compression facilities;
- Subsea pipelines for the transportation of oil and gas; and
- An onshore terminal for the reception and processing of oil and gas.

ES5.1 Offshore facilities

Offshore drilling and production operations will be carried out from a new drilling, production and quarters (PDQ) platform to be installed over a pre-installed drilling template. Prior to installation of the PDQ, a number of wells will be drilled from a semi-submersible drilling rig to enable early production to begin soon after installation of the fixed facility.

To optimise production from the reservoir it will be necessary to maintain pressure within it. This will be achieved by re-injecting associated gas liberated from the production process in addition to water injection. A compression and water injection platform (C&WP) will be installed alongside the PDQ for this purpose approximately one year after the installation of the PDQ (Figure ES.5). The C&WP will provide space for future gas compression and water injection facilities for the whole Azeri field development (FFD Phase 1 and 2).

Figure ES.5 PDQ (left), bridge and C&WP



ES5.1.1. Pre-template and template drilling

As stated above, to accelerate oil production from Phase 1, drilling will begin at the offshore location prior to the installation of the PDQ. This early drilling will be carried out from the semi-submersible drilling rig (the Dada Gorgud) to be towed out and anchored on location. Between eight and ten wells will be drilled from the rig through a drilling template to be installed on the seabed, although the first well may be drilled prior to the installation of this template (subject to a separate environmental impact assessment)[1].

The wells will be drilled in sections with hole diameters of 36"/30", 26", 16", 12 ¼" and possibly 8 ½ using different drilling fluids. The surface-hole section (i.e. 36"/30") will be drilled with seawater (intermittently dosed with clay (bentonite) gel and a water based mud system containing weighting materials and other additives) and will be used for the 26" top-hole section. A mud system containing an organic phase fluid will be used in the lower-hole sections.

Drilled cuttings generated from the surface-hole section will be deposited directly on the seabed around the well. Cuttings from the 26" top-hole section, drilled with water based mud, will be discharged to the sea after separation of the cuttings from the mud system on the drilling facility. Cuttings from the lower hole sections will either be slurrified and re-injected through a dedicated cuttings re-injection well into a deep formation or contained and shipped to shore for treatment and disposal. No drilled cuttings generated from the lower-hole sections will be discharged to the sea.

[1] ACG FFD Phase 1 Pre-drill Well, Environmental Impact Assessment, AIOC, 2001.

A total of three well tests are planned during this early drilling programme. Following testing, the hydrocarbons will be sent to the burner boom for disposal by flaring in a high efficiency burner.

The rig will be supported by a number of utilities including diesel fired power generation, sewage treatment systems, cooling water system, drainage systems, support and supply vessels. Up to 120 people will be accommodated on the rig during the drilling programme.

ES5.1.2. Platform drilling

Drilling will continue from the PDQ once it is installed on location. Up to 48 wells may be drilled for Phase 1, which means an additional 38 to 40 wells may be drilled from the platform. The well design will be similar to that for wells drilled from the drilling rig although it is expected that the 30" surface-hole section will be constructed by hammering the conductor pipe into position and seawater, rather than water based mud, will be used in the 26" top-hole section as a drilling fluid. Drilled cuttings from the surface-hole will be released directly to the seabed and those from the 26" hole section will be discharged to sea following separation from the drilling fluid onboard the platform. All cuttings from the lower-hole sections will be slurrified and re-injected into a dedicated cuttings re-injection well. Should the re-injection system be unavailable at any time, the cuttings will be contained and shipped to shore for treatment and disposal.

Utilities on board the drilling platform are combined for both drilling and production operations and these are discussed below.

ES5.2 Construction and installation of the offshore facilities

Many of the components for construction of the PDQ and C&WP will be pre-fabricated overseas and transported to Azerbaijan for assembly. Both steel jacket structures that support the platforms and the platform topside facilities for the PDQ will be assembled at the Shelfprojectstroi (SPS) yard located 20 km south of Baku. The assembly site for the C&WP topsides is yet to be determined.

The contractor for the offshore works (including the associated yard upgrades work) has been selected and it has been estimated that approximately 4,000 people would be employed for the offshore elements of the ACG Phase 1. Employment will gradually build up from January 2002 to September 2002, when it will continue at peak levels until February/March 2004. It is known that the contractors for the offshore construction propose to source between 70 and 85% of the required personnel within Azerbaijan. At this stage it is envisaged that a maximum of 400 workers will be housed in an "open" camp and these workers would be drawn from outside Azerbaijan.

Following assembly each structure will be tested and commissioned before loading onto a transportation barge for transfer to the offshore location and installation. The jacket structures are slid from the barge into the water and then manoeuvred into position using the flotation chambers that have been fitted onshore. By reducing the buoyancy provided by the chambers the jacket is gently lowered onto the seabed and is then secured into place by piling each of the legs.

The jacket and topsides facilities for both platforms have been designed to allow the topsides to be "mated" with the jacket by means of a float-over operation. The barge transporting the topside platform facilities is floated within the structure of the jacket such that the topsides are positioned above their intended installation position. The barge is then ballasted down until

the topsides reach the jacket structure. The topsides are then secured to the jacket and the barge is manoeuvred away.

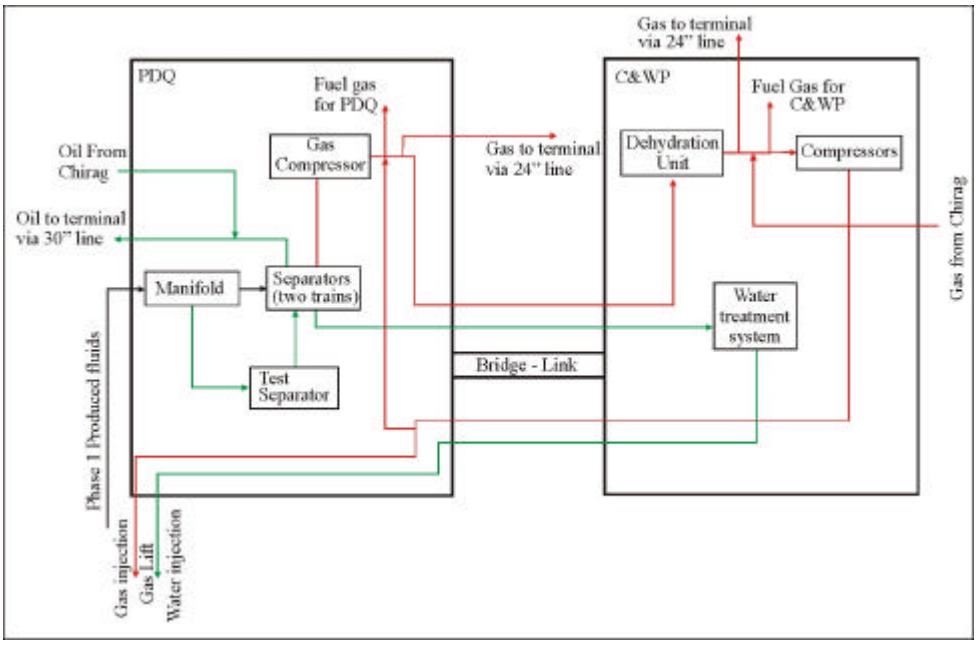
ES5.3 Production process

The fluids produced from the wells will be separated into gas and liquid (oil and produced water) onboard the PDQ. The liquid stream will be pumped at the required pressure and transported through the new oil pipeline (to be installed) to the terminal at Sangachal. Until the produced water treatment facilities are installed offshore, all produced water will be sent with the oil to the terminal for separation and disposal. Oil from Chirag-1 installation will be transferred to the PDQ through a new interfield pipeline and commingled with ACG Phase 1 oil for transportation to shore.

Prior to installation of the C&WP, the gas stream will be sent to shore through the existing EOP oil pipeline that will be converted to gas service. Part of the produced gas will however, be used on the platform as fuel gas. Following installation of the C&WP, all produced gas will be transferred from the PDQ across the bridge-link for dehydration. Subsequently, it will be compressed to injection pressure and sent back to the PDQ for re-injection down-hole for reservoir maintenance purposes. Excess gas will be transferred to shore. Produced water will also be sent to the C&WP for treatment and pumped to water injection pressure and as with the gas, will be sent to the PDQ with pressurised treated seawater for injection down-hole. In the event that the water injection facilities are unavailable, produced water will be released to the sea following treatment to IFC standards to remove any excess oil.

A simplified process flow diagram illustrating the production process offshore is shown in Figure ES.6

Figure ES.6 The offshore oil and gas production process



The C&WP will also host a dedicated gas compressor for gas received from Chirag-1 when it will either enter the gas injection system or will be routed to the terminal.

The flare system, comprising flare booms on both the PDQ and C&WP, is designed to flare gas during periods of process equipment unavailability or in the event of an emergency.

Under normal operating conditions there will be no routine flaring of associated gas for oil production purposes. Small volumes of purge gas, used to prevent the ingress of air, and process leakage from valves and seals will however, be routinely flared.

Seawater will be drawn to the platform topsides by pumps, treated with antifouling chemicals and once passed over the cooling medium system (in order to cool the drilling and process equipment) will be discharged back into the sea.

Power generation for the offshore facilities will be supplied by two gas turbine driven generators on the PDQ and one gas turbine driven generator on the C&WP. All turbines will have dual fuel capabilities to enable operations using diesel as a fuel. Use of diesel as a fuel will be required prior to the generation of fuel gas as well as during abnormal operations when fuel gas is not available. Each platform will also be fitted with a diesel driven emergency generator.

The PDQ will be sized to accommodate 200 personnel on a permanent basis but will have the ability to accommodate an additional 100 personnel on a temporary basis to support commissioning and maintenance activities. All sewage generated will be treated in a marine sanitation unit prior to discharge to the sea.

The platform will be supplied by vessel and helicopter, all excess solid and liquid wastes will be backloaded to the supply ships and returned to shore for treatment and disposal.

ES5.4 Pipelines

A new 30" diameter pipeline 188 km long will be installed along the route of the existing EOP 24" oil pipeline from Chirag-1 for the export of oil from the PDQ to the terminal at Sangachal (Figure ES.1). It is intended to convert the existing 24" oil pipeline from oil to gas service for the export of gas to shore. Three additional interfield pipelines between Chirag-1 and the Phase 1 platforms will also be installed. Pipelines will be constructed of carbon steel and are designed according to a set of established design criteria for the offshore and onshore developments.

The outer wall of each pipeline will be coated with a three-layer polypropylene and/or polyethylene coating for corrosion protection purposes. Each pipeline will also be externally coated with concrete to provide mechanical protection against impact and the weight required to ensure that the structure remains in place and in a stable condition on the seabed. The pipelines will also be fitted with sacrificial anodes for cathodic protection. Additional wall thickness has also been provided to provide internal corrosion allowance.

ES5.4.1. Installation and commissioning

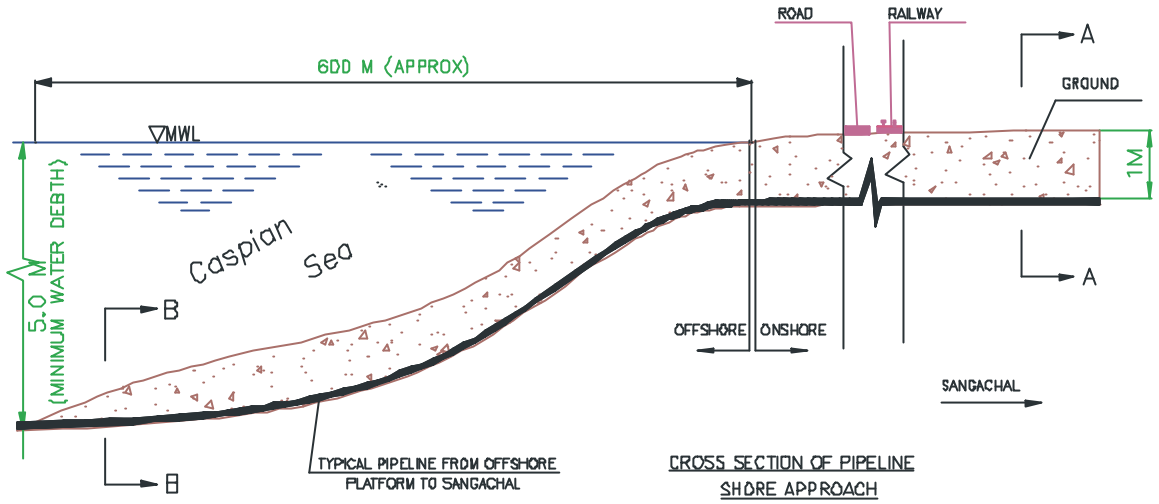
The pipelines will be installed using the pipe-lay vessel Israfil Guseinov in water depths of 8 m and greater. The pipe-laying operation is continuous with the barge moving progressively forward as sections of the pipe are welded, inspected, coated and deployed from the stern of the lay-barge. The pipe-laying vessel will be held in position by 8 to 10 anchors.

In water depths less than 8 m, the pipeline will be pulled onshore using a shore-based winch. A temporary trench will be dug across the shoreline and this will be allowed to flood so that the pipeline can be pulled through the nearshore zone and into the shoreline.

The base case plan is to bury the pipeline beneath the seabed in water depths of less than 5 m. A pipeline trench will be excavated in water depths of up to 2 m and will be approximately

3 m in width. Beyond the 2m water depth mark, the pipeline will be jetted beneath the seabed out to water depths of 5 m. A typical pipeline shore approach is shown in Figure ES.7.

Figure ES.7 Typical pipeline shore approach



A finger pier, approximately 10 m wide at its base and between 250 and 300 m long, will be built from the shoreline into Sangachal Bay to allow an excavator to trench for pipeline installation from the shoreline out to water depths of approximately 2 m. The pier will be a rock groyne type constructed by placing rock aggregate in the shallow inshore zone.

Marine installation operations will occur within the existing exclusion zone that extends for 1,000 m across the EOP pipeline corridor. During installation, exclusion buoys will be placed around the barge installation area to ensure that other vessels do not encroach upon the area of activity. As pipe-laying progresses the exclusion buoys will be moved along the route.

The onshore section of the pipeline from the shoreline to the terminal will be buried in a trench to a nominal depth of 1 m from top-of-pipe. All topsoil removed from the trench will be placed aside and stored so that it may be used for later reinstatement of the route and work site.

Following installation of the offshore platforms, the pipelines will be tied-in to the facilities. Carrying out these operations may require the use of a number of vessels. Once connected to the platform facilities the entire system will be pressure tested using the treated water left in the pipeline following installation. Following a successful test, test waters will be flowed to the terminal for disposal.

ES5.4.2. Pipeline operation

The pipelines are designed to require very little maintenance. A pipeline integrity management system will however, be developed for the pipelines. The strategy will consist of a number of inspection and monitoring activities as well as a programme of regular cleaning of the pipelines using pigs.

ES5.5 Onshore facilities

The existing EOP onshore terminal at Sangachal will be expanded to accommodate production from Phase 1. Phase 1 expansion will be designed to operate in parallel to the existing facilities and will comprise two new oil production trains, resulting in an additional throughput of oil at the terminal site of 360,000 bpd. Combined, the current EOP processing train and new Phase 1 terminal will be able to receive and process up to 490,000 bpd.

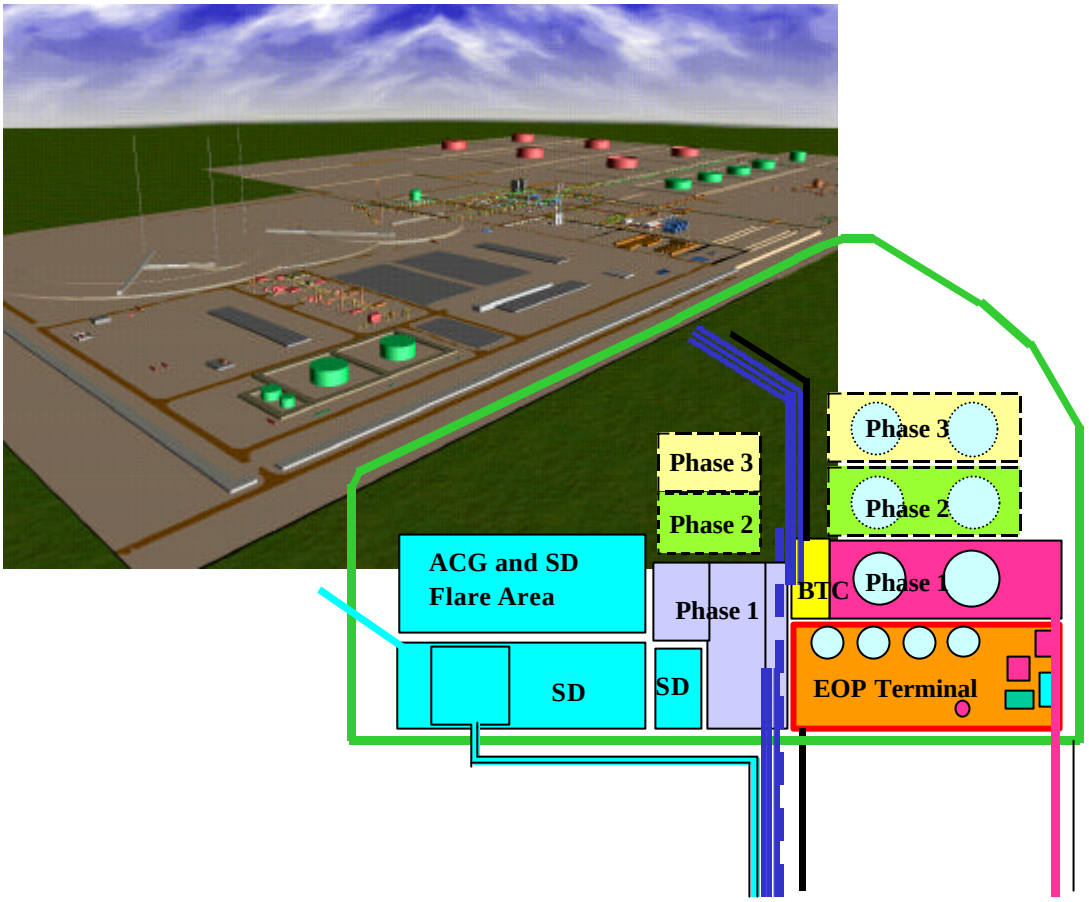
Two new oil storage tanks will be constructed each with a current design capacity of 500,000 bbl[2]. When added to the four existing EOP oil storage tanks, total oil storage volume at the terminal site will be approximately 1.5 million barrels.

Facilities to handle the associated gas exported to shore from the field will consist of reception and dewpoint control sized for 250 MMscfd. The gas system will also consist of gas pressure control. Gas received from offshore will be commingled with gas recovered during the oil stabilisation process where it will undergo dewpoint control before delivery to SOCAR at the boundary of the terminal site.

In the event that the Shah Deniz project is sanctioned, the Shah Deniz gas and condensate-processing terminal will be built adjacent to the AIOC terminal facilities. Space will also be set aside for ACG FFD and the pumping and metering facilities for the BTC Oil Pipeline. The proposed layout of terminal facilities is illustrated in Figure ES.8.

[2] It is noted that developing the Phase 1 oil storage tanks with a greater design capacity is under consideration. A greater storage capacity at the terminal will provide greater operational security.

Figure ES.8 Proposed EOP, ACG FFD, Shah Deniz FFD terminals and BTC pumping station layout



ES5.5.1. Construction

The ACG terminal development requires the use of additional land to that acquired for the EOP terminal. The total land requirement for all terminal facilities is 730 ha. This includes 256 ha previously acquired by AIOC of which 40.5 ha is presently occupied by the existing EOP terminal. Within the land acquisition area, a total 428 ha will be required for the new facilities with the remaining 302 ha being designated as a development exclusion zone around the terminal facilities. The outer limits of the development exclusion zone will be pegged rather than fenced in order to allow access to herders and grazing animals and to maintain a general right of way. Table ES.3 presents the areas that will be occupied by each component of the terminal facilities.

Table ES.3 Proposed terminal facilities land-take area breakdown

Terminal Areas	Areas (ha)
Existing EOP	40.5
ACG Phase 1 terminal facilities	41.8
Shah Deniz terminal area	33.3
ACG/Shah Deniz flare area	34.7
BTC pumping station	2.5
Drainage channel	22.5
New access road	2.5
Workers camp area	13.0
ACG Phase 2 facilities	24.1
ACG Phase 3 facilities	24.7

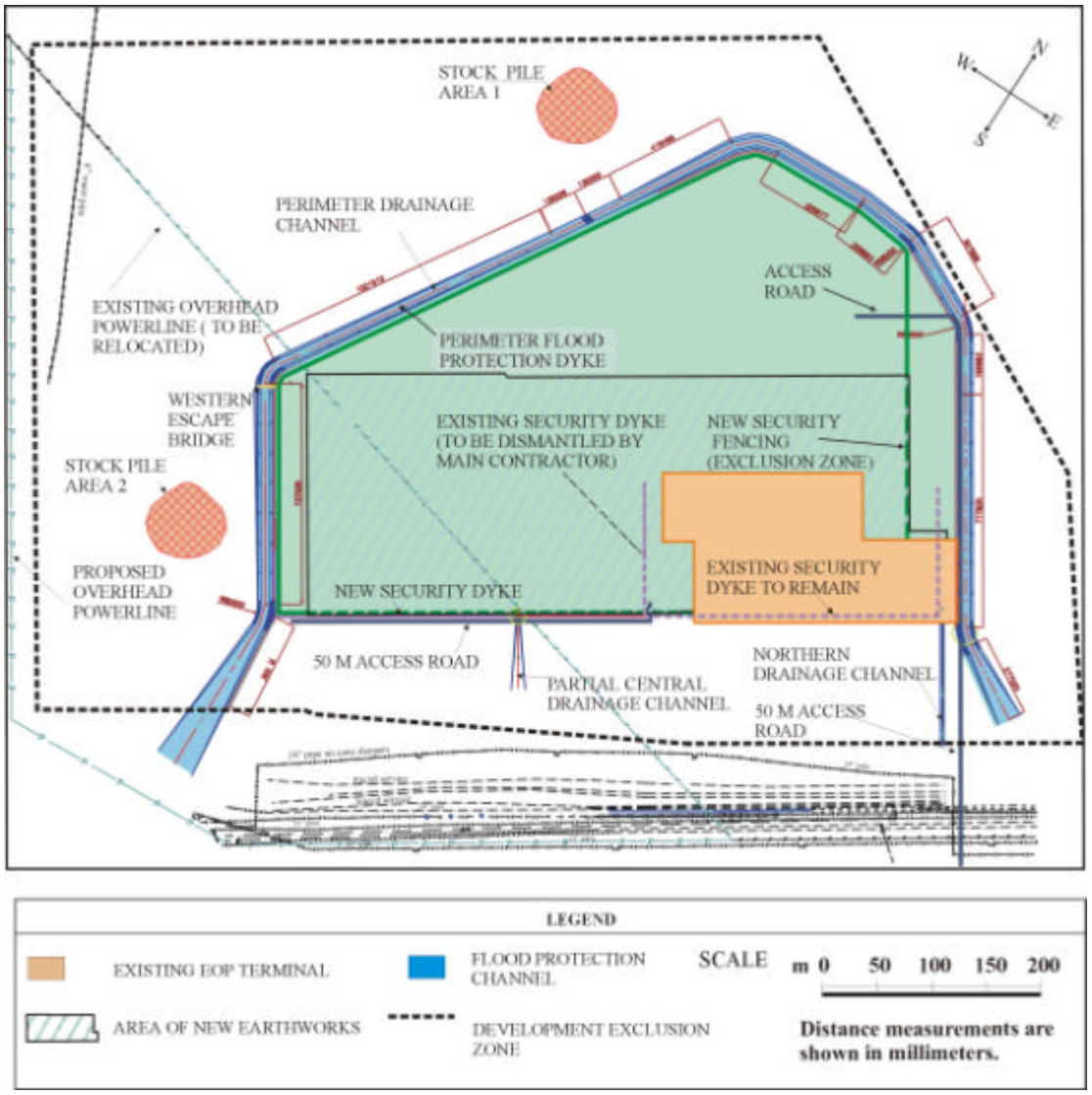
An early civil engineering works programme (subject of a separate ESIA[3]) will be carried out prior to the construction of the Phase 1 terminal facilities. The programme will prepare the terminal area for both the Phase 1 and the Shah Deniz Gas Export Project Stage 1 terminal facilities and will include:

- The clearing, grading and levelling of land in the area on which the terminal facilities will be built;
- The excavation of a flood protection drainage channel and construction of a bund wall on three sides of the proposed terminal site;
- The construction of a security dyke along the south-eastern boundary of the terminal site;
- The construction of a security perimeter fence and lighting;
- The construction of a new access road for the terminal site and railway crossing along with two additional roads within the terminal site; and
- Relocation and potential modification of utilities services.

Figure ES.9 illustrates the location and extent of the above features within the terminal land acquisition area.

[3] Sangachal Terminal, Early Civil Engineering Work Programme BP/AIOC, URS, 2001.

Figure ES.9 Early civil engineering work programme activities



Phase 1 terminal foundations and underground services will be constructed prior to pre-fabricated components arriving on site. Once on site, these components will be positioned and secured in their appropriate locations. While process modules will be commissioned prior to transportation to the terminal site, at various stages during the construction programme, non-destructive testing and inspection will be used to confirm the integrity of the equipment. Pressure vessels, storage tanks and piping runs will be tested with treated water under pressure and the water will be contained for disposal.

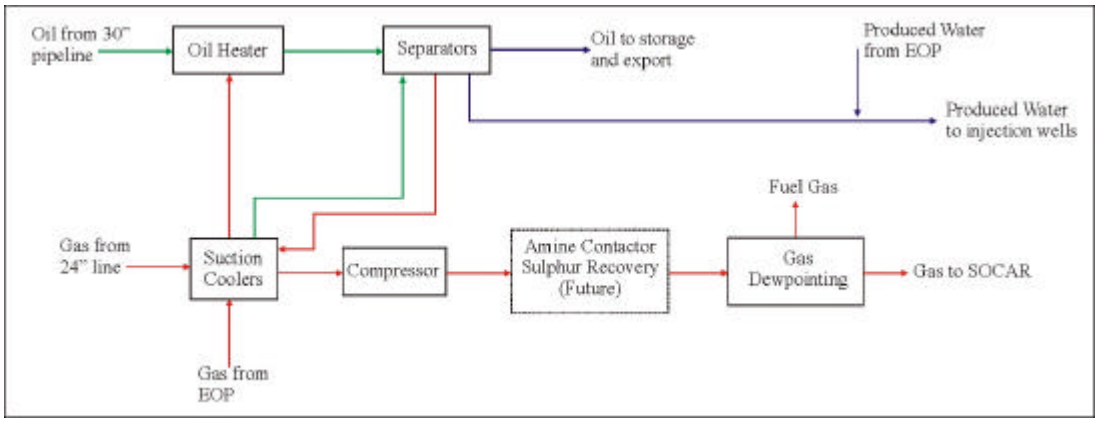
Whilst the contractor has not been selected for the construction of the terminal it is possible to estimate that approximately 800 people would be employed during the construction of the terminal. Employment will gradually build up from January 2002 to September 2002, when it will continue at peak levels until February/March 2004. It is not possible to give full details on the proposed sourcing of the construction workforce for the terminal. It is understood however, that the composition of the workforce will change over time and it is estimated that the Azerbaijani composition during the early stages of construction will be approximately 75%. This will however, drop to approximately 65% towards the end of construction. The contractors are committed to using a maximum of 15% of the man-hours from outside Azerbaijan. At peak times this may equate to some 30% of total personnel. It is envisaged

that a maximum of 350 workers will be housed in an 'open' camp on the terminal construction site. These workers will be drawn from outside Azerbaijan.

ES5.5.2. Terminal operations

Oil received at the terminal will be heated to the temperature required for efficient stabilisation and water removal. It will then be sent to the separators to further remove any residual gas and water from where it will be delivered to the onsite storage tanks prior to pipeline transport. Liberated gas will be compressed and combined with the free gas arriving from the offshore facilities and combined gas will undergo dew-point control to prepare it for delivery to SOCAR at the terminal boundary. A simplified process flow diagram is shown in Figure 5.10.

Figure ES.10 The terminal process system



The terminal design includes space for the provision of future installation of facilities to remove hydrogen sulphide from the hydrocarbon stream should such facilities be required.

There will be no routine flaring of gas at the terminal under normal operating conditions. A flare gas recovery system will be installed which will direct recovered gas that would normally be flared back into the process train. Purge gas will be provided by inert gas. As with the offshore facilities, non-routine flaring may be required in the event of process failure or loss of the gas export route to SOCAR.

Produced water will be transferred to an onsite produced water storage tank. The principal option for disposal of produced water is injection at the Lokbatan field some 22 km to the north of the terminal. Water will be transferred to the injection site by a dedicated water pipeline that will be installed when required. It is envisaged that a proportion of the water may also be sent to the Garadag Cement Plant for use in the cement manufacturing process. Test waters used for commissioning and testing of the Phase 1 facilities, including subsea pipelines will also be disposed of via these routes.

ES5.5.2.1. Power generation

Power generation at the terminal will be provided by three dual-fuel gas turbines. During start-up diesel will be used. Once the terminal is producing, fuel gas from production will be used with diesel as a backup. Construction power will be provided by means of diesel generators.

ES5.5.2.2. Water treatment

A waste water treatment plant using a stabilisation pond system will be installed at the terminal site for sewage waters generated during the construction programme. The water effluent from this system will be used for trickle irrigation purposes and dust suppression provided it is of sufficient quality. Waste water treatment for the terminal will be pumped to the construction camp while it is in use with a permanent system being installed at a later date.

ES5.6 Transportation and logistics

Many of the ACG Phase 1 Project components require specialist materials and construction techniques not currently available in Azerbaijan. They will therefore, need to be imported.

There are a number of transport options available including existing road, rail and canal networks. Table ES.4 summarises the preferred mode of transportation for the major project components.

Table ES.4 Modes of transportation

Development Sector	Components	Mode of Transport
Offshore	PDQ & C&WP tubular elements for jackets	Rail transport via Poti (Georgia) during winter months, then by Russian inland river system to Caspian (i.e. after river thaw)
	Topside modules, mechanical gauge equipment, piping and other bulk equipment	Combination of road, rail and river depending on exact source of materials
Pipelines	Marine - grade pipeline, wye pieces and associated protection structures and valves	Pipeline sections: River and rail (dependent on seasonal conditions); other materials by road
Onshore	All major items	Combination of road rail and river

ES5.7 Decommissioning

The 1989 International Maritime Organisation (IMO) Guidelines for Offshore Installations Removal state that structures in waters deeper than 100 m must be removed to give a clear water column of 55 m for safety of navigation. In addition, all structures installed after 1998 must be designed so as to be feasible for complete removal.

According to the terms of the PSA, AIOC is required to produce a Field Abandonment Plan one year prior to the completion of 70% production of identified reserves. At this time, all partners involved in the project must contribute a proportionate share of the decommissioning costs to an "Abandonment Fund". Thereafter, the Abandonment Plan will be considered and reviewed in discussion between the operator and the authorities. This timing will allow consideration of the most appropriate decommissioning options and may allow for changes in the management of the field in order to facilitate the best abandonment options.

ES6 Existing natural environment

ES6.1 Overview

The offshore project setting is in the Caspian Sea, an enclosed body of water occupying 386,400 km^2 and with a shoreline of 5,360 km. The Caspian is approximately 1,200 km long and averages about 310 km in width. Caspian sea levels have fluctuated significantly over time and it is currently about 27 to 28 m below the world ocean level. The sea level dropped by 2.9 m in the period between 1929 and 1977 and rose by 2.4 m between 1977 and 1997. The recent sea level rises have resulted in the flooding of coastal land and damage to settlements, industrial enterprises and irrigated land.

The geological history of the Caspian has resulted in a unique assemblage of fauna. About 75% of the species of the Caspian are endemic, 6% are from the Mediterranean and 3% are from the Arctic. The remaining 16% are freshwater immigrants that have adapted themselves to the salinity of the Caspian. These freshwater immigrants tend to inhabit the less saline northern Caspian waters.

The Caspian exhibits a multitude of environmental stresses. Most are the result of the many years of pollution from a vast array of land-based sources that reach the Caspian via the 130 rivers that drain its watershed. The largest of these is the Volga. This river receives domestic waste from over half the population of Russia, along with a significant percentage of the country's heavy industry. It is estimated that the Volga contributes 80% of the pollution load entering the Caspian.

Oil extraction and refining complexes in Baku and Sumgait are also major sources of land-based contamination that impact the Caspian as are many of the older generation offshore oil production facilities. Overall it is estimated that a million cubic meters of untreated industrial waste water is discharged into the Caspian annually. This discharge, along with variety of chronic sources of industrial pollution, has resulted in almost 30% of the Azeri coast being exposed to some form of land-based contamination.

The combined effect of these and other factors is illustrated by the collapse of the Caspian fishing industry. The effects have been particularly noticeable for the sturgeon fishery, where the Azerbaijan quota has been reduced in recent years.

ES6.2 Offshore environment

The dominant morphological feature in the ACG Contract Area is the Apsheron Sill that runs south-east across the Caspian Sea from the tip of the Apsheron Peninsula. The Contract Area straddles the western end of the sill. The area is characterised by natural gas seeps, gas charged sediments and subsea mudflows. The Contract Area contains three large mud volcanoes.

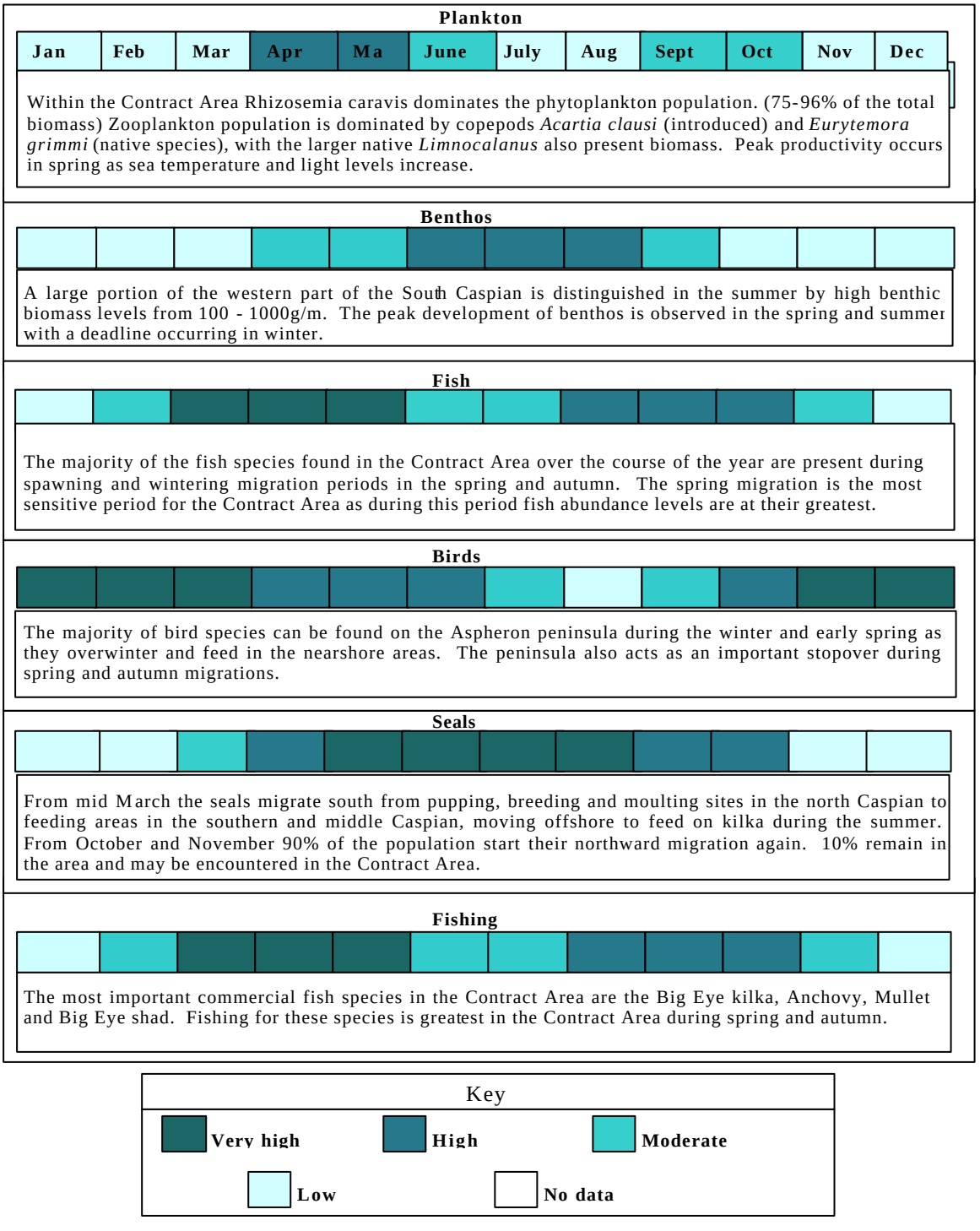
The water depth at the Phase 1 location is 128 m. The surface waters are highly oxygenated in the winter months, reaching saturation levels in the spring due to increased water mixing during the winter and phytoplankton activity in the spring. During summer months, as the surface water temperature increases, the water column becomes stratified.

Benthic abundance in the Contract Area is high. There appears to be a transition from crustacean-dominated communities in the northwest of the Area to annelid-dominated communities in the southeast. Because of the high amounts of benthic biomass during the summer months, the area plays an important role in the life cycle of Caspian Sea fish stocks.

A summary of the environmental sensitivities in and adjacent to the ACG Contract Area is provided in Figure ES.11. The key environmental sensitivities are associated with:

- The presence of numerous fish species including species that pass through the Contract Area during migration periods;
- Spawning periods of anchovy and big eyed Kilka;
- Migrating birds that use the Apsheron Peninsula as an important stop-over point;
- The presence of seals during the summer and spring and autumn migration periods; and
- Spring time benthos and plankton recruitment and increased in productivity.

Figure ES.11 Summary of offshore environmental sensitivities



ES6.3 Nearshore and coastal environment

There are several ecological features and temporal processes within Sangachal Bay. These include:

- Seagrass mats and patchy areas of algae;
- Fish spawning and nursery grounds for juvenile fish; and
- Spring time increases in benthic and plankton productivity and recruitment.

Seasonal fluctuations in the environmental sensitivity occur and are illustrated in Figure ES.12. The spring is the most sensitive period of the year. As water temperatures and light intensity increase fish, plankton, seagrass, algae and benthic communities increase productivity. The majority of the annual recruitment occurs during this period.

Figure ES.12 Seasonal changes in sensitivity

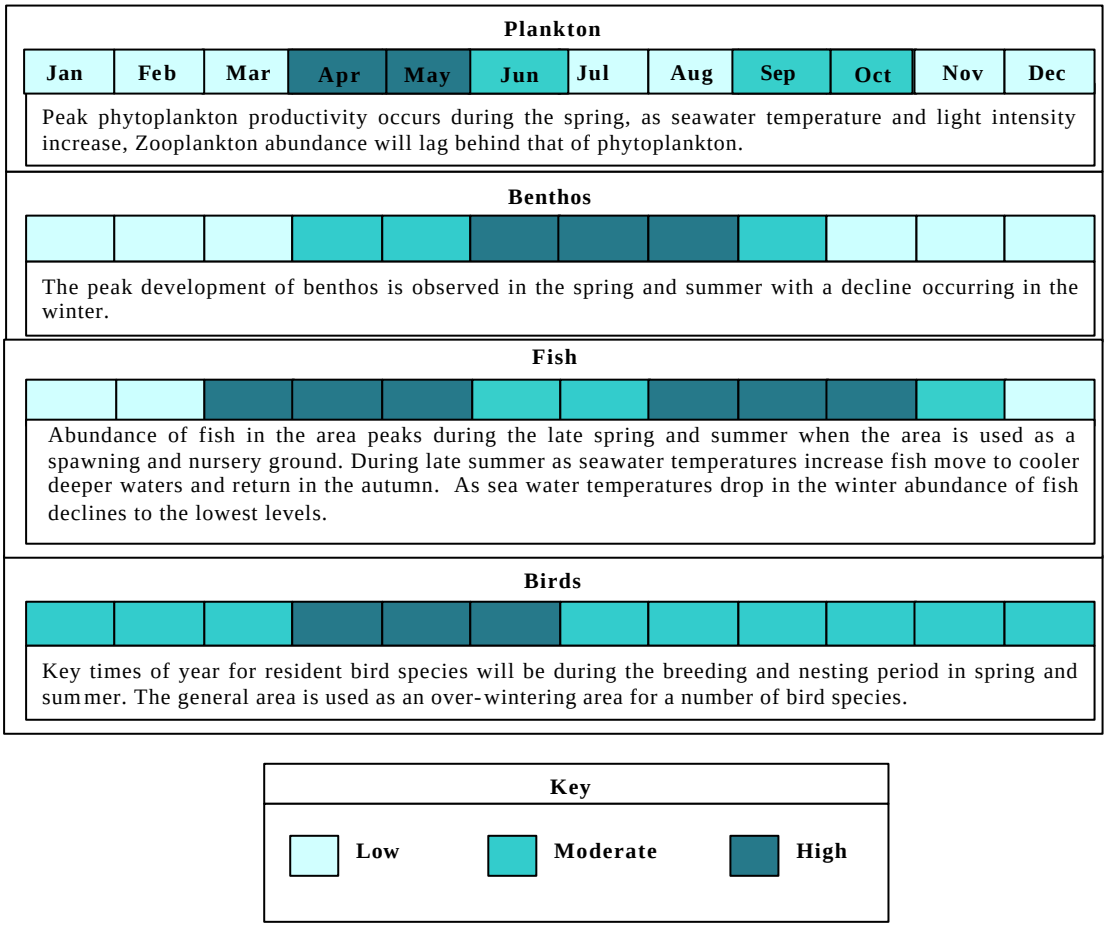
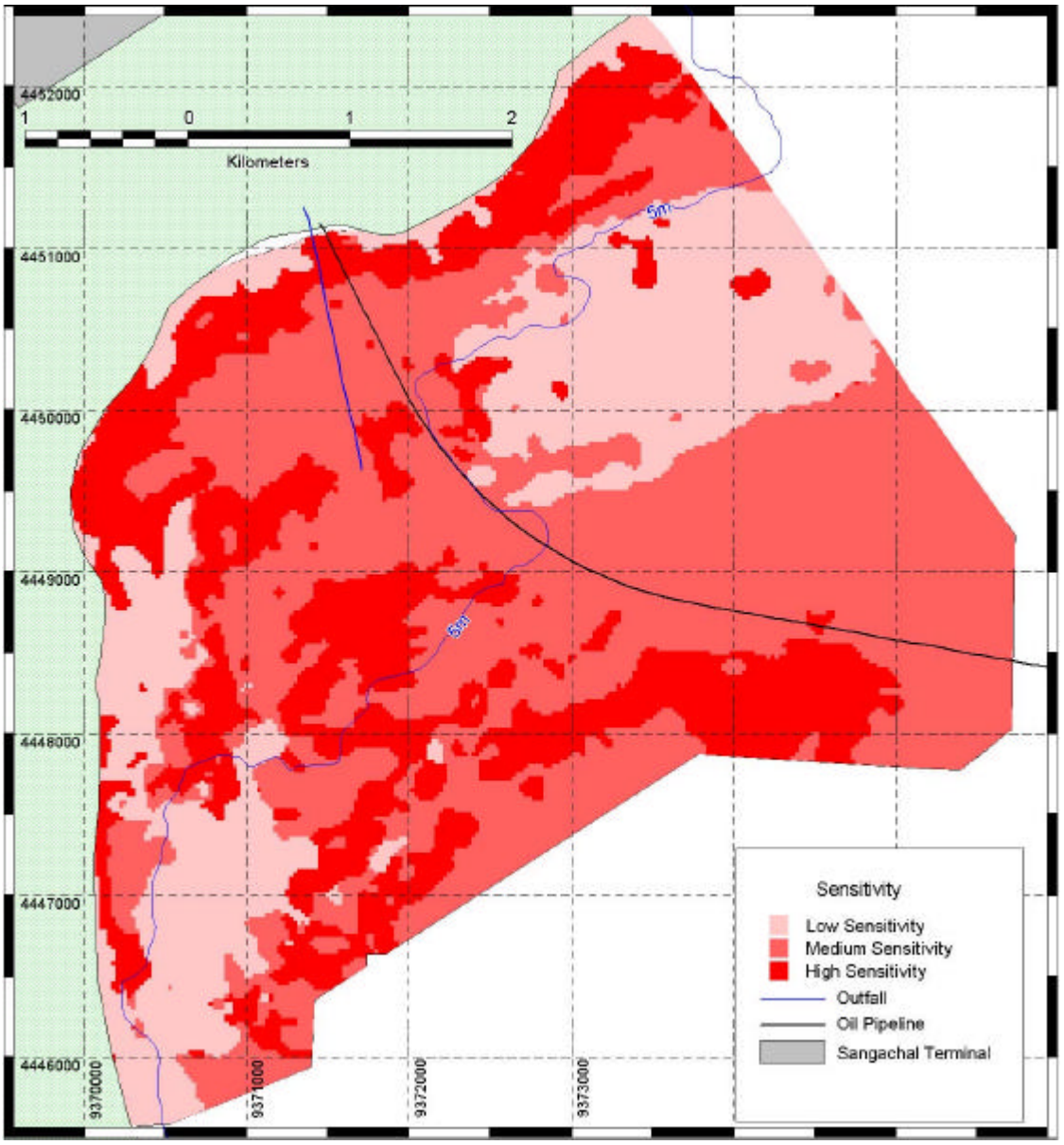


Figure ES.13 illustrates spatial variations in the seabed sensitivity. This has been developed using information on the distribution of seagrass and algae as well as sediment types and their mobility. Areas that support seagrass and red algae are considered the most sensitive as well as fine-grained sediments that are highly mobile. Disturbance of highly mobile sediments will lead to increased water turbidity.

Areas that supported sparse communities of seagrass and red algae or are sandy sediments that could support seagrass mats were classified as medium. Areas where seagrass or red

algae was not observed during the survey and areas composed of silty sand were assigned the lowest sensitivity.

Figure ES.13 Seabed sensitivity in Sangachal Bay



ES6.4 Onshore environment

ES6.4.1. Flora (habitat)

The habitats within a 5 km radius of the existing EOP terminal can be divided into two main types as follows:

- Semi-desert with desert elements comprising most of the inland areas with scattered marshy areas; and
- A coastal community succession of sandy beaches leading to ephemeral, shallow lagoons (usually waterlogged from September/October to March) with a few marshy slacks comprised of riparian vegetation.

The main components of the semi-desert flora are the low perennial bushes wormwood and saltwort species and ephemeral species. The perennial bushes can be observed year-round. Ephemeral species flower early in spring and within one to two months set seed then wither until the autumn rains stimulate new growth.

Tamarisk thickets are scattered throughout the semi-desert in topographically lower areas, especially alongside and on the banks of the various ephemeral streams, near depressions (often manmade) and where water pipes are leaking.

Seeds of Sharp-edged Darling Iris (*Iris acutiloba*) listed in the 1989 Red Book of Azerbaijan and in the 1997 International Union for the Conservation of Nature (IUCN) Red List of Threatened Plants were found in the area of proposed terminal development.

The coastal area's sandy beaches are predominated by the pioneer shrub species. The beaches transition to a littoral ecotone. This zone leads to primarily ephemeral reed-beds.

Slightly inland from the coastline is an area with mixed semi-desert and coastal vegetation. In this area two rare and endemic species, *Calligonum bakuense* and *Astragalus bacuensis*, were found. These species are listed in the 1989 Red Book of Azerbaijan and in the 1997 International Union for the Conservation of Nature (IUCN) Red List of Threatened Plants.

ES6.4.2. Fauna

The coastal and semi-desert habitats were found to host a reasonably high level of faunal species diversity. The area southwest of the land acquisition zone showed the greatest concentration of species.

The Spur-thighed tortoise (*Testudo graeca iberia*), a species listed in the 1989 Red Data Book of the Azerbaijan Republic and in 1994 IUCN Red List of Threatened Animals as "vulnerable", has been previously observed throughout the terminal area and it was encountered during surveys for this ESIA carried out in May/June 2001 in the coastal area close to the interface with the inland areas.

Two red-listed bird species were also observed during the 2001 survey namely, the Black-bellied Sandgrouse (*Pterocles orientalis*) (1989 Red Book of Azerbaijan) and the Lesser Kestrel (*Falco naumanni*) (1997 IUCN Red List of Threatened Animals).

The peak sensitive times for fauna species are during mating seasons and while the animals are pregnant. For mammals, these periods vary widely depending upon the species. For amphibians and reptiles, breeding and incubation occurs during April through to August. Birds breed in the region between March to August with the spring and fall migrations occurring March to April, and August to October, respectively. Over-wintering birds inhabit the coastline in great numbers from October to March.

ES7 Existing Socio-economic environment

ES7.1 National baseline

The Caspian has traditionally been a region of strategic importance providing a direct link between Europe and Asia and a border between two world religions. Azerbaijan is surrounded by newly independent states and more established countries such as Turkey and Iran. The advent of independence and the economic and social transformation process has been marked by armed conflict, social unrest and ethnic tension.

In 1999 Azerbaijan had a population of 7.9 million people with 52% residing in urban areas and 48% in rural areas. Ethnic minorities such as Russians, Armenians and Lezghins make up approximately 20% of the total population. Over 10% of the Azerbaijani population has become internally displaced as a result of the continuing occupation of part of its territory by Armenia. Islam is the major religion with the majority of the population defined as Muslim. In Azerbaijan women and men possess equal rights and liberties under the constitution although economic and educational gender parity has not been reached.

The income level of most Azerbaijani households remains low. In 2000, the average monthly salary in Azerbaijan was AZM205,112 (US$44). Several indicators suggest however, that real household income has increased in recent years.

The unemployment rate is difficult to track in Azerbaijan due to the fact that the government only counts the number of those registered as unemployed. Registration is complicated and little benefit is gained from being registered so the figures are not viewed as accurate. Changes in the public sector profile can be tracked showing public sector employment falling steadily in the past decade but offset by increases in the private sector. There is a large degree of underemployment in the public sector with posts remaining filled when there is insufficient work to do and other employees continuing on the workforce with reduced wages. Unofficial labour markets are also prevalent throughout the country, primarily in the larger settlements.

Until recently the Azerbaijani economy was in the grip of a substantial decline that began in 1989. Whilst GDP has continued to grow since 1996, such growth has been erratic with a recent slowdown. In 2000 however, there was a record increase in growth of 11.3%. Recent monetary and fiscal policies appear to be stabilising the economy and creating a platform for recovery.

Agriculture is the most important sector in terms of employment with around 30% of the workforce directly engaged in agricultural production. Resource based industries have developed a greater importance to the overall economy as compared with manufacturing, due primarily to the development of the oil sector and specifically offshore oil production. The oil and gas sector currently accounts for around 25% of GDP and almost 80% of merchandise exports. As new oil and gas fields and pipeline routes come on stream, export of oil and gas will dwarf the export of other goods and services. Light industry remains underdeveloped due to the former reliance on Soviet markets and a general difficulty in competing with imported goods. The accumulation of foreign assets through the Azerbaijan State Oil Fund and the development of the non-oil economy will however, be vital for providing Azerbaijan with some protection against adverse oil shocks.

Shipping activities in Azerbaijani waters include commercial trade, passenger and vehicular ferry transport, military, scientific and research operations and services, and supply operations to the offshore oil and gas industry. There was a sharp decline in merchant shipping levels in the early and mid 1990s followed by a substantial increase beginning in 1996. The majority of the increase has been related to new oil activities. Azerbaijan has eight commercial ports centred around the Apsheron Peninsula and the capital, Baku.

Fishing in the Caspian has represented a relatively major contribution to GDP at approximately 1%. The fishing industry employs nearly 4,000 people or 7.3% of the workforce in the food industry. The Caspian is an important fishing area with commercial catches of sturgeon, sprat, carp, darters, gobs, herring, salmon and mullet. Fish stocks have however, fallen substantially since the advent of independence among the littoral states. The industry today is in serious decline not only as a result of falling stocks but also disrupted export routes and markets and inadequate supplies of materials for processing and packaging.

Azerbaijan's access to external markets has continually been disrupted by regional political turmoil. The key route for the transport of goods, including oil and gas, to Western markets is through Georgia to the Black Sea though exports also proceed through Russia and Iran. The geographical location of Azerbaijan creates dependence on its neighbours, especially Russia, for the transport of imports and exports with 90% of road freight and 95% of rail freight passing through Russia. Baku itself is a major transport hub for the entire Caspian region.

In 1999 foreign investment in Azerbaijan decreased by 26%. In aggregate, foreign investment flows have been small (outside the oil sector). Notably, there has been little impact on the entire industry base of Azerbaijan including the agricultural/agri-business that is the heart of the Azerbaijani economy.

The privatisation process has moved slowly and the private sector remains small in relation to state concerns. There has however, been a significant increase in the volume of output over the last few years and a corresponding increase in the number of employees. In addition, there is a steady growth of joint venture enterprises involving foreign companies within Azerbaijan. Tax system reforms began in 1995 in response to rampant national tax evasion, declining revenues and pressure from IFIs. Following this, key tax administration measures were adopted in January 1999. Despite these measures however, taxation remains unpredictable.

Privatisation in the agricultural sector began in 1996 and has progressed rapidly. Price controls on agricultural products have been removed and trade has been liberalised. The system of state and collective farms is in the process of being dismantled and a wide variety of small-holder farming structures have emerged. The privatisation of livestock is nearing completion.

Most of Azerbaijan's infrastructure is in poor condition as there has been inadequate public investment and maintenance of infrastructure since independence. Clean water is a scarce resource and water quality is poor. The problem of clean water scarcity is compounded by inefficient water use.

The health care system consists of a complex, hierarchical network of medical structures that remain almost completely within the public sector. Access to effective health services is weak as a result of the deterioration of medical buildings and shortages of up-to-date medical equipment. This has been compounded by the near collapse of emergency services and primary care in most rural areas. A number of modern health facilities have recently become operational, within Baku the capital, however the majority of the population is unable to afford or access these services.

Health indicators for 1997 show male life expectancy as 66.5 years while female life expectancy as 74 years. The birth rate in the same year was 17.4 per thousand and deaths at 6.2 per thousand. The leading causes of mortality in Azerbaijan include cardiovascular disease, cancer, respiratory infections and accidents. The incidence of communicable diseases is on the increase.

Azerbaijan inherited a strong and comprehensive system of education from the Soviet Union characterised by total centralisation and standardisation in approaches to education. Azerbaijan's educational progress is however, jeopardised by funding problems and structural weaknesses within the education system. There is also a need for improvement in terms of access to and the quality of systems and learning.

According to the World Bank, around 20% of families in Azerbaijan can be classified as severely vulnerable. The actual overall income per capita considerably exceeds the official

salary level, indicating that unofficial financial turnover has become the main source of income for a large percentage of the population. The major causes of increasing poverty could be perceived as the general economic decline and the fragmentation of the social welfare system. This poverty is intensified by the reduction of access to social services. Social inequality is also a rising problem and is compounded by a tendency towards migration from Azerbaijan, with the consequence that the proportion of young people in the population is decreasing whilst the proportion of elderly citizens is increasing.

This situation is made more complex by the ongoing economic crises, the uneasy peace with Armenia and the problem of accommodating over half a million people displaced from territories now occupied by Armenia. There are currently about one million Azerbaijani refugees and Internally Displaced People (IDP) within Azerbaijan, accounting for one-seventh of the country's total population.

There are approximately 950 NGOs officially registered in Azerbaijan, although only between 90 and 110 of these are active. The 1995 constitution and 1992 press law ostensibly guarantees free media. The print media in Azerbaijan are however, subject to various restrictions. Recent reports have suggested a lifting of restrictions.[4] The two state-owned television stations dominate the electronic media, although in addition to these there are a number of private and two Russian TV channels. Azerbaijan's telephone system is a combination of old Soviet era technology and modern cellular telephones. Satellite service between Baku and Turkey provides access to 200 countries.

Azerbaijan is a country of ancient history and culture. In ancient times, several states existed on the territory of present day Azerbaijan. In the mountains of Gobustan there is a concentration of rock carvings, settlements and tombstones recording the history of the Azerbaijani people from the Stone Age onwards. The Azerbaijani language is a member of the south Turkic group of languages. Following independence the Government began to phase out the use of Russian, which was widely spoken during Soviet times and is still often spoken in urban areas and understood throughout most of Azerbaijan.

ES7.2 Regional baseline

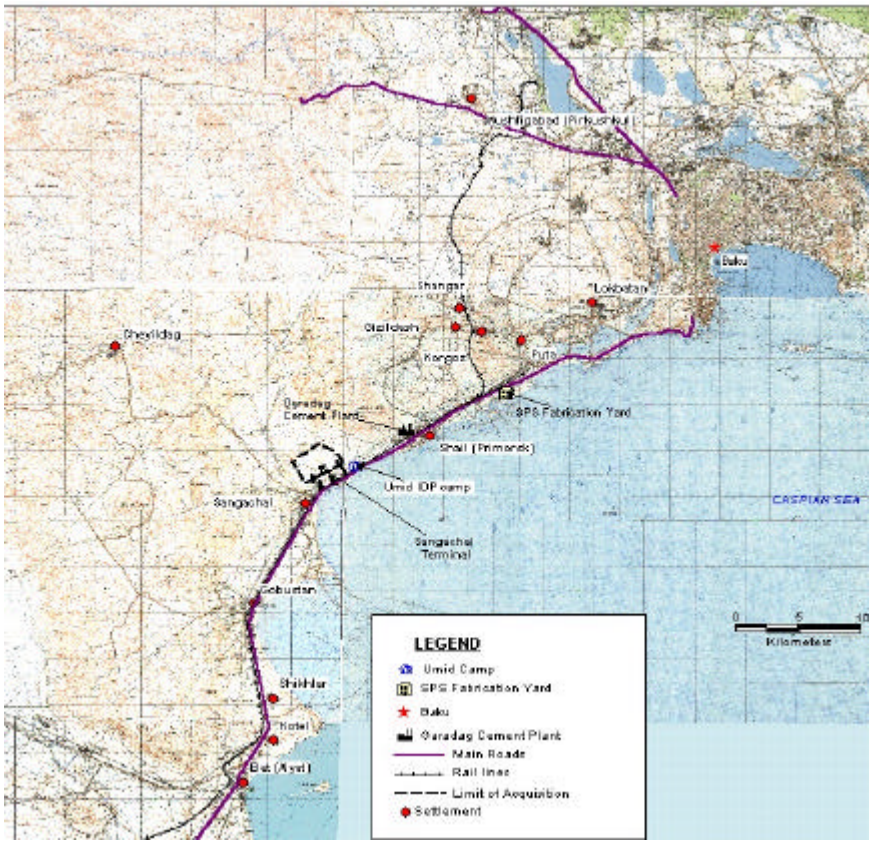
The terminal site at Sangachal is located in the Garadag District (Figure ES.14), part of the Baku Administrative Region extending from just south of Baku to Gobustan.

Population figures indicate that almost 94,300 people are resident in the District. In addition to the key settlements of the district, namely Lokbatan, Sahil (previously Primorsk), Gobustan, Elet, Gizildash, Mushfigabad, Sangachal, Buta, Cheyildag (previously Umbaku), Korgoz and Shangar, there are three small villages Umid, Shikhlar, and Kotel.

The majority of the population in the District is Muslim with only a small minority, (approximately 7.4%) being Christian

[4] Baku Sun, 2002.

Figure ES.14 Garadag region



The average monthly income in Garadag District for 2001 is estimated to be US$75. This figure masks the findings of recent survey work in the area local to the ACG Phase 1 Project which indicate that approximately 35% of those surveyed in Sangachal, Sahil and Umid receive no income at all.

Employment in Garadag District is dominated by its proximity to the industrial and economic activities in Baku and Sahil. The oil and gas industries support large numbers of workers while activities in the agricultural sector appear to be largely confined to grazing during the winter season. Fishing is limited and is concentrated around Elet, Sangachal and Lokbatan and appears to be undertaken for recreational and subsistence purposes.

For the first six months of 2001, the oil sector and its associated industries contributed approximately 50% of total GDP in Garadag District with the construction industry accounting for approximately 30%.

The Baku-Alyaty highway routed along the Sangachal Bay coastline passes to the south of the terminal location. This section of road is a main highway in Azerbaijan being part of the main transportation route north from Baku to Boyuk and to Kesik at the Georgian border and south from Baku to Astara to the Iranian border. In addition, the Baku-Alyaty railway runs parallel to the highway through the Garadag District and is part of the main transportation route for Azerbaijan in terms of its capacity. A number of utility lines and pipelines are also routed along the coast parallel to the highway and railway line. These utility lines provide electricity, communications, oil, gas and water.

Health services in the area are provided through medical ambulance stations in the main settlements and also two hospitals. Health issues that have arisen include a typhus epidemic in 1989 and respiratory problems.
There are 22 secondary schools and 4 colleges in the Garadag District with a capacity for approximately 13,700 students at any one time. In total however, between 25,000 and 27,000 children are studying in these schools. These figures indicate problems of overcrowding. Although no figures are available on the percentage of graduates from the total school population, a rough estimate is that 5.7% of school age children graduate from secondary school. Of these, 36.5% are continuing their education in colleges and other higher schools.

The internally displaced persons (IDP) and refugees in Garadag District are primarily located in Lokbatan, Sahil, Gizildash and Sangachal settlements. Just over 20% of IDPs in the District are from Armenia while the remaining 80% are IDP from occupied territories of Fizuli, Agdam, Zengilan, Gubadli, Kelbejer, Jebrayil, Lachin districts and Shusa, Khojavend, Khojali city and villages of the Nagarno Karabakh region.

ES7.3 Local baseline

The area local to the project includes Sangachal town, Umid IDP/cement camp, herding settlements, railway barrier operations, a 15th century restaurant, a road-side café/garage, fishing related communities and stone mine operations.

Sangachal town has approximately 4,000 residents, 13% of whom are IDP. The majority of the residents follow the Islamic faith (97%) while the remainder are believed to be Christians. The average monthly income for the Garadag region as a whole in 2001 is US$75 (AZM346,500). Meanwhile a survey of Sangachal residents indicates that 35.6% of respondents have no income at all and of the remaining population some 50% earn between AZM100,000 and AZM500,000. The majority of Sangachal residents view their standard of welfare as poor (51.9% of respondents)[5].

Officially between 250 and 300 people are employed in Sangachal, although this excludes those involved in agriculture, which is thought to comprise a further 5-10%. The majority of people in employment work in a number of State-run enterprises in the town. Unemployment is a key problem in Sangachal with official figures showing between 30-50% of people unemployed.

Although there are no figures available detailing the skills base of the available labour force the Garadag Executive Power was able to identify some of the skills that are available from those currently employed, including manual workers, cleaners and a number of welding specialists.

Only a few residents in Sangachal are involved in agriculture. It seems that for those few residents within Sangachal who are practising some form of agriculture it forms a subsistence livelihood. The Sangachal Bay is under the jurisdiction of the Azerbalyk State Fisheries Concern (ASFC). The ASFC does not allow the wider community to fish commercially. They are however, allowed to fish with rods for subsistence and recreational purposes. The fishing season varies depending on species although it is largely in the spring (February-April) and autumn (August-October).

[5] This information has been drawn from the Azeri Holland Friendship Society survey of Sangachal, Umid and Primorsk. There are methodological difficulties with the interpretation of the survey data and at present these figures are indicative only.

The majority of the population is housed in state owned apartments with satisfactory supplies of electricity and gas. Cold water is piped into the town. There is no hot water supply and this is normal for the area. Bottled water is not used for drinking, washing or cooking. The sewage system is basic. Enclosed canals are utilised to take sewage out of the town to where it is collected near the sea. These canals are open between the town and the collection point. From the collection point, sewage is transport out to sea without any treatment. There are five garbage disposal sites in the town and they are emptied once or twice a week. The waste is taken to the main landfill site near Sangachal, where the material is either burnt or covered. There are very few roads in and around Sangachal and most of these are covered in gravel.

Based on discussions with Garadag Executive Power, it appears there are no major health problems in Sangachal town. The issue of health though was discussed during a recent survey of those in the area and over 50% of the Sangachal population assessed their health as poor. No official figures were however available to support this assertion. An immunisation campaign is being undertaken within the town, administered by the doctors from the United Hospital in Primorsk. There is no hospital or pharmacy in Sangachal however an ambulance station provides basic first aid.

Sangachal has only one school and thus several children travel to Primorsk for extra-curricula activities which are not available at Sangachal School. Last year approximately 10 children went on to university education. According to Garadag Executive Power, Sangachal school faces a number of key problems including necessary and ongoing building maintenance and lack of computer equipment for pupils.

Almost 13% of Sangachal residents are classified as IDP. IDPs in Sangachal do not live in permanent accommodation but are housed in either public buildings or abandoned homes. Whilst IDPs receive free medical services and also education, they do have to pay for medication. The receipt of foreign aid for IDPs at Sangachal and Umid is limited and infrequent and no figures were available on the amounts, frequency or purpose.

Access to telephones is limited to 30% of the households, however the majority of people have access to televisions according to Garadag Executive Power, although exact figures are unavailable. There is very limited circulation of newspapers, although radio is accessible to all.

Officials within the government, at the national and regional level, undertake decisions affecting the community, such as those connected with investment and events. Their decisions are then fed down to the local executive power. According to the Garadag Executive Power, in addition to this formal process, Sangachal has a group of elders who bring forward issues and concerns from the residents to the local executive power.

Umid Camp is a settlement with one area housing IDP and another housing workers from the Garadag Cement Plant at Sahil. The camp has been given permanent status in that it is now recognised as a formal settlement. In total there are more than 1,000 people living in Umid Camp. It is estimated that 48.3% of the population is male and 51.7% female. It is estimated that 72% of the households within Umid Camp as a whole are IDP households.

It is estimated that almost 37% of family's within the IDP part of Umid camp do not earn anything. Meanwhile a further 57% earn between AZM0 and AZM200,000[6]. Information also indicates that there are low levels of employment, an apparent unreliability of foreign aid,

[6] AFHS survey 2001.

a low level of national aid and injuries to male members of some of the households. No data was available for income levels for the cement camp.

It is estimated that approximately 70 (i.e. 7%) of residents in Umid camp are employed. All of the employment sources within the camp are state run enterprises. A few residents are involved in fishing, however this is for subsistence purposes to supplement diet. Many of the IDP families have been affected by the war and this specifically affects employment opportunities where the men have been injured. As a result it is often the women within the household who work and not the men, as would normally be the case.

The IDP camp now has 130 households and there are no plans for expansion, although there may be some expansion through natural increases in the size of the population. Meanwhile, the cement camp is being extended by the addition of around 10 houses.

The Camp houses a school, medical office, bakery and post office. Households are supplied with gas, electricity and running water. The sewage system is a simple open drainage ditch around the camp. The roads in and around the camp are gravel based, although the main road to Baku is covered in asphalt.

All households have access to electricity and gas within their homes. Sufficient quantities of water are piped to households and the supply is regular. There is no hot water supply, which is normal for the area and no use is made of bottled water nor wood for cooking and heating purposes. There are three waste disposal points in the IDP camp and one in the cement camp. Waste is collected every week and transported to the landfill site at the cement works. Sewage is transported via simple open drainage ditches. The IDP population is housed independently in normal houses and flats.

According to Garadag Executive Power, Umid Camp has not experienced any health problems to date. Medical services within the camp are limited and the existing medical facility is a basic first aid post. All the children from the IDP Umid Camp are immunised by doctors from Primorsk hospital. Whilst medical facilities are free, there is a limited supply of medicine. Assistance from international organisations is on a very infrequent and ad hoc basis. Umid camp has one school and it is attended by approximately 120 children.

All of the households in the IDP Umid Camp have telephones and radios but they do not have access to newspapers. There is only one telephone in the cement camp. Any decisions about the community are undertaken by either Garadag district or Baku region. There is, however, also a committee of elders who discuss issues, make decision, resolve disputes and take the ideas, concerns to the head of the camp.

The site in and around the terminal area is winter grazing land for a number of pastoralists their families and their animals. There are two herding settlements within the vicinity of the terminal, one in the Central North area and another situated at the foot of the West Hills[7].

The West Hills settlement is used by herders during the winter months and they report to the Qobu cattle breeding enterprise. There are approximately 31 people living at the West Hills settlement during the winter months. The herders spend around 8 months a year at the settlements from approximately mid-August to mid-May each year. During the summer the majority of them travel to Kuba in the north whilst one family of approximately 4-5 people remains at the settlement for security reasons. According to the herder supervisor of the West

[7] Information gathering on the herding settlements is ongoing and the information presented here may change and expand as new data emerges from this process.

Hills herding settlement the herders are paid a wage for looking after state owned sheep. In addition they earn a living from their own produce such as cheese and wool. The children of the West Hills settlement are not normally vaccinated and usually attend the Umid school.

The Central North settlement is used by herders during both the winter and summer seasons and is believed to report to the Guzdek cattle breeding enterprise. The Central North settlement consists of a two main buildings and a number of out houses. There are approximately 10 buildings in total in the West Hills settlement, some of which are for living whilst others are for housing animals. There are no water, gas or electricity supplies to these settlements. Those living in the Central North settlement sustain a living through grazing sheep and cattle. Overall, those living in the Central North settlement appeared to be in a poor nutritional state with signs of malnutrition in the younger children. However no accurate health data has been obtained to date. If there is a need for medical assistance the herders generally attempt to seek help from the Sangachal terminal site. It is understood that the remain in Shamahar during the winter to attend school.[8]. The children of the West Hills settlement attend Sangachal school.

The grazing area around Sangachal, although physically located within the Garadag Executive Power District is mainly controlled by the Apsheron Executive Power based in Baku.

Sangachal Bay attracts a large quantity of commercial fish and their fry for spawning and wintering. The only commercial fishing authorised by Azerbalyk State Fisheries Concern in the Bay is to support the fish hatchery plant nearby. Azerbalyk has two fishing nets positioned in the Bay which remain there all year round, although fishing is only undertaken during the months of January-May and September-December. In addition, Azerbalyk has cages in the bay for catching fish, one of which lies within the ACG Phase 1 pipeline corridor.[9] There are some 3 or 4 fishermen employed to work these nets and cages. There is a temporary building near the shore where the fishermen can shelter.

In addition to the fishing undertaken near the shore, fishing is also undertaken some 1-2 km from the coast via nets are thrown into the sea. This fish is reported to be low quality and as a result is not sold commercially but used for subsistence purposes. Fishing vessels also catch sprats some 40-60 km further out to sea using a combination of lights and nets.

Other activities and sites within the local area include:

- A **roadside café/garage** beside the main road to Baku near to the entrance of the terminal site. It is owned and run by two Sangachal residents.
- An **open cast stone mine** (Firuza stone mine) operating approximately 10 km from Sangachal town and north of the proposed terminal site. The materials are used for construction in the local area. It is estimated that there is enough stone in the mine to remain in operation for a further 20-30 years. The mine is in operation 24 hours a day with employees working in shifts. There are around 25 people employed at the mine.
- A 15th century **historical restaurant** that was a "caravanserai" and is now a protected state monument approximately 1 km southeast of the terminal site.
- A **railway barrier/crossing** with an associated hut (attended 24 hours per day) situated on the access road into the terminal site. Four people share the job as railway barrier

[8] This information has been taken from the BP Resettlement Action Plan process for the ACG Project 2001/2.

[9] Information provided by BP and gathered as part of the Resettlement Action Plan process, 2002.

operator, with each working a 24 hour shift and then having three days off. The hut provides shelter with basic facilities.

- **Archeological finds** are scattered around the local area and the proposed terminal site. Survey work undertaken as part of the ACG Phase 1 ESIA identified some surface finds in the area along with the possibility of sub-surface archeological features.

ES8 Environmental impact assessment

For the purposes of the environmental impact assessment process, the ACG Phase 1 Project was defined as comprising 84 routine and planned non-routine activities. Each of these activities was assessed for its potential to interact with 23 identified environmental receptors. Where an interaction was identified, it was denoted as an environmental aspect. A total of 313 environmental aspects were identified. Each aspect was assessed for its environmental impact and ranked in terms of its impact significance.

The environmental impact assessment process determined that the majority of environmental aspects identified did not result in significant impacts. Of the 84 routine and planned non-routine project activities identified, 13 have the potential to cause 25 different "high" significance impacts on 16 separate environmental receptors. No routine activities were assessed as having the potential to result in environmental impacts of "critical" significance. This is partly a result of the characteristics of the project and partly the result of project design that has sought to mitigate identified and potentially significant impacts during the early design stages by:

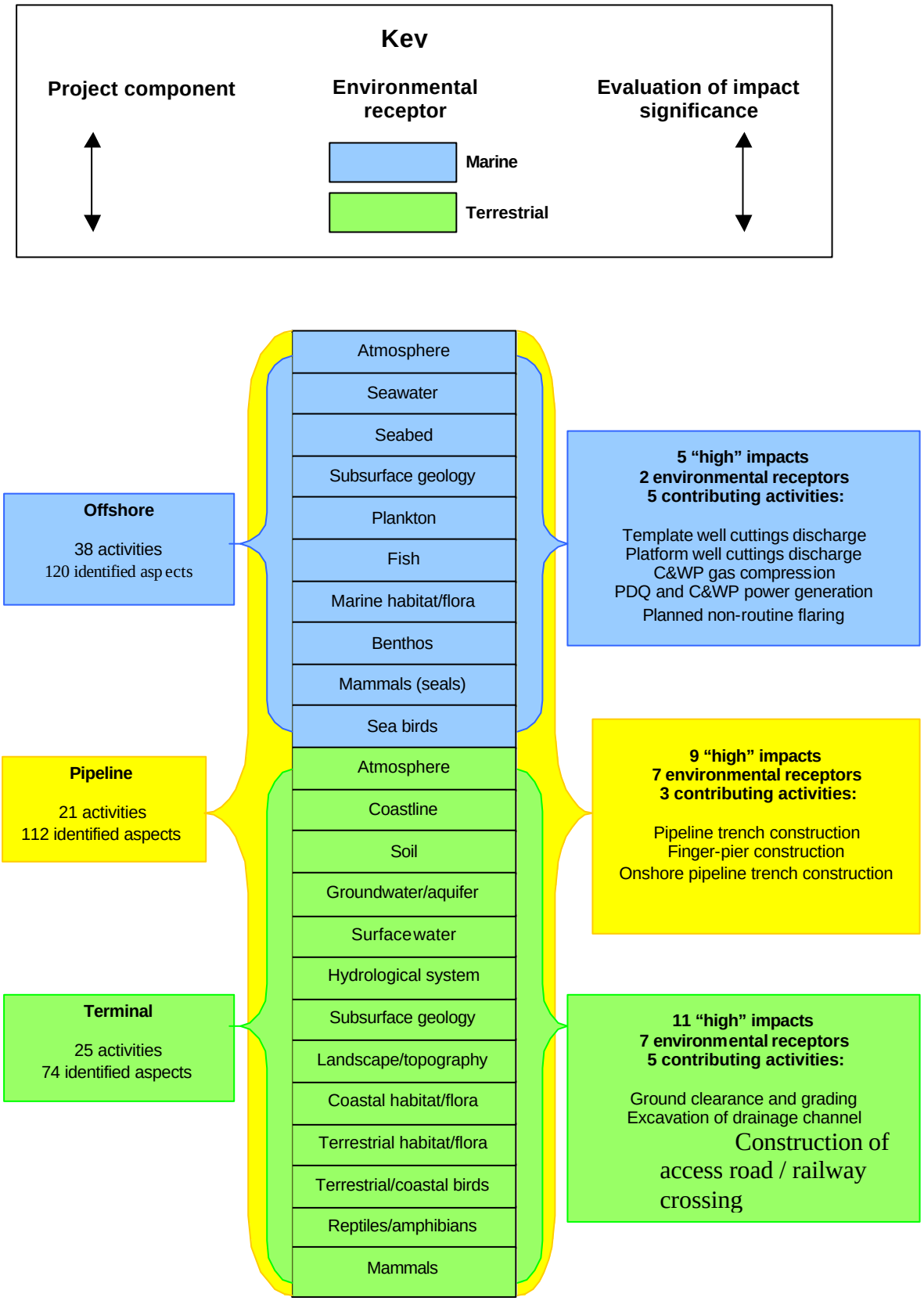
- Eliminating the cause of the potential impact through design modifications;
- Reducing the negative effects through design and/or operational practices; and
- Development of mitigation procedures to minimise the harmful effects of residual impacts.

Clear examples of where project design is such that environmental impacts are minimised include:

- The decision to re-inject drilled cuttings from lower hole sections drilled with non-water based mud systems rather than discharge to sea;
- The decision to use a cooling water antifouling system that will result in far lower concentrations of chlorine being discharged to sea;
- The decision to re-inject produced water offshore rather than discharge to sea;
- The decision to pursue onshore injection of produced water generated at the terminal into dedicated disposal wells;
- Use of associated gas as fuel gas for offshore and onshore facilities and for re-injection offshore for reservoir pressure maintenance, with the remainder to be delivered to SOCAR, resulting in no requirement for routine flaring of gas to produce;
- The decision to commingle Chirag-1 oil and gas with Phase 1 production offshore resulting in the elimination of any routine flaring required at the Chirag-1 platform;
- The decision to install flare gas recovery at the terminal to remove the requirement to flare internal process valve and seal leakage;
- Use of the existing EOP pipeline corridor route for the Phase 1 30" oil pipeline so as to avoid disturbing previously undisturbed benthic habitat;
- Scheduling pipeline installation activities in the nearshore as far as is practicable to avoid environmentally sensitive time (e.g. breeding seasons);
- The decision to locate the Phase 1 terminal alongside the existing EOP terminal resulting in a reduced land-take requirement; and
- The decision to design and install a water treatment plant at the terminal location that will contain and treat sewage waters and eliminate the need to discharge sewage waters to sea.

Figure ES.15 illustrates these assessment results in terms of the project's offshore, subsea pipeline and terminal components.

Figure ES.15 Environmental impact assessment results (routine and planned non-routine activities)



The specific environmental issues and proposed additional mitigation measures associated with the 13 activities identified as having the potential to result in "high" significance environmental impacts (right hand boxes in Figure ES.15) are discussed in the following sections. A brief overview of the relevant project activity is also presented.

ES8.1 Discharge of drilled cuttings and drilling fluid/WBM

A Best Practicable Environmental Option (BPEO) study was completed in parallel with this impact assessment to determine the disposal method for drilled cuttings generated from the 26" surface-hole section of wells drilled as part Phase 1. The BPEO considered five factors as follows:

- Environmental risk;
- Risk to personnel;
- Compliance with legislation, international best practice and AIOC/BP standards;
- Cost of alternatives; and
- Current available technology.

The BPEO study concluded that, on balance, the best disposal method for surface-hole drilled cuttings and drilling fluids/water based mud (WBM) is discharge to the marine environment.

The discharge of drilling cuttings will result in a physical alteration of the seabed and smothering of the seabed habitat in the near vicinity of the drilling facilities. Resident organisms in the impacted area will be lost. The drilling fluids to be used have been carefully formulated so as to ensure that they contain no toxic chemical additives, hence no persistent chemical impacts are anticipated and it is predicted that recolonisation of impacted habitat would commence after the drilling programme has been completed.

While not significant in the context of the whole ACG Contract Area, on a local scale the amount of seabed habitat that will be physically smothered by cuttings discharge from the full Phase 1 drilling programme is considered to be appreciable. In addition, the drilling programme will continue for up to 10 years. Impacts associated with these discharges have therefore, been assessed as being significant.

Discharges from the 26" hole section will be released as deep in the water column as is technically possible in order to minimise lateral spreading of the drilled cuttings on the seabed.

The drilling team will record all discharged volumes of drilled cuttings, drilling fluids/WBM and additives and contingency chemicals used in the drilling fluid systems. Chemical use will be audited to ensure that compliance with international toxicity/discharge standards. The use of chemicals that may cause tainting and known endocrine disruptors will be forbidden.

The project will continue to evaluate alternative options to discharge to sea of surface hole cuttings to ensure that the BPEO is still valid. In the meantime, impacts associated with discharges will be monitored by means of regular benthic surveys around the installations.

ES8.2 Installation of 30" pipeline in Sangachal Bay

Any pipelay activities in Sangachal Bay will, to some extent, impact the benthic environment and result in potential loss of seagrass habitat along and adjacent to the pipeline route. The base case pipeline route has been selected to minimise these impacts by considering seagrass

and algae habitat distribution in the nearshore and identifying a route with limited impact alongside the existing Early Oil Project (EOP) 24"pipeline.
The seasonal sensitivity of the bay has been considered during the development of the construction schedule with installation activities, wherever possible and practical, avoiding the times of the year with highest biological activity (i.e. spring and late summer).

The nearshore section of the 30" pipeline from offshore will be trenched between the shoreline and the 5m water depth contour. The decision to trench the pipeline is however, governed by pipeline integrity considerations and mitigates the risk of third party damage leading to rupture and more widespread environmental damage. The pipeline trench would be mechanically excavated out to the 2m water depth contour then "jetted" into the seabed between the 2m and 5m water depth contours. There will be no requirement for rock-blasting using explosives.

The trench will be approximately 3m wide with a total length of approximately 1.5 km. Trenching will result in the direct loss of seabed habitat over an area of approximately 0.5 ha. Deposition of excavated material adjacent to the trench is estimated to impact an area of at least the same size and possibly up to twice as large. Trench construction activities are therefore, estimated to directly impact 1.5 ha of seabed habitat.

In order to mechanically excavate the trench in the inshore area, it is planned to construct a finger-pier from the shoreline to the 2m depth contour to support the excavation equipment. The pier will be approximately 10 m at its base and between 250 and 300 m long. The total area of seabed that will be directly impacted by the structure will therefore, be approximately 0.3 ha.

It is planned to remove the finger pier following installation and to return the area to its original status. It is possible that if the pier was not removed this may result in a change to coastline configuration beyond the pier. Removal of the pier will result in further short-term disturbance and a re-suspension of sediments thereby potentially impacting again on nearby seagrass beds and benthos. The project is therefore considering alternatives to the construction of the finger pier, such as using a flotation pontoon or floating barge, although preliminary indications are that there are potential difficulties associated with the possible alternatives, in particular, the availability of suitable and appropriate equipment in the region.

Seagrass habitat is important in terms of the ecological role it plays as a spawning and nursery area for a range of marine organisms including commercially important fish species. The root structure of seagrass beds also plays an important role in the stabilisation of seabed sediments. Approximately 450 ha of sensitive seagrass habitat are present in Sangachal Bay (c.12% of the Bay) and it is estimated that between 20% and 25% of the pipeline corridor has seagrass beds. The total area of seagrass habitat that would be directly impacted as a result of pipeline installation activities is, as a percent of total sensitive habitat in the Bay, very small (i.e. <1%).

The excavation activities would also result in increased turbidity of the water column from mobilised sediments. Depending on the strength of currents at the time of trench construction, sediments could be mobilised, transported and deposited considerable distances away from the immediate trench construction area and impacting additional benthic habitat. Consideration is being given to the use of silt screens around the pipelay activities that will trap and limit the lateral movement of mobilised sediments. In light of these direct and indirect impacts, the ecological value of and long restoration times (i.e. years) for seagrass habitat, impacts resulting from pipeline installation in the nearshore activities are considered to be significant.

The pipeline contractor will develop a shore approach mitigation plan prior to any pipeline installation works commencing and will maintain an active monitoring and recording programme during all construction and installation activities. One of the key objectives of the plan will be to restore the impacted habitat to its pre-project condition including the removal of the finger-pier. A post-restoration audit will be conducted to ensure that the area has been restored as far as possible to its original condition. The re-instatement will also be followed by monitoring surveys to ascertain how rapidly and effectively the habitat is becoming re-colonised.

The offshore trench (beyond the 2 m water depth) will be left to back-fill naturally thus reducing the need for further environmental disruption following installation. The trench would be expected to in-fill over a relatively short period of time.

Recovery of the seabed and associated communities around the pipeline route following installation would however, be hampered by the subsequent installation of the pipelines required for ACG FFD and Shah Deniz FFD. These activities would lead to additional and cumulative impacts on seagrass habitats and benthos within the Bay. All opportunities to reduce impacts in the Bay will be pursued including evaluating the possibility of concurrently laying all required pipelines in the nearshore zone for these developments.

ES8.3 Terminal and onshore pipeline construction

Construction of the terminal flood protection drainage channel, terminal access road, construction camp, and clearance and levelling of the ground in preparation for the terminal facilities construction will result in the loss of in excess of 170 ha of terrestrial (semi –desert) habitat. It should be noted however that ground clearance and levelling would be carried out for both the ACG Phase 1 Project terminal facilities and the proposed Shah Deniz gas terminal to be constructed alongside. As the features will be long term, there is no opportunity for habitat restoration within this footprint. Construction of the onshore section of the 30" pipeline would result in the temporary loss of approximately 2 ha of habitat.

In addition to impacts on flora as a result of direct habitat loss there is also the potential for these activities to directly impact fauna, resulting in their mortality.

The drainage channel to be constructed, in order to protect the terminal from flood, will result in an alteration to the local hydrological regime with the potential to also impact on wetland habitat (wadis and marshes) in the vicinity of the terminal site. Further investigations will be conducted to establish the potential impacts of the channel, including a watershed analysis, to analyse channel flow (including seasonal differences) and the spatial fate of diverted water. An ecological study to predict the effects a changed hydrological environment has on nearby wetlands, is also under consideration although monitoring may be sufficient.

The environment around the terminal site location and the onshore pipeline corridor host a number of nationally and/or internationally red-listed flora and fauna species. Listed flora species are the endemic Baku Calligonum (*Calligonum bakuense*), the Baku Astragalus (*Astragalus bacuensis*), and the Sharp-edged Darling Iris (*Iris acutiloba*). Listed fauna species found in the area include the Spur-thighed tortoise, Black-bellied Sandgrouse and the Lesser Kestrel. Hence, the impacts associated with these installation and construction activities are considered to be significant.

The onshore section of the pipeline will utilise the narrowest possible pipeline corridor in order to minimise the aerial extent of disturbance to habitat. Excavated soils will be collected and stored with the topsoil layer stored separately from the subsoil. These soils (subject to suitability) will be used to backfill the open trench following pipelay with the topsoil layer

being re-instated to, as close as possible, pre-disturbance conditions. The potential for direct impact resulting in mortality of individual animals will be mitigated through site control and the restriction of vehicle movements in the area.
Monitoring programmes will be conducted following installation and re-instatement to determine the extent to which habitats and specific species have been disturbed and to ensure that the area disturbed is becoming recolonised with natural flora and fauna. In the event that natural recolonisation does not occur at an effective rate, habitat restoration will be conducted including direct planting of relevant flora species.

Impacts resulting from the construction of the terminal and associated facilities are considered to be significant due to the permanent removal of a large area of habitat that hosts the red-listed flora and fauna species in the area.

An environmental management plan to be developed by the construction contractor will include procedures designed to minimise direct impacts to animals in the area during construction. This will include provision for environmental awareness training to ensure that all personnel understand the key sensitivities in the area of work activity and the required vehicle movement controls. In addition, the possibility of having on-site presence of an HSE representative to monitor construction activities and to identify vulnerable fauna, such as the red-listed Spur-thighed tortoise, for rescue where and when appropriate, is being evaluated.

A habitat compensation programme designed to compensate for habitat loss is also under evaluation. This programme would seek to mitigate, through semi-desert habitat rehabilitation/restoration, the habitats lost to the most significantly impacted flora, birds and herpatofauna from terminal construction activities.

In addition to habitat compensation, a Spur-thighed tortoise augmentation programme is under development in order to compensate for impacts associated with construction activities. This programme includes a captive breeding effort with assistance from specialists with previous experience of conducting such programmes with the objective of breeding the animals and subsequently releasing them to the wild thereby adding to currently viable populations in Azerbaijan.

ES8.4 Emissions of greenhouse gases resulting from Phase 1 operations

The principal contributing activities that result in emissions to the atmosphere occur during the project operational phase. The key contributors are related to the following:

- Combustion emissions from offshore platform and onshore terminal power generation turbines;
- Combustion emissions from the turbine driven gas compressors on the C&WP;
- Emissions from the process heaters at the terminal; and
- Flaring.

The key to the reduction in combustion emissions is high energy efficiency and this will be achieved by using centralised power operated to meet demand only, careful equipment selection and further consideration of waste heat recovery. In fact there has been an allowance for future waste heat recovery to be incorporated into the terminal facilities in the future.

Flaring will be minimised through the re-injection of gas, the use of gas as fuel for the platforms and terminal facilities and transfer of the remainder to SOCAR for onward delivery to the national grid. There will be no continuous flaring as part of the production process. In

addition, there have been a number of key design decisions included into the Phase 1 design to reduce the emissions from operational flaring. These include:

- Flare gas metering both offshore and onshore;
- Flare gas recovery onshore (that collects the low level process train gas leakage from valves and seals and returns it to the process); and
- Use of inert purge gas onshore.

In addition, once the C&WP is operational, any continuous flaring requirements on the Chirag-1 platform will be eliminated.

There will however, be occasions when plant upsets occur and gas will be flared to allow continued production during safe repair and restart of equipment. These occasions will be kept to a minimum by designing equipment with additional capacity, maintaining the equipment and limiting flare quantities. Overall facility design availability has been based on achieving 95% availability, although during the first and second year of operations equipment reliability will be lower due to the commissioning of the facilities and it is at this time that flaring quantities will be at their highest. Flaring quantities will be monitored and recorded.

A flaring policy will be developed that will be defined and agreed with the AIOC partners. The policy will stipulate the maximum duration and/or volume of gas flared annually and beyond this maximum production will be halted until the facility upset is rectified.

Appreciable emissions of greenhouse gases (principally carbon dioxide and methane) will result from the Phase 1 Project operations. These amount to between 1.7% and 1.74% of the United Nations Framework Convention on Climate Change (UNFCCC) predictions for Azerbaijan in the earlier years of the project (2005 and 2010). The cumulative input from EOP, ACG FFD and potential Shah Deniz FFD would, in 2010, be approximately 5% of the UNFCC prediction for Azerbaijan. In the context of global warming there arises therefore, a transboundary environmental impact issue.

ES8.5 Potential unplanned (accidental) events

A total of 22 potential accidental events were identified for the Phase 1 Project, each of which would result in significant impacts on the environment were they to occur. However, the likelihood of occurrence of each of the accidental events identified was considered remote. The only accidental event considered as warranting further investigation is the potential for a well blow-out event during drilling operations resulting in an uncontrolled release of hydrocarbons to the sea. It should be emphasised however that the likelihood of occurrence of such an event is considered to be extremely remote.

AIOC has invested considerable effort in the implementation of high engineering standards and control measures to remove the likelihood of accidental spills of oil to the sea. Through high maintenance of spill prevention equipment, as well as good operating practice, the likelihood of an oil spill is very low.

Well blow-outs are mitigated against by two independent barriers; the weighted drilling mud system and the blow out preventor which will close-in the well in the event that the formation pressure overcomes the hydrostatic pressure applied by the weighted mud. Whilst the likelihood of a blow-out is extremely small, the consequences of an uncontrolled release of hydrocarbons to the sea represents the worst-case oil spill scenario.

Coastal areas can be particularly vulnerable to oil spills. Dispersion modelling of a worst-case spill scenario such as that following a well blow-out determined that the oil released

following such an event could potentially impact the coastline of Azerbaijan and possibly Iran and Turkmenistan thus constituting a potential transboundary impact.

BP has commissioned a number of studies to assess the status of the coastline between Azerbaijan and Iran, in order to identify areas of vulnerability and assist in oil spill response planning. These include sensitivity studies, coastal surveys to assess shoreline types and accessibility as well as the regional Oil Spill Contingency Planning (OSCP).

The key tool for reducing or removing negative impacts as the result of a spill is the OSCP. The purpose of an OSCP is to provide guidance to those involved in responding to an oil spill incident and to initiate all necessary actions to stop or minimise any potential adverse effects of oil pollution on the environment of the development area. The primary step in the BP's response to an accidental release of oil is to first notify the relevant contacts of the occurrence of the incident and to categorise the size of the oil spill.

BP has prepared an overview OSCP for the Azerbaijan Business Unit that addresses onshore and offshore incidents, incident reporting, oil spill remediation contractor databases and response resource availability. This plan will be updated to incorporate the Phase 1 and future phases of development. In addition, the specific OSCP will be based on the results of the spill risk assessment and dispersion modelling. The plan will include an assessment of the adequacy of available response equipment and mobilisation effort required for the spill scenarios identified. Particular attention will be paid to appropriate shoreline protection and prioritisation of protection to sensitive coastal areas identified as being at risk from the potential beaching of a large oil spill. A sensitivity map and coastal protection plan have been developed.

An important feature of the OSCP will be the role of the Azerbaijani Government and the interaction with adjacent littoral states in the event that the spill moves into international waters. The littoral states of the Caspian Sea are working towards developing National Oil Spill Contingency Plans. Azerbaijan has yet to prepare a plan, whilst other states are believed to have plans in various stages of completion. Therefore, in the event of an international oil spill incident, where there is a potential for oil to travel into the territorial waters of neighbouring states, oil spill response would be complicated by this fact. This situation is currently under discussion, with an aim of securing agreements on the appropriate response to an international oil spill incident.

BP recognises the potential problems and risks and is working with industry and government to provide international support. To this end BP is providing:

- Financial and technical support and involvement in the delivery of the National Oil Spill Plan Workshop in Baku (November 2001);
- Participation in the Caspian mutual aid initiative and workshop (November 2001); and
- Financial and technical input with the industry 'steering group' looking at spill response preparedness and mutual aid in the Caspian and Black Sea region.

ES9 Socio-economic impact

For the purposes of the socio-economic impact assessment process, the ACG Phase 1 Project was defined as comprising 84 routine and planned non-routine activities. Each of these activities was assessed for its potential to interact with 11 identified socio-economic receptors. Where an interaction was identified, it was denoted as a socio-economic aspect. A total of 246 socio-economic aspects were identified. Each aspect was assessed for its socio-economic impact and ranked in terms of its impact significance.

The socio-economic impact assessment process determined that the majority of socio-economic aspects identified did not result in significant impacts. Of the 84 routine and planned non-routine project activities identified, 14 activities have the potential to cause 20 "high" impacts and one "critical" significance impact on 6 separate socio-economic receptors. Only one routine activity was assessed as having the potential to result in a socio-economic impact of "critical" significance and this impact (on the local herding population) is being addressed through a mitigation process seeking an acceptable outcome to all parties. This is partly a result of the characteristics of the project and partly the result of project design that has sought to identify all potentially significant impacts during the early design stages by:

- Eliminating the cause of the potential impact through design modifications;
- Reducing the negative effects through design and/or operational practices; and
- Development of mitigation procedures to minimise the harmful effects of residual impacts.

Figure ES.16 illustrates these assessment results in terms of the project's offshore, subsea pipeline and terminal components.

ES9.1 Transportation of equipment and materials to Azerbaijan for onshore and offshore construction and assembly

The transportation of materials and equipment into Azerbaijan for both onshore terminal construction and onshore construction and assembly of offshore components, will have an impact on fishing and shipping activities and the road transport infrastructure.

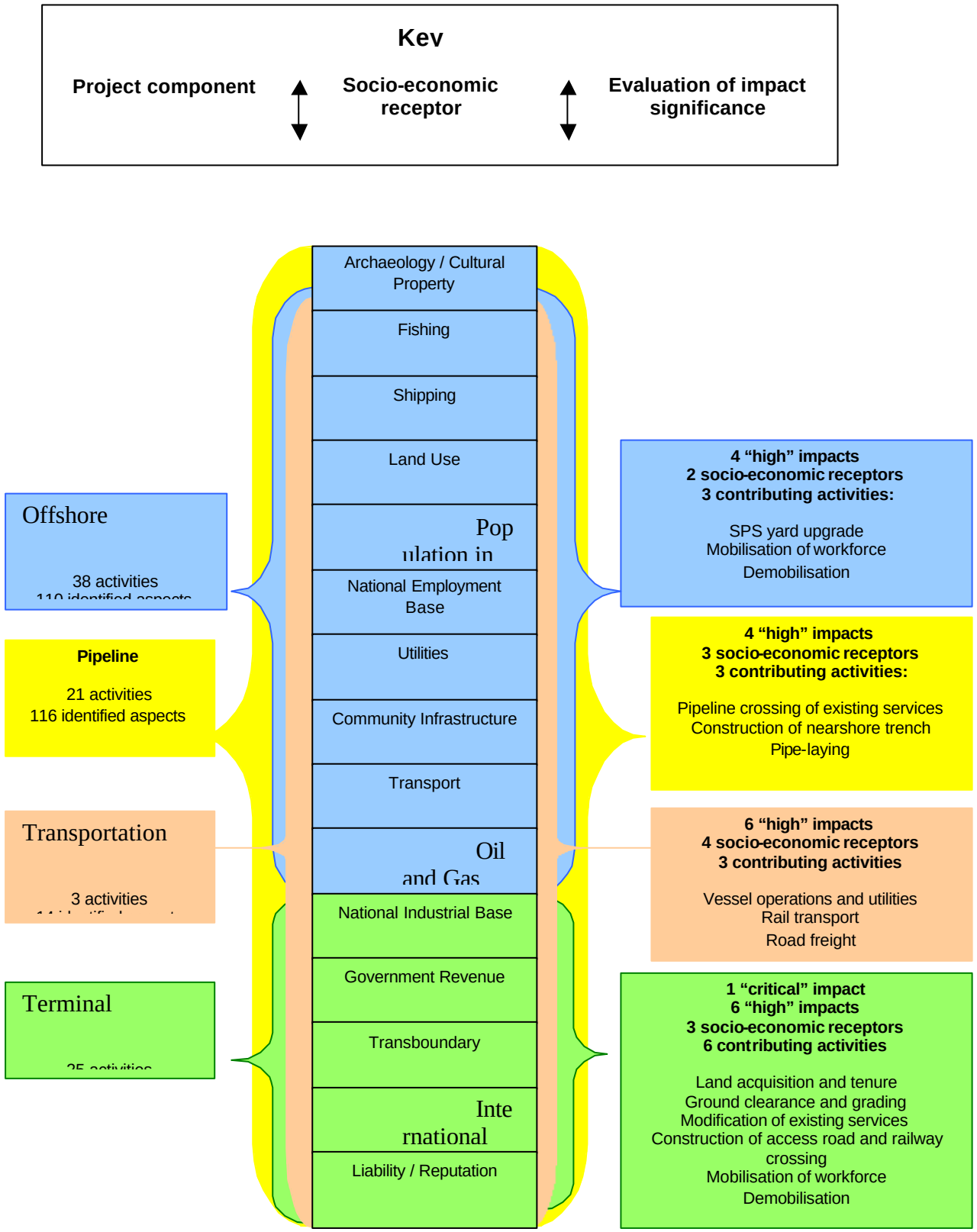
The transportation methods for the offshore installation of pre-fabricated components and pipe sections for the subsea pipelines are still under evaluation and are not yet finalised. A number of transportation methods and routes are under consideration. It is likely that a considerable volume of the facility components and pipe sections will be transported by sea and the number of vessels required for this transportation is significant. Sea transportation routes could include:

- From Europe to the Black Sea and into the Caspian through the Don Volga canal;
- From Europe to the Baltic Sea and into the Caspian through the Baltic Volga canal; and
- From the Middle East across the Persian Gulf to Iran.

Although exact figures for current volumes of traffic are not available for all sections of all routes, it is known for instance, that vessel traffic is extremely high in the Turkish Straits generally, and especially in the Bosphorus Strait. At this stage of the development of transportation logistics it is unknown how many vessel transfers will be made through the Straits, however there is expected to be a significant volume of vessel traffic, which may interfere with other shipping movements in the area.

Some of the loads into the Black Sea will be transferred onto rail wagons or international road trailer for onward transfer. At this stage it is also unknown how many loads will pass onto the Caspian Sea through the Baltic-Don and Volga-Don. There is no historical data on vessel numbers passing through the Baltic-Volga or Don-Volga canals, however the number and frequency of vessel movements anticipated for this project may result in a level of interference with other shipping activities by increasing the load on these waterways. Once into the Caspian, the vessels will transfer to Baku using the recognized Astrakhan to Baku transit route. Increased vessel movements, due to transportation of Phase 1 components from the Middle East across the Persian Gulf to Iran, are not expected to be as significant and will cause less inconvenience to other users of the sea.

Figure ES.16 Socio-economic impact assessment results (routine and planned non-routine activities)



All vessels will be of international maritime standard and the use of these waterways will be compliant with this transport infrastructure network. Detailed forward planning will be in place for the project and this will include notification of other users of these transport routes of the schedules to minimise any interference caused, thereby reducing any significant impact to shipping that has not been anticipated. For ongoing road and rail transport, contractors will be required to supply detailed transport and traffic management plans including scheduling road traffic activities at times when they will least interfere with other users. As the rail transport network within Azerbaijan is under-utilised, rail transport is not expected to be impacted significantly. The onshore construction contractors will also be required to restore any transport access routes used to at least their pre-construction state if any deterioration has occurred as a result of construction transportation activities. In addition, the onshore construction contractor will be required to provide affected communities with education on traffic and safety issues.

ES9.2 Terminal construction and onshore pipeline installation

The terminal construction and onshore pipeline installation activities themselves will impact significantly on the local herder population and on transport facilities in the local area. In addition, the workforce associated with the construction activities, and any inwardly migrating population seeking employment, may have a significant impact on the social, cultural and health issues in the local and regional community.

Construction of the terminal flood protection drainage channel, terminal access road, construction camp and clearance and levelling of the ground in preparation for the terminal facilities construction will require a land take in addition to that already being used for the EOP terminal. The land take for the ACG Phase 1 terminal construction (including that portion of the existing AIOC property that is presently undeveloped) will result in the loss of 438.6 ha of existing grazing land used by the local herder population; that is, approximately 30% of their existing grazing land in the area. As the land take will include both the ACG Phase 1 terminal facilities and the proposed Shah Deniz gas terminal to be constructed alongside, there will be no need for any further land take for future phases of the developments. The initial land take however, will result in a permanent reduction in grazing area.

The nature and extent of the Qobu State Cattle Breeding Enterprise herders' grazing rights are presently being investigated. In the event that it is found that their grazing rights are adversely impacted by the project, the issue of any applicable compensation will be addressed in the first instance by the local executive authority, the district Department of Lands and the Ministry of Agriculture (which has administrative responsibility for the Qobu State Cattle Breeding Enterprise). So far as feasible, preference will be given to providing the affected herder families with rights to replacement grazing area equivalent to that lost to the project.

Land acquisition will be carried out in accordance with the requirements of Azerbaijani law and provisions regarding payment of compensation for land and damages contained in the PSA. In addition, the project will comply with the policies and guidelines of the World Bank Group, in particular with World Bank Operational Directive 4:30 on Involuntary Resettlement, which establishes good international practice for projects involving land acquisition, relocation of people or impacts on livelihood. Commitments and procedures to be followed for project land acquisition will be documented in a Resettlement Action Plan prepared in accordance with Operational Directive 4:30.

The workforce, and any inward migrating population seeking employment, associated with the terminal and onshore pipeline construction activities (including the early civils engineering work programme) may impact on the local and regional community in a number of ways. The main possible significant impacts would be associated with tension created within the local community as a result of labour drawn from outside Azerbaijan, an increase in activity in the informal economy in the area, market distortion as a result of increased wages and possible associated price inflation, and health impacts associated with reproductive health issues and communicable diseases.

Tension may occur within the local community as a result of labour drawn from outside Azerbaijan. Members of the local community may feel that employment opportunities should be for the local and Azerbaijani national population only. These tensions associated with the labour force may become associated with the ethnicity of any labour force from outside Azerbaijan leading to the possibility of local ethnic tension. A number of measures have been included in the operational practices of the project to address this issue including a percentage of local and Azerbaijan workforce content as a requirement of tender and worker and camp management measures, including regulated hours and on-site entertainment facilities.

An increase in money circulating within the local economy as a result of an increase in waged workers and more (and/or more prosperous) local businesses within the local community may have an impact on both the informal economy and contribute to local market distortion and pricing increases. These issues are recognised as being significant but diffuse and difficult to address. Direction will be sought through the BP Social Investment Strategy as to the best way to compensate for, or mitigate, such activities.

Communicable diseases and reproductive health issues are recognised to be of significance as a result of both the construction workforce and any inward migrating population in search of employment. The worker and camp management measures noted above, along with screening and treatment measures for labour drawn from outside Azerbaijan, will go some way towards addressing these impacts. No such measures can be implemented for an inward migrating population in search of employment.

Initial noise modelling undertaken for the proposed ACG FFD terminal has determined that under normal operating conditions, World Bank Guidelines would be met; that is, noise levels would be at or below 45 dB(A) (night-time) and 55 dB(A) (daytime) at the nearest residential receptors (i.e. Umid Camp) and at or below 75 dB(A) at the nearest commercial/industrial receptors (i.e. caravansari; café/garage complex). The noise modelling predicted that under emergency shut-down flaring events, minor and short-term exceedence of the Guideline limits may be experienced. The duration of such events is likely to be only for a few minutes.

The terminal and onshore pipeline construction activity is likely to lead to an increased road traffic load on the main Baku-Alyat highway causing inconvenience and nuisance to local users and possible deterioration in road infrastructure, although no roads within Sangachal, Umid or Primorsk will be utilised as part of the construction process. Contractors will be required to supply detailed transport and traffic management plans, including scheduling road traffic activities at times when they will least interfere with other users. The onshore construction contractors will also be required to restore any transport access routes, to at least their pre-construction condition, if any deterioration has occurred as a result of construction transportation activities. In addition, the onshore construction contractor will be required to provide affected communities with education on traffic and safety issues.

The public transport system is already overstretched in the local area and an increase in use (arising from project activities) will exacerbate this and impact negatively on the local population. To avoid placing extra pressure on these systems, contractors for both offshore

and onshore construction will use private buses to transport day workers to the site. There will however, be an increased load placed on the system as a result of camp workers utilising the system to travel to and from the site for entertainment purposes outside working hours.

ES9.3 Onshore construction and assembly of offshore components (and associated yard upgrade)

The onshore construction and assembly of offshore components to take place at the SPS yard adjacent to Sahil will have many of the same impacts on the local community and the transport infrastructure as the onshore terminal and pipeline construction programme. This activity includes the upgrade of the SPS yard which, although not included within the scope of the ACG Phase 1 ESIA, is being subjected to the same ESIA requirements as the rest of the offshore construction programme as it is being included as part of the same contract as the rest of onshore construction and assembly of offshore components and will be handled by the same contractor.

The workforce associated with the onshore construction and assembly of offshore components and any inwardly migrating population seeking employment, may have a significant impact on the social, cultural and health issues in the local and regional community. The impacts and associated project measures are outlined in Section ES-9.2 above and are not repeated here. Similarly, the impacts on the transport system are as for ES-9.2 above.

ES9.4 Nearshore pipeline installation

The fishing currently undertaken within Sangachal Bay will be directly affected by the proposed ACG Phase 1 developments, as there will be restrictions on access and use of the Bay during construction and there will be some disruption to the subsistence and recreational fishing undertaken in the Bay by local residents.

Azerbalyk use nets and cages in the Bay for spawning activities and employ 3-4 fishermen to manage this activity. As a result of the restrictions on access and use, an agreement has been reached with Azerbalyk to move the nets and cages. This will not affect the productivity of the nets and cages In the process of removal however, the cage in the pipeline corridor was destroyed and is not available for use by the Azerbalyk fishermen in the alternative fishing grounds. As 30-40% of the catch from the nets and cage was taken by the fishermen in lieu of wages, negotiations are ongoing with the 4 fishermen employed by Azerbalyk to ensure that their livelihoods are not affected by the removal of the nets and the destruction of the cage.[10]

Whilst the majority of the fishing grounds in the area are located to the south of the proposed development and the disruptions are not expected to be significant, there will however, be disruption to the subsistence and recreational fishing undertaken in the Bay by local residents.

Information has been gathered to assess the extent of existing fishing activities and establish the legality of those activities. Significant, disruption to any legal commercial fishing activities will be compensated. Current understanding is that the only legal commercial fishing activity is the spawning nets and cages of Azerbalyk and, as outlined in the preceding paragraph, a satisfactory agreement has been reached on an alternative site for relocation of the nets. Subsistence or recreational fishing activity and any illegal fishing activities will not

[10] These negotiations will be documented as part of the Resettlement Action Plan which will be publicly available.

be compensated. To avoid destroying existing fishing nets, the need for removal of illegal nets will be widely advertised. The significance of the contribution of illegal and subsistence/recreational fishing activities to local livelihoods is unclear and clarification may not be possible. Current understanding is that subsistence/recreational fishing activity can be undertaken from comparable places in terms of accessibility and productivity. If not, as noted above, this may adversely affect local socio-economic conditions.

ES9.5 Offshore installation, hook-up and commissioning and operations

The offshore installation, hook-up and commissioning and operations at the offshore facilities will have an impact on sea use, specifically fishing and shipping activities. During installation, commissioning and hook-up activities at the ACG Phase 1 location a number of vessels will be present on the sea surface that will effectively exclude the area of activity for other sea users. In addition, pipe-laying requires that a lay barge and two support tugs are on location along the pipeline route during the installation of the subsea pipelines. The pipelay barge will come into water depths of 8 m (around 5-7 km offshore). Estimated time periods and the number of vessels on the sea for each of these activities are given below in Table ES.5.

Table ES.5 Estimated time periods and number of vessels on the sea

Activity	Estimated Duration	Number of vessels
Tow out, launch and installation of PDQ jacket	50-60 days	1 jacket barge 3 support tugs (1 on standby)
Tow out PDQ topsides and install	14-21 days	1 jacket barge 3 support tugs (1 on standby)
Pipeline installation (offshore)	180 days	1 laybarge 3 support tugs (1 on standby) 1 supply vessel
Tow out, launch and installation of C&WP jacket	50-60 days	1 jacket barge 3 support tugs (1 on standby)
Tow out C&WP topsides and install	14-21 days	1 jacket barge 3 support tugs (1 on standby)
Pipeline tie ins	150 days	1 DSV 2 support tugs

When the drilling rig is on location during the pre-drilling operations, and once the fixed platform structures are installed offshore, their physical presence means that other vessels in transit will be required to change course to avoid the facilities and the area will be effectively lost to fishing operations. A statutory safety zone comprising a 500 m area around the fixed offshore facilities that prohibits vessels from entering the area without permission will be established. In addition, working zones excluding other vessel activity will be in place during installation, commissioning and hook-up operations.

Some 100 fishing boats operate 40-60 km from shore catching sprats and this activity is likely to be negatively impacted by offshore installation of the pipeline. Baku is also home to one of the key fishing markets in the area and those trying to access it are likely to be re-routed during construction.

ES9.6 National employment and industrial base

ES9.6.1. Construction phase

ES9.6.1.1. Direct effects

The sourcing of employment during construction, for both onshore and offshore, is to be determined by the selected contractors. The percent of local content will form one of the evaluation criteria in the tender selection process for all contractors.

Whilst the contractor has not been selected for the construction of the terminal it is possible to estimate that approximately 800 people will be employed during terminal construction.[11] Employment will gradually build up from January 2002 to September 2002, when it will continue at peak levels until February/March 2004. Terminal construction is envisaged to be complete by the end of 2004/beginning of 2005.

At present it is not possible to give full details on the proposed sourcing of the construction workforce for the terminal as the terminal contractor has not yet been selected. However, it is understood that the composition of the workforce will change over time and it is estimated that the Azerbaijani composition during the early stages of construction will be approximately 75%. However this will drop to approximately 65% towards the end of construction. The contractors are committed to using a maximum of 15% of the man-hours from outside Azerbaijan. At peak times however, this may equate to some 30% of total personnel. The sourcing of the workforce is a reflection of the work being undertaken, the skills required and the available personnel. It is understood that the onshore construction contractor will only source labour from the international market where the local labour force cannot supply the skills required for the programme.

The proposed cost in relation to the construction of the terminal for ACG Phase 1 is estimated at $US350 million[12]. It has been estimated that some 50% of this expenditure will occur within Azerbaijan. These costs include the capital costs of the infrastructure and the installation costs (i.e. all associated contracts), owners costs and contingency. The costs are defined as +/- 20%.

The contractors for the offshore works have been selected and it has been estimated that approximately 4,000 people[13] will be employed for the offshore elements of ACG Phase 1. Employment will gradually build up from January 2002 to September 2002, when it will continue at peak levels until February/March 2004. It is known that the contractors for the offshore construction propose to source between 70 and 80% of the required personnel within Azerbaijan. It is understood that the offshore construction contractor will only source labour from the international market where the national labour force cannot supply the skills required for the programme. The contractors for the upgrade of the SPS yard (a related project) propose to locally source between 60% and 70% of the required workforce.

It should be borne in mind that whilst there may be a pool of labour in Azerbaijan large enough to cater for the demands of ACG Phase 1 (and later ACG Phases and Shah Deniz

[11] Likely date for choosing the terminal contractor for ACG Phase 1 is estimated to be November 2001. These figures are the estimated maximum number at the peak of construction. Source: BP.

[12] Source: BP.

[13] These figures are the estimated maximum number at the peak of construction. Source: BP.

Stage 1 projects), some training would be required of this labour source to make it suitable for the tasks required.

The proposed cost in relation to the construction of the offshore elements of ACG Phase 1 is estimated at $US1,605 million[14]. It has been estimated that some 44% of this expenditure will occur within Azerbaijan. These costs include the capital costs of the infrastructure, the installation costs (i.e. all associated contracts), owners costs and contingency. The costs are defined as +/- 30%.

ES9.6.1.2. Indirect and induced effects

The European Bank for Reconstruction and Development (EBRD) estimates that approximately 70% of expenditure (i.e. procurement and income) will leak from the Azerbaijani economy. On this basis it is considered that a combined indirect and induced multiplier of 1.43 is appropriate for the construction phase on the basis of the size of the area and the limited duration of this particular form of direct employment. For the purpose of estimating the indirect and induced employment effect during the construction phase, the multiplier coefficient applies equally to construction workers recruited locally and those brought in from outside the local area. In both cases, construction jobs represent new employment opportunities for the local economy.

Based on the above, it has been estimated that the impact of ACG Phase 1 is detailed in Table ES.6 below.

Table ES.6 Direct and estimated total (onshore and offshore) impact ($ million)

	Azerbaijan
Direct	888.1
Indirect and Induced	381.9
Total	1,270.0

Source: Consultants estimates.

Consideration must be given as to whether the local economy possesses the necessary capacity to respond to the demands and the necessary skills to provide the required materials.

ES9.6.1.3. Wider impacts

The long term sustainability of the local economy built up around one key development would be likely to be limited unless the development draws other investment to the area and also requires construction supplies and materials. For instance, with respect to the local economy, the experience of the Early Oil Project was that although the project resulted in the creation of a number of small roadside businesses in the local area, these were opportunistic in nature and did not experience substantial trade, nor were they long lived[15].

Clearly the local employment created through this expenditure will be lower for construction workers who will most likely be accommodated in a construction camp, simply because of their reduced ability and willingness to spend their incomes locally, as the camp will provide very comfortable living accommodation and recreational facilities. However, there is also the potential for limited negative effects on local business if the construction process results in

[14] Source: BP.

[15] ACG FFD Environmental and Socio-economic Overview, p. 72.

local wage increases leading to a shortage of certain types of labour (i.e. local fishermen seeking employment during the construction phase of the development). It may also be that the local employment situation distorts the local market as outlined above.
Skills enhancement as a result of employment opportunities associated with the ACG Phase 1 Project construction and operational activities may have a positive impact on the local community. Skills enhancement may come as a result of skills transfer from employees from elsewhere in Azerbaijan or from expatriate personnel. In more recent years the involvement of expatriate personnel in projects has been more readily acceptable to local communities and there is a general acknowledgement, amongst the national workforce and local community, of the skills and international experience expatriates can bring.

As a result, programmes will be introduced during the onshore and offshore construction processes to maximise the transfer of skills and knowledge from expatriate personnel to Azerbaijani nationals and from both of these groups to local workers. Contractors have been required to include training and skills enhancement programmes, along with targets for skills training for local workforces, in their tender information. This information has been part of the contractor selection criteria.

ES9.6.2. Operational phase

ES9.6.2.1. Direct effects

During the operational phase of ACG Phase 1, approximately 170 AIOC/BP positions will be created between the onshore and offshore elements. Due to the nature of the work involved a number of the positions will entail shift work and it will be necessary to employ approximately 300 personnel for the offshore operations to support the 150 positions. The requirement for shift work is not as high onshore, however it is required in a number of instances. As a result, for the 20 positions created onshore, some 35 people will be employed. It is envisaged that from day one of operation, some 50% of the jobs would be occupied by Azerbaijani nationals. It is expected that this will increase over time as skills are developed through training and experienced gained, with 75% of positions being held by Azerbaijani's after 5 years and 95% after 10 years.

The key issue during the operational phase will be the role of local people and whether they can benefit from the employment opportunities. BP has a preference for filling the employment places with local people, whilst bearing in mind the necessary skills and experience that will be required. BP will also be inviting individuals to register at recruitment centres in early 2002 to ensure that those workers to be hired can undertake the necessary training in advance of project operational requirements.

The operating and maintenance costs for ACG Phase 1 over an operating life of 21 years have been estimated at a total of $US1.1 billion[16]. This cost estimate is +/- 10%. The extent to which this expenditure will occur within Azerbaijan is difficult to estimate, however it is estimated that overall some 70% of expenditure may occur within the country.

ES9.6.2.2. Indirect and induced effects

The indirect employment effect arises from secondary business supplying goods and services to on site activities, which in turn, create further economic activity by purchasing additional supplies. The induced employment arises from the creation of additional personal income derived from the first (direct workers), and successive (indirect workers) rounds of spend.

[16] Bp's ACG Phase 1 Project Operations Manager.

The extent of the indirect and induced employment impacts within Azerbaijan will be conditioned by the "leakage" caused by the payment of income (such as the payment of wages and salaries, profits, rents, interest and taxes) rather than the purchase of goods and services to individuals or organisations outside the locality.

Based on the above, it has been estimated that the impact during the operation of ACG Phase 1 on the Azeri economy is detailed in Table ES.7 below.

Table ES.7 Direct and estimated total impact ($ million)

	Azerbaijan
Direct	770.0
Indirect and Induced	331.1
Total	1,101.1

Source: Consultants estimates.

ES9.6.2.3. Wider impacts

The impact of the development proposals on local unemployment can be seen as a wider beneficial impact. A potentially negative impact, judged to be moderate, is the risk of generating induced inflation as a result of high expatriate salaries, local spending and increased local employment.

In response to the demand for services, the project may also directly and indirectly contribute to a 'boomtown' effect through a rapid growth of local industry, particularly construction, to support the demands of the project. As such, development is reactionary and based purely on the project, long-term sustainability is questionable, particularly if the economy cannot supply new opportunities. The negative aspects of the boomtown development (e.g. closure of businesses) can in this case be expected to be minimised given the scale of offshore oil reserves and substantial infrastructure requirements that will be needed in the future. Full Field Development (FFD) of the ACG and Shah Deniz fields would provide work for a number of years and should allow the successful diversification of the sector over the longer term.

The project would also generate a number of permanent employment opportunities directly associated with the new business attracted to the area, some of which will provide support to the oil sector. The total number of new jobs created would depend upon the extent to which these represent net additions to the economy. In economic terms, the benefit of the scheme is measured by the number of new jobs created in the local economy after taking into account additionality factors, displacement and the indirect/induced effects.

Such a transformation of the economy (i.e. the development of a supplier network) by the oil industry does not happen in the short term. Invariably during the initial exploration phases for oil development, a comparatively small number of companies are involved and on a very modest scale. Gradually the impact of oil developments increase as more companies move or expand the scale of their operations. Once the oil industry becomes established, there is potential for an ailing economy to be revitalised with increased job opportunities, income and wealth.

The worst effects of decommissioning of plant facilities are experienced in communities that have become dependent on the presence of oil and gas development related activities for their livelihood. The loss of income and/or employment in the community can literally mean its degeneration to a ghost-town. These effects may be offset should other resources be found in the region or alternatively, if the town or region is in a position to service other fields.

Similarly, effects can be off set if the town/community was able to sustain the economic base that existed prior to the oil and gas based industry being introduced into the area.

ES10 Conclusions

The ACG Phase 1 Project has the potential to deliver major economic benefits to Azerbaijan. The project, together with the linked investments including ACG FFD, the BTC project and possible Shah Deniz Gas Export project, are collectively by far the largest investments ever committed in Azerbaijan. They will have a major positive effect on the national economy of Azerbaijan.

This Environmental and Socio-economic Impact assessment has described the extensive engineering design and environmental evaluations conducted over a number of years. One of the prime objectives of these studies has been to identify and characterise the potential environmental and socio-economic impacts at each iteration of the conceptual and detailed engineering design process and either eliminate the cause or contributing factors leading to the impact through re-design, or reduce the potential effect to an acceptable or manageable level, through mitigation measures and operations management.

There are a number of residual environmental impacts that have been assessed as being significant. These include potential physical impacts to selected offshore and onshore habitats (and to several important species of plants and animals) and the emission of Greenhouse Gases. The potential impact of a large oil spill incident would be significant, however the likelihood of such an event occurring is very small. In addition, a number of residual socio-economic impacts have been assessed as being significant. These include potential impacts on fishing and shipping activities, the transport infrastructure, social and cultural interaction issues, land use and impacts on the national employment and procurement base.

A range of other important but less significant environmental and socio-economic impacts are associated with the project and will require an ongoing management commitment. In this respect the operator and the project partners are committed to the development of an improved understanding of the socio-economic and environmental issues that characterise the project, as well as committing to a programme of continued improvement in socio-economic and environmental performance.

Notwithstanding the predicted adverse effects, the project, together with the subsequent development proposals, have the potential to make a very significant contribution to sustainable development in Azerbaijan. This contribution will, to a large extent, depend on the Government's responsible management of the revenues generated from the project. Importantly, the project could indirectly add impetus to energy sector reform within Azerbaijan. This in turn should improve the population's access to energy (gas and electricity) and result in the wider use of cleaner fuels, better ambient and indoor air quality and reduced pressure on traditional sources of fuel (and hence forest products and therefore biodiversity). The combined effects of these outcomes would also reduce the country's greenhouse gas emission inventory and partially offset the emissions generated by the project.