Advisory Review of the Environmental Impact Study for the Heavy Crude Oil pipeline in Ecuador

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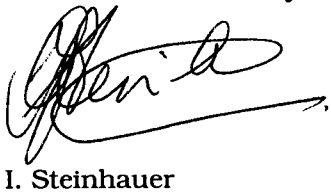
Advice submitted to the Minister of Environment in Ecuador, by a working group of the Commission for Environmental Impact Assessment in the Netherlands.

the technical secretary



I. Steinhauer

the chairman

J.W. Kroon

Utrecht, 11 May 2001

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APPENDICES

1. INTRODUCTION

1.1 The initiative: construction and operation of a heavy crude oil pipeline in Ecuador

In February 2001 a contract was signed between the Minister of Energy and Mines, representing the Ecuadorian State and the Executive President of Oleoducto de Crudos Pesados (OCP) Ecuador S.A. to construct and operate the Heavy Crude Oil Pipeline and Provision of Public Services for Transportation of Hydrocarbons. OCP Ecuador S.A. is a consortium of Alberta Energy Company Ltd., AGIP Oil Ecuador, Kerr-McGee Ecuador Energy Corporation, Occidental Exploration and Production Company, Repsol YPF Ecuador Inc., Perez Compac and Techint Construction Company.

The objective of the OCP is to transport by means of a 500 km pipeline crude produced in the Amazon area and collected near Lago Agrio to the Export Terminal at the coast near Esmeraldas (see map in Appendix 7). The new pipeline will have a capacity of 450,000 barrels per day of 18-24 API crude. The new pipeline will be constructed in or near the right of way of the existing SOTE pipeline, except for a stretch between km 210 and 390 to by-pass the Quito urban area.

According to Ecuadorian Law and as an obligation in the contract, an Environmental Impact Study (EIS) has to be conducted in accordance with the Terms of Reference for the EIS for the OCP, which form part of the contract. The EIS has to be submitted to the Ministry of Energy and Mines for approval within 3 months after signing of the contract and before the beginning of construction. The Ministry shall approve, reject or request clarifications or explanations of the EIS within a period of 30 days following the date that the EIS was formally submitted to the Ministries (16 April 2001).

According to Ecuadorian Environmental Law, the Ministry of Environment has to issue an environmental licence for all activities with potential environmental risks. Moreover, the Ministry is the competent authority for protected areas ('areas protegidas' and 'bosques protectores') which are affected by the OCP. The Ministry of Energy and Mines is the competent authority for the OCP project.
Both Ministries formed an inter-ministerial team for the approval of the EIS and the issuing of the environmental licence. The environmental licence authorises the start of construction. Mandates and tasks of the two Ministries are described in an agreement which was signed in March 2001.

1.2 Rationale and mandate for this review advice

In a letter dated 30 March 2001 (see Appendix 1), the Minister of Environment in Ecuador invited the independent Netherlands Commission for

Environmental Impact Assessment (EIA)[1] to assist the Ministry in the review of an Environmental Impact Study for the OCP. In a letter dated 4 April 2001 (Appendix 2), the Netherlands Embassy at Quito endorsed this request.

The Commission performed a site visit to Ecuador in the period of 18-26 April 2001 (see Appendix 4 for the working programme) and reviewed the EIS in co-operation with the teams of the Ministry of Environment and the Ministry of Energy and Mines. Purpose of the site visit was to:

- collect project- and site-specific information on the project enabling formulation of a review advice of the EIS;
- study relevant project reports and data and discuss matters with several governmental and non-governmental authorities and organisations in Quito and the project area[2];
- perform a joint review with the Ecuadorian competent authorities and mutually benefit from an exchange of EIA-expertise and experience.

The members of the working group of the Commission are listed in appendix 3. The group represents the Commission and comprises expertise in the following disciplines: engineering geology, oil exploration and -exploitation, tropical forestry, nature conservation, biology and environmental law.

1.3 Justification of the approach

The aim of the review is to check whether the EIS contains sufficient information to guarantee the full integration of environmental and social considerations in decision-making. The EIS should be adequate and should not contain inconsistencies. If shortcomings are found, the seriousness of this lack of information for decision-making will be assessed and recommendations will be given for supplementary information.

The EIS must contain information to support decision-making on:

- Approval of the EIS by the Ministry of Energy and Mines;
- Authorisation by the Ministry of Environment, as far as protected areas are affected by the OCP;
- The issuing of the environmental licence (with conditions if required) by the Ministry of Environment.

Furthermore, the EIS must provide information to enable the public to formulate observations and concerns for submission to the responsible authorities.

The Ecuadorian EIA procedures apply for this project. Project- and site specific Terms of Reference were drafted by the proponent and approved by

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[1] The Commission for Environmental Impact Assessment in the Netherlands (henceforth referred to as the Commission)

[2] Unfortunately, the Commission could not participate in the public consultation process on the EIS, which will take place in the beginning of May (see appendix 5). Therefore the Commission has not been able to take into account the observations made by the public.

the Ministry of Energy and Mines and the Ministry of Environment (see appendix 6). During review, the Commission also made use of advisory review reports of the Commission on similar projects[3].

As the time for review of the voluminous EIS has been short, the Commission had to focus on major issues. The main review findings are described below.

2. REVIEW FINDINGS

2.1 General conclusion and observations

The conclusion of the Commission is that the information is **sufficient** for informed and environmentally sound decision-making, provided limited deviations from the projected 2 km corridor will still be possible if results from the detailed design studies so require.

The Commission appreciates the thoroughness of the study and the attempt to be comprehensive, especially for a project of this size and complexity. However, the amount of information hampers in some aspects the accessibility of the EIS.

In spite of the thoroughness of the EIS, it is found that in certain localities and in certain subjects the scale of study leaves room for failures due to natural hazards, which may lead to pipeline ruptures with environmental and socio-economic consequences. These and other shortcomings are mentioned below. Each observation is followed by a recommendation on how these shortcomings can be remedied.

2.2 Context analysis and project objectives

The objectives of the proposed activity could be more fully described. The rationale for the project may be clear (oil export is the main contributor to the gross national product), but the EIS does not provide information on this matter. No justification is given for the proposed 450,000 barrels per day pipeline capacity, at least it is not related to initial production scenarios.

The EIS states that the project's objective is to transport oil during a period of 20 years. After that, the pipeline system will revert to the Ecuadorian government. Oil fields in the Amazon region are generally expected to be subject to rapid decline. Optimal utilisation of the proposed pipeline capacity

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[3] Advisory review of the Environmental Impact Statements of the hydrocarbon appraisal and development in Camisea, Peru, May 1998

Advisory review of the EIS and General Oil Spill Plan, Chad export project, July 1998, October 1999 and February 2000

Advisory review of the EIA-report of the Ankobra Petrochemical Plant, Ghana, February 2001

will therefore require an ongoing intensive exploration and development activity to achieve a sustained production capacity.

These future developments have not been described in the EIS and their (cumulative) impacts have not been assessed.

- The Commission observes that the quality of the EIS would improve if a description would be included of possible exploration and development activities in the Amazon, associated with the oil transport system and an assessment of their environmental and social impacts, e.g. under the heading 'induced impacts'. At this stage, an approximation should suffice but the Commission recommends to prepare, at a later stage, strategic EIAs[4] for oil developments in the region that could be serviced by the pipeline.

2.3 Public consultation and participation

The drafting of ToR for the EIS has taken place without public participation. This is not in line with WB OD 4.01 and the World Bank Sourcebook Update, although the ToR state that WB guidelines will be applied.

In an appendix to the EIS, extensive registration of public involvement is documented. However, it is not clear how the outcome of this process was incorporated in the EIS (e.g. project design and development and selection of alternative routes and proposed project execution).

In the review phase of the EIS, public information and consultation is on-going. As this is a novel approach in the country, the Commission considers that a remarkable effort has been made by OCP and both Ministries in organising this public participation process.

- The Commission recommends to pay special attention to feedback of public participation and show how public comments will be taken into account in the decision-making and implementation.

2.4 Description of the project

Detailed procedures are given in the Environmental Management Plan, which forms part of the EIS. However, quantitative information is not easily accessible in the main body (Volume II) of the EIS. Notably, information is lacking on pipeline construction, pipeline pressure-testing (e.g. disposal and treatment of used water containing chemicals), pipeline operation (pigging procedure, specifically handling of scraped material, and the deployment of block and check valves to minimise potential oil spills in case of pipeline rupture) and marine operation (i.e. potential oil spills during offshore loading).

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[4] Strategic environmental impact assessment for oil development assesses the environmental impacts of strategies to develop oil production in a region before any physical projects are planned. They allow for environmental management in the earliest possible phase of decision-making about future developments.

- The Commission recommends that quantitative information on specific operations that may impact on the environment be incorporated in the main text of the EIS, so as to facilitate easy accessibility and understanding.

2.5 Alternative routes

2.5.1 General remark

The Commission considers the overall procedure that has been followed to be sound, i.e. making a first choice out of four technically feasible, approximate pipeline routes on the basis of macro-economic and strategic considerations. However, the topographical map on which the alternative routes are indicated does not provide specific data on e.g. inhabited areas and indigenous territories, making it impossible to verify the reasons given for rejection of the southern route.

- The Commission recommends that a suitably detailed map be provided on which the proposed alternative routes are marked.

2.5.2 Methodological remarks

Weighing of the alternatives and variants for the preferred approximate route (i.e. as much as technically possible parallel to the existing SOTE pipeline) is not always transparent and logical[5]. The selection criteria to be applied are not logically worked out. 'Technical feasibility' is not a valid weighing criterion in as much that if an alternative is technically not feasible, that alternative is thereby ruled out. Rigidly adhering to the SOTE route is not a valid engineering possibility and therefore not a realistic alternative. On the other hand, 'cost' should have been explicitly included as a selection criterion, in order to achieve a transparent weighing procedure. However, the Commission subscribes the EIS approach that as a general rule route selection along mountain crests is preferable. This criterion reduces on risks of slope instability and secures higher safety levels.

The relative weight of the selection criteria is not given, e.g. it is not clear how 'environmental impact' has been rated with respect to 'socio-economic impact' or 'archaeological impact'.

Non-preferred alternatives are sometimes only described in a negative way. Less attention is paid to their positive aspects, or to the detailing of mitigating measures for some of their negative aspects. The result is that the preferred option is treated differently from the other alternatives.

The Commission is of the opinion that the environmental impact of the northern route has been worked out with much more detail than the southern detour alternative, specifically in respect of the Mindo-Nambillo Bird Reserve. The undoubtedly serious impact of traversing more than 20 km of pristine primary forest in the case of the southern alternative has not been analysed in detail, notably the effects of colonisation via new access routes.

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[5] Arguments are used ambigiously (sometimes the construction parallel to the SOTE is weighed positively, in other comparisons this is considered to be a negative point).

Nevertheless, the available information on the southern route is sufficient to enable a judgement on the comparison of both alternatives.

- The Commission recommends that comparison of alternatives be carried out in a more transparent and logical manner, e.g. by means of a visual presentation. By doing so, the EIS would gain in quality. Each selection step (macro-routes (1), northern and southern alternatives (2), variants (3) and sub-variants (4)) should be summarised in a 1 page overview, using a matrix showing the preferred option followed by a substantiated conclusion[6].

2.6 Risk[7] analysis

Certain sectors not presented under 'high geotechnical risks' (green line on map 6.1.1, Volume VII) contain stretches of high risk that are possibly overlooked and may cause, due to slope instability, failures of sections of the OCP. The Commission refers by means of example to a separate description of the area Guayllabamba-Calderon (see appendix 8) between km. 240 and 250. The need for slight re-routing to circumvent such sections is apparent.

The need for obtaining borrow material for road and further construction purposes will consequently lead to exploitation of existing and new quarries. This in turn may create new hazard situations.

- As a prerequisite to safe handling of hazards posed by slopes and waters[8], the Commission recommends that during pipeline construction the contractor is assisted by an engineering geologist on a continuous basis. The correct engineering geological practice is critical in the safe handling of masses of material composing construction sites, particularly in the dynamic physical environment the OCP pipeline is crossing.

The combined risks listed as 'hidrológico, geotécnico, sísmico and volcánico' are presented as a summing up of individual risks. For a series of stretches this adds up to 'high risk'. The separate indication of particular sectors as having high risk is not substantiated when referring to the underlying maps. The used legends (geomorphological and further risk legends) are not based on the factors 'process', 'materials' and 'genesis', but only on 'form'. This may lead to overlooking geotechnical instability in the appraisal. The title 'high risk' representing a qualitative weighing of widely differing factors ranging from abiotic to biotic and socio-economic is not recommended. A single minor trigger element becoming active should not be masked. Finally, the Commission notes that not all locally present information has been exchanged and used (e.g. of local scientific organisations who have kept

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[6] The Commission notes that in reaching a conclusion on selection of safe routes a basic globally valid order of criteria exists. Constraints posed by physical elements, e.g. topography, materials and geomorphologic dynamics and similarly by construction values are primary. When these conditions are fulfilled, alternative routes are weighed on the basis of ecological evaluation before decision-making on route-selection.

[7] See appendix 9. In the EIS the term 'risk' is used in an ambiguous way, sometimes meaning 'hazard' and at other times 'risk'.

[8] ground water, surface water, meteorological water

inventories of natural hazards producing heavy losses in environmental and socio-economic values as a result of earthquake or other natural forces) in preparing the EIS.

- The Commission advises that in the above gaps of information sufficient follow-up is given by further semi-detailed study during detailed design. At design level scale, a more layered approach in arriving at risks is recommended, in which newer classification systems are applied at least for sensitive areas (urbanised areas, river crossings, wildlife habitats). This could implicate that minor deviations from the planned 2 km corridor are considered necessary.

2.7 Environmental management plan and compliance

2.7.1 General observations

The Environmental Management Plan (EMP) covers the procedures to be followed during the construction as well as the operational phase in sufficient detail to ensure minimisation of impacts on the environment.

The Commission is of the opinion that strict inspection of due implementation of these procedures by competent Governmental Agencies and by independent private entities is paramount to ensure an environmentally successful project. The competent authorities directly involved in the enforcement of compliance with the Environmental Management Plan are listed in the Contract with OCP. However, the Commission considers the consortium's own environmental care system essential in order to maintain good environmental practices.

- The Commission recommends that OCP associates consider to obtain an ISO 14001 (or equivalent) certificate. This certificate guarantees external monitoring of the (sub)contractors' and companies' environmental performance.

2.7.2 Pipeline pressure testing

The EIS deals with the disposal of water employed in pressure testing of the pipeline. However, there is no information on the procedure to avoid contamination of river water with chemicals such as oxygen scavengers.

- The Commission recommends that the EMP contains a procedure to handle the disposal of water containing chemicals, e.g. oxygen scavengers.

2.7.3 Natural environment

In the baseline information the following sites of importance for flora and fauna are mentioned: Aguarico, Recinto Simon Bolivar, El Salado, Río Chalpi Grande, Cayambe Coca, Papallacta and Polylepis Forests, Páramo La Virgen, Cerro Brujo Rumi, Reserva ecológica Antisana, Protected forests of the Important Bird Area (IBA) Mindo (including Mindo-Nambillo and Cuenca Alta del Río Guayllabamba), and Balao. In the EMP however, most of the attention is focussed on Mindo-Nambillo and to a lesser extent on Cayambe-Coca. For these two sites special plans have been developed in order to mitigate the impact of the construction of the OCP. For Mindo calculations have been made to estimate the volume of oil spill in case of an accident in the area

during the operational phase. Such calculations do not exist for other vulnerable areas. For example, in Laguna Papallacta, according to the impact assessment, spills could result in very severe and irreversible alteration of the ecosystems. Moreover, the area serves as a catchment area for drinking water for e.g. Quito and so any spill could have serious socio-economic and health effects.

- The Commission recommends to provide more detailed information on how the above mentioned biologically important areas are going to be dealt with during construction and operation and which mitigation measures will be taken.

Whatever the mitigation measures are going to be, and how tight they may be, the final impact of the construction and operation of the pipeline in biologically important areas will always be negative for the environment. So it would be reasonable to provide compensation for the pipeline crossing the above mentioned areas. In case of the right of way going through private terrain, the compensation criteria are clear (payment for the expropriated land). But in case of passing government owned protected areas, or areas of biological interest of which the ownership is unclear, the procedure is not clear.

- The Commission recommends to provide clarification on this issue in the EMP. In the Mindo-Nambillo IBA for example, the Commission suggests to provide funds to draw up and execute a long-term plan for integrated conservation and development for the whole IBA, in order to compensate environmental and consequent socio-economic damage (e.g. eco-tourism). Such a plan, formulated with full participation of all local stakeholders, should especially deal with important factors threatening the long-term integrity and biological diversity of the area, like (illegal) felling of trees and conversion of forest into pasture land.

For the IBA Mindo-Nambillo there is a special monitoring programme for birds after construction of the pipeline.

- The Commission recommends that the species to be monitored also include species, which are critically endangered, endangered or vulnerable. In practice it may be easier to monitor other species of a certain indicator value, but a lot of (international) interest and concern is focussed on the (critically) endangered species.

Concerning the marine environment, the Commission notes that information is lacking on maximum oil spill scenarios (which should include a stranded tanker). The oil spill contingency plan does not consider special measures to rescue marine birds (e.g. pelicans) and sea turtles.

- The Commission recommends to include these issues in the Oil Spill Contingency plan, including the socio-economic impacts as a result of e.g. loss of commercially valuable fish species.

2.7.4 Socio-ecomomic environment

Provisions for compensation for loss of land caused by the right of way of the OCP are addressed by the EIS, but compensation for economic and environmental losses are not dealt with. Procedures for compensation of negative socio-economic impacts as a result of calamities (e.g. in case an oil

spill takes place in a river thus affecting drinking water for a large number of people) are not described.

- The Commission recommends to clarify and address this issue in the EMP.