

DIGITAL MAPPING TECHNIQUES 2013

The following was presented at DMT'13 (June 2-5, 2013 - Colorado Geological Survey and Colorado School of Mines Golden, CO)

Mines Park

The contents of this document are provisional

See Presentations and Proceedings from the DMT Meetings (1997-2013)

http://ngmdb.usgs.gov/info/dmt/

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Conversion Tools for Idaho Geologic Map Data:

AutoCAD to NCGMP09 Geodatabase

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Bill Richards—Digital Mapping Consultant/ North Idaho College Geology Professor



Don't Know About You, But I Never Want to Work on Another Data Model Schema, Ever, **EVER** Again



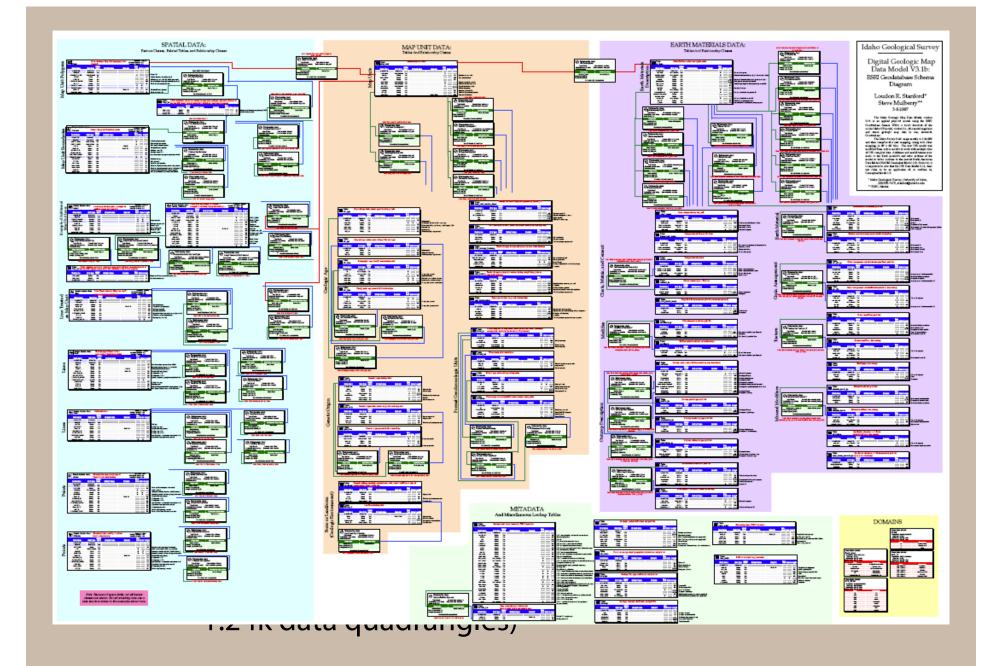
Once a CAD, Not Always a CAD



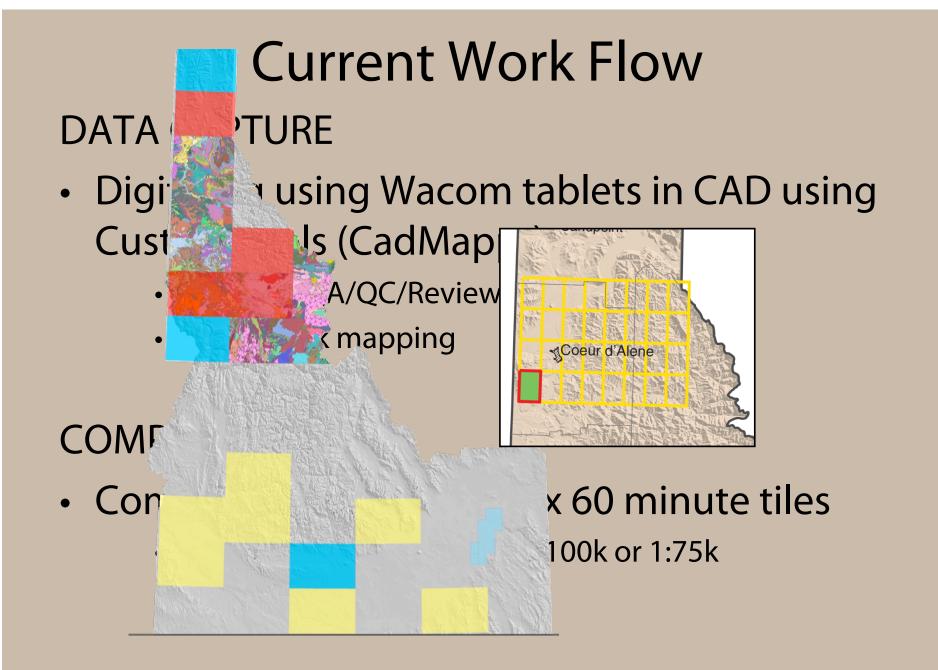
Why Am I Here?

- Idaho GS at a crossroads
- We have "ISSUES"
- NCGMP09 is an answer.....l guess.
- Straw Man





GEOLOGICAL SURVEY DMT 2013



GEOLOGICAL SURVEY DMT 2013

Current Work Flow (cont.)

GIS MANAGEMENT — DELIVERY—TOOLS

- Export to Coverages/shape (set of scripts/ tools)
- Tools to "merge" 30 x 60 tile into Statewide Geodatabase (Idaho Data Model Schema)



Current Problems

- BOTTLE NECKS in production :
 - 24k quads and 30' X 60' tiles get done but merging into Statewide GDB lags.
- OBSOLETE TOOLS/SCRIPTS, still work in 9.3
- Could convert easily---Except for ACAD extended entity data (Xdata).

WHAT TO DO NOW??

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New Strategy and Work Flow

- Digitizing using Wacom tablets in CAD using Custom tools
- Create new tools to convert directly:
 - IGS CAD data → Geodatabase /NCGMP09 –with additions
 - With the idea: New data could be merged into State Wide GDB later.

Begin converting



Why NCGMP09?

Because it's there.... AND.. It's simple and expandable



Three? Strategies

- TRANSLATE
 - OTHER GIS to GDB
 - SHAPE to GDB
 - ETC. to GDB
- (DATA STORAGE/Management)
- WORK NATIVELY in a NCGMP09 GDB

$CAD \rightarrow GDB$ Design:

DRAFT -- To be published in DNT-09 Proceedings NCGMP09—draft standard format for digital publication of geologic maps, ee http://ngmdb.usgs.gov/into/amt/)

By the USGS National Cooperative Geologic Mapping Program (NCGMP) Prepared on behalf of the NCGMP by members of the National Geologic Map Database project and the Pasific Northwast Geologic Manning armiset. Contributors (in alphabetical order): Rainh A. Prepared on behalf of the NCGMP by members of the National Geologic Map Database project is the Pacific Northwest Geologic Mapping project. Contributors (in alphabetical order): Ralph A. Haugerud, Stephen M. Richard, David R. Soller, and Evan F. Thoms email: Inserturble: Research Strategies (in the second strategies) and the second strategies (in the second strategies). version 1.1

NOTE: For the most current version of this document, and for further information including example database and tools, see http://nemubasses.gov/Info/standards/NCGMP09/. NOTE: For the most current version of this document; and jor jurner upe database and tools, see http://ngmith.usgs.gov/Info/standards/NCGMP092 965 974-6448

This document proposes a standard format for geologic map publications funded by the rol. Concentive Geologic Manoiny Program (NCGMP) of the U.S. Geological Survey. 7 This document proposes a standard format for geologic map publications funded by the National Cooperative Geologic Mapping Program (NCGMP) of the U.S. Geological Survey, this and the set of the standard format for geologic map publications funded by the format or database design, is named NCGMP09 to reflect the initial autientum design will adapt to evolving needs and expressions, and meet the needs of a larger computing users. NCGMP09 was introduced at the Digital Mapping Technique, version 0.8.2, in order to solicit preliminary comments and testing. Version 1.0 was released October USCR & CGMP09 was introduced at the Digital Mapping Techniques '09 meeting (May, 2009), as version 0.8.2. in order to solicit preliminary comments and testing. Version 1.0 was released October 4, 2009, for presentation at the Geological Society of America's Annual Meeting. The following, more extensive evaluations were received, and in response the design evolved. The 14, 2009, for presentation at the Geological Society of America's Annual Meeting, in the month following, more extensive evaluations were received, and in response the design evolved. The Josenment is done Proceedings reflects the current manifestation of NCGMP09 (version 1.1). Fit following, more extensive evaluations were received, and in response the design evolved. The document in these *Proceedings* reflects the current manifestation of NCGMP09 (version 1.1). For these readers interested in comparing earlier versions, these are archived at document in these Proceedings reflects the earrent manifestation of NCGMP09 (version 1.1). For those readers interesting the earlier versions, these are archived at an extended group of colleagues will continue to revise the design based on comments received, and intend to release a revised version under a new name in 2011.

a new name in 2011. NCGMP09 is a database design for encoding content analogous to that contained in a tradiabase solution of the state solution of the USGS and by state geological surveys. It stipulates an ESR database imaging in order to adhere to USGS policy' and hecause this is the SIS merginon to non-proprietary USGS, in the state geological surveys, and in the larger community. Margines is designed with this in image and the GNL-based GeoSciML- is a worthy goal, and the database is designed with this imaged. This design is intended to provide a stepping stone toward development of multi-map ses, in particular the National Geologic Map Database (NGMDB). The NGMDB roject assists portunation of database design work between the USGS and state geological surveys, and is solided in Section 6.1.3 (USGS-only link at Index index/patics 6 atom), supplemented May 24, 1999, by details shown at index/patics 6 atom), supplemented May 24, 1999, by details shown at index i

applicable).

Three power tools to promote conversion:

– NCGMP09 Bible

IT 2013

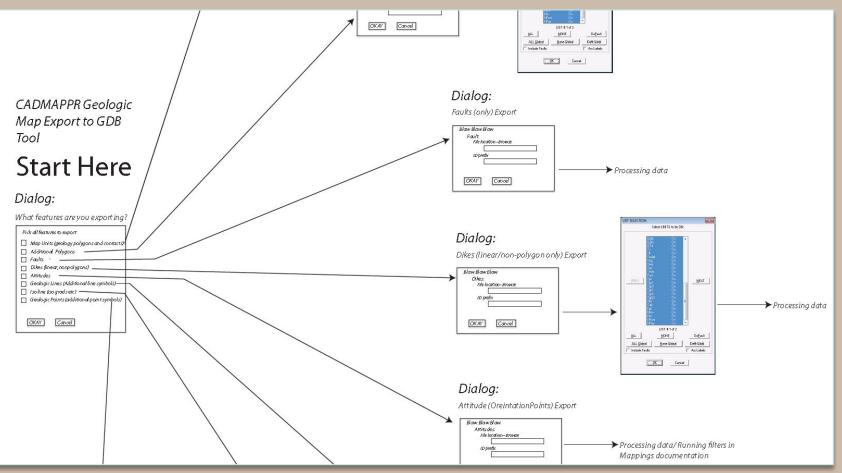
$CAD \rightarrow GDB$ Design:

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T CAD_item	• Action •			notes -
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112 RefID1		DataTileID	Text, 25	
113 RefID3		DataSourceID2	Text, 20	
114 Ftype		FaultType	Text, 70	
115 Fside	concat "Ftype"+"_"+ "Fside". IF Fside is missing, AND "Ftype" is not null in Cadmappr Assoc list (i.e., fault but movement not	FaultMovement	Text, 70	
116 Ftype (processed)	Default is "y". For all Cadmappr derived items.	FaultMoveCapture	Y/N	This is here to accomidate data digitized in Arc
117 RefID5		FaultCode	Text, 25	This is a place holder for Active Fault database.

– Database mappings

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$CAD \rightarrow GDB$ Design:



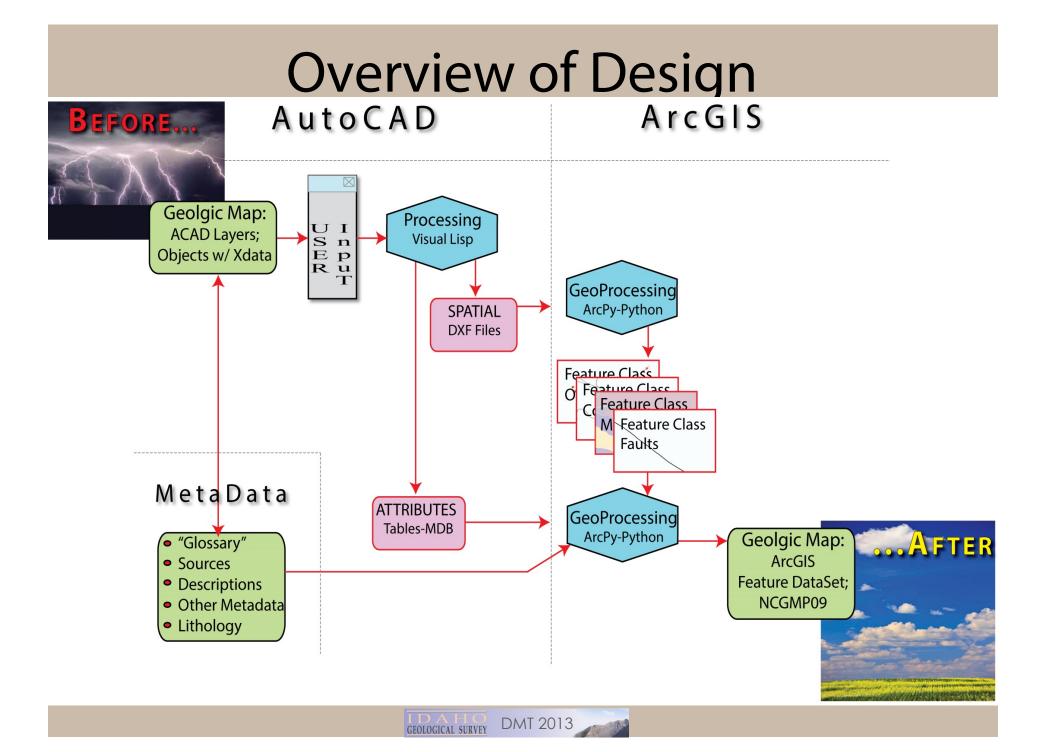
Application flow chart

CEOLOGICAL SURVEY DMT 2013

[IGS] AutoCAD Data: Things to Know

DMT 2013

- One file with:
 - Layers
 - Objects (Entities)
 - Extended Entity data (Xdata)
- Attributes:
 - Line type
 - Fault type
 - Fault Movement
 - Source(s)
 - Feature labels
 - More...



$CAD \rightarrow GDB: CAD Processing$

- Visual Lisp processing on the AutoCad-based map
- Attribute information written to tables in an Access-based database
- Geometry in ascii DXF file format



CAD→ GDB: CAD Processing (cont.)

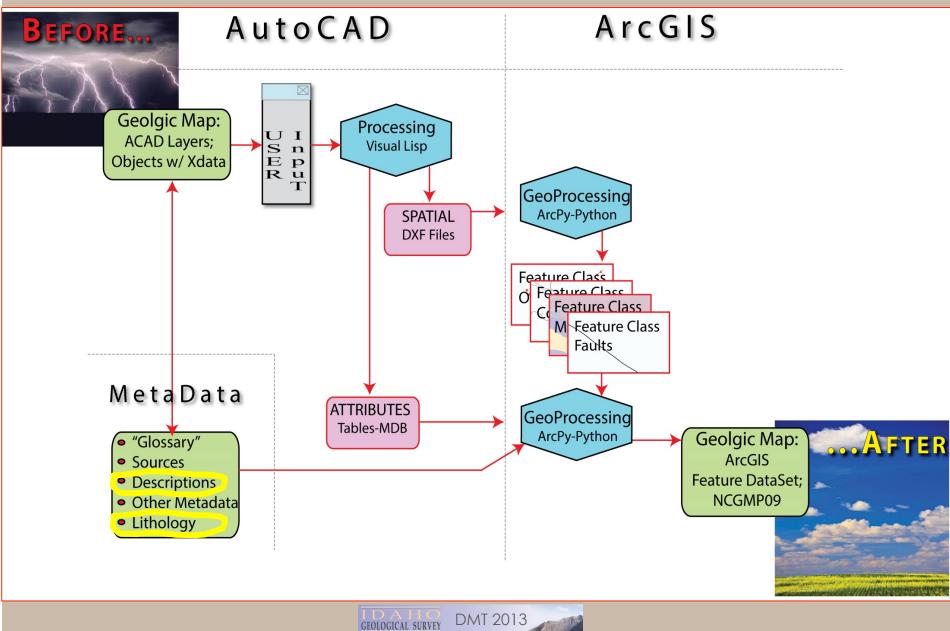
- Process:
 - Geologic map unit boundaries
 - Contacts
 - Map unit polys
 - Faults
 - Dikes
 - Overlay polygon layers
 - Orientation points (Attitudes)
 - Point symbols
 - Cartographic lines
 - Isograd lines
 - Geologic lines



$CAD \rightarrow GDB: CAD Input$

Map Unit Polys "Overlay" Polys "SYM_"Layers for "SYM_"Layers for GP SYM_" for Geologic Lines Sym_" Catallines an SYM_STRIKEA SYM_TECTONC_SPECCIA SYM_FOLDER SYM_FAULTOIR SYM_MEALUEYA SYM_FEALUEP SYM_BOULDER SYM_FOLDER SYM_FAULTOIR SYM_MEALUEYA SYM_FEALUEP SYM_FOLDER SYM_FAULTOIR SYM_FAULTOIR SYM_MEALUEYA SYM_FOLDER SYM_FAULTOIR SYM_FAULTOIR SYM_FAULTOIR SYM_GRAVEL_PIT SYM_FAULTOIR SYM_FAULTOIR SYM_FAULTOIR SYM_FAULTOIR SYM_GRAVEL_PIT SYM_FAULTOIR SYM_FAULTOIR SYM_FAULTOIR SYM_FAULTOIR SYM_GRAVEL_PIT SYM_STRIKEA SYM_FAULTOIR SYM_FAULTOIR SYM_FAULTOIR SYM_GRAVEL_PIT SYM_GRAVEL <	Map Unit Polys "Diversey" Polys "SYM_"Layers for "SYM_"Layers for GP SYM_" for Geologic Lines Sym_"Catolines am Sym_FEATURE, PLUNGEL Sym_FEATURE, PLUNGEL SYM_ENDUEL PEEDDA SYM_ENDUEL PEEDDA af Sym_FEATURE, PLUNGEL SYM_ENDUEL PEEDDA SYM_ENDUEL PEEDDA SYM_FAULTDIR af Sym_FEATURE, PLUNGEL SYM_ENDUEL PEEDDA SYM_ENDUEL PEEDDA SYM_FAULTDIR sym_FEATURE, PLUNGEL SYM_ENDUEL PEEDDA SYM_ENDUEL PEEDDA SYM_FAULTDIR SYM_FAULTDIR sym_FEATURE, PLUNGEL SYM_ENDUEL PEEDDA SYM_ENDUEL PEEDDA SYM_FAULTDIR SYM_FAULTDIR sym_FEATURE, PLUNGEL SYM_FEATURE, PLUNGEL SYM_ENDUEL PEEDDA SYM_STRICA SYM_ENDUEL PEEDDA sym_FEATURE, PLUNGEL SYM_ENDUEL PEEDDA SYM_STRICA SYM_STRICA SYM_STRICA sym_Strict AutoCAD Text Window - Dolworkspace(CAD/GOD_LestingG\NorthFork_geology_3.dwg SYM_FAULTDIR SYM_FAULTDIR sym_Strict Conmaand: _appload dxf4gis.lsp successfully loaded. Sym_Fault PietDach Sym_Fault PietDach up Conmaand: dxf4gis Sym_Fault PietDach Sym_Fault PietDach Sym_Fault PietDach Sym_Fault PietDach </th <th></th> <th></th> <th></th> <th></th> <th></th>					
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Overview of Design



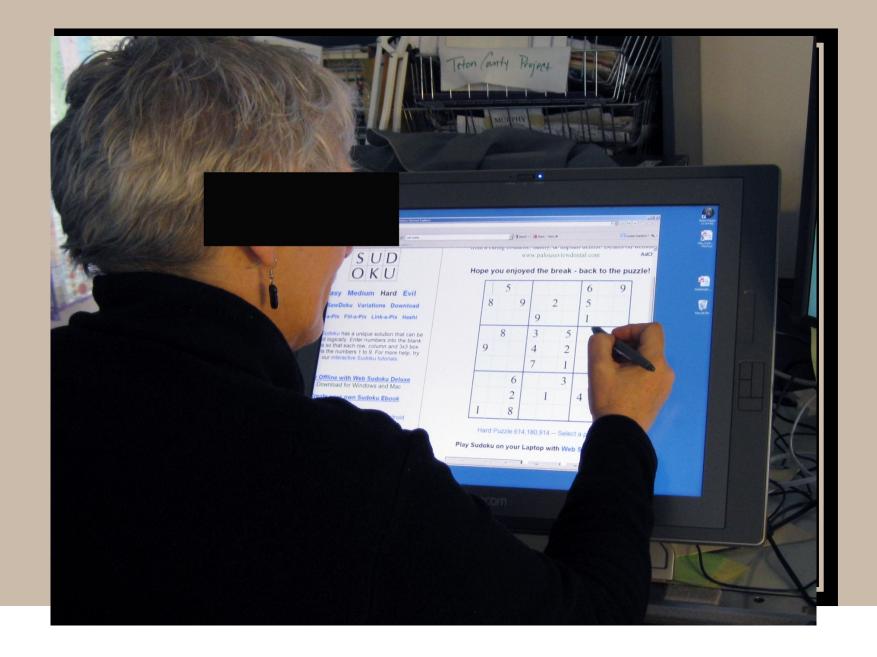
$CAD \rightarrow GDB: ArcPy Processing$

ArcPy-based processing to build Geodatabase:

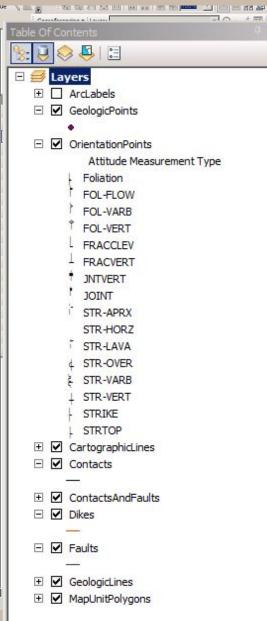
- The DXF files are processed with ArcPy geoprocessing commands to build the Feature Classes required.
- AutoCad-assigned "handles" maintained as primary IDs
- Polygonal feature layers from the line geometry and centroids.
- Geodatabse feature classes now processed to create polygon topology
- The attributes joined to the geodatabase from Accessbased attribute table using ACAD "Handles"
- Cleanup

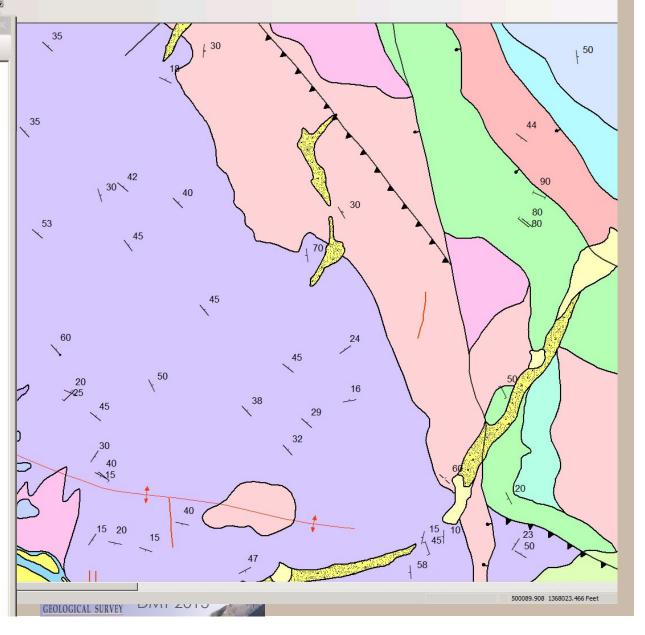
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Making the Sausage



$CAD \rightarrow GDB$: The Geodatabase





$CAD \rightarrow GDB: Contacts$

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Additions IGS has OR will make to NCGMP09

- Fields necessary for
 - Statewide database.
 - Fault information
- Polygon topology stored in contacts
- Sources to Polygon Relate table (not done)
- Code to extract "Glossary", Metadata, Sources from enterprise database to map GDB. (not done)

Conclusions

"NCGMP09" is hard to say.

Not that onerous

• We NEED (Our community) A GENERIC TRANSLATOR TOOL.

Lithology (Earth Materials) is a problem.

I'd rather be boating.