Geological Cross-Section Standards for Salt Caverns (Refer to LAC 43:XVII.307.C and 3307.C)

Geological cross-sections are important to give a two dimensional view of three-dimensional geological features below ground. Geological cross-sections should be constructed from data that is collected from all available sources including boreholes, wells, seismic data, etc., and must be prepared to professional geological standards. In order to ensure consistency, please use the following list of items as a reference when reviewing and/or creating local or area geological cross-sections:

1. At a minimum, two cross-sections oriented north-south and west-east and centered on the facility must be submitted; however, additional cross-sections may be required in order to fully illustrate subsurface structural features below ground, such as the salt stock and/or caprock;
2. Cross-sections shall be referenced to mean sea level (MSL) and include vertical *and* horizontal scales. All cross-sections submitted within the application package must be consistent, using equivalent scales in order to facilitate the review and comparison;
3. All existing salt caverns with a cavern wall within 1,320 feet of the proposed cavern or facility boundary shall be depicted on the cross-sections using data from the most recent salt cavern sonar with the appropriate cavern orientation. The date of the sonar survey should be shown on the cross-section;
4. A title block which includes: the map preparer's full name and the date of preparation, map title, operator's name, and general location (i.e. name of salt dome);
5. A map legend that shall include and define all symbols, lines, dashes, and colors used on the cross-sections;
6. An index base map (if not included elsewhere) should be included on the cross-section so that the orientation of the cross-sections can be identified as well as the wells used to construct the cross-sections;
7. Cross-sections shall be oriented to indicate the closest approach to surrounding caverns, boreholes, wells, periphery of the salt stock, etc., and shall extend at least 1-mile beyond the edge of the salt stock;
    a. For caverns that are positioned closest to the salt periphery or flank of dome, the distance from the outer wall of the cavern to the periphery of the salt at the cavern's closest approach must be shown on the cross-section;
8. Wells that penetrate the salt and are within close proximity to the proposed well location or area boundary shall be included in at least one cross-section line.
    a. Wells and boreholes within a quarter-mile radius of the proposed cavern should be considered to have the best log control of the area to draw representative cross-sections;
9. Each well used to construct the cross-sections must be identified with operator's name, well name and number, well serial number, well status (i.e. active, inactive, plugged and abandoned, etc.), true vertical depth/

measured depth (TVD/MD), perforated interval, and if available a reference elevation (i.e. RKB, GL, or SS) of the wells.

   a. A separate page may be included if needed to detail this information;

10. The distance between the wellheads of any caverns and/or wells used to construct the cross-sections should be indicated on each cross-section;

11. Scaled copies of the electrical logs of all wells shall be included on the cross-sections in order to illustrate the stratigraphic correlations between wells. Please be sure that all electrical log headers shown on the cross-sections are legible.

   a. For any well used to create the cross-section that penetrates the salt stock and/or caprock, an e-log showing the lithology from surface down to the top of salt must be included, if available;

12. Dashed lines can be used to represent wells that are not in the same plane of the cross-sections but may provide lateral control for the geologic mapping of the flank of the salt stock;

13. Solid vertical lines can be used to represent proposed well locations;

14. The horizontal extent of all major topographic features (such as rivers, springs or other surficial water bodies) must be illustrated on the cross-sections;

15. The quarter-mile Area of Review (AOR) from the proposed cavern location(s) or area boundary must be marked on the cross-sections;

16. Faults, shear zones, unconformities, or any other geological features, if present or inferred, must be illustrated on the cross-sections.

   a. Known faulting in the area shall be illustrated on the cross-sections such that the displacement of the subsurface formations is accurately depicted;

17. The occurrence of the base of the Underground Source of Drinking Water (USDW), as well as any other aquifer systems that may be present (top and bottom of the units) shall be properly correlated and marked across the length of the cross-sections;

18. The age of major geological units (i.e. Pleistocene, Pliocene, Miocene, etc.) should be indicated on all cross-sections. Usually this information is indicated next to the depth scale along one side of the cross-sections;

19. Stratigraphic correlations based on particular stratigraphic units (groups, formations or members) should be marked clearly throughout the cross-sections.

   a. When correlating formations or depicting the caprock and/or salt stock, inferred correlations should be depicted with dashed lines;

20. Cross-sections drawn to portray the position and shape of a salt dome should correlate to the structure maps drawn for the top of salt and the top of caprock; and

21. All geological interpretations, including cross-sections must include a licensed Louisiana Professional Geoscientist (PG) stamp/seal with the name and date of the geoscientist who either prepared or approved the map.