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TREASURE ISLAND
SSIC NO. 5090.3.A

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June 15, 1995

Mr. James B. Sullivan
BRAC Environmental Coordinator
Naval Station Treasure Island
410 Palm Avenue, Code 00E
San Francisco, California 94130

SUBJECT: Suggestions and Recommendations to Improve Quarterly Groundwater
Monitoring and Sampling Reports
Related to February 1995 Quarterly Groundwater Sampling Report
Naval Station Treasure Island
San Francisco, California.

Dear Mr. Sullivan:

After reviewing the February 1995 Quarterly Groundwater Sampling Report prepared by PRC Environmental Management, Inc. (PRC), I have prepared some suggestions and recommendations that I think will improve the reports and make them more user friendly. The information being produced from the quarterly groundwater sampling events is important information for the Restoration Advisory Board (RAB) members to review in light of the future remediation work to be completed at Naval Station Treasure Island (NSTI). Thus it is important for the data being produced to be understandable and easy to use by the RAB members, the regulators, and Navy personnel. I and the Treasure Island RAB Ad Hoc Technical Subcommittee hope that the following suggestions and recommendations can be used to improve the reports to make them better, more useable and more understandable. We are requesting responses and comments from the Navy and PRC to the suggestions and recommendations presented herein.

SUGGESTIONS AND RECOMMENDATIONS:

1. What is the purpose of the collection of the dissolved oxygen (DO) measurements being collected from the purge water from the sampled wells? DO measurements collected from a recently purged or in the process of being purged wells will always have high DO readings since the water is disturbed and mixed in the process of purging. If the DO data is being collected for future remediation purposes, the DO measurements should be collected using a down-the-well DO probe that collects the

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measurements within relatively undisturbed groundwater not from water that has been removed from the well. I would suggest that the water in the wells also be checked for redox using a down-the-well probe for future remediation purposes.

2. Is there a reason that all of the wells are being purged by hand bailing? Recent studies have shown the hand bailing provides the least representative groundwater samples for analytical purposes. While some types of purging pumps will volatilize some constituents in the groundwater if done at too rapid a purging rate, reducing the pumping rate limits the volatilization. The pumping also tends to draw more water more quickly from the well allowing more formation water to flow into the well which provides a more representative groundwater sample from the formations outside of the well rather than just the water in the well or the well sand pack. Using a purge pump also speeds up the sampling process, taking fewer days and using fewer personnel, all of which result in a cost savings to the Navy for the sampling events.

3. The field sheets indicate that an oil/water interface probe was used to check for liquid-phase petroleum hydrocarbons in the wells. However, there is no discussion or mention of the interface probe in Section 3.2 Field Sampling Techniques. While this may be covered in the sampling plan, if the other field methods and techniques are mentioned in this section, I would recommend that the interface probe also be discussed. Several sentences about the method, what is read, and the decontamination procedure for the instrument between wells seems appropriate here. Also any readings for liquid-phase petroleum hydrocarbons detected by the interface probe should be verified by a bailer check. A clean bailer should be lowered slowly into the well and allowed to fill. The bailer is then withdrawn and the amount of liquid-phase petroleum hydrocarbons can then be visually checked and measured to verify the interface probe measurement.

4. I would suggest that it might be appropriate and a cost savings to the quarterly sampling program to eliminate the need for testing for major components of sea water in every groundwater sample for every quarter. While they might be part of the CLP metals analysis, many of the results have little significance to the long term site remediation. If the need for calcium, magnesium, potassium and sodium is thought important, they could be tested in wells on an annual or semi-annual basis. They could also only be tested in wells which have reported metals problems in past sampling events rather than sampling for everything in every well all of the time. This could provide another cost savings to the sampling budget for the Navy.

5. I would strongly suggest that the groundwater sampling results from samples collected during earlier sampling events prior the current sampling (1992 and earlier) be included in all of the sampling results tables. While this may not be in the same

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format as the current sampling, this is valuable historic data on groundwater concentrations. This earlier data is very useful to determine what reductions (or increases) take place over time. Reductions in concentrations over a number of years provide information on possible biodegradation rates or dilution rates of petroleum hydrocarbons and other contaminants over time. These rates and changes can be very useful to considerations for the future remedial strategies for the site.

6. Based on the field sampling sheets the turbidity during purging and sampling for Well 20MW01 was "estimated" when the equipment malfunctioned during the sampling. This was not noted in the foot notes in Table 2. It should be noted to prevent misleading conclusions that this is measured data when the data is reviewed. The estimated value could also just be eliminated altogether and left blank under an instrumentation malfunction category rather than "estimating" a turbidity value.

7. Could it be explained by PRC why the pH readings in a few of the wells such as 06MW04 and 24MW02 are higher than most of the other wells? These wells have pH readings of greater than 8.0 while most of the other wells are less than 8.0.

8. Has PRC reviewed any of the chromatograms supplied by the analytical laboratory for any of the groundwater samples? Some of the results are listed as "single peak" sample results that do not match typical chromatograms for total petroleum hydrocarbons. It may be important to review the locations and reasons for these single peaks on the chromatograms to see if they might correspond to some constituent other than petroleum hydrocarbons. They may represent something else that should be sampled and investigated other than total petroleum hydrocarbons and they should be reviewed. They can also be misleading when it is assumed that they are petroleum hydrocarbons and they are remediated as such when the remediation method needed may be entirely different if it is a contaminants are not petroleum hydrocarbons.

9. What is the reason for the low dissolved oxygen reading recorded for the groundwater samples and purge water collected from Well 24MW04? This is one of the lowest DO readings for any well at the site. Is this related to the TCE in the well or? Lower DO readings are also noted for Well 11MW04 and 17MW01.

10. Why are there groundwater samples that were sampled and analyzed, and for which no concentrations were detected that do not show up on the results tables? An example would be Site 4/19 mentions that samples were collected for TPH extractables but there is nothing in the results tables about these samples.

11. The Tables of Results for the groundwater samples for Site 06 reports an estimated concentration (footnote J) for the sample. What is an estimated concentration, how is it determined and why is it being reported?

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12. All footnotes in the Tables of Results should be at the bottom of the page on which they are noted rather than making the reader go back and forth to the table of definitions to look them up. This makes it very hard on the reader to use the tables. There are not that many footnotes, it might be more useful to have them all at the bottom of each page in one, two or three columns so the reader can refer to them.

13. Be sure that all footnotes indicated in the Table of Results are really in either the footnotes or the definitions table. Footnote Z indicated in the table for Site 06 for Well 06MW01 (Dup) is noted in the table but there is no footnote at the bottom of the table or in the definitions table. Also note/footnote indicated by (*) is noted in the Table of Results for Site 06 under other components but there is no footnote to indicate what (*) means.

14. A number of the analytical results listed in the Table of Results are listed as below the reporting limits for the analytical method. If these are below the reporting limits, what are the reporting limits for the analytical results listed? Should these analytical results below the reporting limits be reported at all? What is the value of results that can not be verified or are below the analytical range of error for the method used for the analysis? I would suggest that these be left off entirely since they only confuse the issue. They should be reported as non-detect and show the limit of detection such as ND(<0.005).

15. There seems to be a large number of laboratory errors or problems listed (footnote 7) in the Table of Results. Is there a problem with the analytical laboratory?

16. Concentrations for metal (Iron, Mercury, Zinc, Silver, and explosives) are noted for the groundwater samples for Site 12 (especially for Well 12MW01W). Are these high metals a result of the old landfill activities at Site 12? Is the location of Well 12MW01 in the center of the current housing area located near the slit trench (disposal site?) noticed in the old aerial photos for the site? Future investigations should determine the extent of the old slit trench and what was in it.

17. I would suggest that all of the field sampling data be put on to one table that would be much more useful and easy to read. The table would be done in a columnar fashion to present the data all together in one place for each well. New information for these tables can be added to the tables after each additional sampling event. This provides an historic record that is easy to read and easy to go down the column to look for changes in the groundwater elevations and groundwater field parameters over time. I have included an example of such a table as Table 1 attached. I use this table in my reports and I have found it very useful for noticing changes in the groundwater, especially after

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remediation activities are started. Dissolved oxygen can added to this table or presented as a separate table as shown in example Table 5.

18. All of the Tables of Results also need to be made much more user friendly. They are very hard to use and to compare data for the same well from one sampling event to the next. This problem becomes even more difficult when trying to compare data from several sampling events. I had to go back and forth over four pages of data just to try to put together an historical prospective for one well over several different sampling events. I would suggest that all of the data be presented in a columnar fashion so that the reader can just read down the column and see the changes in a particular well for a particular analysis over a period of time. I have also included an example table (Table 4) of a useful, reader friendly table that I use in my reports that would work very well here.

19. I would suggest that the analytical results for the major constituents analysis in the groundwater samples be presented in a figure(s) that will aid the reader in reviewing the data. I would suggest a spider map for either the entire site, or if that map would be difficult to read, spider maps for each of the separate sites. I have enclosed such a map as example Figure 8 for your review. This kind of map makes the data easy to understand and read without forcing the reader to plow through huge volumes of data tables and text. This would help the reader to see where the problem areas are, and by reviewing the spider maps from several different sampling events, it is also easy to see if the concentrations are decreasing or if the particular plume is stable, spreading or getting smaller over time.

I and the Treasure Island RAB Ad Hoc Technical Subcommittee hope these suggestions and recommendations can be useful to making these groundwater monitoring reports better for all of those who have to read them. We look forward to the responses and comments from the Navy and PRC. If you have any questions regarding these recommendations and suggestions, please do not hesitate to call so that we may discuss them.

Sincerely,

Paul V. Helm
Treasure Island Restoration Advisory Board Community Member

and the

Treasure Island RAB Ad Hoc Technical Subcommittee:
Donald Meyers Dale Smith Dan McDonald
Pat Nelson Brad Wong

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Table 1: Summary of Field Sampling Data
 Plume or Area Name
 Site Name
 Address

Well	Date	Calculated Purge Volume (a) (gallons)	Actual Purge Volume (gallons)	Final		Depth to Water (b) (feet)	Measured Depth of Well (b) (feet)	Water Elevation (feet)	TOC Elevation (feet)	Casing Diameter (inches)	
				pH	SC (µmhos/cm)						Temperature (°F)
MW-24	26-May-94	39.44	40	7.5	2,480	69.1	8.18	23.35	18.52	26.70	4
	7-Jul-94	40.08	40	5.2	1,679	68.0	7.85	23.28	18.85		
	19-Aug-94	44.76	46	7.5	1,860	68.2	7.78	NM	18.92		
	14-Sep-94	40.00	40	(d)	2,230	68.4	7.74	23.16	18.96		
	20-Dec-94	39.98	45	6.5	1,614	63.3	7.67	23.05	19.03		
	5-Mar-95	44.17	45	7	1,600	59.0	7.51	24.50	19.19		
MW-25	26-May-94	32.00	32.5	7.4	1,990	67.5	12.97	25.29	16.03	29.00	4
	7-Jul-94	33.64	33	4.2	1,356	67.5	12.34	25.29	16.66		
	19-Aug-94	33.12	33	8	1,340	65.5	12.26	NM	16.74		
	14-Sep-94	34.00	35	(d)	1,780	69.2	12.12	25.21	16.88		
	20-Dec-94	33.59	35	7.5	1,252	62.8	12.08	25.00	16.92		
	5-Mar-95	34.06	35	7	1,290	61.0	11.90	25.00	17.10		
MW-59	31-May-94	8.12	8.5	(d)	1,690	63.1	10.53	23.26	19.47	30.00	2
	7-Jul-94	8.32	8	7.6	1,262	64.2	10.26	23.27	19.74		
	20-Aug-94	8.84	9	8	1,330	63.9	10.18	NM	19.82		
	13-Sep-94	8.44	9	8	1,810	64.2	10.05	23.25	19.95		
	19-Dec-94	8.36	10	4.3	1,382	65.1	10.08	23.15	19.92		
	7-Mar-95	8.90	10	8	1,210	65.1	9.83	23.75	20.17		
MW-60	31-May-94	7.32	8	(d)	1,840	64.4	12.15	23.61	18.60	30.75	2
	7-Jul-94	7.52	8	7.4	1,400	65.1	11.81	23.62	18.94		
	20-Aug-94	7.52	8	8	1,330	64.0	11.75	NM	19.00		
	12-Sep-94	7.68	8	8	1,960	64.7	11.53	23.57	19.22		
	19-Dec-94	7.43	10	5.5	1,375	63.7	11.58	23.20	19.17		
	7-Mar-95	7.74	10	8	1,200	64.3	11.40	23.50	19.35		



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FROM Staff Civil Engineer T.I. TO

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 TO
 FROM Staff Civil Engineer T.I.
 06-20-1995 06:11PM

Table 5: Summary of Dissolved Oxygen Readings

Plume or Area Name
 Site Name
 Site Address

Well	Date	Well Completion Depth (feet)	Measured Depth of Well (b) (feet)	Screened Interval (feet bgs)	Depth to Water (b) (feet)	Bottom of Screen D.O. Reading (ppm)	Middle of Screen D.O. Reading (ppm)	Top of Screen D.O. Reading (ppm)	TOC Elevation (feet)	Casing Diameter (inches)
MW-24	26-May-94	25	23.35	5 to 25	8.18				26.70	4
	7-Jul-94		23.28		7.85					
	19-Aug-94		NM		7.78	0.25	0.39	0.89		
	13-Sep-94		23.16		7.74	0.25	0.59	1.30		
	11-Oct-94		24.50		7.69	0.08	0.26	3.24		
	13-Nov-94		24.52		7.67	0.18	0.66	1.90		
	19-Dec-94		23.05		7.67	0.39	0.49	0.96		
	5-Mar-95		24.50		7.51	0.13	0.13	0.15		
MW-25	26-May-94	25	25.29	8 to 25	12.97				29.00	4
	7-Jul-94		25.29		12.34					
	19-Aug-94		NM		12.26	0.49	0.60	0.90		
	13-Sep-94		25.21		12.12	0.36	0.38	0.85		
	11-Oct-94		25.00		12.25	0.08	0.14	0.84		
	13-Nov-94		25.00		12.03	0.16	0.49	1.02		
	19-Dec-94		25.00		12.08	0.28	0.81	4.12		
	5-Mar-95		25.00		11.90	0.14	0.19	0.26		
MW-59	31-May-94	24.5	23.26	21 to 24	10.53				30.00	2
	7-Jul-94		23.27		10.26					
	20-Aug-94		NM		10.18	0.22	0.54	1.03		
	12-Sep-94		23.25		10.05	NA	0.98	1.30		
	11-Oct-94		23.75		10.11	0.04	0.15	0.27		
	13-Nov-94		23.75		10.11	0.41	0.84	1.02		
	18-Dec-94		23.15		10.08	0.36	0.68	1.46		
	7-Mar-95		23.75		9.83	0.21	0.13	0.07		

Project No. RC0261.004

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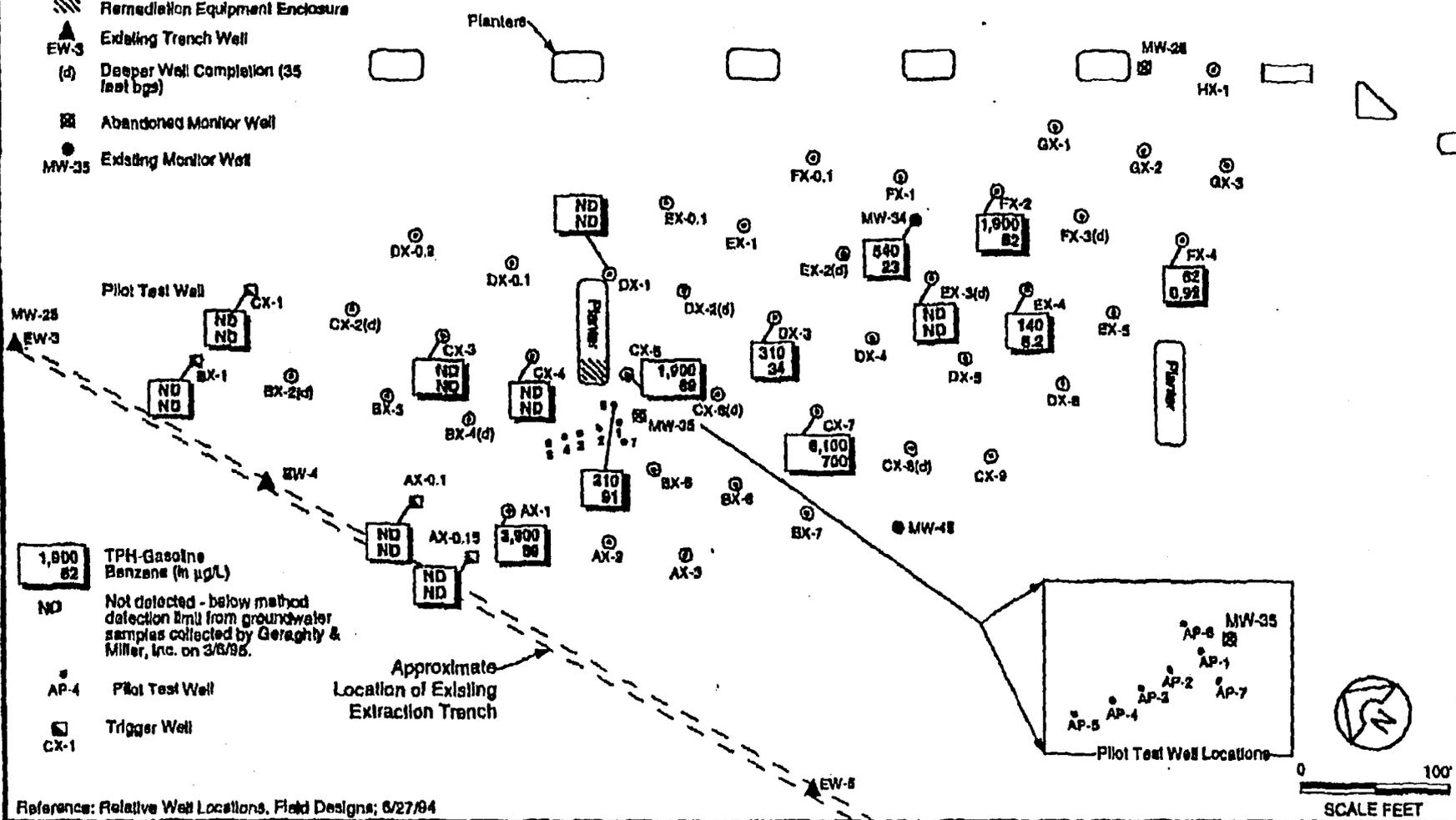


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TOTAL P.10

EXPLANATION

- ⊙ CX-1 Air-Injection Well / Groundwater Monitor Well
- ▨ Remediation Equipment Enclosure
- ▲ EW-3 Existing Trench Well
- (d) Deeper Well Completion (35 feet bgs)
- ⊠ Abandoned Monitor Well
- MW-35 Existing Monitor Well



Reference: Relative Well Locations, Field Designs; 6/27/84

0 100' SCALE FEET

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**GROUNDWATER X PLUME SAMPLE RESULTS
 FIRST QUARTER REPORT 1995**
 Site Name
 Site Address

**FIGURE
 8**



To: Sharon
Tobias
ARC EMI
10 Pages

FAX TRANSMITTAL

TO Mr. Jim Sullivan - BRAC Env
Naval Station Treasure Island
FROM Paul V. Hahn

GERAGHTY & MILLER, INC.
RICHMOND, CALIFORNIA OFFICE

DATE 6/13/95 JOB # _____
FAX # (415) 395-5474 TELEPHONE # (415) 395-5454

COMMENTS:

Following are suggestions and recommendations
on improving the presentation of quarterly groundwater
sampling reporting at Treasure Island. A hard copy of
this letter will follow in the mail.

Please be sure that a copy of this letter gets included
with the mail out to RAB members pre-to next meeting. A copy
has also been sent to Brad Way.

Please give me a call if you have any questions
Thanks, Paul

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