Post-Closure Permit Renewal Application

Golden Eagle Tesoro Refinery
Waste Management Unit 17
150 Solano Way
Martinez, CA

EPA ID: CAD000072751

April 2009

SEND COMPLETED FORM TO: The Appropriate State or EPA Regional Office.

United States Environmental Protection Agency

RCRA SUBTITLE C SITE IDENTIFICATION FORM

1. Reason for Submittal (See instructions on page 14.)

MARK ALL BOX(ES) THAT APPLY

Reason for Submittal:

- ☐ To provide Initial Notification of Regulated Waste Activity (to obtain an EPA ID Number for hazardous waste, universal waste, or used oil activities)
- ☐ To provide Subsequent Notification of Regulated Waste Activity (to update site identification information)
- ☐ As a component of a First RCRA Hazardous Waste Part A Permit Application
- ☑ As a component of a Revised RCRA Hazardous Waste Part A Permit Application (Amendment # 3)
- ☐ As a component of the Hazardous Waste Report

2. Site EPA ID Number (page 15)

EPA ID Number CAD000072751

3. Site Name (page 15)

Name: Golden Eagle Refinery

4. Site Location Information (page 15)

Street Address: 150 Solano Way

City, Town, or Village: Martinez **State:** CA

County Name: Contra Costa **Zip Code:** 94553-1487

5. Site Land Type (page 15)

Site Land Type: ☑ Private ☐ County ☐ District ☐ Federal ☐ Indian ☐ Municipal ☐ State ☐ Other

6. North American Industry Classification System (NAICS) Code(s) for the Site (page 15)

A. 324110

B.

C.

D.

7. Site Mailing Address (page 16)

Street or P. O. Box: 150 Solano Way

City, Town, or Village: Martinez

State: CA

Country: USA **Zip Code:** 94553-1487

8. Site Contact Person (page 16)

First Name: Hilding **MI:** K. **Last Name:** Spradlin

Phone Number: (925) 370-3213 **Extension:** **Email address:** hspradlin@tsocorp.com

9. Operator and Legal Owner of the Site (pages 16 and 17)

A. **Name of Site's Operator:** Tesoro Refining & Operating Company **Date Became Operator (mm/dd/yyyy):** 03/02/2007

Operator Type: ☑ Private ☐ County ☐ District ☐ Federal ☐ Indian ☐ Municipal ☐ State ☐ Other

B. **Name of Site's Legal Owner:** Tesoro Refining & Operating Company **Date Became Owner (mm/dd/yyyy):** 05/17/2002

Owner Type: ☑ Private ☐ County ☐ District ☐ Federal ☐ Indian ☐ Municipal ☐ State ☐ Other

9. Legal Owner (Continued) Address	Street or P. O. Box: 150 Solano Way	
	City, Town, or Village: Martinez	
	State: CA	
	Country: USA	Zip Code: 94533-1487

10. Type of Regulated Waste Activity
Mark "Yes" or "No" for all activities; complete any additional boxes as instructed. (See instructions on pages 18 to 21.)

A. Hazardous Waste Activities
Complete all parts for 1 through 6.

Y ☐ N ☑ **1. Generator of Hazardous Waste**
If "Yes", choose only one of the following - a, b, or c.

☐ a. LQG: Greater than 1,000 kg/mo (2,200 lbs./mo.) of non-acute hazardous waste; or

☐ b. SQG: 100 to 1,000 kg/mo (220 - 2,200 lbs./mo.) of non-acute hazardous waste; or

☐ c. CESQG: Less than 100 kg/mo (220 lbs./mo.) of non-acute hazardous waste

In addition, indicate other generator activities.

Y ☐ N ☑ d. United States Importer of Hazardous Waste

Y ☐ N ☑ e. Mixed Waste (hazardous and radioactive) Generator

Y ☐ N ☑ **2. Transporter of Hazardous Waste**

Y ☑ N ☐ **3. Treater, Storer, or Disposer of Hazardous Waste (at your site)** Note: A hazardous waste permit is required for this activity.

Y ☐ N ☑ **4. Recycler of Hazardous Waste (at your site)**

Y ☐ N ☑ **5. Exempt Boiler and/or Industrial Furnace**
If "Yes", mark each that applies.
☐ a. Small Quantity On-site Burner Exemption
☐ b. Smelting, Melting, and Refining Furnace Exemption

Y ☐ N ☑ **6. Underground Injection Control**

B. Universal Waste Activities

Y ☐ N ☑ **1. Large Quantity Handler of Universal Waste (accumulate 5,000 kg or more) [refer to your State regulations to determine what is regulated]. Indicate types of universal waste generated and/or accumulated at your site. If "Yes", mark all boxes that apply:**

	Generate	Accumulate
a. Batteries	☐	☐
b. Pesticides	☐	☐
c. Thermostats	☐	☐
d. Lamps	☐	☐
e. Other (specify) _____	☐	☐
f. Other (specify) _____	☐	☐
g. Other (specify) _____	☐	☐

Y ☐ N ☑ **2. Destination Facility for Universal Waste**
Note: A hazardous waste permit may be required for this activity.

C. Used Oil Activities
Mark all boxes that apply.

Y ☐ N ☑ **1. Used Oil Transporter**
If "Yes", mark each that applies.
☐ a. Transporter
☐ b. Transfer Facility

Y ☐ N ☑ **2. Used Oil Processor and/or Re-refiner**
If "Yes", mark each that applies.
☐ a. Processor
☐ b. Re-refiner

Y ☐ N ☑ **3. Off-Specification Used Oil Burner**

Y ☐ N ☑ **4. Used Oil Fuel Marketer**
If "Yes", mark each that applies.
☐ a. Marketer Who Directs Shipment of Off-Specification Used Oil to Off-Specification Used Oil Burner
☐ b. Marketer Who First Claims the Used Oil Meets the Specifications

EPA ID NO: C A D 0 0 0 0 7 2 7 5 1

OMB #: 2050-0034 Expires 11/30/2005

United States Environmental Protection Agency

HAZARDOUS WASTE PERMIT INFORMATION FORM

1. Facility Permit Contact (See instructions on page 23)	First Name: Hilding	MI: K.	Last Name: Spradlin
	Phone Number: (925) 370-3213		Phone Number Extension:
2. Facility Permit Contact Mailing Address (See instructions on page 23)	Street or P.O. Box: 150 Solano Way		
	City, Town, or Village: Martinez		
	State: CA		
	Country: USA		Zip Code: 94553-1487
3. Operator Mailing Address and Telephone Number (See instructions on page 23)	Street or P.O. Box: 150 Solano Way		
	City, Town, or Village: Martinez		
	State: CA		
	Country: USA	Zip Code: 94553-1487	Phone Number (925) 228-1220
4. Legal Owner Mailing Address and Telephone Number (See instructions on page 23)	Street or P.O. Box: 150 Solano Way		
	City, Town, or Village: Martinez		
	State: CA		
	Country: USA	Zip Code: 94553-1487	Phone Number (925) 228-1220
5. Facility Existence Date (See instructions on page 24)	Facility Existence Date (mm/dd/yyyy):		

6. Other Environmental Permits (See instructions on page 24)

A. Permit Type (Enter code)	B. Permit Number	C. Description
N	C A 0 0 0 4 9 6 1	NPDES Permit (Order No. R-2005-0041)
E		BAAQMD General Air Permit
P	N S R 4 4 3, S F B 7 8 0 7	PSD Permit for No. 3 Reformer

7. Nature of Business (Provide a brief description; see instructions on page 24)

Petroleum Refining: The refinery surface impoundment unit was used for hazardous waste treatment, storage, and disposal until 1983. The OWI closure was approved by CAL-EPA, DTSC, and USEPA on 12/06/1988. The unit is undergoing post closure pursuant to Permit No. 98-NC-005, dated 06/30/1988.

8. Process Codes and Design Capacities (See instructions on page 24) - Enter information in the Sections on Form Page 3.

A. PROCESS CODE - *Enter the code from the list of process codes in the table below that best describes each process to be used at the facility. Fifteen lines are provided for entering codes. If more lines are needed, attach a separate sheet of paper with the additional information. For "other" processes (i.e., D99, S99, T04 and X99), enter the process information in Item 9 (including a description).*

B. PROCESS DESIGN CAPACITY- *For each code entered in Section A, enter the capacity of the process.*

1. AMOUNT - *Enter the amount. In a case where design capacity is not applicable (such as in a closure/post-closure or enforcement action) enter the total amount of waste for that process.*

2. UNIT OF MEASURE - *For each amount entered in Section B(1), enter the code in Section B(2) from the list of unit of measure codes below that describes the unit of measure used. Select only from the units of measure in this list.*

C. PROCESS TOTAL NUMBER OF UNITS - *Enter the total number of units for each corresponding process code.*

PROCESS CODE	PROCESS	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
	Disposal:	
D79	Underground Injection Well Disposal	Gallons; Liters; Gallons Per Day; or Liters Per Day
D80	Landfill	Acre-feet; Hectare-meter; Acres; Cubic Meters; Hectares; Cubic Yards
D81	Land Treatment	Acres or Hectares
D82	Ocean Disposal	Gallons Per Day or Liters Per Day
D83	Surface Impoundment Disposal	Gallons; Liters; Cubic Meters; or Cubic Yards
D99	Other Disposal	Any Unit of Measure in Code Table Below
	Storage:	
S01	Container	Gallons; Liters; Cubic Meters; or Cubic Yards
S02	Tank Storage	Gallons; Liters; Cubic Meters; or Cubic Yards
S03	Waste Pile	Cubic Yards or Cubic Meters
	Surface Impoundment Storage	Gallons; Liters; Cubic Meters; or Cubic Yards
	Drip Pad	Gallons; Liters; Acres; Cubic Meters; Hectares; or Cubic Yards
S06	Containment Building Storage	Cubic Yards or Cubic Meters
S99	Other Storage	Any Unit of Measure in Code Table Below
	Treatment:	
T01	Tank Treatment	Gallons Per Day; Liters Per Day
T02	Surface Impoundment Treatment	Gallons Per Day; Liters Per Day
T03	Incinerator	Short Tons Per Hour; Metric Tons Per Hour; Gallons Per Hour; Liters Per Hour; Btu Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million Btu Per Hour
T04	Other Treatment	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; Gallons Per Day; Liters Per Hour; or Million Btu Per Hour
T80	Boiler	Gallons; Liters; Gallons Per Hour; Liters Per Hour; Btu Per Hour; or Million Btu Per Hour
	Treatment (continued):	
T81	Cement Kiln	For T81-T93:
T82	Lime Kiln	
T83	Aggregate Kiln	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; Liters Per Hour; Kilograms Per Hour; or Million Btu Per Hour
T84	Phosphate Kiln	
T85	Coke Oven	
T86	Blast Furnace	
T87	Smelting, Melting, or Refining Furnace	
T88	Titanium Dioxide Chloride Oxidation Reactor	
T89	Methane Reforming Furnace	
T90	Pulping Liquor Recovery Furnace	
T91	Combustion Device Used In The Recovery Of Sulfur Values From Spent Sulfuric Acid	
T92	Halogen Acid Furnaces	
T93	Other Industrial Furnaces Listed In 40 CFR §260.10	
T94	Containment Building - Treatment	Cubic Yards; Cubic Meters; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; Btu Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million Btu Per Hour
	Miscellaneous (Subpart X):	
X01	Open Burning/Open Detonation	Any Unit of Measure in Code Table Below
X02	Mechanical Processing	Short Tons Per Hour; Metric Tons Per Hour; Short Tons Per Day; Metric Tons Per Day; Pounds Per Hour; Kilograms Per Hour; Gallons Per Hour; Liters Per Hour; or Gallons Per Day
X03	Thermal Unit	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; or Million Btu Per Hour
X04	Geologic Repository	Cubic Yards; Cubic Meters; Acre-feet; Hectare-meter; Gallons; or Liters
X99	Other Subpart X	Any Unit of Measure Listed Below

UNIT OF MEASURE	UNIT OF MEASURE CODE
Gallons	G
Gallons Per Hour	E
Gallons Per Day	U
Liters	L
Liters Per Hour	H
Liters Per Day	V

UNIT OF MEASURE	UNIT OF MEASURE CODE
Short Tons Per Hour	D
Metric Tons Per Hour	W
Short Tons Per Day	N
Metric Tons Per Day	S
Pounds Per Hour	J
Kilograms Per Hour	R
Million Btu Per Hour	X

UNIT OF MEASURE	UNIT OF MEASURE CODE
Cubic Yards	Y
Cubic Meters	C
Acres	B
Acre-feet	A
Hectares	Q
Hectare-meter	F
Btu Per Hour	I

11. Description of Hazardous Wastes (See instructions on page 22.)

A. Waste Codes for Federally Regulated Hazardous Wastes. Please list the waste codes of the Federal hazardous wastes handled at your site. List them in the order they are presented in the regulations (e.g., D001, D003, F007, U112). Use an additional page if more spaces are needed.

NA						

B. Waste Codes for State-Regulated (i.e., non-Federal) Hazardous Wastes. Please list the waste codes of the State-regulated hazardous wastes handled at your site. List them in the order they are presented in the regulations. Use an additional page if more spaces are needed for waste codes.

NA						

12. Comments (See instructions on page 22.)

(1) WMU 17 was closed in 1988 and issued a post-closure permit in 1998. This submittal is part of the post-closure permit renewal application package.

(2) Tesoro bought the refinery on 05/17/2002 where Tesoro was the owner and Conoco-Phillips was the operator. In an agreement with Conoco-Phillips, Tesoro became operator, as well as owner, on 03/02/2007.

13. Certification. 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.
For the RCRA Hazardous Waste Part A Permit Application, all operator(s) and owner(s) must sign (see 40 CFR 270.10 (b) and 270.11). **(See instructions on page 22.)**

Signature of operator, owner, or an authorized representative	Name and Official Title (type or print)	Date Signed (mm/dd/yyyy)
William M Bodnar	William M. Bodnar, Vice President and General Manager, Refinery	30 Jan 08

8. Process Codes and Design Capacities (Continued)

EXAMPLE FOR COMPLETING Item 8 (shown in line number X-1 below): A facility has a storage tank, which can hold 533.788 gallons.

Line Number		A. Process Code (From list above)			B. PROCESS DESIGN CAPACITY (1) Amount (Specify)	(2) Unit of Measure (Enter code)	C. Process Total Number of Units	For Official Use Only
X	1	S	0	2	533.788	G	001	
	1		N	A	.	NA	NA	
	2				.			
	3				.			
	4				.			
	5				.			
	6				.			
	7				.			
	8				.			
	9				.			
1	0				.			
1	1				.			
1	2				.			
1	3				.			
1	4				.			
1	5				.			

NOTE: If you need to list more than 15 process codes, attach an additional sheet(s) with the information in the same format as above. Number the lines sequentially, taking into account any lines that will be used for "other" processes (i.e., D99, S99, T04 and X99) in Item 9.

her Processes (*See instructions on page 25 and follow instructions from Item 8 for D99, S99, T04 and X99 process codes*)

Line Number (Enter #s in sequence with Item 8)		A. Process Code (From list above)			B. PROCESS DESIGN CAPACITY (1) Amount (Specify)	(2) Unit of Measure (Enter code)	C. Process Total Number of Units	D. Description of Process
X	2	T	0	4	100.000	U	001	In-situ Vitrification
			N	A	NA .			
					.			
					.			
					.			
					.			

10. Description of Hazardous Wastes (See instructions on page 25) - Enter information in the Sections on Form Page 5.

A. EPA HAZARDOUS WASTE NUMBER - *Enter the four-digit number from 40 CFR, Part 261 Subpart D of each listed hazardous waste you will handle. For hazardous wastes which are not listed in 40 CFR, Part 261 Subpart D, enter the four-digit number(s) from 40 CFR Part 261, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.*

B. ESTIMATED ANNUAL QUANTITY - *For each listed waste entered in Section A, estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in Section A, estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.*

C. UNIT OF MEASURE - *For each quantity entered in Section B, enter the unit of measure code. Units of measure which must be used and the appropriate codes are:*

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure, taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:

For listed hazardous waste: For each listed hazardous waste entered in Section A, select the code(s) from the list of process codes contained in Items 8A and 9A on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all the listed hazardous wastes.

For non-listed hazardous waste: For each characteristic or toxic contaminant entered in Section A, select the code(s) from the list of process codes contained in Items 8A and 9A on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed hazardous wastes that possess that characteristic or toxic contaminant.

NOTE: THREE SPACES ARE PROVIDED FOR ENTERING PROCESS CODES. IF MORE ARE NEEDED:

1. *Enter the first two as described above.*
2. *Enter "000" in the extreme right box of Item 10.D(1).*
3. *Use additional sheet, enter line number from previous sheet, and enter additional code(s) in Item 10.E.*

2. PROCESS DESCRIPTION: *If a code is not listed for a process that will be used, describe the process in Item 10.D(2) or in Item 10.E(2).*

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER - Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. *Select one of the EPA Hazardous Waste Numbers and enter it in Section A. On the same line complete Sections B, C and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.*
2. *In Section A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In Section D(2) on that line enter "included with above" and make no other entries on that line.*
3. *Repeat step 2 for each EPA Hazardous Waste Number that can be used to describe the hazardous waste.*

EXAMPLE FOR COMPLETING Item 10 (shown in line numbers X-1, X-2, X-3, and X-4 below) - A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operations. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)									(2) PROCESS DESCRIPTION- (If a code is not entered in D(1))
X	1	K	0	5	4	900	P	T	0	3	D	8	0				
X	2	D	0	0	2	400	P	T	0	3	D	8	0				
	3	D	0	0	1	100	P	T	0	3	D	8	0				
	4	D	0	0	2												Included With Above

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10. Description of Hazardous Wastes (Continued. Use the Additional Sheet(s) as necessary; number pages as 5 a, etc.)

Line Number	A. EPA Hazardous Waste No. (Enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	N A	NA	NA	N A	
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					

11. Map (See instructions on pages 25 and 26)

Attach to this application a topographic map, or other equivalent map, of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in this map area. See instructions for precise requirements.

12. Facility Drawing (See instructions on page 26)

All existing facilities must include a scale drawing of the facility (see instructions for more detail).

13. Photographs (See instructions on page 26)

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas (see instructions for more detail).

14. Comments (See instructions on page 26)

(11) See Part B of Post-Closure Permit Application.

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3-1 Regional Geologic Map (Source: Figure 5-6, Draft Corrective Measures Study Report, Earth Tech, 2005)

3-2 Geologic Cross Section for WMU 17 (Source: Figure 1 – Cross Sections – WMU17, Memorandum, Montgomery Watson, 2008)

3-3 Groundwater Contour Maps for WMU 17 – 2006 and 2007 (Source: Figure 2 – Groundwater Contour Maps – 2006 and 2007, Memorandum, Montgomery Watson, 2008)

3-4 FEMA Flood Insurance Rate Map

4-1 WMU 17 Sub Drain Detail and Synthetic Membrane Support Detail (Source: Drawing 12, Report of Closure Installation, The MARK Group, September 1987)

4-2 WMU 17 Sub Drain Detail and Synthetic Membrane Support Detail 1 (Source: Drawing 13, Report of Closure Installation, The MARK Group, September 1987)

6-1 Well Location Map (Source: Figure 2, Winter/Spring 2007 SMP Report, ATC, 2007)

6-2 Criteria for Additional Investigation at PGMP Wells (Source: Figure 3, Trigger Level Implementation Plan Revision, URS 2004)

6-3 Criteria for Additional Investigation at Interior Wells (Source: Figure 4, Trigger Level Implementation Plan Revision, URS 2004)

Appendices

A Closure Plan Acceptance and Certification of Closure

B Financial Assurance Letter

C Certification of Recordation and Recorded Notice, August 20, 1993

Attachments

1 Closure Plan of Oily Waste Surface Impoundments

Below Ground Surface	bgs
AGTs	Above-Ground Storage Tanks
AOC	Areas of Concern
API	American Petroleum Institute
ART	Avon Remediation Team
BTEX	benzene, toluene, ethylbenzene, xylene
CAMUs	Corrective Action Management Units
CAP	Corrective Action Plan Report
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CMS	Corrective Measures Study
COCs	Constituents of Concern
DAF	Dissolved Air Floatation
DHS	Department of Health Services
DTSC	Department of Toxic Substances Control
El	elevation
FPLH	Free-Phase Liquid Hydrocarbon
ft AMLS	feet above mean sea level
ft bgs	feet below ground surface
LNAPL	Light Non-Aqueous Phase Liquids
MSL	Mean Sea Level
MTBE	Methyl Tertiary Butyl Ether
OWI	Oily Waste Impoundment
PGMP	Perimeter Groundwater Monitoring Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation Report
RWQCB	Regional Water Quality Control Board
S/m	Siemens per meter
SAP	Sampling and Analysis Plan
SCR	Site Cleanup Requirements
Shallow Zone	Shallow Water-Bearing Zone

Certification Statement

I certify under penalty of law that this document (Golden Eagle Refinery's WMU 17 Post-Closure Permit Application – Revised September 2008), was 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 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.

Signature: William M Bodnar Date: 23 APRIL 2009

William M. Bodnar
Vice President and General Manager, Refinery
(925) 228-1220

URS Corporation (URS) has prepared this Post-Closure Permit Application for Waste Management Unit (WMU) 17, located at the Golden Eagle Refinery (Refinery) in Martinez, Contra Costa County, California on behalf of the Tesoro Refining and Marketing Company.

WMU 17 was formerly two Resource Conservation and Recovery Act (RCRA) regulated oily waste surface impoundments that were removed from service in December 1983. The closure of WMU 17 was officially approved by the Department of Health Services (DHS) and the Environmental Protection Agency (EPA) in a letter dated December 6, 1988. A Hazardous Waste Facility Post-Closure Permit (Permit number 98-NC-005) was issued for WMU 17 by the Department of Toxic Substances Control (DTSC) on July 30, 1998 (DTSC, 1998). The Post-Closure Permit incorporated the Closure Plan (EA Engineering, 1985a) and the Post-Closure Plan (EA Engineering, 1985b) by referenced. The Post-Closure Permit was modified in 2002 and 2003 with permit modification numbers NC2-070302-A and NC2-040103-A, respectively (DTSC, 2002; DTSC 2003). The current Post-Closure Permit expires in July 2008 and this is the Post-Closure Permit Renewal Application (permit application) to extend the permit.

The following is the purpose of the Post Closure Permit for WMU 17:

- Maintenance of the closure cover;
- Environmental Monitoring; and
- Maintenance of financial mechanisms to fund the post closure activities.

The permit application also identifies the Post-Closure Permit Authority of the DTSC and the groundwater monitoring authority of the Regional Water Quality Control Board WDR Order No. R2-2004-0056. A Post-Closure Permit is required because WMU 17 was not "clean closed", i.e. residual wastes may be present.

This Post-Closure Permit Application provides the following information for WMU 17: general description and history (Section 2.0), facility location (Section 3.0), WMU 17 closure (Section 4.0), post-closure care (Section 5.0), history and overview of WMU 17 groundwater sampling and monitoring program (Section 6.0), post-closure cost estimate (Section 7.0), financial assurance (Section 8.0), notice in deed (Section 9.0), and corrective action (Section 10.0).

Table 2-1 Post-Closure Permit Application Regulatory Cross-Reference

Federal Regulation (CFR Title 40)	State Regulation (CCR Title 22)	Summary Description of Compliance Requirements	Application Section
270.14(b)(1)	66270.14(b)(1)	A general description of the facility	Section 2.0
270.14(b)(4) 264.14	66270.14(b)(4) 66264.14	Security procedures and equipment	Sections 5.6, 5.7
270.14(b)(5) 264.15, 33	66270.14(b)(5) 66264.15, 33	General inspection requirements and schedule	Sections 5.3, 5.4
270.14(b)(6) 264.32(a) - (d) 264.37	66270.14(b)(6) 66264.32(a) - (d) 66264.37	Waiver or documentation of preparedness and prevention requirements	Sections 5.8, Attachment 4
270.14(b)(11) 264.18	66270.14(b)(11) 66264.18	Facility location information: flood plain requirements applicable if facility is located in a 100-year floodplain	Sections 3.1, 3.2, 3.6 Figure 3-4
270.14(b)(13) 264.111 – 120, 197, 226, 228, 258, 303, 310	66270.14(b)(13) 66264.111-120, 197, 226, 228, 258, 303, 310	Closure Plan and Post-Closure Plan	Sections 4.0, 5.0 Appendix A, Attachments 1, 2 and 3
270.14(b)(14)	66270.14(b)(14) 66265.116, 119	Documentation that notices have been filed	Section 9.0 Appendix C
270.14(b)(16) 264.144, 145, 151	66270.14(b)(16) 66264.144, 145, 151	Most recent post-closure cost estimate and documentation required to demonstrate financial assurance	Sections 7.0, 8.0 Appendix B
270.14(b)(18) 264.149, 150	66270.14(b)(18) 66264.149	Where appropriate, proof of coverage by a State financial mechanism	Section 8.0 Appendix B
270.14(b)(19)	33270.14(b)(18) and (19)	Topographic map showing 1,000 feet around facility showing 100-year floodplain, surface waters, surrounding land uses, wind rose, legal site boundaries, access control, wells, barriers for drainage or flood control	Figures 2-3, 3-4
270.14(c)(1) 265.92 265.93	66270.14(c)(1) 66265.91 66265.93	Interim status groundwater monitoring data, description of wells, sampling and analysis procedures, statistical procedures, groundwater assessment plan	Section 6.0 Figures 6-1, 6-2, 6-3 Attachment 5
270.14(c)(2)	66270.14(c)(2)	Regional and site-specific geological and hydro geological setting, including aquifer description, groundwater flow direction and rate	Sections 3.2, 3.5 Figures 3-1, 3-2, 3-3
270.14(c)(3) 264.95 264.97	66270.14(c)(3) 66264.95 66264.97	On the topographic map, a delineation of the waste management area, property boundary, proposed point of compliance, groundwater monitoring wells, aquifers, groundwater flow direction	Figures 3-2, 3-3, 6-1
270.14(c)(4)	66270.14(c)(4)	Description of contaminant plume including concentrations and plume delineation on topographic map	Not Applicable (see discussion in 6.2.2)
270.14(c)(5)	66270.14(c)(5)	General monitoring program requirements – description of wells, sampling	Section 6.0

The following section provides a general history of the site and the regulatory guidance for completing the permit update.

2.1 FACILITY DESCRIPTION AND HISTORY

The Golden Eagle Refinery is located at 150 Solano Way in Martinez, California (Figure 2-1). The Refinery began operation in 1913 and now encompasses an area of approximately 2,100 acres. It is divided into six tracts (1, 2, 3, 4, 6, and 7). It is bounded to the north by the Carquinez Strait and Suisun Bay, to the east by Point Edith Marsh and the Concord Naval Weapons Station, to the south by the Kinder-Morgan Concord Terminal and Mallard Reservoir, and to the west by Pacheco Slough. The Refinery processes approximately 145,000 barrels of petroleum crude oil per day (Earth Tech, 2005). Its primary products are gasoline and diesel fuel while other products include liquid petroleum gas, heating oil, and petroleum coke.

A RCRA facility assessment (RFA) was performed at the Golden Eagle Refinery (AT Kearny and SAIC, February 1988) that identified WMU 17 as a solid waste management unit (SWMU).

2.2 WASTE MANAGEMENT UNIT 17 DESCRIPTION AND BACKGROUND

WMU 17, historically referred to as Solid Waste Management Unit (SWMU) 17 and also known as the Oily Waste Impoundment (OWI), is located in Tract 1. A Refinery map, showing the location of WMU 17, is included as Figure 2-2. Prior to 1955, the area in the vicinity of WMU 17 was undeveloped. From 1955 to 1966, the area was used for storage of petroleum coke. WMU 17 was constructed in 1966 and consisted of two rectangular shaped ponds which covered approximately 4 acres. The ponds were originally constructed to depths of three feet below grade and were subsequently excavated to a depth of six to seven feet during their operation. WMU 17 was utilized from 1966 to 1983 as oily waste ponds with residence times of 6 to 9 months. Materials stored in WMU 17 included American Petroleum Institute (API) separator sludge, dissolved air floatation (DAF) float, slop oil emulsion solids, and crude oil and unleaded tank bottoms. Oil and waste sludge was allowed to separate in the ponds before it was subsequently removed from the ponds for recycling.

2.3 CLOSURE OF WMU 17

WMU 17 was removed from service in December 1983. Closure and Post-Closure Plans (EA Engineering, 1985a, 1985b) were prepared, and submitted to the Department of Health Services (DHS) in November 1985 (Attachments 1 and 2). Closure of WMU 17 included the removal of sludges and soil and the installation of a cap. The post-closure surface topography as presented in the OWI Final Report, Site Characterization of Oily Waste Impoundment (The MARK Group, 1991) for WMU 17 is depicted in Figure 2-3. A more specific discussion of closure activities and closure design is provided in Section 4.0 of this document. Detailed information regarding the closure activities can be found in the Winterization Activities Report (The MARK Group, 1987b) and the Report of Closure Installation (The MARK Group, 1988). The closure of WMU 17 was officially approved by the DHS and the EPA in a letter dated December 6, 1988. Copies of acceptance letters for the Closure Plan and the acknowledgment of the completed closure activities are included in Appendix A.

This Section was prepared in response to 40 CFR, Section 270.14(b)(11), which requires facility location information.

3.1 FACILITY INFORMATION

The owner and operator of the Golden Eagle Refinery is:

Tesoro Refining and Marketing Company
150 Solano Way
Martinez, California 94553
Phone: (925) 228-1220

Facility EPA Identification No.: CAD 000 072 751

All inquiries regarding the facility should be directed to the attention of the Manager of Environmental Affairs at the Refinery at (510) 228-1220.

Previous owners and operators of the facility were:

- Associated Oil Company 1913-1952
- Tidewater Oil Company 1952-1966
- Phillips Petroleum Company 1966-1976
- Tosco Corporation 1976-2000
- Ultramar, Inc. 2000-2002
- Tesoro 2002-Present

3.2 REGIONAL SETTING

The Refinery is located on a low ridge that trends north-northwest which merges to the east with a flat area of former marshlands and tidal flats. These marshlands were filled with dredge spoils to the present ground surface elevation which ranges from 8 to 11 feet above mean sea level (MSL). The Refinery is bounded by Pacheco Slough on the western boundary and Suisun Bay to the north. A comprehensive description of the regional geology in the area surrounding the facility can be found in the *Draft Corrective Action Plan Report* (CH_2M-Hill, 1993).

3.3 TOPOGRAPHY

The northeastern portion of the Refinery, which includes WMU 17, is located on flat-lying former undeveloped land with ground surface elevations ranging from 2 to 10 feet above MSL. Two relatively small northwest-trending hills, located on the northwestern portion of the Refinery (Tracts 2 and 3) near Waterfront Road, have elevations ranging from approximately 10 to 40 feet MSL.

3.4 SURROUNDING LAND USES

The Refinery is bounded on the north by Suisun Bay. South of the Refinery along State Route 4 and Arnold Industrial Way are primarily light industrial and business park land uses. This area

thickness vegetative soil cover, and surface drainage structures provides a protective boundary from hydrodynamic and hydrostatic forces that might be expected during heavy rainfall; and (4) Inspection of WMU 17 is required within 3 days following a 100-year rainfall event. An inspection report and damage assessment must be submitted to DTSC within 15 days of the rainfall event, and repairs or corrective actions implemented as necessary. After the severe storms experienced during the winters of 1996 and 1997, neither ponded water nor erosion of the cover were observed.

This Section was prepared in response to 40 CFR, Section 270.14(d)(1), which requires information on the waste management unit, including location, description of type, dimensions, dates operated, and specifications of waste that have been managed at the unit.

WMU 17 was removed from service in December 1983. At the time of their closure, both pond depths were approximately 6 feet below ground surface and the areas of the west and east ponds were approximately 425 x 150 feet and 500 x 175 feet, respectively. Information regarding the operation of WMU 17 is in the numerous reports that have been submitted to the DTSC since 1985. Closure and Post-Closure Plans were prepared and submitted to the DHS in November 1985. In accordance with 40 CFR, Section 270.14 (b)(13), the *Closure Plan of the Oily Waste Surface Impoundments* (EA Engineering, 1985a) and *Post-Closure Plan of the Oily Waste Surface Impoundments* (EA Engineering, 1985b) are included as Attachments 1 and 2, respectively. Detailed information regarding the closure activities can be found in the *Winterization Activities Report* (The MARK Group, 1987b) and the *Report of Closure Installation* (The MARK Group, 1988). The closure of WMU 17 was officially approved by the DHS and the EPA in a letter dated December 6, 1988. Results of sampling and analysis of groundwater and other subsurface information at the time of closure is included in the *OWI Final Report* (The MARK Group, 1991) and the *Addendum to OWI Final Report* (The MARK Group, 1992).

This Section outlines specific information regarding the wastes accepted by WMU 17 during operation, the closure design, and the current surface condition of WMU 17.

4.1 WASTES

Under 22 CCR, Section 66264.119, operators are required to submit to the DHS a record of the type, location, and quantity of hazardous wastes disposed of in each hazardous waste management unit. The wastes received by WMU 17 and the EPA waste code (where applicable) are as follows: API separator sludge, K051; DAF float, K048; slop oil emulsion solids, K049; and, crude and unleaded tank bottoms. There are no records of the quantities of each waste received by WMU 17.

The location of WMU 17 on Refinery property is shown on Figure 2-2. Based on information in previous reports, it was estimated that approximately 4 million barrels of liquid waste was treated in WMU 17. This approximation is based on the following assumptions: the area of WMU 17 was 151,250 square feet; the average depth was 6 feet; the operating time was 17 years; and residence time of waste in WMU 17 was approximately 7.5 months.

Since WMU 17 has been removed from service and certified closed, potential releases associated with transportation to and from the unit and/or operating accidents are not an issue of concern. WMU 17 was not "clean closed" due to the residual impacted soils. The quantity of impacted soils remaining after closure is very low due to the excavation and removal of petroleum-containing sediment from the bottom and sides of WMU 17 during the winterization activities (The MARK Group, 1987b). Any residual volatile constituents remaining that were not detected during closure are not likely to migrate or be released to the atmosphere due to the clay cap and polyethylene liner which were installed during the impoundment closure. Since the closure of WMU 17, surface releases are unlikely because WMU 17 has not been used as part of any other activities at the Refinery.

the location of wells surrounding WMU 17. A wind rose was not included because WMU 17 is not active and is capped, and air emissions are not a concern.

Title 22 CCR, Section 66264.118(b) requires that a written Post-Closure Plan be submitted with a description of monitoring activities that will be performed. *Post-Closure Plan of the Oily Waste Surface Impoundments* was submitted to the DHS in November 1985 (EA Engineering, 1985b) and is included as Attachment 2.

A Hazardous Waste Facility Post-Closure Permit (Permit number 98-NC-005; hereinafter referred to as the original Post-Closure Permit) was issued for WMU 17 by the DTSC on July 30, 1998 (DTSC, 1998). The Post-Closure Permit superseded the Post-Closure Plan submitted in 1985. The permit was modified in 2002 and 2003 with permit modification numbers NC2-070302-A and NC2-040103-A, respectively (DTSC, 2002; DTSC 2003). The original Post-Closure Permit and the two modifications are included in Attachment 3.

The remainder of this Section summarizes post-closure activities that are being performed in accordance with the original Post-Closure Permit.

5.1 POST-CLOSURE EMERGENCY CONTACT

In accordance with 22 CCR, Sections 66264.55 and 66264.52(b), the Emergency Response Coordinator(s) for WMU 17 can be reached through the Incident Commander. The Emergency Response Coordinator is a rotating position. The Incident Commander is available at the refinery seven days a week, 24-hours a day. The Incident Commander has a list of the home phone numbers and addresses of each of the Emergency Response Coordinators and will immediately provide the on-shift Emergency Response Coordinator.

Incident Commander
150 Solano Way
Martinez, CA 94553-1487
Direct: (925) 372-3047
Phone: (925) 228-1220 and ask for Incident Commander

In accordance with the original Post-Closure Permit, the name(s) of the Emergency Response Coordinator(s) and how they could be reached in the event of an emergency will be kept up to date at Tesoro's environmental affairs office and will be readily available for inspection upon request by DTSC inspectors. A list of the rotating Emergency Response Coordinators can be found in Appendix D of Attachment 4 (Contingency Plan).

5.2 POST CLOSURE CARE PERIOD

In accordance with the original Post-Closure Permit and 22 CCR, Section 66265.117(b)(2)(B), the post-closure care period will extend 30 years from the effective date of the Post-Closure Permit. The Post Closure care period may be modified, with approval from the DTSC, if the site clean closed or sufficient information is provided to justify modifying the Post Closure care period.

options would be implemented. Post-disaster inspection requirements that are specified in the original Post-Closure Permit and will continue to be followed at WMU 17 are provided in Attachment 3.

Annual surveys of WMU 17 are performed by a licensed land surveyor in accordance with the original Post-Closure Permit and 22 CCR, Section 66264.228(p) to determine the horizontal location and elevation of the cover and other features. Annual differences in elevation for each benchmark are compared to evaluate cap settlement. Based on the survey performed in 2006, the majority of the settlement occurred within the first 10 years of the cap construction (ATC, 2006a). Since that time, relatively little surface elevation change has occurred. The average amount of settlement that took place across WMU 17 from 1988 to 1999 was approximately 0.33 feet. The average amount of settlement across WMU 17 from 1999 to 2006 was 0.06 feet (ATC, 2006a).

5.4 MAINTENANCE

During the quarterly and annual WMU 17 inspections, the general condition of the cover, drainage channels, retaining wall, surveyed benchmarks, groundwater monitoring wells, and warning signs is noted. Any observed damage is repaired. The top of WMU 17 is mowed periodically, and weed removal and herbicide application are performed as needed. Trees, shrubs, or deep-rooted plants are removed if present. Rodent control services are contracted as needed, and any rodent damage to the final cover is repaired. The surface drainage channels are kept clear of debris, grass trimmings, and grass growing in the channels. No other maintenance (i.e., fertilization, replacement of lost soil, or reseeding) of the cover has been required since installation.

In order to minimize disruption to and maintain the integrity of the final cover, WMU 17 is not being used as part of any other activities at the Refinery. No roadways are constructed over the final cover area and no heavy equipment or vehicles are permitted on the final cover area unless involved in maintenance or repair activities. Roadways necessary for post-closure maintenance are maintained in good repair. The final cover is maintained at the approximate slope described in the Closure Plan.

The groundwater sampling contractor notes the condition of each well during each groundwater sampling event. If damage to a groundwater monitoring well is observed during semi-annual groundwater sampling events, repair of damaged wells is performed as soon as practicable.

5.5 GROUNDWATER MONITORING

Groundwater monitoring activities at WMU 17 are described in detail in Section 6.0, History and Overview of WMU 17 Groundwater Sampling and Monitoring Program. The Waste Management Unit 17 Sampling and Analysis Plan is included in Attachment 5.

5.6 SAFETY AND PERSONNEL TRAINING

All personnel at the Refinery are required to take annual safety training and attend weekly safety meetings in their respective departments. Additionally, personnel are required to wear fire-resistant coveralls, sturdy work shoes, hard hats, and eye protection when working in the

Safety of personnel must be assured in all post-earthquake and post-disaster inspection activities. A qualified site safety person shall conduct periodic assessments regarding the conditions encountered during the inspection and any potential hazards to the inspection team shall be noted. Areas of potentially unstable soil shall be avoided, unless the site safety person determines that it is safe to proceed. Ambient air shall be monitored for site contaminants and for possible releases from other nearby facilities. Locations monitored shall be recorded in the inspection log. For safety purposes, remote inspection (e.g., with binoculars) must be done prior to any ride-on or walk-on inspection.

Where a hazard is imminent or has already occurred, remedial action will be instituted immediately and authorities will be notified according to the procedures outline in the current Refinery Hazardous Waste Contingency Plan.

An Inspection Report and Damage Assessment (IRDA) must be received by the DTSC within fifteen days after the disaster. The IRDA must include: a description of damages observed, a description of all releases, a summary of corrective measures undertaken to stabilize the site, and recommendations for additional work (if appropriate). All repairs must be pre-approved by the site safety person. Repairs shall focus on preventing releases and controlling the flow of water. Photographs taken before and after corrective measures must be included. The IRDA must contain: the notification form, the topographic map with field notations, photographs, a map of local faults (when the triggering event is an earthquake), a map of flooded areas (when the triggering event is a rainfall), and copies of field log entries from the inspection. For more extensive repairs, the IRDA shall contain proposed corrective actions and a schedule of work.

5.9 REPORTING

Pursuant to the Post-Closure Permit and 22 CCR, Section 66264.228(r), annual reports describing measures undertaken at the site during the post-closure maintenance period are submitted to DTSC. The reports include data collected during surveying activities for settlement monitoring and the results of the engineering inspection. All inspection records will be maintained at the facility for a period of three years.

All groundwater monitoring and sampling results that are collected pursuant to the Waste Discharge Requirements (WDR), Site Cleanup Requirements (SCR) and the Perimeter Groundwater Monitoring Plan (PGMP) are combined and submitted in annual reports submitted Regional Water Quality Control Board (RWQCB), USEPA, DTSC, and Contra Costa County Department of Health, as described in Section 6.0. The practice of submitting separate reports for each of the WMUs has been discontinued.

This Section was prepared in response to 40 CFR, Section 270.14(c), which requires information regarding the protection of groundwater. Groundwater sampling and monitoring activities in compliance with the Post-Closure Plan have been conducted to date since the closure of WMU 17 in 1988. Specifics of sampling and monitoring activities have evolved since WMU 17 closure based on DTSC, RWQCB, and USEPA requirements. WMU 17 groundwater sampling and monitoring has been incorporated into the Refinery-wide groundwater sampling and monitoring program, which is overseen by the RWQCB and USEPA. Therefore, this Section summarizes the history and current practices of the groundwater sampling and monitoring program at WMU 17 and at the Refinery as a whole, as required by RWQCB and USEPA regulatory Orders. WMU 17 is the only RCRA regulated unit that is also overseen by DTSC (DTSC, 1996). DTSC requirements for WMU 17 under Title 22, Chapter 14, Article 6 are discussed in Sections 6.2.3 and 6.2.7.

6.1 RWQCB AND USEPA ORDERS 1987 THROUGH PRESENT

The Refinery has received several Orders from the RWQCB and one Order from the USEPA identifying areas where groundwater monitoring is required. RWQCB WDR Orders and SCR Orders have established a Self-Monitoring Program (SMP) for the Refinery since 1984. The SMP, updated in each RWQCB WDR Order, provides requirements for groundwater sampling and monitoring activities at WMU 17 and at the Refinery as a whole. The current SMP is described in RWQCB WDR Order No. R2-2004-0056. Table 6-1 summarizes the requirements of the WDR and SCR Orders from 1987 to the present and the USEPA Order from 1989.

Table 6-1 RWQCB and USEPA Regulatory Orders from 1987 to Present

Order	Date	Description
RWQCB WDR 87-123	September 16, 1987	Established SMP for WMU 17. The quarterly groundwater monitoring and reporting activities specified under the Order satisfied groundwater monitoring requirements of the Post-Closure Plan (EA Engineering, 1985b).
RWQCB WDR 90-083	June 20, 1990	Required to drill soil borings and install additional monitoring wells to further characterize the WMUs at the facility. Established a WDR-SMP for several WMUs and Areas of Concern (AOCs) throughout the Refinery. An SMP for WMU 17 was also included in the requirements of the WDR. Required: (1) a technical report documenting the hydrogeological conditions of WMU 17 and the effectiveness of the groundwater monitoring system; (2) a technical report proposing soil borings and groundwater monitoring wells for 20 additional WMUs located throughout the Refinery; (3) performance of the WDR-SMP on WMUs located throughout the Refinery; and (4) submittal of quarterly and annual groundwater monitoring and sampling reports to the RWQCB. This Order amended Order No. 87-123.
RWQCB WDR 92-078	July 15, 1992	Required a work plan specifying corrective actions to be taken to bring 14 WMUs (not including WMU 17) into compliance with California Code of Regulations, Title 22, Chapter 15 requirements. Order No. 92-078 amended Order No. 90-083.

Table 6-1 RWQCB and USEPA Regulatory Orders from 1987 to Present

Order	Date	Description
USEPA RCRA Order 09-89-0013	March 13, 1989	Required a RCRA Facility Investigation (RFI) to be conducted and a report to be prepared and submitted. The Order also required that a Corrective Measures Study (CMS) be completed and submitted subsequent to the RFI approval. The RCRA Order was amended on September 6, 1990 to require additional groundwater investigation and to revise the CMS schedule. This Corrective Action Order addressed 20 WMUs and 4 other AOCs and included corrective measures for three of the units. This is also referred to as a Section 3008(h) Administrative Order.

6.2 HISTORICAL DOCUMENTS PREPARED IN RESPONSE TO REGULATORY ORDERS

Multiple documents pertaining to the groundwater sampling and monitoring activities at the Refinery have been prepared in response to the regulatory Orders summarized in Table 6-1 and DTSC requirements for WMU 17. This Section summarizes historical documents that have influenced the development of the SMP at the Refinery as a whole and at WMU 17.

6.2.1 OWI Final Report and Addendum (1991)

WDR Order No. 90-083 required a technical report documenting the hydrogeological conditions of WMU 17 and the effectiveness of the groundwater monitoring system. The WMU 17 technical report (*OWI Final Report*) required by the Order was submitted June 14, 1991 (The MARK Group, 1991). In response to comments made by the RWQCB, an *Addendum to OWI Final Report* was submitted in June 1992 (The MARK Group, 1992). The *OWI Final Report* and Addendum concluded that the hydrogeologic condition of WMU 17 demonstrates that the site constituent chemicals are not migrating from WMU 17. The report also concluded that the current detection monitoring system, consisting of wells installed in the first-encountered groundwater (Coke-zone) and in the deeper, native water-bearing zone (Shallow Aquifer) that were installed in compliance with Order No. 90-083, was adequate to detect potential migration of site constituent chemicals.

6.2.2 Draft RCRA Facility Investigation Report (1992)

In October 1992, the *Draft RCRA Facility Investigation Report* (Draft RFI Report) presented data collected during investigations at 20 WMUs and four AOCs throughout the Refinery (CH_2M-Hill, 1992a). The report was completed in compliance with RWQCB Order No. 90-083 and the USEPA 3008(h) Order with approval from both agencies. The 3008(h) Order required Tosco to prepare an RFI Work Plan, conduct the RFI, and submit a CMS for WMUs and AOCs throughout the Refinery. Conclusions presented in the RFI confirmed that chemical constituents are present in the soil and groundwater in an area that includes WMU 17 and several adjacent WMUs. The RFI concluded that determining whether WMU 17 or another individual WMU had released constituents to the subsurface was difficult due to the following facts:

vicinity of WMU 17 make determination of the appropriate corrective actions at individual units impractical, the draft RFI Report proposed establishing a CAMU for this area. This complied with 22 CCR, Section 66259.95, which provides that, for contiguous or adjacent WMUs, a waste management area may be described by an imaginary line along the outer boundary of these contiguous waste units. At the hydraulically downgradient boundary, called the point of compliance, the water quality protection standard is applied, and releases from the combined units are assessed. The Article 6 Monitoring Plan applied the Article 6 performance standards to the downgradient limit of the Tract 1 CAMU, also called the OWI Waste Management Area. Development of the OWI Waste Management Area would allow monitoring of WMU 17 in conjunction with the adjacent WMUs in the area by monitoring and sampling wells that are located on the downgradient perimeter of the proposed area.

The Article 6 Monitoring Plan described the proposed groundwater monitoring program as a Corrective Action Monitoring Program to support corrective action design that was in progress for the *Draft Corrective Action Plan Report* (CH_2M-Hill, 1993) and to demonstrate the effectiveness of the corrective action. The Article 6 Monitoring Plan proposed COCs (based on the Title 22, Chapter 14 Appendix IX list), concentration limits, monitoring points, compliance period, data evaluation methods including statistical procedures, and reporting specifications.

In addition to groundwater monitoring requirements, the Article 6 Monitoring Plan included surface water and unsaturated zone monitoring requirements. Surface water bodies included in the monitoring were the Clean Water Canal, Oily Water Canal, surge ponds, coke pond, Hastings Slough and its tributaries, and the canal adjacent to Waterfront Road. Because of the shallow depth to groundwater within the OWI Waste Management Area (generally less than 5 feet below ground surface), unsaturated zone monitoring was determined to be inappropriate.

6.2.4 Draft Corrective Action Plan Report (1993)

WDR Order No. 92-078 required a work plan for corrective action at 14 of the WMUs at the Refinery. Consistent with this requirement, a *Draft Corrective Action Plan Report* (CAP; CH_2M-Hill, 1993) was submitted. The CAP contained a conceptual approach to implement a Refinery-wide perimeter groundwater protection system to monitor and control releases at the perimeter of the Refinery. By monitoring at the perimeter, the POC for detection monitoring at WMUs was also established at the Refinery perimeter. The approach was recommended to supplement corrective actions which may be taken at individual WMUs, because many of the WMUs are continuous and/or coincide with the location of FPLH pools such that identifying a single source of contaminant release is not feasible. The CAP further proposed integrating the perimeter protection system and WMU-specific monitoring. The CAP limited the perimeter monitoring to Tracts 1 and 3, but indicated that such an approach would be useful for Tracts 4 and 6.

The CAP did not recommend specific wells; rather, it identified a phased approach. The first phase identified installing piezometers and monitoring wells to define the downgradient flow paths. The next phase identified installing additional monitoring wells at the perimeter of the tracts, and then sampling and analyzing for site-specific standards developed for protection of beneficial uses. The final phase would be undertaken when concentrations at the perimeter exceeded the water quality protection standards, and would have caused the design and installation of physical and/or hydraulic barriers.

quarters of PGMP groundwater monitoring and sampling pursuant to California Water Code Section 13267. Final approval was obtained in a letter from the RWQCB dated December 14, 1995.

As discussed in greater detail in the PGMP Amendment, the first four quarters of PGMP monitoring activities were developed by completing the following four steps:

1. A detailed hydrogeologic analysis of both the Shallow and Alluvial Aquifers;
2. An identification of potential site chemical constituents for each WMU and AOC based on historical operating and land use information;
3. An identification of COCs based on detectability and mobility of all potential site chemical constituents; and
4. A determination of COCs for each perimeter segment.

Following the initial four quarters of PGMP monitoring, the data were evaluated and based on the results, the analytical parameters for each perimeter segment were adjusted and the frequency of PGMP sampling was reduced from quarterly to semi-annually during the two seasons (wet and dry) to capture the highest and lowest groundwater levels. The retention or removal of an analytical monitoring parameter from the list of parameters for a particular perimeter segment was based on either: the detection or non-detection of a constituent in a monitoring well located in the perimeter segment during the initial four quarters; or, the detection or non-detection of a constituent in a monitoring well located at the intersection of two contiguous segments (a straddle well) during the initial four quarters. A detailed description of the process for defining the perimeter segments and determining COCs to be sampled during the initial four quarters of the PGMP for specific perimeter segments can be found in the PGMP Amendment. The results and detailed evaluation of the first four quarters of PGMP monitoring and sampling, including the rationale for revision of the list of analytical parameters was reported in the *Perimeter Groundwater Monitoring Plan Annual Report* (CH_2M-Hill, 1996).

The first semi-annual self-monitoring event was performed utilizing the modified list of analytical parameters in September 1996.

6.2.7 DTSC Operation and Maintenance Inspection Report for WMU 17 (1996)

In March, 1996, the DTSC conducted an operation and maintenance (O&M) inspection of WMU 17 to evaluate the groundwater SAP, determine whether sampling was being conducted in accordance with the SAP, determine whether sampling equipment and monitoring wells were in good condition, and identify violations of state laws and regulations in connection with the groundwater monitoring program (DTSC, 1996). DTSC reviewed the SAP (Appendix B in the PGMP Amendment [CH_2M-Hill, 1995]), well maintenance, sampling procedures, and quality assurance/quality control procedures. DTSC evaluated the saturated zone groundwater conditions and surface water gauging stations. DTSC confirmed that monitoring of the unsaturated zone was impractical due to the shallow groundwater table. DTSC stated that approval of the Article 6 Monitoring Plan (CH_2M-Hill, 1992b) was still pending.

Chemical parameters for each perimeter segment were originally developed using information on historical operations and the results of environmental investigations at each WMU and AOC. The original list of parameters associated with each perimeter segment was presented in the PGMP. Based on a review of historical monitoring results for inorganic and organic constituents as well as appropriate water quality criteria, revised semi-annual and 5-year lists of parameters were proposed. The criteria used were as follows:

- Parameters that had never been detected above the reporting limit in a given perimeter segment and the two surrounding straddle wells were eliminated from the semi-annual and 5-year monitoring lists;
- Parameters that had never been detected above appropriate water quality criteria in a given perimeter segment or the two surrounding straddle wells were eliminated from the semi-annual monitoring list; however, these parameters were retained for the 5-year monitoring list;
- Parameters detected above appropriate water quality criteria in a given perimeter segment or either of the two surrounding straddle wells were retained for both monitoring lists;
- Parameters were added to both semi-annual and 5-year monitoring lists for a given segment if they were detected above water quality criteria in the segment or either of the two surrounding straddle wells; and
- Certain petroleum constituents may reasonably be expected to appear in groundwater as a result of potential future releases from operating portions of the Refinery. Therefore, they were retained as "core" parameters to serve in the early detection of potential future releases.

Trigger Levels were developed to evaluate concentrations of analytical parameters detected during semi-annual and 5-year monitoring events. Trigger Levels represent concentrations in PGMP wells that will not result in adverse effects to human health or ecological receptors at the point of exposure (i.e., the interface between groundwater and sediment/surface water at the edge of a slough or marsh). Trigger Levels were calculated based on constituent-specific toxicity criteria and the groundwater modeling methods presented in the *Phase II Human Health and Ecological Risk Assessment* (URS, 1999). The chemical-specific Trigger Levels proposed for Perimeter Segments 1 through 16 are presented in the technical memorandum *Development of Perimeter-Specific Parameters and Trigger Levels* (Montgomery Watson, 2000).

Validation and statistical procedures were developed to evaluate whether or not parameter concentrations measured in PGMP wells exceed perimeter segment-specific Trigger Levels. Exceedance of Trigger Levels would be statistically evaluated using the confidence intervals. In the event that the calculated confidence interval exceeded the Trigger Level, the Mann-Kendall procedure would be conducted to evaluate whether or not there was a statistically significant increase or decrease in groundwater concentrations over time within a given monitoring well. Following a statistical demonstration that parameter concentrations for a perimeter segment exceed Trigger Levels and are constant or appear to be increasing, the need for further site-specific evaluation or corrective measures would be assessed. Options for further evaluation are listed in the technical memorandum *Development of Perimeter-Specific Parameters and Trigger Levels* (Montgomery Watson, 2000).

In a letter dated July 16, 2002, the RWQCB approved both semi-annual and 5-year chemical of concern monitoring lists (RWQCB, 2002). The RWQCB also approved the methods and numeric

- Re-define risk-based Trigger Levels in the form of Concentration Limits Greater than Background;
- Re-define monitoring parameters and COCs; and
- Update statistical data evaluation methodologies for defining exceedences in SMP detection monitoring and evaluation/corrective action monitoring.

Update: Proposed revisions are still under evaluation and are currently scheduled to be submitted in the first quarter 2008.

6.3 GROUNDWATER SELF-MONITORING PROGRAM

The groundwater SMP has been ongoing at the Refinery since 1984, and data from this program has been presented in quarterly, semi-annual, and annual reports to the RWQCB. The current SMP complies with requirements described in WDR Order No. R2-2004-0056, SCR Order No. 00-021, RCRA 3008(h) Order No. 09-89-0013a, and Part B Post-Closure Permit Number 98-NC-005 for WMU 17. The Orders require semi-annual groundwater sampling events and reporting. The first semi-annual report of each year monitors Winter/Spring (wet season) conditions and is submitted on June 30. The second semi-annual report monitors Summer/Fall (dry season) conditions and constitutes the annual report to be submitted on December 30. The annual report also includes a summary of post-closure monitoring at WMU-17. SMP reports are submitted to the RWQCB, USEPA, DTSC, and Contra Costa County Department of Health.

The current SMP is designed to accomplish the following:

- Detect releases from the WMUs and AOCs and assess overall groundwater conditions;
- Monitor chemical constituents in groundwater beneath the perimeter of the Refinery;
- Evaluate whether further degradation of groundwater quality at the Refinery is occurring; and
- Map the groundwater gradient.

The current SMP complies with the requirements described in Part B Post-Closure Permit Number 98-NC-005 and the WMU 17 groundwater sampling program as outlined in the Revised WMU 17 SAP (Attachment 5).

This Section describes the evolution of the Refinery SMP since 1987 as it pertains to WMU 17 pursuant to the regulatory Orders and historical documents described in Sections 6.1 and 6.2, respectively. The Revised WMU 17 Sampling and analysis Plan is included as Attachment 5.

6.3.1 Interior Well Sampling Program

In September 1987, an SMP for WMU 17 was established by the RWQCB under Order No. 87-123. The quarterly groundwater monitoring and reporting activities specified under the Order satisfied groundwater monitoring requirements of the *Post-Closure Plan* (EA Engineering, 1985b). From September 1987 through June 1990, groundwater monitoring and reporting activities under Order No. 87-123 were conducted. These groundwater monitoring activities included depth to water measurements and sampling of five wells (MK-24 through MK-28) that were constructed in the first-encountered water-bearing zone immediately underlying the former WMU 17. Each well was screened across first-encountered groundwater in what is referred to as

6.3.1.1 Current Interior Well Program

Currently, there are 136 interior wells in the SMP program. Thirteen of these wells are screened in the Alluvial Aquifer (at depths between approximately 34 and 96 feet). The interior wells are shown on Figure 6-1.

There are 11 interior wells associated with WMU 17, including MK-24K, MK-25K, MK-26K, and MK-28K (the five wells that were part of the original WMU 17 SMP in 1987) and wells MK-24A, MK-25A, MK-26A, MK-28A, and MK-39A, MK-40K and MK-41K (the eight wells that were installed pursuant to Order No. 90-083). Please note, wells MK-27K and MK-42K were removed in 2007 to facilitate closure of WMU-9 and are no longer included in the Interior Well Sampling Program. Detail information on the WMU 17 interior wells can be found in Attachment 5 – WMU 17 SAP.

6.3.2 Perimeter Well Sampling Program

A PGMP was prepared in 1994 in response to RWQCB SCR Order 93-079. The PGMP developed monitoring and corrective action programs for areas of the Refinery as opposed to specific WMUs. The programs were developed based on the results of monitoring and sampling programs in conjunction with a human health and ecological risk assessment. The PGMP was prepared by the Refinery in an effort to identify the migration of chemical constituents to the POCs located at the perimeter of the operating facility. As part of the PGMP, the perimeter was divided into 16 segments for monitoring the Shallow Aquifer and 2 segments for monitoring the deeper Alluvial Aquifer. Quarterly monitoring of PGMP wells was conducted for the first year (1995). Following four quarters of monitoring, the data were evaluated and based on the results, the analytical parameters for each perimeter segment were adjusted and the sampling frequency was reduced to once every six months. In 2000, updated lists of PGMP monitoring parameters and proposed numerical Trigger Levels were developed and a statistical evaluation procedure to evaluate the need for corrective action was approved. Results of the PGMP well sampling and evaluation of analytical data are currently included in the semi-annual and annual Refinery SMP Reports.

Based on a letter dated October 13, 2006 to the RWQCB and USEPA, Sen's non-parametric test for trend analysis rather than Mann-Kendall statistical method is now used for statistical evaluation of interior and perimeter wells in the SMP (ART, 2006).

6.3.2.1 Current Perimeter Well Sampling Program

Currently there are 16 perimeter segments with 81 PGMP wells, of which 64 are screened within the Shallow Zone and 17 in the Alluvial Aquifer (at depths between approximately 34 and 96 feet). The perimeter segments and their associated monitoring wells are shown on Figure 6-1. Each perimeter segment is associated with an adjacent tributary area within the Refinery perimeter. Included within the tributary area are features that potentially affect groundwater flow direction and water quality along the associated perimeter segment. These features include WMUs, AOCs, and light non-aqueous phase liquid (LNAPL) areas.

This Section was prepared in response to 40 CFR, Section 270.14(b)(16), which requires the most recent post-closure cost estimate.

Table 7-1 Estimated Costs for Annual Maintenance of WMU 17

	Rate		Unit		Cost
Post-Closure Inspection and Maintenance					
Annual Inspection by Professional Engineer	$ 1,200.00	estimate	1	$	1,200.00
Annual Survey of Elevation Monuments	$ 1,200.00	estimate	1	$	1,200.00
Quarterly Inspections and Reporting	$ 2,800.00	estimate	4	$	11,200.00
Quarterly Maintenance	$ 500.00	estimate	4	$	2,000.00
Annual Inspection Report	$ 2,800.00	estimate	1	$	2,800.00
Administrative Costs (Project Management)	$ 500.00	estimate	4	$	2,000.00
			Subtotal:	*$*	*20,400.00*
Self-Monitoring Program					
Interior Wells - Monitoring and Sampling	$11,300.00	estimate	2	$	22,600.00
Interior Wells - Analytical Cost	$ 270.00	/well	24	$	6,480.00
Semi-Annual and Annual Reporting	$ 6,500.00	estimate	2	$	13,000.00
Administrative Costs (Project Management)	$ 500.00	estimate	2	$	1,000.00
			Subtotal:	*$*	*22,880.00*
Annual Total				***$***	***63,480.00***
30 Year Total (plus 20% contingency)				**$**	**2,285,280.00**

Notes:

1. Interior wells self-monitoring program for WMU 17consists of 11 wells, one duplicate and one trip blank, sampled twice a year. URS estimated Labor costs are $ 6,560 per event, analytical costs of $ 3,240 per event, and miscellaneous costs, such as equipment rentals at $ 1,500 per event.
2. Interior well monitoring and sampling program based on cost estimate provided by ATC, based on two people for four days. Cost includes all equipment and setup.
3. Inspections consist of one day and subsequent reporting. Monitoring and sampling events consist of two to three days and subsequent reporting.

This Section was prepared in response to 40 CFR, Section 270.14(b)(16), which requires documentation to demonstrate financial assurance.

In addition to annual updates of post-closure cost estimates, the Refinery is required to maintain financial assurances to guarantee funding is available to conduct long-term post-closure care. Adjustments to financial assurance mechanisms are required pursuant to state regulation, whenever cost estimates are modified and approved by DTSC.

Financial assurance for post-closure is demonstrated through the use of a Financial Test as specified in 22 CCR, Section 66264.145(f). The Financial Test, as well as the cost estimate, is updated annually at which time a letter demonstrating financial assurance is submitted to the DTSC. The letter of financial assurance, updated in 2007, is included in Appendix B.

A surety bond and/or a letter of credit will be maintained throughout the post-closure care period.

This Section was prepared in response to 40 CFR, Section 270.14(b)(14), which requires documentation that notices have been filed.

Under 22 CCR, Section 66264.119, the operator of hazardous waste units is required to record a notation on the deed to the facility property that will notify any purchaser of the property that the land has been used to manage hazardous waste. A copy of the certificate of recordation and the recorded notice was submitted to the DTSC pursuant to 22 CCR, Section 66265.116 and Section 66265.119 on August 20, 1993 (Appendix C).

Corrective action is being performed under the directives of the RWQCB for the entire Refinery in accordance with WDRs and SCRs. In the event an immediate or potential threat to human health and/or the environment is identified, new releases or hazardous wastes and/or hazardous constituents are discovered, RWQCB shall be notified orally within 24 hours of discovery. RWQCB and DTSC shall be notified in writing within 10 days of such discovery summarizing the findings including the immediacy and magnitude of any potential threat to human health and/or the environment.

DTSC may require investigation, mitigation, and/or other applicable action to address any immediate or potential threats to human health and/or the environment and newly identified releases of hazardous waste and/or hazardous constituents. Corrective action will be carried out either under a Corrective Action Consent Agreement or Unilateral Corrective Action Order pursuant to Health and Safety Code, Section 25187.

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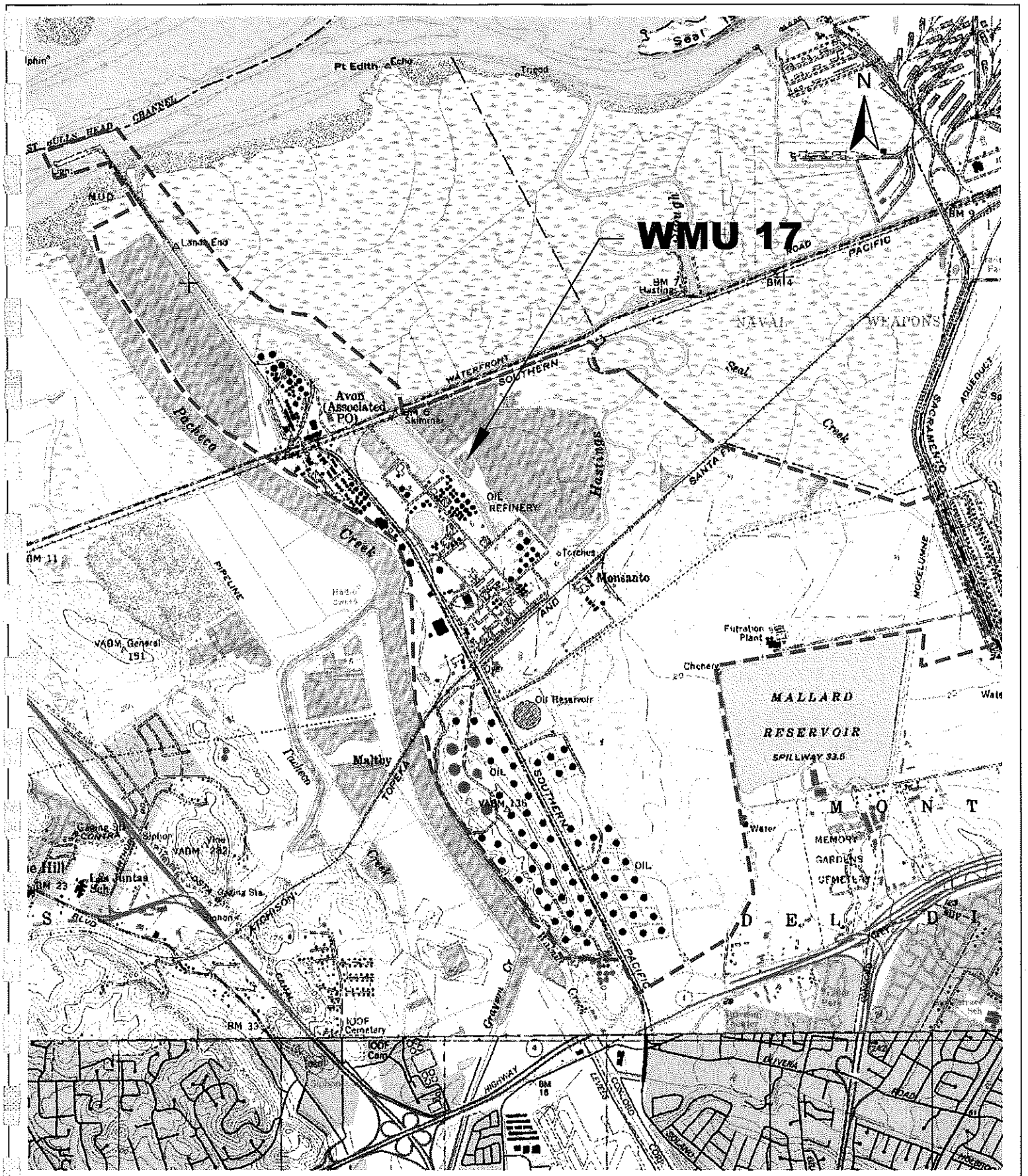

Reference:
Vine Hill Quadrangle, California
USGS 7.5 Minute Series (Topographic)

0 2000' 4000'

Approximate Golden Eagle Refinery Operations Perimeter

N

URS	Golden Eagle Refinery Martinez, CA 26816011	SITE MAP	Figure 2-2

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Reference:
Base map obtained from OWI Final Report, Site Characterization of Oily Waste Impoundments (The Mark Group, 1991)

URS	Golden Eagle Refinery Martinez, CA 26816011	WASTE MANAGEMENT UNIT 17 SITE PLAN	Figure 2-3

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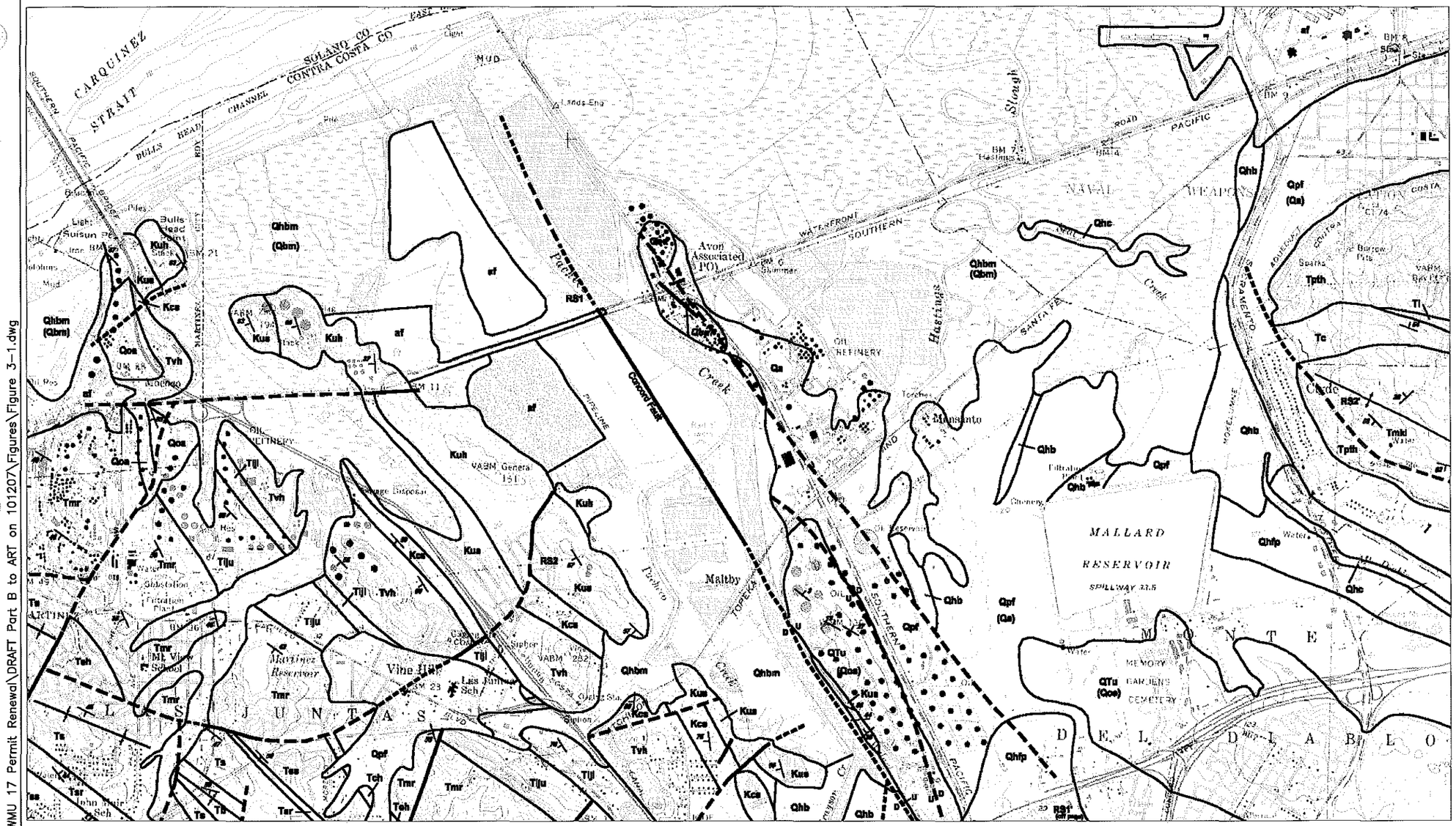

Legend

af	Artificial fill (Holocene, historic)
alf	Artificial levee fill (Holocene, historic)
Qhc	Stream channel deposits (Holocene)
Qhfp	Floodplain deposits (Holocene)
Qhb	Basin deposits (Holocene)
Qhbm	Bay mud deposits (Holocene)
Qpf	Alluvial fan deposits (late Pleistocene)
Qoa	Alluvium (late and early Pleistocene)
QTu	Sandstone, siltstone, and gravel (early Pleistocene and late Pliocene)
Tpth	Tehama Formation (Pliocene)
Tl	Lawlor Tuff (Pliocene)
Tc	Claiborne Sandstone (late Miocene)
Tbr	Briones Sandstone (late and middle Miocene)
Ts	Sobrante Sandstone (early Miocene)
Tsr	San Ramon Sandstone (early Miocene and (or) Oligocene)
Tes	Escobar Sandstone of Weaver (1953) (Eocene)
Teh	Basal shale member
Tmki	Markley Sandstone, lower member (Eocene)
Tmr	Muir Sandstone of Weaver (1953) (Eocene)
Tlju	Las Juntas Shale of Weaver (1953), upper member (Eocene and Paleocene)
Tlji	Las Juntas Shale of Weaver (1953), lower member (Eocene and Paleocene)
Tvh	Vine Hill Sandstone of Weaver (1953) (Paleocene)
Kcs	Massive sandstone (Late Cretaceous)
Kus	Sandstone, siltstone, and shale (Late Cretaceous)
Kuh	Massive sandstone (Late Cretaceous)
(Qoa)	Older Alluvium (as defined by WCC 1988)
(Qa)	Alluvium (as defined by WCC 1988)
(Qbm)	Bay Mud (as defined by WCC 1988)
	CONTACT Depositional contact
	FAULT Dashed where approximately located, short dashed where inferred, dotted where concealed, (U, upthrown side; D, downthrown side)
	ANTICLINE Shows fold axis
	SYNCLINE Shows fold axis
	STRIKE AND DIP OF BEDDING

0 500 1000 2000 Feet

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Basemap:

Vine Hill USGS 7.5 minute quadrangle map.

Reference:
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Figure 5-6: Regional Geologic Map (Earth Tech, 2005)

URS	Golden Eagle Refinery Martinez, CA 26816011	**Regional Geologic Map**	Figure **3-1**

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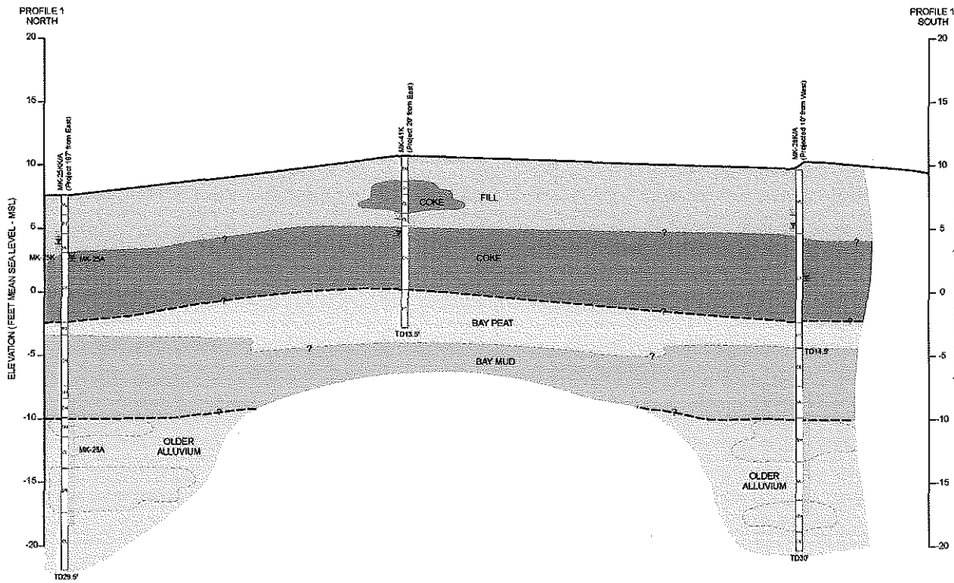
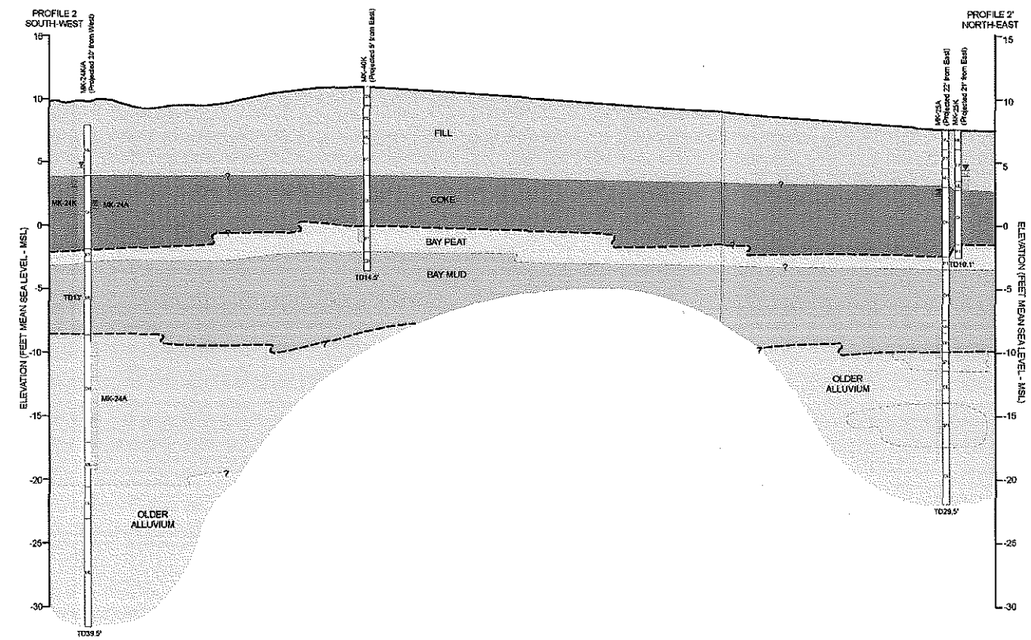
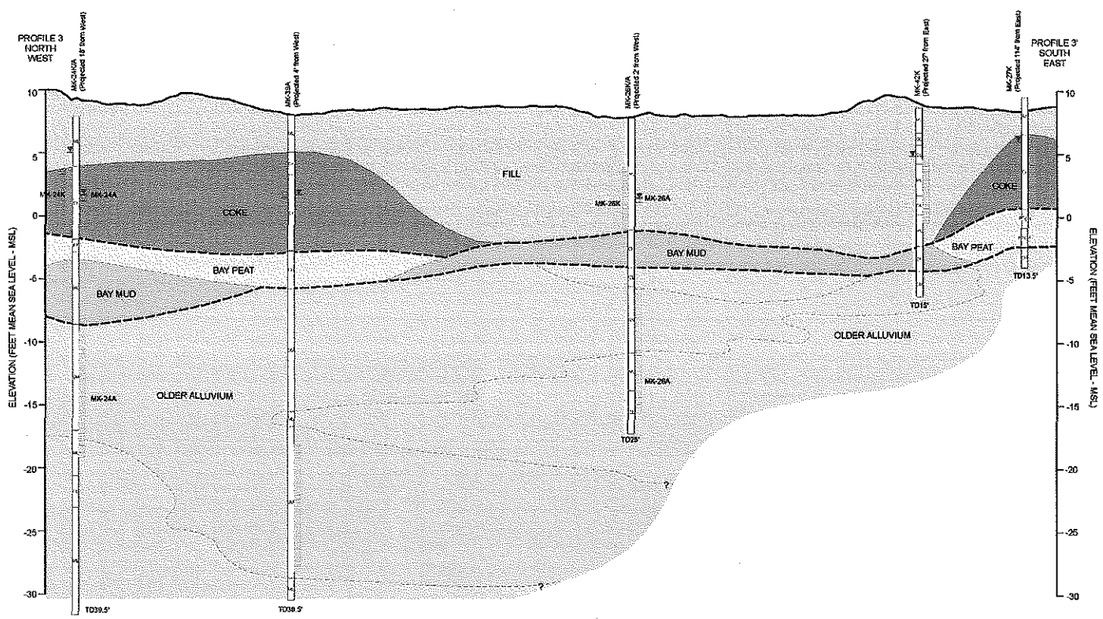
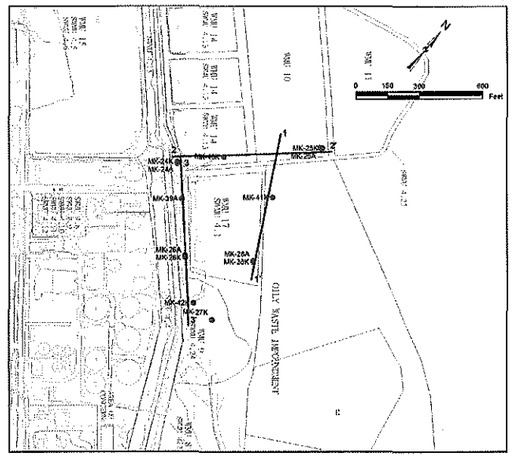








LEGEND

- FILL
- COKE
- BAY PEAT — BAY SEDIMENT
- BAY MUD/CLAY AND SILT WITH ORGANICS — BAY SEDIMENT
- FINE ALLUVIUM — OLDER ALLUVIUM
- MEDIUM ALLUVIUM — OLDER ALLUVIUM
- MK-24A (Projected 18' from West) — WELL / BORING IDENTIFICATION
- WELL DISTANCE FROM CROSS SECTION
- WELL SCREEN
- USCS CLASSIFICATION
- TD29' — TOTAL DEPTH
- WINTER/SPRING (MARCH) 2007 GROUNDWATER ELEVATION - FEET MEAN SEA LEVEL
- SUMMER/FALL (SEPTEMBER) 2007 GROUNDWATER ELEVATION - FEET MEAN SEA LEVEL
- STRATIGRAPHIC BOUNDARY
- LITHOLOGIC BOUNDARY

0 25 50 100 Feet
HORIZONTAL SCALE

0 2.5 5 10 Feet
VERTICAL SCALE

ABBREVIATIONS

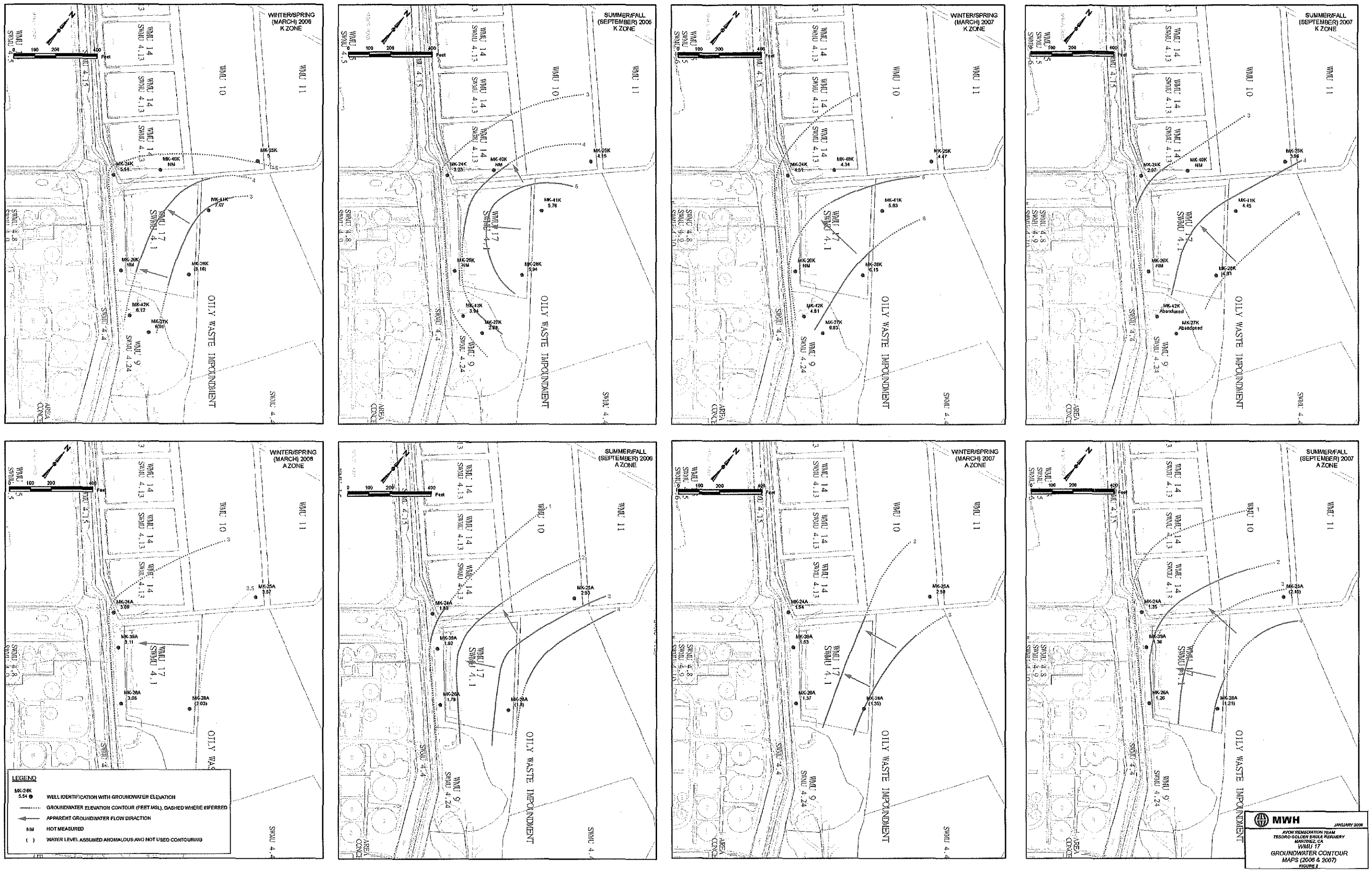
TD	TOTAL DEPTH
MSL	MEAN SEA LEVEL
USCS	UNIFIED SOIL CLASSIFICATION SYSTEM
AC	ASPHALT CONCRETE
GC	CLAYEY GRAVELS
SM	SILTY SANDS
ML	INORGANICS SILTS
CL	INORGANICS LEAN CLAYS
OL	ORGANIC SILTS
CH	INORGANIC FAT CLAYS
OH	ORGANIC CLAYS
CK	COKE

REFERENCE

CROSS SECTION 3-3' REFERENCED FROM: POST CLOSURE PERMIT APPLICATION FOR WASTE MANAGEMENT UNIT 17 FIGURE 3-3: GEOLOGIC CROSS SECTION OF WMU17 AREA, (URS, NOV 2007)

MWH — JANUARY 2009
AVON REMEDIATION TEAM
TESORO GOLDEN EAGLE REFINERY
MARTINEZ, CA
WMU 17
GEOLOGIC CROSS-SECTIONS
FIGURE 1

URS	Golden Eagle Refinery Martinez, CA 26816011	GEOLOGIC CROSS SECTION FOR WMU 17	Figure 3-2



URS	Golden Eagle Refinery Martinez, CA 26816011	**GROUNDWATER CONTOUR MAPS FOR WMU 17 2006-2007**	**Figure 3-3**

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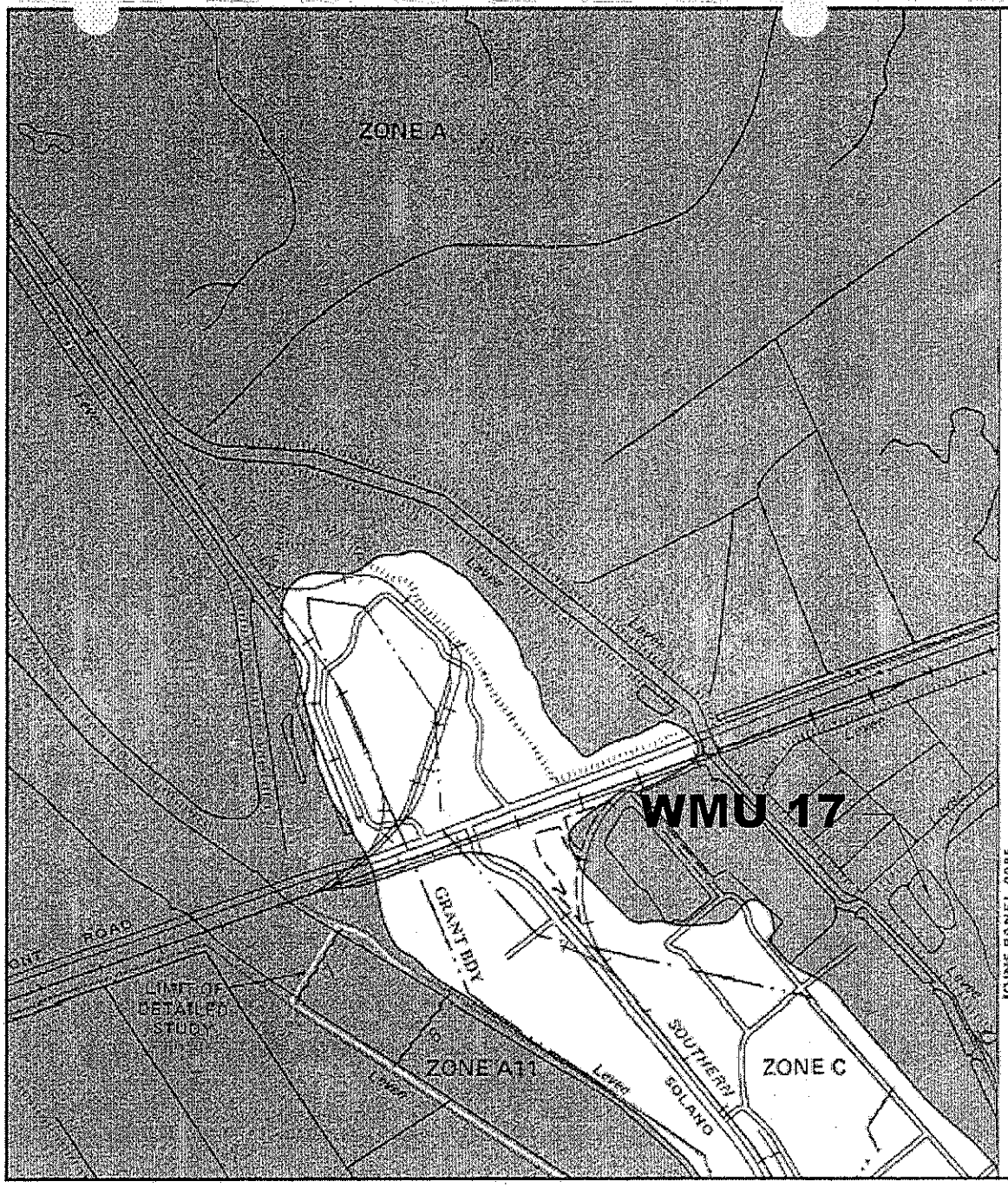

APPROXIMATE SCALE IN FEET

1000 0 1000

Designates 100 year flood zone

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CONTRA COSTA
COUNTY,
CALIFORNIA
(UNINCORPORATED AREAS)

PANEL 90 OF 625

SEE MAP INDEX FOR PANELS NOT PRINTED

COMMUNITY-PANEL NUMBER
0600250090 C

MAP REVISED:
SEPTEMBER 7, 2001

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

URS	Golden Eagle Refinery Martinez, CA 26816011	**FEMA FLOOD INSURANCE RATE MAP**	Figure **3-4**

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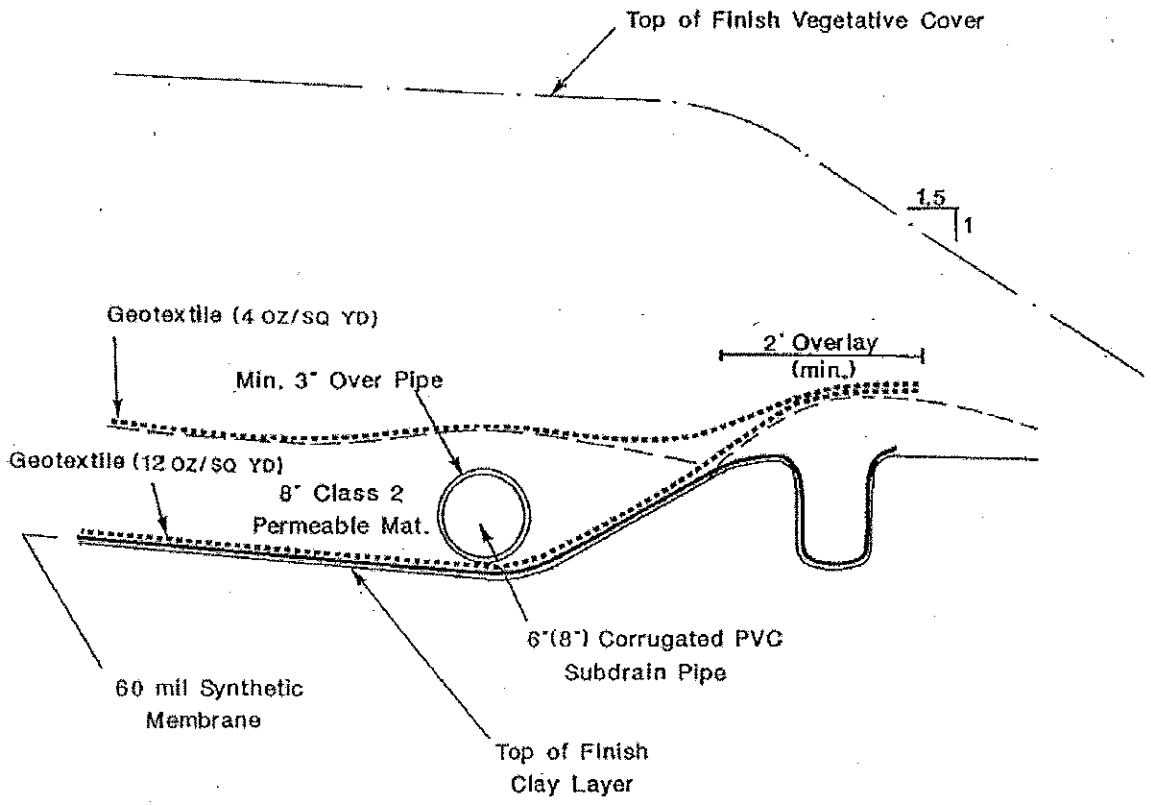
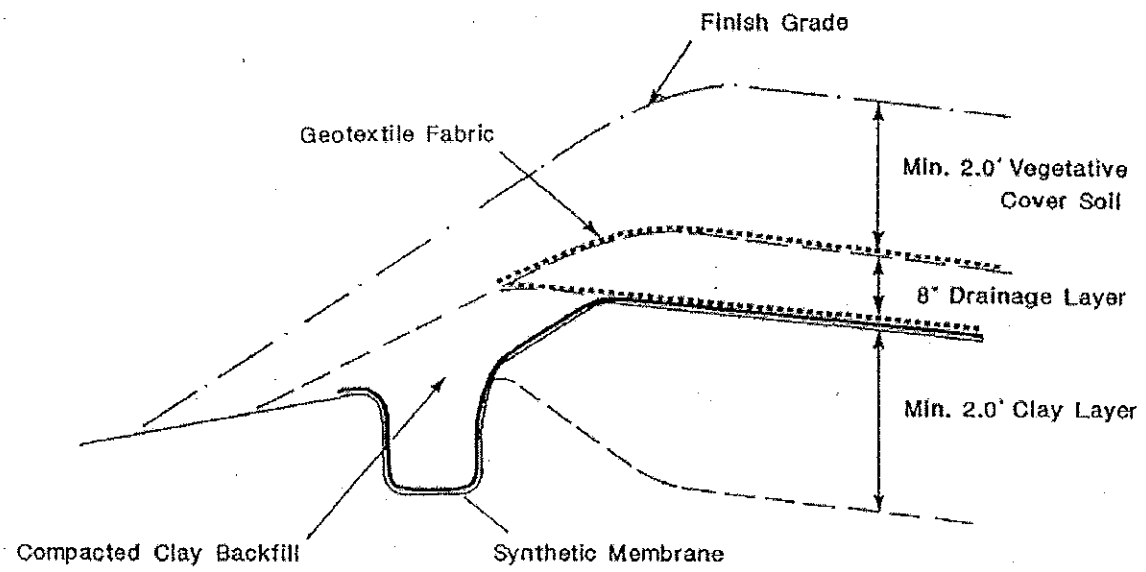


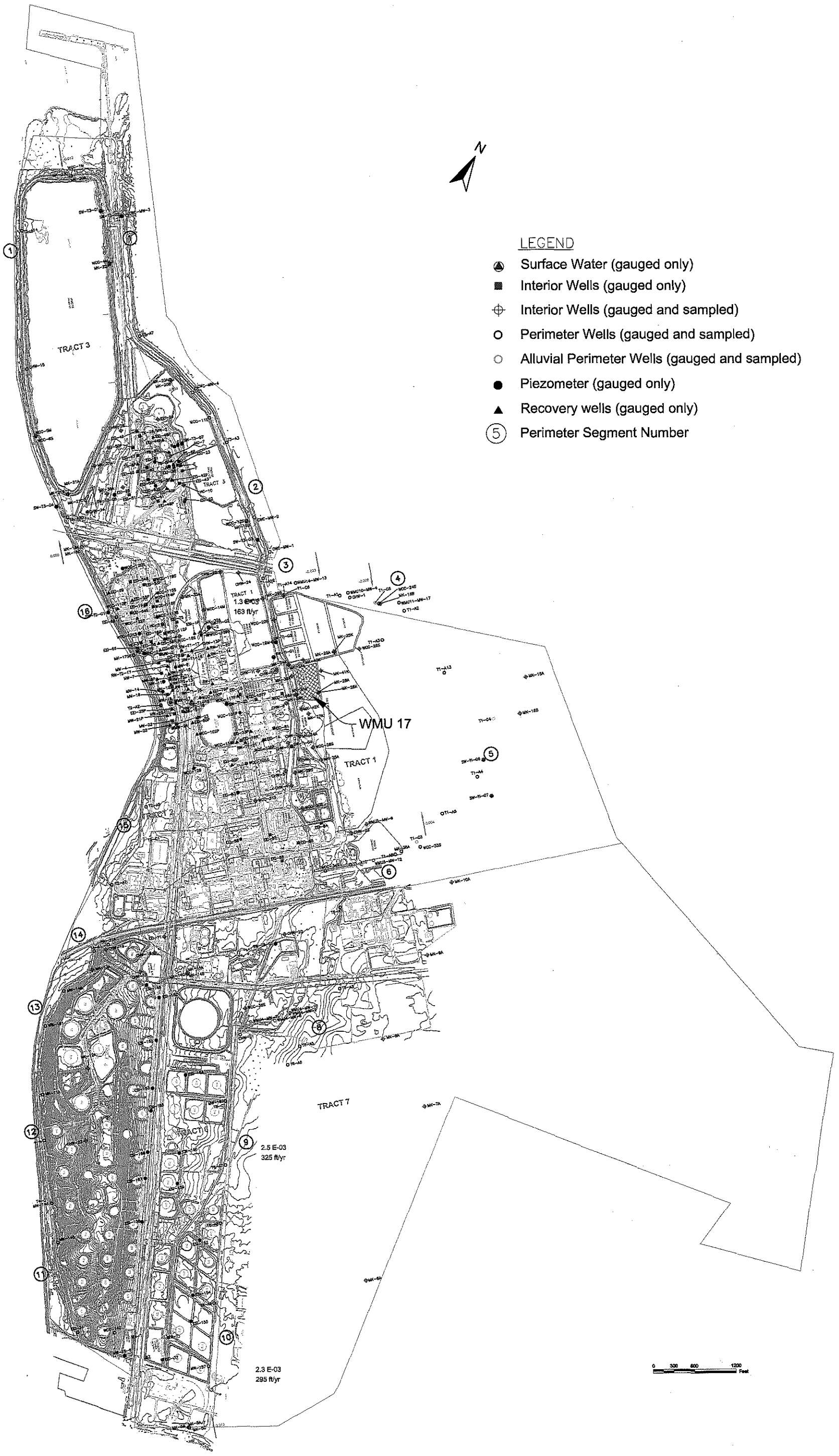
Source:
Report of Closure Installation Oily Waste Impoundments, Drawing No. 12, The Mark Group, September 28, 1988

URS	Golden Eagle Refinery Martinez, CA 26816011	WMU 17 Sub Drain and Synthetic Membrane Support Detail	Figure 4-1



Source:
Report of Closure Installation Oily Waste Impoundments, Drawing No. 13, The Mark Group, September 28, 1988

URS	Golden Eagle Refinery Martinez, CA 26816011	WMU 17 Sub Drain and Synthetic Membrane Support Detail 1	Figure 4-2



Reference:
Well Location Map
March 2007, Winter/Spring 2007 SMP, ATC

URS

Golden Eagle Refinery
Martinez, CA

26816011

Well Location Map

Figure
6-1

Nov 07, 2007 – 1:23pm
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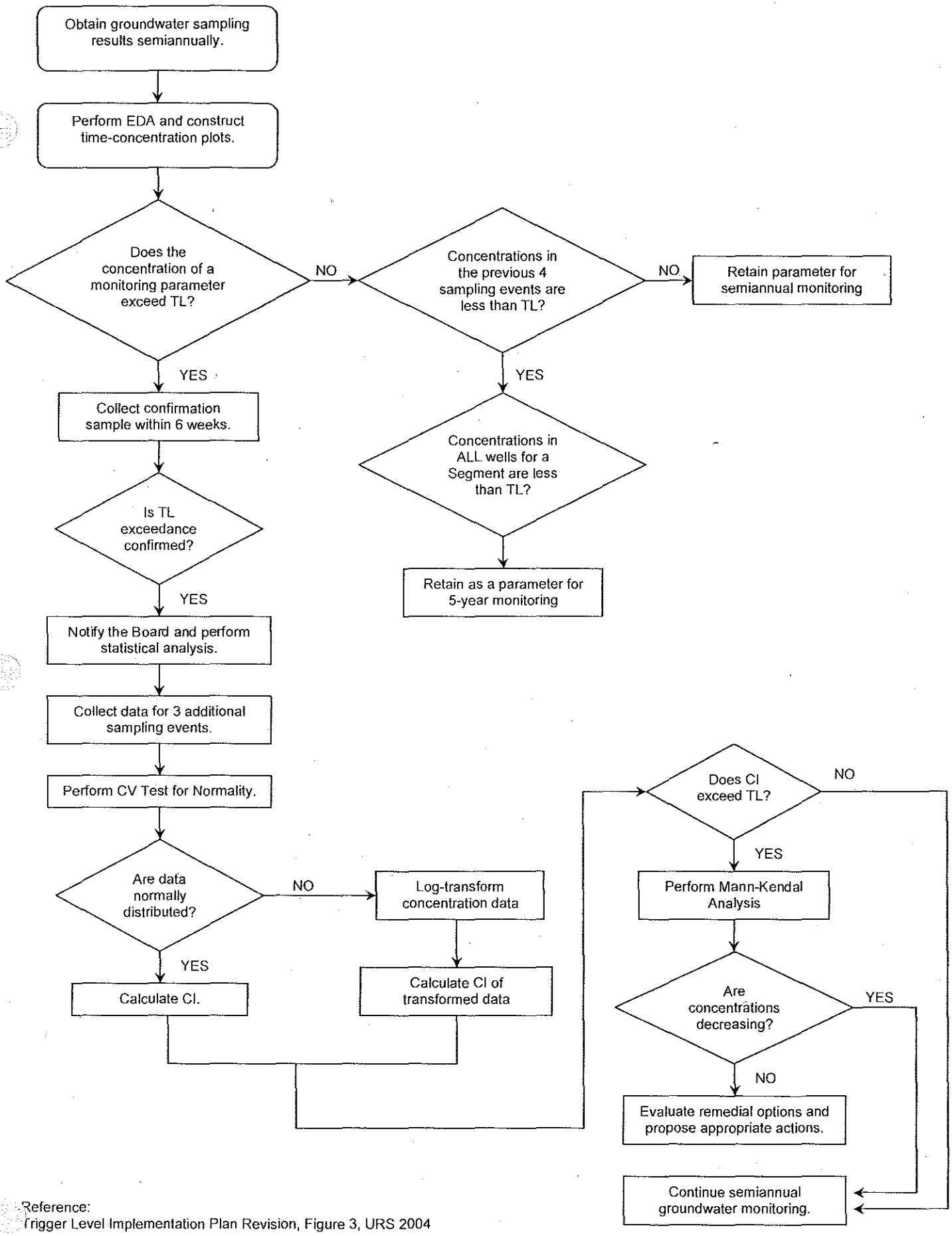
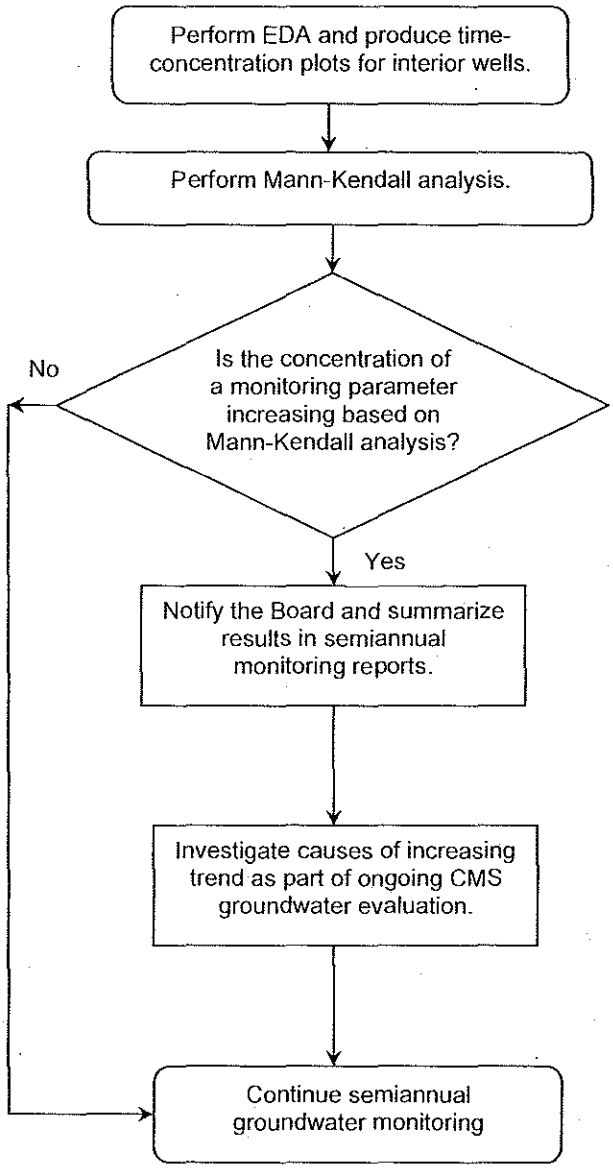


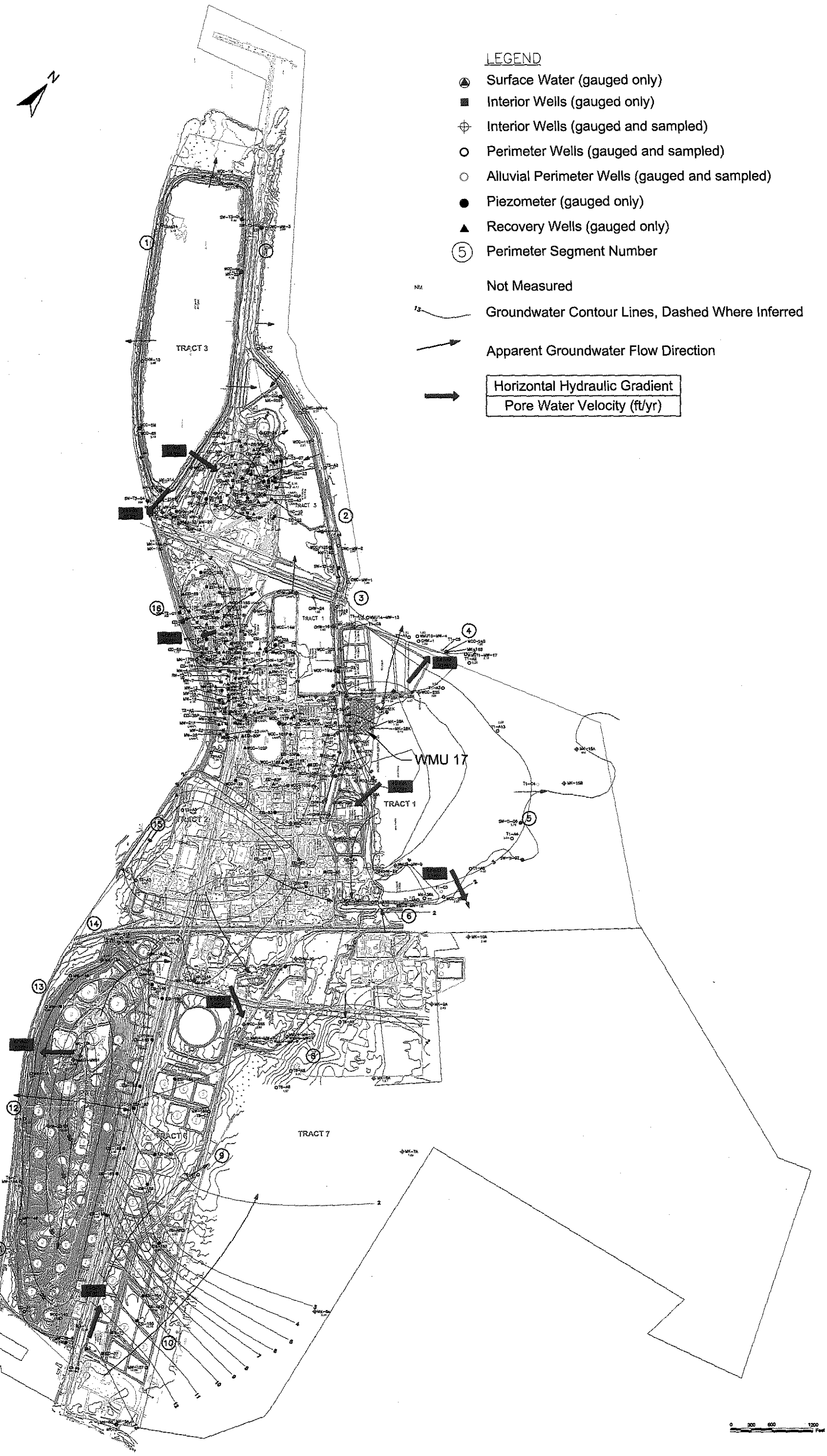
Reference:
Trigger Level Implementation Plan Revision, Figure 3, URS 2004

URS	Golden Eagle Refinery Martinez, CA 26816011	Criteria for Additional Investigation at PGMP Wells	Figure 6-2



Reference:
Trigger Level Implementation Plan Revision, Figure 4, URS 2004

URS	Golden Eagle Refinery Martinez, CA	Criteria for Additional Investigation at Interior Wells	Figure 6-3
	26816011		



Reference:
Groundwater Contour Map, Shallow Zone
March 2007, Winter/Spring 2007 SMP, ATC

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Groundwater Contour Map Shallow Zone, March 2007

Figure 6-4

Nov 07, 2007 – 1:32pm
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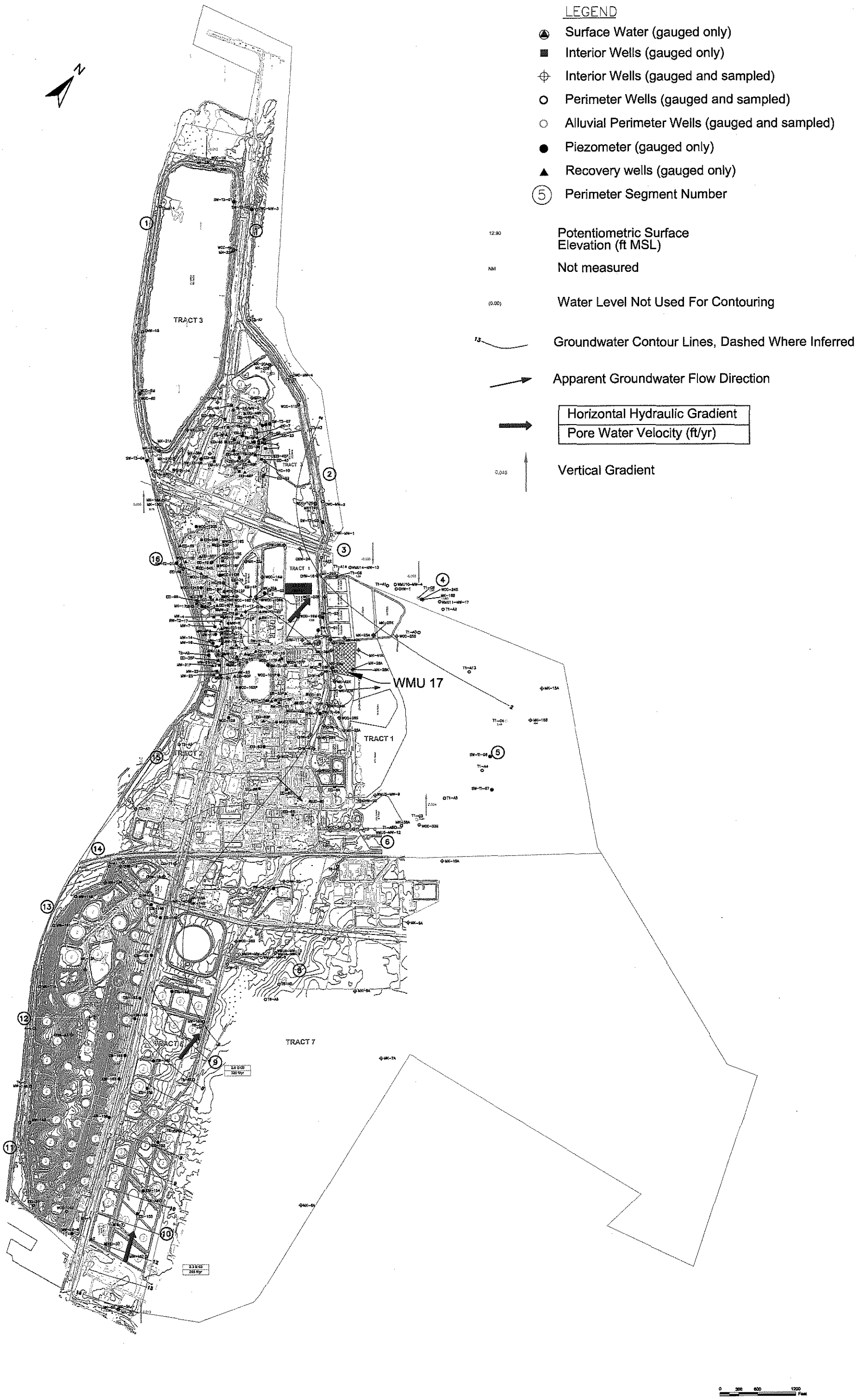

Reference:
Groundwater Level Contour Map Alluvial Zone, March 2007, Winter/Spring 2007 SMP, ATC

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Groundwater Contour Map Alluvial Zone, March 2007

Figure 6-5

Nov 07, 2007 – 1:30pm Z:\x_env_waste\JEIRC Work\PROJECTS\WMU 17 Permit Renewal\DRAFT Part B to ART on 101207\Figures\Figure 6-5.dwg