Mineral Inventory Studies in Cape Breton Island

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Revision of the data for industrial mineral occurrences in the Mineral Occurrences Database was the focus of the Cape Breton Island component of the Mineral Inventory Project in 2004. Metallic mineral occurrence records for most of Cape Breton Island were completed prior to 2004, but recently released assessment reports are reviewed on a regular basis, and any new mineral occurrence data found in them are compiled and added to the database records.

In the summer and fall of 2004, site visits were made to several mineral occurrences and more detailed resource evaluation studies were undertaken on the Eden clay deposit, and the Ironville and Cape Dauphin carbonate deposits (Fig. 1). The clay deposit study was funded by DNR, Strait Highlands Regional Development Agency, Nova Scotia Department of Economic Development, Enterprise Cape Breton and the Tar Ponds Agency. As part of the Eden Project, a technical partner, Dr. Craig Lake, was invited to join the project team. Dr. Lake is located at the Dalhousie University Engineering Department, where he operates an engineering lab that specializes in testing construction material used in landfill or hazardous waste disposal sites.

New data collected in 2004 will be compiled and added to the Mineral Occurrences Database. In addition, 1:20 000 scale carbonate resource maps will be produced in ArcView® for the Ironville and Cape Dauphin deposits. The updated database and resource maps will be released in 2005. Summaries of two of the resource evaluation studies are provided below.

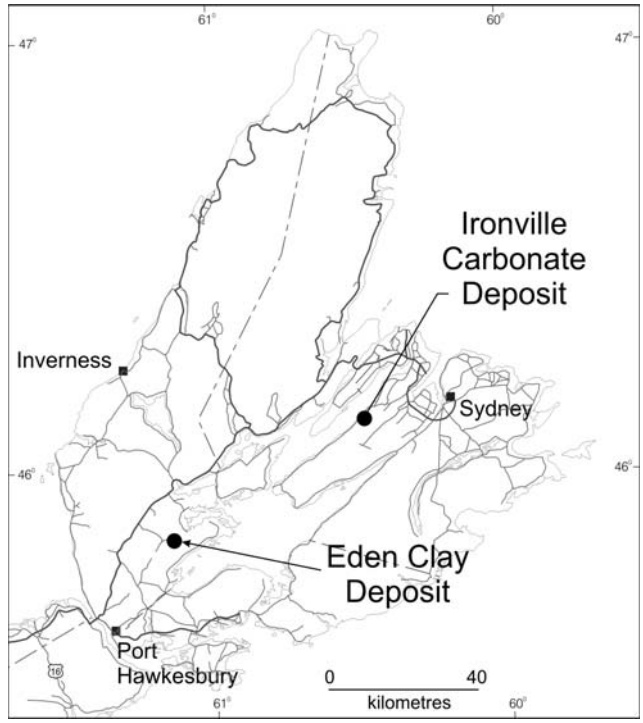

Figure 1. Locations of the Eden clay deposit (NTS 11F/14), Inverness County, and the Ironville carbonate deposit (NTS 11K/01), Cape Breton County.

Ironville Carbonate Deposit

Two areas of Precambrian metasedimentary and metacarbonate rocks are found in the Boisdale Hills. They are separated by a northeast-trending fault and a linear band of Cambrian sedimentary and volcanic rocks. Although the Precambrian rocks found north of the fault are not well mapped, there are enough data to suggest a pronounced change in metamorphic grade across the fault, with amphibolite facies to the south, and greenschist facies to the north.

South of the fault, the Precambrian rocks occur in a narrow, northeast-trending band that roughly parallels the south side of the Boisdale Hills, between Eskasoni and Scotch Lake. Carbonate rocks are common in this block. Large tonnages of dolomite and magnesian-limestone were quarried at Frenchvale and Scotch Lake for use as a fluxing agent in the Sydney Steel Plant. These rocks were historically included as part of the George River Group, but in more recent studies they were redefined as the Bras d'Or Gneiss. Calc-silicate minerals are common in the impure carbonate beds a result of amphibolite facies metamorphism.

Four discontinuous blocks of Precambrian strata found north of the fault are included as part of the George River Group. They are largely unmapped, with the exception of local areas, such as Ironville, where they were the subject of detailed mineral exploration surveys. Metamorphic grade is generally greenschist facies, but higher metamorphic grades are found locally. The extent

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of carbonate rocks within the blocks is not well defined. Assessment reports documenting the work undertaken on the Ironville iron deposits reported the presence of limestone in the workings, but no effort was made to define its extent or grade.

A Nova Scotia Department of Mines report by G. V. Douglas (1944) documents a limestone deposit at Ironville. Douglas focused his studies on the north end of the deposit where a wide section is exposed in the railway cut. The analytical data provided in his report suggest the limestone is too impure for most applications, but samples collected in 2004, in the southern half of the deposit, indicate better quality stone is available at this site. None of the analyses showed the purity required for lime production, but they were certainly within the range required for the manufacture of Portland cement. Further mapping and drilling are required to define tonnage reserve estimates and grades. The proximity of a rail line to this site should make this deposit of interest to anyone looking for carbonate resources to feed a cement plant operation.

Eden Clay Deposit

In 2003-04, the Cape Breton and Central Nova Scotia Railway applied for permission to abandon the Port Hawkesbury to Sydney section of the rail line. The provincial government realized that new cargoes must be identified to save this critical transportation link so DNR staff commenced an assessment of the industrial mineral deposits found along the rail line corridor. Early in this assessment process, the author identified the Sydney Tar Ponds Cleanup Project as a potential market for large volumes of sand and clay.

The River Denys and Eden areas, and in particular the latter, were selected as sites with the potential to host large clay and sand deposits close to the rail line corridor. A brick factory operating at Eden Siding in the early 1900s supplied bricks for construction of some of the numerous buildings found at the Sydney Steel Plant. It is fitting, therefore, that Eden is now being considered as a source area for the clay required for capping the Sydney Tar Ponds and former Steel Plant sites.

The clay quarried at Eden Siding forms part of a large glaciolacustrine deposit mapped by Stea and Feetham (2003). Pit development was restricted to one small corner of the deposit, leaving an extensive area for future exploration and development.

In the summer of 2004, DNR staff undertook a reconnaissance hand auger survey of the Eden area to evaluate its potential as a source area for the sand and clay. Results of this survey were positive so meetings were arranged with the Sydney Tar Ponds Agency, Albert Leblanc of the Nova Scotia Office of Economic Development, and staff of the Nova Scotia Department of Environment and Labour. This led to a more detailed assessment of the deposit by the partner agencies. A grid soil auger survey was completed to locate areas with the best potential to contain a deposit of near-surface clay. This was followed up by a two day excavator trenching survey.

Greater than 5 m of clay were found in the trenches excavated along the edge of the rail line, but clay thicknesses of 2.5 to 3.5 m were more common to the west. The clay is massive, with few drop stones and little indication of bedding. Present day topography is used to define the approximate edges of this former lake basin. The clay was found to occur in topographically low areas, where the ground surface was flat over a large area, and commonly wet. Stony till, marking the position of the lake shoreline, becomes prevalent at surface or beneath a shallow cover of clay around the edges of this flat surface, where topographic elevation changes by +1-2 m.

Clay samples collected in the trenches were sent to Dr. Craig Lake’s lab at Dalhousie University to be tested for their suitability for use as a landfill cap or liner. Test results were very favourable. A report documenting this work is in preparation, and should be available for release in 2005.

References

Douglas, G. V. 1944: Ironville limestone deposit; Nova Scotia Department of Mines, Annual Report on Mines for 1943, p. 129-131.

Stea, R. R. and Feetham, M. 2003: Surficial geology map of the Whycocomagh area (NTS 11F/14) Inverness County, Nova Scotia; Nova Scotia Department of Natural Resources, Mineral Resources Branch, Open File Map ME 2003-1, scale 1:50 000.