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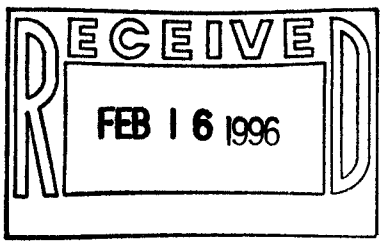
February 15, 1996



Bob Sweeney
Hazardous and Radioactive Materials Bureau
New Mexico Environment Department
2044A Galisteo
Santa Fe, New Mexico 87505

Dear Mr. Sweeney,

Gandy Marley, Inc. is pleased to submit the attached response to additional comments and questions from the Hazardous and Radioactive Materials Bureau (HRMB), New Mexico Environment Department (NMED), relative to the previous "Response to Notice of Deficiency" dated September 29, 1995.

I look forward to our meeting on February 22 to discuss the status of the Triassic Park Waste Disposal Facility. If I can provide any additional information prior to that meeting, please contact me at (505) 255-6200.

Sincerely,

James A. Bonner
Albuquerque Office Manager

cc: Mr. Larry Gandy - Gandy Marley, Inc.
Mr. Ed Kelly - Solid Waste Bureau

The S.M. Stoller Corporation 1717 Louisiana Boulevard, N.E., Suite 209, Albuquerque, New Mexico 87110 (505) 255-6200 FAX (505) 255-1400

RESPONSE to
NOTICE OF DEFICIENCY
for
TRIASSIC PARK PART B PERMIT APPLICATION

The following technical comments and questions from the Hazardous and Radioactive Materials Bureau (HRMB), New Mexico Environment Department (NMED), relate to the Gandy Marley, Inc. "Response to Notice of Deficiency" dated September 29, 1995. The "ITEM" numbers below match the item numbers used in the August 1995 Notice of Deficiency.

ITEM

Comment to 36 The response is inadequate. Although the potential for gas generation in the landfill may be limited, NMED is still interested in how any gas generated will be detected and removed.

Response: Two important issues associated with gas generation and release are meeting air quality standards and gas buildup beneath the final cover.

During the operational phase of the facility, periodic checks will be made within the landfill to detect the presence of hazardous gases and volatile organics to verify PPE and respiratory protection levels. This testing will be conducted in addition to the fingerprint testing conducted on incoming waste. The data from both tests will be implemented to reduce the generation and/or release of these gases to levels which meet prescribed regulatory air quality standards.

Prior to closure of the landfill facility, an assessment will be made of the landfill waste's gas generating potential. This assessment will be based on review of fingerprint test data and data gathered in the landfill during operation of the facility. If, based on this assessment, it is concluded that gas generation and release following closure will not meet regulatory air quality standards or may result in gas build-ups beneath the barrier layer of the cover, then provisions will be made to collect and monitor gas generation and release during the postclosure period. There are a number of gas collection and monitoring design approaches developed in the municipal waste industry which could easily be incorporated into the landfill cover.

Comment to 82 The response is inconsistent with the data provided in the permit application. On July 17, 1994, borehole 14o was drilled to a depth of 100 feet. No groundwater was recorded on the lithology log. The

geophysical log, run on July 17, indicated water in the bottom 9 feet of the borehole. Whether this water is groundwater (i.e., it was present but undetected during the drilling of the borehole or it entered the borehole via the subsurface following the rainstorm on July 17) or water that entered the borehole as surface runoff during the rainstorm is unresolved.

Borehole 14, located approximately 400 feet west of borehole 14o, was also drilled to a depth of 100 feet (on July 14, 1994) and, according to the lithology log, encountered no groundwater. The geophysical log (run on July 15) recorded 38 feet of water in the borehole. Evidently there is groundwater in this area and it is possible that the water found in borehole 14o is groundwater.

Response: The origin of fluid observed in the bottom of borehole 14o apparently requires additional explanation. It is true that borehole 14 (as described on page 3-18 of the permit application) did encounter some "stratigraphically trapped" groundwater. This borehole (and all others in this evaluation program) was drilled using rotary air techniques. The high pressure injection air associated with this drilling technique, when encountering small amounts of groundwater, will prevent this fluid from immediately entering the borehole. The drill cutting samples did not indicate the presence of groundwater. Only after the borehole had been allowed to "sit" for 1-2 hours was the groundwater recognizable. When it did enter the borehole, it rose (equilibrated) to the level of the sand (aquifer) from which it originated.

Because of the identification of groundwater in borehole 14, an offset (borehole 14o) was completed 400 feet to the east (down-gradient). This borehole location was in addition to those pre-approved by the NMED, but it was important to determine the potential extent of groundwater saturation. Borehole 14o was drilled to a depth of 100 feet.

There appears to be some confusion in definitions between depth drilled, depth logged and the actual total depth of the hole. When drilling with mud, it is possible to condition the drill hole walls so that essentially the entire depth can be logged. However, with rotary air techniques, hole conditioning is not possible and considerable side wall material will collapse into the hole. As indicated on the borehole 14o log header sheet, the bottom depth logged, as measured by the trace of the dry neutron log, was 94.5 feet. Considering the location of the neutron detector on the probe, the

total depth of this hole would have been 95.5 feet. The rest of the hole had filled up with drill cuttings.

The top of the fluid was observed to be at a depth of 92.0 feet, indicating a maximum apparent concentration of 3.5 feet (not 9.0 feet). This is an apparent concentration because a 2.25 inch probe will displace approximately one-half of the volume of the hole. Regardless of all of these factors, there is approximately one gallon of fluid in the bottom of this borehole.

This fluid did not migrate upward through several hundred feet of Lower Dockum mudstones. This borehole and nine others (see NOD response) were cased and monitored in order to see if groundwater later entered these holes. It did not. Because of the fact that the water level never rose to the depth of the bottom of the sand in the hole (36.0 feet), it is believed that this sand was not the source of the water. As described in the NOD response, there was a heavy rainfall when this hole was being completed and it is believed that surface runoff entered the drill hole. Eventually, this fluid was absorbed into the side walls of the borehole.

Comment to 86 The response is inadequate because it does not address the disappearance of the 9 feet of water in borehole 14o.

Response: See response to 82.

Comment to 89 The response, while it answers NOD Comment 89, raises another question. Plate 3-8 is cited in the response as an example of facies change from siltstone/sandstone, near the site of the proposed landfill, to mudstone 1,000 feet downgradient to the east. On the contrary, Plate 3-8 shows the siltstone/sandstone beds at the proposed landfill boundary to extend beyond the easternmost borehole. How is this geologic setting capable of retarding migration of contaminants from the landfill to groundwater east of the site?

Response: Upper Dockum sediments were deposited in a fluvial environment. As such, individual beds of sandstones, siltstones, and mudstones are very discontinuous. Plate 3-8 illustrates this discontinuous nature of individual lithologies or facies changes.

However, migration can occur (as described in Additional Comment #1) in Addition to Response to

Unsaturated flow modeling referenced in NOD Response 90 and the Waiver Justification Document took no credit for these facies changes. It was assumed the lateral migration would take place entirely within the siltstone/sandstone lithology (permeability - 1.22 X 10-5 cm/s). This geologic setting is ideal for retarding lateral

migration of contaminants because of the low permeability of the sediments and the fact that they are unsaturated. There is very little lateral hydraulic head generated from the landfill, and unsaturated flow modeling estimated a 3.4-billion-year travel time to reach a point 2,500 feet down-gradient.

Comment to 91 Subsurface evaluation done during July 1995 has shown the lack of groundwater in the Upper Dockum in the eastern part of the proposed facility; however, the existence and location of groundwater in the west half of the proposed facility is unresolved (cf. Item 82 above).

Response: See response to 82.

Comment to 94 Part of the reply reads "One well will be constructed with a 5-foot screen extending from the base of the Lower Dockum." Should this read "Upper Dockum"?

Response: It should read "One well will be constructed with a 5-foot screen extending from the base of the Upper Dockum".

Comment to 99 The July 1995 drilling program found the Upper/Lower Dockum contact 84 feet below ground level in PB-36 (the borehole located at the proposed landfill's east slope). The base of the landfill will be in Lower Dockum sediments if the landfill is excavated to 100 feet as planned. The slope of the landfill will rest on Upper Dockum siltstones and sandstones and, since these will permit contaminant migration from the landfill to groundwater east of the facility, a double liner system will be required on the slopes, as well as on the floor, of the landfill.

Response: This comment is noted and does not appear to require a response. This issue is addressed in detail in the Waiver Justification Document and in summary in the above response to comment 89.

Comment to 100 The response states that locations of the initial shallow drill holes are shown on Plate 3-7. They are not. Please correct the Plate. Also, Plate 3-7 includes several boreholes labeled "Drill Hole" and one labeled "Oil Well." Are the drill holes abandoned oil tests? Are any of them producing or abandoned water wells? If any are/were water wells, please provide the depth and quality of water and the formation name of the aquifer.

Response: The three initial shallow drilling areas are illustrated in Figure 3-9 of the permit application and they will be added to Plate 3-7. The "drill

holes" shown on the USGS topographic map on Plate 3-7 are abandoned oil tests. In sections 22 and 23, T11S, R31E water is currently being produced from abondoned oil tests. The State Engineer's office lists the depth of the production as 100 feet and 120 feet, respectively. The blue "triangles" on Plate 3-7 are water wells within a 3-mile radiu of the proposed facility and were obtained from the State Engineer's office. A listing of the wells and depths will accompany Plate 3-7.

See questions on Table 3-1 (attached); Formation names? Water quality?

Comment to 103 The geophysical and lithology logs for PB-27 indicate siltstone/sandstone is present from a depth of 70 feet to total depth at 200 feet. Groundwater has been found both upgradient and downgradient from this borehole. Can GMI suggest an explanation for the lack of groundwater in PB-27?

The last part of the response for this comment reads "The location of WW-2 is SWSE Section 19, T11S, R31E. The geophysical log and lithology log will be changed to reflect this." The geophysical log needs to be corrected; the lithology log does not. Also, Figure 3-13 and Plate 3-7 need to be corrected because WW-2 is shown in the SESW of Section 19 on both maps.

Response: As described in Response 82, 86 and 91, due to the air rotary drilling techniques used on this project, the low permeability of the sediments and the small amount of groundwater, fluids are not immediately recognizable in these boreholes. This borehole was logged immediately after it was completed and it is possible that groundwater had not yet entered the hole. Due to its stratigraphic position, it is assumed that the lower portion of the borehole would be saturated.

Also attached is a corrected log header sheet for WW-2 and a revised Figure 3-13 and Plate 3-7 showing the location for WW-2 to be in SWSE Section 19, T11S, R31E.

Additional Comment #1 - The corrected Plate 3-1, included in the NOD Response, shows vertical groundwater flow from the Ogallala Formation into and through the Upper Dockum. Please provide an explanation for how vertical flow may occur through the Upper Dockum mudstones and claystones (which are found interbedded with the siltstones and sandstones).

Response: It is unlikely that vertical groundwater flow occurs through Upper Dockum mudstones and claystones. The permit application (page 3-17) describes the presence of springs at the contact of the Ogallala and the Upper Dockum where downward-migrating groundwater meets impermeable Upper Dockum clays and are diverted to the surface. It is important to remember, however, that these mudstones and claystones were deposited in a fluvial environment and are very discontinuous. Where this same downward-migrating groundwater encounters more permeable sediments, it infiltrates into and migrates through the Upper Dockum.

Additional Comment #2 - Figure 3-13 and Plate 3-7, which were included with the NOD Response, show the location of a drill hole between PB-14 and PB-32 immediately west of the facility boundary. Does this drill hole exist?

Response: There is no borehole between PB-14 and PB-32. Figure 3-11 of the permit application is the detailed map showing borehole locations for this close-spaced drilling. Figure 3-13 and Plate 3-7 will be revised to reflect the borehole locations as shown on this figure.

Table 2-1
List of Water Wells Within Three Miles of the Proposed Facility [a, b, c]

Location	Usage	Depth (ft)	Comments
11S.30.26.34444[d]		85	Dry
11S.31.10.4342	Stock	+44	Four wells in group
11S.31.10.4342413		+46	
11S.31.10.4342214	Stock		Submersible
11S.31.10.4342324			
11S.31.11.343334	Stock	+43	Submersible
11S.31.16.41341A	Stock	+142	
11S.31.16.43211		+113	Not in use
11S.31.21.44241	Stock	110	
11S.31.22.12321	OWD[e]	100	Dry
11S.31.23.110[d]	OWD	120	
11S.31.23.11144	OWD/Stock	120	
11S.31.27.324231A	DOM[e]/Stock	+96	Submersible
11S.31.34.224	Stock		

[a] Water well information from State of New Mexico, State Engineer District Office in Roswell.

[b] All information from the State Engineer Office field schedules unless noted otherwise.

[c] One "shot hole" used for seismic exploration of oil was identified within three miles of the proposed facility.

[d] Information from well logs.

[e] OWD = Oil Well Drilling, DOM = Domestic

Questions -
Usage columns - what are blanks?
Depth - of well, pump, T/water ?, what does + mean?