



August 7, 1997



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Department of
Toxic Substances
Control

45 West Broadway,
Suite 350
Long Beach, CA
0802-4444

Mr. Joseph Joyce
BRAC Environmental Coordinator
U.S. Marine Corps Air Station - El Toro
P. O. Box 95001
Santa Ana, California 92709-5001

Pete Wilson
Governor

James M. Strock
Secretary for
Environmental
Protection

**COMMENTS ON ROUND 5 GROUNDWATER MONITORING REPORT,
MARINE CORPS AIR STATION (MCAS) EI TORO**

Dear Mr. Joyce:

The Department of Toxic Substances Control (DTSC) has completed the review of the above subject report dated June 30, 1997 and received by us on July 9, 1997. The reports, prepared by CDM Federal Programs Corporation, present the results of the March 1997 groundwater sampling round from a network of 181 monitoring wells/monitoring ports conducted at MCAS El Toro.

This letter is to transmit DTSC's comments on the document. If you have any questions, please call me at (562) 590-4891.

Sincerely,

Tayseer Mahmoud
Remedial Project Manager
Base Closure Unit
Office of Military Facilities
Southern California Operations

Enclosure

cc: Mr. Glenn Kistner, SFD-8-2
Remedial Project Manager
U. S. Environmental Protection Agency
Region IX
Federal Facilities Cleanup Office
75 Hawthorne Street
San Francisco, California 94105-3901

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cc: Mr. Lawrence Vitale
Remedial Project Manager
California Regional Water Quality
Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, California 92501-3339

Mr. Larry Davidson
CDM Federal Programs Corporation
3760 Convoy Street, Suite 210
San Diego, California 92111

Dr. Dante Tedaldi
Bechtel National, Inc.
401 West A Street, Suite 1000
San Diego, California 92101-7905

Mr. Terry Feng, BSII (45) 7 A 41 (SF01)
Bechtel Group, Inc.
50 Beale Street
San Francisco, California 94105-1895

Mr. Andy Piszkin
Remedial Project Manager
Naval Facilities Engineering Command
Southwest Division - Code 1831.AP
1220 Pacific Highway
San Diego, California 92132-5187



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Department of
Toxic Substances
Control

245 West Broadway,
Suite 425
Long Beach, CA
70802-4444

MEMORANDUM



Pete Wilson
Governor

James M. Strock
Secretary for
Environmental
Protection

TO: Mr. Tayseer Mahmoud
Office of Military Facilities
Region 4

FROM: Sherrill Beard, CHG *Sherrill Beard*
Geologic Services Unit
Region 4

DATE: July 31, 1997

SUBJECT: Comments on "Groundwater Monitoring Report March 1997
Sampling Round, Volumes I and II, Marine Corps Air Station El
Toro, California"

Introduction

As requested by the Office of Military Facilities, the Geologic Services Unit (GSU) of the Department of Toxic Substances Control (DTSC) has reviewed the document entitled "Groundwater Monitoring Report March 1997 Sampling Round, Volumes I and II, Marine Corps Air Station (MCAS) El Toro, California" (the Report), dated February 1997. The document was prepared by CDM Federal Programs Corporation (CDM) for Southwest Division Naval Facilities Engineering Command (SWDIV).

The Report presents the results from the March 1997 groundwater sampling event, fulfilling the stated objectives. However, response from the SWDIV concerning issues outlined in the DTSC letter dated April 9, 1997 containing comments on the November-December 1996 quarterly groundwater monitoring report have not been addressed. GSU recommends the letter be forwarded to Bechtel National, Inc. (Bechtel) with the understanding the issues will be resolved during the development of the long-term groundwater monitoring program.

Besides the issues raised in DTSC's April 9, 1997 letter, the primary concern is the questionable quality in which the groundwater samples were collected, subsequently, the quality of the resultant analytical data may be questionable. The first concern is the subject of low-flow purging, the second is



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availability of trained field personnel that are able to evaluate the validity of field data as it is being collected, and third, the assumption that all prior groundwater data are acceptable. Also, GSU strongly recommends the development of a reporting format to easily evaluate contaminant plumes and within well trends.

Low-flow Sampling

The low-flow method is a valid and recommended technique for collecting groundwater samples. However, the field procedures conducted during the sampling event are not acceptable. All wells were purged and sampled at 0.5 gallon per minute (gpm or 1892 ml/min) discharge rate. Additionally, documentation does not exist to support that water levels were monitored except for the initial and final measurements. Recommended rates used for purging and sampling are typically 100-500 ml/min, depending on site-specific hydrogeology (each well is unique with regard to an optimal purging rate). In addition, close monitoring of the water level in the well should be performed during purging to ensure that little or no drawdown or mixing of stagnant and formation waters occur. Also, six of the 32 wells sampled using the low-flow technique had turbidity values of 50 NTUs or higher. One of the primary benefits from using the low-flow method is to decrease turbidity in groundwater samples. The elevated turbidity units most likely are a result of high flow pump rates.

There is a concern the pump rate is too high and the samples collected are a mixture of water drawn down from the well column into the sampling zone and the formation water. Based on the field parameters and the medium to high range of hydraulic conductivities (e.g., silty sand and sand) of some of the intervals adjacent to the screened interval, the likelihood of collecting a "pure" formation groundwater sample is low. The information provided on the well purging and sampling logs indicate the water levels could be lowering in the wells during the purging process but are not being detected due to infrequent monitoring. Because of medium to high hydraulic conductivities, the waterlevels may recover before the final measurements are collected, giving the appearance that the aquifer was not stressed.

Personnel Training

It was recommended in the DTSC's April 9, 1997 letter that field teams should receive training with regard to the evaluation of field parameters during sample collection. The field team must be able to make sense of the field data they are collecting and be able to troubleshoot simple field problems. This type of training would provide insurance that good, usable field data is collected, and

therefore providing the most representative aquifer samples to the laboratory.

Quality Control While Collecting Groundwater Samples

This section addresses specific wells to highlight the quality control problems occurring during sample events. It is the hope of GSU that this will show both SWDIV and Bechtel the need to allot time for assessment of field data quality prior to interpretation of the analytical data (e.g., trend analysis). Since this process was not performed thoroughly during the collection of groundwater samples, it should now be completed. This process must be done prior to data interpretation so that invalid data is not used in the trend analysis and then later rejected. GSU has only evaluated a portion of the well purging and sampling logs. Attached are some examples.

Example 1 - Monitoring Well 01MW101

I) The average purge rate is recorded at 9.5 gpm, yet the time pumped and the volume purged averages to about 1.7 gpm.

II) It is inferred from the sampling log that the well was being pumped dry and the pump rate was decreased from 9.5 gpm to .05 gpm, however during the November-December 1996 sampling event the well was able to maintain a purge rate of 8.25 gpm. This type of information should be evaluated and action should be taken, such as redevelopment of the monitoring well.

III) The total volume for one casing volume was calculated to be 58.15 gallons, yet the total volume purged was 52 gallons. Less than one casing volume was purged from this well prior to sampling. The probability that a representative sample was collected from this monitoring well is low. Most likely the sample was stagnated well water or a mixture of well water and aquifer water. Additionally, the TCE concentration decreased from 18.0 ug/l to 0.9J ug/l from the November-December 1996 to the March 1997 sampling event. Given the manner in which the groundwater was collected it is not possible to interpret this data as a decrease in the TCE concentration.

Example 2 - Monitoring Well 01MW102

I) Dissolved oxygen values are never negative. This type of reporting leads the reviewer to question the other dissolved oxygen values.

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II) A turbidity value of 239 NTUs is normally unacceptable. This well may need to be redeveloped. Additionally, metals data for this well is erratic when compared quarterly, especially with regard to aluminum, chromium, iron, manganese, and nickel.

Example 3 - Monitoring Well 02DGMW59

I) It is unclear from this sampling log if the stagnate well water is being sampled or if the formation water is being sampled. Without close monitoring of the water level during purging and sampling it is difficult to determine where the groundwater sample is originating.

GSU only evaluated a few of the sampling logs, however, the other logs were briefly surveyed and numerous other discrepancies were noted. It is the hope of GSU that Bechtel can evaluate the March 1997 well purging and sampling logs and compare them with logs in prior quarterly reports, then compare those data with the analytical data.

If you have any questions or need clarification please call me at CALNET 8-635-5528 or (562) 590-5528.

Attachments

Reviewed by: Frank Gonzales, RG
Geologic Services Unit

cc: Karen Thomas Baker, CEG, CHG
Geologic Services Unit
Unit Chief

File

Example 1 1996

MARINE CORPS EL TORO GROUNDWATER MONITORING WELL PURGING AND SAMPLING LOG									
OBJECT NO.: 6206 - 009					TEAM: Non-dedicated Pump <input checked="" type="checkbox"/> Dedicated Pump ()				
PURGING LOG									
WELL NO.: 014W101					SAMPLE NO.: 014W101-002				
START (Date): 11/18/96 (Time): ^{ET HWY} 1017					END (Date): 11/18/96 (Time):				
WELL CASING DIAMETER: 2" () 4" <input checked="" type="checkbox"/> 5" ()					WEATHER: Sunny 75°F				
FIELD PERSONNEL'S NAME(S): Brian Trinh (COM), Philip McKay (Water Development)									
REFERENCE POINT OF DEPTH MEASUREMENT: TOC Black mark									
OVM READING: 0			ORIG. DTW: 64.71			FINAL DTW: 129.82			
PURGE METHOD: Packers () Multiple Port () Teflon Bailor () Submersible Grundfos Pump <input checked="" type="checkbox"/>									
MEASURED	ORIGINAL	CASING	4" - 0.66						
WELL TD	DTW	VOLUME	5" - 0.93						
			6" - 1.50						
153	64.71	88.39	x	58.3	Gal./Csg Vol.	x	3 Csg. Vol.	=	175 Gal.
PURGE WATER CONTAINERIZED? YES					AVERAGE PURGE RATE: gpm				
ACTUAL TIME	ELAPSED TIME	VOLUME PURGED (gal.)	TEMP. toF (°C)	pH (s.a.)	COND. (umhos/m)	TURB. (NTU)	DISSOLVED OXYGEN (%)(mg/l)	REDOX (mV)	COMMENT
1019	2	16.5	22.89	8.52	0.746	235.6	44.2	25.3	
1021	4	33.0	23.02	8.52	0.746	7.9	39.1	24.2	
1023	6	49.5	23.29	8.47	0.752	9.1	32.9	23.7	Purge rate dropped to 0.05 gpm
1025	8	66.0	23.44	8.37	0.760	25.5	29.5	24.9	
1028	11	90.75	23.70	8.32	0.763	74.9	24.3	23.1	
1030	13	107.25	23.83	8.33	0.764	111.3	23.5	22.9	
1032	15	123.75	24.05	8.31	0.766	129.5	22.3	23.3	
1034	17	140.25	24.24	8.27	0.769	149.4	25.4	24.7	
1036	19	156.75	24.37	8.23	0.767	129.1	27.2	26.3	
1039	22	173.25							
Air Entrainment Survey ()					Field Blanks ()				
SAMPLING LOG									
SAMPLING METHOD: Packer () Bailor () Portable Pump <input checked="" type="checkbox"/>									
LAB ANALYSES: VOA <input checked="" type="checkbox"/> SVOA <input checked="" type="checkbox"/> Filtered Metals <input checked="" type="checkbox"/>									
TPH-Gasoline () TPH-Diesel () Pesticides () Herbicides ()									
Gross Alpha/Beta <input checked="" type="checkbox"/> General Chemistry <input checked="" type="checkbox"/> Treatability Parameters ()									
COMMENT: Initial meter reading: 32.044 Purge rate: 0.25 gpm 2.1 min interval									
Final meter reading: 32.093									
Number of containers: 8 bottles collected									
Lock is cut.									

Example 1

1997

MARINE CORPS EL TORO GROUNDWATER MONITORING WELL PURGING AND SAMPLING LOG

WELL ID: 6206-009 TEAM: Non-dedicated Pump (X) Dedicated Pump ()

PURGING LOG

WELL NO.: 01 MW101 SAMPLE NO.: 01 MW101-053
 START (Date): 3/13/97 (Time): 1030 END (Date): 3/13/97 (Time): 1105
 WELL CASING DIAMETER: 2" () 4" (X) 5" () WEATHER: Clear TEMP.: 73°F
 FIELD PERSONNEL'S NAME(S): Robert Paul Smith Philip McHenry
 REFERENCE POINT OF DEPTH MEASUREMENT: TOC

VM READING: -0 ORIG. DTW: 64.9 FINAL DTW: 140

PURGE METHOD: Packers () Multiple Port () Teflon Bailor () Submersible Grundfos Pump (X)

MEASURED ORIGINAL CASING VOLUME: 4" - 0.56
 WELL TD DTW VOLUME: 5" - 0.93
 6" - 1.50

153 * 64.9 = 98.1 * 58.15 Gal./Csg Vol. * 3 Csg. Vol. = 174.4 Gal.

PURGE WATER CONTAINERIZED? YES AVERAGE PURGE RATE: 9.5 gpm *Begin*

ACTUAL TIME	ELAPSED TIME	VOLUME PURGED (gal.)	TEMP. (°C)	pH (s.p)	COND. (umhos/ml)	TURB. (NTU)	DISSOLVED OXYGEN (mg/L) (44)	REDOX (mV)	COMMENT
	0								2/11/97 RA Pump set at 150 feet 150
1035	3	30	22.17	8.18	898.0	13.0	-0.5	144.8	
1039	9	45	22.15	8.12	968	22.5	-0.6	140	
1045	15	50	22.20	8.08	1035	9.2	0.86	136.4	Rate changed to 0.8 GPM
1050	20	51	22.06	8.04	1070	10.1	1.75	128.2	Rate changed to 0.8 GPM
1055	30	52	22.07	8.02	1076	8.9	1.95	124.3	Rate changed to 0.1 GPM
									Rate has changed to 0.05 GPM
									Since parameters are stable and well is about to go dry will go ahead and sample
1105		Collect							01 MW101-053

Air Entrainment Survey () Field Blanks ()

SAMPLING LOG

SAMPLING METHOD: Packer () Bailor () Portable Pump (X)

LAB ANALYSES: VOA (X) SVOA () Filtered Metals (X) Cr VI (X)
 H-Gasoline () TPH-Diesel () Pesticides () Herbicides () Explosives (X)
 Gross Alpha/Beta () General Chemistry (X) Treatability Parameters ()

Initial Meter Reading: 80460 Purge Rate: 0.05 gpm min. interval

Final Meter Reading: 89512

Number of Containers: 4 15 7415

Example 2

MARINE CORPS EL TORO GROUNDWATER MONITORING WELL PURGING AND SAMPLING LOG

NO.: 6206-009 TEAM: Non-dedicated Pump (X) Dedicated Pump ()

PURGING LOG

WELL NO.: 01 MW 102 SAMPLE NO.: 01 MW 102 - 003
 START (Date): 3/13/97 (Time): END (Date): 3/13/97 (Time): 1308
 WELL CASING DIAMETER: 2" () 4" (X) 5" () WEATHER: Clear TEMP: 73°F
 FIELD PERSONNEL'S NAME(S): Robert Paul Smit Philip Melan
 REFERENCE POINT OF DEPTH MEASUREMENT: TOC

OVM READING: ORIG. DTW: 107.50 FINAL DTW: 125

PURGE METHOD: Packers () Multiple Port () Teflon Bailor () Submersible Grundfos Pump ()

MEASURED	ORIGINAL	CASING	
WELL TO	DTW	VOLUME	
			4" - 0.66
			5" - 0.93
			6" - 1.50

140 * 107.50 - 32.5 * 21.45 Gal./Csg Vol. * 3 Csg. Vol. = 64.35 Gal.

PURGE WATER CONTAINERIZED? YES AVERAGE PURGE RATE: gpm

ACTUAL TIME	ELAPSED TIME	VOLUME PURGED (gal.)	TEMP. (°C)	pH (s.a.)	COND. (umhos/cm)	TURB. (NTU)	DISSOLVED OXYGEN (mg/L)	REDOX (mV)	COMMENT
	0								
1211	1	7	22.11	7.17	1430	443	-2.06	113.3	
1212	2	14	21.97	7.16	1452	288	-1.34	89.3	rate down to 2 1/2 GPM
1216	6	34	22.55	7.06	1412	203	0.00	9.0	1 3/4
1220	10	42	23.51	7.13	1370	140	3.70	57.2	rate down to 1 GPM
1223	13	45	24.10	7.13	1337	49.4	2.42	73.8	
1226	16	48	24.53	7.13	1331	69.6	4.38	82.9	
1229	19	51	24.89	7.13	1341	240	4.33	89.5	rate changed to 0.3 GPM
1239	29	54	25.68	7.16	1372	247	5.62	98.1	
1249	39	57	26.25	7.15	1401	173	5.17	103.1	
1300	50	60	26.65	7.14	1451	239	5.16	102.2	
All parameters are stable									
1308 Collect 01 MW 102 - 003									

Air Entrainment Survey () Field Blanks ()

SAMPLING LOG

SAMPLING METHOD: Packer () Bailor () Portable Pump ()
 LAB ANALYSES: VOA (X) SVOA () Filtered Metals (X) Chl VI (X)
 TPH-Gasoline () TPH-Diesel () Pesticides () Herbicides () Explosives (X)
 Gross Alpha/Beta (X) General Chemistry (X) Treatability Parameters ()

COMMENT: Initial Meter Reading: 89525 Purge Rate: 0.3 gpm min. Interval
 Final Meter Reading: 89585
 Number of Containers: 7

Example 3

MARINE CORPS EL TORO GROUNDWATER MONITORING WELL PURGING AND SAMPLING LOG

PROJECT NO.: 6206-009 TEAM: Non-dedicated Pump () Dedicated Pump (X)

PURGING LOG

NO.: 02AGMWS9 SAMPLE NO.: 02AGMWS9-003
 START (Date): 3/26/97 (Time): 1016 END (Date): 3/26/97 (Time): 1035
 WELL CASING DIAMETER: 2" () 4" (X) 5" () WEATHER: Clear, calm TEMP: 75°F
 FIELD PERSONNEL'S NAME(S): S. Mathis
 REFERENCE POINT OF DEPTH MEASUREMENT: TOC

OVM READING: _____ ORIG. DTW: 46.20 FINAL DTW: 46.84

PURGE METHOD: Packers () Multiple Port () Teflon Hailer () Submersible Grundfos Pump (X)

MEASURED	ORIGINAL	CASING	4" - 0.66
WELL TO	DTW	VOLUME	5" - 0.93
			6" - 1.50

See below for low-flow purge volume calculation.

94 _____ = _____ x _____ Gal./Csg Vol. x 3 Csg. Vol. = 6.03 Gal.

PURGE WATER CONTAINERIZED? YES AVERAGE PURGE RATE: 0.5 gpm

ACTUAL TIME	ELAPSED TIME	VOLUME PURGED (gal.)	TEMP. (oC)	pH (s.a.)	COND. (umhos/ml)	TURB. (NTU)	DISSOLVED OXYGEN (mg/L)	REDOX (mV)	COMMENT
1019	3	1.5	17.05	6.88	1170	29.5	2.73	-8.5	Pump set at 85 feet
1022	6	3	17.34	7.02	1169	29.5	2.68	-9.1	
1024	8	4	17.66	7.10	1167	29.8	2.67	-9.0	
1026	10	5	17.90	7.12	1175	30.3	2.64	-7.6	
1028	12	6	17.64	7.11	1174	32.1	2.72	-8.5	

Air Entrainment Survey () Field Blanks ()

SAMPLING LOG

SAMPLING METHOD: Packer () Baller () Portable Pump ()

LAB ANALYSES: VOA (X) SVOA (X) Filtered Metals (X) Chr VI (X)
 TPH-Gasoline () TPH-Diesel () Pesticides (X) Herbicides (X)
 Gross Alpha/Beta (X) General Chemistry (X) Treatability Parameters (X)

INITIAL: Initial Meter Reading: _____ Purge Rate: _____ gpm min. Interval

Final Meter Reading: _____

Number of Containers: _____

Purge vol = ((0.03125^2 * 3.14 * 7.48 * 85) * 0.06) * 3 = 6.03 gal - TOTAL VOLUME PURGED = 9.5 gal.