Advisory Review
of the draft Environmental Impact Statement
for the West African Gas Pipeline

29 April 2004

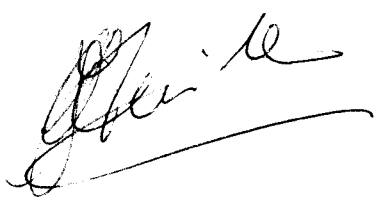
054 – 024

ISBN 90-421-1308-1
Utrecht, the Netherlands Commission for
Environmental Impact Assessment

Advisory Review of the draft Environmental Impact Statement for the West African Gas Pipeline

Advice submitted to the Environmental Protection Agency in Ghana, by a working group of the Commission for Environmental Impact Assessment in the Netherlands.

the technical secretary



Ms. Ineke Steinhauer

the chairman

Mr. Klaas Jan Beek

Utrecht, 29 April 2004

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APPENDICES

1. INTRODUCTION

1.1 The Initiative: the West African Gas Pipeline (WAGP)

The West African Gas Pipeline Company Ltd. (WAPCo), the project proponent, intends to construct an onshore and offshore gas pipeline transmission system that will deliver natural gas from Nigeria to commercially viable markets in Benin, Togo and Ghana.
WAPCo was formed in May 2003. The members are Chevron Texaco Ltd. (41,87%), Nigerian National Petroleum Corporation (25,25%), Shell Overseas Holding Ltd. (18%) and the Volta River Authority (16,38%)[1].

The proposed project involves the construction of a 20.3cm to 76.2cm, 690.5 km dry gas pipeline transmission system, onshore and offshore from Nigeria to Ghana. The onshore pipeline will connect to the existing Escravos-Lagos Pipeline at the Alagbado "Tee," north of Lagos, Nigeria and extend 56km to a compressor station at Badagry Beach in Nigeria, proceeding across Badagry Creek for 2km to the shoreline. The offshore pipeline will be routed at distances from 16km to 25km from the shore in water depths ranging from 24m to 72m. Single lateral connections will be made to bring gas onshore in Benin, Togo, and Ghana (with two delivery points). These laterals will extend onshore between 110m to 520m), except in Benin, 5.1km (see map appendix 6).

1.2 Current situation

The Environmental Protection Agency (EPA) in Ghana has received the draft Environmental Impact Statement (EIS) on the proposed West African Gas Pipeline Project in line with the requirements of the Environmental Assessment Regulations 1999, LI 1652.

As required under the regulations, the Agency has the responsibility of reviewing the statement to ensure that adequate safeguards are incorporated in the design and implementation of the proposed project and of granting an environmental permit for the Ghana segment of the project (although transboundary issues and impacts would also be considered if they come up in the review).

In view of the strategic nature of the proposed project, the potential transboundary impacts and the strong interest of the public, the EPA composed a special inter-sectoral team to undertake the review (see appendix 4).

The outcome of the review process would be a set of comments and recommendations to the Executive Director of the EPA for consideration and onward submission to the proponent to either submit a revised EIS, conduct

[1] Information WAPCo, april 2004

such further studies as the Agency considers necessary or to finalise the report for decision making on environmental permit granting.

The review of the proposed project EIS poses a great challenge to the Agency in view of the limited local capacity and experience in dealing with gas pipeline projects. It was, therefore, considered important that the review team would be supported by external expertise and experience. To obtain this support, the EPA solicited assistance from the Netherlands EIA Commission through the Royal Netherlands Embassy in Accra.

1.3 Request of the EPA and involvement of the Commission

In March 2004, the EPA invited the Netherlands Commission for EIA[2] (see letter appendix 1), to assist the EPA in the review of the EIS. The EPA proposed that the review be done jointly with the Commission, in order to:

- enhance the review of the draft EIS on the WAGP-project
- advise and support the review team
- enhance the review capacity of the Agency and its stakeholders
- enhance the credibility of the review process both locally and internationally
- ensure the quality of the review process

In order to prepare an advisory report on this specific request, the Commission formed a working group of experts, representing the Commission, which comprises the following disciplines: dredging, civil engineering, health/safety/environment, (marine) ecology, nature conservation, risk assessment, social impacts, EIA application. Disciplines were selected also to match with the available expertise in the EPA review team. The working group members of the Commission are listed in appendix 3.

This working group visited Ghana from 20-26 April January 2004 (see appendix 5, working programme). The purpose of this visit was to collect project- and site specific information (see appendix 7, list of documents) and discuss matters with several government authorities and non-government organisations and institutes. More specifically, the visit was organised to (see also appendix 2):

- Participate in review meetings of the EPA inter-sectoral team
- Undertake field visits with the inter-sectoral team
- Comment on the output of the inter-sectoral review team
- Prepare a report on their observations from the review and its output

[2] Henceforth referred to as 'the Commission'

- Comment on the review process and advise on how similar exercises in the future may be conducted
- Review the draft EIS and advise the Agency on its shortcomings
- Provide technical support to the review team

1.4 Approach taken by the Commission

The project proponent had prepared a Scoping document/Terms of Reference (ToR) in March 2003, which had been approved by EPA. The Commission has used these as a review framework.

Before travelling to Ghana, the Commission's working group had prepared a list of topics to be discussed or clarified during the site visit and had sent this list to Ghana.

The Ghana review team is made up of representatives of various Ministries, Agencies, Professional bodies, Research Institutions and EPA staff. The team has been divided into four groups, namely:

- Public Health and Safety
- Project Specification and Description/Alternatives
- Socio-Economic
- Ecology

Each group was expected to focus on specific areas in the review. The team had met several times to plan the strategy, and to discuss their initial review comments, before meeting with the Commission. Three public hearings at three different locations were held, of which a summary of issues raised was made and sent to the Commission.

Upon arrival in Ghana, the Commission undertook two site visits to Tema and Takoradi together with (members of the) EPA review team. The Commission also participated in meetings of the four review teams. Copies of the initial comments of the Commission were distributed in the groups and discussed. Finally, the Commission commented on the group reports and presentations during the plenary sessions.

The next chapters reflect the main findings of the Commission in relation to the review of the draft EIS and its shortcomings (chapter 2) and in relation to the review process and outputs of the EPA review team (chapter 3).

2. GENERAL CONCLUSIONS AND RECOMMENDATIONS

The Commission is of the opinion that in general the EIS in general is of good quality. The thoroughness of the study and the attempt to be comprehensive,

especially for a project of this size, is appreciated. However, the Commission observes a number of deficiencies, that apply both to contents and process. The Commission recommends that the proponent addresses some of these shortcomings **before** decision making on license granting (see 2.1). The Commission observes that other information gaps can be addressed **after** decision making on the licence, can be introduced as preconditions in the license (see 2.2) and should be addressed before the start of the construction. Process issues are discussed in 2.3.

2.1 Issues to be supplemented in the final EIS

The Commission advises to address the following points in the final EIS, for instance in an addendum, before decision-making on the environmental licence and to review the supplementary information before licensing.

2.1.1 General: quality and accessibility of the EIS

The EIS comprises practically only text items without explanatory drawings, which makes it difficult to perform an adequate assessment of impacts and risks. These might demonstrate the need for extra mitigation measures.

- The Commission recommends to include
  - Maps of the pipeline route, including lateral pipelines, with the local characteristics offshore (bathymetry, sediment characteristics) and onshore (topography, sediments characteristics) including information based on:
    - Maps with the turtle nesting sites, protected and sensitive habitat areas (wetlands, beaches), spawning areas and corals in the vicinity of the pipeline route.
    - Longitudinal section bathymetry of the seabed of the pipeline route and the risks of spanning.
    - Maps showing the zones of the fishing activities based on the different types of fishing boats used and fishing techniques applied.
    - Maps showing air and noise pollution contours near protected habitats, residential areas and other objects of interest like hospitals and schools. The areas should be indicated in the maps.

2.1.2 Safety aspects of the pipeline system offshore

As WAPCo has committed itself to minimize damage to the environment and as the uninterrupted operation of this gas pipeline is essential for the energy operations, it is obvious that both the design and installation of this pipeline must ensure minimal risk of failure and damage to the environment.

The key item for the offshore design is the decision as to what extent the pipeline should be protected. The highest risk for the pipeline is generated by objects falling onto the seabed and being dragged over it. The most likely objects to cause damage are ships' anchors and trawling fishing gears.

The pipeline passes through a designated port area, managed by the Ghana Ports and Harbour Authority. The EIS gives no indication of the intensity of shipping activities in the vicinity of the pipeline routes near Tema and Takoradi. The navigational route to the Port of Tema is rather close to the intended pipeline route and is used by ships with a maximum Dead Weight Tonnage (DWT) of 65,000 tonnes. The maximum anchor weight used by these

ships is approximately 6 tonnes (information via Ghana Ports and Harbour Authority). Information on the shipping and anchor characteristics for the Takoradi port is not known to the Commission and not provided in the EIS.

In view of the planned extension of the port of Tema and Takoradi and as the foreseen increase of fishing activities with larger fishing trawling ships, shipping in the pipeline areas will increase near Tema and/or Takoradi. The port of Tema also has plans for the creation of additional pipeline systems for crude oil and other products (eg. SPM[3]), introducing large tankers.

These ships may drift over the pipeline route in case of engine breakdown or other emergencies. In those cases, a ship can be expected to drop its anchor over or in the vicinity of the pipeline. The Commission holds the opinion that protection of the pipeline is needed against either:

- anchor drop: a direct hit by the anchor falling onto the pipeline
- anchor drag: an anchor dropped in the vicinity of the pipeline may be dragged over the seabed if the maximum holding capacity of the anchor is exceeded. A dragging anchor could cross and damage the pipeline.

Trawling fishing also take place in these areas. In general a protection against anchor drag and anchor drop is also sufficient to protect the pipeline against damage inflicted by fishing gears.

The EIS indicates that burial offshore can be done to 8 m or 30 m and that a cost-benefit analysis will be carried out to determine to what depth the pipeline will be buried. In view of the above, the Commission expresses doubts about the correctness of this approach. Instead of a cost benefit analysis, a quantitative risk assessment should be carried out. At present, no information is available in the EIS regarding the risks that the pipeline will be damaged (shipping routes, anchoring areas, future dredging areas, other areas frequently used for marine activities and fishing works).

The sediment characteristics at the pipeline zone and the interpretation of these characteristics with respect to the placing of the pipeline is also not clearly summarised in the EIS.

The EIS indicates that burial up to 30 m will have negative effects on the marine environment and fisheries. In this case, the Commission is of the opinion that permanent safety should be given more attention than the limited temporary environmental effects (which can be strongly reduced by using the appropriate working method).

- The Commission strongly recommends to carry out a quantitative risk assessment for the safety of the offshore pipeline areas, to the satisfaction of and in consultation with EPA and the Ghana Ports and Harbour Authority. Subsequently, conclusions can be drawn with respect to:
  - in which areas the pipeline should be placed in the seabed instead of on the seabed (not a choice between 8 or 30 m)
  - at which depth the pipeline must be placed for sufficient protection

[3] single point mooring

- and also whether or not a protection layer is to be placed on top of the pipeline in the seabed (sand, gravel, rock materials). This decision is to be based on an assessment of the anchor weights (to be) used.

Another safety aspect is the ongoing coastal erosion process. No information is available in the EIS regarding the depth of the pipeline in the coastal zone seabed area and the beach area and regarding the coverage materials.

■ The Commission recommends to provide more information on coastal erosion and possible risks for the stability of the pipeline for the entire usage period.

2.1.3 Alternative most friendly to the environment

Under Dutch EIA regulations, the EIS has to describe the alternative most friendly to the environment. This alternative is not available in this EIS. Although it was not a requirement in the ToR, the Commission recommends to develop such an alternative for the construction part.

■ The Commission suggests the following elements for developing this alternative:

- Shore-crossing of pipelines.

Horizontal drilling is the preferred method for shore crossing, but it is likely that trenching and blasting will be required to place the pipelines at Tema and Takoradi in view of the hard substrates close to the shore. If these substrates comprise only of rather soft sandstone it is recommended to minimise or prevent the blasting activities and to use more environmentally friendly construction tools (e.g. a small cutter suction dredger).

- Work methods with respect to placing the gas pipeline in the seabed

The work methods mentioned are limited to dredging and jetting, other techniques are available like ploughs and injection jetting systems. These techniques (if applicable, depending on the soil conditions) will have less environmental effects on the marine environment.

- Placing sandbags and/or concrete in offshore valleys – peak shaving

The EIS states that locations with depressions in the seabed will be filled with sandbags or concrete to prevent spanning risks. This solution has been presented in view of the presence of corals in the vicinity of the pipeline route, although the EIS does not provide information regarding the presence of corals. The Commission recommends to investigate the environmental and technical risks for the pipeline in time when placing sandbags or concrete. A more common solution ensuring the stability of the pipeline is peak shaving of the tops by means of a trailing suction hopper dredger. It is likely that this is to be done at several places. Probably this type of dredger will also be used for placing the pipeline in the seabed, so no extra equipment would be needed.

2.1.4 General: factual information on Health, Safety and Environment

Health Safety Environmental (HSE) aspects only receive limited attention in the EIS and do not demonstrate full compliance with the HSE aspects as specified in the ToR/Scoping Report. The appendices provide more complete information, but some aspects (Emergency Response) have only been included in the FEED[4] documentation, which is not available to be public.

[4] front end engineering design

■ The Commission recommends that the EIS be supplemented to include all HSE aspects mentioned in the Scoping Report or justify why and which aspects will be dealt with in the Environmental Management Plan (EMP), which will become available at a later stage. To enable verification of the risk analysis procedures followed by WAPCo and to enhance responsible decision making on the subject of safety the underlying facts are to be included in the EIS as well as the results of the analysis.

- Location of valves, performance indicators (reaction time, maximum planned duration of uncontrolled releases) of emergency shutdown systems and SCADA[5] systems.
- Data and facts on incident scenario's including: type of incident, potential effect distances, likelihood, required emergency response.
- Detailed topographical maps of the areas around the ROW[6] and R&M[7] stations

A full appraisal of all HSE aspects can only be made after completion of the EMP. This does not preclude decision making if the EIS can demonstrate that the EMP will be developed within the strategic framework of the EIS. To demonstrate this, at least spatial planning and emergency response should be addressed satisfactorily in the EIS.

2.1.5 Spatial Planning

At Tema, the pipeline ROW crosses land with a residential destination. The pipeline will be positioned 5 meters from the boundary of the ROW. No control over the future developments of the residential area has been demonstrated in the EIS, making it seem possible that residential buildings can appear 5 meters from the pipeline. In addition, the positioning of the pipeline suggests a provision for future expansion of the number of pipelines only increasing the necessity of Safety or Buffer Zones (see also appendix 8) between the pipeline and the surrounding area.

Also no control over the future developments around the R&M station in Tema has been demonstrated in the EIS. This is relevant since no expansion of fire fighting capabilities in the Tema area is demonstrated in the EIS. Public Safety therefore has to be achieved by preventive measures, such as safety or buffer zones.

■ The Commission recommends that assurances be included into the EIS for the prevention of the development of conflicting forms of land use near the gas pipeline and R&M station or the encroachment on buffer zones by other users. This assurance could take the form of spatial planning decisions, including those addressing human populations, or the establishment of buffer zones.

[5] system to detect leakages
[6] right of way
[7] regulating and measuring

2.1.6 Emergency Response

The EIS does not contain specification on the type and nature of any additional demands on Ghana Emergency Response Organisations on-shore and off-shore, nor does it contain explicit information that no additional demands will be made (because of the effectiveness of preventive measures or demonstrated very low risks). No estimate, therefore, can be made on possible investments required to enhance the capacities/capabilities, nor can these be included in the decision making process.

It has to be kept in mind that effective emergency response (ER) does not only entail fire-fighting but also: training, planning, prediction of effects (modelling), co-ordination, logistics, communication, medical services, traffic control, evacuation of the population etc.

- The Commission recommends that the EIS includes the ER capacity and capabilities that WAPCo will establish in Ghana as well as the additional demands to be made on Government or Private Emergency Response Organisations.

2.2 Recommendations for licence conditions

2.2.1 Environmental Management Plan

Only parts of the Environmental Management Plan have been included in the EIS. A complete EMP will be presented to the Ghana Authorities later and will be reviewed by EPA.

- The Commission recommends the inclusion of annual reporting obligations on the progress of the EMP, to enable monitoring of HSE performance of the WAPCo on a policy level, as well as periodic updating of the EMP. The Commission recommends that these reports be publicly accessible and subject to external validation and verification.

2.2.2 Health, Safety and Environmental Management System (HSEMS)

WAPCo has included a HSEMS in the EIS. The HSEMS and the EMP together are presented as assurance that HSE aspects, which have not been included in the EIS, or which will be identified in a later stage of the project, will be managed responsibly and in compliance with Ghana laws and regulations.
The HSEMS is also proposed as a mitigation measure for identified health safety and environmental risks.

- The Commission recommends the accredited certification of the HSEMS of WAPCo as a license condition, to enable independent verification of the present and continued functioning and effectiveness of the HSEMS on an operational level (see also appendix 9).

2.2.3 Hydrotesting, dewatering and drying

It is not clear in the EIS how the hydrotesting will be carried out. Will the pipeline be filled completely with water (fresh, brackish or salt water) or only

partly? How long will this process take and which chemicals will be added to the water during the hydrotesting period?
Appendix 8B presents a very accurate method with respect to the discharging of the test water, and on minimising the effects of the discharged water on the local marine environment.

■ The Commission recommends to include the guaranteed application of this method as a precondition in the license.

2.3 Stakeholder consultation

Stakeholders' consultation is the process to embed a project into its economic, social and cultural environment.

The consultation as presented in the EIS has been well set up and executed, comments such as it having been 'too technical' or 'not having had enough publicity' not withstanding. These are elements to be taken into account in the continuation of the process.

The Commission is of the opinion that three elements are determining the success of stakeholders' consultation.

1. Openness

Openness is crucial, the troublesome stakeholder is the one that has been forgotten, or worse, kept out. This part has certainly been managed well, no indications of incomplete coverage have been noticed.

2. The proponent's response

In order to convey the notion that people have been taken serious, all issues raised should be accounted for as to:

· what has been done -and if nothing has been done, why not,
· who has taken action,
· what were the effects of these actions, and,
· what follow-up, if any, will have to be carried out.

■ The Commission recommends WAPCo respond to the issues raised along these lines.

3. The long-term perspective

The project is still in the design stage. Nothing has happened yet, and as it is a first-of-its-kind project, it is beyond most people's imagination. Therefore,

■ The Commission recommends to hold a second consultation as soon as the final decisions of the project have been taken, and practical issues are better defined, to be followed by another round during the construction phase when people actually see what is happening.

■ For the operation phase, the Commission recommends to set up a permanent structure in order to:
- be aware of any issues cropping up,
- be activated in case of urgent matters, and when new developments such as the extension of the pipeline in Takoradi come up.

■ Furthermore, the Commission recommends the competent authorities to deal in a similar way with derived issues beyond WAPCo's brief.

3. OBSERVATIONS ON THE EPA'S REVIEW PROCESS AND OUTPUTS

3.1 The EPA's review process

In general, the Commission is favourably impressed by the way EPA has organized the review of this project. Interdisciplinary teams have been formed and were given instructions as to which parts of the EIA they had to concentrate on. Group discussions have been very lively, both during the teamwork as well as during the plenary sessions. The Commission appreciates this open and transparent way of working. Reporting by the groups was done orally in plenary sessions and by way of a written document of findings by the four groups.
The Commission has observed that some EPA review-team members did have (necessary) interactions with WAPCo during EIA drafting and engineering design (eg. energy commission, fire brigade). Therefore, they had access to inside information that was not contained in the EIS. Strictly taken, this could imply a conflict of interest and thus interfere negatively with independent review of the EIS. The Commission thinks however that this potential risk has been addressed adequately by the formation of a team of 16 participants and the transparent and interdisciplinary way of working and the involvement of the Netherlands EIA Commission.
During the review, the interaction between the complete EPA review team and the proponent (WAPCo) has been relatively short. EPA explained that the review team members, who did receive inside information of WAPCo, could thus function as intermediaries. The Commission however holds the opinion that some technical questions could only be answered by WAPCo itself. The Commission has some recommendations:

- Next time, the Commission advises to invite a project proponent (in this case WAPCo) at the start of the review process to give eg. a presentation on the project and address frequently asked questions etc. to allow for clarification and explanation.

- Although understanding logistical problems, the Commission recommends that an attempt be made for the whole review team to visit both sites, before the review be finalized.

- The Commission advises that the review team continues to function to be able to perform a review of the supplementary information and to review the final Environmental Management Plan.

3.2 The EPA's review outputs

The Commission has not yet seen the final EPA review document, which is being prepared on basis of the written reports of the four groups. The Commission is of the opinion that the reports that have been prepared by the groups demonstrate that major issues/shortcomings in the EIS have been identified to a great extent. The Commission has not been able to check whether the groups made use of the ToR for the EIS (March 2003) as a review framework. However, these ToR were that extensive, that it would have been difficult to use them for this purpose.

During its stay, the Commission received summary results of a review of the EIS, performed by the World Bank. Also a Questions & Answers document of WAPCo was available, as well as information on issues raised during public hearings. This information was deliberately not provided by EPA to the EPA review team, because this could influence their findings.
Finally, the Commission noticed that some comments of the EPA review team were very detailed and even of editorial nature. This will not have implications for decision making.
The Commission has the following recommendations:

- The review could gain in efficiency if the review team members would receive clear ToR indicating for instance that the groups should concentrate on major shortcomings that are relevant for decision making. Each group should express a clear opinion in terms of whether the EIS is of sufficient quality or not, which issues should be repaired before decision making or which issues should be put as conditions to the license.

- The final EPA review document should make use of issues raised during the public hearings and by the World Bank.

- The review team would have benefited from extra expertise/reference materials in the field of coastal zone management and marine aspects, especially as responsibilities and mandates for the coastal zone do not seem to be fully clear. Also safety aspects could have received more attention in the representation of the team.