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*FINAL*

**Remedial Investigation Work Plan  
San Fernando Valley Area 2 Superfund Site  
Glendale Chromium Operable Unit**

**EPA Contract No. EP-S9-08-04  
EPA Task Order No. 060-RICO-09N2  
CH2M HILL Project No. 427727**

Prepared for  
**United States Environmental Protection Agency  
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April 2012

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# Contents

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Section	Page
<b>Acronyms and Abbreviations</b> .....	<b>vii</b>
<b>Section 1 – Introduction</b> .....	<b>1-1</b>
1.1 Objective of Remedial Investigation.....	1-1
1.2 Site Background.....	1-1
1.3 Guidance for Conducting Remedial Investigation .....	1-1
<b>Section 2 – Approach for Conducting Remedial Investigation</b> .....	<b>2-1</b>
2.1 Project Planning.....	2-1
2.1.1 Community Involvement.....	2-1
2.2 Collect Data.....	2-1
2.2.1 Identify Data Needs .....	2-1
2.2.2 Develop Approach for Data Collection .....	2-2
2.2.3 Field Activities.....	2-2
2.2.4 Data Usability Evaluation.....	2-3
2.3 Data Evaluation.....	2-4
2.3.1 Nature and Extent of Contamination .....	2-4
2.3.2 Contaminant Fate and Transport .....	2-5
2.4 Risk Assessment.....	2-5
2.4.1 Baseline Human Health Risk Assessment .....	2-5
2.4.2 Ecological Risk Assessment.....	2-6
2.5 Reporting .....	2-6
2.5.1 Site Characterization Technical Memorandum.....	2-6
2.5.2 Remedial Investigation Report .....	2-6
<b>Section 3 – References</b> .....	<b>3-1</b>

## Tables

1-1	Remedial Investigation Report Outline
2-1	Data Quality Objectives for Remedial Investigation
2-2	Data Quality Objectives for Data Collection
2-3	Data Needs and Potential Monitoring Well Locations
2-4	Data Quality Objectives for Evaluating the Nature and Extent of Contamination
2-5	Data Quality Objectives for Evaluating the Fate and Transport of Contamination
2-6	Data Quality Objectives for Performing the Baseline Human Health Risk Assessment
2-7	Data Quality Objectives for Performing the Screening Level Ecological Risk Assessment
2-8	Data Quality Objectives for Assessment of Next Steps

## Figures

1-1	Remedial Investigation Schedule
2-1	Locations of Planned Monitoring Wells for the Remedial Investigation



# Acronyms and Abbreviations

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Area 2	San Fernando Valley Area 2 Superfund Site
COPC	contaminant of potential concern
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
ERA	ecological risk assessment
FS	feasibility study
FSP	field sampling plan
GCOU	Glendale Chromium Operable Unit
HSP	health and safety plan
HHRA	human health risk assessment
IDW	investigation-derived waste
LARWQCB	California Regional Water Quality Control Board – Los Angeles Region
MCL	maximum contaminant level
OU	operable unit
PRP	potentially responsible parties
QAPP	quality assurance project plan
RI	remedial investigation
SFV	San Fernando Valley
TM	technical memorandum
VOC	volatile organic compound



# Introduction

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This remedial investigation (RI) work plan presents the approach the U.S. Environmental Protection Agency (EPA) will use for conducting and documenting an RI of contamination in ground water for the Glendale Chromium Operable Unit (GCOU) of the San Fernando Valley (SFV) Area 2 Superfund Site (Area 2).

## 1.1 Objective of Remedial Investigation

EPA's overall objective for conducting an RI is to evaluate the extent and distribution of hexavalent chromium contamination in ground water in Area 2 and potential risks to human health and the environment posed by the contamination. If unacceptable risk exists, EPA will conduct a feasibility study (FS) to identify a preferred remedial alternative that will eliminate, reduce, or control unacceptable risks to human health or the environment. The schedule shown on Figure 1-1 projects completion of the RI in 2013. Table 1-1 presents a general outline of the report that will summarize RI results.

## 1.2 Site Background

In 2007, EPA established the GCOU based on the results of a four-year study of chromium contamination conducted by the California Regional Water Quality Control Board – Los Angeles Region (LARWQCB), funded by EPA, and subsequent LARWQCB investigations. The study and investigations revealed extensive hexavalent chromium contamination in ground water throughout eastern SFV and many potential hexavalent chromium sources. An interim remedy addressing chlorinated volatile organic compound (VOC) contamination in Area 2 is currently in place. However, the interim remedy does not specifically address hexavalent chromium contamination. Therefore, EPA created the GCOU to study the distribution of hexavalent chromium contamination in ground water and to evaluate potential associated unacceptable risks to human health and the environment. EPA is leading the RI for GCOU, with a group of potentially responsible parties (PRPs), the GCOU Respondents Group (Respondents), performing a portion of the field investigation.

## 1.3 Guidance for Conducting Remedial Investigation

EPA will conduct the RI in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan, 40 Code of Federal Regulations Part 300, following guidance provided in the memo *Summary of Key Existing EPA CERCLA Policies for Groundwater Restoration* (EPA, 2009a).



# Approach for Conducting Remedial Investigation

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## 2.1 Project Planning

To guide data collection and evaluation, EPA developed a set of DQOs for the overall RI and a set of DQOs for the six subtasks that will be performed to meet the goals of the RI. Table 2-1 presents the overall DQOs for the RI. Tables 2-2 and 2-4 through 2-8 present the DQOs for the six subtasks listed below.

- Subtask 1: Collect Data
- Subtask 2: Evaluate the nature and extent of contamination
- Subtask 3: Evaluate the fate and transport of contamination
- Subtask 4: Perform baseline risk assessment
- Subtask 5: Perform ecological risk assessment
- Subtask 6: Assess next steps

### 2.1.1 Community Involvement

EPA will perform community involvement activities involving local agencies and community members to understand and address the specific needs and concerns of the community. EPA's community involvement program will support all RI activities, including activities performed by EPA and by the Respondents. Community involvement for the GCOU RI will follow general approach outlined in the *Final Revised Community Relations Plan, San Fernando Valley Superfund Sites* (EPA, 1993). EPA is currently preparing an updated version of the plan to replace the 1993 version and will use the new plan once it is finalized. Community involvement activities may include the following:

- Community interviews
- Public meetings and open houses
- Briefings for elected officials
- Preparation and distribution of fact sheets

In addition to those broader community involvement efforts, community outreach activities will target members of the community potentially affected by EPA's RI field program. Outreach activities will include door-to-door distribution of pre-fieldwork flyers for residents and businesses in the immediate vicinity of each monitoring well installation location.

## 2.2 Collect Data

EPA will use primary data (data collected by EPA) and secondary data (data collected by other stakeholders) to complete the RI. Table 2-2 summarizes the DQOs for data collection. Primary data will consist mainly of data collected during the field activities described below.

### 2.2.1 Identify Data Needs

EPA, LARWQCB and others have overseen and conducted extensive investigative work in the SFV Area 2 Superfund site through work on the Glendale North and South operable units (OUs); the interim remedy for VOC-contaminated ground water; ongoing EPA ground water monitoring; and considerable site-specific investigation and remediation at individual facilities. EPA previously identified areas for additional chromium investigation in the 2005 Burbank and Glendale Operable Units Focused Chromium Trend Study (CH2M HILL, 2005) and in the 2007 Priority Ranking of Potential Well Sites for Chromium Monitoring Technical Memorandum (CH2M HILL, 2007).

Prior to planning the RI field activities EPA evaluated existing data as follows:

- Reviewed the most recent water quality and site characterization data generated in the GCOU area.
- Reassessed the previously identified data gaps and refined the areas of focus within the GCOU.
- Reviewed the preliminary conceptual site model prepared by the Respondents (ERM, 2011).

Beginning with the 2005 Chromium Trend Study (CH2M HILL, 2005), EPA's focused analysis of the data gaps identified seven key areas (A through G) where additional chromium ground water investigation may be warranted to more completely delineate the nature and extent of chromium contamination and to evaluate chromium fate and transport. Figure 2-1 shows the distribution of hexavalent chromium in GCOU ground water and the seven key investigation areas. Table 2-3 presents the data needs associated with each of the key investigation areas.

The Respondents are installing up to 12 new monitoring wells as part of their RI activities, several of which directly address the data needs outlined in Table 2-3. In addition, 14 new monitoring wells are being installed in the vicinity of the Glendale North OU and Glendale South OU extraction wells as part of the Glendale OU Focused Feasibility Study (FFS). EPA is currently planning to install up to 17 new monitoring wells at 15 different locations to address data needs that are not being addressed by the new monitoring wells installed by the Respondents. EPA will install monitoring wells during two separate phases of field work (Phase 1 and Phase 2). Figure 2-1 shows the locations of monitoring wells. The final locations and the need to install the Phase 2 monitoring wells will be evaluated using the results from Phase 1 of the RI (both EPA's and Respondents' work) and available existing data. Table 2-3 presents rationale for the potential monitoring wells EPA plans to install. The quality assurance project plan (QAPP), a companion to this document, provides additional background information on the GCOU, discussion on past chromium investigations, and identification of the seven key areas (EPA, 2012).

## 2.2.2 Develop Approach for Data Collection

EPA will perform the GCOU RI using the approach outlined in the sampling and analysis plan (SAP), a companion to this work plan. The SAP covers the planned RI field program, including ground water monitoring well installation and sampling; soil sampling during monitoring well installation; sampling of existing and PRP-installed monitoring wells; aquifer testing of new EPA wells; and managing investigation-derived waste (IDW). The SAP includes the following planning documents:

- **Field Sampling Plan (FSP):** The FSP supports field and laboratory activities associated with the RI. The FSP also presents the requested analyses for RI analytical testing and documents sampling handling and analysis procedures.
- **Quality Assurance Project Plan (QAPP):** The QAPP addresses collection and evaluation of data for the RI. The QAPP presents DQOs and information, data, rationales, analyses, and procedures for field and laboratory activities. Laboratory activities will include performing chemical analyses on soil and ground water samples collected during the RI field activities.
- **Health and Safety Plan (HSP):** The HSP documents the project organization, the field tasks, and hazard controls for field activities.

## 2.2.3 Field Activities

EPA will implement a field investigation intended to fill data gaps related to the regional distribution of chromium contaminated ground water in the GCOU that are not addressed by other new monitoring wells (installed by the Respondents or for the Glendale OU FFS). Identification and investigation of specific facilities that may be sources of chromium contamination in ground water is outside the scope of the GCOU RI. Source identification is being addressed primarily by the RWQCB with EPA's assistance. The FSP outlines the procedures that EPA will use to conduct the field program. The following list briefly describes the key investigation activities.

- **Pre-field Activities:** EPA will conduct site reconnaissance visits and negotiate access for drilling locations, and procure subcontractors.

- **Monitoring Well Installation:** EPA will install up to 17 new monitoring wells at up to 15 different locations (Figure 2-1). EPA may modify the number and locations of new wells based on the results of Phase 1 of the RI field program.
- **Aquifer Testing:** EPA will perform pumping tests to assess aquifer properties at selected new monitoring wells.
- **Ground Water Sampling:** EPA will conduct quarterly ground water sampling at new and existing wells.
- **IDW Management:** EPA will manage the IDW generated to ensure it will be disposed of at an appropriate disposal facility.

## 2.2.4 Data Usability Evaluation

EPA will evaluate all primary and secondary data for usability in RI evaluations. EPA will complete the data usability evaluation in accordance with the following guidance document: Guidance for Data Quality Assessment (EPA, 2000).

### 2.2.4.1 Primary Data

EPA will generate the following types of primary data as part of the GCOU RI:

- Ground water monitoring well data
  - Well locations and reference point elevations
  - Screened intervals and well depths
- Lithologic logs
- Ground water levels from monitoring wells
- Analytical data
  - Ground water sampling results
- Aquifer testing data
  - Water levels from pumping and observation wells
  - Discharge rates from pumping wells

EPA will not perform geophysical logging of boreholes due to the relatively shallow nature of the investigation and because the planned drilling techniques do not accommodate most standard geophysical methods. EPA will validate all analytical data collected for the RI. EPA will perform Tier 1 level data validation on 90 percent of the analytical data packages, with Tier 3 data validation performed for the remaining 10 percent of the data packages.

EPA will independently validate data following EPA Contract Laboratory Program National Guidelines for Data Review as follows:

- USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review (EPA, 2001b)
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (EPA, 2004a)

Well construction information, lithologic logs, and ground water levels will be reviewed by the RI manager to ensure that the data were collected in accordance with the approved planning documents and were reported accurately. Aquifer testing data will be reviewed by a qualified hydrogeologist to ensure that the data were generated in accordance with approved procedures and are technically acceptable.

### 2.2.4.2 Secondary Data

EPA will use secondary data to complete the GCOU RI. EPA will use the same types of data listed above, but generated by outside parties, as well as the following additional types of data:

- Topographic data
- Land use data

- Geologic data
  - Geologic maps
  - Geophysical logs
- Hydrologic data
  - Precipitation data
  - Surface water data
  - Pumping data
  - Recharge data
- Evaluation criteria
  - Drinking water standards
  - Human health risk screening levels
  - Ecological risk screening levels
  - Chemical toxicity values

The anticipated secondary data sources include the following:

- EPA SFV basin-wide database
- Respondents
- LARWQCB and DTSC
- Other stakeholders
- Other federal, state, and local agencies

The type of secondary data assessment EPA will perform will vary based on the type of secondary data. Secondary data in the form of published information or regulatory levels from federal, state, or local agencies (i.e., topographic data, land use data, maximum contaminant levels (MCLs), etc.) are of known and usable quality and will not require further assessment. EPA will assess secondary data in the form of measurements recorded directly or indirectly by other parties (i.e., lithologic logs, sample results, ground water level measurements, etc.) using one or more of the following methods:

- Follow-up interviews with secondary data collectors to evaluate the procedures followed and documentation generated during collection of secondary data
- Review of existing QAPPs or other documentation relating to quality systems associated with the data collection or analysis to assess whether the secondary data is suitable for use in the RI

EPA's QAPP provides a complete discussion of the secondary data assessment procedures for the GCOU RI.

## 2.3 Data Evaluation

EPA will compile and evaluate analytical and field data generated during the RI and data from secondary sources as part of the overall RI data evaluation effort. EPA's primary focus of data evaluation is to determine the nature and extent, and fate and transport of hexavalent chromium contamination in the GCOU, and to conduct the risk assessment described in Section 2.6. EPA will construct a comprehensive data set of chromium data from over 40 monitoring wells that will be sampled during the RI and recent results from existing wells in EPA's SFV database (more than 100 existing wells are routinely sampled in the GCOU).

### 2.3.1 Nature and Extent of Contamination

EPA will evaluate the nature and extent of hexavalent chromium contamination in GCOU using all available and usable data (as determined in the data usability assessment). Table 2-4 presents the DQOs for evaluating the nature and extent of contamination. EPA's evaluation will include development of the following items:

- Cross sections through the GCOU
- Tables of analytical results

- Maps that post the analytical results from the RI field program
- Maps that assimilate the new and existing hexavalent chromium data and illustrate generalized contaminant concentration contours (plume maps)

### 2.3.2 Contaminant Fate and Transport

After evaluating the nature and extent of contamination, EPA will assess the fate and transport of hexavalent chromium contamination in GCOU. Table 2-5 provides the DQOs for assessing the fate and transport of contamination. EPA's assessment will include development of the following items:

- Ground water elevation contour maps
- Ground water time-series contaminant concentration charts
- Evaluation of vadose zone transport characteristics
- Maps that show the locations of known and potential chromium sources in the GCOU
- Evaluation of ground water flow directions and associated impacts on contaminant migration directions and rates

## 2.4 Risk Assessment

EPA will use the results of the RI field program, the Respondents field program, and existing data available in the SFV basin-wide database to conduct a baseline human health risk assessment (HHRA) and ecological risk assessment (ERA) for relevant receptors and exposure pathways in the GCOU. Prior to initiating risk assessment work, EPA will prepare a technical memorandum outlining the technical approach and describing the data to be used to conduct the HHRA and ERA. The technical memorandum will be prepared prior to conducting Phase 2 of the RI to allow any additional data collection needs to be incorporated into the field program.

The risk assessments will include identification of contaminants of potential concern (COPCs), exposure assessment, toxicity assessment, and risk characterization. The risk assessments will be used to help determine whether remediation is necessary and to provide justification for performing remedial action in the GCOU.

### 2.4.1 Baseline Human Health Risk Assessment

EPA will perform a baseline HHRA to assess the human health risks associated with hexavalent chromium contamination in the GCOU. Table 2-6 provides the DQOs for performing the baseline HHRA. EPA will perform the HHRA in accordance with the following guidance:

- *Risk Assessment Guidance for Superfund, Volume I - Human Health Evaluation Manual, Part A (Interim Final)* (EPA, 1989)
- *Risk Assessment Guidance for Superfund, Volume I - Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment, Final)* (EPA, 2004b)
- *Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment)* (EPA, 2009b)
- *Human Health Risk Assessment (HHRA) Note Number 1. Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Hazardous Waste Sites and Permitted Facilities* (DTSC, 2011)
- California EPA Toxicity Criteria Database. (OEHHA, 2012).

## 2.4.2 Ecological Risk Assessment

EPA will perform an ERA to assess the risks to the environment associated with hexavalent chromium contamination in GCOU. Table 2-7 provides DQOs for performing the ERA. EPA will perform the ERA in accordance with the following guidance:

- Guidance for Ecological Risk Assessment at Hazardous Waste Sites and Permitted Facilities (Cal/EPA, 1996)
- Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (EPA, 1997)
- Final Guidelines for Ecological Risk Assessment (EPA, 1998)

## 2.5 Reporting

EPA will prepare a site characterization technical memorandum (TM) and an RI report to document the RI activities.

### 2.5.1 Site Characterization Technical Memorandum

EPA will prepare the TM as an interim submittal prior to conducting the risk assessments. The TM will help evaluate the necessity of additional RI field investigations and availability of sufficient data for performing the HHRA and ERA. The TM will summarize the following items:

- Documentation of the RI field program
- Basic hydrogeology of the GCOU
- Ground water elevation contour maps
- Results of the nature and extent of contamination evaluation
- Results of the contaminant fate and transport evaluation

### 2.5.2 Remedial Investigation Report

EPA will prepare an RI report that provides detailed information on the GCOU site characteristics, results of the RI, and recommendations for future work. Table 1-1 presents a general outline of the RI report. The RI report will include the following items:

- RI DQOs
- Data collection summary, including collection of primary and secondary data
- Data usability assessment
- Physical characteristics of the GCOU
- Hydrogeology of the GCOU
- Nature and extent of ground water contamination
- Sources of contamination
- General discussion of potential residual vadose zone contamination
- Contaminant fate and transport
- Results of the HHRA and ERA
- Identification of potential data gaps
- Recommendations for future work

A primary goal of the RI report is to provide an assessment of the next steps to take in the RI/FS process. Table 2-8 provides the DQOs for assessment of the next steps in the GCOU RI/FS.

## SECTION 3

# References

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## Tables

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TABLE 1-1

Remedial Investigation Report Outline

*San Fernando Valley Area 2 Superfund Site, Glendale Chromium Operable Unit*

- 1. Introduction**
  - 1.1. Purpose of Remedial Investigation
  - 1.2. Data Quality Objectives
  - 1.3. Report Development and Organization
  - 1.4. Development of Remedial Investigation Data Set
- 2. Site Background**
  - 2.1. Location
  - 2.2. Geology and Hydrogeology
  - 2.3. Site History
- 3. EPA Remedial Investigation Activities**
  - 3.1. Data Evaluation and Planning
  - 3.2. Community Involvement
  - 3.3. Investigation of Regional Aquifer Characteristics and Ground Water Contamination
  - 3.4. Investigation of Contaminant Sources
  - 3.5. Summary of EPA Activities for the Remedial Investigation
  - 3.6. Data Usability Assessment
- 4. Site Characteristics**
  - 4.1. Key Components of the Hydrogeologic Conceptual Site Model
  - 4.2. Summary of Glendale Chromium OU Physical Characteristics
- 5. Nature and Extent of Contamination**
  - 5.1. Remedial Investigation Data Set
  - 5.2. Contaminants of Potential Concern
  - 5.3. Distribution of Key Contaminants of Potential Concern
  - 5.4. Potential Sources of Contamination
- 6. Contaminant Fate and Transport**
  - 6.1. Contaminant Migration Conceptual Site Model
  - 6.2. Contamination Distribution and Migration in Ground Water
  - 6.3. Conclusion
- 7. Summary of Baseline Human Health Risk Assessment**
  - 7.1. Approach for the Baseline Human Health Risk Assessment
  - 7.2. Results of the Baseline Human Health Risk Assessment
  - 7.3. Summary of the Baseline Human Health Risk Assessment
- 8. Summary of Ecological Risk Assessment**
  - 8.1. Approach for the Ecological Risk Assessment
  - 8.2. Results of the Ecological Risk Assessment
  - 8.3. Summary of the Ecological Risk Assessment
- 9. Remedial Investigation Summary and Conclusions**
  - 9.1. Hydrogeologic Conceptual Site Model
  - 9.2. Contaminant Source Identification
  - 9.3. Nature and Extent of Contamination
  - 9.4. Contamination Migration Conceptual Site Model
  - 9.5. Baseline Human Health Risk Assessment
  - 9.6. Ecological Risk Assessment
  - 9.7. Future Work
- 10. References**



Table 2-1  
 Data Quality Objectives for Remedial Investigation  
 San Fernando Valley Area 2 Superfund Site, Glendale Chromium Operable Unit  
 Page 1 of 2

<b>Step 1: State the Overall Problem</b>	<b>Overall Problem</b>	<b>Justification</b>
	Evaluate the current and potential threats to human health and the environment from hexavalent chromium contamination in ground water underlying the GCOU. EPA will complete six subtasks identified in Step 5 to achieve the RI objectives.	Ground water underlying the GCOU is a source of drinking water and hexavalent chromium concentrations in untreated ground water exceed risk-based screening levels.
<b>Step 2: Identify Goals of Remedial Investigation</b>	<b>Overall Goal</b>	<b>Justification</b>
	<b>Principal study questions:</b> <ul style="list-style-type: none"> <li>What are the nature and extent of hexavalent chromium in ground water?</li> <li>What are the potential threats to human health and the environment?</li> </ul>	The nature and extent of hexavalent chromium in ground water is not sufficiently characterized to evaluate 1) potential threats to human health and the environment and 2) if a remedy to address chromium contamination is necessary in the GCOU.
	<b>Possible outcomes include:</b> <ul style="list-style-type: none"> <li>Hexavalent chromium contamination in the GCOU represents a potential threat to human health and/or the environment.</li> <li>Hexavalent chromium contamination in the GCOU does not represent a potential threat to human health and/or the environment.</li> <li>Data gaps exist after the RI and additional investigation/data collection is required to assess the nature and extent of contamination or potential risk to human health and/or the environment.</li> </ul>	
<b>Decision statement:</b> Ensure sufficient characterization of the nature and extent of contamination and assess potential risks posed to human health and the environment.		
<b>Step 3: Identify Data Needs for Remedial Investigation</b>	<b>Data Needs</b>	<b>Data Use</b>
	<b>Identify types and sources of information needed to complete the RI for GCOU:</b> Tables 2-2, 2-4, 2-5, 2-6, 2-7 and 2-8 present the DQOs for the subtasks described in Step 5. Each table identifies the types and sources of information needed for the specific subtask.	Provide sufficient information to complete the RI for the GCOU.
<b>Step 4: Define Boundaries for Remedial Investigation</b>	<b>Boundaries for Consideration</b>	<b>Justification for Boundaries</b>
	<b>Evaluations within the boundaries of the RI study:</b> Spatial boundaries include the regional extent of hexavalent chromium ground water contamination in the GCOU.  Temporal boundaries include the time required to complete the RI.  Tables 2-2, 2-4, 2-5, 2-6, 2-7 and 2-8 list the practical spatial and temporal constraints for each subtask.	Actual site boundaries are defined by the extent of hexavalent chromium ground water contamination underlying the GCOU.  Temporal boundaries include the time required for stakeholders to provide comments.
	<b>Evaluations outside the boundaries of the RI study:</b> <ul style="list-style-type: none"> <li>Assessing potential facility-specific risks to human health or the environment due to hexavalent chromium contamination.</li> <li>Evaluating lithologic and ground water flow conditions in portions of the SFV beyond the GCOU boundaries.</li> <li>Characterizing hexavalent chromium sources upgradient of the GCOU in northern SFV OUs (Burbank and North Hollywood).</li> </ul>	Evaluating potential risks at a facility-specific level is generally done by the state (RWQCB and DTSC)  Other parties are conducting the evaluations in other portions of the SFV, including characterizing sources in upgradient OUs.
<b>Step 5: Develop Process to Complete Remedial Investigation</b>	<b>RI Process</b>	<b>Justification</b>
	The RI evaluation consists of completing the following six subtasks: <ul style="list-style-type: none"> <li>Subtask 1: Data Collection</li> <li>Subtask 2: Evaluate the Nature and Extent of Contamination</li> <li>Subtask 3: Evaluate the Fate and Transport of Contamination</li> <li>Subtask 4: Perform Baseline Human Health Risk Assessment</li> <li>Subtask 5: Perform Ecological Risk Assessment</li> <li>Subtask 6: Assess Next Steps</li> </ul>	Completion of the six subtasks is necessary to evaluate potential risk to human health and the environment and determine if remedial action is necessary.  Community involvement activities are necessary to inform the public of the purpose of the RI and to provide updates on progress.

**Acronyms:**

CSM – conceptual site model  
 DQO – data quality objective  
 EPA – United States Environmental Protection Agency  
 ERA – ecological risk assessment  
 GCOU – Glendale Chromium Operable Unit  
 HHRA – human health risk assessment  
 OU – operable unit  
 RI – remedial investigation  
 VOC – volatile organic compound

**RI Subtasks:**

- 1: Data Collection
- 2: Evaluate Nature and Extent of Contamination
- 3: Evaluate Fate and Transport of Contamination
- 4: Perform Baseline HHRA
- 5: Perform ERA
- 6: Assess Next Steps

Table 2-1  
 Data Quality Objectives for the Remedial Investigation  
 San Fernando Valley Area 2 Superfund Site, Glendale Chromium Operable Unit  
 Page 2 of 2

	<p>Tables 2-2, 2-4, 2-5, 2-6, 2-7 and 2-8 present the DQOs for each subtask, respectively.</p> <p>In addition to completing the six subtasks, EPA will perform community involvement activities to understand and address specific needs and concerns of the community as they relate the GCOU RI.</p>	<p>Additionally it is important to open and maintain a line of communication with local residents and businesses that may be temporarily affected by RI field activities.</p>
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<p><b>Step 6: Specify Acceptance Criteria for Remedial Investigation</b></p>	<p><b>Potential Consequences of Obtaining Incorrect Results</b></p>	<p><b>Methods for Overcoming Incorrect Results</b></p>
	<ul style="list-style-type: none"> <li>• Misrepresentation of the nature and extent of contamination or incorrect identification of potential risks to human health and the environment will adversely impact the decision making process.</li> <li>• Taking an action unnecessarily (i.e., no actual threat to human health or environment exists) will waste resources.</li> <li>• Not taking an action when an actual threat exists will allow current and potential threats to human health and environment to persist.</li> <li>• Collecting unnecessary data will waste resources.</li> </ul>	<ul style="list-style-type: none"> <li>• Consider all usable data and limit biases (such as having a preconceived CSM) during the RI process.</li> <li>• Ensure sufficient confidence in data used to support decision making.</li> <li>• Ensure approach to risk assessment is conservative enough that potential risks are not neglected.</li> <li>• Continually evaluate the completeness and usability of data to minimize unnecessary data collection.</li> </ul>

<p><b>Step 7: Develop Detailed Plan for Completing RI</b></p>	<p><b>Actions</b></p>	<p><b>Methods for Optimizing the Design</b></p>
	<p>Complete each subtask listed in Step 5. Identify the need for additional data collection or a Feasibility Study.</p>	<p>Complete the RI as a means for assessing the need to conduct a Feasibility Study.</p>

**Acronyms:**

CSM – conceptual site model  
 DQO – data quality objective  
 EPA – United States Environmental Protection Agency  
 ERA – ecological risk assessment  
 GCOU – Glendale Chromium Operable Unit  
 HHRA – human health risk assessment  
 OU – operable unit  
 RI – remedial investigation  
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**RI Subtasks:**

- 1: Data Collection
- 2: Evaluate Nature and Extent of Contamination
- 3: Evaluate Fate and Transport of Contamination
- 4: Perform Baseline HHRA
- 5: Perform ERA
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Table 2-2  
 Data Quality Objectives for Data Collection  
 San Fernando Valley Area 2 Superfund Site, Glendale Chromium Operable Unit  
 Page 1 of 2

<b>Step 1: State the Problem of Subtask</b>	<b>Overall Problem</b>	<b>Justification</b>
	Collect the appropriate amount of usable data to assess the nature and extent of hexavalent chromium contamination.	Currently, insufficient data are available to evaluate the nature and extent and fate and transport of hexavalent chromium in GCOU ground water or to evaluate potential threats to human health or the environment.
<b>Step 2: Identify Goals of Subtask</b>	<b>Overall Goal of the Subtask</b>	<b>Justification</b>
	<b>Principal study questions:</b> What types of data need to be collected, what data collection methods should be used, and are the data collected of known, documented and acceptable quality to achieve the RI goals?	Data must be of sufficient quantity and quality to perform defensible and statistically valid evaluations of potential risks to human health and the environment.
	<b>Possible outcomes include:</b> <ul style="list-style-type: none"> <li>• The appropriate amount and types of usable data are collected to complete RI Subtasks 2, 3, 4, and 5.</li> <li>• Some data are of questionable quality and should only be used if qualified as such and collection of higher quality data is infeasible.</li> <li>• Data collected do not meet data quality goals and should not be used in RI evaluations.</li> <li>• Data gaps exist and additional data collection is required.</li> </ul>	
<b>Decision statement:</b> Determine whether or not the data collected for the RI are of sufficient quantity and are of known, documented and acceptable quality to perform RI Subtasks 2, 3, 4, and 5.		
<b>Step 3: Identify Data Needs for Subtask</b>	<b>Data Needs</b>	<b>Data Use</b>
	<b>Identify types of data needed to perform the RI:</b> <ul style="list-style-type: none"> <li>• Lithologic data</li> <li>• Ground water levels from monitoring wells</li> <li>• Water level responses to aquifer stresses (pumping tests)</li> <li>• Analytical data for ground water</li> </ul>	EPA will use data collected to complete RI Subtasks 2, 3, 4, and 5. <ul style="list-style-type: none"> <li>• Lithologic data from boreholes will be considered when designing monitoring wells and to evaluate subsurface hydrogeology</li> <li>• Ground water levels from monitoring wells will be used to create ground water elevation contour maps</li> <li>• Water level responses recorded during pumping tests will be used to estimate hydraulic properties of aquifer materials</li> <li>• Analytical data for ground water will be used to evaluate the general chemistry characteristics and distribution of contaminants in GCOU ground water</li> <li>• Raw data and QA/QC data will be used to validate analytical results.</li> <li>• Data collection methods and the sources of data will be considered in the data usability assessment.</li> <li>• Data evaluation criteria will be considered to evaluate the detection limits for chemical analyses.</li> </ul>
	<b>Identify types of information needed to evaluate data usability:</b> <ul style="list-style-type: none"> <li>• Raw data</li> <li>• QA/QC data corresponding to raw data</li> <li>• Data collection or analysis method</li> <li>• Source of data</li> <li>• Data evaluation criteria [maximum contaminant levels (MCLs), notification levels (NLs), risk-based screening levels]</li> </ul>	
<b>Select appropriate evaluation methods:</b> <ul style="list-style-type: none"> <li>• Review EPA guidance and identify relevant portions for site specific evaluations.</li> <li>• Seek stakeholder input.</li> </ul>		
<b>Step 4: Define Boundaries for the Subtask</b>	<b>Boundaries for Consideration</b>	<b>Justification for Boundaries</b>
	Spatial boundaries include the extent of regional hexavalent chromium ground water contamination in the GCOU. Primary data generated during the RI field activities will be limited to the GCOU; however data from other SFV OUs may be used in RI evaluations.  Temporal boundaries include the time required to collect data. Step 6 provides the practical constraints identified for this subtask.	Actual site boundaries defined by area of ground water contamination underlying GCOU.  Temporal boundaries include the time required to collect sufficient primary and secondary data to complete the RI.

**Acronyms:**

EPA – United States Environmental Protection Agency  
 GCOU – Glendale Chromium Operable Unit  
 LARWQCB – California Regional Water Quality Control Board – Los Angeles Region  
 QA/QC – quality assurance/quality control  
 RI – remedial investigation  
 SFV – San Fernando Valley  
 VOC – volatile organic compound

**RI Subtasks:**

- 1: Data Collection
- 2: Evaluate Nature and Extent of Contamination
- 3: Evaluate Fate and Transport of Contamination
- 4: Perform Baseline HHRA
- 5: Perform Screening Level ERA
- 6: Assess Next Steps

Table 2-2  
 Data Quality Objectives for Data Collection  
 San Fernando Valley Area 2 Superfund Site, Glendale Chromium Operable Unit  
 Page 2 of 2

<b>Step 5: Develop Approach to Data Collection</b>	<b>Outputs</b>	<b>Justification</b>
	<ul style="list-style-type: none"> <li>Identify the amount and types of data needed to conduct the RI.</li> <li>Identify potential sources of secondary data.</li> <li>Identify the appropriate methods for collection of primary and secondary data.</li> <li>Identify the potential uses for the data.</li> <li>Identify the appropriate level of review for each data set.</li> <li>Develop outlines/plans for evaluating primary and secondary data and for assessing the usability of the RI dataset.</li> <li>Prepare the appropriate planning documents to outline the data acquisition approach and for evaluating primary and secondary data usability.</li> </ul> <p><b>Identify sources of data needed to perform the RI:</b></p> <ul style="list-style-type: none"> <li>New and existing data collected by EPA</li> <li>New and existing data collected by external stakeholders</li> </ul>	<p>Necessary to perform RI Subtasks 2, 3, 4, and 5</p> <ul style="list-style-type: none"> <li>Identification of the amount, types, and potential uses of data will allow for appropriate planning and reduce collection of unnecessary data.</li> <li>Identification of secondary data sources will assist in timely data requests,</li> <li>Identification of appropriate methods for collection and level of review for primary and secondary data will assist in planning data collection and evaluation.</li> <li>Preparation of planning documents will streamline data collection and reduce collection of unnecessary data.</li> </ul>
<b>Step 6: Specify Acceptance Criteria for the Subtask</b>	<b>Potential Consequences of Obtaining Incorrect Results</b>	<b>Methods for Overcoming Incorrect Results</b>
	<ul style="list-style-type: none"> <li>Data collected will misrepresent the physical and chemical characteristics of the GCOU.</li> <li>Data of insufficient or unknown quality could be used in RI evaluations and misrepresent the nature and extent of contamination and the risk to human health and the environment.</li> <li>Evaluations based on data of insufficient or unknown quality could lead to spending additional resources on unnecessary investigations.</li> </ul> <p><b>Practical constraints include:</b></p> <ul style="list-style-type: none"> <li>Access to some locations where data collection is preferred may be infeasible due to spatial constraints (property ownership, utility conflicts) or temporal constraints (delayed access).</li> <li>Data from secondary source may be unpublished or restricted from public use.</li> <li>Insufficient QA/QC data collected to validate analytical results.</li> <li>Documentation of data collection is incomplete.</li> </ul>	<ul style="list-style-type: none"> <li>Review existing data prior to collecting new data.</li> <li>Prepare and implement plans that build QA/QC procedures into the data collection process.</li> <li>Follow guidance and plans developed for the data usability evaluation.</li> </ul> <p><b>Methods to Address Practical Constraints:</b></p> <ul style="list-style-type: none"> <li>Identify alternate locations for data collection that meet similar data needs.</li> <li>Identify alternate data sources that achieve the same data use.</li> <li>Prepare and follow plans that outline sufficient QA/QC data collection and proper documentation of data collection procedures.</li> </ul>
<b>Step 7: Develop Detailed Plan for Completing the Subtask</b>	<b>Outputs</b>	<b>Methods for Optimizing the Design</b>
	<ul style="list-style-type: none"> <li>Compile existing data, including primary data (SFV database) and secondary data (State and other stakeholder investigations).</li> <li>Acquire new primary data and secondary data (Respondents' and other stakeholders' investigations).</li> <li>Perform validation to ensure that all primary data collected for the RI are of known, documented and acceptable quality.</li> <li>Confirm the adequacy of QA/QC procedures used for collection of secondary data, such that data are of known, documented and acceptable quality.</li> <li>Perform data quality and usability assessment to ensure the adequacy of the RI dataset, including primary and secondary data.</li> <li>Assess additional data needs.</li> <li>Prepare plans for additional data collection.</li> </ul>	<ul style="list-style-type: none"> <li>Maintain frequent communication with other EPA and stakeholder project staff working in the GCOU and other OUs in SFV.</li> <li>Acquire new primary data and secondary data (Respondents' and other stakeholders' investigations).</li> <li>Complete data usability evaluation.</li> <li>Identify data gaps where additional data collection is required.</li> </ul>

**Acronyms:**

EPA – United States Environmental Protection Agency  
 GCOU – Glendale Chromium Operable Unit  
 LARWQCB – California Regional Water Quality Control Board – Los Angeles Region  
 QA/QC – quality assurance/quality control  
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**RI Subtasks:**

- 1: Data Collection
- 2: Evaluate Nature and Extent of Contamination
- 3: Evaluate Fate and Transport of Contamination
- 4: Perform Baseline HHRA
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- 6: Assess Next Steps

**TABLE 2-3**

Data Needs and Potential Monitoring Well Locations

San Fernando Valley Area 2 Superfund Site, Glendale Chromium Operable Unit

Data Gap Area <sup>1</sup>	Data Need	Well ID	Notes/Justification for New EPA Monitoring Well	Considerations for Placement of Phase 2 EPA Monitoring Wells
A <sup>2</sup>	Insufficient hexavalent chromium and ground water level data are available in this area to delineate the extent of contamination and to assess ground water flow directions and contaminant transport rates from the Burbank OU into the northern part of the Glendale Chromium OU (GCOU).	None	All required RI monitoring wells in Area A will be installed by the GCOU Respondents.	
B	Insufficient hexavalent chromium and ground water level data are available in this area to delineate the extent of contamination and provide data to assess ground water flow directions and contaminant transport rates from the North Hollywood OU into the western part of the GCOU. The area of particular concern is an undefined area of contamination in the western part of the GCOU that contains hexavalent chromium concentrations exceeding 5 µg/L. In addition, there is potential migration of lower level hexavalent chromium contamination from the southwestern portion of the Burbank OU into the western portion of the GCOU.	1	Two well cluster is intended to: - Evaluate the lateral and vertical extent of hexavalent chromium contamination detected at Basinwide RI monitoring wells NH-C06-160 and NH-C06-285.	
		2	- Provide additional information to evaluate ground water flow direction and horizontal and vertical gradients in western GCOU.	
		12	Well is intended to further delineate the lateral extent of the contamination detected in NH-C06.	Well location will be based on water quality results from Wells #1/2 and #5 and an updated review of flow directions based on new ground water elevation data: - For example, may move northeast if ground water flow is more easterly and concentrations in Wells #1/2 are low - May move southeast if ground water flow is to the southeast and Wells #1/2 or #5 contain elevated concentrations
		13	Well is intended to further delineate the lateral extent of the contamination detected in NH-C06.	Well location will be based on water quality results from Wells #1/2 and # 5 and an updated review of flow directions based on new ground water elevation data: - For example, may move southeast if ground water flow is southeasterly and concentrations in Wells #1/2 or Well #5 are elevated. - May move a considerable distance northeast if ground water flow is to the east and concentrations in Wells #1/2 are low.
C <sup>2</sup>	The eastern extent of hexavalent chromium contamination in this area (east of the merging, intermingled plumes that parallel Interstate 5) is incompletely delineated. In addition, ground water with elevated hexavalent chromium concentrations may be bypassing the GNOU extraction wells to the northeast.	3	Well is intended to evaluate hexavalent chromium concentrations along the eastern edge of the primary hexavalent chromium contamination that parallels Interstate 5 and in the vicinity of a plating facility that is not currently monitored.	Well location could be moved or the well eliminated pending results from the Respondents Well 9P: - If Well 9P contains hexavalent chromium; install well either at planned location or further to the north. - If Well 9P does not contain hexavalent chromium; Well #3 may not be needed or may be specifically focused on the plating facility.
		4	Well is intended to evaluate hexavalent chromium concentrations between the GNOU extraction wells and CS-VPB-09.	Well may move or no longer be needed pending results from GRG Well GN-P10: - If Well GN-P10 contains elevated hexavalent chromium; install well generally as planned or move south/southeast - If Well GN-P10 hexavalent chromium concentration is low/non-detect; Well #4 may not be needed or may be moved southeast near the leading edge of contamination.
D	Insufficient hexavalent chromium and ground water level data are available in the southwestern part of the Glendale OU to delineate the extent of contamination and provide data to assess ground water flow directions and contaminant transport rates in this area. Areas of particular concern include an incompletely delineated plume near the former All Metals Processing facility that contains chromium concentrations exceeding 50 µg/L and an area of sparse data far to the west.	5	Well is intended to: - Provide additional data to evaluate hexavalent chromium concentrations ground water flow directions in western GCOU. - Assist in characterizing an anomalous upgradient total chromium detection noted during recent site investigation activities.	
		14	Well is intended to evaluate conditions north of the Los Angeles River in an area of historic ground water recharge	This is a lower priority location because of the limited number of potential sources in this vicinity. Location could be moved to the north if Well #5 contains elevated hexavalent chromium.
		None	The required monitoring downgradient of the former All Metals Processing facility will be provided by two Area D wells to be installed by the GCOU Respondents.	
E <sup>2</sup>	Insufficient hexavalent chromium data are available along the Los Angeles River corridor and south/southeast of the GNOU extraction wellfield to indicate whether hexavalent chromium contamination is present in this area and migrating into the GSOU or along the river corridor.	6	Well is intended to: - Provide data on chromium concentrations and ground water flow conditions south/southwest of the GNOU extraction wells - Improve the conceptual model regarding surface water and ground water interaction along the Los Angeles River in this area.	Well may move or no longer be needed pending results from GRG Well GN-P11 and Respondents Well 7P: - If Well GN-P11 contains hexavalent chromium and the Well 7P concentration is low/non-detect; well likely to be installed as planned. - If Well 7P contains hexavalent chromium and Well GN-P11 concentration is low/ND; well may be moved east of Well 7P. - If Well GN-P11 and 7P chromium concentrations are both non-detect; well may not be needed in this area. Conversely, if both wells have elevated hexavalent chromium, additional wells may be needed in the western portion of Area E.

**TABLE 2-3**

Data Needs and Potential Monitoring Well Locations

San Fernando Valley Area 2 Superfund Site, Glendale Chromium Operable Unit

Data Gap Area <sup>1</sup>	Data Need	Well ID	Notes/Justification for New EPA Monitoring Well	Considerations for Placement of Phase 2 EPA Monitoring Wells	
F <sup>2</sup>	Insufficient hexavalent chromium data are available in the Los Angeles River Narrows area to delineate the eastern and western margins of contamination in the GSOU and between known hexavalent chromium source areas upgradient from the GSOU extraction wells.	7	Two well cluster is intended to: - Evaluate the lateral and vertical extent of chromium between upgradient sources and the GSOU extraction wells.	Well may move pending results from Respondents Wells 6P/12P and existing well sampling (Well of Opportunity and GNOU monitoring wells): - If 6P/12P both contain high levels of hexavalent chromium; Well cluster #7/8 will likely be shifted west, using the existing well results as a guide. - If both the existing shallow well sampling and Well 6P contain high levels of chromium; Well #7, the planned EPA shallow well, may not be needed.	
		8	- Provide data to more accurately predict future hexavalent chromium concentrations and arrival times at the GSOU extraction wells		
		15	Well is intended to: - Evaluate hexavalent chromium concentrations downgradient of PRC-Desoto and cross gradient of the former Drilube Facility - Improve understanding of impacts from the Los Angeles River on ground water conditions in the area.		Well may move pending results from Respondents Well 7P and Respondents existing well sampling in the area: - If 7P contains elevated hexavalent chromium; Well #15 may be moved west closer to the river. - If Well 7P and the existing well sampling in this vicinity are non-detect for hexavalent chromium; Well #15 may not be needed.
		16	Well is intended to evaluate hexavalent chromium concentrations between the upgradient former Drilube Facility and the downgradient former Excello Plating facility/GSOU extraction wells.		Well may move or no longer be needed pending results from Respondents Wells 6P/12P: - If 6P/12P contains elevated hexavalent chromium; Well #16 location will remain generally unchanged. - If Wells 6P/12P contain low or non-detect levels of hexavalent chromium; Well #16 will not likely be needed.
G <sup>2</sup>	Insufficient hexavalent chromium data are available to (1) delineate the extent of contamination downgradient (south) of the GSOU extraction wellfield where contamination migrated either prior to construction of the extraction wells or due to incomplete hydraulic control and (2) assess hydraulic gradients between the GSOU and LADWP's Pollock water supply wellfield.	9	Well is intended to: - Characterize conditions downgradient of the GSOU extraction wells. - Improve understanding of impacts from the Los Angeles River on ground water conditions in the area.		
		10	Well is intended to characterize conditions downgradient of the GSOU extraction wells and upgradient of the Pollock wellfield.		
		11	Well is intended to characterize conditions downgradient of the GSOU extraction wells and upgradient of the Pollock wellfield. An active facility has nearby monitoring wells that may be used to supplement information in this area. The facility well closest to Well #11 extends greater than 50 feet beneath the water table and is not adequate for RI evaluations.		
		17	Well is intended to evaluate ground water conditions at the southern end of the GCOU upgradient of the Pollock wellfield.	Well may move or no longer be needed pending results from EPA Phase Wells #9-11: - If all three new Phase 1 wells contain hexavalent chromium; Well #17 may move farther south and would be placed downgradient of the highest concentrations - If all three wells contain low or non-detect levels of hexavalent chromium; Well #17 is no longer needed.	

Orange shading - Priority well to be installed during in Phase 1 of the EPA RI (6 wells).  
Yellow shading - Well to be installed in EPA RI Phase 2 (up to 11 wells); final locations to be determined based on Phase 1 EPA and Respondents results and data from the GOU FFS fieldwork.

<sup>1</sup> Areas for additional chromium investigation were originally identified in the 2005 Burbank and Glendale Operable Units Focused Chromium Trend Study (CH2M HILL, 2005). This was followed by the 2007 Priority Ranking of Potential Well Sites for Chromium Monitoring Technical Memorandum (TM) (CH2M HILL, 2007). The current areas were developed by CH2M HILL in early 2009 following evaluation of hexavalent chromium data generated during the 2008 sampling of wells identified in the 2007 TM and other updated water quality data. The areas represent fairly broad, generalized areas where data gaps remain. The proposed RI well locations shown in Figure 2-1 were placed in focused, higher-priority areas within the bounds of the larger investigation areas.

<sup>2</sup> The investigation areas shown on Figure 2-1 extend well to the east of any of the currently planned monitoring locations. However, based on our current understanding of ground water flow conditions, the documented extent of hexavalent chromium contamination and potential hexavalent chromium source locations, additional investigation further to the east does not appear to be warranted at this time.

Table 2-4  
 Data Quality Objectives for Evaluating the Nature and Extent of Contamination  
 San Fernando Valley Area 2 Superfund Site, Glendale Chromium Operable Unit  
 Page 1 of 2

<b>Step 1: State the Problem of the Subtask</b>	<b>Overall Problem</b>	<b>Justification</b>
	Assess the nature and extent of hexavalent chromium contamination in ground water in GCOU.	Data gaps have been identified in the current understanding of the lateral and vertical extent of hexavalent chromium contamination in the GCOU.
<b>Step 2: Identify Goals of the Subtask</b>	<b>Outputs</b>	<b>Justification</b> Currently, sufficient data are not available to adequately assess the nature and extent of hexavalent chromium contaminated ground water in the GCOU.
	<b>Principal study question:</b> What is the nature and extent of ground water in the GCOU containing hexavalent chromium?	
	<b>Possible outcomes include:</b> <ul style="list-style-type: none"> <li>The nature and extent of hexavalent chromium in ground water are adequately defined; and the area(s) of contamination are bounded sufficiently (laterally and vertically) by non-detect results.</li> <li>The dataset is insufficient to define the nature and extent of hexavalent chromium contamination in ground water exceeding the evaluation criterion.</li> </ul>	
	<b>Decision statement:</b> Evaluate the nature and extent of hexavalent chromium contamination and identify potential data gaps.	
<b>Step 3: Identify Information Inputs for the Subtask</b>	<b>Data Needs</b>	<b>Data Use</b>
	<b>Identify types and sources of information needed to evaluate the nature and extent of hexavalent chromium in ground water:</b> <ul style="list-style-type: none"> <li>Well construction information</li> <li>Ground water levels</li> <li>Concentrations of hexavalent chromium in ground water</li> <li>Sources of the data collected will include data from ongoing ground water monitoring activities, data from Respondents, facility data, and data from stakeholder investigations</li> <li>Ongoing ground water monitoring activities</li> <li>Respondents</li> <li>Facilities</li> <li>Stakeholder investigations</li> </ul> <b>Select appropriate evaluation methods:</b> <ul style="list-style-type: none"> <li>Summarize ground water elevation and chromium data graphically on maps and in tabular format.</li> <li>Evaluate spatial and temporal trends in ground water elevation and chromium.</li> <li>Compare chromium concentrations to the MCL and risk-based screening levels.</li> <li>Seek stakeholder input.</li> </ul>	Evaluate the nature and extent of hexavalent chromium contamination in ground water. Completing Subtask 2 provides a foundation for Subtasks 3, 4, and 5. <ul style="list-style-type: none"> <li>Well construction information from individual wells will be used to evaluate the portion of the aquifer screened by each well.</li> <li>Ground water levels will be used to assess ground water flow directions and horizontal and vertical hydraulic gradients</li> <li>Concentrations of hexavalent chromium in ground water will be used to laterally and vertically correlate areas containing hexavalent chromium impacts.</li> </ul>
<b>Step 4: Define Boundaries of the Subtask</b>	<b>Boundaries for Consideration</b>	<b>Justification for Boundaries</b>
	<b>Evaluations within the boundaries of the RI study:</b> Spatial boundaries include the extent of regional hexavalent chromium ground water contamination in the GCOU.  Temporal boundaries include the time required to collect and evaluate data with regard to the nature and extent of contamination. Completion of this subtask must precede Subtasks 3, 4, and 5. Step 6 provides the practical constraints identified for this subtask.	Actual site boundaries defined by the extent of ground water contamination underlying the GCOU. The GCOU was defined to address hexavalent chromium contamination in SFV Area 2.  Temporal boundaries include the time required for the Respondents and other project stakeholders to provide comments.
	<b>Evaluations outside the boundaries of the RI study:</b> Though other chemical analyses will be performed as part of the GCOU RI ground water monitoring, the nature and extent of these chemicals will not be evaluated as part of the GCOU RI.	The data generated through the other chemical analyses will be evaluated by EPA and others as part of work for the Glendale OU.
<b>Step 5: Develop Approach to Determining the Nature and Extent of</b>	<b>Outputs</b>	<b>Justification</b>
	<b>Specify inputs to use for making decisions or estimates:</b> <ul style="list-style-type: none"> <li>Lithologic logs.</li> <li>Geologic and hydraulic aquifer properties.</li> <li>Ground water elevations.</li> <li>Ground water flow directions.</li> </ul>	Necessary to perform RI Subtasks 3, 4, and 5. <ul style="list-style-type: none"> <li>Lithologic logs will be used to assess the subsurface hydrogeology.</li> <li>Geologic and hydraulic aquifer properties will be used to assess potential</li> </ul>

**Acronyms:**

EPA – United States Environmental Protection Agency  
 GCOU – Glendale Chromium Operable Unit  
 LARWQCB – California Regional Water Quality Control Board – Los Angeles Region  
 MCL – maximum contaminant level  
 OU – operable unit  
 RI – remedial investigation  
 VOC – volatile organic compound  
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**RI Subtasks:**

- 1: Data Collection
- 2: Evaluate Nature and Extent of Contamination
- 3: Evaluate Fate and Transport of Contamination
- 4: Perform Baseline HHRH
- 5: Perform Screening Level ERA
- 6: Assess Next Steps

Table 2-4  
 Data Quality Objectives for Evaluating the Nature and Extent of Contamination  
 San Fernando Valley Area 2 Superfund Site, Glendale Chromium Operable Unit  
 Page 2 of 2

<b>Contamination</b>	<ul style="list-style-type: none"> <li>• Horizontal and vertical hydraulic gradients.</li> <li>• Presence of separate hydrostratigraphic units or ground water zones.</li> <li>• Ground water analytical data generated from well sampling.</li> <li>• Potential contaminant sources (identified by EPA, the State and other stakeholders).</li> </ul>	<p>hydrogeologic controls to ground water flow.</p> <ul style="list-style-type: none"> <li>• Ground water elevations will provide information on hydraulic gradients.</li> <li>• Ground water flow directions, gradients, and the presence of different ground water zones will be taken into consideration when inferring the distribution of hexavalent chromium between data points.</li> <li>• Ground water elevations and lithologic data will be used to assess the presence of separate hydrostratigraphic units or ground water zones.</li> <li>• Ground water analytical data will be used to evaluate the distribution of hexavalent chromium.</li> <li>• Knowledge of potential chromium sources should be used when extrapolating to areas with little or no data.</li> </ul>
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<b>Step 6: Specify Acceptance Criteria for the Subtask</b>	<b>Potential Consequences of Obtaining Incorrect Results</b>	<b>Methods for Overcoming Incorrect Results</b>
	<p>Misrepresent the nature and extent of hexavalent chromium contamination in ground water.</p> <p><b>Practical constraints include:</b></p> <ul style="list-style-type: none"> <li>• Availability and quality of lithologic data to adequately laterally correlate hydrogeologic units</li> <li>• Availability and distribution of contemporaneous ground water elevation data</li> <li>• Availability and distribution of contemporaneous ground water analytical data</li> <li>• Availability of depth-specific ground water analytical data (i.e., sufficient to delineate the vertical extent of hexavalent chromium contamination)</li> </ul>	<ul style="list-style-type: none"> <li>• Review and consider all data deemed as usable.</li> <li>• Identify data gaps and approaches for addressing data gaps.</li> </ul> <p><b>Methods to Address Practical Constraints:</b></p> <ul style="list-style-type: none"> <li>• Consider other data types to laterally correlate hydrogeologic units</li> <li>• Coordinate water level monitoring efforts with other stakeholders</li> <li>• Coordinate ground water sampling efforts with other stakeholders</li> <li>• Identify areas where additional depth-specific ground water analytical data is needed.</li> </ul>

<b>Step 7: Develop Detailed Plan for Completing the Subtask</b>	<b>Outputs</b>	<b>Methods for Optimizing the Design</b>
	<ul style="list-style-type: none"> <li>• Tabulated summaries of well construction information, ground water elevation data, and analytical results.</li> <li>• Hydrogeologic cross-sections.</li> <li>• Ground water elevation contour maps.</li> <li>• Maps showing the hexavalent chromium distribution in ground water for each aquifer zone.</li> <li>• Contaminant concentrations posted on hydrogeologic cross-sections to evaluate the vertical extent of contamination.</li> <li>• Pattern (e.g., Stiff) diagrams for new monitoring wells to evaluate the general chemical characteristics of ground water at each location.</li> </ul>	<p>Complete Subtask 3: Evaluate Fate and Transport of Contamination.</p> <ul style="list-style-type: none"> <li>• Maintain data in a database to facilitate summarizing data in various formats.</li> <li>• Build on existing hydrogeologic interpretations to the extent possible.</li> <li>• Review existing published contour maps.</li> <li>• Review existing interpretations of the distribution of hexavalent chromium.</li> <li>• Review historic data to determine if any data are anomalous.</li> </ul>

**Acronyms:**

EPA – United States Environmental Protection Agency  
 GCOU – Glendale Chromium Operable Unit  
 LARWQCB – California Regional Water Quality Control Board – Los Angeles Region  
 MCL – maximum contaminant level  
 OU – operable unit  
 RI – remedial investigation  
 VOC – volatile organic compound

**RI Subtasks:**

- 1: Data Collection
- 2: Evaluate Nature and Extent of Contamination
- 3: Evaluate Fate and Transport of Contamination
- 4: Perform Baseline HHRA
- 5: Perform ERA
- 6: Assess Next Steps

Table 2-5  
 Data Quality Objectives for Evaluating the Fate and Transport of Contamination  
 San Fernando Valley Area 2 Superfund Site, Glendale Chromium Operable Unit  
 Page 1 of 2

<b>Step 1:</b> <b>State the Problem of the Subtask</b>	<b>Overall Problem</b>	<b>Justification</b>
	Assess the fate and transport of hexavalent chromium contamination in GCOU ground water.	Ground water underlying the GCOU contains hexavalent chromium at concentrations exceeding risk-based screening levels.
<b>Step 2:</b> <b>Identify Goals of the Subtask</b>	<b>Outputs</b>	<b>Justification</b>
	<b>Principal study question:</b> What is the fate and transport of GCOU ground water containing hexavalent chromium? <b>Possible outcomes include:</b>	Ground water in the GCOU contains hexavalent chromium at concentrations that exceed risk-based screening levels. The fate and transport of hexavalent chromium contamination is currently not sufficiently understood.
	<ul style="list-style-type: none"> <li>Develop a sufficient understanding of the fate and transport of hexavalent chromium contaminated ground water.</li> <li>The dataset is insufficient to adequately evaluate the fate and transport of hexavalent chromium contaminated ground water. Collection of additional data is necessary.</li> </ul>	
<b>Decision statement:</b> Evaluate the fate and transport of hexavalent chromium contamination.		
<b>Step 3:</b> <b>Identify Information Inputs for the Subtask</b>	<b>Data Inputs</b>	<b>Data Use</b>
	<b>Identify types and sources of information needed to assess the fate and transport of contamination:</b> <ul style="list-style-type: none"> <li>Hydrogeologic cross-sections</li> <li>Ground water elevation contour maps</li> <li>Maps showing the distribution in ground water of other chemicals or chemical properties (dissolved metals, DO, ORP) affecting transport of hexavalent chromium in ground water</li> <li>Relevant chemical data posted on hydrogeologic cross-sections</li> <li>Aquifer properties (i.e., hydraulic conductivities, gradients, ground water flow directions and rates)</li> <li>Locations and rates of ground water extraction in and around the GCOU</li> <li>Planned future ground water extraction rates associated with the Glendale OU and potentially other local water purveyors</li> </ul> <b>Select appropriate evaluation methods:</b> <ul style="list-style-type: none"> <li>Follow EPA guidance.</li> <li>Seek input from external stakeholders.</li> </ul>	Evaluate the fate and transport of hexavalent chromium contamination in ground water. Completing Subtask 3 provides a foundation for Subtasks 4 and 5. <ul style="list-style-type: none"> <li>Hydrogeologic cross-sections will be used to evaluate the presence of larger scale geologic features that control contaminant migration.</li> <li>Ground water elevation contour maps will assist in evaluating contaminant migration direction.</li> <li>Maps showing the distribution of other chemicals or chemical properties in ground water will help evaluate ground water chemistry conditions that could impact contaminant migration.</li> <li>Relevant chemical data posted on hydrogeologic cross-sections will help in evaluating contaminant migration pathways.</li> <li>Aquifer properties will assist in estimating the time required for contamination to reach various receptors (supply wells, treatment plants).</li> <li>Locations and rates of current and future ground water extraction in and around the GCOU will assist in evaluating migration pathways and potential future receptors.</li> </ul>
<b>Step 4:</b> <b>Define Boundaries of the Subtask</b>	<b>Boundaries for Consideration</b>	<b>Justification for Boundaries</b>
	<b>Evaluations within the boundaries of the RI study:</b> Spatial boundaries include the extent of regional hexavalent chromium ground water contamination in the GCOU.	Actual site boundaries defined by the extent of ground water contamination underlying the GCOU.
	Temporal boundaries include the time required to assess the fate and transport of contamination. Completion of this subtask must follow Subtask 2 and precede Subtasks 4 and 5. Step 6 provides the practical constraints identified for this subtask	Temporal boundaries include the time required for stakeholders to provide comments.
	<b>Evaluations outside the boundaries of the RI study:</b> Ground water modeling is not necessary to evaluate the fate and transport of hexavalent chromium in ground water and is outside the scope of the GCOU RI.	Fate and transport evaluations conducted using chemical distribution maps, ground water elevation contour maps, aquifer properties, and hydrogeologic cross-sections will be sufficient to understand the fate and transport of

**Acronyms:**

DO – dissolved oxygen  
 EPA – United States Environmental Protection Agency  
 ERA – ecological risk assessment  
 GCOU – Glendale Chromium Operable Unit  
 HHRA – human health risk assessment  
 ORP – oxidation reduction potential  
 OU – operable unit  
 RI – remedial investigation  
 VOC – volatile organic compound  
 ES012412123911SCO/ 120250004

**RI Subtasks:**

- 1: Data Collection
- 2: Evaluate Nature and Extent of Contamination
- 3: Evaluate Fate and Transport of Contamination
- 4: Perform Baseline HHRA
- 5: Perform Screening Level ERA
6. Assess Next Steps

Table 2-5  
 Data Quality Objectives for Evaluating the Fate and Transport of Contamination  
 San Fernando Valley Area 2 Superfund Site, Glendale Chromium Operable Unit  
 Page 2 of 2

		hexavalent chromium contaminated ground water for the purpose of performing the HHRA and ERA.
<b>Step 5: Develop Approach to Assessing the Fate and Transport of Contamination</b>	<b>Outputs</b>	<b>Justification</b>
	<b>Specify inputs for evaluation to use for making decisions or estimates:</b> <ul style="list-style-type: none"> <li>Time series data for chemical concentrations (in particular hexavalent chromium) in ground water at individual wells</li> <li>Hydrographs for ground water wells</li> <li>Maps that show the locations of known or potential chromium sources in the GCOU</li> </ul>	Necessary to perform RI Subtasks 4 and 5. <ul style="list-style-type: none"> <li>Time series plots will assist in evaluating the chemical trends and the well position relative to potential sources.</li> <li>Hydrographs will assist in evaluating water level trends.</li> <li>Maps displaying chromium sources will assist in evaluating where ground water concentrations may increase.</li> </ul>
<b>Step 6: Specify Acceptance Criteria for Subtask</b>	<b>Potential Consequences of Obtaining Incorrect Results</b>	<b>Methods for Overcoming Incorrect Results</b>
	Failure to accurately evaluate the fate and transport of hexavalent chromium contamination in ground water.	Review and consider all data deemed as usable.
	<b>Practical constraints include:</b> <ul style="list-style-type: none"> <li>Uncertainty associated with extrapolating physical and chemical data between measurement locations (i.e., wells and borings) that may be considerable distances apart.</li> <li>Future water budget components (e.g., ground water recharge and extraction) are estimated or unknown.</li> <li>Data subject to multiple interpretations.</li> <li>Unknown contaminant sources could exist.</li> </ul>	<b>Methods to address practical constraints:</b> <ul style="list-style-type: none"> <li>Evaluate the fate and transport of chromium using ranges of values for key parameters (hydraulic properties, concentrations, water budget parameters) to bracket potential outcomes.</li> <li>Consider multiple interpretations of the data and different combinations of parameter assumptions.</li> </ul>
<b>Step 7: Develop Detailed Plan for Completing Subtask</b>	<b>Outputs</b>	<b>Methods for Optimizing the Design</b>
	<ul style="list-style-type: none"> <li>Evaluation of vadose zone transport characteristics based on available soil data</li> <li>Evaluation of ground water flow conditions and associated impacts on contaminant migration directions and rates</li> </ul>	Complete Subtasks 4 and 5: Perform Baseline HHRA and ERA

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 GCOU – Glendale Chromium Operable Unit  
 HHRA – human health risk assessment  
 ORP – oxidation reduction potential  
 OU – operable unit  
 RI – remedial investigation  
 VOC – volatile organic compound

**RI Subtasks:**

- 1: Data Collection
- 2: Evaluate Nature and Extent of Contamination
- 3: Evaluate Fate and Transport of Contamination
- 4: Perform Baseline HHRA
- 5: Perform ERA
6. Assess Next Steps

Table 2-6  
 Data Quality Objectives for Performing the Baseline Human Health Risk Assessment  
 San Fernando Valley Area 2 Superfund Site, Glendale Chromium Operable Unit  
 Page 1 of 2

<b>Step 1:</b> <b>State the Problem of the Subtask</b>	<b>Overall Problem</b> Assess the human health risk associated with potential exposure to hexavalent chromium contamination in GCOU ground water.	<b>Justification</b> Ground water underlying the GCOU contains hexavalent chromium concentrations at concentrations exceeding human health screening levels.
<b>Step 2:</b> <b>Identify Goals of the Subtask</b>	<b>Outputs</b> <b>Principal study question:</b> Does the presence of hexavalent chromium in GCOU ground water potentially pose unacceptable risks to humans, and thus warrant remedial action? <b>Possible outcomes include:</b> <ul style="list-style-type: none"> <li>• Potential unacceptable current or future human health risks warrant remedial action.</li> <li>• Potential current or future human health risks do not warrant remedial action.</li> <li>• Additional data collection is necessary to adequately evaluate the potential current or future risk posed to human health by hexavalent chromium contamination in GCOU ground water.</li> </ul> <b>Decision statements:</b> Perform Baseline HHRA for hexavalent chromium contamination in GCOU ground water.	<b>Justification</b> Current and potential future risks to human health from potential exposure to hexavalent chromium contamination in GCOU ground water are unknown.
<b>Step 3:</b> <b>Identify Information Inputs for the Subtask</b>	<b>Data Needs</b> <b>Identify types and sources of information needed to perform the Baseline HHRA:</b> <ul style="list-style-type: none"> <li>• Nature and extent of hexavalent chromium contamination in ground water (Subtask 2)</li> <li>• Fate and transport of hexavalent chromium contamination (Subtask 3)</li> <li>• Human Health Screening Levels             <ul style="list-style-type: none"> <li>○ EPA RSLs</li> <li>○ EPA MCLs</li> <li>○ California MCLs and NLs</li> </ul> </li> <li>• Chemical Toxicity Values             <ul style="list-style-type: none"> <li>○ Federal toxicity values</li> <li>○ California toxicity values</li> </ul> </li> <li>• COPCs</li> </ul> <b>Select appropriate evaluation methods:</b> <ul style="list-style-type: none"> <li>• Follow EPA guidance.</li> <li>• Seek input from stakeholders.</li> </ul>	<b>Data Use</b> Perform Baseline HHRA for hexavalent chromium contamination in GCOU ground water. Completing Subtask 4 provides input for recommendations for future work. <ul style="list-style-type: none"> <li>• The nature and extent and fate and transport of hexavalent chromium contamination in ground water will be used to identify potential exposure routes.</li> <li>• Human health screening levels and chemical toxicity values will be compared to hexavalent chromium concentrations in ground water</li> <li>• COPCs will be used to select appropriate screening levels and chemical toxicity values.</li> </ul>
<b>Step 4:</b> <b>Define Boundaries of the Subtask</b>	<b>Boundaries for Consideration</b> <b>Evaluations within the boundaries of the RI study:</b> Spatial boundaries include the extent of regional hexavalent chromium ground water contamination in the GCOU.  Temporal boundaries include the time required to perform the HHRA. Completion of this subtask must follow Subtasks 2 and 3. Step 6 provides the practical constraints identified for this subtask.  <b>Evaluations outside the boundaries of the RI study:</b> <ul style="list-style-type: none"> <li>• Assessing risks to human health from potential exposure to contaminants other than hexavalent chromium in ground water.</li> </ul>	<b>Justification for Boundaries</b> Actual site boundaries defined by area of ground water contamination underlying the GCOU. The GCOU was defined to address chromium contamination in SFV Area 2.  Temporal boundaries include the time required for stakeholders to provide comments.  Human health risks may be unacceptable if complete exposure pathways to contaminated ground water exist (none are known to exist currently).  Risks from potential exposure to other contaminants were evaluated previously as part of work on the Glendale OU and will be considered as part of ongoing GOU work.

**Acronyms:**

COPC – chemical of potential concern  
 EPA – United States Environmental Protection Agency  
 GCOU – Glendale Chromium Operable Unit  
 HHRA – human health risk assessment  
 MCL – maximum contaminant level  
 NL – notification level  
 OU – operable unit  
 RSL – regional screening level  
 ES012412123911SCO/ 120250004

**RI Subtasks:**

- 1: Data Collection
- 2: Evaluate Nature and Extent of Contamination
- 3: Evaluate Fate and Transport of Contamination
- 4: Perform Baseline HHRA
- 5: Perform Screening Level ERA
- 6: Assess Next Steps

Table 2-6  
 Data Quality Objectives for Performing the Baseline Human Health Risk Assessment  
 San Fernando Valley Area 2 Superfund Site, Glendale Chromium Operable Unit  
 Page 2 of 2

	<ul style="list-style-type: none"> <li>Assessing risks to human health from potential exposure to hexavalent chromium or other contaminants in soil.</li> </ul>	Evaluating risks from potential exposure to contaminants in soil is typically done at a facility-specific level as part of work done under the direction of the state (RWQCB and DTSC).
<b>Step 5: Develop Approach to HHRA</b>	<p style="text-align: center;"><b>Outputs</b></p> <p><b>Specify inputs for evaluation to use for making decisions or estimates:</b></p> <ul style="list-style-type: none"> <li>Assess the suitability of ground water for domestic tap water use.</li> <li>Calculate human health cancer risks and non-carcinogenic health hazards.</li> <li>Identify potentially complete current or future exposure pathways.</li> <li>Identify potential current or future receptors of contaminated ground water.</li> <li>Estimate potential exposures.</li> </ul>	<p style="text-align: center;"><b>Justification</b></p> <p>Necessary to determine if hexavalent chromium contamination in GCOU ground water poses an unacceptable risk to human health and, if so, if remedial action warranted.</p>
	<b>Step 6: Specify Acceptance Criteria for the Subtask</b>	<p style="text-align: center;"><b>Potential Consequences of Obtaining Incorrect Results</b></p> <ul style="list-style-type: none"> <li>Incorrectly identifying human health risks associated with hexavalent chromium in ground water may waste resources.</li> <li>Incorrectly concluding there are no unacceptable human health risks associated with hexavalent chromium contamination in ground water may put the public at risk.</li> <li>Collecting unnecessary data may waste resources.</li> </ul>
<p><b>Practical constraints include:</b></p> <ul style="list-style-type: none"> <li>Policies subject to multiple interpretations.</li> </ul>		<p style="text-align: center;"><b>Methods to address practical constraints:</b></p> <ul style="list-style-type: none"> <li>Seek input from stakeholders and other regulatory agencies on policy interpretation.</li> </ul>
<b>Step 7: Develop Detailed Plan for Completing the Subtask</b>	<p style="text-align: center;"><b>Outputs</b></p> <p>Document the estimated risks to human health in the Baseline HHRA and use as a basis for recommending potential future work as appropriate.</p>	<p style="text-align: center;"><b>Methods for Optimizing the Design</b></p> <p>Analytical results from ground water samples will be evaluated for usability in the risk assessment. Only data passing the data usability review will be considered for the risk assessment.</p>

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 GCOU – Glendale Chromium Operable Unit  
 HHRA – human health risk assessment  
 MCL – maximum contaminant level  
 NL – notification level  
 OU – operable unit  
 RSL – regional screening level

**RI Subtasks:**

- 1: Data Collection
- 2: Evaluate Nature and Extent of Contamination
- 3: Evaluate Fate and Transport of Contamination
- 4: Perform Baseline HHRA
- 5: Perform ERA
- 6: Assess Next Steps

Table 2-7  
 Data Quality Objectives for Performing the Ecological Risk Assessment  
 San Fernando Valley Area 2 Superfund Site, Glendale Chromium Operable Unit  
 Page 1 of 2

<b>Step 1: State the Problem of the Subtask</b>	<b>Overall Problem</b>	<b>Justification</b>
	Evaluate the potential risk to ecological receptors from hexavalent chromium contamination in the GCOU.	Ground water underlying GCOU contains hexavalent chromium concentrations that exceed ecological screening values (ESVs).
<b>Step 2: Identify Goals of the Subtask</b>	<b>Outputs</b>	<b>Justification</b>
	<ul style="list-style-type: none"> <li><b>Principal study question:</b> Does the presence of hexavalent chromium in ground water in GCOU potentially pose unacceptable risks to the environment, and thus warrant remedial action?</li> </ul>	Potential risks to ecological receptors from potential exposure to hexavalent chromium contamination in the GCOU are unknown.
	<b>Possible outcomes include:</b> <ul style="list-style-type: none"> <li>Potential unacceptable current or future environmental risks warrant remedial action.</li> <li>Potential current or future environmental risks do not warrant remedial action.</li> <li>Additional data collection is necessary to adequately evaluate the potential current or future risk posed to the environment by hexavalent chromium contamination in GCOU ground water.</li> </ul>	
<b>Decision statement:</b> Perform ERA for hexavalent chromium contamination in GCOU ground water.		
<b>Step 3: Identify Information Inputs for the Subtask</b>	<b>Data Inputs</b>	<b>Data Use</b>
	<b>Identify types and sources of information needed to perform HHRA:</b> <ul style="list-style-type: none"> <li>Nature and extent of hexavalent chromium contamination in ground water (Subtask 2)</li> <li>Fate and transport of hexavalent chromium contamination (Subtask 3)</li> <li>Current and future ecological receptors</li> <li>COPCs</li> <li>ESVs</li> <li>Toxicity reference values</li> </ul>	Perform ERA for hexavalent chromium contamination in GCOU ground water. Completing Subtask 5 provides input for recommendations for future work. <ul style="list-style-type: none"> <li>The nature and extent and fate and transport of hexavalent chromium contamination in ground water will be used to identify potential exposure routes and ecological receptors.</li> <li>Current and future ecological receptors will be used to select appropriate ESVs and toxicity reference values.</li> <li>ESVs and toxicity reference values will be compared to hexavalent chromium concentrations in ground water</li> </ul>
<b>Select appropriate evaluation methods:</b> <ul style="list-style-type: none"> <li>Follow EPA guidance.</li> <li>Seek input from stakeholder.</li> </ul>		
<b>Step 4: Define Boundaries of the Subtask</b>	<b>Boundaries for Consideration</b>	<b>Justification for Boundaries</b>
	<b>Evaluations within the boundaries of the RI study:</b> Spatial boundaries include the regional extent of hexavalent chromium ground water contamination in the GCOU.  Temporal boundaries include the time required to perform the ERA. Completion of this subtask must follow Subtasks 2 and 3.	Actual site boundaries defined by the extent of ground water contamination underlying the GCOU. The GCOU was defined to address chromium contamination in SFV Area 2.  Temporal boundaries include the time required for stakeholders to provide comments.  Ecological risks may be unacceptable if complete exposure pathways to contaminated ground water exist.
	<b>Evaluations outside the boundaries of the RI study:</b> <ul style="list-style-type: none"> <li>Assessing risks to the environment from potential exposure to contaminants other than hexavalent chromium in ground water.</li> </ul>	Risks from potential exposure to other contaminants were evaluated previously as part of work on the Glendale OU and will be considered as part of ongoing Glendale OU work.
<b>Step 5: Develop Approach to Perform ERA</b>	<b>Outputs</b>	<b>Justification</b>
	<b>Specify inputs for evaluation to use for making decisions or estimates:</b> <ul style="list-style-type: none"> <li>Identification of potential habitats</li> <li>Identification of ecological receptors</li> </ul>	Necessary to determine if hexavalent chromium contamination in GCOU ground water poses an unacceptable risk to the environment and, if so, is remedial action warranted.

**Acronyms:**

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 ERA – ecological risk assessment  
 GCOU – Glendale Chromium Operable Unit  
 HHRA – human health risk assessment  
 ORP – oxidation reduction potential  
 OU – operable unit  
 RI – remedial investigation  
 VOC – volatile organic compound  
 ES012412123911SCO/ 120250004

**RI Subtasks:**

- 1: Data Collection
- 2: Evaluate Nature and Extent of Contamination
- 3: Evaluate Fate and Transport of Contamination
- 4: Perform Baseline HHRA
- 5: Perform Screening Level ERA
6. Assess Next Steps

Table 2-7  
 Data Quality Objectives for Performing the Ecological Risk Assessment  
 San Fernando Valley Area 2 Superfund Site, Glendale Chromium Operable Unit  
 Page 2 of 2

	<ul style="list-style-type: none"> <li>• Selection of assessment endpoints and measures</li> <li>• Characterization of potential ecological exposures</li> <li>• Development of ESVs</li> </ul> <p>If ecological receptors are identified, the first step of the ERA will be to perform a screening level ERA (SLERA). If no unacceptable risks to ecological receptors are identified in the SLERA, the absence of risk will be documented. If risks are identified, a baseline ERA will be performed.</p>	
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<b>Step 6: Specify Acceptance Criteria for the Subtask</b>	<b>Potential Consequences of Obtaining Incorrect Results</b>	<b>Methods for Overcoming Incorrect Results</b>
	<ul style="list-style-type: none"> <li>• Incorrectly identifying environmental risks due to hexavalent chromium contamination in ground water may waste resources.</li> <li>• Incorrectly concluding there are no unacceptable risks to the environmental due to hexavalent chromium contamination in ground water may put ecological receptors at risk.</li> <li>• Collecting unnecessary data may waste resources.</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure sufficient confidence in data used to support decision making.</li> <li>• Identify and quantify (as feasible) limitations in the dataset.</li> <li>• Continually evaluate the completeness and usability of data to minimize unnecessary data collection.</li> </ul>
	<b>Practical constraints include:</b> <ul style="list-style-type: none"> <li>• Policies subject to multiple interpretations</li> </ul>	<b>Methods to address practical constraints:</b> <ul style="list-style-type: none"> <li>• Seek input from stakeholders and other regulatory agencies on policy interpretation.</li> </ul>

<b>Step 7: Develop Detailed Plan for Completing the Subtask</b>	<b>Outputs</b>	<b>Methods for Optimizing the Design</b>
	The results of the ERA will be documented. If potentially unacceptable risks to environmental receptors are identified, the need for future work will be evaluated.	The ERA will follow a phased approach. The initial phases involve more conservative assumptions regarding potential ecological risks. Subsequent steps typically involve less conservative assumptions more geared to site-specific conditions and realistic assumptions.

**Acronyms:**

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 EPA – United States Environmental Protection Agency  
 ERA – ecological risk assessment  
 GCOU – Glendale Chromium Operable Unit  
 OU – operable unit

**RI Subtasks:**

- 1: Data Collection
- 2: Evaluate Nature and Extent of Contamination
- 3: Evaluate Fate and Transport of Contamination
- 4: Perform Baseline HHRA
- 5: Perform ERA
- 6 : Assess Next Steps

Table 2-8  
 Data Quality Objectives for Assessment of Next Steps  
 San Fernando Valley Area 2 Superfund Site, Glendale Chromium Operable Unit  
 Page 1 of 2

<b>Step 1: State the Overall Problem</b>	<b>Overall Problem</b>	<b>Justification</b>
	Assess the next steps in the RI/FS to mitigate, remediate, or remove potential risks to human health and the environment caused by hexavalent chromium contamination in the GCOU.	Ground water underlying the GCOU is a source of drinking water, and hexavalent chromium concentrations in untreated ground water exceed risk-based screening levels.
<b>Step 2: Identify Goals of the Subtask</b>	<b>Overall Goal</b>	<b>Justification</b>
	<b>Principal study questions:</b> What are the next steps in the RI/FS to address potential threats to human health and the environment? <b>Possible outcomes include:</b> <ul style="list-style-type: none"> <li>No unacceptable risks to human health and the environment are identified, no further action is required.</li> <li>Conduct an FS.</li> <li>Additional data collection necessary to adequately evaluate the potential current or future risks posed to human health or the environment by hexavalent chromium contamination in GCOU ground water.</li> </ul>	The objective of the RI is to assess the potential threat to human health and the environment from hexavalent chromium contaminated ground water in the GCOU. The risk assessments will evaluate if risks to human health or the environment exist and if further action is required.
	<b>Decision statement:</b> Review the results of the HHRA and ERA to make recommendations on the next steps required to complete the RI/FS process.	
<b>Step 3: Identify Information Inputs for the Subtask</b>	<b>Data Needs</b>	<b>Data Use</b>
	<b>Identify types and sources of information needed to complete the RI/FS for the GCOU:</b> The data inputs for the evaluation of the next steps in the RI/FS are the results of Subtasks 2-5.	Provide sufficient information to make recommendations for the next steps to complete the RI/FS for the GCOU.
<b>Step 4: Define Boundaries of the Subtask</b>	<b>Boundaries for Consideration</b>	<b>Justification for Boundaries</b>
	<b>Evaluations within the boundaries of the RI study:</b> Spatial boundaries include the regional extent of hexavalent chromium water contamination in GCOU ground water.  Temporal boundaries include the time required to complete the RI. Completion of this subtask must follow Subtasks 1 through 5.	Actual site boundaries are defined by the extent of hexavalent chromium ground water contamination underlying the GCOU.  Temporal boundaries include the time required for stakeholders to provide comments.
	<b>Evaluations outside the boundaries of the RI study:</b> Evaluations that are outside the spatial boundaries of the RI include: <ul style="list-style-type: none"> <li>Assessing the nature and extent and associated potential human health or environment risks due to hexavalent chromium contamination in the vadose zone.</li> <li>Characterizing hexavalent chromium sources upgradient of the GCOU in northern SFV OUs (Burbank and North Hollywood).</li> </ul>	Evaluating risks from contaminants in soil is typically done at a facility-specific level as part of work done under the direction of the state (RWQCB and DTSC).  Other parties are conducting the evaluations in other portions of the SFV, including characterizing sources in upgradient OUs.
<b>Step 5: Develop Approach to Evaluate the Next Steps</b>	<b>Outputs</b>	<b>Justification</b>
	<b>Specify inputs for evaluation to use for making decisions or estimates:</b> <ul style="list-style-type: none"> <li>Identification of potential data gaps relating to the nature and extent of contamination, contaminant migration pathways, or contaminant source areas.</li> <li>Identification of next steps necessary to address potential risks to human health and the environment.</li> </ul>	Evaluation of next steps is necessary to determine the need for an FS. If an FS is recommended, it will be necessary to identify an effective remedy for hexavalent chromium contamination in GCOU ground water and to mitigate potential risks to human health and the environment.
<b>Step 6: Specify Acceptance Criteria for the Subtask</b>	<b>Potential Consequences of Obtaining Incorrect Results</b>	<b>Methods for Overcoming Incorrect Results</b>
	<ul style="list-style-type: none"> <li>Recommending an unnecessary FS (i.e., no actual threat to human health or environment exists) will waste resources.</li> <li>Recommending no additional action (i.e., an FS) when an actual threat exists will allow current and potential threats to human health and environment to persist.</li> </ul>	<ul style="list-style-type: none"> <li>Consider all usable data and limit biases (such as having a preconceived CSM) during the RI process.</li> <li>Ensure sufficient confidence in data used to complete the RI.</li> </ul>

**Acronyms:**

DO – dissolved oxygen  
 EPA – United States Environmental Protection Agency  
 ERA – ecological risk assessment  
 GCOU – Glendale Chromium Operable Unit  
 HHRA – human health risk assessment  
 ORP – oxidation reduction potential  
 OU – operable unit  
 RI – remedial investigation  
 VOC – volatile organic compound  
 ES012412123911SCO/ 120250004

**RI Subtasks:**

- 1: Data Collection
- 2: Evaluate Nature and Extent of Contamination
- 3: Evaluate Fate and Transport of Contamination
- 4: Perform Baseline HHRA
- 5: Perform Screening Level ERA
6. Assess Next Steps

Table 2-8

Data Quality Objectives for Assessment of Next Steps

San Fernando Valley Area 2 Superfund Site, Glendale Chromium Operable Unit

Page 2 of 2

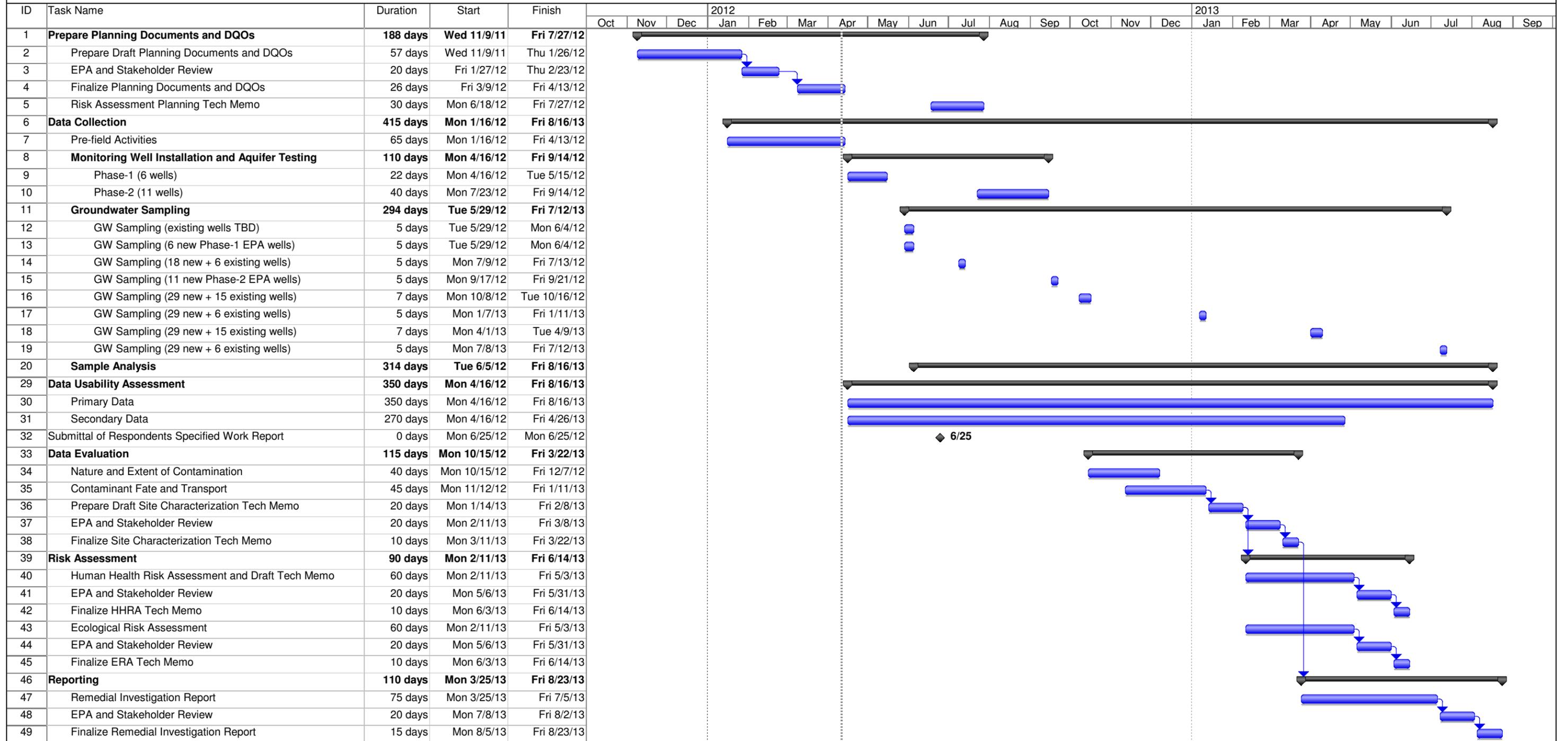
	<ul style="list-style-type: none"> <li>Collecting unnecessary data will waste resources.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure approach to risk assessment is conservative enough that potential risks are considered.</li> <li>Continually evaluate the completeness and usability of data to minimize unnecessary data collection.</li> </ul>
<b>Step 7: Develop Detailed Plan for Completing the Subtask</b>	<b>Actions</b>	<b>Methods for Optimizing the Design</b>
	Complete Subtasks 1 through 5. Identify the need for additional data collection or an FS.	Follow planning documents and guidance to minimize the need for additional data collection. If an FS is recommended, complete the FS as a means for identifying the action best suited to address potential risks to human health and the environment.

## Figures

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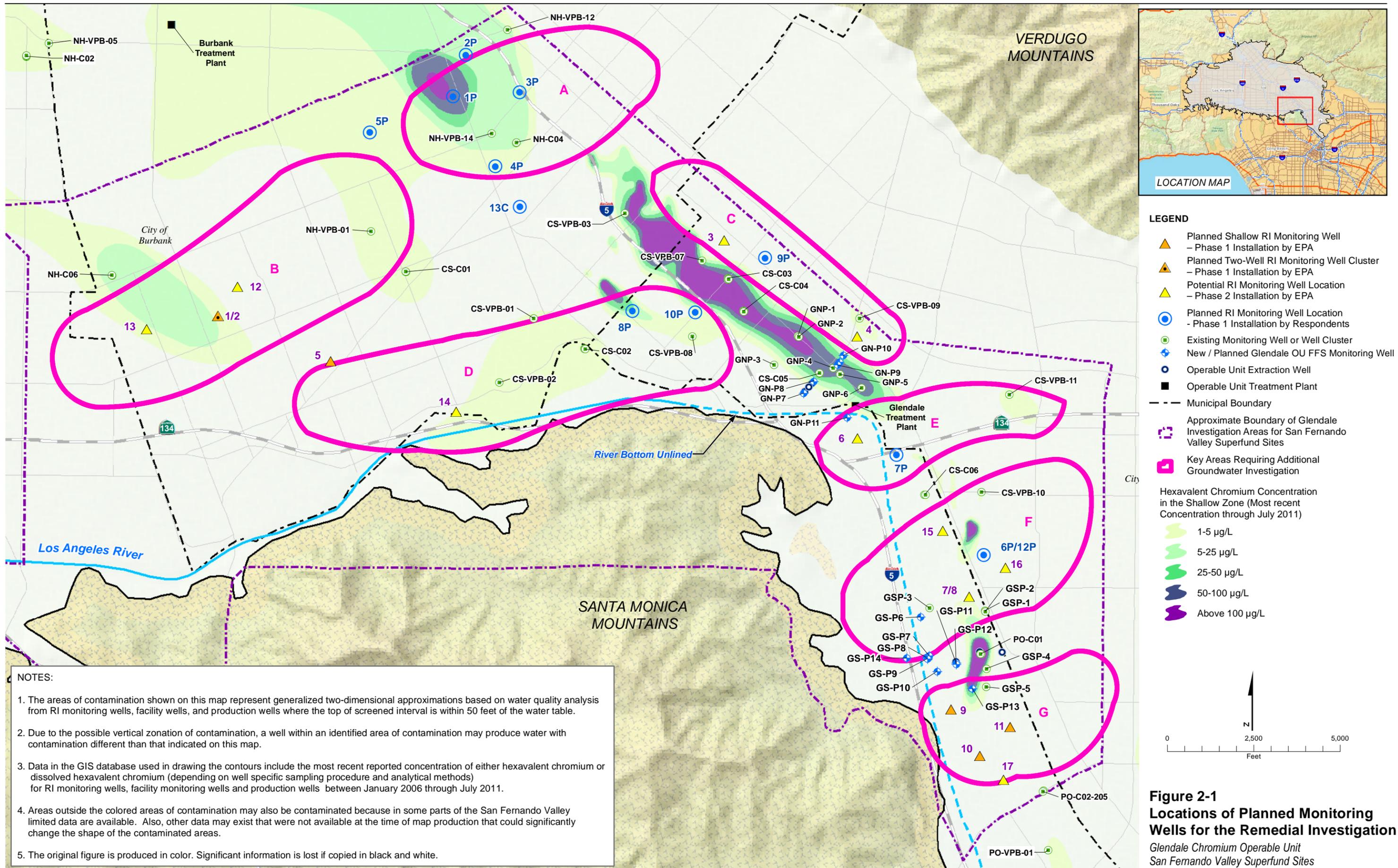
Figure 1-1  
Gledale Chromium OU - Remedial Investigation Schedule



Project: GCOU RI Schedule  
Date: Wed 4/11/12







**Figure 2-1**  
**Locations of Planned Monitoring Wells for the Remedial Investigation**  
 Glendale Chromium Operable Unit  
 San Fernando Valley Superfund Sites

