Drill Core Library Activities January 1, 2016, to March 31, 2017

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Introduction

The Nova Scotia Department of Natural Resources (DNR) Drill Core Library in Stellarton acquires and archives drill cores, well cuttings and other geological sample materials obtained from exploration, evaluation and development projects throughout Nova Scotia. The main intent is to facilitate further investigation and research of the province's geology and its geological resources, such as industrial and metallic minerals; energy resources, such as oil, gas and coal; and infrastructure commodities, such as aggregate resources.

These sample materials are derived from various exploration and development projects conducted by the private sector, as well as from DNR field work and other government or academic sources. The DNR Core Library also acts as the repository for core and well cuttings obtained from drilling done under the jurisdiction of the Nova Scotia Department of Energy.

The Core Library's large collection of valuable drill core currently totals about 700 000 m from more than 7,500 holes drilled throughout the province. In addition, the archived materials include well-cuttings (predominantly from oil and gas drilling), rock slabs, geochemical samples (silts, till, soils, lake sediments and bio-geochemical materials) and large samples of various industrial mineral commodities, such as limestone, barite and building stone. All core and cuttings (unless held confidential) are available for examination by interested parties and may be sampled subject to certain constraints and conditions. Many drill logs, geophysical logs, reports and maps, both published and unpublished, are also available for consultation.

All visitors are advised to make contact well in advance by phoning (902) 752-4842 or by e-mail Mick.ONeill@novascotia.ca. Clients should note that safety policies require that they bring and wear work boots at the facilities when viewing sample materials. Safety glasses are provided for clients during their use of core splitters and saws. Clients are generally required to do their own layout and pick-up of core boxes, which may involve some heavy lifting. The use of work gloves is recommended.

Facilities and Services

The main Core Library facility is located centrally in Nova Scotia at 105–109 Acheron Court in the Stellarton Industrial Park, Pictou County, which is 2 km off the Trans-Canada Highway (Highway 104) at exit 23.

Six buildings occupy close to 5000 m^2, including 375 m^2 of laboratory space and 120 m^2 of office space. Most of the buildings are more than full, making it difficult to acquire core from new exploration work. Free parking is available at the Core Library.

Most core is stored in standard 1.5-metre-long (5 ft.) wooden boxes or trays with capacities of 4.6 to 7.6 m (15 to 25 ft.) of core, depending on the core diameter. The majority of boxes weigh from 15 to 35 kg per box, although some are as much as 45 kg. Much of the drill core in storage was measured and marked in imperial units when drilled, so the boxes and depth markers are often labelled in feet rather than metres. Boxes of core are stored by strapping them onto custom-made wooden pallets—generally about 20 to 50 boxes per pallet—and the pallets are stacked vertically in rows. The storage areas only have basic lighting and are unheated. Individual pallets are retrieved by forklift from storage as needed and are transferred by DNR staff to the core examination labs, where the core boxes may be laid

O`Neill, M. J. 2017: *in* Geoscience and Mines Branch, Report of Activities 2016-17; Nova Scotia Department of Natural Resources, Report ME 2016-001, p. 65-68.

out for viewing on benches, portable stands, or the floor. A large paved yard may also serve as a core box layout area during good weather. The Core Library is equipped with a binocular microscope, a portable UV light, weighing scales, a specific-gravity balance, core-splitters and diamond saws, which are all available for use by clients. Clients are responsible for carrying out and documenting their own sampling, subject to the approval and guidance of Core Library staff. Analyses and other data generated from sampling must be forwarded by clients to Core Library staff by e-mail within 60 days of sampling.

In the summer of 2016, the Nova Scotia Mineral Incentive Program, using funds left over from the 2015-16 program, funded the purchase of an XRF analyzer by the Nova Scotia Prospectors Association (NSPA). It is a Niton XL3t 950 GOLDD+ Mining XRF analyzer with Soils and Mining modes. It will be capable of analyzing up to 37 elements with the additional purchase of REE Element Suite (Y, La, Ce, Pr, Nd, U and Th) in the Mining Mode.

The XRF analyzer is owned by the NSPA, which will oversee its use and handle all bookings for the unit. The analyzer will be stored at the Nova Scotia Department of Natural Resources office in Halifax or at the Drill Core Library in Stellarton. The analyzer will only be used to test samples from Nova Scotia. The analyzer will not be rented or provided to a third party for a fee. The department will be provided with results and location data for all samples run on the unit.

A small reference library area with tables, chairs and a microfiche reader/scanner/printer is available for clients and staff. The library collection includes a complete set of microfiche for older exploration Assessment Reports, Open File Reports and Maps. The Geoscience and Mines Branch no longer microfilms any reports; all Assessment Reports received and released from confidential status have been electronically scanned and are now available free of charge as downloadable PDFs via NovaScan on the Branch website. Paper copies of many reports, papers and maps published by the Geoscience and Mines Branch are also available for reference, together with a selection of Geological Survey of Canada Papers, Memoirs, Bulletins and Maps. Unpublished information (logs, sections, maps, reports, analyses etc.) is available at the Core Library for some drillholes. A public broadband Internet connection is not available at the Core Library; clients wishing to consult web-based reports and logs during core examination may prefer to download the required files prior to their visit, or staff can assist by downloading files to a client's portable USB storage device.

New Acquisitions and Re-organization of Core Storage

The Core Library received five drill holes between January 1, 2016 and March 31, 2017. Two holes were drilled at Egypt Road in the Dominique area, Yarmouth County, for John Wightman, as part of his 2016 Nova Scotia Mineral Incentive Program grant. These two holes consists of 220 m of core in total. Two holes drilled in 2016 from the Larder River area, New Ross were received. These holes were also drilled for John Wightman and total 204 m. Sixty-four cardboard boxes of Alton 08-01 were received in February 2017. Additionally, rocks, slabs and powders were received from Sandra Barr of Acadia University and Rebecca Jamieson of Dalhousie University on projects they have conducted in Nova Scotia over the last thirty years.

Drill core donated to the Core Library is often in poor condition due to neglect and poor stewardship. Everyone should be aware that the *Mineral Resource Regulations* under the *Mineral Resources Act* state that drill core must be retained in standard core boxes at the drill site or at a core storage facility and that precautions must be taken to secure the drill core against weather and vandalism. The boxes should be identified with weatherproof labels that indicate the drillhole number, core interval represented, and the date and name of the company for which the drill core was obtained.

Client Activity

Clients typically include private sector geologists and prospectors working in the mineral exploration sector or in the oil and gas sector, as well as geologists with the Geological Survey of Canada, DNR (Geoscience and Mines Branch) and the

Table 1. Client Activity at the Core Library in recent years.

Year	Person days: lab activities	Person days: other visitors
2007	193	58
2008	209	61
2009	72	48
2010	225	55
2011	110	36
2012	155	50
2013	141	48
2014	106	30
2015	183	39
1 Jan. 2016–31 Mar. 2017	120	69

Nova Scotia Department of Energy. University students and research staff, consultants, architects and engineers also make use of the facilities.

Client activity for period was 120 person-days for use of core, cuttings or other samples. An additional approximately 69 person-days was for various reasons, including access to information and equipment, including the XRF, which arrived in the Core Library in the summer of 2016 (Table 1). This represents a moderate level of activity within a normal range. These figures do not include off-site activity, where core or cuttings were loaned out. The figures should not be analysed too critically as many factors influence the number of clients and the days spent in the lab.

Core Library Database

The department's Drill Core Database provides basic information on all drill core held at the Core Library facilities, including operational data such as storage location and number of boxes per hole. The Drill Core Database is linked to the Drillhole Database, which provides more detailed information about each hole and includes links and references to logs, maps and reports.

The Drill Core Database can be searched by single or multiple fields, for example by place name, company name, hole number, map sheet or year. The database is updated continually, and at the end of March 2017 it contained records for approximately 7,500 holes having core or cuttings in the Core Library. An on-line version of the Drill Core Database (https://novascotia.ca/natr/meb/geoscience-online/about-database-dcdh.asp), based on Microsoft SQL Server, was released in 2016. There are 6,686 drillholes with core associated with them at the DNR Core Library in Stellarton.

Queries should be directed to the Core Library geologist for all drill core information and core data searches. Even with the new and updated holes recently added to the database, there are still holes in the Core Library's collection of archived core for which data are not yet available in the Drillholes Database or for which a match has not yet been identified.

Drillholes Database

As of March 31st 2017, the department's Drillholes Database contained records for 25,819 surface drill holes. A total of 9,827 new holes have been added to the Drillholes Database in the last seven years.

The lack of co-ordinates in many older Assessment Reports, where drillhole collars were referenced only to a local grid, resulted in inaccurate or missing data in the database. Using the GIS software program ArcMap, maps from these reports were scanned and georeferenced to determine the required co-ordinates for the drillhole collar locations. Over the last seven years 3,250 existing records were updated with better collar locations.

Over the course of about 100 years ending in 1996, the government of Nova Scotia operated a diamond drilling division that drilled 8,048 holes, either as a contactor to the mining and other industries or for its own purposes. While much of these data are already in the Drillholes Database, there is a need to capture information for holes that have not yet been included. To this end, a spreadsheet is being populated with existing data from the Drillholes Database and from *Drilling Logs of Government Core Drills* to use as a tool to identify what data remain to be found or updated. The Core Library

contains survey data for some of the more recent government drilling (1975 to 1996), and these data are being added to the Drillholes Database to give more accurate collar locations for some holes.

Many other drillholes are still not recorded in the database, but they will be added as relevant information is obtained. Information sources include a variety of both published and unpublished reports, maps and files, including old annual reports of the Nova Scotia government and the Geological Survey of Canada, as well as various Open File Reports and even some Assessment Reports that were previously overlooked. Drilling on mine leases is not reported to the department, so old mine records are generally the only source for these data.

Due to a major effort over the last few years, most old exploration Assessment Reports are now available online as downloadable PDFs through NovaScan. This makes georeferencing historical drilling easier as large maps are now available as one image to bring into ArcMap, from which proper UTM co-ordinates can be determined.

An on-line version of the Drillhole Database, based on Microsoft SQL Server, became available online in 2016 at https://novascotia.ca/natr/meb/geoscience-online/about-database-dcdh.asp. This database contains 27,300 drillholes, and there are over 35,000 references associated with these holes. A single drillhole will have one or more references associated with it. This generally consists of a reference when the hole is drilled and subsequent references when further work is done on the hole (e.g. extensions, geophysics, sampling).