

APPENDICES

**With the Advisory review of the monitoring
programme for the Lining of the Ismailia Canal
Pilot Project, Egypt**

(appendices 1 to 3)

APPENDIX 1

Letter from DGIS dated 20 August 1999 in which the Commission has been asked to submit an advisory review.

20-AUG-1999 11:29 FROM MIN.FOR.INT. AOB TO WAREHOUSE P.01/01
020 083

Faxbericht

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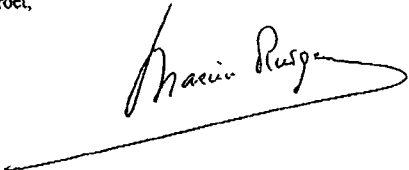
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Referte telefoongesprek Kolthoff-Rutgers

Bitumarin heeft over de projectuitvoering in de periode oktober 1998 - augustus 1999 voortgangsrapportage uitgebracht. Ik verzoek u hierbij om Bitumarin's voortgangsrapportage over genoemde periode te toetsen.

Met vriendelijke groet,

Marien Rutgers



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APPENDIX 2

Project information

Proposed activity: A request for an ORET grant ('Ontwikkelingsrelevante Export Transacties', Export Transactions relevant for Development) has been made by Bitumarin for delivery of materials and equipment for the lining of one kilometre of the Ismailia Canal in Egypt. The transaction is to be considered as a pilot activity, which if successful, may find a large scale application in lining the Ismailia canal in particular and of other irrigation canals in the Nile Delta in general. The advice presents Terms of Reference for a technical and financial feasibility study with respect to the pilot project. Furthermore the advice presents Terms of Reference for an EIS for the Ismailia Canal as a whole, assuming that lining will be applied on a large scale.

Categories: Flood prevention/control DAC CRS-code 92021; River development DAC CRS-code 97300

Project numbers: DGIS: WW92850; JRC 381-93; MER/020/95; Commission for EIA: 020

Procedural information:

Letter requesting advice for Terms of Reference: 29 March 1996
Advice for Terms of Reference submitted: 20 June 1996
Letter with request to submit an advisory review: 20 August 1999
Advisory review submitted: 16 March 2000

Composition of the working group of the Commission for EIA:

Mr P. Eversdijk
Mr J.W. Kroon (chairman)
Mr T. van der Zee
Mr J. Zuurveld (resource person)

Technical secretary: Mr A.J. Kolhoff

APPENDIX 3

Review findings of the progress report no. 1. Monitoring and evaluation of the effect of lining of Ismailia Canal, (July 1999)

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1. INTRODUCTION

In 1996 the proponent (Bitumarin) requested DGIS¹ for an ORET grant² for delivery of materials and equipment for the lining of one kilometre of the Ismailia canal in Egypt. The transaction is to be considered as a pilot project, which if successful, may find large-scale application in lining of irrigation canals in the Nile Delta.

In this pilot project Bitumarin introduces the Hypofors lining material, which has been developed for the Dutch Delta Works and which finds many forms of applications in hydraulic constructions. The combination of concrete blocks and an impermeable Hypofors bituminous liner (HB lining system) is suitable for construction of linings for irrigation canals under wet conditions. The pilot project (testing of the HB lining system on a trial of one kilometre) will provide information necessary to judge the technical feasibility of this lining system.

In the ORET application two objectives are mentioned:

1. Main objective: To test the lining system on the possibilities of wide scale application in order to prevent present substantial leakage in those sections of the canal situated in sandy soils and, at the same time to reduce maintenance costs of the canal.
2. Second objective: The expansion of the discharge capacity of the canal.

The project has been approved by both the Egyptian Government and the Netherlands Government and actual implementation of the project in the field started in 1998. The planning is to complete the technical works in the summer of 2000. After completion of the works monitoring of the effects of lining will be continued for one year in order to get insight in the effectiveness of the project.

In 1996 the Commission became involved in this project as the Minister for Development Cooperation requested the Commission to advise on terms of reference (ToR) for the preparation of an Environmental Impact Statement (EIS)/ technical feasibility study (including the monitoring programme) of the project. This resulted in an advice entitled: Advice for Terms of Reference for the environmental impact statement / technical and financial feasibility study for lining of the Ismailia Canal, Egypt; 20 June 1996. In November 1996 a meeting of the Commission and the proponent took place on the monitoring programme. A letter dd. 6 November 1996 with the conclusions of this meeting have been sent to the DGIS who is the competent authority.

By letter dated 20 August 1999 DGIS requested the Commission to review the report 'Progress report no 1. Monitoring and evaluation of the effect of lining of Ismailia Canal', (July 1999). The review findings of the Commission are presented in chapter two. These findings have been discussed extensively

¹ DGIS = The Directorate General for International Cooperation, the directorate of the Ministry of Foreign Affairs charged with the implementation of development cooperation.

² ORET = "Ontwikkelingsrelevante Export Transacties" – Export Transactions relevant for Development.

with the proponent and the Egyptian consultant. They agreed with the conclusions and it was announced that they will take the recommendations into consideration.

The monitoring programme will provide information on the hydrological effects of the pilot project. Therefore, the Commission noted that with respect to the pilot project it is not necessary to execute a full fledged EIA. The Commission advises to execute an EIA study in case it is decided to apply on a large scale lining of a canal with the HB lining system.

2. MAIN FINDINGS OF THE PROGRESS REPORT NO. (1)

2.1 General conclusion and recommendation

The Commission is of the opinion that essential information is lacking in the progress report. Therefore, a complete picture of the effects of lining cannot be provided by making use of the present monitoring network. Moreover, the analysis of the available data is elaborated in an insufficient manner.

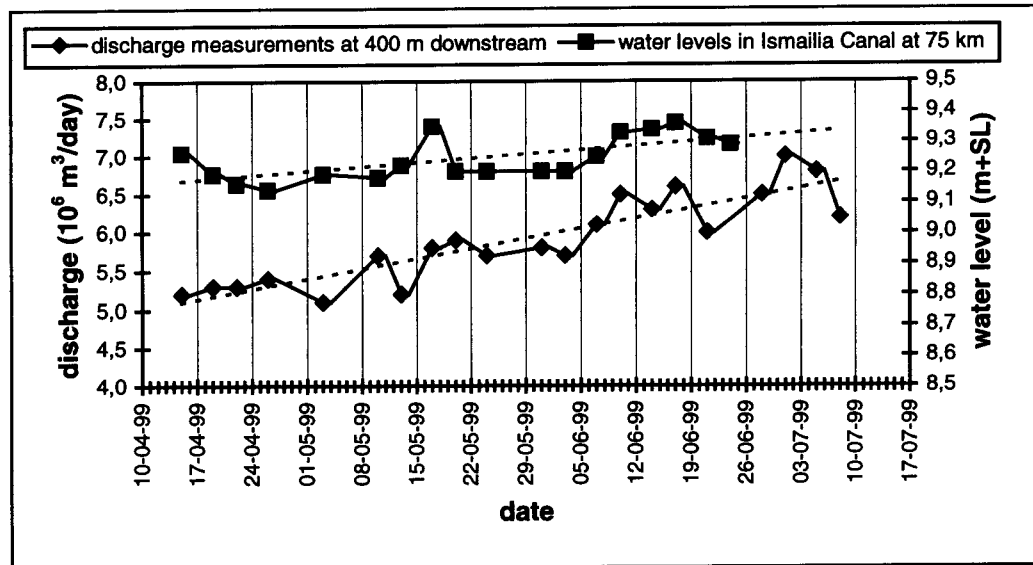
It is recommended to extend the monitoring network by installing an additional number of piezometers. Detailed remarks and suggestions for improvement of the monitoring programme are made in the next section.

2.2 Comments and suggestions for improving monitoring

Flow measurements

Figure 4 in Progress Report No. (1) shows variation of discharge measurements (in time) at three locations downstream of Salhia Head Regulator and Lock. This could be a result of variation of the water inflow near and upstream of the trial section due to nature (rainfall, evaporation), human action (irrigation) or artificial maintenance of discharge. Therefore, information on the water inflow (discharge) from the Salhia Head Regulator and Lock (near and upstream of the trial section) is needed. By calculating the difference between the inflow at Salhia Head Regulator and the outflow at row 3 the net loss in the trial section can be determined (as described in chapter 2; methodology). The actual seepage is depending on the circumstances during measuring, such as weather conditions.

Discharge measurements (in time) are available at three locations and should be compared with the water levels (in time). Enclosed figure shows the discharge measurements at 400 m downstream (based on figure 4) and the water levels in the canal at 75 km (based on figure 7). No significant correlation between discharge and water level can be detected (maybe due to errors during measurements).



Water levels

Water level measurements in the canal should be carried out in the same cross sections as the groundwater level measurements and at the same time. In order to conclude whether the canal is gaining water from the Right Bank, the water level in the canal has to be compared with the groundwater level. According to our information the water level in the canal is higher than the groundwater level. From our point of view, return flows into the canal are at least doubtful. For more justification the correlation between the water levels in the canal and the groundwater levels should be determined, for each row (spatial correlation and time correlation).

Topographical data

Topographical data (bottom level in canal, water level in canal and groundwater level) should be reduced to a known reference level (Mean Sea Level).

General information

In order to give a good overview of the present situation, also information of the site along the canal is needed (height of dikes along the canal, irrigation channels, ground level of the adjacent land). Bottom samples should be collected and analysed, as well in the canal as in the adjacent land (the permeability of different layers is important). Graphical cross-sections (reduced to a reference level) of the canal and the site along the canal are indispensable for a good overview.

Current velocities

Current velocities should at least be measured at two points in the vertical, in order to analyse the vertical distribution of velocity. The vertical distribution of velocity can be described with a logarithmic velocity profile:

$$u(z) = \frac{u_*}{\kappa} \ln \frac{z}{z_0}$$

with:

z = co-ordinate in vertical direction

u_* = bottom-friction velocity (which has no direct physical meaning)

z_0 = integration constant in logarithmic velocity profile

$$u(z_1) - u(z_2) = \frac{u_*}{\kappa} \ln \frac{z_1}{z_2}$$

κ = Von Karman constant (=0,41)

Based on the vertical distribution of velocity assumptions can be made on hydraulic characteristics.

Suggestions for improving the monitoring programme

In the present situation seepage water is used for irrigation. Due to the lining less water is available and effects the adjacent land (and farmers). These side effects should be well known.

Some of the wells are clogged and not all the planned wells are installed, but will be accomplished (chapter 4).

The following aspects need to be taken into account:

- discharge at km 75;
- calculations of net loss in trial section (inflow and outflow) and actual seepage;
- water levels in canal (row 1,2 and 3);
- spatial- and time-correlation between water level in canal and groundwater level;
- correlation in time of discharge in canal and water level;
- cross-sections of canal and adjacent land;
- reference level;
- current velocities (two points in vertical);
- bottom samples (see also chapter 4).