

**Advisory Review
of the Environmental Impact
Statement and the Social Impact Study for
the Chinguetti Offshore Oil
Development Project**

- Mauritania -

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List of acronyms

ALARP	As low as reasonably practicable
APASA	Asia Pacific Applied Science Associates
DSPCM	Délégation Surveillance des Pêches et au Contrôle en Mer
EIA	Environmental Impact Assessment
EITI	Extractive Industries Transparency Initiative
EMP	Environmental Management Plan
ERM	Environmental Resources Management Australia Pty Ltd
FIBA	La Fondation Internationale du Banc d'Arguin
FPSO	Floating, Production, Storage and Offloading Vessel
GHG	Greenhouse gas
GoM	Government of Mauritania
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
IAIA	International Association for Impact Assessment
IFC	International Finance Cooperation (member of the World Bank group)
IMO	International Maritime Organization
IPEICA	International Petroleum Industry Environmental Conservation Association
IUCN	The World Conservation Union
MAED	Ministry of Economic Affairs and Development
MARPOL	International Convention for the Prevention of Pollution from Ships, 73/78
MDRE	Ministry of Rural Development and Environment
MEP	Ministry of Energy and Petroleum
MFME	Ministry of Fishery and Maritime Economy
MMI	Ministry of Mines and Industry
NCEA	Netherlands Commission for Environmental Assessment
NOAA	National Oceanic & Atmospheric Administration
NOGEPa	Dutch Organisation of Oil and Gas Enterprises
OECD	Organisation for Economic Co-operation and Development
OGP	International Organisation of Oil and Gas Producers
OSCP	Oil Spill Contingency Planning
OSPAR	(Oslo-Paris) convention
PCDP	Public Consultation and Disclosure Plan
PFW	Production Formation Water
PNBA	Parc National du Banc d'Arguin
PRCM	Programme Régional de Conservation de la Zone Côtière et Marine en Afrique de l'Ouest
PRSP	Poverty Reduction Strategy Programme
PSC	Product Sharing Contract
SBM	Synthetic based mud
SEA	Strategic Environment Assessment
SIA	Social Impact Assessment
SIMP	Social Impact Management Plan
SMH	Société Mauritanienne des Hydrocarbures
STAR	Stop Think Act Review
WBM	Water-based drilling mud

1. MAIN CONCLUSIONS AND RECOMMENDATIONS

This report contains the conclusions of the advisory review by Netherlands Commission for Environmental Assessment¹ of the EIA/SIA for the Chinguetti offshore oil development project. The first chapter summarises the main conclusions and the recommendations for the initiator of the project and the Government of Mauritania. The following chapters present further details of the review.

1.1 Main Conclusions

The Commission is of the opinion that the EIA/SIA reports give valuable information on techniques applied, possible impacts and mitigation measures. After a summary of the review of the content of the EIA and SIA, this section takes into account the organisation of communication and consultation for the EIA and the SIA.

The observations and recommendations, summarized below and elaborated in the subsequent sections 4 and 5 are hoped to be of use to further decision-making by the Government of Mauritania (GoM) such as the approval of the EMP and SIMP for the Chinguetti Development Project as well as future offshore development projects.

Environmental Impact Assessment

In the view of the Commission the EIA gives sufficient technical information to ensure environmental issues receive the necessary attention in decision-making with respect to the present Production Sharing Contract of June 6th, 2006. However, further elaboration on specific items is necessary, this information can be provided by the initiator as part of the approval procedure for the EMP.

The extensive descriptions in the EIA and (available parts of) the EMP of operational procedures and activities as well as their expected impact are of good quality. Despite this impressive quantity of information the reports are written in an accessible way. In this respect, the EIA sets a standard for future assessments with respect to content and presentation of the findings.

Special attention was given to the environmental impact of oil spills due to either operational failure or accidents, emphasizing the consequences for the fisheries, wildlife and nature reserves along the coast both in Mauritania and bordering Senegal. Also the effects of formation water discharge received the necessary attention.

¹ The Netherlands Commission for Environmental Assessment (hereafter called "the Commission" or NCEA), is an independent advisory body that has a legal basis and was established in 1987. For more information see the website: www.eia.nl.

The EIA/EMP conclusion that possible risks are negligible if appropriate measures are taken in order to prevent spills and discharges and to reduce risks to a minimum is in the view of the Commission well founded and thus plausible.

- Also because the Chinguetti project will be followed by other projects, the NCEA emphasizes the need for action by the GoM to ensure :
 - adequate information is available at strategic level on possible accumulation of impacts due to multiple and prolonged projects of oil and gas production;
 - adequate enforcement is realised to assure actual operations and developments are in line with conditions set out in environmental reports and PSC's;
 - adequate monitoring and evaluation by the initiator as well as by the GoM is realised, elaborated in a Code of Conduct, to verify impacts in practice and if needed to amend relevant and appropriate conditions and regulations.

(Draft) Social Impact Assessment

The SIA carried out by ERM for Woodside makes a significant effort to deal with the SIA complexities and provides comprehensive information on:

- the expected social-economic impacts on micro and macro level;
- possible mitigating measures;
- the consultation procedure followed and its results.

The result is an extensive and elaborate report with a large amount of baseline information. However, the large amount of information has had a negative impact on the accessibility of relevant information.

The NCEA is of the opinion that described impacts adequately cover potential socio-economic impacts, and that proposed mitigation measures are in general well elaborated. The NCEA also subscribes the chosen approach to address both micro and macro impacts. Yet, the method to classify impacts is questionable because this was done taking the mitigation measures into account. Furthermore some impacts and mitigation measures (in the competence of Woodside) are not sufficiently quantified.

- The NCEA gives the following recommendations for the Social Impact Management Plan (SIMP):
 - Apply a more dedicated approach in future stakeholder consultations taking fully into account the level of knowledge and degree of interest of the different (groups of) stakeholders;
 - Classify impacts without taking into account mitigating measures;
 - Emphasize and elaborate on the mitigating measures within the competence of Woodside.

Organisation of the Assessment

With respect to the process, the EIA and SIA should simultaneously address environmental and social issues and should facilitate adequate consultation of stakeholders. For the Chinguetti Development Project the EIA has preceded the SIA. The Commission notes that this procedure, different from international standards for EIA and SIA, possibly has influenced the significance of the findings in the EIA/SIA reports.

- The NCEA advises the GoM to explicitly address the need for an integrated assessment on environmental and socio-economic impacts in future Terms of Reference for upcoming EIA procedures.

According to Mauritanian EIA legislation (see 3.2) environmental, economic and social impacts are to be assessed simultaneously. When official procedures had been adhered to, it could have resulted in:

- more concise information as technical aspects now had to be addressed in both documents;
- consideration in the PSC signed in June 2006 of the capacity within GoM to implement the mitigating measures within their competence.

1.2 Further Conclusion and Recommendations

1. If the GoM considers to adopt the international guideline using double-hulled FPSO's sufficient attention is to be given to the pros and cons of double-hulled tankers when deciding on future offshore development projects,
2. The NCEA advises GoM to request Woodside
 - to clarify the use of the wing tanks for oil storage
 - and in case of regular use of wing tanks to elaborate on possibilities to transfer oil from the central tanks to the transport vessels without using the wing tanks and still comply to refinery standards of 0.2 volume % of water in oil and comply to the EIA.
3. According to the NCEA, the additional information provided by Woodside/APASA adequately substantiates the quality of the current modelling.
4. The NCEA welcomes action undertaken by Woodside to collaborate with the GoM on the use of the oil spill modelling technique used in the EIA for establishing an operational tool for situation and site specific oil spill management.
5. The NCEA advises the GoM to acquire collective funding by oil/gas developing companies to assure that measures, such as the use of vacuum cleaner ships, can be realised.
6. The NCEA advises the GoM to develop its own skills in understanding and utilising back track modelling, making use of and coordinating the initiatives of Woodside and NGO's.
7. The NCEA advises the GoM to
 - give full attention on cumulative impacts on the ecology and on the fishery in the SEA and prescribe the when, where and how methodology, to identify the best window of opportunity for the various activities associated with the exploration, appraisal and development activities (drilling, testing (including flaring) and production);
 - elaborate and start up a monitoring programme with the utmost urgency and with the support of international expertise.
8. The NCEA advises the GoM to demand for the results of the study on re-injection of formation water to be available prior to an approval decision on the EMP.

9. Although first monitoring results show pollutant levels below current standard the NCEA advises the GoM to
 - require elaboration and implementation of measurements by Woodside to be able to meet future industry discharge standards of 10 mg/ltr, e.g. by using available hydro-cyclones;
 - closely monitor water quality and to develop within GoM skills and knowledge in this respect as soon as possible.
10. The NCEA advises the GoM to require operators in future EIA's to :
 - carry out laboratory tests or field test to demonstrate that the SBM used fulfils toxicity and biodegradability criteria as stipulated in the EPA 2001 Guidelines for the Gulf of Mexico.
 - address the possibilities of zero discharge of drill cuttings and the evaluation of re-injection or (collective and environmental friendly) disposal of drill cuttings on land.
11. The NCEA advises Woodside to explore the possibilities of re-entering already drilled or future wells and complete these as producers.
12. The NCEA advises GoM to develop in the SEA a strategy to minimise impacts of drilling activities, such as setting preferred period for drilling on specific sites.
13. The NCEA advises the GoM to seek international assistance to create a traffic control system for their offshore economic zone, to assure the safe and clean passage of all ships through Mauritanian waters.
14. The NCEA advises GoM to consider to divert the international shipping lanes near Cap Blanc further to the West.
15. The NCEA advises GoM to insist on Woodside to use state of art equipment and to upgrade their QA/QC procedures for the commissioning activities, to avoid flaring of the associated gas in future.
16. The NCEA advises the GoM to adopt a non-flaring policy. If exceptional flaring is necessary, mandatory procedures with respect to permits for and methods of flaring are to be included in future terms of reference for EIAs.
17. The NCEA underpins the need to prepare and submit for approval, a detailed decommissioning plan in line with best practice well in advance of the end of the field life.
18. The NCEA advises the GoM to ascertain that EIA procedure for seismic activities in exploration and appraisal stages are included in EIA legislation.
19. The NCEA advises the GoM to investigate in the SEA the window of opportunity for seismic activities to take place, taking into account the absence during specific seasons for sensitive species (use when, where and how to approach).
20. The NCEA recommends GoM to explore the possibilities to apply green and blue light on platforms and FPSO's in order to minimise adverse effects on birds.
21. The NCEA advises the GoM to request Woodside to comply with a Code of Conduct in order to ascertain that operators subsequently adopt the policy of 'Stop-Think-Act-Review' (STAR) for all actual and future controversial activities.

22. The NCEA recommends Woodside:
 - to apply a more dedicated approach in coming stakeholder consultations taking fully into account their level of knowledge and degree of interest;
 - to re-establish the reference group, to review its composition and give it administrative support;
 - to finalise the (Social Impact Management Plan) SIMP as soon as possible in consultation with the reference group, including a continuous consultation plan based on a stakeholder analysis and ensuring conditions for full participation.
 - to seek the advice of the reference group on monitoring the development and implementation of the SIMP.

23. The NCEA recommends the GoM:
 - to assure compliance with obligatory consultation procedures within the GoM and among stakeholders in future assessment procedures (EIA/SIA/SEA);
 - to address socio-economic impacts on Senegalese stakeholders in the SEA.

24. The NCEA advises Woodside in the SIMP to:
 - adjust the classification without taking into consideration mitigation measures;
 - make the different views and opinions of stakeholders on the qualification of impacts more explicit.

25. The NCEA recommends Woodside to contribute to the strengthening of the oil and gas sector in Mauritania by actively working on a sector organisation and developing a policy for societal development.

26. The NCEA recommends the GoM to initiate collective consultation with offshore operators on e.g. mining legislation, enforcement, monitoring and relevant research and to integrate mitigating measures proposed in the SIA into the relevant decentralised PRSPs.

27. In addition, it is recommended to address in the SEA the possibilities of pacing developments, and the possible impact of reduced interest and investments in other sectors.

28. The NCEA recommends Woodside
 - to give quantified data based on recent developments in the SIMP about migration processes and mitigation measures
 - to pay more attention in the SIMP to awareness raising in relation to health issues, not only for company employees but also in a broader sense.
 - to specify and quantify in the SIMP the description of impacts of the project and the related mitigation measures as much as possible
 - to consider investment in private sector developments (small and medium enterprises, rural development) and social programmes (education, health, water supply) as part of Corporate Social Responsibility.

29. The NCEA recommends Woodside in the SIMP to:
 - define the reference situation;
 - quantify baseline information as much as possible and to correct inconsistencies.

2. INTRODUCTION

2.1 General Introduction

This advice has been prepared by the independent Netherlands Commission for Environmental Assessment at the request of the President of the Islamic Republic of Mauritania via the Royal Dutch Embassy of the Netherlands in Dakar (Senegal). This report presents the review findings of:

- the Environmental Impact Assessment (EIA) reports including the Environmental Management Plan (EMP);
- the Social Impact Assessment (SIA);

pertaining to the Chinguetti Development Project, being the exploitation of the Chinguetti oil field off the coast of Mauritania.

This advice has been prepared by a working group of experts of the Commission. The group represents the Commission² and comprises expertise in the following disciplines: oil and gas exploration and production, hydrodynamics, ecology, social issues and economics.

2.2 Request for Advice

In March 2006, the Royal Netherlands Embassy requested the Commission on behalf of the President of the Islamic Republic of Mauritania to advise on the EIA/SIA report dealing with the exploitation of the Chinguetti oil field.

This advice reviews the quality of information given in the EIA/SIA and its coherence with the conditions set in the Production Sharing Contract that is agreed upon by the Mauritanian government and Woodside. It contains recommendations either to amend/improve the exploitation conditions for the Chinguetti project or to support the review by the government of Mauritania of coming EIA reports for future offshore exploitations by Woodside and other operators.

2.3 Outline of this Advice

Chapter 3 describes the Chinguetti project, the legislative and procedural setting, the production sharing contract and the justification of the NCEA review approach.

Chapter 4 presents findings and recommendations on the Environmental Impact Assessment and the Environmental Management Plan.

Chapter 5 presents findings and recommendations on the Social Impact Assessment.

Chapter 6 recapitulates some recommendations on monitoring, evaluation and capacity building.

² For the composition of the working group, please view Appendix 1.

3. SETTING OF THE PROJECT

This chapter describes

- the structure of the project according to the EIA;
- legislation and procedures for EIA;
- the aim and justification for NCEA advice.

3.1 Project Description according to the EIA/SIA

The Woodside Mauritania Pty Ltd (Woodside) and its Joint Ventures Participants³ started to exploit the off shore Chinguetti oil field in February 2006. The field is located in Block 4 in PSC-B, one of several blocks that constitute the PSC area. It is situated off the coast of the Islamic Republic of Mauritania in approximately 800 m deep water and 90 km west of the Mauritanian coastline. Appendix 2 gives a situation map.

The EIA states as rationale for the development of the Chinguetti field, the production of oil and gas and subsequent sale of these products at local or international markets. The field was discovered in 2001 and is operated under a Production Sharing Contract (PSC) with the Mauritanian Government. Woodside is operator of the PSC covering the Chinguetti field and is also Operator of the Project, on behalf of the Joint Venture Participants.

Technical Specifications

The major elements of the development are:

- six oil production wells drilled from three drilling centres/manifolds in Phase 1 and another 4-6 wells during Phase 2 (after two years of operation i.e. in 2008); there is a provision for a total of 10 production wells;
- four vertical water injection wells;
- one gas injection well, located approx. 15 km outside the field;
- a single Floating Production Storage and Off-take (FPSO) facility, producing oil from the production wells and returning the associated gas and seawater to the gas and water injection wells, consecutively.

Oil from the production wells is carried from the manifolds via flexible flow lines and risers to the FPSO. In the EIA it is stated that gas from the oil reservoir will be re-injected.

Produced formation water, separated from the oil, according to the EIA, will be treated to the standard specified for safe, environmentally responsible discharge from the FPSO. The EIA states that following first produced water, a feasibility study will assess the possibilities of re-injection of produced formation water without significant reservoir scaling and souring risks. This feasibility study has not yet been submitted to the competent authority.

The project is expected to have a field lifetime of eight to fifteen years. According to the EIA, development wells will be drilled using established methods. The reference case uses a dynamically positioned drill ship, as well as semi-submersible rig (dynamically positioned or moored). The upper sections of each well will be drilled using water-based mud (drilling fluid). All lower hole sections will be drilled with a low toxicity, synthetic based mud. All synthetic-based mud will be recovered for re-use. A small amount of drilling mud adhering to the drill cuttings will be discharged under normal operations.

³ Joint Venture Participants: WEL Mauritania B.V., Hardman Chinguetti Production Pty Ltd, Premier Oil Mauritania B Limited, Mauritania Holdings B.V., FP Mauritania B B.V., Roc Oil (Mauritania) Company, Roc Oil (Chinguetti) B.V., Groupe Projet Chinguetti.

The FPSO is permanently moored at the field. The FPSO is based on a converted very large crude carrier, according to international standards and with a single-hull configuration. It has a crude oil production capacity of ~75.000 barrels a day and a maximum storage capacity of 1.6 million barrels.

Oil stored on the FPSO will be offloaded to trading tankers for export, with according to the EIA an expected maximum of 28 offloading operations per year. Trading tankers have to comply with the vetting procedures of Woodside as well as of the regulatory and certifying authorities.

Social Economic Specifications

The project description (SIA chapter 2) describes the location and the timing of the project and the investments onshore. The project activities described include project expenditures in Mauritania: employment and training, waste management and transport. The SIA notes that a large part of the effects were already noticeable before the SIA had been carried out because most of the investments already took place between 2001 and September 2005. In subsequent chapters on baseline information (Chapter 4) and impact assessment (Chapter 5) broader project related impacts are taken into account.

The SIA considers the Chinguetti project to have a major impact on the national economy of Mauritania. Therefore, the SIA provides extensive information on the expected social-economic impacts on a micro (project) and macro level and on possible mitigating measures.

3.2 Legislative and Procedural Setting

In accordance with relevant Mauritanian law⁴, an EIA report including socio-economic aspects is a prerequisite to obtain the necessary authorisations from the competent authority to execute this project.

The law (*Loi Cadre* 2000-045) prescribes that activities that may have noticeable impacts on the environment are subject to authorisation by the Minister engaged for the Environment. This authorisation is granted on the basis of an environmental impact assessment. Impacts on the 'Environment' are broadly defined being not only physical, chemical, biological, natural and artificial impacts but also economic, social and cultural impacts.

In the law (*Loi cadre* 2004-094) on EIA drilling, exploitation and storage activities in the energy sector are determined as a Category A project for which an EIA is compulsory. The law elaborates in detail on procedures such as for consultation and EIA contents prerequisites. Consultation procedures as well as content prerequisites are coherent with internationally accepted practices for EIA.

The EIA procedure for the Chinguetti project started up in 2002. The Operator submitted a draft EIA to the competent authority, at that time the Ministry of Mines and Industry (MMI) on the 19th of March 2004 and requested the acceptance of the Minister by the 27th of April 2004. At that moment the decree on EIA, giving detailed requirements on the procedure and content of an EIA was not yet in force.

⁴ Loi No 2000-045/ portant loi cadre de l'environnement, Présidence de la République Islamique de Mauritanie, 27 Juillet 2000 ; and Décret No 2004-094 relatif à l'Etude d'Impact Environnemental, Premier Ministre de la République Islamique de Mauritanie, 4 novembre 2004.

Several stakeholder meetings were organised by Woodside to discuss the draft EIA. Results of the stakeholder meetings and written comments by stakeholders are addressed in the final EIA⁵.

In the letter of acceptance of the draft EIA report (2 September 2004) seven conditions for approval were determined by the Ministry of Energy and Petroleum (MEP). These conditions, also emphasised by the review assessment by Skandpower Risk Management AS,⁶ include:

1. submission of a Social Impact Assessment (SIA) and Social Impact Management Plan (SIMP);
2. submission of a Fisheries Interaction Management Plan (FIMP) and a reassessment of the abandonment strategy in the SIA;
3. submission of an Environmental Management Plan (EMP);
4. present final conclusions on the feasibility study on re-injection of produced formation water and drill cuttings;
5. submission of the Chinguetti Flaring Policy;
6. submission of an oil spill contingency plan;
7. ensure an independent audit of compliance with the authorisation conditions.

In the period since April 2004, a number of additional reports have been published as part of the Environmental Management Plan⁷. As far as the NCEA has been able to ascertain, written comments on these documents have been prepared by international consultants on behalf of the Ministry of Fishery and Maritime Economy⁸ and the Ministry of Energy and Petroleum⁹.

Separate from the EIA and the EMP a SIA was prepared and published in December 2005. The NCEA has received written comments on the draft SIA by several NGO's¹⁰.

3.3 Production Sharing Contract

Exploitation was approved by the agreement on the Production Sharing Contract (PSC) by the Government in May 2004. Based on this PSC exploitation started in February 2006.

In June 2006 a new PSC was agreed upon and duly signed on the 6th of June 2006. In order to assess the necessary coherence between the EIA/SIA and this new PSC for the Chinguetti field (Zone B, Block 4 en5), the PSC was submitted to the NCEA¹¹.

The recent PSC for the Chinguetti project requires all activities to be in accordance with the ALARP principle (as low as reasonably practical), best field practices and the precautionary principle.

Furthermore the PSC prescribes:

⁵ i.e Sandra Kloff & Tom van Spanje, Compte rendu sur l'Avant-projet d'Etude d'Impact Environnemental du Champ pétrolier Chinguetti découvert par la compagnie Woodside, Etude réalisée avec le soutien de l'Institut de Politique Minérale australien, Janvier 2004

⁶ Mission Report from Visit in Nouakchott, Mauritania May/June 2004, 2 June 2004 Skandpower Risk Management AS, Norway

⁷ See Appendix 3 Documentation

⁸ Analyse et recommandations relatives au plan de Gestion Environnementale pour la phase d'exploitation du projet Chinguetti, Sandra Kloff, Loïc Trebaol, Clive Wicks, Juin 2006

⁹ Mauritania : Oil and Gas sector Environment Mission Report, Robert Goodland, April 2006 (commissioned by GTZ)

¹⁰ Revue du projet de document SIA de ERM pour Woodside, Sandra Kloff et Clive Wicks pour PRCM, FIBA,IUCN, Wetlands International and WWF, February 2006.

¹¹ Additionally the PSC s for Zone A, Bloc 6, Bloc Ta 5 le Bassin de Taoudenni et Bloc Ta 6 Bassin de Taoudenni were made available.

- installations and equipment are to be kept in sound condition and well maintained;
- oil spills are to be avoided;
- quality of sea water is to be guaranteed and each pollution is to be reported;
- oil has to be stored in designated structures;
- the right to monitor and audit by the Government of Mauritania (GoM);
- every site is to be left in the original condition after decommissioning;
- sale of oil/gas in mutual consultation including local sale;
- preference of jobs for Mauritanian inhabitants;
- facilitation of transfer of competence and technology to GoM.
- before commencing any petroleum operations, the contractor shall submit the environmental management plan to the Ministry of MEP.

3.4 Justification for the NCEA Review Approach

As production at the Chinguetti field had been started up already and the contract had been agreed upon, before this review had been requested, this review is to make sure that sufficient information is available to guarantee the full integration of environmental and social considerations in further decision-making. Furthermore the EIA/SIA reports should be adequate, coherent with the conditions set in the PSC and not contain inconsistencies. If shortcomings are found, the importance of this lack of information for further decision-making is assessed and recommendations are given for either gathering

supplementary information or for taking additional mitigating measures. Essential shortcomings can lead to major uncertainties and/or unacceptable risks.

This review therefore aims to:

- verify whether the technical specifications in the EIA/EMP/SIA leading to the described impacts correspond with the specifications in the most recent Production Sharing Contract;
- identify relevant shortcomings and give recommendations for further improvement within the Chinguetti project;
- identify shortcomings that may lead to recommendations for the improvement for future EIA's by Woodside or other operators.

In its review of the SIA for the Chinguetti project the NCEA focuses on:

- the consultation process followed;
- distinction between mitigating measures being primarily within the competence of Woodside versus those primarily within the competence of the GoM;
- the capacity of the GoM to implement the necessary mitigation measures within their competence including project contributions to mitigating measures;
- the degree to which the SIA process makes the possible impacts tangible such that stakeholders are adequately informed about facts, attitudes, alternatives and about the consequences of their contribution to the SIA;
- attention to future information, consultation and judicial procedures.

Reference and Standards

NCEA made use of the following international guidelines and directives:

- World Bank/ International Finance Cooperation (IFC) guidelines for oil and gas exploitation;
- International Organisation of Oil and Gas Producers (OGP) standard principles for impact assessment (environmental and social dimension);

- Organisation for Economic Co-operation and Development (OECD) standard;
- Extractive Industries Transparency Initiative (EITI) standard;
- MARPOL International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78);
- Dutch standard for offshore oil exploitation convened by the Dutch Organisation of Oil and Gas Enterprises (NOGEPa) and the Dutch Ministry of Economic Affairs;
- OSPAR (Oslo-Paris) conventions on protection of the marine environment agreed upon by countries bordering the Northeastern Atlantic region including the North Sea;
- EU policy under Natura 2000 for the protection intertidal and subtidal waters (<20 m depth);
- Trilateral Wadden Sea declaration between Wadden Sea countries (the Netherlands, Germany and Denmark) and West Africa, including Mauritania on the protection of the tidal flats and birds wintering on these tidal flats;
- IPIECA, 2004; A guide to Social Impact Assessment in the Oil and Gas Industry;
- Principles and guidelines for Social Impact Assessment in US, version 2003;
- Experience of the Commission with comparable projects.

Method of Review

For this review the Commission made use of the available EIA/SIA reports, available parts of the Environmental Management Plans, existing reviews on the Chinguetti project and additional primary and secondary information. For an overview please view Appendix 3.

The working group of experts met with representatives of Woodside in Utrecht (the Netherlands) on Thursday, June 13. During this meeting Woodside elaborated on the topics dealt with in the EIA/SIA/EMP and on recent developments.

The experts visited Mauritania from 3 July – 7 July 2006 (cf. programme in Appendix 4). During this visit meetings with authorities and stakeholders took place, the production platform (FPSO, Floating, Production, Storage and Offloading Vessel) was visited as well as Banc d'Arguin, one of the vulnerable areas that might be affected by the project. The exploitation phase of the project subject to the EIA/SIA, had already been started when the Commission executed the review. The visit to the FPSO gave NCEA the opportunity to observe exploitation in practice. Furthermore, the first Findings on Water Sampling were made available by Woodside. This information has been included in this review.

4. EIA / EMP: FINDINGS AND RECOMMENDATIONS

The EIA focuses on five main topics, being:

- oil spills;
- discharge of Production Formation Water (PFW);
- drilling discharges;
- trawling interactions;
- greenhouse gas (GHG) Emissions.

The Commission subscribes the selection of these five topics as being the major impacts to be taken into account in the EIA. Topics of less importance are addressed in the EMP.

4.1 Oil Spills and its Impacts

Single-hull/double-hull configuration

The FPSO proposed for this project is based on a converted¹² very large crude carrier, designed to international standards and with a single-hull configuration.

At present, the use of double-hulls for oil tankers, is international standard. For anchored and immobile FPSOs however this is not (yet) obligatory (MEPC/Circ. 406, 10 November 2003). In July 2003 the IMO issued new guidelines recommending double-hulls for new floating production systems. A development option for the Tiof field is presently under consideration and involves the short term lease of a second FPSO. It has become clear that also double-hulls are not without risks¹³. Inadequate maintenance of the double-hull interior will lead to corrosion in the long term. Moreover salvaging damaged or sunken double-hulled oil tankers pose severe problems. Therefore, the NCEA emphasises the need for adequate maintenance in case double-hulled FPSO's are prescribed by the GoM, in order to avoid corrosion in the long term.

- If the GoM considers to adopt the international guideline using double-hulled FPSO's sufficient attention is to be given to the pros and cons of double-hulled tankers when deciding on future offshore development projects.

The dangers of using a single-hull configuration are acknowledged by Woodside. The EIA states that *"A FPSO loading and offloading pattern with centre tanks of the FPSO filled first, and emptied last, to reduce the possibility that a wing tank contains oil in the unlikely case of hull penetration, will be the preferred operating philosophy for the Project. Woodside cannot make a commitment that the wing tanks of the FPSO will never be used for oil storage,.... etc"*

On the 5th of July 2006, the NCEA visited the Berge Hélène and could observe 2 tanks (of a total of 7) on both port and starboard sides to be filled with oil. It appeared to be standard procedure and was explained by the operator as a necessary measure to separate the formation water from the oil in the central tanks before offloading. The EIA has not covered standard use of wing tanks like that and therefore underestimates the increased risks and volumes of oil spilled in case of a collision.

In the opinion of the NCEA other possibilities are available to separate water from oil such as flocculation and flotation¹⁴. Also in case of a belated arrival of a trading tanker, production could be stopped or slowed down.

- The NCEA advises GoM to request Woodside
 - to clarify the use of the wing tanks for oil storage
 - and in case of regular use of wing tanks to elaborate on possibilities to transfer oil from the central tanks to the transport vessels without using the wing tanks and still comply to refinery standards of 0.2 volume % of water in oil and comply to the EIA.

¹² Following Norwegian procedures of Det Norske Veritas.

¹³ Discussion on the merits of double and single-hulled FPSOs can be found on the website from the Australian Maritime Safety Authority: (http://www.amsa.gov.au/Shipping_Safety/Codes_Manuals_and_Reports/Comparison_of_single_and_double_hull_tankers.asp).

¹⁴ Flocculation is a method which comprises the addition of chemicals and flotation is a method using compressed gas. Both methods enhance the separation of water and oil.

(Oil Spill) Modelling

Current Model

The coastal current field is essential input to the oil spill model, which in its turn is a critical instrument for pollution risk analysis and oil spill management. A critical review on the way the current field has been estimated is therefore essential. NGO's in their comments specifically questioned whether large scale currents were considered enough taken and how the 2-D model used can adequately take into account the 3-D dispersion pattern.

For a thorough evaluation the NCEA needed more detailed information on the model used than was given in the EIA, specifically on the way large-scale drift currents are taken into account.

In essence, the model distinguishes several time scales in the oceanographic current field; from smaller to larger scale: turbulence, tidal motion, wind-driven and geostrophic convection currents and large-scale drift currents.

Woodside and their experts (APASA¹⁵) provided the following information on 5 and 10 July 2006.

Turbulence is taken into account via a diffusion sub-model, the usual way to deal with the effects of this relatively small scale motion. Tidal motion is included via the OCCAM model (accessible through NOAA¹⁶), thus separated from the wind-driven and geostrophic convection currents derived from the altimeter data (delivered by NOAA). This approximation is allowable in view of the distinct difference in time scale (hours for the tidal motion, days for the wind-driven and geostrophic currents).

The large-scale drift currents are not really instantaneous flows, but rather the net result of long-term averaging of a much more complex pattern. As far as these drift currents manifest themselves at the ocean surface they are already included in the altimeter current patterns. Drift currents that exist only in the lower parts of the water column are less important for oil spills. Oil tends to rise rapidly to the water surface thus its residence time in the lower water column is too short for the oil to travel over large distances.

Oil spill modelling has to adequately represent the current patterns at time scales comparable to the life span of a spill, i.e. from hours to several days. Since the currents at this scale dominate (and include) the larger-scale ones, it is sufficient to consider only these intermediate-scale currents.

The wind-driven and geostrophic currents are derived from altimeter data using a current model. The altimeter only sees the water surface, so there is little point in including three-dimensionality of the convection cells derived from these data. Moreover, the typical horizontal dimension of these cells seems an order of magnitude smaller than that of the major bed level variations, which justifies the present approach. The OCCAM tidal model used is fully 3-D, which means that the vertical dimension is properly taken into account, including vertical mixing. Also, the effects of depth variations are adequately included. For oil released below the surface, a 3-D oil spill model is used, for oil released at the surface and remaining there, a 2-D oil spill model is used, which makes sense, since the oil does not spread over the water column.

- According to the NCEA, the additional information provided by Woodside/APASA adequately substantiates the quality of the current modelling.

¹⁵ APASA= Asia Pacific Applied Science Associates.

¹⁶ NOAA= National Oceanic & Atmospheric Administration.

Therefore, the modelling also constitutes a good basis for further risk analyses and the development of an operational oil spill management tool.

Oil Spill Modelling

The stochastic oil spill modelling used in the EIA/EMP is state-of-the-art. In the form presented in the EIA (forward tracking) it is especially suitable for risk analyses of spills from preset locations, such as the Chinguetti site. It is important for Mauritania not only to have this system available, but also to have specialists from their own institutions capable of understanding it and utilising it independently.

It is recommended to use the oil spill modelling technique not only in an *a priori* risk analysis mode but also in an operational mode for oil spill management, e.g. once a spill event occurred and its effects had to be contained. The Oil Spill Contingency Plan (part of the EMP) elaborates upon such a operational mode. The main contingency measure in the EMP to deal with oil spills is the use of dispersers. However, if used improperly dispersers will lead to more damage on marine ecology than the impact of the oil spill itself. More dedicated measures with less risk of negative impacts are available.

A more specific and dedicated system of oil spill contingency planning is required taking into account:

- the quantity of spilled oil; smaller quantities require other measurements than larger ones;
- the expected drift of the spill, e.g. towards vulnerable areas such as the Banc d'Arguin or the Senegal Delta;
- temporal changes throughout the year in distribution and abundance of sea birds and marine mammals;
- if action is needed, dedicated strategies could be:
 - use of vacuum cleaning ships for drifting oil spills, stationed on a number of strategic sites to enable rapid deployment and clean up before the spill reaches the shores (e.g. Nouakchott, Nouadhibou, Dakar);
 - use of protection screens also beyond the direct vicinity of the FPSO;
 - allowing a spill to beach at a place where it does little harm, e.g. on sandy coasts. Then, the oil spill can be removed using bulldozers. According to information provided by Woodside equipment to remove spills on the coast is already available.

The real-time integration of meteorological, altimeter, satellite and aerial photography data and other oil spill monitoring data with the current model was used in the EIA. But, if applied here to monitor the speed and direction of the oil spill, would form a powerful tool to combat the effects of oil spills in the Mauritanian offshore.

■ The NCEA welcomes action undertaken by Woodside to collaborate with the GoM on the use of the oil spill modelling technique used in the EIA for establishing an operational tool for situation and site specific oil spill management.

■ The NCEA advises the GoM to acquire collective funding by oil/gas developing companies to assure that measures, such as the use of vacuum cleaner ships, can be realised.

An alternative application of the stochastic oil spill modelling is backtracking from particularly vulnerable areas, such as the National Park Banc d'Arguin and Park Diawling. This method is highly recommended as a risk analysis method for spills from moving objects, such as passing tankers and the fishing fleet.

According to additional information provided to the NCEA, Woodside has developed a statistical backtracking model, indicating at which locations oil releases are particularly dangerous to environmentally sensitive areas, such as Banc d'Arguin.

Several NGO's (FIBA, IUCN, PNBA, WWF and Wetlands international) in collaboration with the IMROP and GTZ have developed a similar approach, using information on habitats, species and fishery activities in order to identify priority protection areas and conservation zones.

A backtracking model as developed by Woodside and the NGO's can be a very useful and powerful tool to support future policy making regarding drilling locations, exploration and production licenses and the position of international shipping lanes. It is a valuable tool to be incorporated in the Strategic Assessment.

■ The NCEA advises the GoM to develop its own skills in understanding and utilising back track modelling, making use of and coordinating the initiatives of Woodside and NGO's.

Long Term Impact on Ecology and Fishery

The conclusion that potential risks are negligible if appropriate measures are taken to prevent large oil spills and discharges, reducing risks to a minimum, is in the view of the Commission well founded and thus plausible. However uncertainties remain. Neither the EIA nor the Fisheries Interaction Management Plan (FIMP) discusses the possible long term effects of 'routine' discharges and accidental small oil spills on the marine ecology and fisheries sector. These uncertainties are caused by insufficient knowledge of long term (cumulative) impacts of continuous small spills on the ecosystem and the fishery sector.

Impacts on ecology are to be seen in coherence with the impacts on fishery. Banc d'Arguin, Park Diawling, the delta of the Senegal River, Cap Blanc and the coastal zone in front of Mauritania represent highly esteemed ecological values as they are of vital importance to species such as turtles, birds, dolphins, large whales and Munk seals. In addition, the presence of these species in the given quantities is also an indicator of other natural resources (*e.g.* fishery) for the local population. Therefore, safeguarding natural values also entails safeguarding the availability of natural resources as such ensuring a very important and sustainable source of income for Mauritania.

The EIA concludes that there will be no direct influence on artisan fisheries and only a minor impact on industrial fisheries. However, this is the case if all precautionary measures proposed in the FIMP are taken. Part of these measures are the responsibility of the GoM. The capacity of the GoM to take all measures required is limited at the moment. The *Delegation Surveillance des Pêches et au Contrôle en Mer* (DSPCM) is able to track the movements of all commercial fishing vessels, but not the movements of all other passing vessels among which are many crude oil tankers. The GoM has not yet prepared and put in place her own oil spill contingency plan and is dependant on assistance from Woodside in case of an oil spill.

In order to reduce remaining uncertainties of long term impacts on the ecosystem more in-depth knowledge is required. IMROP can provide data and knowledge on fishery related subjects. However, information on other species, such as non-commercial species, marine mammals, turtles and crustaceans is lacking. Insight into the functioning of the ecosystem is poor. The background documents of the EIA for the Chinguetti project illustrate this. Knowledge on terrestrial species seems to be very restricted.

A long term monitoring programme is essential to verify the absence of impacts. Interim (bi-annual) reports should enable the GoM to take corrective actions should the monitoring results point to negative impacts. Such a monitoring programme becomes more imminent if the expected future potential of the offshore acreage is realised and more oil and gas developments will take place¹⁷. These developments underline the need for 1) adequate monitoring by the GoM as well as 2) the attention on cumulative impacts. These issues should be addressed in the upcoming SEA. For the short term GoM will need expert support from abroad to start up this programme and build up capacity.

- The NCEA advises the GoM to
 - give full attention on cumulative impacts on the ecology and on the fishery in the SEA and prescribe the when, where and how methodology, to identify the best window of opportunity for the various activities associated with the exploration, appraisal and development activities (drilling, testing (including flaring) and production);
 - elaborate and start up a monitoring programme with the utmost urgency and with the support of international expertise.

4.2 Discharge of Production Formation Water

The EIA estimates a crude oil production capacity of ~75,000 barrels per day. Woodside states that at this moment (June 2006) only a capacity of approximately 35.000 barrels per day is achieved. The first sampling round on quality of the formation water shows that an average oil content of 25-27 mg/l is discharged which is less than the minimal standard of 30 mg/l. However, international industry discharge standards are improving continuously and are presently moving to 10 mg/l or less.

Although the production rate has rapidly declined to 50 % of expectations and thus the amount of discharge is also halved, the expected duration of activities at Chinguetti, presently estimated at 10-15 years, may well be extended if new discoveries (Tevet and Labeidna) are also tied back to the "Berge H el ene" FPSO.

In the EIA a study on the use of the 4 water injection wells to re-inject formation water is announced.

Scaling problems are a well known result of re-injecting seawater and formation water¹⁸. If scaling occurs, acid solutions are used to remove the scaling. These acids can only be employed when non-ferrous tubing material is used for the completions. Laboratory tests are normally conducted before a decision is made on which tubing material is to be used during completion. To conduct a feasibility study this late in the project when the injection wells have already been completed, is not standard practice¹⁹. As re-injection is expected to greatly reduce the discharge of oil and toxic wastes to the sea, the NCEA wants to underpin the urgency of carrying out such a study. This study should address the possibilities to adjust already implied technology and materials. It is recommended to implement the results of the study forthwith.

Although foreseen, representatives of GoM did not participate in the monitoring rounds performed by Woodside. The NCEA likes to stress the need to future involvement in

¹⁷ Labeidna & Tevet are new discoveries and the Hardman 2005 Annual Report (p.17) mentions several new oil/gas development projects due in the short term.

¹⁸ Under certain conditions, BaSO₄ (Barium sulphate) preferentially precipitates out of solution and clogs the tubing thus hampering the injection capacity.

¹⁹ The Skandpower review report already addressed in 2004 the absence of information on the results of the feasibility study on re-injection of produced formation water and drill cuttings.

order to enable the GoM to build up capacity and establish an independent monitoring institution as soon as possible.

- The NCEA advises the GoM to demand for the results of the study on re-injection of formation water to be available prior to an approval decision on the EMP.
- Although first monitoring results show pollutant levels below current standard the NCEA advises the GoM to
 - require elaboration and implementation of measurements by Woodside to be able to meet industry discharge standards of 10 mg/ltr, e.g. by using available hydro-cyclones;
 - closely monitor water quality and to develop within GoM skills and knowledge in this respect as soon as possible.

4.3 Drilling Discharge

As the Chinguetti exploitation has already started, recommendations to avoid or minimise impacts of drilling discharges for the Chinguetti project as such are no longer relevant. As new drilling activities by Woodside in 2008 (4-6 wells) and other parties are foreseen, this is an issue to be addressed in future EIA's.

Woodside used water-based drilling mud (WBM) that was discharged into the ocean, and synthetic based mud (SBM) that was re-used. Cuttings were also discharged into the ocean. Long-term effects of the amounts of mud adhering to drill cuttings (e.g. on benthic communities) are uncertain. In 1993 the Dutch government decided to ban all discharges of oil contaminated ditch cuttings in the North Sea. One license was given to investigate the impact of SBM contaminated ditch cuttings at one location (K14-13) on the condition that a field monitoring programme be carried out to assess possible effects on the benthic system around the location and to estimate degradation rates of esters in the sediment after discharge. The results are reported in Daan et al. 1995²⁰ (NIOZ rapport 1995-2). The ban on discharge of OBM/SBM contaminated ditch cuttings in the North Sea continues. All OBM contaminated ditch cuttings in the North Sea basin are either injected down hole or transported to onshore disposal sites where the oil is recovered for re-use. In most cases it is therefore more economic to use OBM muds (and not SBM muds) and treat the ditch cuttings onshore to recover the oil for future re-use via vacuum distillation. Various companies have mobile installations available to service the industry worldwide.

Based on the precautionary principle and with expected future drilling, more environmental friendly ways of disposal are to be considered.

- The NCEA advises the GoM to require operators in future EIA's to :
 - carry out laboratory tests or field test to demonstrate that the SBM used fulfils toxicity and biodegradability criteria as stipulated in the EPA 2001 Guidelines for the Gulf of Mexico.
 - address the possibilities of zero discharge of drill cuttings and the evaluation of re-injection or (collective and environmental friendly) disposal of drill cuttings on land.

The chance for a blow-out to occur is highest during the drilling phase. The resulting oil slick on the surface of the ocean could be blown to shore or, alternatively, further offshore in another season. Given the changing currents through the year a preferred period of the year for drilling activities will be site-dependent (see also under Oil spill modelling). A consistent way of reducing risks is to drill fewer wells by re-entering the

²⁰ Daan, R., K. Booij, M. Mulder and E.M. van Weerlee, 1995: A study on the environmental effects of a discharge of drill cuttings contaminated with ester based muds in the North Sea, NIOZ-Rapport 1995-2.

exploration and/or appraisal wells and completing these as producers. The initial well design should take the later use as a production well, into consideration.

- The NCEA advises Woodside to explore the possibilities of re-entering already drilled or future wells and complete these as producers.
- The NCEA advises GoM to develop in the SEA a strategy to minimise impacts of drilling activities, such as setting preferred period for drilling on specific sites.

4.4 Transport Risks

According to the EIA, the Mauritanian Exclusive Economic Zone incorporates a number of major commercial shipping routes, with about 13,000 vessel transits through the region annually. Currently, an average of approximately 58 million tons of crude oil is transported off the Mauritanian coast each year, with 400 transits of vessels annually carrying crude oil, mainly from oil producing countries such as Angola and Nigeria. The quantity of oil likely to be transported from the Chinguetti field each year represents the equivalent of 5.7% of the annual crude oil currently transported along the coast. This results in the following combination of potentially conflicting industrial activities: busy shipping lanes, economically important fisheries and the exploitation of oil and gas.²¹

Oil spills either due to operations in the Chinguetti field or by ship collisions with the loading tanker or FPSO may affect marine life and may have a detrimental effect on fishery (both artisan and industrial).

The Fisheries Interaction Management Plan (part of the EMP) includes the use of guard and patrol vessels in and nearby the safety zones of the FPSO. Risks for collision of vessels with the FPSO is therefore correctly estimated as 'low' in the EIA.

As for the risks of tanker transport the *Délégation Surveillance des Pêches et au Contrôle en Mer* (DSPCM) can follow passages of all fishery vessels by satellite. In case of an unauthorised presence or the development of a potentially risky situation, possible risk corrective actions could be taken. However, this system only works with registered fishery vessels that have responders on board. All other (foreign) vessels lack this equipment and sail by unnoticed. Recent modelling on the current situation by Woodside already shows large potential impacts of a tanker collision near Cap Blanc with subsequent risks for Banc d'Arguin.

- The NCEA advises the GoM to seek international assistance to create a traffic control system for their offshore economic zone, to assure the safe and clean passage of all ships through Mauritanian waters.
- The NCEA advises GoM to consider to divert the international shipping lanes near Cap Blanc further to the West.

4.5 GHG Emissions and Flaring

The EIA states that gas from the oil reservoir will be re-injected and not flared²²; In addition, there will be no flaring on board the FPSO during normal production. Flaring

²¹ Similar traffic "congestion" is known from the Channel and Rotterdam harbour (Europort). There, traffic is also intense with mammoth oil tankers delivering their cargo to Europe's major refineries, with oil and gas production platforms offshore and intensive fishery taking place at the same time. Traffic control, obligatory pilots on board, airborne pollution control and radar coverage all cooperate to assure a safe and clean passage of all ships.

²² The Scandpower review report of 2004 underlined the need of submission of a Chinguetti flaring Policy detailing the maximum allowable downtime of the gas re-injection system without shutting down production (incl. maximal allowable

of gas will only occur in the initial stages of the project when gas injection wells still need to be drilled.

Absence of flaring is a significant bonus as flares tend to attract migrating birds to disastrous effects as they fly into the flare and are burned. It furthermore reduces the emission of CO₂ and other greenhouse gases. The flares will attract migrating birds especially at night, low clouds and mist. In the fall, when large numbers of migrating birds arrive from the North, they are especially vulnerable, tired and hungry, and known to be attracted/distracted by these flares, where they are burned in large numbers.

On the 5th of July 2006, the NCEA visited the Berge Hélène and could observe that 5 months after the start of production gas was still being flared. Woodside representatives explained that this was due to a break down of one of the gas compressors used for re-injecting the gas. It is evident that to inject gas, the gas compressors need to function properly. At the moment of the site visit one of the three gas compressors was under repair. As a result less gas could be re-injected and the maximum capacity of the flare was used which in turn restricted the amount of oil that could be produced.

- The NCEA advises GoM to insist on Woodside to use state of art equipment and to upgrade their QA/QC procedures for the commissioning activities, to avoid flaring of the associated gas in future.²³
- The NCEA advises the GoM to adopt a non-flaring policy. If exceptional flaring is necessary, mandatory procedures with respect to permits for and methods of flaring are to be included in future terms of reference for EIAs.

4.6 Other Impacts

Decommissioning

The PSC prescribes every site to be left in the original condition after decommissioning and assures financial coverage of future expenditures to enable complete decommissioning. The EIA describes the principles for decommissioning and gives an indication of measures. The EIA announces a detailed decommissioning and abandonment plan to be prepared and submitted to the relevant authorities before decommissioning commences.

- The NCEA underpins the need to prepare and submit for approval, a detailed decommissioning plan in line with best practice well in advance of the end of the field life.

Seismic Activities

Potential impacts of seismic activities are 1) disturbance of coastal activities (industrial and artisan fishery and maritime transport; and 2) impacts on the ecosystem above and below sea level (birds, fish, and marine mammals). The extent and severity of possible impacts will depend on the timing and duration of these seismic activities. The EIA legislation of Mauritania covers activities of '*ouverture et exploitation*'. It is not entirely clear whether seismic activities are included in these activities²⁴. New seismic activities by Woodside and other parties are foreseen in the near future. Mandatory EIA studies will have to give adequate attention to possible impacts.

annual downtime). According to its information Woodside submitted a flaring policy to the MEP. The NCEA however has not been able to verify its existence nor its content.

²³ See also under 3.3. referring to requirements for installation and equipment under the PSC.

²⁴ According to its information Woodside for all seismic surveys since 1998 has prepared environmental impact assessments and environmental management plans.

- The NCEA advises the GoM to ascertain that EIA procedure for seismic activities in exploration and appraisal stages are included in EIA legislation.
- The NCEA advises the GoM to investigate in the SEA the window of opportunity for seismic activities to take place, taking into account the absence during specific seasons for sensitive species (use when, where and how to approach).

Light Disturbance

The EIA states that light disturbance of birds is negligible. However, light from platforms and transport vessels is known to disturb birds²⁵ especially in misty situations. Recent experiments carried out by the NAM²⁶ using green and blue lighting proved to be very effective in avoiding this disturbance.

- The NCEA recommends GoM to explore the possibilities to apply green and blue light on platforms and FPSO's in order to minimise adverse effects on birds.

4.7 Code of Conduct

The EMP does not address the need for a Code of Conduct for operators implying a policy of 'Stop-Think-Act-Review' (STAR) for controversial activities. Such a Code includes the requirement to inform authorities immediately in case of deviation of procedures laid down and includes additional procedures/measurements: the so called "what, if" scenarios.

During the visit of the NCEA the Director of SMH has stated to be in favour of such a 'Code of Conduct' which would provide the GoM a basis to forbid any activity of uncertain outcome until the situation is studied and alternatives or at least contingencies have been developed.

The flaring practice and the actual procedure on board of the FPSO "Berge Hélène" using the wing tanks for oil storage, which contravenes the written and orally expressed intentions of Woodside, are good cases in point to exercise this 'Code of Conduct'.

- The NCEA advises the GoM to request Woodside to comply with such a Code of Conduct in order to ascertain that operators subsequently adopt the policy of 'Stop-Think-Act-Review' (STAR) for all actual and future controversial activities.

5. SIA / SIMP: FINDINGS AND RECOMMENDATIONS

This chapter addresses:

- consultation procedures;
- impact qualification and ranking method;
- economic impacts;
- societal impacts.

²⁵ Marquenie J, 2006, Green light is a winner (NAM, internal report).

²⁶ NAM= Nederlandse Aardolie Maatschappij (owned by Shell).

5.1 Consultation

The SIA describes in detail the consultation procedures followed. The calendar of consultation is well elaborated. An appreciated effort is made to consult many stakeholders such as different ministries and governmental departments, NGO's, local and national organisations of different disciplines and coastal villages, both in Mauritania as well as in Senegal.

However, by spreading the effort over many stakeholders, and by lack of a proper stakeholder analysis in terms of importance and influence, it cannot be assessed whether relevant input of important stakeholders is missing.

The EIA and the SIA have been carried out separately. This may have led to insufficient involvement of evident stakeholders in the SIA procedure such as IMROP. IMROP was involved in one stakeholder meeting, but was not part of the Reference Group established by Woodside for the SIA, although this institute has valuable knowledge on ecological as well as socio-economic data concerning the marine and coastal environment of Mauritania.

During the consultation rounds comments were given that too little attention was given to stakeholders that did not participate in the EIA process and therefore were not sufficiently informed to give appropriate comments or judgements. It is not clear whether this and other remarks about the process were taken into account by the SIA team and if so, how they were taken into account.

International organisations have major criticism on the (consultation) procedures followed in the past. However, the recent openness of Woodside is appreciated. Other stakeholders - mainly government departments or institutions- still feel inadequate and/or untimely informed. Whether this is caused by the initiator or by lack of communication between the ministries involved, has not become clear. Limited experience with consultation procedures specifically concerning SIA undoubtedly contributed. Yet the observation on inadequate/untimely consultation within the GoM should give way to improvement in future consultation procedures.

Although many Senegalese stakeholders have been consulted their concerns are not elaborated in the SIA. The impact assessment related to Senegal is restricted to the potential impact on their fisheries resources as a result of an oil spill. Other impacts such as on socio-economic aspects are still to be addressed. However a SEA procedure is a more appropriate tool for such concerns and considerations.

Various SIA guidelines emphasise the importance of communication and consultation. Two features are important:

- The indicators used are to reflect the knowledge and interests of a large number of stakeholder groups.
- Stakeholder consultation and participation should be a continuous process²⁷.

In the SIA a Public Consultation and Disclosure Plan (PCDP) is presented. This plan does not extend beyond the end of the SIA study.

²⁷ The SIA refers to IAIA, IPEICA, and OGP for main reference guides. Generally, these guidelines emphasize a continuous dialogue.

- The NCEA recommends Woodside:
 - to apply a more dedicated approach in coming stakeholder consultations taking fully into account their level of knowledge and degree of interest;
 - to re-establish the reference group, to review its composition and give it administrative support;
 - to finalise the (Social Impact Management Plan) SIMP as soon as possible in consultation with the reference group, including a continuous consultation plan based on a stakeholder analysis and ensuring conditions for full participation.
 - to seek the advice of the reference group on monitoring the development and implementation of the SIMP.

- The NCEA recommends the GoM:
 - to assure compliance with obligatory consultation procedures within the GoM and among stakeholders in future assessment procedures (EIA/SIA/SEA);
 - to address socio-economic impacts on Senegalese stakeholders in the SEA.

5.2 Qualification and Ranking of Impacts

Described impacts and proposed mitigation measures are generally sufficiently elaborated in the draft SIA.

Impacts identified in the SIA have not been quantified except for employment. For long term impacts, a SEA process is obviously more suitable to develop a quantitative prognosis on a macro-economic scale which also takes cumulative impacts into account. For the short term however, a more quantitative approach could have been followed by estimating the direct and indirect impact on investments, increase in turnover of local contractors and migration into Nouakchott. Especially when many of the impacts already took place during the last 5 years.

Impacts are qualified (as negligible, minor, moderate or major) taking into account the expected results of the proposed mitigating measures. As these mitigating measures are to a fairly large extent within the competence of the GoM and not within the competence of the initiator, this qualification masks the actual extent of the expected impact. Without taking mitigation measures into account, the classification could have turned out different. For example, the risk of social and political tensions is now classified as “moderate” while in the opinion of the NCEA (and many stakeholders) this is a major issue. The potential impact on natural resources in case of an oil spill is not classified because it is considered exceptional. However, if mitigation measures are not taken into account, this impact would be classified as “moderate” (low probability but high intensity).

The classification is done on the basis of evaluation criteria developed after discussions with stakeholders, only taking into account the general views of stakeholders, most of whom had little knowledge of the project. Preferably, impacts are to be classified in consultation with stakeholders, taking into account different views on the impacts.

- The NCEA advises Woodside in the SIMP to:
 - adjust the classification without taking into consideration mitigation measures;
 - make the different views and opinions of stakeholders on the qualification of impacts more explicit.

As discussed in the SIA, impacts are interrelated through social and economic mechanisms. This is well known for economies benefiting significant revenues from natural resource exploitation²⁸. Without a careful macro-economic policy, economic and social benefits in a strong export oriented sector will lead to negative impacts on other sectors. The following impacts are reflected in the SIA:

- 1) Economic impacts: a strong export oriented sector reduces international competitiveness of other sectors because of the resulting stronger currency (lower export prices expressed in local currency) and a price increase of intermediary products due to demand competition and inflation.
- 2) Societal impacts: economically induced changes will lead to social processes that may provoke social tension. Benefits will not be equally distributed and some groups may even feel threatened in their traditional livelihood. People may benefit but less than expected because their expectations will turn out to be unrealistic. The risk of social problems is apparent. These may need to be dealt with, if possible preventively, by mitigating measures.

5.3 Economic Impacts

The major economic impacts, increase of exchange rate and inflation, are well addressed in the SIA. The SIA qualifies the impacts as intensive, with a high probability to occur and providing limited scope for mitigation measures from the side of Woodside.

The most important impacts refer to an expected increase of the national income leading to positive as well as negative impacts. Many of the mitigation measures by the government as proposed in the SIA are related to improvements in revenue management and transparency. The NCEA underlines the importance of the efforts of GoM and Woodside to continue the process started up by subscribing to the EITI guidelines for transparency and good governance. It seems obvious to the NCEA to encourage future oil companies to subscribe and adhere to the EITI “guidelines for private companies” and to monitor compliance.

- The NCEA recommends Woodside to contribute to the strengthening of the oil and gas sector in Mauritania by actively working on a sector organisation and developing a policy for societal development.

Measures with respect to revenue management are already undertaken or planned by the Ministries responsible and the Central Bank. These ministries co-operate closely with the World Bank²⁹ and the IMF. The GoM relies on an elaborated poverty reduction strategy programme³⁰, which covers the period from 2006-2010. This programme is the responsibility of the Ministry of Economic Affaires and Development. Mitigation measures as suggested in the SIA should be in coherence with the PRSP.

The effectiveness of revenue management will significantly be improved by a realistic pace of development. Spreading out revenues over a longer period of time will improve

²⁸ The so called “Dutch disease” impacts.

²⁹ See also Mauritania, Managing Natural Resources : Challenges and Options, Country Economic Memorandum Update, Jun2006, WB report no. 36386-MR.

³⁰ Cadre Stratégique de Lutte contre la Pauvreté , Plan de Action 2006-2010, (draft) 15 Juin 2006.

the chances of success for structural improvements to take place which in turn may lead to higher returns overall. Possibilities for a responsible rate of development are most appropriately addressed in a SEA³¹.

The SIA does not address impacts on economic values of other sectors. The oil and gas exploitation takes up an important part of the Mauritanian institutional resources and attention. This process may divert investments away from other sectors that rely on renewable sources such as fishery and tourism (culture, nature and landscape).

- The NCEA recommends the GoM to initiate collective consultation with offshore operators on e.g. mining legislation, enforcement, monitoring and relevant research and to integrate mitigating measures proposed in the SIA into the relevant decentralised PRSPs.
- In addition, it is recommended to address in the SEA the possibilities of pacing developments, and the possible impact of reduced interest and investments in other sectors.

5.4 Societal Impacts

The SIA addresses the major social impacts. However the NCEA is of the opinion that some themes need to be analysed in greater detail:

- **Migration:** the SIA mentions extra influx of people to Nouakchott in search for work, but it does not give baseline data on the actual increase. Even though recent studies as reflected by the World Bank³² suggest the complex nature and cause of migration into urban areas, the SIA could have made a bigger effort in estimating the direct and indirect impacts of the Chinguetti project.³³ Mitigation measures taken by Woodside, e.g. awareness raising for the prevention of social pathologies are limited to Woodside employees.
- **Brain drain:** Information from the Ministry of Economic Affairs and Development suggests that the negative impact of the brain drain has been underestimated in its importance and intensity. Also the recent PRSP suggests this impact already to be strong. Basically, each public agency or private company runs the risk that qualified personnel will find a better remuneration in the oil sector.
- **Impact on the fishery sector;** the fishery sector is only discussed in relation to a possible large oil spill. Impacts of accidental oil spills or chronic pollution are not discussed, nor possible economic effects on commercial and artisan fishery.
- The NCEA recommends Woodside
 - to give quantified data based on recent developments in the SIMP about migration processes and mitigation measures
 - to pay more attention in the SIMP to awareness raising in relation to health issues, not only for company employees but also in a broader sense.
 - to specify and quantify in the SIMP the description of impacts of the project and the related mitigation measures as much as possible
 - to consider investment in private sector developments (small and medium enterprises, rural development) and social programmes (education, health, water supply) as part of Corporate Social Responsibility.

³¹ Several major oil producing countries in the Middle East actually apply pacing, mainly by slowing down further exploration. Pacing can also alleviate the negative economic impacts of the brain drain from other sectors.

³² Mauritania, Managing Natural Resources : Challenges and Options, Country Economic Memorandum Update, Jun2 2006, WB report no. 36386-MR.

³³ As also has been suggested by the Agence de Développement Urbain de Nouakchott.

5.5 Other Remarks

It is not clear whether the baseline study is based on the reference situation before exploration or the situation at the moment of the SIA study. The tables suggest the latter, but no analysis is provided of recent project impacts, e.g. extra population growth at Nouakchott.

The study provides comprehensive information on social and economic indicators of Mauritania but sometimes consistency is lacking, e.g. information given on the means of living in coastal villages is not coherent³⁴. For further evaluation programmes, more accurate baseline information is needed to assess whether oil extraction will have an impact on the means of living in coastal villages.

- The NCEA recommends Woodside in the SIMP to:
 - define the reference situation;
 - quantify baseline information as much as possible and to correct inconsistencies.

6. MONITORING, EVALUATION AND CAPACITY BUILDING

A sustainable development and exploitation of natural and social resources will greatly depend on the way safety and environmental standards will be respected and enforced. There is an urgent need to enhance the capacity of the GoM to warrant compliance to the conditions set out in PSC, EMP and PGIS.

The lack of capacity and experience within the GoM to control developments is recognised as well as the lack of knowledge on long term (cumulative) impacts. There is an urgent need to build up capacity within GoM on technical knowledge as well as on legislative and institutional aspects, to enable well founded steering. In addition the GoM needs a strategic environmental assessment (SEA) that sets a framework for future projects. And last but not least, a sound monitoring and evaluation programme is urgently needed.

Priorities for monitoring and evaluation are:

- realisation of and adherence to a code of conduct
- short-term environmental impacts (intensive during spill moments)
- oil spill monitoring (intensive monitoring, hour to hour) in case of spills
- ship motions (especially crude oil carriers): continuously
- long term environmental impacts: by routine or by campaign at regular intervals
- long term societal impacts; by routine or by campaign at regular intervals

Instant action is required taking into consideration the rapid increase of the number of projects for which an EIA is to be performed and reviewed. The recently installed Environmental Commission is seen by the NCEA as a major step forward. This Environmental Commission will develop detailed programmes on the above mentioned topics. The analysis carried out by GTZ on the Mauritanian oil and gas sector at the request of MEP gives excellent suggestions to this effect³⁵.

³⁴ Summary (p.ii): "most coastal villages live from fishing and agriculture". See on page 42: "a certain number" of coastal villages live exclusively from fisheries and Appendix D suggests that all villages north of Nouakchott live exclusively of fishing.

³⁵ Mauritania : Oil and Gas Sector Environment Mission Report, on behalf of the Ministry of Energy and Petroleum, Commissioned by GTZ, Robert Goodland, April 2006.

This advice focuses on possibilities for capacity building, monitoring and evaluation where Woodside could contribute. Possible contributions in capacity building are:

1. Techniques of oil/gas exploitation:

- increase “on the job training” of representatives of MEP, MPEM and MDRE and IMROP;
- training and technical assistance of staff of small Mauritanian supplying companies in the provision of goods and services, to improve compliance to required standards
- establishment of a fund for granting scholarships abroad
- oil spill risk analysis, monitoring and contingency measures:
- Forward tracking oil spill modelling: training of specialists of the GoM (or any other institute they designate) in the background and the use of the oil spill modelling techniques utilised in the EIA;

2. Oil spill monitoring: development of an integrated oil spill monitoring and modelling system, jointly with specialists of the GoM (or any other institute they designate):

- Oil spill risk analysis: further development of the statistical backtracking method, together with specialists of the GoM
- Training of staff of Banc d’Arguin and Diawling National Parks in coherence with the priority activities of PRCM described in their regional Strategy for Marine Protected Areas (MPA), such as to provide MPA zones with adequate technical resources and train staff.