

March 25, 2016

Mr. Jim Griswold
Chief, Oil Conservation Division EMNRD
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Re: C.K. Disposal E&P Landfill and Processing Facility Permit Application

Dear Mr. Griswold:

I am in receipt of two copies of the permit application for the above referenced project. As per your request, I have begun my review of the document and engineering therein for conformance with OCD regulations (NMAC 19.15.36) and generally accepted waste management and environmental engineering practice. The engineer of record is Parkhill, Smith, and Cooper, Inc. (PSC).

One of the main aspects of the permit application is design, construction, and operation of a landfill for the intended oil field waste stream. Given my experience with review of municipal solid waste landfill permit application as a consultant with the State of New Mexico Solid waste Bureau, the permit application is lacking in the requisite engineering calculations required for approval of a permit application for a municipal solid waste landfill. These minimum calculations are required by the Solid Waste Bureau to demonstrate adequacy of design and performance. Most of these calculations have not been supplied by PSC. Drainage and HELP modeling calculations have been supplied as separate attachments. The following are a basic list of engineering calculations required for approval of a municipal landfill:

- Volumetrics as per cover requirements
- Soil erosion estimates for rain and wind erosion
- Anchor trench capacity
- Foundation settlement as it affects leachate collection
- Waste settlement as it affects the top slope and surface drainage features
- Leachate pipe performance as per deflection
- Outside slope stability (static and pseudostatic)
- Liner stability and tensile stress under filling as per a multi-layered liner sequence
- Waste stability via translational failure upon filling
- Final veneer stability for a multi-layered liner sequence
- Geotextile evaluation as per retention, permittivity, and porosity for leachate collection
- Minimum liner thickness based on projected overburden
- Geonet compression under overburden loading

The landfill plans calls for a maximum depth upon completion of the final contours of 130 to 150 ft. The characteristics of the landfill waste have not been specified, such as unit weight (a key input into engineering calculations, for example, foundation settlement. Characteristics of on-site soils used for daily, intermediate, and final cover have not been

CK Disposal, LLC
Applicant's Exhibit H
NMOCD Case No. 15617
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supplied, such a grain size distribution, etc. The characteristics of the subgrade foundation soils are needed for settlement analysis. Cover soil attributes are needed to assess geotextile filtration performance with respect to the leachate collection system. The list of information needed to properly assess and review the design and performance aspects of the proposed landfill is substantial and needs to be supplied and included as part of the permit application. Otherwise, the review is simply a review of narrative.

The facility also includes other aspects of waste handling that have been handled in a cursory manner through narrative, but lacking in essential design and specification information within the permit application. Two major waste handling unit operations are the produced water processing system and the water treatment and reuse system. The latter includes as per the narrative a stripping tower, a greensand filter system for removal of iron and manganese, and a reverse osmosis train. Design plans and specifications and associated calculations should be included within the permit application as a minimum for those unit processes described within Attachment K: Site Operation Plan.

I have given a quick read of the contents of Vol. I and II of the permit application. Based on this first-cut impression of the document, it will not be possible for me to provide a thorough review without additional information being supplied by the engineer of record. In the interim I can review the drainage calculations and HELP modelling provided and the engineering plans supplied as Attachment B. However, given the depth and breadth of requisite information needed, a critical review of the landfill and its ancillaries and unit operations associated with produce water processing and water treatment and reuse systems, review cannot proceed until such information is received. I feel it will take some time for the PSC to comply with this request; as such this review will be delayed as my initial estimate of a two-week turn-around is no longer possible.

Given the nature and intensity of requisite information required for this review, I am asking that OCD as the permitting agency initiate the dialogue with PSC to supply said information based on my assessment of deficiencies in the permit application.

If you require additional information or clarification on this initial assessment of the permit application, please contact me directly at 505-835-5467 (w) or 505-838-6227 (c), or email me at h2odoc@nmt.edu.

Sincerely,

Clinton P. Richardson, Ph.D., P.E., BCEE