

An Overview of the Alton Natural Gas Storage Project

John Hilland, Landis Energy Corporation, Calgary, Canada

Robert Ramsay, SolTech Projects Inc., Calgary, Canada

Abstract

The purpose of this paper is to present an overview of the Alton natural gas storage project located in central Nova Scotia. There are presently no natural gas storage facilities, reservoir or salt cavern facilities, located in the Maritimes, as suitable geological formations have not been identified in the past. This is due to rock formations lacking the required porosity and permeability to store natural gas, and salt formations which are too thin and / or too shallow, or too tectonically deformed. The Schubencadie basin, which covers an area of approximately 300 km² in central Nova Scotia, and hosts the Stewiacke Formation which is a bedded salt deposit, has been known to have potential for cavern facilities due to its relatively flat lying and undisturbed nature. However, with an average Stewiacke Formation thickness of 75 m and the depth to the top of salt generally lying between 300 m and 350 m, previous exploration has not identified salt which is suitable for high pressure natural gas salt cavern storage facilities. Since 2002, Landis Energy Corporation has been exploring for a suitable salt formation for the development of cavern storage facilities, and has identified an area of the Schubencadie basin with a bedded salt deposit which has sufficient thickness and depth for the development of high pressure natural gas storage facilities. A core hole drilled in 2006 intersected the top of the bedded salt at 470 m and the base of the salt at 946 m.

Leach water will be sourced from the Schubencadie estuary which flows into the Bay of Fundy. Brine will be discharged into the estuary. The maximum leach water rate is proposed to be 10,000 m³ per day resulting in a discharge of approximately 9,000 m³ of brine per day for disposal. The saturated brine will be diluted with estuary water to levels which naturally occur in the estuary, prior to discharge. The intake and discharge site on the estuary is 25 km from the ocean (Bay of Fundy) and at this site during an average tidal cycle approximately 3 million m³ of saline water flows upstream during flood tide and 4 million m³ of saline to fresh water flows downstream during ebb tide. A 12 km water pipeline and brine pipeline will connect the estuary to the cavern site.

Initially four cavern wells will be drilled and completed, with a 339 mm (13 3/8 inch) production casing cemented at a depth of 860 m which is at the base of a 17 m thick interbedded anhydrite and limestone layer. The cavern will be 80 m in height and 60 m to 75 m in diameter and will contain 28.2 to 33.8 E6m³ (1.0 bcf to 1.2 bcf) of working gas per cavern. Maximum leach water rates will allow the development of approximately 56.3 E6m³ (2 bcf) of gas storage per year. The initial four caverns will store 113 E6m³ (4 bcf) of pipeline specification natural gas. This project will support other projects such as the import of LNG, local gas distribution networks, pipeline flow balancing and commodity trading.