The CAREL CORPORATION

October 19, 2009
Project No. 09-09-50

Johnny Williamson, P.G., Project Manager
MC 124
Municipal Solid Waste Permits Section
Texas Commission on Environmental Quality (TCEQ)
P. O. Box 13087
Austin, Texas 78711-3087

**Re: Response to TCEQ Notice of Deficiency Letter Dated September 18, 2009; Mill Creek Landfill: MSW Permit No. 208A; Tarrant County, Texas, Tracking No. 12801177; RN100225994 / CN600650311**

Dear Mr. Williamson:

This letter is written on behalf of Mill Creek Landfill in response to a Texas Commission on Environmental Quality (TCEQ) Notice of Deficiency (NOD) letter dated September 18, 2009 concerning the proposed permit modification to incorporate updated 30 Texas Administrative Code (TAC) 330 Subchapter J rules. The letter requested that several comments be addressed within 30 days (October 18, 2009). The TCEQ's comments/questions are provided below in italics and our response immediately follows.

Comment 1: *In order to assist us in drafting the permit modification sheet, should your proposed action be issued, your submittal needs to include a detailed listing of all portions of the facility permit / permit application affected by your proposed action. This list should include all cover sheets, tables of contents, figures and related revision blocks, attachments, and any other impacted content. Your response contains a "List of Revisions" that in part addresses this request, but also lists changes made to your original application, instead of the facility permit / permit application document. Please remove all references to submittal dates in this list, and instead, revise the list so that it represents an accurate account of all revisions to the current facility permit / permit application document requested in your proposed permit modification application. In addition, please list revisions to text narrative by referencing specific page numbers versus sections of narrative.*

Response: The List of Revisions has been revised per your request and the revised list is attached.

Comment 2: *Please be sure to include the revision of the Tables and Illustrations page in the List of Revisions.*

136 Pecan Street, Keller, Texas 76248
Telephone: 817.337.0112 • Facsimile: 817.337.0041

Response: The revision of the Tables and Illustrations page has been added to the List of Revisions.

Comment 3: *For the entire permit modification application, please remove all references to "upgradient" or "downgradient" monitor wells. Instead, please use the terms "background" or "point of compliance", respectively, when describing wells to maintain consistency with current MSW Rules nomenclature. These changes should also be performed in tables (example, Table 2-1), and on maps and figures.*

Response: The terms "upgradient" and "downgradient" have been replaced with "background" and "point of compliance" where appropriate. Revised pages are attached.

Comment 4: *Figure 5A.43 depicts the proposed facility groundwater monitoring system for the Mill Creek Landfill. The historical groundwater potentiometric surface contour maps (Figures 5A.45 through 5A.54) provided in your application indicate a southwestern direction of groundwater flow between the proposed locations for wells MW-13A and MW-17. This is consistent with the designation of proposed monitor well MW-13A as a "downgradient" (point of compliance) well in Table 2-1. Please revise Figure 5A.43 to extend the facility point of compliance north from proposed point of compliance well MW-17 to proposed well MW-13A.*

Response: Per your request the point of compliance has been extended from proposed well MW-17 to proposed well MW-13A. Revised Figure 5A.43 is attached.

We trust this information meets your needs, please call Ms. Jane Berry at (254) 687-2511 (ext 23019) or me at (817) 337-0112 if you have any questions.

Sincerely,
THE CAREL CORPORATION

Steven J. Wimmer
Geologist

Kevin T. Carel, P.G.
Executive Vice President

STATE OF TEXAS
KEVIN T. CAREL
GEOLOGY
#960
LICENSED
PROFESSIONAL GEOSCIENTIST

10-19-09

Att.: TCEQ Part 1 Application Page 1 and Signature Page
List of Revisions
Attachment 5 – Underlined/Strikeout Replacement Pages
Attachment 5 – Clean Replacement Pages

cc: TCEQ Region 4 Office
Jane Berry – Republic Services, Inc. (e-copy)
Mark Allendorf – Republic Services, Inc. (e-copy)

# TCEQ Part 1 Application Page 1 and Signature Page

# Texas Commission on Environmental Quality

## Permit or Registration Application for Municipal Solid Waste Facility

## Part I

### A. General Information

| | | | | |
|---|---|---|---|---|
| Facility Name: | Mill Creek Landfill | | | |
| Physical or Street Address (if available): | 7797 Confederate Park Road | | | |
| (City) (County)( State)( Zip Code): | Fort Worth | Tarrant | TX | 76108 |
| (Area Code) Telephone Number: | 254-687-2511 | | | |
| Charter Number: | | | | |

If the application is submitted on behalf of a corporation, provide the Charter Number as recorded with the Office of the Secretary of State for Texas.

| | | | | |
|---|---|---|---|---|
| Operator Name[1]: | Crow Landfill TX, LP | | | |
| Mailing Address: | 2559 FM 66 | | | |
| (City) (County)( State)( Zip Code): | Itasca | Hill | TX | 76055 |
| (Area Code) Telephone Number: | 254-687-2511 | | | |
| (Area Code) FAX Number: | 254-687-2977 | | | |
| Charter Number: | | | | |

If the permittee is the same as the operator, type "Same as Operator".

| | | | | |
|---|---|---|---|---|
| Permittee Name: | Same as Operator | | | |
| Physical or Street Address (if available): | | | | |
| (City) (County)( State)( Zip Code): | | | TX | |
| (Area Code) Telephone Number: | | | | |
| Charter Number: | | | | |

If the application is submitted by a corporation or by a person residing out of state, the applicant must register an Agent in Service or Agent of Service with the Texas Secretary of State's office and provide a complete mailing address for the agent. The agent must be a Texas resident.

| | | | | |
|---|---|---|---|---|
| Agent Name: | CT Corporation System | | | |
| Mailing Address: | 350 N. St. Paul Street | | | |
| (City) (County)( State)( Zip Code): | Dallas | Dallas | TX | 75201 |
| (Area Code) Telephone Number: | 214-979-1172 | | | |
| (Area Code) FAX Number: | 214-754-0921 | | | |

Application Type:

| | | | | | |
|---|---|---|---|---|---|
| ☐ | Permit | ☐ | Major Amendment | ☐ | Minor Amendment |
| ☐ | Registration | ☒ | Modification | ☐ | Temporary Authorization |
| | | ☒ | w/Public Notice | | |
| | | ☐ | w/out Public Notice | ☒ | Notice of Deficiency Response |

[1] The operator has the duty to submit an application if the facility is owned by one person and operated by another [30 TAC 305.43(b)]. The permit will specify the operator and the owner who is listed on this application [Section 361.087 Texas Health and Safety Code].

**Signature Page**

I, Jane Berry (Operator), Environmental Manager (Title),

certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: [signature] Date: 10/14/09

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TO BE COMPLETED BY THE OPERATOR IF THE APPLICATION IS SIGNED BY AN AUTHORIZED REPRESENTATIVE FOR THE OPERATOR

I, ______________________ (Print or Type Operator Name), hereby designate ______________________ (Print or Type Representative Name)

as my representative and hereby authorize said representative to sign any application, submit additional information as may be requested by the Commission; and/or appear for me at any hearing or before the Texas Commission on Environmental Quality in conjunction with this request for a Texas Water Code or Texas Solid Waste Disposal Act permit. I further understand that I am responsible for the contents of this application, for oral statements given by my authorized representative in support of the application, and for compliance with the terms and conditions of any permit which might be issued based upon this application.

______________________
Printed or Typed Name of Operator or Principal Executive Officer

______________________
Signature

---

SUBSCRIBED AND SWORN to before me by the said ______________________

On this 14 day of October 2009.

My commission expires on the 7 day of April, 2012

KAREN L. FULLER
NOTARY PUBLIC
STATE OF TEXAS
EXPIRES
04-07-2012

Karen L Fuller
Notary Public in and for

Hill County, Texas

(Note: Application Must Bear Signature & Seal of Notary Public)

# List of Revisions

## LIST OF REVISIONS

The following table summarizes the proposed replacement pages for the Permit Modification Request to Revise the Spacing of Monitoring Wells in the Groundwater Monitoring System at the Mill Creek Landfill prepared by The Carel Corporation and submitted to the Texas Commission on Environmental Quality on October 19, 2009.

**Attachment 5, Groundwater Characterization Report**
**Replacement Pages**

| Revision | Page Number | Explanation |
|---|---|---|
| Cover Page and Table of Contents | i-ii | Pages have been signed and sealed for updated Attachment 5. |
| Tables and Illustrations | iii | Revised to include Table 2-1. |
| Section 1.4.3, Flowpath Analysis | 5-6 | Revised well nomenclature to be consistent with MSW Rules. |
| Section 2.1, Groundwater Monitoring System | 5-10 | Updated to reflect current site conditions and to reference maps in Figures 5-A.45 through 5-A.54. |
| Section 2.1.1, Previous Groundwater Monitoring Network | 5-11 | Added to provide a discussion of the previous groundwater monitoring network and to discuss decommissioning of wells with long screen intervals. Previous Section 2.1.1, Monitoring Well Placement, was deleted as much of it was outdated. |
| Section 2.1.2, Revised Groundwater Monitoring Network | 5-11 | Added to provide a discussion of the proposed groundwater monitoring system and to discuss decommissioning of wells with long screen intervals and installation of replacement wells. Also provides the time requirements for installation or decommissioning of wells. |
| Section 2.1.3, Monitoring Well Design | 5-12 | Redesignated from Section 2.1.2 and updated to reflect current regulations. |
| Table 2.1 | 5-13 | Added to provide well construction information for the existing and proposed monitoring wells. |
| Section 2.2, Groundwater Sampling and Analysis Plan (GWSAP) | 5-14 | Redesignated from Section 2.4 and updated to reflect current regulations. Previous Section 2.2, September 2007 Revised Groundwater Monitoring System, deleted as information is now discussed in Section 2.1.2. |
| Section 2.3, Assessment of Corrective Measures | 5-14 | Added to include ACM report in permit. Previous Section 2.3, September 2008 Revised Groundwater Monitoring System, deleted as information is now discussed in Section 2.1.2. |
| Section 3, References | 5-15 | Renumbered. |
| Figure 5-A.42, Existing Monitoring Well Location Map | 5-A.42 | Added to depict current, authorized monitoring well system. |
| Figure 5-A.43, Proposed Monitoring Well Location Map | 5-A.43 | Modified to illustrate the proposed groundwater monitoring wells. Renumbered (was previously Figure 5-A.42). |
| Figure 5-A.44, Existing and Proposed Monitoring Well Details | 5-A.44 | Modified to reflect the construction of existing and proposed monitoring wells. Renumbered (was previously Figure 5-A.43). Previous Figures 5-A.44 through 5-A.46 deleted as all monitor well construction details are now included on Figure 5-A.44. |
| Figures 5-A.45 through 5-A.54, Historical Groundwater Contour Maps | 5-A.45 to 5-A.54 | Added to provide historic contour maps. |
| Figure 5-A.55, Design Certification | 5-A.55 | Renumbered. |
| Figure 5-A.56, Nature and Extent of Dissolved Arsenic Addendum and Assessment of Corrective Measures | 5-A.56 | Added per TCEQ request to include ACM report in permit. |

# Attachment 5
# Underlined/Strikeout Replacement Pages

# MILL CREEK LANDFILL
# TARRANT COUNTY, TEXAS
# TCEQ MSW Permit No. 208A

# SITE DEVELOPMENT PLAN PART III
# ATTACHMENT 5
# GROUNDWATER CHARACTERIZATION REPORT

Prepared for

CROW LANDFILL TX, LP

September 1994

Revised February 1995

Technically Complete August 8, 1995

Prepared by


EMCON Baker-Shiflett, Inc.
Engineering and Environmental Services
Fort Worth, Texas


Project 7500-001-103

~~Revised August 2009~~

<u>Revised October 2009</u>

By


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# CONTENTS



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# TABLES AND ILLUSTRATIONS

## Tables

Calculated hydraulic gradients for the upper hydrogeologic unit range from a minimum of 0.005 ft/ft to a maximum of 0.01 ft/ft, with an average value of 0.007 ft/ft. To be conservative, flowpaths in the uppermost hydrogeologic unit were evaluated using both the average and maximum hydraulic gradient values. Using the gradient for the upper sand unit and assuming that this gradient is a flowpath and that one of these resultant flowpaths intercepts the top of the Paluxy shale, the tangent law for groundwater flow refraction, analogous to Snell's law for light refraction, was used to calculate the hydraulic gradient of the shale unit (Fetter, 1988, page 140, and Freeze and Cherry, 1979, page 172). Groundwater flowlines refract when crossing a geologic boundary between two units of different hydraulic conductivity values (Freeze and Cherry, 1979). Calculations using this tangent law for the hydraulic gradient (angle of groundwater flow) in the Paluxy shale, along with calculations for flow velocities and travel times through the shale, are provided on Figures 5-A.39 through 5-A.41.

Two scenarios were modeled in the groundwater flowpath analysis. The assumption is made in both scenarios that any potential contaminant would be an organic or inorganic constituent of the Subtitle D groundwater monitoring requirements. The analysis further assumes that constituents are in their dissolved phase and remain soluble in order to be detected in groundwater samples. Here it is assumed that a Subtitle D contaminant released into the uppermost aquifer would occur in a dissolved phase within the aquifer and would migrate along the groundwater flowlines in that aquifer. This simple groundwater model does not include contaminant dispersion, diffusion, adsorption, or degradation. Basic assumptions in the model and their source are listed in Table 1-2.

TABLE 1-2
FLOWPATH ANALYSIS ASSUMPTIONS AND RESULTS

| SCENARIO 1: PALUXY SHALE IS ASSUMED TO BE ABSENT | | | | | | |
|---|---|---|---|---|---|---|
| | Hydraulic Conductivity K (cm/sec) | Hydraulic Gradient i (ft/ft) | Effective Porosity $n_e$ | Velocity V (ft/yr) | Flowpath Distance (ft) | Travel Time (years) |
| CASE 1 Upper Sand | $4.7 \times 10^{-4}$ (1) | 0.007 (2) (average) | 0.29 (3) | 11.7 | 200 (4) | 17 |
| CASE 2 Upper Sand | $4.7 \times 10^{-4}$ (1) | 0.01 (2) (maximum) | 0.29 (3) | 16.8 | 200 (4) | 12 |

Note: Source of parameter values:
(1) K (upper sand) – geometric mean of values calculated from slug tests (see Figure 5-A.34).
(2) i (upper sand) – calculated from potentiometric surface maps (see Figures 5-A.1 and 5-A.2).
(3) $n_e$ (upper sand) – from Manger, 1963 (see Figure 5-A.34).
(4) Flowpath Distance (upper sand) – estimated from the leachate sump to the nearest ~~downgradient~~ point of compliance well.

TABLE 1-2 (continued)

| SCENARIO 2: PALUXY SHALE IS PRESENT | | | | | | |
|---|---|---|---|---|---|---|
| | Hydraulic Conductivity K (cm/sec) | Hydraulic Gradient i (ft/ft) | Effective Porosity $n_e$ | Velocity V (ft/yr) | Flowpath Distance (ft) | Travel Time (years) |
| CASE 1 Upper Sand | 4.7 X $10^{-4}$(1) (average) | 0.007(3) | 0.29(5) | 11.7 | 200(7) | 17 |
| Shale | 4.7 X $10^{-5}$(2) (average) | 0.07(4) | 0.07(6) | 48.6 | 143(8) | 3 |
| CASE 2 Upper Sand | 4.7 X $10^{-4}$(1) (maximum) | 0.01(3) | 0.29(5) | 16.8 | 200(7) | 12 |
| Shale | 4.7 X $10^{-5}$(2) (maximum) | 0.10(4) | 0.07(6) | 69.4 | 143(8) | 2 |

Note: Source of parameter values:
(1) K (upper sand) – geometric mean of values calculated from slug tests (see Figure 5-A.34).
(2) K (shale) – assumed to be one order of magnitude less than the upper sand (conservative value allows for sandy areas in shale).
(3) i (upper sand) – calculated from potentiometric surface maps (see Figures 5-A.1 and 5-A.2).
(4) i (shale) – calculated using the hydraulic gradient of the upper sand and the tangent law for refraction of groundwater.
(5) $n_e$ (upper sand) – from Manger, 1963 (see Figure 5-A.34).
(6) $n_e$ (shale) – from Fetter, 1988, page 74.
(7) Flowpath Distance (upper sand) – estimated from the leachate sump to the nearest ~~downgradient~~ point of compliance well.
(8) Flowpath Distance (shale) – calculated using a 10-foot thickness for the shale unit.

Scenario 1 assumes that no Paluxy shale or clay is present below the uppermost sand unit. Hypothetically, this would be the worst-case scenario with the assumption being that without the "perching" characteristic of an underlying less permeable shale, additional monitoring wells would be needed deeper in the section in order to intercept contaminant migration. However, the groundwater model for Scenario 1 indicates that if a contaminant release occurred in the most upgradient northwest corner of the site and traveled a horizontal distance of approximately 2,800 feet where it reached the ~~most downgradient~~ point of compliance monitoring well (~~proposed~~ MW-6), it would have traveled a vertical distance of 20 feet. The flowpaths parallel the potentiometric surface, as expected in the absence of vertical gradients. The absence of vertical gradients at the site was identified by the use of clustered piezometers (P-1/P-1A, P-2/P-2A, P-3/P-3A, P-4/P-4A) screened at different intervals within the upper hydrogeologic unit (see preceding Section 1.1). As previously discussed, water levels measured in these clustered piezometers revealed almost identical hydraulic heads. In conclusion, the Scenario 1 groundwater model indicates that flowpaths parallel the potentiometric surface and that wells screened within the potentiometric surface would intercept potential contaminants. Calculated groundwater flow velocity for the upper sand unit ranges from 11.7 to 16.8 feet per year. A range in velocity was calculated using the average (0.007 ft/ft) and the maximum (0.01 ft/ft) hydraulic gradients for the upper sand unit. Travel time in the upper sand unit from the lowest downgradient point of the facility (leachate sump) to the closest ~~downgradient~~ point of compliance monitoring well (MW-6) were calculated to range from 12 to 17 years. A graphic representation of Scenario 1 is on Figure 5-A.35; calculations are on Figures 5-A.37 and 5-A.38.

Scenario 2 was modeled using assumptions which most closely represent the subsurface lithologies as they exist at the site, including the uppermost hydrogeologic (sand) unit and the underlying Paluxy shale unit. The conservative assumption is made that the most permeable lithology (clayey sand) found within the shale makes up the entire unit, thereby ignoring the lower permeability effects of the shale where it is not as sandy. As illustrated on Figure 5-A.36, groundwater flowpaths in the upper sand unit do not intersect the underlying Paluxy shale. If the shale unit were horizontal, then a contaminant in the upper sand flowpath could intersect the shale at a low angle. Scenario 2 assumes the hypothetical situation of a horizontal shale strata with intersecting upper sand flowpaths. In this scenario, a contaminant flowpath in the upper sand unit would be refracted at the shale boundary and hydraulic gradient, flow velocity, and travel time through the shale would be altered. The hydraulic gradient (angle of groundwater flow) for the shale was calculated using the tangent law which allows for the refraction of groundwater as it travels across a conductivity boundary. The exact location of the potential contaminant beneath the landfill liner system is arbitrary. The purpose of this model is to calculate the distance, velocity, and travel time of a contaminant through the Paluxy shale. As in Scenario 1, conservative values were used in this groundwater model. As previously explained, the conservative hydraulic conductivity value of $4.7 \times 10^{-5}$ cm/see was used in Scenario 2 for the Paluxy shale unit. To calculate the distance traveled through the Paluxy shale, a minimum thickness of 10 feet of shale was used. This is a conservative value considering that the thickness of the shale was identified to range from 10 to 25 feet across the site (see Section 2.2.2 in Attachment 4). Groundwater flow velocity calculations for the shale unit range from 48.6 to 69.4 feet per year. A range in velocity was calculated using the average (0.07 ft/ft) and the maximum (0.10 ft/ft) hydraulic gradients for the Paluxy shale unit. Travel times calculated for groundwater migrating through 10 feet of shale range from about 2 to 3 years. Scenario 2 is graphically represented on Figure 5-A.36; calculations are on Figures 5-A.39 through 5-A.41.

In conclusion, the groundwater models constructed for flowpath analysis of the site indicate that a potential contaminant would likely flow parallel to the potentiometric surface along flowlines in the upper sand unit. Due to the gradient of the Paluxy shale unit and the demonstrated absence of vertical gradients, these flowlines do not intersect the shale. In the unlikely event that a contaminant flowpath intersects the underlying Paluxy shale and moves through the shale to the underlying Paluxy sand, the time period before detection would increase a minimum of 2 to 3 years. This, of course, ignores any associated travel times through the underlying Paluxy sand. Therefore, monitoring wells screened in the upper hydrogeologic (sand) unit would detect a contaminant years before it would be detected in any deeper well.

# 2 GROUNDWATER MONITORING CONSIDERATIONS

## 2.1 Groundwater Monitoring System

Groundwater at the site was determined to exist within a single, unconfined hydrogeologic unit consisting of transmissive alluvial deposits overlying Paluxy sand/sandstone, "perched" above a less permeable Paluxy shale. This unit is the uppermost aquifer at the site and will therefore be monitored. Screened intervals for the existing monitoring wells range from 10 to 25 feet in length and are emplaced such that high water levels are within the screen and screened intervals extend approximately 15 feet below the low water table. All wells extend below the base of excavation. If a release occurs from the facility, it will occur at or near the water table. A flowpath analysis (see Section 1.4.3) indicates that in the absence of vertical gradients a potential contaminant would likely flow laterally, parallel to the potentiometric surface, toward the screens of the proposed monitoring wells in the upper sand unit. The Paluxy shale which immediately underlies this unit is indicated to be approximately 10 to 25 feet thick and serves as the lower confining unit (aquitard) to the upper sand aquifer. The shale would inhibit the downward migration of fluids. In the unlikely event that a contaminant moves through the underlying less permeable shale stratum, calculated travel times indicate that the time period before detection of the contaminant would increase a minimum of 2 to 3 years. Considering the potential travel time through a lower sand unit beneath the shale, a monitoring well screened within this lower sand would detect a contaminant years later than it would be detected in the upper hydrogeologic (sand) unit. Flowpath analysis calculations and graphic representations are on Figures 5-A.35 through 5-A.41.

The existing groundwater monitoring system design was based on the potentiometric surfaces illustrated on Figures 5-A.1 and 5-A.2 of this attachment. Ten new groundwater contour maps were constructed at the request of the TCEQ. The maps were constructed using water-level data collected during groundwater sampling events conducted from November 2000 to June 2009. The new maps, designated as Figures 5-A.45 through 5-A.54, indicate groundwater at the site generally flows to the south and east, with the area proximal to OW-5B being upgradient. Groundwater flow characteristics are addressed in the previous section.

Monitoring well designs and locations were chosen using principles of groundwater monitoring and site characterizations recognized by the U.S. Environmental Protection Agency, the National Ground Water Association, and the Texas Commission on Environmental Quality (TCEQ). In addition, the well locations have been designed in accordance with 30 TAC §330.403(a)(2).

### 2.1.1 Previous Groundwater Monitoring Network

The original groundwater monitoring network for the facility was installed in 1983 and consisted of four (4) monitor wells (MW-1, MW-2, MW-3, and MW-4). OW-5B was installed in 1991 as a background (upgradient) monitoring well. Wells MW-1, MW-2, MW-3, and MW-4 were replaced in 1995 by 12 new monitor wells (MW-1B, MW-2B, MW-3B, MW-4B, MW-6, MW-7, MW-8, MW-9, MW-10, MW-11, MW-12, and MW-13) as part of the facility's required upgrade to the Subtitle D regulations. Wells MW-1B, MW-2B, MW-3B, MW-4B, OW-5B, MW-6, MW-7, MW-8, MW-9, MW-10, MW-11, MW-12, and MW-13 were installed with screen lengths ranging from 20 to 25 feet. These wells, with the exception of MW-11 and MW-12, are now proposed to be decommissioned in response to TCEQ concerns that the long screens are the main cause of groundwater impacts. Piezometer P-14 was subsequently installed in 1998 for additional hydraulic control in the northern portion of the site.

MW-15 was installed in November 2006 and MW-16A was installed in December 2007 as a result of a confirmed statistical exceedance of arsenic above the groundwater protection standard in MW-4B. MW-3C, MW-4C and MW-8A were installed in December 2007. MW-10A was approved to be installed in a February 13, 2009 permit modification.

### 2.1.2 Revised Groundwater Monitoring Network

In order to comply with 30 TAC §330.403(a)(2) and 30 TAC §330.421 the facility proposes to modify the groundwater monitoring network. The proposed future ground water monitoring system will be comprised of fourteen monitor wells. Two new monitor wells (MW-7A and MW-17) are proposed to be installed in order to maintain a 600 foot well spacing along the Point of Compliance (POC). Twelve (12) of the nineteen (19) existing monitor wells (MW-1B, MW-2B, MW-3B, MW-4B, OW-5B, MW-6, MW-7, MW-8, MW-9, MW-10, MW-13 and MW-15) are proposed to be decommissioned because they are not constructed in accordance with 30 TAC 330.421(a)(2)(D) and in response to TCEQ concerns that they are the main cause for the groundwater impacts experienced at the facility. Eight wells (MW-1C, MW-2C, MW-5C, MW-6A, MW-7A, MW-9A, MW-13A, and MW-15A are proposed to be installed as replacements to MW-1B, MW-2B, OW-5B, MW-6, MW-7, MW-9, MW-13 and MW-15. MW-3C, MW-4C, MW-8A, and MW-10A will replace MW-3B, MW-4B, MW-8, and MW-10. Existing wells MW-11 and MW-12 are not located downgradient of waste and are proposed to be converted to observation wells. Water-levels will be collected from MW-11 and MW-12 during routine, background, detection and assessment monitoring events. Existing monitor wells are depicted on Figure 5-A.42, Existing Monitoring Well Location Map. Proposed monitor wells and the POC are depicted on Figure 5-A.43, Proposed Monitoring Well Location Map.

It is proposed that monitor well replacement and decommissioning will occur as follows:

- Monitor wells MW-1C, MW-2C, MW-5C, MW-6A, MW-7A, MW-9A, MW-13A, MW-15A and MW-17 will be installed within one hundred twenty (120) days of the approval date of this permit modification request.

- Monitor wells MW-1B, MW-2B, MW-3B, MW-4B, OW-5B, MW-6, MW-7, MW-8, MW-9, MW-10, MW-13, and MW-15 will be decommissioned upon completion of background monitoring for their respective replacement wells (MW-1C, MW-2C, MW-3C, MW-4C, MW-5C, MW-6A, MW-7A, MW-8A, MW-9A, MW-10A, MW-13A, and MW-15A).

- Monitor wells MW-11 and MW-12 will be designated as observation wells upon approval of this permit modification request.

If physical obstacles preclude installation of the ground water monitoring wells at proposed locations, the wells will be installed at the closest practical distance hydraulically downgradient from the relevant point of compliance that will ensure detection of ground water contamination. The design of the monitoring system was based on site-specific technical information. Certification of the system is provided as Figure 5-A.55.

MW-1C, MW-2C, MW-3C, MW-4C, MW-6A, MW-7A, MW-8A, MW-9A, MW-10A, MW-13A, MW-15A, MW-16A and MW-17 will be located at the point of compliance (i.e., the vertical surface no more than 500 feet from the hydraulically downgradient limit of the waste management unit boundary, extending down through the uppermost ground water underlying the regulated units, and located on land owned or operated by the Mill Creek Landfill). Monitor wells MW-11 and MW-12 will be converted to observation wells and shall be utilized for water level measurements only during each regularly scheduled groundwater monitoring event. ~~Upgradient~~ Background monitor well MW-5C will be sampled for constituents listed in the facility Groundwater Sampling and Analysis Plan during each regularly scheduled groundwater monitoring event.

### 2.1.3 Monitoring Well Design

Monitoring well designs for the existing wells that will be maintained as part of the Groundwater Monitoring Network and proposed monitoring wells are presented in Table 2-1 and illustrated on Figure 5-A.44 of this attachment. Well designs for the proposed monitoring wells were determined based on 1) geologic and hydrogeologic correlations illustrated on the geologic cross sections in Appendix 4C of Attachment 4 (Figures 4-C.4 through 4-C.9), 2) an intra-well approach to detection monitoring statistical analysis, and 3) TCEQ standards. As previously discussed, the point of compliance wells will be screened within transmissive sands of the Paluxy Formation and the overlying remnants of alluvial deposits. Installation of each of the proposed monitoring wells will be in accordance with 30 TAC §330.421.