

## 1 INTRODUCTION

### Background

- 1.1 Various industrial, educational and medical facilities in Hong Kong have, for a number of years, used radioactive materials and generated radioactive waste. Most of the existing waste arisings are stored in disused air raid tunnels close to Queen's Road East in Wan Chai. Other arisings are stored temporarily (although in some cases for several years) at the point of use in educational institutions or hospitals.
- 1.2 The condition of the Queen's Road East tunnels has been found to be unsatisfactory and various parts of the tunnel system suffer from leakage and ingress of water. The condition of some of the waste packages has subsequently deteriorated and they are generally unsatisfactory for the safe long-term containment and storage of radioactive materials.
- 1.3 The existing facilities are unsatisfactory and in addition are located close to a high density of population, which make access to, and management of, the waste more problematic. As well as existing waste, there is also a continuing need to use radioactive materials in Hong Kong and a continuing predictable amount of future waste arisings. Therefore, the Government has decided that storage of low-level radioactive waste in Hong Kong requires a dedicated, purpose-designed facility. After a thorough consultancy study in the "Environmental Impact and Safety Assessment Report, June 1995 (Stage 1 EISA)" and evaluation, the preferred site located on the island of Siu A Chau in the Soko Islands, adjacent to the small bay of Sum Wan on the eastern side of the island was selected.
- 1.4 Environmental Protection Department (EPD) commissioned the construction and operation of the Low-Level Radioactive Waste Storage Facility (LRWF) at Siu A Chau (hereinafter referred as the "Project") under Contract No. EP/SP/40/02 to ATAL-Belgoprocess Consortium (hereinafter called "the Contractor") in July 2003.
- 1.5 An Environmental Permit (EP) (No. EP-131/2002) for the Project was issued on 11 April 2002 to the Special Waste Facilities Group, Environmental Protection Department as Permit Holder. Under the Tender Specification Clause 1.6.3.1, the Contractor is required to obtain a Further Environmental Permit (FEP) before he assumes the responsibility for relevant construction and operation.
- 1.6 As stipulated in the EP Condition 2.5, an Environmental Monitoring and Audit (EM&A) Manual shall be submitted for EPD's approval one month before the commencement of construction of the Project. The EM&A Manual shall include the latest information of the EM&A programme for the ecological and water quality (non-radiological) monitoring during the construction and operation of the LRWF. In addition, the EM&A Manual shall also include a proposal for radiological monitoring as outlined in the Stage 1 EISA.
- 1.7 Cinotech Consultants Limited was commissioned by the Contractor to undertake the EM&A works for the Project. This EM&A Manual was prepared by Cinotech to fulfill the permit requirement for the EM&A programme for non-radiological monitoring (Part

1 of the EM&A Manual). The radiological monitoring programme will be submitted under a separate cover (Part 2 of the EM&A Manual).

### **Purpose of this Manual**

- 1.8 The purpose of this Part 1 of the EM&A Manual (Non-radiological) is to guide the setup of an EM&A programme to ensure compliance with the non-radiological monitoring requirements of the Stage 1 EISA, June 1995, include the latest information for the ecological and water quality monitoring, and to assess the effectiveness of the recommended mitigation measures. The EM&A requirements for radiological monitoring will be submitted separately as a stand-alone manual (Part 2 of the EM&A Manual).
- 1.9 This Manual outlines the monitoring and audit programme to be undertaken for the construction of low-level radioactive waste storage facility at Siu A Chau. It aims to provide systematic procedures for monitoring, auditing and minimising the environmental impacts associated with the construction works and operation.
- 1.10 Hong Kong environmental regulations for noise, air quality, water quality and waste, the Hong Kong Planning Standards and Guidelines, and the recommendations in the Stage 1 EIA have served as environmental standards and guidelines in the preparation of this Manual.
- 1.11 This Manual contains the followings:
- (a) duties of the Contractor, the Employer's Representative (ER), the Independent Environmental Checker (IEC) and the Environmental Team (ET) with respect to the environmental monitoring and audit requirements during construction and operation;
  - (b) information on project organisation and programming of construction activities for the project;
  - (c) requirements with respect to the construction schedule and the necessary environmental monitoring and audit programme to track the varying environmental impacts;
  - (d) definition of Action and Limit (A/L) Levels;
  - (e) establishment of event and action plans;
  - (f) requirements of reviewing pollution sources and working procedures required in the event of non-compliance of the environmental criteria; and
  - (g) requirements of presentation of environmental monitoring and audit data and appropriate reporting procedures.
- 1.12 For the purpose of this Manual, the "Engineer" will refer to the Employer's Representative (ER) as defined in the "Low-Level Radioactive Waste Storage Facility at Siu A Chau, Specification Vol.3". The ET Leader, who will be responsible for and in charge of the ET of the construction and operational phases of the Project, will refer to the person delegated the role of executing the environmental monitoring and audit requirements. IEC will undertake the auditing role.

---

## Description of the Works

- 1.13 The Project comprises the Design, Construction, Operation and skills transfer of a low-level radioactive waste storage facility at Siu A Chau. The general layout of the proposed low-level radioactive waste storage facility at Siu A Chau under current scheme is shown in **Figure 1.1**. The construction works include the following key components:
- Construction of a building of approximately 1000 m<sup>2</sup> with an elevation of about 6.5m required to store circa 260, 275-litre drums if unstacked and moved by overhead travelling crane (o.t.c.) or forklift.
  - Construction of a helicopter landing pad and marine access jetty.
  - Landscaping and security requirements.
- 1.14 The total site area is approximately 0.61 ha. The envisaged storage requirements led to an initial design concept of a simple building with a reinforced concrete or structural steel frame. The composition and finish of the external walls and roof would be determined by the requirements for weatherproofing and other considerations such as visual impact. The building would be raised on a 200mm dais to prevent water ingress and all internal areas would drain to a sump. The building would contain a main storage area with aisles for maneuvering a stacking vehicle, a processing/repackaging/assaying area, and an administration area with washroom facilities.

## Environmental Monitoring and Audit Requirements

- 1.15 The Stage 1 EISA identified the likely environmental impacts during construction and operational phases of the development, including ecology and fisheries, water quality, air quality, noise, transport, historical and cultural heritage, potential visual impact and solid waste. These impacts can be minimized to acceptable levels with the implementation of environmental mitigation measures. In order to ensure compliance with relevant environmental standards, baseline and compliance monitoring for water quality and ecology is required and is described in detail in the subsequent sections. The proposed schedule for the implementation of recommended mitigation measures is shown in **Appendix A**.

## Project Organizations

- 1.16 The proposed EM&A organization is shown in **Figure 1.2** of this Manual. The responsibilities of respective parties for the EM&A programme are listed in later Clauses.
- 1.17 The Environmental Team (ET) will be employed by the Contractor and undertake the EM&A works. The Independent Environmental Checker (IEC) will be engaged by the Contractor to audit the work of the ET. The IEC will not be in any way an associated body of the Contractor or the ET. The ET and the IEC Team Leader will have relevant professional qualifications, or have sufficient relevant EM&A experience subject to approval of the Environmental Protection Department (EPD).

1.18 Appropriate staff will be included in the ET and IEC under the supervision of the ET/IEC Team Leader, to fulfill the EM&A duties specified in this Manual.

1.19 The duties and responsibilities comprise the following:

#### **The Contractor**

- Employ an Environmental Team (ET) to undertake EM&A works, including laboratory analysis and reporting of environmental monitoring and audit;
- Provide assistance to the ET in carrying out environmental monitoring and audit;
- Submit proposals on mitigation measures in case of exceedances of A/L levels in accordance with the Event and Action Plans;
- Implement measures to reduce impact where A/L levels are exceeded; and
- Adhere to the procedures for carrying out complaint investigation in accordance with Sections 7.11 to 7.14 of this Manual.

#### **Employer's Representative (ER)**

- Supervising the Contractor activities and ensure that the requirements in the EM&A Manual are fully complied with;
- Inform the Contractor when action is required to reduce environmental impacts in accordance with the Event and Action Plans; and
- Adhere to the procedures for carrying out complaint investigation in accordance with Sections 7.11 to 7.14 of this Manual.

#### **Environmental Team (ET)**

- Monitor the various environmental parameters as required in this Manual;
- Analyze the environmental monitoring and audit data;
- Review the EM&A programme to confirm the adequacy of mitigation measures implemented and the validity of the EIA predictions and to identify and adverse environmental impacts arising;
- Carry out site inspection to investigate and audit the Contractor's site practice, equipment and work methodologies with respect to pollution control and environmental mitigation, and effect proactive action to pre-empt problems;
- Audit and prepare EM&A reports on the environmental monitoring data and site environmental conditions;
- Report the environmental monitoring and audit results to the IEC, the Contractor, the ER and EPD;
- Recommend suitable mitigation measures to the Contractor in the case of exceedance of A/L levels in accordance with the Event and Action Plans; and
- Adhere to the procedures for carrying out complaint investigation in accordance with Sections 7.11 to 7.14 of this Manual.

---

**Independent Environmental Checker (IEC)**

- Employed by the Contractor to audit the results of the EM&A works carried out by the ET;
- review the EM&A works performed by the ET;
- audit the monitoring activities and results;
- report the audit results to the ER and EPD in parallel;
- reviewing EM&A reports submitted by the ET;
- review proposals on mitigation measures submitted by the Contractor in accordance with the Event and Action Plans and advise the ER; and
- adhere to the procedures for carrying out complaint investigation in accordance with Sections 7.11 to 7.14 of this Manual.

**Construction Programme**

- 1.20 The tentative works programme for the project is presented in **Appendix B**.
- 1.21 The project programme is indicative only and is provided for information of the ET Leader to get an initial idea of the sequence of the works. The ET Leader will make reference to the actual works programme and progress during the construction stages to schedule the EM&A works, and the Contractor will provide the respective information to the ET Leader for formulating the EM&A schedule.