



N00221_000720
MARE ISLAND
SSIC NO. 5090.3.A



Terry Tamminen
Agency Secretary
Cal/EPA

Department of Toxic Substances Control

700 Heinz Avenue, Suite 200
Berkeley, California 94710-2721



Arnold Schwarzenegger
Governor

July 21, 2004

Southwest Division
Naval Facilities Engineering Command
Attn: Mr Jerry Dunaway
1220 Pacific Highway
San Diego, California 92132-5190

Dear Mr. Dunaway:

Mare Island Draft Water Quality Sampling and Analysis Plan, RCRA/Facility Landfill Post-Closure Groundwater Monitoring, dated December, 2003

The Department of Toxic Substances Control has reviewed the subject document. The attached comments are forwarded to you for your consideration.

Should you have any questions regarding this letter, please call me at (510) 540-3773.

Sincerely,

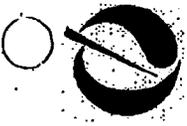
Chip Gibble
Remedial Project Manager
Base Closure Unit
Office of Military Facilities

Attachment

cc: Mr. Dwight Gemar
Mr. Gary Riley
Ms. Carolyn d'Almeida

Post-It™ brand fax transmittal memo 7671		# of pages > 20
To	Jerry Dunaway	From
Co.	Naval Facilities Engineering Command	Co.
Dept.		Phone #
Fax #	510-532-0940	Fax #

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Terry Tamminen
Agency Secretary
Cal/EPA

Department of Toxic Substances Control

8800 Cal Center Drive
Sacramento, California 95826-3200



Arnold Schwarzenegger
Governor

MEMORANDUM

TO: Chip Gribble
Project Manager
Office of Military Facilities, Berkeley Regional Office

FROM: Kate Burger, Ph.D., R.G. *Kate Burger*
Engineering Geologist, Northern California Geological Services Unit (GSU)
Hazardous Waste Management Program, Sacramento Regional Office

CONCUR: Brian Lewis, C.H.G., C.E.G. *Kate Burger for Brian Lewis*
Senior Engineering Geologist, Northern California GSU
Hazardous Waste Management Program, Sacramento Regional Office

DATE: July 19, 2004

SUBJECT: RCRA/Facility Landfill Post-Closure Groundwater Monitoring
Mare Island Naval Shipyard, Vallejo, Solano County
Project No. 25045/200063-33/43-HWMP

DOCUMENTS REVIEWED

Draft Water Quality Sampling and Analysis Plan, RCRA/Facility Landfill Post-Closure Groundwater Monitoring, Mare Island, Vallejo, California. Prepared by Roy F. Weston, Inc. Dated December 2003. (WQSAP)

Section 8 (Abandonment of Existing Monitoring Wells), Groundwater Containment and Extraction Remedial Design Plan, Area H1 Landfill, Mare Island, Vallejo, California. Prepared by Weston Solutions, Inc. Dated February 2004. (Design Plan)

INTRODUCTION

As you requested, the Northern California Geological Services Unit (GSU) of the Department of Toxic Substances Control (DTSC) has reviewed the above-referenced water quality sampling and analysis plan (WQSAP) for the Mare Island Naval Shipyard (MINS). The WQSAP pertains to post-closure groundwater monitoring of the Resource Conservation and Recovery Act (RCRA) Landfill and RCRA Surface Impoundments that are subject to the monitoring requirements of California Code of Regulations, title 22, section 66265.90 et seq.¹ while the units are under interim status and the requirements

¹These monitoring requirements will be referred to as "Article 5" requirements.

Chip Gribble
Page 2
July 19, 2004

of California Code of Regulations, title 22, section 66264.90 et seq.¹ after the units are under a post-closure permit, or equivalent enforceable document.² This memorandum provides our comments and recommendations regarding the WQSAP. In addition, as General Comment 13 of this memorandum, GSU provides comments on the wells proposed for decommissioning in Section 8 of the above-referenced the Design Plan.

DTSC has provided extensive comments on the MINS groundwater monitoring program in the Comprehensive Groundwater Monitoring Evaluation (CME) Report (DTSC, 2004). Where GSU's comments on the WQSAP are redundant with DTSC (2004), GSU refers to the applicable sections of the CME Report. Nothing in this memorandum is intended to modify or reduce the required actions identified in the CME Report.

If you have questions, please contact me at (916) 255-6537 or Brian Lewis at (916) 255-6532.

REQUIRED ACTION

MINS must revise the WQSAP to address the enclosed comments as well as the comments and required actions identified in the CME Report (DTSC, 2004). A revised draft WQSAP must be submitted for DTSC comment and approval without delay. The revised draft WQSAP must be reviewed by GSU prior to approval and implementation.

GSU understands that a modified but equivalent form of groundwater monitoring under the DTSC Office of Military Facilities (OMF) site cleanup program may accomplish some of the requirements discussed in the memorandum. If a given requirement is not covered by the revised WQSAP, MINS must specify the existing document in which the requirement is addressed.

GENERAL COMMENTS AND RECOMMENDATIONS

1. The WQSAP does not clearly identify the type of Article 6 monitoring program under which the RCRA Landfill and Surface Impoundments will be monitored. For example, the second sentence on Page 1-1 refers to both a detection monitoring program (Cal. Code of Regs., tit. 22, §66264.98 or 66265.98) and a corrective action monitoring program for permitted hazardous waste facilities (Cal. Code Regs., tit. 22, §66264.100). Section 2.1.5 refers to detection monitoring. Elsewhere, the WQSAP refers to the requirements of evaluation monitoring programs (Cal. Code of Regs., tit. 22, §66264.99 or 66265.99). For example, annual sampling of the Appendix IX list, an evaluation monitoring requirement, is included in the constituent of concern (COC) discussion on Page 4-4. MINS must clearly identify the type of Article 6 monitoring program and consistently refer to this program throughout the WQSAP.

² For simplicity, this memorandum will use "post-closure permit" to refer to both the "post-closure permit and equivalent enforceable document."

2. Because a release to the uppermost aquifer has been identified, the uppermost aquifer for the regulated units must be monitored under an evaluation monitoring program (Cal. Code Regs., tit. 22, §66265.99 or 66264.99). Regardless of issuance of a post-closure permit², the units must still be monitored under an evaluation monitoring program (Cal. Code Regs., tit. 22, §66264.99) until MINS determines the nature and extent of contamination (Cal. Code Regs., tit. 22, §66264.99(b)), submits an engineering feasibility study that evaluates corrective measures (Cal. Code Regs., tit. 22, §66264.99(b)), submits a groundwater corrective action program in the permit application (Cal. Code Regs., tit. 22, §66264.99(d)), and DTSC has approved the groundwater corrective action plan. Once MINS has fulfilled these requirements, and a post-closure permit² has been issued, MINS may monitor the regulated units under a corrective action monitoring program (Cal. Code Regs., tit. 22, §66264.100). If a post-closure permit² is issued while the units are under an evaluation monitoring program, a permit modification will be needed in order to move into a corrective action monitoring program (Cal. Code Regs., tit. 22, §66264.99(d)). At this time, MINS must continue to monitor the uppermost aquifer under an evaluation monitoring program.
3. The WQSAP refers to the July 2001 DTSC document entitled "Guidance Document, Monitoring Requirements for Permitted Hazardous Waste Facilities" as a requirement. DTSC (2001) is intended to be used as a guidance document rather than the source of Article 6 monitoring requirements. Hence, MINS must cite California Code of Regulations, title 22, section 66265.90 et seq. or 66264.90 et seq. as the source of regulatory monitoring requirements.
4. The WQSAP does not address the Industrial Wastewater Treatment Plant (IWTP) Pipeline System. Portions of the IWTP Pipeline System with releases to groundwater are also subject to post-closure monitoring requirements. Determination of releases from the IWTP Pipeline System is being conducted as part of the on-going remedial investigation at MINS. DTSC (2004) requires MINS to submit a status report for these investigation activities. Based on the findings of these investigations, MINS must revise the post-closure WQSAP to include monitoring networks for the IWTP Pipeline System segments that comply with Article 6 requirements.
5. The WQSAP indicates that the uppermost aquifer is considered to include the water-bearing units to a depth of approximately 65 feet below ground surface [i.e., shallow water-bearing zone (SWBZ), intermediate water-bearing zone (IWBZ), deep water-bearing zone (DWBZ)]. This definition of the uppermost aquifer appears to be based on the capabilities of the existing well network, rather than the regulatory definition of the uppermost aquifer. DTSC (2004) identified an incomplete characterization of the uppermost aquifer as a deficiency of the groundwater monitoring program (Violation 8). See Sections 4.1.8, 6.1, 7.1, and 8.1 of DTSC (2004) for discussions related to the uppermost aquifer. MINS must revise the WQSAP to indicate that hydrogeologic characterization of the uppermost aquifer is incomplete, that upcoming investigations will complete the

Chip Gribble
Page 4
July 19, 2004

characterization, and that the monitoring network will be reevaluated after completion of the hydrogeologic characterization.

6. Based on Figure 4 of the WQSAP, the water-level measurement network is inadequate. The WQSAP must propose a well and piezometer network that assesses the hydrologic control of the slurry wall, impacts of the slurry wall on groundwater flow in the IWBZ and DWBZ, groundwater flow conditions in the general vicinity of Investigation Area H1 (IA H1), and groundwater flow conditions within the extent of impacted groundwater originating from the RCRA Landfill and Surface Impoundments. An adequate hydraulic monitoring well network must be established for each water-bearing zone (WBZ) in the uppermost aquifer such that groundwater flow rate and direction can be accurately identified. When proposing a water-level monitoring network in the revised WQSAP, MINS must address the data gaps identified in Sections 6.2 and 7.1 of DTSC (2004).
7. The WQSAP does not include a figure depicting the point of compliance (POC) as defined in California Code of Regulations, title 22, section 66264.95(a). MINS must revise the WQSAP to include a figure depicting a POC that conforms with the following comments.
 - a. The POC depicted on Figure 4 of the 2003 Annual Report (Weston, 2004) does not comply with Article 6. In the Article 6 context, the slurry wall alignment and the POC only coincide along the southern margin and southwest corner of the RCRA Landfill.
 - b. For the purposes of establishing the POC, the Surface Impoundments and RCRA Landfill should be treated as contiguous units. Otherwise, separate monitoring programs will need to be established for each regulated unit.
 - c. Because groundwater flow directions vary, MINS must define different POCs for each WBZ within the uppermost aquifer. Based on GSU's review of the 2003 Annual Report (Weston, 2004) and the potentiometric surface maps included in DTSC (2004), GSU has identified POCs for the SWBZ, IWBZ, and DWBZ, shown on attached Figures 1, 2, and 3, respectively, that comply with the Article 6 requirement. The POCs depicted in these figures should be considered to be preliminary and are intended to provide a basis for further discussion.
 - d. For the SWBZ only, in addition to the POC discussed under Item 7b, MINS must define an interim POC. This interim POC is coincident with the slurry wall alignment in the vicinity of the RCRA Landfill and Surface Impoundments. The interim POC will be used in designing an appropriate SWBZ monitoring network that considers the SWBZ interim remedy.
 - e. In the revised WQSAP, MINS must submit figures that depict (1) the boundaries of the RCRA Landfill and Surface Impoundments and (2) MINS' interpretation of the Article 6 POCs based on evaluation of the temporal variation in groundwater flow direction. The most representative potentiometric

Chip Gribble
Page 5
July 19, 2004

- surface maps for each water-bearing unit must be used as the base map when depicting the regulated unit boundaries and POC position.
- f. The POC(s) for additional water-bearing units within the uppermost aquifer must be defined after completion of the hydrogeologic characterization.
8. The monitoring well network proposed by the WQSAP must address four main objectives for assessment of water quality.
- Evaluate the performance of the slurry wall/extraction trench barrier, whether contaminants are migrating beyond the wall, and downward vertical migration induced by the barrier.
 - Assess groundwater passing the POC in each water-bearing unit.
 - Fully evaluate the nature and extent of contamination associated with the RCRA Landfill and Surface Impoundments.
 - Establish background water quality for each WBZ in the uppermost aquifer.

The proposed monitoring network is focused on Objective 8a. Even so, the proposed monitoring network partially fulfills the Article 6 monitoring objectives. MINS must submit a revised WQSAP with a monitoring program that fully supports both assessment of the remedy and Article 6 monitoring requirements. The revised WQSAP must clearly identify the monitoring objective(s) for each well. To assist MINS with this revision and to provide a basis for discussion, GSU has the following comments and recommendations regarding the well network. *GSU emphasizes that the following monitoring network discussion is based on current knowledge. Additional modifications of the monitoring network will likely be necessary based on information provided by the uppermost aquifer hydrogeologic characterization and the nature and extent investigation.*

Remedy Monitoring Wells

The monitoring well network for evaluating the slurry wall/trench performance consists of the following existing and proposed wells: 01W33A, 01W34AN, 01W35A, MW-80, MW-81, MW-82, MW-83, MW-84, SWBZ replacement well for 01W39A, and SWBZ replacement well for 01W38A. Except as discussed in the following paragraphs, well placement to evaluate the slurry wall and trench performance is acceptable. MINS should install the proposed SWBZ wells without delay. If an existing well is decommissioned during construction of the slurry wall/trench, MINS must replace the well in the same field mobilization as the decommissioning effort.

MINS must use a consistent well spacing to monitor the length of the barrier. Therefore, three additional monitoring wells are needed to fill gaps in the well network around the slurry wall: (1) between proposed wells MW-83 and MW-84; (2) between proposed well MW-80 and the replacement well for 01W38A; and (3) between the replacement wells for wells 01W38A and 01W39A.

MINS must identify existing or proposed monitoring wells in the IWBZ and DWBZ to evaluate downward migration of contaminants induced by the slurry wall. MINS must establish four or five well clusters around the perimeter of the slurry wall to provide this assessment. These well clusters should be established without delay.

POC Wells

The following factors must be considered when selecting the location and number of POC wells.

- a. MINS is installing a slurry wall and groundwater extraction trench in the SWBZ. The slurry wall encompasses the RCRA Landfill and Surface Impoundments as well as other areas of IA H1. Although the slurry wall alignment is not fully coincident with the POC, operationally it is more meaningful to monitor SWBZ wells located outside of the slurry wall.
- b. With operation of the groundwater extraction trench, SWBZ groundwater flow in the vicinity of the RCRA Landfill and Surface Impoundments should be primarily toward the northwest, west, and southwest.
- c. A RCRA cap may be constructed within all or part of the interior portion of the slurry wall. Designation of POC wells in the interior of the slurry wall and trench would require perforation of the RCRA cap.
- d. The RCRA Landfill is constructed over the Facility Landfill. Wells constructed at the POC to the east and west of the RCRA Landfill may be constructed within (SWBZ) or through waste material (IWBZ, DWBZ, deeper WBZ).
- e. A release to groundwater has already been identified from the regulated units. Hence, the emphasis of the regulated unit monitoring program is to determine the nature and extent of contamination.
- f. Given the identified release, some existing SWBZ wells (off-set approximately 100 to 150 feet from the POC and located outside of the slurry wall) could be used as interim POC monitoring points. In the distant future, when MINS has completed the groundwater remedy, MINS is required to demonstrate that the groundwater protection standard (GWPS) has been achieved in the SWBZ at the POC [see Comment 7; Cal. Code Regs., tit. 22, §§66264.90(c) and 66264.100(g)]. This demonstration will require POC well installation at that time.
- g. Based on the historical groundwater data set, the extent of organic contamination appears to decrease with depth. The historical data set also suggests that metals contamination decreases with depth. However, a more definitive statement cannot be made because background values for metals have not been established for the IWBZ and SWBZ.

SWBZ

GSU recommendations for SWBZ POC and interim POC wells are depicted on Figure 1 (attached). These recommendations are consistent with the SWBZ

well network proposed in the WQSAP. As it is not clear from Figure 4 of the WQSAP, GSU assumes that replacement wells will be installed outside of the slurry wall for wells 01W38A and 01W39A.

IWBZ

GSU recommendations for IWBZ POC wells are shown on Figure 2 (attached). GSU is proposing installation of three POC wells inside of the slurry wall.

DWBZ

GSU recommendations for DWBZ POC wells are shown on Figure 3 (attached). GSU is proposing to use well 01W33C as a POC well and to install two additional POC wells inside the slurry wall.

Deeper WBZ

POC wells for other WBZ will be identified after completion of the hydrogeologic characterization of the uppermost aquifer and the nature and extent evaluation.

Wells to Evaluate Nature and Extent

As previously stated in General Comment 2 and identified as Violation 7 in DTSC (2004), MINS must characterize the nature and extent of contamination originating from the regulated units. The proposed monitoring network does not fulfill this monitoring objective. GSU has the following recommendations for the well network to assess the nature and extent of contamination.

SWBZ

GSU recommendations for wells useful in assessing the nature and extent of contamination are shown on Figure 1 (attached). MINS must propose additional SWBZ wells that address the data gaps identified in Sections 4.1.7, 6.4, and 7.4 of DTSC (2004).

IWBZ

GSU recommendations for wells to assess the nature and extent of contamination are shown on Figure 2 (attached). In addition, MINS must propose additional IWBZ wells that address the data gaps identified Sections 4.1.7, 6.4, and 7.4 of in DTSC (2004).

DWBZ

GSU recommends deferring additional DWBZ well installation to address this monitoring objective until data from the proposed POC wells is evaluated. However, MINS is still required to address the data gaps identified in Sections 4.1.7, 6.4, and 7.4 of DTSC (2004).

Chip Gribble
Page 8
July 19, 2004

Deeper WBZ

The necessity of wells to evaluate the nature and extent of contamination in other WBZ will be identified after completion of the hydrogeologic characterization and nature and extent evaluation in the SWBZ, IWBZ, and DWBZ.

Background Wells

As stated in Violation 6 of DTSC (2004), MINS must identify background wells that will be used to establish background water quality. DTSC (2004) requires MINS to submit a workplan that will be used to establish existing or new background monitoring wells. Further discussion on determination of background concentrations in groundwater is provided in General Comment 10.

9. Based on the reported waste stream for the RCRA Landfill and Surface Impoundments, the list of COCs proposed in Table 3 of the WQSAP does not fully comply with the requirements of California Code of Regulations, title 22, section 66265.93. As summarized in Section 4.1.4 of DTSC (2004), DTSC has previously informed MINS that the following analytical groups must be added to the list of COCs for these units:

- Organotins,
- Hexavalent chromium,
- Speciated radionuclides,
- Compounds representative of explosives,
- Cyanide,
- Pesticides,
- Herbicides,
- Polychlorinated biphenyls,
- Methyl tert butyl ether.

As required by DTSC (2004), MINS must submit a revised WQSAP containing a list of COCs that includes all waste constituents and degradation products that are reasonably expected to be in or derived from the waste. In addition, the WQSAP must include a discussion that justifies selection of monitoring parameters that are indicator compounds for the compounds included on the COC list.

10. The WQSAP proposes to use a combination of laboratory reporting limits and ambient screening levels (TtEMI, 2002) as concentration limits. Use of the laboratory reporting limits as the concentration limits is acceptable for anthropogenic compounds. However, to fully comply with the requirements of California Code of Regulations, title 22, section 66265.94, MINS must revise the WQSAP to address the following comments regarding establishment of concentration limits for naturally-occurring COCs.
- a. Background values are used as the concentration limits and must be established for each naturally-occurring COC.

Chip Gribble
Page 9
July 19, 2004

- b. Determination of background values is subject to the regulatory requirements summarized in Table 1 of this memorandum. [Note: Refer to California Code of Regulations for exact regulatory language.]
 - c. Background values for naturally-occurring COCs must be established for the IWBZ and DWBZ (and deeper WBZ) in accordance with the requirements of Table 1.
 - d. Background values must be established using a procedure that provides for periodic updating of the background value. The SWBZ ambient screening levels established in TtEMI (2002) do not fulfill this requirement.
 - e. The concentration limits must be specifically listed in the WQSAP (e.g., not referenced to another document).
 - f. Specific procedures for establishing and updating background concentration limits must be included in the WQSAP. Guidance on developing procedures for establishing background concentrations can be found in Appendix C of DTSC (2001).
 - g. When presenting the statistical procedure in the WQSAP, MINS should consider the suggested content summarized in Section 13.2 of DTSC (2001) and in Table 1 (attached).
 - h. The WQSAP must include procedures for comparing water quality in wells downgradient of the regulated units.
 - i. MINS cannot establish concentration limits greater than background for the regulated unit monitoring program until MINS has a post-closure permit² and is under a corrective action monitoring program (see also General Comment 2).
11. To comply with California Code of Regulations, title 22, section 66265.96, MINS must specify the compliance period in the WQSAP.
 12. MINS must include sections in the WQSAP that provide the rationale as to why surface water and vadose zone monitoring is not necessary for the RCRA Landfill and Surface Impoundments. Monitoring of these media is required under California Code of Regulations, title 22, sections 66265.97(c) and (d).
 13. Table 2 (attached) provides GSU's recommendations for the wells proposed to be decommissioned in Section 8 of the Design Plan. MINS should consider the requirements identified in this memorandum prior to finalizing decisions as to wells that will be decommissioned.
 14. Existing and proposed wells needed to monitor remedy performance should be installed without delay. Prior to well installation, MINS must submit a workplan for well installation for review and approval. This workplan should be submitted without delay.

Chip Gribble
Page 10
July 19, 2004

SPECIFIC COMMENTS AND RECOMMENDATIONS

1. Page 2-5, Last Sentence. When finalizing the WQSAP, MINS must update citations of reports, as appropriate. For example, provide the citation for the most current Groundwater Remedial Investigation Report.
2. Page 2-6, First Paragraph, Last Sentence. The WQSAP states that the DWBZ sand is at least 34 feet thick. MINS must update this discussion to reflect recent investigations to determine the depth to bedrock in the vicinity of the regulated units.
3. Page 2-7, First Full Paragraph. MINS should elaborate on the source of groundwater mounding associated with the RCRA Landfill.
4. Page 2-7, Section 2.1.5.2. This section must provide a more detailed discussion of the lateral extent of the IWBZ. It would be helpful to the reader if an isopach map were included that illustrated the configuration and extent of the IWBZ.
5. Page 2-8, Section 2.1.5. This section must discuss the water-bearing units beneath the DWBZ.
6. Page 2-11, Section 2.2, First Paragraph. The WQSAP states that groundwater samples will be collected outside of the slurry wall. MINS must clarify that groundwater samples will be collected (1) at the POC, (2) immediately downgradient of the slurry wall (if not coincident with the POC), (3) within the plume downgradient of the regulated units, (4) at the limits of the plume downgradient of the regulated units, and (5) at background locations.
7. Page 2-11, Section 2.2, First Paragraph. In addition to monitoring groundwater levels to ensure that an inward hydraulic gradient is maintained, MINS must monitor groundwater levels in the IWBZ and DWBZ, in the general IA H1 vicinity, and within any groundwater contaminant plumes downgradient of the regulated units.
8. Page 2-11, Section 2.2, Last Paragraph. MINS should state that field work will be conducted in compliance with the procedures identified in this WQSAP. In addition, MINS should clarify what requirements Weston staff will perform in compliance with the "Construction Quality Management Plan, Mare Island Remediation Agreement Site." MINS should either include the applicable sections as an attachment to the WQSAP, or specify the applicable section numbers.
9. Page 2-11, Section 2.3, First Paragraph. The WQSAP states that the historical database was used to "narrow down the list of constituents of concern." The list of COCs for the regulated units must include the "waste constituents, reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the regulated unit" (Cal. Code Regs., tit. 22, ~~§§66264.93~~ or 66265.93). Thus, the list of COCs must be a comprehensive list of

Chip Gribble
Page 11
July 19, 2004

parameters contained in the waste that is monitored on a less frequent basis. MINS can propose a "narrowed down" list of parameters (commonly referred to as monitoring parameters) that are monitored on a frequent basis. The monitoring parameters must include indicator parameters for all compounds included in the list of COCs. MINS must revise this paragraph to reflect GSU's comment.

10. Page 4-4, COCs. See General Comment 9. Also, MINS must provide the rationale and justification for excluding gross alpha measurements from the list of analytical parameters.
11. Page 4-5, Concentration Limits. See General Comment 10. The revised WQSAP must provide a detailed discussion of the concentration limits. If applicable information is presented elsewhere in the WQSAP, the appropriate sections must be cited in this section. MINS must provide a tabular summary of the concentration limits for naturally-occurring parameters and cite this summary in this section. Also, the section must cite the tables in which the laboratory reporting limits are listed.
12. Page 4-6, Point of Compliance. The POC must be redefined based on General Comment 7.
13. Page 4-6, Population of Interest. MINS defines the population of interest as "concentrations of COCs in all groundwater monitoring well samples." The population of interest must be revised to include concentrations of COCs in the uppermost aquifer at locations that are hydraulically downgradient of the RCRA Landfill and Surface Impoundments.
14. Page 4-6, Spatial Boundaries. MINS defines the spatial boundaries as the POC wells and the additional wells "described in the previous section." MINS should clarify what is meant by the reference to the "additional wells" because wells are not discussed in Section 4.1.3. In addition, the spatial boundaries for the monitoring program must be redefined based on General Comment 8.
15. Page 4-6, Rationale for Well Placement. MINS must expand the rationale for well placement to address the monitoring objectives discussed in General Comment 8. GSU recommends that MINS include separate discussions for water-level measurement and water quality assessment. These discussions should be organized by each WBZ. The rationale for the screened interval position must also be provided. See Section 6.3 of DTSC (2001) for the suggested content of this discussion. The discussion must address the data gaps identified in Sections 6.5 and 7.3 of DTSC (2004).
16. Rationale for Well Design. The WQSAP must include a discussion of the rationale for well design and the current operating condition of each existing well. The discussion must address the data gaps and concerns identified in Sections 6.3 and 7.2 of DTSC (2004). See Section 6.4 of DTSC (2001) for the suggested content of this discussion.

17. Page 4-7, Section 4.1.5, Decision Rules. This section must be revised to address the multiple monitoring objectives discussed under General Comment 8. The current decision rules are acceptable for assessing whether a release has occurred. Decision rules are needed to evaluate increasing or decreasing concentration trends, either at a POC well or a well within the extent of impacted groundwater. This section must reference the statistical procedures that will be used to determine whether a statistically significant detection or trend is present.
18. Page 4-9, Null Hypotheses. This section must be revised to address the multiple monitoring objectives discussed under General Comment 8.
19. Page 4-10, Statistical Methods. This section lists the five statistical methods cited under California Code of Regulations, title 22, section 66265.97(e)(8) and provides a limited discussion of preferred methods for evaluating groundwater data sets. The WQSAP must specify specific procedures and provide a detailed description of the selected method(s). The WQSAP must be revised to address the statistical requirements discussed in General Comment 10.
20. Page 4-12, Reporting. When referring to the supporting documentation, this section should use terminology consistent with that used in Section 6 of the WQSAP.
21. Page 4-19, Representativeness. This section should also include a discussion of periodic assessment of well performance to ensure that each monitoring well is producing samples that are representative of in situ groundwater quality. For example, periodic total depth measurement is used to determine whether sediment has accumulated such that the screen interval is blocked. Another example is whether increasing or elevated turbidity values indicate a need for well redevelopment. See Appendix B, Section 11 of DTSC (2001).
22. Page 5-1, Field Duplicates. This section should be revised to state that duplicate samples will be obtained from randomly selected wells, rather than the stated "randomly selected wells with good recharge rates to provide sufficient volumes of water."
23. Page 5-4, Well Inspection. The current wording indicates that missing lid bolts would be replaced "over the course of the quarter". As discussed in Violation 9 of DTSC (2004), well repair and maintenance for items that have an immediate impact on well integrity, or the potential to allow downward migration of contaminants into the subsurface, must be addressed as soon as possible (Cal. Code Regs., tit. 22, §66265.15). The WQSAP must be revised to require expedited repair for items that affect well integrity or provide potential conduits for downward contaminant migration.
24. Page 5-5, Groundwater Sampling. The third paragraph on this page indicates that wells will be purged using the low-flow micro-purge method, or by evacuating wells that purge dry. This paragraph must specify the maximum flow rates during

Chip Gribble
Page 13
July 19, 2004

purging and sampling. For wells that purge dry, the section must be revised to address the concerns identified in Section 7.5 of DTSC (2004).

25. Page 5-11, Section 5.4. This section must list the minimum content for the "forms for groundwater sample collection", "well inspection forms", and "well water level sheet". When referring to the field forms, this section should use terminology consistent with that used in Section 6.
26. Page 5-12. The following items should also be documented in the calibration logbook: calibration fluid manufacturer, lot number, and expiration date; readings prior to and after calibration; and instrument type, model, and serial number.
27. Page 6-1, Section 6. Include separate procedures for the following tasks: total well depth measurement; water-level measurements for use in assessing slurry wall/extraction trench performance; and periodic evaluation of well performance (e.g., elevated turbidity, reduced flow or recharge rate, unusual water levels), required maintenance, and response timeframes.
28. Page 6-1, Section 6.1. This section must indicate that sampling will begin with background wells, followed by wells with increasing contaminant concentrations or detection frequency. MINS should add a section that lists the tasks to be performed prior to sampling (e.g., identifying well sampling order, identifying wells for field QA/QC samples).
29. Page 6-1, Section 6.1.1. After Step 4, include a step to decontaminate the water level probe prior to taking the water-level measurement.
30. Page 6-3, Step 17. The procedure should be modified as follows: (1) complete sample labels prior to sample collection; and (2) as each sample container is filled, place the container in the cooler on ice.
31. Page 6-4, Step 4. See Specific Comment 29.
32. Page 6-4, Step 6. A 3 gallon per minute (gpm) purge rate is excessive for low-yield wells (see Section 7.5 of DTSC (2004)). The rapid purge rate causes unnecessary disturbance of groundwater around the well. Of particular concern is that the rapid drawdown in the well allows cascading of groundwater down the screened interval, essentially stripping any VOCs that are present and potentially altering the chemistry of inorganic parameters. The procedure for low-yielding wells must be revised to propose purging and sampling rates that will produce samples representative of groundwater quality. The procedure must also be revised to state that field parameter measurements will be obtained during purging.
33. Page 6-4, Step 10. The procedure should state that samples from the low yielding wells will be collected on the same day the wells were purged.

Chip Gribble
Page 14
July 19, 2004

34. Page 6-5, Section 6.1.3. If multiple water level sounding probes are used for a given water level measurement event, the serial number of these probes should be recorded on the Well Water Level Sheet.
35. Page 6-5, Second Paragraph. This sentence should be revised as follows, "All measurements will be performed with a *decontaminated* water level sounding probe..." Also, MINS should address any separate procedures that are necessary if nonaqueous phase liquid is expected to be encountered in the well.
36. Page 6-5, Step 5. This step should be prefaced with "if total depth measurements are required for a given sampling event..." Otherwise, this section of the WQSAP requires total depth measurements each time a water level is obtained. For clarity, MINS should consider including the procedures for total well depth measurement in a separate section. The WQSAP must specify a frequency for total depth measurement.
37. Page 6-5, Step 7. This sentence should be revised as follows: *Decontaminate all portions of the probe and tape that come into contact with groundwater or the ground surface by rinsing it in a gallon jug of deionized water and wipe it with a clean paper towel. Also indicate that the probe will be stored in a plastic bag or other container between wells. Additional decontamination procedures must be used for water level probes that contact non-aqueous phase liquid.*
38. Page 6-7, Section 6.3. This section should be revised to indicate that meters equivalent to the YSI Model 556 multi-parameter meter and Hanna Turbidity Meter may also be used to obtain field parameter measurements.
39. Page 7-3, Section 7.1.3. This section should also state that water-level meters will be *calibrated more frequently* if the calibration is suspected to have changed.
40. Table 2. In accordance with General Comment 6, this table must be revised to include all wells and piezometers that will be used to construct groundwater elevation contour maps in the vicinity of IA H1.
41. Table 4. MINS should add the frequency of total well depth measurements in this table.
42. Table 14. The following information must be added to this table: maximum purge, rate, allowable drawdown, and pump intake position.

Chip Gribble
 Page 15
 July 19, 2004

REFERENCES

DTSC. 2001. *Guidance Document, Monitoring Requirements for Permitted Hazardous Waste Facilities*. July 2001.
 (www.dtsc.ca.gov/PublicationsForms/HWMP_Guidance_Monitoring-Requirements.pdf)

DTSC. 2004. *Comprehensive Groundwater Monitoring Evaluation Report, Mare Island Naval Shipyard, RCRA Landfill, Surface Impoundments; and IWTP Pipeline*. April 2004.

TtEMI. 2002. *Final Compilation of Technical Memoranda on Ambient Analyses of Metals in Soils and Groundwater, Mare Island, California*. April 19, 2002.

Weston. 2004. *RCRA/Facility Landfill, 2003 Annual Groundwater Monitoring Report, Mare Island, Vallejo, California*. February 27, 2004.

cc: Wade Cornwell, Hazardous Waste Management Program
 Patti Barni, Statewide Compliance Division

Table 1
Summary of California Code of Regulations, Title 22
Requirements for Establishing Background Concentration Limits

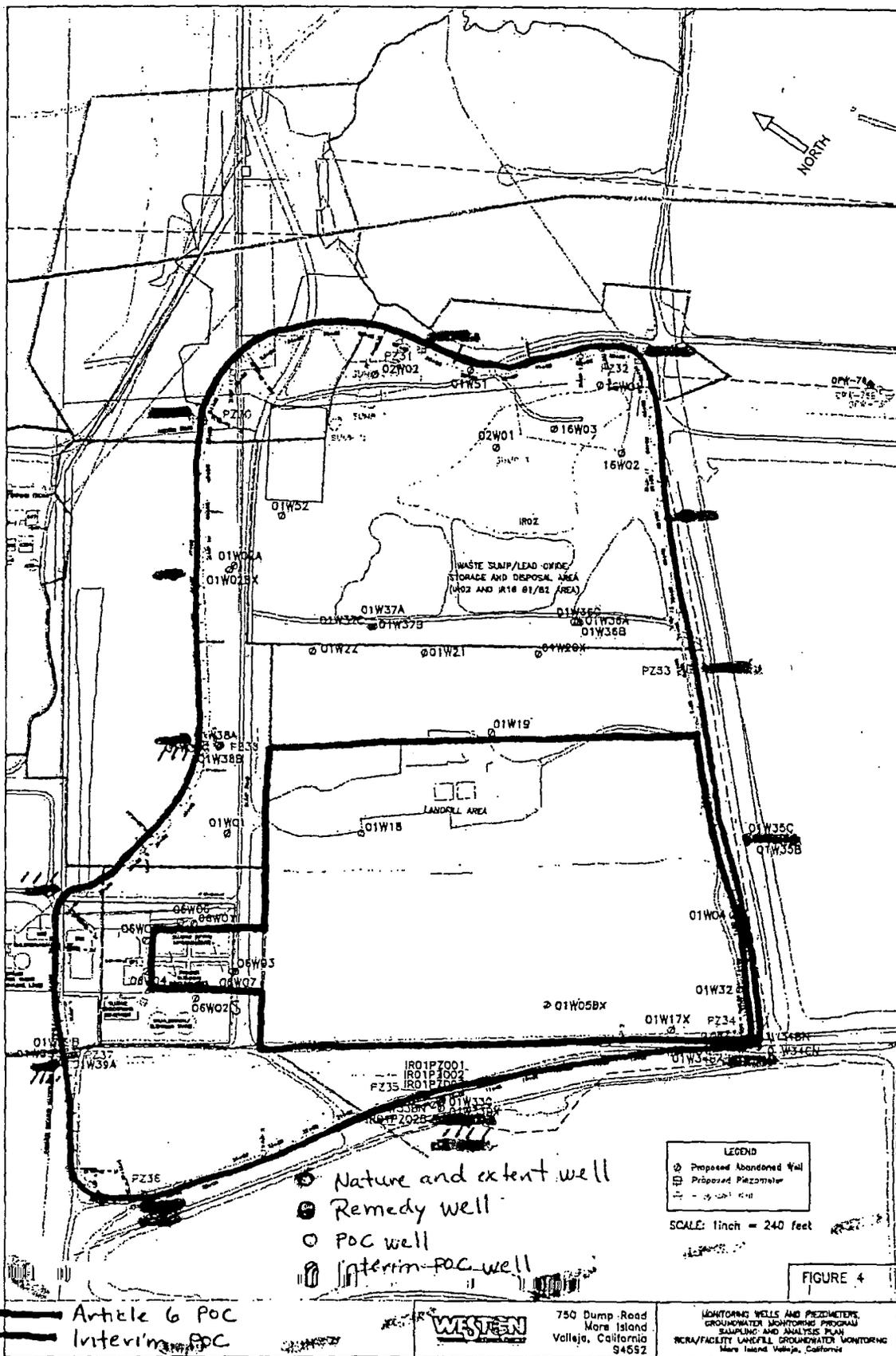
Section No.	Description (refer to complete regulatory citation for exact requirement)
66265.97(e)(6)	Establish a data set to be used to calculate background values.
66265.97(e)(7)	-Select one of the statistical methods specified in subsection (e)(8). Provide detailed description of criteria to be used for determining statistically significant evidence of a release and determining compliance with the water quality protection standard. -Demonstrate that use of the selected statistical method is protective of human health and the environment. -Demonstrate that method complies with performance standards of subsection (e)(9).
66265.97(e)(8)	Specify one of the listed statistical methods in the WQSAP.
66265.97(e)(9)	-Comply with the listed performance standards. -Statistical method must include procedures to control or correct for seasonal and spatial variability as well as temporal correlation in the data.
66265.97(e)(10)	-Select and justify use of the procedure for determining background value for each COC and monitoring parameter. -If parameter does not show natural variation, establish a procedure for determining the background value. -If parameter shows natural variation, statistical method to determine background should include a procedure updating the background value.
66265.97(e)(11)	-If parameter does not show natural variation, establish background value. -If parameter shows natural variation, provide detailed description of procedure to be used to establish and update background value.
66265.97(e)(12)	-For each COC and monitoring parameter, specify the procedure for establishing background values. -For each COC and monitoring parameter, specify the sampling methods that will be used to support establishment of the background value, determination of statistically significant release, and assessment of compliance with GWPS.

Chip Gribble
 Page 16
 July 19, 2004

Table 2
GSU's Recommendation for Well Decommissioning

Well Number	Location Relative to Slurry Wall	Current Well Status	Weston Proposal	GSU's Recommendation
01W01	Inside	Existing	Decommission	1
01W02A	Inside	Decommissioned	n/a	1
01W04	Inside	Existing	Decommission	1
01W18	Inside	Existing	Decommission	1
01W19	Inside	Existing	Decommission	1
01W21	Inside	Existing	Decommission	1
01W22	Inside	Existing	Decommission	1
01W32	Inside	Existing	Decommission	1
01W33A	Outside	Existing	Decommission	2
01W33BN	Outside	Existing	Decommission	2
01W33C	Outside	Existing	Decommission	2
01W34AN	Outside	Existing	Retain	2
01W34BN	Outside	Existing	Retain	2
01W34CN	Outside	Existing	Retain	2
01W35A	Outside	Existing	Retain	2
01W35B	Outside	Existing	Retain	2
01W35C	Outside	Existing	Retain	3
01W36A	Inside	Existing	Decommission	1
01W36B	Inside	Existing	Decommission	2
01W36C	Inside	Existing	Decommission	3
01W37A	Inside	Existing	Decommission	1
01W37B	Inside	Existing	Decommission	2
01W37C	Inside	Existing	Decommission	3
01W38A	Inside	Existing	Decommission	4
01W38B	Inside	Existing	Decommission	4
01W38C	Inside	Existing	Decommission	5
01W39A	Within	Decommissioned	n/a	4
01W39B	Within	Decommissioned	n/a	4
01W39C	Within	Decommissioned	n/a	5
01W51	Within	Decommissioned	n/a	n/a
01W52	Inside	Decommissioned	n/a	n/a
02W01	Inside	Decommissioned	n/a	n/a
02W02	Inside	Decommissioned	n/a	n/a
16W01	Inside	Decommissioned	n/a	n/a
16W02	Inside	Decommissioned	n/a	n/a
16W03	Inside	Decommissioned	n/a	n/a
06W01	Inside	Existing	Decommission	1
06W02	Inside	Existing	Decommission	1
06W03	Inside	Existing	Decommission	1
06W04	Inside	Existing	Decommission	1
06W05	Inside	Existing	Decommission	1
06W06	Inside	Existing	Decommission	1
06W07	Inside	Existing	Decommission	1

- 1 Decommission, but retain if useful for piezometric monitoring purposes (see General Comment 6).
- 2 Retain well for groundwater sampling and piezometric monitoring (see General Comment 8).
- 3 Retain well for piezometric monitoring (see General Comment 6).
- 4 Decommission and replace well at location outside slurry wall alignment (see General Comment 8).
 Use replacement well for groundwater sampling and piezometric monitoring.
- 5 Decommission. If needed, replace well at location outside of slurry wall alignment.
- n/a Not applicable



Article 6 POC
 Interim POC
 Nature and extent data gap

FIGURE 4
 Figure 1 SWBZ Well Network

