

TABLE OF CONTENTS

	Page
1. Introduction	1
2. Justification of the approach	2
3. Review findings	2
3.1 General issues for monitoring	2
3.2 Points of attention in project implementation	3
3.3 Monitoring before and during operation	4
3.3.1 System functioning	4
3.3.2 Water and sediment quality within the Ciénaga and in the Caribbean Sea	4
3.3.3 Erosion patterns	5

Appendices

1. Letter from DGIS dated 8 October 1998, in which the Commission has been asked to submit an advisory review.
2. Letter from the Colombian Ministry of Transport dated 7 October 1998, in which the Commission has been asked to submit an advisory review.
3. Resolución no 0091
4. Issues for monitoring related to construction
5. Aspects to be considered by the Environmental monitoring plan for the mangroves in the Ciénaga de la Virgen.

1. INTRODUCTION

In 1996 the Commission for Environmental Impact Assessment in the Netherlands was requested by the Netherlands Minister for Development Cooperation to carry out advisory reviews of the Environmental Impact Statement and additional information prepared for the so-called Tidal inlet project near Cartagena in Colombia. These reviews have been carried out in close collaboration with CARDIQUE (Corporación Autónoma Regional del Canal del Dique)^{1]}.

In March 1997 an environmental licence for the execution of the project was granted by CARDIQUE and renewed in September 1998. This 'Resolución no 0091' contains 14 articles, in which the final decision for the environmental licence is substantiated (appendix 3).

The most important article in the framework of this report is no. 2 in which it is indicated that *'the environmental licenceis subject to the compliance with all measures and actions proposed in the Environmental Management Plan and the recommendations indicated in the Advisory review of the additional information to the environmental impact statement Tidal Inlet Cartagena, Colombia, executed by the Commission and CARDIQUE and which forms an integral part of this provision.*

In article 4 and 6 is stated that CARDIQUE is allowed to prescribe additional mitigating or compensating measures if the situation so requires.

Towards the end of 1998 most contracts were signed. The preparation for the execution of the project started early 1999. In light of these developments, the Commission received a request from the Minister for Development Cooperation, endorsed by the Colombian Ministry of Transport (see appendix 1 and 2), to 'conduct the project, environmentally and technically, by re-activating the collaboration with CARDIQUE in the evaluation of the review reports which will be drawn up during the execution of the works'.

The environmental licence of CARDIQUE and the letters of the Colombian and Netherlands Ministries therefore form the motive for this advice. However, the reports which would be subject to joint review were not specified in the letter. The Environmental Management Plan (Plan de Manejo Ambiental, mentioned in the licence) refers to several reports. In Chapter 6 of the supplementary information to the Environmental Impact Statement these reports are mentioned again. It is indicated that:

'Following the suggestion of the Commission and CARDIQUE, the project will prepare the information asked for in Chapter 3^{2]} of its review advice before and during construction activities. Therefore, the project will publish the following manuals and documents:

- (i) tender documents, which include a detailed technical description of the project and which define in more detail the amounts and origin/ destination of the materials which will be applied;*
- (ii) an operation and maintenance manual, which includes a monitoring programme on hydrology, water quality an coastal morphology;*
- (iii) an information and safety programme.*

If additional funding can be required, a land- and water use study would be recommendable to guarantee the future use of natural resources in Cartagena.

1 For information on the project and the results of these reviews reference is made to the 'Advisory review of the environmental impact statement Tidal Inlet, Cartagena, Colombia' of 27 June 1996 and 'Advisory review of the additional information to the environmental impact statement Tidal Inlet Cartagena, Colombia' of 19 November 1996.

2 Observations on shortcomings which are less essential for decision-making on funding of the project, but which have to become available before and during construction activities.

As most of the remarks made in both review advices of the Commission and CARDIQUE refer to information which will be provided in the documents mentioned under (i) and (ii), ideally both documents should be subject to joint review.

2. JUSTIFICATION OF THE APPROACH

In March 1999 the Commission and CARDIQUE received the report containing the monitoring programme: 'Programa de Monitoreo Ambiental', febrero 1999.

The tender documents were not sent for review. However, if the Commission and CARDIQUE were to give a judgement on items for monitoring related to the construction phase, some parts of the tender documents have to be summarized or included in the Environmental Monitoring Programme (See Appendix 4, guidelines for information required to monitor the activities related to the phase of construction).

In order to be able to evaluate the Environmental Monitoring Programme, it was decided to distinguish 3 categories (text parts and chapters on monitoring copied from both review advices of 1996):

- (i) General issues for monitoring.
- (ii) Points of attention in project implementation
- (iii) Issues to be monitored before and during operation.

The findings are presented in Chapter 3. The consultant proposes an evaluation of the results and possible adjustments of the monitoring programme, 3 months after monitoring has started (May 1999). The findings in Chapter 3 of this report will form an input for this evaluation.

3. REVIEW FINDINGS

3.1 General issues for monitoring

The Environmental Monitoring Programme lacks an analysis of the purpose(s) of monitoring and is lacking a philosophy towards the short-term and long-term monitoring approach. The study area is not indicated. This area is determined by the geographical area which is affected by the impacts of the works. The study area may differ per aspect and determines the scope of the monitoring programme.

- # It is recommended to adapt the programme, developing a clear strategy and action-plan: (i) it should first analyse (or borrow from the EIA-study) what can go wrong during construction and operation (scenario development); (ii) next it should determine which parameters are essential for indicating if something does go wrong for the different scenarios; this will also provide the justification for the sampling location, the frequency of sampling and the time span of sampling; (iii) it should indicate which values of the selected parameters will be critical in relation to "what can go wrong" (point i) and finally (iv) it should also elaborate who is responsible at the different levels of authority and organisation for evaluating the monitoring results and what actions will be taken if a parameter appears to conflict with compliance. The selection of parameters gives rather large lists of parameters related to the different scenarios, which might be narrowed down towards the most essential parameters for the purpose and specific situation at hand; the same applies to the

number of sampling points; a more tailor-made programme can save money, which might be used for financing the biological monitoring.

- # The monitoring programme should summarize existing information on different parameters or indicate the passages and annexes of the EIA report where such data can be found.
- # It is recommended to review the feasibility of the monitoring programme under Colombian circumstances.

3.2 Points of attention in project implementation

The relationships between the project and the Sewerage Masterplan and other plans are not addressed in the Environmental Monitoring Programme.

Although these issues may not be strictly related to monitoring of the project works, they are vital for the well functioning and overall success of the project.

The Commission considers the simultaneous implementation of the Sewerage Masterplan and the Tidal inlet vital, because the objectives of the project otherwise cannot be realized.

The well-functioning of the Tidal inlet will impose certain limitations and preconditions on existing plans such as the Management Plan for the Cerro de la Popa, the Via Perimetral and the expansion of the Airport Rafael Nuñez. In decisions on existing plans and programmes these preconditions and limitations have to be included.

In the coming years, relevant information on the progress of the execution of the Masterplan, as well as other developments and plans that can influence the project area, must be collected and included in the periodic evaluation of the project monitoring data.

- # In the opinion of the Commission, the monitoring programme has to indicate who will be responsible for monitoring the progress on the execution of the Sewerage Masterplan, what will be done with the results and which measures eventually have to be taken.

3.3 Monitoring before and during operation

3.3.1 System functioning

Monitoring of biological parameters (species and numbers) is essential in relation to the objectives of the activity, due to the great uncertainties such as vitality of mangroves, competition in the water phase between primary producers, fish, functioning and changes in ecosystem.

- # The Commission considers it vital to secure funding for the biological monitoring. CARDIQUE provided information on aspects to be considered in the Environmental Monitoring Plan for the monitoring of mangroves (appendix 5).

3.3.2 Water and sediment quality within the Ciénaga and in the Caribbean Sea

Some selected points of attention are given below:

At present the southern part of the Ciénaga harbours a heavily polluted sediment. As a result of dredging and flushing this polluted layer disperses to other areas. This would lead to an increased area with polluted sediment, deteriorating the situation.

- # The monitoring programme has to indicate how this situation will be controlled. In general remote sensing images can be helpful. The difference in colour images can indicate sources and dispersion of pollution.

Only a reduced number of samples on water quality in the coastal area are foreseen. Although it will be possible with the selected locations to register the pollution affecting the Caribbean Sea, it will be difficult to gauge the effects on the coastal zone (where tourist activities take place).

- # It is recommended to increase the number of sampling locations at greater distance of the tidal inlet.

The locations of the sampling points in the Ciénaga have not been densified related to the main sources of pollution (southern part) nor inside the creeks where the pollution is discharged. The greater distance from these sources (point and diffuse) the wider the sampling grid can be. The effects of reduction or increase of discharge of polluted effluent and the operation of the outlet works can be measured. What does enter the lagoon and what does go out? This is not only related to the water quality and quantity but also to the sediment quality and quantity.

- # The monitoring programme has to adjust the locations for sampling to the parameters that are to be measured.

It is stated that only sampling is done at the surface of the lake bottom.

- # It is recommended to sample down to the not polluted soil.

The monitoring programme indicates sampling of the beaches.

- # The monitoring programme has to sample the sediment at certain distances from the beach and monitor the deposition location.

A large number of samples (7) are taken in the channels: points 11, 13 and 14 do not provide much additional information. In general, the relation of sampling between the channels, the Ciénaga and the shoreline has not been indicated clearly.

- # It is recommended to include sampling points in the Cienaga Las Quintas and in the Bahía de Cartagena and to justify the relation between sampling in the channels, the Ciénaga and the shoreline.

3.3.3

Erosion patterns

The chapter on morphological monitoring has not determined parameters related to the acceptable change of coastal erosion or sedimentation of the outlet or "La Boquilla". E.g. is it acceptable that "La Boquilla" will close due to change of waterflow (and sediment), or do the local people want an open connection with the sea because of their fishing activities?

- # It is recommended to include this impact in the monitoring programme, including mitigating measures if deemed necessary.

A monitoring of cross-sections of the spit from La Boquilla until Crespo is advised. The length on-shore and off-shore of the cross-sections has not been mentioned.

The cross-sections have to be taken at intervals according to the morphological change and must be fixed. As a result of the initial monitoring this can be adapted: widening the intervals or decreasing them. Sediment transport and morphological monitoring could be registered by aerial photography (Servicio de Aerofotogrametria de Colombia) or through satellite imagery (SPOT).