GANDY

94 AR

established 1959

#3

February 11, 1994

Mr. Mark Sides
Hazardous and Radioactive Materials Bureau
525 Camino de las Marquez
Santa Fe, NM 87502

Dear Mark,

Enclosed are responses to Ron Kern's comments on the S. M. Stoller Corporation's "Preliminary Geologic Investigation Report - Gandy Project". These comments are from a draft memorandum from Ron Kern to Steve Alexander, dated January 14, 1994.

I am also fedexing to you copies of drill hole maps, lithology logs, and revised figures from the report to accompany these responses.

I look forward to meeting with you to discuss the technical aspects of this report in more detail. Please let me know when it is convenient to get together. In the meanwhile, if I can provide any additional information, please contact me at (505) 255-6200.

Sincerely,

James A. Bonner

James A. Bonner
Albuquerque Manager

Comment responses for the S. M. Stoller Corporation's
Preliminary Geologic Investigation Report - Gandy Project

1. No response required.

2. The proposed facility will be designed and constructed to accept hazardous wastes currently generated and/or stored in the State of New Mexico that are in full compliance with the land disposal restrictions as codified in 40 CFR 265. While at this time, all waste types cannot reasonably be identified, the proposed facility will accept ash from the incineration of hazardous waste. In the future, RCRA permitted incineration facilities will be queried to determine the EPA codes of the ash wastes that might be accepted at the facility.

   The waste acceptance criteria for the facility will, at a minimum, assure that the requirements in 40 CFR 264.312 through 40 CFR 264.317 are met:

   (1) Initially, the facility will not accept ignitable or reactive waste.

   (2) Incompatible wastes will not be placed in the same landfill cell.

   (3) The facility will not receive bulk or non-containerized liquids. Containers holding free liquids will be placed in the landfill only if: (a)(i) all free standing liquid have been removed by decanting or other methods, or (ii) free standing liquids have been solidified or mixed with absorbents so that free standing liquids are not observed, or (iii) free standing liquids have been otherwise removed, (b) the container is very small, such as an ampule, (c) the container is designed to hold free liquids for use other than storage such as a battery or capacitor, (d) the container is a lab pack. Liquid which is not a hazardous waste will not be placed in the landfill.

3. The purpose of the report was to present preliminary geologic information on the Gandy property as it relates to the siting of a hazardous waste disposal facility. While design engineering of the proposed facility will be the subject of an entirely separate report, careful consideration was given to other such facilities located in areas of low precipitation and deep water tables. In fact, the site characterization criteria discussed in Section 4.0 SITE GEOLOGIC INVESTIGATION, were developed as a result of examining these other facilities.

   In a general sense, these facilities consist of multiple disposal cells surrounded by flood protection dikes. Site specific design engineering will establish the actual size of these cells, but they are relatively small (100 ft. x 100 ft.) and only a few cells would be active at the same time. Depth of these cells would be approximately 25 feet and, for the Gandy project, would be developed entirely within low permeability Triassic clays. The nature of the Triassic host clays and the absence of groundwater may lead to requests for waivers of monitoring requirements.

4. The Triassic Dockum Group consists of non-marine clastic facies ranging from mudstone to conglomerate. These sediments were accumulated in a fluvial-lacustrine depositional environment. In addition to these clastics, there are rare occurrences of gypsum found within interdeltaic mudstone sequences.

   There are no beds of evaporates (e.g., halite; anhydrite) within the Triassic sediments. These lithologies are contained in the underlying, marine Permian sediments. As shown in Figure 8 of the report, the top of the Rustler Formation is characterized by a thick sequence of anhydrite. Below the anhydrite is approximately 500 feet of halite.

5. Geologic literature describes the Triassic sediments as dipping gently to the east. Because there are no visible Triassic outcrops within the project area on which attitudes can be measured, a three-point method of calculating dips was performed. Drill hole logs from three abandoned oil wells, as shown on the attached Exhibit A, were used in these calculations. The proposed site is centrally located with respect to these oil well locations. This method determined the dip to be 0° 51' to the east.

   There were no observed local structures or fracture patterns within the project area. There are also no observed "sinkhole" features related to paleo-karst activity in the underlying Permian sediments. In order for karst features to develop, thick sequences of carbonates are required, These sequences are not present in the Permian. The uppermost Permian sediments (Dewey Lake Red Beds) are primarily clastics and are very similar in nature to the overlying Triassic sediments. Throughout the remainder of the underlying formations of the Permian Artesia Group, limestone sequences, where present, are thin and are over 1000 feet below the Triassic sediments.

6. A legend has been added to the stratigraphic sections illustrated in Figure 6. The three sections were included for illustrative purposes, to show the regional variability within Triassic sediments. This variability is directly related location with respect to the large-scale paleo deposition system.

   The major point to be made about the Triassic sediments within the project area is that there are very few sands present. Shallow air drilling encountered some thin deltaic sands in the upper portion of the section. The proposed site is located in mudstones stratigraphically lower than these sands. The possibility of downward migration from the proposed site to underlying sediments is virtually non-existent.

7. The proposed disposal facility is situated in a portion of the project area where the Quaternary alluvium is less than 10 feet thick. The plan for this facility will be to remove all alluvial material from the area where the hazardous waste disposal cell is being developed and construct the disposal unit entirely within Triassic clays. This will eliminate the possibility of hazardous constituents entering the alluvium and migrating away from the facility.

8. The name and location of the oil well, along with a scale, have been added to Figure 8. The purpose of this well log is to illustrate the characteristics of the Permian sediments that underlie the Triassic in the project area. This well log is important in that it shows there are no aquifers present in the lower Triassic section or the upper Permian sediments. It also provides a relationship between the Triassic section and marker beds within the underlying Permian sediments as identified by the New Mexico Oil Conservation Division.

9. Drilling to the base of the Triassic sediments and a review of upper Permian sediments from oil well logs revealed no aquifers. The presence of a 500 foot thick sequence of halite in the Rustler Formation also indicates that there is no groundwater movement through these Permian sediments.

   The only known aquifer within the vicinity of the project area is the Ogallala Formation which stratigraphically overlies the Triassic. There is no pathway through which hazardous constituents can migrate from the Triassic sediments at the proposed site into the Ogallala Formation.

10. As previously mentioned in response #7, it is important that there be minimal alluvial cover in areas of proposed disposal cells because all overburden will be removed and the disposal cell developed entirely within Triassic clays.

    In a preliminary report there is always an issue concerning how much detailed material to present. For the purpose of your review, copies of all drill hole maps and lithology logs are attached to this response. These will include 28 air rotary holes from the July drilling program, 18 holes from the September air drilling program, 5 holes from the November coring program, and 2 holes from the deep drilling program.

    There was no water encountered within the Triassic sediments and therefore no water table. As previously described in responses #8 and #9, there is no evidence to suggest a water table will be encountered within the top 1000 feet of the underlying Permian sediments.

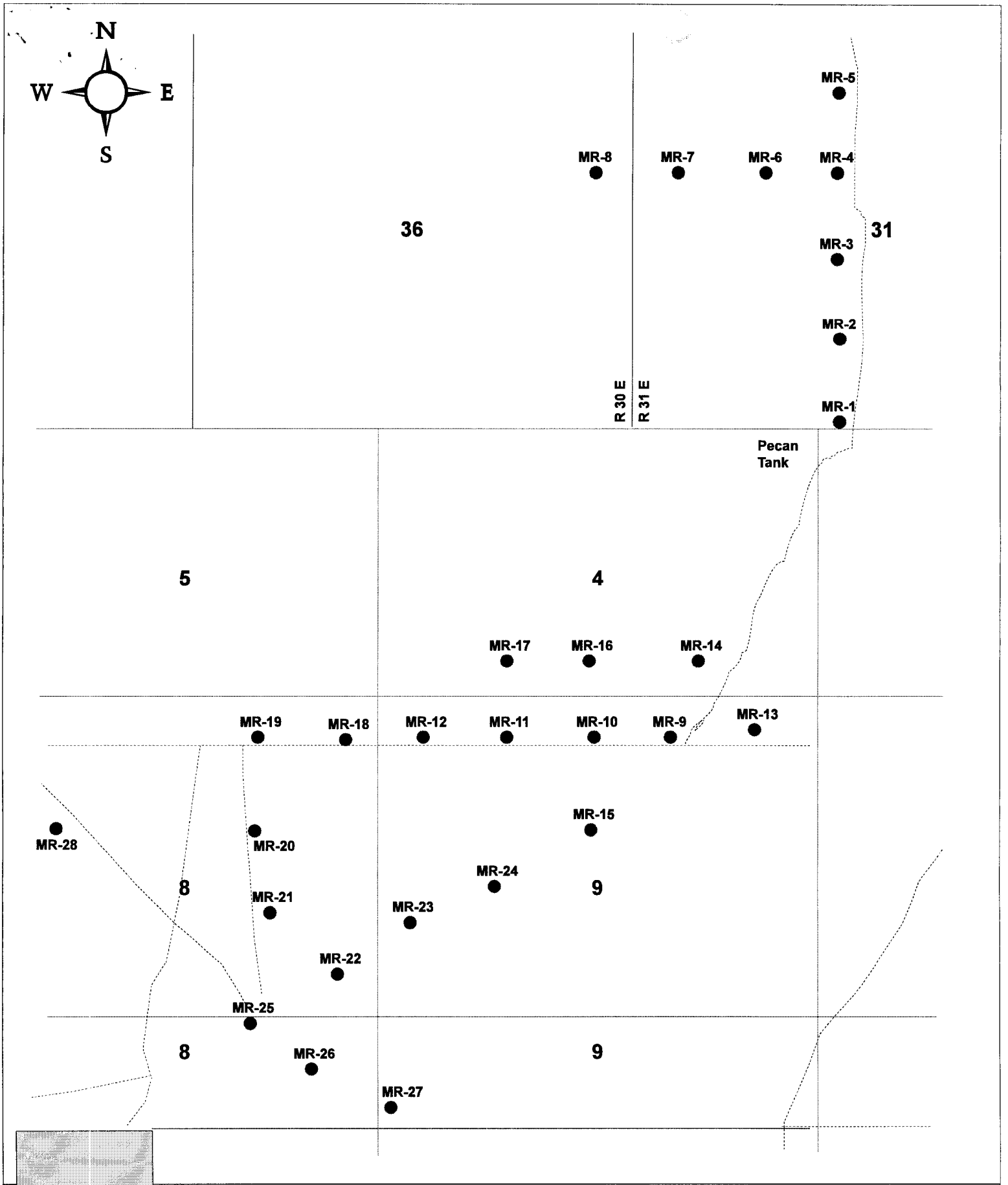
    Moisture contents were measured on the six core samples which were submitted for materials testing. Analyses yielded moisture contents of 10.2%, 22.4%, 10.8%, 11.4%, 8.3%, and 5.5%. This range of moisture contents are typical of unsaturated sediments.

11. The units of measurement for the permeabilities cited in the preliminary report are cm/sec. These values were included in the report for the purpose of identifying representative permeabilities for the Triassic sediments of the proposed site. It is recognized that no far-reaching conclusion can be based upon three samples and more material testing will have to be completed in the future. Your insight into the type and amount of material testing required for this site would be appreciated.

12 None of the 53 drill holes completed on the project area encountered groundwater. Accordingly, all drill hole cutting sampled the vadose zone and were considered to be dry. The only moisture content measurements were from core samples and were listed in response #10.

Drill holes WW-1 and WW-2 were drilled to the base of the Triassic sediments in search of groundwater. As previously stated, no groundwater was encountered. These holes were purposely drilled away from the proposed site to avoid penetrating the clays beneath the proposed site and providing a potential migration pathway for hazardous constituents. It was assumed that the hydrolic gradient would have an east-west orientation. Taking into consideration an easterly dip, WW-1 is located approximately one mile down dip (down gradient) from WW-2 (see Figure 14).

13. Red Tank is a stock tank used by the local ranchers. Water for the stock tank is provided through an underground water line which distributes water from a spring in the Ogallala Formation located approximately one mile east of the project areas.



INDEX MAP - PROPOSED SITE

Exhibit B

SOUTH EAST NEW MEXICO

GANDY PROJECT

ONE INCH ≈ 1500 FT