Appendix I. Groundwater Beneficial Use Evaluation

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Acronyms and Abbreviations

Bay	San Francisco Bay
BCT	BRAC Cleanup Team
bgs	below ground surface
BRAC	Base Realignment and Closure
DWR	Department of Water Resources
EPA	U.S. Environmental Protection Agency
FS	feasibility study
gpd	gallon per day
HGAL	Hunters Point groundwater ambient level
HPS	Hunters Point Shipyard
IR	installation restoration
LFR	Levine-Fricke-Recon, Inc.
MCL	maximum contaminant level
mg/L	milligram per liter
Navy	Department of the Navy
NFECSW	Naval Facilities Engineering Command, Southwest Division
RI	remedial investigation
RWQCB	San Francisco Bay Regional Water Quality Control Board
SSF	site-specific factor
SWRCB	State of California Water Resources Control Board
TDS	total dissolved solids
TtEMI	Tetra Tech EM, Inc.
Uribe	Uribe & Associates

Section I1. Introduction

This appendix presents an evaluation of groundwater beneficial uses for the A- and B-aquifers at Parcel E-2, Hunters Point Shipyard (HPS). The format of this evaluation and much of the information presented has been adopted from material presented in the groundwater beneficial use evaluation for Parcel D (Tetra Tech EM, Inc. [TtEMI], 1999; TtEMI, 2002). This evaluation was conducted in accordance with the following regulatory guidance documents:

- Guidelines for Ground-Water Classification under the U.S. Environmental Protection Agency (EPA) Ground-Water Protection Strategy. (EPA, 1986)
- Functional Equivalent Document, Proposed Groundwater Amendments to the Water Quality Control Plan (Basin Plan) Final. (San Francisco Bay Regional Water Quality Control Board [RWQCB], 2000)
- Resolution No. 88-63. Sources of Drinking Water Policy Resolution (California State Water Resources Control Board [SWRCB], 1988).
- Water Well Standards: State of California. Bulletin 74-81. (Department of Water Resources [DWR], 1981)
- California Well Standards. Bulletin 74-90 (DWR, 1991)

This appendix includes evaluations of potential beneficial uses (Section I2), federal and State groundwater classification criteria (Section I3), and site-specific factors (SSFs) (Section I4). Site-specific factors include aquifer characteristics such as thickness, depth to groundwater, measured total dissolved solids (TDS) concentrations, groundwater yield, and proximity to saltwater. Site-specific factors also include factors, such as historical and current groundwater use, existence of institutional controls on aquifer use, and cost of cleanup to federal drinking water standards. The process of identifying these SSFs is discussed in Subsection I2.3.2.

The conclusions of the beneficial use evaluation, provided in Section I5, were used to support several components of the Parcel E-2 Remedial Investigation (RI) / Feasibility Study (FS), including:

- Identification and selection of appropriate evaluation criteria for the groundwater nature and extent evaluation (Section 5)
- Selection of appropriate potential exposure pathways evaluated in the human health risk assessment (Section 7 and Appendix K)
- Evaluation of applicable or relevant and appropriate requirements (Section 10)
- Evaluation of remedial alternatives for groundwater (Sections 11 to 14)

Section I2. Potential Groundwater Beneficial Uses

According to the RWQCB Basin Plan, groundwater at Parcel E-2 has the following potential beneficial uses (RWQCB, 2000):

1. Agricultural water supply
2. Industrial service water supply
3. Industrial process water supply
4. Surface water replenishment
5. Municipal and domestic drinking water supply

The potential for A- and B-aquifer groundwater at Parcel E-2 to be used for the first four beneficial uses identified above is evaluated in the following subsections. The remainder of this appendix provides an evaluation of the potential for A- and B-aquifer groundwater to be used for the last beneficial use identified above (municipal and domestic drinking water supply).

I2.1. AGRICULTURAL AND INDUSTRIAL USES

Groundwater at Parcel E-2 has not been used for agricultural or industrial purposes in the past, and is unlikely to be used as such in the future due to generally high TDS, chloride, salinity, specific conductance, and hardness values (see data in Appendix G of TtEMI, 2004). Furthermore, use of Parcel E-2 groundwater for industrial or agricultural purposes is not part of the City of San Francisco's redevelopment plan.

I2.2. SURFACE WATER REPLENISHMENT

Groundwater at Parcel E-2 is a source of recharge to the San Francisco Bay (Bay). An evaluation of the potential for chemicals in groundwater to pose a risk to aquatic ecological receptors in the Bay is addressed in Appendix M of this Parcel E-2 RI/FS report by screening A- and B-aquifer groundwater data against promulgated criteria for saltwater aquatic life. This screening-level evaluation is considered preliminary because groundwater near the shore mixes with Bay water prior to discharging into the Bay. Therefore, the direct comparison of groundwater data against aquatic criteria is used primarily as a tool in identifying chemicals of potential concern in groundwater that may pose a risk to aquatic receptors in the Bay. The identified chemicals in Appendix M are considered to be of <u>potential</u> (emphasis added) concern given the qualitative nature of the analysis. A quantitative analysis that would specify chemicals of concern and risk-based remediation goals cannot be prepared until a method for comparing groundwater data to aquatic criteria, in a manner that accounts for the near-shore mixing process, has been agreed to by the Navy and the regulatory agencies.

I2.3. MUNICIPAL AND DOMESTIC DRINKING WATER SUPPLY

The following beneficial use evaluations for municipal and domestic drinking water supply have previously been performed for Parcel E-2 groundwater:

1. The original Parcel E[1] RI report concluded that groundwater in all water bearing zones underlying Parcel E-2 has a beneficial use only as a source of surface water recharge (TtEMI, Levine-Fricke-Recon Inc. [LFR], and Uribe & Associates [Uribe]; 1997).
2. In response to requests from the EPA and the RWQCB, the Navy developed a technical approach to evaluate drinking water as a potential beneficial use for A-aquifer groundwater. The initial approach was presented in a 1999 technical memorandum specific to Parcel D (TtEMI, 1999), and a similar evaluation approach was planned for Parcels C and E.
3. Following comments on the technical memorandum by the regulatory agencies, the Navy agreed to refine the evaluation approach to consist of an initial determination (for Parcels C, D, E, and E-2) based strictly on federal and State groundwater classification criteria, which would be followed by more detailed evaluations (to include SSFs) in the revised FS reports for the respective parcels. The report titled "Revised Final Groundwater Beneficial Use for A-aquifer Parcels C, D, and E" provided the initial determination by identifying groundwater areas at Parcel E-2 that have TDS concentrations that meet federal and State groundwater classification criteria and recommended further evaluation in the FS with respect to SSFs (TtEMI, 2001).
4. A letter from the Department of the Navy (Navy) to the RWQCB requested an exemption for the A-aquifer at HPS from consideration as a municipal or domestic water supply source (Naval Facilities Engineering Command Southwest [NFECSW], 2003) and included updated figures and tables showing TDS concentrations and ambient metal concentrations in the A-aquifer that have exceeded maximum contaminant levels. The RWQCB determined that the A-aquifer at HPS is not suitable or potentially suitable as a municipal or domestic water supply, and meets exemption criteria in SWRCB Resolution 88-63 and RWQCB Resolution 89-39 (RWQCB, 2003).

The following subsections briefly discuss the three evaluations conducted prior to this Parcel E-2 RI/FS. The Parcel E-2 RI/FS report, which this appendix supports, evaluates use of the A-aquifer as a potential

[1] In September 2004 the Navy divided Parcel E into two parcels (E and E-2). Discussions within this appendix that reference reports published prior to September 2004 refer to the portion of Parcel E that became Parcel E-2.

drinking water supply aquifer according to federal criteria, and evaluates use of the B-aquifer as a potential drinking water supply aquifer according to both federal and State criteria.

I2.3.1. Parcel E Remedial Investigation and Feasibility Study (1997 to 1998)

During the original RI and FS process, groundwater from the three water bearing zones at Parcel E was not considered a viable potential drinking water source because of: 1) the thinness of the aquifers; 2) its limited horizontal extent; 3) its generally low to variable water production potential; 4) its generally high TDS content, chloride content, salinity, specific conductance, and hardness; 5) its potential for saline Bay water intrusion; 6) historic industrial use at Parcel E; and 7) City of San Francisco policy and permit conditions regarding groundwater use within the city (TtEMI, 1998). As a result, risk to human health through the drinking water exposure pathway was not evaluated in the RI report (TtEMI, LFR, and Uribe; 1997).

I2.3.2. Drinking Water Beneficial Use Evaluation for Parcel D (1999)

In 1999, the EPA and the RWQCB requested that the Navy formally evaluate drinking water as a potential beneficial use for groundwater in the A-aquifer (at Parcels C, D, E, and E-2) using federal and State groundwater classification criteria. The EPA and the RWQCB requested that the Navy: 1) identify A-aquifer groundwater areas that could be used as future drinking water sources based on federal and State groundwater classification criteria; and 2) evaluate whether these groundwater areas contain hazardous substances at concentrations exceeding drinking water standards.

The Base Realignment and Closure (BRAC) Cleanup Team (BCT) held several meetings between September and November 1999 to discuss the methodology for the drinking water beneficial use evaluation. During the meetings, the BCT agreed that, because the federal and State criteria differed, groundwater should be evaluated separately for each set of criteria. The BCT also agreed that SSFs could be considered in the evaluation of the potential for groundwater to be used as a drinking water source. The EPA provided the Navy with a list of SSFs that can be considered in evaluating the use of groundwater as a potential source of drinking water in an attachment to a 1998 letter (referred to as Enclosure 5) (EPA, 1998; EPA, 1999). The following SSFs were considered: (1) aquifer thickness, (2) TDS concentrations measured, (3) groundwater yield, (4) proximity to saltwater and the potential for saltwater intrusion, (5) the quality of underlying water-bearing units, (6) the existence of institutional controls on well construction or aquifer use, (7) information on current and historical use of the aquifer on HPS or in the community surrounding HPS, and (8) the cost of cleanup to federal drinking water standards. In addition, the BCT considered depth to groundwater a relevant SSF because shallow aquifers are susceptible to contamination and may not be suitable sources of drinking water. Though the RWQCB did not provide a written list of SSFs, the RWQCB stated in meetings that acceptable SSFs included local and State ordinances as well as most of the federal SSFs. The letter from the EPA and Enclosure 5 are included as an attachment to this appendix (Attachment I-1).

Based on the 1999 meetings, the Navy conducted a drinking water beneficial use evaluation of A-aquifer groundwater at Parcel D that considered both federal and State groundwater classification criteria and SSFs. Results of the evaluation were presented in a technical memorandum dated November 24, 1999 (TtEMI, 1999), and a similar evaluation approach was planned for Parcels C and E.

I2.3.3. Groundwater Beneficial Use Determination for the A-Aquifer at Parcels C, D, and E (2000 to 2001)

In 2000, the RWQCB stated that use of SSFs was not appropriate under existing State regulations and that the Navy could not consider SSFs when identifying areas with a potential drinking water beneficial use. The RWQCB stated that the Navy must consider all areas of the A-aquifer with TDS concentrations below the State criterion of 3,000 milligrams per liter (mg/L) to be potential sources of drinking water regardless of SSFs; that is, the Navy must assume that the drinking water exposure pathway is complete for groundwater areas that meet the State well yield and TDS criteria, regardless of other factors that would affect using the groundwater as a source of potable water. RWQCB further stated that, for areas that meet the State TDS criterion, the Navy is required to develop alternatives and estimate costs to remediate hazardous substances to concentrations that meet drinking water standards. RWQCB stated that SSFs may only be considered during the evaluation of the technical and economic feasibility of remedial alternatives developed in the FS.

The Navy did not agree with the RWQCB's position. To move the RI/FS process forward, however, the Navy agreed to develop a new beneficial use technical memorandum, and to address the issue in more detail in the Parcel E-2 RI/FS report. The Navy prepared a new groundwater beneficial use technical memorandum for the A-aquifer at Parcels C, D, and E and submitted a draft version to the BCT in November 2000. The new approach used in the technical memorandum consisted only of an initial screening of groundwater based on the federal and State groundwater classification criteria and did not consider SSFs. The technical memorandum was revised based on agency comments and reissued in April 2001. The technical memorandum was revised again in August 2001 to include new TDS data collected during the Phase II groundwater data gaps investigation. The revised technical memorandum identified groundwater areas at Parcels C, D, and E that meet the federal and State groundwater classification criteria (TtEMI, 2001). The technical memorandum reported that areas that met the criteria required further evaluation in the FS to determine if SSFs adversely affected the potential for groundwater in these areas to be used as a drinking water source.

I2.3.4. Letter to RWQCB Requesting A-Aquifer Exemption from Potable Water Designation

In a letter to the RWQCB, dated August 11, 2003 (NFECSW, 2003), the Navy presented an additional evaluation and emphasized that the A-aquifer is not reasonably expected to supply a public water system because of: 1) high TDS concentrations in much of the A-aquifer; 2) the widespread presence of naturally occurring contaminants in the A-aquifer that can not be reasonably treated; 3) the presence of storm drain and sanitary sewer lines located beneath the A-aquifer water table; 4) the potential for saltwater intrusion should groundwater extraction be attempted; and 5) the existence of a high quality public water supply system that is in place and operational.

In a response to the Navy's letter, RWQCB declared that the A-aquifer at HPS is not suitable or potentially suitable as a municipal or domestic water supply, and meets exemption criteria in SWRCB Resolution 88-63 and RWQCB Resolution 89-39 (RWQCB, 2003). This determination is based on the following factors:

- TDS concentrations in A-aquifer groundwater exceed 3,000 mg/L
- Artificial fill composes most of the A-aquifer
- Some naturally occurring dissolved metals concentrations exceed drinking water maximum contaminant levels (MCLs) when the metal is at or below the estimated Hunters Point groundwater ambient levels (HGAL)
- There is no historical, present, or planned future use of groundwater at HPS
- Well construction requirements prohibit water supply wells in most parts of HPS
- Groundwater extraction would cause salt water intrusion in areas where potable wells could conceivably be installed

Although the 2003 letter from the RWQCB exempted the A-aquifer from being considered as a drinking water aquifer, the EPA was not asked at that time to provide concurrence regarding this exemption. The Navy is in the process of preparing an exemption request letter for the A-aquifer at Parcels C, D, E, and E-2, which is anticipated to be submitted to the EPA for review and comment concurrent with the Parcel E-2 RI/FS.

Section I3. Groundwater Classification

The beneficial use evaluation presented in this appendix is designed to evaluate use of the A-aquifer (at Parcel E-2) as a potential drinking water supply aquifer according to federal criteria, and to evaluate use of the B-aquifer (at Parcel E-2) as a potential drinking water supply aquifer according to both federal and State criteria. This section identifies the groundwater areas that meet the federal and State groundwater classification criteria. Subsections I3.1 and I3.2 present the classification for the A- and B-aquifers, respectively.

I3.1. A-AQUIFER CLASSIFICATION

This section presents federal and State groundwater classification criteria and evaluates the A-aquifer at Parcel E-2 against the federal criteria.

I3.1.1. Federal Criteria

Federal groundwater classification criteria identify three classes of groundwater (EPA, 1986). Class I groundwater is an irreplaceable source of drinking water or is ecologically vital. Class II groundwater is a current or potential source of drinking water that has other beneficial uses. Class III groundwater is not a potential source of drinking water and is of limited beneficial use. The EPA considers groundwater to be Class I or Class II if the following criteria are met:

- The TDS concentration is less than 10,000 mg/L
- A minimum well yield of 150 gallons per day (gpd) or 0.104 gallon per minute is achievable

Transmissivities measured at Parcel E-2 during the RI (TtEMI, LFR, and Uribe; 1997) suggest that the minimum well yield of 150 gpd would be met for the A-aquifer. Therefore, the classification of the A-aquifer, relative to the federal criteria, focuses on measured TDS concentrations. The complete TDS data set for all Parcel E-2 wells is presented on Table I-1. Figure I-1 presents the maximum historical TDS concentrations (from data collected through October 2002) detected in A-aquifer groundwater monitoring wells at Parcel E-2, along with contours for the federal and State TDS criteria, and the boundaries of the installation restoration (IR) sites in the area of Parcel E-2. Parcel E-2 consists primarily of IR Site 1/21 (IR-1/21); however, a small portion of IR Site 2 (IR-02) and a portion of IR Site 76 (IR-76) are also located within Parcel E-2.

Figure I-1 was created from the Parcel E Groundwater Summary Report (TtEMI, 2004) using data from numerous sampling locations located within or near Parcel E-2, including wells associated with IR Sites

1/21, 2, 4, 12, 56, and 72. This figure indicates that maximum TDS concentrations in the A-aquifer generally exceed 10,000 mg/L along the Parcel E-2 shoreline (including a small portion of IR-02 located within Parcel E-2), are between 3,000 and 10,000 mg/L in the central portion of Parcel E-2, and are less than 3,000 mg/L in the northern part of the parcel (including a small portion of IR-76 located within Parcel E-2). In addition, Figure I-1 depicts two isolated areas in the southeast portion of Parcel E-2 where TDS concentrations are greater than 10,000 mg/L (at well IR01MW42A) and are less than 3,000 mg/L (at wells IR01MW44A and IR12MW11A).

Class II groundwater is identified in portions of the A-aquifer where maximum TDS concentrations are less 10,000 mg/L. As shown on Figure I-1, Class II groundwater exists throughout most of Parcel E-2, including IR-1/21 and portions of IR-02 and IR-76. Because Parcel E-2 consists primarily of IR-1/21, and contains only small portions of IR-02 and IR-76, individual SSF evaluations for each IR site are not presented in Subsection I4.1. Instead, the SSF evaluation is performed for all Parcel E-2 areas with Class II groundwater. This approach differs from the approach employed at Parcel D, where areas with Class II groundwater contain 18 different IR Sites and the SSF evaluation was performed on a site-by-site basis.

I3.1.2. State Criteria

Under SWRCB Resolution No. 88-63, all groundwater is considered potentially suitable for municipal or domestic supply unless at least one of the following conditions applies (SWRCB, 1988):

1. The TDS concentration exceeds 3,000 mg/L and the groundwater is not reasonably expected by the RWQCB to supply a public water system
2. The groundwater is contaminated, either by natural processes or by human activity, to the degree that it cannot reasonably be treated for domestic use
3. The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gpd

RWQCB has issued a letter stating that the A-aquifer at HPS is not considered a potential source of drinking water, based on the criteria listed in Subsection I2.3.4; therefore, no additional evaluation of State groundwater criteria is necessary for the A-aquifer.

I3.2. B-AQUIFER CLASSIFICATION

This section evaluates groundwater in the B-aquifer at Parcel E-2 with respect to federal and State groundwater classification criteria.

I3.2.1. Federal Criteria

TDS data are available for the six wells installed in the uppermost B-aquifer at Parcel E-2 (Table I-1). Maximum TDS concentrations in these wells ranged from 1,600 to 5,120 mg/L, and this data is presented on Figure I-2. Based on the federal criteria for TDS concentrations, the limited amount TDS data indicate that B-aquifer groundwater throughout Parcel E-2 is considered Class II groundwater.

I3.2.2. State Criteria

As shown on Figure I-2, maximum TDS concentrations measured in western and northern portions of the uppermost B-aquifer at Parcel E-2 are less than 3,000 mg/L, and groundwater in these areas is considered a potential drinking water source according to the State TDS criterion.

Section I4. Site-Specific Factor Evaluation

This section of the beneficial use evaluation examines SSFs for Parcel E-2 groundwater to evaluate if conditions other than TDS concentrations affect the potential for groundwater beneath the site to be used as a drinking water source. As discussed in Subsection I3.1.1, individual SSFs were evaluated for all Parcel E-2 areas with Class II groundwater, and the SSFs were then considered together using a weight-of-evidence approach to assess the overall feasibility of using groundwater as a drinking water source at Parcel E-2. The methodology of the SSF evaluation is consistent with the approach established for Parcel D (TtEMI, 1999; TtEMI, 2002) and is summarized below.

The SSFs used in this evaluation were based on input from the EPA, in its correspondence to the Navy (EPA, 1998; EPA, 1999), and input from the BCT. The EPA correspondence is included as Attachment I-1. Based on this input, the following SSFs were considered for both the A- and B-aquifers at Parcel E-2: 1) aquifer thickness; 2) depth to groundwater; 3) measured TDS levels; 4) actual groundwater yield; 5) proximity to saltwater and the potential for saltwater intrusion; 6) existence of institutional controls on well construction or aquifer use; 7) information on current and historic use of the aquifer at HPS or in the community surrounding HPS; and 8) the cost of cleanup to federal drinking water standards. A ninth SSF, quality of the underlying water-bearing units, was evaluated for the A-aquifer; however, this SSF was not evaluated for the B-aquifer because of a lack of data.

SSF evaluations for the A- and B-aquifers are presented in Subsections I4.1 and I4.2, respectively.

I4.1. A-AQUIFER EVALUATION

Because the RWQCB has issued a letter stating that the A-aquifer at HPS is not considered a potential source of drinking water, no additional evaluation of State groundwater criteria is necessary for the A-aquifer. Therefore, the SSF evaluation presented in the following subsections is limited to the portion of the A-aquifer identified as Class II groundwater based on federal classification criteria.

The methods for evaluating each SSF and a summary of each SSF evaluation are described in the following subsections. The overall results of the SSF evaluation for the A-aquifer are summarized in Table I-2. As shown in this table, Class II A-aquifer groundwater underlying Parcel E-2 has a low potential to be used as a drinking water source based on the SSFs.

I4.1.1. Aquifer Thickness

According to guidelines provided by the EPA, the aquifer thickness SSF is intended to assess the size of the contaminated groundwater resource (with concentrations greater than MCLs) that may be classified as potable (EPA, 1999). A review of Figure I-1 indicates that groundwater beneath approximately 80 percent of the 47.4-acre area of Parcel E-2 meets the federal TDS criterion for classification as Class II groundwater (TDS < 10,000 mg/L). A-aquifer wells located throughout this area contain various chemicals (most notably antimony, arsenic, and benzene) at concentrations greater than their corresponding primary MCLs.

As described in Section 2.2.1.1 of the Parcel E-2 RI/FS report, the A-aquifer is approximately 5 to 15 feet thick from north to south across Parcel E-2. Assuming an average saturated thickness of 10 feet across the approximately 38-acre area with Class II groundwater, and assuming an average porosity of 25 percent, the size of the potentially potable A-aquifer groundwater resource is estimated at 95 acre-feet.

Because of the limited size of this groundwater resource, continuous pumping of any A-aquifer well at Parcel E-2 will likely induce saltwater intrusion by nearby high-TDS waters (see Subsection I4.1.5), which would further degrade the groundwater resource. Consequently, the entire Class II A-aquifer at Parcel E-2 is considered to have low potential for use as a drinking water source, based on the aquifer thickness SSF.

I4.1.2. Depth to Groundwater

Groundwater at shallow depths is generally vulnerable to contamination because attenuation mechanisms in the vadose zone may not effectively reduce contaminant concentrations in infiltrating water over short vertical distances. In addition, the DWR Well Standards (Bulletins 74-81 and 74-90) require the space between the well casing and the wall of the borehole (the annular space) to be effectively sealed to prevent the annular space from becoming a preferential pathway for movement of contaminants from the surface to the well screen (DWR; 1981 and 1991). A domestic well requires a minimum annular seal thickness of at least 20 feet and a community water supply well requires a minimum annular seal thickness of at least 50 feet (DWR; 1981 and 1991). For these reasons, most potable water supply wells are screened across deeper stratigraphic intervals or below impermeable strata, if possible. At Parcel E-2, the maximum depth to groundwater is 15 feet below ground surface (bgs), and most groundwater is encountered at less than 10 feet bgs. Because the depth to groundwater is so shallow at Parcel E-2, it is unlikely that a domestic well could be installed in the A-aquifer with the required 20-foot minimum well seal. Consequently, the entire Class II A-aquifer at Parcel E-2 is considered to have low potential for use as a drinking water source, based on the depth to groundwater SSF.

I4.1.3. Measured TDS Concentrations

The EPA recognizes that all groundwater with TDS concentrations below 10,000 mg/L is not of equal value as a potential drinking water resource (EPA, 1999). Groundwater extracted from areas with high TDS concentrations would require treatment to meet drinking water quality objectives, and would therefore have lower potential for use as a potable water source than groundwater with lower TDS concentrations.

For the Parcel D TDS SSF evaluation, the Navy identified a ranking system based on TDS concentrations and the federal and State TDS criteria. The same ranking system was used in this evaluation for Parcel E-2, and it includes the following criteria:

- TDS concentrations less than or equal to 3,000 mg/L are associated with a high potential for use as a drinking water source based on this SSF.
- TDS concentrations greater than 3,000 mg/L but less than 7,500 mg/L are associated with a medium potential for use as a drinking water source based on this SSF.
- TDS concentrations greater than or equal to 7,500 mg/L are associated with a low potential for use as a drinking water source based on this SSF.
- If a wide range of TDS values were measured, the evaluation was based on the range of TDS concentrations found at most of the site (i.e. the most predominant TDS value, or range of values, at the site)

Because a wide range of TDS values have been measured at A-aquifer wells across Parcel E-2, the average TDS concentration, for the last three sampling events performed in 2001 and 2002, is assumed to be representative of the TDS concentration found at most of Parcel E-2. This average concentration is 5,592 mg/L. Consequently, the Class II A-aquifer at Parcel E-2 is considered to have medium potential for use as a drinking water source, based on the measured TDS concentration SSF.

I4.1.4. Actual Groundwater Yield

There are no direct data on the actual yield of the A-aquifer. However, based on the reported transmissivities and hydraulic conductivities (see RI/FS Table 2-1) for the A-aquifer at Parcel E-2 calculated from pumping tests performed during the RI (TtEMI, LFR, and Uribe; 1997), A-aquifer wells may be capable of sustaining the minimum required well yield of 150 gpd, per the federal classification criterion. Based on this assumption, the Class II A-aquifer at Parcel E-2 is considered to have high potential for use as a drinking water source, based on the actual groundwater yield SSF.

I4.1.5. Proximity to Saltwater

Groundwater quality in potable wells is at risk if the wells are located close to areas where groundwater exhibits high salinity or are located close to the Bay. Long-term groundwater extraction from wells located in these areas could result in degradation of water quality as nearby saltwater flows toward the wells to replace the extracted groundwater. For the purposes of the evaluation, saltwater areas were defined as areas where TDS concentrations exceed 10,000 mg/L. The following criteria were used to rank the potential for groundwater at Parcel E-2 to be used as a drinking water source, based on proximity to saltwater:

- If groundwater is within 150 feet of a saltwater area (an area with TDS concentrations greater than 10,000 mg/L), it is determined to have a low potential for use as a drinking water source.
- If groundwater is 150 to 250 feet from a saltwater area, it is determined to have a medium potential for use as a drinking water source.

- If groundwater is more than 250 feet from a saltwater area, it is determined to have a high potential for use as a drinking water source.

As shown on Figure I-1, areas with TDS concentrations exceeding 10,000 mg/L are located throughout the Parcel E-2 shoreline and an isolated area in the southeast portion of Parcel E-2 (around well IR01MW42A). Based on this distribution of maximum TDS concentrations, the majority of Parcel E-2 is located within 150 to 250 feet of a saltwater area. Consequently, the Class II A-aquifer at Parcel E-2 is considered to have medium potential for use as a drinking water source, based on the proximity to saltwater SSF.

I4.1.6. Historical and Current Groundwater Use

A-aquifer groundwater at HPS has never been, and is not currently, used as a drinking water source (TtEMI, LFR, and Uribe; 1997). Also, it is unlikely for HPS to be used as a groundwater source because HPS is removed from the more potentially productive valley bottom of the Islais Valley Groundwater Basin to the west, where thicker alluvium is located beneath residential, nonurbanized, and nonindustrial land. HPS is dominated by bedrock, a thin alluvial aquifer, Bay Mud Deposits aquitard, and Artificial Fill (unlikely to be developed as an aquifer). Additionally, HPS has a relatively low freshwater recharge rate because of its high bedrock elevations compared to other areas. HPS also has a thin, tidally and salinity impacted (sea water intrusion) alluvial aquifer that is also not likely to attract groundwater development.

A more readily available and better quality water source is available through the Hetch Hetchy distribution system. San Francisco currently obtains its municipal water supply from the Hetch Hetchy watershed in the Sierra Nevada and plans to continue using the Hetch Hetchy watershed as a drinking water source in the reasonably foreseeable future (TtEMI, 1999). Based on historical and current use, Class II A-aquifer groundwater at HPS has low potential to be used as a future drinking water source.

I4.1.7. Existence of Institutional Controls on Aquifer Use

The City of San Francisco uses the Hetch Hetchy watershed as the drinking water source and is unlikely to change to a different drinking water source in the foreseeable future. Because high quality water is easily obtainable through the existing water distribution system, the City of San Francisco prohibits installation of domestic wells within city boundaries (TtEMI, 1999). In addition, the A-aquifer groundwater within the landfill waste can be considered leachate, and Title 27 of the California Code of Regulations (Sections 21160[a] and [c]) prohibits uncontrolled human contact with landfill leachate. As a result, installation of domestic wells would be prohibited in the majority of Parcel E-2. Based on the existence of local and State institutional controls that prohibit or severely restrict locations where new potable groundwater wells can be installed, there is low potential for Class II A-aquifer groundwater at Parcel E-2 to be used as a drinking water source.

I4.1.8. Cost of Cleanup to Federal Drinking Water Standards

Antimony, arsenic, chromium, magnesium, nickel, thallium, zinc, and other metals are components of the Franciscan Formation bedrock and bedrock-derived fill that underlies HPS. The A-aquifer contains fill material derived from the Fransciscan Formation. As part of the RI process at various HPS parcels, HGALs were estimated for naturally occurring metals (TtEMI, LFR, and Uribe; 1997). The HGALs for antimony, arsenic, and thallium exceeded their respective federal drinking water standards (i.e., primary MCLs). While the Navy has not calculated the cost to reduce concentrations of these naturally occurring metals to below MCLs in groundwater, the cost would likely be prohibitive, and it may be technically impracticable to do so.

The RI/FS evaluates the nature and extent of groundwater contamination (Section 5). The presence of the landfill at Parcel E-2 has introduced a variety of organic contaminants, most notably benzene, into the A-aquifer at concentrations exceeding MCLs. The cost to remove the landfill and other sources of groundwater contamination in the Panhandle Area and East Adjacent Area would be very high, as documented in the RI/FS (Section 14).

Based on this SSF, the Class II A-aquifer groundwater at Parcel E-2 is considered to have low potential to be used as a drinking water source.

I4.1.9. Quality of Underlying Water-Bearing Units

The A-aquifer is underlain by two water-bearing zones: the B-aquifer and the bedrock water-bearing zone. As discussed in Subsection 2.2.1 of the RI/FS, the presence of laterally continuous layers of silt and clay within the B-aquifer sediments serve to hydraulically isolate the uppermost portions of the B-aquifer (that are interconnected with the A-aquifer) from the lower portions of the B-aquifer. Groundwater monitoring has been limited to the uppermost B-aquifer, and no monitoring has been required in the lower portions of the B-aquifer or the bedrock water-bearing zone (see Subsection 2.2.1 of the RI/FS).

Maximum TDS concentrations in the uppermost B-aquifer range from 1,600 to 5,120 mg/L (Table I-1), or well below the federal TDS criterion of 10,000 mg/L. Although the B-aquifer, based on the available data, would qualify as a potential drinking water source per the federal classification criteria, it is not a current source of drinking water because of the local conditions discussed in Subsection I4.1.6.

Groundwater within the uppermost B-aquifer contains dissolved metals concentrations that exceed drinking water standards, most notably antimony and arsenic, but ambient levels have not been established for the B-aquifer, and thus it is unknown how much of the metal contamination is from naturally occurring sources. In addition, benzene is present in the uppermost B-aquifer at concentrations greater than the MCL. The presence of benzene in the uppermost B-aquifer is attributed to landfill waste in the northwest portion of Parcel E-2 that is in direct contact with B-aquifer sediments. Also, uppermost

B-aquifer groundwater at Parcel E-2 typically exceeds the secondary MCLs for chloride, iron, manganese, and sulfate.

Based on this SSF, the B-aquifer would be considered a poor quality drinking water source. For this reason, and considering that the B-aquifer is not a current drinking water source, the Class II A-aquifer at Parcel E-2 is considered to have low potential for use as a drinking water source, based on the quality of underlying water-bearing units SSF.

I4.1.10. Summary of the A-Aquifer Site-Specific Factor Evaluation

Although a portion of the A-aquifer at Parcel E-2 could be considered a potential drinking water source based on the federal TDS criteria, a range of other SSFs make use of A-aquifer groundwater for water supply extremely unlikely. Principal among these are:

1) Insufficient aquifer thickness to provide adequate supply
2) Depth to groundwater too shallow to support a sanitary seal and adequate screened interval
3) Lack of historical and current precedents for use of HPS groundwater for public water supply
4) Existence of local and State institutional controls that prohibit or severely restrict locations where new potable wells can be installed
5) Prohibitive cost to remove naturally occurring dissolved metals from the groundwater to meet federal and State drinking water standards
6) Poor quality of underlying B-aquifer relative to drinking water standards

Considering these factors together, the weight of evidence indicates that the Class II A-aquifer at Parcel E-2 is not a potential source of water for municipal or domestic water supply.

I4.2. B-AQUIFER EVALUATION

The SSFs used to evaluate the A-aquifer were also used to evaluate the beneficial use of groundwater in the B-aquifer. The only SSF not considered for the B-aquifer was the quality of the underlying bedrock water bearing zone, for which there is no data at Parcel E-2. As discussed in Subsection I3.2.1, B-aquifer groundwater throughout Parcel E-2 is considered Class II groundwater based on the federal TDS criterion (<10,000 mg/L). Because a portion of this Class II groundwater also meets the State TDS criterion (<3,000 mg/L), the SSF evaluation also provides information to evaluate the potential viability of the B-aquifer as a municipal or domestic water supply relative to other State criteria (primarily a qualitative assessment of the cost to cleanup the B-aquifer to drinking water standards).

The methods for evaluating each SSF were described in Subsection I4.1; however, the SSF evaluation for the B-aquifer is constrained by the fact that there is limited chemical and geologic data for this aquifer because, as discussed in Subsection I4.1.9, groundwater monitoring has been limited to the uppermost B-aquifer. Consequently, the SSF evaluation for the B-aquifer is less definitive compared to the SSF evaluation for the A-aquifer.

A summary of each SSF evaluation for the B-aquifer is provided in the following subsections. The overall results of the SSF evaluation are summarized in Table I-3. As shown in this table, Class II B-aquifer groundwater underlying Parcel E-2 has medium potential to be used as a drinking water source based on the SSFs.

I4.2.1. Aquifer Thickness

A review of Figure I-2 indicates that groundwater underneath all of Parcel E-2 meets the federal TDS criterion for classification as Class II groundwater (TDS < 10,000 mg/L). Wells in the uppermost B-aquifer contain various chemicals (most notably antimony, arsenic, and benzene) at concentrations greater than their corresponding MCLs.

As noted in Section 2.2.1.3 of the RI/FS report, the B-aquifer at Parcel E-2 consists of undifferentiated sediments ranging in thickness from 45 feet in the northern part of Parcel E-2 to over 235 feet in the southern portion of Parcel E-2 (TtEMI, 2003). The B-aquifer is semi-confined and separated from the A-aquifer by a Bay Mud aquitard, except in the northwest corner of Parcel E-2 (TtEMI, 2004). Based on the hydrogeologic cross-sections presented in the Parcel E Groundwater Summary Report, the B-aquifer is composed of two to three relatively thick (approximately 30- to 40-feet) laterally continuous layers of sand and silty or clayey sand, which are separated by laterally continuous layers of silt or clay that range from 8 to 120 feet in thickness (TtEMI, 2004). Using the interpretation presented on Figure 2-9 of the RI/FS, there are two transmissive layers in the B-aquifer that extend across the majority of Parcel E-2 (the third, deepest layer is interpreted to be present across a small portion of Parcel E-2). Assuming an average thickness of 35 feet (for both transmissive layers) across the 47.4-acre Parcel E-2, and assuming an average porosity of 25 percent, the size of the potentially potable B-aquifer groundwater resource is estimated at 830 acre-feet.

Considering that the estimated storage capacity for the B-aquifer is an order of magnitude larger than the A-aquifer, the entire Class II B-aquifer at Parcel E-2 is considered to have medium potential for use as a drinking water source, based on the aquifer thickness SSF. Because this conclusion is based on the interpretation of limited geologic information, conclusions regarding the aquifer thickness SSF have a moderate level of uncertainty.

I4.2.2. Depth to Groundwater

As discussed in Subsection I4.1.2, an individual domestic well requires a minimum annular seal of at least 20 feet and a community water supply well requires a minimum annular seal of at least 50 feet (DWR; 1981 and 1991). Because the B-aquifer is overlain by the artificial fill and Bay Mud (with an average overall thickness of over 30 feet) across most of Parcel E-2, adequate depth is available to meet annular seal requirements within all but the uppermost portions of the B-aquifer. Consequently, the entire Class

II B-aquifer at Parcel E-2 is considered to have high potential for use as a drinking water source, based on the depth to groundwater SSF.

I4.2.3. Measured TDS Concentrations

Because a wide range of TDS values have been measured at wells in the uppermost B-aquifer, the average TDS concentration, for the last three sampling events performed in 2001 and 2002, is assumed to be representative of the TDS concentration found throughout the uppermost B-aquifer. This average concentration is 2,742 mg/L. Consequently, the Class II B-aquifer at Parcel E-2 is considered to have high potential for use as a drinking water source, based on the measured TDS concentration SSF.

I4.2.4. Actual Groundwater Yield

There are no direct data on the actual yield of the B-aquifer. However, based on the reported transmissivities and hydraulic conductivities (see RI/FS Table 2-1) for the uppermost B-aquifer at Parcel E-2 calculated from pumping tests performed during the RI (TtEMI, LFR, and Uribe; 1997), B-aquifer wells may be capable of sustaining the minimum required well yield of 150 or 200 gpd, per the federal and State classification criteria, respectively. Based on this assumption, the Class II B-aquifer at Parcel E-2 is considered to have high potential for use as a drinking water source, based on the actual groundwater yield SSF.

I4.2.5. Proximity to Saltwater

As discussed in Subsection I4.1.5, saltwater areas were defined, for the purposes of the evaluation, as areas where TDS concentrations exceed 10,000 mg/L. As shown on Figure I-2, there are no B-aquifer areas with TDS concentrations exceeding 10,000 mg/L. Based on the distribution of maximum TDS concentrations in the uppermost B-aquifer, the majority of Parcel E-2 is located greater than 250 feet from a saltwater area. Consequently, the Class II B-aquifer at Parcel E-2 is considered to have high potential for use as a drinking water source, based on the proximity to saltwater SSF.

I4.2.6. Historical and Current Groundwater Use

As with the A-aquifer (see Subsection I4.1.6), B-aquifer groundwater at HPS has never been, and is not currently, used as a drinking water source (TtEMI, LFR, and Uribe; 1997). San Francisco currently obtains its municipal water supply from the Hetch Hetchy watershed in the Sierra Nevada Mountains and plans to continue using the Hetch Hetchy watershed as a drinking water source in the reasonably foreseeable future (TtEMI, 1999). Based on the historical and current groundwater use SSF, Class II B-aquifer groundwater at HPS has low potential to be used as a drinking water source.

I4.2.7. Existence of Institutional Controls on Aquifer Use

As discussed in Subsection I4.1.7, the City of San Francisco prohibits installation of domestic wells within city boundaries because high quality water is easily obtainable from the Hetch Hetchy watershed through the existing distribution system (TtEMI, 1999). In addition, the hydraulic connection between the A-aquifer and uppermost B-aquifer could lead to the migration of, and potential human exposure to, A-aquifer groundwater (which can be considered landfill leachate) if a domestic well is installed in the uppermost B-aquifer. This potential exposure would be prohibited by Title 27 of the California Code of Regulations (Sections 21160[a] and [c]). Based on the existence of local and State institutional controls that prohibit or severely restrict locations where new potable wells can be installed, there is low potential for Class II B-aquifer groundwater at Parcel E-2 to be used as a drinking water source.

I4.2.8. Cost of Cleanup to Federal Drinking Water Standards

Based on the nature and extent evaluation presented in the RI/FS (Section 5), the hydraulic connection between the A-aquifer and uppermost B-aquifer has introduced organic contaminants, most notably benzene, into the uppermost B-aquifer at concentrations exceeding primary MCLs. The cost to remove the landfill and other sources of groundwater contamination in the Panhandle Area and East Adjacent Area would be very high, as documented in the RI/FS (Section 14).

As discussed in Subsection I4.1.9, groundwater in the uppermost B-aquifer contains dissolved metals concentrations that exceed drinking water standards, most notably antimony and arsenic, but ambient levels have not been established for the B-aquifer, and thus it is unknown how much of the metal contamination is from naturally occurring sources. In addition, groundwater in the uppermost B-aquifer typically exceeds the secondary MCLs for chloride, iron, manganese, and sulfate. While the Navy has not calculated the cost to reduce concentrations of these naturally occurring constituents to below MCLs in groundwater, the cost would likely be prohibitive, and it may be technically impracticable to do so.

Based on this SSF, there is low potential for the Class II B-aquifer groundwater at Parcel E-2 to be used as a drinking water source.

I4.2.9. Summary of the B-Aquifer Site-Specific Factor Evaluation

Although the TDS values measured in wells screened in the uppermost B-aquifer are below both federal and State classification criteria for potential sources of drinking water, several SSFs evaluated in the subsections above indicate that the B-aquifer in Parcel E-2 may be an undesirable drinking water source. Principal among these are:

1) Lack of historical and current precedents for use of HPS groundwater for public water supply

2) Existence of local and State institutional controls that prohibit or severely restrict locations where new potable wells can be installed

3) Prohibitive cost to remove contamination sources to the B-aquifer in order to meet federal and State drinking water standards

Considering these factors together, the weight of evidence indicates that the Class II B-aquifer at Parcel E-2 has medium potential for use as a drinking water source.

Section I5. Conclusions of Beneficial Use Evaluation

This section presents the primary conclusions of the beneficial use evaluation for the A- and B-aquifers at Parcel E-2.

I5.1. A-AQUIFER

The A-aquifer at HPS has previously been determined by the RWQCB to be unsuitable as a potential source of drinking water (RWQCB, 2003). The A-aquifer at Parcel E-2 is also considered to be unsuitable as a potential drinking water source based on federal groundwater classification criteria and an evaluation of the SSFs identified in Section I.4.1.

I5.2. B-AQUIFER

Based on available TDS data, the B-aquifer at Parcel E-2 would be considered suitable as a potential drinking water source, and the evaluation of SSFs in Section I.4.2 reveals that the B-aquifer in Parcel E-2 has moderate potential to be used as a drinking water source. Considering this conclusion and past agreements with the BCT on the human health risk assessment, the groundwater ingestion pathway is included in the risk assessment for the B-aquifer. This assumption provides an additional layer of conservatism with respect to the protection of human health at Parcel E-2.

Section I6. References

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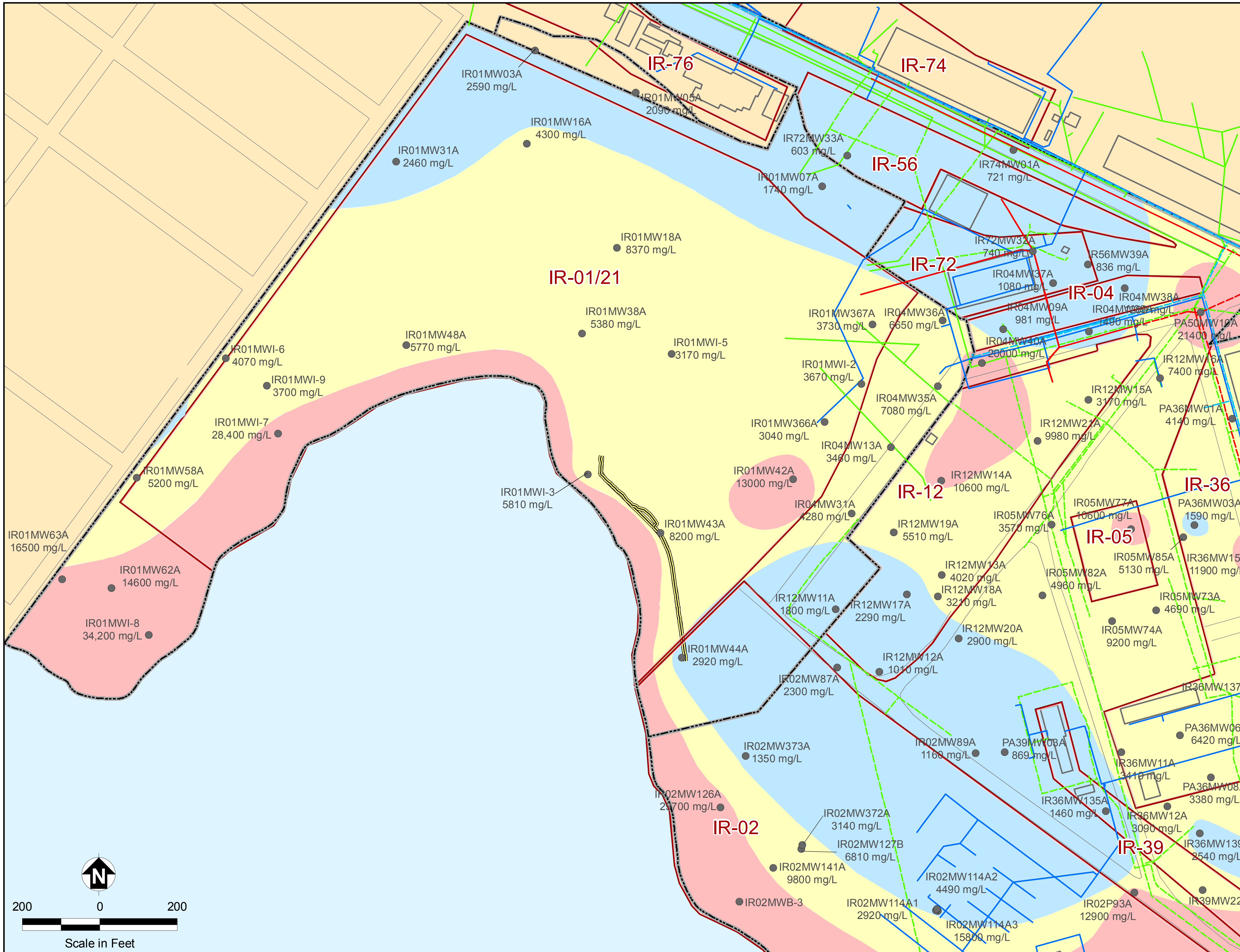
Figures



Legend

- A-Aquifer Monitoring Well With Well Identification and Maximum TDS Result

A-aquifer Maximum TDS Zones

- ≥10,000mg/L
- ≥3,000 mg/L and <10,000mg/L
- <3,000 mg/L

- Parcel E-2 Boundary
- IR Site Boundary
- Building
- Storm Line-Below Groundwater
- Storm Line-Above Ground
- Sanitary Sewer Line -Below Groundwater
- Sanitary Sewer Line-Above Groundwater
- Water Line
- Saltwater Lines
- Sheetpile Wall
- Roads

Reference: Adapted from Tetra Tech EM, Inc. 2004. Revised Final Parcel E Groundwater Summary Report. May 11

ENGINEERING/REMEDIATION RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California

U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE I-1

MAXIMUM TOTAL DISSOLVED SOLID CONCENTRATIONS IN THE A-AQUIFER

Remedial Investigation/Feasibility Study for Parcel E-2

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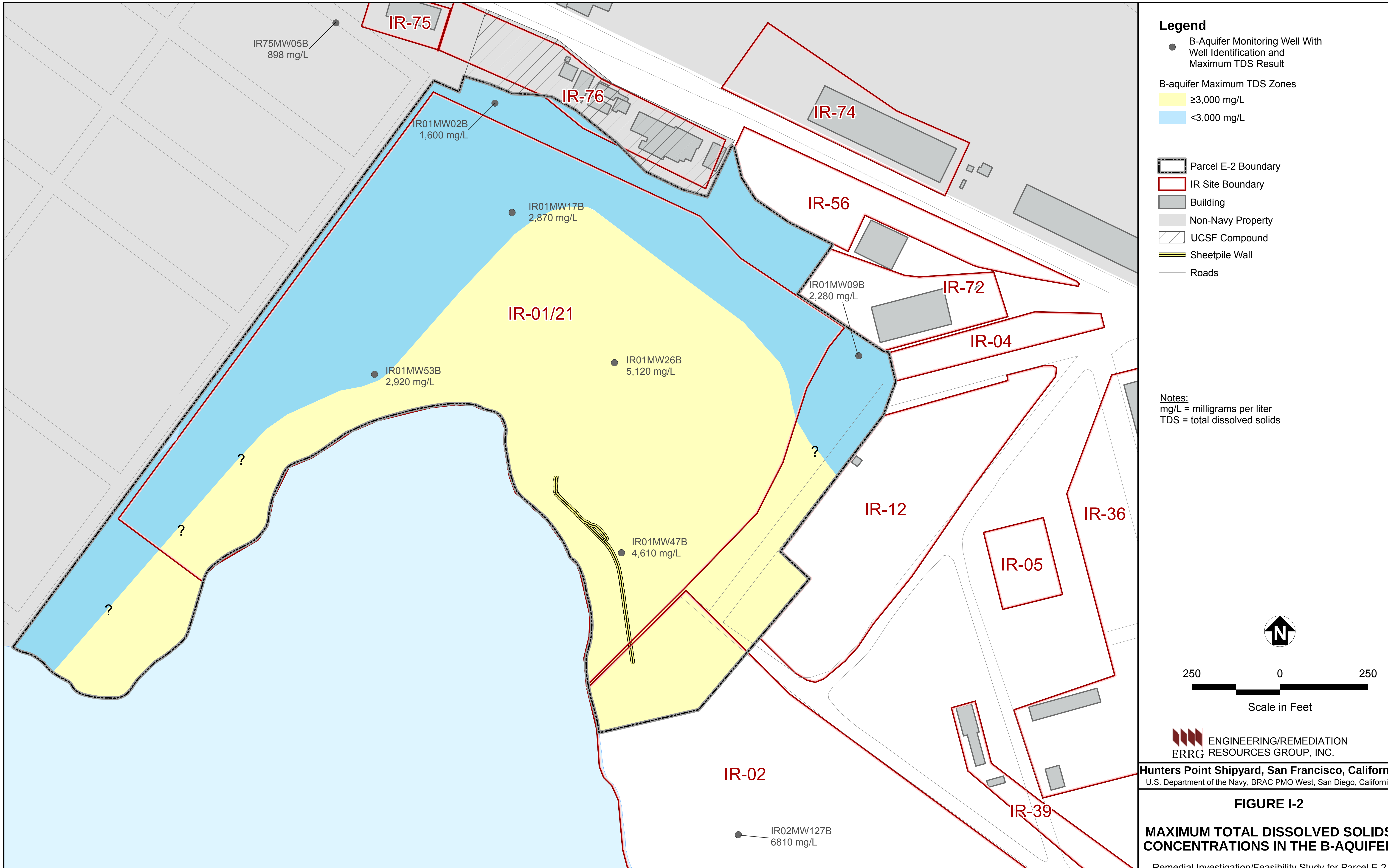

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U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE I-2

MAXIMUM TOTAL DISSOLVED SOLIDS CONCENTRATIONS IN THE B-AQUIFER

Remedial Investigation/Feasibility Study for Parcel E-2

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Tables

Table I-1 Total Dissolved Solids Concentrations in A- and B-Aquifers
Parcel E-2 Remedial Investigation/Feasibility Study, Hunters Point Shipyard

Sample Identification	Location Identification	Sample Date	Aquifer	Total Dissolved Solids Concentration (mg/L)
9201N020	IR01MW03A	1/10/1992	A	1,730
9234X682	IR01MW03A	8/17/1992	A	1,670
9234X683	IR01MW03A	8/17/1992	A	1,680
0111P009	**IR01MW03A**	**3/20/2001**	**A**	**2,590**
0228A009	IR01MW03A	7/11/2002	A	2,090 J3
0238S007	IR01MW03A	9/18/2002	A	2,060
9218Z050	IR01MW05A	5/5/1992	A	1,640
9218Z051	IR01MW05A	5/5/1992	A	1,550
9230J191	IR01MW05A	7/23/1992	A	1,510
9234J200	IR01MW05A	8/17/1992	A	1,020
0111P011	IR01MW05A	3/20/2001	A	2,080
0233D016	**IR01MW05A**	**8/16/2002**	**A**	**2,090**
0239A010	IR01MW05A	9/25/2002	A	1,340
9113X076	IR01MW07A	3/26/1991	A	747
9148H924	IR01MW07A	11/25/1991	A	1,600
9201N021	IR01MW07A	1/10/1992	A	877
9201N022	IR01MW07A	1/10/1992	A	881
9206X484	IR01MW07A	2/4/1992	A	950
9206X485	IR01MW07A	2/4/1992	A	940
9234X681	IR01MW07A	8/17/1992	A	1,410
0110P017	IR01MW07A	3/14/2001	A	980
0229A013	**IR01MW07A**	**7/18/2002**	**A**	**1,740**
0243M002	**IR01MW10A**	**10/22/2002**	**A**	**1,140**
0243M003	**IR01MW11A**	**10/22/2002**	**A**	**1,180**
0243M004	**IR01MW12A**	**10/22/2002**	**A**	**1,630**
9218Z052	IR01MW16A	5/5/1992	A	1,480
9230J184	IR01MW16A	7/22/1992	A	4,260
9230J185	IR01MW16A	7/22/1992	A	4,250
9234J202	**IR01MW16A**	**8/18/1992**	**A**	**4,300**
0229A002	IR01MW16A	7/15/2002	A	3,790
0236G003	IR01MW16A	9/6/2002	A	3,720
9218Z054	IR01MW18A	5/6/1992	A	1,390
9218Z055	IR01MW18A	5/6/1992	A	420
9230J188	IR01MW18A	7/23/1992	A	1,860
9230J189	IR01MW18A	7/23/1992	A	1,900
9234J205	IR01MW18A	8/18/1992	A	1,730
0115D002	**IR01MW18A**	**4/17/2001**	**A**	**8,370**
0230D003	IR01MW18A	7/22/2002	A	7,370
0230D004	IR01MW18A	7/22/2002	A	7,160
0238J015	IR01MW18A	9/19/2002	A	5,720
0238J016	IR01MW18A	9/19/2002	A	6,300
9218Z063	IR01MW31A	5/8/1992	A	2,250
9218Z064	IR01MW31A	5/8/1992	A	2,250
9230J186	IR01MW31A	7/22/1992	A	2,330
9234J207	IR01MW31A	8/19/1992	A	2,330
9234J208	IR01MW31A	8/19/1992	A	2,370
0111T018	IR01MW31A	3/22/2001	A	1,810
0234E007	IR01MW31A	8/21/2002	A	2,010

Table I-1 Total Dissolved Solids Concentrations in A- and B-Aquifers
Parcel E-2 Remedial Investigation/Feasibility Study, Hunters Point Shipyard

Sample Identification	Location Identification	Sample Date	Aquifer	Total Dissolved Solids Concentration (mg/L)
0239A004	**IR01MW31A**	**9/23/2002**	**A**	**2,460**
9620J121	IR01MW366A	5/15/1996	A	2,060
0110P019	**IR01MW366A**	**3/15/2001**	**A**	**3,040**
9620J115	IR01MW367A	5/14/1996	A	3,730
0111P015	IR01MW367A	3/21/2001	A	3,350
0229P002	IR01MW367A	7/15/2002	A	3,120
0238S008	**IR01MW367A**	**9/18/2002**	**A**	**4,280**
9203X420	IR01MW38A	1/16/1992	A	2,280
9203X421	IR01MW38A	1/16/1992	A	2,210
9234X687	IR01MW38A	8/18/1992	A	2,400
0116P006	IR01MW38A	4/24/2001	A	3,820
0233E006	**IR01MW38A**	**8/13/2002**	**A**	**5,380**
0237G012	IR01MW38A	9/12/2002	A	2,280
9202A020	IR01MW42A	1/9/1992	A	12,300
9202A021	IR01MW42A	1/9/1992	A	12,000
9228J160	IR01MW42A	7/9/1992	A	10,100
9234X688	IR01MW42A	8/18/1992	A	11,000
0111T005	IR01MW42A	3/19/2001	A	11,500
0234D010	IR01MW42A	8/21/2002	A	9,230
0237S011	**IR01MW42A**	**9/11/2002**	**A**	**13,000**
9112X068	IR01MW43A	3/22/1991	A	4,360
9147X295	**IR01MW43A**	**11/22/1991**	**A**	**8,200**
9202A019	IR01MW43A	1/9/1992	A	4,000
9206X483	IR01MW43A	2/4/1992	A	7,740
9234X685	IR01MW43A	8/18/1992	A	3,350
9234X686	IR01MW43A	8/18/1992	A	3,380
9612J940	IR01MW43A	3/19/1996	A	2,390
0110P030	IR01MW43A	3/16/2001	A	3,220
0228A012	IR01MW43A	7/12/2002	A	4,030
0237J024	IR01MW43A	9/13/2002	A	3,210
9113X072	IR01MW44A	3/25/1991	A	695 J5
9113X073	IR01MW44A	3/25/1991	A	748 J5
9204X430	IR01MW44A	1/20/1992	A	995
9234X699	IR01MW44A	8/20/1992	A	1,400
9234X700	IR01MW44A	8/20/1992	A	1,390
9612J941	IR01MW44A	3/19/1996	A	1,170
0112T008	**IR01MW44A**	**3/27/2001**	**A**	**2,920**
0229P010	IR01MW44A	7/17/2002	A	1,200
0238J007	IR01MW44A	9/17/2002	A	1,840
9147X293	IR01MW48A	11/22/1991	A	5,500
9204X445	IR01MW48A	1/22/1992	A	5,760
9204X446	IR01MW48A	1/22/1992	A	5,730
9206X486	IR01MW48A	2/4/1992	A	5,400
9228J161	IR01MW48A	7/9/1992	A	5,150
9234J210	**IR01MW48A**	**8/19/1992**	**A**	**5,770**
0112P017	IR01MW48A	3/29/2001	A	3,940
0112P018	IR01MW48A	3/29/2001	A	4,480
0228D013	IR01MW48A	7/11/2002	A	2,490 J3

Table I-1 Total Dissolved Solids Concentrations in A- and B-Aquifers
Parcel E-2 Remedial Investigation/Feasibility Study, Hunters Point Shipyard

Sample Identification	Location Identification	Sample Date	Aquifer	Total Dissolved Solids Concentration (mg/L)
0237J023	IR01MW48A	9/13/2002	A	4,340
9113X075	IR01MW58A	3/25/1991	A	4,300 J5
9147X291	**IR01MW58A**	**11/22/1991**	**A**	**5,200**
9147X292	IR01MW58A	11/22/1991	A	4,900
9204X428	IR01MW58A	1/20/1992	A	4,580
9204X429	IR01MW58A	1/20/1992	A	4,190
9206X487	IR01MW58A	2/4/1992	A	5,100
9206X488	IR01MW58A	2/4/1992	A	5,100
9234J213	IR01MW58A	8/20/1992	A	3,400
0112T004	IR01MW58A	3/26/2001	A	1,520
0229P005	IR01MW58A	7/16/2002	A	1,700
0236G002	IR01MW58A	9/6/2002	A	1,530
9204X438	IR01MW62A	1/21/1992	A	9,090
9204X439	IR01MW62A	1/21/1992	A	8,910
9230J182	IR01MW62A	7/21/1992	A	11,800
9234X702	**IR01MW62A**	**8/20/1992**	**A**	**14,600**
0112P010	IR01MW62A	3/28/2001	A	5,250
0112P011	IR01MW62A	3/28/2001	A	5,560
0228P014	IR01MW62A	7/11/2002	A	2,440 J3
0237E002	IR01MW62A	9/9/2002	A	6,120
9204X448	IR01MW63A	1/22/1992	A	15,500
9230J170	IR01MW63A	7/20/1992	A	15,400
9230J171	IR01MW63A	7/20/1992	A	15,000
9234X701	**IR01MW63A**	**8/20/1992**	**A**	**16,500**
0112T016	IR01MW63A	3/29/2001	A	6,180
0229D020	IR01MW63A	7/19/2002	A	5,100
0237G002	IR01MW63A	9/9/2002	A	7,600
9202A022	**IR01MWI-2**	**1/9/1992**	**A**	**3,670**
9228A393	IR01MWI-2	7/6/1992	A	3,370
9234X707	IR01MWI-2	8/21/1992	A	3,360
0109P001	IR01MWI-2	3/6/2001	A	2,600
0233D008	IR01MWI-2	8/13/2002	A	3,500
0239E003	IR01MWI-2	9/23/2002	A	3,590
9203X418	IR01MWI-3	1/16/1992	A	3,300
9228A395	IR01MWI-3	7/6/1992	A	3,270
9228A396	IR01MWI-3	7/6/1992	A	3,230
9235X709	IR01MWI-3	8/24/1992	A	3,120
9612J939	IR01MWI-3	3/19/1996	A	2,680
0112D007	IR01MWI-3	3/29/2001	A	4,460
0233D014	**IR01MWI-3**	**8/15/2002**	**A**	**5,780**
0239E002	IR01MWI-3	9/23/2002	A	5,430
9203X419	IR01MWI-5	1/16/1992	A	3,070
9228J162	IR01MWI-5	7/9/1992	A	2,970
9228J163	IR01MWI-5	7/9/1992	A	2,890
9234X704	IR01MWI-5	8/21/1992	A	2,800
0116P007	**IR01MWI-5**	**4/24/2001**	**A**	**3,170**
0230E004	IR01MWI-5	7/22/2002	A	3,000
0238E016	IR01MWI-5	9/19/2002	A	2,690

Table I-1 Total Dissolved Solids Concentrations in A- and B-Aquifers
Parcel E-2 Remedial Investigation/Feasibility Study, Hunters Point Shipyard

Sample Identification	Location Identification	Sample Date	Aquifer	Total Dissolved Solids Concentration (mg/L)
0238E017	IR01MWI-5	9/19/2002	A	3,010
9204X433	IR01MWI-6	1/20/1992	A	960
9228J164	IR01MWI-6	7/9/1992	A	3,910
9234X705	**IR01MWI-6**	**8/21/1992**	**A**	**4,070**
9204X437	IR01MWI-7	1/21/1992	A	23,600
9228J165	IR01MWI-7	7/10/1992	A	24,900
9234J214	IR01MWI-7	8/21/1992	A	20,900
0112T019	**IR01MWI-7**	**3/30/2001**	**A**	**28,400**
0229A006	IR01MWI-7	7/16/2002	A	20,700
0236E007Z	IR01MWI-7	9/6/2002	A	20,300
9205X463	IR01MWI-8	1/27/1992	A	28,600
9234J215	**IR01MWI-8**	**8/21/1992**	**A**	**34,200**
9612W181	IR01MWI-8	3/21/1996	A	15,100
0112T015	IR01MWI-8	3/29/2001	A	26,900
0230E013	IR01MWI-8	7/26/2002	A	32,900
0237E023	IR01MWI-8	9/13/2002	A	31,500
0237E024	IR01MWI-8	9/13/2002	A	34,000
9204X436	**IR01MWI-9**	**1/21/1992**	**A**	**3,700**
9228A394	IR01MWI-9	7/6/1992	A	2,670
9234J216	IR01MWI-9	8/21/1992	A	2,870
9234J217	IR01MWI-9	8/21/1992	A	2,800
0112P012	IR01MWI-9	3/28/2001	A	2,930
0229P006	IR01MWI-9	7/16/2002	A	3,300
0236J001	IR01MWI-9	9/6/2002	A	3,110
9207X518	IR04MW13A	2/12/1992	A	3,310 [J5]
9207X519	**IR04MW13A**	**2/12/1992**	**A**	**3,460 [J5]**
9225X627	IR04MW13A	6/17/1992	A	3,350
9225X628	IR04MW13A	6/17/1992	A	3,260
0110P006	IR04MW13A	3/12/2001	A	2,620
0229P012	IR04MW13A	7/18/2002	A	2,200
0238J002	IR04MW13A	9/16/2002	A	2,310
9207X517	IR04MW31A	2/12/1992	A	3,670 [J5]
9225X629	IR04MW31A	6/17/1992	A	3,100
0110P026	IR04MW31A	3/16/2001	A	3,810
0230A008	IR04MW31A	7/23/2002	A	2,860
0237J011	**IR04MW31A**	**9/11/2002**	**A**	**4,280**
9207X520	IR04MW35A	2/12/1992	A	1,440 [J5]
9225X623	**IR04MW35A**	**6/15/1992**	**A**	**7,080**
0111P003	IR04MW35A	3/19/2001	A	2,780
0229E020	IR04MW35A	7/19/2002	A	2,160
0237G008	IR04MW35A	9/10/2002	A	2,390
9207X523	IR04MW36A	2/13/1992	A	1,210
9207X524	IR04MW36A	2/13/1992	A	1,190
9225X630	IR04MW36A	6/17/1992	A	1,490
0111D004	IR04MW36A	3/20/2001	A	1,020
0229D009	**IR04MW36A**	**7/17/2002**	**A**	**6,650**
0237G005	IR04MW36A	9/10/2002	A	480
9209X547	**IR12MW11A**	**2/24/1992**	**A**	**1,800**

Table I-1 Total Dissolved Solids Concentrations in A- and B-Aquifers
Parcel E-2 Remedial Investigation/Feasibility Study, Hunters Point Shipyard

Sample Identification	Location Identification	Sample Date	Aquifer	Total Dissolved Solids Concentration (mg/L)
9612W185	IR12MW11A	3/22/1996	A	1,770
0110P013	IR12MW11A	3/13/2001	A	1,340
0226P016	IR12MW11A	6/28/2002	A	1,720
0236E008Z	IR12MW11A	9/6/2002	A	1,750
9148X300	IR01MW02B	11/25/1991	B	1,200
9203X427	IR01MW02B	1/17/1992	B	1,180
9206F150	**IR01MW02B**	**2/4/1992**	**B**	**1,600**
9234J199	IR01MW02B	8/17/1992	B	1,290
0111P008	IR01MW02B	3/20/2001	B	1,240
0229A005	IR01MW02B	7/16/2002	B	1,180
0238E002	IR01MW02B	9/16/2002	B	1,100
9204X450	IR01MW09B	1/23/1992	B	1,870
9230J190	IR01MW09B	7/23/1992	B	1,920
9234J201	IR01MW09B	8/17/1992	B	2,010
0111P002	**IR01MW09B**	**3/19/2001**	**B**	**2,280**
0228A003	IR01MW09B	7/9/2002	B	1,710
0238E007	IR01MW09B	9/17/2002	B	1,700
9205X467	IR01MW17B	1/28/1992	B	1,500
9230J183	IR01MW17B	7/22/1992	B	1,400
9234J204	IR01MW17B	8/18/1992	B	1,510
0116T004	**IR01MW17B**	**4/24/2001**	**B**	**2,870**
9203X425	IR01MW26B	1/17/1992	B	2,910
9203X426	IR01MW26B	1/17/1992	B	2,940
9234J206	IR01MW26B	8/19/1992	B	3,080
0116T002	**IR01MW26B**	**4/23/2001**	**B**	**5,120**
0230D002	IR01MW26B	7/22/2002	B	4,900
0238E006	IR01MW26B	9/17/2002	B	3,530
9205X465	IR01MW47B	1/27/1992	B	3,330
9230J172	IR01MW47B	7/20/1992	B	3,420
9234J211	IR01MW47B	8/20/1992	B	3,170
0112D004	IR01MW47B	3/28/2001	B	3,060
0112D005	IR01MW47B	3/28/2001	B	3,380
0228P019	IR01MW47B	7/12/2002	B	3,210
0237S017	**IR01MW47B**	**9/13/2002**	**B**	**4,610**
9204X447	IR01MW53B	1/22/1992	B	2,770
9206F151	IR01MW53B	2/4/1992	B	2,500
9234J212	**IR01MW53B**	**8/20/1992**	**B**	**2,920**
0112P016	IR01MW53B	3/29/2001	B	2,510
0228A008	IR01MW53B	7/11/2002	B	1,780 J3
0237S018	IR01MW53B	9/13/2002	B	2,440

Notes:
Results in bold indicate maximum detected total dissolved solids concentration for each location
J3 = Estimated value due to surrogate/laboratory control sample/matrix spike problems
J5 = Estimated value due to holding time problems
mg/L = milligrams per liter

Table I-2. Site-Specific Factor Evaluation for Class II Groundwater, A-aquifer Parcel E-2 Remedial Investigation/Feasibility Study, Hunters Point Shipyard

Site-Specific Factor	Site Value	Potential for Drinking Water Beneficial Use [a]
Aquifer Thickness	5 to 15 feet	Low
Depth to Groundwater	10 to 15 feet below ground surface	Low
Measured TDS Concentrations	Average TDS concentration (2001 to 2002) = 5,592 mg/L	Medium
Actual Groundwater Yield	Assumed to be >150 gallons per day (based on measured transmissivities)	High
Proximity to Saltwater	Majority of parcel is located within 150 to 250 feet of a saltwater area (defined as an area with TDS concentrations greater than 10,000 mg/L)	Medium
Historic and Current Groundwater Use	No former or current use of groundwater as drinking water; more desirable supplies available	Low
Institutional Controls on Aquifer Use	Local and State controls in place to prohibit or severely restrict aquifer use	Low
Cost of Cleanup to Federal Drinking Water Standards	HGALs exceed federal MCLs for antimony, arsenic, and thallium; widespread presence of organic chemicals above MCLs (most notably benzene) associated with waste disposal activities	Low
Quality of underlying water-bearing units	B-aquifer is not a current drinking water source (but is a potential drinking water source, see Table I-3); uppermost B-aquifer has chemical concentrations greater than MCLs	Low
	Overall Potential for Drinking Water Beneficial Use [b]	Low

Notes:

a "Low" indicates that, based on this site-specific factor alone, groundwater at the site has a low potential to be used as a drinking water source. "Medium" indicates that, based on this site-specific factor alone, groundwater at the site has a medium potential to be used as a drinking water source. "High" indicates that, based on this site-specific factor alone, groundwater at the site has a high potential to be used as a drinking water source.

b The overall potential for drinking water beneficial use was determined by considering the individual site-specific factors together.

HGAL Hunters Point groundwater ambient level

MCL Maximum contaminant level

mg/L Milligram per liter

TDS Total dissolved solids

Table I-3. Site-Specific Factor Evaluation for Class II Groundwater, B-aquifer Parcel E-2 Remedial Investigation/Feasibility Study, Hunters Point Shipyard

Site-Specific Factor	Site Value	Potential for Drinking Water Beneficial Use [a]
Aquifer Thickness	Two to three transmissive layers between 30 and 40 feet thick	Medium
Depth to Groundwater	Over 30 feet below ground surface	High
Measured TDS Concentrations	Average TDS concentration (2001 to 2002) = 2,742 mg/L	High
Actual Groundwater Yield	Assumed to be >150 gallons per day (based on measured transmissivities)	High
Proximity to Saltwater	Majority of parcel is located greater than 250 feet from a saltwater area (defined as an area with TDS concentrations greater than 10,000 mg/L)	High
Historic and Current Groundwater Use	No former or current use of groundwater as drinking water; more desirable supplies available	Low
Institutional Controls on Aquifer Use	Local and State controls in place to prohibit or severely restrict aquifer use	Low
Cost of Cleanup to Federal Drinking Water Standards	Presence of organic chemicals above MCLs (most notably benzene) associated with waste disposal activities	Low
Quality of underlying water-bearing units	Quality of bedrock water bearing zone is unknown	--
	Overall Potential for Drinking Water Beneficial Use [b]	Medium

Notes:

a “Low” indicates that, based on this site-specific factor alone, groundwater at the site has a low potential to be used as a drinking water source. “Medium” indicates that, based on this site-specific factor alone, groundwater at the site has a medium potential to be used as a drinking water source. “High” indicates that, based on this site-specific factor alone, groundwater at the site has a high potential to be used as a drinking water source.

b The overall potential for drinking water beneficial use was determined by considering the individual site-specific factors together.

MCL Maximum contaminant level

mg/L Milligram per liter

TDS Total dissolved solids

Attachment I-1. EPA Correspondence Regarding Application of Federal Criteria for Groundwater Beneficial Uses

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

June 30, 1998

Mr Henry Gee
BRAC Business Line Coordinator
Department of the Navy
Engineering Field Activity West
900 Commodore Drive
San Bruno, California 94066-2402

Dear Mr. Gee:

The issue of groundwater classification has recently come up on many of our Bay Area bases, and I would like to take this opportunity to provide some clarification on the differences between the State of California's definition of a potential drinking water source and the federal EPA definition.

Under State Water Board resolution 88-63, all state waters are considered to be potential drinking water unless either the total dissolved solids (TDS) exceeds 3,000 mg/l and the Regional Water Board makes a determination that the water is not reasonably expected to supply a public water system, or the yield is less than 200 gal/day. However, EPA's Groundwater Classification Guidelines use a stricter standard of 10,000 mg/l TDS or less and a yield of 150 gal/day to define a potential drinking water source. The NCP Preamble directs EPA to use the Guidelines when determining the appropriate remediation for contaminated groundwater at CERCLA sites, and EPA's OSWER Direction # 9283.1-09 directs EPA to defer to the NCP Preamble and the Guidelines when a state does not have an EPA endorsed Comprehensive State Groundwater Protection Program (CSGWPP). EPA's definition is based on experiences around the country where the use of aquifers with a TDS up to 10,000 mg/l proved viable as a drinking water source. It also recognizes the importance of maintaining broad protections of potential drinking water sources in light of the growing demands on drinking water supplies. Please see the enclosures for related background information.

Since California does not have a CSGWPP, the federal definition of potential drinking water (10,000 ppm TDS or less and a yield of 150 gal/day) is used during the RI/FS. Many of the Navy's Bay sites overlie aquifers that meet the federal standard of a potential drinking water source and therefore the groundwater beneath these sites needs to be carried into the feasibility study for evaluation of remedial actions to meet potential source of drinking water cleanup goals. Likewise, drinking water Maximum Contaminant Levels (MCLs) are ARARs when an aquifer is a potential drinking water source. The feasibility study should look at a variety of remedial alternatives, which could also include natural attenuation, and, if necessary, the feasibility study might also include the evaluation for a Technical Impracticability waiver of MCLs as ARARs.

I want to acknowledge that in a few past instances, EPA may have inappropriately concurred with determinations made by the State that an aquifer is not a potential source of drinking water, rather than applying the federal criteria. Unfortunately, in some cases, such as at Hunters Point, the application of federal criteria will require us to revisit some of the RI/FS work that has already been completed. I want to also apologize for the impacts that this may have on the process for making cleanup decisions, and let you know that we will work with you as much as possible and appropriate to minimize these impacts.

At each of the closing bases, EPA will work closely with the Navy to assist in the application of the federal criteria for determining potential drinking water sources. Thank you for your attention to this matter. We should discuss this further at our next monthly managers meeting, and please feel free to call me at (415) 744-2384 if you want to discuss this sooner.

Sincerely,

Tom Huetteman

Tom Huetteman
Chief, Navy Section
Federal Facilities Cleanup Branch

Enclosure 1: NCP preamble, pages 8732-8735
Enclosure 2: OSWER Directive #9283.1-09
Enclosure 3: Guidelines for Ground-Water Classification under the EPA Ground-Water Protection Strategy, December 1986, Executive Summary

cc: Dan Murphy, DTSC
Dennis Mishek, RWQCB
Richard McMurtry, RWQCB

Walter/Hank — Here's the last part of the Hunters Pt letter. I plan to send the final letter tomorrow. — Tom

Enclosure 5

Application of Federal Criteria for Determining Beneficial Uses of Groundwater for CERCLA Cleanups

In a letter to EFA-West dated June 30, 1998, EPA provided the Navy information about the document *Guidelines for Ground-Water Classification under the EPA Ground-Water Protection Strategy* (December 1986) and its use in CERCLA cleanups. This is an expansion on that information. It is intended to provide the Navy specific recommendations on how to evaluate groundwater using these guidelines in order to determine whether a contaminated aquifer or portion of an aquifer should be considered a potential drinking water source for the purposes of making CERCLA cleanup decisions.

An evaluation to determine whether an aquifer is a potential drinking water source should include the following:

A determination as to whether the yield criterion is met. EPA's yield criterion is 150 gals/day, and the State of California's yield criterion is 200 gals/day. Generally, most sites meet both the state and federal yield criterion. The Navy needs to provide a conclusion about this criterion using both the state and federal yield criteria.

A determination as to whether and where the Total Dissolved Solids (TDS) criterion is met. Maps should be provided that show where the TDS in the aquifer meets both the state (3,000 mg/l in California) and federal (10,000 mg/l) criteria, where it meets the federal criterion but not the state criterion, and where it does not meet either the state or federal criterion. For maps of the federal TDS criterion, the Navy may use the highest recorded TDS values for each well from their data set (the Navy should consult with the Water Board on which data points they need to see mapped). In addition to map(s), a table should be provided showing all of the available TDS data. Note, indirect measurements of TDS, such as electric conductivity, should not be used in this analysis.

Provide a hydrogeological profile of the site. The documentation should include a description of the site hydrogeology, including identification of each distinct water bearing unit at the site.

Determine the groundwater classification. Using the yield and TDS data, document the portions of the aquifer(s) that meet the federal criteria for a class II aquifer, and document the portions that meet the state criteria. Where a contaminated aquifer is potentially interconnected with an uncontaminated aquifer, the classification of the uncontaminated aquifer also needs to be determined for setting cleanup levels in the contaminated aquifer.

Determine what portions of the contaminated aquifer should be considered a potential drinking water source for a CERCLA cleanup. All waters that the state has determined are potential drinking water sources must be considered potential drinking water sources

GOES (initials)

cy R Powell, R Faris, G Rivera, N Bello ...

Let me know if any major heartburn w/ this enclosure to draft EPA ltr, which is also attached.

Project Team only has an issue w/ Parcel "C" Schedule, which is being clarified bet. Glenna Clark & Sheryl Lauth [illegible] Hank

OPTIONAL FORM 99 (7-90)

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To Hank Gee	From Tom Huetteman
Dept./Agency	Phone #
Fax # 650-7[illegible]	Fax #

for CERCLA cleanups unless the state makes a determination that an aquifer or part of an aquifer is not a potential drinking water source. Although not specifically discussed in EPA's Groundwater Classification Guidelines, the NCP, or the related OSWER Directive #9283.1-09, Region 9 believes that, in applying the federal groundwater classification criteria, other site specific factors can be considered in order to make a final determination as to whether all or portions of the aquifer(s) should be considered a potential drinking water source for making a CERCLA cleanup decision. The following is a list of factors that might be considered: the thickness of the aquifer (i.e., the size of the groundwater resource impacted), the actual TDS levels (are they closer to 10,000 mg/l or closer to 3,000 mg/l), the actual groundwater yield, the proximity to salt water and the potential for salt water intrusion, the quality of underlying water bearing units and whether these units are or are not current or potential drinking water sources, the existence of institutional controls on well construction or aquifer use, information, if any, on current and historic use of the aquifer on the base or in the community surrounding the base, and the cost of cleanup to MCLs. None of these factors by itself is necessarily justification for not being a potential drinking water source.

Tables summarizing groundwater contamination. Develop a groundwater screening table to determine where groundwater contamination is at acceptable concentrations for human health, regardless of whether it is a potential drinking water source, and where it is at potentially unacceptable concentrations. Groundwater data should be screened against MCLs, the tap water PRGs, and, where applicable, background.

Finally, as part of a proposed plan, the public should be given the chance to comment on decisions made about beneficial use of groundwater during the public comment period for a groundwater cleanup decision, and these comments need to be considered in making a final cleanup decision.

When the contaminated portion of an aquifer is determined to be a potential drinking water source, MCLs are ARARs for any CERCLA remedy selected for the aquifer. Where the Navy has made a determination that a contaminated aquifer, or portion of a contaminated aquifer, is not a potential drinking water source for its CERCLA cleanup decision, the Navy still needs to evaluate and address potential health threats from all other pathways, such as vapor phase migration to above ground or migration to surface waters, and all other potential beneficial uses, such as commercial, industrial, and agricultural. Consideration should also be given to the potential health threats that may result from unanticipated or even prohibited uses. For example, if the failure of a groundwater remedy that relies on institutional controls could result in a significant or even acute health threat, a more active remedy may be appropriate.

In those instances where a decision is made not to treat a class II aquifer as a potential drinking water source, the Navy should consider source control and mass removal as part of a remedy where there is the potential for substantial long term further degradation of the groundwater resource through the continued spread of contamination or where there is the potential for significant health threats from unanticipated use of the groundwater. Such an approach involves a balance between overall protection of the groundwater resource, the Superfund policy to generally treat all class II aquifers as potential drinking water sources, and the necessary site specific requirements for a protective and cost-effective remedy. Region 9 is unwilling to support greater flexibility in the application of Superfund policy on the use of EPA's groundwater classification if such a balance is not met in the final cleanup decision. Therefore, EPA concurrence with any Navy determination that a class II aquifer should not be considered a potential drinking water source for a CERCLA cleanup decision will be contingent on the selected remedy and ultimate cleanup number.