VALERO

Benicia Refinery • Valero Refining Company - California
3400 East Second Street • Benicia, California 94510-1097 • Telephone (707) 745-7011 • Facsimile (707) 745-7432

February 1, 2012

Crude by Rail Project
Response to ESA Data Request No. 1
Valero Refining Company – CA,
Benicia Refinery: Facility B2626

Mr. Tim Morgan
Project Manager
ESA Energy
1425 N. McDowell Boulevard, Suite 200
Petaluma, CA 94954

Dear Mr. Morgan:

Enclosed please find Valero's response to ESA Data Request No. 1 for the Crude by Rail project at the Valero Benicia Refinery. We understand you have been designated by the City of Benicia to request project information and to review project details on the City's behalf that will enable the city to issue the required Land Use Permit.

Please contact me at 707-745-7203 if you have any questions or need additional information.

Sincerely,

Susan K Gustofson

Susan K. Gustofson, P.E.
Staff Environmental Engineer

SKG/tac

Enclosures

cc: w/enclosures
Mr. Charlie Knox, City of Benicia

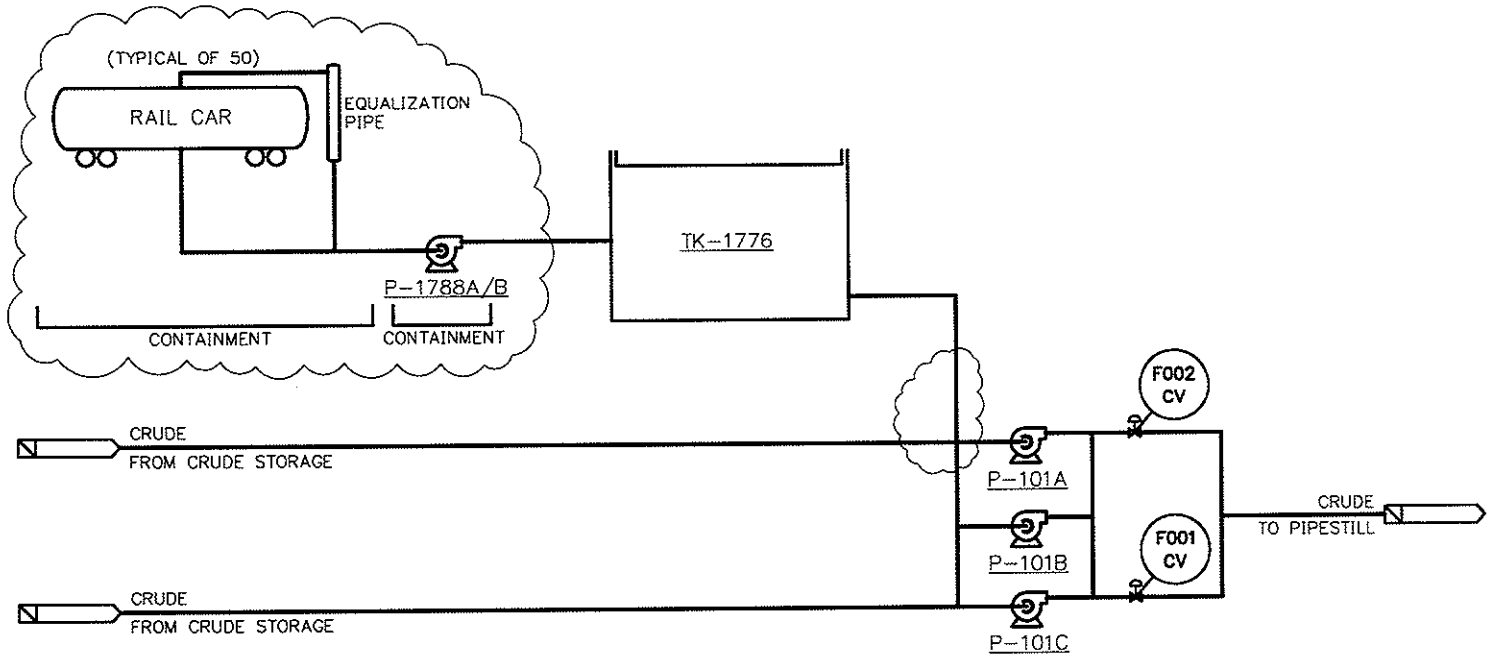
Document # 23601

Valero Crude by Rail Project
Data Request 1
Attachments

Attachment	***Response No.***	***Description***
1	*5*	*Crude by Rail Project PFD 132-FD-1-3588093(P),Rev. C ,*
2	*26*	*NPDES Report, Nov. 2012*
3	*29*	*Safety in Design Review Checklist*
4	*30*	*Storm Water Pollution Prevention Plan (SWPPP), Revised 7/2011*
5	*30*	*Annual Stormwater Report (2011/2012)*
6	*31*	*Drawing entitled 'Groundwater Monitoring & Containment Berms', 32-000-04D-89415 Rev B dated 1/21/2013*
7	*31*	*Drawing entitled 'The Wye Connector' dated 1/30/2013*
8	*32*	*3Q-2012 Groundwater Report*
9	*33*	*Groundwater Monitoring Plan, with Appendix A , Revised 2010*

TK-1776
CRUDE STORAGE TANK
SIZE: 128' I.D. x 48'-0" HT
CAPACITY: 101,400 BBL

NOTE:
CLOUDED ITEMS DESIGNATE PROPOSED CHANGES.



P-1788A/B
RAIL UNLOADING PUMPS
CAPACITY: 3062 GPM

P-101A
CRUDE FEED PUMP

P-101B
SPARE CRUDE FEED PUMP

P-101C
CRUDE FEED PUMP

REV	DATE	DESCRIPTION
C	1-31-13	GENERAL REVISION
B	12-28-12	GENERAL REVISION
A	12-10-12	CRUDE BY RAIL

VALERO REFINING COMPANY-CALIFORNIA
BENICIA REFINERY

DRAWING TITLE
CRUDE BY RAIL
PROCESS FLOW DIAGRAM
PROCESS FLOW / MATERIAL SELECTION DIAGRAM

UNIT 35

SCALE: NONE
DATE: 12/19/07

DRAWING NO.: 132-FD-1-3588093 (P)
REVISION: C

VALERO

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3400 East Second Street • Benicia, California 94510-1097 • Telephone (707) 745-7011 • Facsimile (707) 745-7432

Certified Mail # 7011 1150 0001 6525 5150

December 20, 2012

Monitoring Report for November 2012
NPDES No. CA0005550

Attn: NPDES Wastewater Division
San Francisco Bay Region
California Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, California 94612

Dear Sir or Madam:

The Valero Benicia Refinery submits the prior month's Self Monitoring Report as required by Regional Board Order R2-2009-0079, Attachment E, Section VIII.B. Monitoring data for permitted outfalls are submitted both by hard copy and electronically via the Internet to eSMR, the State Board electronic reporting system.

Please contact Ms. Sky Bellanca at 707-745-7749 if you have any questions regarding this report.

I certify under penalty of law that this document and all attachments are prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed 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.

Sincerely,

Christopher W. Howe, Director
Health, Safety, Environment
& Government Affairs

CWH/KSB/Dlh

Enclosures

Document # 22617

Valero Refining Company - California, Benicia November 2012 Violations EFF-001

Parameter	Type	Limit	Date	Value
Mercury, Total Eff Annual Loading kg/year	Max	0.08	11/30/2012	0.1003

Approved: _____

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Valero Refining Company - California, Benicia November 2012 EFF-001

Day	Daily Minimum Eff Flow MGD NA	Daily Maximum Eff Flow MGD NA	Daily Average Eff Flow MGD NA	Weekly Total Eff Flow MGM NA	Monthly Total Eff Flow MGM NA	Monthly Average Eff Flow MGD NA	<	Daily Maximum Eff BOD mg/L NA	<	Daily Loading Eff BOD lb/day Max 4200	<	Monthly Average Eff BOD mg/L NA	<	Monthly Average Eff BOD lb/day Max 2300	<	Daily Maximum Eff COD mg/L NA	<	Daily Maximum Eff COD lb/day Max 31000	<
01	1.89	2.37	2.16																
02	1.95	2.38	2.14																
03	1.71	2.37	2.12	14.86															
04	1.68	2.52	2.05																
05	1.75	2.55	2.15																
06	1.16	2.2	1.83					ND		5 ND		76.3						58	885.2
07	1.29	2.3	1.85																
08	1.78	2.49	2.2																
09	1.65	2.57	2.22																
10	1.6	2.25	1.87	14.17															
11	1.56	2.38	1.97																
12	1.58	2.37	2																
13	1.36	2.2	1.64																
14	1.37	2.2	1.8																
15	1.36	2.23	1.63																
16	1.41	2.27	1.8																
17	1.72	2.34	2.12	12.96															
18	1.42	2.35	2																
19	1.38	1.98	1.6																
20	1.35	2.06	1.62																
21	1.77	2.41	2.29																
22	1.57	2.36	1.9																
23	1.71	2.45	1.91																
24	1.77	2.42	2.12	13.44															
25	1.64	2.43	1.89																
26	1.95	2.42	2.14																
27	1.22	2.42	2.02																
28	1.8	2.35	2.15																
29	1.71	2.36	2.11																
30	2.26	2.41	2.38		59.68	1.99						ND		5 ND		76.3			
Min	1.16	1.98	1.6	12.96	59.68	1.99	ND	5	ND	76.3	ND	5	ND	76.3		58		885.2	
Max	2.26	2.57	2.38	14.86	59.68	1.99	ND	5	ND	76.3	ND	5	ND	76.3		58		885.2	
Avg	1.61	2.35	1.99	13.86	59.68	1.99	ND	5	ND	76.3	ND	5	ND	76.3		58		885.2	

Approved: _____

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Day	Monthly Average Eff COD mg/L NA	<	Monthly Average Eff COD lb/day Max 16000	<	Daily Maximum Eff TSS mg/L NA	Daily Loading Eff TSS lb/day Max 2900	<	Daily Loading Eff TSS kg/day Max 800	<	Monthly Average Eff TSS mg/L NA	<	Monthly Average Eff TSS kg/day Max 1900	<	Daily Maximum Eff O&G mg/L Max 15	<	Daily Maximum Eff O&G lb/day Max 1300	<	Daily Maximum Eff O&G kg/day NA	<	Monthly Average Eff O&G mg/L Max 8
01																				
02																				
03																				
04																				
05																				
06					8.5	129.73		59				ND		1.4	ND	21.37	ND	9.71		
07																				
08																				
09																				
10																				
11																				
12																				
13					4.2	57.45		26.1				ND		1.4	ND	19.15	ND	8.7		
14																				
15																				
16																				
17																				
18					2.5	41.7		19				ND		1.4	ND	23.35	ND	10.61		
19																				
20																				
21																				
22																				
23																				
24																				
25																				
26																				
27																				
28				<	2	35.86	<	16.3				ND		1.4	ND	25.1	ND	11.41		
29																				
30	58		885.2						<	4.3	<	30.1						ND		1.4
Min	58		885.2	<	2	35.86	<	16.3	<	4.3	<	30.1	ND	1.4	ND	19.15	ND	8.7	ND	1.4
Max	58		885.2		8.5	129.73		59	<	4.3	<	30.1	ND	1.4	ND	25.1	ND	11.41	ND	1.4
Avg	58		885.2	<	4.3	66.18	<	30.1	<	4.3	<	30.1	ND	1.4	ND	22.24	ND	10.11	ND	1.4

Approved: _____

Day	<	Monthly Average Eff O&G lb/day Max 670	<	Monthly Average Eff O&G kg/day NA	<	Daily Maximum Eff Sulfide, Total mg/L NA	<	Daily Maximum Eff Sulfide, Total lb/day Max 28	<	Monthly Average Eff Sulfide, Total lb/day Max 12	Daily Minimum Eff pH SU Min 6	Daily Maximum Eff pH SU Max 9	Daily Maximum Eff Temp Degrees C NA	<	Daily Maximum Eff NH3 mg/L Max 20	Daily Maximum Eff NH3 lb/day Max 2800	<	Daily Maximum Eff NH3 kg/day NA	<
01											7.49	7.87	34.3						
02											7.58	7.85	33.7						
03											7.55	7.82	34.1						
04											7.45	7.86	34.8						
05											7.25	7.83	35.3						
06						ND		0.01 ND		0.15	7.49	7.82	35.3		0.36	5.494392		2.5	
07											7.35	7.86	35.2						
08											7.37	7.83	34.7						
09											6.94	7.86	30.8						
10											7.66	7.95	33.2						
11											7.68	8	35						
12											7.63	7.99	34.4						
13											7.8	8.01	35.4						
14											7.92	8	36						
15											7.89	7.98	35.6						
16											7.67	7.98	34.6						
17											7.75	7.97	33.5						
18											7.6	7.86	34.3						
19											7.67	7.85	36						
20											7.67	7.87	35.4						
21											7.68	7.94	34.3						
22											7.64	7.92	35.3						
23											7.26	7.94	35.5						
24											6.77	7.71	35.1						
25											7.57	7.86	35.7						
26											7.03	7.85	34.5						
27											7.42	7.92	34.1						
28											7.62	7.85	33.8						
29											7.34	7.79	33.3						
30	ND	22.24	ND	10.11					ND	0.15	7.56	7.78	33.4						
Min	ND	22.24	ND	10.11	ND	0.01	ND	0.15	ND	0.15	6.77	7.71	30.8		0.36	5.494392		2.5	
Max	ND	22.24	ND	10.11	ND	0.01	ND	0.15	ND	0.15	7.92	8.01	36		0.36	5.494392		2.5	
Avg	ND	22.24	ND	10.11	ND	0.01	ND	0.15	ND	0.15	7.5	7.9	34.55		0.36	5.49		2.5	

Approved: _____

Day	Monthly Average Eff NH3 mg/L Max 5.7	<	Monthly Average Eff NH3 kg/day NA 1300	<	Daily Maximum Eff ChronicTox TUc NA	11Samp Median Eff ChronicTox TUc Max 10	11Samp 90th% Eff ChronicTox TUc Max 20	Daily Minimum Eff Test1 Specie % survival NA	11Samp 90th% Eff Test1 Specie % survival Min 70	11Samp MovingMed Eff Test1 Specie % survival	<	Daily Maximum Eff Cr ug/L NA	<	Daily Loading Eff Cr lb/day Max 54	<	Monthly Average Eff Cr ug/L NA	<	Monthly Average Eff Cr lb/day Max 18
01																		
02																		
03																		
04																		
05								100	100	100								
06												1.6		0.02				
07																		
08																		
09																		
10																		
11																		
12								100	100	100								
13																		
14																		
15																		
16																		
17								100	100	100								
18																		
19																		
20																		
21																		
22																		
23																		
24																		
25																		
26								100	100	100								
27																		
28																		
29																		
30	0.36		2.71													1.6		0.02
Min	0.36		2.71					100	100	100		1.6		0.02		1.6		0.02
Max	0.36		2.71					100	100	100		1.6		0.02		1.6		0.02
Avg	0.36		2.71					100	100	100		1.6		0.02		1.6		0.02

Approved: _____

Day	Monthly Loading Eff Cr lbs NA	<	Daily Maximum Eff Cr6 ug/L NA	<	Daily Loading Eff Cr6 lb/day NA 3.5	<	Monthly Average Eff Cr6 ug/L Max	<	Monthly Average Eff Cr6 lb/day Max 1.5	<	Monthly Loading Eff Cr6 lbs Max	<	Daily Maximum Eff Cu ug/L Max 120	<	Monthly Average Eff Cu ug/L Max 70	<	Daily Maximum Eff Hg ug/L Max 0.12	<	Daily Loading Eff Hg kg/day NA	<
01																				
02																				
03																				
04																				
05																				
06		ND		0.9 ND		0.014								3.8				0.0184		0.0001
07																				
08																				
09																				
10																				
11																				
12																				
13																				
14																				
15																				
16																				
17																				
18																				
19																				
20																				
21																				
22																				
23																				
24																				
25																				
26																				
27																				
28																				
29																				
30		0.8				ND		0.9 ND		0.014 ND		0.45				3.8				
Min		0.8 ND		0.9 ND		0.014 ND		0.9 ND		0.014 ND		0.45		3.8		3.8		0.0184		0.0001
Max		0.8 ND		0.9 ND		0.014 ND		0.9 ND		0.014 ND		0.45		3.8		3.8		0.0184		0.0001
Avg		0.8 ND		0.9 ND		0.014 ND		0.9 ND		0.014 ND		0.45		3.8		3.8		0.018		0.0001

Approved: _____

Day	Monthly Mass Emission Eff Hg kg/month NA	<	Monthly Average Eff Hg ug/L Max 0.079	<	Annual Loading Eff Hg kg/year Max 0.08	<	Daily Maximum Eff Se ug/L Max 50	Daily Loading Eff Se lb/day NA	<	Monthly Average Eff Se ug/L Max 43	<	Monthly Average Eff Se lb/day NA	<	Monthly Loading Eff Se lbs/month NA	<	Monthly Loading Eff Se kg/month Max	<	12Month Loading Eff Se kg/month Max 9.6	<	Daily Maximum Eff Zn ug/L Max 560
01																				
02																				
03																				
04																				
05																				
06							24	0.37												47
07																				
08																				
09																				
10																				
11																				
12																				
13							20	0.27												
14																				
15																				
16																				
17																				
18							17	0.28												
19																				
20																				
21																				
22																				
23																				
24																				
25																				
26																				
27																				
28							19	0.34												
29																				
30	0.00389		0.018		0.1003					20		0.32		9.955		4.5248		4.902		
Min	0.00389		0.018		0.1003		17	0.27		20		0.32		9.955		4.5248		4.902		47
Max	0.00389		0.018		0.1003		24	0.37		20		0.32		9.955		4.5248		4.902		47
Avg	0.00389		0.018		0.1003		20	0.32		20		0.32		9.955		4.5248		4.902		47

Approved: _____

Day	<	Monthly Average Eff Zn ug/L Max 240	<	Daily Maximum Eff CN ug/L Max 42	<	Monthly Average Eff CN ug/L Max 21	<	Daily Maximum Eff Al ug/L NA	<	Daily (acid-soluble) Eff Al ug/L NA	<	Daily Maximum Eff Phenols ug/L NA	<	Daily Maximum Eff Phenols lb/day Max 26	Monthly Loading Eff Phenols lb/day Max 12	<	Daily Maximum Eff TCDD-TEQ pg/L Max 0.28	<	Monthly Average Eff TCDD-TEQ pg/L Max 0.14	<
01																				
02																				
03																				
04																				
05																				
06				7.2				62		25		6.4		0.1						
07																				
08																				
09																				
10																				
11																				
12																				
13																				
14																				
15																				
16																				
17																				
18																				
19																				
20																				
21																				
22																				
23																				
24																				
25																				
26																				
27																				
28																				
29																				
30			47			7.2										0.1				
Min			47		7.2		7.2		62		25		6.4		0.1	0.1				
Max			47		7.2		7.2		62		25		6.4		0.1	0.1				
Avg			47		7.2		7.2		62		25		6.4		0.1	0.1				

Approved: _____

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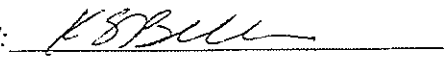
Day	Daily Maximum Eff Methyl Mercury ug/L NA
01	
02	
03	
04	
05	
06	0.00031
07	
08	
09	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
Min	0.00031
Max	0.00031
Avg	0.0003

Approved: 

Valero Refining Company - California, Benicia November 2012 EFF-002

Day	Daily Average Eff Flow MGD NA	<	Daily Maximum Eff TSS mg/L NA	<	Daily Maximum Eff TOC mg/L Max 110	<	Daily Maximum Eff O&G mg/L Max 15	Daily Minimum Eff pH SU Min 6.5	Daily Maximum Eff pH SU Max 8.5	<	Daily Maximum Eff Conduct umhos/cm NA	Daily Maximum Eff Color ADMI Color Max 1	Daily Maximum Eff Oil – Max 1
01	0.003												
02	0												
03	0												
04	0												
05	0												
06	0												
07	0												
08	0.003												
09	0.004												
10	0												
11	0												
12	0												
13	0												
14	0												
15	0												
16	0.004												
17	0.01				4.8 ND		1.4	7.89	7.89		1443		
18	0												
19	0												
20	0.007												
21	0.016												
22	0												
23	0												
24	0												
25	0												
26	0												
27	0												
28	0.011												
29	0.002												
30	0.033												
Min	0				4.8 ND		1.4	7.89	7.89		1443		
Max	0.033				4.8 ND		1.4	7.89	7.89		1443		
Avg	0				4.8 ND		1.4	7.9	7.9		1443		

Approved: _____

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Day	Daily Average Eff Flow MGD NA	<	Daily Maximum Eff TSS mg/L NA	<	Daily Maximum Eff TOC mg/L Max 110	<	Daily Maximum Eff O&G mg/L Max 15	Daily Minimum Eff pH SU Min 6.5	Daily Maximum Eff pH SU Max 8.5	<	Daily Maximum Eff Conduct umhos/cm NA	Daily Maximum Eff Color ADMI Color Max 1	Daily Maximum Eff Oil – Max 1
01	0.03												
02	0												
03	0												
04	0												
05	0												
06	0												
07	0												
08	0.033												
09	0.036												
10	0												
11	0												
12	0												
13	0												
14	0												
15	0												
16	0.042												
17	0.1												
18	0												
19	0												
20	0.07												
21	0.17												
22	0												
23	0												
24	0												
25	0.003												
26	0.003												
27	0.003												
28	0.112												
29	0.021												
30	0.339												
Min	0												
Max	0.339												
Avg	0.03												

Approved: _____

Day	Daily Average Eff Flow MGD NA	<	Daily Maximum Eff TSS mg/L NA	<	Daily Maximum Eff TOC mg/L Max 110	<	Daily Maximum Eff O&G mg/L Max 15	Daily Minimum Eff pH SU Min 6.5	Daily Maximum Eff pH SU Max 8.5	<	Daily Maximum Eff Conduct umhos/cm NA	Daily Maximum Eff Color ADMI Color Max 1	Daily Maximum Eff Oil -- Max 1
01	0.001												
02	0												
03	0												
04	0												
05	0												
06	0												
07	0												
08	0.001												
09	0.001												
10	0												
11	0												
12	0												
13	0												
14	0												
15	0												
16	0.001												
17	0.003				5.6	ND	1.4	7.62	7.62		706		
18	0												
19	0												
20	0.002												
21	0.006												
22	0												
23	0												
24	0												
25	0												
26	0												
27	0												
28	0.004												
29	0.001												
30	0.012												
Min	0				5.6	ND	1.4	7.62	7.62		706		
Max	0.012				5.6	ND	1.4	7.62	7.62		706		
Avg	0				5.6	ND	1.4	7.6	7.6		706		

Approved: KSBell

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Day	Daily Average Eff Flow MGD NA	<	Daily Maximum Eff TSS mg/L NA	<	Daily Maximum Eff TOC mg/L Max 110	<	Daily Maximum Eff O&G mg/L Max 15	Daily Minimum Eff pH SU Min 6.5	Daily Maximum Eff pH SU Max 8.5	<	Daily Maximum Eff Conduct umhos/cm NA	Daily Maximum Eff Color ADMI Color Max 1	Daily Maximum Eff Oil -- Max 1
01	0.112												
02	0												
03	0												
04	0												
05	0												
06	0												
07	0												
08	0.123												
09	0.135												
10	0												
11	0												
12	0												
13	0												
14	0												
15	0												
16	0.157												
17	0.37												
18	0												
19	0												
20	0.258												
21	0.628												
22	0												
23	0												
24	0												
25	0.011												
26	0.011												
27	0.011												
28	0.415												
29	0.079												
30	1.257												
Min	0												
Max	1.257												
Avg	0.12												

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Day	Daily Average Eff Flow MGD NA	<	Daily Maximum Eff TSS mg/L NA	<	Daily Maximum Eff TOC mg/L Max 110	<	Daily Maximum Eff O&G mg/L Max 15	Daily Minimum Eff pH SU Min 6.5	Daily Maximum Eff pH SU Max 8.5	<	Daily Maximum Eff Conduct umhos/cm NA	Daily Maximum Eff Color ADMI Color Max 1	Daily Maximum Eff Oil -- Max 1
01	0.008												
02	0												
03	0												
04	0												
05	0												
06	0												
07	0												
08	0.008												
09	0.009												
10	0												
11	0												
12	0												
13	0												
14	0												
15	0												
16	0.011												
17	0.025												
18	0												
19	0												
20	0.018												
21	0.043												
22	0												
23	0												
24	0												
25	0.001												
26	0.001												
27	0.001												
28	0.029												
29	0.005												
30	0.086												
Min	0												
Max	0.086												
Avg	0.01												

Approved: _____

Day	Daily Average Eff Flow MGD NA	<	Daily Maximum Eff TSS mg/L NA	<	Daily Maximum Eff TOC mg/L Max 110	<	Daily Maximum Eff O&G mg/L Max 15	Daily Minimum Eff pH SU Min 6.5	Daily Maximum Eff pH SU Max 8.5	<	Daily Maximum Eff Conduct umhos/cm NA	Daily Maximum Eff Color ADMI Color Max 1	Daily Maximum Eff Oil — Max 1
01	0.001												
02	0												
03	0												
04	0												
05	0												
06	0												
07	0												
08	0.002												
09	0.002												
10	0												
11	0												
12	0												
13	0												
14	0												
15	0												
16	0.002												
17	0.005												
18	0												
19	0												
20	0.003												
21	0.008												
22	0												
23	0												
24	0												
25	0												
26	0												
27	0												
28	0.005												
29	0.001												
30	0.016												
Min	0												
Max	0.016												
Avg	0												

Approved: _____

Day	Daily Average Eff Flow MGD NA	<	Daily Maximum Eff TSS mg/L NA	<	Daily Maximum Eff TOC mg/L Max 110	<	Daily Maximum Eff O&G mg/L Max 15	Daily Minimum Eff pH SU Min 6.5	Daily Maximum Eff pH SU Max 8.5	<	Daily Maximum Eff Conduct umhos/cm NA	Daily Maximum Eff Color ADMI Color Max 1	Daily Maximum Eff Oil — Max 1
01	0.002												
02	0												
03	0												
04	0												
05	0												
06	0												
07	0												
08	0.002												
09	0.002												
10	0												
11	0												
12	0												
13	0												
14	0												
15	0												
16	0.003												
17	0.006												
18	0												
19	0												
20	0.004												
21	0.01												
22	0												
23	0												
24	0												
25	0												
26	0												
27	0												
28	0.007												
29	0.001												
30	0.021												
Min	0												
Max	0.021												
Avg	0												

Approved: _____

Valero Refining Company - Calif ·ia, Benicia November 2012 EFF-009

Day	Daily Average Eff Flow MGD NA	<	Daily Maximum Eff BOD mg/L Max 48	<	30Day Running Average Eff BOD mg/L Max 26	<	Daily Maximum Eff COD mg/L Max 360	<	30Day Running Average Eff COD mg/L Max 180	<	Daily Maximum Eff TSS mg/L NA 33	<	30Day Running Average Eff TSS mg/L NA 0	<	Daily Maximum Eff TOC mg/L Max 110	<	Daily Maximum Eff O&G mg/L Max 15	<	30Day Running Average Eff O&G mg/L MAx 8	Daily Minimum Eff pH SU Min 6.5
01	0.002																			
02	0																			
03	0																			
04	0																			
05	0																			
06	0																			
07	0																			
08	0.002																			
09	0.003																			
10	0																			
11	0																			
12	0																			
13	0																			
14	0																			
15	0																			
16	0.003																			
17	0.007																			
18	0																			
19	0																			
20	0.005																			
21	0.012 ND		5 ND		5 ND		13 ND		13		2.8		2.8		5.4 ND		1.4 ND		1.4	8.13
22	0																			
23	0																			
24	0																			
25	0																			
26	0																			
27	0																			
28	0.008																			
29	0.002																			
30	0.025																			
Min	0 ND		5 ND		5 ND		13 ND		13		2.8		2.8		5.4 ND		1.4 ND		1.4	8.13
Max	0.025 ND		5 ND		5 ND		13 ND		13		2.8		2.8		5.4 ND		1.4 ND		1.4	8.13
Avg	0 ND		5 ND		5 ND		13 ND		13		2.8		2.8		5.4 ND		1.4 ND		1.4	8.1

Approved: _____

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Day	Daily Maximum Eff pH SU Max 8.5	<	Daily Maximum Eff Conduct umhos/cm NA	Daily Maximum Eff Color ADMI Color Max 1	Daily Maximum Eff Oil — Max 1	<	Daily Maximum Eff Cr ug/L Max 600	<	30Day Running Average Eff Cr ug/L Max 210	<	Daily Maximum Eff Cr6 ug/L Max 62	<	30Day Running Average Eff Cr6 ug/L Max 28	<	Daily Maximum Eff Phenols ug/L Max 350	<	30Day Running Average Eff Phenols ug/L Max 170
01																	
02																	
03																	
04																	
05																	
06																	
07																	
08																	
09																	
10																	
11																	
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	
21	8.13		178				2.1		2.1 ND		0.9 ND		0.9 ND		2 ND		2
22																	
23																	
24																	
25																	
26																	
27																	
28																	
29																	
30																	
Min	8.13		178				2.1		2.1 ND		0.9 ND		0.9 ND		2 ND		2
Max	8.13		178				2.1		2.1 ND		0.9 ND		0.9 ND		2 ND		2
Avg	8.1		178				2.1		2.1 ND		0.9 ND		0.9 ND		2 ND		2

Approved: _____

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Day	Daily Average Eff Flow MGD NA	<	Daily Maximum Eff TSS mg/L NA	<	Daily Maximum Eff TOC mg/L Max 110	<	Daily Maximum Eff O&G mg/L Max 15	Daily Minimum Eff pH SU Min 6.5	Daily Maximum Eff pH SU Max 8.5	<	Daily Maximum Eff Conduct umhos/cm NA	Daily Maximum Eff Color ADMI Color Max 1	Daily Maximum Eff Oil -- Max 1
01	0.002												
02	0												
03	0												
04	0												
05	0												
06	0												
07	0												
08	0.002												
09	0.003												
10	0												
11	0												
12	0												
13	0												
14	0												
15	0												
16	0.003												
17	0.007												
18	0												
19	0												
20	0.005												
21	0.012				6.4 ND		1.4	7.52	7.52		300		
22	0												
23	0												
24	0												
25	0												
26	0												
27	0												
28	0.008												
29	0.002												
30	0.025												
Min	0				6.4 ND		1.4	7.52	7.52		300		
Max	0.025				6.4 ND		1.4	7.52	7.52		300		
Avg	0				6.4 ND		1.4	7.5	7.5		300		

Approved: _____

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Day	Daily Average Eff Flow MGD NA	<	Daily Maximum Eff TSS mg/L NA	<	Daily Maximum Eff TOC mg/L Max 110	<	Daily Maximum Eff O&G mg/L Max 15	Daily Minimum Eff pH SU Min 6.5	Daily Maximum Eff pH SU Max 8.5	<	Daily Maximum Eff Conduct umhos/cm NA	Daily Maximum Eff Color ADMI Color Max 1	Daily Maximum Eff Oil – Max 1
01	0.001												
02	0												
03	0												
04	0												
05	0												
06	0												
07	0												
08	0.001												
09	0.001												
10	0												
11	0												
12	0												
13	0												
14	0												
15	0												
16	0.001												
17	0.003												
18	0												
19	0												
20	0.002												
21	0.005				6.8 ND		1.4	7.52	7.52		44		
22	0												
23	0												
24	0												
25	0												
26	0												
27	0												
28	0.003												
29	0.001												
30	0.009												
Min	0				6.8 ND		1.4	7.52	7.52		44		
Max	0.009				6.8 ND		1.4	7.52	7.52		44		
Avg	0				6.8 ND		1.4	7.5	7.5		44		

Approved: KSBell

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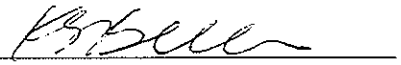
Day	Daily Average Eff Flow MGD NA	<	Daily Maximum Eff TSS mg/L NA	<	Daily Maximum Eff TOC mg/L Max 110	<	Daily Maximum Eff O&G mg/L Max 15	Daily Minimum Eff pH SU Min 6.5	Daily Maximum Eff pH SU Max 8.5	<	Daily Maximum Eff Conduct umhos/cm NA	Daily Maximum Eff Color ADMI Color Max 1	Daily Maximum Eff Oil -- Max 1
01	0.002												
02	0												
03	0												
04	0												
05	0												
06	0												
07	0												
08	0.002												
09	0.002												
10	0												
11	0												
12	0												
13	0												
14	0												
15	0												
16	0.002												
17	0.006												
18	0												
19	0												
20	0.004												
21	0.009				7.2	ND	1.4	7.17	7.17		54		
22	0												
23	0												
24	0												
25	0												
26	0												
27	0												
28	0.006												
29	0.001												
30	0.019												
Min	0				7.2	ND	1.4	7.17	7.17		54		
Max	0.019				7.2	ND	1.4	7.17	7.17		54		
Avg	0				7.2	ND	1.4	7.2	7.2		54		

Approved: _____

Day	Daily Average Eff Flow MGD NA	<	Daily Maximum Eff TSS mg/L NA	<	Daily Maximum Eff TOC mg/L Max 110	<	Daily Maximum Eff O&G mg/L Max 15	Daily Minimum Eff pH SU Min 6.5	Daily Maximum Eff pH SU Max 8.5	<	Daily Maximum Eff Conduct umhos/cm NA	Daily Maximum Eff Color ADMI Color Max 1	Daily Maximum Eff Oil -- Max 1
01	0.003												
02	0												
03	0												
04	0												
05	0												
06	0												
07	0												
08	0.003												
09	0.003												
10	0												
11	0												
12	0												
13	0												
14	0												
15	0												
16	0.004												
17	0.009												
18	0												
19	0												
20	0.006												
21	0.015												
22	0												
23	0												
24	0												
25	0												
26	0												
27	0												
28	0.01												
29	0.002												
30	0.03				7 ND		1.4	7.26	7.26		75		
Min	0				7 ND		1.4	7.26	7.26		75		
Max	0.03				7 ND		1.4	7.26	7.26		75		
Avg	0				7 ND		1.4	7.3	7.3		75		

Approved: _____

Day	Daily Average Eff Flow MGD NA	<	Daily Maximum Eff TSS mg/L NA	<	Daily Maximum Eff TOC mg/L Max 110	<	Daily Maximum Eff O&G mg/L Max 15	Daily Minimum Eff pH SU Min 6.5	Daily Maximum Eff pH SU Max 8.5	<	Daily Maximum Eff Conduct umhos/cm NA	Daily Maximum Eff Color ADMI Color Max 1	Daily Maximum Eff Oil -- Max 1
01	0.001												
02	0												
03	0												
04	0												
05	0												
06	0												
07	0												
08	0.001												
09	0.001												
10	0												
11	0												
12	0												
13	0												
14	0												
15	0												
16	0.001												
17	0.003												
18	0												
19	0												
20	0.002												
21	0.004				11	ND	1.4	7.38	7.38		57		
22	0												
23	0												
24	0												
25	0												
26	0												
27	0												
28	0.003												
29	0.001												
30	0.009												
Min	0				11	ND	1.4	7.38	7.38		57		
Max	0.009				11	ND	1.4	7.38	7.38		57		
Avg	0				11	ND	1.4	7.4	7.4		57		

Approved: 

Day	Daily Average Eff Flow MGD NA	<	Daily Maximum Eff TSS mg/L NA	<	Daily Maximum Eff TOC mg/L Max 110	<	Daily Maximum Eff O&G mg/L Max 15	Daily Minimum Eff pH SU Min 6.5	Daily Maximum Eff pH SU Max 8.5	<	Daily Maximum Eff Conduct umhos/cm NA	Daily Maximum Eff Color ADMI Color Max 1	Daily Maximum Eff Oil -- Max 1
01	0.001												
02	0												
03	0												
04	0												
05	0												
06	0												
07	0												
08	0.001												
09	0.001												
10	0												
11	0												
12	0												
13	0												
14	0												
15	0												
16	0.002												
17	0.004												
18	0												
19	0												
20	0.003												
21	0.006												
22	0												
23	0												
24	0												
25	0												
26	0												
27	0												
28	0.004												
29	0.001												
30	0.012				3 ND		1.4	8.22	8.22		279		
Min	0				3 ND		1.4	8.22	8.22		279		
Max	0.012				3 ND		1.4	8.22	8.22		279		
Avg	0				3 ND		1.4	8.2	8.2		279		

Approved: _____

Day	Daily Average Eff Flow MGD NA	<	Daily Maximum Eff TSS mg/L NA	<	Daily Maximum Eff TOC mg/L Max 110	<	Daily Maximum Eff O&G mg/L Max 15	Daily Minimum Eff pH SU Min 6.5	Daily Maximum Eff pH SU Max 8.5	<	Daily Maximum Eff Conduct umhos/cm NA	Daily Maximum Eff Color ADMI Color Max 1	Daily Maximum Eff Oil -- Max 1
01	0												
02	0												
03	0												
04	0												
05	0												
06	0												
07	0												
08	0												
09	0												
10	0												
11	0												
12	0												
13	0												
14	0												
15	0												
16	0												
17	0.001												
18	0												
19	0												
20	0												
21	0.001												
22	0												
23	0												
24	0												
25	0												
26	0												
27	0												
28	0.001												
29	0												
30	0.002				3.2	ND		1.4	7.97	7.97	41		
Min	0				3.2	ND		1.4	7.97	7.97	41		
Max	0.002				3.2	ND		1.4	7.97	7.97	41		
Avg	0				3.2	ND		1.4	8	8	41		

Approved: _____

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Valero Refining Company - California, Benicia November 2012 EFF-017

Day	Daily Average Eff Flow MGD NA	<	Daily Maximum Eff TSS mg/L NA	<	Daily Maximum Eff TOC mg/L Max 110	<	Daily Maximum Eff O&G mg/L Max 15	Daily Minimum Eff pH SU Min 6.5	Daily Maximum Eff pH SU Max 8.5	<	Daily Maximum Eff Conduct umhos/cm NA	Daily Maximum Eff Color ADMI Color Max 1	Daily Maximum Eff Oil -- Max 1
01	0												
02	0												
03	0												
04	0												
05	0												
06	0												
07	0												
08	0												
09	0												
10	0												
11	0												
12	0												
13	0												
14	0												
15	0												
16	0												
17	0.0588				11	ND		1.4	7.95	7.95		254	
18	0												
19	0												
20	0												
21	0.1176				5.15	ND		1.4	7.805	7.805		131	
22	0												
23	0												
24	0												
25	0												
26	0												
27	0												
28	0.3234				4.8	ND		1.4	7.78	7.78		102	
29	0												
30	0												
Min	0				4.8	ND		1.4	7.78	7.78		102	
Max	0.3234				11	ND		1.4	7.95	7.95		254	
Avg	0.02				6.98	ND		1.4	7.8	7.8		162.3	

Approved: _____

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BENICIA REFINERY
SAFETY IN DESIGN CHECKLIST

PROJECT TITLE: Crude by Rail **MOC #:** _____

PREPARED BY: S. J. Penny **DATE:** 12/03/12

		YES	NO	N/A
1.	**Physical Layout**			
a.	Has the layout and spacing of new equipment been shown on a plot plan?	☒	☐	☐
b.	Are all spacing standards met?	☒	☐	☐
c.	Are existing facilities (valves, equipment, safety facilities, etc.) clearly shown on design sketches to understand impact of new installation?	☒	☐	☐
d.	Have reused idle lines and equipment been inspected and are in good condition?	☐	☐	☒
e.	Has dismantling been evaluated and identified? **Firewater line, TK-1735 vapor recovery facilities, dike wall relocated and underground interferences relocated**	☒	☐	☐
f.	Is access for operation and maintenance, including instrumentation, adequate?	☒	☐	☐
g.	Have known underground and overhead obstructions been considered?	☒	☐	☐
h.	Have special access issues been addressed and platforms specified?	☒	☐	☐
2.	**Design of Construction**			
a.	Are design pressure and temperature consistent with existing facilities?	☒	☐	☐
b.	Are design pressure and temperature appropriate for all operating conditions?	☒	☐	☐
c.	Are specification breaks in line classifications properly identified on P&ID's?	☒	☐	☐
d.	Has the Refinery Metallurgist reviewed the materials of construction?	☒	☐	☐
e.	Are there changes to materials of construction from that of existing facilities? A Refinery Metallurgist signature is required on the MOC for all changes in materials of construction.	☐	☐	☒
f.	Has an Electrical Classification Form been included for new equipment?	☒	☐	☐
g.	Do utility connections conform to the APM?	☒	☐	☐
h.	Are dead legs eliminated?	☒	☐	☐
	Are hot taps and stopples limited to those for which no other options are viable?	☒	☐	☐
j.	Have design and operating conditions been shown on the drawings?	☒	☐	☐
k.	Have chain wheel operators been eliminated?	☒	☐	☐
l.	Has a senior engineer reviewed the design? Consult with Section Manager for senior engineer review requirements.	☒	☐	☐
3.	**Over Pressure Protection**			
a.	Are safety valves protecting the impacted system(s) provided or identified on P&ID's? List:	☐	☐	☒
b.	Have existing safety valves been evaluated and documented as adequate for any new operating conditions?	☐	☐	☒
c.	Is the blowdown and flare system adequate for the impact of the new facilities?	☐	☐	☒
d.	Have the CSO's required for interconnecting equipment been identified on P&ID's?	☐	☐	☒
e.	Has the use of CSO's been limited to where pressure will not exceed hydrotest?	☐	☐	☒
f.	Has the 2/3 rule been satisfied in new and reused heat exchangers or the 10/13 rule for heat exchangers hydrotested at 130% of MAWP?	☐	☐	☒
g.	Has pressure relief been provided for thermal expansion in blocked-in equipment?	☐	☐	☒
4.	**Safety Valve Piping Has Been Designed for:**			
a.	Inlet line delta P less than 3% of safety valve set pressure?	☐	☐	☒
b.	Built up backpressure less than 10% of safety valve set pressure?	☐	☐	☒
c.	Outlet line velocity less than 75% of sonic?	☐	☐	☒
d.	Inlet and outlet valves being identified as CSO on P&ID's?	☐	☐	☒
e.	Has flashing and auto-refrigeration across safety valves been addressed?	☐	☐	☒
f.	Has potential plugging (by catalyst, coke, heavy oils, CWMS, NH3 salts, etc.) of inlet and outlet lines and safety valves been addressed?	☐	☐	☒
g.	Are there NO bellows or pilot-operated safety valves or rupture disks?	☐	☐	☒
h.	Are there NO liquid traps in SV vapor lines?	☐	☐	☒

BENICIA REFINERY
SAFETY IN DESIGN CHECKLIST

PROJECT TITLE: Crude by Rail **MOC #:** _____

	YES	NO	N/A
5. Have Facilities Been Provided for the Various Operations of Equipment:			
a. Startup and shutdown?	☒	☐	☐
b. Clearing equipment with steam, water, or nitrogen?	☒	☐	☐
c. Emergencies; including local and plantwide utilities failure, fire, operating error?	☒	☐	☐
d. Do emergency shutdown, isolation, and flare meet applicable engineering standards (EGGS)?	☒	☐	☐
e. Prevent sending water or light hydrocarbons to hot (>200°F) tankage?	☐	☐	☒
f. Prevent sending hot (>180°F) streams to cold tankage?	☐	☐	☒
g. Vessel low level and potential blow-through of gases to tankage?	☐	☐	☒
h. Have temperature alarms placed to give warning of rundown temperature excursions?	☐	☐	☒
i. Static electricity concerns in filters and tankage? **Railcars grounded to a grounding header**	☒	☐	☐
j. Insulation requirements for personal protection?	☐	☐	☒
k. Exothermic reaction?	☐	☐	☒
l. Vacuum conditions? **Railcars connected to a vent header with an air inlet nozzle for closed doom unloading**	☒	☐	☐
m. Are support systems adequate, including sewers, steam, instrument air, electrical, process control equipment, slop and product dispositions?	☒	☐	☐
n. Abnormal line-ups due to other equipment being out of service? **Isolation valves on P-101A/B suction line to isolate TK-1776 crude from other lines**	☒	☐	☐
6. Instrumentation			
a. Have specification sheets been included?	☒	☐	☐
b. Has the fail-safe action been shown on design sketches?	☐	☐	☒
c. Has flashing including auto-refrigeration across control valves been addressed?	☐	☐	☒
d. Are critical instruments protecting the impacted system(s) provided or identified? List: _____	☐	☐	☒
e. Are facilities provided to check critical instruments on-line?	☐	☐	☒
f. Revised spec sheets are included for all modifications of existing critical instruments?	☐	☐	☒
7. Industrial Hygiene Concerns			
a. If a new chemical is being used, have requirements been discussed with the IH?	☐	☐	☒
b. Have safety showers and eye wash needs been considered?	☒	☐	☐
c. Have ergonomics and human factors been considered in the layout of new equipment?	☒	☐	☐
8. Fire Fighting			
a. Have fire fighting facilities been reviewed with the Fire Chief or Operations Superintendent?	☒	☐	☐
b. Have fireproofing requirements been addressed?	☒	☐	☐
9. Other & Miscellaneous Items			
a. If engineering design standards are not complied with, is an explanation included in the design documents?	☐	☐	☒
b. List which Technicians and Supervisors reviewed operability items (Project Team):	☒	☐	☐
c. Have changes in the process or chemical addition been evaluated for product quality impacts.	☐	☐	☒

Operations – Jim Hill, Rick Morgan

Metallurgist – Andrew Estrada

Senior Engineer – Rick Walker, Tom Rybarczyk

VALERO REFINING COMPANY – CALIFORNIA

VALERO BENICIA REFINERY

3400 East Second Street
Benicia, California 94510

STORM WATER POLLUTION PREVENTION PLAN

Original Plan prepared by:

URS Corporation
2520 Venture Oaks Way, Suite 250
Sacramento, California 95833

September 2003

Plan Revised:

September 2007
July 2011

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LIST OF FIGURES

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LIST OF ACRONYMS

AHM acutely hazardous material
API American Petroleum Institute

BMP best management practice
BOD biological oxygen demand

CASQA California Stormwater Quality Association
CFR Code of Federal Regulations
COD chemical oxygen demand

DAF dissolved air flotation
DHS California Department of Health Services

eSMR electronic self monitoring and reporting

NPDES National Pollutant Discharge Elimination System

O&G oil and grease

RMPP Risk Management and Prevention Program
SFBRWQCB San Francisco Bay Regional Water Quality Control Board

SC specific conductance
SEAOC Structural Engineering Association of California
SIC Standard Industrial Classification
SPCC Spill Prevention Control and Countermeasure
SWRCB State Water Resources Control Board
SWPPP storm water pollution prevention plan

TOC total organic carbon
TSS total suspended solids

UBC Uniform Building Code
URS URS Corporation
U.S. EPA U.S. Environmental Protection Agency
USGS U.S. Geological Survey

CERTIFICATION

Name and Type of Facility:	Valero Benicia Refinery – Petroleum Refining
Location of Facility:	3400 East Second Street Benicia, California 94510
Name and Address of Owner/Operator:	Valero Refining Company – California 3400 East Second Street Benicia, California 94510
Name and Address of Manager:	Douglas W. Comeau Vice President and General Manager 3400 East Second Street Benicia, California 94510
Designated Person Accountable for Storm Water Pollution Prevention at Facility Name and Title:	C. W. Howe, Director of Health, Safety, Environment & Government Affairs

PLAN 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 ensure that qualified personnel have properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed 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.

Approved and Endorsed by:

Signature: _____

Name: C. W. Howe

Title: Director

Health, Safety, Environment & Government Affairs

Date: _____

1 INTRODUCTION

This Storm Water Pollution Prevention Plan (SWPPP) describes policies and procedures used by Valero Refining Company – California, Benicia Refinery (Valero Benicia Fuels Refinery and adjacent Benicia Asphalt Plant) to manage storm water discharges to minimize impacts on water quality. This plan was originally prepared to comply with San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) Order No. 2002-0112 (NPDES Permit No. CA0005550) adopted in October 2002. In July 2011, this plan was revised to comply with Order No. R2-2009-0079, issued by SFBRWQCB on November 18, 2009 and effective from January 1, 2010 through December 31, 2014. A copy of SFBRWQCB Order No. R2-2009-0079 is maintained in the Valero Benicia Refinery Environmental Department.

The original plan prepared by URS Corporation in September, 2003, was certified by a Registered Professional Engineer. This revised plan includes personnel changes and incorporates Valero South, the new property that was acquired in 2010. No substantive changes have been made regarding any engineering evaluations contained in the original document.

The Storm Water Pollution Prevention Plan necessarily depends on other documents, permits and orders for content and regulatory information. By reference, relevant portions of these documents are included in the SWPPP without re-stating the entire reference document. Furthermore, should any disagreement occur between the SWPPP and other documents, the governing document shall prevail.

1.1 REGULATORY REQUIREMENTS

On November 18, 2009, NPDES Permit No. CA0005550 (SFBRWQCB Order No. R2-2009-0079) was adopted for the Valero Benicia Refinery with an effective date of January 1, 2010, and an expiration date of December 31, 2014. This permit superseded the former NPDES permit (SFBRWQCB Order No. 2002-0112) and covers all the storm water outfalls previously covered (outfalls 001 through 017).

Under this NPDES permit, the Valero Benicia Refinery currently monitors the 16 storm water outfalls, which are the focus of this SWPPP. Since storm water and other process wastewaters are all discharged from Outfall 001, it is regulated differently than the other sixteen outfalls. The effluent limitations for the discharge from Outfall 001 can be found on pages 12 through 16 of the NPDES permit. Reporting for Outfall 001 is completed monthly. Permit requirements are summarized in Table 1-1.

One of the key elements of the storm water pollution prevention program is the use of best management practices (BMPs). Dischargers who use, manufacture, store, or handle the chemicals listed as toxic under section 307(a)(1) of the Clean Water Act are required by 40 CFR 125.105 to establish objectives for the control of toxic and hazardous pollutants. They are further required by 40 CFR 125.105 to establish specific BMPs to meet these objectives. The BMPs are required to address each component or system capable of causing the release of toxic or hazardous pollutants to the waters of the United States. This updated SWPPP identifies and describes the BMPs used by the Valero refinery to protect storm water quality.

Table 1-1

Summary of Storm Water Requirements in the NPDES Permit, Order R2-2009-0079

Requirement	Reference
Limits specified for pollutants (pH, oil and grease, TOC, visible oil, and visible color) discharged to Outfalls 002 through 017.	Provision IV.B.1
If there is an exceedance of the oil and grease or TOC limit, supplemental limits specified for pollutants (BOD, TSS, COD, phenolic compounds, Total Chromium, Hexavalent Chromium) discharged to Outfalls 002 through 017.	Provision IV.B.2
Storm water sampling requirements prior to the release of tank farm secondary containment areas through storm water outfalls 006, 009, and 010.	Provision VI.C.2
The SWPPP should be updated by 1 October each year or sooner if there is a change of operation in the facility that may substantially affect the quality of storm water. If Valero determines that it does not need to update its SWPPP, it will submit a letter to the Executive Officer that indicates no revisions are necessary and the last year it updated its SWPPP.	Provision VI.C.4.d
The Annual Storm Water Report should be submitted by 1 July each year.	Provision VI.C.4.d
Records of all monitoring information and reports should be maintained for a period of at least 3 years.	Attachment D.IV.A
Monitor storm water discharges quarterly (TOC, oil and grease, pH, specific conductance) and flow monthly.	Attachment E.IV.B
In a 5-year period, monitor Outfall 009 at least once in the wet season and once in the dry season.	Attachment E.IV.B
Monitor the supplemental limits daily during storm events if the supplemental limits become effective.	Attachment E.IV.B
Monitor Sulfur Springs Creek, Beaver Creek, and Buffalo Wallow for standard observations at least once per month and once during each storm event.	Attachment E.VI
A SWPPP should include: • A topographical map with wastewater treatment area, surface water bodies, and discharge points; • A site map with storm drains, paved areas, surface water locations, discharge locations, vehicle maintenance areas, and a description of the areas with the potential for pollutants in runoff; • Erosion control measures for steep, un-vegetated areas; • A narrative description of wastewater treatment, management practices to minimize storm water, material storage areas, loading and unloading areas, structural and nonstructural control measures, and on-site storage and disposal methods; • A list of pollutants that have a reasonable potential to be present in storm water discharges in significant quantities; and • A description of management controls, including personnel, housekeeping, spill prevention and response, source control, management practices, sediment control, employee training, inspections, and recordkeeping.	Attachment G.I.J
A Facility inspection should be conducted annually to verify that all elements of the SWPPP are accurate and up to date.	Attachment G.I.J.4

2 SITE LOCATION AND BACKGROUND INFORMATION

This section describes the Valero Benicia Refinery and summarizes past sampling results related to storm water discharges.

2.1 SITE LOCATION

The Valero Benicia Refinery is located in the southeast corner of the city of Benicia, in Solano County, California (see Figure 2-1). The site is bounded on the west by the city of Benicia, on the north and east by Sulfur Springs Creek, and on the south by Highway 680. The Valero Benicia Refinery includes the Crude Tank Farm, Refinery Dock, the Crude Transfer Pipeline, the Coke Silos Area, the Wastewater Treatment Area, the Marketing Terminal, the Asphalt Plant, office space at Valero East, and a construction lay down site at Valero South. The Wastewater Treatment Area, the Refinery Dock, and the Coke Silos, Valero East, and Valero South are not part of the refinery proper. The Wastewater Treatment Area is located on Suisun Bay south of Highway 680 at the Industrial Park Road exit, and the Refinery Dock and Coke Silos are approximately one-quarter mile west of the Martinez-Benicia Bridge. Valero East and Valero South are located east of Sulfur Springs Creek.

2.2 FACILITY DESCRIPTION AND OPERATION

The Valero Benicia Refinery began operations in 1969. Refined petroleum products, including gasoline, jet fuels, diesel, asphalt, coke, sulfur, and liquefied petroleum gas, are produced at the refinery. The refinery has a crude-run throughput of about 135,000 barrels per day and is classified as a cracking refinery by the U.S. EPA in 40 CFR 419.20. Refinery operations are conducted 24 hours per day, 365 days per year. The refinery real estate parcels are:

- Parcel 1: Contains the administration building, marketing area, main processing units, 5.1-million-barrel-capacity of oil storage, and the main storage area for hazardous materials and waste (referred to as the Refinery Proper in this plan);
- Parcel 2: Contains 2.1-million-barrel-capacity of crude oil storage (referred to as the Crude Field). This parcel also contains diked areas that provide containment capacity for approximately 13 million gallons of treated refinery effluent water;
- Parcel 3: Contains the wastewater treatment plant (referred to as the Wastewater Treatment Area). Wastewater composed of process wastes, cooling tower and boiler blowdown, ballast water, sour water, raw water treatment backwash, and storm water runoff is treated at this area;
- Parcel 4: Contains two wastewater/rainwater diversion tanks
- Parcel 5: Contains the Refinery Dock, which is located on the Carquinez Strait. The dock is connected to the Fuels Refinery, Crude Field, and Asphalt Plant by pipelines that are used to transfer crude to the Refinery and Asphalt Plant, and intermediates, and petroleum products to barges and ships; and
- Parcel 6: Contains the Benicia Asphalt Plant.
- Parcels 51 & 70: Contains Valero South (a total of 5.71 acres), a temporary construction lay down site.
- Parcel 58: Contains Valero East (4.07 acres), additional office space.

In addition to these real estate parcels, there is a leased coke-loading facility and an inactive ballast water tank. The coke-loading facility (the Coke Silos) is the receptacle for processed coke prior to ship transfer. The coke-loading facility consists of a rail spur, four storage silos, and a ship conveyance system. This facility, which is operated by a lessee, is located approximately one-quarter mile west of the Refinery Dock on the Carquinez Strait.

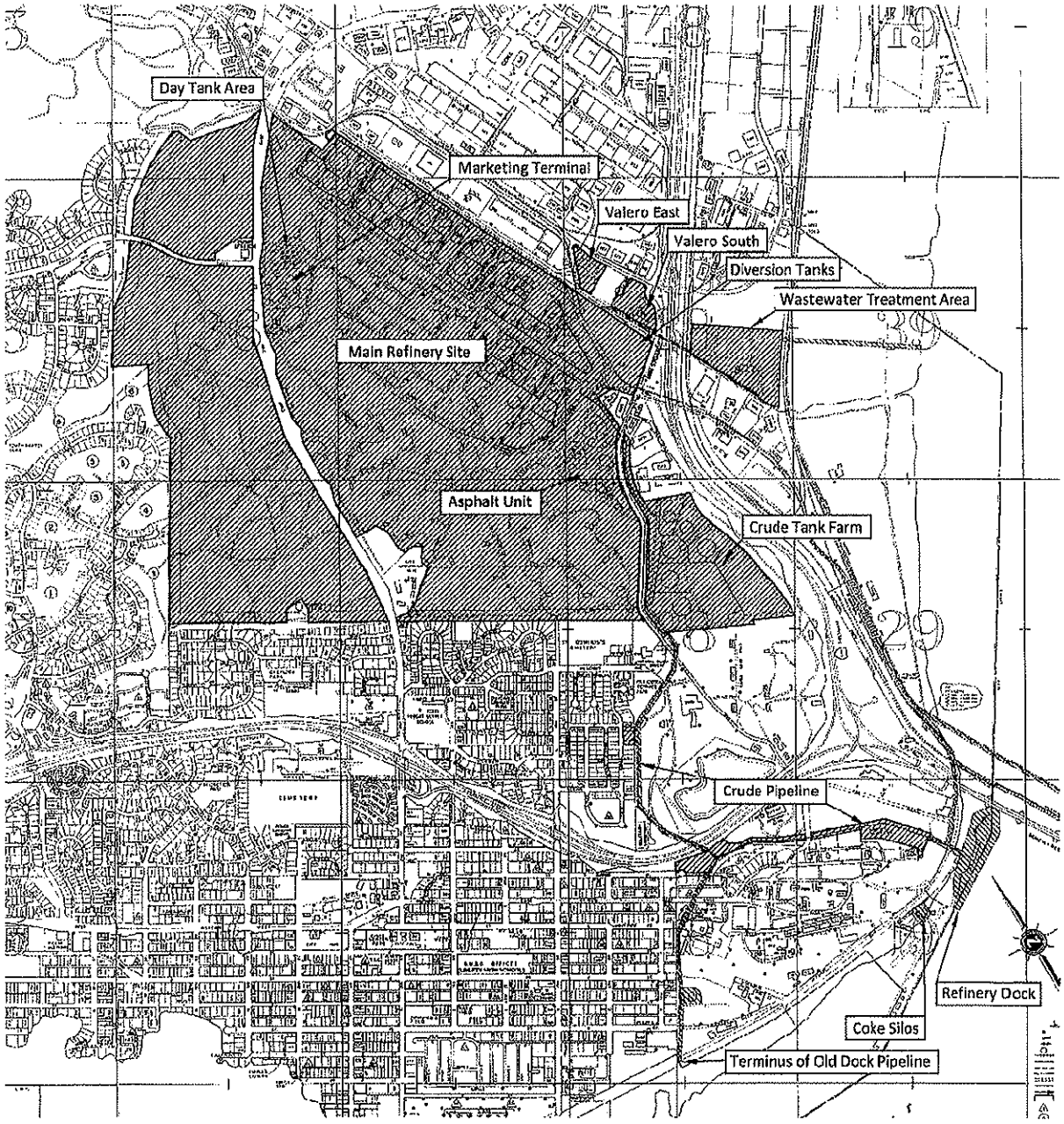

Figure 2-1. Valero Benicia Refinery Site Location – Topographical Map

The inactive ballast water tank was previously used for transfer of ballast water from incoming ships. Currently, the tank is sealed and not in use. The ballast water tank site is located off Highway 780, approximately three-quarters of a mile northwest of the Martinez-Benicia Bridge.

Current NPDES Permitted Outfalls

The following outfalls are described and have specified observation and sampling/analysis requirements in NPDES Permit No. CA 000550.

Outfall 002: Storm water runoff from 1.8 acres of refinery property which is discharged at the north west corner of the wastewater treatment area via a ditch and several pipes into Sulfur Springs Creek and ultimately Suisun Bay. The area is separated from the wastewater treatment area and storm water retention pond by a dike. No treatment is provided.

Outfall 003: Storm water runoff from 85.6 acres of refinery property and may contain the Lower Level Tank Farm (LLTF, tentatively in 2008) which is discharged near the Raw Water Break Tank at the north end of Avenue "A" via a culvert to Sulfur Springs Creek and ultimately Suisun Bay. Tank farm contributions are monitored prior to discharge and can be directed to treatment if off specifications. The drainage area is separated from the refinery processing area by peripheral roads around the processing area. No treatment is provided.

Outfall 004: Storm water runoff from 32.5 acres of gravel area between 1st Street and the railway on the south side of 1st Street. This outfall was identified as a potential storm water outfall in Benicia's 1994 Annual General Industrial Stormwater Permit Report submitted on June 30, 1994. This outfall is discharged west of Gate No. 4, into the eastern end of a ditch (Beaver Creek), followed by a culvert, another ditch (Buffalo Wallow), and a 72-inch culvert into Sulfur Springs Creek and ultimately Suisun Bay. The drainage area is separated from the processing area by the peripheral road. No treatment is provided.

Outfall 005: Storm water runoff from 68.9 acres of refinery property west of the processing area. This outfall is discharged west of Gate No. 4, on the south side of the processing area via a spillway into the western end of a ditch (Beaver Creek), followed by a culvert, another ditch (Buffalo Wallow), and a 72-inch culvert into Sulfur Springs Creek and ultimately Suisun Bay. The drainage area is separated from the processing area by railroad tracks and the peripheral road, and is bordered on the southern side by Gate 5 Road and on the western side by the refinery fence. No treatment is provided.

Outfall 006: Storm water runoff from 3.5 acres under the refinery crude pipeline, starting at the southwest corner of the crude tank field and running northeast along the perimeter of the tank field and Park Road. It includes runoff from the perimeter road on the north side of the crude tank field and may contain the Crude Oil Storage Area (COSA) tank farm storm water discharges. Tank farm contributions are monitored prior to discharge and can be directed to treatment if off specifications. The outfall is discharged on the south side of Park Road, where the refinery crude pipeline crosses Park Road, via a ditch that discharges into Sulfur Springs Creek and ultimately Suisun Bay. A small amount of condensate from steam traps on the pipeline and groundwater seepage enter this outfall. Runoff collects in a concrete sump equipped with a containment valve. No treatment is provided.

Outfall 007: Storm water runoff from 0.7 acres of gravel and paved area near Gate 4. The outfall is discharged just east of Gate 4 via a tributary ditch (Buffalo Wallow) followed by a 72-inch culvert into Sulfur Springs Creek and ultimately to Suisun Bay. The drainage area is separated from the processing area by the peripheral road. No treatment is provided.

Outfall 008: Storm water from 0.9 acres of gravel area along the railway and the refinery fence line. The outfall is discharged east of Gate 4 via a culvert followed by a tributary ditch (Buffalo Wallow) and a 72-inch culvert into Sulfur Springs Creek and ultimately to Suisun Bay. The drainage area is separated from the processing area by the railway. No treatment is provided.

Outfall 009: Storm water from 0.3 acres of gravel and paved area between the railway and avenue "A" and may contain the adjacent Upper Level Tank Farm (ULTF) storm water discharges (tentatively in 2011). Tank farm contributions are monitored prior to discharge and can be directed to treatment if off specifications. The outfall is discharged along Avenue "A" on the south east side of the processing area via a culvert into Sulfur Springs Creek and ultimately to Suisun Bay. The drainage area is separated from the processing area by the railway. No treatment is provided.

Outfall 010: Storm water from 63.8 acres of gravel and paved area between the railway and Avenue "A" and may contain the adjacent Upper Level Tank Farm (ULTF) storm water discharges (tentatively in 2011). Tank farm contributions are monitored prior to discharge and can be directed to treatment if off specifications. The outfall is discharged along Avenue "A" on the south east side of the processing area via a culvert into Sulfur Springs Creek and ultimately to Suisun Bay. The drainage area is separated from the processing area by the railway and the peripheral roadway. No treatment is provided.

Outfall 011: Storm water runoff from 0.4 acres under the refinery crude pipeline on the north side of Park Road. The outfall is discharged on the north side of Park Road, where the refinery crude pipeline crosses Park Road, via a culvert that discharges into Sulfur Springs Creek and ultimately Suisun Bay. This drainage area is not adjacent to any processing area. Asphalt berms are provided on either side of the pipeline to channel runoff to the collection sump. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed. No treatment is provided.

Outfall 012: Storm water runoff from 0.8 acres under a section of the refinery crude pipeline southwest of the crude tank field. The outfall is discharged into the City of Benicia municipal sewer system and ultimately into the Carquinez Strait. The drainage area below the pipeline is bordered on one side by an asphalt berm and on the other side by a service road. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed. No treatment is provided.

Outfall 013: Storm water runoff from 1.2 acres under the refinery crude pipeline southwest of Outfall 12. The outfall is discharged into the City of Benicia municipal sewer system and ultimately into the Carquinez Strait. The drainage area below the pipeline is bordered on one side by an asphalt berm and on the other side by a service road. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed, and with a hydrocarbon detector which alarms at a central control house in the event of a hydrocarbon release. No treatment is provided.

Outfall 014: Storm water runoff from 0.4 acres under a section of the refinery crude pipeline south of Outfall 13. The outfall is discharged into the City of Benicia municipal sewer system and ultimately into the Carquinez Strait. The drainage area below the pipeline is bordered on both sides by asphalt berms. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed. No treatment is provided.

Outfall 015: Storm water runoff from 0.5 acres under a section of the refinery crude pipeline southeast of Outfall 14. The outfall is discharged into the City of Benicia municipal sewer system and ultimately into the Carquinez Strait. The drainage area below the pipeline is bordered on both sides by asphalt berms. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed. No treatment is provided.

Outfall 016: Storm water runoff from 0.1 acres under a section of the refinery crude pipeline south of Outfall 15, near the refinery dock. The outfall is discharged via a culvert into the Carquinez Strait. The drainage area below the pipeline is bordered on both sides by asphalt berms. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed. No treatment is provided.

All of the sumps associated with the crude pipeline (outfall 006, and 011 through 016) were designed to contain releases from a leak or rupture of the pipeline, or runoff from a 10-year, 24-hour storm. Collected runoff is visually inspected before discharge. In case of contamination, the water would be collected with vacuum trucks and treated in the refinery wastewater treatment unit.

Outfall 017: Storm water runoff from approximately 12.1 acres at the Benicia Asphalt Plant (BAP) of which roughly 35 percent is impervious. Runoff collects in a 0.425 million gallon holding tank (Tank 33) located north of Buffalo Wallow. From the holding tank storm water is discharged on a batch basis via an underground culvert to Buffalo Wallow, then to a 72-inch culvert into Sulfur Springs Creek, and ultimately to Suisun Bay. No discharge occurs from the tank without confirmation that all permit limits and conditions are met.

2.3 TOPOGRAPHY, SURFACE WATER, AND HYDROLOGY

Figure 2-1 illustrates the site and the area within a quarter mile of the site boundary.

According to the USGS topographic map, the surface waters that have potential for receiving storm water or wastewater from the Valero Benicia Refinery include Suisun Bay, Sulfur Springs Creek, and Beaver Creek.

Approximately 230 groundwater monitoring wells have been installed at the Valero Benicia Refinery. Because highly impermeable seals have been incorporated into the construction of these wells, storm water intrusion into these wells is not expected. A review of regulatory files and the USGS map indicate that there are no registered domestic groundwater supply wells within a quarter mile of the Valero Benicia Refinery.

2.4 MONITORING PROCEDURES AND HISTORIC SAMPLING RESULTS

Procedures to assure that storm water monitoring requirements specified by NPDES Permit CA0005550 are met are maintained by the Valero Benicia Refinery Environmental Department, Environmental Laboratory and Wastewater Treatment Plant Department.

Sampling and analysis for Outfall 001 are conducted according to the NPDES permit Self Monitoring Program. Because storm water from certain areas is combined with process wastewaters for treatment and discharge at this sample point, this outfall is regulated differently than the other outfalls. Specific limits for Outfall 001 are specified in the Effluent Limitations section of the NPDES permit. Outfall 001 reporting data is submitted monthly via hard copy and via the Internet to the State Water Board eSMR database.

Discharges from Outfalls 002 through 017 consist entirely of storm water. The effluent limitations identified in Provision IV.B of the NPDES permit for discharges from these outfalls are listed in Table 2-1. The discharges from these outfalls have generally complied with all limitations with the exception of rare pH readings outside of the permitted range. During January 2000, studies were conducted to determine the cause of the pH being at times lower than normal storm water pH ranges. During these studies the following observations were made:

- Samples with low conductivity (<100 µmhos/cm) showed a higher level of variability in the pH measurement using standard pH probes.
- Sample pH was dramatically affected by temperature for the low conductivity samples.
- No soil or water contaminants were found that could explain the low pH in this area.

As a result of these findings, the pH probes were changed; probes that are less likely to cause variability under low conductivity conditions are now being used.

Table 2-1

Effluent Limitations for Outfalls 002 through 017

Constituent	Limitation
pH	Within 6.5 to 8.5
Oil & grease	Daily maximum of 15 mg/L
Total organic carbon	Daily maximum of 110 mg/L
Visible oil	None may be observed
Visible color	None may be observed

mg/L milligrams per liter

If there is an exceedance of the TOC or oil and grease limit in Table 2-1, effluent limits in Table 2-2 shall become effective.

Table 2-2

Supplemental Effluent Limitations for Storm Water Outfalls

Constituent	Daily Maximum Limit (mg/L)	30-Day Rolling Average Limit (mg/L)
BOD	48	26
TSS	33	21
COD	360	180
Oil and Grease	15	8.0
Phenolic Compounds	0.35	0.17
Total Chromium	0.60	0.21
Hexavalent Chromium	0.062	0.028

mg/L milligrams per liter

Tank farm secondary containment areas may be discharged through storm water Outfalls 006, 009, and 010. The storm water in the secondary containment areas must meet the limitations in Provision IV.C.2.e, which are listed in Table 2-3, or the storm water must be processed in the wastewater treatment plant.

Table 2-3

Tank Farm Storm Water Limits

Constituent	Limitation
pH	Within 6.5 to 8.5
TSS	Daily maximum of 100 mg/L
Total organic carbon	Daily maximum of 110 mg/L
Visible oil	None may be observed
Visible color	None may be observed

mg/L milligrams per liter

In addition to the effluent limitations specified in the NPDES permit, the discharge of storm water cannot cause any of the following conditions to exist in waters of the state at any place at levels that cause nuisance or adversely affect beneficial uses:

- Floating, suspended, or deposited macroscopic particulate matter or foam;
- Bottom deposits or aquatic growths;
- Alteration of temperature, turbidity, or apparent color beyond present natural background levels;
- Visible, floating, suspended, or deposited oil or other product of petroleum origin; and
- Toxic or deleterious substances to be present in concentrations or quantities that will cause deleterious effects on aquatic biota, wildlife, or waterfowl, or that render any of these unfit for human consumption either at levels created in the receiving waters or as a result of biological concentration.

The wet and dry season visual observations conducted since 1996 indicate there have been no reported violations of these regulations.

2.5 SIGNIFICANT SPILLS AND LEAKS

There have been two reportable spills to ground at the Valero Benicia Refinery. The first spill was contained within the facility's tank farm bermed area and did not impact either surface or ground waters. On January 29, 2003, an estimated 6,750 barrels of crude oil were released from Tank 1702 during mixer maintenance activity. The spill was contained and promptly removed from within the facility's bermed tank farm area and did not impact either surface or groundwater. On December 13, 2003, the # 6 Dock Line released an estimated 1000 barrels of crude oil to the ground near the refinery dock. The spill response limited the impact to surface waters to several quarts, and received full agency oversight.

2.6 LIST OF SIGNIFICANT MATERIALS INCLUDED IN SPCC PLAN

Various significant materials are used in support of the operations that occur at the Valero Benicia Refinery. A current list of these materials is maintained in the facility's Spill Prevention, Control and Countermeasure (SPCC) Plan and is included here by reference.

3 STORM WATER POLLUTION PREVENTION STRATEGY

The goal of this SWPPP is to minimize storm water pollution, improve water quality, and comply with the storm water regulations in NPDES Permit No. CA0005550. The strategy to achieve this goal is to implement BMPs, wet season observations, dry season observations, an annual site inspection, and appropriate responses to the inspections and sampling. This section describes the personnel and tasks related to storm water pollution prevention.

3.1 PERSONNEL AND RESPONSIBILITIES

The Environmental Manager ensures that a storm water pollution prevention team is organized to respond to storm water-related tasks. These tasks include conducting BMP/storm water inspections, performing the annual inspection, collecting storm water samples, and preparing the annual report. The storm water pollution prevention team at the facility is identified in Table 3-1.

Table 3-1

Storm Water Pollution Prevention Team

Point of Contact	Title	Phone No.	Responsibilities
Lisa Crowley	Staff Environmental Engineer	(707) 745-7925	Manage Storm Water Pollution Prevention Program
Sue Gustofson	Environmental Manager	(707) 745-7203	Manage Storm Water Pollution Prevention Program (first alternate)
Chris Howe	Director of Health, Safety, Environment & Government Affairs	(707) 745-7534	Manage facility environmental program

Table 3-2 outlines the strategy of the storm water pollution prevention team for preventing storm water pollution at the Valero Benicia Refinery.

3.2 VISUAL OBSERVATIONS

Storm Water Outfall Observations

The NPDES permit requires quarterly storm water outfall visual observations. Because the discharge to Outfall 017 is controlled by a tank, any discharge from Outfall 017 is considered a storm water discharge. Before a storm event may be observed, it must produce significant storm water discharge. The General Permit defines "significant storm water discharge" as a continuous discharge of storm water for approximately one hour. Visual observations must also be conducted the entire time storm water from tank berms is discharged to the outfalls.

Receiving Water Observations

The NPDES permit requires standard observations during each storm event and at least once per month of Sulfur Springs Creek, Beaver Creek, and Buffalo Wallow. Standard observations include: floating and suspended materials, discoloration and turbidity, odor, beneficial water use, hydrographic condition, and weather conditions.

3.3 SAMPLING AND ANALYSIS

Methods

Sample collection, storage, and analysis are performed according to 40 CFR Section 136 or other methods approved and specified by the executive officer of the SFBRWQCB. Water and waste analysis will be performed by a laboratory approved for these analyses by the California Department of Health Services (DHS) or a laboratory waived by the executive officer of the SFBRWQCB from the necessity of obtaining a certification for these analyses from the DHS.

Collection

Outfalls 002 through 016 are sampled quarterly. Since the discharge from Outfall 017 is controlled by a tank, Outfall 017 will be sampled during each discharge. Grab samples of storm water during storm events that produce a significant discharge must be collected and analyzed for pH, total organic carbon (TOC), and oil and grease (O&G). In addition, the flow must be approximated for each discharge point. Flow volumes are estimated by the Environmental Department and included in Self Monitoring Reports to the SFBRWQCB based on rainfall data, runoff coefficients, and drainage areas.

With appropriate consideration for personnel safety, samples are taken within the first 30 minutes after determining that a storm event is significant. A significant storm event is defined (USEPA, 1992) as greater than 0.1" of rain. According to USEPA guidance, at least 72 hours of dry weather should occur between storm events. To meet sampling requirements according to these guidelines Valero has implemented the following steps:

For Outfalls 002 through 016:

Step	Responsibility
1. Monitor rainfall gauge and notify Environmental Laboratory when 01" of rain has accumulated from new storm event.	Oil Movements Department
2. Sample storm water outfalls 002 through 016 for pH, Oil and Grease and Total Organic Carbon.	Environmental Laboratory
3. Analyze collected samples for pH within 15 minutes and other parameters within timelines specified by USEPA regulations.	Environmental Laboratory
4. Report results from storm water sampling to Environmental Department.	Environmental Laboratory
5.a. Review analytical results for permit compliance. 5.b. Coordinate additional sampling and corrective measures (including implementation of supplemental limits) as appropriate. 5.c. Report results, including any required non-compliance reports, to SFBRWQCB.	Environmental Department

For Outfall 017:

Step	Responsibility
1. Notify Environmental Laboratory each time when discharge from Tank 33 is planned.	Benicia Asphalt Plant
2. Sample storm water Outfall 017 for pH, Oil and Grease and Total Organic Carbon.	Environmental Laboratory
3. Analyze collected samples for pH within 15 minutes and other parameters within timelines specified by USEPA regulations.	Environmental Laboratory
4. Report results from storm water sampling to Environmental Department.	Environmental Laboratory
5.a. Review analytical results for permit compliance. 5.b. Coordinate additional sampling and corrective measures (including implementation of supplemental limits) as appropriate. 5.c. Report results, including any required non-compliance reports, to SFBRWQCB.	Environmental Department

For Storm Water discharge to Outfalls 006, 009, and 010 from Tank Berms:

Step	Responsibility
1. Sample storm water from the secondary containment for pH, Total Suspended Solids, and Total Organic Carbon. Deliver samples to the Environmental Laboratory	Oil Movements Department
2. Analyze collected samples for pH within 15 minutes and other parameters within timelines specified by USEPA regulations.	Oil Movements Department
3. Report results from storm water sampling to Environmental Department and Oil Movements Department.	Environmental Laboratory
4. Review analytical results for permit compliance.	Environmental Department and Oil Movements Department
5. If results show the storm water can be discharged through an outfall, unlock the valve, monitor the entire discharge, and close and lock the valve when discharge is complete. If results show the storm water does not meet the limits, discharge to the waste water treatment plant.	Oil Movements Department

Table 3-2

Strategy for the Storm Water Pollution Prevention Program at Valero Benicia Refinery

Goal			
Minimize storm water pollution, improve water quality, and comply with storm water regulations per NPDES Permit No. CA0005550 under the Clean Water Act.			
Strategy	**Objectives**	**Actions**	**Metrics**
Prepare and maintain SWPPP.	Meet permit requirements for the SWPPP. Establish a program to minimize storm water pollution. Maintain discussion within the refinery and with regulators on storm water issues.	Identify potential sources of pollution to storm water. Design BMPs to minimize each potential source of pollution. Design an inspection and sampling program to monitor the effectiveness of the BMPs.	Did the operators find the BMPs feasible and easy to implement? Did the SFBRWQCB provide positive feedback on the SWPPP, if reviewed? Did results of inspection and monitoring indicate that the BMPs are effective and that storm water is not being polluted?
Train the operators at each facility site.	Ensure that personnel understand the importance of storm water pollution prevention measures. Ensure that personnel are aware of storm water pollution sources and the means for minimizing pollution. Establish communication channels between managers and facility operators to address storm water pollution prevention issues.	Incorporate SWPPP/BMP requirements into technician training program. Conduct a follow-up investigation to ensure proper use of BMPs and to address questions. Storm Water Pollution Prevention Team to provide technical and regulatory support to operators on storm water issues.	Did facility operators use the designated BMPs in their day-to-day operations? Did the results of inspection and monitoring confirm the proper implementation of BMPs?
Monitor potential pollution to storm water.	Confirm effectiveness of the BMPs. Ensure that the SWPPP addresses all potential storm water pollution sources. Obtain information necessary to modify the SWPPP.	Per the SWPPP: Conduct sampling and analysis; and Conduct annual inspections.	Were the sampling and inspection procedures described in the SWMPP followed?

Table 3-2 (Continued)

Strategy for the Storm Water Pollution Prevention Program at Valero Benicia Refinery

Goal			
Minimize storm water pollution, improve water quality, and comply with storm water requirements specified in NPDES Permit No. CA0005550			
Strategy	**Objectives**	**Actions**	**Metrics**
Evaluate storm water monitoring data and BMP inspection reports, and respond if data suggest storm water may have been impacted.	Eliminate illicit discharges. Respond effectively to accidental discharges. Reduce or eliminate other discharges.	Control inappropriate dumping through outreach, inspection, training, and enforcement. Identify responsible parties for initiating cleanup actions and establish cleanup and notification procedures. Train employees for proper response and establish procedures for monitoring, recordkeeping, and reporting. Identify and effectively manage discharges associated with maintenance activities and construction activities.	Were non-storm water discharges identified and eliminated? Were accidental discharges handled effectively and in a timely manner?
Evaluate and update SWPPP.	Identify need to update the SWPPP for the next water year.	Evaluate results of inspections and sampling to determine if BMPs are adequate and if all industrial pollution has been addressed by the SWPPP and SWMRP. Update SWPPP and SWMRP if needed. Submit updates to SFBRWQCB by 1 July.	Did the results of sampling and inspections confirm that the SWPPP is adequate for the next water year
Report to SFBRWQCB.	Comply with report requirements.	Submit annual report for the refinery to SFBRWQCB by 1 July of each year.	Are annual reports submitted before 1 July of each year?

BMP Best Management Practice
NPDES National Pollutant Discharge Elimination System
SFBRWQCB San Francisco Bay Regional Water Quality Control Board
SWPPP Storm Water Pollution Prevention Plan

Annual Site Inspection

Standard Provision I.J.4 of Attachment G, *Regional Standard Provisions, and Monitoring and Reporting Requirements*, of the NPDES permit requires the facility be inspected annually to verify all elements of the SWPPP are up to date. The inspections should identify industrial activities that are affecting storm water discharge and to evaluate whether the BMPs identified in the SWPPP to reduce pollutant loadings are adequate and properly implemented in accordance with the terms of the permit. If the BMPs are inadequate or improperly implemented, additional control measures may be needed. Section 4.0 of this SWPPP describes the BMPs in detail, and Table 4-2 provides a summary list of all BMPs that can be used in the annual site inspection.

During the annual site inspection, all elements of the SWPPP, including the site map, potential pollutant sources, structural and non-structural controls to reduce pollutants, and changes in activity, are verified for accuracy. The storm water drainage system, including conveyances and structures, is also visually inspected for signs of deterioration, physical stress, accumulation of debris, etc. Observations that require a response and the appropriate response to the observation are recorded and retained as part of the SWPPP. All inspections will be conducted by qualified and trained personnel. The Storm Water Pollution Prevention Team ensures that a tracking and follow-up procedure will be implemented and that the correction of any deficiencies will be appropriately documented.

3.4 RESPONSES TO OBSERVATIONS, INSPECTIONS, AND MONITORING

Valero maintains all observation, sampling, and monitoring records for a period of five years. Refinery staff will respond to abnormal conditions or sampling results with appropriate BMPs.

Annual Report

An annual report spanning June 1 through May 31 and covering data for the previous wet season for the identified storm water discharge points is due to the SFBRWQCB on 1 July of each year. The annual storm water report will include:

- A tabulated summary of all sampling results and a summary of the visual observations made during the inspections;
- A comprehensive discussion of the compliance record and the corrective actions taken or planned for full compliance with the NPDES permit;
- A comprehensive discussion of the progress of source identification and control programs for non-effluent limited parameters; and
- Recent modifications to the SWPPP.

4 BMPS FOR INDUSTRIAL ACTIVITY SITES

This section identifies baseline BMPs and site-specific BMPs for industrial areas at the Valero Benicia Refinery. The areas requiring source identification or regulation under this SWPPP are:

- The Refinery Dock;
- The Crude Transfer Pipeline;
- The Coke Silos Area;
- The Burma Road and Fire Training Surface Drainage Area;
- The Raw Water Break Tank Surface Drainage Area;
- The Avenue A Surface Drainage Area;
- Valero East;
- The Buffalo Wallow Surface Drainage Area;
- The Wastewater Treatment Surface Drainage Area;
- The Marketing Terminal;
- The Benicia Asphalt Plant; and
- Valero South

Detailed descriptions of these sites are provided in Sections 4.1 through 4.12.

A figure has been prepared for each area to depict features, as required by the NPDES permit Standard Provisions and Reporting Requirements, Section B [Standard Storm Water Provisions], Provisions 2.b.1 through 2.b.7. Table 4-1 lists the features that the NPDES permit requires the figures to show.

Table 4-1

Features Required by the Permit to be Shown on Maps[a]

Feature[b]	Map Requirements	Item(s) Shown on the Valero Site Plan
1	Storm water conveyance, drainage, and discharge structures	Berms, dikes, channels, and culverts that divert storm water flow (described for each topic area).
2	Outline of the storm water drainage areas for each storm water discharge point	Potential pooling areas and/or receiving surface waters.
3	Paved areas and buildings	All paved areas and buildings.
4	Areas of pollutant contact with storm water, actual or potential	Areas shown on site plans are described in Section 4.0 of the SWPPP.
5	Location of existing storm water structural control measures (i.e., berms, coverings, etc.)	Areas shown on map are described in Sections 4.0 and 5.0 of the SWPPP.
6	Surface water locations, including springs and wetlands	Relevant surface water locations, including springs and wetlands.
7	Vehicle service areas	None of the areas contain vehicle maintenance areas.

[a] NPDES Permit No. CA0005550.
[b] Attachment G: Regional Standard Provisions, Monitoring and Reporting Requirements for NPDES Wastewater Discharge Permits, Section I, Subsection J, Provision 2.b.
NPDES National Pollutant Discharge Elimination System
SWPPP Storm Water Pollution Prevention Plan

Baseline BMPs

Baseline BMPs are non-site-specific; they pertain to most industrial activities. Table 4-2 lists the baseline BMPs and actions for implementing each BMP. Appendix D presents excerpts of pertinent BMPs from the California Stormwater Quality Association's (CASQA) *Stormwater Best Management Practice Handbook (CASQA 2003)*.

Table 4-2

Baseline Best Management Practices

BMP Category	BMP
Good housekeeping	When storm water contacts rubbish, litter, and other uncovered materials, it may wash away residues and materials that may pollute receiving waters. To control this type of storm water contamination, outdoor areas at Valero should be kept neat and clean. Personnel should attempt to prevent littering and should promptly remove any waste materials to avoid contact with storm water. Those materials that must be stored outdoors should be covered with tarps or moved into a covered area. Good housekeeping also includes other types of practices. Sensitive materials (e.g., petroleum, oil, and lubricants; chemicals; cleaning agents; and fuels) should be clearly labeled for use and disposal. Indoor areas should remain uncluttered so that work does not take place outdoors, and leaks and spills can be quickly detected and controlled.
Covering trash dumpsters	Trash in an open bin can bring pollutants into contact with storm water. All trash dumpsters should be covered.
Source control	Source controls include measures such as eliminating or reducing the use of toxic pollutants, covering pollutant areas, sweeping paved areas, containing potential pollutants, and stenciling all storm drain inlets with "No Dumping" signs. Discharges associated with maintenance activities, maintenance facilities, or construction activities (including vehicle and equipment wash water discharges) and discharges associated with waste disposal or the repair/replacement of paved surfaces should be reduced through prevention or effective management.
Preventive maintenance	Materials, buildings, and equipment that are in disrepair are more likely to become storm water hazards than those that operate smoothly. Leaky roofs, broken shed doors, cracked pavement and berms, and any other enclosure defects that compromise storm water protection should be repaired promptly. Similarly, equipment that regularly leaks oil, fuel, or other contaminants should be repaired promptly. Roads, parking lots, and landscaping should not be allowed to degrade to the point where they erode and contaminate runoff. Most important, these types of activities should be undertaken before problems arise, so storm water pollution is minimized.
Control of illicit discharges	The requirements of this SWPPP provide a means for controlling potential illicit discharge through inspections, training, and enforcement.

BMP Category	BMP
Spill and accidental discharge prevention and response	Valero has an oil and hazardous substance SPCC Plan. This plan includes measures and recommendations to reduce the likelihood and extent of spills. Because outdoor spills are a major source of storm water pollution, care should be taken to prevent such spills, equipment should be readily available to mitigate a spill if it occurs, and personnel should receive training on the use of the equipment. These measures are especially important in field training areas, where personnel might incorrectly consider small spills to be harmless. Field trainees should be fully trained in the use and importance of spill control equipment and cleanup procedures. Engineering control features such as berms and containments should be constructed around all sensitive material storage areas, so that spills can be easily detected and controlled. The SPCC Plan defines a mechanism for responding to accidental spills, including identifying parties responsible for initiating immediate cleanup actions; establishing cleanup procedures; notifying appropriate agencies; training employees to identify and react to accidental discharge scenarios; ensuring that properly credentialed contractors are hired for cleanup; and establishing procedures for monitoring, records management, and reporting.
Training	Training is integral to the overall Storm Water Pollution Prevention Program. Personnel should be thoroughly trained in pollution prevention measures pertaining to their day-to-day activities. Training should be tailored to each industrial activity at Valero (e.g., fueling personnel should receive specialized training in fuel spill control). Refinery personnel should receive constructive feedback on their efforts through periodic inspections and reviews.
Inspections	As part of the storm water monitoring program, the storm water pollution prevention team should conduct inspections of each industrial activity and storm water discharge point. The inspections should verify that BMPs are being implemented correctly in each area. The team should also check for signs of storm water pollution (e.g., stains, damaged materials, or oil sheen on runoff or standing water) and should identify ways to correct these problems.

BMP best management practice
SPCC spill prevention control and countermeasure
SWPPP storm water pollution prevention plan

Site-Specific BMPs

In addition to baseline BMPs and Valero's site-wide earthquake preparedness program (see Section 6.3), Valero has identified site-specific BMPs for all industrial activities that have the potential to impact storm water quality. As discussed in Section 5.0, runoff in the Refinery Proper is contained and pumped to the Wastewater Treatment Plant; therefore activities in the refinery proper cannot affect storm water quality. Specific sites and their corresponding BMPs are discussed in the following sections and summarized in Table 4-3.

Table 4-3

Summary of Site-Specific Best Management Practices

BMP	Explanation
Baseline BMPs (see Table 4-2) • Good housekeeping • Covering trash dumpsters • Source control • Preventative maintenance • Control of illicit discharge • Spill and accidental discharge prevention and response • Training • Inspections	Implemented as appropriate at all sites.
Refinery Dock	
Bermed vapor recovery system	The berm surrounding the vapor recovery system is approximately 1.5 feet high and drains to a sump at the end of the dock that has an approximate capacity of 3,000 gallons.
Catch basins and sumps	In case of a spill, sumps and catch basins are used to collect runoff and a sump pumping system discharges the runoff to the treatment plant.
Spill Prevention Controls and Countermeasures Plan	The refinery's SPCC Plan contains procedures for preventing and responding to spills at the refinery dock.
Dock Operations Manual	The Dock Operations Manual provides procedures to prevent and respond to spills.
Crude Transfer Pipeline	
Cathodic protection	Transfer lines are equipped with cathodic protection to prevent corrosion.
Check valves	The transfer line is equipped with check valves to limit the size of spills.
Containment	The asphalt berms and collection sumps contain storm water runoff. Runoff is visually inspected before it is released to the sewer system or surface water.
Inspections	The crude transfer pipeline is visually inspected for leaks once per shift.
SPCC Plan	The SPCC Plan provides procedures for responding to spills from the crude transfer pipeline.
Coke Silos Area	
Catch trays and tarps	Provide containment for coke dust under the conveyor belt.
Vacuum system	Applied to contain coke dust during unloading of bottom-dump rail cars.
Wind barrier	Prevents stray coke dust from leaving the site.

BMP	Explanation
Burma Road and Fire Training Surface Drainage Area	
Bermed training area with discharge to the wastewater treatment plant	Storm water in the fire training area is collected and treated.
Erosion controls	BMPs will be applied to control erosion (see Section 5.0).
Operational procedures	Designed to prevent the storage of hazardous materials.
Metal fence	Designed to prevent gross solids or airborne pollutants from leaving the site.
Raw Water Break Tank Surface Drainage Area	
Erosion controls	BMPs will be applied as needed to control erosion (see Section 5.0).
Avenue A Surface Drainage Area	
Erosion controls	BMPs will be applied as needed to control erosion (see Section 5.0).
SPCC Plan	Provides procedures for responding to spills in the roadway.
Buffalo Wallow Surface Drainage Area	
Erosion controls	BMPs will be applied as needed to control erosion (see Section 5.0).
Berms and sumps	Constructed at the pump pad and Gate 4 to contain spills and discharge them to the API sewer.
Valero East	
Erosion Controls	BMPs will be implemented as need to control any potential erosion (See Section 5.0)
Housekeeping	Throughout the paved receiving area, materials stored will have appropriate BMPs, such as secondary containment, tarps, etc. (See Table 4-2)
Wastewater Treatment Surface Drainage Area	
Dike	Controls drainage within the wastewater treatment plant. Collected runoff is treated prior to discharge.
Marketing Terminal	
Tank overflow prevention	Provides procedures to prevent overflow.
Tank leakage prevention	Specifies maintenance and inspections to minimize leakage.
Loading tank design	Existing tank is designed to send overflow to refinery oily water sewer system.
Vapor recovery system containment	Contains spills in contained area.
Benicia Asphalt Plant[a]	
Storm Water Tank 4633	Storm water drains in the Benicia Asphalt Plant collect storm water flows and direct them to a storm water tank for settling and flow equalization.
Regular inspections	Regular inspections of equipment (including drains, valves, and pumps) for leaks are conducted. In addition, equipment is checked for structural failures. Upon discovery of a malfunction, Valero conducts repairs as required.
Wastewater treatment system	Drains in the Wastewater Treatment System Area capture the storm water in areas with high pollution potential and convey it into the wastewater treatment system.
Good housekeeping	Employees are encouraged to practice good house-keeping procedures throughout the Benicia Asphalt

BMP	Explanation
	Plant.
Maintenance	Wastewater and storm water conveyances are kept open and clear of debris and dirt.
Sweeping	Valero has contracted a street sweeper to sweep the driveways and parking lots prior to each rainy season.
Avoid hosing down areas	Employees are instructed to avoid hosing down the Benicia Asphalt Plant. However, if hosing down the Benicia Asphalt Plant cannot be avoided, the wash water is directed to the Benicia Asphalt Plant's Water Oil Recycling and Treatment System drains instead of the storm drains.
Valero South	
Erosion controls	BMPs will be applied to control erosion (see Section 5.0).
Housekeeping	Throughout the paved receiving area, materials stored will have appropriate BMPs, such as secondary containment, tarps, etc. (See Table 4-2)

[a] Table 4-4 contains site-specific BMPs for other areas within the Benicia Asphalt Plant.
BMP best management practices
SPCC spill prevention, control, and countermeasure
API American Petroleum Institute

4.1 REFINERY DOCK

Site Description

The Refinery Dock is located on the Carquinez Strait approximately a quarter mile northwest of the Martinez-Benicia Bridge (Figure 4-1). No outdoor storage (including aboveground or underground tanks), manufacturing, and/or processing facilities are associated with the Refinery Dock. Dock operating procedures and contingencies are documented in the *Dock Operations Manual* maintained on site (Valero, 1996). Containment curbing, catch basins, a sump, and a sump pumping system, located beneath the dock transfer equipment, are used to collect rainwater and also act as an emergency backup for spills. The sump is pumped to the Crude Transfer Pipeline, which conveys the material into one of the refinery's aboveground storage tanks for later treatment.

Because there are no collection and conveyance systems on point source discharges from the Refinery Dock, storm water samples cannot be collected.

Buildings

There is one building on the Refinery Dock. This building is used as a dock services office for dock employees. The dock services office covers an area of approximately 300 square feet. Wastewater lines from this building are associated with employee rest rooms connecting to the sanitary sewer. The dock services office does not include any industrial activities and, therefore, is not a potential source of storm water pollution. For this reason, this office is not subject to the requirements of the SWPPP.

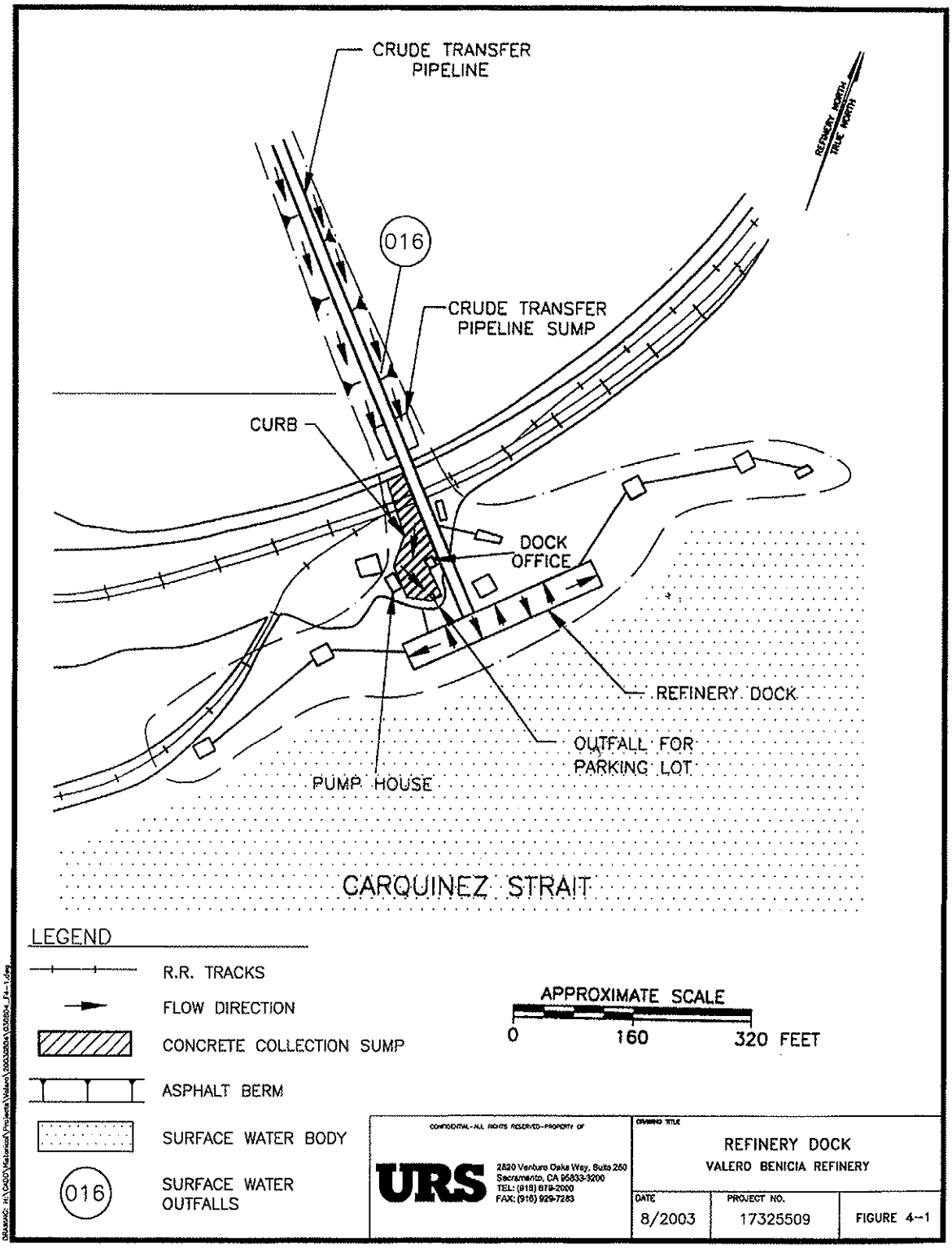

Figure 4-1
Refinery Dock

Additional structures at this site include a fire water pump house and a small covered dock for harboring small boats. Storm water runoff from the dock services office and the fire water pump house runs onto the employee parking lot. Storm water runoff from the small covered dock flows off of the A-frame roof directly into Carquinez Strait.

Loading/Unloading Areas

The primary purpose of the Refinery Dock is to unload incoming ships filled with crude oil and intermediates. The main portion of the dock is 350 feet long and 50 feet wide. It is constructed of pipe piling and reinforced concrete. Product transfer equipment consists of three 16-inch hydraulically operated unloading arms, three 10-inch hydraulically operated loading/ unloading arms, one 12-inch vapor unloading arm and manifold, and a vapor recovery unit. This equipment is surrounded by a curb and drains to a segregated collection system consisting of a 2,380-gallon sump and a 50-gallon-per-minute pump. Also situated on the dock outside of this curbed/contained area are the tie-up crew shelter, the gangway and operating controls, a fire system, and mooring hooks. The dock is normally manned 24 hours a day.

Site Paving and Drainage

Approximately 20% of the Refinery Dock site is covered with impervious surfaces, including paved areas and roofed buildings. The unpaved areas of the site consist of areas around the perimeter of the site that are landscaped, the dock itself, which is constructed from concrete, and the shoreline, which is lined with cemented riprap.

Storm water runoff from the areas of the dock that do not contain transfer equipment flows out from the center of the dock, in the form of sheet flow, to outlets along the sides, and is not directed into any storm drains or channels.

A small employee parking lot at the dock entrance has a drain that channels storm water to Suisun Bay. Because this parking lot is used solely for employee vehicles, no monitoring of the effluent water is required by the NPDES permit.

Process Wastewater and Sanitary Sewer System

Underground utility maps are available for the Refinery Dock and it is believed that all lavatories, shower rooms, and personnel sinks are plumbed to the city of Benicia sanitary sewer. The city of Benicia inspected the integrity of this system on issuing the Building and Occupancy Permits. Other non-storm water discharges appear to be contained, collected, and controlled.

No process wastewater is generated at the Refinery Dock; however, ballast water from incoming ships has, in the past, been generated. Due to updates in the design of today's oil tankers, the necessity to store and treat ballast water has been eliminated. For this reason, the ballast water storage tank has been sealed and is currently inactive.

Storm Drain System

General operation, maintenance, and cleanup practices are implemented so that minimal liquid waste is created in the Refinery Dock area. Valero employees follow strictly enforced spill prevention and control practices, which are described in the *Dock Operations Manual*. Because all storm water at the Refinery Dock is either captured or flows directly into the Carquinez Strait, no storm water drain systems are present at this site.

Site-Specific BMPs

The Refinery Dock presents a significant potential for spills to surface waters.

Potential pollutants at the refinery dock include:

- Crude oil, intermediates, and petroleum products (pipeline leak only).

BMPs used to prevent potential pollutants from entering surface water include:

- **Baseline BMPs.** Implemented as appropriate.
- **Bermed vapor recovery system.** The berm surrounding the vapor recovery system is approximately 1.5 feet high and drains to a sump at the end of the dock that has an approximate capacity of 3,000 gallons.
- **Catch basins and sumps.** In case of a spill, sumps and catch basins are used to collect runoff and a sump pumping system discharges the runoff to the treatment plant.
- **Spill Prevention, Control, and Countermeasure (SPCC) Plan.** The refinery's SPCC plan contains procedures for preventing and responding to spills at the Refinery Dock.
- **Dock Operations Manual.** The *Dock Operations Manual* provides procedures to prevent and respond to spills.

4.2 CRUDE TRANSFER PIPELINE

Site Description

The Crude Transfer Pipeline extends from the Refinery Dock to the Fuels Refinery (Figure 4-2). There are no buildings, storage (including aboveground or underground tanks), manufacturing, and/or processing areas associated with the Crude Transfer Pipeline. The primary loading and unloading facility associated with the Crude Transfer Pipeline is the Refinery Dock. In addition, no wastewater or sanitary sewer lines are associated with the Crude Transfer Pipeline. Outfalls 011 through 016 are located along this pipeline

Outfall 006 is located at the foot of the pipe alley on the south side of the Refinery Proper, and also includes drainage from the Crude Oil Storage Area (COSA) tank farm.

Site Paving and Drainage

The area beneath the Crude Transfer Pipeline (approximately 10,000 linear feet) is underlain primarily with graded, compacted natural soil. One portion of the pipeline extends over a natural earthen swale. This portion extends from the southwest corner of the crude tank field to the northeast along the perimeter of the tank field and Park Road. As indicated on Figure 4-2, one area beneath the pipeline was recently paved with asphalt. Areas immediately adjoining the pipeline consist of landscaped slopes. These areas are maintained on a regular basis to minimize potential erosion. Asphalt berms running parallel with the pipeline channel storm water into seven separate collection sumps located along the length of the pipeline (see Figure 4-2).

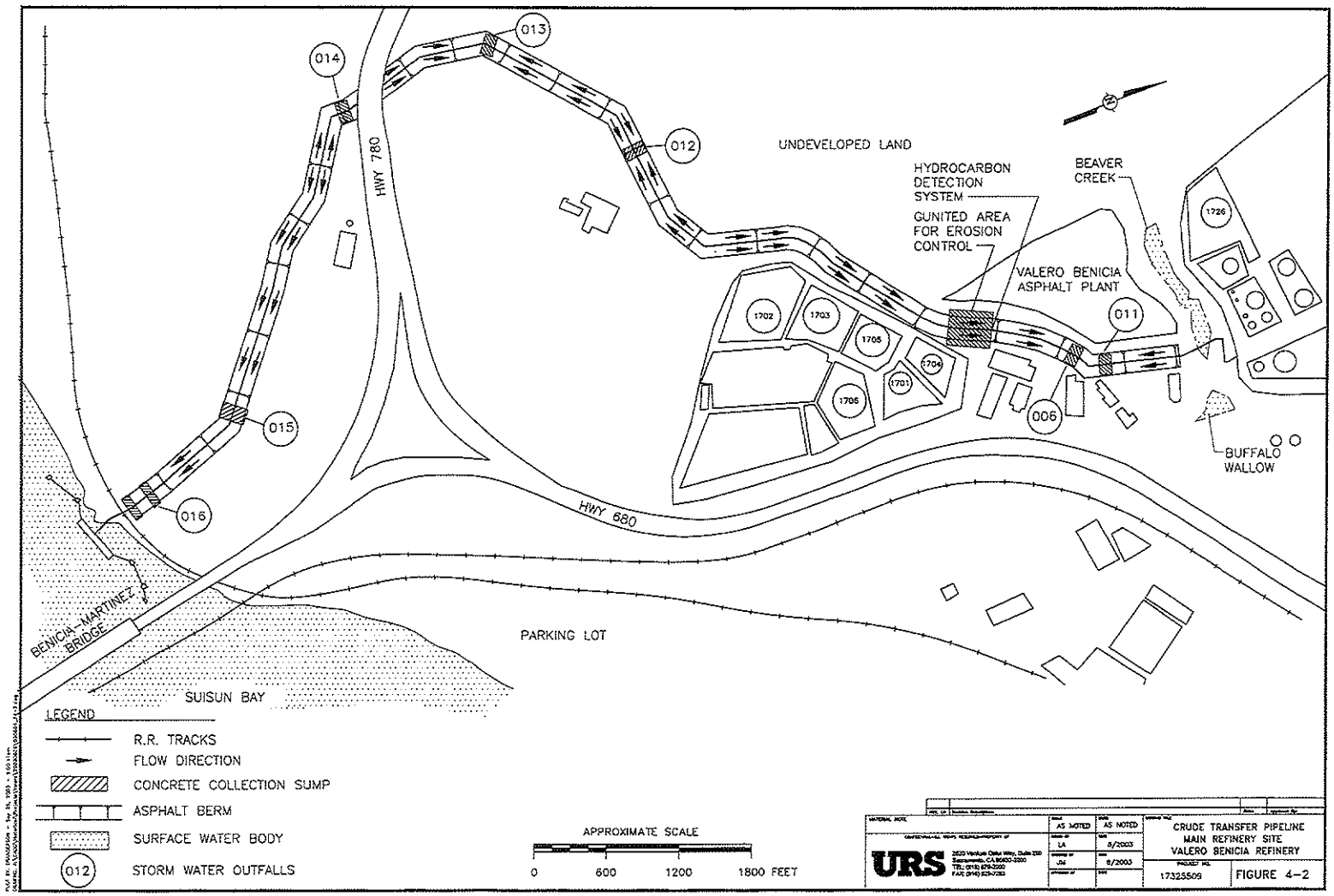

Figure 4-2
Crude Transfer Pipeline

The sumps are constructed from concrete with valved piping connections to the municipal storm water sewer system; the sumps were designed to contain releases from a leak or rupture of the pipeline, or runoff from a 10-year, 24-hour storm. One of the sumps located near the Refinery Dock on the north side of Bayshore Road pumps contained rainwater into the Crude Transfer Pipeline (similar to the dock sump).

Rainwater collected in these sumps is visually inspected prior to release to the municipal sewer system or nearest surface water body. The containment valves for three of the sumps (Outfalls 006, 012, and 015 on Figure 4-2) are normally left open to accommodate flow from natural springs. The valves for these sumps are motor operated and can be automatically closed remotely from central control.

Storm Drain System

The collection sumps associated with the Crude Transfer Pipeline collect storm water runoff from immediately below and around the pipeline. This storm water is channeled via the asphalt berms (illustrated on Figure 4-2) to the collection sumps. Following visual inspection, clean storm water from this area is released into the municipal sewer system or nearest surface water body. If oil sheen is observed during the visual inspection, the contaminated storm water is collected via vacuum truck and directed into the refinery oily water treatment system.

Drainage from outside the Crude Transfer Pipeline is captured in various storm water inlets that drain to municipal storm water sewers.

Site-Specific BMPs

Line failure in the pipe alley due to flange separation could result in leakage. Leaked material could find its way to receiving waters by traveling approximately a quarter mile through a piped drainage system, which is preceded by a sump and underflow weir, to Sulfur Springs Creek.

Valero employees assigned to pipeline maintenance regularly attend training sessions for spill prevention and containment. In addition, established procedures have been prepared to respond to potential spills or releases. Valero's oil spill prevention and contingency plans can be found in the SPCC Plan maintained on site (Valero, in revision at the time of this submittal, 2007).

Specific details of source controls and inspection procedures for the Crude Transfer Pipeline and COSA tank farms are also listed in the SPCC Plan.

Potential pollutants in the Crude Transfer Pipeline and COSA tank farm area include:

- Crude oil, intermediates, and petroleum products.

BMPs used to prevent potential pollutants from entering surface water include:

- **Baseline BMPs.** Implemented as appropriate.
- **Cathodic protection.** Transfer lines are equipped with cathodic protection to prevent corrosion.
- **Check valves.** The transfer line is equipped with check valves to limit the size of any spills.
- **Containment.** The asphalt berms and collection sumps contain storm water runoff. Runoff is visually inspected before it is released to the sewer system or surface water.
- **Inspections.** The Crude Transfer Pipeline is visually inspected for leaks once per shift.

- **Spill Prevention, Control, and Countermeasure Plan.** The SPCC Plan provides procedures for responding to spills from the Crude Transfer Pipeline and COSA tank farm.

4.3 COKE SILOS AREA

Site Description

The Coke Silos are located on the Carquinez Strait approximately a quarter mile west of the Refinery Dock (Figure 4-3). Four silos at this site receive and store processed coke—a petroleum-based powder used for fuel—until it can be loaded onto ships. Coke is transferred to the silos by rail cars, which are loaded in the refinery. Once the rail cars reach the Coke Silos, telescoping extraction tubes are connected to remove their contents. An underground pneumatic system transfers the coke to the four silos pending ship loading.

The Coke Silos and associated transfer systems are constructed and operated in a manner that minimizes or eliminates airborne particulates. A vacuum system is employed at the base of bottom-dump rail cars while off loading coke to the silos. The vacuum system helps draw the coke dust from the rail cars and minimizes potential airborne coke particulates. Coke dust that accumulates at the rail car unloading area is vacuumed up manually. A wind barrier was constructed along the cyclone fence to the immediate north to prevent stray coke dust from leaving the site.

A conveyor belt transfers coke from the silos to waiting ships. The north end of the conveyor belt is completely enclosed to prevent airborne particulates from leaving the site. In addition, a vacuum truck is used to capture airborne particulates while transferring coke from the silos to the ships. The vacuum truck draws airborne coke dust from around the conveyor belt into a portable bin. The bin is transported back to the refinery when full and emptied to accommodate future loading events.

Given the absence of storm water collection and conveyance systems and point source discharges at the Coke Silos Area, no monitoring of effluent storm water is possible. In addition, no storm drain systems are associated with the Coke Silos. Storm water exits this site in the form of sheet flow.

A shower and lavatory facility at the operations shelter is connected to the Benicia sanitary sewer system. No storage tanks are associated with the Coke Silos.

Buildings

There are two small operations shacks at the Coke Silos where contract employees control loading and unloading operations. Storm water runoff from the operations shack flows onto the ground and toward the Carquinez Strait. The lavatory facilities in one of the shacks are connected to the municipal sanitary sewer system.

Storm Drain System

No storm drains exist in this area. Drainage of this area is via sheet flow.

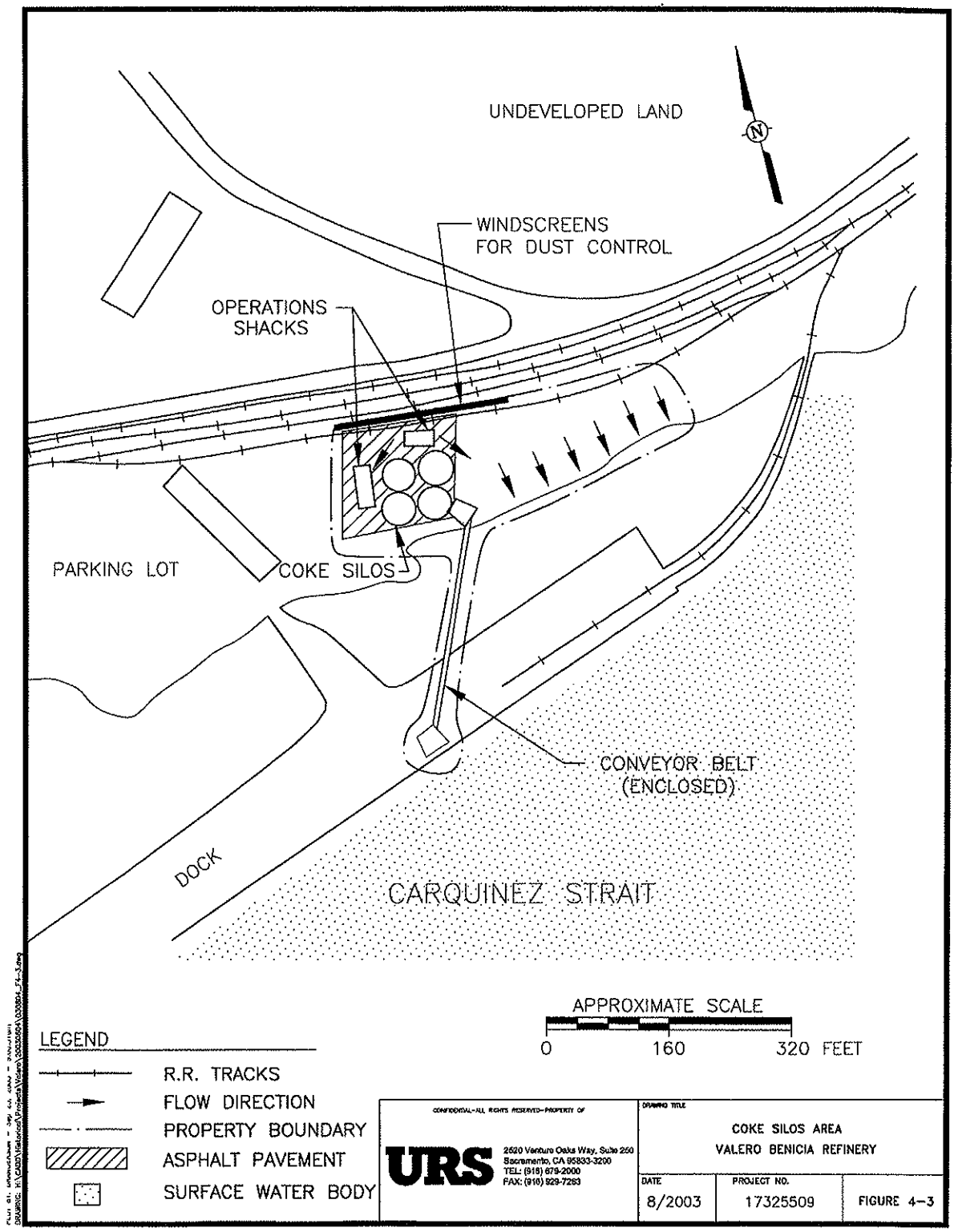

Figure 4-3
Coke Silos Area

Site-Specific BMPs

The Coke Silos area has the potential to contaminate surface water when coke dust is not contained. A small surface water inlet exists near the conveyor belt, which has the potential to become contaminated with coke dust if the coke dust is not handled appropriately.

Potential pollutants in the Coke Silos area include:

- Coke dust (TSS, metals, and hydrocarbons).

BMPs used to prevent potential pollutants from entering surface water include:

- **Baseline BMPs.** Implemented as appropriate.
- **Catch trays.** Provide containment for coke dust under the conveyor belt.
- **Vacuum system.** Applied to contain coke dust during unloading of bottom-dump railcars.
- Wind barrier. Prevents stray coke dust from leaving the site.

4.4 BURMA ROAD AND FIRE TRAINING SURFACE DRAINAGE AREA

Site Description

The Burma Road and Fire Training Surface Drainage Area is located immediately west of the process block and extends to the western Valero property boundary (Figure 4-4). The 69-acre area is primarily unpaved (1% is paved surface), and consists of roads, parking, and temporary administration buildings for contractors. The Burma Road area is also used as a laydown area for miscellaneous equipment and materials.

This area of the refinery has more topographical relief than the rest of the refinery. The steep banks in this area are subject to erosion.

The runoff is discharged west of Gate Number 4, on the south side of the refinery processing area, via a spillway into the western end of Beaver Creek. Beaver Creek routes the storm water via outfall 005 to Buffalo Wallow and, in turn, to Sulfur Springs Creek and Suisun Bay. A natural spring also discharges to this drainage.

There are no manufacturing and/or processing areas or storage tanks associated with this surface drainage area. No industrial process wastes or wastewaters are associated with this surface water drainage area.

Buildings

Buildings at the Burma Road and Fire Training Surface Drainage Area are limited to trailers used by Valero employees and subcontractors while conducting work at the refinery.

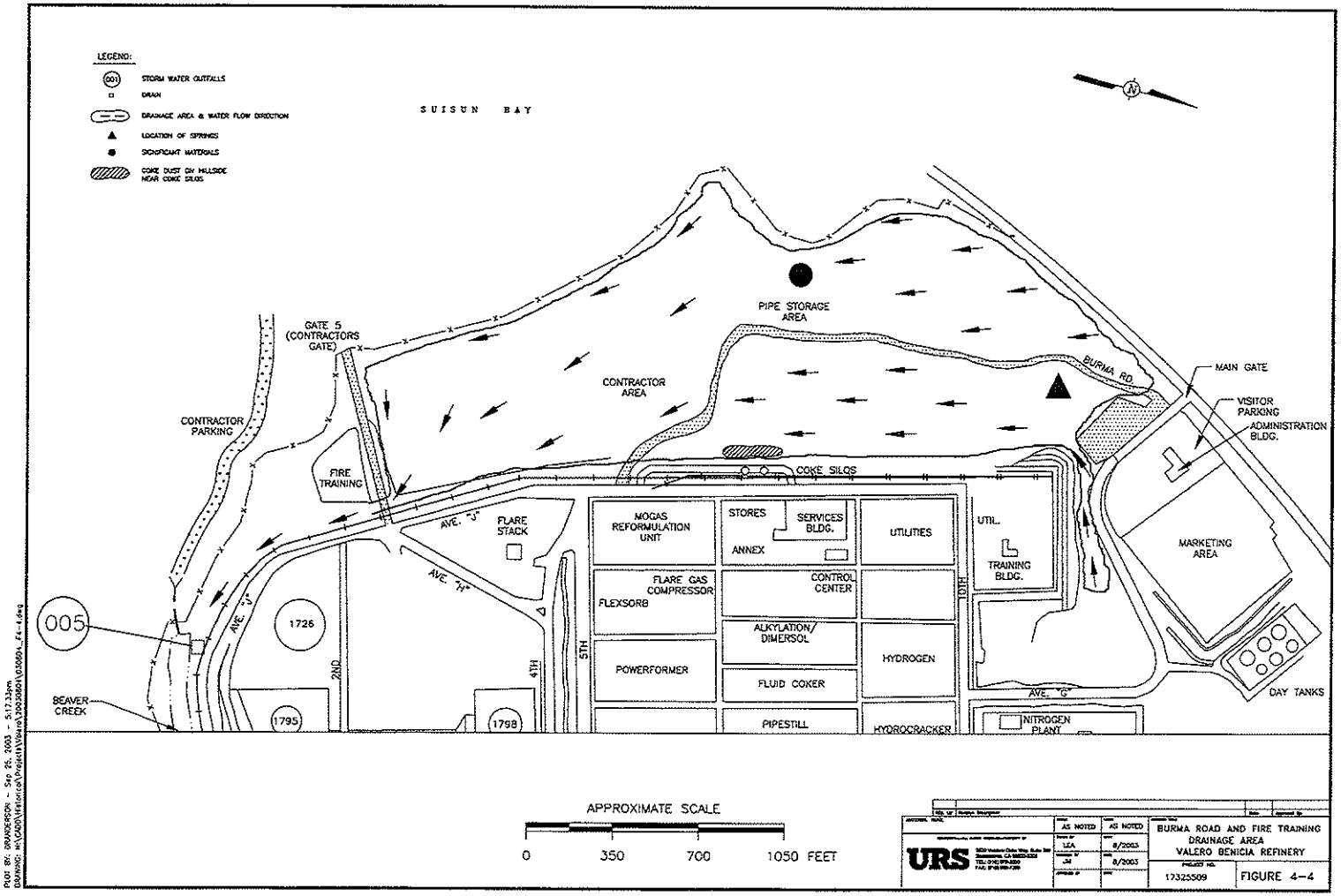

Figure 4-4
Burma Road and Fire Training Drainage Area

Outdoor Storage, Manufacturing, and/or Processing Areas

The primary use of the Burma Road and Fire Training Surface Drainage Area is outdoor storage and fire training. Subcontractors routinely store equipment and supplies at the site until needed (loading and unloading is infrequent). Valero also uses part of the area for storage of piping and potentially salvageable equipment and materials. Outdoor storage areas compose approximately 20% of the 69-acre area.

Approximately a quarter-acre is used for fire training. The remainder of the area consists of steep, vegetated banks and paved access roads.

Site Paving and Drainage

One percent of the Burma Road and Fire Training Surface Drainage Area is paved. The paved areas are limited to access roads. Sheet flow from Burma Road and most of the Fire Training Surface Drainage Area is directed toward Beaver Creek by topography and concrete channels. Drainage from a portion of the Fire Training Area is collected and drained to the Wastewater Treatment Plant to prevent the migration of runoff from training exercises to surface water.

Storm Drain System

The surface drainage area is the primary channel for storm water in the immediate area. This area drains directly to Beaver Creek and subsequently to Suisun Bay via Sulfur Springs Creek. The storm drain clogged during heavy rains in 1997 and 1998, but has since been cleaned and modified to ensure that drainage controls function as designed.

There is a concrete and asphalt fire training pad in the Burma Road and Fire Training Surface Drainage Area. The fire training pad drains independently to the Wastewater Treatment Plant.

Site-Specific BMPs

Potential storm water contamination concerns in this area are greatest in the Fire Training Area, which drains to the Wastewater Treatment Plant. However, in the event of a backup in the drainage system the discharge overflows to the storm drain.

Potential pollutants in the Burma Road and Fire Training Surface Drainage Area include:

- Herbicide applications;
- Metals (in the Fire Training Surface Drainage Area); and
- TSS from erosion.

BMPs used to prevent potential pollutants from entering surface water include:

- **Baseline BMPs.** Implemented as appropriate.
- **Bermed training area with discharge to the Wastewater Treatment Plant.** Storm water in the training area is collected and treated.
- **Erosion controls.** BMPs will be applied to control erosion (see Section 5.0).
- **Operational procedures.** Designed to prevent the storage of hazardous materials.
- **Metal fence.** A metal fence was constructed at the edge of the fire training area to prevent gross solids or airborne pollutants from leaving the site.

4.5 RAW WATER BREAK TANK SURFACE DRAINAGE AREA

Site Description

The Raw Water Break Tank Surface Drainage Area is near the Raw Water Break Tank at the north end of Avenue A (Figure 4-5). Sheet flow is directed toward Outfall 003 from the 19-acre, unpaved area. The outfall flow is directed to Sulfur Springs Creek via a culvert. A spring also discharges to this drainage. This site has significant topographical relief, so the effectiveness of erosion controls must be monitored.

The area includes the Lower Level Tank Farm (LLTF). There are no manufacturing or processing areas associated with this surface drainage area. In addition, no industrial process wastes or wastewaters are associated with this surface water drainage area.

Site Paving and Drainage

Sheet flow from the Raw Water Break Tank Surface Drainage Area is directed into Sulfur Springs Creek through a culvert. Sulfur Springs Creek ultimately conveys the storm water to the Carquinez Strait.

No paving is found in this surface drainage area.

Storm Drain System

The surface water drainage area is the primary channel for storm water in the area. This area drains directly to Sulfur Springs Creek.

Site-Specific BMPs

Storm water runoff from this area is discharged near the refinery water service entrance box at the northeast corner of the refinery (in the processing area at the Raw Water Break Tank) via a culvert that discharges into a ditch tributary to Sulfur Springs Creek. Because of the location of the drains in the Refinery Proper, (the drains lead to the API and Chem Sewers), it is unlikely that drainage from this area would contain hazardous materials. The only potential for a direct discharge into this runoff would be from aboveground piping south of the Main Substation in this area or the LLTF.

Potential pollutants in the Raw Water Break Tank Surface Drainage Area include:

- TSS from erosion.

BMPs used to prevent potential pollutants from entering surface water include:

- **Baseline BMPs.** Implemented as appropriate.
- **Erosion controls.** BMPs will be applied as needed to control erosion (see Section 5.0).
- **Spill Prevention, Control, and Countermeasure Plan.** The SPCC Plan provides procedures for responding to spills from the LLTF.
- **Inspections.** Storm water from the LLTF is contained behind valved berms and is monitored and released manually by operators.

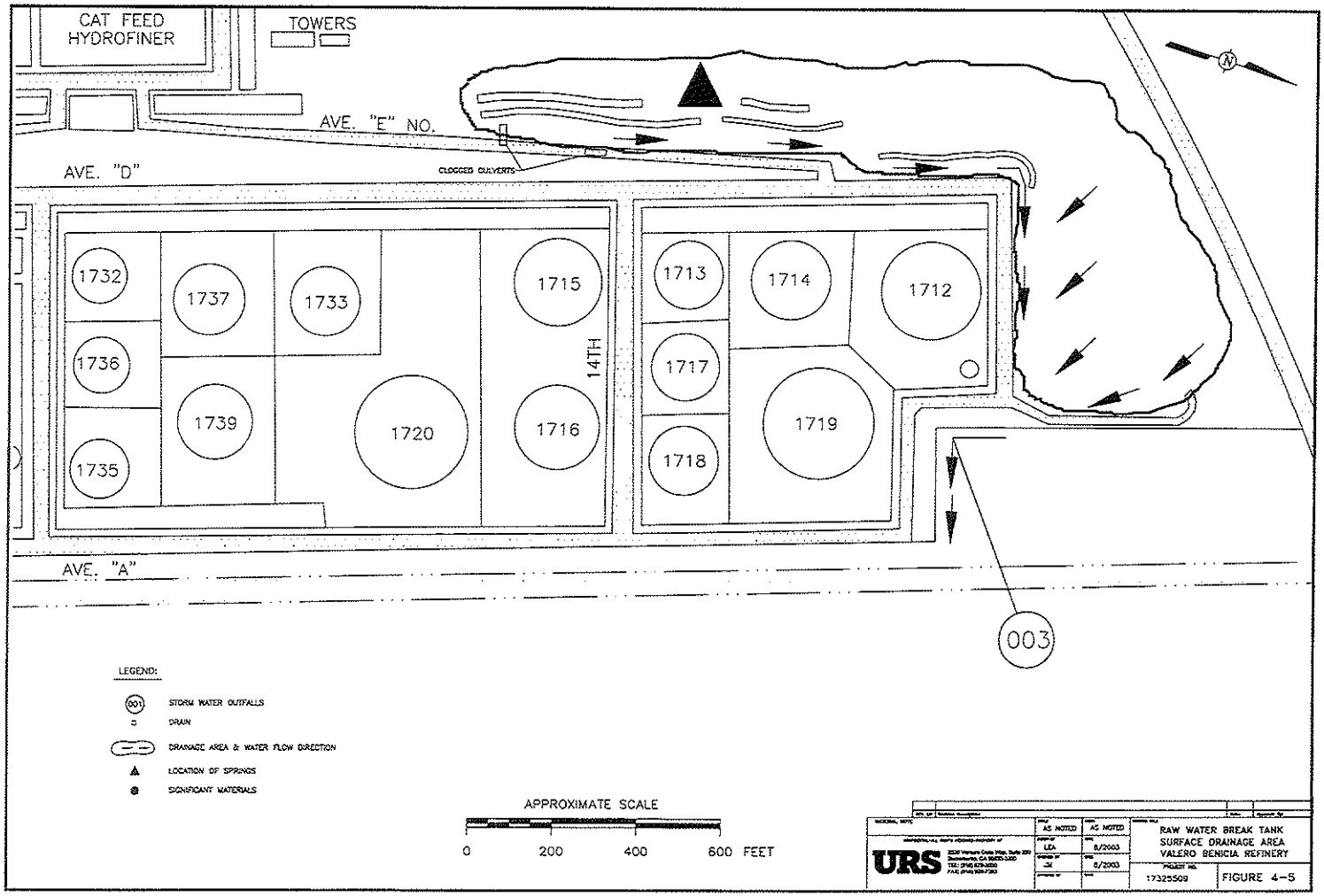

Figure 4-5
Raw Water Break Tank Surface Drainage Area

4.6 AVENUE A SURFACE DRAINAGE AREA

Site Description

A small surface water drainage area is present on Avenue A in the Refinery Proper (Figure 4-6), as well as the storm water contained behind containment berms in the Upper Level Tank Farm (ULTF). Storm water from this area drains to Outfalls 009 and 010 before flowing to Sulfur Springs Creek.

Site Paving and Drainage

Sheet flow from Avenue A, the ULTF and the adjacent railroad is directed toward three storm drains and channeled below ground to surface drainage leading into Sulfur Springs Creek. The main purpose of this drainage area is to control erosion and the flooding of a small access road that bisects the locality.

Storm Drain System

The surface water drainage area is the primary channel for storm water in the immediate area. Storm water in the ULTF is held back to regulate drainage to the Outfalls. This area drains directly to Sulfur Springs Creek.

Site-Specific BMPs

It is unlikely that a spill or discharge could occur in this area because ULTF storm water is controlled and only released manually. Runoff from Avenue A could only be impacted by direct discharge if a spill occurred on the roadway.

Potential pollutants in the Avenue A surface drainage area include:

- TSS from erosion (minimal); and
- Urban runoff from the road.
- Hydrocarbon from tank farm activities

BMPs used to prevent potential pollutants from entering surface water include:

- **Baseline BMPs.** Implemented as appropriate.
- **Erosion controls.** BMPs will be applied as needed to control erosion (see Section 5.0).
- **Spill Prevention, Control, and Countermeasure Plan.** The SPCC Plan provides procedures for responding to spills in the roadway and in the ULTF.

4.7 VALERO EAST

Site Description

The 4.07-acre area consists of a two buildings with associated asphalt paved parking lots and storage areas, and to the north an unimproved soil covered lot. Improvements to this lot are planned for use as a laydown area during refinery turnarounds.

Site Paving and Drainage

Paved areas currently drain to the City of Benicia storm sewers.

Storm Drain System

The surface water drainage area is the primary channel for storm water in the immediate area. This area drains directly to Sulfur Springs Creek.

Site-Specific BMPs

BMPs used to prevent potential pollutants from entering surface water include:

- **Baseline BMPs.** Implemented as appropriate.
- **Erosion controls.** BMPs will be applied as needed to control erosion (see Section 5.0).

4.8 BUFFALO WALLOW SURFACE DRAINAGE AREA

Site Description

A surface water collection area is located near Gate 4 in the Refinery Proper (Figure 4-7). Valero has designated this area as the Buffalo Wallow Area. This area serves as a receptacle for surface water runoff originating adjacent to Beaver Creek and in a small area surrounding an adjacent truck scale and approximately 650 feet of railway. Storm water from Outfalls 004, 007, and 008 is diverted at this point into a 72-inch concrete culvert, which channels the storm water to Sulfur Springs Creek.

Outfall 008 has low flow and is difficult to sample. During the 2011-2012 rain season, Valero will collect samples from both the official Outfall 008 sample location and from the Outfall 008 pipe discharge point upstream of the 72-inch concrete culvert. If sample results are consistent, Outfall 008 may be moved further downstream to the new sample location.

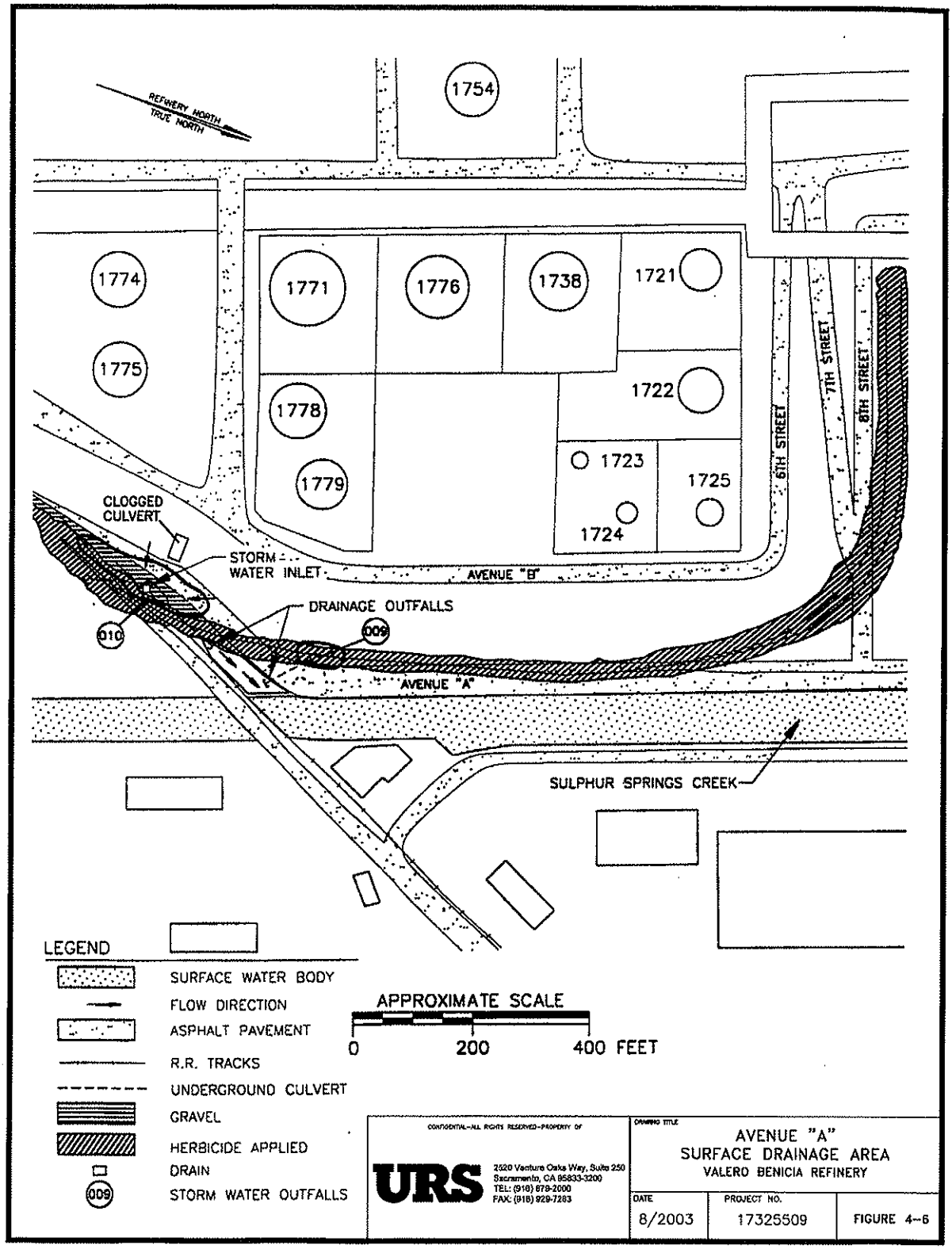

Figure 4-6
Avenue "A" Surface Drainage Area

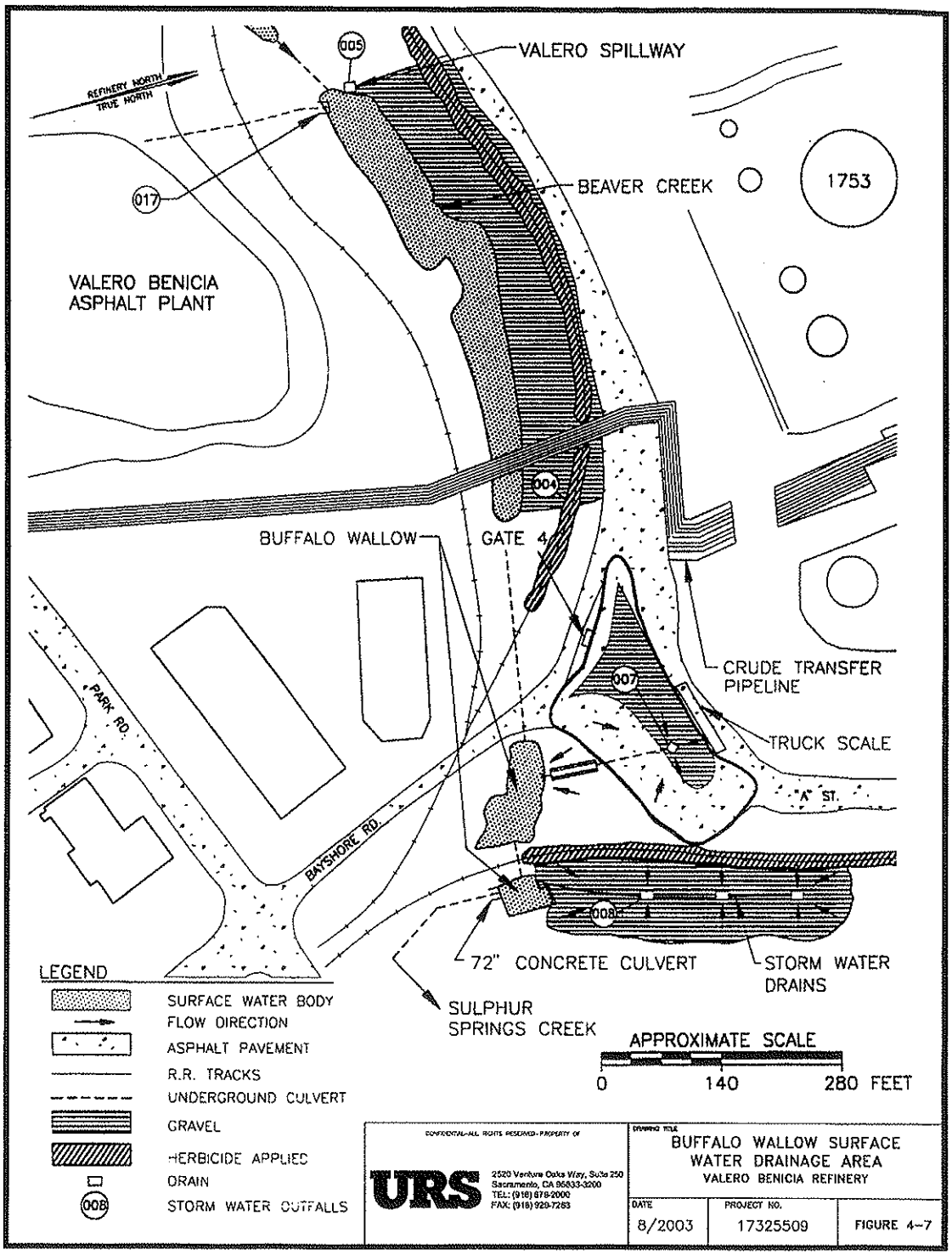

Figure 4-7
Buffalo Wallow Surface Water Drainage Area

There are no buildings, storage (including aboveground or underground tanks), manufacturing and/or processing, or loading and unloading areas associated with the Buffalo Wallow Area. In addition, no industrial process wastes or wastewaters are associated with this area.

Site Paving and Drainage

Sheet flow from an adjacent asphalt truck turnaround area drains into the Buffalo Wallow Area via a storm drain and soil drainage swale. Surface water drainage also enters Buffalo Wallow in the form of sheet flow from the immediate area, which is directed by a slight inward grade on all sides of the area.

In addition, drainage is directed to the Buffalo Wallow Area from a series of storm water inlets. These inlets receive surface water from isolated areas located parallel to a nearby railroad spur. Drainage at each of these isolated areas flows inward toward the inlets, which is facilitated by slight grades in each of the immediate areas.

Storm Drain System

The storm drain at the truck turnaround area is located north of Buffalo Wallow, just past the northern edge of the asphalt turnaround area. An underground culvert channels flow underneath the truck turnaround area to a drainage swale located on the north side of Buffalo Wallow.

A second storm drain system, mentioned above, uses three inlets to receive and direct storm water to the diversion area. The storm water from this system is diverted directly to Sulfur Springs Creek.

Site-Specific BMPs

Drainage at the south side of main refinery/Avenue J is discharged at the pump pad into one or both of two sumps, from which the collected material is pumped to slop tankage or the API sewer. A discharge of hazardous materials could potentially go off site at this point and enter Beaver Creek. The most likely source of discharge would be petroleum product from the pump pad. Discharges at the pump pad (e.g., during transfer of materials) enter a sump, from which the collected material is pumped to the API sewer. In addition, a berm has been constructed at Gate 4 to contain releases within the refinery.

BMPs used to prevent potential pollutants from entering surface water include:

- **Baseline BMPs.** Implemented as appropriate.
- **Erosion controls.** BMPs will be applied as needed to control erosion (see Section 5.0).
- **Berms and sumps.** Constructed at the pump pad and Gate 4 to contain spills and discharge them to the API sewer.

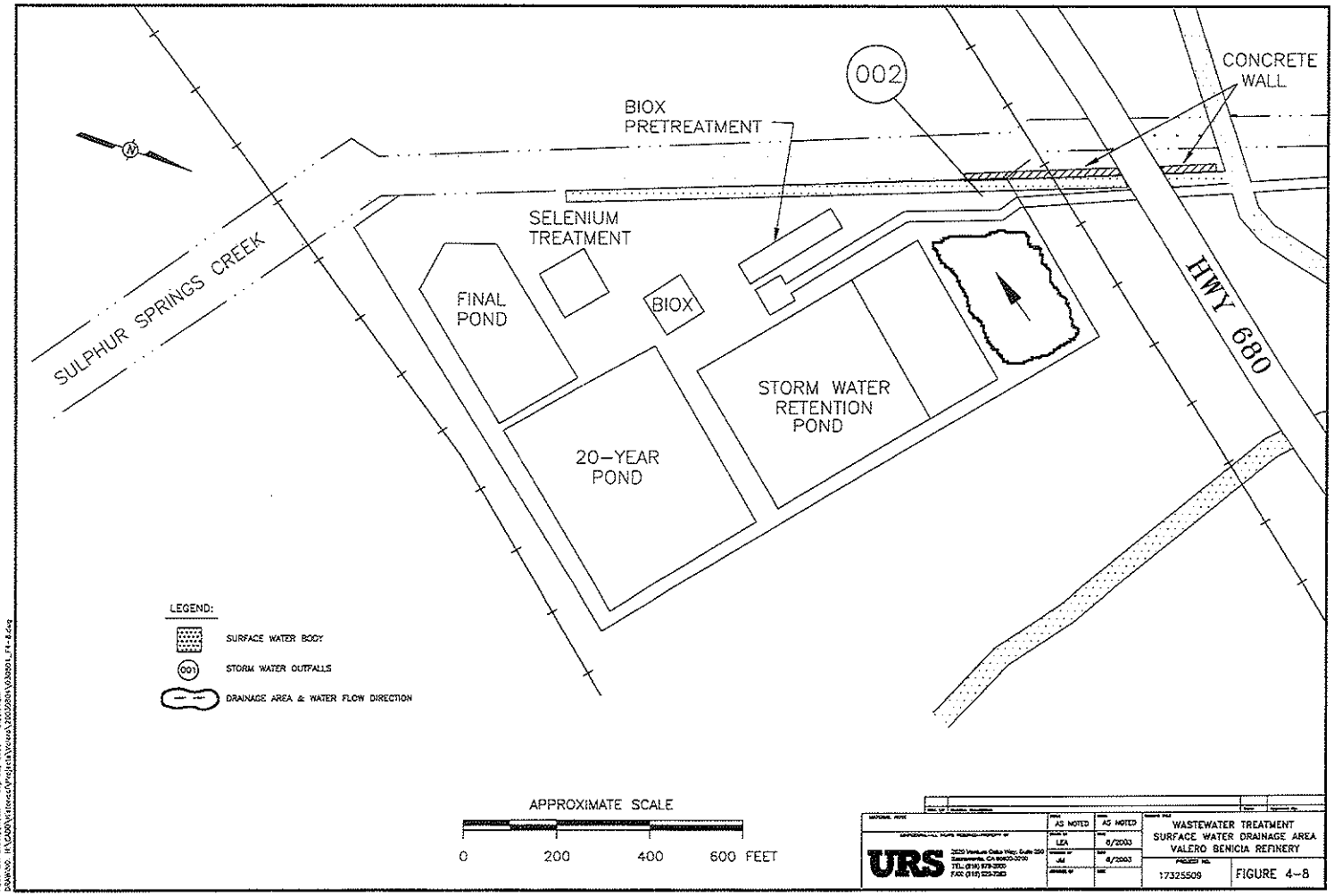

Figure 4-8
Wastewater Treatment Surface Water Drainage Area

4.9 WASTEWATER TREATMENT SURFACE DRAINAGE AREA

Site Description

Wastewater composed of process wastes, cooling tower and boiler blowdown, ballast water, stripped sour water, raw water treatment backwash, and storm water runoff is treated at the Wastewater Treatment Plant (Figure 4-8). This parcel is bordered on the west by a dike; the access road to the Wastewater Treatment Area sits on top of the dike. Immediately west of the dike is Sulfur Springs Creek. The road continues around the southern portion of the Wastewater Treatment Area. The easternportion contains the final pond (fully treated wastewater that is discharged to Suisun Bay), the 20-year pond, and the storm water retention pond. Runoff within the diked area is collected and treated. Areas outside the perimeter of the diked area are discussed below.

The API and Chem Sewer Lines enter this parcel at the northern corner. Two culverts drain to Sulfur Springs Creek from this area. Thus, spillage of untreated wastewater or hazardous materials used at the treatment plant could potentially be discharged to Sulfur Springs Creek, although, the valves are kept closed until water is treated. In addition, the 20-year and storm water retention ponds could contain untreated storm water commingled with untreated wastewater after a storm event.

A 1.8-acre, unpaved site along the western boundary of the Wastewater Treatment Surface Drainage Area drains surface water via Outfall 002 to Sulfur Springs Creek. The area is occasionally used to store equipment and is separated from the Wastewater Treatment Plant by a dike.

There are no buildings, aboveground or underground tanks, or loading and unloading areas associated with the 1.8-acre area. No industrial process wastes or wastewaters are associated with the Wastewater Treatment Surface Drainage Area.

Another area subject to potential BMP incidents is the point at which the API and Chem Sewer Lines cross Sulfur Springs Creek on their way to the Wastewater Treatment Area. Leaks from these lines could spill directly into the creek.

Outdoor Storage, Manufacturing, and/or Processing Areas

The Wastewater Treatment Surface Drainage Area is occasionally used to store equipment. No manufacturing and/or processing areas are associated with this surface water drainage area.

Site Paving and Drainage

The Wastewater Treatment Surface Drainage Area is unpaved. Drainage is discharged through a ditch and several pipes into Sulfur Springs Creek, which is contiguous with Suisun Bay.

Storm Drain System

The Wastewater Treatment Surface Drainage Area is the primary channel for storm water in the immediate area. This area drains through a ditch and several pipes into Sulfur Springs Creek.

Site-Specific BMPs

Runoff within the Wastewater Treatment Plant is contained and treated. Additional BMPs have been developed to address runoff outside of the contained area.

Potential pollutants in the Wastewater Treatment Area include:

- Untreated wastewater from the API and Chem Sewer collection systems.

BMPs used to prevent potential pollutants from entering surface water include:

- **Baseline BMPs.** Implemented as appropriate.
- **Dike.** Controls drainage within the Wastewater Treatment Plant. Collected runoff is treated prior to discharge.

4.10 MARKETING TERMINAL

Site Description

The Marketing Terminal is located immediately to the north of the main refinery administration building on East Second Street (Figure 4-9). Truck and trailer vehicles enter the terminal to load product from the refinery for transport off site.

The Marketing Terminal rack operation is restricted and requires card access for control of the truck or trailer transfer operation. All trucks loading at the rack are required to have overfill protection to shut off the flow of product into the tank truck to prevent spills. Connection of ground and product hoses is monitored automatically. Transfer operations can only commence with all connections correctly connected.

Storm Drain System

The area of the terminal is completely paved with asphaltic concrete. All sheet flow in open areas subject to rainwater drains to a sump located at the south portion of the terminal. This sump drains to the Raw Water Break Tank Surface Drainage Area. This sheet flow is then directed toward Outfall 003.

Any spill at the loading rack would flow to the drain sumps at the rack islands and from there to the refinery oily water sewer system. Emergency cutoff switches are located at the loading rack to shut off the flow from the transfer pumps to the rack area.

Site-Specific BMPs

Storm water runoff is contained in the paved area and transported to the sump at the south end of the terminal. This sump drains to the Raw Water Break Tank Surface Drainage Area and leaves the site through Outfall 003. However, all hazardous material storage areas in the Marketing Terminal are in areas that drain to the refinery oily water sewer system, not the storm water sump. Thus, hazardous constituents are not likely to be present in the sheet flow runoff.

Site-specific BMPs used to prevent potential pollutants from entering surface water include:

- **Tank overflow prevention.** Overflow is prevented through practices and operational procedures for regularly gauging tanks to ensure that overflow is prevented. Any overflow would be contained in the diked area. In addition, trucks are required to have overfill protection and interlocks to ensure all connections are made properly.
- **Tank leakage prevention.** The likelihood of tank leakage is minimized by periodic maintenance activities and inspections according to American Petroleum Institute Standard 653. All tanks are equipped with cathodic protection. Leaked materials would be contained in the concrete containment area.

- **Loading rack design.** Any spill at the loading rack would flow to the drain sumps at the rack islands, which discharge to the refinery oily water sewer system. Emergency cutoff switches are located at the loading rack to shut off the flow from the transfer pumps to the rack area.
- **Vapor recovery design.** Spills or leaks in the tank or recovery area would be contained by the concrete containment.

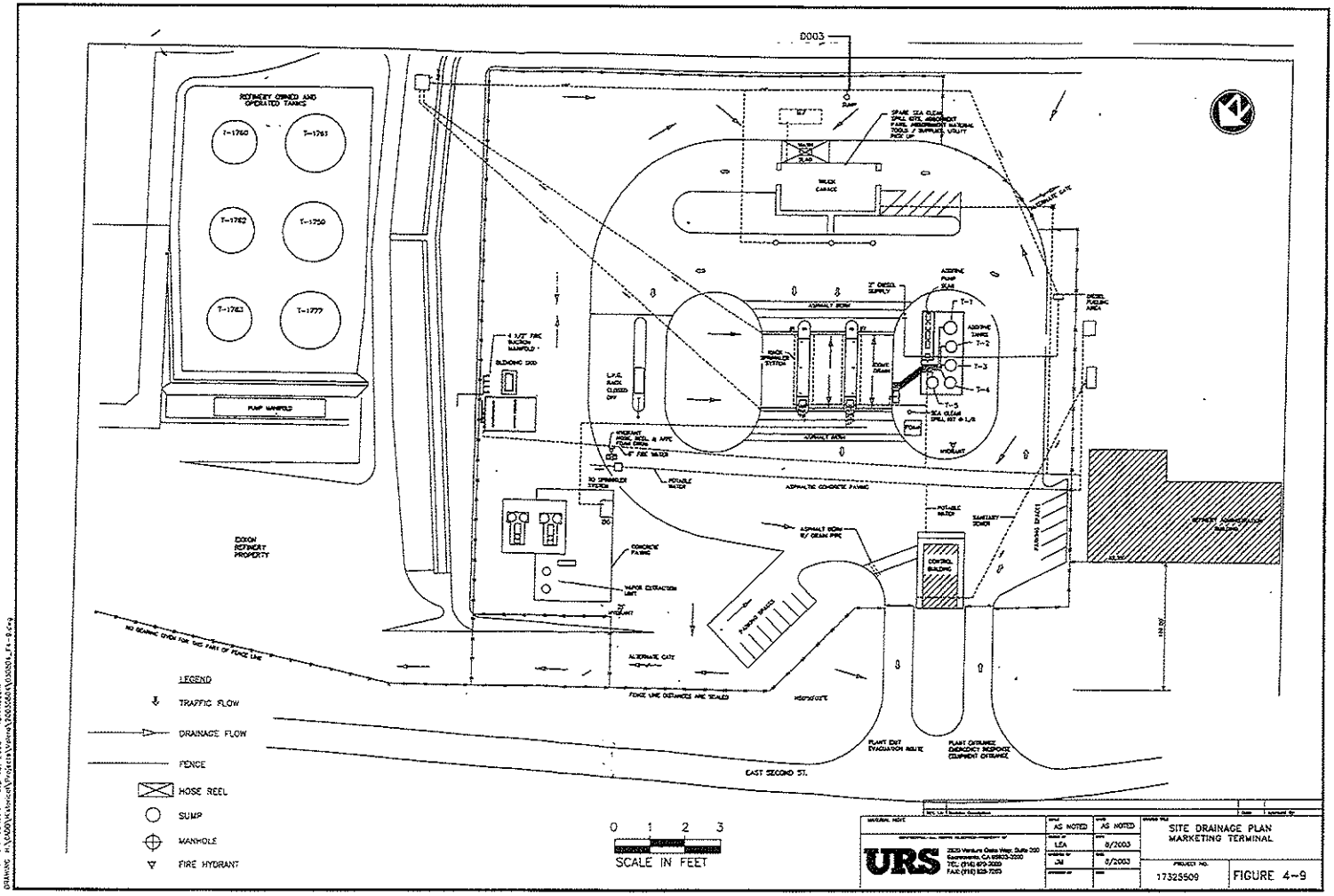

Figure 4-9
Marketing Terminal

4.11 BENICIA ASPHALT PLANT

Site Description

The Benicia Asphalt Plant refines crude oil into a number of asphalt products. The Benicia Asphalt Plant's primary product is paving asphalt. Naphtha, kerosene, and gas oil are secondary products and are typically sent to the main refinery or sold to other refiners for further processing. No distillate fuels, gasoline, diesel fuel, or jet fuel are manufactured.

The primary manufacturing units at the Benicia Asphalt Plant are a pre-flash tower and a vacuum distillate unit. There are no complex hydrocarbon processing units at the Benicia Asphalt Plant, such as hydro-treating, visbreaking, coking, or thermal or catalytic cracking. The absence of complex hydrocarbon processing minimizes the types and toxicity of wastes generated at the Benicia Asphalt Plant.

The Benicia Asphalt Plant is built on approximately 19 acres of land. Storm water is discharged to the Suisun Bay via the city of Benicia's storm water discharge system. There are no active or inactive wells, streams, or wetlands on site.

The location of buildings and major activities at the Benicia Asphalt Plant are shown on Figure 4-10. The buildings and major activity areas consist of two tank farms, a loading rack area, a railcar loading area, executive offices and an operations building, a process unit area, a modified asphalt plant, a maintenance bunker, a wastewater treatment area, a storm water tank, and a laboratory in the operations building. In addition to these, Figure 4-10 shows the following:

- The facility's boundaries;
- Areas of industrial activities;
- Storm water discharge points;
- Paved areas and buildings;
- Areas of potential pollutant contact;
- Location of existing storm water structural control measures (i.e., berms); and
- Areas of existing and potential soil erosion.

Storm Drain System

There are numerous storm water drains located in the Benicia Asphalt Plant. These drains capture the unit's storm water flows. This storm water is captured in the Benicia Asphalt Plant's storm water tank and is held until tested and discharged to Suisun Bay via the City of Benicia's storm water drainage system.

Process Area

The entire production of asphalt and distillates, such as gas oil and naphtha, takes place in the Benicia Asphalt Plant's process area. The process area is paved with concrete and is partially bermed to ensure all storm water is captured and treated in the process area. In addition, the area is sloped toward the center to facilitate the collection of storm water in oil recovery area drains. Potential sources of pollution are major spills due to equipment malfunctioning; and spills while taking product samples.

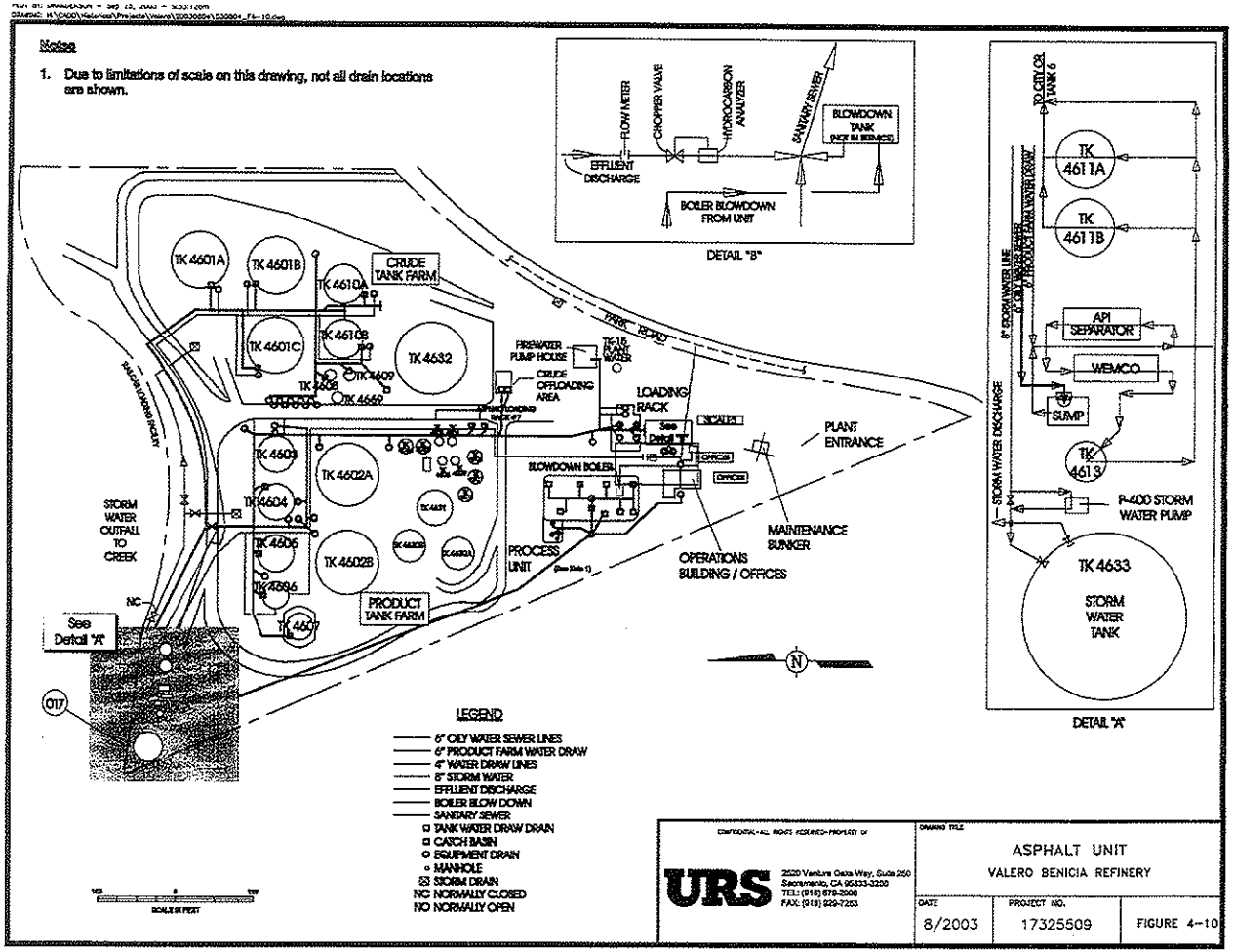

Figure 4-10
Benicia Asphalt Plant

Tank Farm Areas

Crude oil is stored in aboveground tanks in the crude oil tank farm area. Products are also stored in aboveground tanks until shipped via tank truck, ships, or railcars. The capacity of the crude and product tanks varies.

The tank farm truck routes are paved. The tank farm areas are isolated from the rest of the Benicia Asphalt Plant by hills and berms. Spills and overflows are cleaned with gravel, and the dirty gravel is either transported to an asphalt facility for recycling or disposed of. The storm water trapped in the tank farm area flows via area drains to storm water tank 4633. Possible sources of pollution are:

- Crude oil and product spills; and
- Erosion from the berms.

Loading/Unloading Areas

The Benicia Asphalt Plant has two tank truck loading facilities and one railcar loading facility. One of the tank truck loading facilities is used exclusively for transporting asphalt, and the other tank truck loading facility is used for transporting asphalt and distillate products. Valero loads spent caustic and light vacuum gas oil and occasionally receives asphalt and lubrication oil at the railcar loading rack.

The tank truck distillate loading rack is paved with concrete and has area drains that are connected to the water/oil recovery and treatment system. Therefore, any spilled distillate is directed to this system. However, the asphalt and modified asphalt tank truck and railcar loading racks are covered with gravel. Spills and overflows are cleaned with gravel and transported to an asphalt facility for reuse or disposed of. In addition, due to the viscosity and solidification temperature of the asphalt, the likelihood of storm water pollution from spilled asphalt is low.

The tank truck loading racks are covered and sloped. Berming is not possible since it would prevent tank truck access to the loading rack.

The railcar loading area is not paved and there is no drainage system in the railcar loading rack. However, railcars themselves are designed to prevent spills and there is a storm water collection tank located in the railcar loading facility designed to capture storm water discharges.

The distillate/cutback asphalt/crude off-loading area is located between the loading rack and the tank farm area. The area is paved with concrete but is not bermed. Two drains are located in the off-loading area; they are connected to the wastewater treatment system.

The majority of crude oil is shipped to the Benicia Asphalt Plant via underground pipelines and ships.

Possible sources of pollution for loading and unloading activities are:

- Large spills or overflows in the loading areas; and
- Large spills in the off-loading area.

Benicia Asphalt Plant Wastewater Treatment Area

The wastewater treatment area in the Benicia Asphalt Plant is bermed and unpaved. Storm water may come in contact with material generated from tank leaks or chemical spills. However, it is collected by a

drain that automatically pumps the discharge to the crude oil tanks. Therefore, there is low potential for storm water pollution.

Storm Water Tank

The storm water tank is located in the wastewater treatment area. Storm water is collected by various storm water drains throughout the Benicia Asphalt Plant and is conveyed to the storm water tank. Valero has the ability to remove any oil that could enter the tank accidentally. The tank is designed with a leak detection system. The storm water is usually tested for O&G and pH prior to each discharge. During discharge, the tank is sampled and tested for pH, TSS, TOC, SC, and O&G. The tank's contents can be pumped to the wastewater treatment system under emergency circumstances. Possible sources of pollution are:

- Soil entering the tank via area storm water drains; and
- Spills reaching a storm drain in a non-processing area.

Modified Asphalt Plant

The modified asphalt plant is located in the product tank farm. A possible source of pollution is polymer spills. (Asphalt spills are contained by gravel and are not considered to contribute to storm water pollution.)

Dust-and Particulate-Generating Activities

Valero has paved most of the Benicia Asphalt Plant (tank farms) to reduce the amount of dust and particulate generated in the Benicia Asphalt Plant. Certain areas of the Benicia Asphalt Plant still are not paved; wind may blow dust and particulates and disperse them throughout the Benicia Asphalt Plant. In addition, dust may be generated from the outside of the Benicia Asphalt Plant and settle on the roadways or other areas of the facility. Valero continually takes measures to reduce the dust particles in its facility by paving its roadways as explained above and by contracting a powered sweeper to sweep the Benicia Asphalt Plant's parking lots and driveways.

Site-Specific BMPs

The following is a listing of the types of pollutants that may be present in the storm water from the Benicia Asphalt Plant:

- Oil/grease
- Total suspended solids
- Benzene
- Xylene
- Sulfides
- Ethyl benzene
- Petroleum hydrocarbons
- Small floating debris
- Toluene
- Naphthalene
- Ammonia
- Cyclohexane

As required by NPDES Permit renewal submittals, Valero has tested for the above pollutants and has found that only a very limited number of them have been present in the storm water discharges.

Valero currently has the following BMPs in place for the Benicia Asphalt Plant:

- Valero has eliminated all but one of its storm water discharge points by strategically placing storm water drains in the Benicia Asphalt Plant to collect storm water flows and to direct them to a storm water tank.
- Valero conducts regular inspections of its equipment (including drains, valves, and pumps) for leaks. In addition, equipment is checked for structural failures. Upon discovery of a malfunction, Valero conducts repairs as required.
- Drains in the wastewater treatment system area capture the storm water in areas with high pollution potential and transfer it to the wastewater treatment system.
- Valero encourages employees to practice good housekeeping procedures throughout the Benicia Asphalt Plant.
- Wastewater and storm water conveyances are kept open and clear of debris and dirt.
- Valero has a "call card" to contract a street sweeper to sweep the driveways and parking lots prior to each rainy season.
- Valero's employees have been instructed to avoid hosing down the Benicia Asphalt Plant. However, if hosing down the Benicia Asphalt Plant cannot be avoided, the wash water must be directed to the Benicia Asphalt Plant's Water Oil Recycling and Treatment System drains and not storm drains.

Table 4-4 identifies area specific BMPs currently in place at the Benicia Asphalt Plant.

TABLE 4-4
Description of Current Area within the Benicia Asphalt Plant

Specific Best Management Practices

Site	Current BMPs
Loading/Unloading Areas	• The loading rack has a roof that reduces the exposure of materials to storm water. • The distillate tank truck loading rack and product unloading area is paved with concrete. • The distillate loading rack and unloading areas are sloped toward the Benicia Asphalt Plant's oil/water collection system which is designed to handle large material spills. • The asphalt truck loading racks are covered with gravel. Gravel absorbs spilled material. After the spill is cleaned, the used gravel is sent to the neighboring asphalt facility for use. • During the transfer of material to tank trucks, leaks are captured in drip pans. The captured material is then recycled back to the process. • Valero's written procedures for loading or unloading materials are kept in a readily accessible place. • During all loading and unloading activities, an employee trained in spill containment is required to be present. • Small spills are either washed into the Benicia Asphalt Plant's oily wastewater collection system or contained by using rags or absorbents. • Valero has posted a sign at the unloading area requiring the person in charge of unloading to report all spills immediately.

Site	Current BMPs
Railcar Loading Rack	• Spilled asphalt is contained with gravel and the used gravel is sent to an asphalt plant for use. • Valero has provided leak containment devices to collect spillage from tank cars. • Valero has installed a storm water collection tank in its railcar loading rack area in order to prevent discharge of untested storm water and contain accidental spills.
Tank Farm Areas	• The tank farm areas currently meet specific federal and state Spill Prevention SPCC standards. • All tanks are labeled with National Fire Protection Association placards to permit easy identification of their content. • The entire tank farm area is bermed, which provides secondary containment for major spills. • In order to reduce the amount of solids entering its storm water discharge, Valero has paved the gauge truck routes in the tank farm areas.
Chemical and Waste Storage Area	• All waste and chemical drums/containers are labeled. • The chemicals and wastes are stored in areas in a manner that complies with the Solano County's Fire Code. • Operators are trained to prevent overflows and/or spills of chemicals during emptying and/or filling of containers. • Dumpsters are covered at all times to keep out rainwater. The dumpsters will be replaced if they begin deteriorating. • Valero has purchased chemical sheds to store excess chemical and waste containers.
Process Area	• The process area is bermed and paved with concrete. The area also slopes toward the oil/water recovery area drains. • Valero has recently upgraded the old berms surrounding the process area. • There are numerous area drains located in the process plant. All storm water from process areas is captured and receives full treatment at the wastewater treatment plant. The drains are kept clear to assure unrestricted flow of storm water to the system.
Wastewater Treatment System	• The entire wastewater treatment area is fully contained, which eliminates storm water discharges outside of the facility. • The wastewater treatment area is sloped toward a drain that directs the storm water in the wastewater area to the WORT system.
Modified Asphalt Plant	• Valero has enclosed the asphalt rubber plant area to prevent polymer spills from entering the storm water discharges.
Storm Water Tank	• Operators regularly inspect the tank. • Valero tests the storm water prior to each discharge. If the levels are high, storm water is sent through the oil/water recovery system. • The conveyance system to the storm water system is inspected and is regularly cleaned and kept free of solids.

BMP best management practice
SPCC spill prevention, control, and countermeasure

4.12 VALERO SOUTH

Site Description

In 2010 Valero acquired Valero South, a property adjacent to the Refinery, for intermittent use as a temporary construction laydown site. This property consists of a building, adjacent parking lots, unstriped paved yards, and a vacant parcel of unimproved property. Figure 4-12 shows the layout of the property and storm water runoff flow paths. The 5.71-acre site is separated from the refinery proper by Sulfur Springs Creek.

Site Paving and Drainage

Most of the drainage is captured in storm drains. A portion of the vacant lot flows off site towards Sulfur Springs Creek.

Site-Specific BMPs

It is unlikely that a spill or discharge would occur in this area. Potential pollutants include:

- TSS from erosion (minimal); and
- Urban runoff from the road.

BMPs used to prevent potential pollutants from entering surface water include:

- **Baseline BMPs.** Implemented as appropriate.
- **Erosion controls.** BMPs will be applied as needed to control erosion (see Section 5.0).

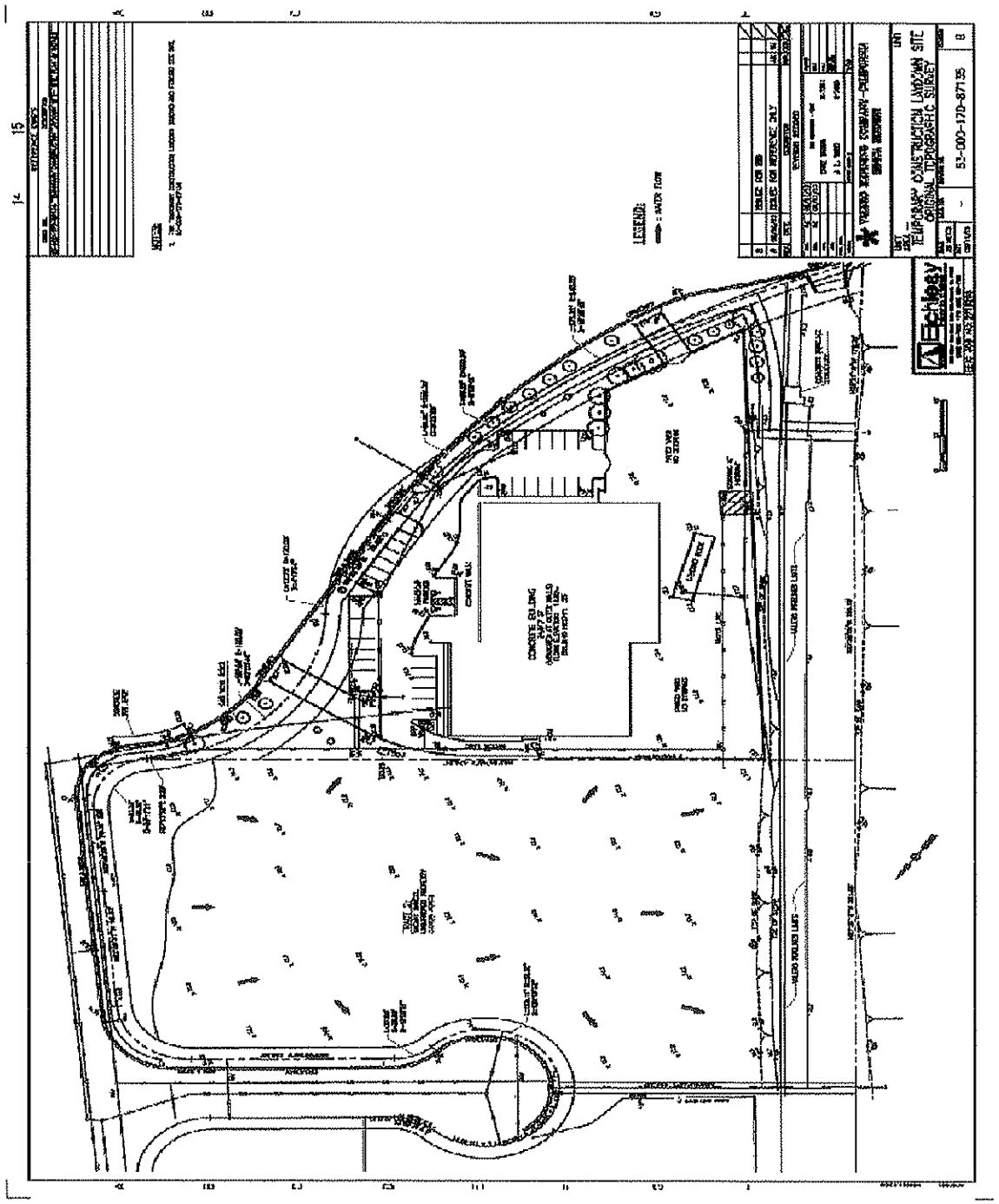

Figure 4-11. Valero South

5 BMPS FOR EROSION CONTROL, CONSTRUCTION AND REMEDIAL ACTIVITIES

Described in the following sections, are BMPs for erosion control, construction activities, and remedial activities that can be applied throughout the Valero Benicia Refinery as needed.

5.1 BMPS FOR EROSION CONTROL

To prevent erosion, earthen banks with the potential for severe erosion problems should be graded and landscaped as needed. Landscaping vegetation should be deep rooted and suitable to prevent erosion. The vegetation should be maintained in a manner that will prevent future erosion. In addition to the vegetation, a geotextile fabric may be appropriate for use on the earthen banks to enhance erosion resistance.

For earthen banks where vegetation cannot be planted, the hillsides may be covered with a gravel layer or gunite.

The areas covered in this SWPPP are occupied by a combination of buildings and/or structures, paving or gravel, and landscaping or natural ground cover. The paving should be inspected for cracks and wear and repaired as needed. Areas that are not paved should be maintained with ground cover or natural foliage, as appropriate, to prevent erosion and improve the aesthetic character of the facility. A landscaping contractor maintains the site vegetation. Watering of the vegetation should be conducted as needed.

Other BMPs for erosion control that can be applied as needed include:

- **Silt fence** A silt fence consists of a filter fabric that is entrenched and attached to supporting poles. It may also be supported or reinforced by a wire fence. Silt fences are typically used in areas where sheet flow runoff occurs. The area should have a level contour, so water does not pond more than 1.5 feet deep at any point. This control measure also requires an area upstream of the fence for sediment disposition. Silt fences are generally ineffective at locations where storm water flows are concentrated.
- **Sandbag barrier** This type of erosion control consists of sandbags stacked along a level contour to detain sediment-laden water. Sandbags may be installed around catch basins to restrict suspended sediment from entering the storm drain system. Sandbag barriers are typically used for trapping sediment in areas of strong flows where silt fences and straw bale barriers are ineffective. An area should be provided behind the barrier for runoff to pond and for sediment processes to occur. With routine inspection and cleaning, sandbags may be used for extended periods of time.
- **Straw bale barrier** This type of barrier consists of straw bales placed end to end along a level contour in a shallow trench. Each bale is secured with stakes. The barrier detains runoff, creating areas of ponding upstream of the barrier to facilitate sedimentation processes. The bales also act as filters. Straw bales are typically used in areas where sheet or rill erosion occurs. Because straw bales decompose, they cannot be used effectively for extended periods of time.

5.2 BMPS FOR CONSTRUCTION ACTIVITIES

Most construction activities at the Valero Benicia Refinery would occur within the drainage area of one of the NPDES-permitted outfalls. Any construction permit executed in a drainage area that is not covered under the NPDES permit will be performed in a way consistent with the requirements of the General Permit for Construction Activities. Construction activities within the drainage areas covered by the NPDES permit may employ, as needed, the erosion control BMPs presented in this SWPPP.

5.3 BMPS FOR REMEDIAL ACTIVITIES

Appropriate erosion control measures should be included as integral parts of work plans involving the excavation and handling of any contaminated soil. Control practices may involve:

- Scheduling soil movement activities to avoid exposure to rainwater;
- Covering soil stockpiles with impervious materials (e.g., Visqueen®);
- Properly backfilling and compacting excavated areas;
- Properly locating soil stockpiles to avoid steep areas subject to severe storm water runoff;
- Properly cleaning soil-moving equipment and vehicles before leaving project areas to avoid spreading the sediment into other areas;
- Preparing spill response plans to address transportation accidents;
- Installing sediment traps at downstream locations to minimize the sediment entering storm drains; or
- Inspecting areas routinely and training personnel.

6 OTHER STORM WATER CONTROLS

The Valero Benicia Refinery has a variety of training programs, plans, manuals, and maintenance procedures to prevent and respond to the release of hazardous materials to the environment. These programs, described in this section, are an important element of Valero's overall storm water pollution prevention strategy.

6.1 SPILL PREVENTION AND RESPONSE

For employees with no specific emergency response assignments, spill prevention and response training focuses on both prevention and initial reporting and response to emergency situations. Personnel responsible for handling spill response and mitigation receive this training plus additional training in safe handling, regulatory requirements, policies, and procedures governing the handling and transport of contaminants.

Specific procedures for responding to an emergency, detailed in the Valero SPCC Plan (2007 update in progress at time of this revision) and Valero Best Management Practices Plan (1991), are regularly reinforced through refresher training. The purpose of the SPCC Plan is to reduce the risks of oil spills, provide comprehensive spill response procedures, and ameliorate the consequences of a spill. The SPCC plan is revised on a three-year cycle. Requirements for the plan are found in 40 CFR Part 112. Additional procedures for handling and responding to any incident involving spills and containment are maintained in the subject areas and are readily accessible to those personnel trained and working in the areas.

Valero provides a comprehensive on-site interactive training system for each employee. This training system uses standardized computer-based training modules ("CBTs") to cover specific topics,

Hazardous Materials Management Plan

Hazardous material inventories and business plans are required of businesses that handle quantities of hazardous materials above regulatory thresholds. The *Emergency Procedures Manual* has been developed to address response to, mitigation of, and prevention of hazardous material incidents. The hazardous materials inventory for the refinery lists the amounts and types of hazardous materials handled at the Valero Benicia Refinery. This inventory, which is also compiled to meet the federal community right-to-know requirements of Superfund Amendments and Reauthorization Act, Title III, is updated annually. The specific requirements for business plans and inventories are found in California Health and Safety Code Section 25503.5.

6.3 OTHER PLANS AND MANUALS

Other plans and manuals at the Valero Benicia Refinery include:

- Hazardous Waste Contingency Plan and Hazardous Waste Emergency Procedures;
- Risk Management Plan;
- Earthquake Preparedness Program;
- Accident Prevention Manual;
- Refinery Task Manuals;
- Housekeeping Manuals;
- Management of Change (MOC) procedures; and

- Spill Prevention, Control and Countermeasures Plan

A brief discussion of these documents is provided below.

Hazardous Waste Contingency Plan and Hazardous Waste Emergency Procedures

Generators of hazardous waste must develop and implement procedures that minimize the possibility of a fire, explosion, or release of hazardous constituents. The refinery's *Hazardous Waste Contingency Plan and Hazardous Waste Emergency Procedures*, which is found in Section IX of the *Emergency Procedures Manual*, has been developed to address materials defined as federal or state-only hazardous waste. This manual is revised as necessary.

Risk Management Plan

Risk Management and Prevention Programs (RMPs) are required of businesses that handle acutely hazardous materials (AHMs) in quantities above regulatory thresholds. RMPs are intended to improve existing emergency response and risk reduction or risk minimization plans or programs established for a facility. An RMP has been developed at the Valero Benicia Refinery to address the AHMs handled at the site.

Earthquake Preparedness Program

The Earthquake Preparedness Procedures at the Valero Benicia Refinery includes measures to protect surface water quality. Various emergency conditions resulting from a major earthquake could cause untreated wastewater discharges to public waters, potentially via the storm drain system or outfalls. Incidents could include fires, utility failures, and hydrocarbon leakage. The refinery's program to prevent and effectively deal with emergency conditions resulting from earthquake events includes:

- The refinery maintains firefighting equipment, and a well-trained firefighting response team of refinery technicians and operating staff is directed by the refinery Shift Superintendent.
- All personnel are trained in basic firefighting techniques, and refinery technicians are cross-trained in the operation of several process units to provide support to personnel handling shutdowns and other needed services.
- Refinery technicians carry portable two-way radios and are in direct contact with other technicians and the refinery's control center. Supervisors, rescue teams, and designated others have radios available to them. In addition, the refinery's internal telephone system operates independently of the Pacific Bell System with a battery backup power supply that is capable of operating for four hours.
- The refinery's on-site warehouse stores general and repair materials to meet emergency needs. In addition, a 20-day supply of polymer and up to a three-month supply of dissolved air flotation (DAF) floc (ISF floc) chemical is maintained.

At the time of its design in 1966 and 1967, the Valero Benicia Refinery was built to the most severe prevailing earthquake standard of the Uniform Building Code (UBC) and the Structural Engineering Association of California (SEAOC). Since then, the UBC and SEAOC standards have been upgraded and revised. Valero's internal standards have kept pace with the revised standards. Valero's internal standards require refinery structures and equipment to be designed for larger earthquake forces than specified to account for the structures' different responses, performances, and functions in an earthquake.

No facility modifications or operational changes were found to be necessary for improvement of refinery safety or reliability as a consequence of the 17 October 1989 Loma Prieta Earthquake. This reflects the strict design criteria used since the initial construction of the refinery. In addition, the Earthquake Engineering Research Institute prepared a report on the effects of the 1989 earthquake, which supports the findings that no further modifications or operational changes are necessary.

Accident Prevention Manual

This manual provides refinery personnel with detailed procedures for reporting health and safety incidents or releases of hazardous materials and conducting follow-up investigations.

Refinery Task Manuals

The task manuals for each of the refinery's units list the tasks to be performed to assure safe operation and include checklists to be completed.

Housekeeping Manuals

Housekeeping manuals for each of the refinery's units assure that personnel maintain a safe and clean workplace and provide checklists to be completed.

Management of Change (MOC)

Various facility modifications to the Valero Benicia Refinery, planned or considered, are described in this program.

Spill Prevention, Control and Countermeasure Plan

The SPCC establishes procedures, methods, equipment, and other measures to prevent the discharge of oil into or upon the navigable waters of the United States or adjoining waters.

6.4 MAINTENANCE

Valero performs regular maintenance on storm drains and conveyance structures as required to prevent plugging or structural damage. In addition, landscaping and ground cover is periodically maintained as needed by a landscaping contractor. The use of fertilizers and pesticides is generally not necessary, though herbicides are used for controlling vegetation (see Figures 4-6 and 4-7 for locations of herbicide applications). When these chemicals are used, the manufacturers' instructions are followed and only the minimum quantity needed is applied.

A plan for regular inspections of the storm water drains and/or conveyance structures is presented in Section 3.5.

6.5 EMPLOYEE ENVIRONMENTAL AND SAFETY TRAINING

Valero employees are trained in refinery safety at the beginning of employment and during yearly refresher training. Employee training is performed using a comprehensive, interactive video training system that is presented by Valero's specialized training department. Training modules are prepared by Valero on specific subjects and are required aspects of an employee's job. These modules are viewed by the employee in a fully equipped classroom and are reinforced with open forum discussions afterwards. Training modules include Valero's emergency procedures, right-to-know requirements, BMPs, and other

pertinent and required topics. Table 6-1 identifies recommended elements for the storm water pollution prevention training program.

Table 6-1

Recommended Elements of Storm Water Pollution Prevention Training Program

Define storm water pollution.
Summarize regulatory requirements (Clean Water Act, NPDES permit, SFBRWQCB documents).
Present overall strategy (Figure 3-1 in the SWPPP) and describe each element.
Discuss roles and responsibilities of management and operators.
Identify and briefly discuss related programs, manuals, and training that are integrated into the storm water pollution prevention program (e.g., SPCC Plan, Hazardous Waste Management Plan, etc.).
Introduce baseline BMPs—making sure these get implemented is everyone's responsibility. The attached excerpts from BMP guidance manuals are good reference materials and may be used as handouts during training.
Identify specific areas of concern around the plant and affected outfalls.
Review the list of site-specific BMPs (Table 4-3 of the SWPPP). The attached excerpts from BMP guidance manuals are good reference materials and may be used as handouts during training.
Solicit input on existing BMPs that are not documented in the SWPPP or suggestions for new BMPs that should be implemented.
Discuss annual inspection (confirms that BMPs are in place).

BMP Best Management Practice
NPDES National Pollutant Discharge Elimination System
SFBRWQCB(San Francisco Bay) Regional Water Quality Control Board
SPCC Spill Prevention Control and Countermeasure
SWPPP Storm Water Pollution Prevention Plan

Certain specialists responsible for handling emergency response receive additional training. The training includes corporate procedures for the handling of unique refinery hazards, regulatory requirements, and emergency procedures. Refinery technicians are provided quarterly safety/environmental training through interactive software training sessions. Additional training is conducted in both classroom and field emergency simulation drills. Special safety and environmental topics are periodically presented through both in-house and off-site seminars and courses.

The Valero Benicia Refinery training department retains personnel training records on site for Valero employees that have completed training classes.

Further details of Valero's training procedures and policies are documented in the BMP manual, the SPCC Plan, and the Hazard Communications Program Manual.

6.6 WASTE COLLECTION, RECYCLING, AND DISPOSAL PRACTICES

In general, wastes are collected at or near their source(s) and are isolated to prevent exposure to storm water.

6.7 RECORDKEEPING AND REPORTING PROCEDURES

The Storm Water Pollution Prevention Team maintains records and plans (including this plan and all documents incorporated by reference). Other records maintained at the Valero Benicia Refinery that are pertinent to the implementation of this plan include:

- Oil Spill Contingency Plan;
- Spill Prevention Control and Countermeasure Plan (SPCC) ;
- Hazardous Materials Management Plan;
- Risk Management and Prevention Plan (RMPP);
- Dock Operations Manual;
- Accident Prevention Manual;
- Refinery Task Manuals;
- Refinery Modifications;
- Housekeeping Manuals;
- Documentation related to any spills requiring regulatory reporting;
- Hazardous Waste Manifests;
- Material Safety Data Sheets;
- Worker Right-to-Know Information;
- Inspection Records;
- Training Records; and
- Employee Records.

These plans and/or records are retained at the site and will be made available to regulatory agencies and inspectors as required by law.

6.8 SECURITY

The entire refinery is fenced to maintain security. Overall security is managed pursuant to a Facility Security Plan that has been approved by the USCG. Access to and within the site is restricted to employees, pre-authorized contractors, and registered visitors.

7 NON-STORM WATER DISCHARGES

Five monitoring locations, 003, 005, 006, 012, and 015, are associated with natural springs located at the Valero Benicia Refinery. In addition, discharges from a steam condensate trap provide minor additional water flow through monitoring location 006. Although these discharges are considered non-storm water discharges, no specific BMPs are deemed necessary due to the uncontaminated nature and quantity of the discharge. Specifically the quality and quantity do not warrant diversion to containment areas or other similar control measures. These natural spring and steam condensate discharges have been reported to the SFBRWQCB.

8 REFERENCES

California Regional Water Quality Control Board, 1994.

California Stormwater Quality Association (CASQA), 2003. Stormwater Best Management Practice Handbook.

Radian International, 1998. Storm Water Monitoring and Reporting Program Plan.

State Water Resources Control Board (SWRCB), 1997. General Industrial Storm Water Permit No. CAS000001, Water Quality Order No. 2002-0112-DWQ, "Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activities (Excluding Construction Activities)."

Exxon, 1991. Best Management Practices Plan.

Exxon, 1996. Dock Operations Manual. (USCG approved, March 2010; CSLC approved, March 2011)

Exxon, 1996. Oil Spill Contingency Plan. (Department of Fish and Game approved until 2013; USCG approved until May 2016; DOT approved until October 2015)

Valero, 2000. Spill Prevention Control and Countermeasures Plan.

Valero, 2000. Storm Water Pollution Prevention Plan.

Valero Off-Site Piping Oil Spill Prevention/Mitigation Project Process Specification No. 31-29.

Valero Hazardous Waste Contingency Plan.

Valero Emergency Procedures Manual.

United States Environmental Protection Agency, Stormwater Sampling Guidance, 1992

VALERO
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Certified Mail # 7011 1150 0001 2589 2531

June 12, 2012

2011/2012 Annual Storm Water Report
RWQCB Order R2-2009-0079
NPDES # CA0005550

Attn: NPDES Wastewater Division
San Francisco Bay Region
California Regional Water Quality Control Board
1515 Clay St., Suite 1400
Oakland, California 94612

Dear Sir or Madam:

Pursuant to Provision VI.C.4.d, Valero is submitting the enclosed information to satisfy the Annual Storm Water Reporting Requirements. This information for Outfalls E-002 through E-017 includes a discussion of Valero's permit compliance record for the year (June 1, 2011 – May 31, 2012), tabular summaries of analytical data and visual observations, and a discussion of source identification and source control programs.

Should there be any questions on the material attached, please contact Ms. Sky Bellanca at 707-745-7749.

I certify under penalty of law that this document and all attachments are prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed 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.

Sincerely,

Christopher W. Howe

Christopher W. Howe, Director
Health, Safety & Environment
and Government Affairs

CH/KSB/DLH/tac

Enclosures

Document #: 23107

2011/2012

ANNUAL STORM WATER REPORT

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APPENDIX A

STORMWATER ANALYTICAL DATA

The attached tables summarize analytical data for the 2011/2012 wet weather season. Under the NPDES permit effective January 1, 2010 the refinery is required to sample outfalls E-002 through E-017 on a quarterly basis, provided effluent limitations are not exceeded.

The table below summarizes the analytical methods used for storm water samples.

Constituent	Method	Preservative
Oil and Grease	EPA 1664	H_2SO_4
PH	EPA 150.1/SM 4500H	None
TOC	SM 5310B	None
Specific Conductance	SM 2510B	None
BOD	SM 5210B	None
TSS	SM 2540D	None
COD	EPA 410.4	H_2SO_4
Total Chromium	EPA 200.8	None
Hexavalent Chromium	SM 3500Cr	None
Total Phenols	EPA 420.4	H_2SO_4

All permit limits for storm water were met and in compliance with the exception of outfall 009. Outfall 009 compliance is discussed in Appendix C.

2011/2012 ANNUAL STORM WATER RUNOFF CHARACTERISTICS SUMMARY

SAMPLE POINT 002

Date	TOC (ppm)	O+G (ppm)	pH	SPEC. COND. (umho/cm)
6/6/2011	6.0	ND 5.0	7.6	1,174
11/24/2011	17.5	ND 1.4	7.1	2,045
1/21/2012	8.5	ND 1.4	7.9	915
4/10/2012	5.2	ND 1.4	7.7	1,387
Minimum	**5.2**	**< 1.4**	**7.1**	**915**
Maximum	**17.5**	**< 5.0**	**7.9**	**2,045**
Average	**9.3**	**< 2.3**	**7.6**	**1,380**

2011/2012 ANNUAL STORM WATER RUNOFF CHARACTERISTICS SUMMARY

SAMPLE POINT 003

Date	TOC (ppm)	O+G (ppm)	pH	SPEC. COND. (umho/cm)
1/21/2012	6.9	ND 1.4	8.4	526
4/10/2012	9.8	ND 1.4	7.9	271
Minimum	**6.9**	**< 1.4**	**7.9**	**271**
Maximum	**9.8**	**< 1.4**	**8.4**	**526**
Average	**8.3**	**< 1.4**	**8.1**	**399**

2011/2012 ANNUAL STORM WATER RUNOFF CHARACTERISTICS SUMMARY

SAMPLE POINT 004

Date	TOC (ppm)	O+G (ppm)	pH	SPEC. COND. (umho/cm)
6/6/2011	3.7	ND 5.0	7.6	865
11/24/2011	4.6	ND 1.4	8.0	928
1/21/2012	8.3	ND 1.4	8.3	653
4/10/2012	6.3	ND 1.4	7.8	421
Minimum	**3.7**	**< 1.4**	**7.6**	**421**
Maximum	**8.3**	**< 5.0**	**8.3**	**928**
Average	**5.7**	**< 2.3**	**7.9**	**717**

2011/2012 ANNUAL STORM WATER RUNOFF CHARACTERISTICS SUMMARY

SAMPLE POINT 005

Date	TOC (ppm)	O+G (ppm)	pH	SPEC. COND. (umho/cm)
6/6/2011	4.2	ND 5.0	8.4	715
10/5/2011	36.1	ND 5.0	8.3	968
1/21/2012	9.6	ND 1.5	8.4	541
4/10/2012	5.4	ND 1.4	8.1	722
Minimum	**4.2**	**< 1.4**	**8.1**	**541**
Maximum	**36.1**	**< 5.0**	**8.4**	**968**
Average	**13.8**	**< 3.2**	**8.3**	**737**

2011/2012 ANNUAL STORM WATER RUNOFF CHARACTERISTICS SUMMARY

SAMPLE POINT 006

Date	TOC (ppm)	O+G (ppm)	pH	SPEC. COND. (umho/cm)
6/6/2011	2.4	ND 5.0	8.1	982
10/5/2011	41.8	ND 5.0	8.3	539
1/21/2012	4.2	ND 1.4	8.1	892
4/10/2012	7.5	ND 1.4	8.1	305
Minimum	**2.4**	**< 1.4**	**8.1**	**305**
Maximum	**41.8**	**< 5.0**	**8.3**	**982**
Average	**14.0**	**< 3.2**	**8.1**	**680**

2011/2012 ANNUAL STORM WATER RUNOFF CHARACTERISTICS SUMMARY

SAMPLE POINT 007

Date	TOC (ppm)	O+G (ppm)	pH	SPEC. COND. (umho/cm)
11/24/2011	39.8	ND 1.4	8.0	542
1/21/2012	8.7	ND 1.4	8.4	494
4/10/2012	18.2	9.4	8.0	238
Minimum	**8.7**	**< 1.4**	**8.0**	**238**
Maximum	**39.8**	**9.4**	**8.4**	**542**
Average	**22.2**	**< 4.1**	**8.1**	**425**

2011/2012 ANNUAL STORM WATER RUNOFF CHARACTERISTICS SUMMARY

SAMPLE POINT 008

Date	TOC (ppm)	O+G (ppm)		pH	SPEC. COND. (umho/cm)
11/24/2011	7.4	ND	1.4	7.8	998
1/21/2012	7.7	ND	1.4	8.3	545
4/10/2012	7.5	ND	1.4	7.6	461
Minimum	**7.4**	**<**	**1.4**	**7.6**	**461**
Maximum	**7.7**	**<**	**1.4**	**8.3**	**998**
Average	**7.5**	**<**	**1.4**	**7.9**	**668**

2011/2012 ANNUAL STORM WATER RUNOFF CHARACTERISTICS SUMMARY

SAMPLE POINT 009

Date	TOC (ppm)	O+G (ppm)	pH	SPEC. COND. (umho/cm)	BOD (mg/L)	TSS (mg/L)	COD (mg/L)	Cr Total (ug/L)	Cr Hexavalent (ug/L)	Phenols Total (ug/L)
11/24/2011	29.0	ND 1.4	7.8	416						
1/21/2012	16.7	25.0	7.9	169						
2/13/2012	14.5	ND 1.4	7.8	330	5	528	93	18.0	ND 10.0	5.6
3/13/2012	25.7		8.0	288	ND 8	63	233	22.0	ND 0.9	15.0
3/14/2012	9.3	ND 1.4	7.8	219	ND 5	96	75	7.1	ND 0.9	10.0
3/16/2012	8.2	ND 1.4	7.8	246	ND 5	28	ND 13	2.9	ND 0.9	7.4
3/25/2012	4.9	ND 1.4	7.7	166	ND 5	6	ND 13	2.0	DNQ 1.0	DNQ 4.8
3/27/2012	5.0	ND 1.4	8.1	181	ND 5	12	ND 13	4.0	ND 0.9	7.0
4/10/2012	9.4	ND 1.4	8.1	263	ND 5	53	ND 13	4.7	4.5	ND 2.0
4/12/2012	5.0	ND 1.4	7.8	215	ND 5	43	ND 13	10.0	ND 4.5	7.3
4/13/2012	3.5	ND 1.4	7.1	163	ND 5	23	ND 13	2.9	ND 1.8	ND 2.0
Minimum	**3.5**	**< 1.4**	**7.1**	**163**	**< 5**	**6**	**< 13**	**2.0**	**< 0.9**	**< 2.0**
Maximum	**29.0**	**25.0**	**8.1**	**416**	**5**	**528**	**233**	**22.0**	**4.5**	**15.0**
Average	**11.9**	**< 3.8**	**7.8**	**241**	**< 5**	**95**	**< 53**	**8.2**	**< 2.8**	**< 6.8**

2011/2012 ANNUAL STORM WATER RUNOFF CHARACTERISTICS SUMMARY

SAMPLE POINT 010

Date	TOC (ppm)	O+G (ppm)	pH	SPEC. COND. (umho/cm)
1/21/2012	8.1	ND 1.4	7.8	299
4/10/2012	8.0	ND 1.4	7.8	898
Minimum	**8.0**	**< 1.4**	**7.8**	**299**
Maximum	**8.1**	**< 1.4**	**7.8**	**898**
Average	**8.0**	**< 1.4**	**7.8**	**599**

2011/2012 ANNUAL STORM WATER RUNOFF CHARACTERISTICS SUMMARY

SAMPLE POINT 011

Date	TOC (ppm)	O+G (ppm)	pH	SPEC. COND. (umho/cm)
6/6/2011	4.5	ND 5.0	8.3	74
4/10/2012	3.3	ND 1.4	7.5	66
Minimum	**3.3**	**< 1.4**	**7.5**	**66**
Maximum	**4.5**	**< 5.0**	**8.3**	**74**
Average	**3.9**	**< 3.2**	**7.9**	**70**

2011/2012 ANNUAL STORM WATER RUNOFF CHARACTERISTICS SUMMARY

SAMPLE POINT 012

Date	TOC (ppm)	O+G (ppm)	pH	SPEC. COND. (umho/cm)
6/6/2011	8.9	ND 5.0	8.0	187
11/24/2011	56.2	ND 1.4	7.4	762
1/21/2012	7.7	ND 1.4	7.9	61
4/10/2012	5.8	ND 1.4	7.8	88
Minimum	**5.8**	**< 1.4**	**7.4**	**61**
Maximum	**56.2**	**< 5.0**	**8.0**	**762**
Average	**19.7**	**< 2.3**	**7.8**	**275**

2011/2012 ANNUAL STORM WATER RUNOFF CHARACTERISTICS SUMMARY

SAMPLE POINT 013

Date	TOC (ppm)	O+G (ppm)	pH	SPEC. COND. (umho/cm)
6/6/2011	18.0	ND 5.0	7.7	235
1/21/2012	13.5	ND 2.2	7.6	100
4/10/2012	15.8	ND 1.4	7.8	142
Minimum	**13.5**	**< 1.4**	**7.6**	**100**
Maximum	**18.0**	**< 5.0**	**7.8**	**235**
Average	**15.8**	**< 2.9**	**7.7**	**159**

2011/2012 ANNUAL STORM WATER RUNOFF CHARACTERISTICS SUMMARY

SAMPLE POINT 014

Date	TOC (ppm)	O+G (ppm)	pH	SPEC. COND. (umho/cm)
6/6/2011	12.3	ND 5.0	7.7	468
11/24/2011	14.3	ND 1.4	8.2	230
1/21/2012	9.9	ND 1.4	7.8	70
4/10/2012	7.5	ND 1.4	8.3	98
Minimum	**7.5**	**< 1.4**	**7.7**	**70**
Maximum	**14.3**	**< 5.0**	**8.3**	**468**
Average	**11.0**	**< 2.3**	**8.0**	**217**

2011/2012 ANNUAL STORM WATER RUNOFF CHARACTERISTICS SUMMARY

SAMPLE POINT 015

Date	TOC (ppm)	O+G (ppm)	pH	SPEC. COND. (umho/cm)
6/6/2011	6.8	ND 5.0	7.5	1,909
11/24/2011	9.2	ND 1.4	7.8	1,445
1/21/2012	4.7	ND 1.4	8.0	873
4/10/2012	9.9	ND 1.4	7.5	1,484
Minimum	**4.7**	**< 1.4**	**7.5**	**873**
Maximum	**9.9**	**< 5.0**	**8.0**	**1,909**
Average	**7.6**	**< 2.3**	**7.7**	**1,428**

2011/2012 ANNUAL STORM WATER RUNOFF CHARACTERISTICS SUMMARY

SAMPLE POINT 016

Date	TOC (ppm)	O+G (ppm)	pH	SPEC. COND. (umho/cm)
6/6/2011	10.4	ND 5.0	8.3	108
1/21/2012	4.6	ND 1.4	8.2	37
4/10/2012	7.2	ND 1.4	7.3	56
Minimum	**4.6**	**< 1.4**	**7.3**	**37**
Maximum	**10.4**	**< 5.0**	**8.3**	**108**
Average	**7.4**	**< 2.6**	**7.9**	**67**

2011/2012 ANNUAL STORM WATER RUNOFF CHARACTERISTICS SUMMARY

SAMPLE POINT 017

Date	TOC (ppm)	O+G (ppm)	pH	SPEC. COND. (umho/cm)
6/2/2011	3.6	ND 5.0	8.5	229
6/4/2011	3.0	ND 5.0	8.1	196
6/28/2011	10.3	ND 5.0	8.0	255
11/6/2011	20.4	ND 1.4	7.5	159
12/14/2011	8.5	ND 1.4	7.8	170
1/20/2012	5.2	ND 1.4	7.9	470
1/23/2012	5.4	ND 1.5	8.2	111
2/7/2012	7.4	ND 1.4	7.1	110
3/13/2012	7.0	ND 1.4	7.3	112
3/24/2012	4.9	ND 1.4	7.5	85
3/25/2012	3.7	ND 1.4	7.2	63
3/27/2012	3.9	ND 1.4	7.2	115
4/10/2012	5.5	ND 1.5	6.9	118
4/12/2012	5.7	ND 2.0	7.7	78
4/26/2012		ND 1.4		
4/27/2012	6.4		7.6	83
Minimum	**3.0**	**< 1.4**	**6.9**	**63**
Maximum	**20.4**	**< 5.0**	**8.5**	**470**
Average	**6.7**	**< 2.2**	**7.6**	**157**

APPENDIX B

SUMMARY OF VISUAL OBSERVATIONS

The attached tables provide a summary of visual observation information for the 16 storm water outfalls covered by the Refinery NPDES permit.

Early in the wet season, there can be measurable precipitation without adequate run-off to obtain samples or make observations because the soil is not yet saturated.

Visual observations were largely consistent with laboratory results for storm water samples during this period.

2011/2012 Annual Stormwater Report
Summary of Visual Observations

Outfall Description: E-002

Stormwater runoff from refinery property which is discharged at the north west corner of the wastewater treatment area via a ditch and several pipes into Sulfur Springs Creek and ultimately Suisun Bay. The area is separated from the wastewater treatment area and stormwater retention pond by a dike.

Non-Stormwater Discharges:

None.

Observation Summary:

Date	Wet or Dry Weather Observation	Runoff	Oil/Sheen	Suspended or Floating Material	Turbidity	Color	Odor	Comments
6/6/2011	Wet	Y	N	Y	Y	Brownish/green algae	N	Suspended/Floating Material: Plant debris Turbidity: Murky groundwater
8/11/2011	Dry	Y	N	N	N	Biological scum	N	Runoff: groundwater; naturally occuring. Need to cut back weeds to improve access to sample points.
10/5/2011	Wet	N						
11/24/2011	Wet	Y	N	N	Y	Cloudy, slightly dirty	N	Turbidity: Slight
1/21/2012	Wet	Y	N	Y	Y	Clear/light tan	N	Suspended/Floating Material: Cattails Turbidity: Moderate
4/10/2012	Wet	Y	N	Y	Y	Cloudy	N	Suspended/Floating Material: Copious amounts of plant debris. Turbidity: Moderate

2011/2012 A...ual Stormwater Report
Summary of Visual Observations

Outfall Description: E-003

Stormwater runoff from refinery property which is discharged near the Raw Water Break Tank at the north end of Avenue "A" via a culvert to Sulfur Springs Creek and ultimately Suisun Bay. The drainage area is separated from the refinery processing area by peripheral roads around the processing area.

Non-Stormwater Discharges:

Intermittent. Groundwater seepage from the North Canyon area of the Refinery. Soils in this area have been tested and verified to pose no risk to ground water quality.

Observation Summary:

Date	Wet or Dry Weather Observation	Runoff	Oil/Sheen	Suspended or Floating Material	Turbidity	Color	Odor	Comments
6/28/2011	Wet	N		N	N		N	
8/11/2011	Dry	N						Haybales and rice wattles have been put in place.
10/5/2011	Wet	N						
11/24/2011	Wet	N						
1/21/2012	Wet	Y	N	N	Y	Clear/light tan	N	Turbidity: Clear water with some light silt.
4/10/2012	Wet	Y	N	Y	Y	Cloudy	N	Suspended/Floating Material: Silt Turbidity: Slight

2011/2012 Annual Stormwater Report
Summary of Visual Observations

Outfall Description: E-004

Stormwater runoff from a gravel area between 1st Street and the railway, on the south side of 1st Street. This outfall is discharged west of Gate No. 4, into the eastern end of a ditch (Beaver Creek), followed by a culvert, another ditch (Buffalo Wallow), and a 72 inch culvert into Sulfur Springs Creek and ultimately Suisun Bay. The drainage area is separated from the processing area by the peripheral road.

Non-Stormwater Discharges:

Intermittent. There is a spring that discharges into this outfall during the wet season.

Observation Summary:

Date	Wet or Dry Weather Observation	Runoff	Oil/Sheen	Suspended or Floating Material	Turbidity	Color	Odor	Comments
6/6/2011	Wet	Y	N	N	Y	Clear	N	Turbidity: Slight
8/11/2011	Dry	Y	N	N	N		N	Runoff: Creek water. Cut reeds back from stairs for ease of sampling.
10/5/2011	Wet	N						
11/24/2011	Wet	Y	N	Y	N	Clear	N	Suspended/Floating Material: Plant debris.
1/21/2012	Wet	Y	N	N	Y	Light tan	N	Turbidity: Turbid but normal
4/10/2012	Wet	Y	N	Y	Y	Tan	N	Suspended/Floating Material: Silt; plant debris. Turbidity: Moderate

2011/2012 A. ıal Stormwater Report
Summary of Visual Observations

Outfall Description: E-005

Stormwater runoff from refinery property west of the processing area. This outfall is discharged west of Gate No. 4, on the south side of the processing area via a spillway into the western end of a ditch (Beaver Creek), followed by a culvert, another ditch (Buffalo Wallow), and a 72 inch culvert into Sulfur Springs Creek and ultimately Suisun Bay. The drainage area is separated from the processing area by railroad tracks and the peripheral road, and is bordered on the southern side by Gate 5 Road, and on the western side by the refinery fence.

Non-Stormwater Discharges:

Intermittent. There is a spring that discharges into this outfall during the wet season.

Observation Summary:

Date	Wet or Dry Weather Observation	Runoff	Oil/Sheen	Suspended or Floating Material	Turbidity	Color	Odor	Comments
6/6/2011	Wet	Y	N	N	N	Clear	N	
8/11/2011	Dry	Y	N	N	N		N	Runoff: natural springs. No specific BMPS but water falls into a sump, then directed to E-004.
10/5/2011	Wet	Y	N	Y	N	Clear	N	Suspended/Floating Material: Light silt
1/21/2012	Wet	N				Clear running water		
4/10/2012	Wet	Y	N	N	Y	Cloudy	N	Turbidity: Very slight.

2011/2012 Annual Stormwater Report
Summary of Visual Observations

Outfall Description: E-006

Stormwater runoff from under the refinery crude pipeline, starting at the southwest corner of the crude tank field and running northeast along the perimeter of the tank field and Park Road. It includes runoff from the perimeter road on the north side of the crude tank field. The outfall is discharged on the south side of Park Road, where the refinery crude pipeline crosses Park Road, via a ditch that discharges into Sulfur Springs Creek and ultimately Suisun Bay. The drainage area is separated from the crude oil tank field by tank dikes and berms. Runoff collects in a concrete sump equipped with a containment valve.

Non-Stormwater Discharges:

Yes. A small amount of condensate from steam traps on the pipeline and groundwater seepage enters this outfall.

Observation Summary:

Date	Wet or Dry Weather Observation	Runoff	Oil/Sheen	Suspended or Floating Material	Turbidity	Color	Odor	Comments
6/6/2011	Wet	Y	N	N	N	Clear running water	N	
9/1/2011	Dry	Y	N	N	N		N	
10/5/2011	Wet	Y	N	N	N	Clear	N	Weir needs to be cleaned of mud and debris.
1/21/2012	Wet	N				Clear	N	Up-stream sump needs reeds to be cleaned out; filled with mud and debris.
4/10/2012	Wet	Y	N	N	N	Clear	N	

2011/2012 Annual Stormwater Report
Summary of Visual Observations

Outfall Description: E-007

Stormwater runoff from a gravel and paved area near Gate 4. The outfall is discharged just east of Gate 4 via a tributary ditch (Buffalo Wallow) followed by a 72-inch culvert into Sulfur Springs Creek and ultimately to Suisun Bay. The drainage area is separated from the processing area by the peripheral road.

Non-Stormwater Discharges:

None.

Observation Summary:

Date	Wet or Dry Weather Observation	Runoff	Oil/Sheen	Suspended or Floating Material	Turbidity	Color	Odor	Comments
6/28/2011	Wet	N						
9/1/2011	Dry	N						Standing water. General housekeeping in area, (extra oil sorbent booms and old can.
10/5/2011	Wet	N						
11/24/2011	Wet	Y	N	Y	Y	Gray	N	Suspended/Floating Material: Waxy/floating objects. Berms in place. Turbidity: High
1/21/2012	Wet	Y	N	Y	Y	Gray	N	Suspended/Floating Material: Suspended silt Turbidity: Modest amount.
4/10/2012	Wet	Y	N	Y	Y	Cloudy	N	Very thick silt runoff. Suspended/Floating Material: Dirt/silt Turbidity: High

2011/2012 Annual Stormwater Report
Summary of Visual Observations

Outfall Description: E-008

Stormwater from a gravel area along the railway and the refinery fence line. The outfall is discharged east of Gate 4 via a culvert followed by a tributary ditch (Buffalo Wallow) and a 72-inch culvert into Sulfur Springs Creek and ultimately to Suisun Bay. The drainage area is separated from the processing area by the railway.

Non-Stormwater Discharges:

None.

Observation Summary:

Date	Wet or Dry Weather Observation	Runoff	Oil/Sheen	Suspended or Floating Material	Turbidity	Color	Odor	Comments
6/28/2011	Wet	N						
8/11/2011	Dry	N						Rice wattle needs to be replaced.
10/5/2011	Wet	N						
10/5/2011	Wet	N						E-008 proposed alternate monitoring point, (Buffalow Wallow).
11/24/2011	Wet	Y	N	Y	Y	Clear	N	E-008 proposed alternate monitoring point, (Buffalow Wallow). Floating/Suspended Material: Plants Turbidity: Low
11/24/2011	Wet	N						
1/21/2012	Wet	Y	N	Y	Y	Light brown	N	E-008 proposed alternate monitoring point, (Buffalow Wallow). Suspended/Floating Material: plant debris in scum. Turbidity: Water is more turbid than normal.
1/21/2012	Wet	Y	N	N	N	Clear	N	
4/10/2012	Wet	Y	N	Y	Y	Cloudy	N	E-008 proposed alternate monitoring point, (Buffalow Wallow). Suspended/Floating Material: Slight silt. Turbidity: Slight
4/10/2012	Wet	Y	N	Y	Y	Cloudy/gray	N	Suspended/Floating Material: Moderate silt Turbidity: Moderate

2011/2012 Annual Stormwater Report
Summary of Visual Observations

Outfall Description: E-009

Stormwater from a gravel and paved area between the railway and Avenue "A". The outfall is discharged along Avenue "A" on the south east side of the processing area via a culvert into Sulfur Springs Creek and ultimately to Suisun Bay. The drainage area is separated from the processing area by the railway and the peripheral roadway.

Non-Stormwater Discharges:

None.

Observation Summary:

Date	Wet or Dry Weather Observation	Runoff	Oil/Sheen	Suspended or Floating Material	Turbidity	Color	Odor	Comments
8/11/2011	Dry	N						Grate is clean; gravel around grate.
10/5/2011	Wet	N						
11/24/2011	Wet	N				Cloudy/dirty	N	
1/21/2012	Wet	Y	N	Y	Y	Dark gray	N	Suspended/Floating Material: Heavy silt Turbidity: Heavy
2/13/2012	Wet	Y	N	Y	Y	Brown/tan	N	Suspended/Floating Material: Silt Turbidity: Moderate
3/1/2012	Wet	Y	N	Y	Y	Tan	N	Suspended/Floating Material: Light silt Turbidity: Mild
3/13/2012	Wet	Y	N	Y	Y	Brown	N	Suspended/Floating Material: Moderate amount of silt Turbidity: Very turbid.
3/14/2012	Wet	Y	N	Y	Y	Light brown	N	Suspended/Floating Material: Moderate silt. Turbidity: Moderate
3/15/2012	Wet	N						No water is reaching the creek.
3/16/2012	Wet	Y	N	Y	Y	Light tan	N	Suspended/Floating Material: Light silt Turbidity: Low
3/17/2012	Wet	N						Water flow to creek but not from E-009.
3/18/2012	Wet	N						Water is not flowing to the creek.
3/24/2012	Wet	N						About an inch of stagnant water at base of E-009 basin. There is not flow either in or out, nor is there runoff entering from surrounding street level. End of pipe area is dry.
3/25/2012	Wet	Y	N	N	N	Light tan	N	Pipe discharge looks Ok.
3/27/2012	Wet	Y	N	Y	Y	Light tan	N	Water is flowing to creek. Suspended/Floating Material: Moderate suspended silt. Turbidity: Moderate
3/31/2012	Wet	Y	N	Y	Y	Light tan	N	Slow flow from pipe, but not to creek. Suspended/Floating Material: Light silt Turbidity: Low

2011/2012 Annual Stormwater Report
Summary of Visual Observations

4/10/2012	Wet	Y	N	Y	Y	Brown/gray	N	Water flowing from pipe but not yet to creek. Suspended/Floating Material: Moderate silt Turbidity: Moderate
4/10/2012	Wet	Y	N	Y	Y	Light tan	N	Not yet flowing to the creek. Suspended/Floating Material: Light silt. Turbidity: Moderate
4/12/2012	Wet	Y	N	Y	Y	Tan	N	Flowing to the creek. Suspended/Floating Material: Silt Turbidity: Moderate Need to clear trash and debris from fence-line.
4/13/2012	Wet	Y	N	Y	Y	Light tan	N	Creek is very high; discharge from pipe normal. Suspended/Floating Material: Low silt. Turbidity: Very low.
4/25/2012	Wet	Y	N	Y	Y	Clear with slight color	N	Water is flowing from pitpe but not yet to the creek. Turbidity: Low

2011/2012 Annual Stormwater Report
Summary of Visual Observations

Outfall Description: E-010

Stormwater from a gravel and paved area between the railway and Avenue "A". The outfall is discharged along Avenue "A" on the south east side of the processing area via a culvert into Sulfur Springs Creek and ultimately to Suisun Bay. The drainage area is separated from the processing area by the railway and the peripheral roadway.

Non-Stormwater Discharges:

None.

Observation Summary:

Date	Wet or Dry Weather Observation	Runoff	Oil/Sheen	Suspended or Floating Material	Turbidity	Color	Odor	Comments
6/28/2011	Wet	N						
8/11/2011	Dry	N						Grate clear; gravel on ground surrounding grate.
10/5/2011	Wet	N						
11/24/2011	Wet	N						
1/21/2012	Wet	Y	N	Y	Y	Light brown	N	Suspended/Floating Material: Moderate silt. Turbidity: Moderate
4/10/2012	Wet	Y	N	Y	Y	Cloudy	Y	Suspended/Floating Material: Slight silt. Turbidity: Slight Odor: Diesel scent in surrounding area. No visible oil or diesel on ground.

2011/2012 Annual Stormwater Report
Summary of Visual Observations

Outfall Description: E-011

Stormwater runoff from a small area under the refinery crude pipeline on the north side of Park Road. The outfall is discharged on the north side of Park Road, where the refinery crude pipeline crosses Park Road, via a culvert that discharges into Sulfur Springs Creek and ultimately Suisun Bay. This drainage area is not adjacent to any processing area. Asphalt berms are provided on either side of the pipeline to channel runoff to the collection sump. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed.

Non-Stormwater Discharges:

None.

Observation Summary:

Date	Wet or Dry Weather Observation	Runoff	Oil/Sheen	Suspended or Floating Material	Turbidity	Color	Odor	Comments
6/6/2011	Wet	Y	N	N	Y	Brown	N	Turbidity: High; muddy water
9/1/2011	Dry	N						Hay bales is in good shape.
10/5/2011	Wet	N						
11/24/2011	Wet	N						
1/21/2012	Wet	N						
4/10/2012	Wet	Y	N	Y	Y	Tan/orange	N	Suspended/Floating Material: Silt Turbidity: Heavy silt

2011/2012 Annual Stormwater Report
Summary of Visual Observations

Outfall Description: E-012

Stormwater runoff from under a section of the refinery crude pipeline southwest of the crude tank field. The outfall is discharged into the City of Benicia storm drain sewer system and ultimately into the Carquinez Strait. The drainage area below the pipeline is bordered on one side by an asphalt berm and on the other side by a service road. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed.

Non-Stormwater Discharges:

None.

Observation Summary:

Date	Wet or Dry Weather Observation	Runoff	Oil/Sheen	Suspended or Floating Material	Turbidity	Color	Odor	Comments
6/6/2011	Wet	Y	N	Y	N	Cloudy, plant life	N	Floating/Suspended Material: Dirty water from plant debris. Lots of standing/iflowing water in area.
9/1/2011	Dry	N						Looks like large rocks have been placed around the outfall location but still a lot of pine needles and mud that needs to be cleaned out.
10/5/2011	Wet	N						
11/24/2011	Wet	Y	N	Y	N	Clear	N	Plants/pine cones.
1/21/2012	Wet	Y	N	Y	N	Clear	Y	Suspended/Floating Material: Pine needles Odor: Fresh pine scent.
4/10/2012	Wet	Y	N	Y	Y	Clear	N	Suspended/Floating Material: Plant deris/pine needles Turbidity: Slight

2011/2012 Annual Stormwater Report
Summary of Visual Observations

Outfall Description: E-013

Stormwater runoff from under a section of the refinery crude pipeline southwest of Outfall 12. The outfall is discharged into the City of Benicia storm drain sewer system and ultimately into the Carquinez Strait. The drainage area below the pipeline is bordered on one side by an asphalt berm and on the other side by a service road. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed.

Non-Stormwater Discharges:

None.

Observation Summary:

Date	Wet or Dry Weather Observation	Runoff	Oil/Sheen	Suspended or Floating Material	Turbidity	Color	Odor	Comments
6/6/2011	Wet	Y	N	Y	Y	Cloudy; plant debris.	N	Floating/Suspended Material: Plant life; trail erosion. Turbidity: Slight level in standing water near drain.
9/1/2011	Dry	N						Culvert leading to outfall has a lot of debris. Consider putting a rice wattle in front of outfall to keep solids out.
10/5/2011	Wet	N						
11/24/2011	Wet	N						
1/21/2012	Wet	Y	N	Y	N	Clear	N	Suspended/Floating Material: Oak leaves.

2011/2012 Annual Stormwater Report
Summary of Visual Observations

Outfall Description: E-014

Stormwater runoff from under a section of the refinery crude pipeline south of Outfall 13. The outfall is discharged into underground stormwater piping, which drains to the Carquinez Strait. The drainage area below the pipeline is bordered on both sides by asphalt berms. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed.

Non-Stormwater Discharges:

None.

Observation Summary:

Date	Wet or Dry Weather Observation	Runoff	Oil/Sheen	Suspended or Floating Material	Turbidity	Color	Odor	Comments
6/6/2011	Wet	Y	N	Y	Y	Brown	N	Turbidity: Muddy water.
9/1/2011	Dry	N						Clean out leaves and debris and replace rice wattles.
10/5/2011	Wet	N						
11/24/2011	Wet	Y	N	N	Y	Cloudy/muddy	N	Turbidity: moderate
1/21/2012	Wet	Y	N	Y	Y	Brown	N	Suspended/Floating Material: Oak leaves. Turbidity: Moderate amount of silt.
4/10/2012	Wet	Y	N	Y	Y	Brownish/orange	N	Suspended/Floating Material: Silt/plant debris. Turbidity: Thick silt.

2011/2012 Annual Stormwater Report
Summary of Visual Observations

Outfall Description: E-015

Stormwater runoff from under a section of the refinery crude pipeline southeast of Outfall 14. The outfall is discharged into underground stormwater piping, which drains to the Carquinez Strait. The drainage area below the pipeline is bordered on both sides by asphalt berms. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed.

Non-Stormwater Discharges:

Intermittent. This outfall does collect groundwater seepage at times.

Observation Summary:

Date	Wet or Dry Weather Observation	Runoff	Oil/Sheen	Suspended or Floating Material	Turbidity	Color	Odor	Comments
6/6/2011	Wet	Y	N	Y	Y	Brown	N	Floating/Suspended Material: Plant debris. Turbidity: Moderate due to mud/dirt.
9/1/2011	Dry	N						Standing water. Add mosquito fish or pump out water. Replace rice wattles as necessary.
10/5/2011	Wet	N						
11/24/2011	Wet	Y	N	Y	Y	Grayish/brown	N	Floating/Suspended Material: Plant debris Turbidity: Moderate
1/21/2012	Wet	Y	N	N	Y	Light gray	N	Turbidity: Moderate
4/10/2012	Wet	Y	N	Y	Y	Cloudy	N	Suspended/Floating Material: Plant debris/silt Turbidity: Slight

2011/2012 Annual Stormwater Report
Summary of Visual Observations

Outfall Description: E-016

Stormwater runoff from under a section of the refinery crude pipeline south of Outfall 15, near the refinery dock. The outfall is discharged via a culvert into the Carquinez Strait. The drainage area below the pipeline is bordered on both sides by asphalt berms. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed, and is then pumped to a tank to be recycled in the refining process.

Non-Stormwater Discharges:

None.

Observation Summary:

Date	Wet or Dry Weather Observation	Runoff	Oil/Sheen	Suspended or Floating Material	Turbidity	Color	Odor	Comments
6/6/2011	Wet	Y	N	Y	Y	Cloudy	N	Floating/Suspended Material: Plant debris Turbidity: Slight due to mud/plants.
9/1/2011	Dry	N						
10/5/2011	Wet	N						
11/24/2011	Wet	N						
1/21/2012	Wet	Y	N	Y	Y	Clear	N	Suspended/Floating Material: Some trash on plant leaves. Turbidity: Low
4/10/2012	Wet	Y	N	Y	Y	Cloudy	N	Suspended/Floating Material: Plant debris Turbidity: Slight

2011/2012 Annual Stormwater Report
Summary of Visual Observations

Outfall Description: E-017

Stormwater runoff from about 12 acres at the Asphalt Plant of which roughly 35 percent is impervious. The stormwater is collected in a 0.425 million gallon holding tank (TK-4633) located north of Buffalo Wallow. The tank is discharged on a batch basis via an underground culvert to Buffalo Wallow, then to a 72-inch culvert into Sulfur Springs Creek, and ultimately to Suisun Bay.

Non-Stormwater Discharges:

None.

Observation Summary:

Date	Wet or Dry Weather Observation	Runoff	Oil/Sheen	Suspended or Floating Material	Turbidity	Color	Odor	Comments
6/2/2011	Wet	Y	N	N	N	Clear	N	
6/5/2011	Wet	Y	N	N	N	Clear	N	
6/28/2011	Wet	Y	N	N	N	Clear/Cloudy	N	
8/11/2011	Dry	N						
11/6/2011	Wet	Y	N	N	N	Clear	N	
12/14/2011	Wet	N				Clear		
2/7/2012	Wet	Y	N	N	N	Clear/yellowish	N	
3/13/2012	Wet	Y	N	N	N	Clear	N	
3/24/2012	Wet	Y	N	N	N	Clear	N	
3/25/2012	Wet	Y	N	N	N	Clear	N	
3/27/2012	Wet	Y	N	N	N	Cloudy	N	
4/10/2012	Wet	Y	N	N	N	Clear	N	
4/12/2012	Wet	Y	N	N	N	Clear	N	
4/26/2012	Wet	Y	N	N	N	Clear	N	

APPENDIX C

COMPLIANCE RECORD

All stormwater discharges were in compliance with permit limitations during the 2011/2012 rain season with the exception of storm water outfall E-009. Monitoring of all permitted outfalls is carried out as required and BMPs will be maintained to ensure the quality of the water discharged will continue to be acceptable.

The exceedance of a storm water permit limit at E-009 in January triggered supplemental permit limits, which included a limit for TSS. Until triggering the supplemental permit limits, there had not been a limit for TSS.

The permit limit exceedances at E-009 include the following:

- daily maximum oil and grease limit exceedance on January 21
- daily maximum TSS limit exceedance on February 13
- daily maximum TSS limit exceedance on March 13
- daily maximum TSS limit exceedance on March 14
- monthly average TSS limit exceedance for March 2012

Corrective actions at E-009 included upgrading Best Management Practices at the catch basin leading to E-009 by adding an oil absorbent boom, filling a nearby depression with gravel to prevent collection of runoff, flushing the catch basin, and paving the area around E-009. No further exceedances have occurred since March 2012.

In accordance with Table E-4 (modified May 11, 2012) of Valero's NPDES permit, E-009 will be monitored for the supplemental limits during the first daylight storm once during the following wet season (commencing on October 1, 2012) before reverting back to the standard quarterly storm water monitoring requirements.

APPENDIX D

SOURCE IDENTIFICATION AND CONTROL PROGRAMS

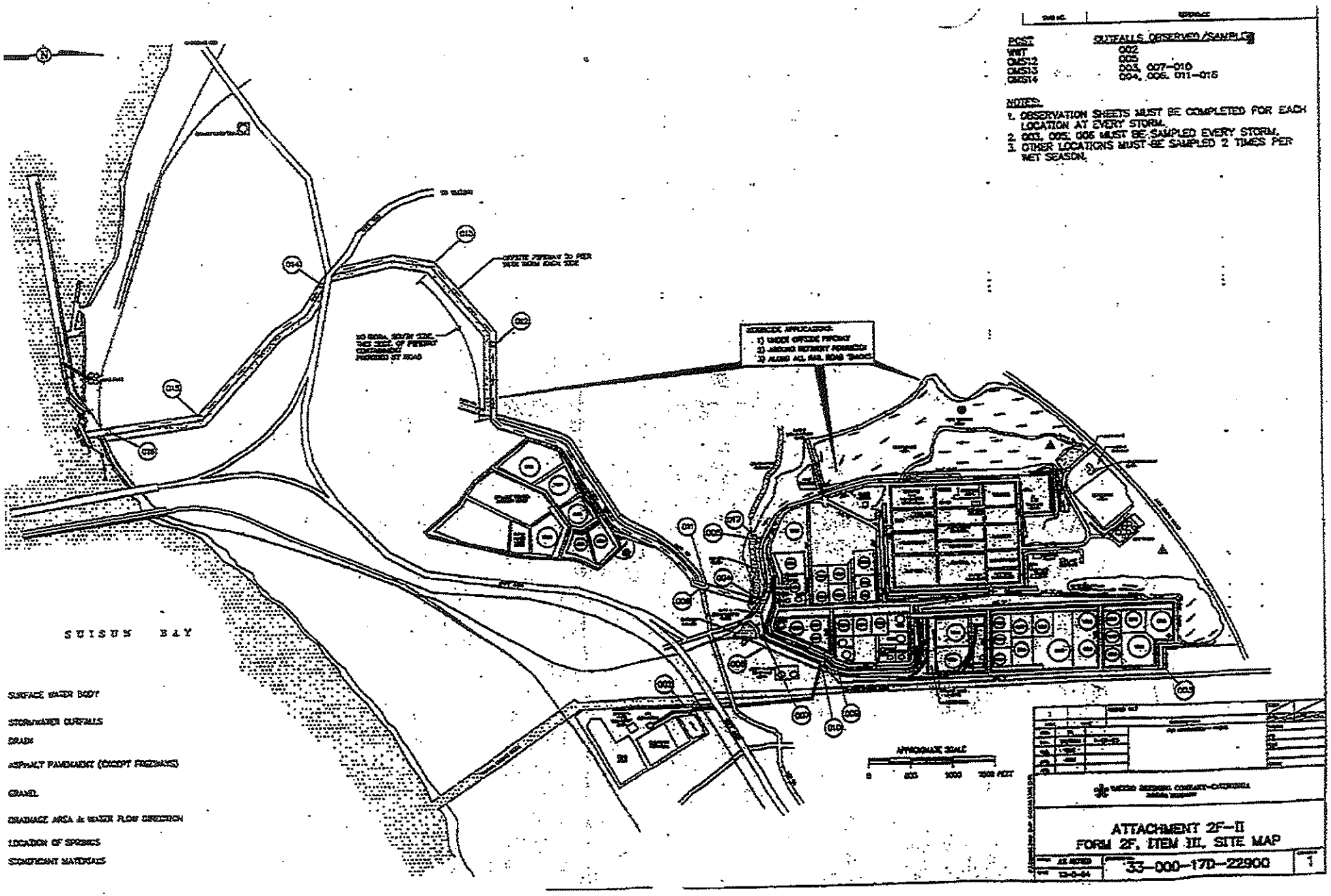
Valero performed a detailed inspection of Best Management Practices (BMP) at all of the permitted stormwater outfalls at the end of the 2008/2009 rain season and identified erosional sources of solids. Through this exercise, a project was developed to improve the BMPs at most sites. Work was completed on September 30, 2009. Included in the project were grading, riprap/gravel applications, rice wattles and hay bales, and oil sorbent boom to capture any potential sheen.

In addition, near the end of the 2011/2012 rain season the area around storm water outfall 009 was paved in order to reduce solids in the runoff.

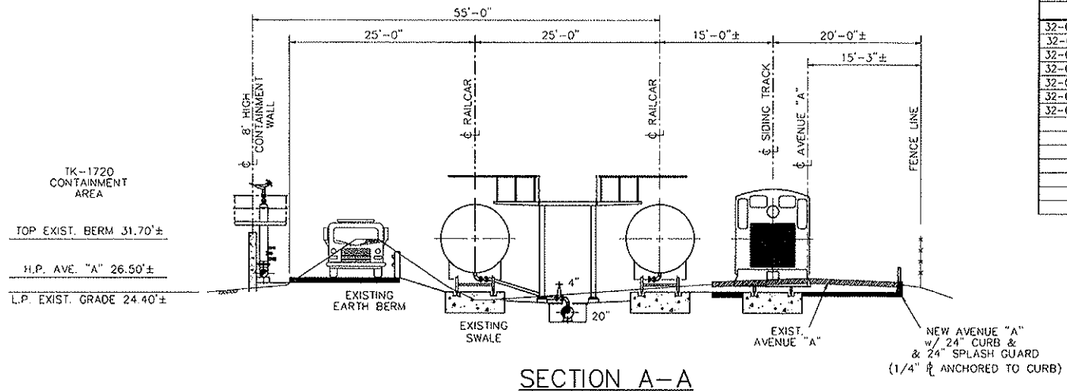
BMP installations are updated and replaced as necessary and continue to perform as designed.

APPENDIX E

PLOT MAP WITH OUTFALL LOCATIONS


OUTFALLS OBSERVED/SAMPLED
POST
WET 002
005
DM512 003, 007–010
DM513 004, 006, 011–016
DM514
NOTES:
1. OBSERVATION SHEETS MUST BE COMPLETED FOR EACH LOCATION AT EVERY STORM.
2. 003, 005, 006 MUST BE SAMPLED EVERY STORM.
3. OTHER LOCATIONS MUST BE SAMPLED 2 TIMES PER WET SEASON.
SUISUN BAY
SURFACE WATER BODY
STORMWATER OUTFALLS
DRAIN
ASPHALT PAVEMENT (EXCEPT FREEWAYS)
GRAVEL
DRAINAGE AREA & WATER FLOW DIRECTION
LOCATION OF SPRINGS
SEDIMENT MATERIALS
APPROXIMATE SCALE
ATTACHMENT 2F–II
FORM 2F, ITEM III, SITE MAP
33–000–17D–22900
1

REFERENCE DWG'S	
DWG. NO.	DESCRIPTION
32-000-04D-89410	CRUDE BY RAIL - PROJECT KEY PLAN
32-000-04D-89411	MASTER PLAN - RAIL CAR UNLOADING
32-000-04D-89412	MASTER PLAN - THE WYE CONNECTOR @ GATE 4
32-000-04D-89413	MASTER PLAN - SECTIONS & DETAILS
32-000-04D-89414	SPARE
32-000-04D-89416	EXIST. PLOT PLAN - GROUND WATER & CONTAIN. BERMS
32-000-04D-89417	PROJ. PLOT PLAN - RAIL ROAD TRACK EXTENSION



SECTION A-A

50' 40' 20' 0

SCALE

THIS DRAWING HAS NOT BEEN APPROVED FOR CONSTRUCTION

UNIT 12
CAT-CRACKER

UNIT 17 & 18
SULFUR RECOVERY

AVENUE "F"

UNIT 56
FLUE GAS SCRUBBER

AVENUE "E"

AVENUE "D"

EXISTING CONTAINMENT BERM

EXISTING CONTAINMENT BERM

6th STREET
7th STREET
8th STREET
9th STREET
14th STREET

LIGHT ENDS LOADING

ROAD

ROAD

BLENDING

1711 REFORMATE

EXIST. TRACK

EXIST. TRACKS

1734 REFORMER FEED

NEW 8' HIGH CONTAINMENT WALL

FIRE WATER LINE

1805 SLOP

1820 ETHANOL

849

847 864 848

850

1732 LCN (CYHEX)

1736 SAT C6

1735 C5

1737 HCN

1739 ALKYLATE

1733 LCN

1730 VAC VGO

1720 VGO

NEW 8' HIGH CONTAINMENT WALL

1715 LCS/SOUR WATER

1716 VGO

NEW 15' FIRE LANE

1713 CBO

1717 CBO

1718 COKER FEED

1714 CFHT FEED

1719 COKER FEED

1712 HCU FEED

2401

PROPERTY LINE

NEW 8' HIGH CONTAINMENT WALL

℄ NEW CRUDE UNLOADING STATIONS

AVENUE "A"

AVENUE "A"

AVENUE "A"

PROPERTY LINE

PROPERTY LINE

PROPERTY LINE

B-26

℄ PG&E EASEMENT 30' WIDE

GROUND WATER INTERCEPTOR TRENCH

MONITORING WELL NEW LOCATION TYP. 4 PLACES

INTERCEPROR TRENCH ELECTRICAL PEDESTAL NEW LOCATION

MONITORING WELLS PROPOSED FOR DELETION

CRUDE UNLOADING PUMPING STATION

FENCE LINE

EXISTING GROUNDWATER MONITORING WELL

LEGEND:

- EXISTING GROUND WATER MONITORING WELLS
- EXISTING MONITORING WELLS TO BE PLUGGED & CAPPED
- RELOCATED MONITORING WELLS SUBJECT TO WATER BOARD APPROVAL
- RELOCATED MONITORING WELLS PROPOSED FOR DELETION SUBJECT TO WATER BOARD APPROVAL
- EXISTING CONTAINMENT BERMS
- RELOCATED CONTAINMENT CONCRETE WALLS REPLACE EARTH BERMS

500' 400' 200' 0

SCALE

REVISION RECORD					
REV.	DATE	DESCRIPTION	DWN	CKD	APD
B	01-21-13	ISSUED FOR FOR PHASE 2 REVIEW	MDA		
A	01-14-13	ISSUED FOR BID	MDA		

FOR INFORMATION PHONE: S. PENNY 7207
T. LAM 7894

DSN.	MDA	01-07-13
DRN.	MDA	01-07-13
CKD.		
APD.		
PROJ. ENG.		
STRESS APD.		
STRESS MODEL #		
HOC#		DATE SOC APD.
WO#	3588093	
T/A#		

VALERO REFINING COMPANY-CALIFORNIA
BENICIA REFINERY

OIL MOVEMENTS
LOWER TANK FIELD
CRUDE BY RAIL
UNIT 32 PLOT PLANS
PROJ. PLOT PLAN - GROUND WATER & CONTAIN. BERMS
RAIL CAR UNLOADING

SCALE	E.J.N. NO.	DRAWING NO.	REVISION
AS SHOWN		32-000-04D-89415	B
DATE 01-14-13			

N

EXIST. MONITORING WELL
POSSIBLE RELOCATION

NEW TRACK
JUNCTION

1795

1797

1796

1794

1753

1791

1793

1757

1st STREET

2nd STREET

PIPEWAY

AVENUE "E"

PIPEWAY

AVENUE "E"

NEW 16"P321395-A

FROM TANKCAR
UNLOADING

EXIST 16"

GATE 4

1773

1772

1774

1775

2nd STREET

AVENUE "B"

1771

1776

1738

1721

1722

1778

1790

1779

4th STREET

1723

1724

1725

6th STREET

NEW CONCRETE
RETAINING WALL
6' HIGH

NEW TRACK
JUNCTION

AVENUE "B"

AVENUE "A"

GROUND WATER
INTERCEPTOR TRENCH

LEGEND:

GROUND WATER MONITORING WELLS

CRUDE BY RAIL
VALERO BENICIA REFINERY
PROJECT MASTER PLAN 2 01-30-2013
THE WYE CONNECTOR

Stantec Consulting Services Inc.
57 Lafayette Circle 2nd Floor
Lafayette CA 94549
Tel: (925) 299-9300
Fax: (925) 299-9302

Stantec

November 8, 2012

Ms. Sky Bellanca
Valero Benicia Refinery
3400 East Second Street
Benicia, CA 94510

Reference: **Third Quarter 2012 Quarterly Monitoring Report**
Valero Benicia Refinery
3400 East Second Street, Benicia, CA
Stantec PN: 185702486.400.0001

Dear Ms. Bellanca:

Stantec Consulting Services Inc. (Stantec) prepared this Third Quarter 2012 Quarterly Monitoring Report on behalf of Valero Refining Company (Valero) for the groundwater monitoring and sampling activities conducted between July and September 2012 at the Valero Benicia Refinery and Fuels Terminal (Refinery), formerly the Exxon Mobil Benicia Refinery (Figure 1). This report is submitted consistent with the *Groundwater Monitoring Plan-Revised 2010, Valero Benicia Refinery* (Stantec; May 24, 2010) approved by the Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) in a letter dated July 13, 2010.

Attached are the following:

- Executive Summary, Third Quarter 2012
- Tables:
  - Table 1 – Groundwater Elevation Data, Third Quarter 2012
  - Table 2 – Summary of Free Phase Hydrocarbons (FPH) in Wells, Third Quarter 2012
  - Table 3 – Groundwater and QA/QC Analytical Results, Third Quarter 2012
  - Table 4 – WQPS Exceedances POC Wells, Third Quarter 2012
  - Table 5 – Field Duplicate and Well Sampling RPD, Third Quarter 2012
  - Table 6 – Surface Water Analytical Results, Third Quarter 2012
  - Table 7 – ULSA Groundwater Interceptor Trench Water Elevations, Third Quarter 2012
  - Table 8 – LLSA Groundwater Interceptor Trench Water Elevations, Third Quarter 2012
  - Table 9 – Influent and Effluent Water Analytical Results for VRU Perched Zone Extraction System, Through Third Quarter 2012
- Figures:
  - Figure 1 – Site Location Map
  - Figure 2 – Refinery Groundwater Elevations – Third Quarter 2012
  - Figure 3 – Fuels Terminal Groundwater Elevations – Third Quarter 2012
  - Figure 4 – Upper Level Storage Area Interceptor Trench Water Elevations - Third Quarter 2012
  - Figure 5 – Lower Level Storage Area Interceptor Trench Water Elevations - Third Quarter 2012

Reference: **Third Quarter 2012 Quarterly Monitoring Report**
Valero Benicia Refinery
3400 East Second Street, Benicia, CA
Stantec PN: 185702486.400.0001

THIRD QUARTER 2012 RESULTS

Groundwater Sampling

Wells that are scheduled for sampling consistent with the Monitoring Program are not sampled in the presence of free-phase petroleum hydrocarbons (FPH), a SoakEase™ or Oxygen Reducing Compound (ORC) sock, or another obstruction preventing access to the well; Table 1 contains explanations, and Table 2 contains a summary of wells containing FPH. Wells that were scheduled but not sampled this quarter are listed below:

- Wells 613, 715, and 843 due to the presence of FPH as sheen;
- Wells 325, 546, 807, and 880 due to the presence of an ORC sock;
- Wells 408 and 524 due the presence of a SoakEase™; and,
- Well 526 due to the presence of both FPH as sheen and a SoakEase™.

The Third Quarter 2012 results are consistent with historic results. Table 3 contains a summary of analytical results, and Figures 2 and 3 contain groundwater elevations for the quarter. Historic analytical results for groundwater samples are contained on Table C-3 in Appendix C of the *Fourth Quarter 2011-Groundwater Monitoring Report and Annual Summary* (Stantec; February 1, 2012).

Results Summary

- **Point of Compliance (POC) Well Results.** Several POC wells that are scheduled for sampling in third quarter were not sampled this quarter due to the presence of either a SoakEase™ or an ORC sock: Wells 325, 524, 546, 807, and 880. As shown on Table 4, results for POC wells for benzene, toluene, ethylbenzene, and total xylenes (BTEX); total petroleum hydrocarbons as gasoline (TPH-g); total petroleum hydrocarbons as diesel (TPH-d), and methyl tertiary-butyl ether (MTBE) were not above their respective Water Quality Protection Standards (WQPS).
- **Interior Well Results.** One Interior Well, Well 408, is scheduled for sampling in third quarter. Well 408 was not sampled this quarter due to the presence of a SoakEase™.
- **Field Duplicates.** As shown on Table 5, the field duplicate sample results were within the 20 percent relative percent difference (RPD) acceptance criteria consistent with the GMP, with the exception of the duplicate samples collected from Well 541 and Well 832:
    - For Well 541, the original/duplicate benzene results were 1.2 micrograms per liter (µg/L) and 0.7 µg/L; an RPD of 52.6 percent.
    - For Well 832, the original/duplicate TPH-d results were 460 µg/L and 300 µg/L (and RPD of 42.1 percent); and the TPH-g results were 140 µg/L and 100 µg/L (an RPD of 33.3 percent).

The elevated RPDs are noted; however, because these concentrations are within historic ranges for these wells, the data are considered valid and suitable for their intended use.

Surface Water Sampling

This quarter, BTEX, TPH, and MTBE were not detected above the reporting limits at the three sampling locations (SW-01, SW-02, and SW-03) which is consistent with historic data (see Table 6). The reporting limits are: 0.50 µg/L for benzene, toluene, ethylbenzene; 1.0 µg/L for total xylenes; 50 µg/L for TPH-g and TPH-d; and 2.0 µg/L for MTBE. BTEX, TPH, and MTBE have not been detected in surface water samples since April 2009. Historic analytical results for surface water samples are contained on Table C-4 in Appendix C of the *Fourth Quarter 2011-Groundwater Monitoring Report and Annual Summary* (Stantec; February 1, 2012).

Groundwater Extraction Systems

Summarized below are the criteria for demonstrating effectiveness of the three groundwater extraction systems at the Refinery, and their performance this quarter:

- **Upper Level Storage Area (ULSA) and Lower Level Storage Area (LLSA) Interceptor Trenches.** The performance criteria for the ULSA and LLSA groundwater interceptor trenches are contained in Section 5.1.3.1 (Main Refinery Site) of the *Groundwater Monitoring Plan for the Valero Benicia Refinery*, July 2005 (URS, 2005) and consist of comparing monthly water levels in and adjacent to the trenches to evaluate flow towards the trenches. Figures 4 and 5 illustrate these wells for the ULSA and LLSA, respectively. At the ULSA, groundwater elevations in six wells installed in the ULSA trench (MW-U2 through MW-U7) are compared to ten wells surrounding the trench (Wells 507, 520, 521, 528, 529, 530, 542, 543, 544, and 545). At the LLSA, groundwater elevations in four wells installed in the LLSA trench (MW-L1 through MW-L4/L4A/L4B) are compared to eleven wells surrounding the trench (Wells 806, 832, 847, 848, 849, 850, 852, 863, 866, 869, and 870).

  In Third Quarter 2012, the groundwater elevations measured monthly in the wells listed above indicate groundwater flows generally toward the trenches in the area adjacent to the trenches, and the trenches were effective at capturing groundwater directly upgradient from the trenches (see Tables 8 and 9, and Figures 4 and 5). One area where the groundwater elevations are slightly lower in wells adjacent to the trench is at Well 863 where the groundwater elevations were 0.57 to 0.76 feet lower than those in MW-L3 (in trench); however, in adjacent Well 806, the groundwater elevation was 0.05 to 0.08 feet higher than in MW-L3 two months in the quarter, indicating inward flow. These data for Wells MW-L3, 863, and 806, are consistent with historic data.

  In Third Quarter 2012 at the LLSA, the pump in extraction well MW-L1 was working intermittently during the month of August. Pump troubleshooting was unable to be completed because the pump ran without tripping in September 2012.

- **Vapor Recovery Unit Perched Zone Extraction (VRU PZE) System.** The performance criteria for the VRU PZE system is contained in: (1) Section 5.1.3.4 (Marketing Terminal) of the *Groundwater Monitoring Plan for the Valero Benicia Refinery*, July 2005 (URS, 2005); and (2) *Soil and Groundwater Investigation and Remediation System Installation Report* (AME, 2001), which state that successful

Reference: **Third Quarter 2012 Quarterly Monitoring Report**
Valero Benicia Refinery
3400 East Second Street, Benicia, CA
Stantec PN: 185702486.400.0001

reductions of hydraulic head in the perched zone correspond to a groundwater elevation of approximately 168 feet above mean sea level (msl) or lower in Piezometers P-1 and P-2 and approximately 173 feet msl or lower in Piezometer P-3.

In Third Quarter 2012, the groundwater elevations measured in Piezometers P-1, P-2, and P-3 were 171.00 feet msl, 168.74 feet msl, and 173.01 feet msl, respectively. Though the groundwater elevation may not be considered optimal at Piezometer P-1 and P-2 this quarter, it is considered consistent with historic data, as groundwater elevations in Piezometers P-1 and P-2 have been generally higher than the optimal target since May 2002 at which time monitoring was initiated. The consistently higher groundwater elevations are associated with the maximum upper float elevation of 169.95 feet msl in pumping Well VS-3 (which is the lowest elevation in the pumping well before shut off), and the distance of Piezometers P-1 and P-2 from the pumping well. Valero plans to resurvey P-1, P-2, and P-3 during the next survey event.

Laboratory results for the VRU PZE system's monthly influent and effluent groundwater samples and the volume of groundwater removed by the PZE system are shown on Table 9.

This data package will also be submitted to the California State Water Resources Control Board, GeoTracker system.

LIMITATIONS

This letter report was prepared in accordance with the scope of work outlined in Stantec's contract and with generally accepted professional engineering and geologic consulting practices existing at the time this report was prepared and applicable to the location of the site. It was prepared for the exclusive use of Valero Benicia Refinery for the express purpose stated above. Any re-use of this report for a different purpose or by others not identified above shall be at the user's sole risk without liability to Stantec. To the extent that this report is based on information provided to Stantec by third parties, Stantec may have made efforts to verify this third party information, but Stantec cannot guarantee the completeness or accuracy of this information. The opinions expressed and data collected are based on the conditions of the site existing at the time of the field investigation. No other warranties, expressed or implied are made by Stantec.

Sincerely,

STANTEC CONSULTING SERVICES INC.

Prepared by:

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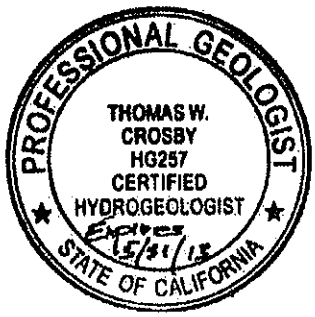
Reference: **Third Quarter 2012 Quarterly Monitoring Report**
Valero Benicia Refinery
3400 East Second Street, Benicia, CA
Stantec PN: 185702486.400.0001

Information, conclusions, and recommendations provided by Stantec in this document have been prepared under the supervision of and reviewed by the licensed professional whose signature appears below.

Licensed Approver:



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Attachments: As Stated

Stantec

THIRD QUARTER 2012
GROUNDWATER MONITORING REPORT
VALERO BENICIA REFINERY AND MARKETING TERMINAL
November 1, 2012

Executive Summary

Monitoring

Activity	Parameter or Location	Value
		Third Quarter 2012
GW Elevations	217 Wells	Groundwater elevations generally decreased compared to Second Quarter 2012
	Flow Direction	Consistent with historic flow direction.
	Dates	July 9 through 11, 2012
FPH Sheen (≤0.01 Feet Thick)	217 Wells	13
FPH Product >0.01 Feet Thick, Not Bailed	217 Wells	0
FPH Product ≥0.02 Feet Thick, Bailed	217 Wells	0
FPH Volume Bailed (milliliters)	217 Wells	0
Locations Sampled		
GW - Total	# Wells	35
Surface Water	# Samples	3
Pond Sediment	# Samples	0
QC		
- Field Duplicate	Samples	5
- Trip Blank	Samples	6
- Equipment Blank	Samples	2
- Ambient Blank	Samples	1
Accelerated Sampling	Wells	0

Analytical Results - Groundwater

Analyte	# Wells	Total # Detections [a]	Min (µg/l)	Max (µg/l)	WQPS Summary - Main Refinery and WWTP[1]			
					WQPS (µg/l)	POC Wells #Exceed	Interior Wells #Exceed	Measures Taken
- TPH-g	30	8	67	4,500	500	0	NA	--
- TPH-d	35	9	200	35,000	640	0	NA	--
- Benzene	30	6	1.1	740	46	0	NA	--
- Toluene	30	2	1.7	8.1	130	0	NA	--
- Ethylbenzene	30	4	1.5	18	290	0	NA	--
- Total Xylenes	30	3	0.6	16	13	0	NA	--
- MTBE	30	13	2.3	480	8,000	0	NA	--

Note:
a=Not including repeat sampling conducted as part of accelerated sampling, if performed.

Analytical Results - Surface Water

Analyte	# Samples	Total # Detections	Min (µg/l)	Max (µg/l)
- TPH-g	3	0	<50	<50
- TPH-d	3	0	<50	<50
- Benzene	3	0	<0.5	<0.5
- Toluene	3	0	<0.5	<0.5
- Ethylbenzene	3	0	<0.5	<0.5
- Total Xylenes	3	0	<1.0	<1.0
- MTBE	3	0	<2.0	<2.0

Stantec

THIRD QUARTER 2012
GROUNDWATER MONITORING REPORT
VALERO BENICIA REFINERY AND MARKETING TERMINAL
November 1, 2012

Executive Summary

Analytical Results - Pond Sediment

Analyte	# Samples	Total # Detections	Min (mg/kg)	Max (mg/kg)
- TPH-g	NA	NA	NA	NA
- TPH-d	NA	NA	NA	NA
- TPH-mo	NA	NA	NA	NA
- Benzene	NA	NA	NA	NA
- Toluene	NA	NA	NA	NA
- Ethylbenzene	NA	NA	NA	NA
- Total Xylenes	NA	NA	NA	NA
- Metals	NA	NA	NA	NA

Analytical Results - Groundwater Leak Detection at WWTP

Analyte	# Wells	Total # Detections	Min (µg/l)	Max (µg/l)	WQPS Summary[2]	
					Standard (µg/l)	# Exceed
- TPH-g	NA	NA	NA	NA	NA	NA
- TPH-d	NA	NA	NA	NA	NA	NA
- Benzene	NA	NA	NA	NA	NA	NA
- Toluene	NA	NA	NA	NA	NA	NA
- Ethylbenzene	NA	NA	NA	NA	NA	NA
- Total Xylenes	NA	NA	NA	NA	NA	NA
- MTBE	NA	NA	NA	NA	NA	NA

Statistical Analysis

Data	Visual Inspection Completed	Mann-Kendall Statistical Analysis	
		Required	Result
Concentration versus Time Plots for Past 10 Years (TPH-g, TPH-d, BTEX) for All Wells	Yes	NA	--

QA/QC Data Summary

Analyte	Data Are Useable
Data is Useable	Yes

Remediation Systems Summary

Location	This Quarter Volume GW Extracted (gal)	Extraction Rate (ft^3 per day)	Cumulative Volume GW Extracted (gal)	This Quarter Volume FPH Removed (milliliters)	Remedial System Performance is Effective (Yes/No) [4,5]	Comments
Fuels Terminal:						
- Additive Tank Area	13,193	21.0	3,755,997	--	n/a	S-1, VS-3, and IT pumps were not operational because there was insufficient water to allow the pumps to operate during the Third Quarter 2012.
- Loading Rack Area	49,793	79.2	2,003,017	--	n/a	--
- VETS	--	--	--	--	n/a	--
- VRU PZE System	34,496	54.9	2,335,374 [3]	--	Varies [6]	VS-3 pump not operational in August and September. IT pump operated intermitently in August and September.
Main Refinery:						
- ULSA Interceptor Trench	450,319	716.7	25,525,871	--	Yes	--
- LLSA Interceptor Trench	1,520	2.4	266,530	--	Yes	Sump MW-L1 not operational in July and September and operated intermittently in August. [7]
FPH Removal from Wells Using Bailer:	--			None	--	--
FPH removal from wells using SoakEase™:	Wells 408, 521, 524, 526, and 528.					--
In Situ remediation at wells using oxygen releasing compound socks:	Wells 325, 546, 807, and 880.					--

Executive Summary

Notes:
NA = Not applicable.

1. WQPSs approved in the comment letter from the RWQCB (File No. 2129.2004 (JSM)) dated September 24, 2002 that approved WQPSs proposed in the letter report dated February 25, 2002, for Valero Benicia Refinery. Consistent with Table 5-8 (Criteria for Additional Investigation at POC Monitoring Wells) and Table 5-9 (Criteria for Additional Investigation at Interior Monitoring Wells) of the Groundwater Monitoring Plan for the Valero Benicia Refinery, July 2005 (URS, 2005), WQPS exceedances are addressed with the appropriate measures.

2. WQPSs were established in the Groundwater Protection Standards and Monitoring Plan for Detecting and Responding to Pond Leaks at the Exxon Benicia Refinery Waste Water Treatment Plant (Exxon, 1997) and accepted in the letter titled "Subject: Approval of the Report 'Waste Water Treatment Plant Ponds Leak Detection Plan, August 14, 1997' " from the RWQCB to the Exxon Benicia Refinery (RWQCB, 1997). Consistent with Table 5-8 (Criteria for Additional Investigation at POC Monitoring Wells), and Table 5-9 (Criteria for Additional Investigation at Interior Monitoring Wells) of the Groundwater Monitoring Plan for the Valero Benicia Refinery, July 2005 (URS, 2005), WQPS exceedances are addressed with the appropriate measures.

3. This value represents correction of an error in the calculation of cumulative volume of groundwater extracted, which has been carried forward since 3Q10, when the totalizer was replaced.

4. The performance criteria for the VRU PZE system is contained in: (1) Section 5.1.3.4 (Marketing Terminal) of the *Groundwater Monitoring Plan for the Valero Benicia Refinery, July 2005 (URS, 2005)*; and *(2) Soil and Groundwater Investigation and Remediation System Installation Report (AME, 2001)*, which states that successful reductions of hydraulic head in the perched zone correspond to a groundwater elevation of approximately 168 feet above msl or lower in Piezometers P-1 and P-2 and approximately 173 feet above msl or lower in Piezometer P-3.

5. The performance criteria for the ULSA and LLSA groundwater interceptor trenches are contained in Section 5.1.3.1 (Main Refinery Site) of the *Groundwater Monitoring Plan for the Valero Benicia Refinery, July 2005* (URS, 2005). For the ULSA, groundwater elevations in the six wells installed in the ULSA trench (MW-U2 through MW-U7) are compared to ten wells surrounding the trench (Wells 507, 520, 521, 528, 529, 530, 542, 543, 544, and 545) for evaluating flow toward the trench. For the LLSA groundwater elevations in the four wells installed in the ULSA trench (MW-L1 through MW-L4/L4A/L4B) are compared to eleven wells surrounding the trench (Wells 806, 832, 847, 848, 849, 850, 852, 863, 866, 869, and 870) for evaluating flow toward the trench.

6. This quarter the elevation of groundwater in Piezometers P-1, P-2, and P-3 were 171.00 feet msl, 168.74 feet msl, and 173.01 feet msl, respectively. Though the groundwater elevation may not be considered optimal in the vicinity of Piezometers P-1 and P-2 this quarter, it is considered consistent with historic data, as groundwater elevations in these piezometers have been generally higher than the optimal target since May 2002 at which time monitoring was initiated. The consistently higher groundwater elevations are associated with the maximum upper float elevation of 169.95 feet above msl in pumping Well VS-3 (which is the lowest elevation in the pumping well before shut off), and the distance of Piezometers P-1 and P-2 from the pumping well.

7. In the Second Quarter 2012 at the LLSA, the sump/extraction point MW-L1 was working intermittently. In the Third Quarter 2012, the sump/extraction point MW-L1 was operational in July and September and intermittently operational in Agusut 2012.

TABLES

TABLE 1. GROUNDWATER ELEVATION DATA
THIRD QUARTER 2012
Valero Benicia Refinery - Benicia, California

Well ID		Well Type	Date	Top of Casing Elevation (feet MSL)	Free Product Data			Water Level Data		Comments
					FPH Depth (feet TOC)	FPH Thickness (feet)	FPH Elevation (feet MSL)	Depth to Water (feet TOC)	Water Level Elevation (feet MSL)	
Area: 1 - Wastewater Treatment Plant (WWTP)										
101	c	Shallow	7/9/2012	5.79				0.69	5.10	
113	c	Shallow	7/9/2012	9.89				5.91	3.98	
114	c	Double Cased	7/9/2012	9.45				5.96	3.49	
115	c	Double Cased	7/9/2012	8.05				3.73	4.32	Well resurveyed by Cullen-Sherry Associates, Inc. on September 16, 2011
116	d	Double Cased	7/9/2012	8.13				4.18	3.95	Well resurveyed by Cullen-Sherry Associates, Inc. on September 16, 2011
117	c	Shallow	7/9/2012	11.71				8.03	3.68	
118	c	Shallow	7/9/2012	7.42				2.97	4.45	
119	c	Shallow	7/9/2012	9.92				5.28	4.64	
121	b	Double Cased	7/9/2012	6.86				2.51	4.35	
122	b	Shallow	7/9/2012	6.47				4.68	1.79	
123	b	Shallow	7/9/2012	8.22				6.10	2.12	
124	b	Shallow	7/9/2012	8.41				6.31	2.10	
125	b	Double Cased	7/9/2012	7.73				5.25	2.48	
126	b	Shallow	7/9/2012	9.39				5.95	3.44	
127		Shallow	7/9/2012	7.83				2.17	5.66	
128		Shallow	7/9/2012	5.73				0.80	4.93	
129		Shallow	7/9/2012	6.49				4.05	2.44	
132		Shallow	7/9/2012	6.11				0.58	5.53	
134		Shallow	7/9/2012	9.20				6.05	3.15	
135		Shallow	7/9/2012	8.23				3.05	5.18	
136		Shallow	7/9/2012	7.69				2.75	4.94	
137B		Shallow	7/9/2012	9.56				5.20	4.36	
138		Shallow	7/9/2012	9.81				6.24	3.57	
143		Shallow	7/9/2012	8.92				5.64	3.28	
144		Shallow	7/9/2012	9.41				5.89	3.52	
Area 2: - Marketing Terminal										
201		Shallow	7/9/2012	182.75				7.80	174.95	
202		Shallow	7/9/2012	182.25				7.65	174.60	
203		Shallow	7/9/2012	181.81				7.86	173.95	
204		Shallow	7/9/2012	182.38				5.77	176.61	
205	c	Shallow	7/9/2012	182.38				13.44	168.94	
206	c	Shallow	7/9/2012	182.96				14.26	168.70	
212		Shallow	7/9/2012	180.73				2.80	177.93	
213		Shallow	7/9/2012	182.97				20.93	162.04	
214		Shallow	7/9/2012	183.10				50.88	132.22	
215		Shallow	7/9/2012	180.96				31.83	149.13	
216		Shallow	7/9/2012	180.09				1.03	179.06	
217	b	Shallow	7/9/2012	147.68				14.98	132.70	
220		Shallow	7/9/2012	128.90				16.73	112.17	
221		Shallow	7/9/2012	144.00				36.65	107.35	Well resurveyed by Cullen-Sherry Associates, Inc. on September 16, 2011
223		Double Cased	7/9/2012	182.84				9.53	173.31	
224	b	Shallow	7/9/2012	127.30				10.27	117.03	
225		Shallow	7/9/2012	141.61				38.35	103.26	Well resurveyed by Cullen-Sherry Associates, Inc. on September 16, 2011
226		Shallow	7/9/2012	183.96				25.13	158.83	
227		Shallow	7/9/2012	183.47				26.23	157.24	
228		Shallow	7/9/2012	184.48				39.11	145.37	
229		Shallow	7/9/2012	182.68				40.90	141.78	
232	c	Shallow	7/9/2012	141.80				45.70	96.10	Well resurveyed by Cullen-Sherry Associates, Inc. on September 16, 2011
236		Shallow	7/9/2012	134.95				38.57	96.38	

TABLE 1. GROUNDWATER ELEVATION DATA
THIRD QUARTER 2012
Valero Benicia Refinery - Benicia, California

Well ID	Well Type	Date	Top of Casing Elevation (feet MSL)	Free Product Data: FPH Depth (feet TOC)	FPH Thickness (feet)	FPH Elevation (feet MSL)	Water Level Data: Depth to Water (feet TOC)	Water Level Elevation (feet MSL)	Comments
237	Shallow	7/9/2012	183.55				23.86	159.69	
S-1	Extraction	7/9/2012	184.24				8.80	175.44	
S-2	Extraction	7/9/2012	183.55				9.83	173.72	
RW-1	Extraction	7/9/2012	182.41				--	--	Water level below pump
RW-2	Extraction	7/9/2012	183.47				46.20	137.27	Water level below pump
RW-3	Extraction	7/9/2012	182.07				--	--	Water level below pump
RW-4	Extraction	7/9/2012	181.93				--	--	Water level below pump
EX-14	Extraction	7/9/2012	185.58				43.30	142.28	Water level below pump
EX-15	Extraction	7/9/2012	184.83				--	--	Water level below pump
P-1	Perched Zone	7/9/2012	183.33				12.33	171.00	
P-2	Perched Zone	7/9/2012	183.45				14.71	168.74	
P-3 [c]	Perched Zone	7/9/2012	183.47				10.46	173.01	
P-4	Shallow	7/9/2012	181.65				37.70	143.95	
P-5 [c]	Shallow	7/9/2012	182.64				38.65	143.99	
VZ-1	Perched Zone	7/9/2012	183.80	12.97	0.00	170.83	12.97	170.83	Sheen present
VZ-2	Perched Zone	7/9/2012	183.53				10.47	173.06	
VZ-3	Perched Zone	7/9/2012	183.69	13.66	0.00	170.03	13.66	170.03	Sheen present
Area 3: - Park Road Parcel									
310	Shallow	7/10/2012	12.30				2.28	10.02	
311	Shallow	7/10/2012	13.16				9.20	3.96	
312	Double Cased	7/10/2012	15.17				13.00	2.17	
313 [c]	Shallow	7/10/2012	12.30				11.20	1.10	
314	Shallow	7/10/2012	13.88				6.10	7.78	
323B	Shallow	7/10/2012	6.89				4.50	2.39	
324	Shallow	7/10/2012	13.89				10.50	3.39	
325	Shallow	7/10/2012	12.91				5.97	6.94	Oxy sock in well.
328	Shallow	7/10/2012	11.00				2.40	8.60	
329	Shallow	7/10/2012	13.39				2.38	11.01	
330 [d]	Shallow	7/10/2012	15.38				8.81	6.57	
331 [c]	Shallow	7/10/2012	12.20				8.41	3.79	
332	Shallow	7/10/2012	10.01				3.34	6.67	
333	Shallow	7/10/2012	23.06				6.41	16.65	
Area 4: - Slop Oil Storage Area									
403	Shallow	7/10/2012	58.04				36.71	21.33	
404 [d]	Shallow	7/10/2012	57.46				46.65	10.81	
405	Shallow	7/10/2012	57.24				16.61	40.63	
406	Shallow	7/10/2012	58.14				30.40	27.74	
408	Shallow	7/10/2012	57.26				43.82	13.44	SoakEase™ in well.
409 [b]	Shallow	7/10/2012	55.41				33.35	22.06	
413	Shallow	7/10/2012	57.89				36.36	21.53	
B-02	Shallow	7/10/2012	55.55				42.15	13.40	
Area 5: - Upper Level Storage Area (ULSA)									
506	Shallow	7/9/2012	56.82				40.45	16.37	
507	Shallow	7/9/2012	57.66	47.67	0.00	9.99	47.67	9.99	Sheen present
508	Shallow	7/9/2012	14.86				9.45	5.41	
509B	Shallow	7/9/2012	15.00				11.53	3.47	
510	Shallow	7/9/2012	57.47				7.00	50.47	
511 [d]	Shallow	7/9/2012	57.18				18.05	39.13	
516	Shallow	7/9/2012	15.00				12.30	2.70	
520	Shallow	7/9/2012	57.78				48.18	9.60	
521	Shallow	7/9/2012	57.92	49.79	0.00	8.13	49.79	8.13	Sheen present; SoakEase™ in well.
524	Shallow	7/9/2012	16.03	11.08	0.00	4.95	11.08	4.95	SoakEase™ in well.
526 [c]	Shallow	7/9/2012	14.96	10.09	0.00	4.87	10.09	4.87	Sheen present; SoakEase™ in well.
528	Shallow	7/9/2012	12.40	16.26	0.00	-3.86	16.26	-3.86	Sheen present; SoakEase™ in well.
529	Shallow	7/9/2012	11.27				7.61	3.66	
530	Double Cased	7/9/2012	11.52				5.48	6.04	

TABLE 1. GROUNDWATER ELEVATION DATA
THIRD QUARTER 2012
Valero Benicia Refinery - Benicia, California

Well ID	Well Type	Date	Top of Casing Elevation (feet MSL)	Free Product Data			Water Level Data		Comments
				FPH Depth (feet TOC)	FPH Thickness (feet)	FPH Elevation (feet MSL)	Depth to Water (feet TOC)	Water Level Elevation (feet MSL)	
531 [c]	Shallow	7/9/2012	57.10				37.95	19.15	
532 [c]	Shallow	7/9/2012	58.00				21.01	36.99	
540	Shallow	7/9/2012	11.62				8.54	3.08	
541	Shallow	7/9/2012	16.93				12.11	4.82	
542	Shallow	7/9/2012	13.07				4.18	8.89	
543	Piezometer	7/9/2012	54.91				38.61	16.30	
544	Piezometer	7/9/2012	11.31				7.18	4.13	
545	Piezometer	7/9/2012	11.40				6.31	5.09	
546	Shallow	7/9/2012	13.03				9.12	3.91	Oxy sock in well.
B-19	Piezometer	7/9/2012	17.45				12.31	5.14	
B-28 [b]	Piezometer	7/9/2012	55.11				36.13	18.98	
MW-U2	Interceptor Trench	7/9/2012	13.26				6.61	6.65	
MW-U3	Interceptor Trench	7/9/2012	16.11				19.45	-3.34	
MW-U4	Interceptor Trench	7/9/2012	16.47				17.45	-0.98	
MW-U5	Interceptor Trench	7/9/2012	15.39				16.89	-1.50	
MW-U6	Interceptor Trench	7/9/2012	10.66				9.18	1.48	
MW-U7	Interceptor Trench	7/9/2012	10.84				8.91	1.93	
Sump U1	Sump	7/9/2012	11.96				16.59	-4.63	
Sump U2	Sump	7/9/2012	12.85				14.84	-1.99	
Sump U3	Sump	7/9/2012	13.37				6.65	6.72	
Area 6: - Crude Oil Storage Area (COSA)									
610	Shallow	7/9/2012	163.93				13.70	150.23	
611 [d]	Shallow	7/9/2012	161.84				20.98	140.86	
612	Shallow	7/9/2012	133.64				9.35	124.29	
613	Shallow	7/9/2012	87.50	18.85	0.00	68.65	18.85	68.65	Sheen present
614	Shallow	7/9/2012	134.03				22.95	111.08	
615	Shallow	7/9/2012	160.10				13.60	146.50	
616	Shallow	7/9/2012	189.58				36.30	153.28	
617	Shallow	7/9/2012	166.11				11.00	155.11	
618	Shallow	7/9/2012	162.49				14.80	147.69	
619	Shallow	7/9/2012	120.63				26.50	94.13	
620	Shallow	7/9/2012	150.85				26.41	124.44	
621	Shallow	7/9/2012	171.77				15.70	156.07	
622	Shallow	7/9/2012	114.83				31.00	83.83	
623	Shallow	7/9/2012	169.80				8.05	161.75	
Area 7: - Light Ends Storage Area									
704C [b]	Shallow	7/10/2012	55.35				1.53	53.82	
707	Shallow	7/10/2012	55.80				17.82	37.98	
711	Shallow	7/10/2012	58.45				12.04	46.41	
712	Shallow	7/10/2012	58.06				7.30	50.76	
713 [c]	Shallow	7/10/2012	56.38				5.21	51.17	
714	Shallow	7/10/2012	56.86				12.67	44.19	
715	Shallow	7/10/2012	55.10	4.81	0.00	50.29	4.81	50.29	Sheen present
716	Shallow	7/10/2012	56.01				4.63	51.38	
717	Shallow	7/10/2012	54.69				5.44	49.25	
719	Shallow	7/10/2012	54.98				9.02	45.96	
726 [c]	Shallow	7/10/2012	57.20				14.54	42.66	
727 [c]	Shallow	7/10/2012	57.30				14.50	42.80	
728 [c]	Shallow	7/10/2012	56.30				9.23	47.07	
729	Shallow	7/10/2012	55.95				4.42	51.53	

TABLE 1. GROUNDWATER ELEVATION DATA
THIRD QUARTER 2012
Valero Benicia Refinery - Benicia, California

Well ID	Well Type	Date	Top of Casing Elevation (feet MSL)	Free Product Data			Water Level Data		Comments
				FPH Depth (feet TOC)	FPH Thickness (feet)	FPH Elevation (feet MSL)	Depth to Water (feet TOC)	Water Level Elevation (feet MSL)	
Area 8: - Lower Level Storage Area (LLSA)									
805 [b]	Shallow	7/9/2012	20.03				12.55	7.48	
806	Shallow	7/9/2012	22.93				15.05	7.88	
807	Shallow	7/9/2012	25.44				16.50	8.94	Oxy sock in well.
808	Shallow	7/9/2012	25.72				15.80	9.92	
809	Shallow	7/9/2012	27.00				8.71	18.29	
810	Shallow	7/9/2012	27.62				5.50	22.12	
811	Shallow	7/9/2012	28.12				17.50	10.62	
815 [d]	Shallow	7/9/2012	26.88				2.10	24.78	
824	Shallow	7/9/2012	26.03				9.70	16.33	
825	Shallow	7/9/2012	33.32				11.67	21.65	
832 [c]	Shallow	7/9/2012	20.05				13.95	6.10	
833	Shallow	7/9/2012	25.66				11.20	14.46	
836	Shallow	7/9/2012	23.81				10.90	12.91	
839	Shallow	7/9/2012	21.59				7.82	13.77	
840	Shallow	7/9/2012	24.44				10.80	13.64	
841	Shallow	7/9/2012	24.55				11.30	13.25	
843	Shallow	7/9/2012	21.67	4.76	0.00	16.91	4.76	16.91	Sheen present
844	Shallow	7/9/2012	21.93	9.26	0.00	12.67	9.26	12.67	Sheen present
845	Shallow	7/9/2012	20.41	6.81	0.00	13.60	6.81	13.60	Sheen present
846	Shallow	7/9/2012	26.18				13.79	12.39	
847	Shallow	7/9/2012	19.59				7.30	12.29	
848 [c]	Shallow	7/9/2012	20.24	8.01	0.00	12.23	8.01	12.23	Sheen present
849	Shallow	7/9/2012	24.33				11.60	12.73	
850	Shallow	7/9/2012	24.39				14.10	10.29	
851	Shallow	7/9/2012	21.87				6.81	15.06	
852	Shallow	7/9/2012	20.33				15.40	4.93	
853	Shallow	7/9/2012	23.01				6.92	16.09	
854 [c]	Shallow	7/9/2012	22.06				5.90	16.16	
863	Shallow	7/9/2012	22.61				15.35	7.26	
866	Interceptor Trench/ Double Cased	7/9/2012	19.88				13.30	6.58	
868	Interceptor Trench/ Double Cased	7/9/2012	22.86				15.65	7.21	
869 [c]	Piezometer	7/9/2012	20.52				13.55	6.97	
870 [c]	Piezometer	7/9/2012	20.48				8.45	12.03	
878	Shallow	7/9/2012	26.51				15.90	10.61	Removed SoakEase™ from well in December 2011
879	Shallow	7/9/2012	25.74				16.95	8.79	
880	Shallow	7/9/2012	20.29				12.82	7.47	Oxy sock in well.
881	Shallow	7/9/2012	21.87				10.57	11.30	
882	Shallow	7/9/2012	23.32				6.65	16.67	
883	Shallow	7/9/2012	25.72				17.10	8.62	
B-07	Piezometer	7/9/2012	25.35				14.75	10.60	
B-08	Piezometer	7/9/2012	25.73				15.30	10.43	
B-09	Piezometer	7/9/2012	25.85				15.75	10.10	
B-10	Piezometer	7/9/2012	25.84				16.47	9.37	
B-11	Piezometer	7/9/2012	25.89				17.00	8.89	
B-13	Piezometer	7/9/2012	25.64				16.70	8.94	
B-14	Piezometer	7/9/2012	25.24				17.30	7.94	
B-18	Piezometer	7/9/2012	19.50				13.40	6.10	
B-26	Piezometer	7/9/2012	23.47				23.40	0.07	
B-27 [b]	Piezometer	7/9/2012	26.05				6.26	19.79	
MW-L1	Interceptor Trench	7/9/2012	19.86				15.65	4.21	
MW-L2	Interceptor Trench	7/9/2012	19.72				16.40	3.32	

TABLE 1. GROUNDWATER ELEVATION DATA
THIRD QUARTER 2012
Valero Benicia Refinery - Benicia, California

Well ID	Well Type	Date	Top of Casing Elevation (feet MSL)	Free Product Data			Water Level Data		Comments
				FPH Depth (feet TOC)	FPH Thickness (feet)	FPH Elevation (feet MSL)	Depth to Water (feet TOC)	Water Level Elevation (feet MSL)	
MW-L3	Interceptor Trench	7/9/2012	22.53				14.70	7.83	
MW-L4 [d]	Interceptor Trench	7/9/2012	24.53				15.50	9.03	
MW-L4A [c]	Interceptor Trench	7/9/2012	24.66				15.52	9.14	
MW-L4B	Interceptor Trench	7/9/2012	24.59				14.40	10.19	
Sump L1	Sump	7/9/2012	19.67				22.10	-2.43	
Area 9: - Process Block									
901	Piezometer	7/11/2012	96.19				37.67	58.52	
905 [c]	Piezometer	7/11/2012	95.87				7.85	88.02	
906	Piezometer	7/11/2012	96.18				17.85	78.33	
908B	Shallow	7/11/2012	94.39				3.86	90.53	
Area 10: - Burma Road Stockpile									
1004 [b]	Shallow	7/9/2012	235.17				51.30	183.87	
1005	Shallow	7/9/2012	180.03				34.70	145.33	
1006	Shallow	7/9/2012	178.98				36.59	142.39	
1008 [d]	Shallow	7/9/2012	201.84				38.40	163.44	
Area 11: - Laboratory and Motor Gasoline UST Area									
1104 [c]	Shallow	7/9/2012	96.31				2.93	93.38	
Area 12: - Gate 5 Stockpile									
1205	Shallow	7/9/2012	63.66				11.50	52.16	
1207	Shallow	7/9/2012	19.25				5.40	13.85	
1208	Shallow	7/9/2012	42.00				24.50	17.50	

NOTES:

[a] = Where product is present, water level elevation values are corrected (specific gravity = 0.88).

[b] = Well resurveyed on 9/26/05 after wellbox replacement

[c] = Well construction data updated 11/11/05 in accordance with boring log information.

[d] = Top of casing elevation updated based on well resurvey on 04/07/07.

MSL = Above mean sea level.

TOC = Top of casing.

FPH = Free phase hydrocarbons.

NM = Not measured.

Oxy sock = Oxygen release compound sock.

SoakEase™ = absorbent sock.

TABLE 2. SUMMARY OF FPH IN WELLS
THIRD QUARTER 2012
Valero Benicia Refinery - Benicia, California

				Free Product Data			Water Level Data			
Well ID	Well Type	Date	Top of Casing Elevation (feet MSL)	FPH Depth (feet TOC)	FPH Thickness (feet)	FPH Elevation (feet MSL)	Depth to Water (feet TOC)	Corrected Water Level Elevation (feet MSL) [a]	Comments	FPH Volume Removed (milliliters)
Area 2:										
VZ-1	Perched Zone	7/9/2012	183.80	12.97	0.00	170.83	12.97	170.83	Sheen present	
VZ-3	Perched Zone	7/9/2012	183.69	13.66	0.00	170.03	13.66	170.03	Sheen present	
Area 5:										
507	Shallow	7/9/2012	57.66	47.67	0.00	9.99	47.67	9.99	Sheen present	
507	Shallow	8/2/2012	57.66	48.20	0.00	9.46	48.20	9.46	Sheen present	
507	Shallow	9/4/2012	57.66	48.76	0.00	8.90	48.76	8.90	Sheen present	
521	Shallow	7/9/2012	57.92	49.79	0.00	8.13	49.79	8.13	Sheen present; SoakEase™ in well.	
521	Shallow	8/2/2012	57.92	50.19	0.00	7.73	50.19	7.73	Sheen present; SoakEase™ in well.	
521	Shallow	9/4/2012	57.92	50.63	0.00	7.29	50.63	7.29	Sheen present; SoakEase™ in well.	
524	Shallow	7/9/2012	16.03	11.08	0.00	4.95	11.08	4.95	Sheen present; SoakEase™ in well.	
526 [c]	Shallow	7/9/2012	14.96	10.09	0.00	4.87	10.09	4.87	Sheen present; SoakEase™ in well.	
528	Shallow	7/9/2012	12.40	16.26	0.00	-3.86	16.26	-3.86	Sheen present; SoakEase™ in well.	
528	Shallow	8/2/2012	12.40	16.29	0.00	-3.89	16.29	-3.89	Sheen present; SoakEase™ in well.	
528	Shallow	9/4/2012	12.40	16.28	0.00	-3.88	16.28	-3.88	Sheen present; SoakEase™ in well.	
Area 6:										
613	Shallow	7/9/2012	87.50	18.85	0.00	68.65	18.85	68.65	Sheen present	
Area 7:										
715	Shallow	7/10/2012	55.10	4.81	0.00	50.29	4.81	50.29	Sheen present	
Area 8:										
843	Shallow	7/9/2012	21.67	4.76	0.00	16.91	4.76	16.91	Sheen present	
844	Shallow	7/9/2012	21.93	9.26	0.00	12.67	9.26	12.67	Sheen present	
845	Shallow	7/9/2012	20.41	6.81	0.00	13.60	6.81	13.60	Sheen present	
848 [c]	Shallow	7/9/2012	20.24	8.01	0.00	12.23	8.01	12.23	Sheen present	
848 [c]	Shallow	8/2/2012	20.24	8.33	0.00	11.91	8.33	11.91	Sheen present	
848 [c]	Shallow	9/4/2012	20.24	8.63	0.00	11.61	8.63	11.61	Sheen present	

NOTES:
[a] = Where measurable product is present, water level elevation values are corrected (specific gravity = 0.88).
[c] * Well construction data updated 11/11/05 in accordance with boring log information.
MSL = Above mean sea level.
TOC = Top of casing.
FPH = Free phase hydrocarbons.

TABLE 3. GROUNDWATER AND QA/QC ANALYTICAL RESULTS
THIRD QUARTER 2012
Valero Benicia Refinery - Benicia, California

Well ID	Type	Sample Date	Benzene µg/l	Toluene µg/l	Ethylbenzene µg/l	Xylenes (total) µg/l	TPH-g (C_6-C_{12}) µg/l	TPH-d (C_{12}-C_{24}) µg/l	MTBE µg/l
		Date	Value/Qual	Value/Qual	Value/Qual	Value/Qual	Value/Qual	Value/Qual	Value/Qual
119		7/11/2012						ND (50)	
137B		7/11/2012						ND (50)	
143		7/11/2012						ND (50)	
144		7/11/2012						ND (50)	
202		7/10/2012	710	ND (5.0)	18	ND (10)	4,300	370 Y	45
204		7/10/2012	740	8.1	7.5	16	4,500	250 Y	71
228		7/10/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	20
228	Dup	7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (49)	17
229		7/10/2012	ND (2.5)	ND (2.5)	ND (2.5)	ND (5.0)	350 YZ	ND (50)	480
310		7/10/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	5.2
311		7/10/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	ND (2.0)
313		7/10/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	5.3
313	Dup	7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	5.6
330		7/10/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	210 Y	ND (2.0)
333		7/10/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	ND (2.0)
413		7/11/2012	7.1	1.7	14	2.6	4,300 Y	890 Y	24
413	Dup	7/11/2012	7.1	1.7	13	2.7	4,400 Y	810 Y	24
508		7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	ND (2.0)
516		7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	230 Y	6.7
540		7/11/2012	1.1	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	200 Y	2.3
541		7/11/2012	1.2	ND (0.5)	ND (0.5)	ND (1.0)	520 Y	1,100 Y	ND (2.0)
541	Dup	7/11/2012	0.7	ND (0.5)	ND (0.5)	ND (1.0)	530 Y	1,100 Y	ND (2.0)
610		7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	ND (2.0)
612		7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (49)	ND (2.0)
614		7/11/2012						ND (50)	
619		7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	ND (2.0)
621		7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	0.6	ND (50)	ND (50)	ND (2.0)
712		7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	67 Y	35,000	ND (2.0)
805		7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (66)	2.6
806		7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	ND (2.0)
832		7/11/2012	3.4	ND (0.5)	ND (0.5)	ND (1.0)	140 Y	460 Y	ND (2.0)
832	Dup	7/11/2012	2.9	ND (0.5)	ND (0.5)	ND (1.0)	100 Y	300 YZ	ND (2.0)
853		7/11/2012	ND (0.5)	ND (0.5)	1.5	ND (1.0)	250 Y	ND (50)	ND (2.0)
879		7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	3.0
883		7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	8.1
B-07		7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (49)	ND (2.0)
B-08		7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (49)	ND (2.0)
B-09		7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	ND (2.0)
B-11		7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	ND (2.0)
B-14		7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	32
AB204	QA/QC	7/10/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)		ND (2.0)
EB204	QA/QC	7/10/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)		ND (2.0)
EB540	QA/QC	7/10/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)		ND (2.0)
TBJL-1	QA/QC	7/10/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)		ND (2.0)
TBME-1	QA/QC	7/10/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)		ND (2.0)
TBMP-1	QA/QC	7/10/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)		ND (2.0)
TBJL-2	QA/QC	7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)		ND (2.0)
TBME-2	QA/QC	7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)		ND (2.0)
TBMP-2	QA/QC	7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)		ND (2.0)

NOTES:

Only those wells that are scheduled for sampling this quarter consistent with the Monitoring Program, and do not contain FPH, an oxygen-releasing compound sock, SoakEase™, or an obstruction, are shown on this table. See Table 1 for details.

Blank cells = not analyzed.

Qual = Laboratory or Data qualifier.

ND = Not detected at the specific reporting level in parentheses.

Y = Sample exhibits chromatographic pattern which does not resemble standard.

Z = Sample exhibits unknown single peak or peaks.

TPH-g = Total petroleum hydrocarbons as gasoline.

TPH-d =Total petroleum hydrocarbons as diesel.

MTBE = Methyl tert-butyl ether.

C_6-C_{12} = Hydrocarbon range.

AB = Ambient Blank

EB = Equipment Blank

TB = Trip Blank

FPH = Free phase hydrocarbons.

µg/l = Micrograms per liter.

Analysis of TPH-g by EPA Method 8015B, and TPH-d by EPA Method 8015B with silica gel clean-up; all other analyses by EPA Method 8260B.

TABLE 4. WQPS EXCEEDANCES - POC WELLS
THIRD QUARTER 2012
Valero Benicia Refinery - Benicia, California

Well ID	Sample Date	Benzene µg/l	Toluene µg/l	Ethylbenzene µg/l	Xylenes (total) µg/l	TPH-g (C_6-C_{12}) µg/l	TPH-d (C_{12}-C_{24}) µg/l	MTBE µg/l
Main Refinery WQPS		46 µg/l	130 µg/l	290 µg/l	13 µg/l	500 µg/l	640 µg/l	8,000 µg/l
		Value/Qual	Value/Qual	Value/Qual	Value/Qual	Value/Qual	Value/Qual	Value/Qual
119	7/11/2012						ND (50)	
137B	7/11/2012						ND (50)	
143	7/11/2012						ND (50)	
144	7/11/2012						ND (50)	
310	7/10/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	5.2
325	NS-O	NS-O	NS-O	NS-O	NS-O	NS-O	NS-O	NS-O
328	NS-SA	NS-SA	NS-SA	NS-SA	NS-SA	NS-SA	NS-SA	NS-SA
330	7/10/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	210 Y	ND (2.0)
331	NS-SA	NS-SA	NS-SA	NS-SA	NS-SA	NS-SA	NS-SA	NS-SA
333	7/10/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	ND (2.0)
508	7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	ND (2.0)
516	7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	230 Y	6.7
524	NS-S	NS-S	NS-S	NS-S	NS-S	NS-S	NS-S	NS-S
540	7/11/2012	1.1	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	200 Y	2.3
546	NS-O	NS-O	NS-O	NS-O	NS-O	NS-O	NS-O	NS-O
610	7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	ND (2.0)
611	NS-SA	NS-SA	NS-SA	NS-SA	NS-SA	NS-SA	NS-SA	NS-SA
614	7/11/2012						ND (50)	
620	NS-A	NS-A	NS-A	NS-A	NS-A	NS-A	NS-A	NS-A
621	7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	0.6	ND (50)	ND (50)	ND (2.0)
805	7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (66)	2.6
806	7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	ND (2.0)
807	NS-O	NS-O	NS-O	NS-O	NS-O	NS-O	NS-O	NS-O
825	NS-A	NS-A	NS-A	NS-A	NS-A	NS-A	NS-A	NS-A
880	NS-O	NS-O	NS-O	NS-O	NS-O	NS-O	NS-O	NS-O
B-07	7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (49)	ND (2.0)
B-08	7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (49)	ND (2.0)
B-09	7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	ND (2.0)
B-11	7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	ND (2.0)
B-14	7/11/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	32

NOTES:
WQPS = Water Quality Protection Standards.
POC = Point of Compliance.
Blank cells = not analyzed.
Qual = Laboratory or Data qualifier.
ND = Not detected at the specific reporting level in parentheses.
NS-SA = Not sampled this quarter because well is sampled semi-annually (second and fourth quarters).
NS-A = Not sampled this quarter because well is sampled annually (fourth quarter).
NS-S = Not sampled this quarter because a SoakEase is present.
NS-O = Not sampled this quarter because an ORC sock is present.
Y = Sample exhibits chromatographic pattern which does not resemble standard.
TPH-g = Total petroleum hydrocarbons as gasoline.
TPH-d =Total petroleum hydrocarbons as diesel.
MTBE = Methyl tert-butyl ether.
C_6-C_{12} = Hydrocarbon range.
µg/l = Micrograms per liter.
Values which are greater than or equal to WQPS levels are shown in **bold.**
Analysis of TPH-g by EPA Method 8015B, TPH-d by EPA Method 8015B with silica gel clean-up; all other analyses by EPA Method 8260B.

TABLE 6. SURFACE WATER ANALYTICAL RESULTS
THIRD QUARTER 2012
Valero Benicia Refinery - Benicia, California

Well ID	Sample Date	Benzene µg/l	Toluene µg/l	Ethylbenzene µg/l	Xylenes (total) µg/l	TPH-g (C_6-C_{12}) µg/l	TPH-d (C_{12}-C_{24}) µg/l	MTBE µg/l
		Value/Qual	Value/Qual	Value/Qual	Value/Qual	Value/Qual	Value/Qual	Value/Qual
SW-01	7/12/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	ND (2.0)
SW-02	7/12/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	ND (2.0)
SW-03	7/12/2012	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (50)	ND (50)	ND (2.0)

NOTES:

Blank cells = not analyzed.

Qual = Laboratory or Data qualifier.

ND = Not detected at the specific reporting level in parentheses.

TPH-g = Total petroleum hydrocarbons as gasoline.

TPH-d =Total petroleum hydrocarbons as diesel.

MTBE = Methyl tert-butyl ether.

C_6-C_{12} = Hydrocarbon range.

µg/l = Micrograms per liter.

Analysis of TPH-g by EPA Method 8015B, and TPH-d by EPA Method 8015B with silica gel clean-up; all other analyses by EPA Method 8260B.

TABLE 7. ULSA GROUNDWATER INTERCEPTOR TRENCH WATER ELEVATIONS [1]
THIRD QUARTER 2012
Valero Benicia Refinery - Benicia, California

Well ID	July 9, 2012 Water Level (feet MSL)	August 2, 2012 Water Level (feet MSL)	September 4, 2012 Water Level (feet MSL)
MW-U2	6.65	5.78	6.25
MW-U3	-3.34	-3.24	-3.26
MW-U4	-0.98	-1.04	-1.05
MW-U5	-1.50	-1.45	-1.54
MW-U6	1.48	1.52	1.48
MW-U7	1.93	1.83	1.75
507	9.99*	9.46*	8.90*
520	9.60	9.33	8.91
521	8.13*	7.73*	7.31*
528	-3.86*	-3.89*	-3.88*
529	3.66	3.45	3.15
530	6.04	6.83	6.47
542	8.89	8.24	8.01
543	16.30	16.09	15.89
544	4.13	3.83	3.40
545	5.09	4.86	4.52
Sump U1	-4.63	-5.47	-5.69
Sump U2	-1.99	-2.28	-2.26
Sump U3	6.72	5.93	6.32

NOTES:

[1] Product present, with thickness in feet shown in brackets; water elevation value corrected according to specific gravity of 0.88.

MSL = Above mean sea level, except where noted as negative value.

* Sheen present.

TABLE 8. LLSA GROUNDWATER INTERCEPTOR TRENCH WATER ELEVATIONS
THIRD QUARTER 2012
Valero Benicia Refinery - Benicia, California

Well ID	July 9, 2012 Water Level (feet MSL)	August 2, 2012 Water Level (feet MSL)	September 4, 2012 Water Level (feet MSL)
MW-L1	4.21	4.21	4.16
MW-L2	3.32	3.27	3.25
MW-L3	7.83	7.71	7.47
MW-L4	9.03	8.85	8.69
MW-L4A	9.14	8.98	8.81
MW-L4B	10.19	8.99	8.84
806	7.88	7.69	7.55
832	6.10	5.77	5.47
847	12.29	11.97	11.55
848	12.23*	11.91*	11.61*
849	12.73	12.39	12.10
850	10.29	10.10	10.03
852	4.93	4.76	4.59
863	7.26	6.95	6.81
866	6.58	6.53	6.40
869	6.97	6.82	6.64
870	12.03	11.75	11.42
878	10.61	10.44	10.25
Sump L1	-2.43	-2.04	-2.39

NOTES:

(1) Product present, with thickness in feet shown in brackets; water elevation value corrected according to specific gravity of 0.88.

MSL = Above mean sea level, except where noted as negative value.

* Sheen present.

TABLE 9. INFLUENT AND EFFLUENT WATER ANALYTICAL RESULTS FOR VRU PERCHED ZONE EXTRACTION SYSTEM THROUGH THIRD QUARTER 2012 Valero Marketing Terminal - Benicia, California

Sample Location	Date Sampled	Quarterly Volume Extracted (gallons)	TPH-g (C_6-C_{12}) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethylbenzene (µg/l)	Total Xylenes (µg/l)	MTBE (µg/l)
Influent	09/20/01	2,002	**1,400**	**46**	**95**	**9**	**46**	**830**
	12/31/01	32,118	NS	NS	NS	NS	NS	NS
	01/22/02		**42,000**	**2,900**	**8,000**	**1,000**	**8,300**	**1,300**
	02/27/02		**220**	**1.5**	**3.5**	**0.63**	**28**	**170**
	03/25/02		**550**	**23**	**81**	**4.4**	**130**	**220**
	03/31/02	14,950	NS	NS	NS	NS	NS	NS
	04/19/02		ND(50)	ND(0.5)	**1.2**	ND(0.5)	**3.8**	**58**
	05/21/02		ND(50)	ND(0.5)	**1.6**	ND(0.5)	**1.2**	ND(2.5)
	06/24/02	7,250	ND(50)	ND(0.5)	ND(0.5)	ND(0.50)	ND(0.5)	ND(2.5)
	07/10/02		ND(50)	ND(0.5)	ND(0.5)	ND(0.50)	ND(0.5)	**170**
	08/12/02		ND(250)	ND(0.5)	**3.4**	ND(2.5)	**3.8**	**1,300**
	09/12/02	9,687	ND(50)	ND(0.5)	ND(0.5)	ND(0.50)	ND(0.5)	**60**
	10/09/02		ND(50)	ND(0.5)	ND(0.5)	ND(0.50)	ND(0.5)	**12**
	11/26/02		**140**	ND(0.5)	ND(0.5)	ND(0.50)	ND(0.5)	**190**
	12/26/02	32,327	ND(50)	ND(0.5)	ND(0.5)	ND(0.50)	ND(0.5)	**92**
	01/29/03		ND(50)	ND(0.5)	**1.1**	ND(0.5)	**1.7**	**7**
	02/05/03		**78**	ND(0.5)	ND(0.5)	**0.71**	ND(0.5)	11
	03/07/03	23,389	**540**	ND(2.5)	ND(2.5)	ND(2.5)	ND(2.5)	**870**
	04/25/03		ND(250)	ND(2.5)	ND(2.5)	ND(2.5)	ND(2.5)	**980**
	05/15/03		**140**	ND(0.50)	ND(0.50)	ND(0.50)	**0.88**	**270**
	06/30/03[a]	27,836	NS	NS	NS	NS	NS	NS
	07/15/03		**780**	**2.6**	**8.6**	ND(2.5)	**17**	**1,300**
	08/19/03		**100**	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	**180**
	09/17/03	11,904	ND(50)	ND(0.50)	**1.3**	ND(0.50)	**3**	ND(2.5)
	10/15/03		NS	NS	NS	NS	NS	NS
	11/15/03		NS	NS	NS	NS	NS	NS
	12/12/03	5,895	**510**	ND(0.50)	**2.0**	ND(0.50)	**3.9**	**1,100**
	02/09/04		**9200**[b]	**680**	**1,300**	**47**	**2,400**	**660**
	03/18/04	64,278	**4400**[b]	**230**	**920**	**110**	**1,100**	**1,200**
	05/20/04	4,099	**890**[b]	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	**1,500**
	07/27/04		NT	ND(100)	ND(100)	ND(100)	ND(100)	**3,000**
	08/27/04	5,362	**160**[b]	ND(0.50)	**0.93**	ND(0.50)	**3.2**	**300**
	10/11/04		**17,000**[b]	**1,200**	**3,400**	**280**	**3,100**	**5,900**
	10/20/04		**1,600**[b]	**56**	**170**	**15**	**180**	**1,800**
	12/14/04		**55**	ND(0.50)	ND(0.50)	ND(0.50)	**1.2**	**59**
	12/28/04	38,486	**96**	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	**130**
	01/20/05		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(2.5)
	02/22/05		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	**68**
	04/15/05	85,899	**300**	ND(2.5)	ND(2.5)	ND(2.5)	ND(2.5)	**590**
	05/09/05		**660**	**77**	ND(2.5)	ND(2.5)	**12**	**900**
	05/29/05		**130**	**2.1**	ND(0.50)	ND(0.50)	ND(0.50)	**240**
	06/30/05	57,629	NS	NS	NS	NS	NS	NS
	07/05/05		**700**	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	**980**
	08/23/05	13,744	ND(2500)	ND(25)	ND(25)	ND(25)	ND(25)	**500**
	09/26/05		**200**	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	**320**
	09/28/05	39,076	NS	NS	NS	NS	NS	NS
	11/30/05		**11,000**	**560**	**2,200**	**350**	**3,000**	**1,000**
	12/27/05		ND (250)	ND (2.5)	**3.4**	ND(2.5)	**4.8**	**360**
	12/30/05	48,065	NS	NS	NS	NS	NS	NS
	03/27/06	150,635	NS	NS	NS	NS	NS	NS
	04/05/06		**22,000**	**44**	**240**	**46**	**510**	**190**
	06/23/06	103,025	NS	NS	NS	NS	NS	NS
	9/30/06[a]		NS	NS	NS	NS	NS	NS
	12/28/06	22,694	NS	NS	NS	NS	NS	NS
	02/22/07		**32,000**	**780**	**3,600**	**140**	**8,900**	**4,700**
	03/30/07	61,803	NS	NS	NS	NS	NS	NS
	06/30/07		NS	NS	NS	NS	NS	NS

TABLE 9. INFLUENT AND EFFLUENT WATER ANALYTICAL RESULTS FOR VRU PERCHED ZONE EXTRACTION SYSTEM THROUGH THIRD QUARTER 2012
Valero Marketing Terminal - Benicia, California

Sample Location	Date Sampled	Quarterly Volume Extracted (gallons)	TPH-g (C_6-C_{12}) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethylbenzene (µg/l)	Total Xylenes (µg/l)	MTBE (µg/l)
	09/14/07		**89,000**	**240**	**960**	**120**	**1,800**	**5,100**
	09/28/07	27,631	NS	NS	NS	NS	NS	NS
	10/18/07		**29,000**	**630**	**1,900**	**380**	**4,100**	**11,000**
	11/12/07		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	**5.1**
	12/06/07	24,366	**23,000**	**490**	**1,900**	**430**	**3,900**	**5,800**
	01/10/08		**35,000**	**410**	**2,300**	**400**	**4,800**	**3,800**
	02/08/08		**1,100**	**8.7**	**58**	**17**	**310**	**17**
	03/14/08	80,327	**8,800**	**110**	**430**	**110**	**1,600**	**3,000**
	04/08/08		**30,000**	**390**	**1,600**	**540**	**5,100**	**11,000**
	05/02/08		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	**27**
	06/12/08		**98**	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	**130**
	06/19/08	29,396	NS	NS	NS	NS	NS	NS
	07/09/08		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	**8.4**
	08/05/08		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	**2.8**
	09/05/08		ND(500)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	**500**
	09/25/08	20,956	NS	NS	NS	NS	NS	NS
	10/03/08		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	**1.2**
	11/06/08		**10,000**	**260**	**540**	**20**	**1,600**	**4,700**
	12/09/08	17,769	ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	**78**
	01/14/09		ND(250)	ND(2.5)	ND(2.5)	**7.8**	**18**	**320**
	02/03/09		ND(250)	ND(2.5)	**3.8**	ND(2.5)	**17**	**260**
	03/06/09	56,367	**35,000**	**370**	**1,500**	**980**	**8,700**	**770**
	04/03/09		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	**4.6**	**42**
	05/01/09		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	**51**
	06/01/09	59,556	**1,100**	**12**	**38**	**19**	**180**	**560**
	07/13/09		**75**	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	**47**
	08/03/09		ND (500)	ND(5.0)	ND(5.0)	ND(5.0)	ND(10)	**110**
	09/01/09	41,065	ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	ND(0.50)
	10/08/09		**200**	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	**180**
	11/03/09		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	**3.7**
	12/03/09	41,011	ND(50)	**0.67**	ND(0.50)	ND(0.50)	ND(1.0)	**4.6**
	01/07/10		**1,000**	**28**	**55**	**40**	**290**	**600**
	02/01/10		ND(50)	**1.8**	**1.6**	**1.0**	**5.2**	**29**
	03/04/10	105,097	**8,300**	**200**	**610**	**400**	**3,000**	**1,500**
	04/06/10		**640 Y**	**25**	**37**	**22**	**230**	**510**
	05/07/10		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	06/04/10	95,433	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	07/07/10		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	**43**
	08/04/10		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	09/09/10	55,797	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	10/05/10		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	11/04/10		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	12/10/10	58,858	**1,800**	**63**	**87**	**45**	**530**	**830**
	01/26/11		**4,000**	**120**	**220**	**190**	**1,400**	**1,500**
	02/01/11		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	03/04/11	151,919	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	**1.8**	**320**
	04/05/11		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	05/17/11		**3,700**	**100**	**99**	**130**	**1,200**	**1,700**
	06/13/11	185,212	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	07/07/11		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	08/01/11		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	09/01/11	117,824	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	**13**
	10/05/11		**3,500**	**110**	**85**	**150**	**940**	**2,600**
	11/03/11		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	12/6/2011	63,235	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	1/10/2012		**5,600 Y**	**190**	**140**	**260**	**1,700**	**3,600**
	2/2/2012		**13,000**	**310**	**240**	**320**	**3,500**	**4,000**
	3/1/2012		**5,800**	**160**	**120**	**200**	**1,700**	**4,500**
	4/3/2012		**9,600**	**220**	**180**	**250**	**3,700**	**1,600**
	5/1/2012		**130**	ND (2.5)	ND (2.5)	ND (2.5)	**31**	**270**
	6/6/2012		**3,700 YZ**	**30**	**23**	ND (2.5)	**1,200**	**3,700**
	7/11/2012		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	8/2/2012		**180 YZ**	**9.7**	**3.7**	ND (0.5)	**59**	**1,200**
	9/4/2012		**150**	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	**270**

TABLE 9. INFLUENT AND EFFLUENT WATER ANALYTICAL RESULTS FOR VRU PERCHED ZONE EXTRACTION SYSTEM THROUGH THIRD QUARTER 2012 Valero Marketing Terminal - Benicia, California

Sample Location	Date Sampled	Quarterly Volume Extracted (gallons)	TPH-g (C_6-C_{12}) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethylbenzene (µg/l)	Total Xylenes (µg/l)	MTBE (µg/l)
Effluent	09/20/01		ND(50)	ND(0.5)	ND(0.5)	ND(0.50)	ND(0.5)	**11**
	01/22/02		ND(50)	ND(0.5)	**0.82**	ND(0.5)	**0.78**	**11**
	02/27/02		**280**	ND(0.5)	ND(0.5)	ND(0.50)	**3.8**	**590**
	03/25/02		ND(50)	ND(0.5)	ND(0.5)	ND(0.50)	ND(0.5)	11
	04/22/02		ND(50)	ND(0.5)	ND(0.5)	ND(0.50)	ND(0.5)	ND(2.5)
	05/21/02		NS	NS	NS	NS	NS	NS
	06/24/02		NS	NS	NS	NS	NS	NS
	07/10/02		ND(50)	ND(0.5)	ND(0.5)	ND(0.50)	ND(0.5)	**3.4**
	08/12/02		ND(50)	ND(0.5)	ND(0.5)	ND(0.50)	ND(0.5)	**25**
	09/12/02		ND(50)	ND(0.5)	ND(0.5)	ND(0.50)	ND(0.5)	ND(2.5)
	10/09/02		ND(50)	ND(0.5)	ND(0.5)	ND(0.50)	ND(0.5)	ND(2.5)
	11/26/02		ND(50)	ND(0.5)	ND(0.5)	ND(0.50)	ND(0.5)	ND(2.5)
	12/26/02		NS	NS	NS	NS	NS	NS
	01/29/03		NS	NS	NS	NS	NS	NS
	02/05/03		ND(50)	ND(0.5)	ND(0.5)	ND(0.50)	ND(0.5)	ND(2.5)
	03/07/03		ND(50)	ND(0.5)	ND(0.5)	ND(0.50)	ND(0.5)	**18**
	04/25/03		ND(50)	ND(0.5)	ND(0.5)	ND(0.50)	ND(0.5)	**17**
	05/15/03		ND(50)	ND(0.5)	ND(0.5)	ND(0.50)	ND(0.5)	**7.2**
	06/30/03[a]		NS	NS	NS	NS	NS	NS
	07/15/03		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	11
	08/19/03		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(2.5)
	09/17/03		NS	NS	NS	NS	NS	NS
	10/15/03		NS	NS	NS	NS	NS	NS
	11/15/03		NS	NS	NS	NS	NS	NS
	12/12/03		**53**	ND(0.50)	**1.3**	ND(0.50)	**1.2**	**58**
	02/09/04		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(2.5)
	03/18/04		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(2.5)
	08/27/04		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	**8.0**
	10/11/04		**120**	**0.72**	**3.0**	ND(0.50)	**4.2**	**200**
	10/20/04		**180**	**1.9**	**5.8**	**0.50**	**7.6**	**310**
	12/14/04		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(2.5)
	12/28/04		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	**5.3**
	01/20/05		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(2.5)
	02/22/05		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(2.5)
	04/15/05		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	**3.5**
	05/09/05		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	**8.8**
	05/29/05		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(2.0)
	07/05/05		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	**3.3**
	08/23/05		ND(2500)	ND(25)	ND(25)	ND(25)	ND(25)	**710**
	09/26/05		**120**	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	**180**
	11/30/05		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	**3.2**
	12/27/05		ND (50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND (2.0)
	12/30/05		NS	NS	NS	NS	NS	NS
	03/27/06		NS	NS	NS	NS	NS	NS
	04/05/06		ND (50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.0)	ND (0.50)
	9/30/06[a]		NS	NS	NS	NS	NS	NS
	12/28/06		NS	NS	NS	NS	NS	NS
	02/22/07		**4,800**	**73**	**140**	ND(10)	**1,100**	**2,000**
	03/30/07		NS	NS	NS	NS	NS	NS
	06/30/07		NS	NS	NS	NS	NS	NS
	09/14/07		ND (5,000)	**57**	**250**	ND (50)	**520**	**3,300**
	09/28/07		NS	NS	NS	NS	NS	NS
	10/18/07		**3,600**	**64**	**210**	**44**	**460**	**3,500**
	11/12/07		ND (50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.0)	**23**
	12/06/07		**3,300**	**39**	**160**	**34**	**330**	**2,100**
	01/10/08		**9,100**	**93**	**500**	**84**	**1,200**	**2,300**
	02/08/08		ND (50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.0)	**2.2**

TABLE 9. INFLUENT AND EFFLUENT WATER ANALYTICAL RESULTS FOR VRU PERCHED ZONE EXTRACTION SYSTEM THROUGH THIRD QUARTER 2012
Valero Marketing Terminal - Benicia, California

Sample Location	Date Sampled	Quarterly Volume Extracted (gallons)	TPH-g (C_6-C_{12}) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethylbenzene (µg/l)	Total Xylenes (µg/l)	MTBE (µg/l)
	03/14/08		**970**	**6.0**	**22**	**5.7**	**94**	**600**
	04/08/08		**3,300**	**20**	**69**	**27.0**	**280**	**3,200**
	05/02/08		ND (50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.0)	**12**
	06/12/08		**60**	ND (0.50)	ND (0.50)	ND (0.50)	**1.6**	**63**
	07/09/08		ND (50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.0)	**5.2**
	08/05/08		ND (50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.0)	**2.1**
	09/05/08		ND (50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.0)	**5.5**
	10/03/08		ND (50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.0)	ND (0.50)
	11/06/08		ND (50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.0)	**9.8**
	12/09/08		ND (50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.0)	**1.3**
	01/14/09		ND (50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.0)	**2.5**
	02/03/09		ND (50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.0)	**1.2**
	03/06/09		ND (50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (1.0)	**4.9**
	04/03/09		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	ND(0.50)
	05/01/09		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	**0.61**
	06/01/09		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	**3.5**
	07/13/09		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	ND(0.50)
	08/03/09		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	ND(0.50)
	09/01/09		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	ND(0.50)
	10/08/09		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	ND(0.50)
	11/03/09		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	ND(0.50)
	12/03/09		ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	ND(0.50)
	01/07/10		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	**9.6**
	02/01/10		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	03/04/10		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	**5.7**
	04/06/10		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	**1.8**	**66**
	05/07/10		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	06/04/10		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	07/07/10		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	**35**
	08/04/10		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	09/09/10		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	10/05/10		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	11/04/10		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	12/10/10		**2,300**	**78**	**110**	**54**	**690**	**960**
	01/26/11		**540**	**9.6**	**16**	**15**	**100**	**150**
	02/01/11		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	**3.2**
	03/04/11		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	**1,200**
	04/05/11		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	05/17/11		**2,100**	**45**	**45**	**72**	**580**	**1,500**
	06/13/11		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	07/07/11		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	08/01/11		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	09/01/11		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	**41**
	10/05/11		**4,600**	**150**	**120**	**220**	**1,300**	**3,000**
	11/03/11		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	12/6/2011		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	1/10/2012		**2200 Y**	**69**	**51**	**93**	**630**	**1,500**
	2/2/2012		**4,100**	**110**	**87**	**110**	**1,300**	**2,600**
	3/1/2012		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	**22**
	4/3/2012		**1,900**	**39**	**30**	**41**	**490**	**250**
	5/1/2012		**180**	ND(2.5)	ND(2.5)	ND(2.5)	**33**	**620**
	6/6/2012		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	7/11/2012		ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1.0)	ND(2.0)
	8/2/2012		**290 YZ**	**11**	**4.3**	ND(0.5)	**89**	**1,900**
	9/4/2012		**76 Y**	**0.8**	ND (0.5)	ND (0.5)	**23**	**1,600**
Total Volume Extracted:	09/26/12	2,335,374						

TABLE 9. INFLUENT AND EFFLUENT WATER ANALYTICAL RESULTS FOR VRU PERCHED ZONE EXTRACTION SYSTEM THROUGH THIRD QUARTER 2012
Valero Marketing Terminal - Benicia, California

Sample Location	Date Sampled	Quarterly Volume Extracted (gallons)	TPH-g (C_6-C_{12}) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethylbenzene (µg/l)	Total Xylenes (µg/l)	MTBE (µg/l)

NOTES:

[a] = Insufficent water present to sample.

[b] = Gasoline Range Organics (Hydrocarbon Range C_4 - C_{12}).

Y = Sample exhibits chromatographic pattern which does not resemble standard.

Z = Sample exhibits unknown singloe peak or peaks.

µg/l = Micrograms per liter.

TPH-g = Total petroleum hydrocarbons as gasoline (Hydrocarbon Range C_6-C_{12}), analyzed by EPA Method 8015B.

MTBE = Methyl tert-butyl ether.

ND = Not detected (detection limit in parenthesis).

NS = Not sampled.

NT = Not tested.

VRU = Vapor Recovery Unit.

C_6-C_{12} = Hydrocarbon range.

Values which are greater than the laboratory reporting limit are shown in **bold**.

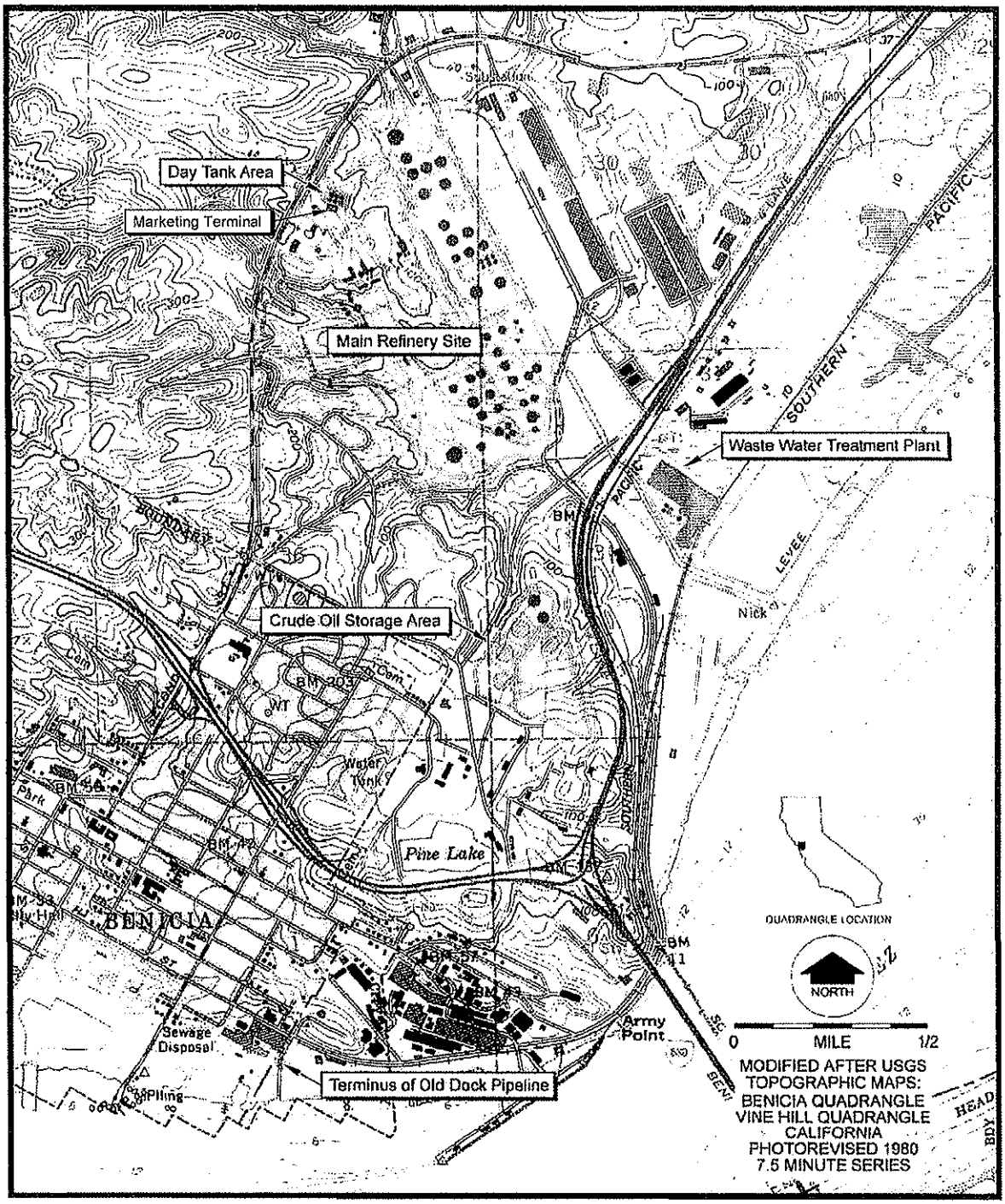
Source of Data: Valero - Refinery Co. Benicia Fuels Terminal Manager

Prior to September 2007, analyses were performed by EPA Method 8015B.

Subsequent to September 2007 and prior to January 2010, analyses were performed by EPA Method 8260B.

Subsequent to January 2010, TPH-g has been analyzed by EPA Method 8015B; all others by EPA Method 8260B.

FIGURES

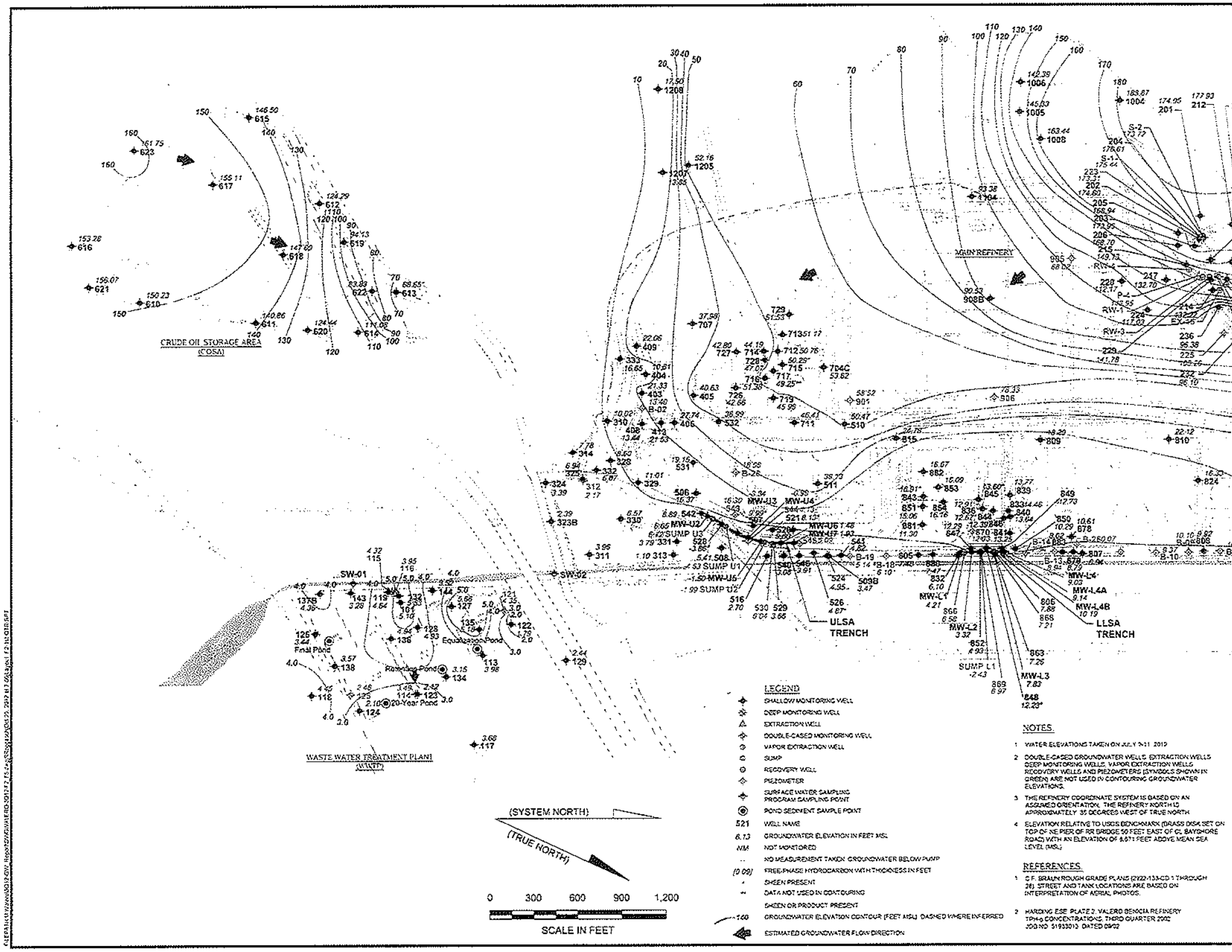


LEGEND
HARDING ESE, SITE LOCATION MAP
FOURTH QUARTER 2001 QUARTERLY REPORT
PLATE 1-1, DATED JANUARY 2002
DRAWN BY DJP; JOB NO. 51933013

Stantec
15575 LOS GATOS BOULEVARD, BUILDING C
LOS GATOS, CALIFORNIA
PHONE: 408.356.6124/356.6138 (FAX)

FOR: VALERO BENICIA REFINERY, BENICIA, CALIFORNIA	SITE LOCATION MAP	FIGURE: 1

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185702346.400.0001	RRR/DP	TC/AM/GH	GH/TC	09/19/12



LEGEND

- SHALLOW MONITORING WELL
- DEEP MONITORING WELL
- EXTRACTION WELL
- DOUBLE-CASED MONITORING WELL
- VAPOR EXTRACTION WELL
- SUMP
- RECOVERY WELL
- PIEZOMETER
- SURFACE WATER SAMPLING PROGRAM SAMPLING POINT
- POND SEDIMENT SAMPLE POINT
- 521 WELL NAME
- 6.13 GROUNDWATER ELEVATION IN FEET MSL
- NM NOT MONITORED
- -- NO MEASUREMENT TAKEN. GROUNDWATER BELOW PUMP
- (0.09) FREE-PHASE HYDROCARBON WITH THICKNESS IN FEET
- * SHEEN PRESENT
- ** DATA NOT USED IN CONTOURING
- SHEEN OR PRODUCT PRESENT
- 140 GROUNDWATER ELEVATION CONTOUR (FEET MSL), DASHED WHERE INFERRED
- ESTIMATED GROUNDWATER FLOW DIRECTION

NOTES:

1. WATER ELEVATIONS TAKEN ON JULY 9-11, 2012
2. DOUBLE-CASED GROUNDWATER WELLS, EXTRACTION WELLS, DEEP MONITORING WELLS, VAPOR EXTRACTION WELLS, RECOVERY WELLS AND PIEZOMETERS (SYMBOLS SHOWN IN GREEN) ARE NOT USED IN CONTOURING GROUNDWATER ELEVATIONS.
3. THE REFINERY COORDINATE SYSTEM IS BASED ON AN ASSUMED ORIENTATION. THE REFINERY NORTH IS APPROXIMATELY 35 DEGREES WEST OF TRUE NORTH.
4. ELEVATION RELATIVE TO USGS BENCHMARK (BRASS DISK SET ON TOP OF NE PIER OF RR BRIDGE 50 FEET EAST OF OL BAYSHORE ROAD) WITH AN ELEVATION OF 8.671 FEET ABOVE MEAN SEA LEVEL (MSL).

REFERENCES:

1. C.F. BRAUN ROUGH GRADE PLANS (2122-133-CD 1 THROUGH 28). STREET AND TANK LOCATIONS ARE BASED ON INTERPRETATION OF AERIAL PHOTOS.
2. HARDING ESE, PLATE 2, VALERO BENICIA REFINERY TPH-g CONCENTRATIONS, THIRD QUARTER 2002 JOB NO. 51933013, DATED 09/02

PREPARED BY: Stantec
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LOS GATOS, CALIFORNIA

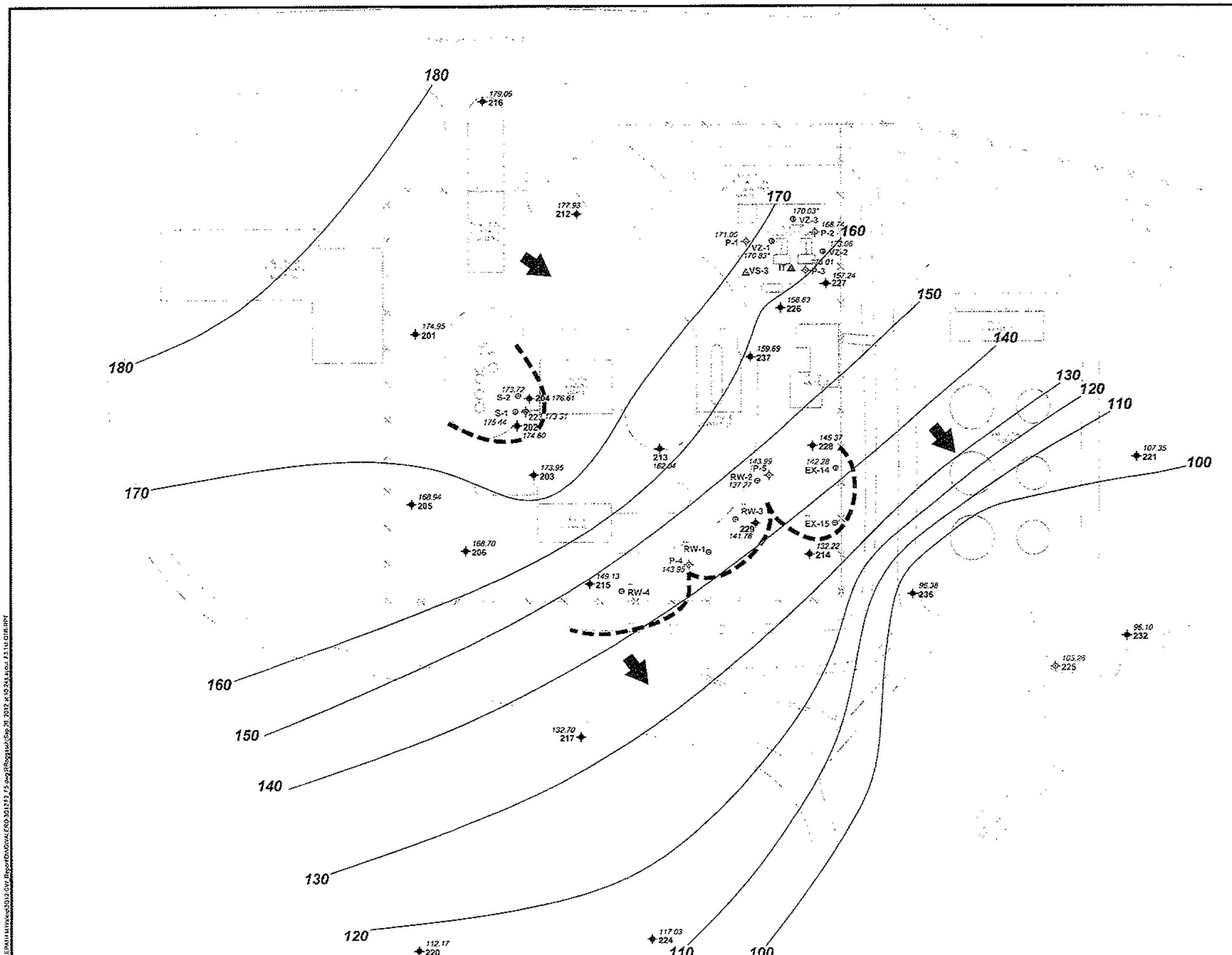
PREPARED FOR: VALERO BENICIA REFINERY
BENICIA, CALIFORNIA

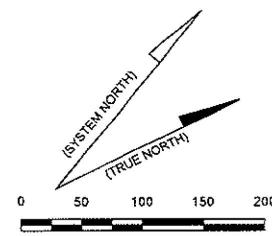
REFINERY GROUNDWATER ELEVATIONS
THIRD QUARTER 2012

DESIGNED BY	DRAWN BY	CHECKED BY
GH/TC	RRR/OP	TO/AM/AJGH

DATE	CAD FILE
09/15/12	VALERO-2012-F2_F6.dwg
PROJECT No.	DRAWING SCALE
185702460.400.0001	AS SHOWN

FIGURE 2





SCALE IN FEET

LEGEND

- SHALLOW MONITORING WELL
- EXTRACTION WELL
- DOUBLE-CASED MONITORING WELL
- VAPOR EXTRACTION WELL
- RECOVERY WELL
- PIEZOMETER
- 204 WELL NAME
- 176.76 GROUNDWATER ELEVATION IN FEET MSL
- NM NOT MONITORED
- -- NO MEASUREMENT TAKEN, GROUNDWATER BELOW PUMP
- • SHEEN PRESENT
- [0.02] FREE-PHASE HYDROCARBON WITH THICKNESS IN FEET
- SHEEN OR PRODUCT PRESENT
- 100 GROUNDWATER ELEVATION CONTOUR (FEET MSL) DASHED WHERE INFERRED
- ESTIMATED GROUNDWATER FLOW DIRECTION
- ESTIMATED RECOVERY WELL CAPTURE ZONE

NOTES:

1. WATER ELEVATIONS MEASURED JULY 9-11, 2012
2. DOUBLE-CASED GROUNDWATER WELLS, EXTRACTION WELLS, DEEP MONITORING WELLS, VAPOR EXTRACTION WELLS, RECOVERY WELLS AND PIEZOMETERS (SYMBOLS SHOWN IN GREEN) ARE NOT USED IN CONTOURING GROUNDWATER ELEVATIONS.
3. THE REFINERY COORDINATE SYSTEM IS BASED ON AN ASSUMED ORIENTATION. THE REFINERY NORTH IS APPROXIMATELY 35 DEGREES WEST OF TRUE NORTH.
4. ELEVATION RELATIVE TO USGS BENCHMARK (BRASS DISK SET ON TOP OF NE PIER OF RR BRIDGE 50 FEET EAST OF CL BAYSHORE ROAD) WITH AN ELEVATION OF 8.671 FEET ABOVE MEAN SEA LEVEL (MSL).

REFERENCES:

1. C.F. BRAUN ROUGH GRADE PLANS (2922-133-CD 1 THROUGH 28). STREET AND TANK LOCATIONS ARE BASED ON INTERPRETATION OF AERIAL PHOTOS.
2. HARDING ESE, PLATE 2, VALERO BENICIA REFINERY TPH-g CONCENTRATIONS, THIRD QUARTER 2002 JOB NO. 51933013 DATED 09/02

PREPARED BY

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PREPARED FOR

VALERO BENICIA REFINERY

BENICIA
CALIFORNIA

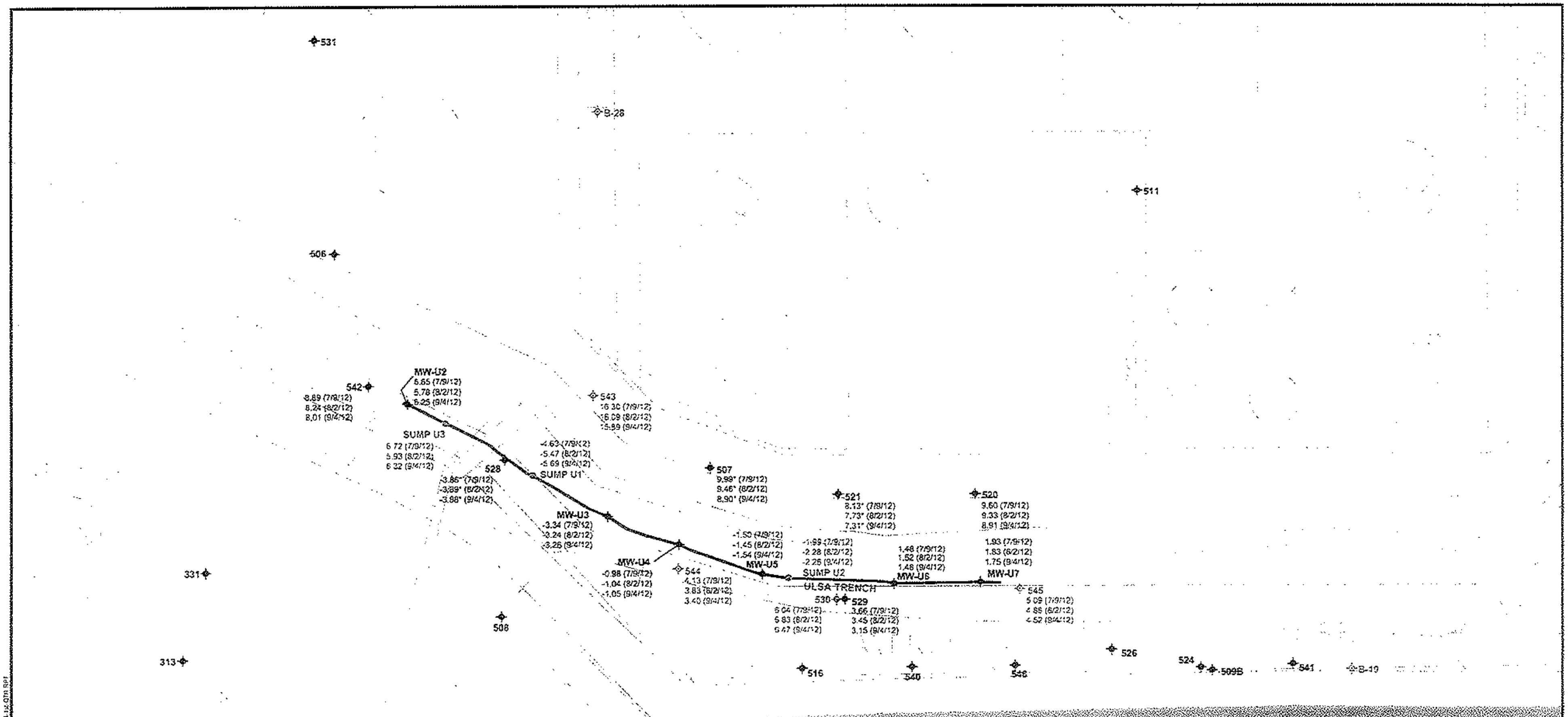
FUELS TERMINAL
GROUNDWATER ELEVATIONS
AND CAPTURE ZONES

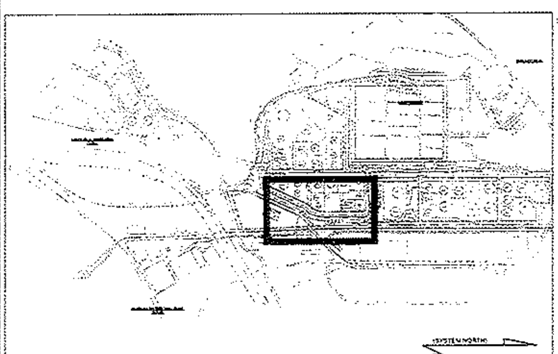
THIRD QUARTER 2012

DESIGNED BY	DRAWN BY	CHECKED BY
GM/TC	RRR/DP	TC/AM/CL/GH

DATE	CAD FILE
09/19/12	VALERO-2012-F2_F5.dwg
PROJECT No.	DRAWING SCALE
185702486.400.0001	AS SHOWN

FIGURE 3





UPPER LEVEL STORAGE AREA
KEY MAP

LEGEND

- SHALLOW MONITORING WELL
- DEEP MONITORING WELL
- EXTRACTION WELL
- DOUBLE-CASED MONITORING WELL
- VAPOR EXTRACTION WELL
- SUMP
- RECOVERY WELL
- PIEZOMETER
- 521 WELL NAME
- 8.13* GROUNDWATER ELEVATION IN FEET MSL
- (7/9/12) DATE(S) GROUNDWATER ELEVATION WAS TAKEN
- * SHEEN PRESENT
- SHEEN OR PRODUCT PRESENT

NOTES.

1. MONITORING OCCURRED MONTHLY
2. THE REFINERY COORDINATE SYSTEM IS BASED ON AN ASSUMED ORIENTATION. THE REFINERY NORTH IS APPROXIMATELY 35 DEGREES WEST OF TRUE NORTH
3. ELEVATION RELATIVE TO USGS BENCHMARK (BRASS DISK SET ON TOP OF NE PIER OF RR BRIDGE 50 FEET EAST OF CL BAYSHORE ROAD) WITH AN ELEVATION OF 8.671 FEET ABOVE MEAN SEA LEVEL

REFERENCES.

1. C.F. BRAUN ROUGH GRADE PLANS (2920-133-CD 1 THROUGH 28): STREET AND TANK LOCATIONS ARE BASED ON INTERPRETATION OF AERIAL PHOTOS
2. HARDING ESE PLATE 2, VALERO BENICIA REFINERY TPH-g CONCENTRATIONS THIRD QUARTER 2002 JOB NO 51933013 DATED 03/02

PREPARED BY

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PREPARED FOR

VALERO BENICIA REFINERY

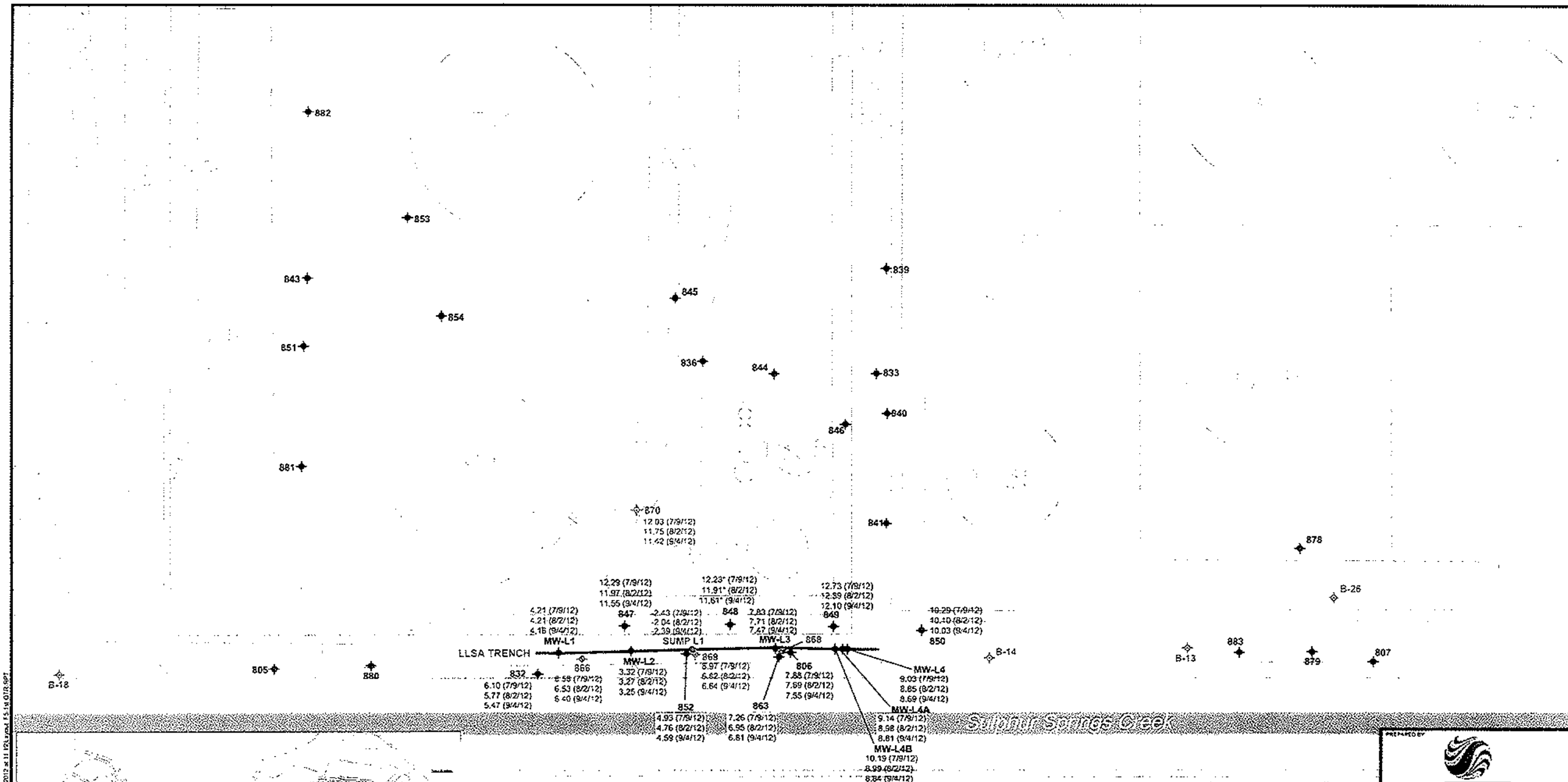
BENICIA
CALIFORNIA

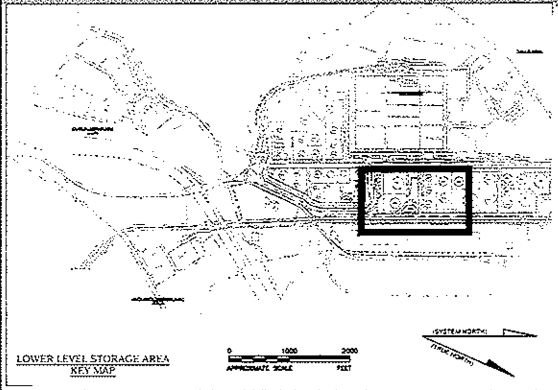
UPPER LEVEL STORAGE AREA
INTERCEPTOR TRENCH
WATER ELEVATIONS

THIRD QUARTER 2012

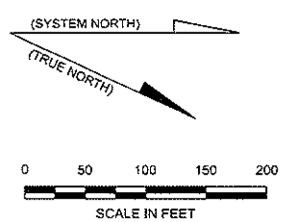
DESIGNED BY	DRAWN BY	CHECKED BY
GH/TC	RRR/OP	TC/AM/CL/GH
DATE 09/19/12	CAD FILE VALERO-2012-F2_F6.dwg	
PROJECT No. 185702486.400.0001	DRAWING SCALE AS SHOWN	

FIGURE 4





LOWER LEVEL STORAGE AREA
KEY MAP



SCALE IN FEET

LEGEND

- SHALLOW MONITORING WELL
- DEEP MONITORING WELL
- EXTRACTION WELL
- DOUBLE-CASED MONITORING WELL
- VAPOR EXTRACTION WELL
- SUMP
- RECOVERY WELL
- PIEZOMETER
- 848 WELL NAME
- 11.61* GROUNDWATER ELEVATION IN FEET MSL
- (9/4/12) DATE(S) GROUNDWATER ELEVATION WAS TAKEN
- * SHEEN PRESENT
- SHEEN OR PRODUCT PRESENT

NOTES:

1. MONITORING OCCURRED MONTHLY.
2. THE REFINERY COORDINATE SYSTEM IS BASED ON AN ASSUMED ORIENTATION. THE REFINERY NORTH IS APPROXIMATELY 35 DEGREES WEST OF TRUE NORTH.
3. ELEVATION RELATIVE TO USGS BENCHMARK (BRASS DISK SET ON TOP OF NE PIER OF RR BRIDGE 50 FEET EAST OF CL BAYSHORE ROAD) WITH AN ELEVATION OF 8.671 FEET ABOVE MEAN SEA LEVEL.

REFERENCES:

1. C.F. BRAUN ROUGH GRADE PLANS (2922-133-CD 1 THROUGH 26). STREET AND TANK LOCATIONS ARE BASED ON INTERPRETATION OF AERIAL PHOTOS.
2. HARDING ESE, PLATE 2 VALERO BENICIA REFINERY TPH-g CONCENTRATIONS THIRD QUARTER 2002 JOB NO. 51933013, DATED 09/02

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VALERO BENICIA REFINERY

BENICIA
CALIFORNIA

LOWER LEVEL STORAGE AREA
INTERCEPTOR TRENCH
WATER ELEVATIONS

THIRD QUARTER 2012

DESIGNED BY	DRAWN BY	CHECKED BY
GH/TC	RRR/DP	TC/AM/CL/GH

DATE	CAD FILE
09/19/12	VALERO-2012-F2_F6.dwg
PROJECT No.	DRAWING SCALE
185702486.400.0001	AS SHOWN

FIGURE 5

Groundwater Monitoring Plan-Revised 2010
Valero Benicia Refinery

3400 East Second Street
Benicia, California
PN: 185702188.200.0002

Stantec

May 24, 2010

Limitations and Certifications

This report was prepared in accordance with the scope of work outlined in Stantec's contract and with generally accepted professional engineering and environmental consulting practices existing at the time this report was prepared and applicable to the location of the site. It was prepared for the exclusive use of Valero Refining Company-California (Valero) for the sole use of Valero and the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB), for the express purpose stated above. Any re-use of this report for a different purpose or by others not identified above shall be at the user's sole risk without liability to Stantec. To the extent that this report is based on information provided to Stantec by third parties, Stantec may have made efforts to verify this third party information, but Stantec cannot guarantee the completeness or accuracy of this information. The opinions expressed and data collected are based on the conditions of the site existing at the time of the field investigation. No other warranties, expressed or implied are made by Stantec.

Prepared by:

Annette Maxwell
Geologic Consultant

Reviewed by:

Gay L. Howard, P.E.
Project Manager

Information provided by Stantec in this document have been prepared under the supervision of and reviewed by the licensed professional whose signature appears below.

Licensed Approver:

Thomas W. Crosby, P.G., C.E.G., C.HG.
Principal Hydrogeologist

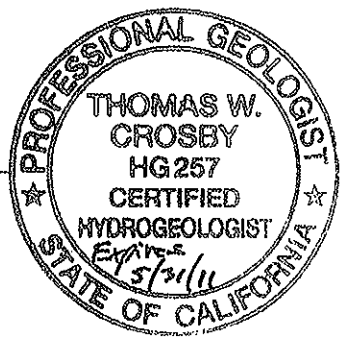

Table of Contents

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LIST OF FIGURES

Note: Tables and Figures appear at end of report.

LIST OF APPENDICES

List of Acronyms

BTEX	benzene, toluene, ethylbenzene, and total xylenes
Cal-EPA	California Environmental Protection Agency
COSA	crude oil storage area
COCs	Contaminants of Concern
FPH	Free-phase hydrocarbon
GMP	Groundwater Monitoring Plan
LLSA	lower level storage area
µg/l	micrograms per liter
MNA	monitored natural attenuation
MTBE	methyl tert-butyl ether
ODPL	Terminus of the Old Dock Pipeline
ORC	oxygen release compound
POC	point of compliance
RWQCB	Regional Water Quality Control Board, San Francisco Bay Region
SVE	soil vapor extraction
SVOCs	semivolatile organic compounds
TOC	Total Organic Carbon
TDS	total dissolved solids
TPH-d	total petroleum hydrocarbons as diesel
TPH-g	total petroleum hydrocarbons as gasoline
TPH-mo	total petroleum hydrocarbons as motor oil
ULSA	upper level storage area
US EPA	U.S. Environmental Protection Agency
UST	underground storage tank
VOCs	volatile organic compounds
VRU	vapor recovery unit
WMU	Waste Management Unit
WQPS	Water Quality Protection Standards
WWTP	Waste Water Treatment Plant

1.0 Introduction

This Groundwater Monitoring Plan-Revised 2010 (GMP) was prepared for the Valero Benicia Refinery and Marketing Terminal, formerly the Exxon Mobil Benicia Refinery, on behalf of Valero Refining Company (Valero). The Valero Benicia Refinery and Marketing Terminal were originally identified by the Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) as separate sites. In 2003, the two areas were combined under one California Environmental Protection Agency (Cal-EPA) Global ID number, and since have been referred to as the Valero Benicia Refinery (Refinery). The site location is shown on Figure 1, and the sampling locations are shown on Figures 2 and 3.

This GMP was prepared following a meeting with Valero, Stantec, and the RWQCB on December 19, 2009, during which the parties discussed the existing GMP (URS, June 2003; revised July 2005), and Stantec and Valero introduced concepts for the GMP refinement. It was agreed during the meeting that Valero would provide the RWQCB this revised GMP for review and approval. This GMP contains the rationale and justification for revising the groundwater monitoring program at the Refinery.

The objective of this revised GMP is to maintain compliance with the RWQCB Orders for the Refinery and improve the effectiveness of the program. Revisions to the current GMP are made consistent with Section 7 of the current GMP (URS, 2005a) primarily due to overall decreasing concentration trends for monitored contaminants of concern (COCs) based on historic data since 1992 in most areas of the Refinery. Future revisions to the GMP may be warranted under conditions, including but not limited to: (1) the data do not support the intent of the GMP's objectives; (2) continued monitoring is not warranted because of changes in COC concentrations; or (3) additional data are needed to meet new objectives that are not currently being met by this GMP.

This revised GMP contains a description of the regulatory framework for the GMP, a summary of the existing GMP (URS, 2005a), and the proposed revisions to the GMP with rationale for the revisions, including sampling and reporting. The GMP as revised herein is also contained in Appendix A.

1.1 SITE DESCRIPTION

The Valero Benicia Refinery is located at the northwestern edge of the Carquinez Strait in Suisun Bay at 3400 East Second Street in Benicia, California. The Marketing Terminal is located adjacent to the Refinery at 3410 East Second Street.

The Refinery produces petroleum hydrocarbon products, by-products and intermediates, and is classified as a cracking refinery as defined by the U.S. Environmental Protection Agency (US EPA) in Title 40, Code of Federal Regulations, Section 419.20. The Refinery, which began operating in 1969, processes approximately 135,000 barrels of oil per day. The Refinery includes a process block area, a lower level storage area (LLSA) and blending area, an upper level storage area (ULSA), a crude oil storage area (COSA), ponds used (either continuously or intermittently) to store storm water and treated wastewater

referred to as the Waste Water Treatment Plant (WWTP), and a Marketing Terminal. The Marketing Terminal receives refined petroleum products (mostly unleaded gasoline and California Air Resources Board diesel) from the nearby day tank storage field at Refinery. Products are shipped from the Marketing Terminal to other bulk terminals and service stations via pipelines and tanker trucks.

The Refinery was divided into 13 areas in the GMP (URS, 2005a). Groundwater monitoring well names are coded to the area; for example, Wells 201, 202, and 203 are all located in Area 2. The 13 areas are shown on Figure 2, and are as follows:

- Area 1 — Waste Water Treatment Plant (WWTP)
- Area 2 — Marketing Terminal
- Area 3 — Park Road Parcel (Beaver Creek, Buffalo Wallow, and Wastewater Diversion Tanks)
- Area 4 — Slop Oil Storage Area
- Area 5 — Upper Level Storage Area (ULSA; also referred to as "Intermediate Storage Area")
- Area 6 — Crude Oil Storage Area (COSA)
- Area 7 — Light Ends Storage Area
- Area 8 — Lower Level Storage Area (LLSA)
- Area 9 — Process Block
- Area 10 — Burma Road Stockpile
- Area 11 — Laboratory and Motor Gasoline UST Area
- Area 12 — Gate 5 Stockpile
- Area 13 — Old Dock Pipeline (ODPL)

The area, its remedial actions, and well summaries are contained on Table 1.

1.2 REGULATORY FRAMEWORK

This section summarizes the RWQCB Orders, a consent judgment, and RWQCB correspondence that relate to groundwater monitoring at the Refinery.

1.2.1 RWQCB Orders

Four RWQCB orders relating to groundwater monitoring at the Refinery are currently in affect: Order 91-094, Order 94-070, Order 94-144, and 97-077. These orders as they relate to the GMP are summarized below:

- RWQCB Order 91-094 (issued June 19, 1991). This order contained a requirement for the investigation of soil and groundwater in 12 areas at the Refinery, and development of a Self-Monitoring Program for the Refinery. This Order was rescinded by Order 97-077 issued on June 18, 1997.

- RWQCB Order 94-070 (issued June 15, 1994) added to, but did not supersede, RWQCB Order 91-094. This order contains a requirement for the development of Water Quality Protection Standards (WQPS) for the "Main Refinery" and WWTP, and continued groundwater monitoring.

- RWQCB Order 94-144 (issued October 19, 1994) added to, but did not supersede, RWQCB Order 91-094. This order contains site investigation and cleanup requirements for the Marketing Terminal. Two remedial actions were implemented: (1) the soil vapor extraction (SVE) at the vapor recovery unit (VRU); and (2) reduction of source concentration and containment of the plume at the Loading Rack Area.

- RWQCB Order 97-077 (issued June 18, 1997) rescinded Order 91-094. This order required investigation of areas of known constituent releases, and revised the groundwater monitoring program for the Refinery. Consistent with the order, the Remedial Action Plan developed in 1991 and revised in 2001 (URS, 2001) and Addendum to the Remedial Action Plan (URS, 2002) were prepared.

1.2.2 RWQCB Letters

The RWQCB has issued letters relating to the GMP at the Refinery. These letters are summarized below.

The RWQCB issued the following letters to approve of submittals made in response to the RWQCB Orders:

- In a letter to ExxonMobil Refining and Supply Company dated September 9, 2002, regarding *Comment Letter – July 27, 2001 Remedial Action Plan – Technical Report Request, Valero (Formerly Exxon-Mobil) Benicia Refinery, 3400 East Second Street, Benicia, California (RAP)*, (RWQCB, 2002a), the RWQCB approved portions of and requested an addendum to the RAP. Subsequently, the Addendum to the Remedial Action Plan (URS, 2002) was submitted to the RWQCB.

- In a letter to ExxonMobil Refining and Supply Company dated September 24, 2002, regarding *Approval of Water Quality Protection Standards letter report dated February 25, 2002, Valero*

(Formerly Exxon-Mobil) Benicia Refinery, 3400 East Second Street, Benicia, California, (RWQCB, 2002b), the RWQCB approved the subject letter report to complete the RAP (per Order 97-077), and approved the WQPS for the Refinery and ODPL. These WQPS are shown on Table 2.

- In a letter to Exxon Benicia Refinery dated August 14, 1997, the RWQCB approved of the *Groundwater Protection Standards and Monitoring Plan for Detecting and Responding to Pond Leaks at the Exxon Benicia Refinery Waste Water Treatment Plant* (Exxon, 1997). The RWQCB letter was entitled, *"Subject: Approval of the Report 'Waste Water Treatment Plant Ponds Leak Detection Plan."* The WQPS developed for the WWTP and approved by the RWQCB are shown on Table 2.

Valero has received RWQCB approval for *No Further Remedial Action* for the following five areas at the Refinery in the letters referenced below; these letters are included in Appendix B.

- **Area 2, Day Tank Area.** In a letter to ExxonMobil Refining and Supply Company dated July 11, 2008 (RWQCB, 2008a), the RWQCB approved of the Proposed Remedial Action at the Day Tank Area of the Marketing Terminal. This letter was provided in response to a January 19, 2007, letter regarding *Update on Day Tank Area Remedial Action Progress and Request for Meeting to Discuss Proposed Remedial Action for Day Tank Area, Valero Benicia* Refinery. In situ land farming and monitored natural attenuation (MNA) of COCs in groundwater was originally proposed as the remedial action for the Day Tank Area. However, based on significant limitations to the implementation of in situ land farming at the Day Tank Area, MNA of COCs was proposed for the Day Tank Area (Wells 221 and 232), and approved by the RWQCB in 2008.

- **Area 3, Well 325.** In a letter to ExxonMobil Refining and Supply Company from the RWQCB dated September 22, 2008 (RWQCB, 2008b), the RWQCB approved of No Further Remedial Action at the Well 325 Area of the Main Refinery (Wells 325, 330, 331, and 332). This letter was provided in response to a September 4, 2008, report entitled, *"Addendum to Report on Evaluation of Enhanced Bioremediation at the Well 325 Area, Valero Benicia Refinery,"* by others which states that the bioremediation in the Well 325 Area has been an effective remedial action, and concentrations of contaminants in downgradient Well 332 and Well 325 are stable or decreasing below the WQPSs. It is the understanding of the RWQCB that continued monitoring of COCs at Wells 325 and 332 will continue.

- **Area 10 (Burma Road Stockpile), Area 12 (Gate 5 Stockpile), and Area 13 (ODPL).** In a letter to Valero Benicia Refinery from the RWQCB dated January 21, 2010, the RWQCB approved of No Further Remedial Action at Areas 10, 12, and 13. This letter was provided in response to two December 17, 2009, letters (Stantec) entitled, *"Review of Groundwater Monitoring Program Area 13,"* (Stantec, 2009a); and *"Review of Groundwater Monitoring Program Area 10 and Area 12,"* (Stantec, 2009b). The RWQCB stated that the ongoing evaluation of natural attenuation of petroleum hydrocarbons in these areas indicate MNA has been an effective remedial action, and that concentrations of contaminants in these areas are stable or decreasing

and below the WQPS. Consistent with the December 17, 2009 letters (Stantec, 2009a and 2009b), water-level monitoring will continue at the Area 10 and 12 wells, and both water-level monitoring and COC sampling will be discontinued at the Area 13 wells (Wells 1329 through 1336) as of the second quarter 2010, and the wells in Area 13 will be properly destroyed.

1.2.3 Consent Judgment

The California Attorney General's Office, the Solano County District Attorney's Office, and ExxonMobil entered into a Consent Judgment on April 10, 2003 (Consent Judgment; April, 2003). The Consent Judgment is contained in Appendix B. In the Consent Judgment, MNA was agreed to for areas of the Refinery where MNA is the RWQCB-approved remedial action. These areas are as follows: the apparent plumes in Areas 5 and 7; Well 408 Area, the Powerformer Reformate Area (in Area 8), and the Day Tank Area (Area 2) at the Main Refinery Site, and the ODPL Area (Area 13).

MNA and associated reporting have occurred at the site since 2003. The sixth and final report required by the Consent Judgment was submitted by Kleinfelder on behalf of ExxonMobil: *Evaluation of 2008 Natural Attenuation Sampling at the Main Refinery Site and Old Dock Pipeline Site, Valero Benicia Refinery, Benicia, California* (Kleinfelder, 2009). The objective of the 2009 Kleinfelder report was to evaluate, through accepted lines of evidence, whether natural attenuation has been effective in stabilizing or decreasing constituent concentrations in the study areas at the Main Refinery site and ODPL site (Kleinfelder, 2009). To evaluate evidence of natural attenuation of petroleum hydrocarbons, the MNA monitoring consists of primary and secondary lines of evidence as outlined in *American Society for Testing and Materials Standard Guide for Remediation of Ground Water by Natural Attenuation at Petroleum Release Sites* (ASTM, 2004), Weidemeier et. al. (1999) (Kleinfelder, 2009). The primary line of evidence focuses on evaluation of changes in concentrations of COCs relative to historic data; and the secondary line of evidence focuses on an evaluation of geochemical indicator parameters. Secondary parameters in the current GMP are geochemical indicator parameters (nitrate, sulfate, total manganese, dissolved and ferrous iron, and methane) and other parameters (total organic carbon [TOC], alkalinity, and total dissolved solids [TDS]). Historic and recent groundwater monitoring data show that concentrations are stable or decreasing over time and distance from known source areas, and at the Day Tank Area and ODPL (Kleinfelder, 2009).

The Consent Judgment states (Page 7, Lines 9 through 11) that *..."Exxon shall continue monitored natural attenuation in these areas until the criteria for no further action defined in ASTM-1943-1998 are met."* The key criteria for no further action at a site which has undergone remediation by natural attenuation consistent with ASTM 1943-1998, Section 6.9-*No Further Action*, are as follows:

- There are no existing or potential receptor impacts.
- The remedial goals have been met.
- The plume is stable or shrinking.
- If needed, institutional controls are in place and maintained.

Based on the conclusions in the 2009 MNA Report (Kleinfelder, 2009), these criteria have been met. The MNA monitoring will continue for COCs, refined where appropriate consistent with the rationale on Table 3, but monitoring for the secondary parameters will be discontinued upon approval of this revised GMP by the RWQCB.

2.0 GMP Overview

This section summarizes the current GMP (URS, 2005a) and the proposed revised GMP. Details of the revised GMP are contained in Section 3.0.

2.1 CURRENT GMP SUMMARY

The GMP currently being implemented at the Refinery is intended to meet the requirements of the RWQCB *Orders 94-144, 94-070*, and *97-077* (RWQCB, 1994a, 1994b, and 1997); and the requirements listed in the RWQCB comment letters dated September 9, 2002, and September 24, 2002 (RWQCB; 2002a and 2002b). The GMP is outlined in the following documents:

- *Groundwater Monitoring Plan*, URS (URS, 2005a). The program for groundwater, surface water, pond sediment monitoring, and reporting for the GMP is described in this document.
- *Groundwater Monitoring Plan for the Valero Refinery,* Valero (May 2007). The format for the quarterly groundwater monitoring reports is described in this document.

Detail on the current GMP is contained in the GMP (URS, 2005a). In summary, the monitoring and reporting components of the current GMP, including reductions in sampling consistent with RWQCB-approved No Further Remedial Actions for Areas 2, 3, 10, 12, and 13 discussed in Section 1.2.2, include the following:

- Well Gauging:
  - 37 Locations Monthly (Area 5 ULSA trench and Area 8 LLSA trench)
  - 217 Locations Quarterly
- Well Sampling:
  - 433 Samples Per Year
- MNA Monitoring:
  - 84 Samples Per Year for MNA Parameters
- Five Year Event:
  - 45 Samples for Volatile Organic Compounds (VOCs), Semivolatile Organic Compounds (SVOCs), and Metals
- Surface Water Sampling-Quarterly:
  - 12 Samples Per Year
- Pond Sediment Sampling-Annually:

- 4 Samples Per Year

- Reports:
  - 3 Quarterly
  - 1 Annual

2.2 PROPOSED REVISED GMP SUMMARY

This section discusses objectives of the revised GMP, the proposed revisions to current GMP, and the components of the GMP (URS, 2005a) that will be retained.

2.2.1 Objectives

The primary objective of the GMP revisions is to maintain compliance with the regulatory framework and improve the effectiveness of the program. The primary factors that were considered are listed below:

- Value of the data due to proximity of sample locations to creeks, remediation systems, former releases, and potential release sources;
- Reduction of the plume over time (*e.g.,* natural attenuation of COCs);
- Monitoring well category (*e.g.,* Point of Compliance (POC), interior, leak detection, etc.);
- Minimize over sampling; and,
- Refinement of the COC list. The COCs to date include benzene, toluene, ethylbenzene, toluene, and xylenes (BTEX); total petroleum hydrocarbons (TPH) as gasoline (TPH-g), as diesel (TPH-d), and as motor oil (TPH-mo); and, methyl tert-butyl ether (MTBE); and,
- Reduce the volume of the quarterly and annual reports.

To achieve the objectives of the program, sampling frequencies are categorized as follows:

- Quarterly near creeks;
- Semiannual near interior plume boundaries; and,
- Semiannual to annual in non-critical areas.

Some well sampling frequencies were increased or decreased, as appropriate to meet the objectives. For example, in some cases the sampling frequency of a well was increased due to the proximity of the well to a creek or former release. The rationale for revising sampling frequencies are as follows:

- Rationale 1 A POC well with reduced frequency where COCs are consistently non-detect, the well is crossgradient from a monitored area, or the well is located adjacent to an area with no historic releases.
- Rationale 2 This well is consistently non-detect and/or is located upgradient or crossgradient from a monitored area or active area.
- Rationale 3 This well is located in the immediate vicinity of an in situ remedial program or plume, and reduction of sampling of this well is reasonable to evaluate COC concentration trends.
- Rationale 4 This well is located in close proximity to another well that is included in the program, and frequent sampling of this well would be duplicative.
- Rationale 5 This well may occasionally contain COCs, at times above WQPS; however, concentrations do not show increasing trend, and more frequent monitoring is not warranted to evaluate concentration trends.
- Rationale 6 The RWQCB issued a No Further Remedial Action status in letter dated January 21, 2010. The well is consistently non-detect for COCs.
- Rationale 7 Monitoring frequency is increased because the well is adjacent to a plume or is needed to monitor COC concentration trends.
- Rationale 8 Monitoring frequency is increased because the well is adjacent to a creek.

2.2.2 Proposed Revisions

The following components of the current GMP will be modified:

- **Groundwater sampling frequency and analytical program.** Section 4 discusses the revisions.
- **Analytical data quality evaluation.** Appendix C of the current GMP outlines a statistically representative approach for analytical data quality evaluation. In the past a 100 percent review of analytical data has been performed. This revised GMP includes a 10 percent review of analytical data.
- **Report contents.** Section 5 discusses the revisions.

The following components of the current GMP (URS, 2005a) will be retained:

- **Section 3.2 and 3.3 – Background.** Refer to this section for a description of the geology and hydrogeology at the Refinery.

- **Section 4 – Water Level Measurements.** Quarterly water-level and free-phase hydrocarbon (FPH) monitoring will continue for all wells, except those wells in Area 13, because monitoring will be discontinued as of Second Quarter 2010 as approved by the RWQCB (RWQCB, 2010).

  Monthly water-level monitoring will continue for the wells used for trench performance evaluations at the ULSA and LLSA (GMP; URS 2005a; *Section 5.1.3.1 Monitoring Remedial Activities, Main Refinery Site*).

- **Section 5 – Water Quality Sampling and Remedial Action Monitoring.** With the exception of Section 5.4-Vadose Zone Sampling, which will be eliminated, the section Water Quality Sampling and Remedial Action Monitoring will be retained with some revisions presented in Sections 3 and 4 of this revised GMP. Surface water and pond sediment sampling frequency and COC parameters will remain unchanged.

- **Section 6 – Monitoring Well Inspection, Maintenance, and Closure.**

- **Appendix B – Sampling Protocol.**

- **Appendix C – Analytical Quality Assurance Project Plan.**

2.2.2.1 In Situ Remedial Actions

In some wells, there currently are in situ remediation activities being implemented such as Oxy Socks and SoakEase™. Also, in the fourth quarter 2009, oxygen sparging was conducted at several wells as discussed in the *Fourth Quarter 2009 - Groundwater Monitoring Report and Annual Summary, Valero Benicia Refinery and Marketing Terminal* (Stantec, 2010). If in situ remedial action is taking place at a well coincident with GMP monitoring, the well will not be sampled, and upon removal of the in situ materials, the well will lay fallow for one quarter and the well will be sampled during the next quarterly event. A determination as to the need to reinstitute in-situ remediation activities will be made upon evaluation of analytical results.

2.2.2.2 TPH-mo

One change to the GMP that will affect wells where TPH-mo is currently monitored is the removal of TPH-mo from the analytical program. The elimination of TPH-mo is based on the absence of known releases of motor-oil range constituents at the Refinery, and consistent non-detections of this analyte in groundwater samples. The only continued TPH-mo monitoring will be for the sediment sampling at the WWTP ponds.

2.2.2.3 MNA of Groundwater

Upon approval of this revised GMP by the RWQCB, MNA will continue only for the primary parameters (*i.e.*, COCs) where it is the approved remedial action, and MNA for the secondary parameters will be discontinued, consistent with the regulatory framework discussed in Section 1.2.3.

3.0 PROPOSED GMP SAMPLING REVISIONS

This section presents the revisions to the sampling frequencies and COC parameters. For each of the 13 areas, a summary of background information and a summary of the GMP revisions are provided. The background information includes former releases, the COC concentration trends, and the remedial actions. The summary of the GMP revisions includes a brief description of the COC revisions and the changes to the well sample frequency. Table 3 contains a complete description of the current GMP sampling frequency and COC list, and the proposed revised GMP sampling frequency and COC list. Table 4 contains an overview of the current GMP and revised GMP. Illustrated on Figures 4 and 5 are the existing and proposed sampling frequencies for each well. Included herein as Appendix C are historic analytical tables, Figures 6 and 7 which illustrate groundwater elevation contours for Fourth Quarter 2009, and Figures 8 through 14 which illustrate concentrations of TPH-g, TPH-d, BTEX, and MTBE in groundwater for Fourth Quarter 2009 (Stantec, 2010).

3.1 AREA 1 – WASTEWATER TREATMENT PLANT (WWTP)

3.1.1 Background

The WWTP is located southeast of the main refinery site. The WWTP treats wastewater from the Refinery, chemical process water, oily and non-oily process wastewater, and storm water. The WWTP is located adjacent to Sulphur Springs Creek to the west, and wetlands to the north, south, and east. The WWTP contains four ponds (final, equalization, retention, and 20-year ponds), the biological-oxidation unit, the primary separation units, the selenium treatment unit, and the wastewater laboratory.

Leak Detection Wells exist and a leak detection plan is in place for the ponds at the WWTP, consistent with the *Groundwater Protection Standards and Monitoring Plan for Detecting and Responding to Pond Leaks at the Exxon Benicia Refinery Waste Water Treatment Plant* (Exxon, 1997). The Leak Detection Well Network is as follows: Wells 113, 123, 124, 126, 127, 128, 134, 135, 136, and 138. Only TPH-d has been consistently detected in these wells, and concentrations have always been below the Leak Detection WQPS.

For non-leak detection wells in Area 1 (Wells 101, 114, 115, 119, 121, 125, 137B, 143, and 144), only TPH-d has been consistently detected in some wells, and MTBE has been detected consistently in only three wells (101, 137B, and 143); and these COCs are detected below the WQPS and show decreasing or stable concentration trends. Historically, the sludge from the bio-oxidation unit was stored in the location near Well 101, and petroleum hydrocarbons have been detected in soil and groundwater samples from Well 101 (URS, 2005a); however, petroleum hydrocarbon concentrations have decreased to non-detect or are stable and below the WQPS.

The approved remedial action for the WWTP was the installation of two monitoring wells (Wells 143 and 144 in 2004) and continued groundwater monitoring (URS, 2005a).

3.1.2 Revised GMP

Because TPH-d is consistently detected in some wells at Area 1, TPH-d will be retained as a COC and analyzed quarterly for the POC wells, semiannually for Well 101 and select Leak Detection Wells, and annually for Well 114. The remaining COCs, BTEX, TPH-g, and MTBE, will be analyzed annually.

The following summarizes the sampling frequency changes for Area 1 as contained on Table 3. The COCs for each well are shown on Table 3.

Area 1 Summary of Revised GMP Sampling Frequency			
Wells Unchanged	Wells Reduced	Wells Removed	Wells Increased
Wells 114, 119, 137B, 143, and 144	Rationale 4: Wells 113, 115, 123, 124, 125, 126, 127, 128, 134, 135, 136, 138, 143, and 144 Rationale 7: Well 101	Rationale 2: Well 121 Rationale 4: Wells 113, 115, 123, 125, 127, 128, 136, and 138	None

Notes:
Rationale 2 Well is consistently non-detect and/or is located upgradient or crossgradient from monitored area or active storage area.

Rationale 4 Well is located in close proximity to another well that is included in the program, and frequent sampling of this well would be duplicative.

The following summarizes the current and proposed number of samples collected and wells sampled one or more times per year.

Area 1 Summary - Samples Collected and Wells Sampled Per Year			
Current # Samples Analyzed Per Year	Proposed # Samples Analyzed Per Year	Current # Wells Sampled Per Year	Proposed # Wells Sampled Per Year
61	27	19	10

3.1.3 Pond Sediment Monitoring

The annual pond sediment sampling frequency and analytical program will remain the same. Pond sediment samples are collected during second quarter from the four WWTP ponds; the 20-Year Pond, the Equalization Pond, the Final Pond, and the Retention Pond. The sediment samples are submitted to the laboratory for BTEX, TPH-g, TPH-d, TPH-mo, and metals analyses.

3.2 AREA 2 – MARKETING TERMINAL

3.2.1 Background

The Marketing Terminal receives refined petroleum products (mostly unleaded gasoline and California Air Resources Board diesel) from the nearby day tank storage field at the Main Refinery. Products are shipped from the Marketing Terminal to other bulk terminals and service stations via pipelines and tanker trucks.

The primary COCs identified in groundwater at the Marketing Terminal are TPH-g and TPH-d, and these compounds show decreasing concentration trends below WQPSs, with few exceptions. Several wells have consistently been non-detect for most or all COCs. Some wells near and downgradient from the Additive Tank Area (Wells 202, 204, 215, 217, and 228) consistently contain COCs above the WQPSs, with generally stable concentrations. MTBE is detected in some wells at the Marketing Terminal; however, as with other areas of the Refinery, some of the historic concentrations may be due to the presence of 3-methylpentane. MTBE concentrations are either non-detect or decreasing and far below the WQPS of 8,000 micrograms per liter (µg/l); with one exception, Well 228 which contains stable concentrations of MTBE, last reported at 4,000 µg/l in October 2009. Well 228 is located downgradient/crossgradient from the VRU area. Wells generally downgradient from Well 228 (Wells 214, 221, 232, and 236) MTBE concentrations are either non-detect or far below the WQPS.

Groundwater extraction and treatment, and vapor recovery for the Marketing Terminal and MNA at the Day Tank Area (Wells 221 and 232) are the RWQCB approved remedial actions for the Marketing Terminal (URS, 2005a). MNA for secondary parameters will be discontinued, and MNA for primary parameters (*i.e.*, COCs) will continue to be monitored upon approval of this revised GMP.

3.2.2 Revised GMP

The proposed COC list will contain BTEX, TPH-g, TPH-d, and MTBE for the wells sampled in Area 2. The following summarizes the sampling frequency changes for Area 2 as contained on Table 3. The COCs for each well are shown on Table 3.

Area 2 Summary of Revised Sampling Frequency			
Wells Unchanged	Wells Reduced	Wells Removed	Wells Increased
Wells 202, 204, 205, 223, 224, 228, 229, S-1, S-2, VZ-1, VZ-2, and VZ-3	Rationale 2: Wells 201, 216, and 232 Rationale 3: Wells 203, 206, 214, 226, 227, 236, and 237 Rationale 5: Wells 215, 217, and 221	Rationale 2: Wells 212, 213, and 220	None

Notes:

Rationale 2 Well is consistently non-detect and/or is located upgradient or crossgradient from monitored area or active storage area.

Rationale 3 Well is located in the immediate vicinity of an in situ remedial program or plume, and reduction of sampling of this well is reasonable to evaluate concentration trends.

Rationale 5 Well may occasionally contain COCs, at times above WQPS; however, concentrations do not show increasing trend, and more frequent monitoring is not warranted to evaluate trends.

The following summarizes the current and proposed number of samples collected and wells sampled one or more times per year.

Area 2 Summary - Samples Collected and Wells Sampled Per Year			
Current # Samples Analyzed Per Year	Proposed # Samples Analyzed Per Year	Current # Wells Sampled Per Year	Proposed # Wells Sampled Per Year
87	54	28	25

3.3 AREA 3 – PARK ROAD PARCEL

3.3.1 Background

The Park Road Parcel is located in the southeast corner of the Main Refinery, and contains four storage tanks. One or more COC have been consistently detected in eight of the fourteen wells sampled (Wells 310, 313, 323B, 325, 328, 329, 330, and 332), but most of these compounds are detected at stable or decreasing concentrations, and all are below the WQPS except for Well 329. Well 329 consistently contain TPH-g and TPH-d. TPH-g is consistently above the WQPS of 500 µg/l, but decreased from 7,150 µg/l in 2001 to 460 µg/l in 2006, and has fluctuated since 2006 between 460 and 3,700 µg/l.

The following summarizes the remedial actions:

- Enhanced bioremediation was the approved remedial action for the Well 325 area (Wells 325 and 332); however, the RWQCB granted No Further Remedial Action in 2008 (RWQCB; 2008b). MNA for secondary parameters will be discontinued, and MNA for primary parameters (*i.e.*, COCs) will continue to be monitored upon approval of this revised GMP.

- Additionally, several wells in Area 3 are used for MNA for adjacent areas: Well 310 for Area 4; and Wells 328, 330, and 331 for Areas 5 and 7. The remedial design is included in the document entitled, *"Remedial Action Design and Operation Plan Report for the Well 325 Area and the Day Tank Area,"* (URS, May 2003b), and was approved by the RWQCB (RWQCB, 2002a). MNA for secondary parameters will be discontinued, and MNA for primary parameters (*i.e.*, COCs) will continue to be monitored upon approval of this revised GMP.

- Oxygen release compound® injection was implemented in the Well 325 area in July 2004 by others (*Construction Certification Report for the Remedial Actions at the Well 325 Area and the Day Tank Area*; URS, December 2005b).

3.3.2 Revised GMP

The proposed COC list will contain BTEX, TPH-g, TPH-d, and MTBE for the wells sampled in Area 3. The following summarizes the sampling frequency changes for Area 3 as contained on Table 3. The COCs for each well are shown on Table 3.

Area 3 Summary of Revised Sampling Frequency			
Wells Unchanged	Wells Reduced	Wells Removed	Wells Increased
Wells 310, 312, 314, 323B, 324, 325, 329, 330, and 333	Rationale 2: Wells 328, 331, and 332	None	Rationale 8: Wells 311 and 313

Notes:
Rationale 2 Well is consistently non-detect and/or is located upgradient or crossgradient from monitored area or active storage area.

Rationale 8 Monitoring frequency is increased because well is adjacent to creek.

The following summarizes the current and proposed number of samples collected and wells sampled one or more times per year.

Area 3 Summary - Samples Collected and Wells Sampled Per Year			
Current # Samples Analyzed Per Year	Proposed # Samples Analyzed Per Year	Current # Wells Sampled Per Year	Proposed # Wells Sampled Per Year
36	36	14	14

3.4 AREA 4 - SLOP OIL STORAGE AREA

3.4.1 Background

The South Upper Storage Area contains ten storage tanks. Of the seven wells monitored, COCs are either non-detect or detected occasionally at concentrations far below the WQPS, with three exceptions (Wells 405, 408, and 413). Wells 405, 408, and 413 show decreasing concentrations of TPH-g to concentrations near the WQPS at Wells 405 (800 µg/l in October 2009) and Well 408 (500 µg/l in October 2009). At Well 413, TPH-g shows a decreasing trend from 45,000 µg/l in 2005 to 8,600 µg/l in October 2009). At Wells 405, 408, and 413, the TPH-g may be associated with a 1,000-barrel release of gasoline from Tank 1793 in 1988 (URS, 2005a).

MNA is the approved remedial action for the Well Area 408 Area (Wells 310, 328, 406, 408, and 413). The remedial design is included in the document entitled, *"Remedial Action Design and Operation Plan Report for the Well 408 Area and the Waste Water Treatment Plant,"* (URS, May 2003c), and was approved by the RWQCB (2002a). MNA for secondary parameters will be discontinued, and MNA for primary parameters (*i.e.*, COCs) will continue to be monitored upon approval of this revised GMP.

3.4.2 Revised GMP

The proposed COC list will contain BTEX, TPH-g, TPH-d, and MTBE for the wells sampled in Area 4. The following summarizes the sampling frequency changes for Area 4 as contained on Table 3. The COCs for each well are shown on Table 3.

Area 4 Summary of Revised Sampling Frequency			
Wells Unchanged	Wells Reduced	Wells Removed	Wells Increased
Wells 405, 408, 409, 413	Rationale 2: Wells 403, 404, 406	None	None

Notes:
Rationale 2 Well is consistently non-detect and/or is located upgradient or crossgradient from monitored area or active storage area.

The following summarizes the current and proposed number of samples collected and wells sampled one or more times per year.

Area 4 Summary - Samples Collected and Wells Sampled Per Year			
Current # Samples Analyzed Per Year	Proposed # Samples Analyzed Per Year	Current # Wells Sampled Per Year	Proposed # Wells Sampled Per Year
18	13	7	7

3.5 AREA 5 – INTERMEDIATE STORAGE AREA (ULSA)

3.5.1 Background

Area 5 is in the eastern area of the ULSA at the Main Refinery and contains 13 storage tanks. The east boundary of Area 5 is adjacent to Sulphur Creek.

The remedial actions and concentrations of COCs in Area 5 are summarized as follows:

- MNA is the approved remedial action for the TPH-g, BTEX, and MTBE detected near the historic plume associated with tank 1798 in Area 7 (Wells 506, 531, and 532; URS, 2005a). MNA for secondary parameters will be discontinued, and MNA for primary parameters (*i.e.,* COCs) will continue to be monitored upon approval of this revised GMP.

- The ULSA groundwater interceptor trench system was installed downgradient of the ULSA in 2001 as part of the Remedial Action Plan (URS, 2001). The goal of the interceptor trench system is to intercept dissolved-phase and potential FPH to prevent them from reaching Sulphur Springs Creek. Consistent with the GMP (URS, 2005a), the interceptor trench is considered effective when the groundwater level and analytical monitoring data show that the groundwater near Sulphur Springs Creek that contains COCs with concentrations greater than the WQPS levels is being drawn inward toward the interceptor trench. The effectiveness of the trench is assessed monthly by measuring the water levels in the wells within and outside the trench. The trench is considered effective if the potentiometric surface shows groundwater flows inward toward the trench.

- Enhanced bioremediation is the approved remedial action for the Well 509B Area (Wells 509B, 524, 526, 540, 541, and 546; URS, 2005a). In an area along the fence line just east of the ULSA in the Well 509B Area, levels of TPH-d, TPH-g and/or benzene are consistently above the WQPS in Wells 526, 541, and 546. With the exception of Well 526 where FPH is consistently detected, concentrations of COCs in these wells show decreasing concentration trends, in some cases to concentrations below the WQPS. MNA for secondary parameters will be discontinued, and MNA for primary parameters (*i.e.,* COCs) will continue to be monitored upon approval of this revised GMP.

- FPH is consistently detected in Wells 507, 521, 526, and 528. One or more of BTEX, TPH-g, and TPH-d are consistently detected at concentrations above the WQPS in the southern and eastern portions of Area 5 (Wells 506, 507, 521, and 532); however, these constituent concentrations are stable or decreasing.

- ORC (oxygen reducing compound) socks and hydrocarbon absorbent SoakEase™ are installed in wells as appropriate to remediate petroleum hydrocarbons.

3.5.2 Revised GMP

The proposed COC list will contain BTEX, TPH-g, TPH-d, and MTBE for the wells sampled in Area 5. The following summarizes the sampling frequency changes for Area 5 as contained on Table 3. The COCs for each well are shown on Table 3.

Area 5 Summary of Revised Sampling Frequency			
Wells Unchanged	Wells Reduced	Wells Removed	Wells Increased
Wells 507, 508, 510, 511, 516, 520, 521, 524, 526, 529, 530, 540, 541, and 546.	Rationale 5: Wells 506, 531, 532, B-28	Rationale 4: Well 509B	None

Notes:
Rationale 4 Well is located in close proximity to another well that is included in the program and frequent sampling of this well would be duplicative.

Rationale 5 Well may occasionally contain COCs, at times above WQPS; however, concentrations do not show increasing trend, and more frequent monitoring is not warranted to evaluate trends.

The following summarizes the current and proposed number of samples collected and wells sampled one or more times per year.

Area 5 Summary - Samples Collected and Wells Sampled Per Year			
Current # Samples Analyzed Per Year	Proposed # Samples Analyzed Per Year	Current # Wells Sampled Per Year	Proposed # Wells Sampled Per Year
53	41	19	18

3.6 AREA 6 – CRUDE OIL STORAGE AREA (COSA)

3.6.1 Background

The COSA is approximately 14 acres, contains six crude oil storage tanks, a crude oil pumping pad, pipelines, and several large ponds. The northernmost pond is lined and is used to store clean, emergency fire water. The other ponds are used at times for temporary storage of treated wastewater that does not exceed the effluent limits (GMP; URS, 2005a). The documented events related to the COSA are as follows (URS, 2005a):

- Placement of a 5 cubic yard stockpile of tank-bottom sludge in the southeast corner of Lake Lund (the easternmost Pond) in 1972.

- Placement of 10,000 cubic yards of biosludge from the Refinery's WWTP retention and final ponds on the ground surface in Lake Lund in 1974.
- A 500-barrel release of crude oil into the Tank 1704 fire wall, subsequently removed in 1989.
- A 6,750-barrel release of crude oil into the Tank 1702 fire wall in 2003.

Historically, three wells (Wells 610, 613, and 617) have had consistent detections of TPH-d and/or MTBE. Wells 610 and 617 show a decreasing TPH-d concentration trend since 1995 and 2005, respectively. Since third quarter 2003, Well 613 has typically contained FPH as sheen or measurable product defined as greater than 0.01 feet thick, and has not been sampled under these conditions. When sampled, Well 613 contains consistent detections of TPH-g, but far below the WQPS. The remaining nine wells are primarily non-detect for the COCs.

3.6.2 Revised GMP

The proposed COC list will contain TPH-g, TPH-d, and MTBE for the POC wells and wells located on the southwest border of Area 6 (Wells 612, 615, and 619). The COC list for Well 613, which consistently contains FPH, will include BTEX, TPH-g, TPH-d, and MTBE when sampled. The COC list for remaining wells (Wells 614, 617, 622, and 623) will include TPH-d only because these wells are typically non-detect for all COCs.

The following summarizes the sampling frequency changes for Area 6 as contained on Table 3. The COCs for each well are shown on Table 3.

Area 6 Summary of Revised Sampling Frequency			
Wells Unchanged	Wells Reduced	Wells Removed	Wells Increased
Wells 610, 614, 617, 621, 622, 623	Rationale 1: Well 611 and 620 Rationale 2: Well 615	None	Rationale 8: Wells 612, 613, and 619

Notes:
Rationale 1 POC well with reduced frequency where consistently non-detect, crossgradient from monitored area, or located adjacent to area with no historic releases.

Rationale 2 Well is consistently non-detect and/or is located upgradient or crossgradient from monitored area or active storage area.

Rationale 8 Monitoring frequency is increased because well is adjacent to creek.

The following summarizes the current and proposed number of samples collected and wells sampled one or more times per year.

Area 6 Summary - Samples Collected and Wells Sampled Per Year			
Current # Samples Analyzed Per Year	Proposed # Samples Analyzed Per Year	Current # Wells Sampled Per Year	Proposed # Wells Sampled Per Year
28	31	12	12

3.7 AREA 7 – LIGHT ENDS STORAGE AREA

3.7.1 Background

The North Upper Storage Area contains nine storage tanks. The 13 wells monitored generally show COCs concentrations either non-detect or decreasing concentration trends sometimes to non-detect. Exceptions include three wells (Wells 712, 714, and 715) that occasionally FPH as a sheen of no measurable thickness; and four wells that contain one or more COC above the WQPS, but show decreasing trends (Wells 716, 717, 726, 728).

The presence of FPH and TPH-d is generally southeast of Tank 1798, and is likely the result of a 1,000-barrel release of diesel fuel from Tank 1798 in 1989. The presence of TPH-g is largely contained within the TPH-d plume associated with Tank 1798.

The approved remedial action in Area 7 is MNA (Wells 712, 713, 714, 716, and 726 through 729; URS, 2005a). MNA for secondary parameters will be discontinued, and MNA for primary parameters (*i.e.*, COCs) will continue to be monitored upon approval of this revised GMP.

3.7.2 Revised GMP

The proposed COC list will contain BTEX, TPH-g, TPH-d, and MTBE for the wells located within the central portion of Area 7 where FPH and one or more of BTEX and TPH-d are detected consistently. The COC list for the remaining wells will include TPH-g, TPH-d, and MTBE.

The proposed COC list will contain BTEX, TPH-g, TPH-d, and MTBE for the wells sampled in Area 7. The following summarizes the sampling frequency changes for Area 7 as contained on Table 3. The COCs for each well are shown on Table 3.

Area 7 Summary of Revised Sampling Frequency			
Wells Unchanged	Wells Reduced	Wells Removed	Wells Increased
Wells 704C, 712, and 719	Rationale 2: Wells 713 and 729 Rationale 3: Well 726 Rationale 5: Wells 714, 716, 727, and 728	Rationale 4: Well 711	Rationale 7: Wells 715 and 717

Notes:

Rationale 2 Well is consistently non-detect and/or is located upgradient or crossgradient from monitored area or active storage area.

Rationale 3 Well is located in the immediate vicinity of an in situ remedial program or plume, and reduction of sampling of this well is reasonable to evaluate concentration trends.

Rationale 4 Well is located in close proximity to another well that is included in the program, and frequent sampling of this well would be duplicative.

Rationale 5 Well may occasionally contain COCs, at times above WQPS; however, concentrations do not show increasing trend, and more frequent monitoring is not warranted to evaluate trends.

Rationale 7 Monitoring frequency is increased because well is adjacent to a plume or is needed to monitor concentration trends.

The following summarizes the current and proposed number of samples collected and wells sampled one or more times per year.

Area 7 Summary - Samples Collected and Wells Sampled Per Year			
Current # Samples Analyzed Per Year	Proposed # Samples Analyzed Per Year	Current # Wells Sampled Per Year	Proposed # Wells Sampled Per Year
37	21	13	12

3.8 AREA 8 – LOWER LEVEL STORAGE AREA (LLSA)

3.8.1 Background

Area 8 is in the eastern area of the LLSA at the Main Refinery and contains 17 storage tanks. The eastern boundary of Area 8 is adjacent to Sulphur Creek.

A groundwater interceptor trench system was installed downgradient of the LLSA in 2001 and 2002 as part of the Remedial Action Plan (URS, 2001). The goal of the interceptor trench system is to intercept dissolved-phase and FPH to prevent them from reaching Sulphur Springs Creek. Consistent with the GMP (URS, 2005a), the interceptor trench is considered effective when the groundwater level and analytical monitoring data show that the groundwater near Sulphur Springs Creek that contains contaminants with concentrations greater than the WQPS levels is being drawn inward toward the interceptor trench. The effectiveness of the trench is assessed by measuring the water levels in the wells within and outside the trench. The trench is considered effective if the potentiometric surface shows groundwater flows inward toward the trench.

The remedial actions and concentrations of COCs in Area 5 are summarized as follows:

- **Well 805 Area**: Along the eastern fence line near Sulphur Springs Creek in the southern portion of the LLSA, elevated levels of TPH-g and TPH-d have historically been detected in samples from well 805 and 880; however, TPH-g and TPH-d concentrations are decreasing in both wells. This plume appears to be separate and distinct from the upgradient Powerformer Reformate Plume. Enhanced bioremediation is the approved remedial action for this area (Wells 805 and 880) (URS, 2005a). MNA for secondary parameters will be discontinued, and MNA for primary parameters (*i.e.,* COCs) will continue to be monitored upon approval of this revised GMP.

- **Powerformer Reformate Plume**: In 1992, a 10-barrel release of Powerformer Reformate resulted in a small, isolated plume centered on the present location of Well 843. The petroleum hydrocarbons in this area are immobile because of the very low permeability of the soils in this area (URS, 2005a). TPH-g and TPH-d are decreasing in Well 843. Removal of potential FPH (if present) and MNA are the approved remedial actions at this location (Wells 843, 853, 854, 851, 881, 882 (URS, 2005a). MNA for secondary parameters will be discontinued, and MNA for primary parameters (*i.e.,* COCs) will continue to be monitored upon approval of this revised GMP.

- **Powerformer Feed Plume**: In the central portion of the LLSA, a release of an unknown volume of Powerformer Feed resulted in a plume that extends east towards Sulphur Springs Creek. This plume has been detected both as FPH (usually only detected as a sheen) and elevated levels of dissolved-phase petroleum hydrocarbons detected as TPH-d, TPH-g and/or BTEX. FPH is consistently detected in Wells 839, 844, 845, and 848. The LLSA groundwater interceptor trench is the remedial action for the FPHs and dissolved contaminants associated with this plume (URS, 2005a).

- **Well 807 Area**: In the central portion of the LLSA, just north of the location of the Powerformer Feed Plume and along the fence line near Sulphur Springs Creek, levels of TPH-g, TPH-d and/or BTEX have been detected in wells 807 and 878 at concentrations above the WQPSs. FPH is consistently detected in Well 878. Enhanced bioremediation is the approved remedial action for this area (Wells 807, 878, 879, 883, and B-26; URS, 2005a). MNA for secondary parameters will be discontinued, and MNA for primary parameters (*i.e.,* COCs) will continue to be monitored upon approval of this revised GMP.

- ORC socks and hydrocarbon absorbent SoakEase™ are installed in wells as appropriate to remediate petroleum hydrocarbons.

In summary, groundwater quality in Area 8 is summarized as follows:

- MTBE concentrations show an increasing trend in some wells: Wells 850, northwest of the LLSA interceptor trench; Well 853, near the Powerformer Reformate Plume; and Wells 883 and B-14, in the Well 807 area.
- Some wells consistently contain FPH: Wells 833, 843, 844, 845, 848, and 878.
- Concentrations of TPH-g and TPH-d are consistently above the WQPSs at Well 880.

With the exception of the above, concentrations of the COCs are generally either stable or decreasing in Area 8.

3.8.2 Revised GMP

The proposed COC list will contain BTEX, TPH-g, TPH-d, and MTBE for the wells sampled in Area 8. The following summarizes the sampling frequency changes for Area 8 as contained on Table 3. The COCs for each well are shown on Table 3.

Area 8 Summary of Revised Sampling Frequency			
Wells Unchanged	Wells Reduced	Wells Removed	Wells Increased
Wells 805, 806, 807, 809, 810, 815, 843, 846, 847, 848, 850, 879, 880, 883, B-07, B-08, B-09, B-10, B-11, B-14	Rationale 1: Well 825 Rationale 2: Well 882 Rationale 3: Wells 851 and 853 Rationale 5: Wells 878 and 881	Rationale 4: Wells 833, 844, 845, 854, B-26 Rationale 2: Wells 870 and B-27	Rationale 8: Well 832

Notes:
Rationale 1 POC well with reduced frequency where consistently non-detect, crossgradient from monitored area, or located adjacent to area with no historic releases.

Rationale 2 Well is consistently non-detect and/or is located upgradient or crossgradient from monitored area or active storage area.

Rationale 3 Well is located in the immediate vicinity of an in situ remedial program or plume, and reduction of sampling of this well is reasonable to evaluate concentration trends.

Rationale 4 Well is located in close proximity to another well that is included in the program, and frequent sampling of this well would be duplicative.

Rationale 5 Well may occasionally contain COCs, at times above WQPS; however, concentrations do not show increasing trend, and more frequent monitoring is not warranted to evaluate trends.

Rationale 8 Monitoring frequency is increased because well is adjacent to creek.

The following summarizes the current and proposed number of samples collected and wells sampled one or more times per year.

Area 8 Summary - Samples Collected and Wells Sampled Per Year			
Current # Samples Analyzed Per Year	Proposed # Samples Analyzed Per Year	Current # Wells Sampled Per Year	Proposed # Wells Sampled Per Year
95	66	34	27

3.9 AREA 9 – PROCESS BLOCK

The main part of the refinery is the Process Block Area (Area 9). This area has one groundwater monitoring well (Well 908B) and three piezometers. There is no history of petroleum hydrocarbons being detected in groundwater in the Process Block Area, except in the vicinity of the USTs in Area 11 (see below). There are no remedial actions in place for Area 9. The current monitoring performed in Area 9 consists of depth-to-water measurements on a quarterly basis; and this monitoring will continue for purposes of monitoring groundwater elevations at the Refinery.

3.10 AREA 10 – BURMA ROAD STOCKPILE

The Burma Road Stockpile consists of covered inert waste area located west of the Refinery. This area was designated as a closed Class III Waste Management Units (WMU) in the RWQCB Order No. 94-070. The stockpile contains mostly of inert waste (vegetation, concrete, etc.) and some asphalt. The area was closed, as stated in a 1997 Montgomery Watson report *Closure Documentation for Burma Road and Gate 5 Stockpiles* (URS, 2005a).

The area has been monitored with four groundwater monitoring wells. Concentrations of TPH-d have historically been detected in groundwater on occasion at concentrations near the reporting limits, and far below the RWQCB-approved WQPS of 640 µg/l. It is believed that the historic detections of petroleum hydrocarbons are associated with the asphalt deposited in the two stockpiles (URS, 2005a). There are no remedial actions in place for Area 10. There are no known releases at Area 10.

The RWQCB approved of no further groundwater sampling in Area 10 (RWQCB, 2010). Depth-to-water monitoring will continue at the four monitoring wells for the purpose of monitoring groundwater elevations at the Refinery.

The following summarizes the sampling frequency changes for Area 10 as contained on Table 3. Groundwater sampling will be discontinued as of the second quarter 2010, but depth-to-water monitoring will continue consistent with the approval from the RWQCB (2010).

Area 10 Summary of Revised Sampling Frequency			
Wells Unchanged	Wells Reduced	Wells Removed	Wells Increased
		Rationale 6: Wells 1004, 1005, 1006, 1008	

Notes:
Rationale 6 The RWQCB issued a No Further Remedial Action status in letter dated January 21, 2010. Well is consistently non-detect.

3.11 AREA 11 – LABORATORY AND MO-GAS UST AREA

Area 11 is a small site with two underground storage tanks (USTs) located within Area 9, and has one groundwater monitoring well (Well 1104). The USTs have stored gasoline. The USTs were replaced in 1989 with modern double-walled tanks with a leak detection system. TPH-d has been detected in samples from the well in Area 11, but only slightly higher than the reporting limit (URS, 2005a). There are no remedial actions in place for Area 11.

The current monitoring performed in Area 11 consists of depth-to-water measurements on a quarterly basis; and this monitoring will continue for purposes of monitoring groundwater elevations at the Refinery.

3.12 AREA 12 – GATE 5 STOCKPILE

The Gate 5 Stockpile consists of a covered inert waste area located west of the Refinery. This area was designated as a closed Class III WMU in the RWQCB Order No. 94-070. The stockpile contains mostly inert waste (vegetation, concrete, etc.) and some asphalt. The area was closed, as stated in a 1997 Montgomery Watson report *Closure Documentation for Burma Road and Gate 5 Stockpiles* (URS, 2005a). The area has been monitored with three groundwater monitoring wells. Concentrations of TPH-d have historically been detected in groundwater on occasion at low concentrations and far below the RWQCB-approved WQPS of 640 µg/l. It is believed that the historic detections of petroleum hydrocarbons are associated with the asphalt deposited in the stockpile (URS, 2005a). There is no remedial action in place for Area 12.

The RWQCB approved of no further groundwater sampling in Area 12 (RWQCB, 2010). Depth-to-water monitoring will continue at the three monitoring wells for the purpose of monitoring groundwater elevations at the Refinery.

The following summarizes the sampling frequency changes for Area 12 as contained on Table 3. Groundwater sampling will be discontinued as of the second quarter 2010, but depth-to-water monitoring will continue consistent with the approval from the RWQCB (2010).

Area 12 Summary of Revised Sampling Frequency			
Wells Unchanged	Wells Reduced	Wells Removed	Wells Increased
		Rationale 6: Wells 1205, 1207, 1208	

Notes:
Rationale 6 The RWQCB issued a No Further Remedial Action status in letter dated January 21, 2010. Well is consistently non-detect.

3.13 AREA 13 – OLD DOCK PIPELINE (ODPL)

The ODPL is located at the terminus of capped pipelines leading to the former crude oil off-loading and finished-product loading dock for ships. The terminus is located approximately 500 feet north of the Carquinez Strait northern shore. The ODPL has not been in use since 1984 and the pipelines are inactive, have been abandoned in place, and are capped; therefore, there is no potential for a future release. The area is currently used for an imported automobile storage area and abandoned manufacturing plant. The topography at the site is generally flat and slopes gently toward the Strait (URS, 2005a).

No releases have been documented for the ODPL. Petroleum hydrocarbons were detected in soil samples collected during a remedial investigation at the ODPL, and were highest near the terminus of the capped pipelines (URS, 2005a). The area has been monitored with eight groundwater monitoring wells. Groundwater monitoring conducted since 2001 indicates concentrations of TPH-d in groundwater have decreased to non-detect or to stable or decreasing trends and are below the WQPS of 640 µg/l. MNA was the approved remedial action for the groundwater at the ODPL.

The RWQCB approved of No Further Remedial Action at the ODPL (RWQCB, 2010). Consistent with the report entitled, *"Review of Groundwater Monitoring Program Area 13 – Old Dock Pipeline Valero Benicia Refinery and Marketing Terminal, Benicia, California,"* (Stantec, 2009b) and the RWQCB approval letter, it is planned to properly destroy the eight groundwater monitoring wells at the ODPL.

The following summarizes the sampling frequency changes for Area 13 as contained on Table 3. Groundwater sampling and depth-to-water monitoring will be discontinued as of the second quarter 2010 consistent with the approval from the RWQCB (2010).

Area 13 Summary of Revised Sampling Frequency			
Wells Unchanged	Wells Reduced	Wells Removed	Wells Increased
		Rationale 6: Wells 1329, 1330, 1331, 1332, 1333, 1334, 1335, 1336	

Notes:
Rationale 6 The RWQCB issued a No Further Remedial Action status in letter dated January 21, 2010. Well is consistently non-detect.

4.0 PROPOSED GMP REPORTING REVISIONS

Several factors were considered for revising the reporting for the GMP. The factors that were considered are as follows:

- Eliminate redundancy and reduce the volume of reports; and,
- Provide quarterly reports, but reduce the first, second, and third quarter reports to a transmittal of an Executive Summary and tables summarizing POC Well, Interior Well, and Leak Detection Well analytical results compared to the WQPS.

The revised reporting program is shown on Table 5, and will consist of the following:

- First Quarter. This report will contain: (1) an Executive Summary containing COC detections, WQPS exceedances, any actions taken if a WQPS was exceeded at a POC, Interior, or WWTP Leak Detection Well; a summary of the QA/QC data evaluation; and a summary of the remediation systems; (2) tables showing POC Well, Interior Well, and WWTP Leak Detection Well analytical results compared to the WQPS. .
- Second Quarter. This report will contain the same information as First Quarter, but with the addition of concentration versus time plots for wells where visual inspection of the plot required a Mann-Kendall statistical analysis be performed (see below).
- Third Quarter. Same as First Quarter.
- Fourth Quarter. This report will contain an Executive Summary (as in the First Quarter Report), report narrative, a full set of tables and figures, and concentration versus time plots for all wells. Tables will include a summary of the monitoring events, the analytical program for the year, and tables summarizing the current as well as historic monitoring and analytical data (water levels, FPH, COC concentrations). Figures will include groundwater elevation contours and COC concentration contours for groundwater.
- The schedule for report submittal to the RWQCB is 45 days following the end of the quarter.

Concentration versus time plots including data for the previous ten years, as available, will be created for the second and fourth quarters for TPH-g, TPH-d, and BTEX for all wells. Visual trend observations will be made of the plots for all wells to assess if concentrations of monitoring parameters are increasing. Based on the following criteria, a "visual" increase will be considered if:

1) Four or more (total) sampling events (data points) are available for the well; and,

2) One or more of the following occurred:

   a) Four or more of the most recent consecutive sampling events have suggested an increasing trend with no more than one downward spike; and/or
   b) Historic high concentration detections have been exceeded in at least two of the last six events.

If a visual observation suggests an increasing trend, then a Mann-Kendall statistical evaluation (null hypothesis) will be performed based on the Mann-Kendall Trend Tests for Small Sample Sizes (less than 10 data points) or the Mann-Kendall Trend Test by Normal Application (ten or more data points; US EPA, 2006).

The following information will be uploaded to the State of California Water Resources Control Board (SWRCB) Geo Tracker site in pdf format by the 45th day following the end of the quarter:

- ❑ Addition of wells or removal (i.e.,destruction) of wells;
- ❑ Change in well northing, easting, or elevation;
- ❑ Water elevation in wells;
- ❑ Report contents (i.e., text, tables, figures, appendices);
- ❑ Laboratory analytical reports; and,
- ❑ Well location map.

5.0 References

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TABLES

Groundwater Monitoring Plan – Revised 2010
Valero Benicia Refinery and Marketing Terminal
3400 East Second Street
Benicia, California
Stantec PN: 185702188
May 24, 2010

TABLE 1. Valero Refinery Area Summary
GMP Revised 2010
Valero Benicia Refinery and Marketing Terminal
Benicia, California

Area Number	Area Name	Prior Release Summary		Approved Remedial Action [1]	RWQCB-Approval of No Further Remedial Action	Current Monitoring System [1]		# Wells Typically Have FPH
		Release Date	Release Identification			# Wells for COCs	# Wells for Water Levels Only	
1	Wastewater Treatment Plant (WWTP)	Unknown.	Bio-sludge storage (Well 101 area)	Installation of Wells 143 and 144; and groundwater monitoring.	–	19	6	0
2	Marketing Terminal	Unknown.	Fuel additive tank releases. Loading rack area releases. Spills related to the operation of the vapor recovery unit.	Groundwater extraction and treatment, vapor extraction and treatment, vapor recovery, land farming of shallow soils, and MNA (Wells 221 and 232).	Land farming of Soil At Day Tank Area (Letter Dated 7-11-08)	28	12	3 (Wells PZ-1, VZ-1, VZ-3)
3	Park Road Parcel	Unknown	Well 325 Area	Enhanced bioremediation in Well 325 area (Wells 325 and 332).	No Further Remedial Action (Enhanced Bioremediation) at the Well 325 Area (Letter Dated 9-22-08)	14	0	0
4	South Upper Tank Area	1988	1,000-barrel gasoline release from Tank 1793.	MNA of Well 408 Area, and enhanced bioremediation (Wells 310, 328, 406, 408, and 413).	–	8	1	1 (Well 408)
5	East Upper Storage Level Area (ULSA)	1989	1,000-barrel release of diesel fuel form Tank 1798.	MNA (Wells 330, 331, 506, 531, and 532) and enhanced bioremediation of Well 509B area (Wells 509B, 524, 526, 540, 541, and 546).	–	19	15	4 (Wells 507, 521, 526, 528)
6	Crude Oil Storage Area (COSA)	1972 1974 1989 2003	Tank bottoms in Lake Lund. 10,000 CY biosludge from WWTP in Lake Lund. 500-barrel crude oil release in Tank 1704 fire wall. 6,750-barrel crude oil release in Tank 1702 fire wall.	–	–	12	2	1 (Well 613)
7	North Upper Level Storage Area (ULSA)	1989	1,000-barrel release of diesel fuel from Tank 1798.	Installation of the ULSA groundwater interceptor trench, and MNA (Wells 712, 713, 714, 716, 726, 727, 728, and 729).	–	13	1	2 (Wells 714, 715)
8	Lower Level Storage Area (LLSA)	1992 Unknown Unknown Unknown	10-barrel release of Powerformer Reformate near Well 843. Release of unknown volume of Powerformer feed. Well 807 area, elevated TPH-g and TPH-d. Well 805 area, elevated TPH-g and TPH-d.	Removal of FPH and MNA (Wells 843, 851, 853, 854, 881, and 882). Installation of the LLSA groundwater interceptor trench. Removal of FPH and enhanced bioremediation at Well 807 (Wells 807, 878, 879, 883, and B-26). Enhanced bioremediation at Well 805 (Wells 805 and 880).	–	34	19	6 (Wells 839, 843, 844, 845, 848, 878)
9	Process Block	–	–	–	–	0	4	0
10	Burma Road Stockpile	1968 [2]	Stockpile of inert waste with some asphalt.	–	No Further Remedial Action Required (Letter Dated 1-21-2010)	2	0	0
11	Laboratory and Mo-Gas UST Area	Pre 1989	Underground storage tanks.	–	–	0	1	0
12	Gate 5 Stockpile	1988 [2]	Stockpile of inert waste with some asphalt.	–	No Further Remedial Action Required (Letter Dated 1-21-2010)	3	0	0
13	Old Dock Pipeline (ODPL)	–	None known.	MNA (Wells 1329, 1330, 1331, 1332, 1333, 1334, 1335, and 1336).	No Further Remedial Action Required (Letter Dated 1-21-2010)	13	–	0

Notes
1 = Groundwater Monitoring Program, Valero Benicia Refinery, dated June 2003, revised July 2005 (URS).
2 = Waste placement was initiated in the year indicated.
COCs = Contaminant of Concern
FPH = Free phase hydrocarbons.
– = None.

TABLE 2. WQPS[1,2] Summary
GMP Revised 2010
Valero Benicia Refinery and Marketing Terminal
Benicia, California

Area Wells	Constituents of Concern (µg/l)							
	Benzene	Toluene	Ethylbenzene	Total Xylenes	TPH-g	TPH-d	TPH-mo	MTBE
Main Refinery[1]	46	130	290	13	500	640	--	8,000
Old Dock Pipeline (ODPL)[1]	71	5,000	430	13	3,700	640	--	8,000
WWTP (Pond Leak Detection Wells Only)[2]	8	8	8	8	1,000	7,000	--	--

Notes:

µg/l = Micrograms per liter.
TPH-g = Total petroleum hydrocarbons as gasoline.
TPH-d = Total petroleum hydrocarbons as diesel.
TPH-mo = Total petroleum hydrocarbons as motor oil.
MTBE = Methyl tert-butyl ether.

1 WQPSs approved in the comment letter from the RWQCB (File No. 2129.2004 [JSM]) dated September 24, 2002 that approved WQPSs proposed in the letter report dated February 25, 2002, for Valero Benicia Refinery. Consistent with Table 5-8 (Criteria for Additional Investigation at POC Monitoring Wells) and Table 5-9 (Criteria for Additional Investigation at Interior Monitoring Wells) of the *Groundwater Monitoring Plan for the Valero Benicia Refinery July 2005* (URS, 2005), WQPS exceedances are addressed with the appropriate measures.

2 WQPSs were established in the *Groundwater Protection Standards and Monitoring Plan for Detecting and Responding to Pond Leaks at the Exxon Benicia Refinery Waste Water Treatment Plant* (Exxon, 1997) and accepted in the letter titled "Subject: Approval of the Report 'Waste Water Treatment Plant Ponds Leak Detection Plan, August 14, 1997' " from the RWQCB to the Exxon Benicia Refinery (RWQCB, 1997). Consistent with Table 5-8 (Criteria for Additional Investigation at POC Monitoring Wells), Consistent with Table 5-8 (Criteria for Additional Investigation at POC Monitoring Wells) and Table 5-9 and Table 5-9 (Criteria for Additional Investigation at Interior Monitoring Wells) of the *Groundwater Monitoring Plan for the Valero Benicia Refinery, July 2005 (URS, 2005)*, WQPS exceedances are addressed with the appropriate measures.

TABLE 3. Current and Proposed GMP[a] Revised 2010

GMP Revised 2010

Valero Benicia Refinery - Benicia, California

Well/Sample Location ID	Well Type	Monitoring Category (From GMP 2005)	Current Purge Method	Current Sampling Frequency	Current Analytical Program	Proposed Sampling Frequency	Proposed Analytical Program	Rationale for Revised Sampling Frequency
Area 1 - Wastewater Treatment Plant (WWTP)								
101	Shallow	source area	No Purge	annual	BTEX/TPH-g,-d/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	7
113	Shallow	leak detection	No Purge	quarterly	BTEX/TPH-g, -d	--	--	4
114	Double Cased	deep	Purge	annual	BTEX/TPH-g, -d	annual	BTEX/TPH-g,-d	--
115	Double Cased	deep boundary	Purge	annual	BTEX/TPH-g,-d/MTBE	--	--	4
116	Double Cased	piezometer	DTW ONLY	--	--	--	--	--
117	Shallow	piezometer	DTW ONLY	--	--	--	--	--
118	Shallow	piezometer	DTW ONLY	--	--	--	--	--
119	Shallow	POC[c]	No Purge	quarterly	BTEX/TPH-g,-d/MTBE	quarterly/annual	Q=TPH-d/A=BTEX,TPH-g,MTBE	--
121	Double Cased	deep	Purge	annual	BTEX/TPH-g, -d	--	--	2
122	Shallow	piezometer	DTW ONLY	--	--	--	--	--
123	Shallow	leak detection	Purge	quarterly	BTEX/TPH-g, -d	--	--	4
124	Shallow	leak detection	Purge	quarterly	BTEX/TPH-g, -d	semiannual/annual	S=TPH-d/A=BTEX,TPH-g,MTBE	4
125	Double Cased	deep	Purge	annual	BTEX/TPH-g, -d	--	--	4
126	Shallow	leak detection	Purge	quarterly	BTEX/TPH-g, -d	semiannual/annual	S=TPH-d/A=BTEX,TPH-g,MTBE	4
127	Shallow	leak detection	Purge	quarterly	BTEX/TPH-g, -d	--	--	4
128	Shallow	leak detection	Purge	quarterly	BTEX/TPH-g, -d	--	--	4
129	Shallow	piezometer	DTW ONLY	--	--	--	--	--
132	Shallow	piezometer	DTW ONLY	--	--	--	--	--
134	Shallow	leak detection	No Purge	quarterly	BTEX/TPH-g, -d	semiannual/annual	S=TPH-d/A=BTEX,TPH-g,MTBE	4
135	Shallow	leak detection	No Purge	quarterly	BTEX/TPH-g, -d	semiannual/annual	S=TPH-d/A=BTEX,TPH-g,MTBE	4
136	Shallow	leak detection	No Purge	quarterly	BTEX/TPH-g, -d	--	--	4
137B	Shallow	POC[c]	No Purge	quarterly	BTEX/TPH-g,-d/MTBE	quarterly/annual	Q=TPH-d/A=BTEX,TPH-g,MTBE	--
138	Shallow	leak detection	No Purge	quarterly	BTEX/TPH-g, -d	--	--	4
143	Shallow	POC[c]	No Purge	quarterly	BTEX/TPH-g,-d/MTBE	quarterly/annual	Q=TPH-d/A=BTEX,TPH-g,MTBE	--
144	Shallow	POC[c]	No Purge	quarterly	BTEX/TPH-g,-d/MTBE	quarterly/annual	Q=TPH-d/A=BTEX,TPH-g,MTBE	--
Final Pond	Sediment Location	--	--	annual	BTEX/TPH-g,-d,-mo/Metals	annual	BTEX/TPH-g,-d,-mo/Metals	--
20-Year Pond	Sediment Location	--	--	annual	BTEX/TPH-g,-d,-mo/Metals	annual	BTEX/TPH-g,-d,-mo/Metals	--
Retention Pond	Sediment Location	--	--	annual	BTEX/TPH-g,-d,-mo/Metals	annual	BTEX/TPH-g,-d,-mo/Metals	--
Equalization Pond	Sediment Location	--	--	annual	BTEX/TPH-g,-d,-mo/Metals	annual	BTEX/TPH-g,-d,-mo/Metals	--
Area 2 - Marketing Terminal								
201	Shallow	evaluation	Purge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	2
202	Shallow	evaluation	Purge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
203	Shallow	evaluation	Purge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	3
204	Shallow	evaluation	Purge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
205	Shallow	uncontaminated	Purge	annual	BTEX/TPH-g,-d,-mo/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
206	Shallow	evaluation	Purge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	3

TABLE 3. Current and . ,sed GMP[a] Revised 2010
GMP Revised 2010
Valero Benicia Refinery - Benicia, California

Well/Sample Location ID	Well Type	Monitoring Category (From GMP, 2005)	Current Purge Method	Current Sampling Frequency	Current Analytical Program	Proposed Sampling Frequency	Proposed Analytical Program	Rationale for Revised Sampling Frequency
212	Shallow	evaluation	Purge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	--	--	2
213	Shallow	evaluation	Purge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	--	--	2
214	Shallow	evaluation	Purge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	3
215	Shallow	evaluation	Purge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	5
216	Shallow	source area	No Purge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	2
217	Shallow	evaluation	Purge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	5
220	Shallow	downgradient	No Purge	annual	BTEX/TPH-g,-d,-mo/MTBE/VOCs	--	--	2
221	Shallow	day tank MNA[b]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d,-mo/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	5
223	Double Cased	deep interval	Purge	annual	BTEX/TPH-g,-d,-mo/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
224	Shallow	downgradient	Purge	annual	BTEX/TPH-g,-d,-mo/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
225	Shallow	piezometer	DTW ONLY	--	--	--	--	--
226	Shallow	evaluation	Purge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	3
227	Shallow	source area	Purge	annual	BTEX/TPH-g,-d,-mo/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	3
228	Shallow	evaluation	Purge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
229	Shallow	evaluation	Purge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
232	Shallow	day tank MNA[b]	Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d,-mo/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	2
236	Shallow	evaluation	Purge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	annual	BTEX/TPH-g,-d/MTBE	3
237	Shallow	evaluation	Purge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	3
S-1	Extraction	remediation	Purge	semiannual	BTEX/TPH-g,-d,-mo/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	--
S-2	Extraction	remediation	Purge	semiannual	BTEX/TPH-g,-d,-mo/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	--
RW-1	Extraction	extraction	DTW ONLY	--	--	--	--	--
RW-2	Extraction	extraction	DTW ONLY	--	--	--	--	--
RW-3	Extraction	extraction	DTW ONLY	--	--	--	--	--
RW-4	Extraction	extraction	DTW ONLY	--	--	--	--	--
EX-14	Extraction	extraction	DTW ONLY	--	--	--	--	--
EX-15	Extraction	extraction	DTW ONLY	--	--	--	--	--
P-1	Perched Zone	extraction	DTW ONLY	--	--	--	--	--
P-2	Perched Zone	extraction	DTW ONLY	--	--	--	--	--
P-3	Perched Zone	extraction	DTW ONLY	--	--	--	--	--
P-4	Shallow	extraction	DTW ONLY	--	--	--	--	--
P-5	Shallow	extraction	DTW ONLY	--	--	--	--	--
VZ-1	Perched Zone	remediation	Purge	semiannual	BTEX/TPH-g,-d,-mo/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	--
VZ-2	Perched Zone	remediation	Purge	semiannual	BTEX/TPH-g,-d,-mo/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	--
VZ-3	Perched Zone	remediation	Purge	semiannual	BTEX/TPH-g,-d,-mo/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	--
Area 3 - Park Road Parcel								
310	Shallow	POC/MNA for Well 408 Area[b]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d,-mo/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
311	Shallow	boundary	No Purge	annual	BTEX/TPH-g,-d/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	8

TABLE 3. Current and Proposed GMP[a] Revised 2010

GMP Revised 2010
Valero Benicia Refinery - Benicia, California

Well/Sample Location ID	Well Type	Monitoring Category (From GMP, 2005)	Current Purge Method	Current Sampling Frequency	Current Analytical Program	Proposed Sampling Frequency	Proposed Analytical Program	Rationale for Revised Sampling Frequency
312	Double Cased	deep interval	Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
313	Shallow	boundary	No Purge	annual	BTEX/TPH-g,-d/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	8
314	Shallow	boundary	No Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
323B	Shallow	boundary	No Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
324	Shallow	boundary	No Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
325	Shallow	POC/enhanced bioremediation[b,c]	Micropurge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
328	Shallow	MNA for Well 408 Area[b,c]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d,-mo/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	2
329	Shallow	interior[c]	No Purge	semiannual	BTEX/TPH-g,-d/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	--
330	Shallow	POC/MNA[b,c]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
331	Shallow	POC/MNA[b,c]	Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	2
332	Shallow	enhanced bioremediation[b]	Micropurge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	2
333	Shallow	POC[c]	Purge	quarterly	BTEX/TPH-g,-d/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
				Area 4 - Stop Oil Storage Area				
403	Shallow	interior[c]	Purge	semiannual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	2
404	Shallow	interior[c]	Purge	semiannual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	2
405	Shallow	downgradient	No Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
406	Shallow	MNA for Well 408 Area[b]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d,-mo/MTBE	annual	BTEX/TPH-g,-d/MTBE	2
408	Shallow	interior/MNA for Well 408 Area[b,c]	Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d,-mo/MTBE/TKN	quarterly	BTEX/TPH-g,-d/MTBE	--
409	Shallow	downgradient	Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
413	Shallow	MNA for Well 408 Area[b]	Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d,-mo/MTBE/TKN	quarterly	BTEX/TPH-g,-d/MTBE	--
B-02	Shallow	piezometer	DTW ONLY	--	--	--	--	--
				Area 5 - Intermediate Storage Area				
506	Shallow	interior/MNA[b,c]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	5
507	Shallow	source/interceptor trench	No Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
508	Shallow	POC[c]	No Purge	quarterly	BTEX/TPH-g,-d/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
509B	Shallow	enhanced bioremediation[b]	Micropurge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	--	--	4
510	Shallow	downgradient	No Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
511	Shallow	downgradient	Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
516	Shallow	POC[c]	No Purge	quarterly	BTEX/TPH-g,-d/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
520	Shallow	downgradient/interceptor trench	Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
521	Shallow	source area/interceptor trench	Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
524	Shallow	POC/enhanced bioremediation[b,c]	Micropurge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
526	Shallow	enhanced bioremediation[b]	Micropurge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
528	Shallow	interceptor trench	DTW ONLY	--	--	--	--	--

TABLE 3. Current and sed GMP[a] Revised 2010
GMP Revised 2010
Valero Benicia Refinery - Benicia, California

Well/Sample Location ID	Well Type	Monitoring Category (From GMP, 2005)	Current Purge Method	Current Sampling Frequency	Current Analytical Program	Proposed Sampling Frequency	Proposed Analytical Program	Rationale for Revised Sampling Frequency
529	Shallow	downgradient/interceptor trench	No Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
530	Double Cased	deep interval/interceptor trench	Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
531	Shallow	interior/MNA[b,c]	Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	5
532	Shallow	interior/MNA[b,c]	Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	5
540	Shallow	POC/enhanced bioremediation[b,c]	Micropurge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
541	Shallow	enhanced bioremediation	Micropurge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
542	Shallow	interceptor trench	DTW ONLY	--	--	--	--	--
543	Piezometer	interceptor trench	DTW ONLY	--	--	--	--	--
544	Piezometer	interceptor trench	DTW ONLY	--	--	--	--	--
545	Piezometer	interceptor trench	DTW ONLY	--	--	--	--	--
546	Shallow	POC/enhanced bioremediation[b,c]	Micropurge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
B-19	Piezometer	piezometer	DTW ONLY	--	--	--	--	--
B-28	Piezometer	interior[c]	Purge	semiannual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	5
MW-U2	Interceptor Trench	piezometer	DTW ONLY	--	--	--	--	--
MW-U3	Interceptor Trench	piezometer	DTW ONLY	--	--	--	--	--
MW-U4	Interceptor Trench	piezometer	DTW ONLY	--	--	--	--	--
MW-U5	Interceptor Trench	piezometer	DTW ONLY	--	--	--	--	--
MW-U6	Interceptor Trench	piezometer	DTW ONLY	--	--	--	--	--
MW-U7	Interceptor Trench	piezometer	DTW ONLY	--	--	--	--	--
Sump U1	Sump	piezometer	DTW ONLY	--	--	--	--	--
Sump U2	Sump	piezometer	DTW ONLY	--	--	--	--	--
Sump U3	Sump	piezometer	DTW ONLY	--	--	--	--	--
Area 6 - Crude Oil Storage Area								
610	Shallow	POC[c]	No Purge	quarterly	BTEX/TPH-g,-d/MTBE	quarterly	TPH-g,d/MTBE	--
611	Shallow	POC[c]	Purge	quarterly	BTEX/TPH-g,-d/MTBE	semiannual	TPH-g,d/MTBE	1
612	Shallow	boundary	No Purge	annual	BTEX/TPH-g,-d/MTBE	quarterly	TPH-g,-d/MTBE	8
613	Shallow	boundary	Purge	annual	BTEX/TPH-g,-d/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	8
614	Shallow	POC[c]	No Purge	quarterly	BTEX/TPH-g,-d/MTBE	quarterly	TPH-d	1
615	Shallow	boundary	No Purge	semiannual	BTEX/TPH-g,-d	annual	TPH-g,d/MTBE	2
616	Shallow	piezometer	DTW ONLY	--	--	--	--	--
617	Shallow	downgradient	No Purge	annual	BTEX/TPH-g,-d	annual	TPH-d	--
618	Shallow	piezometer	DTW ONLY	--	--	--	--	--
619	Shallow	boundary	Purge	annual	BTEX/TPH-g,-d	quarterly	TPH-g,d/MTBE	8
620	Shallow	POC[c]	Purge	quarterly	BTEX/TPH-g,-d/MTBE	annual	TPH-d	1
621	Shallow	POC[c]	No Purge	quarterly	BTEX/TPH-g,-d/MTBE	quarterly	TPH-g,d/MTBE	--
622	Shallow	boundary	Purge	annual	BTEX/TPH-g,-d	annual	TPH-d	--
623	Shallow	boundary	No Purge	annual	BTEX/TPH-g,-d	annual	TPH-d	--
Area 7 - Light Ends storage Area								

TABLE 3. Current and Proposed GMP[a] Revised 2010
GMP Revised 2010
Valero Benicia Refinery - Benicia, California

Well/Sample Location ID	Well Type	Monitoring Category (From GMP, 2005)	Current Purge Method	Current Sampling Frequency	Current Analytical Program	Proposed Sampling Frequency	Proposed Analytical Program	Rationale for Revised Sampling Frequency
704C	Shallow	downgradient/uncontaminated	No Purge	annual	BTEX/TPH-g,-d/MTBE	annual	TPH-g,-d/MTBE	--
707	Shallow	piezometer	DTW ONLY	--	--	--	--	--
711	Shallow	downgradient	No Purge	annual	BTEX/TPH-g,-d/MTBE	--	--	4
712	Shallow	MNA[b]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d/MTBE	quarterly	TPH-g,-d/MTBE	--
713	Shallow	MNA[b]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d/MTBE	annual	TPH-g,-d/MTBE	2
714	Shallow	MNA[b]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d/MTBE	semiannual	TPH-g,-d/MTBE	5
715	Shallow	source area	Purge	annual	BTEX/TPH-g,-d/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	7
716	Shallow	MNA[b]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	5
717	Shallow	source area	No Purge	annual	BTEX/TPH-g,-d/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	7
719	Shallow	source area	No Purge	annual	BTEX/TPH-g,-d/MTBE	annual	TPH-g,-d/MTBE	--
726	Shallow	MNA[b]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	3
727	Shallow	MNA[b]	Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d/MTBE	annual	TPH-g,-d/MTBE	5
728	Shallow	MNA[b]	Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	5
729	Shallow	MNA[b]	Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	2
Area 8 - Lower Level Storage Field								
805	Shallow	POC/enhanced bioremediation[b,c]	Micropurge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
806	Shallow	POC/interceptor trench[c]	No Purge	quarterly	BTEX/TPH-g,-d/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
807	Shallow	POC/enhanced bioremediation[b,c]	Micropurge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
808	Shallow	piezometer	DTW ONLY	--	--	--	--	--
809	Shallow	downgradient/uncontaminated	No Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
810	Shallow	downgradient/uncontaminated	No Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
811	Shallow	piezometer	DTW ONLY	--	--	--	--	--
815	Shallow	uncontaminated	Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
824	Shallow	piezometer	DTW ONLY	--	--	--	--	--
825	Shallow	POC[c]	No Purge	quarterly	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	1
832	Shallow	boundary/interceptor trench	No Purge	annual	BTEX/TPH-g,-d/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	8
833	Shallow	source area	No Purge	annual	BTEX/TPH-g,-d/MTBE	--	--	4
836	Shallow	source area	No Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
839	Shallow	piezometer	DTW ONLY	--	--	--	--	--
840	Shallow	piezometer	DTW ONLY	--	--	--	--	--
841	Shallow	piezometer	DTW ONLY	--	--	--	--	--
843	Shallow	powerformer reformate MNA[b]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d,-mo/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--

TABLE 3. Current and ˌ ˌsed GMP[a] Revised 2010

GMP Revised 2010

Valero Benicia Refinery - Benicia, California

Well/Sample Location ID	Well Type	Monitoring Category (From GMP, 2005)	Current Purge Method	Current Sampling Frequency	Current Analytical Program	Proposed Sampling Frequency	Proposed Analytical Program	Rationale for Revised Sampling Frequency
844	Shallow	source area	No Purge	annual	BTEX/TPH-g,-d/MTBE	--	--	4
845	Shallow	source area	No Purge	annual	BTEX/TPH-g,-d/MTBE	--	--	4
846	Shallow	source area	No Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
847	Shallow	source area/interceptor trench	No Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
848	Shallow	source area/interceptor trench	No Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
849	Shallow	piezometer/interceptor trench	DTW ONLY	--	--	--	--	--
850	Shallow	boundary/interceptor trench	No Purge	annual	BTEX/TPH-g,-d/MTBE	annual	BTEX/TPH-g,-d/MTBE	--
851	Shallow	powerformer reformate MNA[b]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d,-mo/MTBE	semiannual	BTEX/TPH-g,-d/MTBE	3
852	Shallow	piezometer	DTW ONLY	--	--	--	--	--
853	Shallow	powerformer reformate MNA[b]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d,-mo/MTBE	annual/3rd Quarter	BTEX/TPH-g,-d/MTBE	3
854	Shallow	powerformer reformate MNA[b]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d,-mo/MTBE	--	--	4
863	Shallow	piezometer	DTW ONLY	--	--	--	--	--
866	Interceptor Trench/ Double Cased	piezometer/interceptor trench	DTW ONLY	--	--	--	--	--
868	Interceptor Trench/ Double Cased	piezometer	DTW ONLY	--	--	--	--	--
869	Piezometer	piezometer/interceptor trench	DTW ONLY	--	--	--	--	--
870	Piezometer	interior[c]	No Purge	semiannual	BTEX/TPH-g,-d/MTBE	--	--	2
878	Shallow	enhanced bioremediation[b]	Micropurge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	annual	BTEX/TPH-g,-d/MTBE	5
879	Shallow	enhanced bioremediation[b]	Micropurge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
880	Shallow	POC/enhanced bioremediation[b,c]	Micropurge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
881	Shallow	interior/powerformer reformate MNA[b,c]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d,-mo/MTBE/TKN	annual	BTEX/TPH-g,-d/MTBE	5
882	Shallow	powerformer reformate MNA[b]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d,-mo/MTBE	annual	BTEX/TPH-g,-d/MTBE	2
883	Shallow	enhanced bioremediation[b]	Micropurge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
B-07	Piezometer	POC[c]	No Purge	quarterly	BTEX/TPH-g,-d/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
B-08	Piezometer	POC[c]	No Purge	quarterly	BTEX/TPH-g,-d/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
B-09	Piezometer	POC[c]	No Purge	quarterly	BTEX/TPH-g,-d/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
B-10	Piezometer	piezometer	DTW ONLY	--	--	--	--	--
B-11	Piezometer	POC[c]	No Purge	quarterly	BTEX/TPH-g,-d/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
B-13	Piezometer	piezometer	DTW ONLY	--	--	--	--	--
B-14	Piezometer	POC[c]	No Purge	quarterly	BTEX/TPH-g,-d/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	--
B-18	Piezometer	piezometer	DTW ONLY	--	--	--	--	--

TABLE 3. Current and Proposed GMP[a] Revised 2010

GMP Revised 2010

Valero Benicia Refinery - Benicia, California

Well/Sample Location ID	Well Type	Monitoring Category (From GMP, 2005)	Current Purge Method	Current Sampling Frequency	Current Analytical Program	Proposed Sampling Frequency	Proposed Analytical Program	Rationale for Revised Sampling Frequency
B-26	Piezometer	interior/enhanced bioremediation[b,c]	Micropurge	quarterly	BTEX/TPH-g,-d,-mo/MTBE	--	--	4
B-27	Piezometer	interior[c]	No Purge	annual	BTEX/TPH-g,-d/MTBE	--	--	2
MW-L1	Interceptor Trench	piezometer/interceptor trench	DTW ONLY	--	--	--	--	--
MW-L2	Interceptor Trench	piezometer/interceptor trench	DTW ONLY	--	--	--	--	--
MW-L3	Interceptor Trench	piezometer/interceptor trench	DTW ONLY	--	--	--	--	--
MW-L4	Interceptor Trench	piezometer/interceptor trench	DTW ONLY	--	--	--	--	--
MW-L4A	Interceptor Trench	piezometer/interceptor trench	DTW ONLY	--	--	--	--	--
MW-L4B	Interceptor Trench	piezometer/interceptor trench	DTW ONLY	--	--	--	--	--
Sump L1	Sump	piezometer/interceptor trench	DTW ONLY	--	--	--	--	--
				Area 9 - Process Block				
901	Piezometer	piezometer	DTW ONLY	--	--	--	-	--
905	Piezometer	piezometer	DTW ONLY	--	--	--	-	--
906	Piezometer	piezometer	DTW ONLY	--	--	--	-	--
908B	Shallow	shallow	DTW ONLY	--	--	--	-	--
				Area 10 - Burma Road Stockpile				
1004	Shallow	uncontaminated	No Purge	annual	TPH-d	--	-	6
1005	Shallow	uncontaminated	No Purge	annual	TPH-d	--	-	6
1006	Shallow	uncontaminated	No Purge	annual	TPH-d	--	-	6
1008	Shallow	uncontaminated	Purge	annual	TPH-d	--	-	6
				Area 11 - Laboratory and Mo-Gas UST Area				
1104	Shallow	piezometer	DTW ONLY	--	--	--	-	-
				Are 12 - Gate 5 Stockpile				
1205	Shallow	uncontaminated	No Purge	annual	TPH-d	--	-	6
1207	Shallow	uncontaminated	Purge	annual	TPH-d	--	-	6
1208	Shallow	uncontaminated	Purge	annual	TPH-d	--	-	6
				Area 13 - Old Dock Pipeline (ODPL)				
1329	Shallow	MNA[b]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d,-mo	--	--	6
1330	Deep	deep	Purge	annual	BTEX/TPH-g,-d	--	-	6
1331	Shallow	MNA[b]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d,-mo	--	-	6
1332	Shallow	MNA[b]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d,-mo	--	-	6
1333	Deep	deep	Purge	annual	BTEX/TPH-g,-d	--	-	6
1334	Shallow	POC/MNA[b,c]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d,-mo	--	-	6

TABLE 3. Current and Proposed GMP[a] Revised 2010
GMP Revised 2010
Valero Benicia Refinery - Benicia, California

Well/Sample Location ID	Well Type	Monitoring Category (From GMP, 2005)	Current Purge Method	Current Sampling Frequency	Current Analytical Program	Proposed Sampling Frequency	Proposed Analytical Program	Rationale for Revised Sampling Frequency
1335	Shallow	POC/MNA[b,c]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d,-mo	–	-	6
1336	Shallow	POC/MNA[b,c]	No Purge Q1 and Q3 / Micropurge Q2 and Q4	quarterly	BTEX/TPH-g,-d,-mo	–	-	6
Surface Water Samples along Sulphur Creek								
SW-01	Surface Water Location	--	–	quarterly	BTEX/TPH-g,-d/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	–
SW-02	Surface Water Location	–	–	quarterly	BTEX/TPH-g,-d/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	–
SW-03	Surface Water Location	–	–	quarterly	BTEX/TPH-g,-d/MTBE	quarterly	BTEX/TPH-g,-d/MTBE	–

Notes:

Groundwater Monitoring Plan, Valero Benicia Refinery. June 2003, Revised July 2005. URS (GMP).

BTEX Benzene, ethylbenzene, toluene, and total xylenes
TPH-g Total petroleum hydrocarbons as gasoline
TPH-d Total petroleum hydrocarbons as diesel
– None existing or proposed.
TPH-mo Total petroleum hydrocarbons as motor oil
MTBE Methyl tert-butyl ether
TKN Total Kjeldahl nitrogen
DTW Depth to Water
MNA Monitored Natural Attenuation
POC Point of Compliance
VOCs Volatile organic compounds

[a] Sampling procedures and protocol are contained in Appendix B ("Sampling Protocol") of the GMP (URS, 2005).

[b] This well is currently monitored semiannually for geochemical indicator parameters and other parameters.
Geochemical indicator parameters consist of nitrate, sulfate, total manganese, dissolved and ferrous iron, and methane. Other parameters consist of total organic carbon, alkalinity, and total dissolved solids.

[c] This well is currently monitored for all parameters listed above in "b", plus naphthalene and phenol.

(1) POC well with reduced frequency where consistently non-detect, cross-gradient from monitored area, or located adjacent to area with no historic releases.

(2) Well is consistently non-detect; and/or is located upgradient or crossgradient from monitored area or active area.

(3) Well is located in the immediate vicinity of an in-situ remedial program or plume, and reduction of sampling of this well is reasonable to evaluate concentration trends.

(4) Well is located in close proximity to another well that is included in the program, and and frequent sampling of this well would be duplicative.

(5) Well may occasionally contain COCs, at times above WQPS, however concentrations do not show increasing trend, and more frequent monitoring is not warranted to evaluate trends.

(6) The RWQCB issued a No Further Remedial Action status in letter dated 1-21-2010. Well is consistently non-detect.

(7) Monitoring frequency is increased because well is adjacent to a plume or is needed to monitor concentration trends.

(8) Monitoring frequency is increased because well is adjacent to creek.

Groundwater Monitoring Plan, Valero Benicia Refinery. June 2003, Revised July 2005. URS (GMP).

Table 4. Overview of Revised Groundwater Monitoring Plan
GMP Revised 2010
Valero Benicia Refinery and Marketing Terminal
Benicia, California

Area	1 WWTP	2 Marketing Terminal	3 Park Road Parcel	4 Slop Oil Storage Area	5 Intermediates Storage Area	6 Crude Oil Storage Area (COSA)	7 Light Ends Storage Area	8 Lower Level Storage Field	9 Process Block	10 Burma Road Stockpile	11 Laboratory and Mo-Gas UST Area	12 Gate 5 Stockpile	13 Old Dock Pipeline (ODPL)	Total
Current Number of Samples Analyzed Per Year[1]	61	87	36	18	53	28	37	95	0	4	0	3	26	448
Proposed Number of Samples to be Analyzed Per Year	27	54	36	13	41	31	21	67	0	0	0	0	0	290
Current Number of Wells Sampled One or More Times Per Year[1]	19	28	14	7	19	12	13	34	0	4	0	3	8	161
Proposed Number of Wells Sampled One or More Times Per Year	10	25	14	7	18	12	12	27	0	0	0	0	0	125

Notes:
1 Consistent with the Groundwater Monitoring Plan, Valero Benicia Refinery. URS, 2003, revised 2005.

TABLE 5. Reporting Schedule
GMP Revised 2010
Valero Benicia Refinery and Marketing Terminal
Benicia, California

Quarter	Date Report Submitted to RWQCB	Report Submittals						
		Executive Summary [1]	Full Text	Tables	Figures	Concentration Versus Time Plots	Historic Monitoring Data in Electronic Deliverable (ED) Format	Geo Tracker Submittals [5]
1st	15-May	√	--	√ [2]	--	--	--	√
2nd	15-Aug	√	--	√ [2]	--	√ [4]	--	√
3rd	15-Nov	√	--	√ [2]	--	--	--	√
4th	15-Jan	√	√	√ [3]	√	√ [4]	√	√

Notes:

1 Executive Summary includes: Detections, WQPS exceedances and actions taken (if any), QA/QC data evaluation issues (if any), and remediation summary.

2 First, second, and third quarters, tables include include those summarizing analytical data compared with Water Quality Protection Standards for the Point of Compliance Wells, Interior Wells, and Wastewater Treatment Plant Leak Detection Wells.

3 Fourth quarter tables include those in the first through third quarters, plus water levels and elevations, analytical data, ULSA and LLSA trench performance, and historic data from the onset of the program (1992) to present.

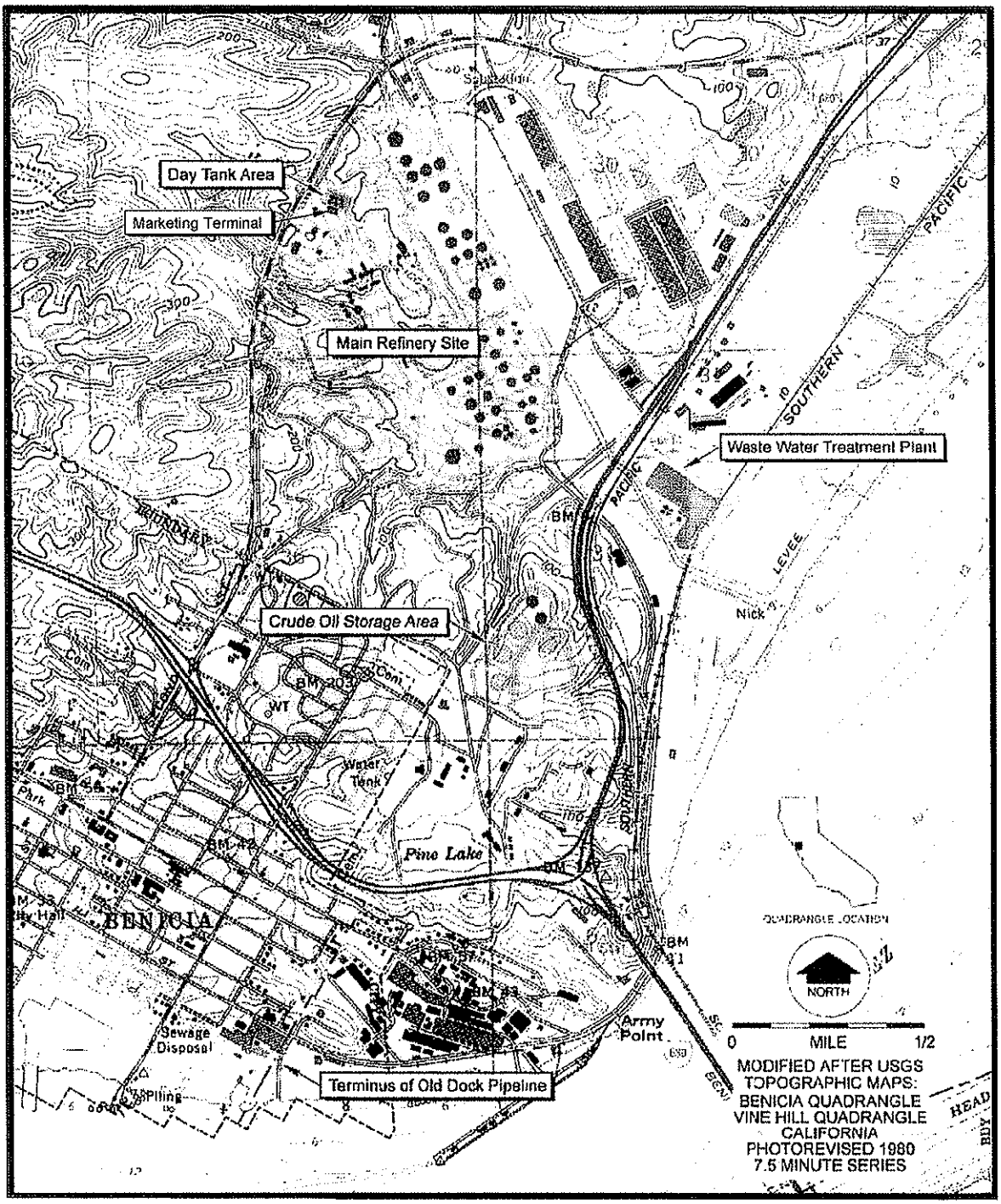
4 For 2nd quarter, concentration versus time plots will be included for wells where a Mann-Kendall statistical analysis is performed. Otherwise, the concentration versus time plots for all wells will be included in the 4th quarter report.

5 California SWRCB Geo Tracker submittals include the following:

- Addition or removal of wells from the monitoring system.
- Change in northing, easting, and elevation of wells.
- Groundwater elevations for the reporting period.
- Laboratory analytical reports for the reporting period.
- Well location map.

FIGURES

Groundwater Monitoring Plan – Revised 2010
Valero Benicia Refinery and Marketing Terminal
3400 East Second Street
Benicia, California
Stantec PN: 185702188
May 24, 2010

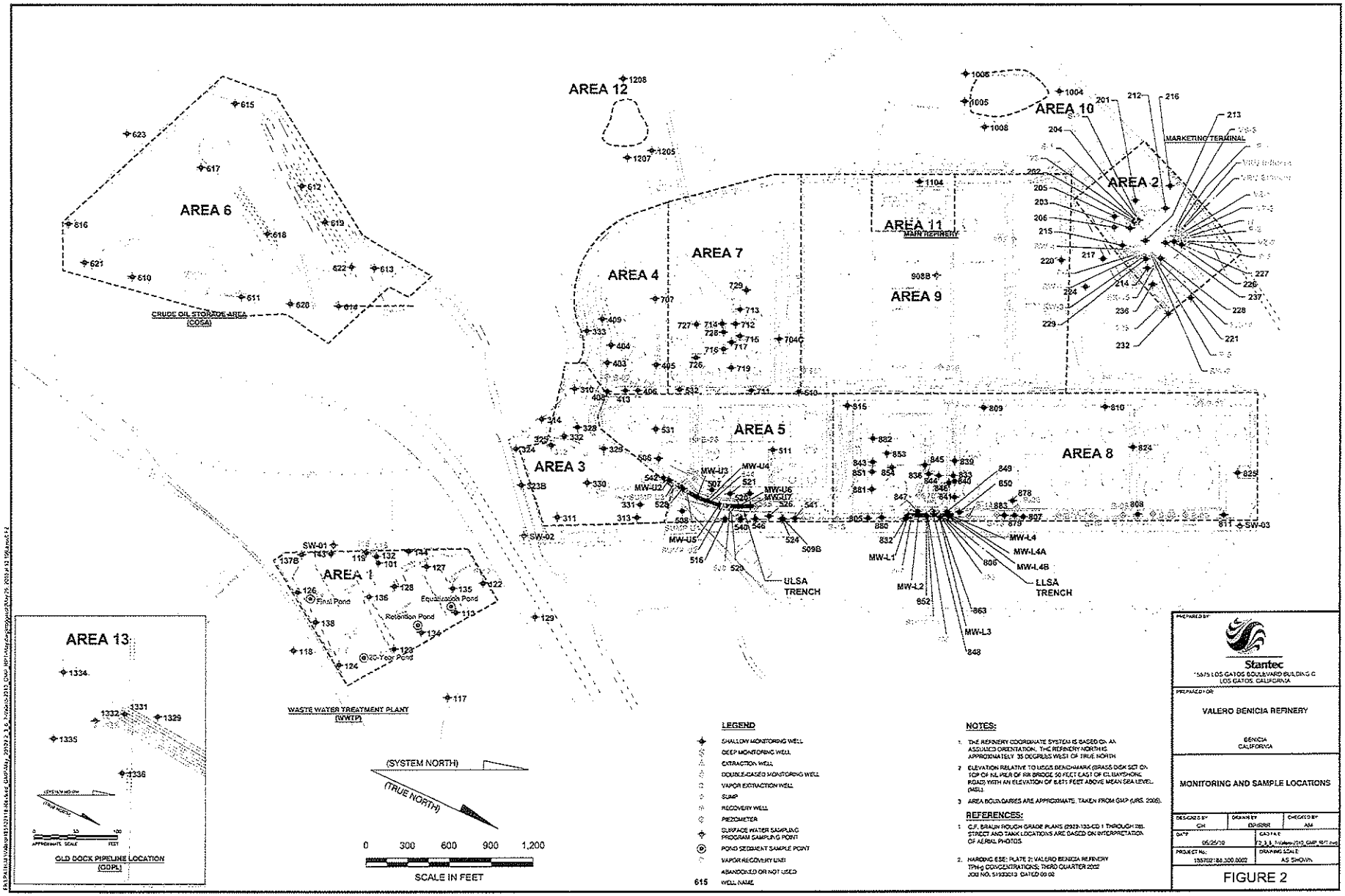


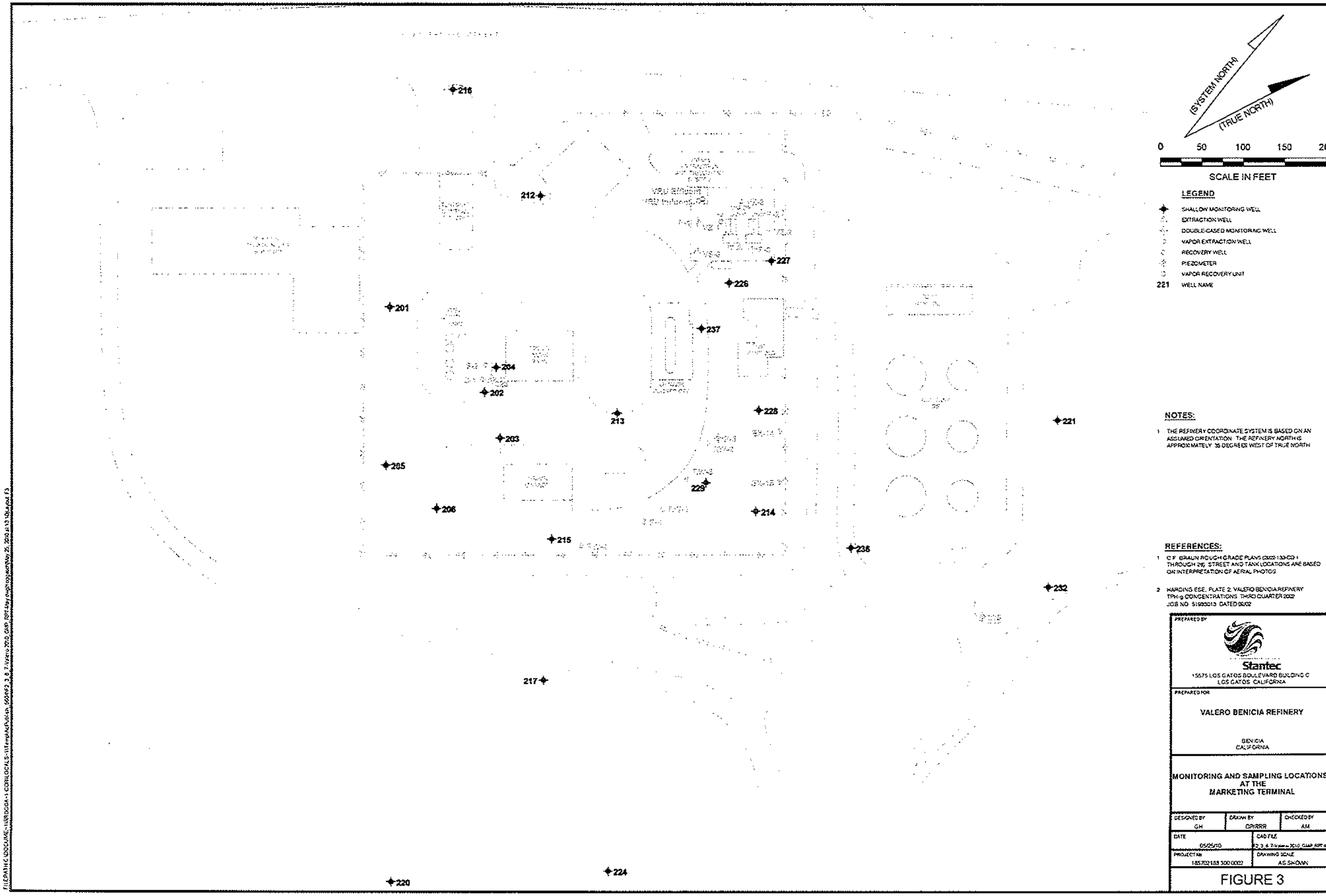
LEGEND
HARDING ESE, SITE LOCATION MAP
FOURTH QUARTER 2001 QUARTERLY REPORT
PLATE 1-1, DATED JANUARY 2002
DRAWN BY DJP; JOB NO. 51933013

Stantec
15575 LOS GATOS BOULEVARD, BUILDING C
LOS GATOS, CALIFORNIA
PHONE: 408.356.6124/356.6138 (FAX)

FOR: VALERO BENICIA REFINERY, BENICIA, CALIFORNIA	SITE LOCATION MAP	FIGURE: 1

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185702188.300.0002	RRR/DP	AM	TC	05/25/10


AREA 1
AREA 2
AREA 3
AREA 4
AREA 5
AREA 6
AREA 7
AREA 8
AREA 9
AREA 10
AREA 11
AREA 12
AREA 13
MAIN REFINERY
MARKETING TERMINAL
CRUDE OIL STORAGE AREA (COSA)
WASTE WATER TREATMENT PLANT (WWTP)
OLD DOCK PIPELINE LOCATION (ODPL)
Final Pond
Equalization Pond
Retention Pond
20-Year Pond
ULSA TRENCH
LLSA TRENCH
MW-L1
MW-L2
MW-L3
MW-L4
MW-L4A
MW-L4B
MW-U1
MW-U2
MW-U3
MW-U4
MW-U5
MW-U6
MW-U7
SW-01
SW-02
SW-03
(SYSTEM NORTH)
(TRUE NORTH)
0 300 600 900 1,200
SCALE IN FEET
LEGEND
SHALLOW MONITORING WELL
DEEP MONITORING WELL
EXTRACTION WELL
DOUBLE-CASED MONITORING WELL
VAPOR EXTRACTION WELL
SUMP
RECOVERY WELL
PIEZOMETER
SURFACE WATER SAMPLING PROGRAM SAMPLING POINT
POND SEDIMENT SAMPLE POINT
VAPOR RECOVERY LINE
ABANDONED OR NOT USED
615 WELL NAME
NOTES:
1. THE REFINERY COORDINATE SYSTEM IS BASED ON AN ASSUMED ORIENTATION. THE REFINERY NORTH IS APPROXIMATELY 35 DEGREES WEST OF TRUE NORTH.
2 ELEVATION RELATIVE TO USGS BENCHMARK (BRASS DISK SET ON TOP OF NE PIER OF RR BRIDGE 50 FEET EAST OF ELLIS/SHORE ROAD) WITH AN ELEVATION OF 8.61 FEET ABOVE MEAN SEA LEVEL (MSL).
3 AREA BOUNDARIES ARE APPROXIMATE, TAKEN FROM GMP (URS, 2006).
REFERENCES:
1. C.F. BRAUN ROUGH GRADE PLANS (2923-133-CD 1 THROUGH 28). STREET AND TANK LOCATIONS ARE BASED ON INTERPRETATION OF AERIAL PHOTOS.
2. HARDING ESE: PLATE 2; VALERO BENICIA REFINERY TPH-g CONCENTRATIONS; THIRD QUARTER 2002 JOB NO. 51933013 DATED 00 00
PREPARED BY
Stantec
1575 LOS GATOS BOULEVARD BUILDING C
LOS GATOS, CALIFORNIA
PREPARED FOR
VALERO BENICIA REFINERY
BENICIA
CALIFORNIA
MONITORING AND SAMPLE LOCATIONS
DESIGNED BY CH
DRAWN BY DP/RR
CHECKED BY AM
DATE 05/26/10
CAD FILE
PROJECT NO. 185702188.300.0002
DRAWING SCALE AS SHOWN
FIGURE 2



0 50 100 150 200

SCALE IN FEET

LEGEND

- SHALLOW MONITORING WELL
- EXTRACTION WELL
- DOUBLE-CASED MONITORING WELL
- VAPOR EXTRACTION WELL
- RECOVERY WELL
- PIEZOMETER
- VAPOR RECOVERY UNIT
- 221 WELL NAME

NOTES:

1. THE REFINERY COORDINATE SYSTEM IS BASED ON AN ASSUMED ORIENTATION. THE REFINERY NORTH IS APPROXIMATELY 35 DEGREES WEST OF TRUE NORTH

REFERENCES:

1. C.F. BRAUN ROUGH GRADE PLANS (3022-130-CD-1 THROUGH 26) STREET AND TANK LOCATIONS ARE BASED ON INTERPRETATION OF AERIAL PHOTOS
2. HARDING ESE, PLATE 2, VALERO BENICIA REFINERY TPH-g CONCENTRATIONS THIRD QUARTER 2002 JOB NO. 51900013 DATED 09/02

PREPARED BY

Stantec
15575 LOS GATOS BOULEVARD BUILDING C
LOS GATOS, CALIFORNIA

PREPARED FOR

VALERO BENICIA REFINERY

BENICIA
CALIFORNIA

MONITORING AND SAMPLING LOCATIONS AT THE MARKETING TERMINAL

DESIGNED BY	DRAWN BY	CHECKED BY
GH	DP/RRR	AM

DATE	CAD FILE
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PROJECT No.	DRAWING SCALE
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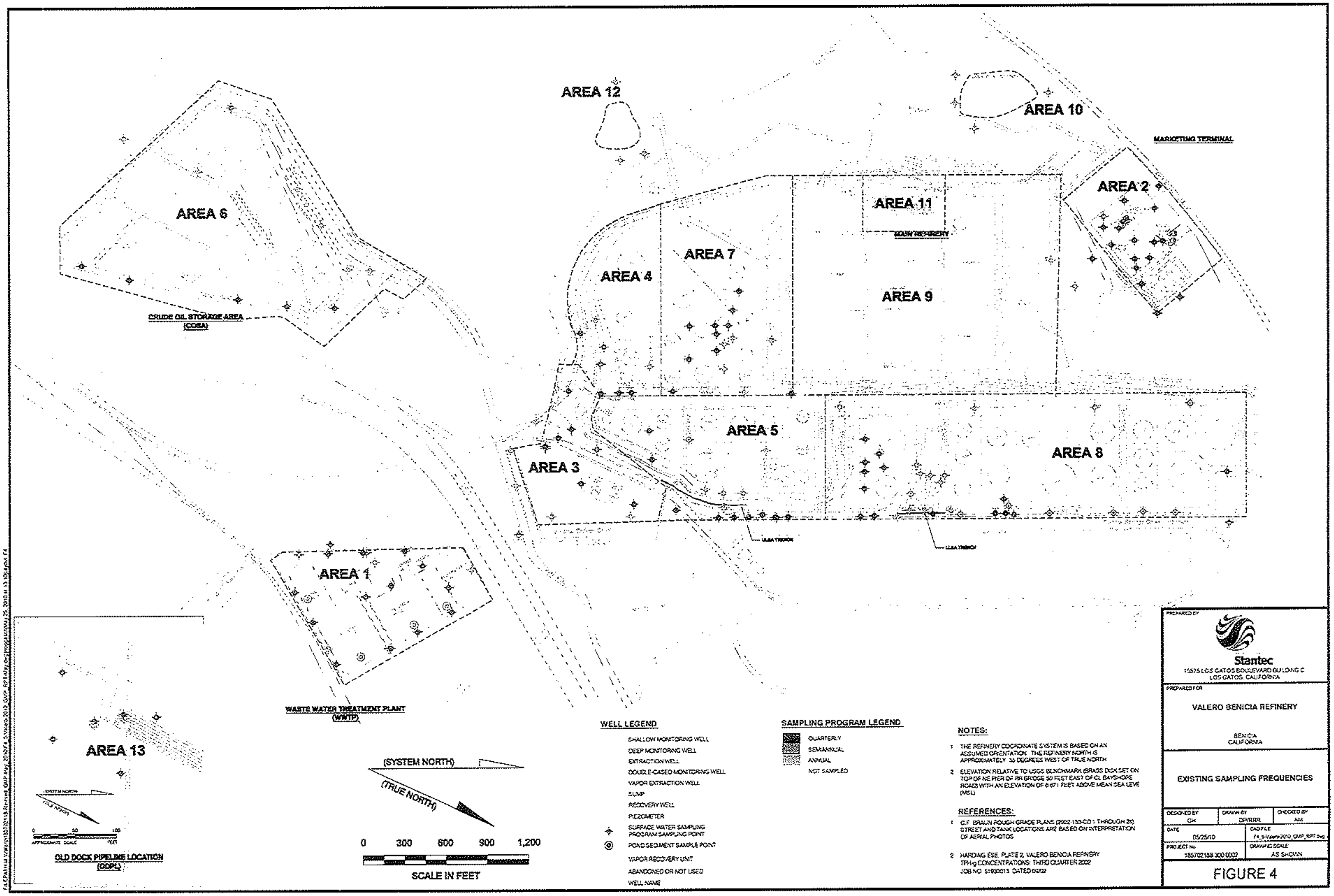
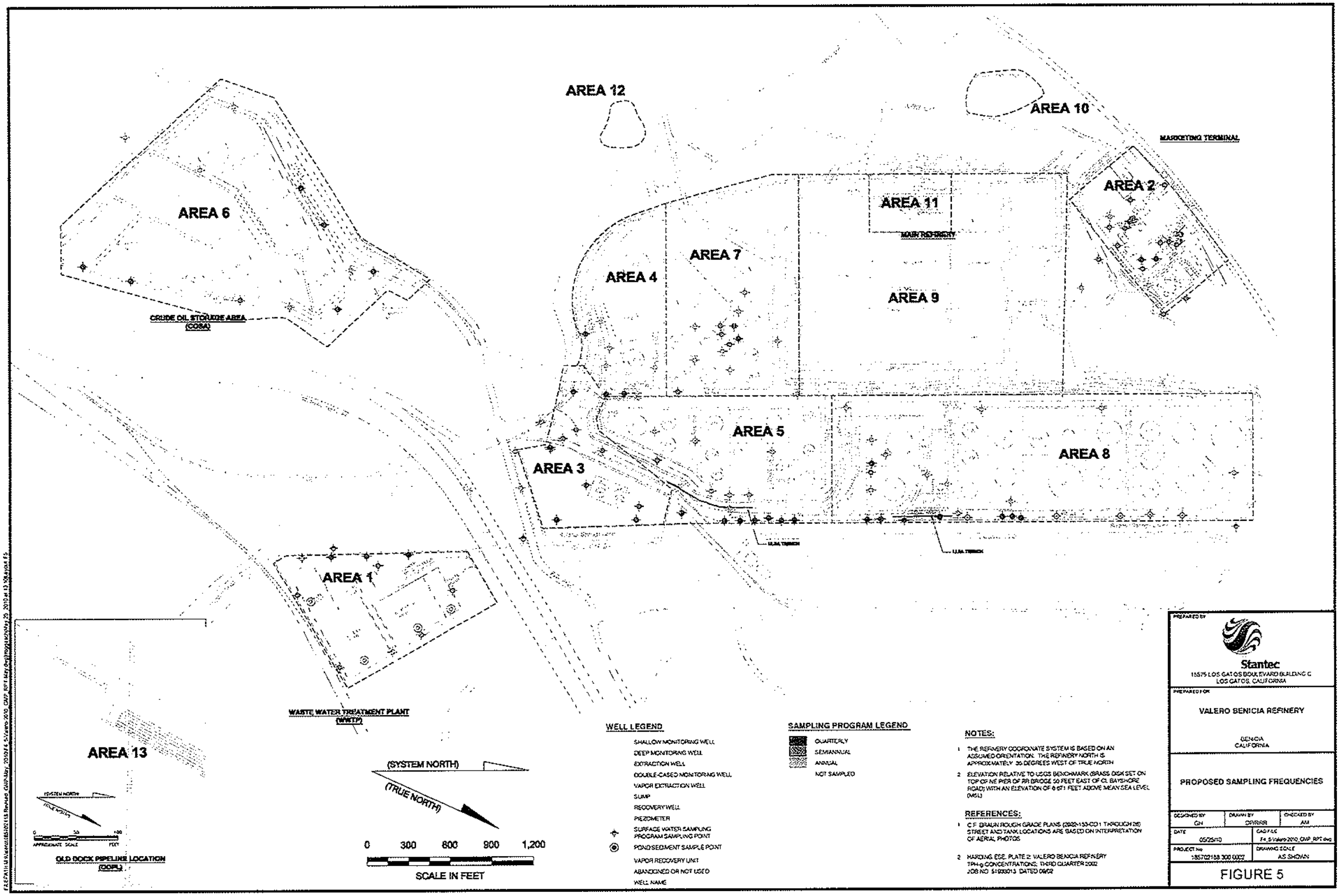
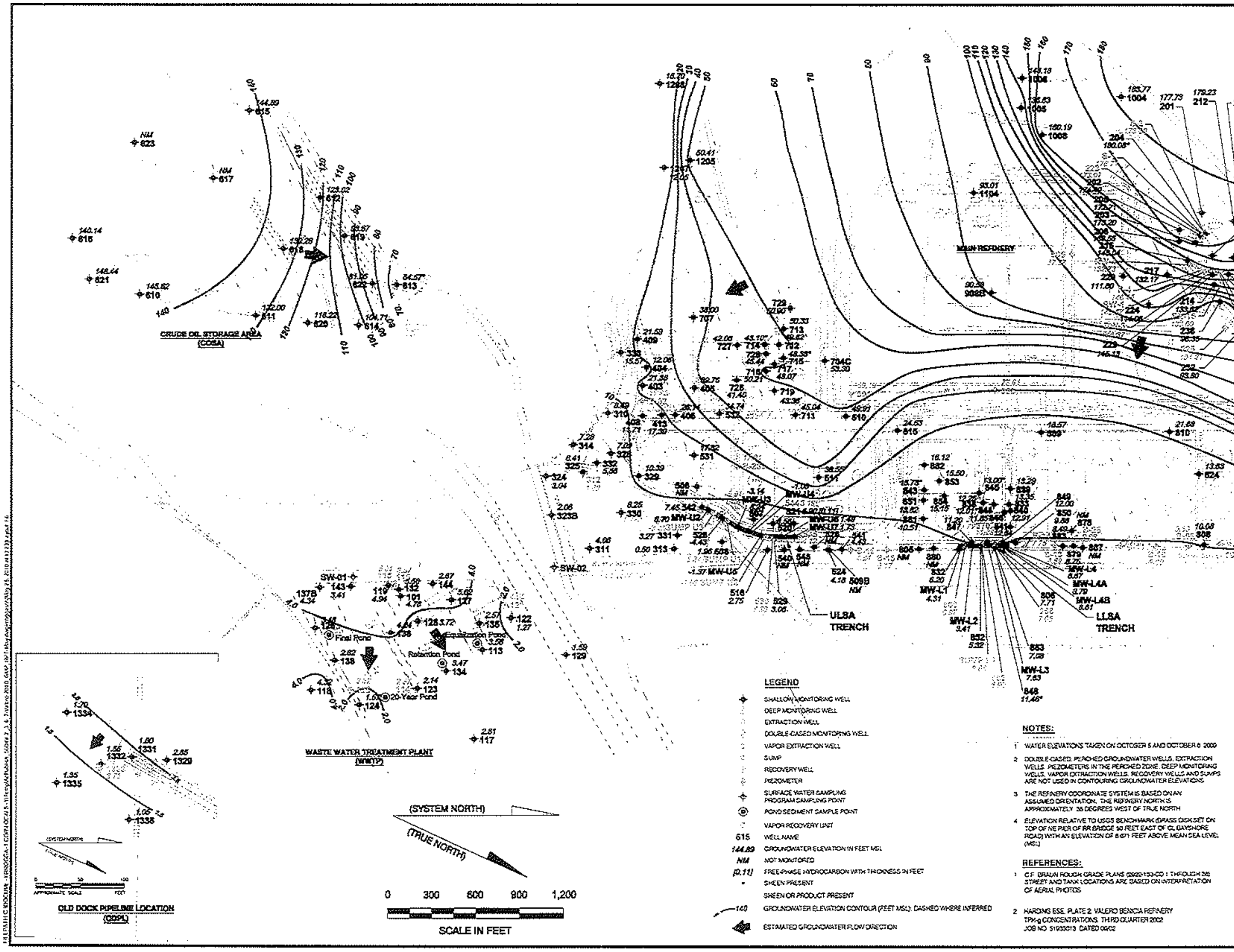
FIGURE 3


AREA 12
AREA 10
MARKETING TERMINAL
AREA 2
AREA 11
MAIN REFINERY
AREA 6
AREA 7
AREA 4
AREA 9
CRUDE OIL STORAGE AREA
(COSA)
AREA 5
AREA 8
AREA 3
AREA 1
WASTE WATER TREATMENT PLANT
(WWTP)
AREA 13
OLD DOCK PIPELINE LOCATION
(ODPL)
(SYSTEM NORTH)
(TRUE NORTH)
0
300
600
900
1,200
SCALE IN FEET
WELL LEGEND
SHALLOW MONITORING WELL
DEEP MONITORING WELL
EXTRACTION WELL
DOUBLE-CASED MONITORING WELL
VAPOR EXTRACTION WELL
SUMP
RECOVERY WELL
PIEZOMETER
SURFACE WATER SAMPLING PROGRAM SAMPLING POINT
POND SEDIMENT SAMPLE POINT
VAPOR RECOVERY UNIT
ABANDONED OR NOT USED
WELL NAME
SAMPLING PROGRAM LEGEND
QUARTERLY
SEMIANNUAL
ANNUAL
NOT SAMPLED
NOTES:
1 THE REFINERY COORDINATE SYSTEM IS BASED ON AN ASSUMED ORIENTATION. THE REFINERY NORTH IS APPROXIMATELY 35 DEGREES WEST OF TRUE NORTH
2 ELEVATION RELATIVE TO USGS BENCHMARK (BRASS DISK SET ON TOP OF NE PIER OF RR BRIDGE 50 FEET EAST OF CL BAYSHORE ROAD) WITH AN ELEVATION OF 8.671 FEET ABOVE MEAN SEA LEVEL (MSL)
REFERENCES:
1 C.F. BRAUN ROUGH GRADE PLANS (2902-133-CO 1 THROUGH 29) STREET AND TANK LOCATIONS ARE BASED ON INTERPRETATION OF AERIAL PHOTOS
2 HARDING ESE, PLATE 2, VALERO BENICIA REFINERY TPH-g CONCENTRATIONS: THIRD QUARTER 2002 JOB NO. 51930013 DATED 00/02
PREPARED BY
Stantec
15575 LOS GATOS BOULEVARD BUILDING C
LOS GATOS, CALIFORNIA
PREPARED FOR
VALERO BENICIA REFINERY
BENICIA
CALIFORNIA
EXISTING SAMPLING FREQUENCIES
DESIGNED BY
GH
DRAWN BY
DP/RRR
CHECKED BY
AM
DATE
05/25/10
CAD FILE
F4_5-Valero2010_GMP_RPT.dwg
PROJECT No.
185702158.300.0002
DRAWING SCALE
AS SHOWN
FIGURE 4


AREA 1
AREA 2
AREA 3
AREA 4
AREA 5
AREA 6
AREA 7
AREA 8
AREA 9
AREA 10
AREA 11
AREA 12
AREA 13
MARKETING TERMINAL
MAIN REFINERY
CRUDE OIL STORAGE AREA (COSA)
WASTE WATER TREATMENT PLANT (WWTP)
OLD DOCK PIPELINE LOCATION (ODPL)
(SYSTEM NORTH)
(TRUE NORTH)
0 300 600 900 1,200
SCALE IN FEET
WELL LEGEND
SHALLOW MONITORING WELL
DEEP MONITORING WELL
EXTRACTION WELL
DOUBLE-CASED MONITORING WELL
VAPOR EXTRACTION WELL
SUMP
RECOVERY WELL
PIEZOMETER
SURFACE WATER SAMPLING PROGRAM SAMPLING POINT
POND SEDIMENT SAMPLE POINT
VAPOR RECOVERY UNIT
ABANDONED OR NOT USED
WELL NAME
SAMPLING PROGRAM LEGEND
QUARTERLY
SEMIANNUAL
ANNUAL
NOT SAMPLED
NOTES:
1 THE REFINERY COORDINATE SYSTEM IS BASED ON AN ASSUMED ORIENTATION. THE REFINERY NORTH IS APPROXIMATELY 36 DEGREES WEST OF TRUE NORTH
2 ELEVATION RELATIVE TO USGS BENCHMARK (BRASS DISK SET ON TOP OF NE PIER OF RR BRIDGE 50 FEET EAST OF OL BAYSHORE ROAD) WITH AN ELEVATION OF 6.671 FEET ABOVE MEAN SEA LEVEL (MSL)
REFERENCES:
1 C.F. BRAUN ROUGH GRADE PLANS (2022-153-CO1 THROUGH 26) STREET AND TANK LOCATIONS ARE BASED ON INTERPRETATION OF AERIAL PHOTOS
2 HARDING ESE, PLATE 2: VALERO BENICIA REFINERY TPH-g CONCENTRATIONS; THIRD QUARTER 2002 JOB NO. 51933013 DATED 09/02
PREPARED BY
Stantec
15575 LOS GATOS BOULEVARD BUILDING C
LOS GATOS, CALIFORNIA
PREPARED FOR
VALERO BENICIA REFINERY
BENICIA
CALIFORNIA
PROPOSED SAMPLING FREQUENCIES
DESIGNED BY GH
DRAWN BY DP/RRR
CHECKED BY AM
DATE 05/25/10
CAD FILE F4_5 Valero 2010_CMP_RPT.dwg
PROJECT No. 185702188.300.0002
DRAWING SCALE AS SHOWN
FIGURE 5



NOTES:

1. WATER ELEVATIONS TAKEN ON OCTOBER 5 AND OCTOBER 6, 2009
2. DOUBLE-CASED, PERCHED GROUNDWATER WELLS, EXTRACTION WELLS, PIEZOMETERS IN THE PERCHED ZONE, DEEP MONITORING WELLS, VAPOR EXTRACTION WELLS, RECOVERY WELLS AND SUMPS ARE NOT USED IN CONTOURING GROUNDWATER ELEVATIONS.
3. THE REFINERY COORDINATE SYSTEM IS BASED ON AN ASSUMED ORIENTATION. THE REFINERY NORTH IS APPROXIMATELY 35 DEGREES WEST OF TRUE NORTH
4. ELEVATION RELATIVE TO USGS BENCHMARK (BRASS DISK SET ON TOP OF NE PIER OF RR BRIDGE 50 FEET EAST OF OL BAYSHORE ROAD) WITH AN ELEVATION OF 8.671 FEET ABOVE MEAN SEA LEVEL (MSL)

REFERENCES:

1. C.F. BRAUN ROUGH GRADE PLANS (2920-133-CO 1 THROUGH 26) STREET AND TANK LOCATIONS ARE BASED ON INTERPRETATION OF AERIAL PHOTOS
2. HARDING ESE, PLATE 2, VALERO BENICIA REFINERY TPH-g CONCENTRATIONS, THIRD QUARTER 2002 JOB NO. 51933013 DATED 09/02

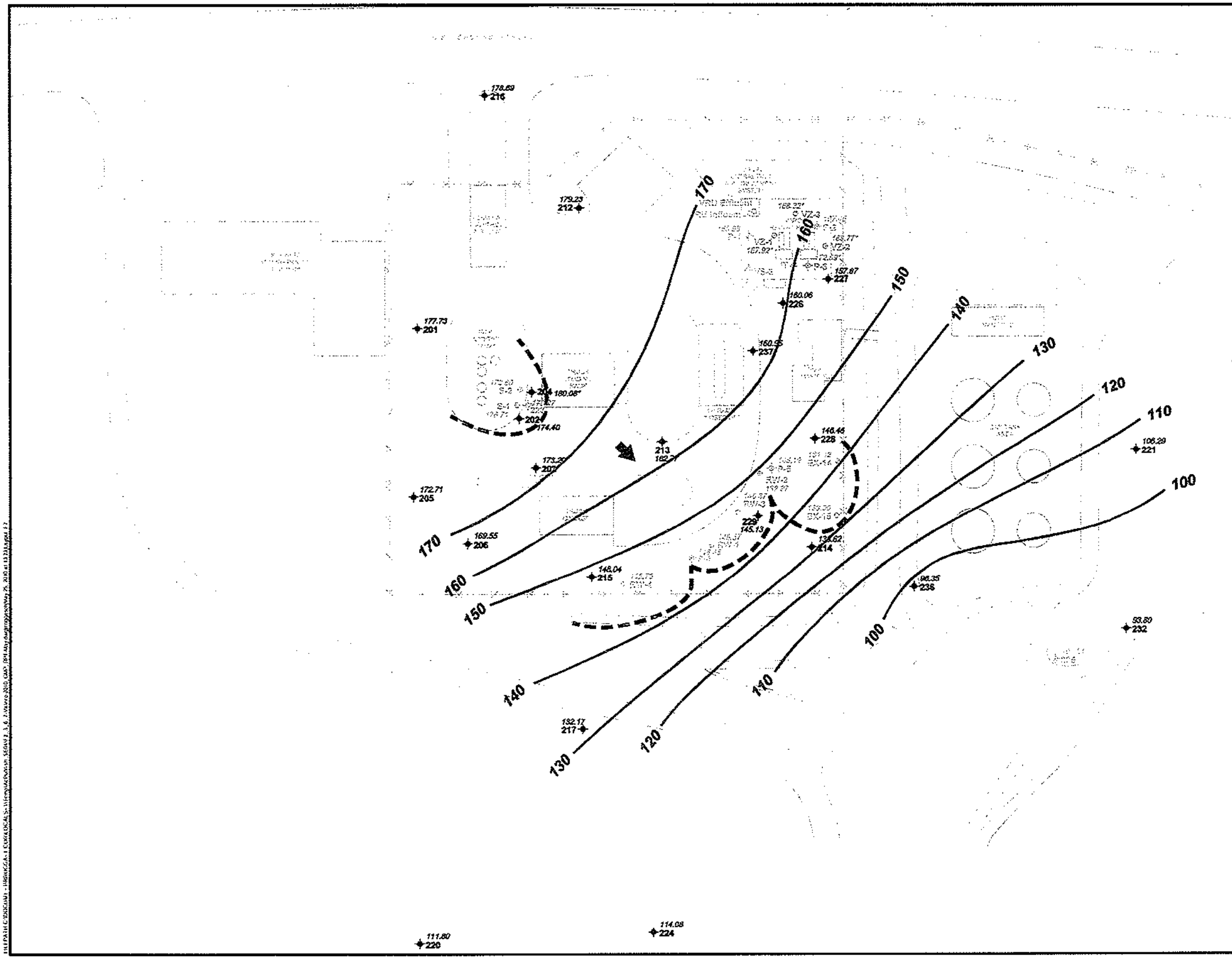
PREPARED BY
Stantec
15575 LOS GATOS BOULEVARD BUILDING C
LOS GATOS, CALIFORNIA

PREPARED FOR
VALERO BENICIA REFINERY
BENICIA
CALIFORNIA

REFINERY GROUNDWATER ELEVATIONS
FOURTH QUARTER 2009

DESIGNED BY	DRAWN BY	CHECKED BY
CH	GPIRRS	AM
DATE: 05/25/10	CAD FILE: 2_3_6_7-Valero 2010_GMP_RPT.dwg	
PROJECT No: 185702183.300.0002	DRAWING SCALE: AS SHOWN	

FIGURE 6



(SYSTEM NORTH)
(TRUE NORTH)

0 50 100 150 200

SCALE IN FEET

LEGEND

- SHALLOW MONITORING WELL
- EXTRACTION WELL
- DOUBLE-CASED MONITORING WELL
- VAPOR EXTRACTION WELL
- RECOVERY WELL
- PIEZOMETER
- VAPOR RECOVERY UNIT
- 221 WELL NAME
- *106.29* GROUNDWATER ELEVATION IN FEET ABOVE MSL
- * SHEEN PRESENT
- SHEEN OR PRODUCT PRESENT
- 100 GROUNDWATER ELEVATION CONTOUR (FEET ABOVE MSL), DASHED WHERE INFERRED
- ESTIMATED GROUNDWATER FLOW DIRECTION
- ESTIMATED RECOVERY WELL CAPTURE ZONE

NOTES:

1. WATER ELEVATIONS TAKEN ON OCTOBER 5, 2009
2. DOUBLE-CASED, PERCHED GROUNDWATER WELLS, EXTRACTION WELLS, PIEZOMETERS IN THE PERCHED ZONE, DEEP MONITORING WELLS, VAPOR EXTRACTION WELLS, RECOVERY WELLS AND SUMPS ARE NOT USED IN CONTOURING GROUNDWATER ELEVATIONS
3. THE REFINERY COORDINATE SYSTEM IS BASED ON AN ASSUMED ORIENTATION. THE REFINERY NORTH IS APPROXIMATELY 35 DEGREES WEST OF TRUE NORTH
4. ELEVATION RELATIVE TO USGS BENCHMARK (BRASS DISK SET ON TOP OF NE PIER OF RR BRIDGE 50 FEET EAST OF OL BAYSHORE ROAD) WITH AN ELEVATION OF 6.071 FEET ABOVE MEAN SEA LEVEL (MSL)

REFERENCES:

1. C.F. BRAUN ROUGH GRADE PLANS (2822-133-CO 1 THROUGH 28). STREET AND TANK LOCATIONS ARE BASED ON INTERPRETATION OF AERIAL PHOTOS
2. HARDING ESE, PLATE 2, VALERO BENICIA REFINERY TPH-g CONCENTRATIONS THIRD QUARTER 2002 JOB NO. 51003013 DATED 09/02

PREPARED BY

Stantec
15575 LOS GATOS BOULEVARD BUILDING C
LOS GATOS, CALIFORNIA

PREPARED FOR

VALERO BENICIA REFINERY

BENICIA
CALIFORNIA

MARKETING TERMINAL GROUNDWATER ELEVATIONS AND CAPTURE ZONES

FOURTH QUARTER 2009

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GH	DP/RRR	AM

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05/25/10	7_1_6_7-Valero 2010_GWP_RPT.dwg
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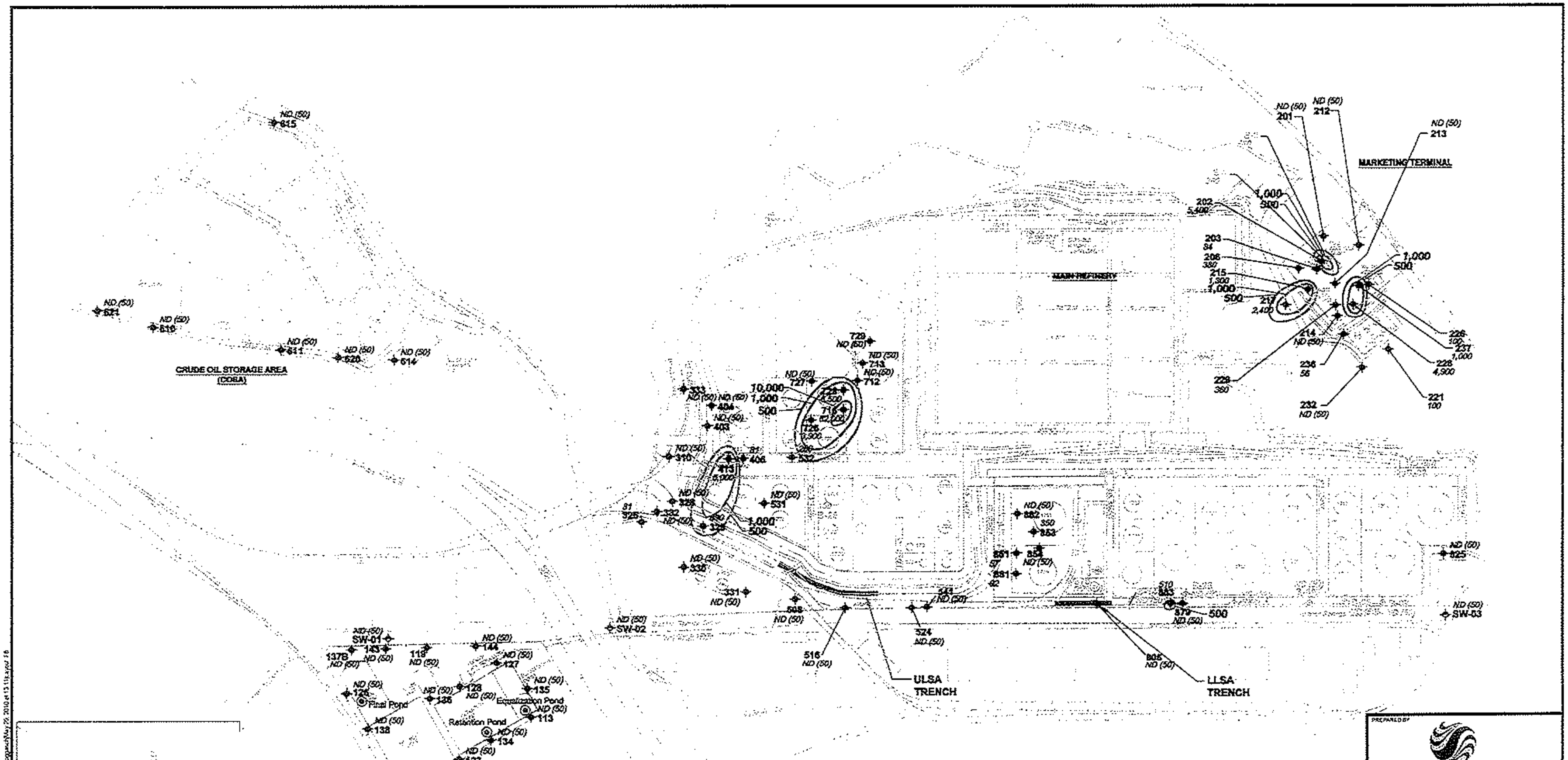
185702188.300.0002	AS SHOWN

FIGURE 7



LEGEND

- SHALLOW MONITORING WELL
- DEEP MONITORING WELL
- EXTRACTION WELL
- DOUBLE-CASED MONITORING WELL
- VAPOR EXTRACTION WELL
- SUMP
- RECOVERY WELL
- PIEZOMETER
- SURFACE WATER SAMPLING PROGRAM SAMPLING POINT
- POND SEDIMENT SAMPLE POINT
- VAPOR RECOVERY UNIT
- 716 WELL NAME
- 82,000 CONCENTRATION OF TPH-GASOLINE IN µg/l
- ND (50) NOT DETECTED AT REPORTING LIMIT
- µg/l MICROGRAMS PER LITER
- 500 ISOCONCENTRATION CONTOURS ESTIMATING TPH-GASOLINE IN µg/l. MINIMUM CONTOUR CONCENTRATION REPRESENTS THE WATER QUALITY PROTECTION STANDARDS APPROVED BY THE RWQCB FOR THE REFINERY AREA AND THE MARKETING TERMINAL AREA. WATER QUALITY PROTECTION STANDARD FOR THE OLD PIPELINE IS 3,700 µg/l

NOTES:

1. DOUBLE-CASED, EXTRACTION, PIEZOMETER, VAPOR EXTRACTION, SUMP OR DEEP MONITORING WELLS ARE NOT USED TO CREATE ISOCONCENTRATION CONTOURS
2. SAMPLING OCCURRED BETWEEN OCTOBER 6 AND OCTOBER 12 2009
3. THE REFINERY COORDINATE SYSTEM IS BASED ON AN ASSUMED ORIENTATION. THE REFINERY NORTH IS APPROXIMATELY 35 DEGREES WEST OF TRUE NORTH
4. ELEVATION RELATIVE TO USGS BENCHMARK (BRASS DISK SET ON TOP OF NE PIER OF RR BRIDGE 50 FEET EAST OF OL BAYSHORE ROAD) WITH AN ELEVATION OF 8.671 FEET ABOVE MEAN SEA LEVEL (MSL)
5. WELLS WITH SHEEN OR PRODUCT PRESENT WERE NOT SAMPLED

REFERENCES:

1. C.F. BRAUN ROUGH GRADE PLANS (262-133-CO 1 THROUGH 28) STREET AND TANK LOCATIONS ARE BASED ON INTERPRETATION OF AERIAL PHOTOS
2. HARDING ESE. PLATE 2: VALERO BENICIA REFINERY TPH-g CONCENTRATIONS THIRD QUARTER 2002 JOB NO. 51903013, DATED 09/02

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PREPARED FOR

VALERO BENICIA REFINERY

BENICIA
CALIFORNIA

TPH-g
CONCENTRATIONS IN GROUNDWATER

FOURTH QUARTER 2009

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05/25/10	F8-Valero-2010_GMP_RPT.dwg
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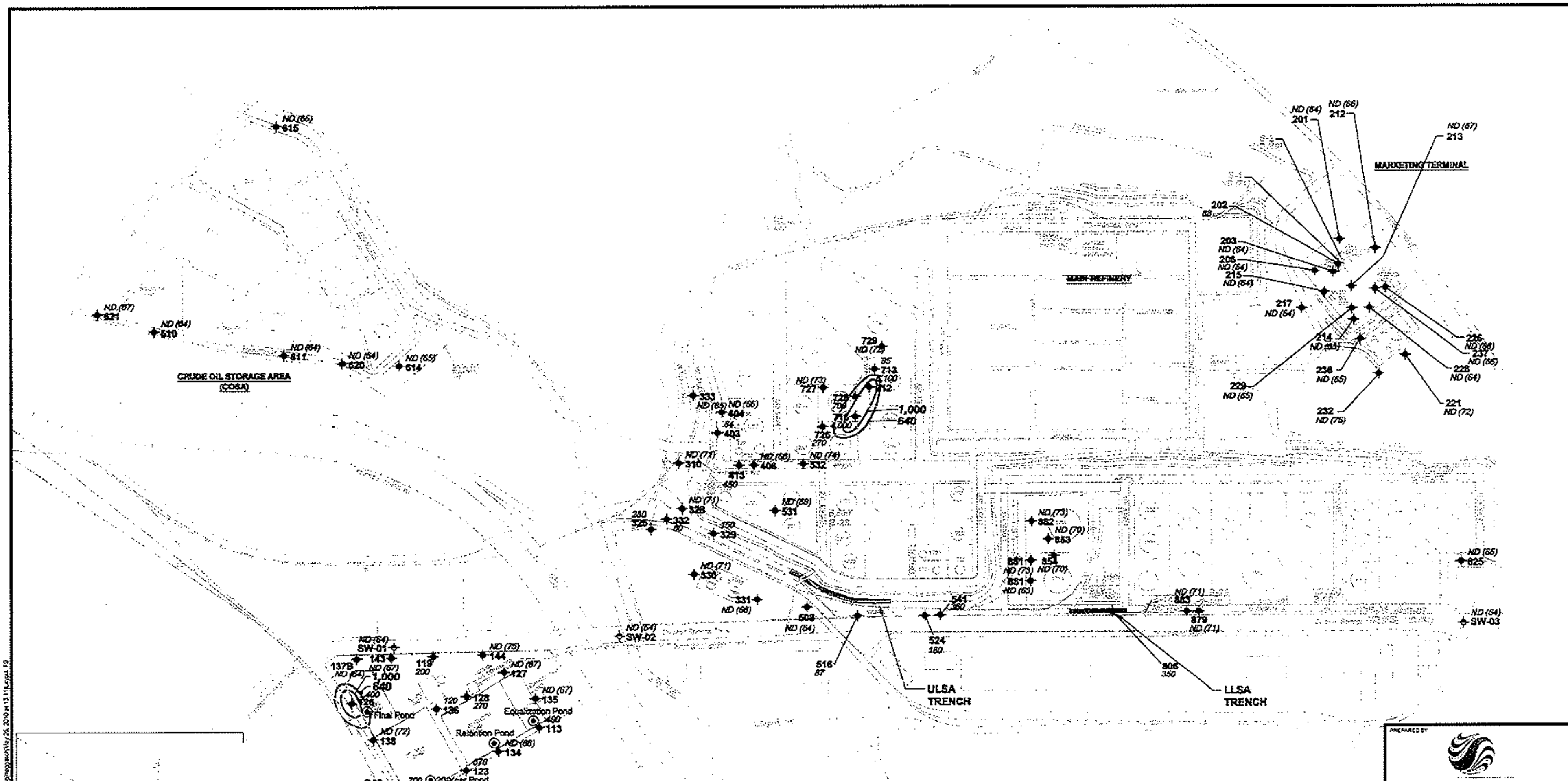
185702183.300.0002	AS SHOWN

FIGURE 8



LEGEND

- SHALLOW MONITORING WELL
- DEEP MONITORING WELL
- EXTRACTION WELL
- DOUBLE-CASED MONITORING WELL
- VAPOR EXTRACTION WELL
- SUMP
- RECOVERY WELL
- PIEZOMETER
- SURFACE WATER SAMPLING PROGRAM SAMPLING POINT
- POND SEDIMENT SAMPLE POINT
- VAPOR RECOVERY UNIT
- 716 WELL NAME
- *4,000* CONCENTRATION OF TPH-DIESEL IN µg/l
- *ND (64)* NOT DETECTED AT REPORTING LIMIT
- 640 ISOCONCENTRATION CONTOURS ESTIMATING TPH-DIESEL IN µg/l MINIMUM CONTOUR CONCENTRATION REPRESENTS THE WATER QUALITY PROTECTION STANDARDS APPROVED BY THE RWQCB FOR THE REFINERY AREA, THE OLD DOCK PIPELINE AREA AND THE MARKETING TERMINAL AREA

NOTES:

1. DOUBLE-CASED EXTRACTION, PIEZOMETER, VAPOR EXTRACTION, SUMP OR DEEP MONITORING WELLS ARE NOT USED TO CREATE ISOCONCENTRATION CONTOURS
2. SAMPLING OCCURRED BETWEEN OCTOBER 6 AND OCTOBER 12 2009
3. THE REFINERY COORDINATE SYSTEM IS BASED ON AN ASSUMED ORIENTATION. THE REFINERY NORTH IS APPROXIMATELY 35 DEGREES WEST OF TRUE NORTH
4. ELEVATION RELATIVE TO USGS BENCHMARK (BRASS DISK SET ON TOP OF NE PIER OF RR BRIDGE 50 FEET EAST OF OL BAYSHORE ROAD) WITH AN ELEVATION OF 8.671 FEET ABOVE MEAN SEA LEVEL (MSL)
5. WELLS WITH SHEEN OR PRODUCT PRESENT WERE NOT SAMPLED

REFERENCES:

1. C.F. BRAUN ROUGH GRADE PLANS (2622-133-CO 1 THROUGH 26 STREET AND TANK LOCATIONS ARE BASED ON INTERPRETATION OF AERIAL PHOTOS
2. HARDING ESE, PLATE 2, VALERO BENICIA REFINERY TPH-g CONCENTRATIONS: THIRD QUARTER 2002 JOB NO. 51930013, DATED 09/02

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PREPARED FOR
VALERO BENICIA REFINERY
BENICIA
CALIFORNIA

TPH-d
CONCENTRATIONS IN GROUNDWATER
FOURTH QUARTER 2009

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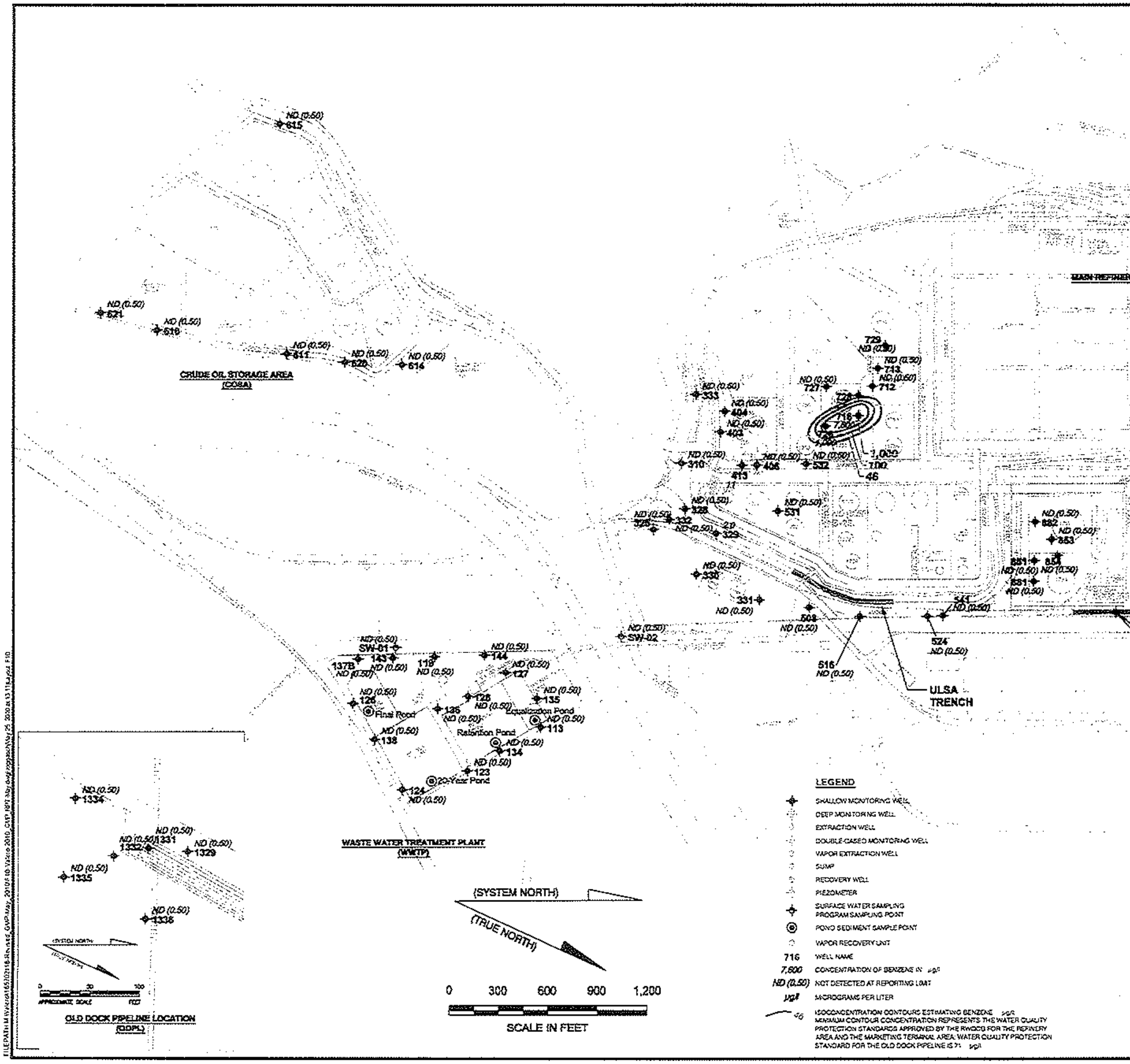
185702188.300.0002	AS SHOWN

FIGURE 9



LEGEND

- SHALLOW MONITORING WELL
- DEEP MONITORING WELL
- EXTRACTION WELL
- DOUBLE-CASED MONITORING WELL
- VAPOR EXTRACTION WELL
- SUMP
- RECOVERY WELL
- PIEZOMETER
- SURFACE WATER SAMPLING PROGRAM SAMPLING POINT
- POND SEDIMENT SAMPLE POINT
- VAPOR RECOVERY UNIT
- 716 WELL NAME
- 7,600 CONCENTRATION OF BENZENE IN µg/l
- ND (0.50) NOT DETECTED AT REPORTING LIMIT
- µg/l MICROGRAMS PER LITER
- 46 ISOCONCENTRATION CONTOURS ESTIMATING BENZENE µg/l. MINIMUM CONTOUR CONCENTRATION REPRESENTS THE WATER QUALITY PROTECTION STANDARDS APPROVED BY THE RWQCB FOR THE REFINERY AREA AND THE MARKETING TERMINAL AREA. WATER QUALITY PROTECTION STANDARD FOR THE OLD DOCK PIPELINE IS 71 µg/l

NOTES:

1. DOUBLE-CASED EXTRACTION, PIEZOMETER, VAPOR EXTRACTION, SUMP OR DEEP MONITORING WELLS ARE NOT USED TO CREATE ISOCONCENTRATION CONTOURS
2. SAMPLING OCCURRED BETWEEN OCTOBER 6 AND OCTOBER 12 2009
3. THE REFINERY COORDINATE SYSTEM IS BASED ON AN ASSUMED ORIENTATION. THE REFINERY NORTH IS APPROXIMATELY 35 DEGREES WEST OF TRUE NORTH
4. ELEVATION RELATIVE TO USGS BENCHMARK (BRASS DISK SET ON TOP OF NE PIER OF RR BRIDGE 50 FEET EAST OF OL BAYSHORE ROAD) WITH AN ELEVATION OF 8.671 FEET ABOVE MEAN SEA LEVEL (MSL)
5. WELLS WITH SHEEN OR PRODUCT PRESENT WERE NOT SAMPLED

REFERENCES:

1. C.F. BRAUN ROUGH GRADE PLANS (2602-133-CO 1 THROUGH 28) STREET AND TANK LOCATIONS ARE BASED ON INTERPRETATION OF AERIAL PHOTOS
2. HARDING ESE PLATE 2, VALERO BENICIA REFINERY TPH-g CONCENTRATIONS THIRD QUARTER 2002 JOB NO. 51993013 DATED 09/02

PREPARED BY
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PREPARED FOR
VALERO BENICIA REFINERY
BENICIA
CALIFORNIA

BENZENE
CONCENTRATIONS IN GROUNDWATER
FOURTH QUARTER 2009

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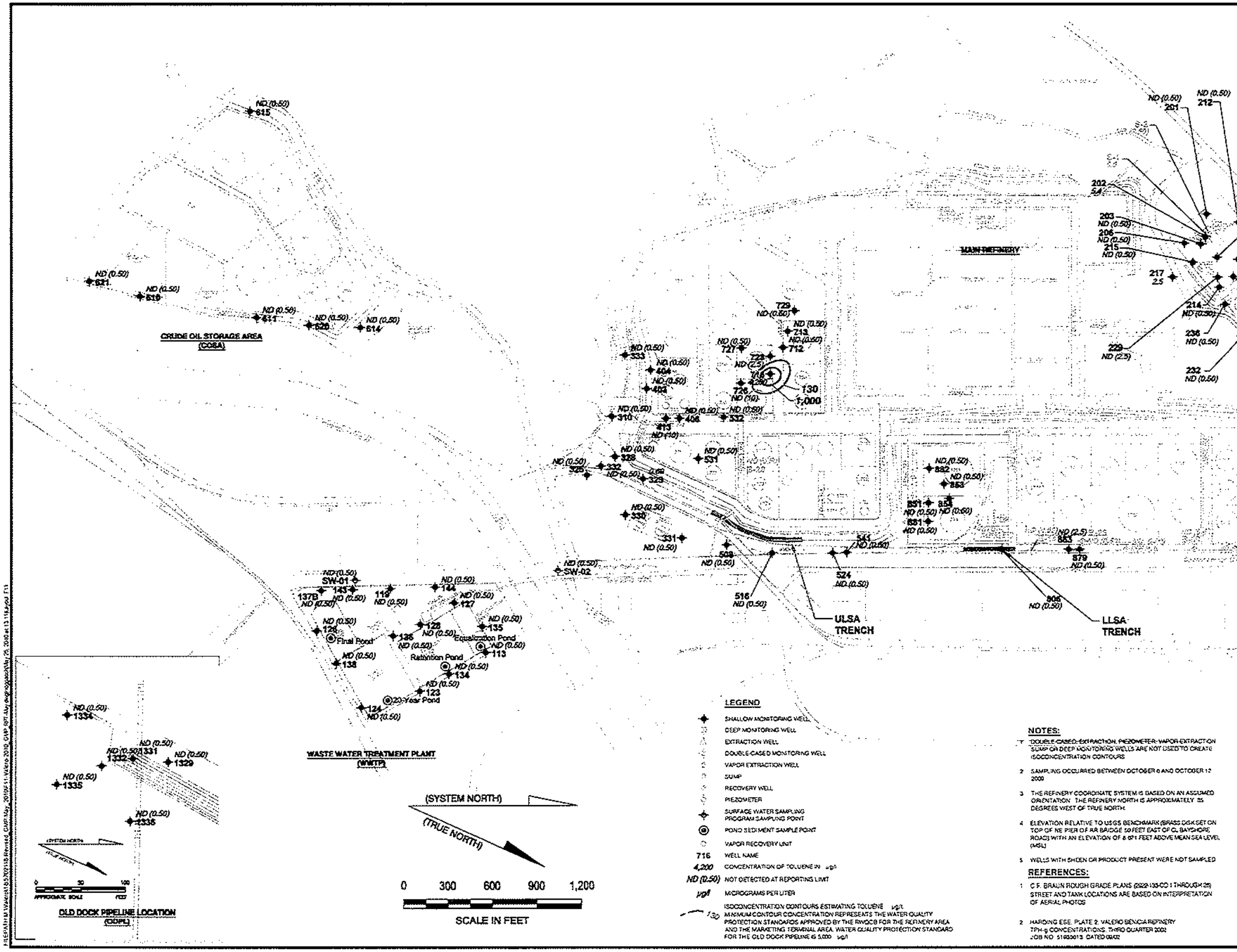
DATE	CAD FILE
05/25/10	F10-Valero2010_GMP_RPT.dwg
PROJECT No.	DRAWING SCALE
185702168.300.0002	AS SHOWN

FIGURE 10



LEGEND

- SHALLOW MONITORING WELL
- DEEP MONITORING WELL
- EXTRACTION WELL
- DOUBLE-CASED MONITORING WELL
- VAPOR EXTRACTION WELL
- SUMP
- RECOVERY WELL
- PIEZOMETER
- SURFACE WATER SAMPLING PROGRAM SAMPLING POINT
- POND SEDIMENT SAMPLE POINT
- VAPOR RECOVERY UNIT
- 716 WELL NAME
- 4,200 CONCENTRATION OF TOLUENE IN µg/l
- ND (0.50) NOT DETECTED AT REPORTING LIMIT
- µg/l MICROGRAMS PER LITER
- 130 ISOCONCENTRATION CONTOURS ESTIMATING TOLUENE µg/l. MINIMUM CONTOUR CONCENTRATION REPRESENTS THE WATER QUALITY PROTECTION STANDARDS APPROVED BY THE RWQCB FOR THE REFINERY AREA AND THE MARKETING TERMINAL AREA. WATER QUALITY PROTECTION STANDARD FOR THE OLD DOCK PIPELINE IS 5,000 µg/l

NOTES:

1. ~~DOUBLE-CASED, EXTRACTION, PIEZOMETER, VAPOR EXTRACTION~~ SUMP OR DEEP MONITORING WELLS ARE NOT USED TO CREATE ISOCONCENTRATION CONTOURS
2. SAMPLING OCCURRED BETWEEN OCTOBER 6 AND OCTOBER 12 2009
3. THE REFINERY COORDINATE SYSTEM IS BASED ON AN ASSUMED ORIENTATION. THE REFINERY NORTH IS APPROXIMATELY 35 DEGREES WEST OF TRUE NORTH.
4. ELEVATION RELATIVE TO USGS BENCHMARK (BRASS DISK SET ON TOP OF NE PIER OF RR BRIDGE 50 FEET EAST OF C. BAYSHORE ROAD) WITH AN ELEVATION OF 8.071 FEET ABOVE MEAN SEA LEVEL (MSL)
5. WELLS WITH SHEEN OR PRODUCT PRESENT WERE NOT SAMPLED

REFERENCES:

1. C.F. BRAUN ROUGH GRADE PLANS (2022-133-CO 1 THROUGH 25) STREET AND TANK LOCATIONS ARE BASED ON INTERPRETATION OF AERIAL PHOTOS
2. HARDING ESE, PLATE 2, VALERO BENICIA REFINERY TPH-g CONCENTRATIONS, THIRD QUARTER 2002 JOB NO. 51633013 DATED 08/02

PREPARED BY

Stantec
15575 LOS GATOS BOULEVARD BUILDING C
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PREPARED FOR

VALERO BENICIA REFINERY

BENICIA
CALIFORNIA

**TOLUENE
CONCENTRATIONS IN GROUNDWATER
FOURTH QUARTER 2009**

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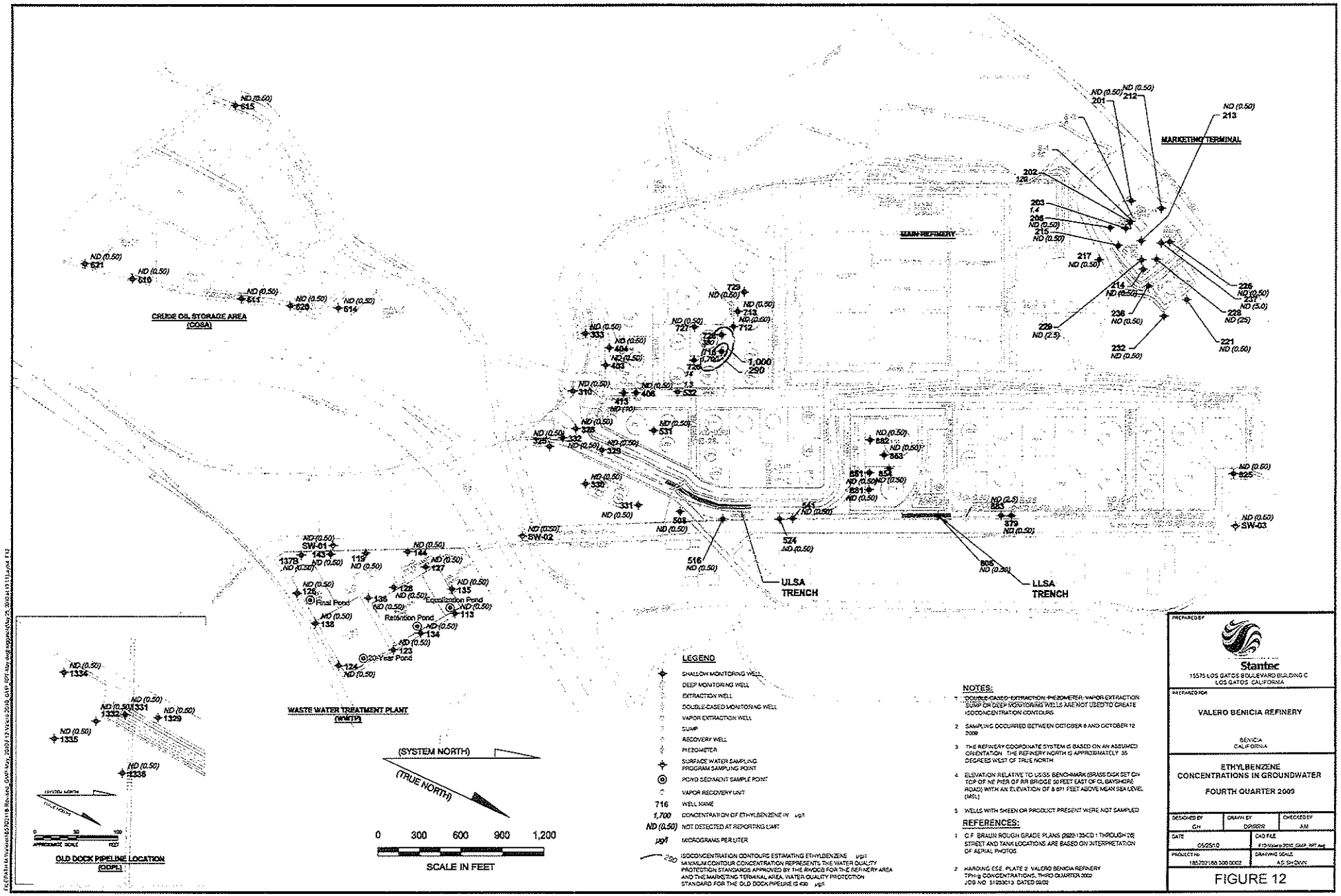
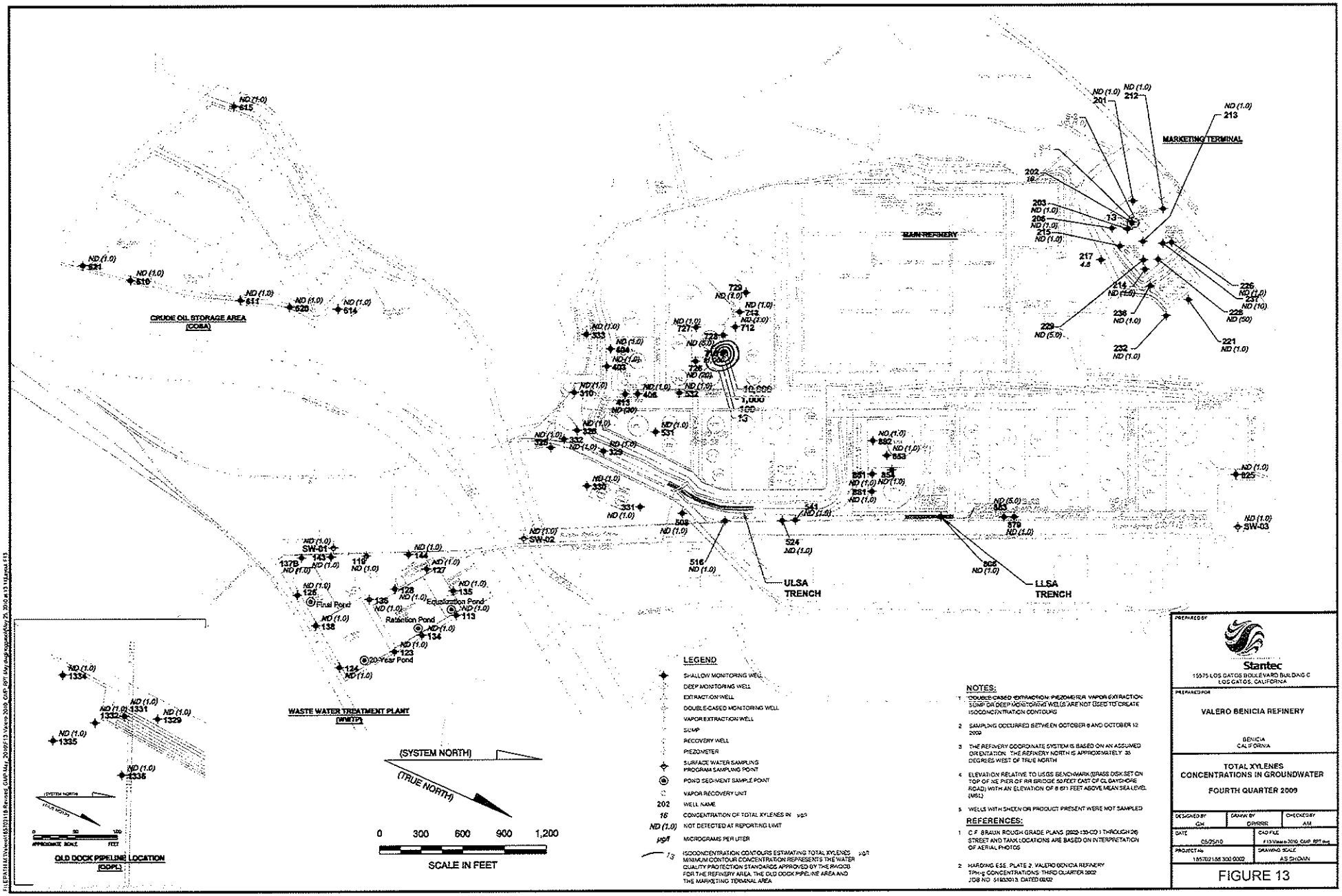
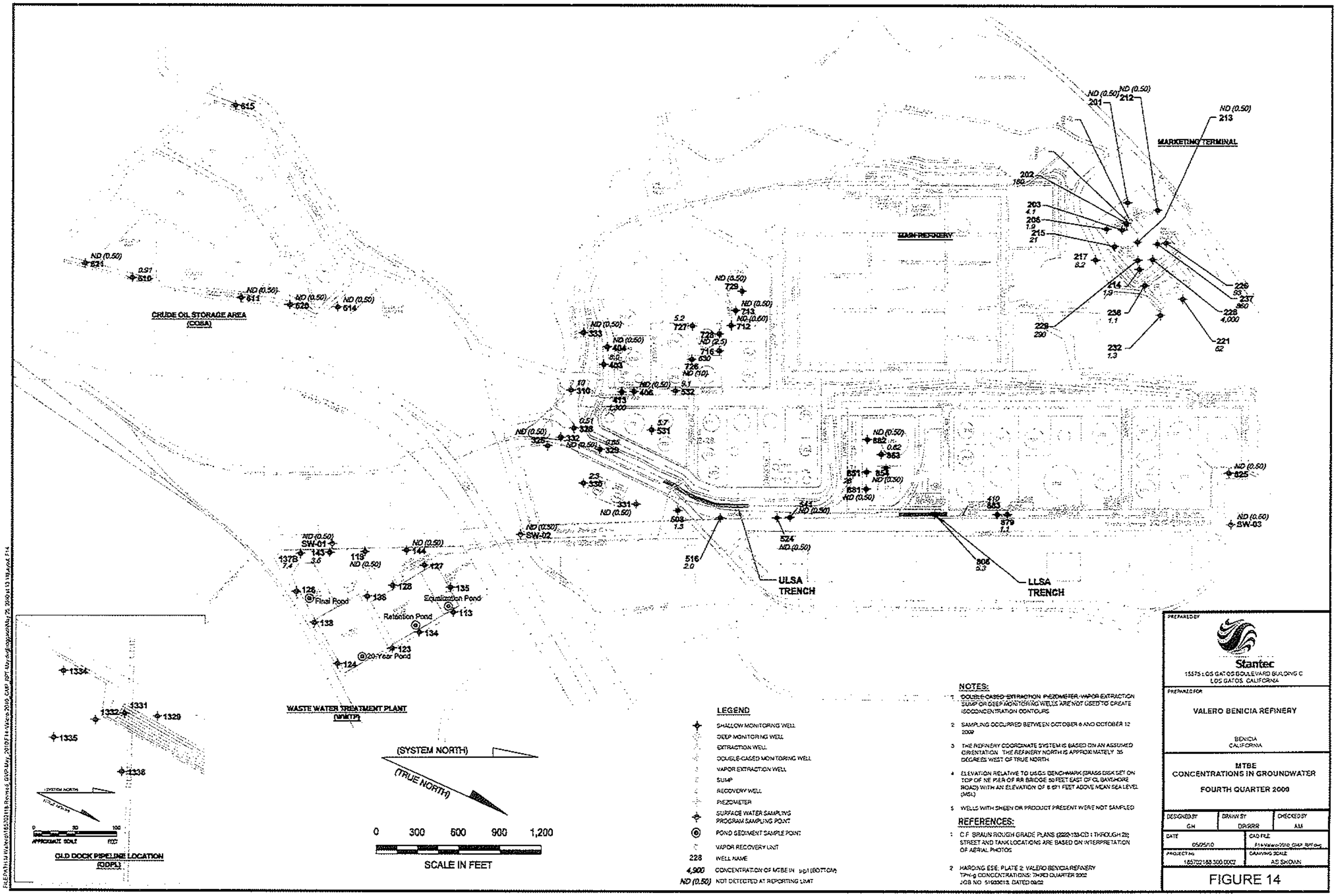
GH	DP/RRR	AM

DATE	CAD FILE
05/25/10	F11-Valero 2010_GMP_RPT.dwg
PROJECT No.	DRAWING SCALE
185702188.300.0002	AS SHOWN

FIGURE 11


MAIN REFINERY
MARKETING TERMINAL
CRUDE OIL STORAGE AREA (COSA)
WASTE WATER TREATMENT PLANT (WWTP)
OLD DOCK PIPELINE LOCATION (ODPL)
ULSA TRENCH
LLSA TRENCH
Final Pond
Equalization Pond
Retention Pond
20-Year Pond
SW-01
SW-02
SW-03
(SYSTEM NORTH)
(TRUE NORTH)
0 300 600 900 1,200
SCALE IN FEET
LEGEND
SHALLOW MONITORING WELL
DEEP MONITORING WELL
EXTRACTION WELL
DOUBLE-CASED MONITORING WELL
VAPOR EXTRACTION WELL
SUMP
RECOVERY WELL
PIEZOMETER
SURFACE WATER SAMPLING PROGRAM SAMPLING POINT
POND SEDIMENT SAMPLE POINT
VAPOR RECOVERY UNIT
716 WELL NAME
1,700 CONCENTRATION OF ETHYLBENZENE IN µg/l
ND (0.50) NOT DETECTED AT REPORTING LIMIT
µg/l MICROGRAMS PER LITER
290 ISOCONCENTRATION CONTOURS ESTIMATING ETHYLBENZENE µg/l
MINIMUM CONTOUR CONCENTRATION REPRESENTS THE WATER QUALITY PROTECTION STANDARDS APPROVED BY THE RWQCB FOR THE REFINERY AREA AND THE MARKETING TERMINAL AREA. WATER QUALITY PROTECTION STANDARD FOR THE OLD DOCK PIPELINE IS 430 µg/l
NOTES:
1 DOUBLE-CASED EXTRACTION, PIEZOMETER, VAPOR EXTRACTION SUMP OR DEEP MONITORING WELLS ARE NOT USED TO CREATE ISOCONCENTRATION CONTOURS
2 SAMPLING OCCURRED BETWEEN OCTOBER 6 AND OCTOBER 12 2009
3 THE REFINERY COORDINATE SYSTEM IS BASED ON AN ASSUMED ORIENTATION THE REFINERY NORTH IS APPROXIMATELY 35 DEGREES WEST OF TRUE NORTH
4 ELEVATION RELATIVE TO USGS BENCHMARK (BRASS DISK SET ON TOP OF NE PIER OF RR BRIDGE 50 FEET EAST OF CL BAYSHORE ROAD) WITH AN ELEVATION OF 8 971 FEET ABOVE MEAN SEA LEVEL (MSL)
5 WELLS WITH SHEEN OR PRODUCT PRESENT WERE NOT SAMPLED
REFERENCES:
1 C F BRAUN ROUGH GRADE PLANS (2920-135-CD 1 THROUGH 20) STREET AND TANK LOCATIONS ARE BASED ON INTERPRETATION OF AERIAL PHOTOS
2 HARDING ESE PLATE 2 VALERO BENICIA REFINERY TPH-g CONCENTRATIONS, THIRD QUARTER 2002 JOB NO 51293013 DATED 09/02
PREPARED BY
Stantec
15575 LOS GATOS BOULEVARD BUILDING C
LOS GATOS CALIFORNIA
PREPARED FOR
VALERO BENICIA REFINERY
BENICIA
CALIFORNIA
ETHYLBENZENE CONCENTRATIONS IN GROUNDWATER
FOURTH QUARTER 2009
DESIGNED BY GH
DRAWN BY DP/RR
CHECKED BY AM
DATE 05/25/10
CAD FILE
PROJECT No 185702188 300 0002
DRAWING SCALE AS SHOWN
FIGURE 12


MAIN REFINERY
MARKETING TERMINAL
CRUDE OIL STORAGE AREA
(COSA)
WASTE WATER TREATMENT PLANT
(WWTP)
OLD DOCK PIPELINE LOCATION
(ODPL)
ULSA TRENCH
ULSA TRENCH
Final Pond
Equalization Pond
Retention Pond
20-Year Pond
SW-01
SW-02
SW-03
(SYSTEM NORTH)
(TRUE NORTH)
0 300 600 900 1,200
SCALE IN FEET
LEGEND
SHALLOW MONITORING WELL
DEEP MONITORING WELL
EXTRACTION WELL
DOUBLE-CASED MONITORING WELL
VAPOR EXTRACTION WELL
SUMP
RECOVERY WELL
PIEZOMETER
SURFACE WATER SAMPLING PROGRAM SAMPLING POINT
POND SEDIMENT SAMPLE POINT
VAPOR RECOVERY UNIT
202 WELL NAME
16 CONCENTRATION OF TOTAL XYLENES IN µg/l
ND (1.0) NOT DETECTED AT REPORTING LIMIT
µg/l MICROGRAMS PER LITER
13 ISOCONCENTRATION CONTOURS ESTIMATING TOTAL XYLENES µg/l MINIMUM CONTOUR CONCENTRATION REPRESENTS THE WATER QUALITY PROTECTION STANDARDS APPROVED BY THE RWQCB FOR THE REFINERY AREA, THE OLD DOCK PIPELINE AREA AND THE MARKETING TERMINAL AREA
NOTES:
1 DOUBLE-CASED EXTRACTION, PIEZOMETER, VAPOR EXTRACTION, SUMP, OR DEEP MONITORING WELLS ARE NOT USED TO CREATE ISOCONCENTRATION CONTOURS
2 SAMPLING OCCURRED BETWEEN OCTOBER 6 AND OCTOBER 12, 2009
3 THE REFINERY COORDINATE SYSTEM IS BASED ON AN ASSUMED ORIENTATION. THE REFINERY NORTH IS APPROXIMATELY 35 DEGREES WEST OF TRUE NORTH
4 ELEVATION RELATIVE TO USGS BENCHMARK (BRASS DISK SET ON TOP OF NE PIER OF RR BRIDGE 50 FEET EAST OF CL DAYSHORE ROAD) WITH AN ELEVATION OF 8.671 FEET ABOVE MEAN SEA LEVEL (MSL)
5 WELLS WITH SHEEN OR PRODUCT PRESENT WERE NOT SAMPLED
REFERENCES:
1 C.F. BRAUN ROUGH GRADE PLANS (2922-135-CO-1 THROUGH 26) STREET AND TANK LOCATIONS ARE BASED ON INTERPRETATION OF AERIAL PHOTOS
2 HARDING ESE, PLATE 2, VALERO BENICIA REFINERY TPH-g CONCENTRATIONS: THIRD QUARTER 2002 JOB NO. 51633013, DATED 02/02
PREPARED BY
Stantec
15575 LOS GATOS BOULEVARD BUILDING C
LOS GATOS, CALIFORNIA
PREPARED FOR
VALERO BENICIA REFINERY
BENICIA
CALIFORNIA
TOTAL XYLENES
CONCENTRATIONS IN GROUNDWATER
FOURTH QUARTER 2009
DESIGNED BY GH
DRAWN BY DPARR
CHECKED BY AM
DATE 05/25/10
CAD FILE F13 Wave to 2010_GWP_RPT.dwg
PROJECT No. 185702106.300.0002
DRAWING SCALE AS SHOWN
FIGURE 13



LEGEND

- SHALLOW MONITORING WELL
- DEEP MONITORING WELL
- EXTRACTION WELL
- DOUBLE-CASED MONITORING WELL
- VAPOR EXTRACTION WELL
- SUMP
- RECOVERY WELL
- PIEZOMETER
- SURFACE WATER SAMPLING PROGRAM SAMPLING POINT
- POND SEDIMENT SAMPLE POINT
- VAPOR RECOVERY UNIT

228 WELL NAME

4,900 CONCENTRATION OF MTBE IN µg/l (BOTTOM)

ND (0.50) NOT DETECTED AT REPORTING LIMIT

NOTES:

1. DOUBLE-CASED, EXTRACTION, PIEZOMETER, VAPOR EXTRACTION SUMP OR DEEP MONITORING WELLS ARE NOT USED TO CREATE ISOCONCENTRATION CONTOURS.
2. SAMPLING OCCURRED BETWEEN OCTOBER 6 AND OCTOBER 12 2009
3. THE REFINERY COORDINATE SYSTEM IS BASED ON AN ASSUMED ORIENTATION. THE REFINERY NORTH IS APPROXIMATELY 35 DEGREES WEST OF TRUE NORTH.
4. ELEVATION RELATIVE TO USGS BENCHMARK (BRASS DISK SET ON TOP OF NE PIER OF RR BRIDGE 50 FEET EAST OF OL BAYSHORE ROAD) WITH AN ELEVATION OF 6.671 FEET ABOVE MEAN SEA LEVEL (MSL)
5. WELLS WITH SHEEN OR PRODUCT PRESENT WERE NOT SAMPLED

REFERENCES:

1. C.F. BRAUN ROUGH GRADE PLANS (2222-133-CD 1 THROUGH 28) STREET AND TANK LOCATIONS ARE BASED ON INTERPRETATION OF AERIAL PHOTOS
2. HARDING ESE: PLATE 2: VALERO BENICIA REFINERY TPH-g CONCENTRATIONS: THIRD QUARTER 2002 JOB NO. 51900013, DATED 09/02

PREPARED BY

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PREPARED FOR

VALERO BENICIA REFINERY

BENICIA
CALIFORNIA

MTBE
CONCENTRATIONS IN GROUNDWATER

FOURTH QUARTER 2009

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FIGURE 14

APPENDIX A
Groundwater Monitoring Plan – Revised 2010

Groundwater Monitoring Plan – Revised 2010
Valero Benicia Refinery and Marketing Terminal
3400 East Second Street
Benicia, California
Stantec PN: 185702188
May 24, 2010

Appendix A
Groundwater Monitoring Plan – Revised 2010

Valero Benicia Refinery
3400 East Second Street
Benicia, CA

This Appendix contains the Groundwater Monitoring Plan-Revised 2010 (GMP Revised 2010; Stantec, 2010[1]) for the Valero Benicia Refinery (Refinery) which was prepared on behalf of Valero Refining Company (Valero). The objective of this GMP-Revised 2010 is to maintain compliance with the Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Orders for the Refinery, and improve the effectiveness of the program. Summarized in this appendix are the sampling and analytical program for groundwater, surface water, and pond sediment at the Refinery, and the reporting program for the monitoring. Sampling frequencies include quarterly, semiannual, annual, and every 5 years. Contained in the GMP-Revised 2010 are the regulatory framework for the GMP and the rational for the GMP-Revised 2010. Components of the previous GMP (URS, 2005[2]) that are to be retained are summarized below:

- **GMP (URS, 2005) Section 4 – Water Level Measurement Program**. With the exception of Area 13, quarterly water-level and free-phase hydrocarbon (FPH) monitoring will continue for all wells, and monthly water-level monitoring will continue for the wells used for trench performance evaluations at the Upper Level Storage Area (ULSA) and Lower Level Storage Area (LLSA) (GMP; URS 2005a; *Section 5.1.3.1 Monitoring Remedial Activities, Main Refinery Site*). At Area 13 (Old Dock Pipeline), water-level monitoring ceased as of second quarter 2010 consistent with the approval letter from the RWQCB (2010[3]).

- **GMP (URS, 2005) Section 5 – Water Quality Sampling and Remedial Action Monitoring.** With the exception of Section 5.4-Vadose Zone Sampling, which will be eliminated, the section Water Quality Sampling and Remedial Action Monitoring will be retained with some revisions presented in Sections 3 and 4 of the GMP-Revised 2010 (Stantec, 2010[1]). Surface water and pond sediment sampling frequency and contaminants of concern (COC) parameters will remain unchanged. Included in Section 5 (URS, 2005) are criteria for evaluating Water Quality Protection Standard (WQPS) exceedances in Point of Compliance (POC) Wells, Interior Wells, and Wastewater Treatment Pond (WWTP) Leak Detection Wells. Accordingly, COC monitoring results will be evaluated consistent with the following figures in the GMP (URS, 2005): Figure 5-8 (Criteria for Additional Investigation at POC Monitoring Wells) and Figure 5-9 (Criteria for Additional Investigation at Interior Monitoring Wells).

---

[1] Stantec Consulting Corporation. 2010. Groundwater Monitoring Program – Revised 2010. May.

[2] URS. 2005. *Groundwater Monitoring Plan, Valero Benicia Refinery*. June 2003. Revised July 2005.

[3] Regional Water Quality Control Board. 2010. Approval Letter to Valero Benicia Refinery regarding: *No Further Remedial Action, Areas 10, 12, and 13, Valero Benicia Refinery*. January 21.