Program

The 2nd Canadian Symposium on
Aquitard Hydrogeology

TUESDAY JUNE 21ST, 2011
AQUITARDS FOR INDUSTRIAL AND MUNICIPAL WASTES AND AS AQUIFER PROTECTION FORMATIONS
DESMARAIS HALL (DMS 1160)

08:30-09:00	Nell van Walsum, Grant Ferguson and Ian Clark	Welcome on behalf of the Ottawa Geotechnical Group, the CNC/IAH and the University of Ottawa
09:00-10:00	John Cherry	History and Evolution of Aquitard Science
10:00-10:30	*COFFEE BREAK & POSTER SESSION (DMS 4101)*	
10:30-11:00	Jim Hendry	Solute Transport in Near-Surface Clay-Rich Aquitards on the Canadian Prairies
11:00-11:30	Jimmy Jiao	Hydrogeology of Coastal Chinese Aquitards
11:30-12:00	Beth Parker	Forward & Back Diffusion in Clay Aquitards and implications for aquitard integrity and contamination site remediation
12:00-13:00	*LUNCH*	
13:00-13:30	Rick Gerber	Hydrogeology of South-Central Ontario Aquitards
13:30-14:00	Robert Chapuis	Some New Results for the Lachenaie Experimental Test Sites
14:00-14:30	*COFFEE BREAK & POSTER SESSION (DMS 4101)*	
14:30-15:00	Paul Martin	Building Aquitards into 3-D Numerical Groundwater Flow Models
15:00-15:30	Ken Bradbury	Recent Aquitard Studies in Wisconsin
15:30-16:15	Knut Erik Klint	Hydrogeologic Implications about Clayey Till Aquitards from Fracture Mapping and Structural Analysis
16:15-17:00	Chris Neuzil	Do we understand fluid and solute transport in aquitards?
17:00-17:30	John Cherry	Wrap up for Day 1

WEDNESDAY JUNE 22ND, 2011
RADIOACTIVE WASTE STORAGE IN AQUITARD SYSTEMS
DESMARAIS HALL (DMS 1160)

08:30-09:00	John Cherry	What constitutes scientific evidence for public policy decisions on nuclear waste storage sites?
09:00-09:45	Martin Mazurek	European Studies of Argillaeous Aquitards for Radioactive Waste Storage
09:45-10:15	*COFFEE BREAK & POSTER SESSION (DMS 4101)*	
10:15-10:45	Jim Hendry	Solute Transport in Thick Bedrock Aquitards on the Canadian Prairies and the Great Australian Basin: Progress to Date
10:45-11:30	Robert Holt	Hydrogeology of the Upper Dockum Group at the Waste Control Specialists Site, West Texas, US
11:30-12:00	Gunther Funk	Hazardous Waste Landfill in a Diffusion-Controlled Clayey-Aquitard
12:00-13:00	*LUNCH*	
13:00-13:20	Mark Jensen	Introduction to the Ontario Power Generation's Proposed DGR
13:20-14:00	Ken Raven	Geology and Hydrogeology of the Bruce DGR Site
14:00-14:40	Ian Clark	Solute and Isotope Profiles in the DGR Cores: A Record of Paleofluid Origin and Movement
14:40-15:10	*COFFEE BREAK & BEST STUDENT POSTER PRIZES (DMS 4101)*	
15:10-15:50	Tom Al	Diffusion proceses at the Proposed Low- and Intermediate-Level DGR
15:50-16:30	Kent Novakowski	Modeling the environmental isotope profiles from the DGR
16:30-17:30	PANEL DISCUSSION	Panel: Martin Mazurek, Garth van der Kamp, Kent Novakowski, Chris Neuzil, Jim Hendry, Beth Parker, Mark Jensen Moderator: John Cherry **The State of Aquitard Science and Implications for Use of Deep Canadian Aquitards for Radioactive Waste Isolation**

THURSDAY JUNE 23RD, 2011
CONCURRENT WORKSHOPS
SIMARD HALL (SMD 221 & 222)

9:00am – 12:30pm SMD 222	WORKSHOP A: Measurement of the hydraulic properties of aquitards	Chris Neville & Garth van der Kamp
9:00am – 12:30pm SMD 221	WORKSHOP B: Multilevel monitoring in aquitards	John Cherry
1:30pm – 5:00pm SMD 222	WORKSHOP C: Measurement of the hydrogeochemical properties of aquitards	Ian Clark & Len Wassenaar
1:30pm – 5:00pm SMD 221	WORKSHOP D: Characterization of organic contaminants in aquitards	Beth Parker

HYDROGEOLOGY OF SOUTH-CENTRAL ONTARIO AQUITARDS

Richard E. Gerber

Oak Ridges Moraine Hydrogeology Program, Central Lake Ontario Conservation Authority

The Quaternary geologic history of south-central Ontario has seen repeated cycles of glacial advance and interglacial periods characterized by glaciofluvial and glaciolacustrine environments. Geologic units present within the study area are believed to represent deposition within the last ~125,000 years. Aquitards within the study area are generally glacial diamict (till) units up to ~50m thick, with minor occurrences of what are interpreted to be debris flow deposits. More permeable deposits generally occur within the glaciofluvial and glaciolacustrine sequences and these are utilized as aquifers; however, recent investigations have discovered thick deposits (~50m) of clay and silt-clay rhythmites at depth. The surficial geology of the study area is dominated by widespread occurrences of till or till with a thin veneer of glaciolacustrine deposits. As a result, aquitard units control recharge over a large part of the study area.

Aquitards within the study area have historically been utilized as hosts for municipal waste facilities and are also considered to provide protection to underlying aquifers utilized for municipal water supply. The hydraulic properties of these aquitards have been estimated utilizing a range of methods encompassing a range of scales of observation from lab tests on drill core (very localized-scale) to regional groundwater tracer tests and flow modelling. The resultant estimates of hydraulic properties for these aquitards reflects the effects of both depositional history and subsequent post-depositional processes.

This talk will explore the current hydrogeological knowledge relating to aquitards in south-central Ontario. Specifically, the talk will focus on scale issues related to hydraulic parameter estimation and its relevance to overall groundwater flow system understanding and to contaminant transport processes in these southern Ontario aquitard environments. Methodologies that will be discussed include physical testing (e.g. pumping tests), isotopic

tracers and modelling. While each method has inherent limitations, the use of multiple methods helps to reduce uncertainty in parameter estimation. Ultimately this will lead to more understandable and usable predictive information for stakeholders and decision makers. Examples will be provided relating to performance of municipal waste sites and municipal aquifer protection.