California Regional Water Quality Control Board
Santa Ana Region

July 20, 2009

UPDATE TO THE AGENDA

(Prepared 7-16-09)

The following item has been postponed:

***6. <u>Revised Waste Discharge Requirements for Frank R. Bowerman (FRB) Landfill, Orange County - Order No. R8-2009-0012</u>**
This item is postponed to the August 28, 2009 Board Meeting in order to address several revisions requested by the discharger.

California Regional Water Quality Control Board
Santa Ana Region

July 10, 2009

STAFF REPORT

ITEM: 6

SUBJECT: Revision of Waste Discharge Requirements for Orange County Waste & Recycling, Frank R. Bowerman Landfill, Order No. R8-2009-0012

DISCUSSION:

Orange County Waste & Recycling (hereinafter discharger) owns and operates the Frank R. Bowerman (FRB) Landfill located at 11002 Bee Canyon Access Road in an unincorporated area of Orange County near the City of Irvine. The FRB Landfill is a Class III landfill that accepts non-hazardous municipal solid waste.

The discharger is currently regulated under Waste Discharge Requirements Order Nos. 89-1, 96-67, 97-70, 98-99, and R8-2002-0049. The discharger submitted an application in April 2008 to expand the permitted footprint of the landfill. The vertical expansion will increase the maximum built-out elevation of the landfill from 1,100 feet to 1,350 feet above mean sea level. The lateral expansion will increase the current 341-acre disposal area to approximately 534 acres. The proposed expansion will increase the landfill airspace from 117 to 266 million cubic yards. Proposed Order R8-2009-0012 updates, replaces and consolidates the above referenced orders into one order, and incorporates the future expansions of the existing footprint at the landfill.

Regional Board staff has reviewed the expansion, design and construction plans, and finds them to be consistent with the requirements of the California Code of Regulations, Title 27. This expansion should not result in any adverse impacts to either the present or potential beneficial uses of the waters of the Region, if conducted in accordance with the terms and conditions of this order.

RECOMMENDATION:

Adopt Order No. R8-2009-0012, as presented.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SANTA ANA REGION

ORDER NO. R8-2009-0012

WASTE DISCHARGE REQUIREMENTS
FOR

ORANGE COUNTY
WASTE & RECYCLING

FRANK R. BOWERMAN LANDFILL
CLASS III SOLID WASTE DISPOSAL SITE
ORANGE COUNTY

DRAFT

The California Regional Water Quality Control Board, Santa Ana Region (hereinafter Regional Board), finds that:

1. Orange County Waste & Recycling (hereinafter Discharger) owns and is responsible for the operation and maintenance of the Frank R. Bowerman Landfill (FRB). FRB is a Class III landfill that accepts non-hazardous municipal solid waste (MSW). The Landfill is located at 11002 Bee Canyon Access Road in an unincorporated area of Orange County near the City of Irvine. Landfilling operations at FRB began in 1990. Approximately 341 acres of the original 725-acre site have been surveyed and permitted for waste disposal activities to date. The permitted footprint of the FRB landfill is located in portions of Blocks 117, 118, 119, 143, and 144 of the Irvine Subdivision of the County of Orange, at latitude 33°42'31" and longitude 117°42'30". The location of the facility is shown on **Attachment A**, which is hereby made a part of this order.

2. The discharge of waste to land is regulated by California Code of Regulations, Title 27 (Title 27). The terms used in this order are contained in Title 27, Subdivision 1, Chapter 2, §20150, §20163, §20164, and §20415.

3. FRB currently operates under Waste Discharge Requirements (WDR) Order Nos. 89-01, 96-67, 97-70, 98-99, and R8-2002-0049. The current permitted capacity of FRB is 117 million cubic yards (mcy). This order updates and replaces WDR Order Nos. 89-01, 96-67, 97-70, R8-2002-0049, and only those portions of WDR Order No. 98-99 that apply to FRB.

4. Storm water discharges from FRB are regulated by State Water Resources Control Board (SWRCB) Water Quality Order No. 97-03-DWQ, NPDES General Permit No. CAS000001, for discharges of storm water associated with industrial activities.

5. FRB is located near the City of Irvine in the upper reach of Bee Canyon. The property lines of the landfill are roughly aligned with the ridgelines of the canyon. Elevations across the site range from 900 feet above mean sea level (MSL) to 1,800 feet above MSL.

6. FRB is located in the western foothills of the northern Santa Ana Mountains. These mountains form the northernmost extension of the Peninsular Ranges Geomorphic province, a region characterized by northwest-trending mountain ranges bounded by right-lateral strike-slip faults. The Santa Ana Mountains are bounded to the east by the Elsinore fault

and to the west by the Coastal Plain of the Los Angeles Basin. The Santa Ana River cuts a westward-draining canyon separating the Santa Ana Mountains to the south from the Puente Hills to the north.

7. The northern Santa Ana Mountains are underlain by a sequence of Jurassic through Quaternary rocks (about 190 million years before present – Recent) that rests uncomfortably on plutonic (igneous intrusive) rocks of the Cretaceous-age southern California batholith. The oldest rock units exposed in the mountains include the middle Jurassic metasedimentary rocks of the Bedford Canyon Formation and a range of igneous dikes, flows and tufts of the late Jurassic to early-Cretaceous Santiago Peak Volcanics (Schoellhamer et al., 1981).

8. FRB is located approximately 10 miles west of the Elsinore Segment of the Whittier-Elsinore fault zone system and approximately 11 miles south of the Whittier Segment of that fault zone system. The Newport-Inglewood fault zone is located approximately 14 miles west of the site and the closest approach of the Elysian Park fold and thrust belt is approximately 15 miles northwest of the site. Other local active faults include the San Jacinto and San Andreas faults, located 33 and 41 miles east and northeast of the site respectively, and Sierra Madre-Cucamonga fault zone, located approximately 28 miles north of the site. Numerous unnamed faults cross the site, but none are known to be active.

9. A large active landslide is present on the north end of the landfill in the middle of the north expansion area. The landslide will be remediated prior to construction of the Phase VIII liner expansion project at FRB.

10. The site is located in an arid to semi-arid environment. Average annual site precipitation is estimated to be approximately 15.1 inches based on precipitation data collected from Irvine Station #75 using available rainfall data from October 1987 to November 2005. According to an isopleths map from the National Weather Service, FRB is located in an area with an evaporation rate between 50 and 55 inches per year.

11. The principal water-bearing units in the vicinity of FRB are located west of the site in the Los Angeles Coastal Plain. The Coastal Plain extends from the Santa Monica Mountains southeastward and terminates where the San Joaquin Hills and Santa Ana Mountains merge in southern Orange County. The southeastern portion of the Coastal Plain is known as the Tustin Plain, and it is recharged by ephemeral creeks from the adjacent highlands. San Diego Creek is the principal surface water course through the Tustin Plain, and Bee Canyon is a tributary to this water course. San Diego Creek's beneficial uses are listed below:

    a. Water Contact Recreation,

    b. Non-Contact Water Recreation,

    c. Warm Freshwater Habitat, and

    d. Wildlife Habitat.

12. No perennial surface water courses exist at the FRB site, although two historical springs (S-1 and S-2) and four seeps (S-3 through S-6) have been mapped within the site boundaries. Springs S-1 and S-2 are located along the northern edge of the site and emanate from sandstones and shales, respectively, of the La Vida member of the Puente Formation. Discharge from these springs is estimated to be approximately 0.1 gallons per minute.

Seeps S-3, S-4, and S-5 are also located in the northern portion of the site within the Puente Formation, and occur as seepage from sandstone beds and support higher than normal vegetation. Minor groundwater also surfaces from the Vaqueros Formation sandstone at S-6. In addition to these buried historical seeps and springs, which have been engineered to drain into the subdrain beneath the liner system, recent grading activities in the Phase VII area have produced several seeps along the base of landslides above the undisturbed Vaqueros Formation near an existing desilting basin. The combined flow from these new seeps is approximately 15 gallons per minute, which is sufficient to sustain a pond of surface water in the desilting basin.

13. Although a small amount of groundwater has been encountered in the canyon alluvium, landslide deposits and bedrock at the FRB, these units are generally considered to be non-water bearing because the saturated thickness and extent of the alluvial deposits and the permeabilities of the bedrock formations are too low to yield economically beneficial quantities of water. Furthermore, groundwater at the site naturally contains high concentrations of dissolved solids and minerals that preclude its beneficial use for most purposes. However, groundwater from the site is tributary to the Orange County Groundwater Management Zone, which has the following beneficial uses:

    a. Municipal and Domestic Supply,

    b. Agricultural Supply,

    c. Industrial Service Supply, and

    d. Industrial Process Supply.

14. Seventeen groundwater monitoring wells have been constructed at FRB (**Attachment B**). Historical groundwater elevations indicate that groundwater flows predominantly from northeast to southwest, generally following the pre-landfill topography at a hydraulic gradient of approximately 0.10 ft/ft toward the toe of the landfill. On the basis of available estimates of the hydraulic characteristics of the groundwater-bearing units beneath the site, groundwater flow velocities ranging from less than one foot per year in the low permeability bedrock material to approximately 500 feet per year in the higher permeability alluvial sediments downgradient of the landfill were calculated for FRB.

15. FRB is equipped with a leachate collection and removal system to remove leachate from over the lined units of the landfill. Two subdrain extraction wells were installed in the gravel trench at the toe of the landfill to extract liquids from the subdrain collection system. Two toe drains were also installed along the periphery of the landfill to control and collect seepage water from the side slopes. The extracted liquids are collected and mixed with landfill gas condensate, leachate and potable water for use as dust control on the lined portions of the landfill.

16. In addition to the groundwater monitoring and extraction wells constructed by the Discharger throughout the life of the landfill, six other groundwater wells were identified within a one mile radius of the site. Each of these six wells is located southwest of the site in the Tustin Plain area, east of the inactive El Toro Marine Corps Base. All but one of these six wells has been abandoned, and the remaining well (TIC-86) is operated as a groundwater production well by the Irvine Company. A study by Earth Technology Corp. indicated that the Irvine Ranch Water District has four additional wells within one mile of this site; however, none of these four wells could be located, and they are presumed to be abandoned.

17. Review of historical water quality data indicates that the groundwater quality is naturally highly variable across the site, not only between each geologic formation, but also within a single formation. Background chloride, sulfate, and TDS concentrations vary naturally by as much as an order of magnitude over time in samples from a single well or in samples collected at the same time in different background wells.

18. Volatile organic compounds (VOCs) have been detected in groundwater samples downgradient of the site, and are most often detected in samples from well BC-13. A study has indicated that these VOCs are present in the groundwater in large part due to landfill gas impacts from the waste prism. The VOCs most often detected in samples from BC-13 include 1,1-dichloroethane, tetrachloroethene, and dichlorodifluoromethane. In response to the downgradient detection of VOCs in groundwater, the site is monitored under a Corrective Action Program (CAP) to control and monitor the VOCs in the groundwater. The Discharger has enhanced the landfill gas collection system and final cover system along the front face of the landfill to help limit VOC contamination.

19. The gas recovery system at the FRB consists of a network of horizontal and vertical collection wells. Horizontal collection pipes are installed across the fill area. The gas flare station blowers provide the vacuum necessary to draw the landfill gas (LFG) from the collectors. The horizontal collectors are laid out in a staggered array on every other refuse lift (i.e. 40 to 60 feet vertically). Horizontal spacing between the LFG collector pipes is approximately 150 to 200 feet. Vertical extraction wells have been placed at the FRB along the benches at the existing westerly and northerly slope areas. Initial construction of the LFG flare station was completed in the summer of 1993. The flare station initially consisted of two 1500 standard cubic feet per minute (scfm) LFG flares, two LFG blowers, and related LFG extraction and delivery systems. Additional flare station improvements were completed in 1999, 2002, and 2004. Flare station improvements consisted of two additional LFG flares (for a total of four flares permitted to run at 1,700 scfm), two additional LFG blowers, and a programmable logic controller. In May 2004, one additional flare, permitted to run at 4,200 scfm, and two additional blowers were installed at the site. All five flares and five blowers are currently operating at this time. This system, including additional flares and horizontal and vertical collection wells, will be expanded as the landfill is developed, to provide ongoing control within the performance criteria established and mandated by the South Coast Air Quality Management District, and State and federal regulations.

20. The Regional Board adopted Order No. 89-1 on April 14, 1989, for discharges of MSW to land at FRB. Order No. 89-1 contains discharge requirements, provisions, and monitoring and reporting requirements in accordance with Title 23, Division 3, Chapter 15 of the California Code of Regulations (23 CCR), for landfill design, operations, and groundwater monitoring.

21. Order No. 89-1 was subsequently amended by Order Nos. 93-57 and 94-17, adopted on September 10, 1993 and March 11, 1994, respectively, to incorporate new federal regulations (Title 40, Code of Federal Regulations [40CFR], Part 258, commonly known as Subtitle D), and to prescribe uniform drainage and erosion control system requirements for MSW landfills in the Santa Ana Region.

22. On July 12, 1996, the Regional Board adopted Order No. 96-67, which amended the existing waste discharge requirements (Order Nos. 89-1, 93-57, and 94-17) to use engineered alternatives for bottom and sideslope liners for Phase VA at FRB. Order No. 96-67 requires the discharger to comply with certain provisions and monitoring requirements for construction of the engineered alternative design (EAD) bottom and sideslope liner systems.

23. On July 18, 1997, the State Water Resources Control Board (SWRCB) and the California Integrated Waste Management Board (CIWMB) enacted the Consolidated Regulations for Treatment, Storage, Processing, or Disposal of Solid Waste, Subdivision 1 of new Division 2, Title 27, to replace the non-hazardous waste portions of Title 23, Chapter 15, CCR.

24. On October 17, 1997, the Regional Board adopted Order No. 97-70, which amended Board Order Nos. 89-1, 94-57, 94-17, and 96-67 for FRB to require the discharger to comply with certain provisions and monitoring requirements for construction of the waste containment system using the proposed EAD. This order also included a provision authorizing the Executive Officer of the Regional Board to approve use of the EAD liner system on other steep sideslopes at FRB.

25. On November 20, 1998, Order Nos. 93-57 and 94-17 were rescinded and replaced by Order No. 98-99. This Order contained additional discharge, monitoring, and reporting requirements that require the Discharger to maintain FRB in accordance with Title 27 and with State Board Resolution No. 93-62, *Policy for Regulation of Discharges of Municipal Solid Waste* (Resolution No. 93-62).

26. On May 31, 2002, the Regional Board adopted Order No. R8-2002-0049 amending the then current WDRs for the site to allow for the Phase VD expansion of the permitted footprint of the landfill. This 12-acre expansion area utilizes an EAD for the bottom and sideslopes of the Phase VD.

27. The existing landfill footprint consists of construction phases I, II, IIIA, IIIB, IVA/B, IVC, VA/B and VC, VD, VIIA, and VIIB, with differing liner systems as shown on **Attachment C**. The existing footprint of FRB is approximately 341 acres.

28. Currently, FRB is using two types of approved alternative daily cover (ADC) at the site to cover the wastes at the end of the day. The ADCs approved for the site are: processed green material (PGM) and geosynthetic blankets (tarps). Before any other type of ADC can be used at the site, the Discharger must submit a proposal to, and obtain approvals from, the Executive Officer of the Regional Board.

29. The Discharger submitted an application in April 2008 to expand the permitted footprint of FRB as documented in the Master Development Plan. The vertical expansion of FRB will increase the maximum built-out elevation of the landfill from 1,100 feet to 1,350 feet above mean sea level (including approximately 4 feet of final cover over 1 foot of foundation soil). The lateral expansion will increase the current 341-acre disposal area to approximately 534 acres. The proposed expansion will increase the landfill airspace from 117 to 266 million cubic yards. The expanded footprint of FRB is shown on **Attachment D**, which is hereby made a part of this order.

30. The Final Environmental Impact Report (EIR) No. 604 (SCH No. 2005071102) was certified by the County Board of Supervisors on August 15, 2006. Addendum No. 1 to the Final EIR clarifies the landfill expansion capacity information and was certified on April 21, 2008.

31. Regional Board staff have reviewed and commented on the EIR. If the project is carried out in a manner that implements all the mitigation measures provided for in the Final EIR, and the Discharger complies with Order No. R8-2009-0012, there should be no adverse environmental impacts, including water quality, from the landfill.

32. The California Water Code (CWC) §13263(a) requires that waste discharge requirements implement relevant water quality control plans. The requirements contained herein are

intended to assure compliance with the Water Quality Control Plan, Santa Ana River Basin, including water quality objectives and beneficial uses. The Discharger is proposing to implement a waste containment system that meets or exceeds the requirements imposed by Title 27 to protect water quality.

33. As part of the permit application for the expansion of FRB, the Discharger has requested the use of an EAD for both the bottom and side-slope liner systems in place of the prescriptive standard design (PSD). The proposed EAD is equivalent to that previously approved by Order Nos. 96-67 and 97-70.

34. Title 27 §20240(c) stipulates that there shall be a five-foot separation zone between MSW and the highest anticipated elevation of underlying groundwater. There are portions of FRB where, prior to liner construction, natural groundwater seeps were observed at ground surface. The proposed EAD liner for the FRB expansion areas includes the use of a subdrain system to intercept and collect the intermittent flow from the seeps, in lieu of a five-foot separation zone beneath the landfill. Regional Board staff have evaluated the Discharger's engineering analysis and concluded that the subdrain component of the EAD liner systems meets the requirements of Title 27 §20080(c) for protection of water quality, and is equivalent to that provided by a five-foot separation zone between the historic high groundwater elevation and the first lift of refuse.

35. Regional Board staff has reviewed the Joint Technical Document (JTD), which is equivalent to a report of waste discharge. It includes the slope stability analyses; the construction quality assurance/ construction quality control (CQA/CQC) plan; final closure and postclosure maintenance plans (PCMP); the financial assurance plan; and the design, operation, and drainage control plans for the expansion areas. During the JTD review period, Regional Board staff provided comments to, and received responses from, the Discharger. All comments were incorporated in the final JTD.

36. The capability of the EAD liner systems to afford water quality protection equivalent to the PSD system depends largely on good quality control during manufacturing of the materials used and diligent CQA/CQC during the installation of these materials.

37. The Discharger is proposing to implement a rigorous CQA/CQC program for all phases of the project. This CQA/CQC program is intended to identify and correct any problems associated with the construction of the landfill liner systems. The goal of the CQA/CQC program is to prevent any potential tears or other imperfections in the base and side-slope liner systems.

38. A quality assurance/ quality control (QA/QC) program is also implemented during the operation of the landfill. This program includes load checking to screen waste material that comes into the landfill for disposal in order to remove and properly dispose of hazardous waste detected in the waste stream. The QA/QC program also includes on-going monitoring of various elements of the landfill's liner containment system[1] so that any problems detected will be corrected immediately.

39. The proposed post-closure land use is non-irrigated open-space, landscaped with low-maintenance ground cover and native plants and shrubs.

[1] The liner containment system includes the landfill liner and leachate collection and recovery system (LCRS), which may also include subdrains, and a protective soil layer placed over the liner and LCRS system.

40. The Regional Board has notified the Discharger and interested agencies and persons of its intent to prescribe revised WDRs for FRB.

41. The Regional Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT **IS HEREBY ORDERED** that the Discharger, in order to meet the applicable provisions contained in the California Water Code (CWC), Title 27, and 40CFR Part 258, shall comply with the following:

A. DISCHARGE SPECIFICATIONS

1. GROUNDWATER:

The discharge shall neither cause nor contribute to the contamination or pollution of groundwater via the release of waste constituents in either the liquid or gaseous phase.

2. SURFACE WATER:

The discharge shall neither cause nor contribute to any surface water contamination, pollution, or nuisance, including, but not limited to:

a. Floating, suspended, or deposited macroscopic particulate matter or foam;
b. Increases in bottom deposits or aquatic growth;
c. An adverse change in temperature, turbidity, or apparent color change beyond natural background levels and occurrences;
d. The creation or contribution of visible, floating, suspended, or deposited oil or other products of petroleum origin; and
e. The introduction or increase in concentration of toxic or other pollutants/ contaminants resulting in unreasonable impairment of beneficial uses of the waters of the State.

3. UNSATURATED ZONE:

The discharge shall not cause any increase in the concentration of waste constituents in soil-pore gas, soil-pore liquid, soil, or other geologic materials beneath or outside of the FRB if such waste constituents could migrate to the waters of the State and cause a condition of contamination, pollution, or nuisance.

4. PRECIPITATION AND DRAINAGE CONTROL

a. Waste management units shall be designed, constructed, and maintained to prevent, to the greatest extent possible, ponding, infiltration, inundation, erosion, slope failure, and washout which could occur as a result of precipitation from a 100-year, 24-hour frequency storm.

b. Units shall be designed and constructed to achieve compliance with Title 27, §20365.

c. Top deck surfaces shall be constructed to achieve a minimum three-percent slope and to direct flows to downdrains.

d. Downdrains and other necessary drainage structures must be constructed for all sideslopes.

e. All containment structures shall be protected and maintained continuously to prevent commingling of leachate and gas condensate with surface run-on and runoff and to ensure their effectiveness.

f. The operation of a municipal solid waste landfill facility shall not cause a discharge of pollutants into waters of the United States, including wetlands, that violates any requirements of the Clean Water Act (CWA), including, but not limited to, the National Pollutant Discharge Elimination System (NPDES) requirements, pursuant to Title IV Section 402.

5. LIQUIDS USAGE:

a. The discharge of liquids, including groundwater, leachate or landfill gas condensate, or their use for dust control or irrigation, at a MSW landfill is prohibited, unless the following conditions are met:

   i. The liquids are being returned to, or used at, the landfill that produced it; **and**

   ii. The portion of the landfill to which these liquids are discharged is equipped with a containment system meeting the requirements of Section B of this order; **or**

   iii. The liquids generated from the site are disposed of in accordance with a disposal plan approved by the Executive Officer of the Regional Board.

b. This section shall not apply to groundwater, leachate, and landfill gas condensate generated from a MSW landfill that is treated in accordance with an approved plan prior to being used for dust control or irrigation over the unlined portions of the site.

6. ALTERNATIVE LINER DESIGN:

Engineered alternative liner design - The Discharger has demonstrated that the EAD for FRB (including the expansion areas) liner system satisfies the criteria for an engineered alternative to the PSD (as provided by Title 27, §20080 (b)). The performance of the EAD equals or exceeds the waste containment capability of the PSD. For each phase of liner construction, the following shall apply:

a. An approved construction quality assurance/ construction quality control (CQA/CQC) program for the EAD shall be implemented during each phase of construction;

b. All mitigation measures proposed by the Discharger shall be implemented to protect water quality;

c. The Discharger and its contractors shall submit progress reports on a weekly basis to the Regional Board during the construction of the landfill's EAD so that compliance with Item (a), above, can be determined. Daily summary reports, including all construction activities and tests, shall be submitted by 12:00 PM the following day;

d. Within 90 days of completion of the EAD, the Discharger shall submit a final as-built report including drawings, maps, and CQA/CQC certification; and

e. If the EAD fails to perform as expected, the Regional Board reserves the right to require additional protective measures at the landfill.

B. CONTAINMENT SYSTEMS INSTALLED BEYOND THE EXISTING FOOTPRINT

Discharge prohibition – The discharges of MSW to any area of FRB beyond the existing footprint of the site is prohibited unless approved by the Regional Board, and such discharge is to an area equipped with a containment system that is constructed in accordance with the standard of the industry, and that meets the additional requirements for both liners and leachate collection systems in accordance with an approved JTD or JTD addendum, and any additional requirements of Title 27, §§20330, 20080, 20340, and 20360; and State Board Resolution No. 93-62.

C. PROVISIONS

1. The Discharger shall comply with all discharge prohibitions, discharge specifications, provisions, and monitoring and reporting requirements of this order immediately upon its adoption.

2. The discharge of wastes shall not cause the release of pollutants or waste constituents in a manner that could cause a condition of contamination, pollution, or nuisance to occur, as indicated by the most appropriate statistical or non-statistical data analysis method and retest method.

3. The treatment or disposal of wastes shall not cause a nuisance or pollution, as defined in the CWC, §13050.

4. All wastes shall be maintained on property owned or controlled by the Discharger.

5. The discharge of hazardous or designated wastes at the site is prohibited.

6. The disposal of liquid wastes into the landfill is prohibited, except as allowed by Discharge Specification A.5 of this order.

7. The operation of the FRB shall not cause a discharge of pollutants into waters of the United States, including wetlands, that violates any requirements of the CWA, including, but not limited to, the NPDES requirements, pursuant to CWA Section 402.

8. Title 27, §20330, and 40 CFR §258, stipulate that, as of October 9, 1993, a prescriptive composite liner[2] design, (or PSD, must be included in all waste containment systems at MSW landfills. This design must include, at a minimum, an upper synthetic flexible membrane[3] liner (FML) that is at least 60-mils[4] thick (if a high density polyethylene FML is used), and a lower component of soil that is at least two feet thick with a hydraulic conductivity no more than $1x10^{-7}$ cm/s. However, Resolution No. 93-62, and Title 27, §20080 allow for engineered alternatives to the prescriptive liner requirements, provided the performance criteria contained in 40CFR §258.40(a)(1) and (c), and Title 27 §20080(b), are satisfied.

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[2] A liner is a containment system, usually constructed of low permeability materials such as clay or plastic, which are placed at the bottom of a landfill, between the refuse and the natural subgrade. The purpose of the liner is to prevent, as much as is possible, the infiltration of contaminated water from the landfill into groundwater and is a requirement of current, applicable regulations (40CFR, Title 27, and the CWA).

[3] A membrane or geomembrane is a thin, impermeable material used as a liquid or vapor barrier.

[4] A "mil" is a unit of length equal to 1/1000 inch (0.0254 millimeters), used in measuring the diameter of wire, fabrics, or geosynthetics. "Geosynthetic" is a general term for all synthetic materials used in geotechnical engineering applications such as geotextiles, geocomposites, geogrids, geonets, and geomembranes.

9. During the months when precipitation can be expected, disposal activities shall be confined to the smallest area possible based on the anticipated quantity of wastes that will be received and on operational procedures.

10. The Discharger shall remove and properly dispose of any wastes that are placed at the site in violation of these requirements.

11. The Discharger shall establish and maintain monuments in California coordinates (or equivalent) to define the boundary of the footprint of the landfill. The control benchmarks shall be certified by a licensed surveyor or a professional civil engineer authorized to practice in California.

12. The water used during landfill operations shall be limited to the minimum amount reasonably necessary for dust control purposes, fire suppression, and minor maintenance.

13. Adequate cover shall be placed over all lifts except the active face. ADC or soil is used on the active face of the landfill.

14. At the end of each operating day, as defined in FRB's solid waste facility permit, or if landfilling operations cease for more than a 12-hour period, daily cover or an approved ADC must be placed over the active face in a quantity and depth sufficient to prevent waste from daylighting, or as directed by Regional Board staff.

15. The Discharger shall notify the Regional Board within 48 hours of any slope failure occurring in a waste management unit. Any failure that threatens the integrity of containment features or the landfill shall be promptly corrected after a remediation workplan and schedule have been approved by the Executive Officer of the Regional Board, unless it poses an immediate threat to the environment or landfill containment structures. Then it will be corrected as soon as possible.

16. The Discharger shall implement the attached M&RP No. R8-2009-0012 in order to detect any unauthorized discharge of waste constituents from the landfill, or any unreasonable impairment of beneficial uses caused by or associated with discharges of waste to the Unit.

17. At any time, the Discharger may file a written request, including appropriate supporting documents, with the Executive Officer of the Regional Board, proposing modifications to M&RP No. R8-2009-0012. The Discharger shall implement any changes in the revised M&RP approved by the Regional Board's Executive Officer upon receipt of a signed copy of the revised M&RP.

18. The compliance period shall be in accordance with Title 27, §20410. At a minimum, the compliance period is equal to the active life of the landfill plus the closure period.

19. Concentration Limits – The concentration limit for any given Constituent of Concern (COC) or Monitoring Parameter in a given monitored medium at an MSW landfill shall be in accordance with Title 27, §20400.

D. CONTINGENCY RESPONSES

1. **Leachate seep** – The discharger shall immediately report by telephone the discovery of any seepage from or soil staining at the site. If feasible, a sample of the leachate shall

be collected and analytical data submitted to the Regional Board. A written report shall be filed with the Regional Board within seven days, containing at least the following information:

a. Map – A map showing the location(s) of seepage;

b. Flow rate – An estimate of the flow rate or volume;

c. Description – A description of the nature of the discharge (e.g., all pertinent observations and analyses); and

d. Corrective measures - Measures proposed to address any seep(s) for approval by Regional Board staff.

2. **An initial indication of a release** – Should the initial statistical or non-statistical comparison of the groundwater monitoring data under Title 27, §20415 for any COC or Monitoring Parameter indicate that a release is tentatively identified, the discharger shall immediately notify the site's designated Regional Board staff person by phone. The discharger shall also provide written notification by certified mail within seven days of such determination (Title 27, §20420(j)(1)) and shall carry out a discrete retest in accordance with Title 27, §20415(e)(8)(E). The discharger shall inform the Regional Board of the outcome of the retest as soon as the results are available, and follow up with written results submitted by certified mail within seven days of completing the retest.

3. **Retest** – If the retest confirms the existence of a release, the discharger shall carry out the requirements of Title 27, §20420(k) and §20425.

4. **Physical evidence of a release** – If either the discharger or the Regional Board determines that there is significant physical evidence of a release (Title 27, §20385(3)), the discharger shall conclude that a release has been discovered and shall:

   a. Immediately notify the Regional Board of this fact by certified mail (or acknowledge the Regional Board's determination);

   b. Carry out the requirements of Title 27, §20420(k) and §20425 for all potentially affected monitored media; and

   c. Carry out any additional investigations stipulated in writing by Regional Board staff for the purpose of identifying the cause of the release.

5. **Release beyond facility boundary** – Any time the discharger or Regional Board staff concludes that a release from the Unit has proceeded beyond the facility boundary, the discharger shall so notify all persons who either own or reside upon the land that directly overlies any part of the plume (Affected Persons).

   a. **Initial notice** – Initial notification to Affected Persons shall be accomplished within 14 days of making this conclusion and shall include a description of the discharger's current knowledge of the nature and extent of the release.

   b. **Updated notice** – Subsequent to initial notification, the discharger shall provide updates to all Affected Persons, including any persons newly affected by a change in the boundary of the release, within 14 days of concluding there has been any material change in the nature or extent of the release.

c. **Submittal** – Each time the discharger sends a notification to Affected Persons, the discharger shall, within seven days of sending such notification, provide Regional Board staff with both a copy of the notification and a current mailing list of all Affected Persons.

6. **Response to VOC detection in background**

a. **Detection and verification** - Except for VOCs validated as not having come from the landfill, any time the laboratory analysis of a sample from a background monitoring point shows either two or more VOCs at or above their respective method detection limit (MDL), or one VOC at or above its respective practical quantitation limit (PQL), then the discharger shall immediately notify Regional Board staff by phone that possible background contamination has occurred; shall follow up with written notification by certified mail within seven days; and within thirty days, shall obtain two new independent VOC samples from that background monitoring point and send them for laboratory analysis of all detectable VOCs. If either or both of these retest samples validate the presence of VOCs at that background monitoring point using the above procedure, the discharger shall:

i. **Notification** - Immediately notify the Regional Board about the VOCs verified to be present at that background monitoring point, and follow up with written notification submitted by certified mail within seven days of validation; and

ii. **Report** - Within 180 days of validation, submit a report, acceptable to the Regional Board staff that examines the possibility that the detected VOC(s) originated from the Unit (e.g., using concentration gradient analyses) and proposes appropriate changes to the monitoring program.

b. **VOCs not from landfill** - If, after reviewing the report, Regional Board staff determines that the VOC(s) detected originated from a source other than the Unit, the Regional Board will make appropriate changes to the monitoring program.

c. **VOCs likely from landfill** - If, after reviewing the report, Regional Board staff determines that the detected VOC(s) most likely originated from the Unit, the discharger shall be notified that a release has been detected and shall immediately begin carrying out the requirements of Title 27, §20420(k) and §20425.

E. WATER SAMPLING AND ANALYSIS

All water quality monitoring and sampling analysis for the monitored media, and the monitoring points and background monitoring points for each such medium, shall be in accordance with Title 27, §20415.

1. Monitoring parameters for the required monitoring program(s) at the landfill shall be approved by Regional Board staff. Regional Board staff may approve alternative monitoring parameters that meet the requirements of both Title 27, §§20380 et seq. and 40 CFR §258.54. Regional Board staff may also approve alternative statistical methods that meet the requirements of Title 27, §20415(e) and 40 CFR §258.53.

2. **Latter third/thirty days** – For any given monitored medium, samples shall be taken from all monitoring points and background monitoring points to satisfy the data analysis

requirements. All samples shall be taken during the latter third of the Reporting Period within a maximum of 30 days, and shall be taken in a manner that insures sample independence to the greatest extent feasible, in accordance with Title 27, §20415(e)(12)(B).

3. **Elevation/field parameters** – Shall be in accordance with Title 27, §20415(e)(13). Groundwater elevations taken prior to purging the well and sampling for monitoring parameters shall be used to fulfill the Spring and Fall groundwater flow rate/direction analyses required under item 5, below.

4. **Data analysis** – Data analysis shall be carried out as soon as the monitoring data are available, in accordance with Title 27, §20415(e).

5. **Groundwater flow rate/direction** – Shall be monitored in accordance with Title 27, §20415(e)(15). This information shall be included in the regular monitoring reports for FRB.

F. DRAINAGE AND EROSION CONTROL

1. Waste management units shall be designed, constructed, and maintained to prevent, to the greatest extent possible, ponding, infiltration, inundation, erosion, slope failure, and washout which could occur as a result of precipitation from a 100-year, 24-hour frequency storm. This shall be accomplished by, at a minimum, the following:

   a. Top deck surfaces shall be constructed to achieve a minimum of one percent (1%) slope, including structures which direct water to downdrains;

   b. Downdrains and other necessary drainage structures must be constructed for sideslopes as necessary; and

   c. Components which protect or convey drainage from the waste containment system must be designed and constructed to withstand site-specific maximum intensity precipitation (peak flow[5]) from a 100-year, 24-hour storm.

2. Leachate and landfill gas condensate containment system structures shall be protected and maintained to provide for their effectiveness and to prevent commingling of leachate and gas condensate with surface run-on and runoff.

3. The Discharger shall design, construct, and maintain:

   a. A run-on drainage control system to prevent flow from off-site sources onto the disposal areas of the landfill (active or inactive portions), and to collect and divert the peak flow calculated volume from off-site sources that result from a 100-year, 24-hour storm;

   b. A runoff drainage control system to collect and divert both the calculated volume of precipitation and the peak flow from on-site surface runoff that results from a 100-year, 24-hour storm.

4. All drainage structures shall be protected and maintained to assure their effectiveness.

5. Annually, by October 1, all drainage control system construction and maintenance activities shall be completed. By December 31 of each year, the Discharger shall submit a drainage control system maintenance report to the Regional Board staff of the

Regional Board. The drainage control system maintenance report shall include, but not be limited to, the following information:

a. For the previous 12 months, a summary of the adequacy and effectiveness of the drainage control system to collect and divert the calculated volume of precipitation and peak flows resulting from a 100-year, 24-hour storm;

b. A tabular summary of both new and existing drainage control structures, including the types and completion dates of maintenance activities performed for each of these structures; and

c. An 11"x17" or larger site map indicating the locations of the elements listed in Item b., above, and the flow direction of all site drainage.

6. At least 30 days prior to the construction of any new elements of the drainage control system, the Discharger shall submit a workplan outlining all design parameters and calculations, construction details, and a construction quality assurance plan for approval by Regional Board staff.

7. The Discharger shall submit as-built drawings within 4 weeks of completing construction of any new elements of the drainage control system at the site.

8. All design plans, construction plans, and operation and maintenance plans shall be prepared by, or prepared under the direct supervision of, a registered civil engineer or a certified engineering geologist.

9. Periodic inspection of all waste management units, the drainage control system, and all containment structures shall be performed to assess the conditions of these facilities, and to initiate corrective actions necessary to maintain compliance with Provisions F.1 through F.5 of this order.

10. The facility shall be surveyed once a year either by aerial surveillance or a licensed surveyor to assure compliance with the one percent slope requirements. By December 31 of each year, a map compiled from the survey data shall be submitted to Regional Board staff, showing landfill elevations, the flow direction of all site drainage, the drainage control system, and containment structures.

11. The Discharger shall notify the Regional Board staff site representative by telephone (951-782-4130) within two business days of determination of a failure of facilities necessary to maintain compliance with the requirements in this order. Within five days, the notification shall be submitted in writing to the Regional Board.

12. The Discharger shall maintain a copy of this order at the site so it is available at all times to site operating personnel.

13. The Discharger shall permit the Regional Board:

a. Entry upon premises where a discharge source is located;

b. To copy any records required to be kept under terms and conditions of this order;

c. To photograph or videotape any structures, facilities, activities, or other phenomena that could result in adverse impacts to water quality and that are pertinent to compliance of the landfill with its WDRs; and

d. To sample any discharges from the landfill.

14. The Discharger shall notify the Regional Board in writing of any proposed change in ownership or responsibility for construction, operation, closure, or post-closure maintenance of the landfill. This notification shall be given prior to the effective date of the change and shall include a statement by the new discharger that construction, operation, closure, and post-closure maintenance will be in compliance with any existing WDRs and any revisions thereof.

G. REQUIRED REPORTS AND NOTICES

1. REPORTING PROVISIONS:

   a. Applications, reports or information submitted to the Regional Board shall be signed and certified in accordance with 40CFR §122.22.

   b. The Discharger shall furnish, within a reasonable time, any information the Regional Board may request to determine whether cause exists for modifying, reissuing, or terminating this order. The Discharger shall also furnish to the Regional Board, upon request, copies of records that this order requires the discharger to maintain.

2. The Discharger shall file a JTD or JTD amendment with the Regional Board at least 120 days before making any material change or proposed change in the character, location, volume, treatment, or disposal methods of any discharge of waste.

3. The Discharger shall give advance notice to the Regional Board of any planned changes in the permitted facility or site activities that may result in noncompliance with these WDRs.

4. In the event of any change in control or ownership of land or waste discharge facilities currently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of this order by letter. A copy of this letter shall be signed by the new owner accepting responsibility for complying with this order, and shall be forwarded to the Executive Officer of the Regional Board.

5. **CLOSURE AND POST-CLOSURE MAINTENANCE PLANS:**

   a. In accordance with Title 27, §21780 (b)(3), final closure and PCMPs for solid waste landfills shall be submitted two years prior to the anticipated date of closure. Within five years of the anticipated date of closure, the operator may submit the final closure and PCMPs in lieu of submitting new or updated preliminary closure and PCMPs.

   b. An alternative monolithic final cover using on-site soil was modeled to determine whether the alternative cover would be consistent with the performance goal addressed by the prescriptive standard. The soils used for the model exhibited a grain size distribution that excluded particles in excess of three inches and had a minimum fines-content passing U.S. No. 200 Sieve of 20 percent by weight, and a minimum fines-content less than five microns of seven percent by weight. In addition, the cover soils exhibited a maximum saturated hydraulic conductivity of 5.0 x 10^{-6} cm/sec.

      Based on the model results, Regional Board staff approved the five year alternative final cover demonstration project. The cover was constructed using a minimum five-

foot-thick layer of soil derived from the on-site fine-grained soils as described above, and compacted to 90 percent of maximum dry density according to ASTM D1557. A prescriptive cover was also constructed adjacent to the alternative cover.

The Discharger submitted a report titled *Alternative Final Cover Evaluation Report for the Front Face Demonstration Area* (report), dated October 16, 2008. This report compiled the results of five years of moisture monitoring on both the alternative final cover and the prescriptive final cover. The results show that the alternative final cover performance is equivalent to the prescriptive and will exceed it in performance for the long-term. Therefore, Regional Board staff have approved the use of alternative cover design at FRB with design characteristics noted above. The PCMP has been updated to incorporate the changes in cover design.

6. FINANCIAL ASSURANCE PLANS:

The Discharger shall obtain and maintain assurances of financial responsibility for:

a. Closure activities pursuant to Title 27 §22205;

b. Post-closure maintenance activities pursuant to Title 27 §22210;

c. Operating liability pursuant to Title 27 §22215; and

d. Corrective action activities pursuant to Title 27 §22220.

I, Gerard J. Thibeault, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, Santa Ana Region, on July 10, 2009.

Gerard J. Thibeault
Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SANTA ANA REGION

ORDER NO. R8-2009-0012

MONITORING AND REPORTING PROGRAM FOR ORANGE COUNTY WASTE & RECYCLING FRANK R. BOWERMAN LANDFILL CLASS III SOLID WASTE DISPOSAL SITE ORANGE COUNTY

A. GENERAL

1. The discharger shall comply with all the monitoring programs required under this Monitoring and Reporting Program (M&RP).

2. Water Quality Protection Standard (Water Standard) – The Water Standard shall consist of the list of Constituents of Concern (COC) (under Title 27, §20395), the Concentration Limits (under Title 27, §20400), and the Point of Compliance and all Monitoring Points (under Title 27, §20405). The Water Standard shall apply during the active life of the landfill, the closure period, the postclosure maintenance period, and during any compliance period (under Title 27, §20410).

3. The Water Standard concentration limits shall be assumed to be equal to background concentration limits for all COCs unless the discharger proposes, and the Regional Board approves, an alternative Water Standard. The discharger shall perform all monitoring activities in compliance with the Water Standard, and the requirements of both Title 27, §20390 and 40 CFR §258.50 et seq.

4. The Concentration Limit for any given COC or Monitoring Parameter in a given monitored medium (e.g., the uppermost aquifer) shall be established in accordance with Title 27, §§20400 and 20415(e)(6, 7, and 10), and shall be used as the basis of comparison with data from the monitoring points in that monitored medium. Concentration Limits Greater than Background (CLGB), established pursuant to Title 27, §20400(c, d, and e) for each Appendix II constituent, are presented in Table 1 of this M&RP. Monitoring parameters, COCs, CLGB, data evaluation procedures, and reporting requirements for the required water quality monitoring programs for the FRB Landfill are specified in this M&RP. This M&RP may be revised and approved by the Executive Officer of the Regional Board as necessary to reflect changes in the required water quality programs.

5. The Regional Board shall specify the Points of Compliance at which the Water Standard applies, in accordance with Title 27, §20405. All Point of Compliance Monitoring Point and Background Monitoring Point locations and depths shall be in accordance with Title 27, §20415(a-d).

6. The compliance period of the Detection Monitoring Program (DMP) at FRB Landfill shall equal the active life of the landfill plus a 30 year closure period in accordance with Title 27, §20410. The compliance period may be extended if the facility is not in compliance with its Water Standard.

7. Sample collection, storage, and analysis shall be performed according to the most recent version of Standard U.S. EPA Methods (U.S. EPA Publication "SW-846").

8. **CORRECTIVE ACTION SYSTEM**

The corrective action system installed at the landfill toe consists of an enhanced landfill gas collection system and two downgradient monitoring wells, BC-13 and BC-15, to assess the effectiveness of the landfill gas collection system as a means of preventing VOCs from impacting the groundwater. VOC concentrations in groundwater samples collected from corrective action Monitoring Wells BC-13 and BC-15 have significantly decreased since the landfill gas extraction system was enhanced in 1996. The decreasing VOC concentrations in corrective action Monitoring Wells BC-13 and BC-15 are at non-detect and in corrective action Monitoring Well BC-1A, are at trace value concentrations.

9. **MONITORING PARAMETERS**

a. The discharger shall analyze separate water samples from each water-bearing medium for the monitoring parameters approved (see **Attachment E**), and shall test the resulting data using one of the statistical or non-statistical methods listed in Title 27, §20415(e)(7) et seq. Monitoring parameters for the required monitoring program(s) at FRB Landfill shall be approved by the Executive Officer of the Regional Board. The Executive Officer may approve alternative monitoring parameters that meet the requirements of both Title 27, §§20380 et seq. and 40 CFR §258.54. The Executive Officer may also approve alternative statistical or non-statistical analytical methods that meet the requirements of Title 27, §20415(e) and 40 CFR §258.53.

b. The VOCs listed as monitoring parameters in Table 2 are based on a compilation of historical landfill gas and leachate data collected from FRB Landfill. The VOCs contained in Table 2 were detected more than once (confirmed) in either landfill gas or leachate samples. The degradation by-products of the VOCs confirmed in the landfill gas and leachate samples are also included in Table 2. The VOC monitoring parameters list will be updated annually as follows:

i. Any Appendix I VOC or degradation by-products (Table 4) of confirmed VOCs that are detected in the landfill gas sample collected in October of each year and confirmed in the landfill gas sample collected in April of the following year, will be permanently added to the VOC monitoring parameter list included in Table 2.

ii. Any Appendix I VOC or degradation by-products of confirmed VOCs that are detected in the leachate sample collected in October of each year and confirmed in the leachate sample collected in April of the following year, will be permanently added to the VOC monitoring parameter list included in Table 2.

c. The groundwater monitoring parameters shall be evaluated as follows:

i. **Monitoring parameters (metals surrogates) that use statistical data analysis methods**:

(a) **Metals surrogates under 40 CFR §258.54(a)(2)** - pH, chloride, and nitrate as nitrogen, shall be analyzed using an intrawell statistical analysis method specified in Title 27, §20415(e)(8)(C, D, and E). If using SANITAS™, the discharger shall use the "CA Standards" settings. Other inorganic monitoring

parameters, in particular those that can be naturally-occurring (such as metals), shall be evaluated using time-series concentration plots.

ii. **Monitoring parameters (VOCs) that use non-statistical data analysis methods (see Figure 1 for flowchart of data evaluation and retesting procedures)**:

(a) **VOCs-** A release of VOCs in a DMP well will have tentatively occurred if either of the two following triggering conditions is met:
(i) Three or more VOCs exceed their laboratory method detection limits (MDLs) in the sample; or
(ii) One or more VOCs exceed their laboratory practical quantitation or reporting limit (PQL or RL) in the sample.

(b) If a tentative release is indicated in a DMP well, the Regional Board shall be immediately notified and two additional groundwater samples will be collected from this well within 30 days of the notification for retesting (unless laboratory contamination or impacts from naturally-occurring geochemical conditions are suspected). The two additional groundwater samples will be retested in the laboratory for only the constituents detected in the initial sample that triggered the retesting. If either of the two triggering conditions listed above is met for either of the two additional groundwater samples, then the release will be confirmed (see Figure 1).

(c) If the concentration(s) of the confirmed constituent(s) is below its corresponding CLGB (listed in Table 1), then the release will not be considered a significant release and no further action is necessary beyond continued routine semi-annual monitoring (see Figure 1). If the concentration(s) of the confirmed constituent(s) exceeds its corresponding CLGB, then the release will be considered a significant release (see Figure 1).

(d) If the release is confirmed and is considered significant, but is derived from off-site sources, then the discharger shall comply with Title 27, §20420(k)(7) and demonstrate that the landfill is not the cause of the release. If the landfill is the cause of the release, then the discharger shall implement an EMP pursuant to Section B.3 of this M&RP.

10. CONSTITUENTS OF CONCERN (COCS)

The FRB Landfill is equipped with both a liner and a leachate collection and removal system (LCRS) that produces leachate. Therefore, COCs shall be established and monitored as follows:

a. The "COC list" (list of Constituents of Concern required under Title 27, §20395) includes all Appendix II constituents listed in Table 5 of this M&RP.

b. The discharger shall monitor all COCs every five years, pursuant to Title 27, §20420(g). Any COC that exceeds its PQL in any of the monitoring wells will be added to the list of groundwater monitoring parameters for the site.

c. Background sampling for new constituents - For each newly detected Appendix II constituent that is added to the existing monitoring parameter list, the discharger shall establish a reference background value by analyzing at least one sample semi-

annually from each background monitoring point for a period of at least two years. Once this reference set of background data is collected, the discharger shall include it as a separate, identified item in the next monitoring report submittal. Existing background data for the newly identified Appendix II constituents may be substituted for additional background sampling with the approval of the Executive Officer of the Regional Board.

B. MONITORING PROGRAM

1. **Water Quality Monitoring**

   a. The discharger shall comply with the requirements of Title 27, §20415 for any water quality monitoring program developed to satisfy §20420, §20425, or §20430 of Title 27 and the requirements of this order.

      i. The ground water monitoring shall meet the requirements of Title 27, §20415(b) and 40 CFR §§258.51(a, c, and d).

      ii. The surface water monitoring shall meet the requirements of Title 27, §20415(c).

      iii. Unsaturated zone monitoring shall meet the requirements of Title 27, §20415(d).

      iv. All general monitoring requirements shall be in accordance with Title 27, §20415(e).

2. **Detection Monitoring Program (DMP)** - The discharger shall implement the requirements of the DMP as outlined in Title 27, §20420 and as specified in **Attachment E** of this M&RP.

3. **Evaluation Monitoring Program (EMP)** - In the event of the discovery of a release from the expanded unit, the discharger shall implement the requirements of Title 27, §20425. The EMP shall be used to assess the nature and extent of the new release and to design a corrective action program meeting the requirements of Title 27, §20430.

4. **Corrective Action Program (CAP)** – The discharger shall continue to implement the CAP to meet the requirements of Title 27, §20430 and as specified in **Attachment E** of this M&RP. The compliance period of the CAP shall end when the discharger can demonstrate, and the Regional Board concurs, that the site has been in compliance with its Water Standard for a period of three consecutive years.

5. **General Site Monitoring**

   a. At a minimum, all systems such as landfill gas condensate collection, leachate containment, groundwater extraction, and seep water collection systems shall be inspected and evaluated on a monthly basis for their effectiveness. All deficiencies identified and the dates and types of corrective action taken shall be recorded in a permanent log. All deficiencies shall be documented for the record. The volume of liquids collected in the containment structures shall be recorded monthly. Liquid samples, such as gas condensate and leachate, shall be collected in accordance with the monitoring frequency in Table 3, and analyzed for constituents specified in **Attachment E**.

   b. Monthly, the discharger shall inspect all waste management units and shall evaluate their effectiveness in achieving compliance with Discharge Specifications, A and F of

the WDRs. All areas of slope failure, differential settlement, fissuring, erosion, ponding, leachate staining, and seepage into or from the landfill shall be identified, field-marked, and documented. In the event seepage is discovered, the location of each seep shall be mapped and a mitigation plan submitted for the approval of Regional Board staff. All findings shall be photographed for the record.

c. At a minimum, all run-on and runoff drainage control structures shall be inspected and evaluated quarterly for their effectiveness in achieving compliance with Discharge Specification F.3. of the WDRs. During dry weather conditions, the effectiveness of the drainage control system shall be evaluated on the basis of its conformance to the as-built drawings, or revised drawings, for the system. All deficiencies shall be identified, recorded, and repaired.

d. Annually, by October 15, an aerial or ground survey of the landfill facility shall be performed in accordance with the schedule in Table 3 of this M&RP. The Discharger shall notify the Regional Board if the October 15 deadline for the aerial photogrammetric survey cannot be adhered to due to bad weather conditions or bad visibility.

C. REPORTING

1. **Monitoring report contents** - All reports shall be submitted no later than one month following the end of their respective Reporting Period. The reports shall be comprised of at least the following, in addition to the specific contents listed for each respective report:

   a. **Transmittal letter** - A letter summarizing the essential points in the report. This letter shall include a discussion of any requirement violations found since the last such report was submitted, and shall describe actions taken or planned for correcting those violations;

   b. **Compliance evaluation summary** - For groundwater monitoring and COC reports, a compliance evaluation summary containing at least:

      i. **Flow rate/direction** - For each monitored ground water body, a description and graphical presentation (e.g., arrow on a map) of the velocity and direction of ground water flow under/around the Unit, based upon water level elevations taken during the quarterly collection of the water quality samples. The results are reported on a semi-annual basis;

      ii. **Well information** - For each monitoring well addressed by the report, a description of the method and time of water level measurement, and a description of the method of purging used before sampling to remove stagnant water in the well, pursuant to Title 27, §20415(e)(12)(B); and

      iii. **Sampling Information** - For each monitoring point and background monitoring point addressed by the report, a description of the type of pump or other device used and its vertical placement for sampling, and a detailed description of the sampling procedure (number and description of the samples, field blanks, travel blanks, and duplicate samples taken, the type of containers and preservatives used, the date and time of sampling, the name of the person collecting the samples, and any other observations);

c. **Map** - A map (or copy of an aerial photograph) showing the locations of observation stations, monitoring points, and background monitoring points;

d. **Laboratory data** - The laboratory results of all analyses shall be submitted in accordance with Section A.7 of this M&RP;

e. **Leachate monitoring and control facilities, and drainage and erosion control system** - A statement as to the condition and performance of any leachate monitoring and control facilities, containment structures, waste management unit, and the drainage and erosion control systems. The summary shall include a list of deficiencies identified and the dates and types of corrective actions taken to achieve compliance with the requirements contained in this order. If corrective actions for identified deficiencies could not be implemented by the end of the monitoring period; the discharger shall provide the reason(s) for noncompliance and a time schedule for implementing the corrective actions; and

f. **Waste type and placement** - The quantity and types of wastes discharged and the locations in the landfill where waste has been placed since submittal of the last such report.

2. **Compliance monitoring report** - The discharger shall submit monitoring reports for the monitoring periods and reporting due dates specified below, which are also summarized in Table 3. The discharger may propose an alternate schedule and the Executive Officer may approve the proposal or require the discharger to comply under an alternate reporting frequency.

3. **Semi-Annual monitoring reports** - For each monitored medium, all monitoring points assigned to detection monitoring, evaluation monitoring and corrective action monitoring, including all background monitoring points, shall be monitored on a semi-annual basis. Reports prepared for this M&RP shall be submitted semi-annually to the Regional Board in accordance with Table 3.

4. **Leachate Monitoring Report** –

a. **October leachate sampling results** - The discharger shall report to the Regional Board, no later than January 31 of each year, the analytical results of the leachate sample taken the previous October;

b. **April leachate retest results**- If the annual leachate sample taken in October identifies constituents which are not on the updated monitoring parameters list, the discharger shall collect and analyze a retest leachate sample in April. The retest sample shall be analyzed only for the constituents detected in the October sampling event. During any year in which an April leachate retest is carried out, the discharger shall submit a report to the Regional Board no later than August 1 of that year. This report must identify all constituents, including degradation by-products of confirmed constituents(s) that must be added to the landfill's monitoring parameters list as a result of having been detected in both the previous calendar year's October sample and in the April retest sample. The report shall also include an updated monitoring parameter list.

5. **Landfill Gas Monitoring Report –**

   a. **October landfill gas sampling results** - The discharger shall report to the Regional Board, no later than January 31 of each year, the analytical results of the landfill gas sample taken the previous October;

   b. **April landfill gas retest results-** If the annual landfill gas sample taken in October identifies constituents that are not on the updated monitoring parameters list, the discharger shall collect and analyze a retest landfill gas sample in April. The retest sample shall be analyzed only for the constituents detected in the October sampling event. During any year in which an April landfill gas retest is carried out, the discharger shall submit a report to the Regional Board no later than August 1 of that year. This report must identify all constituents that must be added to the landfill's monitoring parameters list as a result of having been detected in both the previous calendar year's October sample and confirmed in the April retest sample (as well as degradation by-products of confirmed constituents(s). The report shall also include an updated monitoring parameter list.

6. **Annual summary report** - The discharger shall submit an annual report to the Board covering the previous monitoring year (April 1 of the previous year through March 31 of the following year). The annual summary reports are due on April 30. This report may be combined with the water quality monitoring report period ending March 31, and shall meet the following requirements:

   a. **Graphical Presentation** - Graphing the Groundwater Analytical Data shall be in accordance with Title 27, §20415(e)(14);

   b. **Tables** - All monitoring analytical data obtained during the two previous semi-annual reporting periods shall be presented in tabular form in the annual summary report and shall be uploaded electronically onto the State's database (GeoTracker) within one month following the submittal of the semi-annual monitoring reports to the Regional Board. The Regional Board regards the submittal of data in hard copy and electronically on the State's database as the form necessary for statistical analysis [Title 27, §20420(h)]. This format facilitates periodic review by the Board's statistical consultant;

   c. **Compliance record discussion** - A comprehensive discussion of the compliance record, and of any corrective actions taken or planned which may be needed to bring the Discharger into full compliance with the landfill's waste discharge requirements relating to water quality issues;

   d. **Waste allocation map** - A map showing the area, if any, in which filling has been completed during the previous calendar year;

   e. **Summary of changes** - A written summary of monitoring results and monitoring and control systems, indicating any changes made or observed since the previous annual report; and

   f. **Leachate control** - For units having leachate monitoring/control facilities, an evaluation of their effectiveness, pursuant to Title 27, §20340(b, c, & d). This evaluation of the effectiveness of leachate monitoring/control systems will be performed under the General Site Monitoring Program described in Section B.5.a. of the M&RP.

7. **Annual drainage control and maintenance report** - Annually, by December 31, an annual site drainage control and maintenance report shall be submitted. The drainage control system maintenance report shall include, but not be limited to, the following information:

   a. For the previous 12 months, a summary of the adequacy and effectiveness of the drainage control system to collect and divert the calculated volume of precipitation and peak flows resulting from a 100-year, 24-hour storm.

   b. A tabular summary of the new and existing drainage control structures including the types and completion dates of maintenance activities performed for each of these structures; and

   c. An 11"x17" site map indicating the locations of the elements listed in Item b., above, and the flow direction of all site drainage.

8. **COC Report at least every five years** - In the absence of a new release being indicated, the discharger shall monitor all parameters on the facility's COC list and submit a report (COC Report).

   a. **Reporting period for COCs** - The discharger shall sample all monitoring points and background monitoring points for each monitored medium for all COCs every fifth year, beginning with the Fall of 2011. The first Reporting Period ends September 30, 2011, with subsequent COC monitoring to be carried out every fifth year thereafter, alternately in the Spring (Reporting Period ends March 31) and the Fall (Reporting Period ends September 30).

   b. **COC report** - This report, which is due one month following the Reporting period, may be combined with any semi-annual monitoring report or annual summary report. Previous COC reports were submitted in 1996, 2001, and 2006. Future COC reports are due every 5 years since the last COC report submittal (in 2011, 2016, 2021, etc.)

9. **Reporting Schedule** - The discharger shall submit the reports/ documents in accordance with the deadlines specified in Table 3.

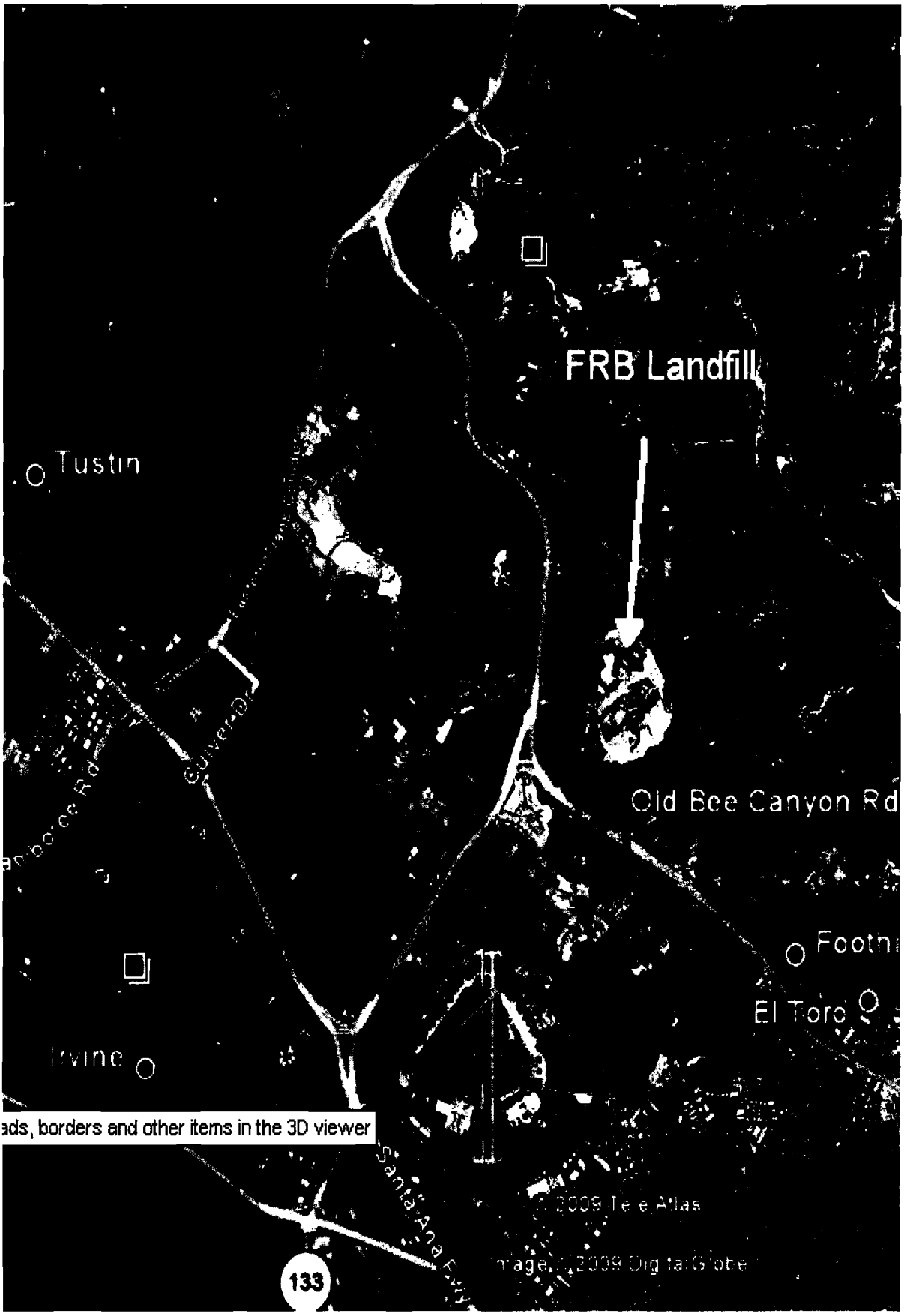
10. **Signature** - All reports shall be signed by a responsible officer or a duly authorized representative of the discharger and shall be submitted under penalty of perjury.

I, Gerard J. Thibeault, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, Santa Ana Region.

Gerard J. Thibeault
Executive Officer

July 10, 2009

Attachment A



Attachment B

Attachment C

FRB Liner Design Phases

Phase I	
Bottom Liner Design	**Side Slope Liner Design**
A 24-inch thick layer of protective cover soil An 8 oz. geotextile A 12-inch thick LCRS gravel drainage layer An 80-mil HDPE geomembrane (textured both sides) A 24-inch thick layer of compacted low-permeability soil A subdrain system	A 36-inch thick layer of protective cover soil A 16 oz. geotextile An 80-mil HDPE geomembrane (a portion is double-sided textured and a portion is smooth on both sides) A 16 oz. geotextile on subgrade
Phases II, IIIA, and IIIB	
Bottom Liner Design	**Side Slope Liner Design**
A 24-inch thick layer of protective cover soil An 8 oz. geotextile A 12-inch thick LCRS gravel drainage layer An 8 oz. geotextile (Phase IIIB only) An 80-mil HDPE geomembrane (textured both sides) An 18-inch thick layer of compacted low-Permeability soil A subdrain system	A 36-inch thick layer of protective cover soil A 16 oz. geotextile An 80-mil HDPE geomembrane (textured both sides) A 16 oz. geotextile on subgrade <u>NO SLOPE AREA ON PHASE IIIB</u>
Phases IVA and IVB	
Bottom Liner Design	**Side Slope Liner Design**
A 24-inch thick layer of protective cover soil An 8 oz. geotextile A 12-inch thick LCRS gravel drainage layer An 80-mil HDPE geomembrane (textured both sides) An 24-inch thick layer of compacted low-Permeability soil A subdrain system	A 36-inch thick layer of protective cover soil A 16 oz. geotextile An 80-mil HDPE geomembrane (textured side down) An 24-inch thick layer of compacted low-Permeability soil
Phases VA	
Bottom Liner Design	**Side Slope Liner Design**
A 24-inch thick layer of protective cover soil An 8 oz. geotextile A 12-inch thick LCRS gravel drainage layer An 80-mil HDPE geomembrane (textured both sides) An 24-inch thick layer of compacted low-Permeability soil A subdrain system	A 36-inch thick layer of protective cover soil A 16 oz. geotextile An 80-mil HDPE geomembrane (textured side down) A GCL Layer A geocomposite drainage layer

Phases VB and VC	
Bottom Liner Design	**Side Slope Liner Design**
A 24-inch thick layer of protective cover soil An 8 oz. geotextile A 12-inch thick LCRS gravel drainage layer An 60-mil HDPE geomembrane (textured both sides) A GCL layer A subdrain system	A 36-inch thick layer of protective cover soil A 16 oz. geotextile An 60-mil HDPE geomembrane (textured side down) A GCL Layer on subgrade
Phases VD	
Bottom Liner Design	**Side Slope Liner Design**
A 24-inch thick layer of 1.5-inch minus protective cover soil An 16 oz. geotextile A 12-inch thick LCRS gravel drainage layer A 16 oz. geotextile An 60-mil HDPE geomembrane (textured both sides) A 12-inch thick layer of compacted low-permeability soil ($K \leq 1 \times 10^{-6}$) A subdrain system	A 24-inch thick layer of 1-inch minus protective cover soil A 16 oz. geotextile An 80-mil HDPE geomembrane (textured side down) A GCL Layer A 40-mil geomembrane (textured both sides) A 16 oz. geotextile on subgrade
Phases VIIA and VIIB	
Bottom Liner Design	**Side Slope Liner Design**
A 24-inch thick layer of protective cover soil An 16 oz. geotextile A 12-inch thick LCRS gravel drainage layer A 16 oz. geotextile An 80-mil HDPE geomembrane (textured both sides) A 12-inch thick layer of compacted low permeability soil ($K \leq 1 \times 10^{-6}$) A subdrain system	A 24-inch thick layer of 1-inch minus protective cover soil A 16 oz. geotextile A 60-mil HDPE geomembrane (textured side down) A GCL Layer A 16 oz. geotextile on subgrade

Attachment D

Attachment E

FRANK R. BOWERMAN LANDFILL

Type of Program	Monitoring Parameters	Monitoring Frequency
Detection water quality monitoring program (DMP Wells)	pH, nitrate, chloride, sulfate, total dissolved solids (TDS), and volatile organic compounds (VOCs) listed in Table 2[1]	Semi-annually
Corrective action water quality monitoring program (CAP Wells)	VOCs listed in Table 2[1]	Semi-annually
Landfill gas condensate analysis	The Appendix II constituents	Annually
Leachate (untreated) monitoring	Appendix II constituents (which are not already groundwater monitoring parameters) and General minerals	Semi-Annually (October and April of each year)[2]
Landfill gas (untreated) monitoring	VOCs specified by SCAQMD Rule 1150.1 Table 1[4] (which are not already groundwater monitoring parameters)	Semi-Annually (October and April of each year)[3]
Vadose Zone Monitoring (perimeter gas probes)	Methane (field), total gaseous non-methane organic hydrocarbons (TGNMO), and the VOCs specified by SCAQMD Rule 1150.1 Table 1[4]	Monthly in the field and quarterly in the laboratory (per Rule 1150.1)
COC analysis	The Appendix II constituents and general minerals	Once every five years
Aerial or ground survey	Not applicable	Annually
General Site Monitoring	Not applicable	Varies (see Section B.5 of M&RP)

1. The list of VOCs shall be updated each year based on leachate and landfill gas testing/retesting programs (See footnote on Table 2).

2. October leachate testing with a confirmation retest in April of the following year.

3. October landfill gas testing with a confirmation retest in April of the following year

4. See attached SCAQMD Rule 1150.1 Table 1

TABLE 1
CONCENTRATION LIMITS GREATER THAN BACKGROUND
FRANK R. BOWERMAN LANDFILL
ORANGE COUNTY, CALIFORNIA

Appendix II Constituent [1]	Drinking Water Maximum Contaminant Level [2] (MCL)	Laboratory Practical Quantitation Limit [3] (PQL)	Concentration Limit Greater Than Background (CLGB)
Acenaphthene		10 ug/l	10 ug/l
Acenaphthylene		10 ug/l	10 ug/l
Acetone		100 ug/l	100 ug/l
Acetonitrile		50 ug/l	50 ug/l
Acetophenone		10 ug/l	10 ug/l
2-Acetylaminofluorene		20 ug/l	20 ug/l
Acrolein		50 ug/l	50 ug/l
Acrylonitrile		10 ug/l	10 ug/l
Aldrin		0.11 ug/l	0.11 ug/l
Allyl chloride		10 ug/l	10 ug/l
4-Aminobiphenyl		20 ug/l	20 ug/l
Anthracene		10 ug/l	10 ug/l
Antimony	0.006 mg/l	0.006 mg/l	0.006 mg/l
Arsenic	0.01 mg/l	0.002 mg/l	0.01 mg/l
Barium	1.0 mg/l	0.100 mg/l	1.0 mg/l
Benzene	1.0 ug/l	5.0 ug/l	1.0 ug/l
Benzo[a]anthracene		10 ug/l	10 ug/l
Benzo[b]fluoranthene		10 ug/l	10 ug/l
Benzo[k]fluoranthene		10 ug/l	10 ug/l
Benzo[ghi]perylene		10 ug/l	10 ug/l
Benzo[a]pyrene	0.2 ug/l	10 ug/l	0.2 ug/l
Benzyl alcohol		10 ug/l	10 ug/l
Beryllium	0.004 mg/l	0.001 mg/l	0.004 mg/l
alpha-BHC		0.04 ug/l	0.04 ug/l
beta-BHC		0.03 ug/l	0.03 ug/l
delta-BHC		0.03 ug/l	0.03 ug/l
gamma-BHC	0.2 ug/l	0.03 ug/l	0.2 ug/l
Bis(2-chloroethoxy)methane		10 ug/l	10 ug/l
Bis(2-chloroethyl) ether		10 ug/l	10 ug/l
Bis(2-chloroisopropyl) ether		10 ug/l	10 ug/l
Bis(2-ethylhexyl) phthalate		10 ug/l	10 ug/l
Bromochloromethane		5.0 ug/l	5.0 ug/l
Bromodichloromethane	100 ug/l	5.0 ug/l	100 ug/l
Bromoform	100 ug/l	5.0 ug/l	100 ug/l
4-Bromophenyl phenyl ether		10 ug/l	10 ug/l
Butyl benzyl phthalate		10 ug/l	10 ug/l
Cadmium	0.005 mg/l	0.001 mg/l	0.005 mg/l
Carbon disulfide	160 ug/l	5.0 ug/l	160 ug/l
Carbon tetrachloride	0.5 ug/l	5.0 ug/l	0.5 ug/l
Chlordane	0.1 ug/l	0.25 ug/l	0.1 ug/l
p-Chloroaniline		10 ug/l	10 ug/l
Chlorobenzene	100 ug/l	5.0 ug/l	100 ug/l
Chlorobenzilate		10 ug/l	10 ug/l
p-Chloro-3-methylphenol		10 ug/l	20 ug/l
Chloroethane		5.0 ug/l	5.0 ug/l
Chloroform	100 ug/l	5.0 ug/l	100 ug/l
2-Chloronaphthalene		10 ug/l	10 ug/l
2-Chlorophenol		10 ug/l	10 ug/l
4-Chlorophenyl phenyl ether		10 ug/l	10 ug/l
Chloroprene		5.0 ug/l	5.0 ug/l

TABLE 1 (cont.)
CONCENTRATION LIMITS GREATER THAN BACKGROUND
FRANK R. BOWERMAN LANDFILL
ORANGE COUNTY, CALIFORNIA

Appendix II Constituent [1]	Drinking Water Maximum Contaminant Level [2] (MCL)	Laboratory Practical Quantitation Limit [3] (PQL)	Concentration Limit Greater Than Background (CLGB)
Chromium	0.05 mg/l	0.01 mg/l	0.05 mg/l
Chrysene		10 ug/l	10 ug/l
Cobalt		0.001 mg/l	0.001 mg/l
Copper	1.0 mg/l	0.005mg/l	1.0 mg/l
m-Methylphenol		10 ug/l	10 ug/l
o-Methylphenol		10 ug/l	10 ug/l
p-Methylphenol		10 ug/l	10 ug/l
Cyanide	0.15 mg/l	0.01 mg/l	0.15 mg/l
2,4-D	70 ug/l	12 ug/l	70 ug/l
4,4-DDD		0.06 ug/l	0.06 ug/l
4,4-DDE		0.05 ug/l	0.05 ug/l
4,4-DDT		0.06 ug/l	0.06 ug/l
Diallate		10 ug/l	10 ug/l
Dibenz[a,h]anthracene		10 ug/l	10 ug/l
Dibenzofuran		10 ug/l	10 ug/l
Dibromomethane		5 ug/l	5 ug/l
Dibromochloromethane	100 ug/l	5.0 ug/l	100 ug/l
1,2-Dibromo-3-chloropropane	0.2 ug/l	0.01 ug/l	0.2 ug/l
1,2-Dibromoethane	0.05 ug/l	0.02 ug/l	0.05 ug/l
Di-n-butyl phthalate		10 ug/l	10 ug/l
o-Dichlorobenzene	600 ug/l	5.0 ug/l	600 ug/l
m-Dichlorobenzene		5.0 ug/l	5.0 ug/l
p-Dichlorobenzene	5.0 ug/l	5.0 ug/l	5.0 ug/l
3,3'-Dichlorobenzidine		10 ug/l	10 ug/l
trans-1,4-Dichloro-2-butene		20 ug/l	20 ug/l
Dichlorodifluoromethane	1,000 ug/l	5.0 ug/l	1,000 ug/l
1,1-Dichloroethane	5.0 ug/l	5.0 ug/l	5.0 ug/l
1,2-Dichloroethane	0.5 ug/l	5.0 ug/l	0.5 ug/l
1,1-Dichloroethene	6.0 ug/l	5.0 ug/l	6.0 ug/l
cis-1,2-Dichloroethene	6.0 ug/l	5.0 ug/l	6.0 ug/l
trans-1,2-Dichloroethene	10 ug/l	5.0 ug/l	10 ug/l
2,4-Dichlorophenol		10 ug/l	10 ug/l
2,6-Dichlorophenol		10 ug/l	10 ug/l
1,2-Dichloropropane	5.0 ug/l	5.0 ug/l	5.0 ug/l
1,3-Dichloropropane		5.0 ug/l	5.0 ug/l
2,2-Dichloropropane		5.0 ug/l	5.0 ug/l
1,1-Dichloropropene		5.0 ug/l	5.0 ug/l
cis-1,3-Dichloropropene	0.5 ug/l	5.0 ug/l	0.5 ug/l
trans-1,3-Dichloropropene	0.5 ug/l	5.0 ug/l	0.5 ug/l
Dieldrin		0.06 ug/l	0.06 ug/l
Diethyl phthalate		10 ug/l	10 ug/l
O,O-Diethyl O-2-pyrazinyl phosphorothioate		20 ug/l	20 ug/l
Dimethioate		20 ug/l	20 ug/l
p-(Dimethylamino)azobenzene		10 ug/l	10 ug/l
7,12-Dimethylbenz[a]anthracene		10 ug/l	10 ug/l
3,3'-Dimethybenzidine		10 ug/l	10 ug/l
2,4-Dimethylphenol		10 ug/l	10 ug/l
Dimethyl phthalate		10 ug/l	10 ug/l
m-Dinitrobenzene		20 ug/l	20 ug/l
4,6-Dinitro-2-methylphenol		10 ug/l	10 ug/l

TABLE 1 (cont.)
CONCENTRATION LIMITS GREATER THAN BACKGROUND
FRANK R. BOWERMAN LANDFILL
ORANGE COUNTY, CALIFORNIA

Appendix II Constituent [1]	Drinking Water Maximum Contaminant Level [2] (MCL)	Laboratory Practical Quantitation Limit [3] (PQL)	Concentration Limit Greater Than Background (CLGB)
2,4-Dinitrophenol		10 ug/l	10 ug/l
2,4-Dinitrotoluene		10 ug/l	10 ug/l
2,6-Dinitrotoluene		10 ug/l	10 ug/l
Dinoseb	7.0 ug/l	0.7 ug/l	7.0 ug/l
Di-n-octyl phthalate		10 ug/l	10 ug/l
Diphenylamine		20 ug/l	20 ug/l
Disulfoton		10 ug/l	10 ug/l
Endosulfan I		0.03 ug/l	0.03 ug/l
Endosulfan II		0.06 ug/l	0.06 ug/l
Endosulfan sulfate		0.06 ug/l	0.06 ug/l
Endrin	2.0 ug/l	0.06 ug/l	2.0 ug/l
Endrin aldehyde		0.13 ug/l	0.13 ug/l
Ethylbenzene	300 ug/l	5.0 ug/l	300 ug/l
Ethyl methacrylate		50 ug/l	50 ug/l
Ethyl methanesulfonate		20 ug/l	20 ug/l
Famphur		20 ug/l	20 ug/l
Fluoranthene		10 ug/l	10 ug/l
Fluorene		10 ug/l	10 ug/l
Heptchlor	0.01 ug/l	0.08 ug/l	0.01 ug/l
Heptachlor epoxide	0.01 ug/l	0.05 ug/l	0.01 ug/l
Hexachlorobenzene	1.0 ug/l	10 ug/l	1.0 ug/l
Hexachlorobutadiene		10 ug/l	10 ug/l
Hexachlorocyclopentadiene	50 ug/l	10 ug/l	50 ug/l
Hexachloroethane		10 ug/l	10 ug/l
Hexachloropropene		10 ug/l	10 ug/l
2-Hexanone		20 ug/l	20 ug/l
Indeno(1,2,3-cd)pyrene		10 ug/l	10 ug/l
Isobutyl alcohol		250 ug/l	250 ug/l
Isodrin		20 ug/l	20 ug/l
Isophorone		10 ug/l	10 ug/l
Isosafrole		10 ug/l	10 ug/l
Kepone		20 ug/l	20 ug/l
Lead	0.015 mg/l	0.005 mg/l	0.015 mg/l
Mercury	0.002 mg/l	0.001 mg/l	0.002 mg/l
Methacrylonitrile		35 ug/l	35 ug/l
Methapyrilene		100 ug/l	100 ug/l
Methoxychlor	30 ug/l	0.57 ug/l	30 ug/l
Methyl bromide		5.0 ug/l	5.0 ug/l
Methyl chloride		5.0 ug/l	5.0 ug/l
3-Methylcholanthrene		10 ug/l	10 ug/l
Methyl ethyl ketone		100 ug/l	100 ug/l
Methyl iodide		5.0 ug/l	5.0 ug/l
Methyl methacrylate		20 ug/l	20 ug/l
Methyl methanesulfonate		10 ug/l	10 ug/l
2-Methylnaphthalene		10 ug/l	10 ug/l
Methyl parathion		10 ug/l	10 ug/l
4-Methyl-2-pentanone		10 ug/l	10 ug/l
Methylene bromide		5.0 ug/l	5.0 ug/l
Methylene chloride	5.0 ug/l	5.0 ug/l	5.0 ug/l
Naphthalene	170 ug/l	10 ug/l	170 ug/l
1,4-Naphthoquinone		10 ug/l	10 ug/l
1-Naphthylamine		10 ug/l	10 ug/l

TABLE 1 (cont.)
CONCENTRATION LIMITS GREATER THAN BACKGROUND
FRANK R. BOWERMAN LANDFILL
ORANGE COUNTY, CALIFORNIA

Appendix II Constituent [1]	Drinking Water Maximum Contaminant Level [2] (MCL)	Laboratory Practical Quantitation Limit [3] (PQL)	Concentration Limit Greater Than Background (CLGB)
2-Naphthylamine		10 ug/l	10 ug/l
Nickel	0.1 ug/l	0.010 mg/l	0.1 ug/l
o-Nitroaniline		50 ug/l	50 ug/l
m-Nitroaniline		10 ug/l	10 ug/l
p-Nitroaniline		10 ug/l	10 ug/l
Nitrobenzene		10 ug/l	10 ug/l
o-Nitrophenol		10 ug/l	10 ug/l
p-Nitrophenol		10 ug/l	10 ug/l
N-Nitrosodi-n-butylamine		10 ug/l	10 ug/l
N-Nitrosodiethylamine		20 ug/l	20 ug/l
N-Nitrosodimethylamine	0.01 ug/l	10 ug/l	0.01 ug/l
N-Nitrosodiphenylamine		10 ug/l	10 ug/l
N-Nitrosodipropylamine		10 ug/l	10 ug/l
N-Nitrosomethylethalamine		30 ug/l	30 ug/l
N-Nitrosopiperidine		20 ug/l	20 ug/l
N-Nitrosopyrolidine		40 ug/l	40 ug/l
5-Nitro-o-Toluidine		10 ug/l	10 ug/l
Parathion		10 ug/l	10 ug/l
Pentachlorobenzene		10 ug/l	10 ug/l
Pentachloronitrobenzene		20 ug/l	20 ug/l
Pentachlorophenol	1.0 ug/l	10 ug/l	1.0 ug/l
Phenacetin		20 ug/l	20 ug/l
Phenanthrene		10 ug/l	10 ug/l
Phenol		10 ug/l	10 ug/l
p-Phenylenediamine		10 ug/l	10 ug/l
Phorate		10 ug/l	10 ug/l
Polychlorinated biphenyls	0.5 ug/l	0.65 ug/l	0.5 ug/l
Pronamide		10 ug/l	10 ug/l
Propionitrile		100 ug/l	100 ug/l
Pyrene		10 ug/l	10 ug/l
Safrole		10 ug/l	10 ug/l
Selenium	0.05 mg/l	0.005 mg/l	0.05 mg/l
Silver	100 ug/l	10 ug/l	100 ug/l
Silvex	50 ug/l	1.7 ug/l	50 ug/l
Styrene	100 ug/l	5.0 ug/l	100 ug/l
Sulfide		0.1 mg/l	0.1 mg/l
2,4,5-T		2.0 ug/l	2.0 ug/l
1,2,4,5-Tetrachlorobenzene		10 ug/l	10 ug/l
1,1,1,2-Tetrachloroethane		5.0 ug/l	5.0 ug/l
1,1,2,2-Tetrachloroethane	1.0 ug/l	5.0 ug/l	1.0 ug/l
Tetrachloroethene	5.0 ug/l	5.0 ug/l	5.0 ug/l
2,3,4,6-Tetrachlorophenol		10 ug/l	10 ug/l
Thallium	0.002 mg/l	0.001 mg/l	0.002 mg/l
Tin		0.005 mg/l	0.005 mg/l
Toluene	150 ug/l	5.0 ug/l	150 ug/l
o-Toluidine		10 ug/l	10 ug/l
Toxaphene	3.0 ug/l	3.13 ug/l	3.0 ug/l
1,2,4-Trichlorobenzene	5.0 ug/l	10 ug/l	5.0 ug/l
1,1,1-Trichloroethane	200 ug/l	5.0 ug/l	200 ug/l
1,1,2-Trichloroethane	5.0 ug/l	5.0 ug/l	5.0 ug/l
Trichloroethene	5.0 ug/l	5.0 ug/l	5.0 ug/l
Trichlorofluoromethane	150 ug/l	5.0 ug/l	150 ug/l

TABLE 1 (cont.)
CONCENTRATION LIMITS GREATER THAN BACKGROUND
FRANK R. BOWERMAN LANDFILL
ORANGE COUNTY, CALIFORNIA

Appendix II Constituent [1]	Drinking Water Maximum Contaminant Level [2] (MCL)	Laboratory Practical Quantitation Limit [3] (PQL)	Concentration Limit Greater Than Background (CLGB)
2,4,5-Tricholophenol		10 ug/l	10 ug/l
2,4,6-Trichlorophenol		10 ug/l	10 ug/l
1,2,3-Trichloropropane	0.005 ug/l	5.0 ug/l	0.005 ug/l
0,0,0-Triethyl phosphorothioate		20 ug/l	20 ug/l
1,3,5-Trinitrobenzene		10 ug/l	10 ug/l
Vanadium	0.05 mg/l	0.003 mg/l	0.05 mg/l
Vinyl acetate		50 ug/l	50 ug/l
Vinyl chloride	0.5 ug/l	5.0 ug/l	0.5 ug/l
Xylenes (total)	1,750 ug/l	5.0 ug/l	1,750 ug/l
Zinc	5.0 mg/l	0.050 mg/l	5.0 mg/l

(1) Appendix II constituents are listed in 40 CFR, Chapter 1, Part 258.

(2) MCLs, if any, as established by the California Department of Health Services- Drinking Water Program or the Environmental Protection Agency National Primary Drinking Water Standards as of 2007.

(3) Laboratory PQLs as provided from Associated Laboratories in April 2007.

TABLE 2
MONITORING PARAMETERS FOR GROUNDWATER
FRANK R. BOWERMAN LANDFILL
ORANGE COUNTY, CALIFORNIA

Volatile Organic Constituents *(DMP and CAP Wells)*	
Appendix I VOCs Confirmed in Leachate or Landfill Gas	**Degradation By-Products of Appendix I VOCs Confirmed in Leachate or Landfill Gas**
Acetone	Chlorobenzene
Benzene	Chloromethane
Chloroethane	trans-1,2-Dichloroethene
1,4-Dichlorobenzene	Trichloroethene
1,1-Dichloroethane	
1,2-Dichloroethane	
cis-1,2-Dichloroethene	
Ethylbenzene	
Methyl isobutyl Ketone (4-Methyl-2-pentanone)	
Dichloromethane	
Tetrachloroethene	
Toluene	
Naphthalene	
Vinyl Chloride	
Xylenes	
Inorganic Constituents *(DMP Wells)*	
pH	
Nitrate as Nitrogen	
Chloride	

Note:
Monitoring Parameters list shown in this table includes analytical leachate and landfill gas data collected through March 2007. This list of VOCs will be updated (augmented) by the discharger each year based on the annual leachate and landfill gas monitoring programs (any Appendix I VOC which is detected and confirmed in either leachate or landfill gas samples, as well as its degradation by-products, will be added to this list).

TABLE 3

MONITORING AND REPORTING

Task Description	Monitoring Period	Report Due Date
Semi-annual Water Quality monitoring	October 1 – March 31	April 30 of each year
	April 1 – September 30	October 31 of each year
Semi-annual general site monitoring	October 1 – March 31	April 30 of each year
	April 1 – September 30	October 31 of each year
October leachate and landfill gas testing analysis	October 1 – October 31	January 31 of the following year
April leachate and landfill gas retesting analysis	April 1 – April 30	August 1 of each year
Annual drainage control and maintenance	By October 1 of each year	December 31 of each year
Aerial or ground survey	By October 15 of each year	December 31 of each year
Annual summary	April 1 of previous year – March 31	April 30 of each year
COC analysis	Every 5 Years (alternating between Fall and Spring reporting periods)	October 31, 2011; April 30, 2016; October 31, 2021; April 30, 2026; etc.

Reports with the same submittal date may be consolidated into a single report.

TABLE 4

LIST OF APPENDIX I CONSTITUENTS

Inorganic Constituents	Organic Constituents – continued
Antimony	p-Dichlorobenzene; 1,4-Dichlorobenzene
Arsenic	trans-1,4-Dichloro-2-butene
Barium	1,1-Dichloroethane; Ethylidene chloride
Beryllium	1,2-Dichloroethane; Ethylene dichloride
Cadmium	1,1-Dichloroethylene; 1,1-Dichloroethene; Vinylidene chloride
Chromium	cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene
Cobalt	trans-1,2-Dichloroethylene; trans-1,2-Dichloroethene
Copper	1,2-Dichloropropane; Propylene dichloride
Lead	cis-1,3-Dichloropropene
Nickel	trans-1,3-Dichloropropene
Selenium	Ethylbenzene
Silver	2-Hexanone; Methyl butyl ketone
Thallium	Methyl bromide; Bromomethane
Vanadium	Methyl chloride; Chloromethane
Zinc	Methylene bromide; Dibromomethane
	Methylene chloride; Dichloromethane
Organic Constituents	Methyl ethyl ketone; MEK; 2-Butanone
Acetone	Methyl iodide; Iodomethane
Acrylonitrile	4-Methyl-2-pentanone; Methyl isobutyl ketone
Benzene	Styrene
Bromochloromethane	1,1,1,2-Tetrachloroethane
Bromodichloromethane	1,1,2,2-Tetrachloroethane
Bromoform; Tribromomethane	Tetrachloroethylene; Tetrachloroethene; Perchloroethylene
Carbon disulfide	Toluene
Carbon tetrachloride	1,1,1-Trichloroethane; Methylchloroform
Chlorobenzene	1,1,2-Trichloroethane
Chloroethane; Ethyl chloride	Trichloroethylene; Trichloroethene
Chloroform; Trichloromethane	Trichlorofluoromethane; CFC-11
Dibromochloromethane; Chlorodibromomethane	1,2,3-Trichloropropane
1,2-Dibromo-3-chloropropane; DBCP	Vinyl acetate
1,2-Dibromoethane; Ethylene dibromide; EDB	Vinyl chloride
o-Dichlorobenzene; 1,2-Dichlorobenzene	Xylenes

TABLE 5

LIST OF APPENDIX II CONSTITUENTS

Acenaphthene
Acenaphthylene
Acetone
Acetonitrile; Methyl cyanide
Acetophenone
2-Acetylaminofluorene; 2-AAF
Acrolein
Acrylonitrile
Aldrin
Allyl chloride
4-Aminobiphenyl
Anthracene
Antimony (total)
Arsenic (total)
Barium (total)
Benzene
Benzo[a]anthracene; Benzanthracene
Benzo[b] fluoranthene
Benzo[k] fluoranthene
Benzo[ghi] perylene
Benzo[al pyrene
Benzyl alcohol
Beryllium (total)
alpha-BHC
beta-BHC
delta-BHC
gamma-BHC; Lindane
Bis(2-chloroethoxy) methane
Bis(2-chloroethyl) ether; Dichloroethyl ether
Bis(2-chloro-1-methylethyl) ether; 2,2-Dichlorodiisopropyl
ether; DCIP
Bis(2-ethylhexyl) phthalate
Bromochloromethane; Chlorobromomethane
Bromodichloromethane; Dibromochloromethane
Bromoform; Tribromomethane
4-Bromophenyl phenyl ether
Butyl benzyl phthalate; Benzyl butyl phthalate
Cadmium (total)
Carbon disufide
Carbon tetrachloride
Chlordane
p-Chloroaniline
Chlorobenzene
Chlorobenzilate
p-Chloro-m-cresol; 4-Chloro-3-methylphenol
Chloroethane; Ethyl chloride
Chloroform; Trichloromethane
2-Chloronaphthalene
2-Chlorophenol
4-Chlorophenyl phenyl ether
Chloroprene
Chromium (total)
Chrysene
Cobalt (total)
Copper (total)
m-Cresol; 3-methylphenol
o-Cresol; 2-methylphenol
p-Cresol; 4-methylphenol
Cyanide
2,4-D; 2,4-Dichlorophenoxyacetic acid
4,4-DDD
4.4-DDE
4,4-DDT
Diallate
Dibenz [a,h] anthracene
Dibenzofuran
Dibromochloromethane; Chlorodibromomethane
1,2-Dibromo-3-chloropropane; DBCP
1,2-Dibromoethane; Ethylene dibromide; EDB
Di-n-butyl phthalate
o-Dichlorobenzene; 1,2-Dichlorobenzene
m-Dichlorobenzene; 1,3-Dichlorobenzene
p-Dichlorobenzene; 1,4-Dichlorobenzene
3,3-Dichlorobenzidine
trans-1,4-Dichloro-2-butene
Dichlorodifluoromethane; CFC 12
1,1-Dichloroethane; Ethyldidene chloride
1,2-Dichloroethane; Ethylene dichloride
1,1-Dichloroethylene; 1,1-Dichloroethene; Vinylidene chloride
cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene
trans-1,2-Dichloroethylene; trans-1,2-Dichloroethene
2,4-Dichlorophenol
2,6-Dichlorophenol
1,2-Dichloropropane; Propylene dichloride
1,3-Dichloropropane; Trimethylene dichloride
2,2-Dichloropropane; Isopropylidene chloride
1,1-Dichloropropene
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene
Dieldrin
Diethyl phthalate
0,0-Diethyl 0-2-pyrazinyl phosphorothioate; Thionazin
Dimethoate
p-(Dimethylamino)azobenzene
7,12-Dimethylbenz[a]anthracene
3,3-Dimethylbenzidine
2,4-Dimethylphenol; m-Xylenol
Dimethyl phthalate
m-Dinitrobenzene
4,6-Dinitro-o-cresol; 4,6-Dinitro-2-methylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Dinoseb; DNBP; 2-sec-Butyl-4,6-dinitrophenol
Di-n-octyl phthalate
Diphenylamine
Disulfoton
Endosulfan I
Endosulfan II
Endosulfan sulfate
Endrin
Endrin aldehyde
Ethylbenzene
Ethyl methacrylate
Ethyl methanesulfonate
Famphur
Fluoranthene
Fluorene
Heptachlor
Heptachlor epoxide
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Hexachloropropene
2-Hexanone; Methyl butyl ketone
Indeno (1,2,3-cd) pyrene
Isobutyl alcohol
Isodrin
Isophorone
Isosafrole
Kepone
Lead (total)

TABLE 5 (continued)

LIST OF APPENDIX II CONSTITUENTS

Mercury (total)
Methacrylonitrile
Methapyrilene
Methoxychlor
Methyl bromide; Bromomethane
Methyl chloride; Chloromethane
3-Methylcholanthrene
Methyl ethyl ketone; MEK; 2-Butanone
Methyl iodide; Iodomethane
Methyl methacrylate
Methyl methanesulfonate
2-Methylnaphthalene
Methyl parathion; Parathion methyl
4-Methyl-2-pentanone; Methyl isobutyl ketone
Methylene bromide; Dibromomethane
Methylene chloride; Dichloromethane
Naphthalene
1,4-Naphthoquinone
1-Napthylamine
2-Napthylamine
Nickel (total)
o-Nitroaniline; 2-Nitroaniline
m-Nitroaniline; 3-Nitroaniline
p-Nitroaniline; 4-Nitroaniline
Nitrobenzene
o-Nitrophenol; 2-Nitrophenol
p-Nitrophenol; 4-Nitrophenol
N-Nitrosodi-n-butylamine
N-Nitrosodiethylamine
N-Nitrosodimethylamine
N-Nitrosodiphenylamine
N-Nitrosodipropylamine; N-Nitroso-N-dipropylamine;
Di-n-propylnitrosamine
N-Nitrosomethylethylamine
N-Nitrosopiperidine
N-Nitrosopyrrolidine
5-Nitro-o-toluidine
Parathion
Pentachlorobenzene
Pentachloronitrobenzene
Pentachlorophenol
Phenacetin
Phenanthrene
Phenol
p-Phenylenediamine
Phorate
Polychlorinated biphenyls; PCBS; Aroclors
Pronamide
Propionitrile; Ethyl cyanide
Pyrene
Safrole
Selenium (total)
Silver (total)
Silvex; 2,4,5-TP
Styrene
Sulfide
2,4,5-T; 2,4,5-Trichlorophenoxyacetic acid
1,2,4,5-Tetrachlorobenzene
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene; Tetrachloroethene;
Perchloroethylene
2,3,4,6-Tetrachlorophenol
Thallium (total)
Tin (total)
Toluene
o-Toluidine
Toxaphene
1,2,4-Trichlorobenzene
1,1,1-Trichloroethane; Methylchloroform
1,1,2-Trichloroethane
Trichloroethyiene; Trichloroethene
Trichlorofluoromethane; CFC-1 l
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
1,2,3-Trichloropropane
0,0,0-Triethyl phosphorothioate
1,3,5-Trinitrobenzene
Vanadium (total)
Vinyl acetate
Vinyl chloride; Chloroethene
Xylenes (total)
Zinc (total)

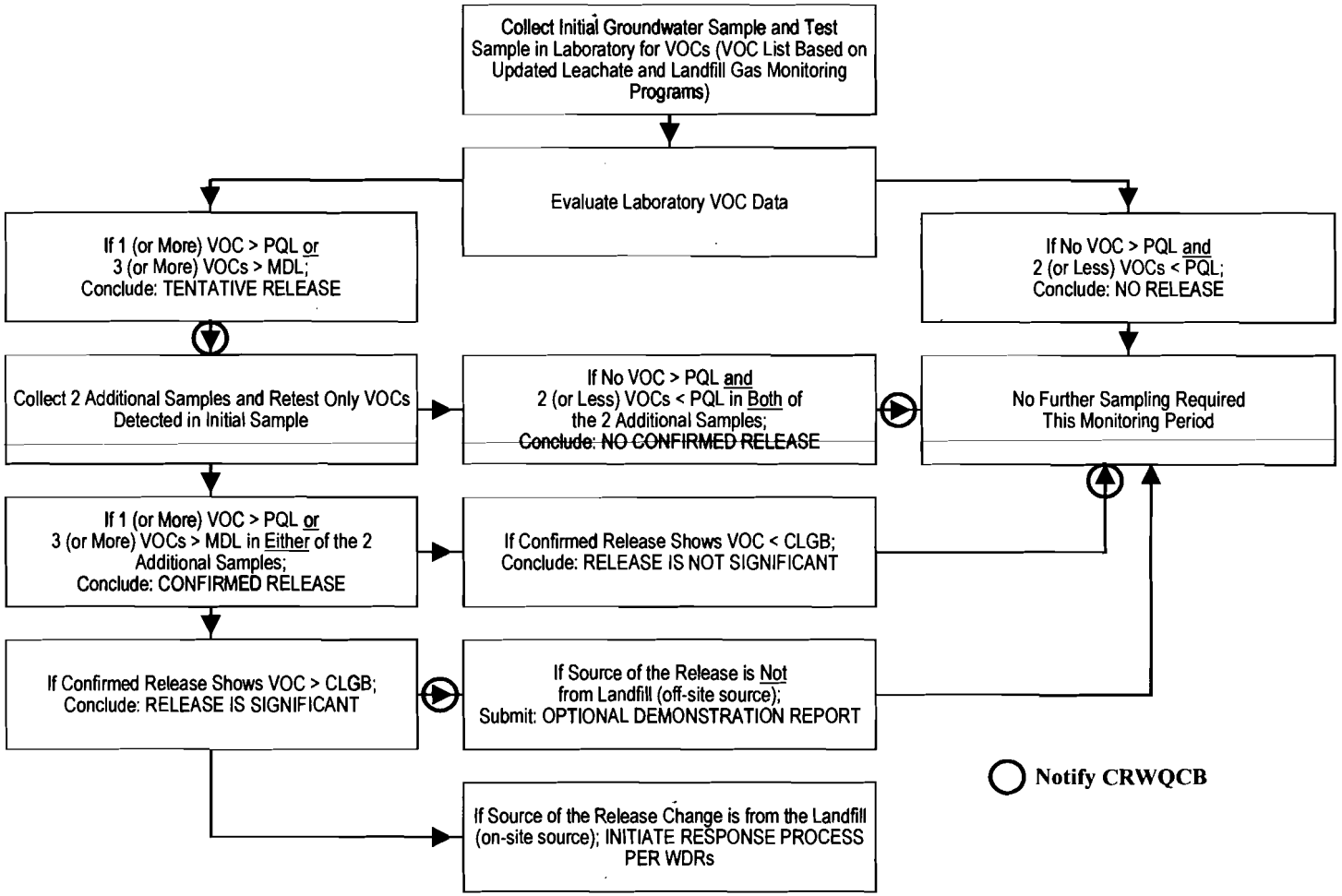



FIGURE 1
FLOWCHART FOR VOC DATA EVALUATION AND RETESTING PROCEDURES
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