



John R. Kasich, Governor
Mary Taylor, Lt. Governor
Scott J. Nally, Director

December 11, 2012

**RE: JEFFERSON COUNTY
APEX SANITARY LANDFILL
ENG**

Apex Environmental, LLC
P.O. Box 157
Amsterdam, OH 43903

Attention: Scott Lockhart, Corporate Engineer

Subject: PTI Application No. 06-8448, Notice of Deficiency # 2

Dear Mr. Lockhart:

On October 28, 2011, Ohio Environmental Protection Agency (Ohio EPA) received Apex Environmental, LLC's (Apex) Permit-to-Install (PTI) Application No. 06-08448 for a proposed contiguous lateral and vertical expansion and an increase of the Authorized Maximum Daily Waste Receipt (AMDWR) for the Apex Sanitary Landfill in Jefferson County, Ohio. The submission included four of five bound volumes and 47 of 65 plan sheets. Previously on September 1, 2011, Apex had pre-submitted Volume II (Hydrogeologic Site Investigation Report), Volume IV's Appendix C9-A (Ground Water Detection Monitoring Program), and Plan Sheet Nos. 3D through 3N and 5A through 5G (18 of 65). Civil & Environmental Consultants, Inc. (CEC) had prepared the submissions and is the landfill expansion's design consultant.

On December 22, 2011, Ohio EPA forwarded the application's initial Notice of Deficiency (NOD) and established that the application was not approvable at that time. In particular, Ohio EPA said that landfill odor control practices need to be developed, proven effective and incorporated into the application. Further review of the application was delayed until November 1, 2012 with Apex's substantial completion of the December, 2012 Directors Final Findings & Orders.

On October 11, 2012, Apex submitted a Supplemental Hydrogeologic Report which further investigated the remaining limestone deposits within the balance of the original unit and within the proposed expansion unit.

The review of the application was performed with respect to Ohio Administrative Code (OAC) Chapter 3754-27 (Solid and Infectious Waste Regulations).

Ohio EPA has partially completed our initial full review of the application which was found to be deficient and not approvable at this time. Enclosed, please find Attachment A (General Engineering Review) and Attachment B (Stability and Settlement Reviews) for a list of deficiencies, comments, and recommendations. Attachment C

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(Hydrogeologically Review) will be forwarded mid-December, 2012 once we have received comments from the Southeast District Office's Division of Drinking and Ground Water.

Please respond to each item within the resubmission's cover letter and revise the application as necessary. The attachments will be forwarded to CEC in Microsoft's Word format to aid in their preparation of your response to this letter.

Should you have any questions regarding our review of the permit application, I may be reached at (740) 380-5440.

Sincerely,



Craig Walkenspaw
District Engineer
Division of Material and Waste Management

Attachments

CW/mr

cc:	Jefferson County General Health District	w/ attachments
cc:	Dale Warner, SEDO-DMWM	w/ attachments
cc:	Civil & Environmental Consultants, Inc. 333 Baldwin Road Pittsburgh, PA 15205-9702	w/ attachments

Attachment A

The following items are deficiencies based upon the initial General Engineering Review of PTI Application No. 06-08448, as submitted October 28, 2011, for a proposed contiguous lateral and vertical expansion and for the proposed Authorized Maximum Daily Waste (AMDWR) increase of Apex Environmental, LLC's Apex Sanitary Landfill (Facility).

Plan Sheets

- 1) On Plan Sheets 2C-1 and 2C-2 (Man-Made Potential Explosive Gas Migration Pathways), please amend the drawings to include the sewer/water lines and other underground utilities associated with the proposed solidification facility, rail unloading building and the landfill gas processing facility.
- 2) On Plan Sheet 2D-2 (Siting Criteria Summary), a comment is provided relative to OAC Rule 3745-27-07(H)(3)(C) and water supply wells. In particular, the comment states "None within 1,000-ft of waste placement, except the well at the landfill office which meets the criteria of rule OAC 3745-27-07(H)(3)(C)(i)."

Please fully explain how the main office well satisfies the criteria of OAC Rule 3745-27-07(H)(3)(C)(i) or alternately criteria (ii or iii) .

Please reference Comment No. 21 and its alternate justification narrative on Page C1-19.

- 3) On Plan Sheets 3A (Landfill Facilities/Utilities Location Plan), please amend the drawings to include all new utilities associated with the proposed solidification facility, rail unloading building and the landfill gas processing facility.
- 4) On Plan Sheet 3B (Explosive Gas Control System Plan), please revise the drawing to merge the current GCCS as-built (Fall 2012) with the balance of the modeled system.
- 5) On Plan Sheet 3B and subsequent drawings, please amend to incorporate the southern haul road from the rail yard (Constructed - Summer 2012).
- 6) On Plan Sheet 3C (UAS Separation Isopach Map), please revise Note No. 4 to be reflective of Phase 6A-East's construction. And adjust the phasing limits to show Phases 6A and 6B. Please incorporate similar changes to subsequent drawings as necessary.
- 7) On Plan Sheets 4A (Horizontal and Vertical Limits of Excavation), please amend the drawing to include areas of excavation and fill associated with the proposed solidification facility, rail unloading building and the landfill gas processing facility. And please incorporate the as-built grading of the southern haul road from the rail yard.
- 8) On Plan Sheet 4G (Top of Final Cover Grading Plan), the maximum elevation for the top of final cover is shown at 1577' msl which is 28' higher than Ohio's highest natural

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elevation which is at Campbell Hill near Bellefontaine, Ohio (1,549' msl). And the proposed maximum elevation is 189 feet higher than Jefferson County's highest natural elevation near Monroeville, Ohio at 1,388' msl.

When faced with a similar situation Cherokee Run Landfill elected to establish 1548' msl as their top of final cover.

In consideration of the proposed expansion, Ohio EPA requests that the expansion's top of final cover be reconfigured to be held less than 1549' msl.

- 9) On Plan Sheet 4H (Surface Water Management Plan), please add a reference to Detail A/7A (Sedimentation No. 1), B/7M (Sedimentation Pond No. 2) and B/7M (Sedimentation Pond No. 3).
- 10) On Plan Sheet 7D (Leachate Management System Details), please revise Detail F/7D (Valve Vault) to show its correct position with respect to the sideslope riser pipe and pitless adapter.

As a suggestion, please note that the valve vault is a "confined space" and should be posted as such. The optional encasement of the in-line condensation sumps (Details A/7H and B/7H) should also be posted as confined spaces.

- 11) On Plan Sheet 7G (Gas Management System Details), please add a typical detail to show the configuration of a gas extraction well that utilizes a caisson to support an extended well.

**Volume I
Introduction, (C)(1) and (C)(2)**

- 12) According to Section II (Multimedia Information), a NPDES permit, a 401 permit, a 404 water quality certification, an isolated wetland permit, and an air permit are needed for the proposed expansion. At the time of the original submission, these applications weren't submitted yet.

What is the status of these or other applicable applications?

- 13) Please revisit Section III (Additional Information) #9 to correct the "Total Area Within the Limits of Waste Placement" which should be the sum of "Area Previously Approved" and "New Area Added by this Permit."
- 14) Please revisit Section III #10 to correct the "Total Volume" which should be the sum of "Volume Previously Approved" and "New Volume Proposed by this Permit."

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GENERAL ENGINEERING REVIEW
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- 15) Section IV (Cost Estimates) reports that the Total Closure Cost Estimate is \$16,918,804 which actually appears to be based on some 183 acres as shown within Section (C)(5) [Closure Cost Estimate]. In contrast, Section IV declares 117 acres the "Worst Case Acreage" for when Phase 13 is just developed (please see Plan Sheet 6G).

Within Sections IV and (C)(5), please revise the Total Closure Cost Estimate with regards to the Worst Case Acreage only and without any discount for the installed gas collection and control systems. The proposed \$92,453/ac appears to be low.

- 16) In recent years, Apex Environmental, LLC has progressively increased the facility's "worst case acreage." With the development of Phase 6A-East, the worst case acreage will be 87.3 acres. With the transition from the originally permitted 117.5-acre unit to the proposed expansion's 288.5-acre unit, beginning the closure of the original unit appears to be logical to limit the growing environmental liability.

In consideration of the proposed expansion, Ohio EPA requests the development of a systematic closure scheme for the originally permitted unit.

- 17) On Pages C1-5 & 6 [Information per OAC Rule 3745-27-07(A)(3)], please revise the compliance narrative to note the DFF&O of December 22, 2011 and revise Appendix C1-E as necessary.
- 18) On Page C1-6 [Information per OAC Rule 3745-27-07(A)(5)], please update when the most recent disclosure statement was submitted as necessary.
- 19) On Page C1-12 [Information per OAC Rule 3745-27-07(E)(3)], please revise the compliance narrative as necessary.
- 20) On Page C1-19 [Information per OAC Rule 3745-27-07(H)(3)(C)], the narrative notes the following "The authorized fill area, the contiguous new unit and proposed vertical expansion are **not** located within 1,000 feet of a water supply well or developed spring." In contrast, the following sentence says "Apex uses and controls two water wells that are on the facility and used to support operations; only one is within 1,000 feet from the limits of waste." Actually, the proposed limits of waste placement will be some 220' from the well located at the main office.

Please revise the narrative to clarify that the proposed expansion is within 1,000 feet of one water supply well.

- 21) Reportedly, the water supply well adjacent to the main office is protected from the limits of waste placement by a "hydrogeologic barrier" as provided by OAC Rule 3745-27-07(H)(3)(C)(iii).

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GENERAL ENGINEERING REVIEW
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Please show that this well is actually isolated by a hydrogeologic barrier. Alternately, the well could be replaced with a cistern.

- 22) On Page C1-21, please revise the facility compliance narrative to note the DFF&O of December 22, 2011.
- 23) Please revise and amend Appendix C1-E (Compliance Violations Summary) as necessary.

**Volume II
(C)(3) Hydrologic Site Investigation Report**

- 24) As available mid-December, 2012, please see Attachment C for further deficiencies as provided by the Southeast District Office's Division of Drinking and Ground Water (Joe Laughery).

**Volume III
(C)(4) Stability Analysis**

- 25) Please see Attachment B for further deficiencies as provided by the Southeast District Office's Geotechnical Resource Group (Brian Queen).

**Volume IV
(C)(5) Calculations**

- 26) As shown within Section (C)(5), please update the "remaining airspace of the existing unit", "anticipated life of facility" and other life estimates. As of December 29, 2010, some 13.9 MCY of permitted airspace remained with a projected remaining life of 5.1 years. With the increased AMDWR alone (without additional airspace), the remaining life of the facility was estimated at 3.6 years.
- 27) As found within Section (C)(5), please revise the reported "Total Cost of Post-Closure Per Acre" to be based on the total permitted 288.5 acres and not the actual surface area of the landfill.

**Volume V
(C)(6), (C)(7), (C)(8), (C)(9) and (C)(10)**

- 28) Within Section (C)(8) [Operational Information], please revise the Odor Management Plan based the resolution of the December 22, 2011 DFF&Os.

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- 29) Please submit two copies of the "final ground water detection monitoring program" so they may be placed within Appendix C9-A (Ground Water Detection Monitoring Program) of the first two copies of the permit application.
- 30) Within Appendix C9-B (Explosive Gas Monitoring Plan), please revisit the "Discussion of Latest Explosive Gas Investigation" as necessary.
- 31) Within Appendix C9-B, please revisit the "Description of the Proposed Monitoring System" to include the installation of permanent gas monitoring probes for "other structures" within 200 feet of the waste limits.

End of Attachment A

ATTACHMENT B
APEX LANDFILL, PTI # 06-08448
GEOTECHNICAL RESOURCE GROUP COMMENTS NOD#1

Hydrostatic Uplift

1. The hydrostatic uplift calculations determined that a factor of safety of 1.40 could not be met as the facility is currently designed. Calculations were also included that indicated a factor of safety above 1.40 could only be achieved once waste is placed in the facility. These calculations verify that the site's current design does not meet OAC 3745-27-08(C)(7)(a) which states:

“The factor of safety for hydrostatic uplift shall not be less than 1.40 at any location during the construction and operation of the facility.”

Since the weight of the liner system at the end of its construction is insufficient to achieve a factor of safety of 1.40 for hydrostatic uplift. The facility should be redesigned. Two possible designs are to raise the floor of the facility so it is not below the piezometric surface or to place a drainage layer beneath the liner to underdrain the liner system to prevent uplift pressure from developing in the areas of concern. It should also be noted that the current underdrain system is not providing drainage to all areas that show a piezometric surface above the liner.

Deep Seated Stability

2. The unit weight of the Municipal solid waste was modeled as 90 pcf. This unit weight is higher than what is typically found in literature, and tended to make the factors of safety slightly higher than what would have been modeled with a lower unit weight. The consultant for the facility should provide a site specific explanation for the higher unit weight or change it to 75pcf and revise the submittal appropriately.
3. The back calculated internal shear strength determined necessary to maintain a factor of safety of 1.5 may not be achievable at the site. The 2005 interface shear strength data is lower than what is required by the back calculation. The consultant for the facility should evaluate if a redesign of the facility is necessary.

Table 1

Material interface	Normal stress (psf)	PTI peak shear strength (psf)	2005 peak shear strength (psf)	PTI post-peak shear strength peak shear strength (psf)	2005 post-peak shear strength (psf)
GCL vs GMX	150		76		60
GCL vs GMX	1000		356		277
GCL vs GMX	3000	1500	1144	875	711
GCL vs RSL	6000	2000	2023	1290	1029
GCL vs GMX	1350	4100	3233	2100	1188

4. Weak saturated sandy clay mine spoil with SPT blow counts less than 4 were found in soil boring SB-20 at an elevation between 1238 and 1242. Soils with blow counts

below 4 have been known to suffer undrained failures during excavation and loading. A cross section in a location similar to that shown in Figure 1 should be evaluated for interim undrained stability.



Figure 1

The undrained shear strength for this weak mine spoil may be best estimated from the consolidated undrained tests performed on samples of the material. Ohio EPA recommends using the following formula to determine the undrained strength ratio (S_u/σ'_v) of the soil:

$$\frac{S_u}{\sigma'_v} = \frac{1}{2} \left(\frac{\sigma_3}{\sigma'_v} + \frac{c_u}{\sigma'_v} \right)$$

Or if σ_3 is inadvertently less than _____ then use _____

Where

- S_u = undrained shear strength
- σ'_v = effective vertical stress and is $= \sigma_3$ for each load being tested
- σ_1 = major principle stress
- σ_3 = minor principle stress
- σ'_p = preconsolidation stress

The undrained stability of the cross section can either be evaluated using the undrained strength of the weak soil prior to loading/excavating or the weight of the structural fill being placed all at once can cause pore water pressure to be created. In the latter the undrained strength ratio can be entered as vertical stress ratios in Slide, and the weight of the structural fill will create the excess pore pressure. In the former the undrained strength can be estimated by multiplying the undrained strength ratio by the pre-excitation vertical stress to determine the cohesion value and setting the $\phi = 0$.

5. There is a 2H : 1V slope associated with the proposed gas management area. The consultant should evaluate the stability of this slope.

Shallow Saturated Stability

6. In the shallow saturated stability calculations the consultant attempted to apply a factor of safety of 2.0 to the calculation by multiplying 2.0 times the peak 100-year 24 hour storm, which resulted in a 5.12 inches/hour rain event or 3.61E-03 cm/sec rain event. However, since the permeability of the vegetative soil was estimated at 4.2E-5 cm/sec the impingement rate used in the calculation defaulted to 4.2E-5 cm/sec for the permeability of the vegetative soil and thereby making the applied factor of safety irrelevant in the calculation. In order to properly apply a factor of safety in this calculation one must apply it to the reduction factors. The consultant should revise the calculation appropriately.
7. The design permeability of the vegetative cover soil is 4.20E-5 cm/sec. Some soils are not able to maintain this low of permeability after drought conditions. Please include the testing of the long term permeability of the vegetative soil in the quality assurance quality control plan. Please refer to Guidance Document 700 "Selecting Material for Cap Protection Layers".
http://www.epa.ohio.gov/portals/34/document/guidance/gd_700.pdf
8. The post settlement slope of the leachate collection pipe between points 1230 and 1229 is 0.20%. This is below the regulatory limit of 0.5%. The consultants should revise the design appropriately.
9. The structural fill area on the west side of phase 7 was not evaluated sufficiently for settlement. Please add the settlement points indicated in Figure 2 and evaluate them for settlement. When this evaluation is complete the consultant will determine that the slopes in these area do not meet the regulation and the design will need to be revised in this area (see) Table 2.



Figure 2

ATTACHMENT B
Apex Landfill, PTI # 06-08448
November 20, 2012

Table 2

Post Settlement Slope and Strain Calculation -- Existing Facility

Point No.	Pipe			Pipe	
	I	J	K	L	E
Top of RSL El.	1207.1	1209.1	1205.6	1212	1210.3
Top of Waste El.	1265.7	1322	1318	1312	1271.2
Top of Existing Ground El.	1182	1174	1188	1180	1159.8
Top of Bedrock El.	1179.0	1171.0	1185.0	1177.0	1156.8
Top of Final Cover El.	1269.7	1326.0	1322.0	1316.0	1275.2
MSW Thickness (ft)	57.6	111.9	111.4	99.0	60.0
Shot Rock Thickness (ft)	22.1	32.1	14.6	29.0	47.4
Residual Soil Thickness (ft)	3.0	3.0	3.0	3.0	3.0
<u>RSL</u>					
Po (psf)	187.5	187.5	187.5	187.5	187.5
ΔP (psf)	5,987	10,874	10,829	9,713	6,201
S _c (ft)	0.012	0.076	0.076	0.064	0.016
<u>Shot Rock</u>					
Po (psf)	1,547	2,247	1,022	2,030	3,321
ΔP (psf)	7,721	13,308	12,038	11,930	9,709
S _c (ft)	1.730	3.084	1.474	2.689	3.864
<u>Residual Soil</u>					
Po (psf)	195	195	195	195	195
ΔP (psf)	9,268	15,555	13,060	13,960	13,030
S _c (ft)	0.184	0.241	0.222	0.229	0.221
Total S _c (ft)	1.926	3.401	1.771	2.982	4.101
Horizontal Dist. (ft)		210	120		150
Original Distance (ft)		210.010	120.051		150.010
Final Distance (ft)		210.001	120.015		150.027
Pre-settlement Slope (%)		-0.95%	2.92%		1.17%
Post-settlement Slope (%)		-0.25%	1.56%		1.91%
Strain (%)		-0.004%	-0.030%		0.011%

⁽¹⁾ Negative strain indicates tension.

Fail

Fail

Pass