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National Geological and Geophysical Data Preservation Program

Preservation of Geologic Data and Collections in Illinois: Compilation, Documentation and Planning

Final Technical Report

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Abstract

This report summarizes the work performed for the Illinois State Geological Survey FY13 NGGDPP project:

- Data entry was completed and new metadata records were created for 3 collections: Chicago Area Deep Borehole Records, Lake Michigan Lake Bed Core Data, and Water Well Records.

- The Chicago Area Deep Borehole Records project included scans of engineering logs as well as core images from photographic slides and photographic paper prints.

- Lake Michigan Lake Bed Core Data project included scans of core descriptive logs, core images from photographic slides, and other related project documents including maps. Additional lakebed core data covering the nearby Chain-Of-Lakes area in Illinois was discovered during the project and was also processed.

- Existing metadata records for other non-static collections were updated.

- All new or modified metadata records were uploaded to the NGGDPP National Catalog.

We believe the collection metadata generated and uploaded for this project represents an appropriate and successful use of the resources provided under the project contract.

Collections Processed in FY13

The following collections were processed for FY13. Student hourlies were used to perform most tasks, including pre-processing/organization, scanning, and data entry.

Chicago Area Deep Borehole Records

This project consisted of Chicago area deep borehole data in the form of engineering reports, slides/photos of core samples, and physical cores from projects contracted by the Metropolitan Water Reclamation District (MWRD); the majority are related to the Chicago Tunnel and Reservoir Plan (TARP) from the 1970s.

With expanding city infrastructure covering many locations, much of this data would be difficult if not impossible to obtain again. The MWRD/TARP collection represents one of the largest, if not the largest sets of deep borehole data for a U.S. metro area. While much of the MWRD/TARP data exist in engineering reports, it is not easily discoverable by region or location, as it is scattered throughout many separate paper-based engineering reports from the 1970s by different companies of which very limited copies were produced. In addition, we have many uncatalogued core samples for MWRD/TARP projects in temporary storage. These data will be necessary to add the cores to our formal collection in the future.

Each borehole log was scanned to a PDF file, and basic information such as location, total depth and formation, top of bedrock and formation, and completion date were entered into a project database. In most cases the location was specified precisely in state plane coordinates (most likely surveyed), but in some cases, the only available location was marked on a map, in which case the map was scanned and georeferenced to obtain borehole locations.

This project required extensive and careful research and correlation with our existing paper and digital records as approximately 20% of the boreholes already had some information in our records, often because core had been added to our core library. Because many of the boreholes were near or along streets that coincided with section lines, sometimes the section assigned to the core did not match the section as derived from the log's precise state plane footages, making it difficult to identify duplicates as they were in different adjoining sections and/or townships.

Several data entry errors in our existing records were discovered and corrected during the correlation. In addition, we found and corrected several cases where data for an existing borehole near or on a section line was duplicated in our database with locations in two different sections.

After confirming that each borehole was not in our primary wells and borings database, it was assigned a unique ID (API number). For those boreholes for which we had existing information, the information was checked and revised as necessary; for example, in some cases we had a more precise footage location to replace an approximate PLSS quarters location, in other cases specific information such as the borehole identifier was missing or incompletely specified.

In cross-checking locations with project maps, it was found that a few of the original engineering logs with precise state plane location footages had substantially incorrect locations due to typos or transposed digits. In each of these cases the proper location coordinates could be determined with some experimentation and insight. For example, in one case transposing two digits in one of the coordinate values resulted in a location matching the mapped location.

We also scanned core images (color slides and color photographs) corresponding to two specific sub-projects to TIFF files, correlating them to the borehole database.

In total 3,164 new metadata records were created and uploaded to NGGDPP for this project.

Lake Michigan Lake Bed Core and Associated Data

We processed original data from multiple research cruises that covered nearly the entire Lake Michigan in the early 1970s, including log descriptions and color slides of full core samples. Our core library has some reduced core samples as chips from these cruises, but no full cores, making the full core slides a unique resource.

We scanned detailed descriptive logs for each core. The location for each core was specified in degrees, minutes, and seconds. The location was data-entered in the original format, and subsequently programmatically converted to decimal degrees to simplify data entry as well as avoid conversion errors. We also matched each of the reduced core samples we have in storage to the corresponding log. It should be noted that these core samples with Lake Michigan locations were not easily discoverable to most researchers as they were not entered into our core database due to limitations of the database. This project makes the core samples as well as the photographs visible and discoverable.

During the project we discovered additional core log data from the nearby Chain-of-Lakes area in Illinois which we processed and included in the project.

We also scanned related data and documents including particle size analysis, grab sample data, and maps with plotted cruise routes and sample locations.

In total 1,483 metadata records were created and uploaded to NGGDPP.

Historic Well Boring Records (General)

The ISGS is the state repository for well boring records, which arrive in paper format. New paper records have been entered into our database since the 1980’s; these records are discoverable and available to researchers and the public on our website. However, due to lack of resources many older non-oil (mostly water well) boring records have never been entered into the database and thus are not available to researchers or the public unless they come to our records facility and manually search the paper files.

We began this extensive multi-year task last year, and proposed continuing it this year. A miscalculation in our proposal process had resulted in less funding than anticipated for what we wanted to accomplish this year. However we were able to identify another source of funding to continue this task.

We entered basic well data and driller's logs for 5,434 water wells into our Wells and Borings database and uploaded corresponding metadata records to NGGDPP.

Other Issues / Notes

We had access to a sophisticated automatic tray-fed slide scanner, but in practice the automation was extremely unreliable due to frequent jams and misfeeds of slides. For both collections with slides, we ended up having to load, scan, and unload each slide individually by hand, which took considerably more time than originally anticipated.

For all projects, the photographic slides and paper photographs were scanned to color TIFF files.

Updates to Existing Metadata

In addition to the collections previously described, the following collections were updated to include new data and data revisions (static collections were not updated). With these updates, all of our collections with metadata in the National Catalog are current as of August 2014.

- Rock Cores
- Rock Cuttings

Comparison of Proposal Goals with Project Accomplishments

Chicago Area Deep Borehole Records

Goals: Research, find, scan and enter metadata for all deep borehole records from Chicago TARP project engineering reports in our possession. Search, review, and merge with or update any existing records we may already have in other forms.

Results:
Completed as planned. We also correlated the data with any existing cataloged core samples in our core library. In total 3,164 new metadata records were created and uploaded to NGGDPP.

Lake Michigan Lake Bed Core and Associated Data

Goals: Organize, scan, and enter metadata for all Lake Michigan Lake Bed core data records. Scan and correlate slides of a subset of the core samples. Correlate with existing core samples in our core library. Scan additional data records and cruise maps.

Results:
Completed as planned. Also discovered and included data from nearby Chain-of-Lakes area in Illinois. In total 1,483 metadata records were created and uploaded to NGGDPP.

Historic Well Boring Records

Goals: Systematically search for and enter missing paper log data into the Wells and Borings database. This involves going through our paper indexes, looking up paper records for wells that do not have database information and entering the information. This is an extensive multi-year task which we are prioritizing by counties where we see the most near-term benefit.

Results: Completed entering a subset of data as planned, with some additional assistance. We entered basic well data and driller's logs for 5,434 water wells into our Wells and Borings database and uploaded corresponding metadata records to NGGDPP.

Summary of FY13 metadata record goals versus actual:

Metadata Records		
Collection Name	**Estimated**	**Created and Uploaded**
Chicago Area Deep Borehole Records	~ 2,000	3,164
Lake Michigan Lake Bed Core / Data	~ 500-1,500	1,483
Historic Well Boring Records	~5,000-10,000	5,434

Conclusion

We believe the collection metadata generated and uploaded for this project represents an appropriate and successful use of the resources provided under the project contract.