Revealing Data...

Examples and insights from ISGS NGGDPP data preservation projects

Ronald Klass
Scientific Database Coordinator
Revealing Data

- Overview of NGGDPP projects
- What can projects and project data reveal?
- An occasional tangential topic of interest
ISGS NGGDPP projects

- We’ve accumulated a lot of data since 1905
- ISGS NGGDPP project areas -- since 2008
  - Boring and Well records
  - Field Notes
  - Hand Samples and Fossils
  - Photographic Images – prints, negatives, slides
  - Geophysical logs
  - Groundwater Potential surveys
  - Clay Mineralogy
  - Fluorspar and Lead-Zinc districts historical data
  - Lake Michigan core data
Typical projects involve

- Data Entry – usually/always
- Scanning/digitizing – often
- Geolocation - often
Data Entry

- Usually develop custom database for data entry
  - Layout on the screen and tab order optimize data entry and minimize error
  - Use dropdown picklists wherever possible to standardize the range of input
  - Where possible, validate data as entered
  - Encourage and implement design improvement suggestions from data entry staff
  - Include queries to perform checks across the entire dataset

- Typically use Microsoft Access
- Quick, easy, and flexible
Data Entry

- Yes, be careful entering data, but also:

- Be especially careful when entering location
  - Wrong location often translates into lost data

- Enter text exactly as originally written
  - including abbreviations, which may not be what you think they are

- Include “Issues” field in data entry form
Data Entry

- Handwritten text:
  - can be unclear and/or difficult to read
  - ...and open to subjective interpretation

- Original scans can be useful for possible later (re-)interpretation

“Blair Oil Well No. 1 7 ab. 1920”?
OR
“Blair Oil Well No. 1 Feb. 1920”?
Data Entry

Blair Oil Well #1  July 1922  Edgar Jones  E.H. Bercozet

Use all clues when deciphering handwritten text
Data Entry...would you believe...this is July?

(Yes, month likely unimportant here, but that’s not the point)
Scanning

- Majority of projects utilize scanning
- Rarely, opt not to scan to minimize project size/scope
- Example: Groundwater Potential Reports
- Geospatial index to paper data (~27K locations, ~20K reports)
Geo-Location, location, location…

- At the risk of being repetitive: location is critical
- Wrong location: corresponding data effectively invisible
- more later…
Carozzi Hand Sample Collection
Revealing Data

- What else can we learn from the “now-digital” data?
Revealing Data... Revealing Errors...

- Sure, we might make a few data entry errors, but...
- Geologists also make errors in the original data
- Correcting original errors can be time consuming
- But correcting erroneous data... especially location...
- ... improves discoverability
Revealing Errors...

- Invalid PLSS location is common
  - (often discovered when rejected by coordinate generation software)
- PLSS location long string of many parts
- All must be precisely entered (or accurately transcribed)
- Typical error example: 1E instead of 1W
Revealing Errors...

- Chicago Tunnel and Reservoir Plan
  - Surveyed location on log plotted in Lake Michigan
  - With some sleuthing, discovered two digits transposed

- BTW: we have all these deep cores

- ...but no proper place to store them
Revealing Errors...

- Chicago Tunnel and Reservoir Plan
  - Surveyed location on log plotted in Lake Michigan
  - With some sleuthing, discovered two digits transposed
- BTW: we have all these deep cores
- …but no proper place to store them
Revealing Errors...

Fortunately some issues pop out on simple review...

How would you enter #60?

...how about: “Two venomed prints”
Revealing Connections

- Disparate datasets can be linked in various ways:
- Location – match locations
- Keywords – through metadata and possibly OCR’d text
- Codes – unknown reference located

Examples:
Connections between Field Notes and Historic Photographs
1916
Near Rushville. Near center section 23, 2N-1W.
Outcrop No. 5 coal.
Has black slate roof with concretion, 3'-4' thick
with limestone cap rock.
Coal is one place cut by a seam of calcite and
sulphur like horseback, certainly never forced
into coal....black slate cut by numerous clay
seams.

Get following, roll in creek, took two pictures,
8-3 sec., 16-3 sec.
Revealing Connections...by text keyword search

July 6, 1929

Original Peorian locality. Photo K2-f45-16sec. looking south from railway grade. Men are standing at tops of (1) Peorian loess, (2) Sangamon loess, (3) illinoian gumbotil. Banding or oxidized zones of Sangamon stand out very well. (cloudy)

Closeup of top of Peorian loess marked with hammer K2-f45-30sec.

Closeup of oxidized and carbonaceous top of Sangamon loess same as above.

Closeup at east end of cut to left of general view.
Revealing Connections... by text keyword search

July 6, 1929

Original Peorian locality. Photo K2-f45-16sec. looking south from railway grade. Men are standing at tops of (1) Peorian loess, (2) Sangamon loess, (3) illinoian gumbotil. Banding or oxidized zones of Sangamon stand out very well. (cloudy)

Closeup of top of Peorian loess marked with hammer K2-f45-30sec.

Closeup of oxidized and carbonaceous top of Sangamon loess same as above.

Closeup at east end of cut to left of general view.
In this case, an “old number” is referenced in the original image index.

- Referenced only in original field notes – wasn’t transferred to typed field notes.

- BTW-”Repr.”, “Rip”, “Rep”...
Kampsville from East bank of Illinois River, Delta at center left
Google Street View of Kampsville across Illinois River
Revealing Connections... another tangent...

Gravel pit in 1919...  
...does Kame still exist?

1919
(1131.3001)
Sec. 31-39N-7E, SW/4, SE/4, SW/4

224 Kame-hill, conical in shape, one of most perfect ones I have seen, 35' high, 100 yards through base. Gravel exposed on slope in pit and on top where excavated for tank? (Photo)
Current imagery enhanced with LiDAR elevations
Revealing Data — another look:

- What else can the digital data help tell us?
- Patterns and trends
Electrical Earth Resistivity Surveys

Typically used to help locate potential water sources

Revealing Patterns

Electrical Earth Resistivity Surveys

Typically used to help locate potential water sources
Electrical Earth Resistivity Surveys

Typically used to help locate potential water sources

With:
Major Sand and Gravel Aquifers

Revealing Patterns
Revealing Patterns
Typed Field Notes
Number of points (notes) per section
Revealing Patterns

Lead-Zinc Borings By Year
Revealing Patterns

Typed Field Notes Pages By Year
Revealing Data — a last look:

- Field notes and other documents often contain non-geological information:
  - Historical
  - Industrial
  - Environmental
  - Archaeological
  - Infrastructure
  - ...and/or just plain interesting facts and observations...
"I never smelled mash stronger than it was here. The St. Louis bootleggers must draw part of their supply from here."
June 27, 1927

Examination of reported deposits of native mercury in Lake County.

"...in the basement, beads of mercury occur on the floor...and between bricks of wall..." [...several other reports]
“...the occurrences of native mercury...are in connection with man-made fills...”

“The source of mercury in the man-made fill is conjecture. No one seems to know just where the materials came from or what could be the source of the mercury in them.”
…two skeletons found…

…human bones found near…

The human bones found near Sears where within 4' of the top of the loess bluff of the clay pit of the Blackhawk Mfg. Co. The loess at the top of the cliff at this place was pried off with crowbars and in the debris that fell to the base of the cliff was the human bones. They were not more than 4' below the surface. No human bones have been found in this vicinity that were not within 3-5' of the top of the ground. Horns of an elk were found in the loess about 50' below the surface. These horns were undoubtedly old but there is no possibility that the human bones are of the age of the loess, or anything earlier than the Indians. This is the west end of Blackhawks Watch toward ridges and it is probable that many Indians were buried on this hill.

…it is probable that many Indians were buried on this hill…
Before using waterbound macadam - Lehigh Stone Co.
After using waterbound macadam - Lehigh Stone Co.
"Note:
...drill hole...could not be logged because the cuttings were all destroyed by pigs."

Drillers are just as good as geologists at making excuses.
The End...
“For those of you who don’t know Mr. Ingham—he’s our institutional memory.”
Ist das nicht ein Schützelbank?
Ja, das ist ein

Lichtputzer
Kreuz und quer
Alte scheuche
Grosses Glas
Hauten netzl
Dichte frau
Gagner Mann
Hirnverbrannt

Hin und her
Schersgemehr
Damenhauche
Crennas
Schnickofritz
Fette sau
Tannenbush
Strumpfbrand
“Typical dwelling”, Pope Co., 1916
The Rose Clare Lead Mines
ROSE CLARE,
HARDIN COUNTY, ILLINOIS.

Situation.—The Rose Clare Lead Mines are situated on the Ohio River, in Southern Illinois, thirty-eight miles below Shawneetown and ninety-five miles above Cairo.

The first, and at present the deepest, shaft (two hundred and ten feet in depth) of the Rose Clare Company is one half mile from the north bank of the river and about twenty rods west of Main Street, in Rose Clare.

The River.—The river at this point is always in a navigable stage, there being, within the crescent formed by the river, never less than twenty-five feet of water. The landing is always good, being against an abrupt rock-shore for about a mile along the river, with a flat rock-surface of several thousand square yards, and a high, permanent bank skirting the front of the town.

The Rose Clare Mines have become famous, and, although they have only been worked less than two years, have been developed sufficient to show them to be one of the richest mines in the world, all of which can be shown to those that wish to take stock in the company.

LOUISVILLE, KY., March, 1872.
Now that we have BOTH field notes and historic photographs geolocated...

...we can view their locations together.
FIELD NOTES

Illinois State Geological Survey

(0725.69) Section in Davis Creek 1 unit 72 foot
See photos and preceding notes.

(0725.69) Till bluff 45'-50' high. Gravel at base and top. Dark buff surface clayey till, darker below that weathers into a friable light clay with rectangular "fractures." Large blocks of cemented gravel in bluff. Some "C" show flat and many form a ledge, but more was found in place. Across the flat, here 20'- 30 rodes wide, the west wall is of limestone in place. Limestone in place in creek just above. Rocks dip south.

By G.F. Ebbes

Quadrangle: Kankakee

County: Kankakee

Date: 1925

(0725.69) Davis Creek-
then a coarse sand layer 2'-6', then coarse gravel
with clay. These layers make a pronounced "cyncline" in the slope of which they are thickest, but the blue
layer is beneath the water. On the south side of the
cyncline the blue layer goes up nearly vertical. It
contains a streak of brown gravel. On the west
southeast there is an iron stain 1"-2" on sand
which abuts gravel. The layer disappears above, and in
the silt and sand layers are cut by the gravel-clay topping. South of this is a dense clay
(till) in creek, with coarse rubble for 2'-4', then
sand to fine sand, then coarse clayey sand with
numerous pebbles and cobbles, then the gravel clay
top. Blue clay is dense, very dark, and overlying
silt is also dense and dark tuff weathered in
stream vally, a flat on rock or gravel. Limestone
forms a cliff. Just south a few rods this limestone
banks of coarse glacial gravel.

By G.F. Ebbes

Quadrangle: Kankakee

County: Kankakee

Date: 1925

(0725.69) Davis Creek -
then a coarse sand layer 2'-6', then coarse gravel
with clay. These layers make a pronounced "cyncline" in the slope of which they are thickest, but the blue
layer is beneath the water. On the south side of the
cyncline the blue layer goes up nearly vertical. It
contains a streak of brown gravel. On the west
southeast there is an iron stain 1"-2" on sand
which abuts gravel. The layer disappears above, and in
the silt and sand layers are cut by the gravel-clay topping. South of this is a dense clay
(till) in creek, with coarse rubble for 2'-4', then
sand to fine sand, then coarse clayey sand with
numerous pebbles and cobbles, then the gravel clay
top. Blue clay is dense, very dark, and overlying
silt is also dense and dark tuff weathered in
stream vally, a flat on rock or gravel. Limestone
forms a cliff. Just south a few rods this limestone
banks of coarse glacial gravel.

By G.F. Ebbes

Quadrangle: Kankakee

County: Kankakee

Date: 1925

(0725.69) Davis Creek -
then a coarse sand layer 2'-6', then coarse gravel
with clay. These layers make a pronounced "cyncline" in the slope of which they are thickest, but the blue
layer is beneath the water. On the south side of the
cyncline the blue layer goes up nearly vertical. It
contains a streak of brown gravel. On the west
southeast there is an iron stain 1"-2" on sand
which abuts gravel. The layer disappears above, and in
the silt and sand layers are cut by the gravel-clay topping. South of this is a dense clay
(till) in creek, with coarse rubble for 2'-4', then
sand to fine sand, then coarse clayey sand with
numerous pebbles and cobbles, then the gravel clay
top. Blue clay is dense, very dark, and overlying
silt is also dense and dark tuff weathered in
stream vally, a flat on rock or gravel. Limestone
forms a cliff. Just south a few rods this limestone
banks of coarse glacial gravel.

By G.F. Ebbes

Quadrangle: Kankakee

County: Kankakee

Date: 1925
Revealing Connections...by location

[Image of a section along the west side of Davie Creek, showing gravel over sand over silt, with blue till at base, barely visible in photograph. Shows synclinal structure, a feature of these deposits that is difficult to explain. To the north (right) the deposits are very much folded into open synclines and anticlines, that are covered unconformably by the gravel at the top.

Kankakee Quadrangle 0723.69.
Ekhlaw
July 7, 1923]
Revealing Connections...by location
Revealing Patterns

Typed Field Notes

Sections with notes