

MEMORANDUM

FILE

GNDY Kern/94

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TO: Steve Alexander

FROM: Ron Kern *RAK*

DATE: January 14, 1994

SUBJECT: **Basic Evaluation of Preliminary Geologic Investigation Report - Gandy Project**

Comments related to a basic evaluation of the document "Preliminary Geologic Investigation Report - Gandy Project", drafted by S.M. Stoller Corporation of Albuquerque, are summarized below:

1. The report focuses primarily on presenting preliminary data from regional and local geologic investigations to support the Gandy Property (eastern Chavez County, New Mexico) as possessing a suitable geologic environment for hosting a long-term hazardous waste disposal site.
2. Types, amounts, etc. of "hazardous waste" are not discussed in this document.
3. Preliminary disposal structure criteria (e.g. depths, volumes, monitoring capabilities) for long-term containment of hazardous waste are not discussed in this document.
4. The discussion of regional geology of the Triassic Dockum Group concentrates on the occurrence of predominant mudstone and siltstone with "thin discontinuous sandstones". There is no mention of evaporite beds (e.g. halite; anhydrite) which may be a characteristic lithology of the Dockum Group.
5. A discussion of local structural geology in the vicinity of the Gandy property concludes that the sediments currently dip slightly to the east. Dip should have been defined better in the vicinity of the project site. The discussion should have probably also addressed the occurrence (or lack thereof) of any local fault or fracture patterns and/or the occurrence of any "sinkholes" related to paleo-karst activity in the underlying Permian limestone units.
6. Stratigraphic sections (covering east central New Mexico, the project area, and west central Texas) are illustrated in Figure 6. The lithologies of these sections are not defined and therefore unknown. Their relationship to the project site is unknown.
7. Quaternary alluvium, derived from Tertiary Ogallala Formation, occurs throughout the project area and varies in thickness from a "few feet to as much as 35 feet" throughout the project

- area. Except for gross lithological characteristics, there is no discussion of any other properties (e.g. permeability, etc.) of the alluvium. Further discussion and characterization of these alluvial sediments might be appropriate.
8. Lithologic nature of underlying Permian sediments is discussed, and a generic well log with electric and gamma ray log responses (no label and no scale) is illustrated in Figure 8. The purpose of this discussion is unknown.
  9. A discussion of "Groundwater Potential" (Section 3.5) concludes that "groundwater potential within Triassic sediments in the project area is negligible due to the lack of sands to act as aquifers." This discussion should probably have been expanded to include depth to and general characteristics of any known aquifers within the vicinity of the project area.
  10. Within Section 4.0 (Site Geologic Investigation), based upon an air rotary drilling program, the favorability criteria of the project site were listed:
    - a) "Depth to Triassic sediments ranged from 4.5 to 10 feet" (i.e. alluvial sediment thickness).
    - b) "Drilling encountered 40-60 feet of Triassic Clays" (although a purple clay and a red clay were illustrated in cross-sections, no lithologic logs are provided).
    - c) "All clays were dry and above the water table" (Information related to moisture contents of any lithologies and depth to water table are not discussed).
  11. Material test data (triaxial permeability, sieve analysis, and plasticity index) from six representative core samples (Section 4.4) are presented in Table 1. There is no discussion of these summary data, and the permeability data do not have any units of measurement.
  12. Section 4.5 (Groundwater Investigation) discusses drilling of two air rotary holes to depths of 740 and 820 feet. These holes were sited approximately one mile north and south of the project area to not "violate the integrity of [site] sediments" and to "examine groundwater in an estimated 'upgradient' and 'downgradient' from the proposed site." Although the "dryness" of the sediments is discussed, there is no discussion of moisture content of soils or if any groundwater was encountered. Additionally, based upon previous discussions of the Triassic paleo-environment

Gandy Project  
January 14, 1994  
Page 3

(braided and meandering streams flowing primarily to the east) and the slight eastward dip of the sediments currently, it is more probable that estimated "upgradient" and "downgradient" locations would be west and east of the proposed site, respectively. No lithologic data related to these two boreholes are presented.

13. A "Red Tank" (stock tank?) is illustrated on many of the proposed site figures. If this is a stock tank, the source of water for the Red Tank should be discussed.

#### GENERAL CONCLUSION:

More site-specific discussion of geological and geotechnical data (with inclusion of the data in the report) would be more appropriate for an adequate preliminary geologic investigation report of the Gandy site. Introductory information about the hazardous waste to be disposed of and characteristics of the proposed disposal structures (e.g. trenches) may help to focus the objectives of this report.