APPENDICES

with the advisory review of the
Environmental Impact Statement
Oil refinery Tout Lui Faut, Surinam

(Appendices 1 to 4)

APPENDIX 1

Letter of DGIS dated 3rd May 1994, in which the Commission is asked to submit an advisory report

Ministerie van Buitenlandse Zaken

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Directorate-General
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Date : May, 3rd 1994

Re : WW92850 vlgnr. 11
jrc nr. 93/381

Ref : DDI-DST
ML/94/240

Staatsolie Suriname plans to build the first phase of a refinery at Tout Lui Faut in Surinam, as discussed on the 29th of April between a delegation of Surinam and representatives of the Suriname desk, DLA/SU, and the Environment Programme of DGIS and Mr. Post of the Commission.
Upon mutual agreement between Staatsolie and DGIS, it was decided to ask the Commission to prepare the outside review of the Environmental Study of Phase I, which has been handed over to you already.

The Commission will, as usual, pay due attention to quantity and quality of data and also assess the appropriateness of the proposed standards.

Based on the results of the review to be prepared by the Commission, which I look forward to receive in the first week of July of this year, a further study will be executed to complete the Environmental Impact Statement, if deemed necessary.

Information/documentation and data regarding the planning of the location visit, can be obtained through DLA/SU (Mr. Bevort), the RN Embassy in Paramaribo, Mr. Chaves of ABB Lummus Crest B.V. The Hague and the technical director of Staatsolie, Mr. Waaldijk.

Although Phase II is not foreseen in the near future and will not financially be supported by DGIS, comments about an eventual phase II in as far it will affect phase I at this stage, will be appreciated.

The composition of the working group of the Commission and its budget will be proposed by you under reference to the agreement between DGIS and the Commission.

THE MINISTER FOR DEVELOPMENT COOPERATION
For the Minister

The Head ~~of the~~ Environment Programme

Mr. F.L. Schlingemann

APPENDIX 2

Project information

Proposed Activity: Realisation of an oil refinery at Tout Lui Faut, Surinam.
Staatsolie Maatschappij Suriname N.V. (Staatsolie) intends the construction of a 7,000 barrels per stream day modular refinery, to process locally produced crude.

Categories: Petroleum refining

Project numbers: WW92850 vlgnr. 11, jrc nr. 93/381

Progress: An Environmental study/Environmental Impact Statement (EIS) was prepared by Staatsolie 1989, for an oil refinery at Tout Lui Faut, Surinam. During the visit to Surinam the Commission noticed that more ample information about the design of the refinery and environmental issues were available. Therefore the Commission has decided to incorporate this information in its review besides the EIS. A review advice on the EIS and supplementary documents has been submitted to the Minister for Development Cooperation on 7th July 1994.

Composition of the working group of the Commission for EIA:
mr. W.A. Been;
mr. A. Kiestra;
mr. J.W. Kroon (chairman);
mr. D. Noordam (local expert);
mr. P.A. Teunissen (local expert).

Technical secretary: mr. A.J. Kolhoff

APPENDIX 3

Programme - visit to Surinam 6 - 12 June 1994

•Monday 6th June;

15.00 hours - Arrival at Zanderij Airport, Surinam.

•Tuesday 7th June;

09.15 hours - Visit to Staatsolie head office, Mr E. Jharap - managing director; Mr M. Waaldijk - technical director; Mrs R. Bouterse-Ramautar - safety officer; Mr M. Nandlal - production manager.

12.30 hours - Meeting with Mr P. Ouboter - chairman of the environmental working group of the "Anton de Kom Universiteit".

14.00 hours - Discussion with the working group

17.00 hours - Meeting with Mr N. Waagmeester - director of "Stichting voor een schoon Suriname" and Mr S. Hoever policy adviser juridical affairs from the Ministry of Public Works.

•Wednesday 8th June; field visit to Tout Lui Faut:

08.30 hours - Trip on the Suriname river.

10.00 hours - Presentation of the Staatsolie profile.

13.00 hours - Site visit.

14.00 hours - Discussion about design and environmental issues by Mr J. Chaves - contractor Lummus Crest, M. Waaldijk, Mr S. Murli and Mrs Bouterse-Ramautar.

16.00 hours - Visit to the surroundings of the site.

•Thursday 9th June; field visit to Tambaredjo oil field in Saramacca:

09.00 hours - Visit to the Saramacca production facilities (Catharina Sophia and Jossie Creek).

11.30 hours - Presentation of the oil spill contingency plan by Mr M. Nandlal.

13.00 hours - Visit to the Sarah Maria facilities.

13.30 hours - Presentation of the drilling operations by Mr W. Dwarkasing.

14.00 hours - Visit to the production development area.

•Friday 10th June;

08.00 hours - Meeting with the District Commissioner of Wanica - Mr K. Bhoendie.
09.00 hours - Meeting with the Harbour authorities - Mr E. Fitz Jim.
09.30 hours - Meeting with Mr C. Becker - head of the meteorological department from the Ministry of Public Works.
10.30 hours - Meeting with Mrs H. Jesserun of the Ministry of Agriculture, Livestock and Fisheries and the working group environment and sustainable development, Mrs S. D. Adhin - chairman of the working group and head section environment of the planning office of the Ministry of Natural Resources; Mr F.L. Baal - head section nature management of the Surinam Forest Service of the Ministry of Natural Resources; Mr Zeegelaar from the public health office of the Ministry of Health; Mr A. Amatali - head hydrological department of the Ministry of Public Works; Mr Rodgers director of the Ministry of Planning and Development Cooperation.
14.00 hours - Starting to write the advice.

•Saturday 11th June; writing of the advice

13.30 hours - Meeting with Mr Bakker of the Dutch Embassy.

•Sunday 12th June;

08.00 hours - Trip to Dyumu, Upper Suriname river.
13.00 hours - Writing of the advice.

•Monday 13th June;

08.00 hours - Debriefing at the Dutch Embassy with Mr M. Lenstra and Mr A. Brands.
10.00 hours - Discussion with Staatsolie about the draft advice.
17.00 hours - Departure to the Netherlands.

•Tuesday 14th June;

07.30 hours - Arrival at Schiphol Airport, Amsterdam.

APPENDIX 4

Review framework/guidelines for EIA

Guidelines as prepared by the Commission will consist of the following subjects. These guidelines are used as a review framework for the review as described in chapter 3.

Structure of the guidelines

1. Legislation and policy
2. Description of the intended activity and alternatives
   - 2.1 Description of the intended activity
   - 2.2 Alternatives
3. Description of the prevailing condition, autonomous development and impacts on the environment
4. Comparison of the environmental impacts for the intended activity and its alternatives
5. Remaining gaps in knowledge and post project evaluation
6. Presentation of the EIS

1. Legislation and policy

Describe:

- (proposals for) working procedures between relevant authorities regarding monitoring, emergency programmes, safety regulations, auditing;
- present policies, regulations and standards governing environmental quality, health, occupational health, safety, protection of sensitive areas, endangered species, at company, national, regional (ARPEL) levels;
- the existing physical planning (if any) for the direct surrounding of the site;
- legal possibilities for public participation and reaction in case of violation.

2. Description of the intended activity and alternatives

2.1 Description of the intended activity

Describe in which way during the design of phase 1, the extension of phase 2 is taken into consideration.

Location and logistics

Present on maps the site location and the distance to the inhabited area (number of people living in relation to distance). Motivate the site location. Describe the route and the way of transport, supply, discharge and internal transport of crude (both for domestic and imported), products and waste materials.

Existing storage and jetty

Description of the existing crude terminal at Tout Lui Faut:

- storage capacity and through put;
- transport (shipping/pipeline);
- waste water treatment and the capacity of the system;
- care systems for oil spills.

Raw materials and products
Describe:
- quality and quantity of the crude (% of sulphur, mercaptans, hydrogen sulphide, heavy metals);
- type of (by) products (quantity and quality): fuel gas, naphtha, HVGO, LVGO, fuel oil and asphalt;
- revamping of existing storage facilities and construction of new storage facilities;
- barge loading facilities.

Production process
Give a process flow scheme of the production process and a description of the process operation, the maximum capacity and relevant technical specifications. Specific emphasis on process parts directly relevant for the environment like; heaters, boilers, fuel gas system, vacuum ejectors, process waterstripper, desalter and flare system. Provide information about the provisions foreseen to handle the instability of the underground.

Waste water (treatment and drainage systems)
Describe the waste / water streams (process water, rain water, domestic waste water) as far as influenced by the intended activity (normal operation):
- the composition and quantity of the water streams (emissions of oil and grease, ammonia, suspended solids, phenolic compounds, sulphides, organic acids, nickel and other metals). These pollutants may be expressed in terms of biochemical oxygen demand (BOD) and chemical oxygen demand (COD);
- what kind of waste water treatment (purification) system;
- what kind of facilities are foreseen for the drainage of water during heavy rainfall or calamities (fire water);
- maximum oil spill scenarios.

Emissions to soil and groundwater
Describe:
- possible groundwater contamination from leaks and spills, storage facilities, product loading areas and processing areas.

Emissions to atmosphere and groundlevel immissions
Describe:
- the used standards with a comparison to international standards;
- the expected emissions of hydrocarbons, carbon monoxide, sulphur oxides, nitrogen oxides and particles; furthermore the outlet concentrations in the flue gas of the heaters/boilers and the heights of the stacks and flare;
- the expected quantities to be flared;
- the ground level immission concentrations;
- the mitigating measures in order to reduce the emissions.

Noise
Describe:
- the emission relevant sources of the noise producing equipment (air fin coolers, pums, heaters and flare) and the calculated noise level in the nearby Tout Lui Faut residential area and the expected nuisance for the residents;
- the mitigating measures to reduce the noise level. The used standards for noise production must be motivated.

Light
Describe:
- the expected normal and maximal flare gas scenario;
- the mitigating measures to reduce the hindrance for the residents of Tout Lui Faut.

Waste
Describe:
- the total production of solid and liquid waste and its destination (tank bottom sludges, oil and water separators and pigging operations).

Internal environmental care / monitoring
Describe:
- the environmental care system (good house keeping, periodic training, monitoring and safety procedures);
- the maintenance system and equipment inspection procedures;
- availability of spare parts for equipment relevant for the environment;
- environmental auditing.

Occupational health / internal safety precautions
Describe:
- the organisation and policies of Staatsolie concerning labour safety;
- the provisions in the design of phase 1 concerning labour safety.

External safety
Describe:
- the Staatsolie oil spill contingency plan;
- a worst case scenario (maximum credible accident) for fire and explosion with special attention to the storage of naphtha and LPG.
- the results of HAZOP's;
- the emergency plan and fire fighting facilities.

2.2 Alternatives

Alternatives of the design
Describe:
- alternative processes;
- flocculation/flotation additional to the oil separator;
- closed liquid ring vacuum pumps instead of steam ejectors;
- ground flare instead of elevator flare;
- impermeable membranes underneath the storage tanks.

Zero alternative or existing situation
To make a comparison with other alternatives possible it is necessary to describe the situation if the intended activity will not take place. In case of Staatsolie this is the existing situation, which means no refinery. The existing situation and the impacts at the environment must be described and will be used as a reference situation. In particular the consequences on logistics (increase of shipped crude for export) and the air pollution (SO_2 emission) by the use of crude (mixed with diesel) versus the use of fuel oil by local customers must be described.

Mitigating and compensating measures
Describe:
- further decrease of noise nuisance (e.g. by screening noise sources like heaters and isolating screens);
- increasing stack heights in order to reduce immissions;
- further safeguarding;
- the possibilities of creating a buffer zone.

3. Description of the prevailing condition, autonomous development and impacts on the environment

Prevailing condition of the environment
The prevailing condition of the environment in the study area (current situation) must be described as far as relevant for the forecasting of the environmental impacts of the intended activity or alternatives. This means that the existing environmental condition in the study area must be described for aspects as mentioned below. The study area is not fixed and differs for the different types of emission. The boundaries of the study area need to be fixed depending on the extension of the worst case expected emissions to air, water and soil.

Autonomous development
The development of the environment of the study area must be described in case the intended activity will not be executed. The information about the autonomous development of the environment is important to get clear what the contribution of the refinery will be in relation to the expected environmental quality in the future in this region.

Impacts of the intended activities and its alternatives
The way impacts are described and measured must be motivated. Expected emissions can be predicted on basis of measured emissions for comparable installations. Special attention can be given to the emissions which differ for the distinguished alternatives. It must be noticed in how far impacts are irreversible, temporarily or permanent and in how far cumulation occurs.

The Commission asks attention for the following aspects. All the aspects are mentioned once and if relevant they must be described for the current situation, the autonomous development and for the impacts.

c	=	the current situation / prevailing condition of the environment
a	=	the autonomous development
i	=	impacts of the intended activities and its alternatives
.	=	means no description asked for

Climatology and air quality

Describe:

c/./i
- relevant climatological conditions (e.g. prediction of air inversions) necessary to estimate the level of impact of air emissions;

c/a/i
- air quality on CO, SO_2, particles, NO_x and hydrocarbons.

The possibility of obtaining information from the closest meteorological station must be investigated.

Hydrography, hydrology and surface water quality

c/./i Describe the relevant hydrological conditions of the Suriname river to estimate the level of impact of waste water discharge and oil spills. A distinction must be made between surface water (Suriname river) and ground water. The use of the water must be described (e.g. drinking water). The seasonal fluctuations in the Suriname river, chance of overflooding of the site by storm tides from sea or heavy rainfall.

Soil and groundwater quality

Describe:

c/a/. - the relevant geohydrological (aquifers) and soil conditions of the site in relation to potential oil and waste water spills and (if any) the disposal of solid waste;

c/a/i - soil and groundwater quality of the site (storage tanks), and pollution as a result of oil leaks and spills, infiltration and percolation of rain water at the site.

Noise levels

c/./i Describe existing noise levels.

Biotic environment

c/a/i Considering the dispersion via waterways of large oil spills the following information must be mapped on a scale 1: 40.000 based on aerial photos's, description of all sensitive areas and objects along the Suriname River between Paranam and Leonsberg and upstream along the Commewijne River up to Alliance: estuarine, mangrove and wetland ecosystems (habitats and breeding grounds for fishes, shrimps, permanent and migratory birds and nesting beaches for sea turtles),

././i Describe potential (including worst case) impacts of oil spills on above mentioned ecosystems, flora and fauna.

Socio-economic environment

c/./. Map on a scale 1: 40.000 and describe all sensitive areas and objects along the Suriname River between Paranam and Leonsberg: areas with fishery and aquacultural activities, recreational sites, harbours, piers, industrial water intakes a.o.).

c/a/. Map on (a) blow-up map(s) of the refinery area and direct surroundings (2 km) and describe based on aerial photographs: existing forms of land-use e.g. agricultural areas per crop/ horticultural areas, aquacultural areas, areas with animal husbandry, residential areas, including population densities, aquifers and well fields, industrial areas, waste water and storm water drainage systems.

c/./. Describe present availability of piped drinking water in adjacent residential areas and alternative sources used in times piped water is not available.

././i Describe the possible economic spin off effects in the direct surroundings of the plant site (e.g. labour situation and infrastructure).

4. Comparison of the environmental impacts for the intended activity and its alternatives

A comparison must be made in the EIS between the impact of developed alternatives, with the existing situation (eventually including autonomous development). Based on the comparison, the final preferred alternative will be determined. The comparison must (also) be based on formulated standards and target values of the environmental policy. A sensitivity analysis must be executed with respect to the assessment criteria used.

5. Remaining gaps in knowledge and post project evaluation

A post project evaluation programme is necessary in order to be able to compare the predicted impact with the actually occurring impact. In the first place it must be investigated whether the actual environmental impact is more positive/ more serious or less positive / less serious than the predicted environmental impact and whether further measures must be taken. Secondly it must be investigated wether the gaps in knowledge and information mentioned in the EIS can meanwhile be supplemented. Finally, it must be investigated whether external developments give cause to adjust or review the decision taken.

6. Presentation of the EIS

The EIS must contain a summary in English and Dutch. This has to be clearly written so that it can be understood by the public as an independent document and form a good reflection of the contents of the EIS. Special; attention must be paid to the presentation (on a map) of the intended activity and the most important alternatives as well as to the comparison of the alternatives. It is recommended to:

- keep the EIS comprehensive;
- give the maps a topographical basis and to provide it which clear legends and names;
- present motivated option elements which has been important at the drafting of the EIS;
- motivate the possible deviations of the guidelines;
- include background information (which substances, conclusions, predictions and choices) must be included in appendices;
- include a glossary, a list of abbreviations used and a literature list.