1.0 INTRODUCTION

1.1 Background

ADI Limited was retained by the Crane Mountain Enhancement, Inc. formerly the Fundy Future Environment and Benefits Council (FFEBC), to complete an Independent External Review of the Crane Mountain Landfill. FFEBC is a community-based group from within the Host Community near the landfill. Their role is to act as an advisory council and monitor all aspects of the Crane Mountain Landfill. ADI's role is to act independently of the Fundy Region Solid Waste Commission (FRSWC) and provide FFEBC with an objective review of the design and operation of Crane Mountain Landfill.

1.2 Crane Mountain Landfill

Crane Mountain Landfill is an engineered sanitary landfill serving the City of Saint John and the surrounding communities of Grand Bay - Westfield, Rothesay, Quispamsis, Hampton and St. Martins, as well as the Local Service Districts of Hampton, Rothesay, Kingston, Greenwich, Westfield, Petersville, Clarendon, Musquash, Saint Martins and Simonds. The landfill site includes lined disposal cells complete with leachate collection systems, a Construction and Demolition debris disposal site and a composting facility. The landfill began operation in 1997. It operates under an Approval to Operate issued by the NB Department of Environment and Local Government.

1.3 Scope of Work

The FFEBC monitoring committee defined the scope of work in the request for proposals dated January 28th, 2005. The RFP identified seven project objectives for the landfill review. These provide the overall framework for the project, while the FFEBC specifications provide a detailed list of tasks to be completed in order to address each objective. The following lists the objectives.

Objectives of Review

2.1 *To ensure that the landfill is operating in compliance with its Approval to Operate, issued by the Department of the Environment and Local Government, Province of New Brunswick.*

LIST OF FIGURES

ADI Quality System Checks			
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2.2 *To ensure that the provincial Approval to Operate is sufficiently comprehensive to safeguard the well being of the host community.*

2.3 *To ensure that the landfill is operating in compliance with the provincial and federal Clean Environment, Clean Air, Clean Water and Health Acts and associated regulations, as well as any other laws affecting the operation of the landfill.*

2.4 *To ensure that both surface water and ground water emanating from the landfill are not being contaminated by the landfill and to ensure that systems are in place to prevent their future contamination.*

2.5 *To ensure that landfill gas is not contaminating the surrounding environment and to ensure that systems are in place to prevent future contamination.*

2.6 *To ensure that the domestic wells down gradient of the landfill are not being contaminated by the landfill and to ensure that systems are in place to prevent their future contamination.*

2.7 *To provide the basis for an ongoing monitoring/review program, facilitated by FFEBC.*

Specifications

The FFEBC Monitoring Committee further defined the scope of work in a detailed list of Specifications. These provide a thorough task list for the project. Completing each of these tasks, provides the basis for providing recommendations to FFEBC for possible improvements to the landfill operations and monitoring program. The following lists the various specifications which are sequentially addressed through the report.

Specification 3.1 Review of Approvals to Operate

- *Assessment of the Fundy Region Solid Waste Commission's compliance with Approvals to Operate*
- *Assessment of adequacy of the Approvals to Operate in providing protection for domestic wells and streams in "host community" down gradient of landfill.*

Specification 3.2 Review of Monitoring Wells Surrounding the Landfill

- *Adequacy of location, design, and number of onsite monitoring wells, given the hydrogeological characteristics of the site.*
- *Analytical database of monitoring well data.*
- *Adequacy of background data with respect to scope and variability.*
- *Identification of analytical anomalies with particular attention to leachate indicator parameters.*
- *Adequacy of sampling and testing: quality control, frequency, and scope.*
- *Adequacy of analysis of data from testing.*
- *Adequacy of emergency response plans relative to findings in onsite monitoring wells.*

Specification 3.3 Review of Handling and Control of Leachate

- *Effect of uncapped cells on leachate quantity and quality.*
- *Effect of raising height of cells on integrity of clay and synthetic liners.*
- *Adequacy of material used for cell-capping.*
- *Permeability/breakthrough time of clay liner, under field conditions, relative to recorded heights of leachate in cells (based on studies of three sources of materials tested).*
- *Effect on clay and synthetic liners of using cells as holding ponds.*
- *Pre-treatment of leachate before disposal.*
- *Assessment of interaction between groundwater and surface water.*
- *Surge pond: Integrity of clay liner and synthetic liner, using projected depth of stored leachate.*
- *Identification of chemical composition of leachate.*
- *Adequacy of sampling and analysis of sampling of under-drain layer.*
- *Adequacy of emergency response plans relative to leachate control.*

Specification 3.4 Review of Handling and Control of Onsite Surface Water

- *Effectiveness of sedimentation ponds in treating and containing surface runoff during normal conditions.*
- *Effectiveness of sedimentation ponds in treating and containing surface water during conditions of heavy or extended precipitation.*
- *Effectiveness of monitoring of surface water runoff.*

Specification 3.5 Review of Handling/Disposal of Hazardous Wastes

- *Methods of identification and control of industrial and household hazardous wastes.*

Specification 3.6 Review of Waste Diversion

- *Methods used.*
- *Rate of diversion.*

Specification 3.7 Review of Daily Operations

- *Daily cover.*
- *Quality control of acceptable and unacceptable waste.*
- *Pest and bird control.*

Specification 3.8 General Review of Monitoring/Control of Landfill Gas

- *Effect of uncapped cells on landfill gas production.*
- *Monitoring/control of concentration and migration of methane, carbon dioxide, non-methane organic compounds (NMOCs).*
- *Monitoring/control of lateral migration of landfill gas.*
- *Monitoring/control of airborne particulate and odour.*

This entire specification was deleted from the scope of work. Only a brief commentary will be presented relative to this item.

Specification 3.9 Review of Issues Related to Domestic Wells

- *Location of wells tested.*
- *Number of wells tested.*
- *Frequency of testing.*
- *Parameters tested.*
- *Adequacy of emergency response plans relative to domestic well contamination.*
- *Devise a system whereby results of domestic well tests can be managed.*

Based on the findings related to the review of each Specification, recommendations were developed. FFEBC suggested recommendations related to the following three areas:

Item 4.1 Highlighting of real and/or potential areas of concern, if any.
Item 4.2 Proposals for remedial measures, if required.
Item 4.3 Proposal for regular, ongoing monitoring/review of landfill.

1.4 Project Team and Acknowledgements

This review has been completed by ADI Limited. The personnel who contributed key components to the study included Tom O'Connell, M.Eng., P.Eng., John Sims, M.Sc., P.Eng., P.Geo., Bob Gallagher, M.Sc.Eng., P.Eng., Tim Murphy, M.Eng., P.Eng. and Chad Connors, P.Eng., with review by Roland LeBlanc, P.Eng. and Dave Crandall, M.Eng., P.Eng.

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