

**OCCIDENTAL OF ELK HILLS, INC.**

**Revised  
Post-Closure Permit Application  
for the  
27R Hazardous Waste  
Trench Unit - Part B  
CA4170024414**

**February 2008**

Prepared for:  
Occidental of Elk Hills, Inc.  
28590 Highway 119  
Post Office Box 1001  
Tupman, California 93276-1001

Prepared by:  
Rockwood General Contractor Inc.  
781 Calle Bendita  
Arroyo Grande, CA 93420



**ROCKWOOD**  
GENERAL CONTRACTORS, INC.

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## **1.0 Introduction**

### **1.1 Purpose**

Rockwood General Contractors Inc. (Rockwood) has prepared this Revised Part B Post-Closure Permit Application for the 27R Hazardous Waste Trench Unit on behalf of Occidental of Elk Hills Inc. (OEHI) to comply with Title 22 of the California Code of Regulations (22 CCR), section 66270.1(c) and other requirements, as requested by Mr. Peter Bailey, P.G., Engineering Geologist, of the Department of Toxic Substances Control (DTSC) in their letter dated February 23, 2007.

### **1.2 Document Organization**

This Part B Post-Closure Permit Application is organized according to the requirements for post-closure permit applications set forth in 22 CCR, Chapter 20. For ease of review, reference is made in the text to the applicable regulations of the permit in the following sections.

### **1.3 Site Contact Information**

Name of Facility: 27R Hazardous Waste Trench Unit  
Site Owner: Occidental of Elk Hills, Inc.  
Site Operator: Occidental of Elk Hills, Inc.

Mailing Address: 28590 Highway 119  
Tupman, California 93276-1001  
Occidental of Elk Hills, Inc.

Mr. George N. Gough, Jr. – Environmental Team Leader (Program Manager)  
or Mr. Richard Garcia – Environmental Consultant (Project Manager)  
Occidental of Elk Hills, Inc.  
28590 Highway 119  
Post Office Box 1001  
Tupman, California 93276-1001  
Phone: 661-763-6000 (main)  
Phone: 661-763-6021 (George direct)  
Phone: 661-763-6514 (Richard direct)

EPA ID Number: CA4170024414

## **2.0 Application Certification [22 CCR 66270.11]**

The following certification and signature are presented to satisfy the requirements of regulations 22 CCR 66270.11.

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

---

Patricio Rivera  
Health Environment Safety (HES)  
Occidental of Elk Hills, Inc.

Date

### **3.0 General Facility Description [22 CCR 66270.14(b)(1), 66270.14(b)(13), and 66264.118(b)(3)]**

#### **3.1 Location**

The 27R Hazardous Waste Trench Unit (“the 27R WMU”) is located near the center of the Elk Hills Oilfield, within the extreme Southeastern corner of Section 27, and the extreme Northeastern corner of Section 34, Township 30 South, Range 23 East, MDB&M, County of Kern, State of California (Figure 1), and has been assigned EPA Identification Number CA4170024414. The site occupies 6.08-acres of land and is located approximately one mile west of Elk Hills Road and just north of Skyline Road (Figure 2). Highway 119 is located approximately four miles east of the site and Interstate 5 is located approximately ten miles northeast of the 27R WMU. This Property bears Kern County Assessor's Parcel Number(s): 158-090-01-9; 158-090-06-8.

The nearest incorporated community is the City of Taft, located approximately ten miles southwest of the 27R WMU. Two smaller communities are located between the site and Taft, Dustin Acres and Valley Acres, which are approximately six and eight miles southwest of the site along Highway 119, respectively (Figure 1).

#### **3.2 Facility History**

The 27R WMU and portions of the Elk Hills Oilfield were originally part of the Naval Petroleum Reserve No.1 (NPR-1) and was owned and operated under a unit agreement between the federal government and Chevron U.S.A, Inc. (formerly Standard Oil Company) in 1944. The government interest in the site was approximately 78 percent and Chevron’s interest was approximately 22 percent. The government’s interest was managed under the jurisdiction of the United States Department of Energy (DOE). The size of the property at the time of the agreement was approximately 74 square miles, which included the DOE owned NPR-1 portion of the property (the 27R WMU is approximately 6.08-acres).

NPR-1 was owned by DOE and operated by Williams Brothers Engineering Company (Williams Brothers) between 1975 and 1985 when wastes were deposited to the 27R WMU. The wastes received at the site consisted of neutralized well stimulation fluids and tank bottom sludges that were deposited into five unlined adjacent surface impoundments or trenches. Therefore, the five unlined adjacent surface impoundments or trenches make up one Waste Management Unit (WMU), which occupies approximately 6.08-acres (Figure 3). The approximate dimensions of the five trenches, which make up the WMU, are as follows: 85 by 390 feet, 85 by 420 feet, 120 by 420 feet, 70 by 320 feet and 60 by 260 feet moving west to east across the WMU, respectively (Figure 3). Each of the trenches were approximately 5 feet deep at the time of waste disposal.



Bechtel Petroleum Operations, Inc. (BPOI) took over operations of NPR-1 (the 27R WMU) in July 1985. BPOI was the operator of the WMU at NPR-1 from July 1985 through February 1998.

The 27R Waste Management Facility (NPR-1), part of which includes the 27R WMU, began operations in 1975 under Waste Discharge Requirement (WDR) No. 73-141, which was issued to Williams Brothers by the California Regional Water Quality Control Board – Central Valley Region (RWQCB) in 1973 and amended in 1976. Available correspondence between the RWQCB and Williams Brothers is provided in Appendix A.

In response to the Resource Conservation and Recovery Act (RCRA) regulations, the DOE applied for a hazardous waste permit for the 27R WMU in 1980 under the facility name NPR-1. However, due to the RCRA “petroleum exclusion” for oil exploration and production wastes under CFR Title 40, the U.S. Environmental Protection Agency (EPA) returned the application because this facility was not under their jurisdiction. Upon receipt of this information from the EPA, the State of California Department of Health Services (DHS) [currently Cal-EPA] issued an Interim Status Document in 1981 to allow the continuous disposal of waste. NPR-1 continued to operate under the Interim Status Document until waste was no longer disposed of in November 1985 by BPOI.

Closure actions were initiated at the 27R WMU by the DOE in 1985 and completed in March of 1992. A closure plan for the 27R WMU was submitted in 1986, which required a site characterization study (Bechtel 1993). The characterization study of the 27R WMU was completed by the Mark Group in 1987 and summarized in their report “Vertical and Lateral Extent of Waste Constituents, 27R Waste Management Facility”, December 1987 (Mark Group, 1987). As part of a separate investigation, a core hole was drilled adjacent to the 27R WMU. The result of a test hole (1CH-27R) drilled at the Trench Unit in 1990 indicated groundwater was not encountered to a total depth of 1,000 feet below the existing grade (Bechtel 1993).

Based on the results of the site characterization, test core hole, and discussions with pertinent regulatory agencies, the site closure plan was revised and submitted to the DHS (currently the Cal-EPA), for approval. The first closure plan for the 27R WMU was submitted in February 1987, followed by an August of 1990 submittal. The final updated closure plan was submitted in December of 1990 which was approved by the Cal-EPA in May 1991 (Bechtel 1993). A copy of the Closure Plan Approval has been included in Appendix A. Copies of pertinent information regarding the deep core hole (1CH-27R) has been provided in Appendix B.

Additionally, in the Closure Plan Approval letter for NPR-1 dated May 1991, the DTSC (formerly DHS-Toxic Substances Control Program) waived the requirements for groundwater monitoring under the provisions of Title 22, Section 67191. This waiver is based on the depth to groundwater (greater than 1,000 feet), site geology, the designation of groundwater beneath the site as an except aquifer by the California Division of Oil, Gas, and Geothermal Resources (DOGGR) because it is within a hydrocarbon producing area, and the



lack of migration potential as demonstrated in the Closure Plan (Bechtel 1990). However, in lieu of a groundwater monitoring program a vadose zone monitoring system was to be installed as delineated in the Closure Plan Approval (DHS 1991). No additional groundwater monitoring is being performed within the Elk Hills Oilfield at this time.

Following approval of the closure plan by the DHS in 1991 (DHS 1991), site closure activities were initiated at the site and included the installation of a final engineered cap/cover consisting of a clean soil layer measuring approximately 5 to 10 feet thick (10 feet in the center or crown of the engineered cap), a 2-foot thick clay layer or water infiltration cap placed over the clean fill soil, and an approximate 1.5 foot thick vegetative soil layer at the surface.

A Revised Post-Closure Permit Application for the 27R WMU was submitted by BPOI to the California EPA, Department of Toxic Substances Control (DTSC) in September 1993. Following review of the Permit Application (BPOI 1993) by the DTSC, BPOI addressed deficiencies in the Permit Application. This letter addressing deficiencies, dated April 28, 1994, was sent to the DTSC for review and approval. On June 24, 1994, a Completeness Determination for the Revised Post-Closure Plan Application, Part B was issued to BPOI by the DTSC (DTSC 1994). A copy of the Completeness Determination letter is provided in Appendix A.

In accordance with Title 22 of CCR 66264.119(b), BPOI issued a letter in 1993 on behalf of DOE notifying the Kern County Planning and Development Services that the 27R WMU was used to manage hazardous waste and the land use is therefore restricted. A copy of this letter is included in Appendix A.

On June 8, 1995, BPOI issues a letter regarding the Post-Closure Monitoring Program for the site. The letter discussed monthly inspections, vadose monitoring, and the permit status of the site. A copy of this letter has been included in Appendix A.

On October 31, 1997 the DTSC filed a Negative Declaration for the 27R WMU as part of the California Environmental Quality Act (CEQA) review process. This was followed by issuance of a Final Hazardous Waste Facility Post-Closure Permit for the site on December 31, 1997. This permit expired on December 31, 2007. A copy of the 2007 Permit and Final Negative Declaration letter for the site has been provided in Appendix A.

An additional element of the December 1997 Post-Closure Permit for the 27R WMU was a requirement to perform quarterly vadose zone soil moisture monitoring. A neutron probe monitoring system was installed at the Trench Unit in 1992 during the construction of the engineered cover. Quarterly neutron probe monitoring was discontinued in 1995 due to the inability to acquire comparable vadose zone monitoring data.

In February 1998 two letters were sent by OEHI to the DTSC to inform them of a transfer of ownership regarding the 27R WMU. The official transfer of the property (27R WMU) was completed on February 5, 1998, at which time OEHI became the owner and operator of

approximate 47,000 acre Elk Hills Oil Field. Copies of the property transfer letters have been included in Appendix A.

Following the property transfer from DOE to OEHI and with the concurrence of the DTSC, installation of an alternative in-situ vadose zone soil moisture monitoring system was completed in November 1998. This soil moisture monitoring system consists of a datalogger, remote telecommunication relay equipment, fifteen Campbell Scientific (model CS615) water content reflectometer probes, and seven Campbell Scientific (model 107) temperature probes.

Each of the soil moisture monitoring probes were installed beneath the engineered clay cap (18 to 24 inches beneath the surface) at 100-foot intervals across the site (Figure 4). The current vadose monitoring system has been operating continuously at the 27R WMU since November 1998. Vadose zone monitoring results have not identified infiltration of surface water through the engineered clay cap during nine years of monitoring. Additional details regarding post-closure monitoring are included in sections 8 and 14 of this permit.

Other documents relevant to the closure of the 27R WMU are referenced in Section 7.1 of this permit.

### **3.3 Physical Description of the Facility**

The 27R WMU is located on top of a gentle rolling hill (anticline structure) within the southeast section (Section 27R) of the Elk Hills Oilfield. The topography of the 27R WMU and surrounding area consists of rolling hills with gentle to medium slopes and relatively flat areas with 1 to 5 percent slopes. The main surface drainage from the Elk Hills Oilfield is toward the southwest and northeast moving away from the anticline through the property. The elevation of the site ranges from approximately 1390 feet above mean sea level (msl) at the base of the 27R Trench Unit to approximately 1420 feet msl.

Surface water runoff at the 27R WMU and vicinity are controlled by the topography of the engineered cap. Large amounts of precipitation within the limits of the 27R WMU runs off the site in several directions due to the shape of the engineered cap (a mound with gentle slopes to all directions). The majority of surface water runs off site and collects in two low lying areas adjacent to the 27R WMU during large rain events. Some of the precipitation accumulates on the surface and infiltrates the vegetative cover (top 18-inches of the cover). The natural topographic depressions or basins, where rainwater collects outside of the 27R WMU, are located to the south-west and to the south-east of the site (Figure 2). Water collected in these areas naturally infiltrate the surface or evaporates over time.

A north-south cross section constructed through Section 27R indicated that the depth to groundwater beneath the 27R WMU is approximately 1,100 feet below grade at an elevation of 350 feet above mean sea level. A prominent and consistent horizon of low permeable soil,

called the Amnicola Clay, underlies the area of the Trench Unit at a depth of approximately 550 feet below the surface elevation and attains a thickness of approximately 35 feet.

The Tulare Formation within the Elk Hills Oilfield is where the first groundwater beneath the site is anticipated has been designated as an exempt aquifer by the California Division of Oil, Gas, and Geothermal Resources (DOGGR) because it is within a hydrocarbon producing area and contains groundwater with a total dissolved solids (TDS) content exceeding 3,000 parts per million (ppm) in some areas. Figure 5 shows the cross section beneath the 27R WMU.

The site consists of a series of five north-south oriented surface impoundments or one Waste Management Unit within a 6.08-acre area (Figure 3). The approximate dimensions of the five trenches is 85 by 390 feet, 85 by 420 feet, 120 by 420 feet, 70 by 320 feet and 60 by 260 feet moving west to east across the WMU, respectively (Figure 3). Each of the trenches were approximately 5 feet deep at the time of waste disposal.

Construction of the engineered cap consisted of establishing a base (sub grade ~1402 feet msl) followed by installation of a 10 foot thick clean fill layer (medium to fine silts and sands), a 24-inch clay cap, and completed at the surface with an 18 to 24-inch clean soil layer (vegetation layer). Each of the layers was placed on the site so that a crown was established with a 3 to 5 percent slope from the center of the engineered cap to the outer portion of the landfill cover. A 10 to 15 percent slope was created around the perimeter of the engineered cap (approximately 50 to 100 feet from the edge of the landfill cover to the existing grade of the surrounding area outside of the 27R WMU).

The engineered cap was completed in March 1993 by Golder and Associates of Alameda, California. Details regarding the construction of the closure cover are included in the Golder report "Quality Assurance Observation and Testing for Closure Cover Construction, 27R Hazardous Waste Trench Unit, Naval Petroleum Reserve No. 1 (NPR-1)", dated May 6, 1992 (Golder 1992). Pursuant to Title 22 of the CCRs, a Completeness Determination was issued to BPOI for final closure of the cover construction on May 19, 1993 by DTSC. A copy of the Completeness Determination for the closure cover construction is provided in Appendix A and a copy of the 27R Waste Clay Layer Final Certification Map is provided in Appendix C.

A vadose zone monitoring system consisting of three neutron probes was installed during the construction of the engineered cap in 1992 to determine if surface water was infiltrating the clay layer (engineered clay cap). Monitoring of the neutron probe system was discontinued in 1995 due to the inability to acquire comparable vadose zone data. At the request of the DTSC and with their concurrence, an alternative vadose zone monitoring system was installed at the site in November 1998. The new monitoring consists of a datalogger, 15 water content reflectometer probes (soil moisture probes), 7 soil temperature probes, an onsite datalogger, and a remote telecommunication station. Each of the soil moisture and temperature probes were installed just beneath the clay layer (cap) and the associated wires from each probe location was placed in a trench, above the clay layer, to the control station near the central portion of the 27R WMU (Figure 4).

The 6.08-acre facility is protected by a chain-link security fence that was installed around the perimeter of the 27R WMU in December 1993 to control both human and wildlife access. The fence includes six access gates evenly spaced around the 27R WMU. Each gate has a key lock to prevent unauthorized entrance into the engineered cover.

The surrounding land use in the vicinity of the 27R WMU is limited to oil and gas production. Refer to Figures 1 and 6 for land use information in the vicinity of the 27R WMU.

### 3.4 Wastes Received at the Facility

The 27R WMU consists of a surface impoundment that was used for the disposal of neutralized acids and tank bottom sediments and sludges. The site was operated by Williams Brothers from 1975 until November 1985, when BPOI took over operations for DOE and ceased disposal operations at the 27R WMU. The volume of wastes disposed of into the WMU (trench unit) prior to January 1978 is not available, however the yearly total of the waste streams disposed of between 1978 and 1985 are as follows:

<b>Year</b>	<b>Tank Bottom Sediment/Sludge (Total Barrels)</b>	<b>Neutralized Acid Mixtures (Total Barrels)</b>
1975-1977	Unknown Volume	Unknown Volume
1978	8,869	4,030
1979	3,824	16,310
1980	340	1,490
1981	855	0
1982	7,395	130
1983	0	130
1984	13,735	0
1985	0	0
<b>Totals</b>	<b>35,018</b>	<b>22,090</b>

*Note: one barrel is equal to 42 gallons.*

These volumes were estimated based on the number of barrels per truckload disposed of at the 27R WMU. Volume estimates for the disposal of the neutralized acid mixtures are more accurate than those for tank bottom sediment/sludge (Bechtel 1993).

### 3.5 Contact Person for the Post-Closure Care Period

During the post-closure period, the person responsible for the 27R WMU and all post-closure activities associated with the site is currently:

Mr. George N. Gough, Jr. – Environmental Team Leader (Program Manager)  
or Mr. Richard Garcia – Environmental Consultant (Project Manager)



Occidental of Elk Hills, Inc.  
28590 Highway 119  
Post Office Box 1001  
Tupman, California 93276-1001  
Phone: 661-763-6000 (main)  
Phone: 661-763-6021 (George direct)  
Phone: 661-763-6514 (Richard direct)

#### 4.0 Post-Closure Notices [22 CCR 66264.119]

This section presents the regulatory requirements for filing post-closure notices for the 27R WMU. The required notices filed prior to the sale of the property were sent by BPOI pursuant to the regulation stated above and are described in Section 3.11 of the BPOI Revised Post-Closure Permit Application (Bechtel 1993). Additional Post-Closure notices prior to the sale of the property on February 5, 1998 to OEHI have been provided in Appendix A or are not available at this time. Further discussion of the closure certification for the 27R WMU is presented in Section 7.2 of this permit application.

The following is a summary of pertinent post-closure notices subsequent to the purchase of the property by OEHI:

- “Transfer of 27R Hazardous Waste Trench Unit Post Closure Permit, Elk Hills Oil Field, EPA ID CA 4170024414”, February 5, 1998. Prepared by Mr. Dennis L. Newman of OEHI and sent to Mr. Gerard Abrams of the DTSC. This letter was a follow up to the DOE letter dated January 8, 1998 and to notify the DTSC of the closing sale of the property on February 5, 1998 and to request completion of the transfer of ownership of the Post Closure Permit for the 27R WMU from DOE to Occidental of Elk Hills.
- “Permit Modification – Transfer of Post-Closure Permit from DOE Naval Petroleum Reserve No. 1 to Occidental of Elk Hills, Kern County, California”, February 11, 1998. Prepared by Mr. Dennis Newman of OEHI and sent to Ms. Jody Sparks of the DTSC. This purpose of the letter was to provide notification of a permit modification as required by Title 22 CCR 66270.42. The DTSC is transferring a post-closure permit for the 27R Hazardous Waste Trench Unit at the Naval Petroleum Reserve No. 1 from the DOE to Occidental of Elk Hills, Inc.
- “Review of 1999 Annual Monitoring Report for Post-Closure Permit for the 27R Hazardous Waste Trench Unit”, September 1, 2000. Prepared by Ms. Lisa M. Austin of DTSC for Mr. Dennis L. Newman of OEHI. This letter includes a memorandum from the DTSC regarding requested changes or modification to the monitoring program.

- “Final Report on Quality Assurance and Testing for Closure Cover Construction 27R Hazardous Waste Trench Unit Naval Petroleum Reserve No. 1 (NPR-1)”, May 6, 1992.
- “Completeness Determination, 27R Hazardous Waste Trench Closure, Elk Hills Naval Petroleum Reserve No. 1 (NPR-1), EPA I.D. No. CA4170024414, Kern County”, May 19, 1993.
- “Revised Post-Closure Permit Application, Part B for the 27R Hazardous Waste Trench Unit, Naval Petroleum Reserve No.1”, Elk Hills, California, September 1993.
- “Revised Post-Closure Permit Application, Part B for the 27R Hazardous Waste Trench Unit, NPR-1, EPA I.D. No. CA4170024414”, April 28, 1994.
- “Completeness Determination for the Revised Post-Closure Application, Part B, for 27R Hazardous Waste Trench Unit, Naval Petroleum Reserve Number 1, Elk Hills, California, September 1993, EPA ID No. CA4170024414”, June 24, 1994.
- “Post-Closure Monitoring Program at the 27R Hazardous Waste Trench Unit, Naval Petroleum Reserve NO. 1, Tupman, California, EPA I.D. No. CA4170024414”, June 8, 1995.
- “Revised Post-Closure Permit Application, Part B for the 27R Hazardous Waste Trench Unit, Naval Petroleum Reserve No. 1 (NPR-1), EPA I.D. No. CA4170024414”, March 11, 1997.
- “Hazardous Waste Facility Post-Closure Permit”, December 31, 1997.
- “Final Negative Declaration for Post-Closure Permit 27R Hazardous Waste Trench Unit, Naval Petroleum Reserve No. 1, CA 4170024414”, December 31, 1997.
- “Permit Modification - Transfer of 27R Hazardous Waste Trench Unit Post Closure Permit From DOE Naval Petroleum Reserve No.1 to Occidental of Elk Hills, Kern County, California”, February 11, 1998.
- “Post-Closure Permit Renewal Call-In Letter for Naval Petroleum Reserve No. 1, Elk Hills, Kern County, California EPA ID CA4170024414”, February 23, 2007.
- “Post-Closure Permit Application Extension For Naval Petroleum Reserve No. 1, Elk Hills, Kern County, California EPA ID CA4170024414”, May 24, 2007.

A copy of these letters has been included in Appendix A for your reference.

## **5.0 Compliance with Other Federal Laws [22 CCR 66270.3]**

Pursuant to regulation 22 CCR 66270.3, the 27R WMU is required to comply with the Wild and Scenic Rivers Act, National Historic Preservation Act of 1996, Endangered Species Act, Coastal Zone Management Act, and the Fish and Wildlife Coordination Act. The following is a summary of compliance with the acts discussed above.

### **5.1 Wild and Scenic Rivers**

The Wild and Scenic Rivers Act does not apply to the post-closure permit for the 27R WMU because the site is not located near a State of California river designated in the Wild and Scenic Rivers Act. The closest listed river is the South Fork of the Kern River, which is approximately 30 miles from the 27R WMU. Based on the distance between the 27R WMU and the south fork of the Kern River, removes the potential for any environmental impacts from this site that would apply to the wild and scenic rivers act.

A portion of the Kern River, which is not designated in the Wild and Scenic River Act, is approximately 8 miles north of the 27R WMU and is a dry floodplain/river during a portion of the year.

### **5.2 National Historic Preservation Act**

The National Historic Preservation Act does not apply to the post-closure permit for the 27R WMU, because there are no Historic Places currently listed in the vicinity of the site.

The Lean Oil Absorption Plant constructed in 1952, located in Section 35R of the OEHI property, may be considered an historic site in the future. This site is located approximately 1 mile southeast of the 27R WMU and would not be affected by the permitted activities of the site.

### **5.3 Endangered Species Act**

Activities performed as part of the post-closure permit for the 27R WMU would not result in the killing, harming, or harassing of an endangered or threatened species located in the vicinity of the site. A search of the California Natural Diversity Database, maintained by the California Department of Fish and Game, identified four endangered and one threatened species on the Federal database and three endangered and three threatened species on the State of California database that reportedly exist in the area of the 27R WMU (East Elk Hills Quadrangle – Figure 2):

- Giant kangaroo rat (*Dipodomys ingens*) – Endangered (State and Federal)

- Tipton kangaroo rat (*Dipodomys nitratoides nitratoid*) – Endangered (State and Federal)
- Blunt-nosed leopard lizard (*Gambelia sila*) – Endangered (State and Federal)
- San Joaquin kit fox (*Vulpes macrotis mutica*) – Endangered (Federal), Threatened (State)
- Nelsons antelope squirrel (*Ammospermophilus Nelsoni*) – Threatened (State)
- Giant garter snake (*Thamnophis gigas*) – Threatened (State and Federal)

Three additional species were identified in the California Department of Fish and Game database as species of concern. These include: the Burrowing owl (*Athene cucularia*); Short-nosed kangaroo rat (*Dipodomys nitratoides brevinas*); and the Tulare grasshopper mouse (*Onychomys torridus tularensis*).

Based on current information regarding Federal and State listed animals the Giant garter snake and Tipton kangaroo rat are reportedly no longer located within the East Elk Hills quadrangle. The Tipton kangaroo rat is reportedly located northeast of the California Aqueduct, which is approximately 5 miles from the 27R WMU. A copy of the Natural Diversity database is included in Appendix D.

There were no listings on the Department of Fish and Game database for plant species in the area of the 27R WMU. The Hoovers Woolly Star was reportedly de-listed as a species of concern in the area.

Occidental of Elk Hills has received a “take permit” from the Department of Fish and Game under the California Endangered Species Act. The “Take” authorization between Elk Hills and the Department of Fish and Game is a memorandum of understanding dated December 29, 1997 and is specifically for the Elk Hills Unit. The permit number is 2081. Additionally, OEHI received a “Biological Opinion” from the US Department of Interior for “takes” associated with oilfield activities at the site. The reference number for this biological opinion is No. 1-1-95-F-102, dated November 8, 1995. Copies of these documents are kept at the OEHI office located in Tupman, California.

However, since the final closure cap construction was completed in March 1992, the potential for the residual wastes at the 27R WMU to adversely impact protected species is believed to be minimal. The greatest threat to these species is habitat loss mainly from oilfield production activities, which are not conducted within the limits of the 27R WMU. Therefore the post-closure permit for the 27R WMU would should not interfere with the continued existence of these species or adversely affect their critical habitat.

## **5.4 Coastal Zone Management Act**

The Coastal Zone Management Act does not apply to the 27R WMU because the site is over 100 miles from the Coast of California and has no potential to affect land or water use in the coastal zone.

## **5.5 Fish and Wildlife Coordination Act**

The Fish and Wildlife Coordination Act does not apply to the post-closure permit for the 27R WMU because there is no proposed modification of any body of water associated with the site.

## **6.0 Facility Description**

### **6.1 Facility Location [22 CCR 66270.14(b)(11)]**

As described in Section 3.1 and shown in Figures 1, 2, 6, and 7 the 27R WMU is located on the crest of Elk Hills near the center of the Elk Hills Oilfield within the extreme Southeastern corner of Section 27, and the extreme Northeastern corner of Section 34, Township 30 South, Range 23 East, MDB&M, County of Kern, State of California (Figures 1 and 2). The 27R WMU has been established in Kern County as Assessor's Parcel Number(s): 158-090-01-9; 158-090-06-8. Refer to Section 3.1 for a detailed description of the 27R WMU and surrounding area and Appendix E, Exhibits A and B for the legal description and figure for the 27R WMU.

### **6.2 Topographic Map [22 CCR 66270.14(b)(18) and 66270.14(c)(3)]**

Pursuant to the regulations indicated above, a topographic map of the 27R WMU is included as Figure 2 and include some of the features listed below. Features not shown on Figure 2 are represented on separate figures which have been noted:

- Scale of 1 inch equal to 2,000 feet;
- Contours sufficient to show surface water flow around the 27R WMU;
- Date of survey 1973;
- Contour interval of 20-25 feet (major) and 5 feet (minor);
- Area including 2,000 feet surrounding the site;

- 100-year flood plain area (not required);
- Surface waters including intermittent streams or drainage;
- Surrounding land uses (Figures 1 and 6);
- Taft Airport (closest airfield; Figure 1);
- Map orientation;
- Legal boundaries of the 27R WMU (Figures 2 and 3, and Appendix E);
- Access and internal roads (Figure 7);
- Structures on 27R WMU (none);
- Sewers (none);
- Flood control or drainage barriers (none);
- Run-on and run-off control systems (none);
- Operational areas (none);
- Waste management areas (Figure 3);
- Point of compliance and vadose monitoring instruments (Figure 4);
- Deep core well (Appendix B).
- Wind Rose diagram (Appendix F).

### **6.3 Wind Rose Diagram [22 CCR 66.14(c)(3)]**

A Class 7 All Weather Wind Rose diagram for the Bakersfield California Airport was constructed using data obtained from the National Oceanic and Atmospheric Administration (NOAA). The Bakersfield Airport is approximately 25 miles from the 27R WMU but is the only source within the area where wind data has been collected over time to evaluate and prepare a Wind Rose diagram. The Wind Rose diagram depicts wind direction versus wind speed during all weather conditions at the airport from 1993 through 2002. Wind information obtained from this diagram may be indicative of and/or provide similar data for wind conditions at the 27R WMU over the same time period. Based on information from the diagram, the prevailing wind speed and direction is 0 to 16 miles per hour from the

northwest. The Wind Rose diagram was prepared by Triad Environmental Consultants, Inc., located in Nashville, Tennessee and has been provided in Appendix F (Triad 2006).

#### **6.4 Floodplain Information [22 CCR 66264.18(b) and 66270.14(b)(11)]**

Floodplain information is required by the above regulations to determine whether the 27R WMU is located within a 100-year floodplain. A flood plain study for a portion of the Naval Petroleum Reserves (NPR) No. 1 and No. 2 was performed by the US Army Corps of Engineers in 1993. Results of this study did not identify the 27R WMU within a 100-year flood plain. Results of this study “Approximate Flood Plain Study 100-Year Flood for the Naval Petroleum Reserve No. 1 & No. 2 Kern County, California”, November 1993 is included in Appendix G.

In addition to the 100 year floodplain study performed at NPR Nos. 1 and 2, the 27R WMU is located at the crest of Elk Hills at an elevation of 1400 feet above mean sea level within an area of rolling topography and receives an average of less than 6 inches of precipitation each year. Based on the results of the study performed by the Army Corps of Engineers along with the information stated above, the 27R WMU is not considered to be located within an area that would be affected by a 100 year flood.

### **7.0 Closure Plan and Report [22 CCR 66270.14(b)(13)]**

#### **7.1 Closure Plan**

The documents related to the preparation, implementation, and completion of closure include the following:

1. “Closure/Post-Closure Plan for the 27R Waste Disposal Trenches at the Elk Hills Naval Petroleum Reserve No.1”, February 1987. Prepared for DOE– Elk Hills Operations Office. Prepared by BPOI, Tupman, California.
2. “Vertical and Lateral Extent of Waste Constituents 27R Waste Management Facility, Naval Petroleum Reserve-1, Elk Hills, California, Volumes I and II”, December 1987. Prepared by The MARK Group, Engineers & Geologists, Inc., Pleasant Hill, California.
3. “Background Levels Health Risk Assessment of Trace Metals”, August 12, 1988. Prepared by Kaman Sciences Corporation, Santa Barbara, California.
4. “Closure of the Naval Petroleum Reserve No. 1 27-R Disposal Trench Area”, March 6, 1989. Prepared by DHS –Toxic Substances Control Program, Region 1. Prepared for BPOI.

5. "27R Closure Plan", August 22, 1990. Prepared by BPOI on behalf of the DOE and Chevron U.S.A. Prepared for DHS –Toxic Substances Control Program, Region 1.
6. "27R Hazardous Waste Trench Unit Closure Plan, 27R Waste Management Facility, Elk Hills, Naval Petroleum Reserve No. 1" December 1990. Prepared for DHS – Toxic Substances Control Program, Region 1. Prepared by BPOI on behalf of the DOE.
7. "Closure Plan Approval for the Elk Hills Naval Petroleum Reserve Number One, 27-R Hazardous Waste Trench Unit, EPA I.D. No. CA4170024414", May 7, 1991. Prepared for BPOI by the DHS–Toxic Substances Control Program, Region 1.
8. "Final Report on Quality Assurance and Testing for Closure Cover Construction 27R Hazardous Waste Trench Unit Naval Petroleum Reserve No. 1 (NPR-1)", May 6, 1992.
9. "Completeness Determination, 27R Hazardous Waste Trench Closure, Elk Hills Naval Petroleum Reserve No. 1 (NPR-1), EPA I.D. No. CA4170024414, Kern County", May 19, 1993.
10. "Preliminary Endangerment Assessment of 27R, 23S, and 1A-6M Metal Contaminated Site, Naval Petroleum Reserve Number 1", May 12, 1995. Prepared by Clayton Environmental Consultants for BPOI.

The letters and reports mentioned above provide detailed information relevant to the closure, post-closure, design and construction of the final cover for the 27R WMU and are available for review at:

Occidental of Elk Hills, Inc.  
28590 Highway 119  
Post Office Box 1001  
Tupman, California 93276-1001  
Phone: 661-763-6000 (main)

Contact(s): Mr. George N. Gough, Jr. – Environmental Team Leader (Program Manager)  
or Mr. Richard Garcia – Environmental Consultant (Project Manager)  
661-763-6021 (George direct)  
661-763-6514 (Richard direct)

## **7.2 Certification of Closure**

The closure certification for the 27R WMU was prepared in the report "Final Report on Quality Assurance and Testing for Closure Cover Construction 27R Hazardous Waste Trench



Unit Naval Petroleum Reserve No. 1 (NPR-1)", May 6, 1992. This report was prepared for BPOI and DOE by Golder and Associates of Alameda, California.

Results of the Golder report were reviewed and approved by the DTSC in their letter "Completeness Determination, 27R Hazardous Waste Trench Closure, Elk Hills Naval Petroleum Reserve No. 1 (NPR-1), EPA I.D. No. CA4170024414, Kern County.", May 19, 1993. A copy of the DTSC approval letter is included in Appendix A and a Figure showing the 27R Final Certification is provided in Appendix C.

## **8.0 Post-Closure Plan [22 CCR 66270.14(b)(13) and 66264.118]**

### **8.1 Written Plan**

Section 8.0 of this permit represents the updated Post-Closure Plan (Maintenance Plan) for the 27R WMU.

A copy of this Post-Closure Plan and Permit Approval Plan from the DTSC will be kept at the Occidental of Elk Hills office (site owner) in Tupman, California during the remainder of the post-closure period, as required by regulation 22 CCR 66264.118(c). The maintenance activities will continue to be performed until the end of the compliance period is reached [22 CCR 66264.96]. The following persons will be responsible for storing and updating the Post-Closure Plan:

Mr. George N. Gough, Jr. – Environmental Team Leader (Program Manager)  
or Mr. Richard Garcia – Environmental Consultant (Project Manager)  
Occidental of Elk Hills, Inc.  
28590 Highway 119  
Post Office Box 1001  
Tupman, California 93276-1001

Phone: 661-763-6000 (main)  
Phone: 661-763-6021 (George direct)  
Phone: 661-763-6514 (Richard direct)

## **8.2 Monitoring Activities [22 CCR 66264.118(b)(1)]**

### **8.2.1 Reporting**

Post-Closure Monitoring at the 27R WMU includes walk over survey inspection, topographic survey activities (civil survey), security systems, and vadose zone monitoring. Details regarding inspection and maintenance of these activities are provided in Sections 8.2.2 and 14.0 of this permit.



At the conclusion of the calendar year, an Annual Post-Closure Monitoring Report will be prepared for the DTSC to document the post-closure care activities performed during a calendar year (January 1 through December 31). The Post-Closure Monitoring Report will include the following information: site background, geology, surface monitoring activities, site security system inspections, civil survey results, and results of vadose zone monitoring. The report will include all supporting documentation regarding the monitoring performed throughout the calendar year. The Post-Closure Monitoring Report will be completed under the direction of and signed off by a State of California Professional Geologist. The Post-Closure Monitoring Report will be completed no later than the April 30th of the subsequent year (i.e. the 2007 Annual Post-Closure Monitoring Report will be due before April 30, 2008).

### **8.2.2 Option to Request Termination of the Vadose Zone Monitoring System**

Occidental is evaluating the cost of whether to terminate the 27R WMU vadose zone monitoring system or continue to monitor as outlined in section 8.2.3. A proposal to terminate the existing vadose zone monitoring system was included as part of a draft Post-Closure Permit Application for the 27R WMU dated June 2007. The proposal to terminate the vadose zone monitoring system was reviewed by DTSC's Geological Services Unit (GSU). DTSC rejected discontinuation of vadose monitoring due to insufficient justification and conflicts with California Code of Regulations (CCR), Title 22, Article 6 (Memorandum to Mr. Peter Bailey of the DTSC Permit Renewal Team, dated December 17, 2007, included in the Notice of Deficiency letter dated December 20, 2008). DTSC suggested that discontinuation of vadose monitoring is possible if it can be demonstrated that in the absence of groundwater and vadose zone monitoring networks, surface inspections and civil surveys as well as other lines of existing evidence assure the future performance of the cap and does not impact human health and the environment.

Based on comments and recommendations provided by the GSU and a cost evaluation, OEHI may decide to evaluate and provide the information requested by the GSU for further evaluation to terminate vadose zone monitoring at the 27R WMU. In the event OEHI elects to pursue termination of vadose zone monitoring, OEHI will submit a "Proposal to Terminate Vadose Zone Monitoring at the 27R Hazardous Waste Trench Unit" to DTSC within 2 years of final Post-Closure Permit date for review. The "Proposal to Terminate Vadose Zone Monitoring at the 27R Hazardous Waste Trench Unit" will include but not be limited to the following: a subsurface site characterization; annual rainfall and engineered cap evaluation; a comprehensive analysis of vadose zone monitoring data; and all pertinent aquifer exemption data and other regulatory exemptions for the groundwater aquifer beneath the 27R WMU.

In the event DTSC approves the "Proposal to Terminate Vadose Zone Monitoring at the 27R Hazardous Waste Trench Unit", OEHI will implement cessation of activities without a permit modification.

### **8.2.3 Vadose Zone Monitoring**

In the Closure Plan Approval letter for the 27R WMU (formerly NPR-1) dated May 1991 the DTSC (formerly DHS -Toxic Substances Control Program) waived the requirements for groundwater monitoring under the provisions of Title 22, Section 67191. The waiver was approved for the site based on the depth to groundwater (greater than 1,000 feet), site geology, the designation of groundwater beneath the site as an except aquifer by DOGGR due to the site being located within a hydrocarbon producing area, and the lack of migration potential or surface water infiltration as demonstrated in the Closure Plan (Bechtel 1990). No other groundwater monitoring programs are currently being conducted at the Elk Hills Oilfield at this time.

However, in lieu of a groundwater monitoring program for the site a vadose zone monitoring system was installed at the site in order to evaluate whether infiltration of the engineered cap was occurring. The installation of the original vadose zone monitoring system and current monitoring system are discussed in Section 3.2 of this Permit Application.

The following vadose zone monitoring activities will be performed as part of the post-closure permit.

- Vadose zone soil moisture data will continue to be collected from the system as outlined in Section 14.3 of this permit.
- The vadose zone monitoring data will be recorded directly from the CS-615 water content reflectometers and downloaded to an on site datalogger.
- In the event of a loss of data or a system malfunction occurs the DTSC will be notified in writing within two weeks of identifying the problem. The letter will explain the situation in detail and provide solutions to resolve the problem. In addition, this information will be presented as part of the Annual Post-Closure Monitoring Report.
- Data collected during the vadose zone monitoring will be evaluated upon data collection at the site. If a spike or significant increase of more than 2 percent soil moisture content is observed over a two week period or following a significant rain event, an evaluation of the observation will be performed and the DTSC will be notified within two weeks of identifying the observation. If the increase in soil moisture is proven not to be a result of surface water infiltration than a response will be prepared to inform the DTSC of the observation. If the increase in soil moisture has occurred due to surface water infiltration or due to other field related issues than a proposal to correct the situation will be provided for DTSC review and approval.
- It is anticipated that some of the historical data collected between 2001 and 2007 will require manual calculations, as has been the case during the previous six years of

monitoring. Any manual calculation will be explained in the Post-Annual Monitoring Reports.

#### **8.2.4 Surface Water Monitoring**

As discussed in Section 3.3 of this permit application, during significant rain events, precipitation that does not infiltrate the surface layer (vegetal layer) runs laterally in several directions across the surface of the site to localized collection areas (basins). These basins are located outside of the boundaries of the 27R WMU to the south-west and south-east of the WMU (Figure 3). Surface water collected in these areas would likely infiltrate the subsurface and/or evaporate over time. Small amounts of precipitation at the site would typically infiltrate the top 18-inches of the surface at the site (vegetal cover) and therefore stay within the limits of the site.

Due to the lack of significant precipitation events in the region of the 27R WMU and the fact the site is located within an active oil field where surface water may become cross contaminated with surface water from locations outside of the 27R WMU, surface water monitoring does not appear to be a feasible option for data collection at the site. Furthermore, there are no localized streams and natural standing water areas or wetlands in the vicinity of the site that would be at risk from surface water leaving the 27R WMU. In addition, wastes deposited at the 27R WMU were buried approximately 10 feet below the existing grade and a clay cap was installed beneath the surface of the site to prevent surface water infiltration and/or migration or contaminants from beneath the cap. Therefore, surface water monitoring at the site is not recommended as a reliable or viable monitoring activity.

#### **8.3 Maintenance Activities [22 CCR 66264.118(b)(2)]**

A detailed description of the post-closure inspection and maintenance activities are discussed in Section 14.3 of this permit application.

#### **8.4 Post-Closure Contact [22 CCR 66264.118(b)(3)]**

The contact office for the 27R WMU during the post-closure care period is provided below:

Mr. George N. Gough, Jr. – Environmental Team Leader (Program Manager)  
or Mr. Richard Garcia – Environmental Consultant (Project Manager)  
Occidental of Elk Hills, Inc.  
28590 Highway 119  
Post Office Box 1001  
Tupman, California 93276-1001

Phone: 661-763-6000 (main)



Phone: 661-763-6021 (George direct)  
Phone: 661-763-6514 (Richard direct)

A copy of the Final Post-Closure Plan Application and approved Post-Closure Permit will be available at the Occidental of Elk Hills office located at 28590 Highway 119 in Tupman, California. This office is located approximately 5 miles east of the 27R WMU (Figure 1).

## **8.5 Amendment of Plan [22 CCR 66264.118(d)]**

If the 27R WMU owner wishes to amend the approved post-closure plan cited in Sections 8.0 and 14.0 of this application, the site owner will submit written notification, or request for a permit modification, as specified in regulation 22 CCR 66264.118(d).

## **9.0 Security**

### **9.1 Security Requirements [22 CCR 66264.14 and 66270.14(b)(4)]**

A description of the 27R WMU security procedures and equipment is required by the regulations stated above. The 27R WMU is located within the fenced property boundary of the Occidental Petroleum Oilfield, west of Elk Hills Road. Access onto the oilfield is controlled 24-hours a day by manned security gates. Mobile security patrols provide additional security within the confines of the Occidental property.

A six foot chain-link security fence with six access gates was installed around the perimeter of the 6.08-acre 27R WMU in December 1993 to prevent access of unauthorized site personnel and to prevent animals from entering the site. Warning signs have been posted along the fence and gates to further prevent unauthorized access to the 27R WMU. Each of the six gates have are locked using keyed Master locks. The locks used for the gates are replaced periodically as an added security measure.

### **9.2 Emergency Preparedness**

#### **9.2.1 Emergency Equipment [22 CCR 66270.14(a) and (b)]**

Emergency equipment, such as portable fire extinguishers, fire control equipment, spill control equipment, and decontamination equipment are not necessary during the post-closure care period because there are no personnel within the fenced, closed disposal area of the 27R WMU except during site inspections and data management of the datalogger. Additionally, wastes at the 27R WMU have been capped beneath a minimum of 5 to 10 feet of clean fill material, a 2-foot thick clay cap, and an 18-inch vegetation layer at the surface to prevent any threat to human health or the environment.

Although the 27R WMU does not pose an immediate threat to human health and the environment, the following emergency equipment is available in the vicinity of the 27R WMU (Figure 3).

- A signal alarm system at the adjacent gas plant to warn employees of emergencies.
- A telephone is available at the truck washout facility located approximately 150 feet north-east of the 27R WMU.
- Portable fire extinguishers are available at the hazardous waste storage pad located east of the 27R WMU.

In general, all personnel working at or in the vicinity of the 27R WMU are equipped with either two-way radios or cellular telephones to contact the appropriate emergency personnel in case an emergency does occur.

### **9.2.2 Water and Fire Control [22 CCR 66264.32(c) and (d)]**

As discussed in the previous Section (9.2.1), on-site emergency equipment such as water for fire control is not necessary for activities performed during the post-closure care period. In the event of a fire OEHI has an on site fire truck that is used to control small/localized burns. The local fire department would be called for any significant fire emergency.

### **9.2.3 Post Fire Erosion Control**

Should a fire occur at the 27R WMU, erosion control and other work necessary to stabilize soils in the burned areas until vegetation can be re-established will be performed. Eroded areas shall be repaired using on-site soils in order to bring surface back to design grade. If necessary, a soil amendment or soil stabilizing supplies will be used along the sloped areas to prevent deep erosion and migration of surface soils from the 27R surface layer.

If natural vegetation does not re-establish itself over the succeeding season, re-seeding with salt bush and native grasses, previously used at the 27R WMU, will be implemented to re-establish a shallow root system of grasses and scrub brush on the surface. A water truck with hose or local water outlets may be used to irrigate seedlings, if required.

## **10.0 Testing and Maintenance of Equipment [22 CCR 66264.33]**

As discussed in Section 9.2.1 above, on-site emergency equipment is unnecessary during the post-closure period. Therefore, there will be no need for on-site testing and maintenance of equipment. However, fire extinguishers and telephones in the immediate vicinity of the site

are tested by site personnel on a regular basis as part of the OEHI's site wide health and safety program.

Electrical equipment used at the 27R WMU is battery operated and recharged through an on-site solar panel. The battery and solar equipment used at the site are evaluated during data management activities every two months. In the event of battery failure or any other damage that would interfere with the on-site power source, the damaged part or equipment will be evaluated to properly identify the damage and replaced in a timely manner. Any damage and/or repair to the electrical equipment at the 27R WMU will be documented and reported in the Annual Post-Closure Monitoring Report.

## **11.0 Arrangements with Emergency Agencies [22 CCR 66264.37]**

An Emergency Management Plan for the entire Elk Hills site was updated by Occidental in 2007 and distributed to local and state organizations that may be called upon to provide emergency services at the 27R WMU. The following agencies are aware of the site layout, access to and from the site, evacuation routes, and site specific activities:

- Kern County Fire Department
- California Highway Patrol
- Kern County Health Department

A copy of the Occidental of Elk Hills, Inc. Emergency Management Plan, Revision 7, June 2007 is kept at the OEHI office located at 28590 Highway 119 in Tupman, California (Figure 1), which is approximately a 10 minute drive from the 27R WMU.

## **12.0 Contingency Plan [22 CCR 66270.14(b)(7)]**

The Contingency Plan is intended to assist personnel in responding to unusual and unexpected incidents at the 27R WMU during the post-closure period. These incidents may include hazardous waste spills or releases of other unknown contaminants. The plan is intended to meet the regulatory requirements set forth in 22 CCR, Article 4 Sections 66264.50-66264.56 and 22 CCR 66270.14 (b)(7). A copy of the OEHI Emergency Management Plan dated June 2007 is available at the OEHI office located at 28590 Highway 119 in Tupman, California.

The OEHI Emergency Management Plan may need to be updated occasionally to reflect the following changes:

- Site development and or other site wide construction activities.

- Procedures derived from hands-on experience with the plan during actual incidents, if any.
- Changes in key personnel.
- Regulatory changes.

## **12.1 Procedures to Update Contingency Plan**

It might be necessary to update the Contingency Plan (OEHI Emergency Management Plan, Version 7) during the post-closure care period. Changes would be made as a result of those instances listed in 22 CCR 66264.54 affecting the 27R WMU, only. The following provisions will be observed when amending or changing the Contingency Plan for the 27R WMU:

- Changes will be made in accordance with local, state, and federal guidelines.
- Changes will be made by the Emergency Response Coordinator (currently Terry Lisman of OEHI), his/her authorized representative, or his/her successor.
- Changes will be printed with the entire page of text on which they occur.
- The revised page(s) will be placed in the Contingency Plan (Emergency Management Plan) in the appropriate order.
- Copies of the revised pages will be distributed to and reviewed with the applicable regulatory agencies and emergency responders.

## **13.0 Financial Responsibility**

### **13.1 Post-Closure Cost [22 CCR 66270.14(b)(16)]**

Post-closure costs are estimated as required by 22 CCR 66264.144 and 22 CCR 66264.15. Post-closure care of the site will consist of routine site inspections, security system inspections and maintenance, vadose zone monitoring, civil surveys, and physical maintenance to identify and correct deterioration that might lead to a threat to human health or the environment. Post-closure monitoring and maintenance activities will follow the requirements of the Post-Closure Plan as described in Sections 8 and 14 of this application. The post-closure care cost estimate worksheets for the 27R WMU is included in Appendix H.

### **13.2 Financial Assurance [22 CCR 66270.14(b)(16)]**

The site owner maintains a financial test and corporate guarantee to cover annual monitoring and maintenance costs under 22 CCR 66270.14(b)(16). The annual maintenance and monitoring costs for the 27R WMU and DTSC correspondence regarding financial assurance for the site are provided in Appendix H.

## **14.0 Inspection and Maintenance [22 CCR 66264.301, 66264.309, 66264.310, and 66270.21(a) and (b)]**

### **14.1 Closure Structures**

#### **14.1.1 Wastes Received at the Facility [22 CCR 66270.21(a) and 66264.309]**

As discussed in Section 3.4 of this application, the wastes received at the 27R WMU consisted of surface impoundments used for the disposal of neutralized acids and tank bottom sediments and sludges.

The site was operated from 1975 until November 1985. The volume of wastes disposed of into the trench units prior to January 1978 is not available, however the yearly total of waste streams disposed of between 1978 and 1985 were estimated based on the number of loads disposed of at the 27R WMU (formerly NPR-1). Approximately 22,000 barrels (42 gallons per barrel) of neutralized acid mixtures and approximately 35,000 barrels (42 gallon per barrel) of tank bottom sediments and sludges were received at the 27R WMU during its operating life (Bechtel 1993).

#### **14.1.2 Closure Structures and Maintenance [22 CCR 66264.301, 66264.310 and 66270.21(b)]**

An engineered final cover over the 27R WMU was completed on March 23, 1992 and a Completeness Determination for the engineered cover was issued by the DTSC on June 24, 1994. The constructed final cover components were designed to promote drainage off the 27R WMU, minimize erosion, and function with minimal maintenance (Refer to Sections 3.2 and 3.3 of this permit).

Pursuant to 22 CCR 66264.250(c), surface water monitoring is not required at the 27R WMU since the site is protected from surface water run-on and runoff by the nature of the site closure (cap) design. A copy of the final certification map for the 27R WMU is provided in Appendix C.

## **14.2 Training Program [22CCR 66270.14(b)(12)]**

Occidental personnel, subcontractors, or State inspectors performing inspections during the post-closure care period will be required to have completed 40-hour Occupational Safety and Health Administration (OSHA) training, with 8-hour annual refreshed courses (if required), as specified in Title 29 CFR Section 1910.120. Other personnel performing post-closure activities at the 27R WMU will be allowed to enter the site provided they attend a brief site safety orientation and are accompanied by qualified on site personnel familiar with the Elk Hills Oilfield and the 27R WMU.

## **14.3 Post-Closure Inspection and Maintenance [22 CCR 66270.14(a)(5)]**

### **14.3.1 Inspection Schedule**

This section describes the post-closure inspection schedule of the 27R WMU as required by 22 CCR 66264.15(b)(c), 66264.118(b)(2), and 66270.14(b)(5). The proposed inspection schedules include walkover survey, topographic survey (civil survey), security system survey, and vadose zone monitoring.

Based on site specific information gathered during the post-closure care period the site owner may request modification of the monitoring schedules or termination of post-closure monitoring at a future date under the provision of 22 CCR 66264.117(b)(2).

The following is a summary of the inspection schedules for each activity.

#### **14.3.1.1 Final Cover Walkover Survey**

Walkover inspections of the final cover will be conducted on a monthly basis during the first year (2008) of this permit and quarterly thereafter for the remainder of the post-closure care period. Once quarterly walkover monitoring begins, a walkover survey will be performed following any precipitation event in which 1-inch of rainfall occurs over a one week period. The local weather station data or local weather information will be used to determine the amount of precipitation during the week.

#### **14.3.1.2 Topographic Survey (Civil Survey)**

Topographic surveys will be performed on a semi-annual basis during the first year (2008) of this permit and annually thereafter for the remainder of the post-closure care period. Semi-Annual civil survey events will continue or resume if an increase or decrease of elevation greater than 1-inch is measured at any of the 22 survey locations (Pt. 2 through Pt. 23) across the 27R WMU during a period of one calendar year.

### **14.3.1.3 Security System Survey**

Inspections of the security system at the 27R WMU, including the perimeter fencing, access gates surrounding the facility, and warning signs posted along the fencing, will be conducted on a monthly basis during the first one year (2008) of this permit and quarterly thereafter for the remainder of the post-closure care period.

### **14.3.1.4 Vadose Zone Monitoring**

OEHI is in the process of evaluating termination of vadose zone monitoring from Post-Closure Monitoring activities. If OEHI decides to pursue closure of the vadose zone monitoring system as part of the Post-Closure Monitoring process, a proposal for termination of the system will be prepared for the DTSC and GSU prior to December 2009. In the event that OEHI does not pursue terminating the vadose zone monitoring system or in the event the proposal to terminate the vadose zone monitoring system is not approved by the DTSC, then vadose zone monitoring will continue as described in this section and Section 8.2 of this permit.

Vadose zone monitoring will be performed daily with soil moisture measurements collected every four hours. The daily measurements (6 measurements over a 24 hour period) will be calculated by the on site datalogger to record a daily average soil moisture measurement. Both of these measurements (4-hour and daily average) will be recorded at the on site datalogger and downloaded at the time of the site inspection. This data will be included with the annual post-closure monitoring report for the 27R WMU.

Inspection of the vadose zone system will be performed every two months during data collection from the on-site datalogger. Data is collected during the inspection and downloaded to a lap-top computer. At the time of the data retrieval, an evaluation of the system is performed and noted on daily field logs or equivalent. A copy of a Rockwood daily field log is provided in Appendix I.

The on site monitoring station is equipped with a modem that can be used for remote access to the datalogger and data retrieval. The modem has not been used to retrieve data since 2006 due to telecommunication errors. In the event the modem is repaired or replaced, data will be retrieved from the on site datalogger remotely every two months. Inspection of the monitoring equipment will be performed semi-annually to evaluate the datalogger and other components of the monitoring station.

## **14.3.2 Facility Inspections**

Site inspections will include the following 27R WMU features: site surface (vegetal layer), survey locations, security systems, and the vadose zone monitoring station. The following is a description of the inspection activities.

#### **14.3.2.1 Inspection and Maintenance of the Site Surface**

Routine site walkover inspections will be performed by OEHI trained site personnel. The inspector will evaluate the site for visible signs of abnormal erosion, surface settling or cracking, abnormal surface mounding, animal burrowing, deep rooted vegetation and vegetation overgrowth, trash and other debris, and damage to the vadose zone monitoring station.

Site personnel performing the walkover survey will use an inspection checklist to document findings of the survey for future reporting and site maintenance, if required. Based on the findings of the site inspection, corrective actions to the surface or other features will be performed promptly. All corrective actions will be reported to the site contact and summarized in the Annual Post-Closure Report.

#### **14.3.2.2 Inspection and Maintenance of Survey Benchmarks**

Survey benchmarks are located throughout the 27R WMU. Each survey location has been established using two 6-inch wooden stakes and a 3-foot wooden lath. One of the 6-inch stakes has been installed even with the surface for the survey and the other 6-inch stake has been installed approximately 3-inches into the surface to locate the surface stake used for the survey. A piece of lath has also been installed at each location to help locate and identify the location of each survey point.

Each of the survey measuring points and location markers are maintained by the civil survey contractor semi-annually during the topographic survey event. Damage to any of the benchmarks stakes or lath are repaired at the time of the survey.

Records regarding the civil survey (survey measurement) are kept at the Occidental of Elk Hills office in Tupman, California for a minimum of five years.

#### **14.3.2.3 Maintenance of Security Fencing**

The condition of the perimeter fencing will be inspected during the walkover survey activities. Inspections of the fence will check that all gates are in working order and remained locked, the integrity of the fence is structurally sound, and that all warning signs are in place and visible. Damage to the fence, gates, or signs will be noted on Site Inspection Checklist, reported to the site contact and promptly repaired. All corrective actions will be reported to the site contact and summarized in the Annual Post-Closure Report.

The 27R WMU Inspection Checklist forms will be kept at the Occidental of Elk Hills office located in Tupman, California for a minimum of five years. A copy of the 27R WMU Inspection Checklist form used for the walk over surveys and security inspections is provided in Appendix I.

### **14.3.3 Response to Need for Remedial Action [22 CCR 66264.15(c)]**

In the event that site inspectors discover a situation requiring a response, this section provides instructions for fulfilling the post-closure care requirements.

#### **14.3.3.1 Site Surface**

This section provides instruction for addressing major surface erosion, areas of significant settlement, deep rooted vegetation, and active animal burrows. In the event that major surface disturbance is observed during the inspection the following steps will be taken.

- 1) Notify the Post-Closure Contact listed in Section 8.4 of this permit to inform them of the issue.
- 2) Evaluate the appropriate corrective actions and proper equipment and supplies required to repair the disturbance.
- 3) If possible, perform or supervise the work to repair the disturbance.
- 4) Record the corrective work performed on an OEHI Work Order form.
- 5) Submit all original corrective action forms to the Post-Closure Contact listed in Section 8.4 of this permit.

#### **14.3.3.2 Security Fence and Gates**

This section provides instruction for addressing damage to the perimeter security fence, access gates, or warning signs. If damage is observed the inspector should take the following actions.

- 1) If possible repair the fence, gate, or warning sign. Contact the Post-Closure Contact listed in Section 8.4 of this permit to notify them of the issue.
- 2) If the fence, gate or warning sign cannot be repaired immediately by inspection personnel, notify the Post-Closure Contact listed in Section 8.4 of this permit to notify them of the disturbance.
- 3) Evaluate the appropriate corrective actions and proper equipment and supplies required to repair the disturbance.
- 4) Install a temporary fence or gate if the repair work will take more than one day to complete.
- 5) If possible, perform or supervise the work to repair the disturbance.

- 6) Record the corrective work performed on the OEHI Work Order form.
- 7) Submit all original corrective action forms to the Post-Closure Contact listed in Section 8.4 of this permit.

The 27R WMU Work Order forms will be kept at the Occidental of Elk Hills office located in Tupman, California for a minimum of five years. A copy of the 27R WMU Work Order form is provided in Appendix I.

## **15.0 Seismic Requirements [22 CCR 66270.14(b)(11)(A) and 66264.228]**

There are no known faults within 200 feet of the 27R WMU. The maximum probable earthquake for the San Andreas Fault (less than 20 miles southwest of the site) is a magnitude 8.0 on the Richter scale. The Buena Vista Fault is the closest fault to the site. This fault is a small thrust fault located near the city of Taft. Several faults are located within 50 miles of the 27R WMU that may produce earthquakes with a magnitude between 5 and 7.5 on the Richter scale.

A full scale site inspection will be immediately scheduled following a reported 5.5 magnitude (Richter scale) earthquake with an epicenter within 100 miles of the 27R WMU. All information will be recorded on a Site Inspection form and Work Order form, if required. The 27R WMU Inspection Checklist and 27R WMU Work Order forms (if required) will be kept at the Occidental of Elk Hills office located in Tupman, California for a minimum of five years. Copies of the 27R WMU Inspection and Work Order forms are provided in Appendix I.

## **16.0 Corrective Action [22 CCR 66270.14(d)(1)(A)]**

### **Solid Waste Management Units**

Approximately 129 Solid Waste Management Units (SWMUs) have been identified during previous Corrective Action assessments within the Elk Hills Oilfield. No Corrective Action has been required at the 27R WMU since the site began receiving wastes in 1975. However, Corrective Action activities are ongoing outside of the 27R WMU and within the Elk Hills Oilfield. Corrective Action is being conducted under an Agreement for Site Assessment (ASA) between DTSC and DOE, originally signed on December 2, 1997 with two amendments in 1999 and one amendment in 2001. A fourth amendment is currently being prepared as this permit application is being prepared.

The DOE contracted the Army Corp of Engineers (ACE) to continue Corrective Action or RCRA Facility Investigation activities. Some of these activities include a review of historical



information, site assessment, soil sampling and analysis, risk assessment activities, data analysis, site characterization and remediation, and reporting. There are no RCRA Facility Investigations planned or scheduled at this time.

Pursuant to the purchase and sales agreement between the DOE and OEHI, DOE is responsible for the management of any additional investigations of SWMUs. The ACE is still working on developing the appropriate scope of work for the human health and ecological risk assessment activities. OEHI does not have a contract with the ACE nor do they have the complete scope of work for the ACE.

## 17.0 Potential Redevelopment [22 CCR 66270.14(b)(19)]

In accordance with Title 22 of CCR 66264.119(b), BPOI issued a letter on behalf of DOE notifying the Kern County Planning and Development Services that the 27R WMU was used to manage hazardous waste and the land use is therefore restricted. A copy of this letter is included in Appendix A.

The current site owner (OEHI) has no intention of developing the 27R WMU and has secured the property using a chain link fence to avoid any possible use of the property that may disturb the integrity of the vegetal cover, engineered cap, or monitoring systems. The 27R WMU shall not be used for any purpose, with the exception of site maintenance, civil survey activities, and vadose zone monitoring. The 27R WMU will continue to be maintained as non-irrigated open space with no agricultural or range use permitted on or in the vicinity of the site. Any construction or maintenance activities that would result in the excavation or removal of the surface cover or the clay layer (cap) at the 27R WMU shall be requested and approved by the DTSC prior to initiation of such activities.

A draft Covenant to Restrict Use of Property (Covenant) was sent to DTSC on December 19, 2007 by OEHI for review and approval. Pursuant to Civil Code section 1471(c), the DTSC has determined that a Covenant is reasonably necessary to protect present or future human health or safety, or the environment as a result of the presence on the land of hazardous materials as defined in Health and Safety Code section 25260. OEHI and the DTSC intend that the use of the 27R WMU be restricted in order to protect human health and safety and the environment, as set forth in this Covenant. A copy of the draft Covenant is provided in Appendix E.

## 18.0 Additional Information

The DTSC has not requested any additional information regarding the 27R WMU.

## **19.0 References**

Bechtel Petroleum Operations Inc., - 1993, Revised Post-Closure Permit Application, Part B for the 27R Hazardous Waste Trench Unit, Naval Petroleum Reserve No. 1, Elk Hills, California.

The Mark Group – 1987, Vertical and Lateral Extent of Waste Constituents, 27R Waste Management Facility, Naval Petroleum Reserve-1, Elk Hills, California. Prepared for BPOI.

Bechtel Petroleum Operations, Inc. – August 1990, 27R Closure Plan.

Department of Health Services – Toxic Substances Control Program – May 1991, Closure Plan Approval for the Elk Hills Naval Petroleum Reserve Number One 27-R Hazardous Waste Trench Unit, EPA I.D. No. CA4170024414.

Department of Toxic Substances Control - June 24, 1994, Completeness Determination for the Revised Post-Closure Application, Part-B, for 27R Hazardous Waste Trench Unit, Naval Petroleum Reserve Number 1, Elk Hills, California, September 1993, EPA ID No. CA417002444.

Bechtel Petroleum Operations, Inc – October 1993, 27R Hazardous Waste Trench Unit-Notification of Restricted Land Use.

California Environmental Protection Agency Department of Toxic Substances Control – December 31, 1997, Hazardous Waste Facility Post-Closure Permit.

Golder and Associates Inc., - 1992 – Final Report on Quality Assurance Observation and Testing for Closure Cover Construction, 27R Hazardous Waste Trench Unit, Naval Petroleum Reserve No. 1 (NPR-1). Prepared for BPOI.

TriAD Environmental Consultants, Inc. – April 2006, Operation Plan Hazardous Waste Permit Modification, Revised March 21, 2007. Prepared for KW Plastics of Bakersfield, California.

California Department of Fish and Game – Endangered and Threatened Animals List, Natural Diversity Database.

California Department of Fish and Game – Endangered, Threatened and Rare Plants List, Natural Diversity Database.

Occidental of Elk Hills, Inc. – June 2007, Emergency Management Plan, Revision 7.

# Figures

# **Appendices**

Electronic - CD Attached

# Part A

# Part B