



October 5, 2011

Ms. Kelly Manheimer
United States Environmental Protection Agency, Region IX
75 Hawthorne Street
San Francisco, California 94105

Subject: **Final Remedial Design Work Plan
North Hollywood Operable Unit
Second Interim Remedy, Groundwater Remediation System Design
AMEC Project: 4088115718 5100.1**

Dear Ms. Manheimer:

AMEC Engineering & Infrastructure is pleased to submit this Final Remedial Design Work Plan for the North Hollywood Operable Unit on behalf of Lockheed Martin Corporation and Honeywell International Inc., to the U.S. Environmental Protection Agency, Region IX. This document has been prepared pursuant to the Administrative Settlement Agreement and Order on Consent for Remedial Design dated February 14, 2011.

If you have any questions regarding this report, please contact Michael Taraszki at (510) 628-3222.

Sincerely,

AMEC Engineering & Infrastructure

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Robert Hartwell, PE
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For Robert Hartwell
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**Final
Remedial Design Work Plan**

**North Hollywood Operable Unit
Second Interim Remedy
Groundwater Remediation System Design**

Revision 2

October 5, 2011

AMEC Project Number: 4088115718 5100.1

Client: Honeywell International, Inc. Lockheed Martin Corporation	Draft Remedial Design Work Plan	
Project: NHOU Second Interim Remedy Groundwater Remediation Design	Project 4088115718 2100.1 Rev. 00	

Final REMEDIAL DESIGN WORK PLAN

North Hollywood Operable Unit
Second Interim Remedy
Groundwater Remediation System Design

Revision 2



Michael Taraszki (Project Manager)



Robert Hartwell (Engineering Manager)

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AMEC Project No. 4088115718 5100.1

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- D EPA Comments on RD Work Plan and Responses

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ACRONYMS AND ABBREVIATIONS LIST

AACE	Association for the Advancement of Cost Engineering
AMEC	AMEC Environment & Infrastructure
AOC	Agreement and Order on Consent
ARARs	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
BMP	Best Management Practices
BOU	Burbank Operable Unit
CAO	Cleanup and Abatement Order
CDPH	California Department of Public Health
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
COC	constituents of concern
CSM	conceptual site model
DTSC	Department of Toxic Substances Control
EPA	Environmental Protection Agency
FFS	Focused Feasibility Study
FSP	Field Sampling Plan
GAC	Granular Activated Carbon
GIS	Geographic Information System
GMP	Groundwater Monitoring Plan
GREM	Green Remediation Evaluation Matrix
HASP	Health and Safety Plan
HMI	Human Machine Interface
LADWP	Los Angeles Department of Water and Power
LAFD	Los Angeles Fire Department
LCM	Life-Cycle Management
AMEC	AMEC Environment & Infrastructure
MCL	maximum contaminant level
µg/L	micrograms per liter
ND	non-detect
NHOU	North Hollywood Operable Unit
NPL	National Priorities List
OPCC	Opinion of Probable Construction Costs
PCE	tetrachloroethene
PIDs	Process and Instrumentation Diagrams
PLC	Programmable Logic Controller
PM	preventive maintenance
PRPs	Potentially Responsible Parties
RAO	Remedial Action Objectives
RD	Remedial Design
RD QAPP	Remedial Design Quality Assurance Project Plan
RI	Remedial Investigation
ROD	Record of Decision

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RWQCB-LA	Regional Water Quality Control Board, Los Angeles Region
SAP	Sampling and Analysis Plan
SCAQMD	South Coast Air Quality Management District
SFBFS	San Fernando Basin Feasibility Study
SFV	San Fernando Valley
SOW	Scope of Work
SVOCs	semi-volatile organic compounds
TCE	trichloroethene
TCP	1,2,3-trichloropropane
TM	Technical Memorandum
ULARA	Upper Los Angeles Rivera Area
USGS	United States Geological Survey
VOC	volatile organic compound
VPGAC	vapor-phase granular activated carbon

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1 PROJECT DESCRIPTION

VOC contamination, primarily trichloroethene (TCE) and tetrachloroethene (PCE), in groundwater beneath the City of North Hollywood, California is currently being addressed by the existing North Hollywood Operable Unit (NHOU) Extraction and Treatment System. The existing NHOU Extraction and Treatment System, designed to achieve VOC plume containment and reduction of VOC contaminant mass using groundwater extraction, air stripping, and vapor-phase granular activated carbon (VPGAC) treatment, began operating in December 1989 and remains in operation today. The treated water, which is delivered to the water supply system for the City of Los Angeles, has consistently had levels of TCE and PCE well below the maximum contaminant level (MCL) for drinking water of 5 micrograms per liter ($\mu\text{g/L}$).

Although the existing NHOU Extraction and Treatment System has reduced contaminant migration in the groundwater and removed substantial VOC mass from the aquifer, VOC concentrations remain above MCLs in groundwater. In addition, changing groundwater conditions and pumping patterns in the San Fernando Valley (SFV) groundwater basin and the discovery of VOC contamination in new areas have demonstrated that the existing NHOU Extraction and Treatment System is not capable of fully containing the VOC plume. The United States Environmental Protection Agency (EPA) has also discovered new contaminants in NHOU groundwater in excess of MCLs or state notification levels, including hexavalent chromium; 1,4-dioxane; 1,2,3-trichloropropane (TCP); and other select emerging contaminants (including perchlorate and n-nitrosodimethylamine [NDMA]). The existing NHOU Extraction and Treatment System were not designed to treat chromium (in any form) or the emerging contaminants. The California Department of Public Health (CDPH) advised LADWP to shut down well NHE-2 on February 14, 2007 because the high concentration of chromium (hexavalent and total chromium) in groundwater extracted from the well was largely responsible for a total chromium concentration in the combined effluent from the NHOU Central Treatment Facility exceeding 30 micrograms per liter ($\mu\text{g/L}$), equivalent to 60 percent of the 50 $\mu\text{g/L}$ maximum contaminant level (MCL).

The EPA established an Interim Action Record of Decision (ROD) on September 30, 2009 (EPA, 2009a), referred to as the Second Interim Remedy, intended to upgrade and expand the existing NHOU groundwater remediation system to improve containment, protect production wellfields, and address emerging contaminants. An Administrative Settlement Agreement and Order on Consent for Remedial Design, dated February 21, 2011 (AOC), was executed between the United States, Honeywell International Inc. (Honeywell), and Lockheed Martin Corporation (Lockheed Martin) to conduct pre-design data acquisition and remedial design activities associated with the ROD. Lockheed Martin and Honeywell have selected AMEC to perform the Remedial Design (RD) and AMEC has been approved by the EPA as the Remedial Design Contractor. This RD Work Plan has been prepared in compliance with the AOC Appendix A (scope of work; SOW) Section 5.1 and Attachment 2. The AOC SOW is included in Appendix A of this RD Work Plan. Remedial Design and Remedial Action associated with NHE-2 is being addressed by Honeywell under a separate AOC.

1.1 REMEDIAL DESIGN OBJECTIVES

As stated in Section 2.8 of the ROD, the Second Interim Remedy for the NHOU is intended to achieve the following Remedial Action Objectives (RAOs):

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- Prevent exposure to contaminated groundwater, above acceptable risk levels,
- Contain areas of contaminated groundwater that exceed the MCLs and notification levels to the maximum extent practicable,
- Prevent further degradation of water quality at the Rinaldi-Toluca and North Hollywood West production wells by preventing the migration toward these well fields of the more highly contaminated areas of the VOC plume located to the east/southeast,
- Achieve improved hydraulic containment to inhibit horizontal and vertical contaminant migration in groundwater from the more highly contaminated areas and depths of the aquifer to the less contaminated areas and depths of the aquifer, including the southeast portion of the NHOU in the vicinity of the Erwin and Whitnall production well fields,
- Remove contaminant mass from the aquifer.

Because surrounding large-capacity production well fields capture portions of the VOCs plume (as defined by concentrations greater than 5 µg/L) and will continue to operate to meet municipal water demand, it will not be possible to hydraulically capture all contaminated groundwater. Rather, the NHOU is intended to establish a target capture zone that contains high concentration portions of the plume (and other portions above regulatory limits to the extent practicable) and be operated such that no further groundwater quality degradation occurs in the vicinity of the Rinaldi-Toluca and North Hollywood West production well fields. For the purposes of the RD, high concentration portions of the plume can be defined as ten times the applicable drinking water criteria, as implied in the Focused Feasibility Study (FFS; EPA, 2009b) and ROD and defined in CDPH 97-005 guidelines for compounds posing chronic health effects.

To achieve RAOs and capture high concentration portions of the plume, the approach to the Remedial Design focuses on four major steps:

- Update the current conceptual site model (CSM) and the San Fernando Valley Basin (SFVB) numerical groundwater flow model, considering recently obtained groundwater elevation and analytical data, and identify data gaps and evaluate how these gaps may affect the Remedial Design,
- Refine and re-run the SFVB model to develop a remedial well field configuration basis (including the number of wells, their locations, depths, peak and average flow rates) that results in hydraulic capture of groundwater with higher concentrations (i.e., the target capture area) and hydraulic control of groundwater with constituent concentrations greater than the applicable current drinking water quality criteria (to the extent practicable),
- Evaluate available groundwater quality data in conjunction with anticipated groundwater extraction rates to establish influent water quality to the NHOU system, and
- Design and implement a groundwater treatment system in compliance with the Second Interim ROD and CDPH requirements, with consideration for Los Angeles Department of Water and Power (LADWP) drinking water supply needs.

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1.2 AOC WORK SCOPE

This RD Work Plan describes the tasks and deliverables to be performed in order to meet the project remediation action objectives (RAOs) as stated in the previous Section. During the pre-design work and Remedial Design work the current CSM and numerical groundwater flow model will be reviewed and the existing well designs, data collection, groundwater elevation values, analytical results, and hydraulic test results validated. Recently collected groundwater monitoring data will be incorporated into the current models and any discrepancies between the recent data and historical data will be evaluated and documented. The updated models will be used to evaluate the following issues as stated in the AOC:

- **Additional Groundwater Monitoring**
Additional monitoring wells have already been installed and samples collected (MWH, 2010). Data from these monitoring wells and recent NHOU-wide groundwater sampling events will be evaluated to refine the hydrostratigraphy and distribution of contaminants of concern (COC) in NHOU groundwater. Evaluations will be done to determine requirements necessary to fill data gaps for design and to track the location and movement of groundwater contamination throughout the NHOU for the duration of the AOC.
- **Replacement of Existing Extraction Wells and Installation of New Extraction Wells**
The ROD specifies the replacement or modification of existing extraction wells and the installation of up to three new extraction wells. Specifically, the ROD states:
 - **Replacement of Existing Extraction Well NHE-1**
The ROD states that a deeper well of similar construction is necessary to achieve the required hydraulic containment.
 - **Replace or Repair and Modify Extraction Wells NHE-2, NHE-4, and NHE-5**
The ROD states that replacement of wells NHE-2, NHE-4, and NHE-5 with deeper wells of similar construction or possibly new adjacent wells will likely be necessary to achieve the required hydraulic containment of the contaminated groundwater plume.
 - **Construction of New Extraction Wells**
The ROD states that new extraction wells are necessary to further limit contaminant migration and to improve mass removal. Previous modeling has indicated that up to three new wells would be required northwest of the existing treatment system.

The ROD also states that "further evaluation of specific pumping rates and extraction well locations will be performed during remedial design to ensure that implementation of the Second Interim Remedy will not cause additional degradation of the aquifer". Additionally, the ROD states that "if new data collected prior to or during remedial design indicates that a different configuration of extraction wells is more effective and cost effective than the configuration described in the Proposed Plan, then that different configuration will be considered for implementation as part of the Second Interim Remedy". Considering this, results from the data evaluation and refined groundwater flow model will be used to evaluate the need for or modification of locations, depths, and pumping rates of extraction wells.

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- **Wellhead Treatment at NHE-2**

Based on EPA's selected alternative, wellhead treatment for hexavalent chromium and 1,4-dioxane was required to be performed at NHE-2. Honeywell has been developing an approach to treatment and disposal of water extracted from NHE-2 pursuant to a Cleanup and Abatement Order (CAO) issued by the Regional Water Quality Control Board, Los Angeles Region (RWQCB-LA). Subsequent discussions among Honeywell, the EPA, and the RWQCB-LA resulted in their agreeing to rescind the NHE-2 portion of the CAO and cede oversight of remedial design and remedial action of NHE-2 to the EPA under a separate AOC with Honeywell. Because Honeywell is addressing ROD requirements regarding NHE-2 under a separate AOC, the NHE-2 wellhead treatment component of the ROD is not included in the scope of this RD Work Plan.

Honeywell has selected MWH Americas, Inc. (MWH) as the lead designers for the NHE-2 remedy. NHE-2 is an integral part of the NHOU and, as such, MWH will adjust their design schedule to match AMEC's design schedule for NHOU. This will ensure that both companies collaborate closely during the Design Phases of this project in order to:

- Achieve the hydraulic containment of the groundwater plume required by the ROD,
- Ensure that the NHE-2 alternative selected is consistent with the RAOs for the Second Interim Remedy,
- Confirm that the designs are compatible with each other and are completed at the same time,
- Ensure the intent of 97-005 is met with both systems, and
- Develop the criteria that will allow flow from NHE-2 to be returned to the Second Interim Remedy RD.

- **Treatment of VOCs in Extracted Groundwater**

The ROD states that expansion of VOC treatment capacity at the NHOU will be necessary to treat the volume of groundwater produced by existing and proposed new extraction wells. The degree of expansion required will be evaluated during the Remedial Design phase.

- **Centralized Treatment for Hexavalent Chromium**

Information developed for the FFS and the ROD indicated that treatment for hexavalent chromium would be required for some of the existing and new groundwater extraction wells. The degree to which hexavalent chromium treatment is necessary and the appropriate treatment technology will be evaluated during the design phase.

- **Delivery of Treated Groundwater to LADWP**

The Remedial Design work for the Second Interim Remedy will deliver the treated groundwater to LADWP for use in its municipal supply system. For purposes of the Remedial Design and Remedial Action, the point of compliance for all performance standards shall be the discharge point of the treatment facility, after passing through the "double barrier" treatment system, just upstream of the LADWP header line. LADWP, as the water utility, will have to comply with CDPH's Policy Memorandum 97-005 through the submittal of a permit application. AMEC will support LADWP in the assembly of information necessary for the development of one report covering the NHOU wellfield.

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The information provided will include NHE-2, even though flow from this well may not initially be conveyed to the Central Treatment System. Section 6.1.3 provides additional details on roles for completion of the CDPH 97-005 report.

1.3 REMEDIAL DESIGN WORK PLAN ORGANIZATION

This RD Work Plan is organized consistent with the SOW and includes the following components:

- 1.0 Project Description – Provides a statement of the problem, a brief description of Remedial Design objectives, and project expectations as described in the AOC;
- 2.0 Background – Gives a brief summary of the NHOU area, previous groundwater investigations, regulatory history and oversight, and a brief summary of existing data;
- 3.0 Remedial Design Scope – Includes a description of each task provided for the design of the Second Interim Remedy. This work is intended to respond to the remedial objectives stated in the AOC;
- 4.0 Remedial Design Team Organization and Coordination – A description of the Project Team and of the AMEC Team (including organization charts), a summary of roles and responsibilities of the Remedial Design team, and how each will interact with other stakeholders for the duration of this project;
- 5.0 Remedial Design Project Schedule – Gant chart providing a description of major milestones and of method to be used to ensure AOC deadlines will be met;
- 6.0 Permits, Access, and Third Party Agreements – Includes a summary of permits (including guidance associated with CDPH 97-005), property leases, and/or easements required for implementation of the Remedial Design, as well as a discussion of the substantive permit requirements, schedule of permit applications, property acquisitions, and third party agreements;
- 7.0 Site Management - Covers how access, site security, management responsibilities, decontamination, and waste disposal will be handled during the Remedial Design;
- 8.0 Sustainability Approach - Provides a discussion of the process or plans to be implemented to ensure the entire project is managed in the most sustainable manner possible;
- 9.0 Description of Deliverables – Provides a bullet list of project deliverables associated with each task comprising the Remedial Design.

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2 BACKGROUND

This section describes the geographic area including the NHOU, the history of San Fernando Valley land uses and groundwater remediation, as well as a description of the NHOU area.

2.1 San Fernando Valley Groundwater Basin

The San Fernando Valley groundwater basin is one of several basins comprising the Upper Los Angeles Rivera Area (ULARA) within the Los Angeles River Watershed in the County of Los Angeles. The surface area is approximately 145,000 acres (226 square miles), including the San Fernando Valley proper, the Tujunga Valley, Browns Canyon, and the alluvial areas surrounding the Verdugo Mountains near La Crescenta and Eagle Rock. The basin is bounded on the north and northwest by the Santa Susana Mountains, on the north and northeast by the San Gabriel Mountains, on the east by the San Rafael Hills, on the south by the Santa Monica Mountains and Chalk Hills, and on the west by the Simi Hills. The valley is drained by the Los Angeles River and its tributaries. Annual precipitation ranges from 15 to 23 inches and averages approximately 17 inches (California Department of Water Resources [DWR], 2003).

The following sections briefly describe the history of groundwater production and adjudication, geology and hydrostratigraphy, and groundwater remediation history of the SFV.

2.1.1 Groundwater Production, Recharge, and Adjudication

During the 1930's most land in the SFV was occupied by farms, orchards, and ranchland. By 1949, after the war, nearly all the land in Burbank and North Hollywood was occupied by housing developments, industrial facilities, retail establishments, and the Burbank Airport. Accompanying these land use changes in the 1940s was a substantial increase in population and groundwater withdrawals from the SFV. In the 1950s, the North Hollywood, Erwin, Whitnall, and Verdugo Well Fields were constructed by the LADWP in the North Hollywood area to meet the increasing demand for potable water.

Recharge to the SFV basin includes infiltration from seasonal rainfall (typically between November and April), infiltration beneath streams from surrounding mountains, runoff from impervious surfaces, reclaimed wastewater from the Tillman, Burbank, and Los Angeles-Glendale Water Reclamation Plants (WRP), industrial discharges, storm water percolation through the Branford, Hansen, Lopez, and Pacoima Spreading Grounds, and imported water via the Los Angeles Aqueduct and Metropolitan Water District (ULARA Watermaster, 2011).

In 1968, water rights in the ULARA were established and groundwater withdrawals from the SFV were reduced to achieve "safe yield" from the basin (approximately 104,040 acre-feet per year [AF/Y]). Final judgment in 1979 further restricted groundwater, included provisions regarding water rights and storage, and established a ULARA Watermaster to track groundwater elevation and analytical data; water usage, storage, and disposal; and water imports to the SFV groundwater basin (ULARA Watermaster, 2011).

2.1.2 Geology and Hydrostratigraphy

The basin is filled with alluvial sediments originating from the surrounding mountains. Three aquifers are identified consisting of Pleistocene and Holocene alluvium and the Pleistocene

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Saugus Formation (DWR, 2003; Impact Sciences, 2007). Alluvial deposits are encountered to as much as 1,200 feet below ground surface in the deepest portions of the basin. Groundwater flow through the basin is generally from west/northwest to east/southeast, with remaining subsurface flow exiting the basin through the Los Angeles River Narrows.

A remedial investigation (RI) was conducted by J. M. Montgomery, Inc., (JMM) for the Los Angeles Department of Water and Power under cooperative agreement with the EPA with the RI report issued in 1992. JMM conducted extensive explorations and combined these with pre-existing information to formulate a basinwide geologic and hydrogeologic model. JMM recognized four major depositional events and indicated that these strata exhibited similar characteristics. These were initially termed the Upper, Middle, Lower, and Deeper depth horizons. The JMM conceptual model was also the basis for the first basinwide numerical groundwater flow model. Both the conceptual model and the numerical model have undergone refinement with the addition of new data and interpretation as described in following paragraphs.

CH2M Hill (1994) indicates that while the alluvium lacks large-scale geologic layers, it is possible to subdivide it into four major depth regions consisting of discontinuous fine- and coarse-grained zones; however, these deposits are predominantly coarse-grained and permeable. The USGS (Land and Belitz, 2008) characterizes the SFV aquifers as “composed of unconsolidated to semi-consolidated gravel, sand, and clay of Pleistocene to Recent age. These sediments were deposited by alluvial fans from the surrounding hills and mountains. Deeper water-bearing units in SFSG [San Fernando-San Gabriel] consist of marine deposits of the later Pleistocene age.”

The principal conceptualization for the alluvial fill from a groundwater modeling perspective has been to subdivide it into four principal depth regions initially based on production well screen intervals. Depth Region 1 consists of about 200 feet of vadose zone and about 100 feet or less of saturated thickness; Depth Region 2 ranges from about 100 to 150 feet thick; depth zone 3 is between 200 and 300 feet thick; and Depth Region 4 is 200 to 600 feet thick (EPA, 2009a; CH2M Hill, 1994; MWH, 2010).

Others, such as Oberlander, et al. (1993) have further subdivided some hydrostratigraphic units in their work in the Burbank area. They describe division of the Younger (Recent) Alluvium into five zones (A', X, A, Y, and B); A, A' and B composed of coarse sands, gravel and cobbles, while the X and Y zones are primarily sand, silty sand, sandy silt and silty clay.

Subdivision of the alluvial fill into precisely defined zones is likely not possible given its depositional nature and degree of heterogeneities present. Gross subdivisions are possible, but these subdivisions may have implications when used to evaluate aquifer responses and groundwater flow paths under applied stresses. In order to better characterize the subsurface, MWH has geophysically logged boreholes for recently installed monitoring wells and initiated a comparison of their results to indicator beds identified by the ULARA Watermaster to better refine the understanding of the hydrostratigraphy, especially in depth zones 1 and 2 where contamination in the SFB largely resides. The evaluation also included analysis of natural gamma ray logs, sonic logs, and resistivity data. MWH concluded that while the geophysical log analysis was generally consistent with the SFBFS EPA depth regions, the analysis could support additional subdivision of the hydrostratigraphy layered within the SFBFS model. The

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MWH hydrostratigraphic evaluation was presented in their draft Characterization Report (MWH, 2010).

2.1.3 SFV Groundwater Remediation History

In 1979, industrial contamination was found in groundwater in the San Gabriel Valley (to the east of the SFV), prompting the CDPH (formerly the California Department of Health Services) to request that all major water providers in the region, including those in the SFV, sample and analyze groundwater for potential industrial contaminants. Trichloroethene (TCE) and tetrachloroethene (PCE) were consistently detected in a large number of production wells in the SFV at concentrations greater than Federal and State MCLs for drinking water.

TCE and PCE were widely used in the San Fernando Valley starting in the 1940s for dry cleaning and for degreasing machinery. Disposal was not well regulated at that time, and releases from a large number of facilities throughout the eastern SFV have resulted in the large plume of VOC-contaminated groundwater that extends from the NHOU to the southeast. To replace wells within the NHOU area contaminated by TCE and PCE, and to provide more operational flexibility for groundwater recharge and pumping in the SFV, LADWP constructed the Rinaldi-Toluca Well Field in 1988 and 1989, and the Tujunga Well Field in 1993.

Based on the significant levels of groundwater contamination present in the SFV and the impact of that contamination on numerous municipal water supply wells, EPA added four SFV Sites to the National Priorities List (NPL) in 1986 and defined them as areas of regional groundwater contamination. Three of the four Sites (Areas 1, 2 and 4) are contiguous areas within whose boundaries are well fields that serve the water supply systems for the cities of Los Angeles, Burbank and Glendale. There is a large, continuous plume of groundwater contamination that runs through these three Sites. The fourth Site, Area 3, lies in the Verdugo basin, a geographically separate area of the eastern San Fernando Valley (see Figure 2-1). The SFV Area 1 Site, located at the upgradient end of the contaminated groundwater plume, the selection and implementation of the initial interim remedy – the existing NHOU Extraction and Treatment System – for the LADWP’s North Hollywood well field was given fast-track status because of the potential for contamination to spread to other well fields and areas of uncontaminated groundwater.

In December 1992, a remedial investigation (RI) for the SFV groundwater basin, including installation and subsequent regular monitoring of 84 groundwater wells, was completed under a cooperative agreement between EPA and the LADWP (JMM, 1992). The RI was conducted to evaluate the groundwater quality throughout the SFV basin and assist in identifying the best treatment method(s) and optimal locations to install groundwater treatment systems to address the SFV groundwater contamination.

EPA listed the SFV Sites as "groundwater only" (i.e., only the regional groundwater contamination was intended to be addressed by EPA's Superfund program) with the intent to focus on addressing the regional groundwater contamination, with an agreement with the state agencies to address the sources. From the late 1980s to late 1990s, EPA provided funds to RWQCB-LA to conduct assessments of facilities in the SFV to determine the extent of solvent usage and to assess past and current chemical handling, storage, and disposal practices. These investigations were conducted pursuant to RWQCB-LA’s Well Investigation Program and resulted in source remediation activities under RWQCB-LA oversight at several facilities within

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the SFV. Source investigations and remediation activities are currently in progress under the lead of RWQCB-LA and the California Department of Toxic Substances Control (DTSC).

2.1.4 North Hollywood Operable Unit

The NHOU comprises approximately 4 square miles of contaminated groundwater underlying an area of mixed industrial, commercial, and residential land use in the community of North Hollywood (a district of the City of Los Angeles). The NHOU is approximately 15 miles north of downtown Los Angeles and immediately west of the City of Burbank, and has approximate Site boundaries of Sun Valley and Interstate 5 to the north, State Highway 170 and Lankershim Boulevard to the west, the Burbank Airport to the east, and Burbank Boulevard to the south. North Hollywood has a population of approximately 78,000.

In 1986, LADWP completed the *Operable Unit Feasibility Study for the North Hollywood Well Field Area of the North Hollywood-Burbank NPL Site* (LADWP, 1986), which was the basis for selection and implementation of the existing NHOU Extraction and Treatment System. The 1987 ROD for the Site selected the existing NHOU Extraction and Treatment System as an interim groundwater containment remedy.

In 1989, LADWP constructed the existing NHOU Extraction and Treatment System with financial support from EPA. The existing NHOU Extraction and Treatment System consists of eight groundwater extraction wells (NHE-1 through NHE-8)¹, an air-stripping treatment system to remove VOCs from the extracted groundwater, activated carbon filters to remove VOCs from the air stream, and ancillary equipment. The treated groundwater is discharged into an LADWP blending facility where it is combined with water from other sources before entering the LADWP water supply system. The existing NHOU Extraction and Treatment System commenced operation in December 1989 and remains in operation today.

In 1993, 1998, 2003, and 2008, EPA conducted five-year reviews (as required by CERCLA) to evaluate the protectiveness of the NHOU interim remedy. The *Third NHOU Five-Year Review* (EPA, 2003) reported that the TCE and PCE groundwater plume that the remedy was designed to capture was migrating vertically and laterally beyond the remedy's zone of hydraulic control. This conclusion was based largely on EPA's evaluation of the current NHOU groundwater conditions and LADWP findings in the *Draft Evaluation of the North Hollywood Operable Unit and Options to Enhance Its Effectiveness* (LADWP, 2002). The *Final Evaluation of the North Hollywood Operable Unit and Options to Enhance Its Effectiveness* (LADWP, 2003) also raised concerns regarding detections of total chromium and hexavalent chromium in extraction well NHE-2 of the NHOU interim remedy. Well NHE-2 is located just a short distance from the former Bendix facility, one of the major VOC sources in the NHOU.

In July 2006, after a year of high rainfall and rising groundwater levels in the SFV, the total chromium concentration detected at NHOU extraction well NHE-2 began to increase. Chromium was used in the metal plating and aerospace industry (metal fabrication), as well as for corrosion inhibition in industrial cooling towers, from the 1940s through the 1980s. In 2007, the elevated concentrations of chromium at well NHE-2 caused total chromium concentrations in the combined NHOU treatment system effluent to exceed 30 micrograms per liter (µg/L) (60

¹ Well NHE-1 has never been operational and does not contribute to hydraulic capture or to the treatment plant influent.

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percent of the state MCL). As a result, CDPH advised LADWP to shut down well NHE-2 or divert the water produced by the well to nonpotable use.

NHE-2 remained shut down until September 2008, when the installation of a wellhead VOC treatment unit and modification of the discharge piping were completed, resulting in effluent discharged to the Los Angeles Bureau of Sanitation sewer system. This work was conducted by Honeywell (a corporate successor to Bendix) as an interim measure, pursuant to a Cleanup and Abatement Order (CAO) from the RWQCB-LA requiring Honeywell to clean up the chromium contamination and to restore lost water caused by the shut-down of well NHE-2. An NHE-2 treatment and disposal approach, including treatment for chromium and, if necessary, 1,4-dioxane, to meet drinking water standards is expected to be implemented separate from this Remedial Design by Honeywell but in coordination with the implementation of the NHOU Second Interim Remedy.

2.1.5 Burbank, Glendale North, and Glendale South Operable Units

Three other groundwater remediation operable units are active in the SFV, including the Burbank Operable Unit (BOU) and Glendale North Operable Unit (GNOU) and the Glendale South Operable Unit (GSOU). In 1989, EPA issued a ROD for the BOU of the SFV Area 1 Site; the BOU is located east and downgradient of the NHOU area. That ROD also selected an interim remedy (containment) for the VOC-contaminated groundwater within the Burbank area, where ten of the city's water supply wells had been shut down due to contamination. The BOU remedy, which provides treated water for the City of Burbank's water supply system, began operation in 1996 and remains in operation to this day.

The GNOU and GSOU are located within the SFV Area 2 Site, near the Crystal Springs well field farther east and downgradient of both the NHOU and BOU areas. The EPA issued the ROD in 1993 and selected groundwater pump and treat as the interim cleanup remedy; operations commenced in 2000.

2.2 Regulatory Oversight and Community Involvement

The EPA is the lead agency for the current and planned future groundwater remedial activities at the NHOU. The EPA's response activities at the NHOU are and have been conducted under the authority established in the federal Superfund law, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. Section 9601 et seq. The official lead state agency is the DTSC; however, the RWQCB-LA has provided and continues to provide substantial support, particularly with the investigation and cleanup of sources of contamination in the SFV. The expected source of cleanup monies for the NHOU is an enforcement settlement with the Potentially Responsible Parties (PRPs).

The City of Los Angeles established 90 Neighborhood Councils throughout the City comprised of residents, business owners, and property owners. Each Council is led by elected Board Members and meets regularly (e.g., quarterly) to discuss various community issues and projects so they can better understand and voice the opinions of the neighborhood to the City before final decisions are made. The current NHOU treatment system is located within the North Hollywood North East Neighborhood Council boundary and this Council is anticipated to have significant interest in the Second Interim Remedy implementation. The North Hollywood West Neighborhood Council may also have significant interest due to its close proximity to the NHOU.

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2.3 Summary of existing data

This section presents a summary of existing data pertinent to future investigative and remedial activities outlined in this Work Plan. All data presented in this section was compiled from the EPA's SFV database and previous investigation reports. Well construction, analytical, and pumping data are limited to wells within the North Hollywood well field, as well as a subset of wells associated with other well fields that are still within the impacted area of the NHOU. A comprehensive overview of available data types per well location is summarized on Table 2-1.

2.3.1 NHOU Geology and Well Construction

As mentioned above, subsurface geology in the NHOU area was substantially investigated as part of the 1992 Remedial Investigation (JMM, 1992) and much of the current geological CSM is based upon data generated from that effort. Subsequent investigations have refined and modified that CSM as additional information was generated or otherwise became available (e.g., CH2M Hill, 1994; MWH, 2010).

The alluvial aquifer(s) of the SFV have been divided by the EPA into four distinct depth regions (EPA, 2009a). Depth regions are defined primarily by the number and type of production well screens that penetrate each zone. Depth Region 1 is 200 to 280 feet below ground surface (bgs) and contains many older production wells, as well as remedial investigation and groundwater monitoring wells. Depth Region 2 is 280 to 420 feet bgs and contains several of the North Hollywood well field production wells. Depth Region 3 is 420 to 660 feet bgs and contains many of the more recently installed production wells, such as those in the Rinaldi-Toluca, Tujunga, and western North Hollywood fields. Depth Region 4 exists below 660 feet bgs and is penetrated by few well screens.

Geologic records from many production wells in the area originate from drillers' reports, whereas records associated with most monitoring wells originate from geologists' reports. Geophysical logs exist for several of the production wells in the SFV (personal communication with the ULARA Watermaster, May 2011) and for 19 of the boreholes associated with recently installed monitoring wells (i.e., NH-C07 through NH-C25).

Construction data and associated depth regions for wells in the NHOU area include 78 production wells, 77 monitoring wells, and 8 NHOU extraction wells. Locations of most of these wells are illustrated on Figure 2-1.

2.3.2 Groundwater Elevation Data

A summary of wells for which groundwater elevation or at least depth-to-water data have been collected is included in Table 2-1. Groundwater flow in the NHOU area of the SFV is generally directed toward the southeast, and the top of the piezometric surface is generally 200 to 300 feet bgs (MWH, 2010). Locally, groundwater flow is highly variable and dependent on pumping due to the density of production well fields in the area. Groundwater elevations have been observed to fluctuate up to 40 feet in a single year, and over 100 feet over the course of several years, with associated reversals of vertical gradient direction as rates of groundwater withdrawn by production wells vary (MWH, 2010). A comprehensive analysis of groundwater flow patterns and pumping stresses will be incorporated into the updated transient groundwater flow model (see Section 3).

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2.3.3 Groundwater Sample Analytical Data

Table 2-1 indicates the most recent sampling event for each well that has occurred since 2009 (inclusive). The December 2010 sampling event was intended to represent a comprehensive assessment of SFV groundwater quality and included 154 wells in the NHOU area.

Groundwater quality from monitoring, extraction, and production wells in the NHOU area can be discerned with data contained in the EPA SFV database. Analytical data include volatile and semi-volatile organic compounds (VOCs and SVOCs), metals, field parameters, major cations and anions, and non-analytical water quality indicators. Results can be compared to reporting limits and applicable current drinking water quality criteria available from the CDPH. Analytical results have been evaluated with respect to detections and applicable current drinking water quality criteria. Since 1980, 380 constituents and field parameters have been detected and recorded, and 81 constituents have exceeded their applicable drinking water quality criteria at least once. Many of these exceedances have been detected in the same location within the NHOU.

In addition to samples collected from monitoring or pumping wells, a series of depth-discrete groundwater samples were taken from a series of NHOU monitoring wells installed between 2009 and 2010 via SimulProbe® simulphasic sample collection devices. These data will be evaluated as part of the preliminary design activities.

2.3.4 Trend Analysis of Selected Analytes

Concentration trends with time were statistically evaluated for chromium, TCE, and PCE in the Basinwide Groundwater Monitoring Program Optimization document (CH2M Hill, 2011). Analytical results from select wells monitored between 2000 and 2009 with at least six sampling events per analyte were evaluated using the Mann-Kendall nonparametric test for trends (Gilbert, 1987). As discussed therein, approximately twice as many wells were found to have decreasing trends for TCE and chromium as increasing trends. There was greater parity in the numbers of increasing and decreasing PCE trends. A detailed summary of Mann-Kendall analysis is available in the Basinwide Groundwater Monitoring Program Optimization document (CH2M Hill, 2011). Trends documented in this report were based on data collected between 2000 and 2009.

2.5.5 Groundwater Pumping Rates

Pumping records for NHOU area production wells are available via the EPA SVF database, with data dating back to 1968. Average and maximum production well flow rates in Table 2-5 are based on 1990 through 2009 data, concurrent with the period of operation for the NHOU system extraction wells. The NHOU Extraction and Treatment system was designed with a capacity of 2,000 gpm; however, active NHOU extraction wells typically operate at rates of about 200 gallons per minute (gpm) or less with a current collective capacity of about 800 gpm. Production capacities of SFV well fields (e.g., Rinaldi-Toluca, Tujunga, Whitnall, Erwin, and North Hollywood [West and East]) are summarized annually by the ULARA Watermaster and typically range from approximately 870 gpm to almost 12,400 gpm.

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3 REMEDIAL DESIGN SCOPE

This section describes the major design elements, design submittals, subsequent design submittals, and schedule for Remedial Design. The tasks and work described here have been written assuming a design/bid/build approach. Remedial Design submittals may vary depending on the preferred contracting method selected as well as key decisions made during remedial design. These decisions will consider critical path components and key factors that influence the design and implementation of the Second Interim Remedy. This section will also complement Section 10 that will list the specific deliverables that will be produced by the Remedial Design for submittal to EPA (consistent with AOC Appendix A, Attachment 2). Development of deliverables contained in the Remedial Design scope will be prepared with respect to guidance documents listed in AOC Appendix A, Attachment 3 when applicable.

3.1 Project Management

AMEC will provide project management services consisting of the development of work plans, project monitoring, controls, and reporting, and progress and coordination meetings. The primary purpose of these project management activities is to maintain a high level of communication between AMEC, including AMEC's sub-consultants, and the Lockheed Martin and Honeywell Project Managers, while achieving the level of communication required with all Stakeholders including the EPA and other public agencies. In addition to the items listed below, AMEC will coordinate internal Project Team communication, including a project kick-off meeting, weekly teleconference calls, file sharing via Microsoft SharePoint™, emails, and face-to-face meetings on an as-needed basis.

3.1.1 Work Plans

The following site-specific work plans may be required pursuant to the AOC. These work plans will be prepared in accordance with the AOC, the project requirements, and relevant EPA guidance manuals. Each of these plans is discussed in later sections of this RD Work Plan.

- Site-Specific Health and Safety Plan (HASP)
- Sampling and Analysis Plan (SAP)
 - Quality Assurance Project Plan (QAPP)
 - Field Sampling Plan
- Remedial Design Quality Assurance Project Plan (RD QAPP)
- Data Gap Analysis Memorandum
- Groundwater Monitoring Plan

The NHOU QAPP will also consider the San Gabriel Valley and San Fernando Valley QAPP (CH2M Hill, 2008), which was co-authored by USEPA and RWQCB-LA.

3.1.2 Progress Reporting

Weekly Electronic Project Status Update Reports will be prepared for submittal to the EPA and DTSC following approval of the final RD Work Plan. These reports will briefly document the progress and current status of each task listed herein.

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Monthly Progress Reports will be submitted to EPA on the 10th day of every month following EPA approval of the final RD Work Plan. The reports will include the following content:

- A description of the progress achieved in the previous month toward achieving compliance with the SOW and AOC;
- Summary of all sampling, tests, and other data generated during the previous month;
- Identify plans, reports, and other deliverables required by the SOW and AOC that were completed and submitted during the previous month;
- Description of key actions including, but not limited to, data collection and implementation of work plans that are scheduled for the next six weeks and provide other information relating to the progress of the design, activities, including, but not limited to, critical path diagrams, Gantt charts, and Pert charts;
- Present information regarding percentage of completion, unresolved delays encountered or anticipated that may affect the future schedule for implementation of the work, and a description of efforts made to mitigate those delays or anticipated delays; and
- Modifications to the work plans or other schedules that have been proposed to, or approved by, the EPA.

An Annual Performance Evaluation Report will be submitted to EPA on September 30th of each year. This report will describe the operation and performance of the Second Interim Design including any recommended changes or modifications required and projected operational timelines. An outline of this report is included in Appendix B.

3.1.3 Progress Meetings

Progress meetings and telephone calls with EPA will occur on an as-needed basis to keep EPA up-to-date on the progress of the Remedial Design. Any critical project decisions that are discussed during these meetings and calls will be approved by EPA prior to implementation. Following any such meetings or telephone conversations, draft meeting notes will be prepared and submitted to EPA within five days of the discussion. All decisions will be documented along with the rationale for those decisions. Meeting notes will include any layout or design drawings used for discussion.

3.1.4 Data and Document Management

For the Data/Document Management and Geographic Information System tasks, AMEC will use the following technologies to support the NHOU project:

- 1) ESRI ArcGIS Desktop™ and ArcGIS Server™
- 2) Microsoft ASP.NET™
- 3) Microsoft SQL Server™
- 4) Microsoft SharePoint™

As much as possible, AMEC will utilize standard off-the-shelf software, controls, add-ons, etc. to develop the NHOU project applications. This will allow for rapid application development and increase the community of support. Current versions of all software will be utilized.

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AMEC will provide Lockheed Martin, Honeywell, and the EPA electronic versions of deliverable documents using Microsoft Word™ with a 97-2003 format (i.e., .doc extension) to ensure backward compatibility with older versions of this word processing application. Graphical files will be provided using PDF format whenever possible. Deliverables will be submitted electronically (no hard copies) to the EPA in compliance with the AOC SOW, included herein as Appendix A.

3.1.4.1 Data Management

AMEC will develop a centralized data repository which will serve as the Project database. AMEC will procure copies of the SFV database for integration into the Project database to be developed. Other legacy data identified by Lockheed Martin, Honeywell, and the EPA will be evaluated for inclusion in the Project database based on scope and necessity.

All project data (analytical, water level, lithologic, and spatial) will be incorporated into a single Project database. The database will utilize the Microsoft SQL Server database management system, which will allow for high performance concurrent user access through web and GIS applications. The database will be housed on a server providing secure access by project team members, participating contributors, and agencies (if desired). The Project database will be designed, normalized, and implemented to allow for the efficient loading of initial data, updating/loading of subsequent data, and querying/reporting of the data. Geospatial data will comply with Federal Geographic Data Committee standards.

Complete or selective copies of the database can be provided to the client and team members as a part of the QA program, in either Microsoft Access or Microsoft SQL Server format. However, it should be established at the project outset that these copies should not be used in lieu of the centralized data available via the Project Management portal.

3.1.4.2 Geographic Information System and Geospatial Portal

To organize and analyze the vast amounts of sampling data involved with this project, AMEC will develop an NHOU Geographic Information System (GIS) to visualize, manage, and analyze NHOU data. ESRI ArcGIS software will be utilized to create the project GIS. The system will be integrated with groundwater elevation and analytical laboratory data stored in the project database. The GIS will integrate these data with geospatial features including major roadways, buildings, and existing production, remedial extraction and monitoring wells. The GIS will allow for efficient spatial and temporal data management, map query, and creation of custom maps and reports. Additionally, the GIS will be used to perform contouring, area/volume estimates, and other advanced spatial queries.

AMEC will utilize the NHOU GIS to produce a web-based GIS that will be accessible via the project management portal (see below). It will provide a navigation and investigation tool for accessing/reporting water quality (chemistry), water-level data, production well information, and well logs. The web-based GIS will allow users to quickly identify monitoring and sampling locations, either through visual clues (such as streets or other landmarks) or through menus. Pop-up menus for locations will provide options for displaying available data for that location in a tabular format or as files (e.g. well or boring logs). Additional search or filtering tools will be provided on the tabular results, allowing users to define/select/sort the data. The ability to select multiple locations at a time will be provided. The tabular results can also be used to

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generate XY graphical output, such as time-concentration graphs and hydrographs. There will be an option from the pop-up menus and tabular results to download data in a format such as Excel or a specifically formatted text file that is usable to modelers or other members of the user's community. The download file based on the tabular results will incorporate any filters or sorting criteria applied when generating the data table.

3.1.4.3 E-Document Library and Project Management Portal

AMEC will provide a single, centralized, and secure web-based Project Management/E-Document Library portal. The portal is available to the Design Team, Lockheed Martin, Honeywell and the EPA. The portal will digitally store reference documents, memoranda, plans, and reports. The portal will also list work tasks, associated schedules, and the status of work tasks so that project progress can be monitored. Document versioning controls will be available. Facilities will be provided for the administration of user access permissions (e.g., read, write, modify, upload, delete). The Project Management portal will provide the web-based access point for the GIS and data query tools described above.

3.2 Data gap analysis

AMEC will continue to evaluate data described in Section 2.5 and additional data as they become available to identify data gaps critical to preparation of the Remedial Design. Data gaps will be assessed with respect to the monitoring network, hydrostratigraphy, and groundwater quality. The results of our assessment of these data will form the basis of (1) identifying data gaps critical to developing the interim remedy, and (2) groundwater characterization of the NHOU portion of the San Fernando Valley.

Should data gaps critical to the Remedial Design be identified, AMEC will prepare a Data Gap Analysis Memorandum to identify each data gap and recommend actions to resolve each. The Data Gap Analysis Memorandum will evaluate data comprising the CSM with respect to at least the monitoring network, site hydrostratigraphy, and groundwater analytical data.

3.2.1 Monitoring Network

Data from the existing monitoring well network will continue to be assessed, specifically with respect to groundwater elevations and analytical results collected from the December 2010 sampling event. This event was designed to be comprehensive and included more wells than the EPA plans for sampling in subsequent sampling events. Due to access issues, some wells were not sampled until February and April of 2011. These and available subsequent data will be incorporated into the numerical groundwater flow model and used for RD. Results from recently installed monitoring wells NH-C07 through NH-C25 will be of particular interest, specifically with respect to potential changes in the CSM and/or anticipated target capture zone.

As part of our analytical assessment, we will evaluate (to the extent practicable) well construction details and the sampling methods employed to collect the sample such that a sample depth may be ascertained. This assessment pertains to assigning a depth to each result that will then be used to delineate their vertical distribution through the NHOU. Lacking this information, or finding that the sample was collected using a method not depth discrete, we will resort to evaluating the well construction details (e.g., screen interval) and associated geologic materials to reasonably apply a depth to the analytical results. Should geologic data indicate a single soil

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type throughout the screen interval; the analytical results will be assigned a depth consistent with the mid-point of the screen interval. Should geologic data indicate a portion of the screen interval penetrates a soil type(s) with obviously higher permeability values, the sample may be assigned a depth correlating with that geologic unit. Regardless, we will consider weighting analytical data originating from wells with longer screens to ascribe a greater degree of uncertainty (as opposed to analytical data with a depth-discrete association). This weighting factor (if applied) would be incorporated into contouring algorithms used to illustrate the lateral and vertical (in particular) extent of each COC, which will in turn be used to define the appropriate hydraulic capture area (as discussed in Section 3.4.2).

Should it be determined that additional monitoring wells or alternative sampling methods are needed to fill data gaps critical to the preliminary design (i.e., a need to refine the lateral or vertical extent of contamination for capture), appropriate action will be recommended in the Groundwater Monitoring Plan and associated SAP.

3.2.2 Hydrostratigraphy

SFV hydrostratigraphy has been described both in terms of geologic units (i.e., alluvium zones and the Saugus Formation) and with respect to production well screen intervals (i.e., EPA Depth Regions 1 through 4) (JMM, 1992). AMEC will evaluate existing geologic logs with respect to consistency (among proximal boreholes) and completeness (with respect to geologic parameters recorded at each borehole). AMEC will review previous geophysical investigation findings and, if necessary, will contact the ULARA Watermaster and LADWP to obtain geologic and/or geophysical logs from existing production wells, oil wells, or other borings advanced in the SFV basin. We will also evaluate available groundwater elevation data and analytical results to (in combination with geologic and geophysical data) assess previous depictions of SFV hydrostratigraphy and (potentially) further refine EPA's groundwater flow model to include additional vertical resolution in the NHOU vicinity.

Software applications (e.g., Tecplot™) will be used that allow the integration of various types of data, including analytical, and to display these data from selected points of view and times, and to also export some of this information into the groundwater flow model. This integration of data into the conceptual model will provide a rationale for further refinement of the numerical groundwater flow model based on distinctions of the character of the aquifer from stratigraphic and hydrostratigraphic perspectives and the current representation of the SFV aquifers as Depth Regions 1 through 4.

Additional data to be evaluated include aquifer and/or aquitard hydraulic parameters (e.g., hydraulic conductivity, transmissivity, porosity, storativity, etc.) in support of our refined numerical groundwater flow model (including development of particle pathlines). Volumetric estimates of SFV water sources (recharge) and sinks (discharge) will also be reviewed and assessed for completeness and water balance neutrality.

3.2.3 Groundwater Quality

AMEC will evaluate analytical results available from the EPA database with respect to current and anticipated drinking water quality criteria and assess their lateral and vertical distribution to identify the target capture zone and zones that will require hydraulic capture by the NHOU

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extraction wells. Our analysis of analytical data will focus the 15 COCs included in Table 6 of the SOW (see Appendix A), including:

- TCE
- PCE
- 1,1-DCA
- 1,2-DCA
- 1,1-DCE
- cis-1,2-DCE
- 1,1,2-TCA
- Carbon Tetrachloride
- Methylene Chloride
- Total Chromium
- Hexavalent Chromium
- Perchlorate
- TCP
- 1,4-dioxane
- NDMA

Of these, PCE, TCE, and chromium are the most laterally extensive and most commonly exceed current regulatory limits in samples collected since 2009. Hexavalent chromium, 1,4-dioxane, and 1,1,1-TCA have also been detected above their cleanup limits in a number of recently installed and sampled wells (MWH, 2010). The degree to which areas with concentrations above respective cleanup goals are collocated will be evaluated to appropriately configure the NHOU extraction wells to establish the necessary capture zones to meet RAOs.

In addition to comparing contaminant concentrations to current regulatory limits and performance standards, AMEC will evaluate reporting levels for constituents recorded as non-detect and compare those results to regulatory limits. Reporting levels for one or more constituents higher than existing regulatory limit(s) may represent a data gap if the results are not co-located with other constituents that are known to exceed regulatory limits. In other words, elevated reporting limits may represent data gaps with respect to delineating the lateral and vertical extent of contamination. Several naturally occurring or background constituents may be present within the NHOU area at concentrations above regulatory limits. These constituents will be acknowledged in the refined CSM but will not be considered with respect to defining the target capture area.

The potential utilization of other constituents (non-hazardous) that may refine our understanding of groundwater flow conditions in the SFV basin will also be considered and assessed. If the CSM could be substantially improved by evaluating the distribution of other analytes not previously characterized (e.g., various forensic tracer compounds), these or other sample analysis actions will be recommended in the Groundwater Monitoring Plan and associated SAP.

We will also evaluate analytical results collected over time to assess historical concentration fluctuations and mass migration and attempt to correlate these movements with groundwater flow conditions of the SFV. Groundwater flow conditions will be based, in part, on historical groundwater elevations and production well fields' operational data.

3.3 Groundwater Characterization

Results of our data gap analysis will be used to further evaluate the anticipated capture zone associated with the existing NHOU extraction wells with respect to groundwater with VOC concentrations above their MCLs and the apparent distribution of higher concentration portions of plumes. Details regarding plans to further characterize groundwater to address and resolve data gaps identified in the Data Gap Analysis Memorandum will be proposed in the Groundwater Monitoring Plan.

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3.3.1 Groundwater Monitoring Plans

The initial Groundwater Monitoring Plan (GMP) cited in the AOC was intended to be used to coordinate a comprehensive baseline sampling event in the NHOU area. However, this event was conducted in December 2010 and April, 2011, as agreed to by the EPA, this deliverable has since been removed from this scope of work.

Using the results of the updated CSM and Data Gap Analysis, a GM will be prepared during the preliminary design phase. The GMP will describe existing and proposed monitoring wells to be sampled, the frequency of sampling, and the analytical parameters necessary to monitor the location and movement of groundwater contaminants throughout the NHOU, and to fill critical data gaps in the Remedial Design. A Sampling and Analysis Plan (SAP), including a QAPP and FSP, will be provided with the GMP to describe groundwater sample collection to follow monitoring well installation if specific analytes or sampling techniques are recommended.

Submittal of the preliminary design GMP is intended to allow sufficient time to have critical data gaps filled in time to complete the preliminary design phase. The GMP will thus identify potential impacts to the project schedule and include revised schedule as necessary such that critical data gaps can be addressed.

The "preliminary design" GMP will be updated during the final design to describe existing and proposed monitoring wells, the frequency of sampling, and the analytical parameters necessary for semi-annual monitoring to evaluate the location and movement of groundwater contamination throughout the NHOU and evaluate performance of the interim remedy. The GMP will identify the location of monitoring, sentinel, and compliance wells; establish the sampling and monitoring frequency; and describe how the data will be analyzed, interpreted, and reported to ascertain compliance with performance standards.

3.3.2 Sampling and Analysis Plan

Semi-annual groundwater monitoring events are being performed by EPA in first half of April and first half of October (CH2M Hill, 2011). Presently, AMEC is not performing any sampling at NHOU in support of the pre-design groundwater modeling and therefore a SAP is not required at this time. It is anticipated that, as a result of the Data Gap Analysis, AMEC will collect additional groundwater samples in the future. Prior to initiation of that work, AMEC will prepare a SAP (including a QAPP and FSP) for sampling activities. Honeywell and Lockheed Martin continue to perform routine groundwater sampling in accordance with site-specific CAOs issued by RWQCB-LA.

However, as described above, should data gaps critical to the Remedial Design be identified that would require the collection of additional groundwater monitoring samples by Lockheed Martin and Honeywell, a SAP will be submitted for EPA approval prior to the work being conducted. For instance, a SAP would be prepared in conjunction with the GMP to convey details regarding collection of groundwater samples, analytical tests to be performed, and data quality objectives to be used. Elements of the SAP will include a QAPP and a FSP, each of which would be prepared to comply with appropriate EPA guidance documents (e.g., EPA, 2000; 2002; 2006). Sampling techniques and analytical methods will be implemented during the subsequent semi-annual sampling event.

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If necessary, sample acquisition will start with the EPA approval of the SAP and will continue on a routine frequency until the work performed under the AOC is completed. Sample acquisition will include:

- Mobilization and Demobilization
- Field Investigation and Sampling
- Sample Analysis

All laboratories used for the analysis of groundwater samples will be certified by the State of California and approved in advance by EPA. Any analytical data received will be validated by a third party who is not involved in managing or performing the monitoring activities. Validation reports will be submitted to EPA when complete.

3.3.3 Data Evaluation Reports

In the event that additional monitoring wells are needed, their installation will be recommended in the Groundwater Monitoring Plan. Following each sampling event (assumed semi-annual frequency, to be coordinated by EPA and performed by other entities), a data evaluation report would be prepared to describe groundwater elevation measurements, analytical data, and their implications with respect to the interim design process. Data evaluation reports will be submitted to EPA within 90 days following the completion of each event. Data evaluation reports will not be produced for sampling currently being coordinated by EPA.

3.3.4 Review LADWP Groundwater Management Plan (ICIAP)

As part of the preliminary design process, AMEC will contact LADWP and EPA to gather information regarding their Groundwater Management Plan, currently being discussed between LADWP and EPA. This plan will include information regarding their intent to operate production well fields and, presumably, ongoing operations to recharge the SFV basin. Given the large scale of these operations, information regarding current and planned production well pumping rates will be critical to consider when developing the interim remedy and will be specifically considered (if available) in the groundwater flow model. In addition to natural events (i.e., seasonal recharge), the model (described further below) will account for transient changes in well field production rates and spreading grounds operations to address what are anticipated to be significant hydraulic influences on the NHOU capture zone. Establishing and maintaining a capture zone to hydraulically contain higher COC concentrations is essential to meeting the second interim remedy RAOs as specified in Section 2.8 of the ROD.

AMEC will interact with the LADWP throughout the design process to refine the CSM and groundwater flow model, and develop the preliminary design by obtaining existing LADWP data (e.g., as documented in the FFS) and providing progress updates regarding the Remedial Design. Once the pre-design groundwater modeling memorandum has been submitted, we will specifically discuss our findings with the LADWP to facilitate their consideration of NHOU remediation needs associated as they may pertain to developing the ICIAP.

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3.4 Preliminary Design

The purpose of the Preliminary Design will be to establish a treatment system for the NHOU which will achieve the RAO's as stated in Section 1. This work will encompass work tasks involving sub-surface data review and modeling to identify and contain contaminated groundwater, and aboveground treatment system design to remove the contaminant mass from the groundwater prior to the use of the groundwater as municipal supply. The design of the aboveground treatment system is dependent on the results of the groundwater modeling and stakeholder acceptance. It is therefore imperative that consensus from all stakeholders on the treatment systems to be employed is achieved early in the design process.

Preliminary design will include evaluation and interpretation of the current groundwater model, engineering analysis and calculations, and the means and methods for implementing the selected remedy. The Preliminary Design tasks include a conditions assessment of the NHOU Central Treatment Facility, Pre-Design groundwater modeling, an Evaluation of Treatment Options, and a Preliminary Design Report. The Preliminary Design Report will present the system design up to a level of 30% complete. These tasks are further described below.

3.4.1 Building Conditions Assessment

AMEC will conduct a site visit to better understand the requirements associated with refurbishing and upgrading the NHOU Central Treatment Facility. During the site visit, the following building components and conditions will be reviewed:

- Type, size and condition of treatment equipment;
- Available space on the property and in the building for future expansion;
- Vicinity of neighbors;
- Security considerations;
- Existing power source and distribution system;
- Sprinkler systems, fire suppression equipment, and other health and safety equipment;
- Heating ventilation and cooling equipment, water heaters and fixtures;
- Fences, gates, sidewalks and curbing;
- Utility drawings;
- Site access for personnel and vehicles;
- Asphalt parking lots;
- Storm drainage and ponds; and
- Easements and conveyances.

A meeting will be held with the facility's O&M staff to review operational and maintenance issues that affects capacity, operating cost, and performance. AMEC will request the following information from LADWP and completion of the Building Conditions Assessment will be contingent on receiving this information.

- Treatment System Design basis
- As-built plans
- Current operating basis
- Influent/effluent water quality analyses
- List of equipment, name of the equipment manufacturer, model number, serial number

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- Description of maintenance activities
- O&M costs on an annual basis
- List of operational issues
- Capacity of area sanitary sewers, design drawings

The evaluation will not address compliance of the facilities with current codes, regulations, or Applicable or Relevant and Appropriate Requirements (ARARs), except for specific existing facilities or equipment that will be modified or replaced. These conditions will be documented in the Building Conditions Assessment Technical Memorandum (TM) and be included as an Appendix to the Preliminary Design Report.

In their response to the draft RD Work Plan (see Appendix D), LADWP indicated that power bumps are a major cause of outages for the existing NHOU treatment system. LADWP recommends that the well power supply and control equipment be upgraded as a part of a potential remedy. AMEC will contact LADWP for further clarification on causes of power bumps and will include a review of the affects power bumps have on the existing system in the Building Conditions Assessment Technical Memorandum.

3.4.2 Pre-Design Groundwater Modeling

Consistent with previous SFV modeling projects, AMEC will use MODFLOW as the numerical groundwater model code with MODPATH and other MODFLOW-linked modeling codes added as needed or appropriate. A Groundwater Modeling Memorandum will be prepared that incorporates results from the following activities:

- Incorporate the updated CSM, based on our review of ongoing characterization efforts, including results from additional monitoring wells installed in 2010 (e.g., MWH, 2010) and recent groundwater monitoring results;
- Re-mapping the target contaminant zones published in EPA's FFS to incorporate data from recently installed monitoring wells (e.g., MWH, 2010); and
- Refinement of the EPA San Fernando Basin Feasibility Study (SFBFS) groundwater flow model to develop an appropriate NHOU extraction well pumping configuration (including rates and locations) to contain higher concentrations, remove contaminant mass, and minimize plume spreading.

Methods to prepare a refined groundwater flow model may include, but may not be limited to, the following steps:

1. Concur with or revise the existing model layers, or define additional layers that correlate with hydrostratigraphic units (including aquitard units) based on our review of geologic, geophysical, and other data;
2. Preserve boundary conditions from the EPA's current SFV model to the extent practical, to account for changes in production well schedules and other natural or anthropogenic stresses applied throughout the basin as data become available;
3. Evaluate the distribution of aquifer property zones within each layer, the vertical conductance between each model layer, and incorporate new hydraulic property data

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that may be available from the EPA database or from other historical or ongoing groundwater investigations in the area (e.g., geologic logs, geophysical logs, well construction data, specific capacity data, aquifer test results, and analytical results);

4. Develop a refined transient groundwater flow model and calibrate it to historical groundwater elevation data (contained in the EPA SFV database) and to current groundwater elevation generated from the basin wide groundwater monitoring program;
5. Demonstrate that the refined and calibrated model is generally consistent with and matches specific calibration data as does the existing SFBFFS-B model;
6. Implement optimization routines to develop an appropriate NHOU extraction well configuration that captures the contaminant target zones under various transient conditions (i.e., drought, seasonal fluctuations, and associated changes in production well operations); and
7. Recommend modifications to the current NHOU extraction well field in the Groundwater Modeling Memorandum as appropriate, including, but not limited to: extraction well locations, well depths, active screen intervals, and pumping rates.

Revision of the model will be based on the results of evaluating geologic, hydrogeologic, geophysical data, and other available data to generate a three dimensional conceptual model of the SFV as discussed in Section 3.2.

Historical and recent analytical will be reviewed to identify areas where COCs (including those specified in the SOW, Table 6) have been detected above an existing regulatory threshold (e.g., current MCL, PHG, notification level, or other performance standard). NHOU extraction wells will be designed and configured to capture these areas to the maximum extent practicable, consistent with RAOs.

The ROD recognizes that capture of all groundwater containing constituents above regulatory threshold is not possible and thus states that 'higher concentrations' of contaminants must be hydraulically contained to prevent further degradation of groundwater quality at surrounding production well fields. As such, we intend to specifically illustrate areas with compounds measured at concentrations greater than ten times their associated regulatory limit to highlight the "higher concentration areas". Capture of this area is anticipated to prevent further degradation of groundwater quality occurring in the vicinity of the Rinaldi-Toluca and North Hollywood West production well fields. This threshold is consistent with the description in the ROD where TCE "hot spots" are defined as having concentrations greater than 50 µg/L (i.e., ten times the MCL) and is consistent with the CDPH definition of an 'extremely impaired source' (i.e., exceeds ten times an MCL or action level based on chronic health affects) (CDPH, 1997). The approach to determining the degree of capture in different areas of the NHOU area will be evaluated as part of the Data Gap Analysis, Groundwater Modeling Memorandum, and other documents leading the Preliminary Design Report.

Analytical data available from recently installed monitoring wells will be specifically evaluated with respect to existing analytical data to define the spatial zone requiring hydraulic capture. The depth associated with each groundwater sample will be determined first by assessing the sample collection method, then by screen interval, and finally by soil types screened by each

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well. For instance, samples collected using dedicated pumps will be assigned a depth interval equal to the pump intake if the pump is located within the screen interval. Samples collected from pumps located in the well casing (either above or below the screen interval) will be assigned a depth interval equal to the mid-point of the screen. Samples collected using depth non-discrete techniques from wells with particularly long screens (e.g., greater than 50 feet), will be assigned a depth in part considering geologic materials correlating the screen interval and assigned a depth interval specific to the most productive zone. Data from longer screen wells will be evaluated to account for their potentially greater uncertainty. This analysis is conducted in order to generate the most accurate depiction of contaminant capture zone extent in the model which will be used to determine optimal extraction well configurations to achieve RAOs.

3.4.2.1 Groundwater Flow Model Calibration

Calibration of the refined groundwater flow model will be performed in accordance with available guidance, e.g., ASTM D5981-96 (Reapproved 2002). Goodness-of-fit will be measured by observed agreement with interpreted measured data as well as model residuals analysis including statistical measures such as mean, absolute mean, sum of squares, standard deviation, and normalized standard deviation. Calibration may be assisted with the use of parameter estimation applications (e.g., PEST) to improve parameter distributions and boundary condition settings (within pre-defined limits) that effectively minimize objective functions (typically statistical measures of goodness-of-fit) in conjunction with manual adjustment of model input parameters to obtain the calibrated revised model. Caution will be exercised to not compromise our overall goals of maintaining parsimony and to avoid over-parameterization of the model.

3.4.2.2 Target Capture Zone Analysis

Target capture zone analysis will be conducted in accordance with EPA's *A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems* (EPA, 2008), including a sensitivity analysis and use of particle pathlines to illustrate the anticipated hydraulic capture zone. Model refinement will also include a statistical analysis of hydraulic parameter distribution and a sensitivity analysis to quantitatively describe the degree of uncertainty (and thus increase the defensibility) of the model output, including predictive simulations. Statistical analysis of model input parameters will generate probable ranges of values that will serve as guides for confidence in the reasonableness of model results as model calibration does not guarantee a unique solution of governing equations. The analysis will include determination of sensitive parameters in the model and a sensitivity analysis to determine the adequacy of the proposed remedy with respect to uncertainty in the input parameter values and inherent limitations in any model to support a robust design specification.

The effectiveness of the anticipated target capture zones will be illustrated with forward particle tracking for the various limits of anticipated aquifer conditions, including average pumping during wet years and above-average pumping during drought conditions. Should additional extraction wells be determined necessary to meet RAOs, identifying their optimal locations and pumping rates may be facilitated with the use of optimization software (e.g., MODMAN, MGO). These programs automatically modify predefined variables (i.e., potential extraction well locations and/or rates) and iteratively operate the numerical flow model to identify an optimal extraction well configuration under specified stress conditions. The simulations will, at a minimum, account for average SFB aquifer conditions (i.e., anticipated well field pumping

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withdrawals and estimated spreading grounds recharge rates; the FFS simulations projected results up through 2017) using data obtained from the LADWP and the ULARA Watermaster. The analysis will attempt to provide for a set of bounding conditions that will incorporate uncertainties in contaminant extent and model parameters in order to simplify this process. Other alternatives will be modeled that combine flexibility in operation and robustness in light of other engineering evaluation criteria. The project hydrogeology team will coordinate with the engineering team to define selected alternatives and model these to obtain optimal representations for each. The ability to implement the numerically optimal solution may be limited by access and/or cost constraints. Areas where new wells may be sites should be identified in collaboration with appropriate agencies. Our ultimate selection of a preferred configuration will be dependent on the ability to achieve RAOs under a variety of aquifer conditions that might occur, cost-effectiveness, and flexibility of design. To the extent possible, the preferred configuration will capitalize on flexibility incorporated into the extraction well designs (e.g., use of packers to control screen length) and network (e.g., the ability to use all extraction wells or a subset thereof).

3.4.2.3 Groundwater Modeling Memorandum

Results of the simulations will be documented in a Groundwater Modeling Memorandum to support proposed extraction well locations, screen depths, and pumping rates to attain the RAOs of containment and contaminant mass removal. Specifically, the model will be used to evaluate the preferred remedy described in the ROD involving the replacement of extraction well NHE-1, the replacement or modification of extraction wells NHE-2, NHE-4, and NHE-5, and the installation of up to three new extraction wells northwest of the current NHOU extraction wells.

The Groundwater Modeling Memorandum will document all phases of the modeling task. This will include detail and rationale regarding modifications made to the SFBFFS-B model to better support the design, calibration procedures and results, model verification to an independent data set, sensitivity runs and tabulated results, model simulations (i.e., particle tracking and/or transport runs), sensitivity on simulation runs, list of all model runs, appended model documentation of individual runs, limitations of the modeling, and conclusions and recommendations. Model input/output files for all model runs will be maintained and be available for review.

The draft Groundwater Modeling Memorandum will be submitted to the EPA, the LADWP, the RWQCB-LA, and the ULARA Watermaster for review and comment.

3.4.3 Treatment Options Memorandum

After completion of the pre-design groundwater modeling, groundwater treatment options will be evaluated considering the target zones, pumping well locations, depths, flow rates, and influent concentrations determined during the modeling effort to achieve the RAOs involving containment of high concentration areas of the plume to ensure no further degradation of the groundwater quality occurs in the vicinity of the production well fields.

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3.4.3.1 Potential Extraction Scenarios

Output from the pre-design groundwater flow model is anticipated to identify a preferred extraction well configuration (including the pumping rate from each active extraction well) and perhaps several alternative configurations that pertain to specific seasonal and/or production well field conditions (i.e., average rainfall, drought conditions, etc.). This memorandum will assess the anticipated raw water quality from each likely extraction well configuration to form the basis of the preliminary treatment design. For instance, available analytical data from wells within each capture zone will be queried for minimum, maximum, and average concentrations of COCs and evaluated with respect to concentration changes over time. These concentrations will be coupled with groundwater mass removal associated with each capture zone to account for mixing and estimate the individual well influent COC concentrations. Flow contributions from each well to the conveyance system will then be evaluated to estimate influent (i.e., raw water) concentrations to the Central Treatment Facility. This step complies with CDPH 97-005 guideline Part C.4 (i.e., Effective Monitoring and Treatment). The potential need for additional monitoring wells to ensure hydraulic capture occurs and that nearby production well fields are protected will be addressed in the Data Gap Analysis Report.

3.4.3.2 Evaluation of Treatment Technologies

Evaluation of treatment technologies will begin using the output of the pre-design groundwater model and the anticipated raw water quality as noted above.

The Second Interim Remedy includes performance criteria that will require extraction and treatment of contaminated groundwater at certain locations within the plume, expanded treatment for VOCs, and additional treatment for chromium and 1,4-dioxane. The following table identifies these constituents and some alternative treatment technologies that will be evaluated. This list is not intended to be comprehensive, but represents the minimum number of technologies that will be evaluated. Unlisted technologies and combinations may also be assessed for relevance. The technology selected in the ROD is underlined in the following table.

Constituent	Treatment Methods	Location of Treatment System
Hexavalent Chromium	<ul style="list-style-type: none"> • <u>Reduction/Coagulation/Filtration</u> • Ion-Exchange • Above treatment with addition of membrane polishing • Above treatment with blending from other wells 	Central Treatment or Well Head Treatment

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Constituent	Treatment Methods	Location of Treatment System
VOCs	<ul style="list-style-type: none"> • <u>Air stripping followed by Granular Activated Carbon (GAC)</u> • Two-Stage liquid phase GAC treatment system • Advanced Oxidation Process 	Central Treatment
1,4-Dioxane	<ul style="list-style-type: none"> • <u>Treatment using Advanced Oxidation Process</u> • Blending with other wells prior to reaching compliance point. 	Well Head Treatment or Central Treatment

Selection Criteria

Evaluating the treatment options and treatment locations will require the design team to evaluate key factors associated with each constituent and associated treatment technology. Discussions with equipment vendors will be performed to evaluate the performance of any packaged or proprietary treatment systems and determine their effectiveness. Location of wells, available conveyance piping, flow rates, unique constituents, property access and space considerations will also be evaluated to determine the feasibility of wellhead treatment systems, combined central treatment systems or a combination of both. Factors such as property acquisitions, access agreements, and easements will also be considered.

During the evaluations, the design team will give each treatment option rankings based on the factors evaluated. The rankings will be in terms of criteria for selection including, but not limited to:

1. Ability to Achieve RAOs
2. Space requirements and location
3. Ability to meet ARARs
4. Adaptability for future constituent and regulatory changes
5. Reliability and redundancy
6. Costs, including capital and operating

The selected criteria will be initially ordered and presented to the project stakeholders during a meeting. The result of the meeting will be a consensus among stakeholders for the ordering of criteria based on most to least importance and in a manner that meets the project goals and their requirements.

It is anticipated that the following factors will be considered in the selection of the final treatment technology:

- Hydraulic capacity, influent concentration ranges, treatment effectiveness

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- Reliability of process and need for redundancy (part of CDPH 97-005 guidance)
- Adaptability and expandability of the treatment technologies to handle variations in influent concentrations as well as changes in MCL's for constituents such as TCE, PCE, and hexavalent chromium.
- Ease of maintenance and need for spare parts,
- Capital costs
- Lifecycle expectancy and costs
- Operating costs
 - Labor Costs
 - Energy usage
 - Chemicals
 - Waste disposal
 - Lab costs for maintaining compliance
- Ease of operation, degree of automation, need for full-time operators
- Instrument control systems
- Points of compliance
- Future system expansion
- Code Evaluation and Permits
- Constructability
- Sustainability
 - Waste generation and waste characteristics
 - Energy efficiency
 - Carbon neutrality
 - Stormwater handling
 - Alternative energy generation
- System Space Requirements
 - Space available at existing treatment facility and at wellheads
 - Land acquisitions
 - Easements and access agreements
 - Third party agreements
- Location, noise and other system aesthetics

This will be a collaborative process that includes consultation with EPA, the LADWP, the CDPH, the RWQCB-LA, and the ULARA Watermaster. At the completion of the work, a

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Treatment Options Technical Memorandum will be prepared and will be submitted to EPA, the LADWP, CDPH, the RWQCB-LA, and the ULARA Watermaster for review and comment.

3.4.4 Preliminary Design Report

A Preliminary Design Report will be prepared that will establish the technical framework upon which the design will be based, including the project description, design requirements and provisions, and operation, monitoring and maintenance (OM&M) requirements. A technical design basis for the design of each component of the groundwater remediation treatment system will be completed documenting information such as well extraction rates, conveyance pipeline sizing, plant influent water quality, treatment processes, and the configuration of the water treatment facility. Materials of construction for the major system components, including the treatment vessels, system transfer pumps, and the conveyance pipelines will be established.

The preliminary design of the Second Interim Remedy treatment system will include the following tasks:

- **Design/Construction Approach**

Near the end of the preliminary design, the proposed treatment system will be reviewed, and based on the information developed, a description of the anticipated contracting approach for implementation of the Remedial Design will be provided. The two primary contracting approaches under consideration are design/bid/build and design/build.

 - Design/Bid/Build: The design under this construction approach is typically prescriptive to allow bidding from multiple contractors on well-defined work that can be implemented using standard construction methods. The design would include agency review at initial, intermediate, and final design phases. This method tends to be more favorable when schedule is less of a factor, when significant modifications for the design are unlikely, and when constructability issues are expected to involve only typical field challenges. Modifications to the design require amendments or change orders. This design-bid-build method could result in either a prescriptive specification or performance-based specification approach. The overall design, review, procurement, and construction schedule must be able to accommodate this method which could be the longest in duration.
 - Design/Build: Under this approach, contractor procurement and construction elements are initiated during the design process. Prior to embarking upon this contracting method, an agreed-upon design review process would be developed to assure appropriate agency review and approval of the Remedial Design and construction submittals. This process would likely involve the submittal, review, and approval of design packages as each is developed to move into contractor procurement and remedial construction. The request(s) for proposal for construction services will include the approved intermediate design documents, for which subsequent changes and final design will also need agency review and approval. The design documents used for evaluation and selection of the design-build team would likely be more performance-based allowing latitude in the means and methods to meet the selected remedy requirements. This

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contracting approach tends to be more favorable when the schedule does not allow time to accommodate the design-bid-build approach. It also allows for significant flexibility and creativity during the contracting phase to consider optimal or innovative approaches.

- **Preliminary Delivery Plan and Schedule**

Once the construction approach has been selected, a preliminary delivery plan will be developed which will provide details on how the Remedial Action will be performed. This document will present an organizational structure showing the relationships and responsibilities of the PRP's executing the Remedial Action along with a contracting and communications strategy.

- **Preliminary Construction Schedule**

A preliminary schedule for remedial action will be developed near the end of the preliminary design. This schedule, based on the selected construction approach will break down the various tasks to a level commensurate to the level of design. Included in the schedule will be such items as:

- RFP release, pre-bid meeting/site walk, bid preparation and submittal
- Bid review, EPA/stakeholder review, contractor selection
- Contract Negotiation
- Mobilization
- Equipment and materials procurement, including long lead time items
- Property acquisition
- Permit acquisition

- **Design Basis Document**

The Design Basis document will form the basis for all work performed during the preliminary, intermediate, and final designs. This document will list the influent flows and concentrations as determined by the groundwater modeling and all assumptions used in those determinations. The performance standards for the COC's in the extracted and treated groundwater that the treatment system must achieve will be listed and include a discussion of the future status of such limits. Anticipated effluent concentrations will be listed based on capabilities of equipment, treatment technologies, and results from other similar operations. Applicable design codes and standards will be identified for appropriate design disciplines including structural, piping, mechanical, and electrical. Finally, the treatment process steps and equipment necessary to treat the influent conditions to meet effluent limits will be documented including equipment sizing, utility requirements, instrumentation, waste generation, and chemical requirements.

The Design Basis document will also define the technical parameters upon which the design is based. As noted above, these parameters may include:

- Waste characterization
- Volume and types of groundwater requiring treatment
- Influent quality over the design life of the treatment system examining the short-term and long-term delta in influent concentrations

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- Additional treatment requirements above and beyond treatment of the COC's. These treatment requirements may be driven by permits, regulation, ARAR's, sustainability, etc.
- Point of compliance for the delivery of the treated groundwater
- Assumptions regarding treatment efficiencies
- A preliminary Sequence of Operations will be prepared to provide a description of the remediation system control philosophy
- Long term performance monitoring requirements

It is understood that while ARAR's have been frozen when the ROD was signed, treated effluent from the Second Interim Remedy must meet off-site criteria (including treatment facility discharge criteria) for LADWP acceptance. The design basis will specify the all the treatment standards that the system will achieve at the time the design is conducted.

- **Supporting Calculations**

Supporting calculations will be required during many tasks to properly size piping and equipment, determine space requirements, evaluate holding requirements, etc. Calculations will be documented, reviewed and checked in accordance with the QMP previously submitted. The types of calculations necessary will depend upon the technology selected. These calculations may consist of the following however others may be performed as required.

- Preliminary demonstration of plume capture consistent with EPA's guidance documentation
- AOP residence times hydrogen peroxide dose and UV light intensity
- Piping hydraulic calculations
- System hydraulic profiles
- Chemical feed rates
- Reaction residence times
- Filtration rates and required area
- GAC loading, residence times, breakout times
- Air stripper sizing, air and liquid flow rates
- Electrical load calculations, grounding, short circuit analysis
- Life cycle cost evaluation for all system components including a method for minimizing or offsetting impacts, including all carbon emissions
- Any calculations associated with O&M
- Quantities of waste produced

- **Preliminary Drawings**

Preliminary drawings will be developed which will graphically represent the physical design of the Second Interim Remedy. The drawings will be created using AutoCAD 2010 software and will follow AMEC's drafting and file naming standards. For the preliminary design, the following drawings will be created:

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- Cover Sheet: the cover sheet will provide the project name and location and include contact information for all relevant stakeholders and project contributors. The drawing will include a reduced site map or site photo showing basic location information.
- List of Drawings: the list of drawings will be a series of sheets providing an overall index of project drawings organized by discipline. The list will provide the drawing number and the title of the drawing.
- Process Flow Diagram: a process flow diagram (block flow diagram) will be developed which will show a simplified diagram of how the Remedial Design will operate. Each key operation, represented by a box or block will be shown on the diagram with primary and secondary flows represented by connecting lines. New, existing, and existing but modified operations will be delineated. Very basic information such as flow rates will be shown on this drawing.
- Process and Instrumentation Diagrams (P&ID's): P&ID's will be developed to provide more detailed information on the process and flows within the process. P&ID's break the system down to each piece of equipment showing basic design information for that equipment, all flow inputs and outputs, types of instrumentation, local and remote instrumentation equipment, and alarms.
- Hydraulic Grade Line: a hydraulic grade line diagram will be developed to show the hydraulic profile of flow from the wells to the treatment system.
- Electrical Single Line Diagram: the electrical single line diagram will provide basic information on the electrical distribution for the Remedial Design. This diagram will show such information as size of incoming feed, motors and motor horsepower, conduit and cable sizes, starter sizes, fuses and disconnects and preliminary distribution panels.
- SCADA Block Diagram: a SCADA block diagram will be developed showing the relationship between the various control systems.
- Site Drawings: for preliminary design, the site drawing will show the NHOU including the existing extraction wells and any recommended new wells. The drawing will identify suitable locations for the treatment system construction and locations for wellhead treatment if validated. Yard piping will also be shown.
- General Arrangement: a preliminary GA will be developed showing the location of new and existing equipment at a central treatment facility and wellhead treatment facility if required. No interconnecting piping will be shown.
- **Specifications Outline**
An outline will be developed which will list all specification sections which will be used as part of the preliminary design. As the design progresses into the intermediate and final design stages, specifications may be added or deleted as necessary based on project requirements. It is anticipated however, that this list will be fairly complete at the end of preliminary design. The format and organization of the specifications will be consistent with the Construction Specifications Institute format (1995).
- **Easement and Access Requirements**
With the completion of the groundwater modeling and selection of treatment system locations, land parcels can be identified as possible locations for remedial action. These

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parcels will be identified, reviewed for suitability, and a plan will be developed for obtaining the property through purchase, easement, or other third party agreement. Action will not begin on this plan until the Preliminary Design Report is approved by EPA.

- **Value Engineering Screening**

A value engineering (VE) screening will be performed near the completion of the preliminary engineering work. The focus of this screening will be to review the design and determine if a full VE study will be beneficial. It is anticipated that the screening will review:

- Currently accepted environmental control measures
- Constructability of Design
- Land Use
- Costs of selected treatment options
- Review of currently acceptable construction practices
- Review of potential cost savings resulting from design changes/optimization

- **Plan for Satisfying Permit Requirements including CDPH 97-005**

Please refer to Section 6 of this RD Work Plan.

- **Plan for complying with Project Requirements**

Please refer to Section 6 of this RD Work Plan.

- **Sustainability of Design**

Starting with the preliminary design and continuing through to the final design, the Remedial Design will focus on using best sustainable practices in order to minimize the impact on the area, neighbors and the environment. AMEC has assigned personnel who will monitor the on-going design from a sustainability standpoint and provide direction at each key design stage. The Leadership in Energy and Environmental Design will be utilized and the project will, to the greatest extent possible, offset all carbon emissions. Some specific areas examined will be:

- Stormwater handling
- Energy efficiency and power reduction
- Waste generation, reuse and recycle
- Use of alternative energy to offset power requirements

- **Opinion of Probable Construction Costs**

A Class V Opinion of Probable Construction Costs (OPCC) using the contingencies recommended by the Association for the Advancement of Cost Engineering (ACE) 18R-97 will be prepared under the supervision of an ACE certified estimator for the capital costs. The cost estimate will consider price escalation and other market factors such as inflation. The preliminary design will also include an opinion of operation and maintenance costs for staffing, chemical usage, power, equipment replacement, maintenance and repair, residuals disposal, and other significant operation and maintenance cost elements.

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- **Appendices**

As noted in the AOC, the follow documents will be submitted with the Preliminary Design Report as appendices:

- Final Building Conditions Assessment TM
- Preliminary Design Update of Groundwater Modeling TM
- Final Treatment Options TM

3.5 Intermediate Design (60%)

An Intermediate Design Report will be prepared which will incorporate comments on the Preliminary Design package, and advance the remediation system design to the approximate 60% stage of completion. The Intermediate Design drawings provided under this task will include the following:

- 60% complete site plans, grading plans, and drainage plans
- 60% complete structural drawings including building, equipment, and water bearing structure foundations and overall building structural drawings
- Piping and instrumentation diagrams will be updated to reflect any changes since the Preliminary Design Task
- Extraction well and well head details
- Conveyance piping alignments, sizes, and materials to the appropriate design stage
- Electrical, instrumentation, and control drawings to the appropriate design stage
- Process equipment to the appropriate design stage
- Preliminary start-up and testing plan
- Initiation of 97-005 Compliance Report

The Intermediate Design Report will also include draft specifications required for the remediation system, an updated construction schedule, and identification of long lead items for procurement at this stage of design. A revised Basis of Design shall be provided, summarizing the evaluations conducted to identify the system components to be incorporated.

The Class V estimate will be revised to a Class IV OPCC using the contingencies recommended by the Association for the Advancement of Cost Engineering (AACE) 18r-97 under the supervision of an AACE certified estimator for the capital costs. The cost estimate will consider price escalation and other market factors such as inflation. An initial opinion of the anticipated operations and maintenance costs will also be provided in the Intermediate Design Report.

3.6 Pre-Final and Final Design (90% and 100%)

This section describes the scope associated with the pre-final design and final design reports, as well as the pre-achievement O&M plans associated with each.

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3.6.1 Pre-Final Design Report

A Pre-Final Design Report will be prepared with the incorporation of comments on the Intermediate Design package and the refinement and update of the design plans. The report will include final P&IDs, equipment layout, system piping plans and details, civil and yard piping details, mechanical plans and piping details, structural/architectural and foundation plans, sections, and details, electrical site plans, electrical single lines, schematics, and details, and instrumentation and control system details, and the detailing for the Programmable Logic Controller (PLC) and Human Machine Interface (HMI), as needed. The pre-final design will clearly show any modifications to the design resulting from the intermediate design review. Deliverables for the pre-final design will include:

- **Specifications**
The Pre-Final Design Report will include a package of construction specifications conforming to the CSI format, including Division 1 specifications and a bid sheet.
- **Drawings**
The Pre-Final Design Report will be submitted electronically with half-size drawings (11 inch by 17 inch) for review.
- **Design Basis**
The project design basis, established at the beginning of preliminary engineering, will be reviewed and modified to incorporate any changes to the system as a result of the intermediate design review and the advancement of the design from 60% to 90%.
- **Delivery Plan and Schedule**
The preliminary Delivery Plan and Schedule will be updated to incorporate any changes. When submitted with the Final Design, it will include the then identified timing and duration of major construction activities and operational milestones noted in the AOC.
- **Start-up and Testing Plan**
The preliminary plan will be finalized to incorporate any changes.

3.6.2 Pre-Achievement O&M Plan

A draft Pre-Achievement O&M Plan identifying the operation and maintenance activities necessary to satisfy the established Performance Standards will be developed. The Plan will describe the following:

- **Description of Equipment:** An equipment list will be developed which will list the equipment name, manufacturer, serial number and model number. The list will reference the appropriate O&M Plan section where manufacturer's information will be provided. This OEM data will include such items as preventative maintenance activities and schedules, component replacement schedules (as appropriate) and recommended spare parts lists.
- **Routine Operating Activities:** The plan will include standard operating procedures addressing facility operations. SOP's will include:
 - Facility Start-up procedures
 - Facility Shutdown procedures

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- Normal daily operations and system compliance checks
- Daily compliance monitoring
- System specific operating procedures and checks
- Remote monitoring
- Operator training, certification and staffing.
- **Routine Maintenance Activities:** The plan will include a description of routine or preventative maintenance which will be required to maintain operation. These may include:
 - Daily inspections
 - Instrument calibrations
 - Equipment preventive maintenance (PM) per manufacturers recommendations
- **Extraction Well Rehabilitation:** During normal operations, extraction wells will require maintenance and periodic rehabilitation in order to maintain design flowrates and projected operating times. The plan will include standard maintenance tasks and a schedule for future rehabilitation of all NHOU extraction wells.
- **Emergency Operating Activities:** The plan will include SOP's to be implemented should an emergency or alarm condition occur at the new treatment facilities which would have a direct impact on the ROD Performance Standards. Initial SOP's will be developed to address potential operating issues that are identified during design. Additional SOP's will be developed during start-up and performance testing to address any issues identified at that time. These SOP's will include steps to protect the municipal water supply, and provide notification procedures to the appropriate departments.
- **Failure of Proposed Treatment:** As with any treatment system, there is a risk that equipment or control failure could allow untreated water to reach the distribution system. CDPH 97-005 guidance requires that an assessment be conducted to first evaluate the risks of failure. As part of the preparing the O&M plan, an evaluation of the approved 90% treatment process will be conducted to identify those processes for which failure would cause a pass through of untreated water. The failure evaluation will also evaluate the impact of extraction well shutdown on well field containment to determine allowable frequency and durations of system shutdown events.
- **Compliance monitoring sampling and analysis plan:** This plan will cover the sampling and analysis requirements necessary to comply with:
 - Performance Standards
 - Requirements of any permit obtained to allow the plant to operate
 - Monitoring identified to protect the environment such as noise.
- **General Facility Plans:** In addition to the operating plans, three initial plans will be developed during the Remedial Design to outline procedures at the facility. These plans are:

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- Health and Safety Plan
A Health and Safety Plan will be developed covering the Operation and Maintenance of the Second Interim Remedy.
- Waste Disposal Plan
This plan will cover the proper disposal of materials used and wastes generated during operation and maintenance of the facility. This plan will include safe handling practices, PPE required (from HASP) and proper disposal.

The Waste Disposal Plan will note that wastes generated during project implementation are from a CERCLA site. Based on existing precedents, not all wastes generated must be classified as CERCLA waste. The Waste Disposal Plan will describe procedures for the classification of wastes generated.

- Records and Reporting Plan
A plan will be developed describing how information and data, developed as part of the operation of the Second Interim Remedy will be stored. These data will include:
 - Operating information such as logs, maintenance activities, compliance sampling, lab results, etc.
 - Personnel records
 - Audits and inspections
 - Visitor logs

Reporting mechanisms and procedures will also be included in the event of emergencies. The plans will provide a matrix to identify operating procedures to implement and agencies to notify.

3.6.3 Final Design Report

A Final Design Report will be prepared with incorporation of comments on the Pre- Final Design package and the refinement and update of the design plans. All Final Design documents will be approved and stamped by a professional engineer registered in the State of California.

3.6.4 Final Opinion of Probable Construction Costs

With the submittal of the Final Design Report, the OPCC will be upgraded to a Class III estimate using the contingencies recommended by the Association for the Advancement of Cost Engineering (AACE) 18r-97 under the supervision of an AACE certified estimator for the capital costs. The cost estimate will consider price escalation and other market factors such as inflation. The OPCC will be based on the 90% design submittal.

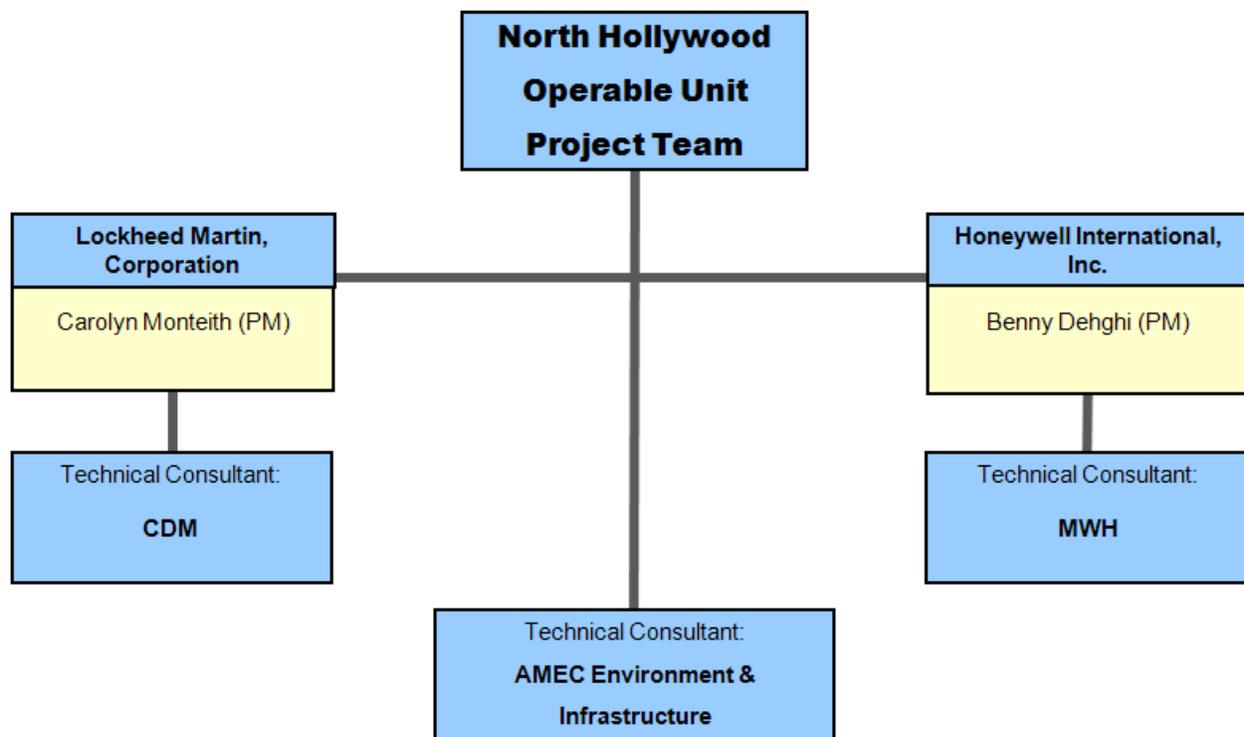
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4 TEAM ORGANIZATION AND COORDINATION

This section will provide a discussion and organizational charts for the project organization. The first organization chart will show the Lockheed Martin and Honeywell relationship and primary leads as well and their respective sub-consultants. The second chart will show the AMEC organization and the various roles (as was included in our QMP).

4.1 Lockheed Martin and Honeywell Project Team

The Lockheed Martin and Honeywell project team is illustrated in the following organization chart, including the relationships with regulatory stakeholders.



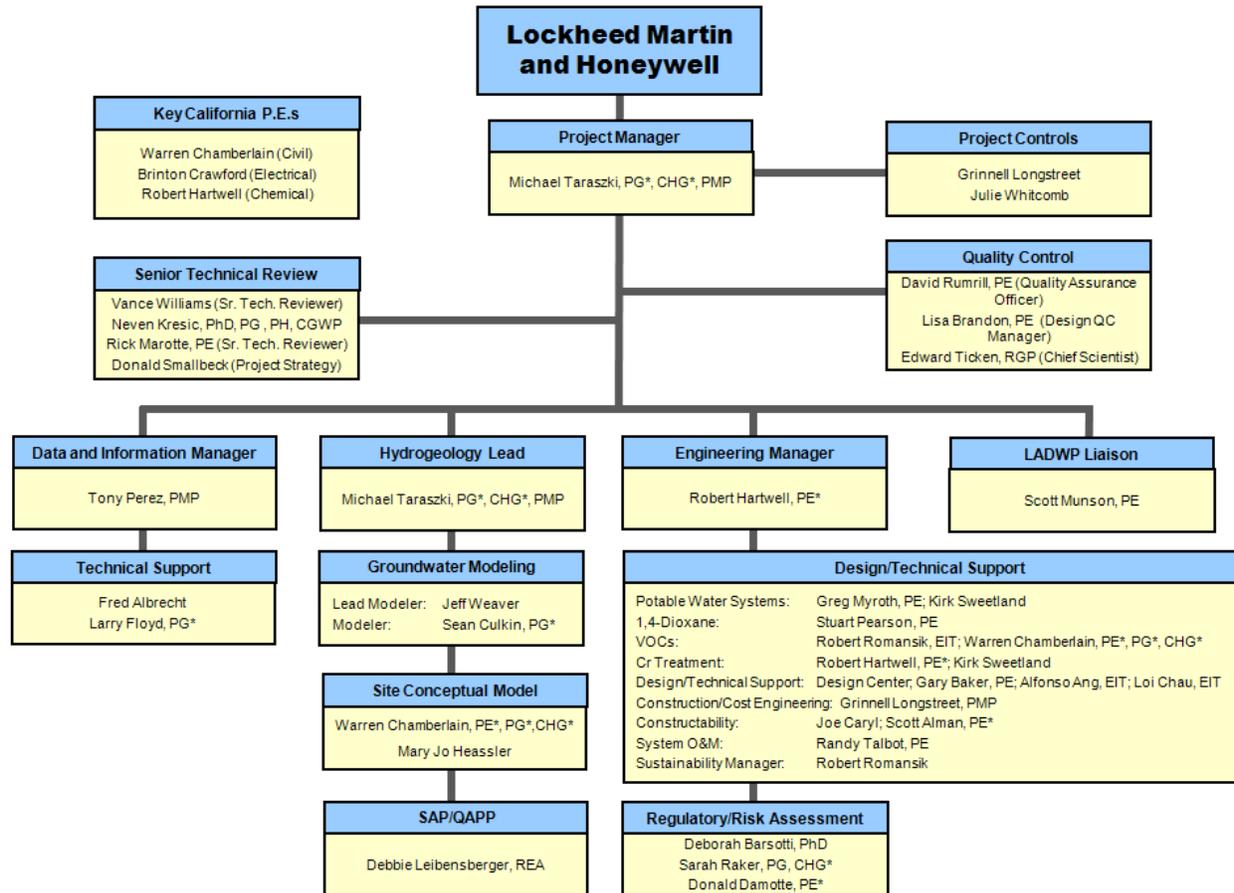
Roles and responsibilities specified in the AOC are as follows:

Respondents:	Honeywell International Inc.; Lockheed Martin Corporation
Supervising Contractor:	AMEC Engineering and Consulting, Inc. (AMEC)
Project Coordinator:	Mr. Michael Taraszki (AMEC)
EPA Project Manager:	Ms. Kelly Manheimer
EPA Alternate Project Manager:	Mr. Fred Schaufler
Sustainability Manager:	Mr. Robert Romansik (AMEC)

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4.2 AMEC's NHOU Project Team

The AMEC Team includes a Hydrogeology Group, a Remediation Engineering Group, and a Data and Document Management Group, as illustrated in the following organization chart.



* CA license

A description of the personnel associated with each group and how they will interact with one another to achieve the remedial objectives is described below. The entire project will be managed by Mr. Michael Taraszki, who will be responsible for technical, financial, and project scheduling matters and will serve as the main contact with Lockheed Martin and Honeywell project managers. Mr. Michael Taraszki will be responsible for coordination between AMEC, Lockheed Martin, and Honeywell, including regular communication (e.g., weekly teleconference calls) and meetings. Communication procedures include use of email and distribution of files and deliverables via the AMEC SharePoint™ site. All deliverables will be provided to EPA and associated stakeholders in an acceptable electronic format (e.g., PDF) unless specifically requested otherwise.

4.2.1 Hydrogeology Group

This group will be managed by Mr. Michael Taraszki, who will be responsible for groundwater characterization activities as are needed to support the Remedial Design team. Mr. Taraszki

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will be supported by Mr. Warren Chamberlain and Ms. Mary Jo Heassler to refine the site conceptual model (geology/hydrogeology) and by Mr. Jeff Weaver and Mr. Sean Culkin to evaluate various groundwater flow and mass transport scenarios in support of the Remedial Design process. He will also be supported by Ms. Debbie Leibensberger to develop the Sampling and Analysis Plan, Quality Assurance Plan, and Field Sampling Plan.

4.2.2 Remediation Engineering Group

Remedial Design engineering will be managed by Mr. Robert Hartwell P.E. Mr. Hartwell will be responsible for the overall project design and will be assisted by Mr. Warren Chamberlain P.E. (Civil) and Mr. Brinton Crawford P.E. (Electrical).

The design team will be responsible for development of the basis of design and the deliverables associated with the Preliminary Design Report. The design team is made up of water treatment experts and process designers each having a specific focus. Mr. Stuart Pearson P.E will provide expertise on the treatment of 1,4-dioxane and other organic compounds not readily treated with conventional stripping. Mr. Pearson will be evaluating the advanced oxidation process as well as other potential technologies. Mr. Robert Romansik has been selected to lead the engineering task involving removal of VOCs from the extracted groundwater. Mr. Hartwell and Mr. Kirk Sweetland will be tasked with evaluation of hexavalent chromium removal technologies.

Bringing the technology evaluations together along with input from MWH on Wellhead NHE-2 treatment, a preliminary design will be developed. The design team will then work together to integrate each of the systems and prepare the preliminary design report. Working with the design team will be individuals dedicated to providing input on sustainability, constructability, and any Applicable or Relevant and Appropriate Requirements. A design charrette, overseen by our Sr. Technical Reviewers Mr. Vance Williams and Mr. Rick Marotte P.E., will provide technical project review and VE Screening.

Intermediate design will involve the use of AMEC's A/E Design centers. The design centers are equipped to take preliminary design documents and produce the physical designs needed for construction. The design team will oversee the work at the design centers to resolve issues and provide guidance. The design team will have input into and review all drawings and specifications developed at the design centers. A second design charrette will be conducted after the completion of intermediate design.

After approval of intermediate design, the design team, along with the design centers will progress the work to 90% and ultimately 100% complete (should design/bid/build be selected).

As this project is located in southern California, Mr. Romansik, Mr. Don Damotte, Mr. Chamberlain, and Mr. Alfonso Ang will provide a review of each stage of the project based on design requirements, permits, codes, and design philosophy unique to California and this portion of the state. Our interaction with LADWP will be facilitated by Mr. Scott Munson throughout the Remedial Design process and particularly during the preliminary design phase.

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4.2.3 Data and Document Management Group

This group will be managed by Mr. Larry Floyd and Mr. Fred Albrecht, who will be responsible for execution of an enterprise information system that facilitates data organization, dissemination, project collaboration, geospatial awareness and mapping and implementation of an electronic document library.

4.3 Community involvement and support

As mentioned in Section 2.4, we anticipate significant interest and interaction with the North Hollywood North East Neighborhood Council with respect to preparation of the Remedial Design. As such, community involvement support will be provided to EPA throughout the performance of the Work under this AOC consistent with Paragraph 43 of the AOC and in accordance with the *Superfund Community Involvement Handbook* (EPA, 2005). As directed by the EPA, community involvement support may include the following subtasks:

- **Fact Sheet Preparation Assistance:** Lockheed Martin and Honeywell will, at EPA's request, assist with the preparation of fact sheets that inform the public about activities related to the Remedial Design, the schedule for RA, activities to be expected during construction, provisions for responding to emergency releases and spills, and any potential inconveniences such as excess traffic and noise that could affect the community during the Remedial Design or Remedial Action.
- **Technical Support:** At EPA's request, Lockheed Martin and Honeywell will provide technical support for community involvement, which may include providing technical input to news releases, fact sheets, briefing materials, and other community involvement vehicles.
- **Public Meeting Support:** Lockheed Martin and Honeywell will, at EPA's request, prepare presentation materials and provide logistical support for public meetings and open houses.
- **Public Notice:** As otherwise needed, Lockheed Martin and Honeywell will provide individual notice to residents in the vicinity of areas where work will be performed if requested by EPA.
- **Reporting:** Lockheed Martin and Honeywell will, at the request of EPA, provide verbal status reports concerning the work performed by the Respondents.
- **Report Copies:** Lockheed Martin and Honeywell will, at the request of EPA, provide extra electronic copies for the public of final deliverables or other documents produced pursuant to this SOW.

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5 REMEDIAL DESIGN PROJECT SCHEDULE

The project schedule GANT chart (see Appendix C) was prepared using Microsoft Project™ and other software applications to identify the critical path items and will be used specifically to track progress and manage associated tasks and deliverables. Schedule logic and task relationships is based on the project deliverables and review times as detailed in the AOC, Appendix A, Attachment 2 (see Appendix A of this RD Work Plan).

The baseline GANT chart will be used to track progress over time (i.e., percent complete) on each task and/or deliverable. Project schedule changes will be provided as necessary throughout the Remedial Design process. This information will be included in monthly progress reports to the EPA. The Program Evaluation and Review Technique (PERT) will also be used to update anticipated task durations and will be included in the monthly progress reports to the EPA.

AMEC will maintain use of the project schedule and other tools to ensure compliance with the AOC. For instance, compliance milestone documents include the RD Work Plan, the Preliminary Design Report, and the Intermediate Design Report.

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6 PERMITS, ACCESS, AND THIRD PARTY AGREEMENTS

Requirements and details pertaining to necessary permits, access and third party agreements will be developed during the preliminary design phase of the project. These requirements will be based upon the preliminary design conditions, including equipment and operations arrangements and locations. Based upon the alternative that was selected and included in the ROD, permit requirements, access to lands and easements will have to be reviewed to install new pumping and monitoring wells, refurbishment of existing wells, addition of new pipelines, and the refurbishment and installation of new treatment units. Should the treatment systems change during the preliminary design to either eliminate or add a permit, AMEC will issue a TM to update this information.

6.1 Applicable or relevant and appropriate requirements (ARARs)

ARARs have been assessed for the selected alternative; these requirements are summarized in Tables 7, 8 and 9 of the ROD. These ARARs pertain to:

- Safe Drinking Water Act for performance standards related to treated groundwater,
- Clean Air Act for potential air emissions from groundwater treatment units,
- Resource Conservation and Recovery Act for the handling of hazardous waste that is generated during site activities and groundwater treatment, and
- California Water Code requirements for well construction and maintenance.

The Federal requirements listed above have been adopted by the State of California, and therefore are enforced through the California Health and Safety Code. As such, the ARARs will conform to the applicable California Health and Safety Codes requirements.

Two types of ARAR requirements are based upon whether the activity is determined to be onsite or offsite. Onsite activities must comply with substantive requirements and offsite activities must comply with both substantive and administrative requirements. Permits are related to administrative requirements, therefore, permits must only be obtained for offsite activities (as necessary).

As indicated in the ROD, the onsite ARARs are frozen, whereby the on-site requirements shall not change for the purposes of this Remedial Design phase. However, the ARARs are not frozen for off-site requirements, so any change to regulatory requirements during this phase will be applied to off-site requirements, which mainly deal with drinking waters to be delivered to the LADWP.

6.1.1 Onsite ARARs

Since this phase is intended to assure that impacted water is contained, groundwater (before delivery to the LADWP) will be considered on-site and ARARs for that water are frozen. The same concept will be applied to treatment systems, whereas they are proposed to be on-site, therefore the ARARs for those systems will be frozen as well. As such, for these on-site ARARs no permits will be obtained, but substantive requirements will be followed which consist of applying Best Management Practices (BMPs) and monitoring. In addition to the descriptions in

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the ROD, each substantive requirement will be further defined in the Preliminary Design Report and the associated agency contacted to assure conformance with the requirements. The agencies will be notified in writing of the proposed activities; the notifications will provide a project description as well as a description of the means to comply with the applicable regulations. These notifications may be provided to the appropriate agency through the completion of applicable permit application forms; however, permits will not be obtained as part of this process.

Although a permit from the South Coast Air Quality Management District (SCAQMD) was previously obtained for the existing air stripper unit, it is not Lockheed Martin and Honeywell's intention to seek a modification or new permit as part of this phase, since all treatment units are proposed to be on-site at this time.

Hazardous waste may be generated from the addition of wells and pipelines, as well from spent or collected materials from treatment units. If hazardous waste is generated it will be handled as an off-site requirement, since the waste would be disposed or further treated before disposal at an off-site facility. However, it is Lockheed Martin and Honeywell's intention to follow the small or large quantity generator requirements (as applicable depending on the waste volume generated) without the need to obtain permits (i.e., Permit-By-Rule or Part A or B RCRA permit).

6.1.2 Offsite ARARs

Besides environmental related requirements, other construction and land use substantive and administrative requirements may apply. These may include, but are not limited to:

- Fire safety and storage tank permits from the Los Angeles Fire Department (LAFD) for certain types of process units, storage tanks, and/or building enclosures; and
- Building and safety, construction, easement and excavation permits from the City of Los Angeles (CLA) for new and expanded pipelines, treatment units and buildings. Depending on the final routes for pipelines, location of new wells and treatment units, third party agreements for access and use will be obtained from the appropriate businesses.

Because ARARs do not apply to local requirements, necessary permits will be obtained from the agencies associated with the activities above.

6.1.3 Other Requirements

Note that this project will consider guidance associated with the CDPH 97-005 policy guidance, but will not include applying for or obtaining this permit. Some information needed to evaluate the CDPH 97-005 permitting process may be obtained from the LADWP. Because the treated groundwater will be delivered to LADWP for use as municipal supply, LADWP will ultimately be responsible for preparing and submitting the water supply permit application (through preparation by the LADWP or others) and assuring compliance with CDPH 97-005 policy guidance requirements. Work conducted under the AOC will support the LADWP in the CDPH 97-005 application process. The items shown below in the first column are required to be developed as part of the CDPH 97-005 application process, to ultimately obtain a water supply permit. The second column reflects work performed under the AOC which LADWP can use in support of the CDPH 97-005 application process.

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CDPH 97-005 Policy Guidance Evaluation Elements	
Element	Roles and Responsibility
1. Source water assessment	AMEC will use the capture zones developed during the Pre-Design Groundwater Modeling effort can be used to support the Source Water Assessment.
2. Full characterization of raw water quality	AMEC will identify constituents of concern and their concentrations developed during the Pre-design Groundwater Modeling task which can be used to support the raw water characterization.
3. Source protection	AMEC will address source protection through collaboration with LADWP, EPA, CDPH, and other known or suspected source facilities.
4. Effective monitoring and treatment	AMEC will address monitoring and treatment in the preliminary, intermediate, and final designs. Failure analysis will be conducted and presented in the Pre-Achievement O&M Plan.
5. Human health risks associated with failure of the proposed treatment system	AMEC will develop the central treatment system failure modes and perform the basic risk calculations. LADWP will determine human health risks.
6. Identification of alternatives to the use of the extremely impaired source	LADWP Responsibility.
7. Completion of the CEQA Review	LADWP Responsibility.
8. Submittal of a permit application	LADWP Responsibility.
9. Public hearing	CDPH Responsibility.
10. DHS evaluation	CDPH Responsibility.
11. Requirements for DHS Approval	CDPH Responsibility.
12. Issuance or denial of permit	CDPH Responsibility.

6.2 Property Acquisition, Access, and Third Party Agreements

Property acquisitions and access agreements will need to be made to allow construction of the treatment systems associated with the Second Interim Remedy. If there is insufficient space to build on existing property, additional land will need to be obtained. In addition, any new conveyance piping will need easements to allow for installation and future maintenance.

Based upon expected routes for pipelines (possibly along, across or underneath roadways) an Encroachment Permit may have to be obtained from the California Department of Transportation (for roadway construction) and an Encroachment permit from the City of Los Angeles (for access across sidewalks, roadway entrance, etc.). If new buildings are proposed, building permits will have to be obtained from the City. Given that construction of new foundations are needed for any new treatment units (i.e., unit pads), and the expected location of these units is upon commercial properties, a City excavation and grading permit will likely have to be

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obtained, along with a City electrical, mechanical and plumbing permit (depending upon the final treatment units size and nature). As part of the detailed design, information needed for permit applications will be generated. The installation of pipelines and wells (and possibly new treatment units) will likely impede upon private or public lands owned by others.

At this time, a detailed scope of the project has not yet been prepared to know whether new wells will be needed or what specific treatment technologies will be used, how large a treatment system footprint will be needed, or what space is (or will be) available. Property leases, property acquisitions, third party agreements, and/or leases will thus be addressed in the Preliminary Design Report.

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7 SITE MANAGEMENT

During the Remedial Design work, neither Lockheed Martin nor Honeywell will be in responsible charge of any NHOU groundwater wells or treatment systems as these systems are being operated by the LADWP. Therefore there are no requirements for handling access, security, management, decontamination, or waste disposal. Any on-site activities at the NHOU will be for information gathering in coordination with LADWP and therefore site management activities are not included in this RD Work Plan.

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8 SUSTAINABILITY APPROACH

Lockheed Martin and Honeywell, along with AMEC are committed to producing a Remedial Design for the Second Interim Remedy of the NHOU in a sustainable fashion minimizing the impact of the design and construction on the environment while still achieving the Remedial Design objectives.

To achieve sustainability for this project, the DTSC Green Remediation Evaluation Matrix (GREM) will be employed in addition to various EPA guidance (e.g., EPA, 2009c). The techniques used in the GREM will be qualitative in nature and focus on the use of technologies and approaches that reduce a project's environmental footprint. The sustainability concepts of GREM are based upon a holistic assessment of a broader scope and time horizon, which aim to obtain optimal sustainable revitalization by striking a balance between environmental, economic and social impacts. GREM factors are based upon the following: substance release and production; thermal release; physical disturbances and disruptions; and resource depletion and gain. Generally, this analysis reviews sustainability from the basis of: air emission reductions, incorporation of energy efficiency measures, water conservation and quality improvement, minimization of land impacts, and management and minimization of waste generation. For this project the concepts of Life-Cycle Management (LCM) will be employed as well. Below is an outline of a sustainability approach for this project:

1. Analyze Stakeholder interest and requirements:
 - a. Identify key social, environmental and financial stakeholders
 - b. Identify key supplier requirements (goods, services and transportation)
 - c. Document the key components and requirements of each party
 - d. Identify key risks factors and opportunities for improvement
2. Develop Sustainability Goal Matrices:
 - a. Identify sustainable sites and locations for equipment and operations
 - b. Development water production efficiencies
 - c. Maximize energy use, identify reductions and alternatives
 - d. Minimize environmental impacts, including air pollutants, hazardous and non-hazardous waste products, and wastewater discharges (i.e., carbon neutrality)
 - e. Utilize sustainable products and resources (consistent with *Greener Cleanup Policy – EPA Region 9*; EPA, 2009c)
 - f. Employ innovative techniques and technologies where appropriate
3. Review alternative assessment results, select and implement final strategies.

It is also AMEC's goal to minimize the impact on the environment while performing work on the Second Interim Remedial Design. As part of this effort, AMEC will, to the greatest extent possible:

1. Utilize electronic and digital formats for performing and reviewing calculations,
2. Utilize electronic reviews of drawings and specifications generated,
3. Utilize telephone and video conferencing to reduce travel,
4. Communicate with the project team via e-mail and our SharePoint™ Data System

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5. Minimize printing and toner by providing deliverables to all project stakeholders in electronic PDF form on our SharePoint™ Data System.

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9 DESCRIPTION OF DELIVERABLES

This section lists the deliverables for the project. This section complements Section 3 – Scope of Work which provides more details on the work tasks associated with completing these deliverables. Where a particular deliverable is made up of parts or sub-deliverables, these sub-deliverables have been defined as best as possible at this time.

9.1 Health and Safety Plan/Contingency Plan

Because the scope of work associated with the Remedial Design does not include intrusive investigation or construction activities, a HASP is not needed at this time. Should such activities be implemented, AMEC will develop a HASP in accordance with EPA's Standard Operating Safety Guide and will all currently applicable Occupational Safety and Health Administration (OSHA) regulations found at 29 CFR Part 1910. If EPA determines that it is appropriate, the HASP will also include contingency planning.

AMEC will prepare a general Job Hazards Analysis (JHA) that will pertain to non-intrusive site access/activities anticipated to occur during the Remedial Design portion of this project. Each JHA will:

- Identify specific hazards associated with the work tasks,
- Provide specific safety procedures to protect employees, visitors and the public during the execution of the work,
- Describe the emergency procedures to be followed if an incident occurs.

Planning, preparation and execution of work tasks for this project will be performed with specific attention to the safety of employees, visitors, field personnel, and the public.

AMEC's JHA's includes both a screening level assessment, evaluating for major hazards, and a formal risk assessment providing project managers with a step by step approach for identifying and minimizing hazards. Specific JHA's are then developed which identify actual and potential site hazards and provides a means to minimize their impact.

9.2 Data Gap Analysis Memorandum

AMEC will review data from previous and ongoing investigations in the NHOU area (as summarized in Section 2.5 of this RD Work Plan) and, in combination with findings from the numerical groundwater flow model, refine the CSM and identify data gaps critical to the Remedial Design. Results will be summarized in a technical memorandum. In the event that data gaps critical to the Remedial Design are identified, a GMP will be prepared during the preliminary design phase that will identify and recommend actions to resolve them to support the Remedial Design.

9.3 Groundwater Monitoring Plan

The initial GMP cited in the AOC was intended to be used to coordinate a comprehensive baseline sampling event in the NHOU area. This event was conducted in December, 2010,

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February 2011, and April 2011 and, as ordered by EPA (EPA email dated April 20, 2011), this deliverable has since been removed from the AOC SOW.

Actions to address and resolve critical data gaps may include, but not be limited to, installation of additional monitoring wells and/or collection of additional groundwater samples. In the event additional monitoring wells are recommended to be installed, the GMP will identify installation methods and data collection parameters. The GMP will be prepared in conjunction with the pre-design modeling effort such that critical data gaps can be addressed collectively.

The preliminary design phase GMP will be updated during the final design phase to describe existing and proposed monitoring wells, frequency of sampling, and the analytical parameters necessary for semi-annual performance monitoring of the interim remedy.

9.4 Sampling and Analysis Plan

The need for a SAP will be determined as part of developing the Groundwater Monitoring Plan (following review of the baseline sampling event data); if needed, a SAP will be developed and submitted as part of that plan. In that case, the SAP will include a QAPP, Field Sampling Plan, and a schedule for implementation of sampling, analysis, and reporting activities. The project schedule tentatively includes this deliverable as associated with the Groundwater Monitoring Plan.

9.5 Remedial Design Quality Assurance Project Plan

An RD QAPP will be prepared to ensure that the quality of data collected is sufficient to support the Remedial Design. This plan shall describe the quality control activities that will be implemented to ensure that the Remedial Design is conducted in an effective and compliant manner.

9.6 Progress Reports

As stated in the AOC, weekly electronic progress reports will be prepared and submitted. In addition, a more detailed monthly progress report will be prepared for submittal to EPA on the 10th of each month (or the following work day should the 10th fall on a weekend or holiday).

Draft meeting notes from progress meetings held with the EPA will be submitted for approval within five days of the meeting.

9.7 Data Evaluation Report

The purpose of data evaluation reports following each semi-annual sampling event (within 90 days of the event completion) is to enable EPA to assess the adequacy of the work performed. At this time, groundwater monitoring is being performed by EPA and is not included in the current scope of work for the Second Interim Remedy. The need for additional monitoring well installation and groundwater monitoring requirements cannot be determined at this time until the data gap analysis has been completed. Data evaluation reports, following the requirements of AOC Sections 4.3.5 and 4.3.6, will be utilized in the future should the data gap analysis/CSM update show a need for additional monitoring.

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9.8 Preliminary Design Report (30%)

The Preliminary Design Report will provide a summary of the design and will provide design details to a level of about 30% completion. This report will provide the stakeholders with an understanding of the groundwater analysis, the treatment options selected, and the expected levels of treatment for each constituent of concern. Treatment system design will begin with the completion of the groundwater modeling. A Design Basis document will be developed which will clearly show the location and number of extraction wells, COC's, and expected concentrations. Technology options for each COC, including the selected technology in the ROD, will then be evaluated and a system developed. The design basis will show the proposed process and the expected treated water quality. This document will be reviewed with the project team stakeholders and modified to achieve consensus. Preliminary design will then proceed based on this document.

Main tasks for the preliminary design include:

- Existing Building Conditions Assessment Memorandum
 - A building conditions/system assessment report will be prepared.
- Pre-design Groundwater Modeling Memorandum
 - A pre-design groundwater modeling memorandum will be prepared
 - Refine EPA's SFBFS-B groundwater flow model
 - Propose NHOU extraction well locations
- Treatment Options Memorandum
 - Extraction well locations, depths, and pumping rates
 - Expected COC locations, concentrations, future concentrations
 - Analysis of various treatment technologies
 - Evaluation of wellhead treatment versus central treatment for COC's
- Preliminary Design Report
 - Design/Construction Approach
 - Evaluation of the benefits and drawbacks of design/bid/build versus design/bid approach
 - Based on the selected method, an outline showing the approach to contracting, procurement, construction management, and quality control during construction.
 - Preliminary Delivery Plan and Schedule
 - Description of how the Remedial Action will be delivered
 - Design/Construction Approach evaluation
 - Description of the organization of the Remedial Action Team
 - Communication Plan
 - Methods to expedite the Remedial Action

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- Preliminary Construction Schedule
 - A preliminary schedule will be developed which will cover the major components of the Remedial Action. This will be a base schedule and not anticipate expedited methods.
- Design Basis Document
 - Summary of all inputs to the preliminary design; flows, constituent concentrations, locations of wells, conveyance
 - Description of the design approach, treatment processes, flows, waste streams generated, air emissions, chemicals required, utility requirements
 - Detailed description of evaluations performed to select the design approach
 - Summary of all effluent criteria requirements and an evaluation of final effluent concentrations and flow rates to LADWP at the point of compliance
 - List of all assumptions made during the preliminary design
 - Evaluation of how all requirements will be met
 - A plan for minimizing environmental and public impacts
 - An outline of all permitting requirements including additional actions.
 - Update on how the chosen design follows CDPH 97-005 guidance.
 - Identification of long term operation and maintenance requirements and performance monitoring requirements.
- Supporting calculations
Supporting calculations will be documented, reviewed and checked and included as part of Preliminary Design Report.
- Preliminary Drawings
The following preliminary drawings will be included in the Preliminary Design Report:
 - Cover Sheet
 - List of Drawings
 - Process Flow Diagram
 - Well Diagrams (if needed)
 - P&ID's
 - Hydraulic Profile
 - Electrical Single Line Diagrams
 - SCADA Block Diagram
 - Site Drawings
 - General Arrangement
- Specifications Outline

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- An outline of specifications to be used for the Remedial Design. Specifications listed will be those anticipated during the preliminary design. Specifications will be Construction Specifications Institute 1995 format.
 - Easement and Access Requirements
 - Identification of land acquisition, easements, access agreements, or other third party agreements will be performed based on size requirements and location optimization.
 - Value Engineering Screening
 - Results of a design charrette will be provided. A charrette is part of the design review process and not only evaluates the proposed design but also provides constructability review and well as design optimization.
 - Opinion of Probable Construction Costs
 - Capital cost estimate for the selected preliminary design
 - Evaluation of price escalation and inflation
 - Estimate of Operations and Maintenance Costs

9.9 Intermediate Design Report (60%)

Once the EPA and stakeholders have approved the Preliminary Design Report, design work will continue with intermediate design. The intermediate design will expand on the work performed during the preliminary design phase advancing the level of the design to approximately 60% complete. The level of the intermediate design may vary depending on the design proposed and what EPA approves and whether or not the project is conducted on a design/bid/build or design/build basis. The intermediate design will address EPA comments on the preliminary design. The following sections will be included in the Intermediate Design Report.

- Updated Construction Schedule
 - Update the schedule based on additional work performed during the intermediate design phase
- Intermediate Specifications
 - Draft specifications, as identified in the preliminary design and as needed, will be developed during intermediate design phase.
- 60% Drawings
 - An updated listing of all drawings
 - Updated PFD
 - Updated P&ID's
 - Grading, paving and foundations
 - Extraction wells, wellheads
 - Piping, mechanical, structural, electrical, and instrumentation as appropriate
- Revised Design Basis

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- Updated Design Basis deliverable
- Remedial Action Contracting Strategy
 - Description of procurement process for equipment and contractor
 - Project phasing
 - Long lead time items
 - Design/Bid/Build or Design/Build
- Identification of Easement and Access Requirements
 - Provide update to preliminary design information
- Projected O&M Requirements and Annual Costs
 - Provide update to preliminary design information

9.10 Pre-Achievement O&M Plan

This plan will describe all operation and maintenance activities which will be conducted at the newly constructed facilities until such time as the performance standards are met. This document will be written based on the type of facilities designed and the level of automation provided as well as outlining the compliance monitoring that will be conducted to measure the performance of the system in achieving and maintaining the performance standards. This document will include:

- Equipment Description
 - Equipment description including model and serial number
 - Identification of specific materials of construction
 - Recommended spare parts list including life analysis of significant components and current replacement costs
 - Replacement and/or calibration schedules
 - Performance Monitoring equipment description
 - Site equipment routine maintenance (as anticipated)
- Description of Operation and Maintenance activities
 - Start-up and Shutdown procedures
 - Routine O&M Tasks
 - Emergency O&M tasks as anticipated
 - O&M schedule based on system operational needs and recommended equipment preventative maintenance procedures.
 - Remote monitoring and control
 - Staffing requirements, operator training and certification requirements
- Description of Operating Issues
 - An evaluation of anticipated operating problems including potential remedies

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- Compliance Monitoring, Sampling and Analysis
 - Description of how compliance will be monitored
 - Compliance point at discharge of treatment system to LADWP supply conveyance
 - Data required to be collected
 - Required laboratory tests
 - Identification of internal monitoring points to track system performance including schedule of monitoring, testing, and data evaluation
 - Comparison criteria to determine when performance standards have been met
- Waste Disposal
 - Waste disposal plan covering disposal of any materials generated during O&M activities. These may include:
 - Wastewater
 - Spent treatment media
 - PPE and other disposable equipment
 - Special equipment disposal
 - Reuse and recycling
- Health and Safety Plan for O&M
 - Health and safety plan covering operation and maintenance of the remediation facilities
- Recordkeeping and Reporting
 - Development of a program to establish a recordkeeping and reporting
 - Monitoring results and lab records
 - Operating logs
 - PM records
 - Purchasing of chemicals and equipment

9.11 Prefinal/Final Design Report (90% AND 100%)

This work will be conducted in the event that the project is built under the design/bid/build process. This task will address comments made on the preliminary and intermediate design submissions as well as advancing the intermediate design from 60% to 90% for Pre-final, and 100% for Final Design. Deliverables will include:

- A complete set of construction specifications in CSI format
 - Final set of specifications for the implementation of the Remedial Action
 - Specifications provided electronically in PDF format
- Complete set of construction drawings

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- All drawings finalized and produced in 11"x17" size
- Drawings provided electronically in PDF format
- Final Basis of Design
 - Incorporates any changes made since intermediate design
- Delivery Plan and Schedule
 - Incorporates any changes made since preliminary design

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TABLES

Table 2-1. Summary of Available Data in the NHOU Vicinity
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Well Name	Well Construction ¹	Geologic Log ²	Geophysical ³	Groundwater Elevation ⁴	Analytical Samples 2009-2011 ⁵				Hydraulic Parameters ⁶	Pumping Data ⁷	Most Recent Sample 2009-2011 ⁵
					1,4-dioxane	Chromium (VI)	PCE	TCE			
<i>Erwin Production Well Field</i>											
EW-1	X	X		X						X	
EW-10	X	X		X			X	X		X	2011Q1
EW-2	X	X									
EW-2A	X	X								X	
EW-3	X	X		X						X	
EW-4	X	X								X	
EW-5	X	X		X						X	
EW-6	X	X		X			X	X		X	2011Q1
EW-8	X	X		X							
<i>Former Bendix Facility Monitoring Wells</i>											
GW-1	X			X	X	X	X	X			2010Q4
GW-10	X		X	X							
GW-11-273	X				X	X	X	X			2010Q4
GW-11-287	X				X	X	X	X			2010Q4
GW-11-316	X				X	X	X	X			2010Q4
GW-12A-284	X				X	X	X	X			2010Q4
GW-12A-319	X				X	X	X	X			2010Q4
GW-12A-349	X				X	X	X	X			2010Q4
GW-16-277	X				X	X	X	X			2010Q4
GW-16-317	X				X	X	X	X			2010Q4
GW-16-347	X				X	X	X	X			2010Q4
GW-16-417	X				X	X	X	X			2010Q4
GW-16-507	X				X	X	X	X			2010Q4
GW-17-282	X				X	X	X	X			2010Q4
GW-2	X			X	X	X	X	X			2010Q4
GW-3	X			X	X	X	X	X			2010Q4
GW-4	X			X	X	X	X	X			2010Q4
GW-5	X			X	X	X	X	X			2010Q4
GW-6	X			X	X	X	X	X			2010Q4
GW-7	X		X	X	X	X	X	X			2010Q4
GW-8	X		X	X	X	X	X	X			2010Q4
GW-9	X			X	X	X	X	X			2010Q4
<i>North Hollywood Production Well Field</i>											
NH-02	X	X		X						X	
NH-04	X	X								X	
NH-05	X							X		X	
NH-07	X							X		X	
NH-10	X	X		X							
NH-11	X	X		X						X	
NH-13	X	X		X				X		X	
NH-14	X	X		X						X	
NH-14A	X	X		X				X		X	
NH-15	X	X		X						X	
NH-16	X	X		X						X	
NH-17	X	X		X						X	
NH-18	X	X		X						X	
NH-19	X	X		X						X	
NH-20	X	X		X						X	
NH-21	X	X		X						X	
NH-22	X	X		X			X	X		X	2011Q1

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					1,4-dioxane	Chromium (VI)	PCE	TCE			
NH-23	X	X		X			X	X		X	2011Q1
NH-24	X	X		X			X	X		X	2011Q1
NH-25	X	X		X			X	X		X	2010Q4
NH-26	X	X		X			X	X		X	2011Q1
NH-27	X	X		X					X	X	
NH-28	X	X		X					X	X	
NH-29	X	X		X					X	X	
NH-30	X	X		X						X	
NH-31	X	X		X						X	
NH-32	X	X		X			X	X	X	X	2010Q4
NH-33	X	X		X			X	X	X	X	2010Q4
NH-34	X	X		X			X	X		X	2011Q1
NH-35	X	X								X	
NH-36	X	X					X	X		X	2011Q1
NH-37	X	X					X	X		X	2011Q1
NH-38	X	X								X	
NH-39	X	X								X	
NH-4	X			X			X	X	X		2010Q4
NH-40	X	X								X	
NH-41	X	X								X	
NH-42	X	X								X	
NH-43	X	X		X							
NH-43A	X	X					X	X		X	2011Q1
NH-44	X	X					X	X	X	X	2009Q4
NH-45	X	X					X	X		X	2011Q1
NH-5	X	X		X							
NH-7	X	X		X			X	X			2010Q4
<i>NHOU Monitoring Wells</i>											
3830S	X				X	X	X	X			2010Q4
NH-C01-325	X			X		X	X	X			2010Q3
NH-C01-450	X			X							
NH-C01-660	X			X		X	X	X			2010Q1
NH-C01-780	X			X		X	X	X			2010Q1
NH-C02-220	X			X		X	X	X			2010Q1
NH-C02-325	X			X		X	X	X			2010Q1
NH-C02-520	X			X		X	X	X			2010Q1
NH-C02-681	X			X		X	X	X			2010Q1
NH-C03-380	X			X		X	X	X			2009Q4
NH-C03-580	X			X		X	X	X			2009Q4
NH-C03-680	X			X		X	X	X			2009Q4
NH-C03-800	X			X		X	X	X			2009Q4
NH-C04-240	X			X		X	X	X			2009Q4
NH-C04-375	X			X		X	X	X			2009Q4
NH-C04-560	X			X		X	X	X			2009Q4
NH-C05-320	X			X							2010Q1
NH-C05-460	X			X		X	X	X			2010Q1
NH-C06-160	X			X		X	X	X			2010Q3
NH-C06-285	X			X		X	X	X			2010Q3
NH-C06-425	X			X		X	X	X			2009Q4
NH-C07-300	X	X	X	X	X	X	X	X			2010Q4
NH-C08-295	X	X	X	X	X	X	X	X			2010Q4
NH-C09-310	X	X	X	X	X	X	X	X			2010Q4

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					1,4-dioxane	Chromium (VI)	PCE	TCE			
NH-C10-280	X	X	X	X	X	X	X	X			2010Q4
NH-C10-360	X	X	X	X	X	X	X	X			2010Q4
NH-C11-295	X	X	X	X	X	X	X	X			2010Q4
NH-C12-280	X	X	X	X	X	X	X	X			2010Q4
NH-C12-360	X	X	X	X	X	X	X	X			2010Q4
NH-C13-385	X	X	X	X	X	X	X	X			2009Q3
NH-C14-250	X	X	X	X	X	X	X	X			2010Q4
NH-C15-240	X	X	X	X	X	X	X	X			2010Q4
NH-C15-330	X	X	X	X	X	X	X	X			2010Q4
NH-C16-320	X	X	X	X	X	X	X	X			2010Q4
NH-C16-390	X	X	X	X	X	X	X	X			2010Q4
NH-C17-255	X	X	X	X	X	X	X	X			2010Q4
NH-C17-339	X	X	X	X							
NH-C18-270	X	X	X	X							
NH-C18-365	X	X	X	X	X	X	X	X			2010Q4
NH-C19-290	X	X	X	X	X	X	X	X			2010Q4
NH-C19-360	X	X	X	X	X	X	X	X			2010Q4
NH-C20-380	X	X	X	X	X	X	X	X			2010Q4
NH-C21-260	X	X	X	X							
NH-C21-340	X	X	X	X							
NH-C22-360	X	X	X	X							
NH-C22-460	X	X	X	X							
NH-C22-600	X	X	X	X							
NH-C23-310	X	X	X								
NH-C23-400	X	X	X								
NH-C24-305	X	X	X								
NH-C24-410	X	X	X								
NH-C25-290	X	X	X								
<i>NHOU Extraction Wells</i>											
NHE-1	X	X		X						X	
NHE-2	X	X		X	X	X	X	X	X	X	2011Q1
NHE-3	X	X		X	X	X	X	X	X	X	2011Q1
NHE-4	X	X			X	X	X	X	X	X	2009Q1
NHE-5	X	X		X					X	X	
NHE-6	X	X		X	X	X	X	X	X	X	2011Q1
NHE-7	X	X		X	X	X	X	X	X	X	2011Q1
NHE-8	X	X		X	X	X	X	X	X	X	2011Q1
<i>NHOU Vertical Profile Wells</i>											
NH-VPB-01	X			X		X	X	X			2010Q3
NH-VPB-02	X			X		X	X	X			2010Q3
NH-VPB-03	X			X							
NH-VPB-04	X			X							
NH-VPB-05	X			X		X	X	X			2010Q1
NH-VPB-06	X			X		X	X	X			2009Q3
NH-VPB-07	X			X		X	X	X			2009Q4
NH-VPB-08	X			X		X	X	X			2010Q1
NH-VPB-09	X			X							
NH-VPB-10	X			X							2009Q4
NH-VPB-11	X			X							
NH-VPB-12	X			X							
NH-VPB-13	X			X							
NH-VPB-14	X			X		X	X	X			2010Q4

Table 2-1. Summary of Available Data in the NHOU Vicinity
 Second Interim Remedy, Groundwater Remediation System Design
 Remedial Design Work Plan

Well Name	Well Construction ¹	Geologic Log ²	Geophysical ³	Groundwater Elevation ⁴	Analytical Samples 2009-2011 ⁵				Hydraulic Parameters ⁶	Pumping Data ⁷	Most Recent Sample 2009-2011 ⁵
					1,4-dioxane	Chromium (VI)	PCE	TCE			
PA1-MW3	X				X	X	X	X			2009Q2
<i>Rinaldi-Toluca Production Well Field</i>											
RT-01	X	X					X	X		X	2010Q4
RT-02	X	X					X	X		X	2010Q4
RT-03	X	X					X	X		X	2009Q1
RT-04	X	X					X	X		X	2010Q2
RT-05	X	X					X	X		X	2010Q4
RT-06	X	X					X	X		X	2010Q4
RT-07	X						X	X		X	2010Q4
RT-08	X						X	X		X	2010Q4
RT-09	X						X	X	X	X	2010Q4
RT-10	X	X					X	X		X	2010Q4
RT-11	X	X					X	X		X	2010Q4
RT-12	X	X					X	X		X	2010Q4
RT-13	X	X					X	X		X	2010Q4
RT-14	X						X	X		X	2010Q4
RT-15	X						X	X		X	2010Q4
<i>Whitall Production Well Field</i>											
4917A	X			X	X	X	X	X			2010Q4
4917B	X			X	X	X	X	X			2010Q4
WH-10	X	X		X						X	
WH-2	X	X		X						X	
WH-3	X	X		X						X	
WH-4	X	X		X			X	X	X	X	2011Q1
WH-5	X	X		X			X	X		X	2011Q1
WH-6	X	X		X						X	
WH-6A	X	X		X			X	X		X	2011Q1
WH-7	X	X		X			X	X		X	2009Q4
WH-8	X	X		X						X	
WH-9	X	X		X						X	

Notes:

- ¹ Well construction details are from the USEPA SFV database, as well as Table 1-1 of the MWH Draft Characterization Report for the NHOU (2011)
- ² Geologic log information taken from geologist's and driller's borehole logs and compiled in the USEPA SFV database
- ³ Geophysical log information for former Bendix facility wells are from James Montgomery Remedial Investigation of Groundwater Contamination in the SFV (1992), and for NHOU monitoring wells from Appendix C of the MWH Characterization Report
- ⁴ Groundwater elevation information is compiled in the USEPA SFV database
- ⁵ All analytical data shown is from sample information compiled in the USEPA SFV database
- ⁶ Hydraulic information is from the James Montgomery Remedial Investigation of Groundwater Contamination in the SFV (1992)
- ⁷ Pumping rate data is compiled in the USEPA SFV database

FIGURES

APPENDIX A

AGREEMENT AND ORDER ON CONSENT, FINAL STATEMENT OF WORK FOR
REMEDIAL DESIGN OF THE SECOND INTERIM ROD

**UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION IX**

IN THE MATTER OF:

North Hollywood Operable Unit,
San Fernando Valley (Area 1)
Superfund Site
Los Angeles, California

Honeywell International Inc.; Lockheed
Martin Corporation

Respondents

**ADMINISTRATIVE SETTLEMENT
AGREEMENT AND ORDER ON
CONSENT FOR REMEDIAL DESIGN**

U.S. EPA Region IX
CERCLA Docket No. 2011-01

Proceeding under Sections 104, 106, 107,
and 122 of the Comprehensive
Environmental Response, Compensation,
and Liability Act of 1980, as amended, 42
U.S.C. §§ 9604, 9606, 9607, and 9622.

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I. JURISDICTION AND GENERAL PROVISIONS

1. This Administrative Settlement Agreement and Order on Consent (“Settlement Agreement”) is entered into voluntarily by the United States Environmental Protection Agency (“EPA”) and Honeywell International Inc. and Lockheed Martin Corporation (collectively “Respondents”). This Settlement Agreement provides that Respondents shall undertake a Remedial Design (“RD”), including various procedures and technical analyses, to produce a detailed set of plans and specifications for implementation of the Remedial Action selected in EPA’s September 30, 2009 Record of Decision for the North Hollywood Operable Unit (“NHO”) of the San Fernando Valley Area 1 Superfund Site (the “ROD”). Honeywell has been developing an approach to treatment and disposal of water extracted from NHO well NHE-2 pursuant to a Cleanup and Abatement Order issued by the Regional Water Quality Control Board, Los Angeles Region (“Proposed NHE-2 Treatment and Disposal Approach”). Honeywell intends to separately submit a design of the Proposed NHE-2 Treatment and Disposal Approach to EPA for its evaluation as an alternative to the NHE-2 treatment and disposal approach selected by EPA in the ROD.¹ The NHO generally comprises approximately 4 square miles of groundwater contaminated with hazardous substances underlying an area of mixed industrial, commercial and residential land use in the community of North Hollywood, and includes any areas to which and from which such hazardous substance groundwater contamination migrates. The NHO is generally shown on the maps included in Appendix A. In addition, Respondents shall reimburse the United States for certain response costs that it incurs, as provided herein.
2. This Settlement Agreement is issued under the authority vested in the President of the United States by Sections 104, 106, 107, and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (“CERCLA”), as amended, 42 U.S.C. §§ 9604, 9606, 9607, and 9622. This authority was delegated to the EPA Administrator by Executive Order 12580 (52 *Fed. Reg.* 2923, Jan. 29, 1987) and further delegated to EPA Regional Administrators by EPA Delegation No. 14-14-C on April 15, 1994, and by EPA Delegation 14-14-D on May 11, 1994. The Regional Administrator of EPA Region IX further re-delegated the authority to the Superfund Branch Chief, now called Assistant Director, by Regional Delegations R9-1290.15 and R9-1290.20 (both dated September 29, 1997).
3. EPA and Respondents recognize that this Settlement Agreement has been negotiated in good faith and that the actions undertaken by Respondents in accordance with this Settlement Agreement do not constitute an admission of any liability. Respondents do not admit, and retain the right to controvert in any subsequent proceedings other than proceedings to implement or enforce this

¹ Irrespective of the final treatment and disposal approach selected for well NHE-2, this Settlement Agreement and Section 1.3.2 of the SOW require Respondents to design well NHE-2 in order to achieve (along with the rest of the NHO extractions well network) the hydraulic containment of the groundwater plume required by the ROD.

Settlement Agreement, the validity of the findings of fact, conclusions of law, and determinations in Sections IV and V of this Settlement Agreement. Respondents agree to comply with, and be bound by, the terms of this Settlement Agreement and further agree that they will not contest the basis or validity of this Settlement Agreement or its terms.

4. The objectives of EPA and Respondents in entering into this Settlement Agreement are to protect public health or welfare or the environment at the Site by the design and implementation of response actions at the Site by Respondents, to reimburse response costs of EPA, and to resolve the claims of EPA against Respondents as provided in this Settlement Agreement.
5. In accordance with the National Oil and Hazardous Substances Pollution Contingency Plan, 40 C.F.R. Part 300, *et seq.*, as amended (“NCP”), and Section 121(f)(1)(F) of CERCLA, 42 U.S.C. § 9621(f)(1)(F), EPA notified the State of California (the “State”) on October 6, 2010, of negotiations with potentially responsible parties (“PRPs”) regarding the implementation of the remedial design for the Site, and EPA has provided the State with an opportunity to participate in such negotiations and be a party to this Settlement Agreement.
6. In accordance with Section 122(j)(1) of CERCLA, 42 U.S.C. § 9622(j)(1), EPA notified the United States Department of the Interior and the National Oceanic and Atmospheric Administration on February 22 and February 25, 2010, respectively, of negotiations with PRPs regarding the release of hazardous substances that may have resulted in injury to the natural resources under federal trusteeship and encouraged the trustee(s) to participate in negotiations for cleanup of the NHOU.

II. PARTIES BOUND

7. This Settlement Agreement applies to and is binding upon EPA and upon Respondents and their successors, and assigns. Any change in ownership or corporate status of a Respondent including, but not limited to, any transfer of assets or real or personal property shall not alter such Respondent’s responsibilities under this Settlement Agreement. The signatories to this Settlement Agreement certify that they are authorized to execute and legally bind the parties they represent.
8. Respondents are jointly and severally liable for carrying out all activities required by this Settlement Agreement. In the event of the insolvency or other failure of any one or more Respondents to implement the requirements of this Settlement Agreement, the remaining Respondents shall complete all such requirements.
9. Respondents shall ensure that their contractors, subcontractors, and representatives receive a copy of this Settlement Agreement and comply with this Settlement Agreement within 14 days after the Effective Date of this Settlement

Agreement or after the date of such retention. Respondents shall be responsible for any noncompliance with this Settlement Agreement.

III. DEFINITIONS

10. Unless otherwise expressly provided herein, terms used in this Settlement Agreement that are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in CERCLA or its implementing regulations. Whenever terms listed below are used in this Settlement Agreement, in the documents attached to this Settlement Agreement, or incorporated by reference into this Settlement Agreement, the following definitions shall apply:
 - a. "CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601, *et seq.*
 - b. "Day" shall mean a calendar day. In computing any period of time under this Settlement Agreement, where the last day would fall on a Saturday, Sunday, or federal holiday, the period shall run until the close of business of the next working day.
 - c. "Effective Date" shall be the effective date of this Settlement Agreement as provided in Section XXVIII.
 - d. "EPA" shall mean the United States Environmental Protection Agency and any successor departments or agencies of the United States.
 - e. "Future Response Costs" shall mean all costs, including, but not limited to, direct and indirect costs, that the United States incurs in reviewing or developing plans, reports and other items pursuant to this Settlement Agreement, verifying the Work, or otherwise implementing, overseeing, or enforcing this Settlement Agreement, including but not limited to, payroll costs, contractor costs, travel costs, laboratory costs, Agency for Toxic Substances and Disease Registry ("ATSDR") costs, and the costs incurred pursuant to Section XI (Site Access and Institutional Controls), Paragraph 44 (emergency response), and Paragraph 92 (Work takeover).
 - f. "Institutional controls" shall mean non-engineered instruments, such as administrative and/or legal controls, that help to minimize the potential for human exposure to contamination and/or protect the integrity of a remedy by limiting land and/or resource use. Examples of institutional controls include easements and covenants, zoning restrictions, special building permit requirements, and well-drilling prohibitions.
 - g. "Interest" shall mean interest at the rate specified for interest on investments of the EPA Hazardous Substance Superfund established by 26 U.S.C. § 9507, compounded annually on October 1 of each year, in accordance with CERCLA § 107(a), 42 U.S.C. § 9607(a). The applicable rate of interest shall be the rate in

effect at the time the interest accrues. The rate of interest is subject to change on October 1 of each year.

- h. "NCP" shall mean the National Oil and Hazardous Substances Pollution Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, codified at 40 CFR Part 300, and any amendments thereto.
- i. "Paragraph" shall mean a portion of this Settlement Agreement identified by an Arabic numeral.
- j. "Parties" shall mean EPA and Respondents.
- k. "Performance Standards" shall mean the cleanup standards and other measures of achievement of the objectives of the Remedial Action, including those set forth in Section 2.13.2 (including Table 6) and 2.8 of the ROD and Section 1.3 of the SOW.
- l. "Record of Decision" or "ROD" shall mean the EPA Record of Decision relating to the NHOU, and all attachments thereto that the Regional Administrator, EPA Region IX, or his/her delegate, signed on September 30, 2009. The ROD is included as Appendix B.
- m. "Remedial Action" or "RA" shall mean all actions to be taken by Respondents and any other potentially responsible parties to implement the remedy selected by EPA in the September 30, 2009 Interim Action Record of Decision for the North Hollywood Operable Unit of the San Fernando Valley Area 1 Superfund site in accordance with the Remedial Design as approved pursuant to this Settlement Agreement.
- n. "Remedial Design" or "RD" shall mean those activities that Respondents shall undertake to develop the final plans and specifications for the Remedial Action pursuant to the Remedial Design Work Plan.
- o. "Remedial Design Work Plan" or "RD Work Plan" shall mean the document developed pursuant to Paragraph 36 of this Settlement Agreement and approved by EPA, and any amendments thereto.
- p. "RCRA" shall mean the Resource Conservation and Recovery Act, also known as the Solid Waste Disposal Act, as amended, 42 U.S.C. §§ 6901, et seq.
- q. "Respondents" shall mean Honeywell International Inc. and Lockheed Martin Corporation.
- r. "Section" shall mean a portion of this Settlement Agreement identified by a Roman numeral and includes one or more paragraphs.
- s. "Settlement Agreement" shall mean this Administrative Settlement Agreement and Order on Consent and all appendices attached hereto. In the event of conflict

between this Settlement Agreement and any appendix, this Settlement Agreement shall control.

- t. "Site" or "NHO" shall mean the North Hollywood Operable Unit of the San Fernando Valley (Area 1) Superfund Site, which is generally comprised of approximately 4 square miles of groundwater contaminated with hazardous substances underlying an area of mixed industrial, commercial and residential land use in the community of North Hollywood, and includes any areas to which and from which such hazardous substance groundwater contamination migrates. The Site is generally shown on the maps included in Appendix A.
- u. "State" shall mean the state of California.
- v. "Statement of Work" or "SOW" shall mean the statement of work for implementation of the Remedial Design, and any modifications made thereto in accordance with this Settlement Agreement, as set forth in Appendix A of this Settlement Agreement. The Statement of Work is incorporated into this Settlement Agreement and is an enforceable part of this Settlement Agreement.
- w. "Waste Material" shall mean (1) any "hazardous substance" under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14); (2) any pollutant or contaminant under Section 101(33) of CERCLA, 42 U.S.C. § 9601(33); (3) any "solid waste" under Section 1004(27) of RCRA, 42 U.S.C. § 6903(27); and (4) any "hazardous material" under California Health and Safety Code Section 25117; or (5) any "hazardous substance" under California Health and Safety Code Section 25316.
- x. "Work" shall mean all activities Respondents are required to perform under this Settlement Agreement, except those required by Section XIV (Retention of Records).

IV. FINDINGS OF FACT

- 11. The Site is an area of contaminated groundwater in the San Fernando Valley Basin (the "Basin"), which lies beneath the San Fernando Valley in Los Angeles County, California. Beginning in the 1940s, the San Fernando Valley was developed for both residential and industrial uses, and was home to many large aerospace companies.
- 12. The Basin is an important source of drinking water for the Los Angeles metropolitan area. The Los Angeles Department of Water and Power ("LADWP") produces groundwater for public distribution from seven well fields near or within the NHO. Over the past ten years, groundwater from LADWP well fields located in the Basin, including in the NHO, has contributed approximately fifteen percent of the City of Los Angeles' municipal water supply.
- 13. Tests conducted in the early 1980s to determine the presence of certain industrial chemicals in the State's drinking water revealed extensive contamination from volatile organic compounds ("VOCs") in the Basin's groundwater. In 1985,

groundwater from 27 of the 38 production wells in the NHOU well field exceeded the federal Maximum Contaminant Level ("MCL") for trichloroethylene ("TCE"), and four wells exceeded the MCL for tetrachloroethylene ("PCE").

14. Pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, EPA placed the Site on the National Priorities List, set forth at 40 CFR Part 300, Appendix B, by publication in the Federal Register on June 10, 1986, 51 Fed. Reg. 21054.
15. On September 23, 1987, EPA signed a Record of Decision for the remediation of VOC-contaminated groundwater in the NHOU ("1987 ROD"). The 1987 ROD called for 15 years of extraction and treatment of VOC-contaminated groundwater in order to contain the VOC plume and remove contaminant mass. The groundwater extraction and treatment remedy selected in the 1987 ROD began operating in December 1989 and continues to operate today (the "First Interim Remedy").
16. The First Interim Remedy was constructed to operate in conjunction with the Los Angeles Department of Water and Power's ("LADWP") North Hollywood municipal water treatment and distribution plant. Since its startup, the First Interim Remedy has been operated by LADWP under a series of cooperative agreements with EPA, and the treated water has been delivered to LADWP's water supply system.
17. In 1996 and 1997, 37 parties entered into consent decrees with the United States, in which they agreed to (1) reimburse the United States for all NHOU past costs and a proportional share of past Basin-wide costs, and (2) pay future costs to operate and maintain the First Interim Remedy for the remainder of its fifteen-year term.
18. Chromium contamination was detected in the Basin for the first time in 1987. EPA began a chromium monitoring program in the early 1990s, and in 1999 EPA began quarterly monitoring for hexavalent chromium (also referred to as chromium VI), the predominant form of chromium in the Basin's groundwater.
19. On September 30, 2009, EPA issued a new ROD for the NHOU, selecting a new interim remedy for the Site ("Second Interim Remedy"). The Second Interim Remedy includes construction of new extraction wells, chromium and 1,4 dioxane treatment, expanded VOC treatment, and continued use of the treated water in LADWP's water supply system. 1,4 dioxane was used typically as a stabilizer in conjunction with VOCs.
20. According to the ATSDR, drinking or breathing high levels of TCE may cause nervous system effects, liver and lung damage, abnormal heartbeat, coma, and possibly death. Drinking small amounts of TCE for long periods may cause liver and kidney damage, impaired immune system function, and impaired fetal development in pregnant women. ATSDR also considers exposure to very high concentrations of PCE to cause dizziness, headaches, sleepiness, confusion,

nausea, difficulty in speaking and walking, unconsciousness, and death. The National Institute for Occupational Safety and Health considers PCE a potential carcinogen.

21. The Department of Health and Human Services, the International Agency for Research on Cancer, and the EPA have determined that chromium (VI) compounds are known human carcinogens. In workers, inhalation of chromium (VI) has been shown to cause lung cancer.
22. Honeywell International Inc. is a Delaware corporation that is the successor to the former owner and operator of an aerospace manufacturing facility from which there have been releases of VOCs and chromium that have impacted or threaten to impact groundwater in the NHOU.
23. Lockheed Martin Corporation is a Maryland corporation that is the successor to the former owner and operator of an aerospace manufacturing facility from which there have been releases of VOCs and chromium that have impacted or threaten to impact groundwater in the NHOU.

V. CONCLUSIONS OF LAW AND DETERMINATIONS

Based on the Findings of Fact set forth above, as well as the Administrative Record supporting this Settlement Agreement, EPA has determined that:

24. The Site is a "facility" as defined in Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).
25. The contamination found at the Site, as identified in the Findings of Fact above, includes "hazardous substances" as defined in Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).
26. Each Respondent is a "person" as defined in Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).
27. Each Respondent is a responsible party as defined in Section 107(a) of CERCLA, 42 U.S.C. § 9607(a), and is subject to this Settlement Agreement under Section 106(a) of CERCLA, 42 U.S.C. § 9606(a). Respondents are jointly and severally liable for performance of response action under the Settlement Agreement and for response costs incurred, and to be incurred, at the Site. Respondents Honeywell International and Lockheed Martin are the former "owners" and/or "operators" of facilities from which there has been a release of hazardous substances, as defined by Section 101(20) of CERCLA, 42 U.S.C. § 9601(20), and within the meaning of Section 107(a)(1) of CERCLA, 42 U.S.C. § 9607(a)(1).
28. The conditions described in the Findings of Fact above constitute an actual or threatened "release" of a hazardous substance from a facility as defined by Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

VI. SETTLEMENT AGREEMENT AND ORDER

29. Based upon the foregoing Findings of Fact, Conclusions of Law, Determinations, and the Administrative Record for this Site, it is hereby Ordered and Agreed that Respondents shall comply with all provisions of this Settlement Agreement, including, but not limited to, all attachments to this Settlement Agreement and all documents incorporated by reference into this Settlement Agreement.

VII. DESIGNATED PROJECT MANAGER AND COORDINATORS

30. Respondents shall retain one or more contractor(s) to perform the Work and shall notify EPA of the name(s) and qualifications of such contractor(s) within 45 days of the Effective Date. Respondents shall also notify EPA of the name(s) and qualification(s) of any other contractor(s) or subcontractor(s) retained to perform the Work at least 10 days prior to commencement of such Work. EPA retains the right to disapprove of any or all of the contractors and/or subcontractors retained by Respondents. If EPA disapproves of a selected contractor, Respondents shall retain a different contractor and shall notify EPA of that contractor's name and qualifications within 45 days of EPA's disapproval. With respect to any contractor proposed to be Supervising Contractor, Respondents shall demonstrate that the proposed contractor has a quality system that complies with ANSI/ASQC E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs," (American National Standard, January 5, 1995), by submitting a copy of the proposed contractor's Quality Management Plan (QMP). The QMP should be prepared in accordance with "EPA Requirements for Quality Management Plans (QA/R-2)" (EPA/240/B-01/002, March 2001) or equivalent documentation as determined by EPA. EPA will issue a notice of disapproval or an authorization to proceed. Any decision not to require submission of the contractor's QMP should be documented in a memorandum from EPA's Project Manager and Regional Quality Assurance personnel to the Site file.
31. Within 10 days after the Effective Date, Respondents shall designate a Project Coordinator who shall be responsible for administration of all actions by Respondents required by this Settlement Agreement and shall submit to EPA the designated Project Coordinator's name, address, telephone number, and qualifications. To the greatest extent possible, the Project Coordinator shall be present on-site or readily available during site work. EPA retains the right to disapprove of the designated Project Coordinator. If EPA disapproves of the designated Project Coordinator, Respondents shall retain a different Project Coordinator and shall notify EPA of that person's name, address, telephone number, and qualifications within 30 days following EPA's disapproval. Receipt by Respondents' Project Coordinator of any notice or communication from EPA relating to this Settlement Agreement shall constitute receipt by all Respondents.
 - a. Documents to be submitted to the Respondent Honeywell International Inc. shall be sent to Mr. Benny DeHghi, Remediation Manager – Health, Safety,

Environment & Remediation, Honeywell International Inc., M/S 23-21-80, 2525 West 190th Street, Torrance, California 90504-6002 [(310) 512-2296; benny.dehghi@honeywell.com].

- b. Documents to be submitted to the Respondent Lockheed Martin Corporation shall be sent to C. Douglas Goins, Assistant General Counsel, Lockheed Martin Corporation, 6801 Rockledge Drive, Bethesda, Maryland, 20917 [(301) 214-3402; doug.goins@lmco.com].
- 32. EPA has designated Kelly Manheimer of the Region IX Site Cleanup Branch as its Project Manager. Except as otherwise provided in this Settlement Agreement, Respondents shall direct all submissions required by this Settlement Agreement to the Project Manager at 75 Hawthorne Street, SFD-7-1, San Francisco, California 94105 [(415) 972-3290; manheimer.kelly@epa.gov].
- 33. EPA's Project Manager shall have the authority lawfully vested in a Remedial Project Manager ("RPM") and On-Scene Coordinator ("OSC") by the NCP. In addition, EPA's Project Manager shall have the authority, consistent with the NCP, to halt any Work required by this Settlement Agreement and to take any necessary response action when the Project Manager determines that conditions at the Site may present an immediate endangerment to public health, welfare, or the environment. The absence of the EPA Project Manager from the area under study pursuant to this Settlement Agreement shall not be cause for the stoppage or delay of Work.
- 34. EPA and Respondents shall have the right, subject to Paragraph 31, to change their respective designated Project Coordinator and Project Manager. Respondents shall notify EPA 10 days before such a change is made. The initial notification may be made orally, but shall be promptly followed by a written notice.

VIII. WORK TO BE PERFORMED

- 35. Respondents shall perform all action necessary to implement the Statement of Work.
- 36. Work Plan and Implementation
 - a. Within 30 days after EPA's approval of the Supervising Contractor, Respondents shall submit to EPA and the State a work plan for the design of the Remedial Action at the NHOU ("Remedial Design Work Plan" or "RD Work Plan"). The RD Work Plan shall provide for design of the remedy set forth in the ROD, in accordance with the SOW and for achievement of the Performance Standards and other requirements set forth in the ROD, this Settlement Agreement, and/or the SOW. Upon its approval by EPA pursuant to Section IX (EPA Approval of Plans and Other Submissions), the RD Work Plan shall be incorporated into and enforceable under this Settlement Agreement.

- b. The RD Work Plan shall include plans and schedules for implementation of all remedial design and pre-design tasks identified in the SOW, including, but not limited to, plans and schedules for the completion of a: (1) Health and Safety Plan; (2) Sampling and Analysis Plan; (3) Remedial Design Quality Assurance Project Plan (RD QAPP), in accordance with Section VII (Quality Assurance, Sampling and Data Analysis)); (4) Groundwater Monitoring Plan; (5) preliminary design submission; (6) an intermediate design submission; (7) a data evaluation report; and (8) a pre-final/final design submission (if required - see SOW section 2.1.1). Respondents shall also propose in the RD Work Plan whether they plan to implement the design and construction utilizing the design/bid/build or design/build process for EPA's approval (see section 2.1.1 of the SOW).
- c. Upon approval of the RD Work Plan by EPA pursuant to Section IX, (EPA Approval of Plans and Other Submissions), after a reasonable opportunity for review and comment by the State, and submission of the Health and Safety Plan for all field activities to EPA and the State, Respondents shall implement the RD Work Plan. Respondents shall submit to EPA and the State all plans, reports, and other deliverables required under the approved RD Work Plan in accordance with the approved schedule for review. Unless otherwise directed by EPA, Respondents shall not commence further Remedial Design activities at the NHOU prior to approval of the RD Work Plan.
- d. The preliminary design submission shall include, at a minimum, the following: (1) design criteria; (2) results of additional field sampling and pre-design work; (3) project delivery strategy; (4) preliminary plans, drawings and sketches; (5) required specifications in outline form; and (6) preliminary construction schedule.
- e. The intermediate design submission shall be a continuation and expansion of the preliminary design.
- f. The pre-final/final design submission shall include, at a minimum, the following: (1) final plans and specifications (if the Design/Bid/Build process is approved; not required for the Design/Build process); (2) Construction Quality Assurance Project Plan ("CQAPP"); (3) Field Sampling Plan (directed at measuring progress towards meeting Performance Standards); and (4) Contingency Plan. The CQAPP, which shall detail the approach to quality assurance during construction activities at the NHOU, shall specify a quality assurance official, independent of the Supervising Contractor or Project Coordinator, to conduct a quality assurance program during the construction phase of the project.
- g. Health and Safety Plan. As approved in the Remedial Design Work Plan, Respondents shall prepare and submit to EPA for review and comment a plan that ensures the protection of the public health and safety during performance of on-Site work under this Order. This plan shall be prepared in accordance with EPA's Standard Operating Safety Guide (PUB 9285.1-03, PB 92-963414, June 1992). In addition, the plan shall comply with all currently applicable Occupational Safety and Health Administration ("OSHA") regulations found at 29 C.F.R. Part 1910.

If EPA determines that it is appropriate, the plan shall also include contingency planning. Respondents shall incorporate all changes to the plan recommended by EPA and shall implement the plan during the pendency of the removal action.

37. Respondents shall conduct all work in accordance with the SOW, the ROD, CERCLA, the NCP, and all applicable EPA guidance. EPA's Project Manager shall use his or her best efforts to inform Respondents if new or revised guidances may apply to the Work.
38. Respondents shall perform the tasks and submit the deliverables that the SOW sets forth. EPA will approve, approve with conditions, modify, or disapprove each deliverable that Respondents submit under this Settlement Agreement and the SOW, pursuant to Section IX (EPA Approval of Plans and Other Submissions). Each deliverable must include all listed items as well as items that the RD Work Plan indicates Respondents shall prepare and submit to EPA for review and approval.
39. Upon EPA's approval, this Settlement Agreement incorporates any reports, plans, specifications, schedules, and attachments that this Settlement Agreement or the SOW requires. With the exception of extensions that EPA allows in writing or certain provisions within Section XVII of this Settlement Agreement (*Force Majeure*), any non-compliance with such EPA-approved reports, plans, specifications, schedules, and attachments shall be considered a violation of this Settlement Agreement and will subject Respondents to stipulated penalties in accordance with Section XVIII of this Settlement Agreement (Stipulated Penalties).
40. If any unanticipated or changed circumstances exist at the NHOU that may significantly affect the Work or schedule, Respondents shall notify the EPA Project Manager by telephone and email within 72 hours of discovery of such circumstances. Such notification is in addition to any notification required by Section XVII (*Force Majeure*).
41. If EPA determines that additional tasks, including, but not limited to, additional investigatory work or engineering evaluation, are necessary to complete the Work, EPA shall notify Respondents in writing. Respondents shall submit a work plan to EPA for the completion of such additional tasks within 30 days of receipt of such notice, or such longer time as EPA agrees. The work plan shall be completed in accordance with the same standards, specifications, and requirements of other deliverables pursuant to this Settlement Agreement. EPA will review and comment on, as well as approve, approve with conditions, modify, or disapprove the work plan pursuant to Section IX (EPA Approval of Plans and Other Submissions). Upon approval or approval with modifications of the work plan, Respondents shall implement the additional work in accordance with the schedule of the approved work plan. Failure to comply with this Subsection, including, but not limited to, failure to submit a satisfactory work

plan, shall subject Respondents to stipulated penalties as set forth in Section XVIII (Stipulated Penalties).

42. Quality Assurance and Sampling

Respondents shall use quality assurance, quality control, and chain of custody procedures for all design, compliance, and monitoring samples in accordance with “EPA Requirements for Quality Assurance Project Plans (QA/R5)” (EPA/240/B-01/003, March 2001, reissued May 2006), “Guidance for Quality Assurance Project Plans (QA/G-5)” (EPA/240/R-02/009, December 2002), and subsequent amendments to such guidelines upon notification by EPA to Respondents of such amendment. Amended guidelines shall apply only to procedures conducted after such notification. Respondents shall only use laboratories that have a documented Quality System that complies with ANSI/ASQC E-4 1994, “Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs” (American National Standard, January 5, 1995), and “EPA Requirements for Quality Management Plans (QA/R-2)” (EPA/240/B-01/002, March 2001), or equivalent documentation as determined by EPA. Upon request by EPA, Respondents shall have such a laboratory analyze samples submitted by EPA for QA monitoring. Respondents shall provide to EPA the QA/QC procedures followed by all sampling teams and laboratories performing data collection and/or analysis.

- a. Upon request, Respondents shall allow EPA or its authorized representatives to take split or duplicate samples. Respondents shall notify EPA not less than 28 days in advance of any sample collection activity unless shorter notice is agreed to by EPA. In addition, EPA shall have the right to take any additional samples that EPA deems necessary. Upon request, EPA shall allow Respondents to take split or duplicate samples of any samples it takes as part of EPA’s oversight of Respondents’ implementation of the Work.
- b. Respondents shall, as specified in Attachment 2 to the SOW, summarize and submit to EPA copies of the results of all sampling and/or tests or other data obtained or generated by or on behalf of Respondents with respect to the NHOU and/or the implementation of this Settlement Agreement unless EPA agrees otherwise.
- c. Respondents shall report all communications that they have with local, state, or other federal authorities related to the Remedial Design Work in the monthly progress reports.
- d. If, at any time during the Remedial Design process, Respondents become aware of the need for additional data beyond the scope of the approved Work Plans, Respondents shall have an affirmative obligation to submit to EPA’s Project Manager, within 30 days, a memorandum documenting the need for additional data.
- e. Notwithstanding any provision of this Settlement Agreement, the United States retains all of its information gathering and inspection authorities and rights,

including enforcement actions related thereto, under CERCLA, RCRA, and any other applicable statutes or regulations.

43. EPA may prepare a community relations plan, in accordance with EPA guidance and the NCP. As requested by EPA, Respondents shall provide information supporting EPA's community relations plan and shall participate in the preparation of such information for dissemination to the public and in public meetings that may be held or sponsored by EPA to explain activities at, or concerning, the Site, as further described in the SOW.

44. Emergency Response and Notification of Releases

- a. If any action or occurrence during the performance of the Work causes or threatens a release of Waste Material at the NHOU that constitutes an emergency situation or may present an immediate threat to public health or welfare or the environment, Respondents shall immediately take all appropriate action to prevent, abate, or minimize such release or threat of release, and shall immediately notify the EPA's Project Manager, or, if the Project Manager is unavailable, EPA's Alternate Project Manager. If neither of these persons is available, Respondents shall notify the Duty Officer in EPA Region IX's Emergency Response, Preparedness, and Prevention Branch, at (800) 300-2193. Respondents shall take such actions in consultation with EPA's Project Manager or other available authorized EPA officer and in accordance with all applicable provisions of the Health and Safety Plans, the Contingency Plans, and any other applicable plans or documents developed pursuant to the SOW. In the event that Respondents fail to take appropriate response action as required by this Section, and EPA takes such action instead, Respondents shall reimburse EPA all costs of the response action not inconsistent with the NCP under Section XV (Payment of Response Costs).
- b. In addition, in the event of any release of a hazardous substance from the Site, Respondents shall immediately notify the National Response Center at (800) 424-8802. Respondents shall submit a written report to EPA within 7 days after each release, setting forth the events that occurred and the measures taken, or to be taken, to mitigate any release or endangerment caused or threatened by the release and to prevent the reoccurrence of such a release. This reporting requirement is in addition to, and not in lieu of, reporting under Section 103(c) of CERCLA, 42 U.S.C. § 9603(c), and Section 304 of the Emergency Planning and Community Right-To-Know Act of 1986, 42 U.S.C. § 11004, *et seq.*

IX. EPA APPROVAL OF PLANS AND OTHER SUBMISSIONS

45. After review of any plan, report, or other item that is required to be submitted for approval pursuant to this Settlement Agreement, in a notice to Respondents, EPA shall: (a) approve, in whole or in part, the submission; (b) approve the submission upon specified conditions; (c) modify the submission to cure the deficiencies; (d) disapprove, in whole or in part, the submission, directing that Respondents

modify the submission; or (e) any combination of the above. However, EPA shall not modify a submission without first providing Respondents at least one notice of deficiency and an opportunity to cure within 15 days, except where to do so would cause serious disruption to the Work or where previous submission(s) have been disapproved due to material defects.

46. In the event of approval, approval upon conditions, or modification by EPA, pursuant to Subparagraph 45(a), (b), (c), or (e), Respondents shall proceed to take any action required by the plan, report, or other deliverable, as approved or modified by EPA subject only to their right to invoke the Dispute Resolution procedures set forth in Section XVI (Dispute Resolution) with respect to the modifications or conditions made by EPA. Following EPA approval or modification of a submission or portion thereof, Respondents shall not thereafter alter or amend such submission or portion thereof unless directed by EPA. In the event that EPA modifies the submission to cure the deficiencies pursuant to Subparagraph 45(c) and the submission had a material defect, EPA retains the right to seek stipulated penalties, as provided in Section XVIII (Stipulated Penalties).
47. Resubmission
 - a. Upon receipt of a notice of disapproval, Respondents shall, within 15 days or such longer time as specified by EPA in such notice, correct the deficiencies and resubmit the plan, report, or other deliverable for approval. Any stipulated penalties applicable to the submission, as provided in Section XVIII, shall accrue during the 15-day period or otherwise specified period but shall not be payable unless the resubmission is disapproved or modified due to a material defect as provided in Paragraphs 48 and 49.
 - b. Notwithstanding the receipt of a notice of disapproval, Respondents shall proceed to take any action required by any non-deficient portion of the submission, unless otherwise directed by EPA. Implementation of any non-deficient portion of a submission shall not relieve Respondents of any liability for stipulated penalties under Section XVIII (Stipulated Penalties).
 - c. Respondents shall not proceed further with any subsequent activities or tasks until receiving EPA approval, approval on condition, or modification of the RD Work Plan, the Preliminary Design, the Intermediate Design, the Prefinal Design, the Groundwater Monitoring Plan, and the Sampling and Analysis Plan. While awaiting EPA approval, approval on condition, or modification of this deliverable, Respondents shall proceed with all other tasks and activities that may be conducted independently of this deliverable, in accordance with the schedule set forth under this Settlement Agreement.
 - d. For all remaining deliverables not listed above in Subparagraph 47(c), Respondents shall proceed with all subsequent tasks, activities, and deliverables without awaiting EPA approval on the submitted deliverable. EPA reserves the

right to stop Respondents from proceeding further, either temporarily or permanently, on any task, activity, or deliverable at any point.

48. If EPA disapproves a resubmitted plan, report, or other deliverable, or portion thereof, EPA may again direct Respondents to correct the deficiencies. EPA shall also retain the right to modify or develop the plan, report, or other deliverable. Respondents shall implement any such plan, report, or deliverable as corrected, modified, or developed by EPA, subject only to Respondents' right to invoke the procedures set forth in Section XVI (Dispute Resolution).
49. If upon resubmission, a plan, report, or other deliverable is disapproved or modified by EPA due to a material defect, Respondents shall be deemed to have failed to submit such plan, report, or other deliverable timely and adequately, unless Respondents invoke the dispute resolution procedures in accordance with Section XVI (Dispute Resolution) and EPA's action is revoked or substantially modified pursuant to a Dispute Resolution decision issued by EPA or superseded by an agreement reached pursuant to that Section. The provisions of Section XVI (Dispute Resolution) and Section XVIII (Stipulated Penalties) shall govern the implementation of the Work and accrual and payment of any stipulated penalties during Dispute Resolution. If EPA's disapproval or modification is not otherwise revoked, substantially modified, or superseded as a result of a decision or agreement reached pursuant to the Dispute Resolution process set forth in Section XVI, stipulated penalties shall accrue for such violation from the date on which the initial submission was originally required, as provided in Section XVIII.
50. In the event that EPA takes over some of the tasks, Respondents shall incorporate and integrate information supplied by EPA into the final reports.
51. All plans, reports, and other deliverables submitted to EPA under this Settlement Agreement shall, upon approval or modification by EPA, be incorporated into and enforceable under this Settlement Agreement. In the event EPA approves or modifies a portion of a plan, report, or other deliverable submitted to EPA under this Settlement Agreement, the approved or modified portion shall be incorporated into and become enforceable under this Settlement Agreement.

X. PROGRESS REPORTS

52. Reporting
 - a. Respondents shall submit written monthly progress reports to EPA on the 10th day of each month beginning after the receipt of EPA's approval of the RD Work Plan until termination of this Settlement Agreement, unless otherwise directed in writing by EPA's Project Manager. These reports shall: (a) describe the actions that have been taken toward achieving compliance with this Settlement Agreement during the previous month; (b) include a summary of all results of sampling and tests and all other data received or generated by Respondents or their contractors or agents in the previous month; (c) identify all plans, reports,

and other deliverables required by this Settlement Agreement completed and submitted during the previous month; (d) describe all actions, including, but not limited to, data collection and implementation of work plans, which are scheduled for the next six weeks; (e) include information regarding percentage of completion, unresolved delays encountered or anticipated that may affect the future schedule for implementation of the Work, and a description of efforts made to mitigate those delays or anticipated delays; (f) include any modifications to the work plans or other schedules that Respondents have proposed to EPA or that have been approved by EPA; and (g) describe all activities undertaken in support of the Community Relations Plan during the previous month and those to be undertaken in the next six weeks.

- b. Respondents shall submit copies of all plans, reports, data and other deliverables required by this Settlement Agreement as specified in Attachment 2 of the SOW.
53. **Final Report.** Within 45 days after completion of all Work required by this Settlement Agreement, Respondents shall submit for EPA review and approval a final report summarizing the actions taken to comply with this Settlement Agreement. The final report shall conform, at a minimum, with the requirements set forth in Section 300.165 of the NCP entitled "OSC Reports." The final report shall include the following certification signed by a person(s) who supervised or directed the preparation of that report:

To the best of my knowledge, after thorough investigation, I certify that the information contained in, or accompanying, this submission is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

XI. SITE ACCESS AND INSTITUTIONAL CONTROLS

54. If any Respondent owns or controls property within the boundaries of the Site, or any other property where access is needed to implement this Settlement Agreement, or where land/water use controls are necessary to implement this Settlement Agreement, such Respondent shall, commencing on the Effective Date, provide EPA, the State, and its/their representatives, including contractors, with access at all reasonable times to such property in order to conduct any activity related to this Settlement Agreement. Commencing on the Effective Date, such Respondents shall not use real property that they own or control, in any manner that EPA determines will pose an unacceptable risk to human health or to the environment due to exposure to Waste Materials or interfere with or adversely affect the implementation, integrity, or protectiveness of the Remedial Action. If required by the Work, the land/water use restrictions shall include, but not be limited to: installation of drinking water wells. Respondents who own or control property within the boundaries of the Site shall, at least 30 days prior to the conveyance of any interest in real property within the boundaries of the Site, give written notice to the transferee that the property is subject to this Settlement

Agreement and written notice to EPA and the State of the proposed conveyance, including the name and address of the transferee. Respondents who own or control property within the boundaries of the Site also agree to require that their successors comply with the immediately preceding sentence, this Section, and Section XII (Access to Information). The activities related to this Settlement Agreement include, but are not limited to:

1. Monitoring the Work;
 2. Verifying any data or information submitted to the United States;
 3. Conducting investigations regarding contamination at or near the NHOU;
 4. Obtaining samples;
 5. Assessing the need for, planning, or implementing additional response actions at or near the NHOU;
 6. Assessing implementation of quality assurance and quality control practices as defined in the approved Quality Assurance Project Plans;
 7. Implementing the Work pursuant to the conditions set forth in Paragraph 92 (Work Takeover);
 8. Inspecting and copying records, operating logs, contracts, or other documents maintained or generated by Respondents or their agents, consistent with Section XII (Access to Information);
 9. Assessing Respondents' compliance with the Settlement Agreement;
 10. Determining whether the NHOU or other real property is being used in a manner that is prohibited or restricted, or that may need to be prohibited or restricted under the Settlement Agreement; and
 11. Implementing, monitoring, maintaining, reporting on, and enforcing any Institutional Controls.
55. If any real property where access and/or land/water use restrictions are needed, is owned or controlled by persons other than any Respondent, Respondents shall use best efforts to secure from such persons:
- a. An agreement to provide access thereto for the United States, the State, and Respondents, and their representatives, contractors and subcontractors, to conduct any activity regarding the Settlement Agreement including, but not limited to, the activities listed in Paragraph 54; and
 - b. An agreement, enforceable by Respondents, the State, and the United States, to refrain from using the real property owned or controlled by such persons, in any

manner that EPA determines will pose an unacceptable risk to human health or to the environment due to exposure to Waste Materials or interfere with or adversely affect the implementation, integrity, or protectiveness of the Remedial Action. The agreement shall include, but not be limited to, the land/water use restrictions listed in Paragraph 54.

56. For purposes of Paragraphs 54 and 55, "best efforts" includes the payment of reasonable sums of money to obtain access, an agreement to restrict land/water use, a proprietary control, and/or an agreement to release or subordinate a prior lien or encumbrance. If, within 45 days of the Effective Date, Respondents have not obtained agreements to provide access or restrict land/water use as required by Paragraph 54 and 55, Respondents shall promptly notify the United States in writing, and shall include in that notification a summary of the steps that Respondents have taken to attempt to comply with Paragraph 54 or 55. The United States may, as it deems appropriate, assist Respondents in obtaining access or agreements to restrict land/water use. Respondents shall reimburse the United States under Section XV (Payments for Response Costs), for all costs incurred, direct or indirect, by the United States in obtaining such access or agreements to restrict land/water use, including, but not limited to, the cost of attorney time and the amount of monetary consideration paid or just compensation.
57. If EPA determines that Institutional Controls in the form of state or local laws, regulations, ordinances, zoning restrictions, or other governmental controls are needed, Respondents shall cooperate with EPA's efforts to secure and ensure compliance with such governmental controls.
58. Notwithstanding any provision of this Settlement Agreement, the United States and the State retain all of their access authorities and rights, as well as all of their rights to require Institutional Controls, including enforcement authorities related thereto, under CERCLA, RCRA, and any other applicable statute or regulations.
59. If Respondents cannot obtain access agreements, EPA may obtain access for Respondents, perform those tasks or activities with EPA contractors, or terminate the Settlement Agreement. If EPA performs those tasks or activities with EPA contractors and does not terminate the Settlement Agreement, Respondents shall perform all other activities not requiring access to that site and shall reimburse EPA for all costs incurred in performing such activities. Respondents shall integrate the results of any such tasks undertaken by EPA into its reports and deliverables.

XII. ACCESS TO INFORMATION

60. Respondents shall provide to EPA and the State, upon request, copies of all documents and information within their possession or control or that of their contractors or agents relating to the implementation of this Settlement Agreement, including, but not limited to, sampling, analysis, chain of custody records, manifests, trucking logs, receipts, reports, sample traffic routing, correspondence,

or other documents or information related to the Work. Respondents shall also make available to EPA and the State, for purposes of investigation, information gathering, or testimony, their employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Work.

61. Respondents may assert business confidentiality claims covering part or all of the documents or information submitted to EPA and the State under this Settlement Agreement to the extent permitted by and in accordance with Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7), and 40 C.F.R. § 2.203(b). Documents or information determined to be confidential by EPA will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no claim of confidentiality accompanies documents or information when it is submitted to EPA and the State, or if EPA has notified Respondents that the documents or information are not confidential under the standards of Section 104(e)(7) of CERCLA or 40 C.F.R. Part 2, Subpart B, the public may be given access to such documents or information without further notice to Respondents. Respondents shall segregate and clearly identify all documents or information submitted under this Settlement Agreement for which Respondents assert business confidentiality claims.
62. Respondents may assert that certain documents, records, and other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If the Respondents assert such a privilege in lieu of providing documents, they shall provide EPA and the State with the following: a) the title of the document, record, or information; b) the date of the document, record, or information; c) the name and title of the author of the document, record, or information; d) the name and title of each addressee and recipient; e) a description of the contents of the document, record, or information; and f) the privilege asserted by Respondents. However, no documents, reports or other information created or generated pursuant to the requirements of this Settlement Agreement shall be withheld on the grounds that they are privileged.
63. No claim of confidentiality shall be made with respect to any data, including, but not limited to, all sampling, analytical, monitoring, hydrogeologic, scientific, chemical, or engineering data, or any other documents or information evidencing conditions at, or around, the Site.

XIII. RECORD RETENTION

64. During the pendency of this Settlement Agreement and until 10 years after the Respondents' receipt of EPA's notification that work has been completed, each Respondent shall preserve and retain all non-identical copies of documents, records, and other information (including documents, records, or other information in electronic form) now in its possession or control or which come into its possession or control that relate in any manner to the performance of the Work or the liability of any person under CERCLA with respect to the Site, regardless of any corporate retention policy to the contrary. Until 10 years after notification that work has been completed, Respondents shall also instruct their

contractors and agents to preserve all documents, records, and other information of whatever kind, nature, or description relating to performance of the Work.

65. At the conclusion of this document retention period, Respondents shall notify EPA and the State at least 90 days prior to the destruction of any such documents, records, or other information and, upon request by EPA or the State, Respondents shall deliver any such documents, records, or other information to EPA or the State. Respondents may assert that certain documents, records, and other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If Respondents assert such a privilege, they shall provide EPA with the following: (a) the title of the document, record, or other information; (b) the date of the document, record, or other information; (c) the name and title of the author of the document, record, or other information; (d) the name and title of each addressee and recipient; (e) a description of the subject of the document, record, or other information; and (f) the privilege asserted by Respondents. However, no documents, records, or other information created or generated pursuant to the requirements of this Settlement Agreement shall be withheld on the grounds that they are privileged.
66. Each Respondent hereby certifies individually that to the best of its knowledge and belief, after thorough inquiry, it has not altered, mutilated, discarded, destroyed, or otherwise disposed of any records, documents, or other information (other than identical copies) relating to its potential liability regarding the Site since notification of potential liability by EPA or the State or the filing of suit against it regarding the NHOU, and that it has fully complied with any and all EPA requests for information pursuant to Sections 104(e) and 122(e) of CERCLA, 42 U.S.C. §§ 9604(e) and 9622(e), and Section 3007 of RCRA, 42 U.S.C. § 6927.

XIV. COMPLIANCE WITH OTHER LAWS

67. Respondents shall undertake all action that this Settlement Agreement requires in accordance with the requirements of all applicable local, state, and federal laws and regulations, unless an exemption from such requirements is specifically provided by law or in this Settlement Agreement. The activities conducted pursuant to this Settlement Agreement, if approved by EPA, shall be considered consistent with the NCP.
68. Except as provided in Section 121(e) of CERCLA, 42 U.S.C. § 9621(e), and the NCP, no permit shall be required for any portion of the Work conducted entirely on-site. Where any portion of the Work requires a federal or state permit or approval, Respondents shall submit timely applications and take all other actions necessary to obtain and to comply with all such permits or approvals.
69. This Settlement Agreement is not, and shall not be construed to be, a permit issued pursuant to any federal or state statute or regulation.

XV. PAYMENT OF RESPONSE COSTS

70. Payment for Future Response Costs

- a. Respondents shall pay EPA all Future Response Costs not inconsistent with the NCP. On a periodic basis, but at least one year after the Effective Date, EPA will send Respondents a bill requiring payment that includes an EPA cost summary, which includes direct and indirect costs incurred by EPA and its contractors. Respondents shall make all payments within 45 days of receipt of each bill requiring payment, except as otherwise provided in Paragraph 72.
- b. Respondents shall make all payments by a certified or cashier's check or checks made payable to "EPA Hazardous Substance Superfund," referencing the name and address of the party/parties making payment, the Site name, the EPA Region and Site/Spill ID Number 09N1, and the EPA docket number for this action. Respondents shall send the check(s) to:

U.S. Environmental Protection Agency
Superfund Payments
Cincinnati Finance Center
PO Box 979076
St. Louis, Missouri 63197-9000

The payment may instead be made by Electronic Funds Transfer ("EFT" or "wire transfer") in accordance with instructions provided to Respondent in the first bill for response costs.

- c. At the time of payment, Respondents shall send notice that payment has been made to Kelly Manheimer at 75 Hawthorne Street SFD-7-1, San Francisco, California 94105. This notice will include copies of the transmittal letter and the check.
 - d. The total amount to be paid by Respondents pursuant to Subparagraph 70.a shall be deposited in the NHOU Special Account within the EPA Hazardous Substance Superfund to be retained and used to conduct or finance response actions at or in connection with the Site, or to be transferred by EPA to the EPA Hazardous Substance Superfund.
71. In the event that the payments for Future Response Costs are not made within 45 days of Respondents' receipt of a bill, Respondents shall pay Interest on the unpaid balance. The Interest on Future Response Costs shall begin to accrue on the date of the bill and shall continue to accrue until the date of payment. Payments of Interest made under this Paragraph shall be in addition to such other remedies or sanctions available to the United States by virtue of Respondents' failure to make timely payments under this Section, including but not limited to, payment of stipulated penalties pursuant to Section XVIII.

72. Respondents may contest payment of any Future Response Costs billed under Paragraph 70, if they determine that EPA has made an accounting error, or if they believe EPA incurred excess costs as a direct result of an EPA action that was inconsistent with the NCP. Such objection shall be made in writing within 45 days of receipt of the bill and must be sent to the EPA Project Manager. Any such objection shall specifically identify the contested Future Response Costs and the basis for objection. In the event of an objection, Respondents shall within the 45-day period pay all uncontested Future Response Costs to EPA in the manner described in Paragraph 70. Simultaneously, Respondents shall establish an interest-bearing escrow account in a federally-insured bank duly chartered in the State of California and remit to that escrow account funds equivalent to the amount of the contested Future Response Costs. Respondents shall send to the EPA Project Manager a copy of the transmittal letter and check paying the uncontested Future Response Costs, and a copy of the correspondence that establishes and funds the escrow account, including, but not limited to, information containing the identity of the bank and bank account under which the escrow account is established as well as a bank statement showing the initial balance of the escrow account. Simultaneously with establishment of the escrow account, Respondents shall initiate the Dispute Resolution procedures in Section XVI (Dispute Resolution). If EPA prevails in the dispute, within 15 days of the resolution of the dispute, Respondents shall pay the sums due (with accrued interest) to EPA in the manner described in Paragraph 70. If Respondents prevail concerning any aspect of the contested costs, Respondents shall pay that portion of the costs (plus associated accrued interest) for which they did not prevail to EPA in the manner described in Paragraph 70. Respondents shall be disbursed any balance of the escrow account. The dispute resolution procedures set forth in this Paragraph in conjunction with the procedures set forth in Section XVI (Dispute Resolution) shall be the exclusive mechanisms for resolving disputes regarding Respondents' obligation to reimburse EPA for its Future Response Costs.

XVI. DISPUTE RESOLUTION

73. Unless this Settlement Agreement expressly provides otherwise, the dispute resolution procedures of this Section shall be the exclusive mechanism for resolving disputes arising under this Settlement Agreement. The Parties shall attempt to resolve any disagreements concerning this Settlement Agreement expeditiously and informally.
74. If Respondents object to any EPA action taken pursuant to this Settlement Agreement, including billings for Future Response Costs, they shall notify EPA in writing of their objection(s) within 20 days of such action, unless the objection(s) has/have been resolved informally. EPA and Respondents shall have 30 days from EPA's receipt of Respondents' written objection(s) to resolve the dispute through formal negotiations (the "Negotiation Period"). The Negotiation Period may be extended at the sole discretion of EPA.

75. Any agreement reached by the parties pursuant to this Section shall be in writing and shall, upon signature by both parties, be incorporated into and become an enforceable part of this Settlement Agreement. If the Parties are unable to reach an agreement within the Negotiation Period, an EPA management official at the Division Director level or higher will issue a written decision on the dispute to Respondents. EPA's decision shall be incorporated into and become an enforceable part of this Settlement Agreement. Respondents' obligations under this Settlement Agreement shall not be tolled by submission of any objection for dispute resolution under this Section. Following resolution of the dispute, as provided by this Section, Respondents shall fulfill the requirement that was the subject of the dispute in accordance with the agreement reached or with EPA's decision, whichever occurs. Respondents shall proceed in accordance with EPA's final decision regarding the matter in dispute, regardless of whether Respondents agree with the decision.

XVII. FORCE MAJEURE

76. Respondents agree to perform all requirements of this Settlement Agreement within the time limits established under this Settlement Agreement, unless the performance is delayed by a *force majeure*. For purposes of this Settlement Agreement, a *force majeure* is defined as any event arising from causes beyond the control of Respondents, or of any entity controlled by Respondents, including, but not limited to, their contractors and subcontractors, that delays or prevents performance of any obligation under this Settlement Agreement despite Respondents' best efforts to fulfill the obligation. The requirement that Respondents exercise "best efforts to fulfill the obligation" includes using best efforts to anticipate any potential *force majeure* event: (a) as it is occurring; and (b) following the potential *force majeure* event, such that the delay is minimized to the greatest extent possible. *Force majeure* does not include financial inability to complete the Work or increased cost of performance.
77. If any event occurs or has occurred that may delay the performance of any obligation under this Settlement Agreement, whether or not caused by a *force majeure* event, Respondents shall notify EPA by telephone and by email within 72 hours of when Respondents first knew that the event might cause a delay. Within 10 days thereafter, Respondents shall provide to EPA in writing: an explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; Respondents' rationale for attributing such delay to a *force majeure* event if they intend to assert such a claim; and a statement as to whether, in the opinion of Respondents, such event may cause or contribute to an endangerment to public health, welfare, or the environment. Failure to comply with the above requirements shall preclude Respondents from asserting any claim of *force majeure* for that event for the period of time of such failure to comply and for any additional delay caused by such failure. Respondents shall be deemed to know of any circumstance of which Respondents,

any entity controlled by Respondents, or Respondents' contractors knew or should have known.

78. If EPA agrees that the delay or anticipated delay is attributable to a *force majeure* event, the time for performance of the obligations under this Settlement Agreement that are affected by the *force majeure* event will be extended by EPA for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the *force majeure* event shall not, of itself, extend the time for performance of any other obligation. If EPA does not agree that the delay or anticipated delay has been or will be caused by a *force majeure* event, EPA will notify Respondents in writing of its decision. If EPA agrees that the delay is attributable to a *force majeure* event, EPA will notify Respondents in writing of the length of the extension, if any, for performance of the obligations affected by the *force majeure* event.

XVIII. STIPULATED PENALTIES

79. Respondents shall be liable to EPA for stipulated penalties in the amounts set forth in Paragraphs 80 and 81 for failure to comply with the requirements of this Settlement Agreement specified below, unless excused under Section XVII (*Force Majeure*). "Compliance" by Respondents shall include completion of the activities under this Settlement Agreement, the SOW, or any other plan approved under this Settlement Agreement identified below in accordance with all applicable requirements of law, this Settlement Agreement, the SOW, and any plans or other documents approved by EPA pursuant to this Settlement Agreement and within the specified time schedules established by, and approved under, this Settlement Agreement.
80. Stipulated Penalty Amounts - Work (Including Payments and Excluding Plans, Reports, and Other Deliverables).
- a. The following stipulated penalties shall accrue per violation per day for any noncompliance identified in Paragraph 80.b:

<u>Penalty Per Violation Per Day</u>	<u>Period of Noncompliance</u>
\$2,000	1st through 14th day
\$3,500	15th through 30th day
\$7,000	31st day and beyond

- b. Compliance Milestones.
1. Timely payment of Future Response Costs.
 2. Providing or arranging for access as set forth in Section XI (Site Access and Institutional Controls).

3. Submittal of Remedial Design Work Plan.
 4. Submittal of Preliminary Design Report.
 5. Submittal of Intermediate Design Report.
81. Stipulated Penalty Amounts - Plans, Reports, and other Deliverables. The following stipulated penalties shall accrue per violation per day for failure to submit timely or adequate reports or other plans or deliverables as otherwise required in this Settlement Agreement and the SOW:

<u>Penalty Per Violation Per Day</u>	<u>Period of Noncompliance</u>
\$1,000	1st through 14th day
\$2,000	15th through 30th day
\$3,000	31st day and beyond

82. In the event that EPA assumes performance of a portion or all of the Work pursuant to Paragraph 92, Respondents shall be liable for a stipulated penalty in the amount of \$250,000.
83. All penalties shall begin to accrue on the day after the complete performance is due, or the day a violation occurs, and shall continue to accrue through the final day of the correction of the noncompliance or completion of the activity. However, stipulated penalties shall not accrue: (a) with respect to a deficient submission under Section VIII (Work to be Performed), during the period, if any, beginning on the 31st day after EPA's receipt of such submission until the date that EPA notifies Respondents of any deficiency; and (b) with respect to a decision by the EPA Management Official designated under Paragraph 75 of Section XVI (Dispute Resolution), during the period, if any, beginning on the 21st day after the Negotiation Period begins until the date that the EPA management official issues a final decision regarding such dispute. Nothing herein shall prevent the simultaneous accrual of separate penalties for separate violations of this Settlement Agreement.
84. Following EPA's determination that Respondents have failed to comply with a requirement of this Settlement Agreement, EPA may give Respondents written notification of the failure and describe the noncompliance. EPA may send Respondents a written demand for payment of the penalties. However, penalties shall accrue as provided in the preceding Paragraph regardless of whether EPA has notified Respondents of a violation.
85. Respondent shall pay EPA all penalties accruing under this Section within 45 days of Respondents' receipt from EPA of a demand for payment of the penalties, unless Respondents invoke the dispute resolution procedures under Section XVI (Dispute Resolution). All payments to EPA under this Section shall be paid by

certified or cashier's check(s) made payable to "EPA Hazardous Substances Superfund," and shall be mailed to:

U.S. Environmental Protection Agency
Superfund Payments
Cincinnati Finance Center
PO Box 979076
St. Louis, Missouri 63197-9000

Respondents shall indicate that the payment is for stipulated penalties, and shall reference the EPA Region and Site/Spill ID Number 09N1, the EPA Docket Number 2011-01, and the name and address of the party/parties making payment. Copies of checks paid pursuant to this Section, and any accompanying transmittal letters, shall be sent to EPA as provided in Paragraph 32.

The payment may instead be made by Electronic Funds Transfer ("EFT" or "wire transfer") in accordance with instructions provided to Respondents in the first bill for response costs.

86. The payment of penalties shall not alter in any way Respondents' obligation to complete performance of the Work required under this Settlement Agreement.
87. Penalties shall continue to accrue during any dispute resolution period but need not be paid until 15 days after the dispute is resolved by agreement or by receipt of EPA's decision.
88. If Respondents fail to pay stipulated penalties when due, EPA may institute proceedings to collect the penalties, as well as Interest. Respondents shall pay Interest on the unpaid balance, which shall begin to accrue on the date of demand made pursuant to Paragraph 84. Nothing in this Settlement Agreement shall be construed as prohibiting, altering, or in any way limiting the ability of EPA to seek any other remedies or sanctions available by virtue of Respondents' violation of this Settlement Agreement or of the statutes and regulations upon which it is based, including, but not limited to, penalties pursuant to Sections 106(b) and 122(l) of CERCLA, 42 U.S.C. §§ 9606(b) and 9622(l), and punitive damages pursuant to Section 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3). Provided, however, that EPA shall not seek civil penalties pursuant to Section 106(b) or 122(l) of CERCLA or punitive damages pursuant to Section 107(c)(3) of CERCLA for any violation for which a stipulated penalty is provided herein, except in the case of a willful violation of this Settlement Agreement or in the event that EPA assumes performance of a portion or all of the Work pursuant to Section XX (Reservation of Rights by EPA), Paragraph 90. Notwithstanding any other provision of this Section, EPA may, in its unreviewable discretion, waive any portion of stipulated penalties that have accrued pursuant to this Settlement Agreement.

XIX. COVENANT NOT TO SUE BY EPA

89. In consideration of the actions that Respondents will perform and the payments that Respondents will make under the terms of this Settlement Agreement, and except as otherwise specifically provided in this Settlement Agreement, EPA covenants not to sue or to take administrative action against Respondents pursuant to Sections 106 and 107(a) of CERCLA, 42 U.S.C. §§ 9606 and 9607(a), for the Work and Future Response Costs. This covenant not to sue shall take effect upon the Effective Date and is conditioned upon Respondents' complete and satisfactory performance of all obligations under this Settlement Agreement, including, but not limited to, payment of Future Response Costs pursuant to Section XV. This covenant not to sue extends only to Respondents and does not extend to any other person.

XX. RESERVATION OF RIGHTS BY EPA

90. Except as specifically provided in this Settlement Agreement, nothing herein shall limit the power and authority of EPA or the United States to take, direct, or order all actions necessary to protect public health, welfare, or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants or contaminants, or hazardous or solid waste on, at, or from the Site. Further, except as specifically provided in this Settlement Agreement, nothing herein shall prevent EPA from seeking legal or equitable relief to enforce the terms of this Settlement Agreement, from taking other legal or equitable action as it deems appropriate and necessary, or from requiring Respondents in the future to perform additional activities pursuant to CERCLA or any other applicable law.
91. The covenant not to sue set forth in Section XIX above does not pertain to any matters other than those expressly identified therein. EPA reserves, and this Settlement Agreement is without prejudice to, all rights against Respondents with respect to all other matters, including, but not limited to:
- a. claims based on a failure by Respondents to meet a requirement of this Settlement Agreement;
 - b. liability for costs not included within the definition of Future Response Costs;
 - c. liability for performance of response action other than the Work;
 - d. criminal liability;
 - e. liability for damages for injury to, destruction of, or loss of natural resources, and for the costs of any natural resource damage assessments;
 - f. liability arising from the past, present, or future disposal, release, or threat of release of Waste Materials outside of the Site; and

- g. liability for costs incurred, or to be incurred, by the Agency for Toxic Substances and Disease Registry related to the Site.
- 92. **Work Takeover.** In the event EPA determines that Respondents have ceased implementation of any portion of the Work, are seriously or repeatedly deficient or late in their performance of the Work, or are implementing the Work in a manner that may cause an endangerment to human health or the environment, EPA may assume the performance of any or all portion(s) of the Work as EPA determines necessary. Unless EPA determines that the circumstances require more immediate action on its part, EPA shall give Respondents 30 days notice of its intent to assume the performance of any or all portion(s) of the Work under this Paragraph. Respondents may invoke the procedures set forth in Section XVI (Dispute Resolution) to dispute EPA's determination that takeover of the Work is warranted under this Paragraph. Costs that the United States incurs in performing the Work pursuant to this Paragraph shall be considered Future Response Costs that Respondents shall pay pursuant to Section XV (Payment of Response Costs). Notwithstanding any other provision of this Settlement Agreement, EPA retains all authority and reserves all rights to take any and all response actions authorized by law.

XXI. COVENANT NOT TO SUE BY RESPONDENTS

- 93. Respondents covenant not to sue and agree not to assert any claims or causes of action against the United States, or its contractors or employees, with respect to the Work, past response actions, Future Response Costs, or this Settlement Agreement, including, but not limited to:
 - a. any direct or indirect claim for reimbursement from the Hazardous Substance Superfund established by 26 U.S.C. § 9507, based on Sections 106(b)(2), 107, 111, 112, or 113 of CERCLA, 42 U.S.C. §§ 9606(b)(2), 9607, 9611, 9612, or 9613, or any other provision of law;
 - b. any claim arising out of response actions at, or in connection with, the Site, including any claim under the United States Constitution, the State Constitution, the Tucker Act, 28 U.S.C. § 1491, the Equal Access to Justice Act, 28 U.S.C. § 2412, as amended, or at common law; or
 - c. any claim against the United States pursuant to Sections 107 and 113 of CERCLA, 42 U.S.C. §§ 9607 and 9613, relating to the Work or payment of Future Response Costs.

Provided, however, that nothing in this Settlement Agreement is intended to alter in any way the rights and obligations of the parties under : (1) the Consent Decree entered January 20, 2000 in the U.S. District Court (Central District of California) in *United States v. Lockheed Martin Corporation et al.* (Consolidated Cases No. 91-4527-MRP and No. 97-4214-MRP) ("the 2000 Consent Decree"); and (2) Settlement Agreement entered September 6, 2000, between the United States,

acting through the United States Department of Defense, Defense Contract Management Agency, and Lockheed Martin Corporation addressing discontinued operations, including the San Fernando Valley Superfund Sites (“the 2000 Settlement Agreement”).

Subject to the 2000 Consent Decree and the 2000 Settlement Agreement, and specifically (without limitation) the terms thereof respecting the avoidance of any double recovery, nothing in this Settlement Agreement shall be construed as a waiver by Respondents of any rights they may have to include costs incurred due to this Settlement Agreement, which have not been paid or reimbursed by the United States pursuant to the 2000 Consent Decree or any other agreement, in any of their proposals of allowable costs for purposes of costing or pricing pursuant to contracts with the United States. Nothing in the Settlement Agreement shall be construed to create or recognize any such right. The incurrence or payment of any costs by the Respondents pursuant to this Settlement Agreement, or inclusion of such costs in the Respondents’ proposals for purpose of costing or pricing of contracts with the United States, does not, in and of itself, render such costs allocable or allowable for Government contracting purposes. For Government contracting purposes, the cost incurred in implementing this Agreement remain subject to the applicable provisions of (1) the Federal Acquisition Regulation (“FAR”) and Cost Accounting Standards (“CAS”), (2) agency implementing regulations of FAR, (3) the contract(s) between the Respondents and the United States pursuant to which such costing or pricing proposals are submitted, and (4) any determination by the cognizant Contracting Officer concerning allocability and allowability of such costs, subject to any right of appeal Respondents may have under the applicable contract(s) or the FAR. Notwithstanding any other provision of this Agreement, Respondents agree that they will not claim or include, as allowable costs for purposes of costing or pricing pursuant to contracts with the United States, any amounts they may pay as Stipulated Penalties pursuant to Section XVIII of the Settlement Agreement (Stipulated Penalties), and any such stipulated penalties shall be treated by Respondents as unallowable costs.

94. These covenants not to sue shall not apply in the event the United States brings a cause of action or issues an order pursuant to the reservations set forth in Subparagraphs 91(b), (c), and (e) - (g), but only to the extent that Respondents’ claims arise from the same response action, response costs, or damages that the United States is seeking pursuant to the applicable reservation.
95. Respondents reserve, and this Settlement Agreement is without prejudice to, claims against the United States subject to the provisions of Chapter 171 of Title 28 of the United States Code, for money damages for injury or loss of property or personal injury or death caused by the negligent or wrongful act or omission of any employee of the United States while acting within the scope of his office or employment under circumstances where the United States, if a private person, would be liable to the claimant in accordance with the law of the place where the act or omission occurred. However, any such claim shall not include a claim for

any damages caused, in whole or in part, by the act or omission of any person, including any contractor, who is not a federal employee as that term is defined in 28 U.S.C. § 2671; nor shall any such claim include a claim based on EPA's selection of response actions, or the oversight or approval of Respondents' plans or activities. The foregoing applies only to claims that are brought pursuant to any statute other than CERCLA and for which the waiver of sovereign immunity is found in a statute other than CERCLA.

96. Nothing in this Agreement shall be deemed to constitute approval or preauthorization of a claim within the meaning of Section 111 of CERCLA, 42 U.S.C. § 9611, or 40 C.F.R. § 300.700(d).

XXII. OTHER CLAIMS

97. By issuance of this Settlement Agreement, the United States and EPA assume no liability for injuries or damages to persons or property resulting from any acts or omissions of Respondents. The United States or EPA shall not be deemed a party to any contract entered into by Respondents or their directors, officers, employees, agents, successors, representatives, assigns, contractors, or consultants in carrying out actions pursuant to this Settlement Agreement.
98. Except as expressly provided in Section XIX (Covenant Not to Sue by EPA), nothing in this Settlement Agreement constitutes a satisfaction of, or release from, any claim or cause of action against Respondents or any person not a party to this Settlement Agreement, for any liability such person may have under CERCLA, other statutes, or common law, including, but not limited to, any claims of the United States for costs, damages, and interest under Sections 106 and 107 of CERCLA, 42 U.S.C. §§ 9606 and 9607.
99. No action or decision by EPA pursuant to this Settlement Agreement shall give rise to any right to judicial review, except as set forth in Section 113(h) of CERCLA, 42 U.S.C. § 9613(h).

XXIII. CONTRIBUTION

100. Contribution
- a. The Parties agree that this Settlement Agreement constitutes an administrative settlement for purposes of Section 113(f)(2) of CERCLA, 42 U.S.C. § 9613(f)(2), and that Respondents are entitled, as of the Effective Date, to protection from contribution actions or claims as provided by Sections 113(f)(2) and 122(h)(4) of CERCLA, 42 U.S.C. §§ 9613(f)(2) and 9622(h)(4), for "matters addressed" in this Settlement Agreement. The "matters addressed" in this Settlement Agreement are the Work and Future Response Costs.
- b. The Parties agree that this Settlement Agreement constitutes an administrative settlement for purposes of Section 113(f)(3)(B) of CERCLA, 42 U.S.C. § 9613(f)(3)(B), pursuant to which Respondents have, as of the Effective Date,

resolved their liability to the United States for the Work and Future Response Costs.

- c. Nothing in this Settlement Agreement precludes the United States or Respondents from asserting any claims, causes of action, or demands for indemnification, contribution, or cost recovery against any persons not parties to this Settlement Agreement. Nothing herein diminishes the right of the United States, pursuant to Sections 113(f)(2) and (3) of CERCLA, 42 U.S.C. § 9613(f)(2)(3), to pursue any such persons to obtain additional response costs or response action and to enter into settlements that give rise to contribution protection pursuant to Section 113(f)(2).

XXIV. INDEMNIFICATION

101. Respondents shall indemnify, save, and hold harmless the United States, its officials, agents, contractors, subcontractors, employees, and representatives from any and all claims or causes of action arising from, or on account of, negligent or other wrongful acts or omissions of Respondents, their officers, directors, employees, agents, contractors, or subcontractors, in carrying out actions pursuant to this Settlement Agreement. In addition, Respondents agree to pay the United States all costs incurred by the United States, including, but not limited to, attorneys fees and other expenses of litigation and settlement, arising from, or on account of, claims made against the United States based on negligent or other wrongful acts or omissions of Respondents, their officers, directors, employees, agents, contractors, subcontractors, and any persons acting on their behalf or under their control, in carrying out activities pursuant to this Settlement Agreement. The United States shall not be held out as a party to any contract entered into, by, or on behalf of Respondents in carrying out activities pursuant to this Settlement Agreement. Neither Respondents nor any such contractor shall be considered an agent of the United States.
102. The United States shall give Respondents notice of any claim for which the United States plans to seek indemnification pursuant to this Section and shall consult with Respondents prior to settling such claim.
103. Respondents waive all claims against the United States for damages or reimbursement or for set-off of any payments made, or to be made, to the United States, arising from, or on account of, any contract, agreement, or arrangement between any one or more of Respondents and any person for performance of Work on, or relating to, the Site, including, but not limited to, claims on account of construction delays. In addition, Respondents shall indemnify and hold harmless the United States with respect to any and all claims for damages or reimbursement arising from, or on account of, any contract, agreement, or arrangement between any one or more of Respondents and any person for performance of Work on, or relating to, the Site.

XXV. INSURANCE

104. At least 10 days prior to commencing any on-Site Work under this Settlement Agreement, Respondents shall secure and shall maintain for the duration of this Settlement Agreement comprehensive general liability insurance and automobile insurance with limits of two million dollars (\$2,000,000), combined single limit, naming the EPA as an additional insured. Within the same period, Respondents shall provide EPA with certificates of such insurance and a copy of each insurance policy. Respondents shall submit such certificates and copies of policies each year on the anniversary of the Effective Date. In addition, for the duration of the Settlement Agreement, Respondents shall satisfy, or shall ensure that their contractors or subcontractors satisfy, all applicable laws and regulations regarding the provision of worker's compensation insurance for all persons performing the Work on behalf of Respondents in furtherance of this Settlement Agreement. If Respondents demonstrate by evidence satisfactory to EPA that any contractor or subcontractor maintains insurance equivalent to that described above, or insurance covering some or all of the same risks but in an equal or lesser amount, then Respondents need provide only that portion of the insurance described above that is not maintained by such contractor or subcontractor.

XXVI. FINANCIAL ASSURANCE

105. Within 30 days of the Effective Date, Respondents shall establish and maintain financial security for the benefit of EPA in the amount of \$2.2 million in one or more of the following forms, to secure the full and final completion of Work by Respondents:
- a. a surety bond unconditionally guaranteeing payment and/or performance of the Work;
 - b. one or more irrevocable letters of credit, payable to or at the direction of EPA, issued by financial institution(s) acceptable in all respects to EPA equaling the total estimated cost of the Work;
 - c. a trust fund administered by a trustee acceptable in all respects to EPA;
 - d. a policy of insurance issued by an insurance carrier acceptable in all respects to EPA, which ensures the payment and/or performance of the Work;
 - e. a corporate guarantee to perform the Work provided by one or more parent corporations or subsidiaries of Respondents, or by one or more unrelated corporations that have a substantial business relationship with at least one of Respondents; including a demonstration that any such company satisfies the financial test requirements of 40 C.F.R. Part 264.143(f); and/or
 - f. a corporate guarantee to perform the Work by one or more of Respondents, including a demonstration that any such Respondent satisfies the requirements of 40 C.F.R. Part 264.143(f). If any Respondent that seeks to make a demonstration

pursuant to 40 C.F.R. Part 264.143(f) in order to satisfy the financial assurance requirements of this Section has provided a similar demonstration at other CERCLA or RCRA sites, such Respondent must provide EPA with documentation of the prior demonstration(s) so that EPA can account for the amount of financial assurance already being provided at other sites.

106. Any and all financial assurance instruments provided pursuant to this Section shall be in form and substance satisfactory to EPA, determined in EPA's sole discretion. In the event that EPA determines at any time that the financial assurances provided pursuant to this Section (including, without limitation, the instrument(s) evidencing such assurances) are inadequate, Respondents shall, within 30 days of receipt of notice of EPA's determination, obtain and present to EPA for approval one of the other forms of financial assurance listed in Paragraph 105, above. In addition, if at any time EPA notifies Respondents that the anticipated cost of completing the Work has increased, then, within 30 days of such notification, Respondents shall obtain and present to EPA for approval a revised form of financial assurance (otherwise acceptable under this Section) that reflects such cost increase. Respondents' inability to demonstrate financial ability to complete the Work shall in no way excuse performance of any activities required under this Settlement Agreement.
107. If Respondents seek to ensure completion of the Work through a guarantee pursuant to Subparagraph 105(e) or 105(f) of this Settlement Agreement, Respondents shall: (i) demonstrate to EPA's satisfaction that the guarantor satisfies the requirements of 40 C.F.R. Part 264.143(f); and (ii) resubmit sworn statements conveying the information required by 40 C.F.R. Part 264.143(f) annually, on the anniversary of the Effective Date, to EPA. For the purposes of this Settlement Agreement, wherever 40 C.F.R. Part 264.143(f) references "sum of current closure and post-closure costs estimates and the current plugging and abandonment costs estimates," the current cost estimate of \$2.2 million for the Work at the Site shall be used in relevant financial test calculations.
108. If, after the Effective Date, Respondents can show that the estimated cost to complete the remaining Work has diminished below the amount set forth in Paragraph 105 of this Section, Respondents may, on any anniversary date of the Effective Date, or at any other time agreed to by the Parties, reduce the amount of the financial security provided under this Section to the estimated cost of the remaining Work to be performed. Respondents shall submit a proposal for such reduction to EPA, in accordance with the requirements of this Section, and may reduce the amount of the security after receiving written approval from EPA. In the event of a dispute, Respondents may change the form of financial assurance required hereunder only in accordance with a final decision resolving such dispute pursuant to Section XVI (Dispute Resolution).
109. Respondents may change the form of financial assurance provided under this Section at any time, upon notice to and prior written approval by EPA, provided that EPA determines that the new form of assurance meets the requirements of

this Section. In the event of a dispute, Respondents may change the form of financial assurance required hereunder only in accordance with a final decision resolving such dispute pursuant to Section XVI (Dispute Resolution).

XXVII. INTEGRATION/APPENDICES

110. This Settlement Agreement, its appendices, and any deliverables, technical memoranda, specifications, schedules, documents, plans, reports (other than progress reports), etc. that will be developed pursuant to this Settlement Agreement and become incorporated into, and enforceable under, this Settlement Agreement constitute the final, complete, and exclusive agreement and understanding among the Parties with respect to the settlement embodied in this Settlement Agreement. The parties acknowledge that there are no representations, agreements, or understandings relating to the settlement other than those expressly contained in this Settlement Agreement.
111. In the event of a conflict between any provision of this Settlement Agreement and the provisions of any document attached to this Settlement Agreement or submitted or approved pursuant to this Settlement Agreement, the provisions of this Settlement Agreement shall control.
112. The following documents are attached to and incorporated into this Settlement Agreement:
 - “Appendix A” is the SOW.
 - “Appendix B” is the ROD.

XXVIII. EFFECTIVE DATE AND SUBSEQUENT MODIFICATION

113. This Settlement Agreement shall be effective 5 days after the Settlement Agreement is signed by the Assistant Director of EPA Region IX’s Superfund Division, California Site Cleanup Branch.
114. This Settlement Agreement may be amended by mutual agreement of EPA and Respondents. Amendments shall be in writing and shall be effective when signed by EPA. EPA Project Managers do not have the authority to sign amendments to the Settlement Agreement.
115. No informal advice, guidance, suggestion, or comment by the EPA Project Manager or other EPA representatives regarding reports, plans, specifications, schedules, or any other writing submitted by Respondents shall relieve Respondents of their obligation to obtain any formal approval required by this Settlement Agreement, or to comply with all requirements of this Settlement Agreement, unless it is formally modified.

XXIX. NOTICE OF COMPLETION OF WORK

116. When EPA determines, after EPA's review of the Final Report, that all Work has been fully performed in accordance with the other requirements of this Settlement Agreement, with the exception of any continuing obligations required by this Settlement Agreement, including but not limited to payment of Future Response Costs, EPA will provide written notice to Respondents. If EPA determines that any such Work has not been completed in accordance with this Settlement Agreement, EPA will notify Respondents, provide a list of the deficiencies, and require that Respondents modify the Work Plan if appropriate to correct such deficiencies. Respondents shall implement the modified and approved Work Plan and shall submit the required deliverables. Failure by Respondents to implement the approved modified Work Plan shall be a violation of this Settlement Agreement.

THE UNDERSIGNED SETTLING PARTY enters into this Settlement Agreement in the matter of U.S. EPA CERCLA Docket No. 2011-01, relating to the North Hollywood Operable Unit of the San Fernando Valley Superfund Site, Area 1:

Agreed this 20 day of January, 2011.

For Respondent Honeywell International Inc.

By: 
Benny DeHghi

Title: Remediation Manager – Health, Safety, Environment & Remediation

THE UNDERSIGNED SETTLING PARTY enters into this Settlement Agreement in the matter of U.S. EPA CERCLA Docket No. 2011-01, relating to the North Hollywood Operable Unit of the San Fernando Valley Superfund Site, Area 1:

Agreed this 18th day of January, 2011.

For Respondent Lockheed Martin Corporation

By: David J. C. Constable
David J. C. Constable

Title: Vice President Energy, Environment Safety and Health

It is so ORDERED AND AGREED this 14th day of February, 2011.

BY: Kathleen Salyer

Kathleen Salyer
Assistant Director, Superfund Division
California Site Cleanup Branch
Region IX
U.S. Environmental Protection Agency

DATE: 2/14/11

EFFECTIVE DATE: February 21, 2011

Appendix A

Statement of Work
for Remedial Design
of the Second Interim ROD

**North Hollywood Operable Unit
San Fernando Valley (Area 1) Superfund Site
Los Angeles County, California
EPA ID: CAD980894893**

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Attachments

Attachment 1: Site Map

Attachment 2: Summary of Deliverables

Attachment 3: Primary Guidance and Resources

Attachment 4: Performance Standards for COCs

Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
AOC	Administrative Order on Consent
CDPH	California Department of Public Health
CFR	Code of Federal Regulations
CQA	Construction Quality Assurance (Plan)
CSI	Construction Specification Institute
COC	contaminant of concern
CSM	Conceptual Site Model
DQO	Data Quality Objective
DTSC	CA Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
FFS	Focused Feasibility Study
FSP	Field Sampling Plan
HASP	Health and Safety Plan
ICIAP	Institutional Controls Implementation and Assurance Plan
LADWP	Los Angeles Department of Water and Power
LCA	Life Cycle Analysis
MCL	Maximum Contaminant Level
NHOU	North Hollywood Operable Unit
O&M	Operation and Maintenance
OU	Operable Unit
PCE	Tetrachloroethylene
QA/QC	Quality Assurance and Quality Control
QAPP	Quality Assurance Project Plan
QMP	Quality Management Plan
RAOs	Remedial Action Objectives
RD	Remedial Design
ROD	Record of Decision
RWQCB	CA Regional Water Quality Control Board
SAP	Sampling and Analysis Plan
SFV	San Fernando Valley
SMP	Site Management Plan
SOW	Statement of Work
TCE	Trichloroethylene
VE	Value Engineering
VOC	Volatile Organic Compounds

1.0 Introduction

This Statement of Work (“SOW”) sets forth the activities required to be performed by the Respondents under the Administrative Settlement Agreement and Order on Consent for Remedial Design entered into between the United States and Respondents, dated X/X/2011 (“AOC”), to conduct pre-design data acquisition and Remedial Design activities associated with the Second Interim Action Record of Decision for the San Fernando Valley (“SFV”) (Area 1), North Hollywood Operable Unit (“NHOU”) Superfund Site signed by the EPA on September 30, 2009 (“ROD”). The ROD presented the selected second interim remedy for the groundwater within the NHOU. This SOW is Appendix A to the AOC. All terms used in this Statement of Work shall have the same meanings as defined in Section III of the AOC.

1.1 Site Description

The San Fernando Valley (Area 1) Superfund Site was listed on the National Priorities List on June 10, 1986 (Comprehensive Environmental Response, Compensation, and Liability Information System (“CERCLIS”) Identification Number CAD980894893).

The NHOU is one of two operable units within the San Fernando Valley (Area 1) Superfund Site. The NHOU comprises approximately 4 square miles of contaminated groundwater underlying an area of mixed industrial, commercial, and residential land use in the community of North Hollywood (a district of the City of Los Angeles). The NHOU is approximately 15 miles north of downtown Los Angeles and immediately west of the City of Burbank, and has approximate boundaries of Sun Valley and Interstate 5 to the North, State Highway 170 and Lankershim Boulevard to the west, the Burbank Airport to the east, and Burbank Boulevard to the south (see Figure 1).

Prior to World War II, most land in the SFV was occupied by farms, orchards, and ranchland. By 1949, after the war, nearly all the land in Burbank and North Hollywood was occupied by housing developments, industrial facilities, retail establishments, and the Burbank Airport. Accompanying these land use changes in the 1940s was a substantial increase in population and groundwater withdrawals from the SFV groundwater basin. In the 1950s, the North Hollywood, Erwin, Whitnall, and Verdugo Well Fields were constructed by the Los Angeles Department of Water and Power (“LADWP”) in the North Hollywood area to meet the increasing demand for water. In 1968, groundwater withdrawals from the SFV were reduced to achieve “safe yield” from the basin, and more surface water was imported to the basin from external sources.

In 1979, industrial contamination was found in groundwater in the San Gabriel Valley (to the east of the SFV), prompting the California Department of Public Health (“CDPH”; formerly the California Department of Health Services) to request that all major water providers in the region, including those in the SFV, sample and analyze groundwater for potential industrial contaminants. Trichloroethylene (“TCE”) and tetrachloroethylene (“PCE”) were consistently detected in a large number of production wells in the SFV at concentrations greater than Federal and State Maximum Contaminant Levels (“MCLs”) for drinking water.

TCE and PCE were widely used in the San Fernando Valley starting in the 1940s for dry cleaning and for degreasing machinery. Disposal was not well regulated at that time, and releases from numerous facilities throughout the eastern SFV have resulted in the large plume of groundwater contaminated with volatile organic compounds (“VOCs”) that extends from the NHOU to the southeast. To replace wells within the NHOU area contaminated by TCE and PCE, and to provide more operational flexibility for groundwater recharge and pumping in the SFV, LADWP constructed the Rinaldi-Toluca Well Field in 1988 and 1989, and the Tujunga Well Field in 1993 (see Figure 1 in Attachment 1).

1.2 Purpose

The purpose of this SOW is to set forth the requirements for pre-design data acquisition and the Remedial Design (“RD”) of the remedy selected in the ROD. The RD is generally defined as those activities to be undertaken by the Respondents to develop the final plans and specifications, general provisions, and specific requirements necessary to implement the ROD. Pre-design data acquisition involves environmental sampling, sample analysis, and data evaluation in support of the RD. The RD will also ensure that the remedy complies with the performance standards set forth in Sections 2.8 and 2.13.2 of the ROD (“Performance Standards”), and other requirements of the ROD and AOC.

The purpose of the Superfund program is to eliminate unacceptable risks to human health and the environment from abandoned hazardous waste sites. In recent years, EPA has taken a more comprehensive view of this purpose, to include life cycle analysis (“LCA”) of all the risks posed by the site, and by any resulting remediation efforts. In an effort to describe this approach in more detail, EPA has developed several guidance documents regarding “green remediation” and “greener cleanups,” such as Region IX’s policy memo, *Greener Cleanups Policy - EPA Region 9*.

1.3 General Requirements

The Respondents shall furnish all necessary and appropriate personnel, materials, and services needed for, or incidental to, performing and completing the Work, as defined below and in Section III of the AOC.

1.3.1 Performance Standards

Respondents shall conduct the RD to achieve the Performance Standards and comply with the provisions and requirements of the ROD, the AOC, and this SOW. Table 6 from the ROD, which identifies the numeric performance standards for the contaminants of concern, is replicated in Attachment 4 to this SOW.

The Remedial Action Objectives (“RAOs”) for this action are:

- Prevent exposure to contaminated groundwater, above acceptable risk levels.
- Contain areas of contaminated groundwater that exceed the MCLs and notification levels to the maximum extent practicable.
- Prevent further degradation of water quality at the Rinaldi-Toluca and North Hollywood West production wells by preventing the migration toward these well fields of the more highly contaminated areas of the VOC plume located to the east/southeast.
- Achieve improved hydraulic containment to inhibit horizontal and vertical contaminant migration in groundwater from the more highly contaminated areas and depths of the aquifer to the less contaminated areas and depths of the aquifer, including the southeast portion of the NHOU in the vicinity of the Erwin and Whitnall production well fields.
- Remove contaminant mass from the aquifer.

As stated in the ROD, in some areas of the NHOU, high volume LADWP production wells currently capture part of the VOC plume (i.e., groundwater with VOC concentrations of 5 micrograms per liter (“µg/L”) or greater). LADWP relies on these wells (particularly those in the Rinaldi-Toluca and North Hollywood West well

fields) to meet its water supply needs and manages their use so as to ensure that drinking water standards are always met. Because these wells will continue to be used, it is not possible for the NHOU system to capture and contain all of the contaminated groundwater. Consequently, one of EPA's objectives is to improve containment of the high concentration areas of the plume to ensure that no further degradation of groundwater quality occurs in the vicinity of the Rinaldi-Toluca and North Hollywood West well fields from those areas.

Additionally, if EPA determines that modifications to the Work specified in this SOW for the RD or in work plans developed pursuant to this SOW are necessary to achieve and maintain the Performance Standards and/or comply with ARARs as set forth in the ROD, EPA may require that such modifications be incorporated into the appropriate work plans developed pursuant to this SOW, as set forth in Paragraph 41 of the AOC.

1.3.2 Items Covered by Work

Respondents shall design a groundwater extraction and treatment system to meet the stated RAOs. The Work required to be performed by the Respondents pursuant to the AOC and this SOW includes, but is not limited to, the following specific components:

Groundwater Monitoring

Approximately 37 new monitoring wells are required to be installed as part of the remedy selected in the ROD; however, Honeywell has already installed 31 new wells. As described in EPA's 2009 Focused Feasibility Study ("FFS") Respondents will install additional monitoring wells as necessary and required by EPA to track the location and movement of groundwater contamination throughout the NHOU to fill data gaps necessary for design. Groundwater monitoring pursuant to this AOC and this SOW shall be conducted to fill data gaps necessary for design and to track the location and movement of groundwater contamination throughout the NHOU for the duration of this AOC. Monitoring shall include continued sampling and analysis of the new and existing monitoring wells within the NHOU, selected facility monitoring wells, LADWP production wells, and extraction wells in the North Hollywood area. Monitoring parameters shall include VOCs, chromium, emerging chemicals, and parameters indicative of geochemical conditions that may affect chromium speciation and transport. Proposed activities associated with groundwater monitoring shall be described in a Groundwater Monitoring Plan (see Section 2.2.3 of this SOW).

Replace Existing Extraction Well NHE-1

The ROD states that replacement of existing extraction well NHE-1 with a deeper well of similar construction is necessary to achieve the required hydraulic containment under the Second Interim Remedy. During pre-design data acquisition (described in Section 4) and design (described in Section 5), existing data and data gathered as part of this SOW will be used to verify the need for and determine the optimal location, depth, and pumping rate of the new NHE-1 extraction well.

Replace or Repair and Modify Existing Extraction Wells NHE-2, NHE-4, and NHE-5

The ROD states that replacement of wells NHE-2, NHE-4, and NHE-5 with deeper wells of similar construction will likely be necessary to achieve the required hydraulic containment of the contaminated groundwater plume. Alternatively, the

existing wells could remain active in their present configuration, and a new well with deeper screened intervals could be constructed adjacent to each existing well. During pre-design data acquisition (described in Section 4) and design (described in Section 5), existing data and data gathered as part of this SOW will be used to verify the need for and determine the optimal location, depth, and pumping rate of these three wells.

Wellhead Chromium Treatment at Well NHE-2

The ROD states that wellhead treatment of chromium is required at existing extraction well NHE-2. The ROD also states that ferrous iron reduction with microfiltration is the preferred technology for a wellhead treatment system. Alternatively, an anion-exchange-based treatment process could be installed, if results expected from the pilot tests conducted at the Glendale treatment system in 2010 demonstrate that the process is effective, does not produce excessive NDMA or other problematic constituents, and is otherwise acceptable to the CDPH.

During pre-design data acquisition (described in Section 4) and design (described in Section 5), existing data and data gathered as part of this SOW will be used to confirm the final design for the NHE-2 wellhead treatment system, and determine if any modifications are required.

Honeywell has been developing an approach to treatment and disposal of water extracted from NHOU well NHE-2 pursuant to a Cleanup and Abatement Order issued by the Regional Water Quality Control Board, Los Angeles Region (“Proposed NHE-2 Treatment and Disposal Approach”). Honeywell intends to separately submit a design of the Proposed NHE-2 Treatment and Disposal Approach to EPA for its evaluation as an alternative to the NHE-2 treatment and disposal approach selected by EPA in the ROD.¹

Wellhead 1,4-Dioxane Treatment at Extraction Well NHE-2

The ROD states that wellhead treatment for 1,4-dioxane is required at extraction well NHE-2. The preferred treatment technology is ultraviolet light and hydrogen-peroxide advanced oxidation process; however, the ROD states that during design, another treatment option may be recommended. During pre-design data acquisition (described in Section 4) and design (described in Section 5), existing data and data gathered as part of this SOW will be used to confirm the final design for the NHE-2 wellhead treatment system, and determine if any modifications are required.

Construct New Extraction Wells

The ROD states that new extraction wells are necessary to further limit contaminant migration and to improve contaminant mass removal. Based on groundwater modeling conducted as part of the FFS, three new wells should be located northwest of the existing NHOU treatment system in locations selected to prevent VOC and chromium migration towards the Rinaldi-Toluca well field and the western portion of the North Hollywood well field. A plan for optimizing the pumping rates of the new

¹Irrespective of the final treatment and disposal approach selected for well NHE-2, this Section of the SOW – specifically the requirements under the headings *Replace Existing Extraction Well NHE-1*; *Replace or Repair and Modify Existing Extraction Wells NHE-2, NHE-4, and NHE-5*; and *Construct New Extraction Well* – requires Respondents to design well NHE-2 in order to achieve (along with the rest of the NHOU extractions well network) the hydraulic containment of the groundwater plume required by the ROD.

NHOU extraction well system shall be developed as part of the design. During pre-design data acquisition (described in Section 4) and design (described in Section 5), existing data and data gathered as part of this SOW will be used to verify the need for and determine the optimal location, depth, and pumping rate of these three wells.

Treatment of VOCs in Extracted Groundwater

The ROD states that expansion of VOC treatment capacity at the NHOU is necessary to treat the volume of groundwater produced by the existing NHOU extraction wells and the proposed additional extraction wells. The ROD states that the existing air stripper shall be refurbished and a second air stripper, similar in capacity to the original, shall be installed and operated in parallel with the existing system. During pre-design data acquisition (described in Section 4) and design (described in Section 5), existing data and data gathered as part of this SOW will be used to verify the need for and determine the degree of VOC treatment capacity expansion necessary. This design may be amended pending consultation with CDPH (see below “Delivery of Treated Groundwater to LADWP”).

Ex Situ Chromium Treatment for Wells NHE-1, NEW-2, and NEW-3

The ROD requires that *Ex situ* treatment of chromium (including hexavalent chromium) shall be implemented for the combined flow from at least three extraction wells at the NHOU groundwater treatment facility. During pre-design data acquisition (described in Section 4) and design (described in Section 5), existing data and data gathered as part of this SOW will be used to verify the need for and determine the degree of *Ex situ* treatment of chromium necessary.

Delivery of Treated Groundwater to LADWP

The treated groundwater will be delivered to LADWP for use in its municipal supply system. LADWP, as the water utility, will separately have to prepare, submit, and comply with, the CDPH’s *Policy Guidance for Direct Domestic Use of Extremely Impaired Sources*, CDPH Policy Memorandum 97-005 (“CDPH 97-005”). CDPH 97-005 establishes a specific process for the evaluation of, and selection of treatment systems for, impaired water sources before they can be approved for use as drinking water. Respondents shall provide all necessary information and draft submittals, as necessary, to the LADWP in support of this process. To the extent that the CDPH 97-005 requirements are known, they will be considered during implementation of the Work. Data collection necessary to begin the 97-005 process will be conducted by Respondents as necessary to perform the RD. The preparation of the 97-005 permit application is not included in this SOW. Unless otherwise directed by EPA, the remediation system will be designed to meet the standards that were in effect at the time of the ROD.

1.3.3 Guidance and Reference Material

The Respondents shall comply with all guidance issued by EPA for conducting RD and the activities described herein, to the extent deemed appropriate by EPA. A list of primary guidance and reference material is attached (Attachment 3). In all cases, the Respondents shall use the most recently issued guidance, as appropriate.

In addition, Respondents shall implement EPA’s *Greener Cleanups Policy - EPA REGION 9*, issued September 14, 2009. EPA Headquarters is also finalizing

additional guidance on its “Superfund Green Remediation Strategy”, which shall be consulted and followed to the extent practicable, and subject to EPA direction.

1.3.4 Communication

The primary EPA contact for activities to be conducted pursuant to this Statement of Work is the EPA Project Coordinator, Kelly Manheimer, (415) 972-3290, manheimer.kelly@epa.gov.

The alternate contact is Fred Schaffler, Chief of California Site Cleanup Section I, (415) 972-3174, schaffler.frederick@epa.gov.

The LADWP contact is Robert McKinney, 213-367-0921, Robert.McKinney@WATER.LADWP.com

The California Department of Toxic Substances Control (“DTSC”) contact is Poonam Acharya, (818) 717-6558, pacharya@dtsc.ca.gov

The CDPH contact is Jeff O’Keefe, (818) 551-2044, jokeefe@cdph.ca.gov.

1.3.5 EPA Oversight

EPA will provide oversight of the Respondents' activities throughout the RD and performance of the Work. EPA will review deliverables to ensure that the RD and all Work correctly identifies and achieves the ROD Performance Standards and other requirements of the ROD, the Consent Decree, and this SOW. Notwithstanding any action by EPA, Respondents remain fully responsible for achieving the Performance Standards and other provisions and requirements of the ROD, the AOC and this SOW. Nothing in the AOC, this SOW, EPA's approval of the RD or any other submission, shall be deemed to constitute a warranty or representation of any kind by EPA that full performance of the RD will achieve the ROD Performance Standards. Respondents' compliance with submissions approved by EPA does not foreclose EPA from seeking additional work to achieve the applicable Performance Standards.

1.3.6 Timeframes, Deliverables Review

The timeframes and deadlines for the submission of each deliverable are listed in Attachment 2. The “EPA Estimated Review Period” specified in Attachment 2 is set by EPA as a goal. EPA will strive to achieve this goal to keep the project on schedule. However, if EPA is unable to meet one or more of these review periods, and deliverables from the Respondents are affected by EPA’s delay, EPA in its discretion will modify the deadlines for those deliverables to reflect such delay.

All deliverables will be submitted for review in accordance with Section IX of the AOC and will either be approved or disapproved by EPA. If EPA disapproves the deliverable and requests modifications, the Respondents shall revise the deliverable and resubmit it to EPA, as provided in Section IX of the AOC. After Respondents’ receipt of EPA comments on any draft document, if any, Respondents shall submit for EPA review and approval a final document within 15 days of receipt of such comments, or other due date as specified in EPA’s comment letter. The Respondents shall submit the major deliverables using a form approved by EPA.

2.0 Project Planning and Support

The purpose of this task is to determine how the site-specific Performance Standards will be satisfied. The following activities shall be performed as part of the project planning and support task:

2.1 Personnel

As required in Section VII of the AOC, Respondents shall notify EPA as noted in Attachment 2 of this SOW of the name, title, and qualifications of the Supervising Contractor that Respondents will retain to perform the Work. Respondents shall also provide EPA with a copy of the Supervising Contractor's Quality Management Plan ("QMP").

Respondents shall demonstrate that the proposed contractor has a quality assurance system that complies with ANSI/ASQC E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs" (American National Standard, January 5, 1995), by submitting a copy of the proposed contractor's QMP. The QMP should be prepared in accordance with "EPA Requirements for Quality Management Plans (QA/R-2)" (EPA/240/B-01/002, March 2001, reissued May 2006) or equivalent documentation as determined by EPA.

In addition, Respondents shall identify an individual who shall be responsible for ensuring that each phase of the project is reviewed to identify the most sustainable path that is appropriate for the project. Best sustainable practices shall be reviewed for appropriate inclusion, including Leadership in Energy and Environmental Design ("LEED"), LCA, etc. To the extent practicable, all carbon emissions shall be offset, so that the entire project is carbon neutral, or negative, preferably with internally generated credits.

2.2 Develop Site-Specific Plans

The Respondents shall obtain and evaluate existing data and documents pertinent to the implementation of the ROD. This information shall be used to determine pre-design data acquisition activities necessary to support RD implementation.

The Respondents shall prepare and submit for EPA approval the site-specific plans specified in this SOW, in accordance with the approved RD Work Plan (described in Section 5.1 of this SOW). The following describes the site-specific plans that are required.

2.2.1 Health and Safety Plan/Contingency Plan

A site-specific Health and Safety Plan ("HASP") must specify how workers will be protected during any site activities through the identification, evaluation, and control of health and safety hazards. The HASP shall be in conformance with U.S. Occupational Safety and Health Administration requirements in Title 29 of the Code of Federal Regulations ("CFR") (sections 1910 and 1926), and any other applicable requirement(s). The contingency plan portion of the HASP shall specify the actions to be taken to protect the local community in the event of an accident or emergency. EPA will review, but will neither approve nor disapprove, the HASP. Each of Respondents' employees, and contractors, etc., is responsible for ensuring that its workers follow applicable federal and State worker health and safety regulations. Contingency plans shall be posted at a visible location during all field work.

2.2.2 Sampling and Analysis Plan

The Sampling and Analysis Plan ("SAP") shall address sampling and analysis activities associated with the groundwater monitoring activities described in Section 2.2.3 and any additional field activities that the Respondents determine, and EPA approves, are required to implement the Work. The SAP shall include a Quality Assurance Project Plan ("QAPP"), a Field Sampling Plan ("FSP"), and a schedule for implementation of sampling, analysis, and reporting activities. Upon EPA approval of the SAP, the Respondents shall proceed to implement the sampling activities described in the SAP.

- Quality Assurance Project Plan. The QAPP must be prepared in accordance with the *EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations*, and with the *EPA Guidance on Systematic Planning Using the Data Quality Objectives Process* and other applicable guidance (see Attachment 3). The QAPP shall describe project objectives, organizational and functional activities, data quality objectives (“DQOs”), and quality assurance and quality control (“QA/QC”) protocols that shall be used to achieve the desired DQOs. The DQOs shall, at a minimum, reflect use of analytical methods for obtaining data of sufficient quality to meet National Contingency Plan requirements as identified at 40 CFR 300.435(b). In addition, the QAPP shall address personnel qualifications, sampling procedures, sample custody, analytical procedures, document control procedures, preservation of records (see AOC Section XIII), data reduction, data validation, data management, procedures that will be used to enter, store, correct, manipulate, and analyze data. It shall also include protocols for transferring data to EPA in electronic format, and document management. The QAPP shall provide sufficient detail to demonstrate that:
 - The project technical and data quality objectives are identified;
 - The measurements or data acquisition methods are appropriate for achieving project objectives;
 - Assessment procedures are sufficient for confirming that data of the type and quality needed and expected are obtained; and,
 - Any limitations on the use of the data are identified and documented.

All analytical data, whether or not validated, shall be submitted to the EPA within 60 calendar days of sample shipment to the laboratory, or 14 days of receipt of analytical results from the laboratory, whichever occurs first. All analytical data shall be validated and submitted to EPA in an approved electronic format within 90 calendar days of the sample shipment to the laboratory. Well construction information shall be submitted to EPA at the completion of the initial sampling activities, or within 90 days after completion of a well, whichever is earlier.

- Field Sampling Plan. The FSP must be in accordance with the regional guidance document *EPA Region IX Sampling and Analysis Plan Guidance and Template* (R9QA/002.1, April, 2000); and other applicable guidance (see Attachment 3). The FSP shall describe sampling objectives, analytical parameters, analytical methods, sampling locations and frequencies, analytical holding times, sampling procedures and equipment, sample preservation, sample packing, QA/QC samples, sample paperwork and chain-of-custody procedures, sample handling and shipping, management of investigation-derived wastes, and planned uses of the data. The FSP must define the sampling and data collection methods that will be used for a project. The FSP shall be written so that a field sampling team unfamiliar with the project would be able to gather the samples and field information required. The FSP shall include a schedule that describes activities that must be completed in advance of sampling, including acquisition of property, access agreements, and arrangements for disposal of investigation-derived waste.

2.2.3 Groundwater Monitoring Plan

Respondents shall submit a Groundwater Monitoring Plan in accordance with the schedule identified in Attachment 2. The groundwater monitoring shall be implemented upon EPA approval of the Groundwater Monitoring Plan.

The Groundwater Monitoring Plan shall be amended as necessary over the life of the activities conducted pursuant to this SOW and the AOC. Considering this:

- Respondents will prepare an initial Groundwater Monitoring Plan coincident with development of the RD Work Plan to describe the identification of existing monitoring wells, LADWP production wells, and extraction wells in the North Hollywood area to be sampled by the Respondents during a coordinated effort with EPA for the purposes of providing a comprehensive set of groundwater level and groundwater quality data on the onset of the 2nd Interim Remedy Design (referred to hereafter as “Baseline Groundwater Monitoring”).
- The Groundwater Monitoring Plan will be updated during the design to describe the rationale for the location and depth, and procedures for the installation of additional monitoring wells, if additional monitoring wells are necessary to fill critical data gaps to support the design.
- The Groundwater Monitoring Plan shall be updated during the Final Design to describe existing and proposed monitoring wells, the frequency of sampling, and the analytical parameters necessary for semi-annual monitoring to evaluate the location and movement of groundwater contamination throughout the NHOU and evaluate performance of the interim remedy.

The Groundwater Monitoring Plan shall address the following requirements:

- **Data Collection Parameters:** specify the locations of monitoring wells, and a sampling and monitoring frequency. It is expected that, initially, selected groundwater monitoring wells will be sampled semi-annually, with the majority being sampled annually.
- Identify monitoring wells, sentinel wells, and compliance wells.
- **Contingency Action:** the Groundwater Monitoring Plan shall propose contingency plans to be used in the event that sampling results in the sentinel wells located on the edges of the plume indicate unexpected increases in COC concentrations. Contingency actions may include increases in monitoring frequency, installation of additional groundwater monitoring wells in the impacted areas, and/or adjustment of groundwater extraction locations or rates.
- **Data Analysis and Reporting:** The Groundwater Monitoring Plan shall also describe how the performance data will be analyzed, interpreted, and reported to evaluate compliance with ARARs and the Performance Standards. All data shall be submitted by the deadlines approved in the SAP. Claims of change, difference, or trend in water quality or other parameters (e.g., between observed values and an ARAR or Performance Standard) shall include the use of appropriate statistical concepts and tests.

To the extent practicable, any Respondent that is currently conducting source control work at a facility in the NHOU under RWQCB or DTSC order, or otherwise, shall work with the appropriate oversight agency to coordinate times for groundwater

quality and water level sampling to coincide with the area-wide events described herein.

2.2.4 Remedial Design Quality Assurance Project Plan

A RD QAPP shall be submitted to EPA for review and approval. This plan shall describe the quality control activities that Respondents will implement to ensure that the RD is conducted in an effective and compliant manner.

2.3 Project Status Reports and Meetings

2.3.1 Weekly Project Status Update

The Respondents shall prepare and submit weekly electronic Project Status Updates to EPA and DTSC that briefly document the progress and current status of each task required by this SOW and approved RD Work Plan. Each update should consist of a simple tracking form for the tasks, a narrative of problems arising, and description of steps planned or underway to mitigate them. In addition, weekly teleconferences may be scheduled to review the progress during particularly active times, at the discretion of the EPA Project Coordinator. These meetings may be held in person, at the discretion of the EPA Project Coordinator.

2.3.2 Monthly Progress Report

In addition, the Respondents shall prepare and submit written Monthly Progress Reports that:

- a) describe the actions which have been taken toward achieving compliance with the requirements of this SOW and the AOC during the previous month;
- b) include a summary of all results of sampling and tests and all other data received or generated by Respondents in the previous month;
- c) identify all plans, reports, and other deliverables required by this SOW and AOC completed and submitted during the previous month;
- d) describe all actions, including, but not limited to, data collection and implementation of work plans, which are scheduled for the next six (6) weeks and provide other information relating to the progress of the design, activities, including, but not limited to, critical path diagrams, Gantt charts and Pert charts;
- e) include information regarding percentage of completion, unresolved delays encountered or anticipated that may affect the future schedule for implementation of the work, and a description of efforts made to mitigate those delays or anticipated delays; and,
- f) include any modifications to the work plans or other schedules that Respondents have proposed to EPA or that have been approved by EPA.

If requested by EPA, Respondents shall also provide briefings for EPA to discuss the progress of the Work.

2.3.3 Progress Meetings

The Respondents shall consult with EPA during the design process, and shall discuss and obtain approval for critical decisions in meetings and conversations with EPA. Following such meetings and conversations, Respondents shall prepare and submit for EPA approval, draft meeting summary notes within five (5) days of the discussion. Respondents shall document all decisions made and rationale for those

decisions. Meeting notes shall include appropriate layout and design drawings or figures used in the meetings. The meeting summary deliverable shall be factual and shall present any technical disputes in an unbiased manner.

2.3.4 Annual Performance Evaluation Report

At the end of each fiscal year (September 30), Respondents shall provide an Annual Performance Evaluation Report. The format and exact content of the updates and reports shall be determined in the RD Work Plan. The Annual Performance Evaluation Reports shall include but not be limited to a review of how the system is working and any recommended changes or modifications to the system, as well as any projected operational timelines.

3.0 Community Involvement Support

The Respondents shall provide community involvement support to EPA throughout the performance of the Work under this AOC consistent with Paragraph 43 of the AOC and in accordance with the *Superfund Community Involvement Handbook*, April 2005. Community involvement support may include the following subtasks:

Fact Sheet Preparation Assistance: The Respondents shall, at EPA's request, assist with the preparation of fact sheets that inform the public about activities related to the remedial design, the schedule for RA, activities to be expected during construction, provisions for responding to emergency releases and spills, and any potential inconveniences such as excess traffic and noise that could affect the community during the RD or RA.

Technical Support: The Respondents shall, at EPA's request, provide technical support for community involvement, which may include providing technical input to news releases, fact sheets, briefing materials, and other community involvement vehicles.

Public Meeting Support: The Respondents shall, at EPA's request, prepare presentation materials and provide logistical support for public meetings and open houses.

Public Notice: The Respondents shall, at EPA's request or as otherwise needed, provide individual notice to residents in the vicinity of areas where work will be performed by the Respondents.

Reporting: The Respondents shall, at the request of EPA, provide verbal status reports concerning the work performed by the Respondents.

Report Copies: The Respondents shall, at the request of EPA, provide extra copies for the public of final deliverables or other documents produced pursuant to this SOW.

4.0 Pre-Design Data Acquisition

Pre-design data acquisition involves environmental sampling, sample analysis, and data evaluation in support of the RD. The planning for this task, including the scheduling, shall be accomplished in accordance with Section 2.2.2 (SAP) and Section 2.2.3 (Groundwater Monitoring Plan) of this SOW, and shall result in the plans and timeframes required to collect the field data. Sample acquisition starts with EPA approval of the SAP and continues on a routine frequency (as defined in the SAP and Groundwater Monitoring Plan) until the Work performed under the AOC is completed.

4.1 Sample Acquisition

The Respondents shall perform the following field activities or combination of activities for sample acquisition in accordance with the EPA-approved SAP:

4.1.1 Mobilization and Demobilization

Provide the necessary personnel, equipment, and materials for mobilization and demobilization to and from the NHOU for the purpose of conducting the sampling program approved in the SAP. Coordinate with and allow EPA to conduct split sampling whenever requested by EPA.

4.1.2 Field Investigation

Conduct environmental sampling / field investigations as described in the EPA-approved SAP.

4.1.3 Sample Analysis

The Respondents shall arrange for and carry out the analysis of environmental samples, collected during the previous task, according to the SAP approved by EPA. The sample analysis task begins with arranging the sample analysis work with a qualified laboratory and after completion of the field sampling program. This task ends with the Respondents verifying that the laboratory has completed the requested analyses and has submitted sample data packages for full third party validation (Region 9 Tier 3) per the frequency defined in the approved monitoring specific QAPP. Normally this would be 20% for routine monitoring.

The Respondents shall demonstrate in advance and to EPA's satisfaction that each laboratory used is qualified to conduct the proposed work and satisfies the requirements specified in Section VII of the AOC. EPA may require that the Respondents submit detailed information to demonstrate that the laboratory is qualified to conduct the work, including information on personnel qualifications, equipment and material specification, and laboratory analyses of performance samples (blank and/or spike samples). In addition, EPA may require submittal of data packages equivalent to those generated by the EPA Contract Laboratory Program. Electronic data deliverables shall be submitted to EPA.

4.2 Analytical Support and Data Validation

The Respondents shall arrange for and carry out third party data validation of the analytical data received from the laboratory during the previous task, according to the approved SAP. For purposes of this SOW, "third party" is defined as any party other than the entity managing or performing the monitoring activities. The data validation task begins with the Respondents transmitting all sample data packages received from the laboratory to the third party for validation in accordance with USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, and USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review. This task ends with the Respondents providing EPA with data validation reports for the analytical data received from the laboratory.

4.3 Data Evaluation

The Respondents shall organize and evaluate both pre-existing data and data gathered as part of this SOW; such data will be used later in the RD effort. This work shall be performed in accordance with the EPA-approved SAP. The EPA Guidance for Data Quality Assessment, Practical Methods for Data Analysis should also be consulted for this operation.

Specifically, the Respondents shall perform the following activities or combination of activities during the data evaluation effort:

- Baseline Groundwater Monitoring Report

- Building Conditions Assessment Report
- Pre-Design Groundwater Modeling Report
- Treatment Options Evaluation Report

These submittals are described below.

4.3.1 Baseline Groundwater Monitoring Report

A report describing and evaluating the data collected in the initial groundwater sampling event described in Section 2.2.3 of this SOW shall be submitted.

4.3.2 Building Conditions Assessment Report

Pertinent information about the NHOU will be collected and regulatory requirements will be researched to identify and evaluate factors affecting the design. A site visit to the NHOU Central Treatment Facility will be conducted and a Building Conditions Assessment Report prepared.

4.3.3 Pre-Design Groundwater Modeling

Approximately 37 new monitoring wells are required to be installed as part of the interim remedy selected in the ROD. In 2009, Honeywell installed 26 new groundwater monitoring wells throughout the NHOU under oversight by EPA. Information obtained from the installation of these wells is presented in the “Draft NHOU Groundwater Characterization Report, North Hollywood Operable Unit,” dated April 7, 2010. This report currently is being revised to reflect the results of five additional monitoring wells installed during the summer of 2010. The additional data obtained through the installation of these groundwater monitoring wells across the NHOU has provided a more refined understanding of the contaminant plumes, their potential risk to nearby production wellfields, and the possible sources of the contaminants of concern. Consideration of the new data obtained from the 31 new groundwater monitoring wells will be essential to the development of the RD. The new data will be used to refine the planned treatment options.

A Pre-Design Groundwater Modeling Memorandum will incorporate results from the following activities:

- Refining EPA’s SFBFS-B groundwater flow model consistent with the updated hydrogeologic conceptual model. This is expected to consist of subdividing and refining the model layers, particularly in Depth Regions 1 and 2, to improve the model’s accuracy with regard to plume containment by existing and proposed extraction wells. Additional modifications may address variations in the distribution of aquifer properties. The modified model may require recalibration and subsequent validation and sensitivity analysis.
- Refining proposed extraction well locations, depths, and pumping rates using the updated model. These refinements will be made to maximize contaminant removal while minimizing plume spreading.

4.3.4 Treatment Options Memorandum

After completion of the pre-design groundwater modeling, groundwater treatment options will be evaluated considering the target zones, pumping well locations, depths, flow rates, and influent concentrations estimated during the modeling effort. To achieve the RAOs involving containment of high concentration areas of the plume to ensure no further degradation of the groundwater quality occurs in the vicinity of

the production wellfields, potential groundwater extraction and treatment scenarios will need to consider:

- Extraction well locations, depths, and pumping rates;
- The efficiency and cost-effectiveness of separate treatment areas that target distinct plumes (if confirmed during the Baseline Groundwater Monitoring);
- The use of wellhead treatment versus centralized treatment; and,
- The need for additional groundwater investigation to assess the risk contaminants pose to wellfields.

This will be a collaborative process that includes consultation with USEPA, LADWP, CDPH, RWQCB, and the Upper Los Angeles River Area (“ULARA”) Watermaster.

4.3.5 Data Usability Evaluation and Field QA/QC

Each submittal will:

- State the criteria used to review and validate data, in an objective and consistent manner.
- Describe how the results obtained from the project or tasks were reconciled with the requirements defined by the data user or decision maker.
- Outline the methods used to analyze the data and determine possible anomalies or departures from assumptions established in the planning phase of data collection.
- Describe the methods used for field QA/QC.

4.3.6 Data Reduction, Tabulation, and Evaluation

Each submittal will:

- Tabulate, evaluate, and interpret the data;
- Present data in an appropriate format for final data tables;
- Design and set up an appropriate database for pertinent information collected that will be used during the performance of the Work;
- Submit electronic database in a format compatible with EPA’s existing database (to enable efficient import into that system); and,
- Submit processed data tables to EPA.

4.3.7 Development of Reports

Respondents shall evaluate and present results in a report, which shall be submitted to EPA for review and approval, within 90 days of the completion of each activity or as specified in Attachment 2. Sufficient information must be provided in this report to enable EPA to assess the adequacy of the work performed.

5.0 Remedial Design

Remedial Design activities shall include the preparation of clear and comprehensive design documents, construction plans and specifications, and other design activities needed to implement the Work and satisfy all Performance Standards set forth in the ROD. All plans

and specifications shall be developed in accordance with relevant portions of the EPA Remedial Design/Remedial Action Handbook, and in accordance with the schedule set forth in the approved RD Work Plan.

5.1 Develop RD Work Plan

The Respondents shall submit a draft RD work plan, in accordance with the schedule in Attachment 2. The deliverables and schedule approved by EPA in the final RD Work Plan shall become requirements of this SOW and the AOC.

Design/Construction Approach:

Respondents shall indicate if they are interested in pursuing a conventional design/bid/build strategy, or the design/ build approach to design and construction. The conventional design/bid/build approach is one in which the design is taken to the 100 percent completion level to allow contractor bidding of the construction work. The design/build approach is one in which the design is developed to about the 60 percent completion level followed by subsequent field engineering during construction. EPA will indicate preliminary approval of the approach as part of RD Work Plan approval. The final decision will be made with the approval of the Preliminary Design.

The RD Work Plan shall include the following information:

- **Project Description:** A statement of the problem and any potential problems posed by the Site and how the objectives of the RD will address these problems. A discussion of the proposed extraction and treatment options to be evaluated and the approach in evaluating the options.
- **Background:** A background summary setting forth:
 - A brief description of the NHOU including any geographic, physiographic, hydrologic, geologic, demographic, ecological, cultural, or natural resource features that are relevant to the RD.
 - A brief synopsis of the history of the area including a summary of past disposal practices and a description of previous responses that have been conducted by local, state, federal, or private parties at the NHOU.
 - A summary of the existing data including physical and chemical characteristics of the contaminants identified and their distribution among the environmental media at the NHOU.
- **Scope of Work:** A discussion of the detailed scope of work to be performed during the RD.
- **RD Team Organization and Coordination:** A discussion and organizational charts for the Respondents' organization, the RD project organization, coordination and communications procedures, and a discussion of the roles and responsibilities of the RD team. The Respondents shall identify any subcontractors it plans to use to accomplish all or part of any task identified.
- **RD Project Schedule:** The schedule shall include, but not be limited to, all design deliverables listed in Attachment 2 of this SOW.
- **Permits, Access and Third Party Agreement(s):** Any and all permits, property leases, and/or easements required for implementation of the RD, as well as a discussion of the substantive permit requirements, schedule of permit applications, property acquisitions, and third party agreements. This shall include planning for the CDPH 97-005 process, as

referenced above in Section 1.3.2 of this SOW.

- Site Management: a description of how access, security, management responsibilities, decontamination, and waste disposal are to be handled during RD.
- Sustainability Approach: a thorough description of the process or plans to be implemented by the Respondents to ensure that the entire project is managed in the most sustainable manner possible.
- Data Gap Analysis: an evaluation of existing data and determination of data gaps necessary to be filled prior to design. This will include evaluation of the remaining FFS monitoring wells (those identified in the FFS, not already installed by Honeywell), to determine which are required for design.
- Description of Deliverables: The RD Work Plan shall include plans for the completion of all the deliverables identified below. In addition, the RD Work Plan shall present the technical and management approach to each task to be performed, including: a detailed description of each task; the assumptions used; the identification of any technical uncertainties (with a proposal for the resolution of those uncertainties); the information needed for each task; any information to be produced during and at the conclusion of each task; and a description of the deliverables that will be submitted to EPA. These deliverables include:
 1. Health and Safety Plan/Contingency Plan (“HASP”);
 2. Sampling and Analysis Plan (“SAP”);
 3. Groundwater Monitoring Plan;
 4. Remedial Design Quality Assurance Project Plan (“RD QAPP”);
 5. Monthly Progress Reports;
 6. Data Evaluation Report (if additional data is needed prior to, or during, design – see section 4.5);
 7. Preliminary Design Report (30%);
 8. Pre-Achievement O&M Plan;
 9. Intermediate design report (60%); and,
 10. Prefinal/final design report (if applicable).

The Respondents shall also identify any additional deliverables believed necessary, and include a schedule for the submission of these deliverables.

Hydraulic modeling has been performed on many occasions during the Site history, and most recently for EPA’s *Focused Feasibility Study*. The Respondents shall submit to EPA any proposed changes in modeling assumptions, and discuss their effect on recommended extraction rates and well locations. The RD Work Plan shall describe the model calibration approach and assumptions. All models must be calibrated and approved by EPA prior to use. When establishing extraction capture zones, the Respondents shall follow the guidelines described in the EPA guidance document: *A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems*.

5.2 Approval of the RD Work Plan

The draft RD Work Plan will be submitted for review in accordance with Sections VIII and IX of the AOC. Respondents shall submit a final RD Work Plan within 30 days of receipt of

any EPA comments on the draft RD Work Plan. Upon approval of the final RD Work Plan by EPA, Respondents shall implement the RD.

5.3 Preliminary Design

The Respondents shall conduct Preliminary Design activities in accordance with the RD Work Plan and Attachment 2 of this SOW. The components that constitute the Preliminary Design are described below and shall be submitted to EPA for review and approval in accordance with Sections VI and X of the AOC, unless otherwise provided herein. Preliminary Design begins with the initial design and ends with the completion of approximately 30 percent of the design effort. The Respondents shall include the following components in the Preliminary Design:

5.3.1 Design/Construction Approach

If EPA preliminarily approved the design/build approach with the approval of the RD Work Plan, Respondents shall include a final request to perform design/build for any or all of the design and construction with the Preliminary Design. The Preliminary Design will then outline the approach to contracting and quality control in a more thorough manner.

5.3.2 Preliminary Design Report

A Preliminary Design Report will be prepared that includes the design criteria, delivery plan and schedule, construction schedule, specifications outline, preliminary drawings and specifications, the basis of design, easement and access requirements, and value engineering, as described below. The Pre-Design Groundwater Modeling and Treatment Options Memorandum will be appended to the Preliminary Design Report.

5.3.3 Design Criteria

The Design Criteria shall define in detail the technical parameters upon which the design will be based. Specifically, the Design Criteria shall include the preliminary design assumptions and parameters, including, as appropriate:

- Waste characterization;
- Volume and types of each medium requiring treatment;
- Assumed treatment plant influent quality over the design life of the treatment system(s), with a description of the methodology used to develop the estimate (including discussion of the likelihood and magnitude of short-term and long-term changes in influent concentrations);
- Treatment schemes (including all media and byproducts), rates, and required qualities of waste streams (i.e., input and output rates, influent and effluent qualities, potential air emissions, etc.);
- Filtration, disinfection, corrosion control, or other treatment requirements in addition to removal of site contaminants;
- Delivery locations, rates, and pressures for the treated groundwater, and other conveyance system assumptions for supplying treated groundwater;
- Description of how the design will achieve Performance Standards;
- Long-term operation and maintenance (“O&M”) and performance monitoring requirements;

- An LCA evaluation for all components of the system and a method for minimizing or offsetting impacts, including all carbon emissions;
- Preliminary demonstration of plume capture, consistent with EPA’s guidance: *A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems*;
- All ARARs, pertinent codes, and standards to be complied with; and,
- Technical factors of importance to the design and construction including use of currently accepted environmental control measures, constructability of the design, end-use of land, and use of currently acceptable construction practices and techniques.

5.3.4 Preliminary Delivery Plan and Schedule

The Delivery Plan and Schedule shall describe how the Remedial Action is to be delivered, how contracting shall be done, the contracting strategy (conventional 100 percent design-bid-build versus design-build), the organizational structure, communication strategy, etc. The schedule shall include an evaluation of a phased approach to expedite the Remedial Action. The contracting strategy shall be carefully described.

For a conventional design-bid-build approach, all four phases of design including Preliminary Design (approximately 30 percent design completion), Intermediate Design (approximate 60 percent completion), Prefinal Design (approximately 90 percent completion) and Final Design (100 percent completion) shall be required to facilitate bidding of the construction work and commencement of the construction work itself. In addition, as-built drawings shall be required at the end of construction.

5.3.5 Preliminary Construction Schedule

A preliminary Remedial Action schedule appropriate to the size and complexity of the project shall be included in the Preliminary Design.

5.3.6 Specifications Outline

The general specifications outline shall include all specification sections to be used. The format and organization shall be consistent with the Construction Specification Institute (“CSI”) format.

5.3.7 Preliminary Drawings and Specifications

The drawings and schematics shall reflect organization and clarity. This submittal shall include the following:

- An outline or listing of the drawings and schematics;
- Facility representations including a process flow diagram and a preliminary piping and instrumentation diagram;
- A general arrangement diagram; and,
- Site drawings, consisting of engineering drawings submitted in 11-inch x 17-inch sheets (or larger with approval from the EPA Project Coordinator).

5.3.8 Basis of Design

The Basis of Design shall include a detailed description of the evaluations conducted to select the design approach. It shall include a Summary and Detailed Justification of Assumptions, which shall include:

- Calculations supporting the assumptions;
- Detailed evaluation of how all ARARs will be met;
- Model input files (to the extent that the design is based upon modeled results);
- A plan for minimizing environmental and public impacts; and,
- A plan for satisfying any permitting requirements, including a status update of the progress of the CDPH 97-005 process.

5.3.9 Easement and Access Requirements

The potential need for land acquisition for access, or any other access or easement issues or requirements shall be identified.

5.3.10 Value Engineering Screening (Optional)

The Respondents may choose to perform Value Engineering (“VE”) screening that shall include an evaluation of cost and function relationships, concentrating on high-cost areas. The VE screening shall be performed by an independent Value Engineering group. An “Independent Value Engineering group” is defined as any qualified party other than the individuals that performed the design. However, as necessary, selected individuals from the design team may also participate in the VE screening. The outcome of the screening shall be a recommendation for or against a full-scale VE study based on the potential for cost savings as a result of design changes. VE screening can be performed at the discretion of the Respondents. However, any decisions made as a result of any VE effort that could impact the design of the interim remedy shall be submitted to EPA for approval.

5.4 Intermediate Design

The Respondents shall conduct Intermediate Design activities in accordance with the RD Work Plan and the requirements identified below. Intermediate Design activities shall include the preparation of clear and comprehensive design documents, construction plans and specifications, and other design activities needed to implement the work and satisfy all Performance Standards set forth in the ROD. All plans and specifications shall be developed in accordance with relevant portions of the EPA Remedial Design/Remedial Action Handbook, and in accordance with the schedule set forth in the approved RD Work Plan, and Attachment 2 of this SOW.

The components that constitute the Intermediate Design are described below and shall be submitted to EPA for review and approval in accordance with Sections VIII and IX of the AOC and Attachment 2 to this SOW. Intermediate Design begins with completion of the Preliminary Design and ends with the completion of approximately 60 percent of the design effort. The level of the Intermediate Design may vary, depending on whether the Respondents propose and EPA approves, to complete the project on a design/bid/build or design/build basis. The Intermediate Design shall address all prior EPA comments on the Preliminary Design, or provide a memorandum explaining why specific comments were not incorporated or addressed.

The Respondents shall include in the Intermediate Design, at a minimum, the following components:

5.4.1 Update of Construction Schedule

The schedule for implementation of the Remedial Action shall identify the timing for initiation and completion of all major construction activities. The schedule shall specifically identify duration for completion of the project and major milestones.

5.4.2 Intermediate Specifications

Plans and specifications shall conform to acceptable standards and shall be formatted in accordance with CSI requirements. Plans and specifications shall include preliminary specifications for construction, installation, site preparation, and fieldwork associated with the remediation system implementation.

5.4.3 Intermediate Drawings

Intermediate Drawings shall include an outline or listing of all of the drawings anticipated to be required for the remediation system construction. The Intermediate Drawings package shall include facility representations containing a process flow diagram, a piping and instrumentation diagram with a control logic table, and continuations and expansions of drawings submitted with the preliminary plans and specifications. The Intermediate Drawings shall also include engineering drawings for grading/paving, foundation, extraction wells and wellheads, piping, electrical, structural, mechanical, instrumentation, and monitoring systems, as appropriate.

5.4.4 Revised Basis of Design

The revised Basis of Design shall include a revised summary of the evaluations conducted to select the design approach. This summary shall include any additions made to the Basis of Design, as presented in the Preliminary Design.

5.4.5 Remedial Action Contracting Strategy

The contracting strategy shall describe the management approach for procuring the Remedial Action contractor, including procurement methods, phasing alternatives, and contractor and equipment availability concerns. It shall identify the specific procurement process proposed; i.e. design/build or design/bid/build.

5.4.6 Updated Identification of Easement and Access Requirements

The need for land acquisitions for access and easement requirements shall be updated, as appropriate, as part of the Intermediate Design.

5.4.7 Identification of the Projected O&M Requirements and Annual Costs

The Respondents shall identify the projected O&M requirements, including performance monitoring as initially established in the Groundwater Monitoring Plan, and develop an estimate of the annual O&M costs.

5.4.8 VE Study and Report Recommendations

If recommended by the preliminary VE screening, the VE Study shall be conducted and the report prepared and submitted by an independent Value Engineering group. However, any decisions made as a result of any VE effort that could affect the design of the interim remedy shall be submitted to EPA for approval. This task is optional, and shall be done at the discretion of the Respondents.

5.5 Prefinal and Final Design

The Respondents shall conduct Prefinal and Final Design activities in accordance with the RD Work Plan and the approved schedule.

- These design activities shall be performed if the construction approach uses a conventional design/bid/build strategy in which the design is taken to the 100 percent completion level to allow contractor bidding of the construction work. If a design/build approach is utilized in which the design is developed to about the 60 percent completion level followed by subsequent field engineering during construction, then prefinal and final design activities would not be required. In this case, the as-built drawings will serve as the final design drawings. In addition, the 60 percent design package shall be revised to fully address all EPA comments on the Preliminary and Intermediate Design submittals and re-submitted for EPA approval.

The following discussion and requirements would be applicable if the design/bid/build approach is approved, and prefinal and final design activities are performed.

5.5.1 Prefinal Design

The Prefinal Design shall fully address all comments made on the Preliminary and Intermediate design submissions, and, if not previously addressed, be accompanied by a memorandum indicating how the comments were incorporated into the Prefinal Design. The Prefinal Design submittal shall include an updated capital and O&M cost estimate, reproducible drawings and specifications, and a complete set of construction drawings in one-half-size reduction (11-inch by 17-inch size).

The components and deliverables that constitute the Prefinal and Final Design are described below and shall be submitted to EPA for review and approval in accordance with Section IX of the AOC, and Attachment 2 to this SOW. The Prefinal Design shall clearly show any modifications to the design resulting from the Intermediate Design review. EPA will review the Prefinal Design in accordance with Section IX of the AOC.

5.5.2 Final Design

Within 30 days after EPA approves the Prefinal Design, Respondents shall submit all Final Design deliverables to EPA. All Final Design documents shall be approved and stamped by a Professional Engineer registered in California. EPA approval of the Final Design, including the Final Draft Pre-Achievement O&M Plan and the Final Construction Quality Assurance Plan, is required before initiating the RA, unless specifically authorized otherwise by EPA.

The Respondents shall include the following components in the Prefinal and Final Designs:

5.5.3 Specifications

A complete set of construction specifications shall be submitted at the prefinal stage. All specifications shall conform to CSI format. If the Value Engineering study is conducted, the VE report recommendations that have been approved by EPA shall be incorporated into the Prefinal Design specifications. The specifications must be consistent with the technical requirements of all ARARs and must meet all ARARs, Performance Standards, and other provisions and requirements of the ROD, the AOC, and the SOW. Any offsite response activities shall be in compliance with Section 121(d)(3) of CERCLA, 42 U.S.C. Section 9621(d)(3), 40 C.F.R. 300.440,

and other applicable guidance. Before submitting the project specifications, the Respondents shall coordinate and cross-check the specifications and drawings.

5.5.4 Drawings

A complete set of construction drawings shall be submitted in the 11-inch x 17-inch size. Value Engineering report recommendations (submitted as part of the Intermediate Design) that have been approved by EPA shall be incorporated into the Prefinal Design drawings.

5.5.5 Basis of Design

A Basis of Design that incorporates any changes made since the Intermediate Design shall be submitted.

5.5.6 Delivery Plan and Schedule

The Delivery Plan shall incorporate any changes made since the Preliminary Delivery Plan and Schedule. The Final Design should also include the timing and duration of major construction activities and operational milestones identified in this SOW.

5.5.7 Report of VE Modifications

A Report of VE Modifications shall be submitted that describes the changes made to the final designs as a result of the VE Study and Recommendations, if conducted.

5.6 Operation and Maintenance Plan

Respondents shall submit a draft Pre-Achievement O&M Plan for EPA's review, in accordance with Attachment 2 of this SOW. Once approved by EPA, this document will be considered the Final Pre-Achievement O&M Plan.

"Pre-Achievement O&M" shall mean all operation and maintenance activities required for the Remedial Action to achieve Performance Standards, as provided under the Pre-Achievement O&M Plan approved by EPA and the SOW. Pre-Achievement O&M includes all O&M activities to be conducted until Performance Standards are met. The O&M Plan shall describe, among other things, the compliance monitoring that will be conducted to measure the performance of the system in achieving and maintaining the Performance Standards described in the ROD. At a minimum, the Pre-Achievement O&M Plan shall include the following:

5.6.1 Description of Equipment

A description of equipment including: the equipment identification numbers; identification and description of monitoring components; maintenance needs and schedules of site equipment; material requirements; anticipated equipment replacement for significant components; and a list of recommended spare parts.

5.6.2 Description of O&M

A description of routine and emergency O&M tasks, including startup and shutdown procedures, prescribed treatment or operation conditions, and schedule for each O&M task. In addition, a description of provisions for remote monitoring and control, operator training and certification requirements, staffing needs, and related requirements.

5.6.3 Description of Potential Operating Problems

A description and analysis of potential operating problems, including common and/or anticipated remedies with a description of the system monitoring implemented to track these operational problems. In addition, a useful-life analysis of significant components and replacement costs shall be included in this Pre-Achievement O&M Plan.

5.6.4 Compliance Monitoring Sampling and Analysis Plan

A description of the compliance monitoring strategy and tasks, location of the points of compliance monitoring, required data collection, and a description of required laboratory tests and their validation and interpretation. (See Section 2.2.3, Sampling and Analysis Plan and the Groundwater Monitoring Plan, for more information). It shall also include criteria for determining when the Performance Standards have been met as well as other indicators of system performance and/or maintenance (e.g., parameters to be monitored to determine timing for activated carbon replacement, etc.).

5.6.5 Waste Disposal

A description of the plans for the proper disposal of materials used and wastes generated during the O&M periods (e.g., wastewater from the treatment process including process blowoff water from the wells, spent treatment media, protective clothing, and disposable equipment). These provisions shall be consistent with the off-site disposal requirements of Superfund Amendments and Reauthorization Act, the Resource Conservation and Recovery Act, and applicable state laws. The Respondents, their authorized representative, or another party acceptable to the EPA shall be identified as the generator of wastes for the purpose of regulatory or policy compliance.

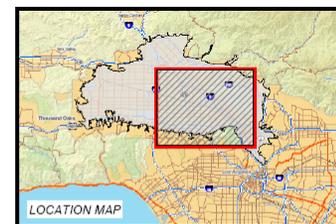
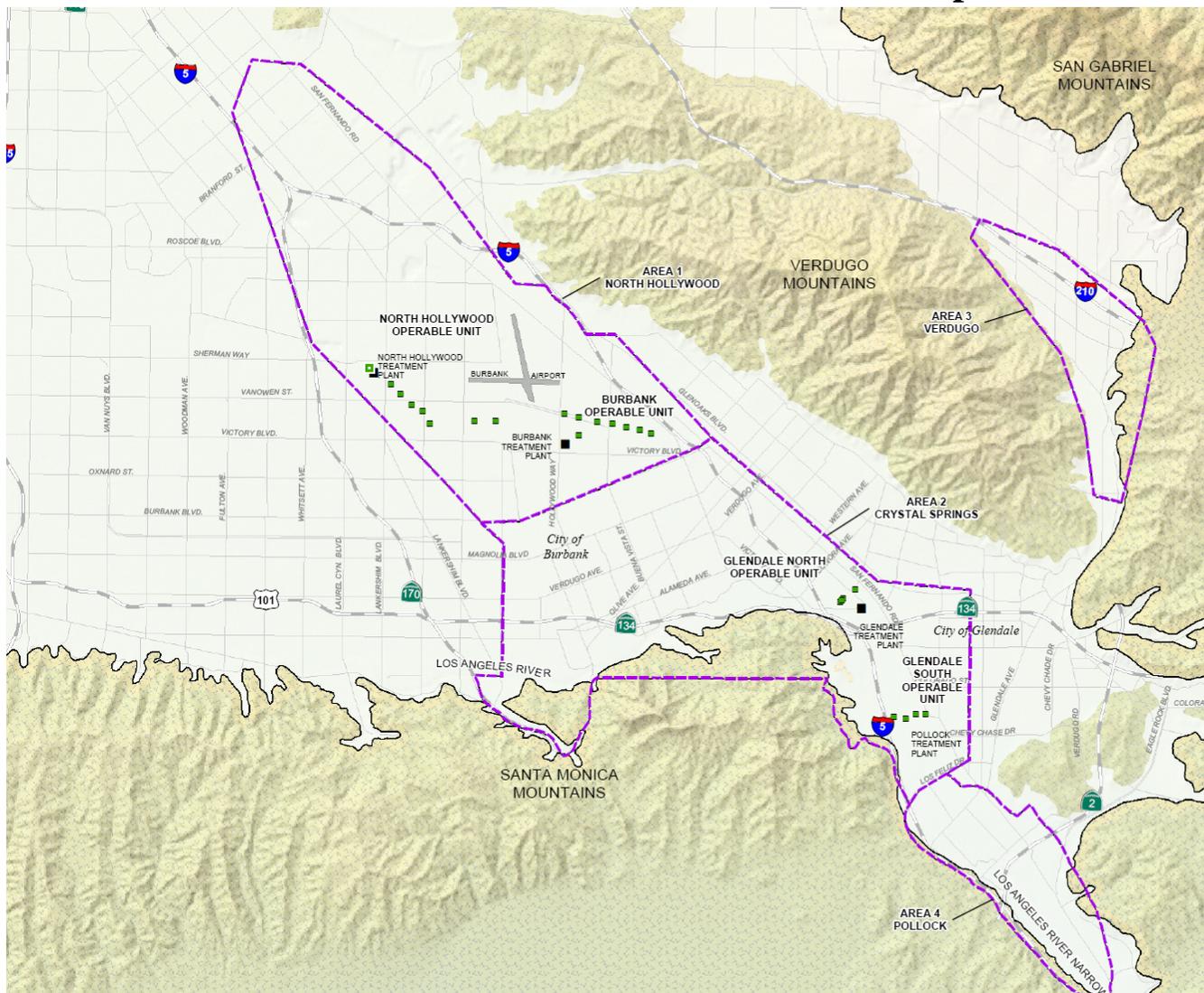
5.6.6 Health and Safety Plan for O&M

A description of precautions and necessary equipment to protect site personnel shall be included. The HASP shall be in conformance with U.S. Occupational Safety and Health Administration requirements in Title 29 of the CFR, sections 1910 and 1926.

5.6.7 Records and Reporting Mechanisms

A description of records and reporting mechanisms including, as appropriate, performance monitoring results, daily operating logs, preventative maintenance logs, laboratory records, records for operating costs, mechanism for reporting emergencies, and personnel and maintenance records.

Attachment 1: Site Map



- LEGEND**
- OPERABLE UNIT EXTRACTION WELL (OPEN SYMBOL IF INACTIVE)
 - OPERABLE UNIT GROUNDWATER TREATMENT PLANT
 - APPROXIMATE BOUNDARY OF INVESTIGATION
 - AREAS FOR SAN FERNANDO VALLEY SUPERFUND SITES

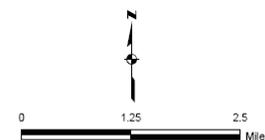


FIGURE 1
LOCATION MAP
 SAN FERNANDO VALLEY SUPERFUND SITES

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Attachment 2: Summary of Deliverables

Ref SOW Section	Deliverable	No. of copies ¹	Due ²	EPA Estimated Review period ³
2.1	Selection and QMP of Supervising Contractor and Sustainability Manager	Email	January 30, 2011	7 days
Communications				
2.3.1	Project Status Updates	email to EPA and DTSC	Weekly, or as approved in Work Plans	N/A
2.3.2	Monthly Progress Reports	Electronic via email	10 th day of each month	7 days
2.3.3	Progress Meeting Notes	Email	Within 5 days of each meeting	N/A
2.3.4	Annual Performance Evaluation Report		Annually, by September 30 th	21 days
Design and Action				
5.1	Draft RD Work Plan	Electronic only	30days after EPA's approval of the Supervising Contractor	30 days
5.2	Final RD Work Plan		15 days after receipt of any EPA comments on the draft RD Work Plan	10 days
2.2.1	Health And Safety Plan/Contingency Plan	Electronic only	As approved in RD Work Plan	21 days
2.2.2	Sampling & Analysis Plan		As approved in RD Work Plan	30 days
2.2.2	Analytical Data	Electronic only	See section 2.2.2 (QAPP bullet)	
2.2.3	Initial Groundwater Monitoring Plan		Coincident with RD Work Plan	30 days
2.2.4	Remedial Design Quality Assurance Project Plan	Electronic only	as approved in RD Work Plan	30 days
4.5.3	Data Evaluation Report	Electronic only	90 days after completion of each monitoring event	21 days
5.3	Building Conditions Assessment	Electronic only	Coincident with RD Work Plan development	Not applicable
	Pre-Design Groundwater Modeling Memorandum		120 days after EPA approval of the RD Work Plan	30 days
	Treatment Options Memorandum		90 days after completion of the Pre-Design Groundwater Modeling Memorandum	30 days
	Preliminary Design		130 days after completion of the Treatment Options Memorandum	30 days

Ref SOW Section	Deliverable	No. of copies ¹	Due ²	EPA Estimated Review period ³
5.4	Intermediate Design		90 days after EPA approval of the Preliminary Design	30 days
5.5	Prefinal Design		90 days after EPA approval of the Intermediate Design	30 days
5.6	Draft Pre-Achievement O&M Plan		With the Prefinal Design	30 days
5.5	Final Design		30 days after EPA approves the Prefinal Design	30 days
5.6	Final Draft Pre-Achievement O&M Plan		15 days after EPA comments on the draft Plan	21 days

¹ Unless otherwise indicated, four (4) hard copies shall be provided: one (1) copy sent to USEPA, one (1) copy sent to EPA's contractor, one (1) copy sent to LADWP, and one (1) copy sent to DTSC. Four (4) electronic copies (on compact disc) also shall be provided - one (1) copy to EPA, one (1) copy to EPA's contractor, one (1) copy sent to LADWP, and one (1) copy to DTSC.

² All deliverables set forth in Attachment 2 will be reviewed and approved by EPA in accordance with Section IX of the AOC. If EPA disapproves a deliverable and requests modifications pursuant to Section IX of the AOC, the Respondents shall revise the deliverable and resubmit it to EPA within the timeframe specified in Section IX of the AOC.

³ The "EPA Estimated Review Period" specified herein is set by EPA as a goal. EPA will strive to achieve this goal to keep the project on schedule. However, if EPA is unable to meet one or more of these review periods, and deliverables from the Respondents are affected by EPA's delay, the deadlines for those deliverables will reflect such delay.

Attachment 3: Primary Guidance and Resources

The following list, although not comprehensive, consists of many of the regulations and guidance documents that apply to the RD/RA process:

- 1) *Greener Cleanups Policy - EPA REGION 9*, issued September 14, 2009; found at: <http://www.epa.gov/region09/climatechange/green-sites.html>.
- 2) *Superfund Green Remediation Strategy*, draft dated August 2009, <http://www.epa.gov/superfund/greenremediation/sf-gr-strategy.pdf>.
- 3) *CERCLA Compliance with Other Laws Plan*, Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, August 1988 (DRAFT), OSWER Directive No. 9234.1-01 and -02.
- 4) *Superfund Community Involvement Handbook*, U.S. EPA, Office of Solid Waste and Emergency Response, April 2005, EPA-540-K-05-003.
- 5) *EPA Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA QA/G-4, 2006).
- 6) Federal Acquisition Regulation, Washington, DC: U.S. Government Printing Office (revised periodically).
- 7) *Guidance on Expediting Remedial Design and Remedial Actions*, EPA/540/G-90/006, August 1990.
- 8) *Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites*, U.S. EPA Office of Emergency and Remedial Response (DRAFT), OSWER Directive No. 9283.1-2.
- 9) *Guide to Management of Investigation-Derived Wastes*, U.S. EPA, Office of Solid Waste and Emergency Response, Publication 9345.3-03FS, January 1992.
- 10) *Interim Guidance on Compliance with Applicable of Relevant and Appropriate Requirements*, U.S. EPA, Office of Emergency and Remedial Response, July 9, 1987, OSWER Directive No. 9234.0-05.
- 11) *Institutional Controls: A Guide to Implementing, Monitoring and Enforcing Institutional Controls at Superfund, Brownfields, Federal Facility, UST and RCRA Corrective Action Cleanups*, (Draft), February 2003, OSWER 9355.0-89, EPA 540-R-04-002, <http://www.epa.gov/superfund/action/ic/guide/index.htm>
- 12) National Oil and Hazardous Substances Pollution Contingency Plan; Final Rule, Federal Register 40 CFR Part 300, March 8, 1990.
- 13) *Permits and Permit Equivalency Processes for CERCLA On-Site Response Actions*, February 19, 1992, OSWER Directive 9355.7-03.
- 14) *Quality in the Constructed Project: A Guideline for Owners, Designers and Constructors, Volume 1, Preliminary Edition for Trial Use and Comment*, American Society of Civil Engineers, May 1988.
- 15) *Remedial Design/Remedial Action (RD/RA) Handbook*, U.S. EPA, Office of Solid Waste and Emergency Response (OSWER), 9355.0-04B, EPA 540/R-95/059, June 1995.

- 16) *EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations*, U.S. EPA, EPA/240/B-01/003, March 2001, Reissued May 2006.
- 17) *Guidance for Quality Assurance Project Plans*, U.S. EPA, EPA/240/R-02/009, December 2002.
- 18) *Scoping the Remedial Design* (Fact Sheet), February 1995, OSWER Publ. 9355-5-21 FS.
- 19) Standards for the Construction Industry, Code of Federal Regulations, Title 29, Part 1926, Occupational Health and Safety Administration.
- 20) Standards for General Industry, Code of Federal Regulations, Title 29, Part 1910, Occupational Health and Safety Administration.
- 21) *Superfund Guidance on EPA Oversight of Remedial Designs and Remedial Actions Performed by Potentially Responsible Parties*, April 1990, EPA/540/G-90/001.
- 22) *Value Engineering* (Fact Sheet), U.S. EPA, Office of Solid Waste and Emergency Response, Publication 9355.5-03FS, May 1990.
- 23) *USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review*, EPA-540-R-00-006, June 2001.
- 24) *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review*, EPA-540-R-08-01, June 2008.
- 25) *Policy Guidance for Direct Domestic Use of Extremely Impaired Sources*, CDPH Policy Memorandum 97-005
- 26) *Focused Feasibility Study, North Hollywood Operable Unit, San Fernando Valley Area 1 Superfund Site*, EPA, prepared by CH2MHILL, July 2009
- 27) *American National Standards Practices for Respiratory Protection*. American National Standards Institute Z88.2-1980, March 11, 1981.
- 28) *A Compendium of Superfund Field Operations Methods*, Two Volumes, USEPA, Office of Emergency and Remedial Response, EPA/540/P-87/001a, August 1987, OSWER Directive No. 9355.0-14.
- 29) *Data Quality Objectives for Remedial Response Activities*, USEPA, Office of Emergency and Remedial Response and Office of Waste Programs Enforcement, EPA/540/G-87/003, March 1987, OSWER Directive No. 9335.0-7B.
- 30) *Engineering Support Branch Standard Operating Procedures and Quality Assurance Plan*, USEPA Region IV, Environmental Services Division, April 1, 1986 (revised periodically).
- 31) *NIOSH Plan of Analytical Methods*, 2nd edition. Volumes I-VII for the 3rd edition, Volumes I and II, National Institute of Occupational Safety and Health.
- 32) *Occupational Safety and Health Guidance Plan for Hazardous Waste Site Activities*, National Institute of Occupational Safety and Health/Occupational Health and Safety Administration/United States Coast Guard/Environmental Protection Agency, October 1985.

- 33) *Superfund Remedial Design and Remedial Action Guidance*, USEPA, Office of Emergency and Remedial Response, June 1986, OSWER Directive No. 9355.0-4A.
- 34) *EPA Region IX Sampling and Analysis Plan Guidance and Template* (R9QA/002.1, April, 2000).
- 35) *Draft: Region 9 Superfund Data Evaluation/Validation Guidance*, USEPA, Quality Assurance Office, R9QA/006.1, December 2001.
- 36) *Methods for Monitoring Pump and Treat Performance*, USEPA, Office of Research and Development, June 1994 (EPA 600/R-94/123).
- 37) *A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems*, EPA, January 2008 (EPA/600/R-08/003).
- 38) *Operation and Maintenance in the Superfund Program*, EPA, May 2001, (OSWER 9200.1-37FS, EPA 540-F-01-004).
- 39) *Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs* (American National Standard, January 5, 1995), ANSI/ASQC E4-1994.
- 40) *EPA Requirements for Quality Management Plans (QA/R-2)*, EPA/240/B-01/002, March 2001, reissued May 2006.
- 41) *EPA Guidance for Data Quality Assessment, Practical Methods for Data Analysis* (EPA QA/G-9, 1998).

Attachment 4: Performance Standards for COCs

**Table 6. Performance Standards for COCs in Extracted and Treated Groundwater
(from ROD)**

Contaminant of Concern	Federal MCL (µg/L)	California MCL (µg/L)	CDPH Notification Level (µg/L)	Basis for Performance Standard	Performance Standard (µg/L) ^a
TCE	5	5	None	Federal MCL	5
PCE	5	5	None	Federal MCL	5
1,1-DCA	5	5	None	Federal MCL	5
1,2-DCA	0.5	0.5	None	Federal MCL	0.5
1,1-DCE	6	6	None	Federal MCL	6
cis-1,2-DCE	6	6	None	Federal MCL	6
1,1,2-TCA	5	5	None	Federal MCL	5
Carbon tetrachloride	0.5	0.5	None	Federal MCL	0.5
Methylene Chloride	5	5	None	Federal MCL	5
Total Chromium	100	50	None	California MCL	50
Hexavalent Chromium	None ^b	None ^{b,c}	None	See footnote "d"	5 ^d
Perchlorate	None	6	None	California MCL	6
TCP	None	None	0.005	CDPH notification level	0.005
1,4-dioxane	None	None	3	CDPH notification level	3
NDMA	None	None	0.01	CDPH notification level	0.01

Notes:

^a The CDPH permitting process may require lower concentrations in the treated effluent.

^b Federal and state MCLs specific to hexavalent chromium have not been established; therefore, the state MCL for total chromium currently is applied to hexavalent chromium.

^c A PHG for hexavalent chromium is currently under development by OEHHA. Following development of a PHG, a state MCL specific to hexavalent chromium may be established.

^d Based on discussions with LADWP, it is EPA's understanding that LADWP will continue to use a voluntary cleanup level of 5 µg/L for hexavalent chromium for water it will accept for use in its water supply system. Consequently, under the drinking water end use option, chromium treatment at the NHOU will be needed so that LADWP's voluntary cleanup level of 5 µg/L can be met.

APPENDIX B

ANNUAL PERFORMANCE REPORT TEMPLATE

North Hollywood Operable Unit

Second Interim Record of Decision

Annual Performance Report

Prepared by:

Submitted by:

September 30, 20XX

1 Introduction

The introduction section will provide a brief description of the North Hollywood Operable Unit and a brief synopsis of the history of the area. It will also cover the development and construction of the Second Interim Remedy.

2 Prior year operation

This section will provide a summary of the facility operation for the prior year. It will include, but not be limited to the following information:

- Summary of operation including total hours of operation and percent uptime
- Identification of any sampling events not meeting performance standards, reasons for the non-compliance, and steps taken to resolve.
- A description of any outages taken, including reason for the outage, and outage duration. Any effect on plume capture will also be discussed here.
- Provide a table or list of materials and quantities purchased for such items as chemicals, filter media, resin, replacement equipment, etc.
- Provide a table or list of types of waste disposed and quantities. This will include groundwater diverted to the sanitary sewer.

3 Sustainability

A measure of the facilities sustainability for the prior year will be shown here with respect to things like carbon emissions, energy efficiency, etc. These data will be included in updated charts showing the rolling five years target for each measure of sustainability.

4 Summary of Monitoring and Performance Sampling

This section will provide a summary and reference tables showing both treatment system monitoring sampling to ensure the treatment processes are functioning properly and performance sampling for demonstration of meeting performance standards as outlined in Table 6 of the ROD and modified based on any changes by EPA or the State of California. A comparison of monitoring results vs. performance benchmarks will be conducted to show continued compliance. Any non-compliance will provide a description of the event that occurred to cause the non-compliance and the remedy.

5 Evaluation of Groundwater Monitoring Data

Groundwater monitoring data, including groundwater elevations and analytical results, collected over the past year will be evaluated with respect to spatial distribution and statistical trends over time and incorporated into the SFV groundwater model as needed. The model will be used to determine if statistically different COC concentration changes or the detection of additional chemicals that have

reached notification levels remain consistent with the NHOU extraction wells' operation, pumping configuration, and treatment system design.

6 Recommended Changes or Modifications

Based on the results of the groundwater analysis, changes or modifications to the existing treatment systems should be proposed to bring the system back into compliance with performance standards or provide treatment for emerging chemicals. This section will provide details on the proposed changes.

7 Notifications and Submittals

Attached to the report should be copies of all notifications and submittals made to EPA, CDPH, LADWP, or other agencies during the past year.

8 Updated Schedule for Upcoming Year

An updated schedule for operation of the NHOU treatment facilities will be prepared to show activities planned for the upcoming year. The schedule should include, but not be limited to the following activities:

- Monitoring events
- Performance monitoring and reporting
- Groundwater well monitoring
- Planned shutdowns
- Media change outs
- Major planned PM activities

APPENDIX C

NHOU PROJECT SCHEDULE

ID	Predecessors	Task Name	Duration	Year 1				Year 2				Year 3				Year 4			
				Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3
1		EPA APPROVAL OF SUPERVISING CONTRACTOR (NOTICE-TO-PROCEED)	0 days																
2		TASK 1 - PROJECT MANAGEMENT	1264 days																
3	1SS	Prepare Quality Management Plan	6 days																
5	4	EPA Review	7 days																
6		Receipt of EPA approval	1 day																
7		Prepare Remedial Design Work Plan, HASP, and RD QAPP	189 days																
8	6	Develop Draft RD Work Plan	29 days																
14	13	Submit Draft RD Work Plan to EPA	0 days																
15	14	EPA Review of RD Work Plan	130 days																
16	15	Prepare Final RD Work Plan	15 days																
17	16	Submit Final RD Work Plan to EPA	0 days																
18	17	EPA Review of Final RD Work Plan	15 days																
19	18	Prepare RD QAPP per RD Work Plan	90 days																
20	18	Draft RD QAPP	45 days																
24	20	EPA Review of RD QAPP	30 days																
25	24	Compile Final RD QAPP	15 days																
26		Prepare Monthly Progress Reports and Annual Performance Evaluations	1107 days																
69		Conduct Weekly and Monthly Teleconference Calls with LMC/HW Team and USEPA	979 days																
212		TASK 2 - DATA AND DOCUMENT MANAGEMENT	425 days																
213	6	Data Management	270 days																
214	227	Geospatial Data Dissemination and Aggregation	180 days																
215	6	e-Document Solution (SharePoint)	90 days																
216		TASK 3 - GROUNDWATER CHARACTERIZATION	984 days																
217		Data Gap Analysis Report	230 days																
218	14	Draft Data Gap Analysis Memorandum	170 days																
225	218	Submit Draft Data Gap Analysis Report to EPA	0 days																
226	225	EPA Review of Draft Data Gap Analysis Memorandum	30 days																
227	226	Review EPA comments and prepare Final Data Gap Analysis Memorandum	15 days																
228	227	EPA Review of Final Data Gap Analysis Memorandum	15 days																
229		Preliminary Groundwater Monitoring Plan and SAP	118 days																
230	226	Draft Preliminary Groundwater Monitoring Plan	60 days																
237	236	Submit Preliminary Groundwater Monitoring Plan and SAP	0 days																
238	237	EPA Review of Preliminary Groundwater Monitoring Plan	30 days																
239	238	Update Preliminary Groundwater Monitoring Plan with EPA comments	15 days																
240	238	Draft Groundwater Monitoring Plan and SAP	124 days																
241	305	Final Design Update of Groundwater Monitoring Plan	60 days																
245	244	Submit Draft Groundwater Monitoring Plan and SAP	0 days																
246	245	EPA Review Update of Groundwater Monitoring Plan	30 days																
247	246	Review EPA comments/develop Final Draft of Final Update	15 days																
248	226	LADWP GMP Review	90 days																
249		TASK 4 - PRELIMINARY DESIGN	609 days																
250		Building Conditions Assessment	182 days																
251	6FS+32 days	NHOU CTF Site Visit	1 day																
254	253	Final Building Conditions Assessment Report	1 day																
255		Predesign Groundwater Modeling Memorandum	295 days																
256	18	Draft Groundwater Modeling Memorandum	120 days																
270	18FS+60 days	Collaboration Meeting with USEPA, LADWP, CDPH, and RWQCB	0 days																
271	18FS+120 days	Submit Draft Groundwater Modeling Memorandum to EPA	0 days																
272	271	EPA Review of Pre-Design Groundwater Modeling Memorandum	30 days																

Project: NHOU AOC Schedule 10-04-11 RDWP.mpp
 G. Longstreet, Project Controls

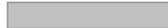
Task Progress Summary External Tasks Deadline
 Split Milestone Project Summary External Milestone

LOCKHEED MARTIN CORPORATION AND HONEYWELL INTERNATIONAL INC.
NORTH HOLLYWOOD OPERABLE UNIT (NHOU) 2nd INTERIM REMEDY GROUNDWATER REMEDIATION SYSTEM DESIGN
Project Design Schedule

Tue 10/4/11

ID	Predecessors	Task Name	Duration	Year 1				Year 2				Year 3				Year 4				
				Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
273	272FS+15 days	Submit Final Groundwater Modeling Memorandum	0 days																	
274		Treatment Options Memorandum	135 days																	
275	273	Collaboration Meeting with USEPA, LADWP, CDPH, and RWQCB	0 days																	
276	275	Treatment Options Memorandum	90 days																	
280	273FS+90 days	Submit Draft Treatment Options Memorandum to EPA	0 days																	
281	280	EPA Review of Treatment Options Memorandum	30 days																	
282	281FS+15 days	Submit Final Treatment Options Memorandum	0 days																	
283		Preliminary Design Report	160 days																	
284	282	Preliminary Design Report	130 days																	
288	282FS+130 days	Submit Draft Preliminary Design Report to EPA	0 days																	
289	288	EPA Review of Preliminary Design Report	30 days																	
290		TASK 5 - INTERMEDIATE DESIGN	120 days																	
291		Intermediate Design Package	120 days																	
292	289	Intermediate Design Report	90 days																	
296	289FS+90 days	Submit Intermediate Design Report to EPA	0 days																	
297	296	EPA Review of Intermediate Design Report	30 days																	
298		TASK 6 - PRE-FINAL AND FINAL DESIGN	180 days																	
299		Pre-Final Design Package	120 days																	
300	297	Pre-Final Design Report	90 days																	
304	297FS+90 days	Submit Pre-Final Design Report to EPA	0 days																	
305	304	EPA Review of Pre-Final Design Report	30 days																	
306		Final Design Package	60 days																	
307	305	Final Design Report	30 days																	
311	305FS+30 days	Submit Final Design Report to EPA	0 days																	
312	311	EPA Review of Final Design Report	30 days																	
313		Pre-Achievement O&M Plans	156 days																	
314	297	Draft Pre-Achievement O&M Plan	90 days																	
318	297FS+90 days	Submit Draft Pre-Achievement O&M Plan to EPA	0 days																	
319	318	EPA Review of Draft Pre-Achievement O&M Plan	30 days																	
320	319	Final Pre-Achievement O&M Plan	15 days																	
324	305FS+15 days	Submit Final Pre-Achievement O&M Plan to EPA	0 days																	
325	324	EPA Review of Final Pre-Achievement O&M Plan	21 days																	
326		TASK 7 - ENGINEERING SERVICES DURING BIDDING AND CONSTRUCTION	285 days																	
327		Construction Management Plan	105 days																	
328	325	Draft	60 days																	
329	328	Review	30 days																	
330	329	Final	15 days																	
331	330	Office-based Services During Construction	90 days																	
332	331	Assist LMC/Hi and Contractor with Start-up and Testing	90 days																	

Project: NHOU AOC Schedule 10-04-11 RDWP.mpp
 G. Longstreet, Project Controls

Task		Progress		Summary		External Tasks		Deadline	
Split		Milestone		Project Summary		External Milestone			

APPENDIX D

EPA COMMENTS ON RD WORK PLAN AND RESPONSES



October 5, 2011

Kelly Manheimer
75 Hawthorne Street
San Francisco, CA 94105-390

Subject: Response to EPA comments, Draft RD Work Plan (May 13, 2011)

Dear Ms. Manheimer,

AMEC Environment & Infrastructure (AMEC) is pleased to provide responses to comments you provided to us on September 20, 2011 regarding our draft Remedial Design Work Plan (May 13, 2011). Responses to each comment are included below in italicized font.

General Comments

1. As presented in the acronym list, the "water board" representing the Regional Water Quality Control Board, Los Angeles Region needs to be changed to RWQCB-LA representing the Regional Water Quality Control Board - Los Angeles Region.

Response: *References have been revised as requested.*

2. **Section 1, page 1-1:** first reference to chromium should be defined to include trivalent chromium (CrIII) and hexavalent chromium (CrVI). Does this include dissolved chromium? Once the chromium has been defined, then future reference(s) to chromium should be consistent. Need to review the document for this consistency

Response: *The first reference to chromium in RD Work Plan has been revised to include hexavalent chromium and total chromium. Total chromium includes all forms.*

3. **Section 1-2, page 1-3:** The NHE-2 remedy is being designed separately by MWH. The relationship between the two projects and their schedules should be clarified. If the treated NHE-2 effluent is to be used at any time for potable supply, the expectation by CDPH is that there will be one full 97-005 report to assess the entire NHOU wellfield, not two separate reports.

Response: *Honeywell has selected MWH Americas, Inc. (MWH) as the lead designers for the NHE-2 remedy. NHE-2 is an integral part of the NHOU and, as such, design schedules will be modified to be consistent with each other.*

AMEC, in collaboration with LADWP and CDPH, will assemble the information necessary for the development of one report covering the NHOU extraction well field. The information provided will include NHE-2, even though flow from this well may not initially be conveyed to the Central Treatment System.

4. **Section 1.2, page 1-4, second bullet:** The Work Plan states that "LADWP, as the water utility, will have to prepare, submit, and comply with CDPH's Policy Memorandum 97-005. To

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the extent that CDPH 97-005 guidance applies to the NHOU, it will be considered throughout the Remedial Design process. Once the extraction well locations, depths, pumping rates, and capture zones have been determined, MACTEC will support LADWP in the assembly of information necessary for the CDPH 97-005 process.”

CDPH has previously noted that the 97-005 process *does* apply, and it must be completed if the groundwater extracted and treated by the NHOU will be delivered to LADWP for public drinking supply. This is a key component of the Remedial Design, as noted in the Record of Decision (ROD). Close coordination between the Respondents, their Remedial Design (RD) consultant, LADWP, and CDPH regarding the 97-005 process will improve the likelihood of successfully navigating the process and implementing the remedy. Respondents should develop a more specific plan for coordinating with LADWP and CDPH on 97-005.

Response: *The RD Work Plan has been revised to confirm the applicability of 97-005. AMEC is committed to collaborating with LADWP and CDPH with respect to implementing the CDPH 97-005 process as is now described more clearly in the RD Work Plan.*

5. **Section 2.1.4, page 2-4, first partial paragraph:** This paragraph states that the existing NHOU extraction system consists of eight groundwater extraction wells. It should be noted in this section that well NHE-1 has never been operational, and does not contribute to hydraulic capture or to the treatment plant influent.

Response: *The text has been revised with this notation accordingly.*

6. **Section 2.2, Page 2-5:** Although the first paragraph discussing the roles and responsibilities of the DTSC and Regional Board is technically accurate, the Regional Board is much more active at this site. Adding “official” before “lead state agency”, and a “however” before the next sentence might help clarify this.

Response: *Text has been revised as suggested.*

7. **Section 2.5.5, page 2-6:** This section states that the “collective capacity” of the Existing NHOU Extraction and Treatment System is about 800 gpm. It should be noted that the design capacity of the system is 2,000 gpm, which was achieved on a few occasions. In the next sentence of the Work Plan, the production capacities of the surrounding LADWP well fields are summarized, presumably for comparison to the capacity of the NHOU extraction wells. However, the range of capacities of these LADWP well fields is given in units of acre-feet per year, which makes direct comparison to the NHOU system capacity difficult. It is recommended that the NHOU and surrounding well field capacities be summarized in the same units (gallons per minute, acre-feet per year, or both).

Response: *Flow rate units have been revised to be consistent between well fields as suggested.*

8. **Section 3.1.1, Page 3-1:** Note should be made that there is also a QAPP for the San Gabriel Valley and San Fernando Valley which was co-authored by USEPA and the Regional Board. A link to this QAPP is as follows:
http://www.waterboards.ca.gov/losangeles/waterissues/programs/remediation/Board_SGV-SFVCleanupProgram_Sept2008_QAPP.pdf

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Response: *A citation to the San Gabriel Valley/San Fernando Valley Cleanup Program QAPP has been added to the RD Work Plan.*

9. **Section 3.2.1, page 3-4, first paragraph:** This paragraph states that the December 2010 NHOU sampling event “was designed to be comprehensive and included more wells than the EPA plans for sampling in subsequent sampling events.” Unfortunately, due to access issues to some sites and wells, additional wells were sampled in February and April 2011. Additional data collected subsequent to the December 2010 event may prove to be important for the RD process, and should be included in the data set used for RD.

Response: *Comment noted. The RD Work Plan has been revised to account for data collected subsequent to the December 2010 sampling event.*

10. **Section 3.3.2, Page 3-7, first paragraph:** states that neither Lockheed Martin nor Honeywell are performing groundwater monitoring at NHOU, which is in error. Both entities have been issued a Cleanup and Abatement Order (CAO) from the Regional Board. Each CAO requires routine groundwater monitoring to be conducted.

Response: *The RD Work Plan has been clarified accordingly.*

11. **Section 3.3.2, Page 3-7, last paragraph:** states all laboratories....will be approved by EPA. Recommend a sentence that states these laboratories should also be certified by the State of California.

Response: *The RD Work Plan has been revised to specify that the analytical laboratories should also be certified by the State of California, as suggested.*

12. **Section 3.4.1, page 3-9:** Of particular note for the condition assessment, DWP reports that NHE-3, NHE-6, NHE-7, and NHE-8 power supply equipment and control equipment should also be upgraded. Power bumps are a major cause of outages for the existing remedy. These same wells produce substantially less than the design flow, and will also need to be rehabilitated.

Response: *In their response to this RD Work Plan, LADWP has recently indicated that power bumps are a major cause of outages for the existing NHOU treatment system. LADWP recommends that the well power supply and control equipment be upgraded as part of a potential remedy. AMEC will contact LADWP for further clarification on causes of power bumps and will include a review of the affects power bumps have on the existing system in the Building Conditions Assessment Technical Memorandum.*

13. Section 3.4.2, page 3-11, second paragraph: This section states that the target capture zone will be established by compiling the areas of the plume where contamination exceeds ten times the associated regulatory limit. This is acceptable as a target zone; however, to the extent that lower concentration areas must be captured in order to meet the containment RAO, then those areas shall also be included. The containment RAO states: “Contain areas of contaminated groundwater that exceed the MCLs and notification levels to the maximum extent practicable.” Containment is expected to be more difficult in the north and northwestern part of the hot spots, but is expected to be more readily achieved in the southern end of the Operable Unit.

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Response: *We agree that extraction wells will be designed to capture, to the maximum extent practicable, areas where COC's have been detected above MCLs and notification levels.*

14. Section 3.4.3.1, page 3-13, middle of paragraph: This section states that influent COC concentrations and flow rates from individual wells will be used to estimate combined influent concentrations to the planned central treatment facility, for the purpose of preliminary treatment design. This approach implies that the RD might ignore concentrations of COCs that exceed regulatory limits at individual wells. CDPH may not accept such an approach for the intended beneficial use of the treated water, which is delivery to LADWP for municipal supply. This aspect of RD should be coordinated with LADWP and CDPH as part of the 97-005 process discussions (see previous comment on 97-005).

Response: *As stated in the Interim ROD, "For the purposes of determining compliance with the performance standards presented in Table 6, the point of compliance shall be the combined effluent from the NHOU treatment facility, just prior to its delivery to the end use, the LADWP drinking water system." The RD Work Plan was written to be consistent with this clause. Analytical results from individual wells will be considered as part of the Second Interim Remedy design.*

15. Section 3.4.3.2, page 3-14, last row of in-text table: The alternative treatment method for 1,4-dioxane, blending with other wells, may not be acceptable to CDPH for water that will ultimately be delivered to LADWP for municipal use. This aspect of RD should be coordinated with LADWP and CDPH as part of the 97-005 process discussions (see previous comment on 97-005).

Response: *Comment noted. See responses to Comments #4 and #14.*

16. Section 3.4.3.2, page 3-14, Selection Criteria: These criteria are reasonable; however, if the recommended treatment option is any different than what is currently in the ROD, the options must be vetted against the CERCLA 9 criteria. If EPA is to approve any alternative treatment option, some sort of ROD amendment must be completed, and therefore, the information necessary to justify that amendment must be presented in the Treatment Options Technical Memorandum.

Response: *Comment noted.*

17. Section 3.4.4, page 3-17, first bullet: The Basis of Design should also specify the anticipated permitted effluent requirements. Some treatment processes, such as air stripping and advanced oxidation, are designed based on the concentration difference between the influent and the effluent. The Work Plan states "The design basis will specify the treatment standards that the system will achieve." Instead, it is recommended that the Basis of Design state the anticipated permit requirements and compare the predicted effluent against the anticipated permit requirements. Section 9.8 appears to indicate this will occur. These two sections should be consistent. Additionally, any contaminant that is found through 97-005 screening, including those below permit thresholds, should be noted in the Basis of Design report, because the presence of other trace contaminants may affect the selection of the preferred treatment technologies.

Client: Honeywell International, Inc. Lockheed Martin Corporation	Response to EPA Comments RD Work Plan	
Project: NHOU Second Interim Remedy Groundwater Remediation Design	Project 4088115718 Rev. 2	

Response: *Comment noted. The RD Work Plan has been clarified and the sections made consistent.*

18. Section 3.5, page 3-21: The key items listed include “60% complete piping and instrumentation diagrams (P&IDs).” However, P&IDs were noted as being included in the preliminary design. It would be typical that P&IDs included in the preliminary phase would be well beyond 60% complete. It would be helpful if the Work Plan clarified the difference between the two versions.

Response: *The work plan will be modified to reflect that P&IDs will be developed in the Preliminary Design and modified as the work progresses.*

19. Section 3.6.2, page 3-22: Rehabilitation of the existing extraction wells, as well as a schedule and plan for future rehabilitation of all the extraction wells, should be included in the O&M plans. In particular, NHE-3, NHE-6, NHE-7, and NHE-8 produce substantially less than their design flow, and will need to be rehabilitated immediately during RA. In addition, CDPH requirements for O&M plans should be evaluated and incorporated.

Response: *The need for extraction well rehabilitation in general will be incorporated into the O&M plans; the need to rehabilitate specific wells will be assessed as part of the Data Gap Analysis report and Groundwater Modeling Memorandum.*

20. Section 3.6.2, page 3-23, fourth bullet: The Waste Disposal Plan needs to describe that all wastes generated during project implementation are considered CERCLA wastes and must be disposed at a facility approved to accept CERCLA wastes, regardless of whether or not the wastes are considered hazardous.

Response: *AMEC acknowledges that the off-site rule does apply; however, not all wastes generated must be classified as CERCLA waste. The RD Work Plan will be revised to indicate that procedures for classification will be addressed in the RD Waste Disposal Plan.*

21. Section 3.6.4, page 3-24, Task 3.6 deliverables table: There is an error in the schedule in that the Final Design Report is to be submitted on the same day that EPA comments are Pre-Final Design Report are due. This same error is repeated in the Project Schedule in Attachment C. In addition, the schedule needs to be updated with the actual date of these comments, with the effect cascaded through the rest of the deliverable dates.

Response: *The project schedule has been updated.*

22. Section 6.1.1, 1st paragraph, page 6-1 and 6-2, last sentence: Please strike the last sentence, which begins “If for any reason the associated permitting agency...”. I am not willing to approve such a broad statement. If the issue arises, it will be dealt with at that time.

Response: *The RD Work Plan has been revised accordingly.*

23. Section 6.1.3, page 6-2: Please clarify the statement “others to be determined”, in the last sentence before the table. In the table, there are a few references that state “to be addressed by others” – please clarify who these “others” are.

Response: *The RD Work Plan has been revised to more clearly refer to specific parties.*

Client: Honeywell International, Inc. Lockheed Martin Corporation	Response to EPA Comments RD Work Plan	
Project: NHOU Second Interim Remedy Groundwater Remediation Design	Project 4088115718 Rev. 2	

24. **Section 6.2, page 6-3, second and third paragraphs:** The second paragraph refers to the City of Burbank (for permits). This seems to be irrelevant since the site is in Los Angeles (not Burbank). Please review and explain.

Response: *The RD Work Plan has been revised accordingly.*

25. **Section 9.9, page 9-5, second bullet:** This section indicates that draft specifications will be prepared. The discussion of specifications in Section 3.5 of this plan indicates that only a list of the specifications will be provided at this phase. Please clarify.

Response: *The RD Work Plan has been revised to reflect that the list of specifications will be included in the Preliminary Design Report, the draft specifications will be included in the Intermediate Design Report, and the final specifications will be provided in the Pre-Final and Final Design Reports.*

Please contact Michael Taraszki at (510) 628-3222 if you have questions regarding our responses to comments on the Remedial Design Work Plan.

Sincerely,



Michael Taraszki, PG, CHG, PMP
Project Manager, AMEC Environment & Infrastructure



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901**

September 20, 2011

Michael Taraszki
AMEC
1330 Broadway Street, Ste 1702
Oakland, CA 94612

Re: EPA Comments on *Draft Remedial Design Work Plan, North Hollywood Operable Unit, Second Interim Remedy, Groundwater Remediation System Design, May 13, 2011 (RD WP)*

Dear Mr. Taraszki:

EPA has reviewed the above-referenced document, and provides the following comments. These comments should be addressed and resubmitted with the Final RD WP, which is due **October 5**, 2011. Overall, the RD WP is comprehensive, well written, and addressed all required components; however, there is not enough detail about how the work on NHE-2 will be coordinated with this design, nor how the process for the 97-005 permit will be conducted.

Following are some specific comments (note that I have not included comments on typographical errors in the document):

General Comments

1. As presented in the acronym list, the "water board" representing the Regional Water Quality Control Board, Los Angeles Region needs to be changed to RWQCB-LA representing the Regional Water Quality Control Board - Los Angeles Region.
2. **Section 1, page 1-1:** first reference to chromium should be defined to include trivalent chromium (CrIII) and hexavalent chromium (CrVI). Does this include dissolved chromium? Once the chromium has been defined, then future reference(s) to chromium should be consistent. Need to review the document for this consistency
3. **Section 1-2, page 1-3:** The NHE-2 remedy is being designed separately by MWH. The relationship between the two projects and their schedules should be clarified. If the treated NHE-2 effluent is to be used at any time for potable supply, the expectation by CDPH is that there will be one full 97-005 report to assess the entire NHOU wellfield, not two separate reports.
4. **Section 1.2, page 1-4, second bullet:** The Work Plan states that "LADWP, as the water utility, will have to prepare, submit, and comply with CDPH's Policy Memorandum 97-005. To the extent that CDPH 97-005 guidance applies to the NHOU, it will be considered throughout the Remedial Design process. Once the extraction well locations, depths, pumping rates, and capture zones have been

determined, MACTEC will support LADWP in the assembly of information necessary for the CDPH 97-005 process.”

CDPH has previously noted that the 97-005 process *does* apply, and it must be completed if the groundwater extracted and treated by the NHOU will be delivered to LADWP for public drinking supply. This is a key component of the Remedial Design, as noted in the Record of Decision (ROD). Close coordination between the Respondents, their Remedial Design (RD) consultant, LADWP, and CDPH regarding the 97-005 process will improve the likelihood of successfully navigating the process and implementing the remedy. Respondents should develop a more specific plan for coordinating with LADWP and CDPH on 97-005.

5. **Section 2.1.4, page 2-4, first partial paragraph:** This paragraph states that the existing NHOU extraction system consists of eight groundwater extraction wells. It should be noted in this section that well NHE-1 has never been operational, and does not contribute to hydraulic capture or to the treatment plant influent.
6. **Section 2.2, Page 2-5:** Although the first paragraph discussing the roles and responsibilities of the DTSC and Regional Board is technically accurate, the Regional Board is much more active at this site. Adding “official” before “lead state agency”, and a “however” before the next sentence might help clarify this.
7. **Section 2.5.5, page 2-6:** This section states that the “collective capacity” of the Existing NHOU Extraction and Treatment System is about 800 gpm. It should be noted that the design capacity of the system is 2,000 gpm, which was achieved on a few occasions. In the next sentence of the Work Plan, the production capacities of the surrounding LADWP well fields are summarized, presumably for comparison to the capacity of the NHOU extraction wells. However, the range of capacities of these LADWP well fields is given in units of acre-feet per year, which makes direct comparison to the NHOU system capacity difficult. It is recommended that the NHOU and surrounding well field capacities be summarized in the same units (gallons per minute, acre-feet per year, or both).
8. **Section 3.1.1, Page 3-1:** Note should be made that there is also a QAPP for the San Gabriel Valley and San Fernando Valley which was co-authored by USEPA and the Regional Board. A link to this QAPP is as follows:
http://www.waterboards.ca.gov/losangeles/waterissues/programs/remediation/Board_SGVSFVCleanupProgram_Sept2008_QAPP.pdf
9. **Section 3.2.1, page 3-4, first paragraph:** This paragraph states that the December 2010 NHOU sampling event “was designed to be comprehensive and included more wells than the EPA plans for sampling in subsequent sampling events.” Unfortunately, due to access issues to some sites and wells, additional wells were sampled in February and April 2011. Additional data collected subsequent to the December 2010 event may prove to be important for the RD process, and should be included in the data set used for RD.
10. **Section 3.3.2, Page 3-7, first paragraph:** states that neither Lockheed Martin nor Honeywell are performing groundwater monitoring at NHOU, which is in error. Both entities have been issued a Cleanup and Abatement Order (CAO) from the Regional Board. Each CAO requires routine groundwater monitoring to be conducted.

11. **Section 3.3.2, Page 3-7, last paragraph:** states all laboratories....will be approved by EPA. Recommend a sentence that states these laboratories should also be certified by the State of California.
12. **Section 3.4.1, page 3-9:** Of particular note for the condition assessment, DWP reports that NHE-3, NHE-6, NHE-7, and NHE-8 power supply equipment and control equipment should also be upgraded. Power bumps are a major cause of outages for the existing remedy. These same wells produce substantially less than the design flow, and will also need to be rehabilitated.
13. **Section 3.4.2, page 3-11, second paragraph:** This section states that the target capture zone will be established by compiling the areas of the plume where contamination exceeds ten times the associated regulatory limit. This is acceptable as a target zone; however, to the extent that lower concentration areas must be captured in order to meet the containment RAO, then those areas shall also be included. The containment RAO states: "Contain areas of contaminated groundwater that exceed the MCLs and notification levels to the maximum extent practicable." Containment is expected to be more difficult in the north and northwestern part of the hot spots, but is expected to be more readily achieved in the southern end of the Operable Unit.
14. **Section 3.4.3.1, page 3-13, middle of paragraph:** This section states that influent COC concentrations and flow rates from individual wells will be used to estimate combined influent concentrations to the planned central treatment facility, for the purpose of preliminary treatment design. This approach implies that the RD might ignore concentrations of COCs that exceed regulatory limits at individual wells. CDPH may not accept such an approach for the intended beneficial use of the treated water, which is delivery to LADWP for municipal supply. This aspect of RD should be coordinated with LADWP and CDPH as part of the 97-005 process discussions (see previous comment on 97-005).
15. **Section 3.4.3.2, page 3-14, last row of in-text table:** The alternative treatment method for 1,4-dioxane, blending with other wells, may not be acceptable to CDPH for water that will ultimately be delivered to LADWP for municipal use. This aspect of RD should be coordinated with LADWP and CDPH as part of the 97-005 process discussions (see previous comment on 97-005).
16. **Section 3.4.3.2, page 3-14, Selection Criteria:** These criteria are reasonable; however, if the recommended treatment option is any different than what is currently in the ROD, the options must be vetted against the CERCLA 9 criteria. If EPA is to approve any alternative treatment option, some sort of ROD amendment must be completed, and therefore, the information necessary to justify that amendment must be presented in the Treatment Options Technical Memorandum.
17. **Section 3.4.4, page 3-17, first bullet:** The Basis of Design should also specify the anticipated permitted effluent requirements. Some treatment processes, such as air stripping and advanced oxidation, are designed based on the concentration difference between the influent and the effluent. The Work Plan states "The design basis will specify the treatment standards that the system will achieve." Instead, it is recommended that the Basis of Design state the anticipated permit requirements and compare the predicted effluent against the anticipated permit requirements. Section 9.8 appears to indicate this will occur. These two sections should be consistent. Additionally, any contaminant that is found through 97-005 screening, including those

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Please let me know if you have any questions.

Sincerely,



Kelly Manheimer
EPA Project Manager