Advisory Review of the Environmental Impact Assessment (EIA) for the Chongoene Export Facility, Chibuto, Gaza province

- Mozambique -

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Advisory Review of the Environmental Impact Assessment (EIA) for the Chongoene Export Facility, Chibuto, Gaza province - Mozambique -

Advice submitted to the Minister for Co-ordination of Environmental Affairs of Mozambique (MICOA), by a working group of the Commission for Environmental Impact Assessment in the Netherlands

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Utrecht, 20 September 2004

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1. Letter from the competent authority (MICOA), dated 31 March 2004, requesting the Commission to advise on review of the EIA for the Chongoene Export Facility, Gaza Province, Mozambique

2. Information on the project and composition of the working group

3. List of abbreviations

1. INTRODUCTION

1.1 Historic overview of transport options development

On 16 September 2002 the Ministry for Co-ordination of Environmental Affairs of Mozambique (MICOA) issued an environmental license for the establishment and operation of a heavy mineral sands mining activity in Chibuto in the Gaza province of Mozambique. The activity includes the establishment of a high-voltage power connection, the realisation of a rail link from Chibuto to Matola harbour and the establishment of a bulk cargo facility at the Matola harbour. The proponent of the activity is Corridor Sands Limited, a Maputo (Mozambique) -based, 100 % Western Mining Company Resources Limited (WMC, Australia) owned mining company.

The proposed mining activity includes in the first phase the establishment of three smelter furnaces. Production starts in 2007. Production forecasts foresee export of 375,000 tonnes of Titanium slag, 195,000 tonnes of high purity Iron (in pigs), 30,000 tonnes of Zircon and 12,000 tonnes of Rutile per annum from 2007 to 2010. In the second phase, the number of furnaces will increase to 10 and annual export will increase to 1,000,000 tonnes of Titanium slag, 520,000 tonnes of high purity Iron, 110,000 tonnes of Zircon and 32,500 tonnes of Rutile in 2019. In addition, up to 200,000 tonnes of anthracite will be imported per annum as well as 12,000 tonnes of diesel fuel. Total investment will be about US$ 1 billion.

Towards the end of 2002, Corridor Sands Ltd. (CSL) developed a preference for an alternative option for exporting and importing its commodities, the Alternative Export Facility (AEF). This AEF would generate substantive savings in capital expenditure and operational costs of transportation and export of its products and required inputs, facilitate further expansion and minimise risks of down-time, as well as enhancing the company's control of the operations (letter to MICOA of 16 January, 2003).

1.2 Decision making process

Adopting the advice of the Netherlands Commission for Environmental Impact Assessment (the Commission) as published on 4 April 2003, MICOA decided to undertake a strategic environmental assessment (SEA) to support the decision to be made by the National Council for Sustainable Development (CONDES) on the transport option to be developed.

Pending decision-making by CONDES, MICOA informed CSL that it could pursue the Environmental Impact Assessment (EIA) for the AEF, renamed Chongoene Export Facility (CEF), at one's own risk. As the SEA would compare all relevant transport options, MICOA agreed with CSL, in a meeting held on 3 June 2003, that the EIA for the CEF would not need to compare the Chibuto-Chokwe railway option with the CEF option.

A November 2003 review of the draft SEA report by the Commission made clear that the SEA report did not include sufficient background information and that, specifically, the financial and (national) economic consequences of

the short term options were required for supporting the decision to be made by CONDES. The Portuguese version of the final SEA report was published in April 2004. Decisions on CEF licensing can only be made after decision-making by CONDES in favour of the CEF.

1.3 Description of the activity

CSL's preferred option for the export of its products is to construct a 65 km long private and fenced dedicated haul road (DHR) furnished with 42 crossing points, from the smelter to a bulk cargo facility (Materials Handling and Storage Facility, MHSF) behind the frontal dunes approximately 5 km north-east of Chongoene beach, a conveyor and materials transport system through the dunes and a 1,2 km long, 20 meters above mean sea level, open lattice structured private jetty, to be built perpendicular to the coast-line, capable of docking two 25,00-45,000 Dead Weight Tonnes (DWT) Handymax sized vessels. Jetty and MHSF together form the Chongoene Load Out Facility (CLOF).

1.4 Rationale and mandate for this advisory review

Mozambican law (decree no 76/98) indicates that an Environmental Impact Assessment (EIA) is applicable to the project. MICOA is the authority competent for granting the environmental licence.

By letter dated 31 March 2004 MICOA asked the Commission to assist in reviewing the EIA for the Chongoene Export Facility.

In view of further developing MICOA's EIA review capacities, MICOA and the Commission decided to co-review this EIA and to compose a joint working group. In this way, professional knowledge and experience could be mutually transferred. The composition of the review team is given in appendix 2.

In its advisory capacity, the working group represents the Commission and is therefore referred to as 'the Commission'. The working group includes the following disciplines: geology, geography, tourism, port management and port safety, railways and structures, ecology, social aspects, general EIA expertise.

The Commission visited Mozambique from 28 June to 2 July 2004 inclusive.

1.5 Focus of this advice

This advisory review starts by focusing on the main issues that are at stake in decision-making for this project. Subsequently, it addresses additional points of interest for the next stages of project development. The review takes into account the main environmental and social issues and issues related to the EIA process in Mozambique. On request, the Commission is prepared to provide more detailed observations.

The review is based on the ToR, the Mozambican legislative framework, South African EIA practices as well as the Commission's own EIA practice.

2. GENERAL OBSERVATIONS:

- The present EIA has been prepared for an export capacity of 500,000 tonnes of cargo per year and the environmental licence is expected to be provided for this capacity only. However, it is foreseen and can be expected that in due time CSL will file a request to extend the capacity of the facilities to the scheduled maximum capacity of > 1.5 million tonnes of cargo per year. This will triple most environmental impacts. Once CSL has obtained the licence for 500,000 t/y and, having made the investment, it will be extremely difficult for MICOA not to provide CSL with a licence for 1.5 million tonnes[1].

  Recommendation:
  The Commission recommends that MICOA should carefully consider whether the Government of Mozambique can approve this EIA based on an export capacity of 500,000 tonnes, or whether the EIA should address the 1.5 million tonnes scenario.

- The infrastructure presented in this EIA is designed for sole use by CSL.

- The EIA does not address the potential conflict between the surface activities of CSL and the Rio Tinto minerals concession at Chongoene.

- The ToR do not ask for an assessment of the environmental impacts of decommissioning of the structures. If CONDES decides to provide a temporary licence spanning twenty years for the CEF, the Commission recommends that decommissioning should be addressed in Tier 2 of the EIA process (see chapter 3).

- The EIA (volume 1 page 153) states that in the meeting between CSL and MICOA it was agreed that the EIA for the CEF would not have to compare the Chokwe rail link option to the CEF option. The EIA states that final ToR for the EIA would be produced. Such ToR have not been made available to the Commission.

3. MAIN CONCLUSIONS AND RECOMMENDATIONS FOR THIS EIA

The Commission concludes that:

1. This EIA is based on a conceptual design. The level of detail of the design of the facilities does not allow for detailed specification of mitigating measures and reliable prediction of impacts before and after mitigation. Therefore, the Commission believes that MICOA does not possess sufficient information in this EIA to make an informed decision about granting a full environmental licence.

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[1] For that reason the Netherlands government and European Commission and their respective courts explicitly require EIAs to address the foreseeable final situation and not a first stage of a foreseeable development.

2. However, after provision of the additional information specified in chapter 4 below, the Commission considers the information contained in this EIA a sufficient basis for the following decisions:
   - o whether or not the jetty option is an option that can safely be operated at the selected location and under the institutional realities of Mozambique (environmental viability of the option);
   - o whether the rail or the haul road option should be preferred;
   - o whether diesel import via the jetty or via Maputo or Matola harbour should be preferred.

3. The Commission holds the opinion that the EIA correctly argues that the tunnelling alternative is not an option to pursue.

Recommendation:
The Commission recommends that a tiered EIA procedure should be adopted:

Tier 1: *After provision of additional information specified in chapter 4 below, the present EIA will provide sufficient information to allow decisions to be made on: a go-ahead for detailed design of the jetty, the go-ahead for the detailed design of the railway or the road, and on the import of diesel via the jetty or via Maputo or Matola port.*

Tier 2: *In the event that the CONDES decides to give the go-ahead to the CEF option, an EIA based on detailed design of the chosen options (rail or road, diesel via jetty or not) can then be completed to inform the decision to go-ahead with the development of an operational plan. Detailed design will allow this second tier EIA to contain much more verifiable quantitative information.*

Tier 3: *Operational plans for the project elements will allow decision making on environmental licensing and licensing conditions.*

Tier 2 and tier 3 could be combined into one tier as well.

4. OBSERVATIONS AND RECOMMENDATIONS FOR COMPLEMENTING THE EIA FOR TIER 1 DECISION MAKING

4.1 Loading and off-loading facilities

The description of the off-loading activity is very limited. It consists of a general design of the jetty, the general design of the conveyor belt, and a limited amount of information on the estimated number of ships calling per year.

Diesel tankers	:	6 per year
Other ships	:	120 per year

Activities on the jetty are based on the first phase of operations: approximately 500,000 tonnes of processed product per year. The activities that are mentioned are:

- Loading of heavy minerals (500,000 tonnes) : 120 ships
- Loading of 100,000 ton of pig-iron (included in the 120 ships)
- Unloading of 120,000 tonnes of anthracite : 3 ships
- Unloading of 2,000m3 of diesel 6 times per year : 6 ships

Although not stated in the EIA report, the average loading of minerals and pig iron per vessel is estimated by CSL to be between 5,000-10,000 tonnes. Vessels would arrive partially loaded and would top-up to full capacity at the jetty before continuing their journey to their final destination. The ships would be under charter to the cargo owner, and therefore CSL would not be the responsible party.

It is true (as claimed by CSL) that similar operations at similar jetties have functioned satisfactorily in many other places in the world. However this is only the case because detailed analysis has been performed beforehand and mitigating and preventive measures have been put into place at these locations.

The main factors in determining whether safe and efficient operations are possible are:

- The window of operations
- Pilotage
- Tug boat assistance

The description of these activities is insufficiently detailed to enable MICOA to verify whether port operations can take place safely at the proposed location and with the proposed jetty concept:

- The fact that no hydro-meteo data are provided makes it impossible to verify the safety claimed. Currents, waves and wind have a significant influence on jetty design at a given location. Should currents be significant, an L or T shaped jetty would be a far safer design. It is not demonstrated that the present jetty design is adequate for the conditions present at the proposed location.
- Description of the nautical infrastructure (turning basin, approach channel, anchorage), which stretches out into the sea for many nautical miles, is not included in the report.

Recommendations:

To enable verification of the safety of the jetty-concept at the specified location, it is recommended that the description of the activity should include:

- *Hydro-meteo data*
  In the proposal, the jetty is situated at an exposed location. Information on hydro-meteo data (wind, waves and currents), which would verify that safe port operations can take place at the proposed location and with the proposed jetty concept, should be included. Some information on wind and waves is included in the present EIA, but no mention has been made of currents.

- *Specification of the safe window of operations*
  The safe window of operations (maximum wind, waves and current conditions, under which mooring and cargo handling operations can take place)

should be included. The number of operational days for the jetty should be provided.

- *Organisation of the jetty operations*
  The tasks and responsibilities of the jetty operator should be described. Also the relationship with the relevant Mozambique authorities (SAFMAR), and the role these authorities will assume in jetty operations should be described.

- *Aspects such as pilotage, tug boat assistance.*

- *Provisions for a service port, which would accommodate tugboats and other service vessels such as pilot launches and/or ski-boats.*

- *The nautical infrastructure (turning basin, approach channel, anchorage). This information should be included in the EIA for review by CFM and SAFMAR.*

4.2 Risk assessment

4.2.1 Unloading of Diesel

The most critical element in the unloading of diesel is the proposed flexible hose connection between the ship and the jetty. Considering the exposed location of the jetty and the identification of diesel spills as one of the major risks, the proposed use of flexible hoses should be reviewed and the incorporation of a loading arm (a much more reliable way of unloading) in the jetty design is recommended as the main mitigating measure. Furthermore, strict procedures should be adhered to in order to prevent spills due to faulty operations. Good and clear arrangements between ship and jetty should be agreed upon. The International Maritime Organisation (IMO), part of the UN organisation, has developed "ship to shore guidelines" and checklists which have become standard and are in use practically all over the world.

Recommendations:

- *Replace flexible hoses with a loading arm;*

- *Unloading procedures should meet the IMO ship to shore guidelines. The IMO ship to shore checklist should be adhered to.*

4.2.2 Nautical risks

Nautical risk is a generic term which includes the probability and consequences of the following scenarios:

- Collision between ships
- Ramming of jetty by a ship
- Grounding of ships
- Incidents on board of ships: fire, explosion etc.

It should be realised that every time a ship approaches the shore (a port or a jetty) it is taking a calculated risk. In Volume 2, chapter 11 "Risk Assessment" the probabilities for various scenarios are derived. These figures do not necessarily give a true reflection of the expected situation at the proposed CLOF, including the jetty:

- The CLOF is much more exposed than the ports on which the probability assessment has been based (Vancouver, Durban), leading to a higher probability of accidents for the CLOF than in a port.
- The accident probabilities of chemical tankers have been used, which are the safest vessels in business. These probabilities need to be reviewed for bulk carriers and tankers, which statistically are more prone to accidents.

Recommendations:

To enable an exposed jetty to function at a comparable level of safety as a (sheltered) port, a wide range of safety measures should be put into place:

Nautical operations:

- *The safe widow of operations should be established and adhered to;*
- *Weather forecasting should be accurate, and acted upon;*
- *Pilotage should be of a high standard;*
- *Sufficient and adequate tug-boat assistance should be available for mooring and unmooring, and during cargo handling operations;*
- *At least at the start of the jetty operations only daylight berthing should be undertaken. Only after detailed evaluation should night-time berthing be undertaken;*
- *Ships should be in full operational condition (engine propulsion, rudder, navigational means) as mentioned in the EIA.*

Nautical infrastructure:

- *Navigational aids (buoys, lightlines, radar beacons) should be adequate;*
- *The facility should be included in navigation charts, a navigational chart for the CLOF should be produced;*
- *Nautical infrastructure should be surveyed regularly.*

Port management:

- *A port management organisation should be developed;*
- *Port regulations should be developed and published;*
- *VHF communication channels should be established and published.*

4.2.3 Oil Spill Analysis

According to the Mozambique Coastal Zone Development Institute, there is a west to east current parallel to the coast of approximately 0.5-1 m/s present at the CLOF location. This current has not in any way been taken into account in the dispersal models used to calculate dispersal of possible bunker oil and diesel spills, thereby possibly misrepresenting the consequences of a spill and the locations at risk from a spill.

Recommendation:

It is recommended that the effect of currents is included in the dispersal calculations given in chapter 13.

Comments on Oil Spill response:

- The feasibility of a boom around the diesel tanker during unloading is questionable. This could imply that the boom must be deployed under the jetty, which seems impossible.
- Without any provisions for a service port it is unclear where the ski-boats required for boom deployment will be stationed.

4.3 Comparison of alternatives

4.3.1 Haul road versus rail

The Commission holds the opinion that the EIA does not provide sufficient and equally detailed information on each alternative for making a truly objective comparison.

4.3.1.1. Questions on information present in the EIA

The Commission questions the following information in the EIA:

1. *"Train lengths of 50 wagons will be employed during all phases of the project".* This statement is queried since shorter trains could be employed during the initial phase of the project.
2. *"Loading and unloading of the train is assumed to take 24 hours....the loading and offloading rate for titanium is 60 t/hour".* If it takes 24 hours to load 50 rail wagons to their 20t axle load capacity, then the rate of loading should be closer to 120 t/hour than 60 t/hour. At 60 t/hour it will take 5 hours to load a 300t road train. Another aspect is that 500,000t per annum reduces to ± 60 t/hour if produced over 360 days of 24 hours.
3. *"transit times were also based on 360 operating days of 24 hours".* Locomotive availability is accepted as being about 75% of total operating time. Pre-departure preparation and inspection will also affect road trains.
4. *"The DHR will require ..... a road reserve of 30 m" (Volume 3 page 35). "The road will require a 40 m wide servitude" (Volume 1 Scoping and Terms of Reference, page 12). "A 100m. noise servitude will be available for affected households for the DHR if the household so wishes" (Vol-*

ume 2 page 274). The required road width and road servitude needs to be established, applying the proper servitude for noise.

5. *"The rail reserve will be 100 m wide".* Apparently this width is a legal requirement in Mozambique. This should be mentioned in the EIA.
6. *"the ruling gradient is 1:80"* for the rail option, but no ruling gradient is given for the road. The Commission notes that a single Class 34 diesel electric locomotive currently operating in South Africa of mass 111t with an adhesion of 20% can haul only 17 wagons at 20t axle loading up a 1:80 gradient. A new modern design locomotive of the same mass can have an adhesion of 30% and can haul 26 wagons at 20 t axle loading up a 1:80 gradient. The Commission also notes that road trains will probably be similarly affected by gradient.
7. Air pollution (Volume 3, Item 8.3.1): "The rail option will result in the emission of a greater amount of nitrous oxides (Moderate) and hydrocarbons (High to Very High Impact), whereas the road will generate more dust (Moderate Impact)". With regard to air pollution the Commission observes that:
   a. the specialist study provides emission data for the base case and for the rail alternative. The former are given in tonnes per day (t/day), while the latter are given in tonnes per annum (tpa) (see table 1).
   b. Dispersion modelling subsequently leads the EIA to conclude that the rail option has moderate impact through NOx emissions and high to very high impact through emissions of Hydrocarbons (HC). For the base case, the EIA finds a moderate impact for dust. Comparing the figures for both options expressed in tonnes per annum (tpa, see table 2), the Commission has difficulty understanding these conclusions.
   c. The Commission finds it is equally difficult to understand that annual CO emissions of the base case being next to twenty-fold the rail option emissions for CO, dispersion modelling gives much higher hourly and daily CO concentrations for the rail option as compared to the base case.

Table 1	(t/day)	(tpa)
	base case	railway
CO	3,020	60,67
HC	0,230	37,92
NOx	14,830	295,76
PM	0,670	15,17
SO2	2,300	37,92

Table 2	(tpa)	(tpa)
	base case	railway
CO	1102	61
HC	84	38
NOx	5413	296
PM	245	15
SO2	840	38

4.3.1.2. Information lacking in the EIA

The Commission could not find the following information that it deems necessary for proper comparison of the base case and the rail option:

1. Information on whether and on what basis a (privately owned) DHR is legally permitted in Mozambique;
2. Information on routing of the railway;
3. A quantitative noise and vibrations study for both options;
4. A comparative quantitative study of the cut and fill operations, bridge crossings and base materials;

5. A comparative quantitative study on resettlement and compensation needs for both options;
6. With respect to safety, the rail option is probably safer due to its lower frequency of operation. The EIA states that both options were found to pose low risk. The EIA, however, gives no description and comparison of the risks posed by each option.
7. A comparison of the energy efficiency of each option.

Recommendation:

The Commission recommends:

- *to include in this EIA a logistical study that works out and compares both options;*
- *to include in the EIA more details on routing of both options, land requirement of both options, design (e.g. gradients) etc.;*
- *to review, elaborate on, and make transparent the comparative study of the air pollution of both options;*
- *to address in the EIA the points mentioned in paragraph 4.3.1.2.*
- *to include in the EIA a comparison of both options in tabular form, providing the quantitative information on the criteria of comparison and providing a qualitative interpretation of the figures.*

4.3.2 Diesel via Jetty versus diesel via Matola or Maputo

Safety concerns are at the basis of the proposal to develop an alternative for importing the diesel through the proposed jetty.

Recommendation:

For proper comparison of both alternatives, the Commission recommends to include in this EIA a comparative risk analysis of both options.

5. OBSERVATIONS AND RECOMMENDATIONS FOR THE TIER 2 EIA REPORT

5.1 General

In comparison with the present EIA report, the Commission recommends that the second tier EIA report should provide:

- clear maps, at an appropriate scale, showing the items addressed in the texts such as villages and rivers;
- a regional description and a regional location map;
- a complete list of abbreviations;

- a clear description of the CEF in the context of the overall mining project, especially where mitigation measures are shared;
- diagrams that clarify the organisational structure of CSL.

5.2 Base line information

In addition to the information contained in the present EIA, the Commission recommends that more comprehensive quantitative base line information should be included in the second tier EIA, such as:

- information on the topography and adequate maps facilitating interpretation of any topographic information contained in the report;
- a summary description of the climate with respect to prevailing and storm wind conditions, frequency of cyclones, 24-hour rainfall events, evaporation, droughts etc;
- comprehensive information on the hydrology of the study area, including an assessment of the risk and consequences of flooding. This includes an inspection of the proposed dedicated 65 km road from Chibuto to Chongoene which should indicate the likelihood of flooding at all river crossings and low-lying areas, including the MHSF, as well as an assessment of the impact of water abstraction on lake, river and wetlands functioning;
- a comprehensive study of the groundwater conditions in the area;
- a detailed wetland study, including aquatic fauna and flora;
- baseline water quality sampling needs to be undertaken at regular intervals for at least a year before construction starts at all river crossings, lakes wetlands and aquifers that might be affected by the project;
- information on the soils with respect to sodicity, salinity, erodibility (wind and water) and land capability especially for rehabilitation;
- a detailed analysis of the socio-economic circumstances in the study area;
- a base line study on the health situation in the area (including incidence of HIV);
- information on sites of spiritual and religious importance;
- It is unclear in the noise study why no ambient noise measurements were taken along the DHR route and around the CLOF. It is equally unclear why the consultant compares the noise impacts against internationally recognised standards for urban residential areas rather than against the assumed rural ambient noise levels which prevail in the area. The noise impact zone is therefore considerably larger than described in the specialist noise study. It is recommended therefore that a baseline noise survey should be undertaken and that rural ambient noise levels should be used as the baseline against which the impacts should be assessed.

5.3 Project description and project impacts

5.3.1 General

The Commission recommends that the second tier EIA should provide enough site specific detail on design to enable detailed assessment of impacts and detailed Environmental Management Plans (EMPs) to be drawn up.

5.3.2 Design and Construction

In addition to the information contained in the present EIA, the Commission recommends that the second-tier EIA should be more comprehensive. The following list is by no means exhaustive, but provides an indication of the problems that the reader will encounter in obtaining a full understanding of the project:

- details on jetty design:
  - Clear and detailed drawings of the proposed jetty facility should be included in the report, indicating the number of berths.
  - Information on the berth occupancy rate.
  - The strategy and provisions made in the design for foreseeable future expansion. This enables MICOA to verify if any additional jetties would be required in the future.
  - The maximum capacity of the jetty, to enable MICOA to determine whether a second operator could make use of the facility.
- details regarding the road (DHR): road width, depth of topsoil removal, depth of sub-base and base course required, location of local borrow pits, location of cut and fill sections, use of tar or bitumen for spraying the road surface, road drainage etc;
- an assessment of the adequacy of the proposed chip and spray road surface in relation to axle (or wheel) load used;
- details regarding the use of the existing road system during construction of the DHR and the related impacts of such use (e.g. transport of 250,000 tonnes of gravel, supposedly from Mafiane);
- details regarding the access road from the MHSF to the jetty – route, surface, construction etc;
- information on location of bridges and types of bridges to be constructed;
- information on the criteria for selecting the crossing points (e.g. population density);
- details regarding temporary water abstraction and use during construction: source(s) of water, abstraction point(s), method(s) of abstraction (type of pump station or well field), pipeline route whether buried or on surface and the related impacts;
- details regarding the 33kV power line which apparently will run alongside the road and the impacts relating to this;
- information on other linear infrastructure to be placed along the road such as pipelines, telephone lines, communications infrastructure such as mobile phone masts and radio relay stations;
- details on design measures for containment of air pollution, dust, noise and vibration for the entire CEF;
- information on lighting along the road and/or at intersections and the impacts of light pollution;
- concept plans regarding liquid and solid, hazardous and non-hazardous waste disposal;
- information on construction methods e.g. the need for a concrete plant at the MHS and an asphalt plant, materials to be used to construct the noise protection berms and the impact of such berms on access, loss of land, etc.

5.3.3 Operation

In addition to the information contained in the present EIA, the Commission recommends that the second tier EIA should be more comprehensive and include also:

- details regarding road or rail operation such as travel times, loading and offloading times, dimensions and capacities (load, tare) of the wagons/vehicles, wagon/vehicle servicing etc;
- if the road option is given the go ahead: indicate whether other CSL-related vehicles will be allowed to use the DHR (e.g. employees, general work traffic, service and delivery vehicles), or whether these have to use the existing road. If so, give estimations of the amount of traffic, indicate whether the road will be upgraded, address the impacts thereof. Indicate who will be responsible for road maintenance etc;
- details regarding water abstraction and use during operations e.g. source(s) of water, abstraction point(s), method(s) of abstraction (type of pump station or well-field), pipeline route;
- information on whether the pipeline will be buried or on surface etc;
- more details on the nature and operation of the manned and unmanned crossing points;
- information on working hours: Indicate whether trucks/trains will travel throughout the night and on weekends. Indicate whether operations at the MHS will be on a 24 hour basis. Indicate whether ship loading/unloading will occur at night;
- information on above-background radiation in the export products;
- information on radiation levels of the filter bags in the bag filter houses, on safety measures (if needed) to protect the workers from excess radiation (mention exposure criteria) and information where and how radioactive waste will be disposed of;
- details on management measures on dust, air pollution, noise and vibrations containment for the entire CEF (in EMP);
- details regarding CSL's whole approach to community issues (resettlement, graves, land allocation for resettled people, skills training, school development etc.).

5.3.4 Decommissioning

If / when the CEF is given the go ahead for a limited period of time, the second tier EIA must include a detailed and thorough description and impact assessment of its decommissioning.

5.4 Public participation process and public understanding

The Commission doubts that the public participation process so far has created a full and objective understanding within the affected populations of (what the project will mean for them in terms of) negative impacts. The Commission recommends that a capacity building programme should be undertaken so that the local communities can obtain an objective and full understanding of all the project impacts before negotiations on compensation are initiated. The Commission also recommends that a report in detail on this capacity building programme should be provided in the second tier EIA.

5.5 Risk assessment

Extensive risk assessment being recommended for the present first tier of the recommended EIA process, the Commission recommends to concentrate in the second tier EIA on risk assessment of the diesel tank.

Diesel tanks on shore

The design is based on two diesel tanks, each of 1357 m^3, within a single bund area capable of containing 110% of the volume of one storage tank. No further description is given. No mention is made on the type of tanks envisaged nor are any fire fighting installation specifications mentioned.

The risk scenario presented, assumes loss of containment of one tank, ignition of the resulting diesel pool in the bund, and a resulting pool-fire, with a duration of 5 hours. No mention is made of the possible consequences for the second tank, which will also be enveloped in fire. A number of consequences may be the result of this scenario:

- Weakening of the tank-wall due to overheating, with a resulting loss of containment of the second tank. This would possibly lead to overflowing of the bund area and the resulting spreading of the pool fire outside the bund area or:
- Gasification of the diesel due to heat transfer, possibly resulting in an explosion.

Other possible scenario's (not taken into account in the EIA) may include:

- Tank fire due to e.g. faulty operational or maintenance practices.
- Tank collapse e.g. due to vacuum or overpressure caused by faulty operational practices.

Recommendations:

The following mitigating measures are recommended to enable safe and controlled emergency response:

- *Position each tank into its own bund area;*
- *Increase the minimum distance between tanks and in relation to other objects on site (mentioned in EMP);*
- *Installation of remote controlled monitors with the capability to cover the bund area and or tanks with an appropriate foam (mentioned in EMP);*
- *Installation of remote controlled monitors with the capability to cool tank walls during incidents (mentioned in EMP);*
- *Install reserve tank capacity, either in each tank or by adding a third tank, so diesel fuel can be transferred from one tank to another in case of emergencies.*

5.6 Impact quantification and qualification

For the second tier EIA, the Commission recommends that all the potential impacts of the project should be quantified to the best possible extent and to compare these quantified impacts with established environmental standards. In addition to providing the figures in the second-tier EIA, the Commission recommends that the impacts should be evaluated according to the system used in the present EIA.

5.7 Environmental Management Plan

- The Commission recommends that copies of WMC's operational policies, its code of conduct, safety policy, environmental policy and its policy on community development, to which the present EIA makes reference, should be added to the EMP.
- The Commission recommends that the EMP should address the organisational structure for environmental management (individual tasks and responsibilities, checks and balances, feedback mechanisms), systems for risk management, systems for mitigation of impacts, systems for management of change, monitoring and reporting systems and details on what will be monitored for how long and with what frequency, commitments for and systems of reparation of environmental damage and commitments and a detailed plan for compensation of affected individuals and communities (community development plan) and compensation to the State of Mozambique for the loss of land and coastal resources.
- The Commission recommends that a comprehensive and relevant listing of standards should be provided for all possible emissions (noise, water quality, air quality, sewage discharges, radiation etc.), together with the sources of the standards.