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1. Introduction

The United States Environmental Protection Agency (EPA) is conducting a ***remedial investigation*** and ***feasibility study*** (RI/FS) to address regional ***groundwater contamination*** within the San Gabriel Valley Area 3 ***Superfund*** Site (Area 3) in Los Angeles County, California. Under the authority of the ***Comprehensive Environmental Response, Compensation, and Liability Act*** of 1980 (CERCLA), EPA placed the four areas of the San Gabriel Valley Superfund sites (Areas 1 through 4) on the ***National Priorities List*** (NPL).

Figure 1-1 depicts the location of Area 3 relative to the other San Gabriel Valley Superfund sites summarized in the list below.

- Area 1 contains the South El Monte, El Monte, and Whittier Narrows ***Operable Units*** (OUs), based on delineation of three areas of contamination in groundwater.
- Area 2 contains the Baldwin Park OU, based on delineation of one area of contamination in groundwater.
- Area 4 contains the Puente Valley OU, based on delineation of one area of contamination in groundwater.

Area 3 is the final OU to enter the RI/FS phase of the Superfund remedial response process for the San Gabriel Valley Superfund sites. Figure 1-2 summarizes the phases of the overall Superfund remedial response process (or CERCLA process). The events leading up to EPA's initiation of the Area 3 RI are discussed below.

1.1 Site History

This subsection provides a historical overview of the discovery of groundwater contamination in the San Gabriel Valley Groundwater ***Basin*** (San Gabriel Basin) and the listing of the San Gabriel Valley Superfund sites on the NPL. Figures 1-3a and 1-3b illustrate the original locations of the OUs and the evolution of EPA's remedial investigation areas as of 2007.

1.1.1 Contaminant Discovery and Site Listing

The discovery of ***volatile organic compound (VOC)*** contamination of the groundwater throughout the San Gabriel Basin occurred during the 1980s. In 1984, EPA placed the four San Gabriel Valley Superfund sites on the NPL to address the contamination. In taking this action, EPA sought to address and prevent migration of regional groundwater contamination.

Each section of this report provides a discussion of the subject, followed by any tables or figures cited in the text. In addition, exhibits and text boxes noted in the margins present key concepts, tables, and figures.

*The glossary explains words presented in **bold, italicized** text.*

Figure 1-1 depicts the locations of the San Gabriel Valley Superfund sites.

Figure 1-2 summarizes the phases of the overall Superfund remedial response process.

Figures 1-3a and 1-3b illustrate the locations of the OUs and the evolution of EPA's remedial investigation areas as of 2007.

EPA's website provides information on the overall status of activities at the San Gabriel Valley Superfund sites. (www.epa.gov/region09/SanGabriel/All).

EPA subsequently prioritized ***remedial actions*** in each of the four San Gabriel Valley Superfund NPL Areas and associated OUs, based on the following ranking factors.

- Confidence in the estimated extent of VOC contamination
- Quantity of the VOC-impacted water supply
- Severity of VOC contamination relative to contamination in other OUs
- Potential for contamination migration

Groundwater underlying Area 3 is used for local water supplies. Water purveyors implement safeguards through well shut downs, wellhead treatment, and blending to ensure that all tap water meets drinking water standards.

The discovery of contamination in water purveyor production wells compelled EPA to designate Area 3 an NPL site. Although safeguards are in place to ensure the quality of drinking water, VOCs have been detected in production wells throughout Area 3. Many of the production wells contain VOCs at concentrations that exceed state or federal ***evaluation criteria***, which include ***maximum contaminant levels*** (MCLs) or state ***notification levels*** (NLs).

The City of Alhambra's water treatment plant will process up to 7,000 gallons of water per minute, utilizing ***liquid-phase granular activated carbon*** and ***ion-exchange*** treatment technologies. The treatment combination will remove contaminants from two active and two inactive production wells.

Figure ES-1 shows the location of the treatment plant and production wells.

1.1.2 Previous Investigations

Prior to 1999, EPA performed limited investigations of Area 3 as part of past basinwide RI activities in the San Gabriel Valley. Two important findings helped shape the direction of subsequent investigation work at Area 3.

- VOC detections in groundwater occur across most of Area 3.
- The extent of VOC contamination has remained fairly constant.

To help investigate and clean up the numerous sources of contamination, EPA requested local technical assistance from the California Regional Water Quality Control Board, Los Angeles Region (LARWQCB) in 1989. EPA has collected data for the Area 3 RI continuously since 1999.

1.2 Purpose of Remedial Investigation

EPA began the RI task of the RI/FS process for Area 3 in 1999. This RI focuses on evaluating the nature and extent of groundwater contamination only within Area 3 and assessing the potential risks posed by this contamination to human health and the environment. The following list describes the purposes of EPA's evaluation.

- To support consideration of risk-based cleanup decisions.
- To lay the foundation for a future feasibility study.

- To facilitate eventual analysis of possible groundwater cleanup options.
- To assist in the selection of a groundwater cleanup remedy.

1.3 Site Characteristics

Area 3 consists of a large area (19 square miles) of contaminated groundwater that contains many potential ***contaminants of potential concern*** (COPCs). This subsection provides an overview of the site geography, geology, water resources, and groundwater flow conditions. Section 3 discusses in detail these features.

1.3.1 Geography

The San Gabriel Basin is located in the San Gabriel Valley, a 170-square-mile area in eastern Los Angeles County, California, as shown in Figure 1-1. The San Gabriel Basin is a large geologic depression in the ***bedrock*** of the San Gabriel Valley filled with unconsolidated sediments. The Raymond ***Fault*** separates the San Gabriel Basin from the Raymond Basin, located to the northwest. The San Gabriel Mountains represent the northern boundary of the basin; the Repetto, Montebello and Puente, and San Jose Hills represent the west, south, and southeast boundaries, respectively.

1.3.2 Geology and Water Resources

The geology of Area 3 consists of unconsolidated ***alluvium*** overlying marine ***sedimentary*** bedrock. Underground layers of sand and rock form ***aquifers*** that transmit groundwater.

As shown in Figure 1-1, RI data suggest the presence of a ***structural bedrock discontinuity*** that bisects the western and eastern portions of Area 3. The steep drop in the top of the bedrock surface may be an erosional feature or an unnamed inferred fault zone in the western portion of Area 3 that may be associated with the Whittier Fault Zone (Lamar, 1970). The structural bedrock discontinuity likely affects groundwater flow from the western portion of Area 3 into the eastern portion of Area 3.

Figure 1-1 depicts the location of the structural bedrock discontinuity.

1.3.3 Groundwater Flow

Over the last century, groundwater flow conditions throughout the San Gabriel Basin markedly changed. Prior to land development, ***groundwater recharge*** into the aquifers roughly equaled groundwater discharge from the aquifers. Groundwater flowing throughout the basin likely followed topography, moving from higher elevations to lower elevations. Groundwater leaving the basin funneled into Whittier Narrows to the south of Area 3 (EPA, 1992). The development and operation of groundwater production wells have caused groundwater flow conditions to change over time.

Production well pumping influences the direction of groundwater flow east of the bedrock discontinuity in Area 3, but the influence of pumping is less pronounced west of the discontinuity.

1.4 Report Development and Organization

To guide data collection, analysis, and interpretation, EPA developed an overall set of ***data quality objectives*** (DQOs) for the RI and a set of DQOs for each of the six RI subtasks listed below; the sections in this report that describe these tasks, and the corresponding DQO summary tables, are shown in parentheses.

- RI Task – Area 3 Remedial Investigation (Section 2, Table 2-1)
- Subtask 1 – Hydrogeologic ***Conceptual Site Model*** (Section 3, Table 3-1)
- Subtask 2 – ***Contaminant*** Source Identification (Section 4, Table 4-1)
- Subtask 3 – Contamination Migration Conceptual Site Model (Section 5, Table 5-1)
- Subtask 4 – ***Human Health Risk Assessment*** (Section 6, Table 6-1)
- Subtask 5 – ***Ecological Risk Assessment*** (Section 7, Table 7-1)
- Subtask 6 –Assessment of Next Steps (Section 8, Table 8-1)

In developing this RI report, EPA coordinated with LARWQCB and the California Department of Toxic Substances Control (DTSC). LARWQCB oversees the preservation and enhancement of the quality of California water resources and DTSC functions as the lead state agency for NPL sites. This report refers to LARWQCB and DTSC as the State of California.

EPA also solicited input from stakeholders that include groundwater management agencies, local municipalities, and other interested parties. Exhibit 2-4 in Section 2.4.2 provides the list of stakeholders.

This RI report serves several purposes, as listed below.

- Site Background – Section 1 summarizes the background and history of Area 3.
- RI Activities – Section 2 describes the RI activities performed by EPA including planning, community involvement, and data collection activities such as monitoring well installation, groundwater sampling, measurement of groundwater levels, and contaminant source investigation.
- Hydrogeologic Conceptual Site Model – Section 3 presents the evaluation and interpretation of hydrogeologic data collected during the RI.
- Contamination Distribution and Source Identification – Section 4 discusses identification of COPC distribution, and potential contaminant sources.
- Contamination Migration Conceptual Site Model – Section 5 describes the evaluation and interpretation of COPC transport and contamination migration and distribution in groundwater.

- Risk Assessments – Sections 6 and 7 present the results of a baseline human health risk assessment (HHRA) and ecological risk assessment, respectively.
- Remedial Investigation Summary – Section 8 summarizes the RI, presents conclusions, and the next steps to be taken in Area 3.
- Reference – Section 9 provides the references used in the compilation of this report.

Each section of this report provides a discussion of the subject, followed by any tables or figures cited in the text. In addition, exhibits and text boxes noted in the page margins present key concepts, tables, and figures. This report also includes a detailed technical appendix at the end of Section 5 to augment the discussion. Appendices A through G present planning and reporting documents for Area 3, the data quality and usability assessment, the hydrostratigraphic assessment, additional data to support the discussion in Sections 4 and 5, and the risk assessments. The report as a whole serves as a reference to help stakeholders understand groundwater contamination in Area 3 and EPA's efforts to address the contamination.

1.5 Development of the Remedial Investigation Data Set

Previous ***environmental data***, collected primarily for compliance testing of production wells, provides limited information about the vertical extent of contamination. In order to investigate the contamination detected in the Area 3 production wells, EPA works with LARWQCB to identify potential sources of VOC contamination in groundwater.

LARWQCB initially identified over 500 facilities as potential sources of VOC contamination in Area 3. Investigations at facilities within Area 3 evaluate contamination in soil, ***soil vapor***, and groundwater. Of these potential source facilities, 33 facilities performed subsurface investigations; 31 of the 33 facilities reported VOC detections in soil vapor, soil, or groundwater. Twelve facilities reported detections of VOCs in groundwater at concentrations that exceed the most protective evaluation criteria, typically the MCL or NL. Contaminant source identification will continue during the feasibility study.

Data collected during the RI enable EPA to examine critical physical characteristics of Area 3, including the hydrogeology and sources and distribution of VOC contamination. Section 2 summarizes the RI activities. The current data set for geologic conditions, groundwater elevation, and groundwater COPC concentrations in Area 3 helps to considerably improve EPA's understanding of ***groundwater gradients***, flow directions, and COPC distribution in Area 3 groundwater. However, the evaluation has identified several data needs, which will be considered during the feasibility study as discussed in Section 8.

Results of the HHRA presented in Section 6 indicate that groundwater is significantly impacted by COPCs at multiple locations in Area 3. The ecological risk assessment, presented in Section 7, identifies no risks to ecological ***receptors*** from contaminated groundwater in Area 3. Section 8 assesses the next steps for Area 3, which include conducting the feasibility study, continuing groundwater monitoring, and identifying contaminant sources.

Figures