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1. INTRODUCTION

1.1 The proposed activity: hydrocarbon appraisal and development in the Camisea area in Peru

In 1996, an agreement came into force between Shell and the Peruvian authorities for the purpose of hydrocarbon appraisal and development in the Lower Urubamba region. This area and more specifically the so called Camisea Blocks (88 A, 88B and 75) are located some 500 km east of Lima, in the department of Cuzco. Two EIAs^{1]} were conducted and approved: first in 1996 for the appraisal program in Block 88 A and B and then separately in Block 75 for an exploration program in 1997. The results of the appraisal drillings will be used to aid the decision on whether to proceed with the Full Field Development Programme (FFDP). This decision has to be taken mid 1998. If no positive decision is reached, the project will cease. The FFDP consists of:

- ! in field production wells and pipelines connected to a gas processing plant in the Camisea Region;
 - ! two parallel export pipelines for gas and natural gas liquids from the gas processing plant to the Pacific coast;
 - ! a coastal fractionation plant, storage and marine loading facilities for the natural gas liquids.
- Each of the components will be covered by a separate EIA.

1.2 Motive and mandate for this review advice

In his letter dated 12th of January 1998 (appendix 1) the Ambassador of the Royal Netherlands Embassy in Lima, Peru has invited the Dutch independent Commission for Environmental Impact Assessment to carry out an advisory review of two EIA-studies that have already been performed and approved (Camisea Appraisal Drilling Campaign (1996) and Pagoreni/San Martin East Exploratory Wells (1997) and a review of the scoping document for the three EIAs for the FFDP (see above).

The aim of the review is to check if the studies contain sufficient information to guarantee the full integration of environmental and social considerations in decision-making. The studies should be adequate and should not contain inconsistencies. If shortcomings are found, the seriousness of this lack of information for decision-making will be assessed. Although the EIA-studies of 1996 and 1997 already have been approved by the competent authority in Peru (Ministry of Energy and Mines), the review of these EIA-studies may be still useful to adjust the scoping document for the FFDP (see chapter 4 of this advice).

This advice has been prepared by a working group of the Commission. The members of this working group are listed in appendix 2. The group represents the Commission and will therefore be referred to as 'the Commission'. In the Commission the following disciplines are represented: exploration and production of hydrocarbons, toxicology, ecology, environment (soil, water, air), process engineering, occupational health and safety, biodiversity, tropical rainforests, socio-economy, anthropology.

During the preparation of the advice, the working group visited the project area (Nuevo Mundo, Pagoreni/San Martin and Cashiriri 3), studied the relevant project reports and data and discussed

1 EIA= Environmental impact assessment, referring to the procedure
EIS= Environmental impact statement, referring to the report or EIA-study

with several governmental and non-governmental authorities and agencies in Lima and the project area in the period of 4-11 March 1998. The programme of the visit to Peru, including the site visit to Camisea is presented in appendix 3. Purpose of this visit was twofold:

- ! collect project- and site-specific information on the project enabling formulation of a review advice of the EIA-studies and the scoping document;
- ! joint review (capacity-building) with the Peruvian competent authority (Ministry of Energy and Mines) on how to perform a review of the EIA-studies (which criteria, how to convert review results in preconditions in the licence agreement). Therefore two workshops, conducted by the Commission, formed part of the programme (see appendix 3).

1.3 Review framework

For its review framework the Commission made use of:

- ! the guidelines for the contents of an Environmental Impact Study of the Peruvian Ministry of Energy and Mines²] ('Guia para elaborar estudios de impacto ambiental', Dirección General de Asuntos Ambientales);
- ! guidelines (like World Bank, EC directive 337³], Dutch EIA decree of 1994) used and drafted by the Commission for comparable projects⁴];
- ! commitments made and policies formulated by Shell in their scoping documents and briefing papers related to environmental and social issues.

In this advice, the Commission has taken into account as much as possible the opinions of affected people and relevant stakeholders involved (see appendix 4).

1.4 Outline of the advice

In Chapter 2 the Commission makes observations on both EIA-studies. Chapter 3 gives some general observations on the EIAs. In Chapter 4 the Commission presents some observations regarding the scoping document on main issues. Appendix 5 provides a review framework which is meant to serve as a guideline for the development of the EIA for the field production wells in Camisea (and could serve as an example of project and site-specific Terms of Reference for the upcoming EIAs of Shell and other companies).

Appendix 6 gives an overview of the documents subject to review by the Commission.

2. REVIEW FINDINGS OF THE EIAs FOR THE PAGORENI/SAN MARTIN EAST EXPLORATION WELLS, THE CAMISEA APPRAISAL DRILLING CAMPAIGNS AND THE ENVIRONMENTAL MANAGEMENT PLANS

2 The Ministry of Energy and Mines requires an EIA to be made and approved prior to starting the project

3 The Dutch EIA is an implementation of this European guideline and also requires the investigation and description of alternatives. Environmental effects of alternatives must be mutually compared. In the comparison the current environmental situation, including expected autonomous developments and the alternative most friendly to the environment must be given. The comparison must yield the preferred alternative for implementation.

4 Similar guidelines are drafted for appraisal drillings for gas in the Dutch Wadden Sea and reviews performed on an EIS prepared for the World Bank supported Nam Theun 2 hydropower dam in a sensitive rainforest area in Laos PDR.

2.1 General observations

The review findings^{5]} are based on the study of the documents but as well on findings of the site visit to Camisea.

Reviewing the documents and discussing them with Shell and ERM ^{6]}, a sincere company intention became clear to limit as much as possible the adverse social and environmental impacts related to the project and to reach a high quality on the EIAs and the stakeholder participation process.

The 2 EIAs reviewed are related to only the first stage of a potentially huge project to be implemented over the years. The shortcomings observed by the Commission and formulated hereafter can be partly related to this. A complexing factor at the start of the project was the uncertainty on design options and choices to be made in the course of the EIA process.

In general, the Commission is of the opinion that in the EIA-studies:

! Insufficient data is submitted on:

- amount and chemical composition of gas and gas condensates;
- used chemicals;
- waste generation;
- waste water generation and effluent quantity and quality of discharge to the forest floor and water streams;
- noise generation, duration and frequency.

Additional data on this is necessary in order to give insight in the scope of the environmental impacts, both in terms of toxic components released and quantities/time duration of emissions to the environment. The statements in the EIA's on fulfilling to certain emission concentration standards when discharging waste streams to the environment, is not enough to make a good analysis on the consequences for the environment.

! Shell's commitment to 'highest international standards' and 'state of the art technology' is a very important and positive element in the project. However, it cannot properly be verified from the EIA documents. In addition it must be mentioned that observations at the drilling site were not entirely in accordance with the positive intentions of the EIAs. Comparison of international standards applied elsewhere and motivation of standards chosen by Shell is missing. This information is necessary to evaluate whether the selection of a certain standard is appropriate for the specific circumstances of the project. Is the project area as to the aspect under review, as vulnerable (of more/less vulnerable) as the area or country from which the standard was derived?

! A description of the autonomous development is lacking. This information would provide an insight in how the area would develop without the execution of the proposed activities. For example, such information could indicate that the orientation of the local population towards market economy would take place anyway, but only at a somewhat lower pace. Or it could indicate that cultural disruption would still take place because of other factors. The description of the autonomous development serves as a reference framework to be able to evaluate the possible impacts of the proposed activities.

! Alternatives are not described and a comparison of the impacts of different alternatives is therefore missing as well. The chosen preferred alternative for the drilling site has not been made explicit. The added value of presenting different alternatives can be illustrated by the following example. As a policy framework for its activities in the Camisea area Shell uses the so called 'offshore concept'. This means that access to drilling sites will only take place by means of air traffic. No access roads will be constructed. It enables Shell to take measures to restrict any human contact between the workers on the site and the local indigenous population. Migration to the area is in principle less attractive. This means that negative secondary impacts on biodiversity (like colonization), will probably be very limited. For conservation and sustainable

5 The EIAs were reviewed with the use of the generic guidelines provided in appendix 7

6 Environmental Resource Management, the consultant who wrote the EIS

use of the natural resources of the area, this is of vital importance. The offshore approach can be judged as good practice. However, the arguments that lead to this concept have not been documented. If the alternative - road construction, maintenance and at the end removal of roads- would have been described in full detail, including the increased risk of colonization and sabotage, the conclusion to select the 'offshore policy' could have been drawn more firmly, based on a comparison of expected impacts.

- ! Gaps in knowledge are not identified. The importance of lacking information for decision-making can therefore not be evaluated.
- ! Insight in public involvement regarding decision making is lacking. Stakeholders should be able to deduct from the information in the EIA to what extent their concerns and observations have caused changes in the design and execution of the proposed activities.

2.2 Specific observations

2.2.1 Site selection and alternatives

A comparison of alternatives is lacking in the EIAs. According to the Pagoreni/San Martin report 5 surface locations have been considered. It is not clear whether site location and well trajectories are based on a re-evaluation of old 2-D seismic or whether 3-D seismic was considered. The potential consequences, among others to lower the risk for a blow-out, were not identified. The need for shallow seismic in this area remains unclear.

Selection criteria have not been properly defined. It is unclear whether environmental considerations played any role at all in the site selection. A map showing the alternatives is lacking.

2.2.2 Description of the activity

Logistics:

Transport can be a highly impacting factor in remote and rural areas since it may easily interact with the day to day life of local people. In general, transport is well visible and noisy and forms one of the greatest risk factors as well. This accounts for heavy barge transport on shallower parts of the river and frequent helicopter flights. In order to assess the impact and in the process of public consultation, the information should be complete and understandable. As a result, information in decibel numbers regarding the source noise levels of a single helicopter is insufficient to communicate the impact without emission levels (whether calculated or measured) at ground level, without frequency, without information on day/night schedules and without information on routes. The choice for an offshore concept with no access roads is extremely important in the prevention of intrusion of new settlers as well as to prevent disturbances of nature values. However, this concept also puts very specific demands on the logistics with respect to weight of installation, construction time and waste handling. The frequency of movements (eg there are differences between text and figure 3.1.) is not given. This applies to both river transport and helicopter transports. A good description of the logistics (including frequency of transport) is important because it is the basis for risk assessments of spills and the assessment of disturbance (noise, visible presence in the area).

The emissions from transport are inadequately described.

A risk-assessment is lacking, including the risk of crashes, leakage of engine oil, or incidental leakage of products that are being transported. These phenomena are sometimes reported from oil-drilling activities in sensitive areas and are always of great concern to the general public.

Site clearance and preparation:

A proper site preparation is very important to prevent erosion. The EIA for San Martin suggests to leave the cut vegetation as a seed bank. Its effectiveness however, remains unclear and is doubtful. A description of the ground water flows and the potential impact of spills is lacking.

Erosion

Engineering measures in order to prevent (secondary) effects of erosion, especially in the long term, are not addressed sufficiently in the EIAs. Possible effects may result from landslides causing damage and leakages of pipelines, releasing buried mud waste from the mud pits etc. During the site visit to Cashiriari 3 erosion damage was visible at the mud pit dike and near the drilling-rig, thus demonstrating an inappropriately applied design.

Also at the other sites erosion was a visible recurring problem. Worldwide, a lot of research has been devoted to prevent and restore erosion. References to these studies are lacking in the EIAs. This problem deserves therefore an expert solution that is not given in the present EIAs.

Waste and wastewater management:

1. Drilling muds/cuttings: none of the EIAs make clear that oil based mud is not being proposed (as became clear during the site visit). Information on the use and toxicity of water based chemicals is lacking or insufficient. During the field visit other chemicals were observed and mentioned to be used than described in the EIA (potentially giving rise to salinity problems).

2. Sewage treatment: a risk assessment of epidemics is lacking for diseases that may have a great impact on the indigenous people, although the EIAs clearly recognize this risk. Some diseases are known to spread through faeces via fishery products and drinking water. In this respect the treatment of sewage is inadequately described. The EIAs did not mobilise the abundantly available knowledge on sewage treatment in an applicable format, partly by insufficient expert input. On both locations Nuevo Mundo and Cashihuari 3 sewage treatment was a problem. As a consequence, insufficiently treated waste water was discharged for several weeks in potential drinking and fishing waters.

3. Other waste waters: discharge of waste water is tested against WHO standards that may be inadequate to protect the local environment (very soft water, low in nutrients and a low chloride), typical for characide fish. The EIAs did not indicate how this is coped with.

4. The used IFC/1995 standards of 10 mg/litre oil in discharge water cannot be considered as 'highest international standard'. Furthermore the oil/water separation does not comply with 'state of the art technology' as was observed during the site visit.

Disturbance by noise and light:

Data on the emission and disturbance of noise and light is very limited. Both parameters will have an "extended" impact outside the offshore concept. Emission of light is not mentioned and the emission of noise is only given fragmentarily in numbers that do not compare easily. Flare design and operation at Cashiriari 3 does not comply with 'state of the art technology', as was observed during the site visit.

Well evaluation:

The EIAs do not indicate how the site during well testing is protected from heat radiation; what are the expected noise levels and duration and what is the impact on fauna or how is this prevented. Also information is lacking on how fluids will be treated (condensate and/or salt water) and how carry-overs are prevented.

Well control:

No blow-out risk assessment has been made. What is the chance and what is the impact (emissions, noise) if such might happen? How is it going to be stopped?

2.2.3

Review of Environmental Management Plans

The company EMPs are considered by the Commission as a very important instrument for maintaining high environmental standards over time.

The content of the presented EMPs is a good basis for implementing a standardized certified environmental care system, combined with independent auditing by third party certified surveyors. Such a system, to be regarded necessary, is not presented in the EIAs and EMPs.^{7]}

2.2.4 **Public involvement**

Although there are sincere efforts regarding consultation with native communities, stakeholder identification and consultation, and wide dissemination of results, a description of the planning of the stakeholder participation process is lacking.

No proper analysis has been made of institutions and local population present in the area, their activities, in terms of relevance for ongoing activities. In the first EIA (Camisea 1996), however, there is more analysis of this issue.

The list of stakeholders seems to be incomplete. For instance the municipalities and the regional government are missing.

2.2.5 **Socio-economic and socio-cultural considerations**

A socio-economic baseline study is lacking. Such a study is needed for the description of the autonomous development of the area in order to serve as a reference framework. As that situation is not properly described, it will be difficult to assess what impacts can be expected in the region. Knowledge of the socio-economic situation has the advantage that a pro-active policy is possible instead of a reactive one. Possible risks can be predicted more easy and the planning can be adapted accordingly. For a single exploration well, this study should provide a general overview of potential socio-economic and socio-cultural interactions. As a minimum the study should describe the interaction with potential resources in order to be able to assess whether it is possible to prevent or mitigate disturbance of the local way of life.

If the exploration phase prolongs (for instance more than 1-2 years) this study should progress in more detail in order to set a baseline for the future.

In case field development is considered, this baseline can be used in two ways: as a point of reference for future development and to make a projection of the autonomous development over reasonable time spans (30-100 years). Shell is operating in the region since early 1980 and resumed activities since 1994 and is considering a significant development program. As baseline studies were still not adequately available, there is no information on production of crops (quantitative data), volumes of consumption and selling as well as destination of products being sold. It is not known what products are being bought. By means of the results of the survey the Shell activities can be evaluated as to their impact on the 'monitarisation' of the regional economy.

Migration and colonisation are not treated in sufficient detail. It is important to describe the patterns of migration in a bigger zone around the project area, and the driving forces behind the migration-colonisation. For example the Sepahua village used to be a centre for commerce in timber. It would be important to gauge if this activity increases and if the village will increase much in population because of the Shell activities.

In the existing EIAs only qualitative information is provided on the use of natural resources by local populations. It is also important to have quantitative information on the use of natural resources like animals, fish and plants (timber and non-timber). Information is lacking on what streams are used for what function (drinking water, fisheries, wastewater disposal).

Information is lacking on the role of outside actors on the regional economy, like intermediate traders and religious groups. An increase of the activities of these groups in the zone would indicate that changes in the regional economy are taking place.

⁷ During the meeting with Shell in Lima, it became clear that Shell recently decided to implement the above mentioned system, according the international ISO 14001 standard.

The cultural aspects of the local populations are not described sufficiently. The narrow relation these populations have with their environment is not elaborated. Sacred places, cosmology and myths that refer to the natural environment are not mentioned. The danger of erosion of cultural values is not addressed. Information on how Shell will consider and respect these cultural aspects is not provided.

Information is lacking on nomad Indian groups, their migration patterns and areas important for their economy and religion. A health plan is missing to deal with epidemics resulting from e.g. incidental direct contacts, malfunctioning of sewage treatment. According to Peruvian law the rights of the indigenous people are recognized. However, a clear description of the content of these customary rights, which includes rights of access to natural resources, is lacking. It is the policy of Shell to compensate encroachments of these rights. Since the so called nomadic groups exercise these rights as well, compensation of encroachment of these right is justified. In exerting its policy of compensation, the true extent and content of these customary rights must therefore be taken into account.

In Chapter 5 of the Camisea EIA (1996) reference is made to the different sources of income of people such as temporary work for oil companies, sale of agricultural products to intermediate traders, sale of timber. Although this document was published before the Pagoreni/San Martin EIA, it contains more analysis than the latter. But there is neither a description nor a quantification of these activities.

There is no analysis of the implications of the incorporation of indigenous persons in the Shell work force on the time they have to do other activities related to cultural and socio-economic reproduction and the impact on internal relations, for example gender relations.

2.2.6 **Aquatic ecology and fisheries**

There is only interest in commercial species or species being used by the local populations. No inventory has been made of species of the streams that receive wastewater from the drilling sites. The aquatic ecology is very important even in the exploration phase, because one of the major effects of exploration is the emission of wastewater to small streams which could potentially change the habitat considerably. Therefore it is necessary to investigate already in the exploration phase the following items: inventory of all waterstreams, waterplants, shellfish, fish, amphibians and seasonality, determination of the route of the different wastewater streams. Such inventories should be compared with inventories of other streams in the neighbourhood in order to be able to determine if any endemic species are present in the affected streams. The inventories should identify key aquatic species to be monitored during the execution of the activities.

2.2.7 **Vegetation, flora and fauna**

There is only interest in commercial timber species, while it is probable that the biodiversity of the region is exceptional and of value for the world society as a whole. Besides timber, other products from plants, like medicines, also have an economical value, although probably only for self-sufficiency of the local populations.

A contour map and linked to that a map of the vegetation types of the area around the potential drilling site are missing (maximum 12 km² around each site). This information is required to see what types are most affected by the proposed activities.

There is no information regarding timber production in the area.

In the exploration phase an ecological baseline study is necessary to get an indication of the species richness and to determine to what extent the affected forests are unique. Such a study could be executed using rapid appraisal techniques.

2.2.8

Protected areas

The proposed activities will be executed in zones located near the Manu National park. The area and the Manu park are related because there are animals that migrate from Manu to the project area and vice-versa. The non-contacted indigenous groups follow these animals for hunting practices.

According to a new Peruvian law, national parks have buffer zones in which activities can only be developed if they are in accordance with the objectives of the national park. The EIAs do not indicate to what extent Shell acts in accordance with these objectives.

3. GENERAL OBSERVATIONS

In this chapter some general and important features of the Shell activities are discussed, that are fundamental for appraising the environmental, socio-economic and cultural impacts.

3.1 Autonomous development

The Commission considers it essential to make a projection of the autonomous development of the area as a reference framework for the future. In view of international developments it is not realistic to assume that the region will remain unchanged forever. Colonization is a natural process, tourism and religious influences will undoubtedly increase. Whether the offshore concept will enhance this inherent process strongly is difficult to predict, but in general local populations are not very resilient against long-term impulses and influences. As a consequence, the offshore policy will not be able to prevent change but will probably slow down the process compared with invasive road building and will add control to it. Also the policy of compensating communities in terms of social capital for loss of their land will bring about a process of irreversible change.

3.2 The 'phased character' of the project

Both executed EIAs and EMP's are related to only the starting phase of the project. The next three EIAs concerning the FFDP project will be submitted during 1998 and 1999. It is very likely that more EIAs will be necessary after implementation and completion of the FFDP project.

As for the long term impacts over the coming decades, good insight at this phase of the start of the project is needed, but difficult to obtain. A so called 'master plan' covering this is missing in the existing EIAs.

For its field activities and relations with outside stakeholders, the impression arises that Shell acts at the moment that the necessity to do so appears.

A good insight in the participation process during the time frame of the total project is lacking, including further activities in Block 75. The lack of planning may even be interpreted as lack of guarantee that the process will continue.

A 'master plan' could be a helpful instrument in the decision making process with the stakeholders bringing the different EIAs for the various parts of the project more in perspective with each other.

3.3 The briefing papers

The briefing papers 1 till 10 can be seen as a good method of presenting information to stakeholders and other interested parties. However, they should not take over the function of EIAs.

The quality of the briefing papers could be enhanced by including a regular and systematic basis. Items which can be treated:

- ! monitoring results;
- ! evaluation of mitigating measures and benefit programmes;
- ! results of (independent) auditing and surveying;
- ! key issues (as was raised during the meeting with ERM).

3.4 Other relevant documents

A lot of documents is produced (like a socio-economic baseline study, documents on the selection of alternative pipeline routes) which do not form part of the EIAs. The Commission is of the opinion that the most relevant parts of all these documents should be summarized in the EIAs.

3.5 Purpose of the EIAs

It is not very clear how the information in the EIA is used. Shell indicates that the EIAs serve as an instrument for improving design options (whereas for the Peruvian government the EIA is required as an instrument for informed decision-making). During the site visit to Camisea however, the Commission noted some problems (with erosion and flaring) which show the lack of a thoroughly prepared design. Apparently, the EIA did not contain this information which could have prevented such problems.

Although the (wealth of) information in the EIA is used to establish EMPs, these plans lack clear action plans or strategies. It is not clear if and how the implementation of the EMPs will be guaranteed and controlled.

3.6 Safety

Safety measures and procedures implemented at the various sites the Commission visited, seem of the highest standard. The commitment of Shell and its personnel to give safety the highest priority, is beyond any doubt, and should be considered as a positive aspect of project development so far.

4. GENERAL OBSERVATIONS ON THE SCOPING DOCUMENT

Chapter 4 is based on the observations made in the preceding chapters and will be restricted to the main issues. In appendix 5 the Commission provides by way of example a review framework which is meant to serve as a guideline for the development of the EIA for the field production wells in Camisea. This framework could serve as an example of project- and site-specific Terms of Reference for the upcoming EIAs of Shell and any other E&P company working in rainforest areas.

Based on the observations that were made in the preceding chapters and on the contents of the scoping report "Full field development programme EIAs (June 1997)", the Commission presents the following observations:

The scoping report is a challenging document. It gives a description of the work to be undertaken during the process and forms a solid basis as Terms of Reference. The Commission appreciates the commitments that are made by Shell and recognises several improvements with respect to the previous EIAs as for instance the announced description of standards and level of detail.

The Commission supports the split between the three different phases (Camisea field development, pipeline and fractionation plant) in order to keep grip on the key issues and be able to maintain sufficient detail. However, making this choice it becomes – for outsiders like NGOs and other stakeholders – difficult to get an overview and assess the overall impacts. It also makes it difficult to decide whether improvements can be made over the total project (like in life-cycle analysis where the total chain of events is considered). The Commission therefore recommends that in addition to the partial EIAs, a bridging document be made (a so-called master plan), specifically dealing with the

interphases between the three parts of the project and, overlooking the total, identifying whether environmental improvements in the subsequent phases can be identified. This master plan should be based on the maximum capacity of the Trans Andes pipeline.