

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION**

**TECHNICAL REPORT
FOR
CLEANUP AND ABATEMENT ORDER NO. R9-2006-0016
UNITED STATES MARINE CORPS
MARINE CORPS BASE CAMP PENDLETON
LAS PULGAS LANDFILL
SAN DIEGO COUNTY**

January 27, 2006

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INTRODUCTION

For the reasons set forth below, the California Regional Water Quality Control Board, San Diego Region (San Diego Water Board) issued Cleanup and Abatement Order No. R9-2006-0016, *United States Marine Corps Marine Corps Base Camp Pendleton Las Pulgas Landfill, San Diego County* to the United States Marine Corps under authority of Water Code Section 13304.

I. STATUTORY AND REGULATORY BACKGROUND

Solid waste landfills¹ in California are subject to both the Porter-Cologne Water Quality Control Act² and various policies and regulations promulgated by the State Water Resources Control Board (SWRCB) including Title 27, California Code of Regulations – CCR Title 27 and the federal Resource Conservation and Recovery Act (RCRA), including regulations implementing RCRA’s Subtitle D found in Title 40 Code of Federal Regulations (C.F.R.), Part 258) (hereinafter "Subtitle D regulations"). In 1993, the SWRCB adopted Resolution No. 93-62, *Policy for Regulation of Discharge of Municipal Solid Waste*, requiring each Regional Water Quality Control Board to incorporate both the Chapter 15 (now CCR Title 27, as of 1997) and the subtitle D regulations in waste discharge requirements (WDRs) for landfills.

Several statutory and regulatory provisions provide the San Diego Water Board with broad authority to require responsible parties operating landfills to take necessary remedial actions to prevent the threatened release of waste constituents from a landfill and, in the event of an actual release, to cleanup the discharge and abate the pollution and nuisance effects thereof. California Water Code section 13304 contains the statutory cleanup and abatement authority of the San Diego Water Board. Section 13304(a) provides that any person who has discharged or discharges waste³ into waters of the state in violation of any waste discharge requirement or other order or prohibition issued by a Regional Water Board or the State Water Board or who has caused or permitted, causes or permits, or threatens to cause or permit any waste to be discharged or deposited where it is, or probably will be, discharged into the waters of the state and creates, or threatens

¹ “Landfill” means a waste management unit at which waste is discharged in or on land for disposal. It does not include surface impoundment, waste pile, land treatment unit, injection well, or soil amendments. [Note: see also the definition of “waste management unit” Title 27 §20164 and §§20090(c&f).]

² Division 7 of the California Water Code, commencing with section 13000.

³ “Waste” is very broadly defined in California Water Code section 13050(d) and includes sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, processing operation, including waste placed within containers of whatever nature prior to, and for purposes of, disposal.

to create, a condition of pollution⁴ or nuisance⁵ may be required to clean up the discharge and abate the effects thereof. This section authorizes Regional Water Boards to require complete cleanup of all waste discharged and restoration of affected water to background conditions (i.e., the water quality that existed before the discharge). The SWRCB has promulgated regulations specifying corrective action requirements whenever there is significant physical evidence of an actual threatened release of waste from a landfill (Title 27 CCR §§20385, 20425, and 20430).

SWRCB Resolution No. 92-49, *Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code §13304*, applies to releases of wastes or waste constituents from landfills. Resolution No. 92-49 directs that water affected by an unauthorized release be cleaned up to attain either background water quality or the best water quality that is reasonable if background water quality cannot be restored (SWRCB Resolution No. 92-49, Section III.G.) Any alternative level of water quality less stringent than background must be consistent with the maximum benefit to the people of the state, not unreasonably affect current and anticipated beneficial use of affected water, and not result in water quality less than that prescribed in the water quality control plan for the basin within which the site is located.

SWRCB Resolution 92-49 specifies that cleanup and abatement actions must conform to Resolution 68-16, *Statement of Policy with Respect to Maintaining High Quality of Waters in California*. SWRCB Resolution No. 68-16 is a state policy that establishes the requirement that discharges to waters of the state shall be regulated to achieve “the highest water quality with maximum benefit to the people of the State.” Resolution 68-16 also establishes the intent where the waters of the State are of higher quality than required by state policies, including Water Quality Control Plans, such higher “shall be maintained to the maximum extent possible” consistent with the maximum benefit to the people of the State.

The San Diego Water Board’s Water Quality Control Plan (Basin Plan) for the San Diego Basin (Basin Plan) designates existing groundwater beneficial uses in the San Onofre Hydrologic Subarea (901.52) as municipal and domestic water supply (MUN)^{6,7} and

⁴ Pollution” is defined in Water Code section 13050 (1) as “an alteration of the quality of the waters of the state by waste to a degree which unreasonably affects either of the following: (A) The waters for beneficial uses, (B) Facilities which serve these beneficial uses.” Pollution” may include “contamination.”

⁵ Nuisance is defined in Water Code section 13050(m) “. . . anything which: (1) is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property, and (2) affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal, and (3) occurs during or as a result of the treatment or disposal of wastes.”

⁶ See Water Quality Control Plan for the San Diego Basin (Basin Plan), Page 2-3. The Basin Plan defines MUN as “[u]ses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.”

agricultural supply water (AGR) supply. The Basin Plan also contains numeric water quality objectives⁸ for chemical constituents to protect ground waters designated for MUN. The numeric objectives are derived from primary maximum contaminant levels (MCLs)⁹ established by the Department of Health Services (Department) in Title 22 of the California Code of Regulations.¹⁰ In general, the Department establishes MCLs to ensure the safety of public drinking water supplies at the point of use, i.e. at the tap. The Basin Plan also contains a narrative water quality objective to protect ground waters designated for agricultural supply (AGR) as follows: “Waters designated for use as agricultural supply (AGR) shall not contain concentrations of chemical constituents in amounts that adversely affect such beneficial use”.

The Basin Plan also designates existing beneficial uses of surface waters in the San Onofre Hydrologic Subarea (901.52) as including agricultural supply water (AGR), contact recreation (REC1), non-contact recreation (REC2), wildlife habitat (WILD), cold freshwater habitat (COLD), warm freshwater habitat (WARM), and support of rare, threatened or endangered species (RARE).¹¹ The surface waters are excluded¹² from the municipal and domestic water supply (MUN) designation.¹³ The Basin Plan contains numeric surface water quality objectives for chemical constituents to protect the surface

⁷ Basin Plan, footnote 6, supra. Table 2-5 at page 2-51.

⁸ “Water quality objectives” are defined in Water Code section 13050(h) as “the limits or levels water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area.”

⁹ MCLs, maximum contaminant levels, are public health-protective drinking water standards to be met by public water systems. MCLs take into account not only chemicals' health risks but also factors such as their detectability and treatability, as well as the costs of treatment. Primary MCLs can be found in Title 22 California Code of Regulations (CCR) sections 64431 - 64444. Secondary MCLs address the taste, odor, or appearance of drinking water, and are found in 22 CCR section 64449.

¹⁰ Basin Plan, footnote 6, supra. Page 3-10 and Table 3-6 at 3-11. The Basin Plan provides that “Water designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels specified in California Code of Regulations, Title 22, Table 64444-A of Section 64444 (Organic Chemicals) which is incorporated by reference into this plan. This incorporation by reference is prospective including future changes to the incorporated provisions as the changes take effect. (See Table 3-6.)”

¹¹ Basin Plan, footnote 6, supra. Page 2-17

¹² Basin Plan, footnote 3, supra. Page 3-5. The surface waters are excluded from the municipal and domestic water supply (MUN) designation. pursuant to the SWRCB No. 88-63 (Sources of Drinking Water) and San Diego Water Board Resolution 89-33 (Incorporation of the Source of Drinking Water “into the Water Quality Control Plan (Basin Plan) of the San Diego Region). (See also Basin Plan, Page 2-8.1.)

¹³ Basin Plan, footnote 6, supra. Page 2-17.

water designated beneficial uses.¹⁴ In addition the USEPA's California Toxics Rule (CTR) and National Toxics Rule (NTR) water quality criteria are also applicable to the surface waters of the San Onofre Hydrologic Subarea (901.52).¹⁵ The Basin Plan also contains a narrative water quality objective to protect surface waters designated for agricultural supply (AGR)¹⁶.

II. FINDINGS AND FACTUAL BASIS FOR FINDINGS

This Section provides the rationale and factual information supporting the findings of Cleanup and Abatement Order No. R9-2006-0016. The text of each Cleanup and Abatement Order (CAO) finding is presented first followed by a summary of the rationale and factual evidence supporting the finding.

A. FINDING NO. 1 STATES:

WASTE DISCHARGE. From 1980 until the present, the United State Marine Corps (USMC) has owned and operated the Las Pulgas Sanitary Landfill at a site located within the boundaries of USMC Base Camp Pendleton in San Diego County, approximately 0.2 miles north of Basiline Road in Area 43, Sections 28 and 29, T9S, R5W, SBB&M. Past discharges of waste into the Las Pulgas Landfill have resulted in a release of waste constituents creating an existing condition of pollution in groundwater located within the San Onofre Hydrologic subarea. The USMC has discharged solid wastes from Marine Corps Base Camp Pendleton into the Las Pulgas Landfill Phase 1 Expansion waste management unit (Unit) since approximately May 2000. The Phase 1 Expansion Unit is underlain by a defective composite liner system in violation of waste discharge requirements prescribed by the Regional Board. The USMC threatens to cause or permit the release of waste constituents from the Phase 1 Expansion Unit through the defective composite liner system to soils and ground water underlying the Los Pulgas Landfill creating or exacerbating a condition of pollution in the ground water underlying the landfill by exceeding applicable water quality objectives. The USMC is also discharging leachate from Las Pulgas Landfill and allowing it to pond in an uncontrolled manner in violation of waste discharge requirements prescribed by the Regional Board. The USMC threatens to cause or permit the release of the ponded leachate into Las Flores Creek and create a condition of pollution by exceeding applicable California Toxics Rule water quality criteria for

¹⁴ Basin Plan, footnote 6, supra. Chapter 3 and Table 3-2 at Page 3-23.

¹⁵ The USEPA promulgated a final rule prescribing water quality criteria for toxic pollutants in inland surface waters, enclosed bays, and estuaries in California in 2001 (The California Toxics Rule or "CTR;" [40 CFR 131.38]). CTR criteria constitute applicable water quality objectives in California. In addition to the CTR, certain criteria for toxic pollutants in the National Toxics Rule (NTR) [40 CFR 131.36] constitute applicable water quality objectives in California as well.

¹⁶ Basin Plan, footnote 6, supra. Page 3-5.

pollutants in Las Flores Creek.

BASIS FOR FINDING NO. 1

The Las Pulgas Landfill is a municipal solid waste¹⁷ (MSW) landfill¹⁸ (Class III¹⁹ waste management unit²⁰) owned and operated by the United States Marine Corps. The United States Marine Corps (USMC) has operated the landfill since 1980, accepting municipal solid waste generated within the boundaries of Marine Corps Base (MCB) Camp Pendleton pursuant to waste discharge requirements prescribed by the San Diego Water Board. Las Pulgas Landfill is currently regulated under the San Diego Water Board's Order No. 2000-54, *Waste Discharge Requirements for the U.S. Marine Corps, Marine Corps Base Camp Pendleton, Las Pulgas Landfill, San Diego County*.

The Marine Corps Base Camp Pendleton covers 125,000 acres in the northwestern portion of San Diego County, California and has a daytime population of approximately 60,000 persons. The Las Pulgas Landfill is located in San Diego County, within the boundaries of Marine Corps Base (MCB) Camp Pendleton approximately 0.2 miles north of Basilone Road in Area 43, Sections 28 and 29, T9S, R5W, SBB&M. The landfill is located within the San Onofre Hydrologic Subarea (901.52) of the San Juan Hydrologic Unit.

Groundwater in the San Onofre Hydrologic Subarea is currently designated for municipal supply and agricultural use in the San Diego Water Board's Basin Plan. With the exception of San Mateo Point housing, which receives water from the South Coast Water District (SCWD), the USMC relies upon ground water

¹⁷ Municipal solid waste has the same meaning as under 40 CFR Part 258 and includes household waste and solid waste (garbage, trash, and sanitary waste in septic tanks) derived from households (including single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas).

¹⁸ "MSW landfill" or "municipal solid waste landfill unit" means any landfill that is subject to the federal regulations of 40CFR258, including any portion of a disposal site that is subject to those regulations. The term includes any landfill, other than a Class I landfill, that received municipal solid waste (MSW) at any time and that has received any solid waste since October 9, 1991; therefore, the term does not include any landfill that stopped receiving waste prior to that date.

¹⁹ Under Title 27, CCR, Division 2, Chapter 3, Subchapter 2, Article 2 waste management units must be classified as Class I, II, or III units, depending on the ability of the units to contain wastes. Class III units, which may receive non hazardous wastes, must be sited where soil characteristics, distance from waste to ground water, and other factors will ensure no impairment of beneficial uses of surface water or of ground water beneath or adjacent to the landfill.

²⁰ Waste management unit" or "Unit," means an area of land, or a portion of a waste management facility, at which waste is discharged. The term includes containment features and ancillary features for precipitation and drainage control and for monitoring.

produced from local aquifers located at Camp Pendleton, to meet all the potable water requirements to support military operations and residents. MCB Camp Pendleton provides water service to all areas of the Base through the following two water systems:

Table 1- Base Water Supply Service Areas at Camp Pendleton

WATER SYSTEM	SERVICE AREA	WATER SOURCE
Northern Water System	San Onofre Housing and Mobile Home areas, San Onofre Recreation Beach, and the 52-64 Areas of Camp Pendleton	Camp Pendleton currently pumps approximately 2,500 acre-feet per year of groundwater from supply wells located in the San Mateo, San Onofre River Basins.
Southern Water System	All areas not serviced by the Base's northern water system or by the SCWD.	Camp Pendleton currently pumps approximately 6,000 acre-feet per year of groundwater from alluvial aquifers located in the Las Flores and Lower Santa Margarita River basins.

There are at least three active base drinking-water supply wells located within the Las Flores Creek Watershed: 10S-5W – 18M3, 10S/5W – 18M4, and 10S/5W – 18E2. These drinking water supply wells supply potable water to the Southern Water System and are located, 1, approximately 4 miles down hydrologic gradient from the Las Pulgas Landfill. To the knowledge of the Regional Board, these wells are not currently affected by the release of waste constituents from the Las Pulgas landfill due to their location relative to the Las Pulgas Landfill.

Existing Groundwater Pollution

Past discharges of solid wastes into the Las Pulgas Landfill have resulted in the release of waste constituents from the landfill creating an existing condition of pollution in groundwater resources located within the San Onofre Hydrologic subarea (901.52)).²¹ The nature and extent of groundwater pollution is documented in the USMC's Remedial Investigation and Feasibility (RI/FS) report for Operable Unit No. 2 (dated September 23, 1996). The USMC reported that groundwater resources underlying the Las Pulgas Landfill contain the following categories of waste constituents: a total of 20 volatile organic constituents (VOCs), 12 semivolatile organic constituents, 3 total petroleum hydrocarbons, 1 pesticide, and 24 inorganic compounds (24 metals and cyanide). The RI/FS report further documents the following constituents were detected at concentrations exceeding applicable ground water quality objectives:

²¹ The Regional Board will be addressing the cleanup and abatement of the existing condition of pollution of the ground water underlying the Las Pulgas Landfill in a future cleanup and abatement order.

Table 2- Applicable Water Quality Objectives for Ground Water

Constituent	Applicable MCL Ground Water Quality Objective (µg/L)
1,2 Dichloroethane (1,2-DCA)	0.5
1,2 Dichloroethene (DCE)	0.5
Benzene ¹	1
Carbon tetrachloride	0.5
Methylene chloride	76
Trichloroethene (TCE)	5
Vinyl chloride ¹	0.5
1,4 Dichlorobenzene	5

1 = the U.S. EPA classifies benzene and vinyl chloride as known human carcinogens.

Twelve of the 25 inorganic constituents detected in groundwater monitoring samples at the Las Pulgas Landfill were determined to contain concentrations that were determined to be statistically elevated compared to background concentrations. The inorganic constituents with elevated concentrations included: aluminum, arsenic, beryllium, cadmium, chromium, copper, cyanide, mercury, molybdenum, silver, thallium, and zinc.

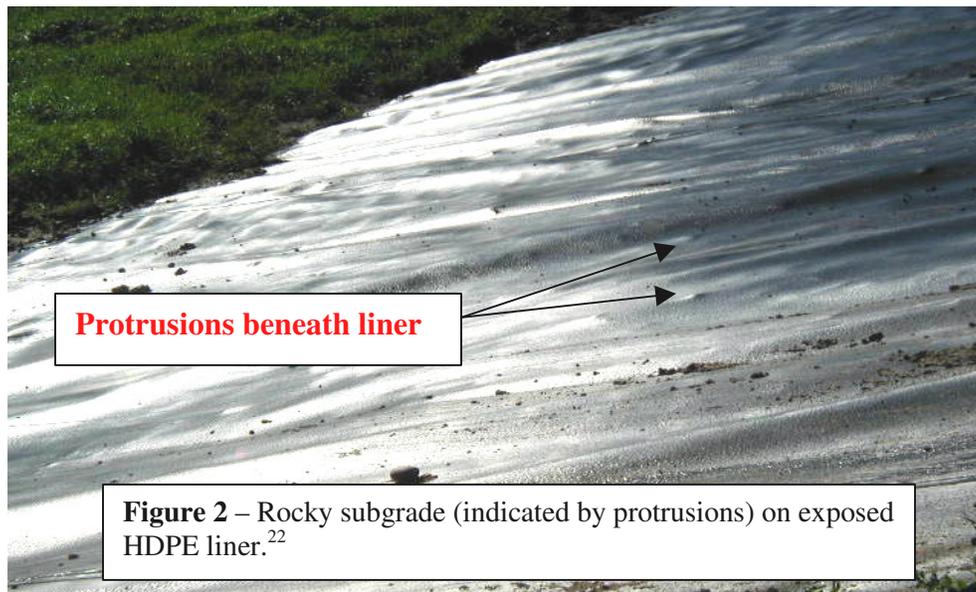
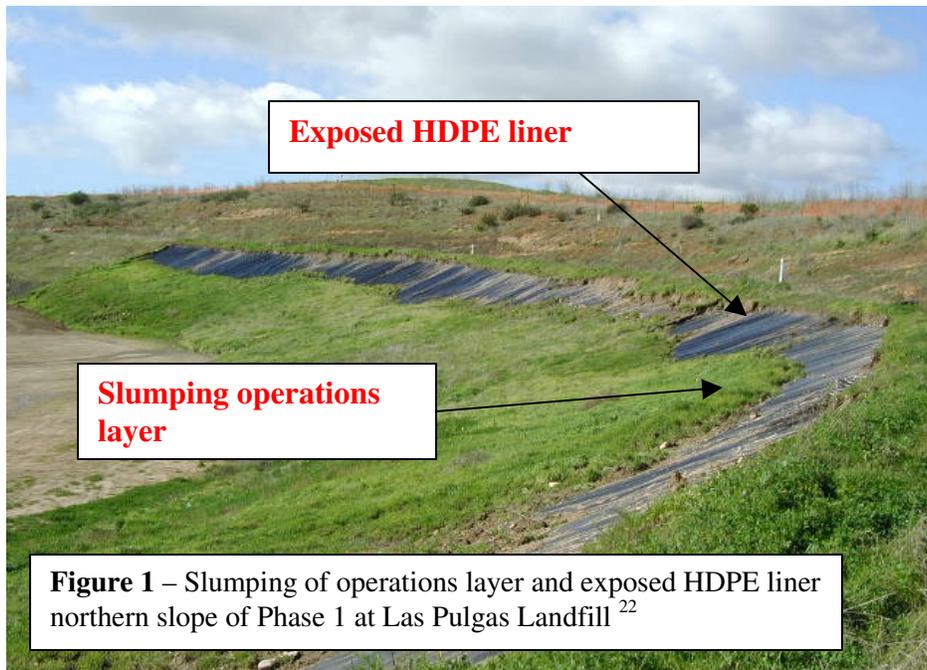
Based upon groundwater monitoring results information reported to the Regional Board in 2005, concentrations of VOCs and certain inorganic constituents in groundwater continue to exceed applicable water quality objectives: vinyl chloride (wells 8W2A, 8W14B, 8W17A,) 1,4 Dichlorobenzene (wells 8W14B, 8W17A), TDS (wells 8W04A, 8W06A, 8W14B, 8W17A, 8W20, MW01S, MW04, MW05), sulfate (8W17A), and chloride (8W17A).

Liner Defects

The USMC is discharging waste into a waste management unit cell at Las Pulgas Landfill underlain by a liner that was not properly constructed to meet the performance standards described in 27 CCR 20080(b) and SWRCB Resolution 93-62. San Diego Water Board field investigations indicate the operations layer located above the liner system located on the northern slope of the Phase 1 unit has slumped (see Figure 1)²². The observed condition of the exposed liner suggests that there have been localized failures (slumps) in the subgrade in some areas of the northern slope, and that the geocomposite clay liner (or GCL) has been punctured by the rocky subgrade (see “protrusions” in high density polyethylene (or HDPE) liner from rocky subgrade in Figure 2).²² Results of field

²² Photo taken January 15, 2005 by Ms. Amy Grove, Engineering Geologist, San Diego Water Board.

investigations, conducted by Brown and Caldwell (2003), indicates that the current Phase 1 liner system contains a number of defects (holes) in the GCL and the plastic/HDPE liner. The extent of damage to the existing liner system is not known at this time.



The observed defects in the liner's construction constitute a violation of Discharge Specification B.22 of Order No. 2000-54 which provides that

“Materials used to construct liners shall have the appropriate physical and chemical properties to ensure containment of discharged wastes over the operating life, closure, and post-closure maintenance period of the waste management unit.”

Uncontrolled Leachate Discharges

Results of field investigations by the San Diego Water Board also indicate the USMC is periodically discharging leachate²² from seeps (also see Figure 5 below) through the south facing slope of the Phase 1 Waste Management Unit (WMU).

An unpermitted discharge/release of leachate to land, located outside the Phase 1 WMU, was observed at the toe of the south slope located approximately 500 yards north of Las Flores Creek. A sample of the leachate collected by USMC indicates the leachate contained elevated concentrations of waste constituents (metals) well in excess of the federally mandated California Toxics Rule (CTR) water quality criteria applicable to Las Flores Creek. The analytical results for waste constituents in leachate discharged from Phase 1 WMU are as follows:

Table 3 – Waste constituents concentrations in leachate vs. CTR limits

Constituent	Observed Leachate Concentration (µg/L)	CTR Values (µg/L)
Acetone	10,100	N/A ²⁵
2-Butanone	9,720	N/A ²³
Diethylphthalate	480	23,000 ²⁴
Nickel	132,000	470 ²⁷
Zinc	682,000	120 ²⁷

N/A = none available

The observed discharge of leachate occurred in violation of Order 2000-54 and was not contained in an engineered containment facility. Future discharges of

²² “Leachate” means any liquid formed by the drainage of liquids from waste or by the percolation or flow of liquid through waste. It includes any constituents extracted from the waste and dissolved or suspended in the fluid. The term ceases to apply to such liquid upon its being mingled with ground water outside the Unit’s liner system. The term also ceases to apply to such liquid upon its being treated to the extent that it no longer contains any constituent of concern whose concentration exceeds the water quality objectives of ground water in the uppermost aquifer underlying the waste management unit.

²³ Freshwater aquatic life criteria for metals are expressed as a function of total hardness (mg/l) in the water body. The equations are provided in matrix at paragraph (b)(2) of this section. Values displayed above in the matrix correspond to a total hardness of 100 mg/l.

²⁴ Criteria revised to reflect USEPA’s q1* or RfD, as contained in the Integrated Risk Information System (IRIS) as of October 1, 1996. The fish tissue bioconcentration factor (BCF) from the 1980 documents was retained in each case.

leachate in this area may be washed into Los Flores Creek in the event of a 100-year frequency 24-hour storm or a lesser magnitude storm event.

Specification B.29 of Order No.2000-54 provides that: “Class III landfill units and related containment structures shall be constructed and maintained to prevent, to the greatest extent possible, ponding, infiltration, inundation, erosion, slope failure, washout, and overtopping under a 100-year, 24-hour storm.”

Discharge Specification B.35 of Order No. 2000-54 provides that “All containment systems shall include a leachate collection and removal system (LCRS) which shall convey all leachate which reaches the liner to an appropriately lined sump or other appropriately lined collection area. The LCRS shall not rely upon unlined or clay-lined areas or such conveyance.”

Discharge Specification B.36 of Order No.2000-54 provides that: “Materials used to construct leachate collection and removal systems (LCRS) shall have appropriate physical and chemical properties to ensure the required transmission of leachate over the life of the WMU and the post-closure maintenance period.”

The uncontrolled discharge and ponding of leachate from seeps through the south-facing slope of the Phase 1 Waste Management Unit is a violation of Discharge Specifications B.29, B.35, and B.36. The combination of defects in the existing liner system underlying the Phase 1 Waste Management Unit and the leachate seeps from the south facing slope of the Unit will likely result in a release of leachate and/or landfill gas to both ground water and nearby Los Flores Creek. The types and levels of waste constituents likely to be found in Las Pulgas Landfill leachate and gas can cause the presence of waste constituents in the ground water²⁵ and Las Flores Creek in concentrations in excess of applicable public health protective water quality objectives and CTR water quality criteria. Based on these considerations, the San Diego Water Board has concluded that the USMC threatens to cause or permit a release of waste from the Las Pulgas landfill into ground water and Las Flores Creek via various preferential pathways and exacerbate an existing condition of pollution in the ground water as well as create a condition of pollution in the waters of Las Flores Creek by exceeding applicable water quality objectives or CTR water quality criteria.

B. FINDING NO. 2 STATES:

PERSONS RESPONSIBLE: The Department of the Navy owns the property, encompassing the Las Pulgas Landfill. The USMC is the owner and operator of

²⁵ Solid Waste Assessment Test Reports, submitted to Regional Water Boards pursuant to California Water Code section 13273, have shown that releases of leachate and gas from MSW landfills that are unlined are likely to degrade the quality of underlying ground water and cause applicable water quality objectives to be exceeded.

the Las Pulgas Landfill. The USMC is referred to as “Discharger” in this Cleanup and Abatement Order (CAO).

BASIS FOR FINDING NO. 2

California Water Code section 13304 authorizes the Regional Board to order any person who “causes or permits” waste to be discharged where it “creates or threatens to create a condition of pollution or nuisance” to clean up or abate the effects of the waste. The State Water Resources Control Board (SWRCB), in a series of orders dealing with the review of Regional Water Quality Control Board (RWQCB) decisions on who is responsible for ground water cleanups, has established general principles regarding naming responsible parties. These principles can be summarized as follows:

- In general, name all persons who have caused or permitted a discharge (Orders Nos. WQ 85-7 and 86-16).
- “Discharge” is to be construed broadly to include both active discharges and continuing discharges (Order No. WQ 86-2).
- There must be reasonable basis for naming a responsible party (i.e., substantial evidence). It is inappropriate to name persons who are only remotely related to the problem such as suppliers and distributors of gasoline (WQ 85-7, 86-16, 87-1, 89-13, and 90-2).
- Persons who are in current possession, ownership or control of the property should be named, including current landowners and lessees (numerous orders, including WQ 84-6, 86-11, 86-18, 89-1, 89-8, 89-13 and 90-3).

The San Diego Water Board has applied these principles in determining that the United States Marine Corps (USMC), the owner/operator of the Las Pulgas Landfill, should be named as the discharger in the cleanup and abatement order.

C. FINDING NO. 3 STATES:

ALTERNATIVE LINER DESIGN. The Phase 1 Expansion WMU at the Las Pulgas Landfill employed an engineered alternative composite liner design as allowed by Title 40 Code of Federal Regulations (CFR), [section 258.40\(a\)\(1\) and \(c\)](#), [CCR Title 27](#) section 20080(b), and State Water Resources Control Board (SWRCB) [Resolution No. 93-62](#). Construction on the Phase 1 Expansion Unit was completed on May 24, 1999 and the Unit began receiving wastes thereafter. The liner was not properly constructed in accordance with the requirements and performance specifications in Order No. 2000-54: “*Waste Discharge Requirements for the U.S. Marine Corps, Marine Corps Base Camp Pendleton, Las Pulgas Landfill, San Diego*”

County.”

BASIS FOR FINDING 3:

Report of Waste Discharge. On March 5, 1998 the USMC submitted a Joint Technical Document (JTD) containing a Report of Waste Discharge (ROWD) prepared by EMCON consultants in application for waste discharge requirements for horizontal and vertical expansion of landfill operations at the Las Pulgas Landfill. The JTD proposed additional phased increases in the acreage of the Las Pulgas Landfill resulting in an increase in the total acreage from 39.4 to 88.7 acres with the Phase 1 expansion encompassing approximately 17 acres. Subsequent revisions to the ROWD were submitted through September 1998.

As part of the ROWD submittal, the USMC provided the San Diego Regional Water Board with the proposed liner²⁶ and leachate collection and removal system (LCRS)²⁷ design specifications in a report entitled “*Liner, Leachate Collection and Removal System (LCRS) at the Marine Corps Base Camp Pendleton, San Diego California.*”²⁸ This report proposed the design of an engineered alternative²⁹ liner system and outlined the engineering specifications for each of the liner and LCRS components, as well as the

²⁶ See 27 CCR 20164. “Liner” means a continuous layer of natural or artificial material, or a continuous membrane of flexible artificial material, or a continuous composite layer consisting of a membrane of flexible artificial material directly overlying a layer of engineered natural material, which is installed beneath or on the sides of a waste management unit (Unit), and which acts as a barrier to both vertical or lateral fluid movement.

²⁷ See 27 CCR 20164. . “Leachate collection and removal system” or “LCRS” (SWRCB) means that portion of a waste management unit’s containment system that is designed and constructed (pursuant to §20340) to collect all leachate that reaches it, and to convey such leachate to a designated collection area to minimize the buildup of leachate head on any underlying liner. The term does not include systems that are designed to collect ground water outside the Unit’s liner, if any, including ground water that has been polluted by leachate.

²⁸ 40 CFR 258.40 provides that all new (as of October 1993), lateral and/or vertical expansions of municipal solid waste landfills must be constructed with a composite liner and LCRS.

²⁹ 27 CCR 20080(b) and SWRCB Resolution 93-62 allow dischargers to construct engineering alternatives to the prescriptive standard when the following criteria are met:

- (a) The construction of the prescriptive standard is not feasible;
- (b) The engineered alternative is consistent with the performance goals of the prescriptive standard; and
- (c) The engineered alternative provides equivalent protection against water quality impairment.

The alternative composite liner’s waste containment capability, must equal or exceed that of the prescriptive liner design specified in 40 CFR 258.40.

construction protocols to be followed during the installation of the liner system.

By letter dated September 15, 1998 the San Diego Water Board notified the USMC that pursuant to California Water Code (CWC) section 13264³⁰, construction of the landfill could legally move forward, following a 150-day waiting period commencing with the submittal of the ROWD, unless the Regional Board found the ROWD to be deficient. The 150-day waiting period expired on January 29, 1999 and subsequently the USMC began construction of the Phase 1 expansion unit of the Las Pulgas Landfill.

On May 10, 2000 the San Diego Water Board adopted Order No. 2000-54, "*Waste Discharge Requirements for the U.S. Marine Corps, Marine Corps Base Camp Pendleton, Las Pulgas Landfill, San Diego County.*" The waste discharge requirements (WDR) included specifications for the construction of the proposed engineered alternative liner design.

Construction specifications for the engineered alternative liner system in the Phase 1 expansion unit were prepared by EMCOM (1998 and 1997) including the following required components:

- i. The composite liner design for the Phase 1 expansion unit side slopes consists of, from top to bottom:
 - A geotextile;
 - A double-sided textured, 60-mil high-density polyethylene (HDPE) geomembrane;
 - A geosynthetic clay liner (GCL); and
 - A prepared subgrade.
- ii. The design for the composite liner design on the floor of the Phase 1 expansion unit is comprised of the following elements:
 - An operations layer;
 - A nonwoven geotextile;
 - LCRS drainage materials;
 - A single-sided textured, 60-mil HDPE geomembrane;
 - Geosynthetic clay liner (GCL); and
 - A prepared subgrade.

From the information available to the San Diego Regional Water Board, it is likely that various elements of the constructed subgrade/liner/operations soil layer system departed significantly from the engineering specifications developed for the construction of the Phase 1 expansion unit liner system. As a result, it appears

³⁰ California Water Code section 13264 provides in part that following a 150-day waiting period commencing with the submittal of the ROWD; the Discharger may proceed to initiate a discharge unless the Regional Board finds the ROWD to be deficient.

that the liner system contains an undetermined amount of damage that may seriously compromise the ability of the the Phase 1 expansion unit to adequately and reliably contain waste and waste constituents as required by Order No. 2000-054.

D. FINDING NO. 4 STATES:

WASTE DISCHARGE REQUIREMENT VIOLATIONS. The USMC is discharging waste into a waste management unit and discharging leachate in violation of the following performance standards prescribed in the Regional Board's Order No. 2000-54, *Waste Discharge Requirements for the U.S. Marine Corps, Marine Corps Base Camp Pendleton, Las Pulgas Landfill, San Diego County*.

- a. Discharge Specification B.22: "Materials used to construct liners shall have the appropriate physical and chemical properties to ensure containment of discharged wastes over the operating life, closure, and post-closure maintenance period of the waste management unit."
- b. Specification B.29 of Order No.2000-54 provides that: "Class III landfill units and related containment structures shall be constructed and maintained to prevent, to the greatest extent possible, ponding, infiltration, inundation, erosion, slope failure, washout, and overtopping under a 100-year, 24-hour storm."
- c. Discharge Specification B.35 of Order No. 2000-54 provides that "All containment systems shall include a leachate collection and removal system (LCRS) which shall convey all leachate which reaches the liner to an appropriately lined sump or other appropriately lined collection area. The LCRS shall not rely upon unlined or clay-lined areas or such conveyance."

BASIS FOR FINDING 4.

Liner Violation of Discharge Specification B. 22

Discharge Specification B.22 of Order Number 2000-54 provides that: "Materials used to construct liners shall have the appropriate physical and chemical properties to ensure containment of discharged wastes over the operating life, closure, and post-closure maintenance period of the waste management unit."

On April 8, 2003 the San Diego Water Board conducted a routine site inspection at the Las Pulgas Landfill. The inspection was prompted by an inspection report received from the County of San Diego Local Enforcement Agency (LEA), which indicated a series of violations had recently been observed. The violations noted by the LEA included areas of significant erosion, a failure of the existing storm

water runoff controls (Figure 3)³¹ to meet the performance requirements of Order 2000-54 (Discharge Specification B.29) and localized slumping (Figure 4) of the operations layer on the side slopes in the Phase 1 expansion unit.



During the San Diego Water Board's April 8 inspection, some of the violations noted in the LEA's inspection were observed, however it was also evident that USMC had taken steps since the LEA inspection to implement temporary measures to control erosion and runoff (see Figure 3). On April 16, 2003 the San Diego Water Board conducted a follow-up inspection at the Las Pulgas Landfill, and determined that USMC failed to implement adequate best management practices (BMPs) at the landfill to control erosion and storm water runoff as required by the SWRCB's General Industrial NPDES Permit for storm water discharges.³² The San Diego Water Board responded by issuing a Notice of Violation (NOV) Order No. R9-2003-0154) to the USMC. On May 13, 2003 the San Diego Water Board issued Investigative Order No. R9-2003-0206 requiring the USMC to investigate and evaluate the extent of potential damage to the liner

³¹ Photo taken April 8, 2003 by Ms. Amy Grove, Engineering Geologist, San Diego Water Board.

³² In 1992, the USMC obtained coverage under the State Water Resources Control Board's 1991 General Industrial Permit for storm water discharges. That permit, Order No. 91-15, DWQ, NPDES No. CAS000001 and its successor, Order No. 97-03, NPDES No. CAS000001, supplements USMC's WDRs for the landfill. The WDRs apply to the containment, and monitoring of solid waste discharged at the landfill and the storm water permit applies to discharges of pollutants through storm water runoff.

system and leachate collection and removal system (LCRS) at the Las Pulgas Landfill.



Figure 4- Localized failure/slumping of operations layer in the Phase 1 expansion unit during April 2003.³¹

Following is a discussion of the findings from two technical analyses conducted by the USMC on the Phase 1 expansion unit of the Las Pulgas Landfill:

Brown and Caldwell Report (2003)

Brown and Caldwell (BC) conducted a field investigation and prepared their report of findings concerning the failed side slope areas of the Phase 1 expansion unit. BC also compared the results of their field investigation to the engineering specifications (EMCON, 1997) used for construction of the Phase 1 expansion unit waste area. The findings presented in the BC report include the following:

- a. Two distinct areas of damage to the existing geomembrane and GCL were identified in the areas exposed by the failure at the operations soil/plastic HDPE liner interface.
- b. Certain requirements of the Engineering Design Specifications were not achieved during construction of the Phase 1 liner system. These included:
 - Subgrade preparation specifications.

- Geomembrane texturing specifications.
 - Geotextile specifications
 - Operations soil layer specifications.
- c. The side slope LCRS system function is likely compromised due to the low permeability of the existing operations soil layer.
- d. The rocks in the subgrade beneath the damaged GCL together with reports of the GCL being deployed over a rocky subgrade may be indicative of damage to the GCL and geomembrane in other areas.
- e. Bridging of the geomembrane over the underlying GCL and subgrade may be indicative of an uneven subgrade surface and may result in reduced containment effectiveness of the composite liner system and increased risk of damage to the geomembrane due to tension (*Brown and Caldwell, 2003*).

ERRG Report (2004)

The observations and findings of the Engineering/Remediation Resources Group, Inc. (ERRG) report supports the observations of the BC report concerning the condition of the subgrade and bridging of the geomembrane over the GCL. The investigation by ERRG also included laboratory testing of the operations soil layer and concluded that the permeability of the operations soil layer was significantly less than the specified permeability in the applicable engineering specifications prepared by EMCON (1997). The results from geotechnical testing of the HDPE materials for tensile strength and their field observations, led ERRG to conclude that the integrity of the geomembrane has not been impacted. ERRG's evaluation of slope stability, for the operations soil layer, estimated a static factor of safety (FS) below 1 indicating that the operations soil layer will experience a certain extent of movement and localized slumping.

The San Diego Water Board does not concur with ERRG (2004) that the installation of a buttress fill alone will adequately address the potential problems with the integrity of the existing liner system in the Phase 1 expansion unit at the Las Pulgas Landfill. Field observations reported by both BC (2003) and ERRG (2004) indicate that elements of the liner/operations soil layer do not meet the intended engineering specifications for the preparation of the subgrade, installation of the liner system (GCL and HDPE), and preparation/application of the operations soil layer.

Summary of Liner Construction Deficiencies

The following table summarizes the discrepancies found between the engineering specifications (EMCON, 1997) and the constructed liner system (from top to bottom) based on the field investigations of the Phase 1 unit performed by Brown and Caldwell (2003) and ERRG (2004):

Table 4 – Phase 1 as-built construction vs. engineering specifications

LINER COMPONENT	EMCON's PROJECT SPECIFICATIONS	AS-BUILT CONSTRUCTION
Operations Layer	<p>Poorly graded or well graded gravel or sand (USCS: GP, FW, SP, SW) containing no recycled concrete, limestone or asphalt, or other material that could adversely react with landfill leachate; less than 3 % fines (passing No. 200 sieve). Free of roots, debris, scrap material, vegetation, refuse, soft unsound particles and deleterious or objectionable materials.</p>	<p>Silty-fine sand with more than 42.5 percent fines (passing No. 200 sieve). Large angular rocks (maximum size 8 inches) and other deleterious material were observed in the operations soil layer including concrete, asphalt, wooden stakes, and rebar. Prior to large scale slumping of cover soils/operations layer, stress cracks observed along the entire length of the expansion area side slopes.</p>
Non-woven Geotextile	<p>Placement below the operations layer to act as a cushion layer between the operations layer and the geomembrane. This layer provides puncture protection for the geomembrane due to loads caused by the overlying operations soil and waste.</p>	<p>The geotextile was installed over the geomembrane during construction, but ripped during deployment and the subsequent placement of the operations soil layer. In at least one test area, the geotextile layer was absent from the sideslope.</p>
HDPE	<p>The HDPE geomembrane shall be installed above the GCL, and below the geotextile. The geomembrane shall be installed in uniform contact with the underlying and overlying liner components.</p>	<p>The exposed HDPE surface includes shallow undulations up to 1-inch due to improper subgrade conditions. At one test location, the HDPE was suspended, "bridged" approximately 8 inches over the underlying GCL and subgrade.</p>
GCL	<p>Install in direct and uniform contact with the underlying subgrade materials.</p>	<p>The subgrade was rocky and uneven, with rocks up to 9-inches in length, creating observed holes/punctures in the liner system (GCL and HDPE).</p>
Subgrade	<p>Shall be rolled to a smooth and level surface. The surface shall be free of stones greater than 0.5-inch diameter, and organics and other deleterious materials.</p>	<p>The subgrade surface is loosely compacted, uneven rocky, with rocks up to 5-inches in diameter observed during field investigations. At one location, rocks ranging in size from 1/2-inch to 1 & 1/2 inch were removed from beneath the damaged GCL. Another location had rocks ranging in size from 1-inch to</p>

LINER COMPONENT	EMCON's PROJECT SPECIFICATIONS	AS-BUILT CONSTRUCTION
		4-inches in diameter were found beneath the GCL.

The discrepancies in the existing Phase 1 liner system, previously discussed and tabulated above, have resulted in violation of Discharge Specification B.22 of Order 2000-54.

Leachate Conveyance and Discharge Violations of Discharge Specifications B.29 and B.35

Specification B.29 of Order No.2000-54 provides that: “Class III landfill units and related containment structures shall be constructed and maintained to prevent, to the greatest extent possible, ponding, infiltration, inundation, erosion, slope failure, washout, and overtopping under a 100-year, 24-hour storm.”

Discharge Specification B.35 of Order No. 2000-54 provides that “All containment systems shall include a leachate collection and removal system (LCRS) which shall convey all leachate which reaches the liner to an appropriately lined sump or other appropriately lined collection area. The LCRS shall not rely upon unlined or clay-lined areas or such conveyance.”

On February 4, 2005 the USMC contacted the San Diego Water Board and reported that a leachate seep had been observed on the lower bank of a south facing side slope in the Phase 1 expansion unit of the Las Pulgas Landfill. On February 9, 2005, per the San Diego Water Board’s request, the USMC provided photographs³³ to document the reported leachate seep, and the condition of the waste management unit in proximity to the location of the seep. On February 11, 2005 the USMC submitted a written notification reporting the leachate release via e-mail.

On February 9, 2005 the Regional Board issued Notice of Violation Order No. R9-2005-0071 for violations of waste discharge requirements in Order No. 2000-54 pertaining to an illegal discharge of leachate via a leachate seep from a south facing slope of the Phase 1 Unit (Figure 5).

On February 11, 2005 the Regional Board sent an e-mail requesting that the USMC provide the Regional Board with analytical results from sampling and analysis of the leachate reported to be seeping out of the Phase 1 expansion unit at the Las Pulgas Landfill. The Regional Board followed up this e-mail with a formal request for information in the form of Investigative Order No. R9-2005-0075, sent to the USMC on February 11, 2005. The USMC failed to submit the required results by April 11, 2005, as required by Order R9-2005-0075. As a

³³ Photo provided by USMC Camp Pendleton to Regional Water Board February 9, 2005.

result, the Regional Board issued Notice of Violation (Order R9-2005-0119) to the USMC on April 22, 2005.



The USMC submitted an incomplete technical report of results from analysis of the leachate seep in June 2005 and followed up with a complete report submittal on September 13, 2005. Table 5 summarizes the reported analytical results for a liquid sample collected from the leachate seep:

Table 5 – Waste constituents in February 2005 leachate discharge

Constituent	Concentration ($\mu\text{g/L}$)
Acetone	10,100
2-Butanone	9,720
Diethylphthalate	480
Nickel	132,000
Zinc	682,000

The uncontrolled discharge and ponding of leachate from seeps through the south-facing slope of the Phase 1 Waste Management Unit is a violation of Discharge Specifications B.29 and B.35. The combination of defects in the existing liner system underlying the Phase 1 Waste Management Unit and the leachate seeps

from the south facing slope of the Unit will likely result in a release of leachate and/or landfill gas to both ground water and nearby Los Flores Creek. The types and levels of waste constituents likely to be found in Las Pulgas Landfill leachate and gas can cause the presence of waste constituents in the ground water³⁴ and Las Flores Creek in concentrations in excess of applicable public health protective water quality objectives and CTR water quality criteria.

Leachate Conveyance and Discharge Violations of Discharge Specifications B.35

Discharge Specification B.35 of Order No. 2000-54 provides that “All containment systems shall include a leachate collection and removal system (LCRS) which shall convey all leachate which reaches the liner to an appropriately lined sump or other appropriately lined collection area. The LCRS shall not rely upon unlined or clay-lined areas or such conveyance.”

The presence of a leachate seep located on the side slope of the Phase 1 expansion unit indicates that the LCRS is not functioning as designed or required by Order 2000-54.

Summary Conclusion

The failure of the existing system to comply with required performance standards in Order No. 2000-54 resulted in the Regional Board taking a number of regulatory actions (see Chronological List in Appendix 1) for conditions at the Las Pulgas Landfill. Based on these considerations, the liner and LCRS of the Phase 1 expansion unit fail to meet the performance standards set forth in CCR Title 27, 40 CFR Section 258, and waste discharge requirements Order No. 2000-54. The information provided by the USMC indicates that the problems associated with the liner components and LCRS may be pervasive throughout the basal and side slopes of the Phase 1 expansion Unit, and that the existing composite liner and leachate collection and removal system (LCRS) must be replaced in order to protect the beneficial uses of groundwater at USMC Camp Pendleton.

E. FINDING NO. 5 STATES:

LEGAL AND REGULATORY AUTHORITY: This Order is based on (1) [section 13267](#) and Chapter 5, Enforcement and Implementation commencing with [section 13304](#), of the Porter-Cologne Water Quality Control Act (Division 7 of the Water Code, commencing with section 13000); (2) applicable state and federal regulations; (3) all applicable provisions of statewide Water Quality Control Plans adopted by the State Water Resources Control Board and the [Water Quality](#)

³⁴ Solid Waste Assessment Test Reports, submitted to Regional Water Boards pursuant to California Water Code section 13273, have shown that releases of leachate and gas from MSW landfills that are unlined are likely to degrade the quality of underlying ground water and cause applicable water quality objectives to be exceeded.

[Control Plan for the San Diego Basin](#) (Basin Plan) adopted by the Regional Board including beneficial uses, water quality objectives, and implementation plans; (4) State Water Board policies, including State Water [Resolution No. 68-16](#) (*Statement of Policy with Respect to Maintaining High Quality of Waters in California*) and [Resolution No. 92-49](#) (*Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304*); (5) regulatory requirements found in California Code of Regulations, [Title 27](#) and Code of Federal Regulations, [Title 40, Part 258](#); and (6) relevant standards, criteria, and advisories adopted by other state and federal agencies.

BASIS FOR FINDING 5.

The basis for Finding 5 is provided in Section I, STATUTORY AND REGULATORY BACKGROUND of this report.

F. FINDING NO. 6 STATES:

CEQA EXEMPTION: This enforcement action is exempt from the provisions of the California Environmental Quality Act (CEQA) in accordance with section 15321 (Enforcement Actions by Regulatory Agencies), Chapter 3, [Title 14](#) of the California Code of Regulations.

BASIS FOR FINDING 6:

Title 14, California Code of Regulations, Chapter 3, Article 3, section 15300 provides that certain classes of projects listed in Article 3 do not have a significant effect on the environment, and they are declared to be categorically exempt from the California Environmental Quality Act (CEQA) requirement for preparation of environmental documents. 14 CCR section 15321(a) identifies certain actions by regulatory agencies involving enforcement of a law, general rule, standard, or objective, administered or adopted by the regulatory agency as being categorically exempt pursuant to 14 CCR section 15300. The Regional Board's regulatory action of issuing a cleanup and abatement order (or an addendum to a cleanup and abatement order) to enforce cleanup and abatement of discharges under California Water Code section 13304 falls under the class of projects defined by 14 CCR 15321(a) and is therefore categorically exempt from the CEQA's requirement for the preparation of environmental documents.

REFERENCES

EMCON, 1997; Liner, Leachate Collection and Removal System (LCARS) at the Marine Corps Base Camp Pendleton, San Diego California: Design and Specifications, dated May 1997.

EMCON, 1998, Joint Technical Document Las Pulgas Landfill, dated August 1998.

Ninyo and Moore, 2000; Camp Pendleton Landfills Testing Summary.

Brown and Caldwell, 2003; Technical Evaluation of Soil Slumping and Geosynthetic Liner Damage and Construction Quality Assurance Report for Liner Repairs, Las Pulgas Landfill, Marine Corps Base Camp Pendleton.

ERRG, 2004; Liner and Leachate Collection and Removal System Evaluation, Las Pulgas landfill, marine Corps Base Camp Pendleton, San Diego County, California.

ERRG, 2004; Construction Quality Assurance Report, Liner, Leachate Collection & Removal System Phase I Construction, Las Pulgas landfill, Marine Corps Base Camp Pendleton, San Diego County, California.

ERRG, 2005; Technical Report Response to Regional Water Quality Control Board Order Number R9-2005-0075, Las Pulgas Landfill Marine Corps Base Camp Pendleton, San Diego County, California, dated June 2005.

IT Corporation, 1996, Marine Corps Base Camp Pendleton Remedial Investigation and Feasibility Study for Operable Unit 2 Site 8 and 22/23 Area Sites, Draft Final, dated September 23, 1996.

Leedshill and Herkenhoff, 1988; Basewide Water Requirement/Availability Study, Marine Corps Base Camp Pendleton, dated September 1988.

MACTEC, 2005; Leachate Monitoring October 2004 Letter Report, Las Pulgas and San Onofre Landfills, MCB Camp Pendleton, California.

MACTEC, 2005; 2005 Semi-Annual Water Quality Monitoring Report, Las Pulgas Sanitary Landfill, MCB Camp Pendleton, California.

USMC, 1997, Final Environmental Assessment for Las Pulgas Landfill Permitted Disposal Area Expansion and Leachate Collection and Recovery System Installation, Marine Corps Base Camp Pendleton, dated December 1997.

APPENDIX 1

CONSTRUCTION PHASE 1 EXPANSION UNIT AND CHRONOLOGY OF REGULATORY ACTIONS

The following is a chronology of correspondence between the Regional Board and USMC, regarding the construction of the Phase 1 expansion unit, permitting, violation history, and enforcement actions pertaining to the expansion unit.

- June 24, 1997: Letter sent by USMC (LtC K.Quigley) to RWQCB (Mark Alpert). RE: Notification of Intent to Install Leachate Collection and Removal Systems at Las Pulgas and San Onofre Landfills.
- March 5, 1998: Draft Joint Technical Document submitted for review and comment.
- March 5, 1998: Submittal of "Final Environmental Assessment for Las Pulgas Landfill permitted Disposal Area Expansion and Leachate and Recovery System Installation" by USMC.
- March 11, 1998: Submittal of "Final Environmental Assessment for Las Pulgas Landfill permitted Disposal Area Expansion and Leachate and Recovery System Installation" by USMC.
- March 12, 1998: Letter sent from RWQCB (Mark Alpert) to Mr. Tom DeCosta, Waste management Division. RE: Reporting Schedule and Information update for the San Onofre and Las Pulgas Sanitary Landfills Pursuant to Regional Board Order No. 93-86. RWQCB conducting information update for landfills.
- April 24, 1998: Letter from the USMC (LtC. R. Tiberg) to RWQCB (Mark Alpert). Letter contains the completed Joint Application for Landfill expansion, and the Report of Facility Information.
- May 1, 1998: Letter from USMC (Tom DeCosta) to RWQCB (Brian McDaniel). RE: Contractor Quality Control Specifications for Construction of Landfill Liner Systems at San Onofre and Las Pulgas Landfills. Letter contained the CQA guidelines from the contract specifications for construction of the LCRS systems at both landfills.
- July 22, 1998: Revisions to JTD submitted to RWQCB from the USMC. Attached was the GCL technical evaluation.

- August 3, 1998: Report submittal from EMCON to RWQCB. RE: Alternative liner design for lateral expansion of Las Pulgas and San Onofre Landfills.
- August 24, 1998: Revised RWD submittal in the form of a Joint Technical Document for lateral expansion of Las Pulgas Landfill.
- September 15, 1998: Letter sent from RWQCB (John Robertus) to USMC (Tom DeCosta). RE: Joint Technical Document / Report of waste Discharge; San Onofre and Las Pulgas Sanitary Landfills. Letter acknowledges receipt of JTD (March 5, 1998), and subsequent revisions (July 22, August 3, August 24, and September 2, 1998). Letter outlines the conditions under which the USMC may proceed with the construction of the landfills as per the Water Code and Title 23.
- November 20, 1998: Letter from USMC (Tom DeCosta) sent to RWQCB (Mark Alpert). Letter was a summary of submittal dates for the ROWD for the expansion of the Las Pulgas and San Onofre Landfills.
- December 1, 1998: Letter from RWQCB (John Robertus) to USMC (Commanding General). RE: Letter explains that the 150-day waiting period to begin construction on the project expired on September 5, 1998 and therefore the USMC can commence with the construction of the lateral expansions of the landfills.
- May 24, 1999: Construction of the liner and LCRS at Las Pulgas Landfill completed.
- August 12, 1999: Letter from RWQCB (Mark Alpert) sent to Commanding General. RE: Compliance Inspection – Las Pulgas and San Onofre Landfills. A portion of the letter outlines what is required in the CQA Liner Certification Report, as requested by USMC Environmental Security during a post-inspection briefing.
- December 3, 1999: Letter from RWQCB (John Robertus) to Commanding General. **RE: Notice of Violation No. 99-193: Las Pulgas Landfill, U.S. Marine Corps Base Camp Pendleton.** Failure to submit a final CQA Documentation Report.
- December 17, 1999: Submittal of CQA Final Documentation Report for the Las Pulgas liner expansion project.
- March 8, 2000: Letter sent by RWQCB (John Robertus) to the USMC (Theresa Trost). RE: Construction Quality Assurance (CQA) Plan and

Final Documentation Report, San Onofre and Las Pulgas Landfills, U.S. Marine Corps Base, Camp Pendleton, CA. RWQCB informs USMC that the submittal of 12/17/99 fails to meet the requirements for a final CQA report.

March 24, 2000: Letter sent from RWQCB (John Robertus) to the Commanding General. RE: Waste Discharge Requirement Update – Request for Information. Letter requests the submittal of any additional information reflecting changes that have occurred since the submittal of the 1998 Joint Technical Document.

May 10, 2000: **ADOPTION OF WDR ORDER NO. 2000-54 by San Diego Regional Board.**

June 6, 2000: Submittal of Testing Summary for Camp Pendleton Landfills from Ninyo and Moore. This submittal was submitted as the final CQA Report for the Phase 1 expansion unit.

April 21, 2003 **NOTICE OF VIOLATION NO. R9-2003-0154.** On April 8, 2003, the California Regional Water Quality Control Board, San Diego Region (“Regional Board”) conducted a routine compliance inspection at the Las Pulgas Landfill after receiving an inspection report from the San Diego County LEA, informing the Regional Board of a series of violations at the site. The Regional Board staff observed that temporary measures had been installed on the affected slopes in an attempt to control erosion and runoff. On April 16, 2003, the Regional Board conducted a follow-up inspection after another storm event. The U.S. Marine Corps has failed to implement effective erosion and drainage control measures in the Phase 1 Expansion cell at the facility. Additional measures are required to effectively prevent further erosion and damage to drainage conveyance system parameters due to high volumes of runoff from the upper and lower decks of the Phase 1 expansion unit.

May 13, 2003 **INVESTIGATIVE ORDER NO. R9-2003-0206:** Technical Report of Damage to Waste Management Unit and Storm water Conveyance System at the Las Pulgas Landfill. The Order set a due date of September 27, 2003 for the USMC to provide the RWQCB with a technical report containing the results of their evaluation.

July 2003 USMC voluntarily halts discharges of solid waste into Phase 1 expansion cell at Las Pulgas Landfill.

- December 16, 2003 RWQCB receives technical report: “Technical Evaluation of Soil Slumping and Geosynthetic Liner Damage and Construction Quality Assurance Report for Liner Repairs, Las Pulgas Landfill”, prepared by Brown and Caldwell (dated November 2003).
- January 30, 2004 **NOTICE OF VIOLATION NO. R9-2004-0044:** Upon review of a technical report (Brown and Caldwell, 2003), the Regional Board staff identified a number of technical discrepancies between the as-built construction and the design specifications for the expansion of the Phase 1 waste cell. Some of those conditions are also associated with violations of WDR Order No. 2000-54.
- In addition, reporting deficiencies were also identified in technical reports submitted to the Regional Board by the USMC pursuant to WDR Order No. 2000-54: “Waste Discharge Requirements for the U.S. Marine Corps, Marine Corps Base Camp Pendleton, Las Pulgas Landfill, San Diego County.” These deficiencies were associated with the WDR Discharge Specification No. B.34 requiring the U.S. Marine Corps to submit an acceptable final Construction Quality and Assurance (CQA) Report for the Phase 1 expansion unit at the Las Pulgas Landfill. Additionally, the cover letter failed to contain certification statement required by Order R9-2004-0044.
- August 16, 2004 RWQCB receives a technical report from the USMC: “Work Plan Evaluation of Liner and Leachate Collection and Removal System and Preparation of a Construction Quality and Assurance Report, Las Pulgas Landfill”, prepared by Environmental Remediation Resources (ERRG) and dated August 2004.
- December 1, 2004 RWQCB receives a technical report from the USMC: “Liner and Leachate Collection and Removal System Evaluation, Las Pulgas Landfill, Marine Corps Base Camp Pendleton”, prepared by ERRG and dated November 2004.
- “Construction Quality Assurance Report Liner, Leachate Collection and Removal System Phase 1 Construction, Las Pulgas Landfill”, prepared by ERRG and dated November 2004.
- December 6, 2004 RWQCB requested (via email) the USMC to provide complete copies of the following technical reports:
- Liner, Leachate Collection and Removal System (LCRS) at the Marine Corps Base Camp Pendleton, prepared by EMCON, May 1997 (Contract Document).

Geotechnical Report for Las Pulgas and San Onofre Landfills, Camp Pendleton, prepared by EMCOM, dated August 1996 (Geotechnical Report).

- December 9, 2004 RWQCB received the requested technical reports from the USMC, as requested in the December 6, 2004 e-mail.
- December 13, 2004 RWQCB staff met with USMC staff/management from Environmental Security, Facilities Maintenance and ROICC staff to discuss EO/staff concerns and pending enforcement actions for Las Pulgas Landfill.
- December 21, 2004 RWQCB sends comment letter to USMC on technical reports prepared by Brown and Caldwell (2003) and EERG (2004).
- February 1, 2005 RWQCB issues Notice of Violation No. R9-2005-0040 for violations of WDR Order No. 2000-54, caused by ~1,000 gallons of leachate overflowing the LCRS above ground tank, and discharging to unlined areas.
- February 9, 2005 RWQCB issues Notice of Violation No. R9-2005-0071 for a leachate seep discovered by the USMC, on the side slope of the Phase 1 expansion unit.
- February 11, 2005 RWQCB issues investigative Order No. R9-2005-0075 for sampling of the leachate seep at the Las Pulgas Landfill. The analytical summary report is due by April 11, 2005.