

Final Technical Report

Prepared for the
National Geological and Geophysical Data Preservation Program

**Continuation of Metadata Development for Geological Data Collections
at the Tennessee Division of Geology
and Special Needs Award Request for Core Preservation
from July 1, 2010 to June 30, 2011**

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Abstract

For FY2010 the National Geological and Geophysical Data Preservation Program (NGGDPP) awarded the Tennessee Division of Geology (TDG) funds to complete the sample-level metadata for four collections and to help offset the unexpected costs of relocating core stored at a facility in Cookeville, Tennessee. The metadata projects involved reviewing and cataloging the documents in the two Tennessee Valley Authority (TVA) mineral resources collections (P1273 and P1322), and the portion of the Coal Reports collection (P1344) that contains TVA generated coal resources data. This work was successfully completed and a total of 549 TVA non-coal mineral resource records and 265 TVA coal reports records were loaded into the National Digital Catalog (NDC). In addition, TDG created metadata records for 99 core holes and loaded them into the NDC as part of the Rock Core collection (P1234). As a result of this effort customers will find it easier to determine if this geologic information is available and it will benefit the TDG by saving time responding to requests for the documents and information contained in these collections.

Introduction

The Tennessee Valley Authority and Tennessee Division of Geology have had a long and cooperative relationship in geological, geophysical, and geotechnical investigations. As a result, many reports, maps and investigations produced by TVA have been acquired by TDG. In particular, the intensive mineral resource investigations conducted prior to dam site selection and reservoir filling are a significant source of mineral resource data for the state. In the mid-1970's TVA phased out its geophysical and mineral resource programs. The reduction in staff led to a loss of not only institutional knowledge, but many unpublished geological documents once available to the public at TVA. TDG may be the only governmental agency that has retained this valuable store of geological information for not only the state of Tennessee, but the entire TVA region. The NGGDPP FY 2010 project focused on the metadata development for all the documents and maps in TDG's TVA (non-coal and coal) mineral resources collections (P1273, P1322, and P1344).

In addition to funds for metadata development, the NGGDPP funded a Special Needs Award to TDG to assist with the cost of transferring rock core from a storage facility in Cookeville to a warehouse in Nashville, Tennessee. The facility in Cookeville is up for sale and the core either had to be moved or discarded. The rock core stored at the Cookeville facility represent mineral test holes from the Middle Tennessee zinc industry and stratigraphic tests drilled in conjunction with Tennessee's Superconducting Super Collider initiative in the late 1980's. This rock core is a valuable resource that is irreplaceable and preserving as much of it as possible had a high priority.

Work Completed

In 2007, the TVA (non-coal) mineral resources information was submitted to the NGGDPP as two separate collections entitled TVA Mineral Resources File Collection (P1273) and TVA Reports Collection (P1322). Both of these collections represent the same type of information that were essentially acquired from the same source, TVA. They were classified as separate

collections because one collection was located in TDG's Knoxville Field Office and the other was in TDG's Nashville Central Office. At that time we were unable to determine how many of the documents were unique to each collection and therefore decided to identify them by different names.

As a result of this year's effort we determined that each of the TVA (non-coal) mineral resources collections contained both unique and identical documents. However, since the content of all the documents found did represent mineral resources information obtained from TVA, we decided that it would be confusing to keep them separate and decided to combine them into a single TVA Mineral Resources Collection (P1273). This collection contains approximately 549 documents pertaining, in part, to site specific and regional mineral resource evaluations, quadrangle scale mineral resource information maps, and geochemical analysis reports.

The primary goal of the NGGDPP FY 2010 project was to complete the metadata for the TVA (non-coal P1273 and coal P1344) collections and submit them in a format suitable for input into the NDC. This goal was achieved and a total of 814 records were successfully loaded into the NDC; 549 records for the TVA Mineral Resources Collection (P1273) and 265 records for the Coal Reports Collection (P1344). The total number of records is less than the number of "approximately 1000" that we originally estimated for these collections as stated in the proposal. One reason for the reduced amount is that it reflects the number of duplicate documents that exist in these collections. We will use this knowledge to our advantage by storing duplicates in a different and secure location.

In addition to providing the metadata records for the NDC, the following outcomes were realized as a result of this effort:

- (1) all of the material in the TVA (coal and non-coal) collections was reviewed;
- (2) a decision was made for 95% of the material regarding its suitability for inclusion into the National Digital Catalog;
- (3) items were filed in a location known to all TDG staff;
- (4) an Excel database of all the items in the TVA mineral resources collection that contains additional fields for each record to assist TDG staff with the sorting and retrieval of pertinent information when a request is made;
- (5) a GIS-based (ArcMap) project to better visualize the extent and location of the TVA mineral resources data that exists across the state was created that will also help with the sorting and retrieval of pertinent information when a request is made (Figure 1).

We also completed an inventory of our Rock Core Collection (P1234) and determined that out of the 475 core holes initially estimated to be contained in this collection, we can confidently establish the location for only 99 of the core holes. Because of subsequent office moves and retirement of key personnel we have been unable to locate existing documentation that will help us establish the location for the remaining core holes at this time. Therefore only 99 core hole records for this collection have been uploaded into the NDC.

One substantive outcome of the work completed on the Rock Core Collection is that we were able to use the information to locate suitable core for porosity tests. The core porosity tests are one component of a TDG carbon dioxide sequestration project that was funded by the U.S. Geological Survey this past year. We needed to locate three widely spaced core holes in middle Tennessee that penetrated the Ordovician Knox Group and Stones River Group, which is considered to be a viable carbon dioxide storage unit. We collected a total of 100 samples from the three core holes in order to assess the matrix porosity for this potential carbon dioxide storage unit.

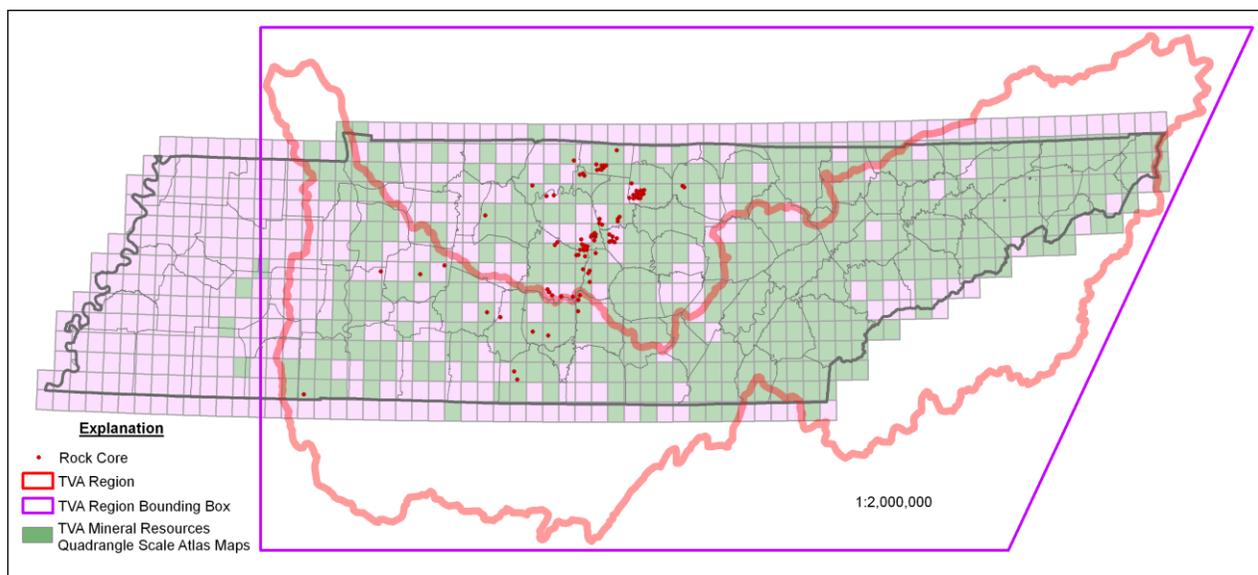


Figure 1. A snapshot of the GIS map project produced from the results of this year's NGGDPP award. The TVA Mineral Resources Collection elements shown include the irregular outline of the TVA region and associated bounding box, and the location of the quadrangles with TVA mineral resources information. The figure also contains the location of the 99 core holes in the Rock Core Collection.

The metadata files for all of the collections completed this year were created in Microsoft Excel and saved in .csv file format using the pipe (|) record delimiter character as a field separator. Although all of the mandatory metadata elements were provided, we had to incorporate the use of a bounding box to define the extent of the information contained in some of the documents. In particular, some of the reports discussed sites across the entire TVA region. The TVA region is an odd shape that extends outside of Tennessee into adjacent states. The only way to accommodate these reports was to draw a bounding box consisting of four points with geographic coordinates around the entire TVA region (Figure 1). ESRI's ArcMap software was used to determine the geographic coordinates (lat/long) for the centroid of all bounding boxes. The centroid coordinates were entered into the metadata Coordinates field and the associated bounding box coordinates were entered into the AlternateGeometry field for the non-point specific items. The .csv files were uploaded onto the NGGDPP website, tested, and submitted for final loading by NGGDPP staff into the NDC this summer.

Work Completed with the Special Needs Award

As a result of the special needs award TDG staff was able to relocate a total of 59 test holes from a soon to be abandoned facility in Cookeville, Tennessee (Figure 2). The rock core was moved to the Ellington Warehouse facility in Nashville (Figure 3). Bids were requested and a contract established to have 53 core holes consisting of 78 pallets shrink wrapped, loaded and transported 82 miles to the new facility. The criteria for determining which core to preserve was based on finding documents that provided the location of the core hole and depth intervals that were cored, as well as the physical condition of the core boxes and pallets. Subsequent to the first move, documentation was found for an additional six core holes consisting of 14 pallets of core boxes left at the Cookeville facility. In this case, TDG staff used a state truck to move the core to the Nashville facility.



Figure 2. Cookeville, Tennessee rock core storage facility.



Figure 3. Ellington Warehouse storage facility in Nashville, Tennessee.

Tennessee Division of Geology Staff Participation

A number of TDG staff were involved in completing the work for this year's NNGDPP projects. Chief Geologist Dr. Peter Lemiszki and Secretary Becky Hawkins in the Knoxville Field Office and Assistant State Geologist Mike Hoyal in the Nashville Central Office completed the review and metadata records for the TVA Mineral Resources Collection. Geologist Barry Miller in the Knoxville Field Office completed the review and metadata records for the TVA Coal Reports Collection. Mike Hoyal and Geologist Albert Horton in the Nashville Central Office completed the review and metadata records for the Rock Core Collection. Mike Hoyal and Geologists Albert Horton, Ron Clendening, and Vince Antonacci in the Nashville Central Office completed the inventory and transfer of the rock core from the Cookeville to the Nashville storage facility.

Publications

Currently there are no plans publish this information in any other form than what is available on the NNGDPP website.