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Stoller

#7

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June 30, 1994

Ms. Barbara Hoditschek, Manager
RCRA Permits Program
Hazardous and Radioactive Materials Bureau
New Mexico Environment Department
525 Camino De Los Marquez
Santa Fe, NM 87502

Dear Ms. Hoditschek:

Attached to this letter is a proposed drilling plan for the final site characterization effort on the Gandy Project. In your letter of June 23, 1994, it was stated that you would like to review and comment on this plan. We would appreciate receiving your comments on this plan by July 6, 1994.

If I can provide any additional information, please contact me at (303) 546-5381.

Sincerely,

Denise Gelston

Denise Gelston

FINAL SITE CHARACTERIZATION DRILLING PROGRAM GANDY PROJECT

The following summary describes the proposed site characterization drilling program for the Gandy Project, scheduled for July 1994. This summary will outline drilling locations and methods, analytical tests and methods, and down-hole geophysical logging. For more information on the geology of this property, please refer to the S.M. Stoller Corporation's "Preliminary Geologic Investigation Report - Gandy Project", dated January 1994.

Drilling locations and methods

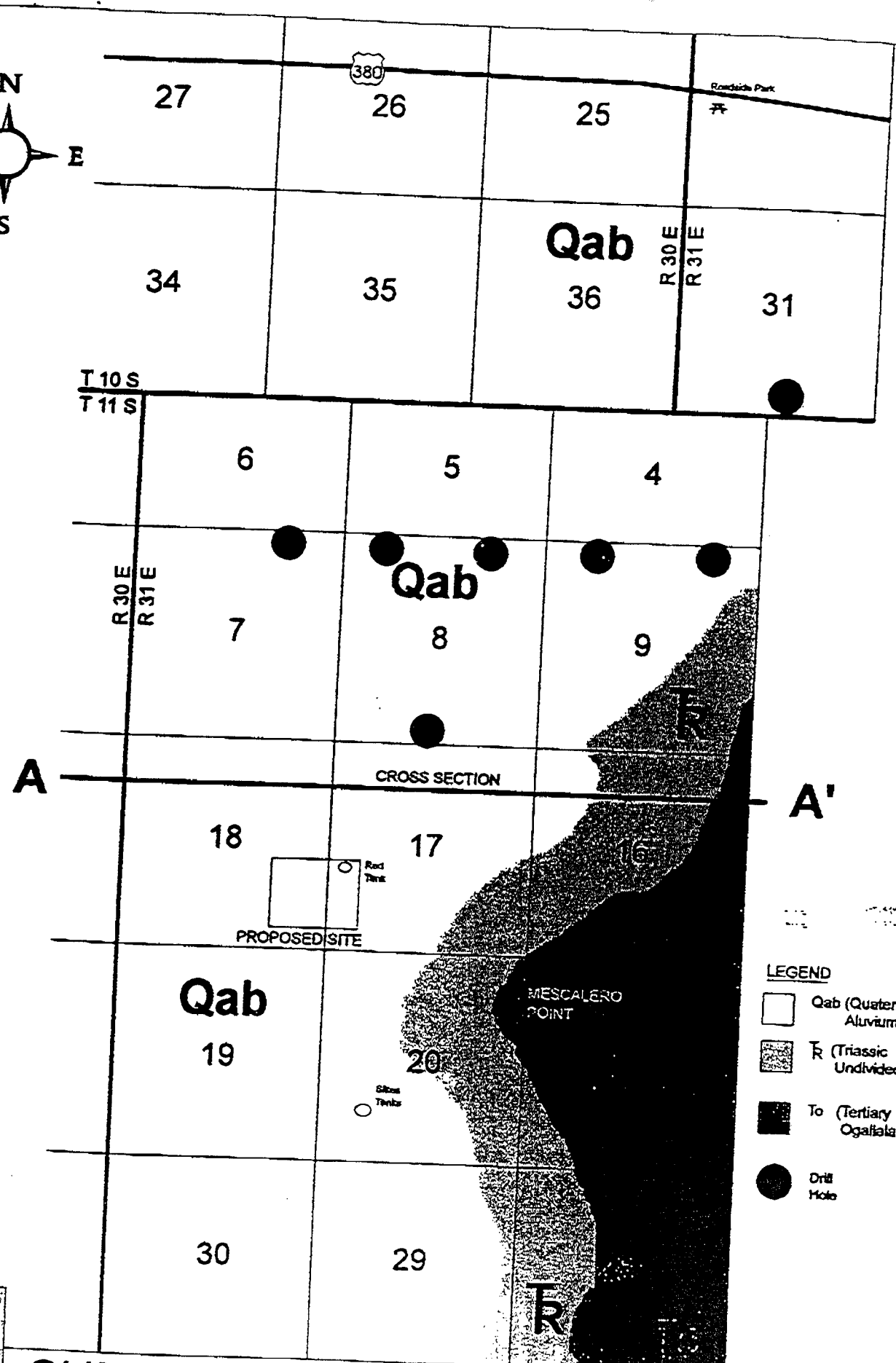
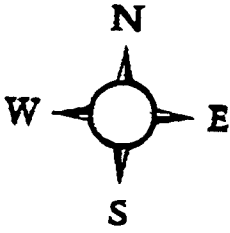
The proposed July drilling program will consist of approximately 40-45 rotary air and hollow-stem auger core holes. Information obtained from this drilling will be incorporated into a formal site geologic model, vadose zone groundwater modeling, and geotechnical modeling for design engineering studies. The drilling will examine the proposed disposal site in detail and provide stratigraphic information on Triassic sediments in the project area (Figure 1). All drill holes will be surveyed to assure accurate location and elevation data.

Proposed Site - A close-spaced drilling pattern (750 ft x 750 ft) has been outlined for the proposed disposal area on Figure 2. Approximately 30 holes in this drill hole spacing will examine the depth to Triassic sediments and the variability of the host sediments. The depth of each hole in this pattern will be 100 feet. This depth was selected because:

- 1) previous deeper drilling found continuous lithology (mudstones and thin interbedded siltstones) throughout the lower portion of the Triassic section, and
- 2) preliminary, conservative groundwater modeling indicated that uncontrolled infiltration from the surface would not reach this depth.

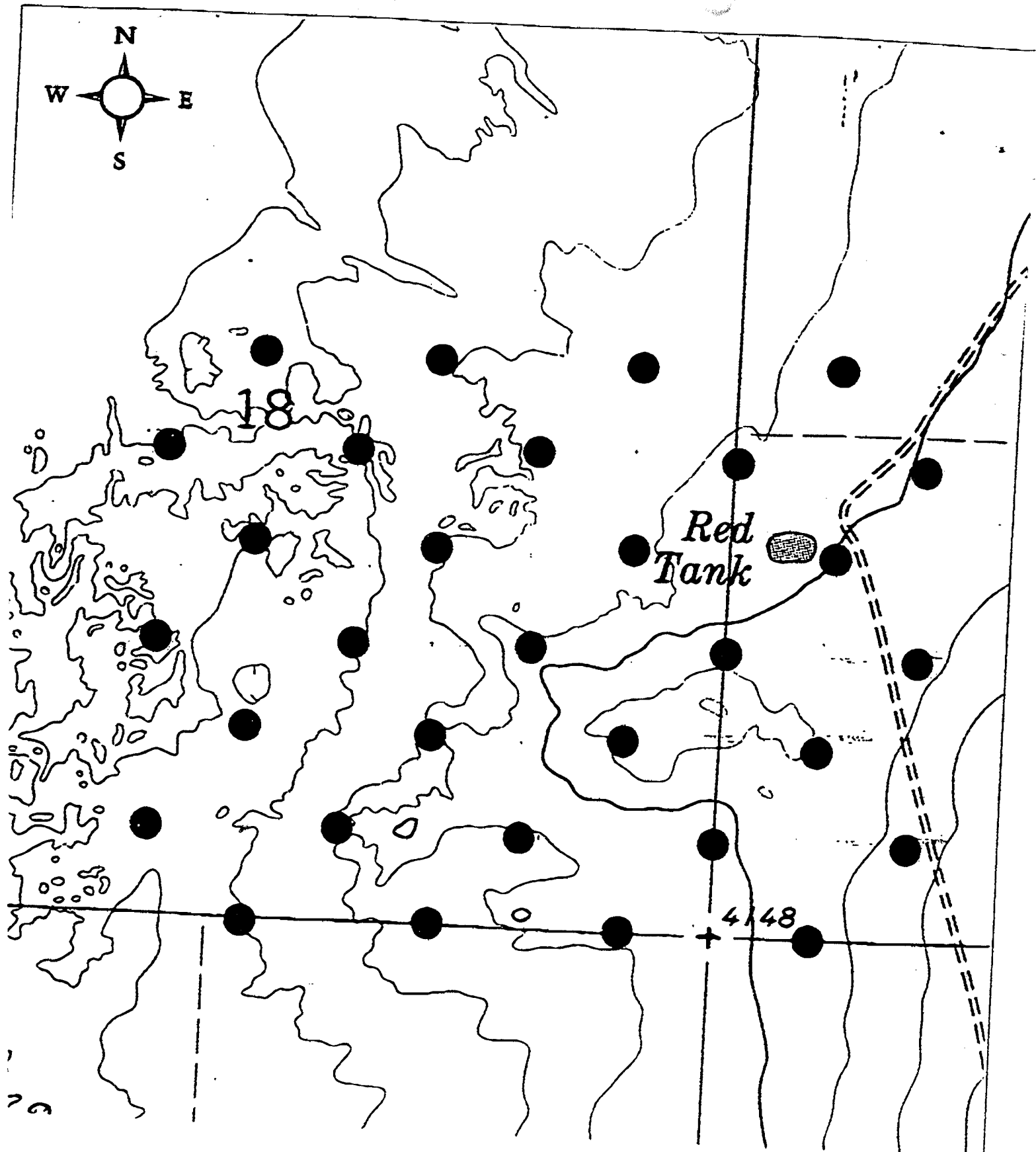
Stratigraphic drilling - Figure 1 shows seven proposed stratigraphic drill holes north of the proposed disposal site. Previous geologic studies determined the regional dip of the Triassic sediments to be less than one degree to the east. This stratigraphic drilling will illustrate the character of the Triassic section in the Gandy project area and show the spatial relationship of the proposed host sediments to the entire section. This is important to show that the few sands within the section overlay the proposed host sediments. Each hole in this drilling will be drilled to a depth of 200 feet.

Drilling techniques - All close-spaced drilling in the proposed disposal site and the stratigraphic drilling will be conducted using a rotary air rig. Samples will be collected on five-foot intervals and displayed on the ground. A lithology log of each hole will be prepared and samples collected for possible future use. In the proposed disposal site area, a hollow-stem auger rig will collect core samples adjacent (within 10 feet) to several air rotary holes. These cores will provide samples for material analyses and will help to enhance the lithologic descriptions from the air holes.



- LEGEND**
- Qab (Quaternary Alluvium)
 - T̄ (Triassic Undivided)
 - To (Tertiary Ogallala Fm.)
 - Drift Hole

SURFACE GEOLOGY - PROJECT AREA
SOUTH EAST NEW MEXICO



PROPOSED SITE
SOUTH EAST NEW MEXICO

Figure 2

Analytical Tests and Methods

Geotechnical parameters will be measured and used in groundwater modeling and design engineering studies. The following summary describes the type of material analysis to be performed, the methodology for used in the analysis, and the rationale for the selection of the methodology.

Groundwater modeling needs - As previously discussed, a hollow-stem auger core rig will be used to collect samples to obtain geologic parameters needed for groundwater modeling. This coring will collect 3-5 representative samples of the three major lithologies (i.e. mudstone, siltstone, and sandstone [if encountered]). Listed below are the geologic parameters to be analyzed and the analytical method.

<u>Geologic Parameter</u>	<u>Analytical Method</u>
• Saturated Hydraulic Conductivity	• Laboratory triaxial permeability test (Because of the unsaturated nature of the sediments, it was decided that in-situ packer testing would not be accurate.
• Dry Bulk Density	• A ring sampler tool on the hollow stem auger core rig will be used to collect a sample. Analysis will be performed on the sample in a laboratory.
• Porosity	• A ring sampler tool will be used to obtain a sample. Specific gravity is measured in the laboratory and porosity is calculated indirectly.
• Initial Water Content	• Laboratory analysis will be performed on a core sample.
• Fraction of Organic Carbon	• Laboratory analysis will be performed on a core sample.
• Residual Water Content	• Laboratory analysis will be performed on a core sample.
• Saturated Water Content	• Laboratory analysis will be performed on a core sample.
• Water Retention Curve	• Laboratory analysis will be performed on a core sample.

Design Engineering Studies - Samples of the in-situ clay which will be used as liner material during landfill construction will be collected. Approximately 20 bulk (five gallon bucket) samples will be collected adjacent to the rotary air holes. A backhoe will be used to obtain these samples. Listed below are the geotechnical analyses required and the testing method.

- USCS Classification
- Moisture Content
- Grain Size - sieve and hydrometer
- Atterburg limits
- Proctor compaction
- Kneaded recompacted permeability
- ASTM D2487
- ASTM D2216
- ASTM D422
- ASTM D4318
- ASTM D1557
- ASTM D5084

Geophysical Logging

Geophysical logs provide an accurate and indisputable record of the lithologies encountered in a drill hole. Because all drilling will take place in unsaturated sediments, the suite of geophysical logs available is limited. For this drilling program, gamma and thermal neutron logs will be run on all drill holes. In addition, the two deep holes (800 feet) drilled to the base of the Triassic in 1993, will also be logged. These deep holes had been cased with plastic and gamma/neutron logs will penetrate this material to record down-hole lithologies. Using these geophysical logs, along with sample cutting (lithology) logs, accurate correlations in the proposed disposal site and throughout the project area can be obtained.

TELEFAX

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DATE: _____

TIME: _____

SENT FROM:

Name DENISE GELSTON

SENT TO:

Name: BARBARA HODITSCHKE

CONCERNING:

Fax No.: _____

This telefax consists of this cover page plus 6 additional pages.