

Environmental Audit at Kuramathi for the Registration of Existing Desalination Plant and Powerhouse

Proposed by

Kuramati Island Resort

Prepared by

For Water Solutions Pvt. Ltd., Maldives



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1 Introduction

The Ministry of Housing and Environment requires that desalination plants and powerhouse in the Maldives be registered. In order to carry out the registration process, environmental clearance is required from EPA. A decision statement regarding the Environmental Impact Assessment of the power and water infrastructure needs to be obtained from EPA. In order to provide such clearance, EPA requires that an environmental audit be done for existing facilities.

Environmental Protection Agency has decided that an Environmental Audit Environmental is required for the registration of desalination plant under the Desalination Regulation of the Maldives and Guidelines for Power System Approval issued by the Maldives Energy Authority.

1.1 Aims and Objectives

The objectives of the report are:

- to assess the environmental performance of the existing powerhouse and desalination plant at Kuramati
- to facilitate the application to register the existing powerhouse and desalination plant according to the requirements of the Environmental Protection Agency and the Maldives Energy Authority.
- To demonstrate the commitment by the proponent to undertaken environmental monitoring.
- To fulfill the obligations of the proponent to undertake an EIA under Clause 5 of the Environmental Protection and Preservation Act of the Maldives and requirements of the Tourism Regulations.

1.2 Environmental Audit Implementation

This audit has been undertaken by a local environmental consulting firm, Water Solutions. Water Solutions have been chosen by the proponent as the environmental consultants for this project. The team members were:

- Ahmed Jameel, Environmental Engineer (EIA Registration No: EIA 07/07)
- Abdul Aleem, MPH, BSc. Environmental Health (EIA Registration No: EIA 09/07)
- Mohamed Riyaz, Assistant Surveyor

1.3 Terms of Reference

The terms of reference for this audit have been attached as an annex. This audit has been prepared based on these terms of reference.

The scope for this environmental audit is to focus the environmental compliance and performance of the existing power system and desalination plant.

2 Project Description

2.1 Location and Study Area

The study is focused on the existing power and desalination plant at Kuramati. The specific areas includes the powerhouse, powerhouse stacks, the desalination plant, surrounding areas of powerhouse and desalination plant house for noise and emission, seawater intake and brine discharge outfall of the desalination plant and fuel tanks and oil handing areas. This report focuses only on the powerhouse and the desalination plant and no other operations of the resort are incorporated within the context of this report.

2.2 Methodology

Existing environment was studied using standard methods used in EIA studies. Field visit was undertaken on 28th December 2010.

2.3 Mapping and Location identification

The island, including shore line including the low tide line, mid tide line and high tide line and vegetation lines were mapped for the assessment. Mapping was undertaken using hand held differential GPS and available satellite photos. The location of data collection sites were marked using handheld GPS.

2.4 Water Quality

Groundwater and marine water quality was assessed using water quality logger, which was calibrated at National Health Laboratory. Water samples were collected, as outlined in the TOR, at about 1m below from the surface Desalinated water quality was tested at the Coco Cola laboratory. BOD and COD of marine water were not tested as its tests were not able to be carried out at the National Health Laboratory.

2.5 Marine Environment surveys

Marine environmental surveys were conducted to collect data and establish marine environmental baseline conditions for impact evaluation.

2.6 Noise

Noise level was measured using a digital sound level meter Q 1362 from Dick Smith Electronics. The noise level was measured using A weighting, 'A' weighting was used as this enables sound level meter to respond in the same manner as the human ear, which increases and decreases amplitude over the frequency spectrum. The sound level meter that was used for the part of the assessment had an accuracy of ± 2 dB.

2.7 Uncertainties in impact prediction

Environmental impact prediction involves a certain degree of uncertainty as the natural and anthropogenic impacts can vary from place to place due to even slight differences in ecological or social conditions in a particular place. There is also limited data and information regarding the particular site under consideration, which makes it difficult to predict impacts.

4.7.4 Audit Summary

Parameter	Compliance		Performance			Observation	recommendation
	Yes	No	Low	Fair	Good		
Impact on ground water	X				X		
RO Plant	X				X		
Storage tank	X				X	Storage tank can store up to 2 days of water for the island	Implement water conservation measures and check the water distribution network to fix any leaks in the system
Chlorination	X				X		
Noise & Emission	X				X		
Water quality	X				X		
Marine water quality	X				X	Marine water quality is not undertaken as part of the monitoring programme	Include marine water quality as part of the regular monitoring programme
Fuel handling and management	X				X	Fuel purification system is installed	
Water demand	X		X			The demand for water is very high on the island	Need to check for leaks in the distribution system and implement water conservation measures
Energy demand	X		X			The demand for energy is very high on the island	Need to implement energy conservation measures as to reduce the demand.

5 Mitigating and management of Negative Impacts

This section identifies measures to mitigate significant negative impacts to acceptable levels. The main issues that were identified during the audit were high demand for water and energy at the island. The RO system and the power system on the island has been recently upgraded and modernized. Hence the RO system and power system are performing to levels that it does not have any significant impact on the environment.

5.1 Reducing the demand for energy

The daily average consumption of electricity per person on the island is around 592 Kwh.

Presently a number of measures have been implemented to reduce the wastage of electricity in the distribution system. Since the island is very large, high voltage transmission system has been implemented to reduce the energy lost and voltage drop.

Implementing other energy conservation measures could also help to bring down the energy demand on the island.

5.2 Reducing the demand for Water

The daily average consumption of water per person on the island is around 581 litres. This is very high consumption rate for water for a tourist facility. This high rate for consumption is suspected to be associated with leaks in the distribution network.

Implementing water conservation measures targeted to staff and guests could help to reduce the demand for water on the island.

6 Environmental management and monitoring plan

This section covers the monitoring needs of the powerhouse and desalination plant facilities at Island.

6.1 Cost of Monitoring

The proponent has committed fully for the monitoring programme outlined in this report.

6.2 Aspects of monitoring

Monitoring will only include groundwater, RO water and marine water quality. Summary monitoring reports will be provided when such is required.

6.3 Methods of monitoring

Environmental monitoring will be undertaken using standard methods described in the Methodology section.

Table 3: Aspects of the environmental monitoring program with cost breakdown

Monitoring Attribute	Indicator	Methodology	Monitoring Frequency	Estimated Cost (US\$)
Marine water quality	pH, temp, DO and Salinity	Onsite or Lab analysis	Quarterly	250 per quarter
Ground water quality	pH, temp, BOD, DO, Salinity, nitrates, phosphates,	Onsite or Lab analysis	Quarterly	250 per quarter
RO water quality	suspended solids, TDS, pH, temp, Salinity, turbidity, Ecoli	Onsite or Lab analysis	Quarterly	250 per quarter
Energy Demand	Daily production of electricity	onsite	quarterly	NA
Water Demand	Daily production of water	onsite	quarterly	NA

6.4 Monitoring responsibility

Monitoring responsibility will be with the client and financial provisions will be made to undertake the monitoring.

6.5 Monitoring Report

Monitoring report will be compiled based on the baseline data collected for monitoring the parameters included in the monitoring program. This report will be submitted to the relevant government agencies for compliance, if requested. The report will include details of the site, data collection and analysis, quality control measures, sampling frequency and monitoring analysis and details of methodologies and protocols followed.

7 References

UNEP (2005) Maldives Post Tsunami Environmental Assessment, United Nations Environment Programme, Geneva

English, S., Wilkinson, C. and Baker, V. (1997). Survey Manual for Tropical Marine Resources (2nd edition), Australian Institute of Marine Science

MWSA (2006), General Guideline for Domestic Wastewater Disposal, Maldives Water & Sanitation Authority

Maniku, H. A. (1990) Changes in the Topography of the Maldives, Forum of Writers on Environment (Maldives), Male'

Jameel (2007) *A Model to Integrate the Management of Hazards and Disasters in the National Sustainable Development Planning of the Maldives*, University of Canterbury, unpublished thesis

8 Declaration of the consultants

This Environment Audit has been prepared according to the EIA Regulations 2007, issued by the Ministry of Environment, Energy and Water. The EIA was carried out by a multidisciplinary consulting team representing Water Solutions Private Ltd.

I certify that the statements in this Environmental Impact Assessment study are true, complete and correct, to our best of our knowledge and ability.

Name: Ahmed Jameel (EIA 07/07)

Signature:

Name: Abdul Aleem (EIA 09/07)

Signature:

9 Annex: Terms of reference