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2006

EPA Superfund
Explanation of Significant Differences:

SAN GABRIEL VALLEY (AREA 1)
EPA ID: CAD980677355
OU 05
EL MONTE, CA
11/10/2005

EXPLANATION OF SIGNIFICANT DIFFERENCES
TO THE 2000 INTERIM RECORD OF DECISION
SOUTH EL MONTE OPERABLE UNIT
SAN GABRIEL VALLEY SUPERFUND SITES, AREA 1

Introduction and Purpose

The United States Environmental Protection Agency (EPA) is updating the Superfund cleanup plan for the South El Monte Operable Unit ("South El Monte OU") of the San Gabriel Valley (Figure 1) in Los Angeles County, California in response to the detection of perchlorate, a chemical used in solid rocket fuel, in the groundwater underlying the area. Perchlorate was detected above the state of California (State) drinking water advisory level and may require treatment. 1,4-dioxane, a stabilizer in chlorinated solvents, has also been detected in the groundwater. EPA is currently evaluating the need for 1,4-dioxane treatment and containment. The EPA adopted the original South El Monte OU cleanup plan in 2000 after extensive public comment.

In addition to perchlorate and 1,4 dioxane, groundwater in the South El Monte OU is contaminated with perchloroethylene (PCE), trichloroethylene (TCE), and other chlorinated solvents. Chlorinated solvents are members of a group of chemicals called "volatile organic compounds," or VOCs.

The South El Monte OU 2000 cleanup plan calls for pumping VOC-contaminated groundwater from the intermediate aquifer in the northwest half, as specified in the Interim ROD, of the South El Monte OU that migrates towards the west and treating it to remove the VOCs. VOC-contaminated groundwater in the shallow and intermediate aquifers of the South El Monte OU that migrate to the south towards Whittier Narrows are addressed in a separate cleanup plan identified in the Whittier Narrows OU Interim Record of Decision Amendment, issued by EPA in November 1999. Nearly all of the VOC-contaminated groundwater in the shallow aquifer and a portion of the VOC-contaminated groundwater in the intermediate aquifer in the South El Monte OU migrate to the south. EPA has already constructed a groundwater remedy in the Whittier Narrows OU that is anticipated to capture any VOC contamination from the shallow aquifer and intermediate aquifer of the South El Monte OU that migrates to the south.

The focus of this ESD is to address the potential impacts of adding perchlorate treatment to the existing treatment systems of the remedy components from the IROD that are intended to capture that portion of the VOC contaminated groundwater in the intermediate zone that is flowing to the west. This ESD does not address, and specifically reserves for future determination in a subsequent decision document, how to contain or treat perchlorate in the shallow zone and those portions of the intermediate zone that flow south toward Whittier Narrows.

The detection of perchlorate above State drinking water advisory level in the groundwater from the intermediate aquifer migrating towards the west will change the cleanup project in the South El Monte OU in one significant way. The technologies typically used to remove chlorinated solvents from water (air stripping and carbon adsorption), do not effectively remove perchlorate. Installation of additional treatment facilities to treat perchlorate in the groundwater may be necessary at one or

more of the VOC treatment facilities, and this will increase the cost of the cleanup, as described below. The need for containment and treatment of 1,4-dioxane detected above State drinking water advisory level in the shallow aquifer is currently being evaluated by EPA. If EPA determines containment and treatment for 1,4-dioxane in the shallow zone is necessary, this decision will be documented in a subsequent decision document.

When significant, but not fundamental changes are needed in a Superfund cleanup plan, the EPA informs the community through an Explanation of Significant Differences (ESD). In this instance, EPA has determined that an ESD is appropriate because the interim remedy remains as outlined in the 2000 Interim ROD: to pump the contaminated groundwater from the northwest half of the intermediate aquifer beneath the South El Monte OU and to treat it to remove the contaminants. This ESD does not finalize the interim remedy.

The lead agency for the South El Monte OU cleanup is EPA and the support agency is the California Department of Toxic Substances Control.

EPA is issuing this Explanation of Significant Differences to satisfy its public participation responsibilities under CERCLA Section 117(c) and National Contingency Plan (NCP) Section 300.435(c)(2)(i).

This ESD will become part of the Administrative Record file for the South El Monte OU pursuant to NCP Section 300.825(a)(2) and will be available to the public at the following locations:

EPA Region 9 Superfund Records Center
75 Hawthorne Street, San Francisco, CA 94105 • (415) 536-2000

The Record Center's hours are 8:00 am to 5:00 p.m., Monday through Friday.

West Covina Public Library
1601 West Covina Parkway
West Covina, CA 91790
(626) 962-3541

Rosemead Library
8800 Valley Boulevard
Rosemead, CA 91770
(626) 573-5220

For hours of operation, interested parties may call the libraries at the numbers listed above.

The ESD is also available on the EPA's web site at http://yosemite.epa.gov/r9/sfund/rodex.nsf under the San Gabriel Valley (Area 1) heading.

The South El Monte Cleanup: A Brief History

San Gabriel Valley Groundwater Contamination

Groundwater contamination in the San Gabriel Valley was discovered in 1979. In 1984, the EPA added four portions of the San Gabriel Valley to the national Superfund list. The South El Monte OU is officially part of the *San Gabriel Valley Area 1* Superfund site. Investigations by the EPA

and others revealed the large extent of groundwater contamination in the South El Monte OU and the San Gabriel Valley. During the past 20 years, numerous water supply wells throughout the San Gabriel Valley have been found to be contaminated with chlorinated solvents and other VOCs. In response to the contamination, water companies have shut down contaminated wells, installed new treatment facilities, and taken other steps to ensure that they can continue to supply clean drinking water to the public.

South El Monte Groundwater Contamination

The remedial investigation/feasibility study ("RI/FS") for the South El Monte OU of the San Gabriel Valley Superfund sites was funded by a group of potentially responsible parties (PRPs) for contamination of groundwater in the South El Monte area and was completed in 1999. The remedial investigation determined that PCE, TCE, and other volatile organic compounds were contaminating the shallow and intermediate depth groundwater aquifers in a fifteen-square-mile area of the San Gabriel Valley around South El Monte. Businesses in South El Monte and surrounding areas had used these chemicals for degreasing, metal cleaning, and other purposes, and had probably released them to the ground through a combination of on-site disposal, careless handling, leaking pipes, and other means.

The study found that the upper most, or shallow aquifer includes most of the known sources of the groundwater contamination. VOC contaminant concentrations in portions of the shallow aquifer are hundreds of times drinking water standards (see Figure 2). In the intermediate aquifer, VOC contaminant concentrations are generally lower, but still exceed drinking water standards (see Figure 3).

EPA Adopts Cleanup Plan

On September 29, 2000, the EPA adopted a cleanup plan for the South El Monte OU known as the *South El Monte Operable Unit Interim Record of Decisio*n. The plan addresses the contamination described in the RI/FS. The goals of the 2000 cleanup plan are to prevent exposure of the public to VOC-contaminated groundwater, limit the movement of VOC-contaminated groundwater into clean or less contaminated areas and depths of the intermediate zone, reduce the impact of continued contaminant migration on downgradient water supply wells in the intermediate zone, and protect future uses of uncontaminated areas.

In the South El Monte OU, nearly all of the shallow zone groundwater and a portion of the intermediate zone groundwater migrate south towards Whittier Narrows. As part of a separate cleanup plan (identified in the *Whittier Narrows OU Interim Record of Decision Amendment*, issued by EPA in November 1999), EPA has already constructed a groundwater remedy in the Whittier Narrows OU that is anticipated to capture any shallow zone and intermediate zone VOC contamination in the South El Monte OU that is migrating to the south. This leaves only the portion of the intermediate-zone VOC contamination in the northwest half of the South El Monte OU that migrates towards the west to be addressed in the South El Monte OU cleanup plan.

The South El Monte OU 2000 cleanup plan calls for pumping the VOC-contaminated groundwater from a portion of the intermediate aquifer beneath the South El Monte OU and treating it to remove the contaminants. More specifically, the plan allows for the use of existing water supply wells, treatment systems, and pipelines if possible, and the construction of new facilities where needed, to pump and treat approximately 10,000 gallons per minute of VOC-contaminated groundwater from the intermediate aquifer. Final decisions on extraction rates and locations will be made during the remedial design phase of the project.

The 2000 Interim ROD selected a remedy that "is an interim action and is focused on controlling the migration of contamination" (Interim ROD, 09-2000). The Interim ROD established Performance Criteria as follows: **"***The remedial action shall provide sufficient hydraulic control to prevent migration of intermediate zone groundwater contaminated above chemical-specific ARARs* (listed in Table 6 of the Interim ROD) *into or beyond the Central Containment Area and into or beyond the Western Containment Area* (defined in Section 11.1.3.2 of the Interim ROD).

The EPA has installed and sampled monitoring wells and modeled the groundwater aquifers to prepare for the implementation of cleanup work for the intermediate aquifer. Water purveyors' facilities in the SEMOU have been proposed as part of the SEMOU VOC containment remedy. These facilities are: 1) San Gabriel Valley Water Company's Plant 8 production Wells b, c, and d and their associated VOC treatment facility, 2) City of Monterey Park (MP) Wells 12 and 15 and their associated VOC treatment facility, 3) MP Well 5 and its associated VOC treatment facility, and 4) Southern California Water Company (SCWC) San Gabriel Wells 1 and 2 and their associated VOC treatment facility. In addition to VOC treatment, perchlorate treatment may be required at the two MP facilities and the SCWC facility listed above.

In mid-2002, EPA began start-up operation of its Whittier Narrows OU groundwater remedy. When fully operational, the Whittier Narrows remedy includes 7 extraction wells (four in the shallow aquifer and 3 in the intermediate aquifer) installed by EPA to extract approximately 11,000 gpm of VOC-contaminated water. The contaminated groundwater is treated using a two-stage carbon adsorption system. The Whittier Narrows remedy is currently pumping and treating 2500-2800 gpm of VOC contaminated groundwater from the shallow aquifer and will be pumping and treating 6000 gpm of VOC contaminated groundwater from the intermediate aquifer in late 2005.

Reason for this Action: Detection of Perchlorate in the South El Monte OU

After the discovery in 1997 and 1998 of perchlorate, n-nitrosodimethylamine (NDMA), and 1,4-dioxane in the Baldwin Park area of the San Gabriel Valley, the Los Angeles Regional Water Quality Control Board requested that facilities in several areas of the San Gabriel Valley sample their groundwater monitoring wells for these newly-discovered "emergent chemicals." During the same time period, widespread testing for perchlorate was conducted in the San Gabriel Valley by water suppliers. EPA also began testing for the emergent chemicals in several areas of the San Gabriel Valley, including the South El Monte OU. Perchlorate and 1,4-dioxane were detected in the groundwater in the South El Monte OU. 1,4- dioxane was detected at concentrations more than 20 times the State drinking water advisory level of 3 ppb in the shallow aquifer in the northern and

southern portions of the South El Monte OU. Concentrations of 1,4-dioxane detected in the intermediate aquifer were generally less than the State drinking water advisory level. Perchlorate detected in the groundwater in the South El Monte OU did not exceed the State drinking water advisory level of 18 ug/l established in 1997.

In early 2002 and 2004, the State issued new drinking water advisory levels for perchlorate of 4 ppb and 6 ppb respectively. Susbsequently, perchlorate was detected at concentrations above the State drinking water advisory level of 6 ppb during testing of groundwater in the intermediate aquifer of the South El Monte OU. Some water purveyors' wells were impacted by perchlorate contamination, and consequently, intermediate zone groundwater pumped from these wells has to be treated for perchlorate. In some cases where the perchlorate concentration in water purveyor wells is just slightly above the State drinking water advisory level, water purveyors may be able to blend perchlorate contaminated water with clean water to meet the State drinking water advisory level. Concentrations of perchlorate in the shallow aquifer were generally less than the State drinking water advisory level and shallow zone perchlorate treatment is not needed at this time. If EPA determines containment and treatment for perchlorate in the shallow zone is necessary, this decision will be addressed in a subsequent decision document.

Figures 4 and 5 depict the approximate extent of perchlorate contamination in shallow and intermediate groundwater in the South El Monte OU.

The need for containment of 1,4-dioxane detected above State drinking water advisory level in the shallow aquifer is currently being evaluated by EPA using groundwater modeling. The evaluation will assess 1) the likelihood of elevated concentrations of 1,4-dioxane in the shallow aquifer in the South El Monte OU migrating to the Whittier Narrows OU in the future and impacting the Whittier Narrows OU remedy extraction wells, and 2) the potential for 1,4-dioxane in shallow aquifer source areas in the northern portion of the South El Monte OU to migrate into the intermediate aquifer and affect extraction wells proposed as components of the South El Monte OU interim remedial action. If EPA determines containment for 1,4-dioxane in the shallow zone is necessary, this decision will be documented in a subsequent decision document.

In the intermediate aquifer, concentrations of 1,4-dioxane in the South El Monte OU are generally less than the State drinking water advisory level. Treatment for 1,4-dioxane in the intermediate aquifer is not included as part of the remedy at this time. If EPA determines containment for 1,4-dioxane in the intermediate zone is necessary, this decision will be documented in a subsequent decision document.

NDMA and hexavalent chromium have also been detected in groundwater in the South El Monte OU, but do not exceed Federal or State water quality regulatory levels. Thus, additional treatment processes for NDMA and hexavalent chromium are not needed at this time. Treatment processes for these chemicals may be required in the future however, if ongoing monitoring indicates exceedance of water quality standards in the intermediate aquifer. If EPA determines containment and treatment of either NDMA or hexavalent chromium or both is necessary in the shallow or intermediate zone or both, that decision will be documented in a subsequent decision document.

In March 2002, EPA sent *Special Notice* letters to 67 PRPs to begin formal EPA-PRP negotiations to obtain a binding commitment from the PRPs to carry out the South El Monte OU cleanup plan for the design, construction, and operation of the groundwater extraction, treatment, and discharge facilities specified in the South El Monte OU Interim ROD. EPA is currently negotiating this commitment, called a Consent Decree, with a group of South El Monte OU PRPs.

Because perchlorate at concentrations above the State drinking water advisory level was discovered after EPA issued the South El Monte OU Interim ROD, EPA is now modifying the cleanup decision to address the need to potentially treat perchlorate at those portions of the IROD remedy that are operating in the intermediate zone. As a result, one of the perchlorate treatment technologies described below may be required. To the extent treatment is required for perchlorate, the groundwater has to be treated to achieve the treatment levels described below. In some cases, where the perchlorate concentration is close to the State drinking water advisory level, there may be an opportunity to blend perchlorate contaminated water with clean water to meet the State drinking water advisory level, under the purview of the California Department of Health Services.

Table 1 shows the significant differences between the remedy as presented in the 2000 Interim ROD and the action now proposed.

Description of Treatment Options for Perchlorate

Since 1997, when perchlorate was discovered in the San Gabriel Valley groundwater basin, the availability and capability of technologies for removing perchlorate from groundwater have improved considerably. There are two commonly used perchlorate removal technologies: ion exchange and biological treatment.

In the ion exchange treatment technology, the perchlorate ion is replaced by chloride, a chemically similar but non-toxic ion. Ion exchange processes have been used in homes and businesses for *softening* hard water for decades. In the spring of 2001, a 2,500-gallon-per-minute groundwater treatment system using ion exchange to remove perchlorate began operation in the Baldwin Park Operable Unit, producing potable water for use in the San Gabriel Valley.

In the biological treatment process, nutrients are added to the contaminated water to sustain microbes that destroy perchlorate. The microbes convert the perchlorate ion to oxygen and chloride, which are present at low levels in all drinking water. The biological treatment process is being used in a full-scale treatment system at the Aerojet Superfund site in northern California.

Liquid-phase granular-activated-carbon (LGAC) is another technology that has been proven capable of removing perchlorate from water, to a limited extent and at higher costs. Conventional filtration, sedimentation, or air-stripping technologies cannot remove perchlorate from water.

Treatment Levels

Applicable or Relevant and Appropriate Requirements (ARARs)

The treatment technologies used in the South El Monte OU will have to be capable of effectively and reliably removing VOCs, and if necessary, perchlorate from the groundwater.

ARARs include only substantive, not administrative, requirements, pertain only to on-site activities, and are frozen at the time of the ROD, or ESD. Off-site activities must comply with all applicable federal, state, and local laws, including both substantive and administrative requirements that are in effect when the activity takes place.

As noted in the Interim ROD, delivery of treated water into a public water supply is considered to be an off-site activity, and must meet all legal requirements for drinking water in existence at the time the water is served, including obtaining necessary State water supply permits. If any of the treated groundwater in the intermediate aquifer of the SEMOU is to be used as drinking water, it must meet all applicable Federal and State drinking water standards in existence at the time the water is served, including any permit requirements.

Generally, the applicable drinking water standard is the Maximum Contaminant Level (MCL) established by State and Federal regulation. However, while MCLs have been established for some of the chemicals in the groundwater in the South El Monte OU, neither of the recently detected emergent chemicals has a MCL.

For some chemicals that lack MCLs, the state of California Department of Health Services (DHS) has specified *notification levels* that are *health-based advisory levels* for drinking water use. Notification levels are established as precautionary measures for contaminants that may be considered candidates for establishment of MCLs. DHS has established notification levels for perchlorate at 6 ug/l and set the Public Health Goal for perchlorate at 6 ug/l. Although not an enforceable standard, a notification level is the concentration level of a contaminant in drinking water that DHS has determined, based on available scientific information, does not pose a significant health risk but warrants notification. California Health & Safety Code Section 116455, Chapter 679, Statutes of 2004, AB2528, (Lowental) requires that the operator of a public water system notify local government authorities when a drinking water well exceeds a notification level. If a public water system is a water company regulated by the California Public Utilities Commission, the public water system shall notify the Commission when a drinking water well exceeds a notification level. In addition, DHS requires that drinking water purveyors notify the public if notification levels are exceeded, unless the wells in question are taken out of service.

EPA's cleanup plan also allows for other discharge options for the treated water such as surface water discharge, with or without the goal of aquifer recharge, instead of delivering it for use as drinking water. The 2000 Interim ROD sets forth the ARARs for the South El Monte OU for discharges to surface water. These ARARs include: 1) the Los Angeles Regional Water Quality Control Board (RWQCB) Basin Plan, as applied in the Interim ROD; 2) the California Toxics Rule,

which establishes water quality criteria for 126 pollutants, including many of the VOCs found in groundwater at the South EL Monte OU, as applied in the Interim ROD; 3) the State Water Resources Control Board Resolution No. 68-16, as applied in the Interim ROD; and 4) the chemical specific ARARs listed in Table 6 of the Interim ROD. Except as noted herein, the ARARs identified in the 2000 Interim ROD remain unchanged.

Consistent with CERCLA section 121 (e)(1), an on-site discharge from a CERCLA site to surface waters must meet the substantive National Pollutant Discharge Elimination System Permit ('NPDES") requirements, but need not obtain an NPDES permit nor comply with the administrative requirements of the permitting process. Dischargers under the NPDES program may apply for a general permit if there is an applicable general permit available for the type of discharge contemplated, or a facility specific permit. The NPDES authority under the CWA has been delegated to the state of California, and is outlined in the RWQCB Basin Plan.

If any treated water is to be discharged to surface water, except with respect to the perchlorate level noted below, Region 9 is selecting Table F of the General Permit[1] as an ARAR for discharges to surface water because it generally reflects the substantive requirements or discharge levels that the State would require, if a permit was necessary. The General Permit selects 4 ug/l as the discharge limit for perchlorate. However, since the General Permit was issued in 2002, California modified the notification level for perchlorate from 4 to 6 ug/l and the Office of Environmental Health Hazard Assessment set the PHG for perchlorate at 6 ug/l. Therefore, this ESD selects 6 ug/l as the ARAR for the surface water discharge of treated water containing perchlorate because it is the level or substantive requirement the State would require, if a facility specific NPDES permit was necessary.

Estimated Costs

In the 2000 Interim ROD, EPA estimated the cost of the VOC cleanup in the South El Monte OU at $5.9 million in capital costs associated with construction, and $837,000 per year in operation and maintenance (O&M) costs. EPA has revised the cost estimate to account for the additional treatment needed for perchlorate in the intermediate groundwater and the "double barrier" treatment for VOCs in groundwater. The revised cost estimate may potentially range from $10.9 million in

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[1] The General Permit is California Regional Water Quality Control Board, Los Angeles Region (LARWQCB), Order No. R4-2002-0107, "Waste Discharge Requirements for Discharges of Treated Groundwater from Investigation and/or Cleanup of Volatile Organic Compounds Contaminated-Sites to Surface Waters in Coastal Watersheds of Los Angeles and Ventura Counties (GENERAL NPDES PERMIT NO. CAG914001)."

capital costs and $2.2 million per year in O&M costs to $17.5 million in capital costs and $4.8 million per year in O&M costs based on the same extraction and treatment rates as the 2000 Interim ROD. The capital costs are based on using primarily new production wells and infrastructure. If agreements are reached to use existing water purveyor-owned production wells and infrastructure, the capital costs could decrease by approximately $2 million.

There is a range in the revised cost estimates because some of the water purveyors whose wells are contaminated with perchlorate may be able to blend (lower-end) to bring the perchlorate contamination in the VOC-treated groundwater to below the State drinking water advisory level of 6 ug/L, and others may have to treat for perchlorate (higher-end). Some of the factors to consider in blending are: concentrations of perchlorate in the VOC treated water, source of clean groundwater to use for blending, and DHS approval.

The higher-end cost estimate includes additional treatment at three water purveyor's facilities to reduce perchlorate in treated water to below the State drinking water advisory level. The lower-end cost estimate includes additional treatment for perchlorate at only one water purveyor facility and blending of perchlorate-contaminated water at the other two water purveyor facilities with clean water to reduce perchlorate in the blended water to below the State drinking water advisory level.

EPA's revised cost estimates also include "double barrier" treatment for VOCs at two water purveyor facilities where VOC concentrations in groundwater exceed 10 times State drinking water standards. Under California DHS Policy Memo 97-005[2], California DHS requires "double barrier" treatment when concentrations of contaminants in the source water exceed 10 times the drinking water standards - in this case, the MCL for at least one VOC. Although California DHS Policy Memo 97-005 is not an ARAR for the South El Monte OU, its requirements must be met by water purveyors who serve the treated water as drinking water.

The additional treatment needed for perchlorate in the intermediate groundwater and the "double barrier" treatment for VOCs in groundwater are the primary factors responsible for the increases in the cleanup cost estimates in the South El Monte OU.

[2] California DHS Policy Memo 97-005 is a guidance document that sets forth the position and the basic tenets by which the California Drinking Water Program would evaluate proposals, establish appropriate permit conditions, and approve the use of an extremely impaired source for any direct potable use.

It should be noted that water purveyors, whose wells and treatment facilities are proposed for use as part of the SEMOU remedy, have developed capital and annual O&M cost estimates for their VOC and perchlorate treatment facilities in the SEMOU. The water purveyors' cost estimates are higher than EPA's estimates presented in this ESD. The difference in costs is primarily due to three factors namely: 1) water purveyors extraction rates at some facilities are greater than the rates specified in the SEMOU 2000 Interim ROD, 2) water purveyors periods of operation at some facilities are longer than those specified in the ROD, and 3) water purveyors costs for the operation and maintenance of some facilities (resin costs) are higher than EPA's cost estimates.

Final Selection of Treatment Technologies

EPA will select the final treatment technologies for the South El Monte OU over the next year during completion of pre-design activities and the design of the South El Monte OU cleanup facilities for the new contaminant. During this time, additional cost and performance data from operation of full-scale treatment systems in the San Gabriel Valley and the results of treatment studies elsewhere will become available. EPA will incorporate this information into the selection of treatment technologies for the South El Monte OU.

State Concurrence

The California Department of Toxic Substances Control documented concurrence with this ESD in a letter dated November 8, 2005.

Statutory Determination

As required by CERCLA Section 121(d), the modified cleanup plan for the South El Monte OU remains protective of human health and the environment and will continue to meet all ARARs identified in the 2000 Interim ROD, as modified by this ESD.

Public Participation Compliance

An ESD notice will be published in November 2005 in a local newspaper as required by the NCP, section 300.435(c)(2)(i)(B). The public participation requirements set out in the NCP, sections 300.435(c)(2)(i) and 300.825(a)(2) will continue to be met.

Elizabeth Adams

November 10, 2005

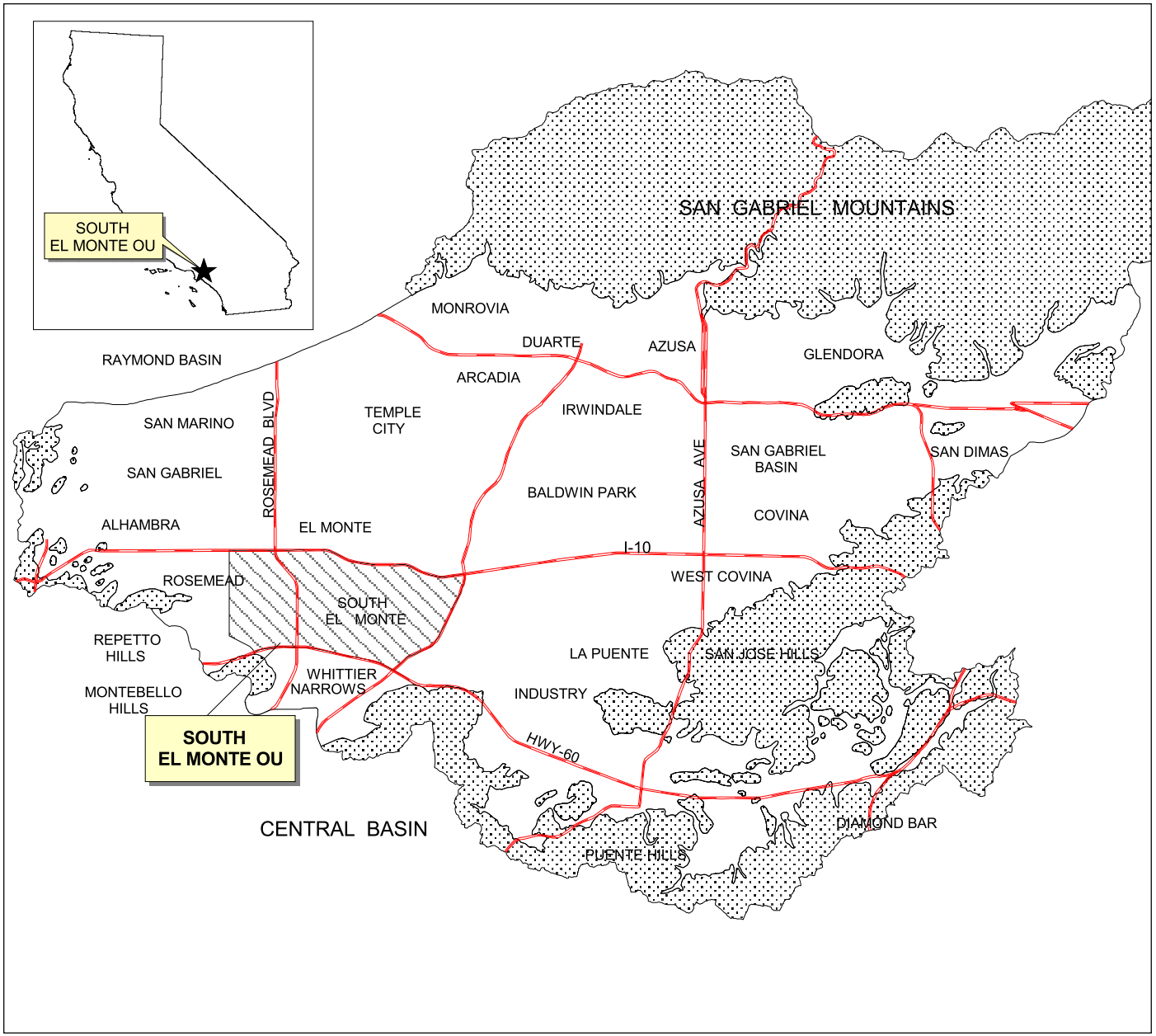
Elizabeth Adams, Chief
Superfund Site Cleanup Branch
U.S. Environmental Protection Agency, Region 9

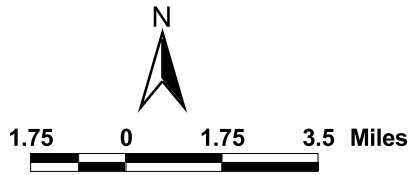
Date

Table 1. Comparison of Cleanup Plans – Most Aspects of the 2000 Plan Have Not Changed

Remedial Action Categories	Original Cleanup Plan	Updated Cleanup Plan
Remedial Objectives	Prevent exposure, limit further migration of contaminated groundwater, reduce impacts on downgradient water supply wells, protect future uses of clean areas.	Same
Groundwater Extraction Areas	Extract water from the intermediate aquifer.	Same
Groundwater Extraction Rates	Extract contaminated groundwater at rates needed to meet remedial objectives. Determine final rates during remedial design. Initial estimate was 10,020 gpm.	Same
Groundwater Treatment Technologies	Use air stripping with off gas treatment or liquid-phase granular-activated carbon (LGAC) to remove VOCs from the groundwater. Finalize technologies during remedial design.	Use same technologies to remove VOCs. Potentially use ion exchange or biological treatment to reduce perchlorate. Finalize technology during remedial design.
Groundwater Treatment Standards	Design treatment systems to reduce VOC concentrations to below MCLs.	Reduce VOC concentrations to below MCLs; reduce perchlorate concentration to below State drinking water advisory levels.
Use of Treated Groundwater	Supply water to water companies for distribution, or surface water discharge, with or without aquifer recharge. Make final decision during remedial design.	Same

Project Costs	Estimated capital costs of $5.9 million; estimated operation and maintenance costs of $837,000 per year.	Estimated capital costs and operation and maintenance costs, including perchlorate treatment at only one facility, blending for perchlorate at two facilities, and double barrier treatment for VOCs, potentially increase to $10.9 million and $2.2 million per year respectively. Estimated capital costs and operation and maintenance costs, including perchlorate treatment at three facilities, and double barrier treatment for VOCs, potentially increase to $17.5 million and $4.8 million per year respectively.



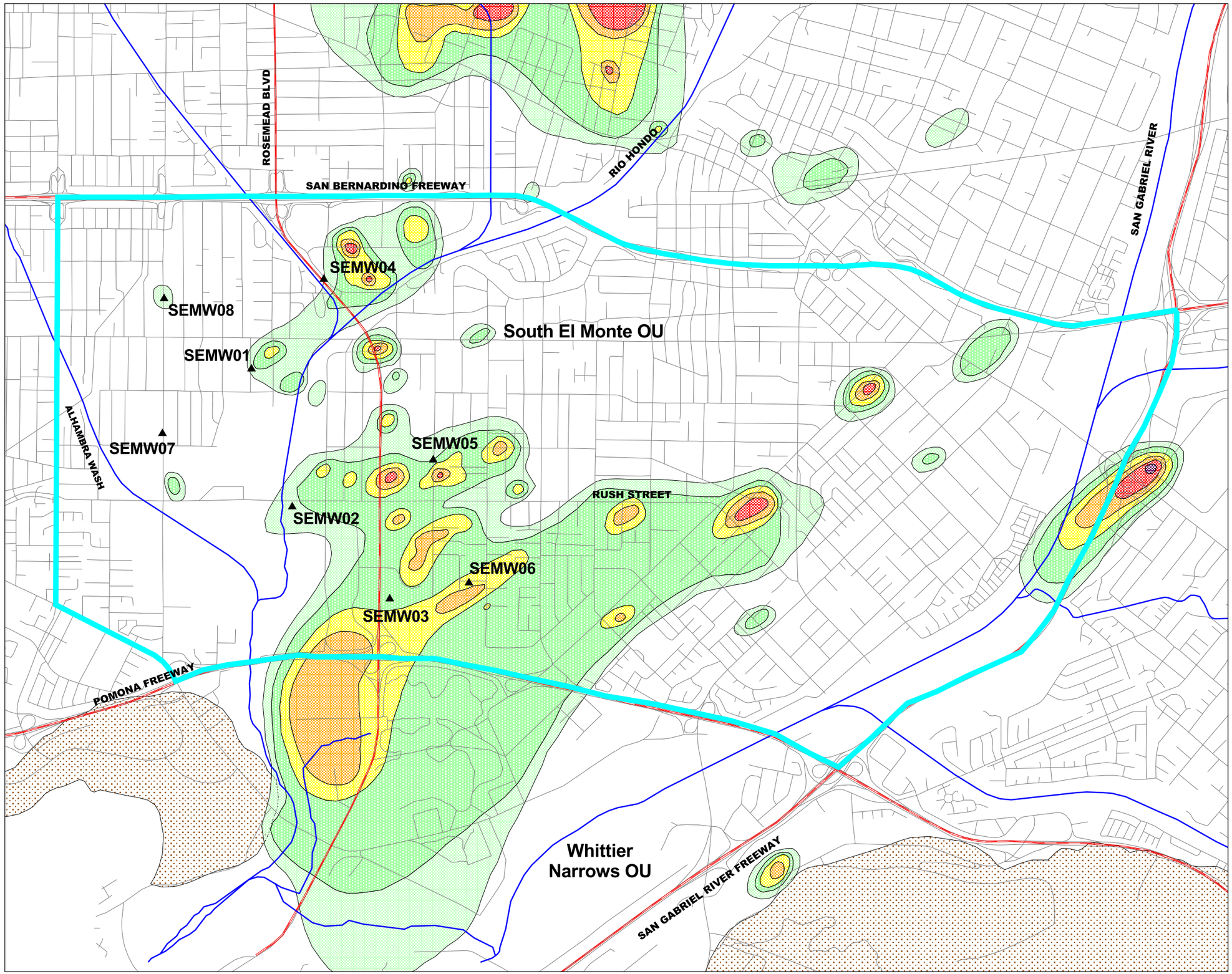


LEGEND

- MAJOR TRANSPORTATION
- SOUTH EL MONTE OU
- HYDROLOGIC BOUNDARY
- BEDROCK

Figure 1
Location Map
South El Monte Operable Unit

South El Monte OU ESD



N

2500 0 2500 Feet

- BEDROCK
- VOC CONTAMINATION POTENTIALLY EXCEEDING 1000X MCLS
- VOC CONTAMINATION POTENTIALLY RANGING FROM 100X TO < 1000X MCLS
- VOC CONTAMINATION POTENTIALLY RANGING FROM 20X TO < 100X MCLS
- VOC CONTAMINATION POTENTIALLY RANGING FROM 10X TO < 20X MCLS
- VOC CONTAMINATION POTENTIALLY RANGING FROM MCLS TO < 10X MCLS
- VOC CONTAMINATION POTENTIALLY RANGING FROM LABORATORY DETECTION LIMITS TO < MCLS
- BASIN BOUNDARY
- MAJOR TRANSPORTATION
- RI MONITORING WELL
- SOUTH EL MONTE OPERABLE UNIT BOUNDARY

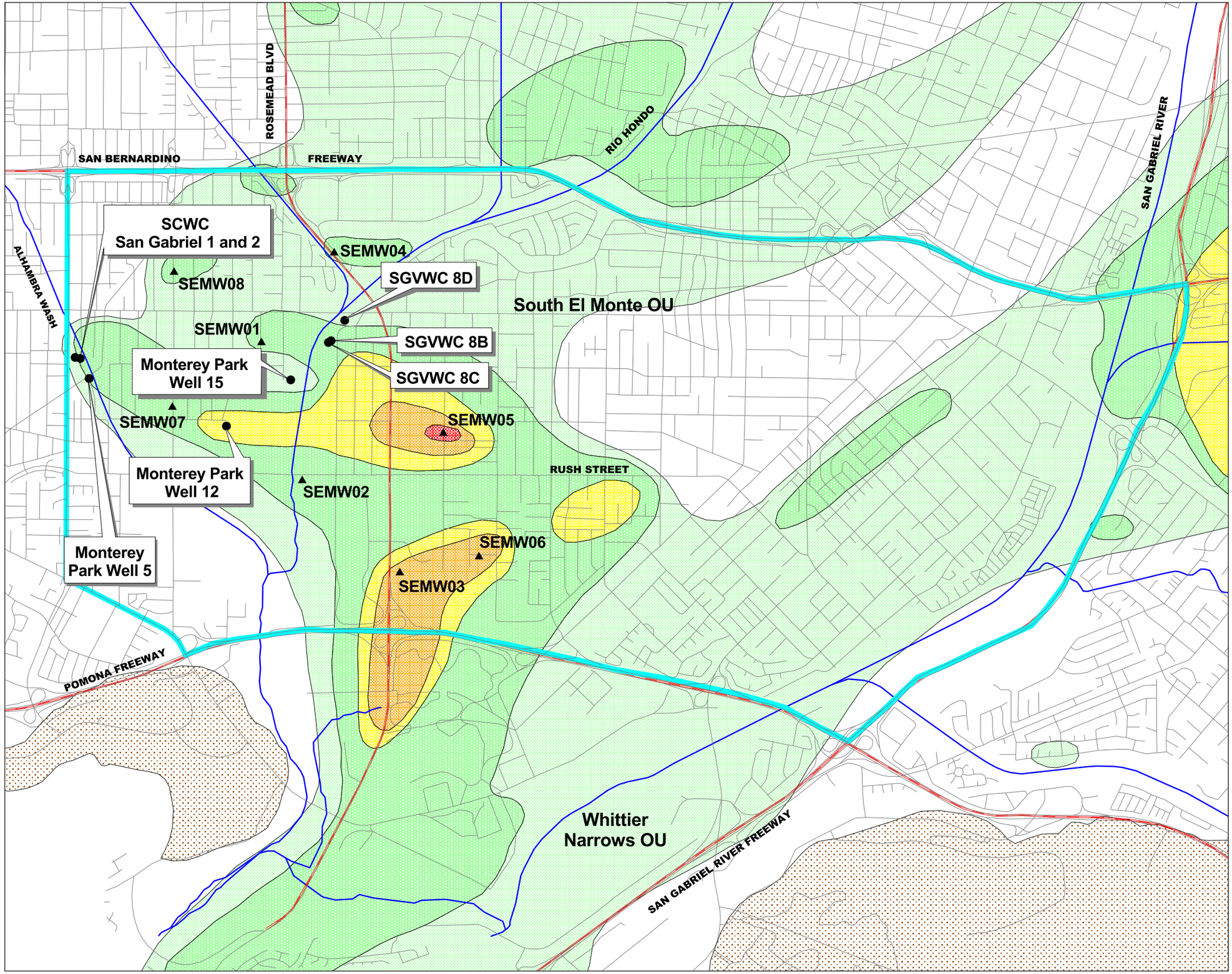
THE AREAS OF CONTAMINATION SHOWN REPRESENT SIMPLIFIED APPROXIMATIONS BASED ON THE LAST AVAILABLE CONCENTRATION (THROUGH 03/06/03) OF ANY OF A SELECT LIST OF VOCS. AREAS OF CONTAMINATION ARE BASED ON THE MOST RECENT AND HIGHEST VOC RESULTS AT EACH WELL, DIVIDED BY THE MCL FOR EACH VOC. THE VOC AT EACH WELL WITH THE HIGHEST QUOTIENT WAS THEN USED IN THE CONCENTRATION CONTOURING PROCESS. ONLY WATER QUALITY DATA FROM PRODUCTION AND MONITORING WELLS SCREENED ENTIRELY IN THE UPPER 75 FEET OF THE SATURATED AQUIFER WERE USED. DATA POINTS MORE THAN FIVE YEARS OLD WERE GENERALLY NOT CONSIDERED.

BECAUSE CONTAMINATION CONCENTRATIONS VARY WITH TIME, A WELL MAY AT TIMES PRODUCE WATER WITH DIFFERENT CONTAMINANT LEVELS THAN THOSE INDICATED. DIFFERENCES COULD ALSO BE CAUSED BY VERTICAL VARIATIONS IN CONTAMINATION (THE FIGURE IS A TWO-DIMENSIONAL DEPICTION OF CONTAMINATION THAT ACTUALLY VARIES WITH DEPTH).

THE FIGURE SHOWS ONLY REGIONAL VARIABILITY IN CONTAMINATION IN MUCH OF THE BASIN. DISTANCES BETWEEN DATA POINTS ARE IN THE 1,000S OF FEET. THUS, THERE IS SIGNIFICANT UNCERTAINTY IN THE TRUE LOCATIONS OF THE CONCENTRATION CONTOURS.

Figure 2
Shallow Groundwater Zone
(<100 feet below ground surface)
VOC Contamination
Through March 2003

South El Monte OU ESD



N

2500 0 2500 Feet

- BEDROCK
- VOC CONTAMINATION POTENTIALLY RANGING FROM 100X TO < 1000X MCLS
- VOC CONTAMINATION POTENTIALLY RANGING FROM 20X TO < 100X MCLS
- VOC CONTAMINATION POTENTIALLY RANGING FROM 10X TO < 20X MCLS
- VOC CONTAMINATION POTENTIALLY RANGING FROM MCLS TO < 10X MCLS
- VOC CONTAMINATION POTENTIALLY RANGING FROM LABORATORY DETECTION LIMITS TO < MCLS
- BASIN BOUNDARY
- MAJOR TRANSPORTATION
- EXTRACTION WELL
- RI MONITORING WELL
- SOUTH EL MONTE OPERABLE UNIT BOUNDARY

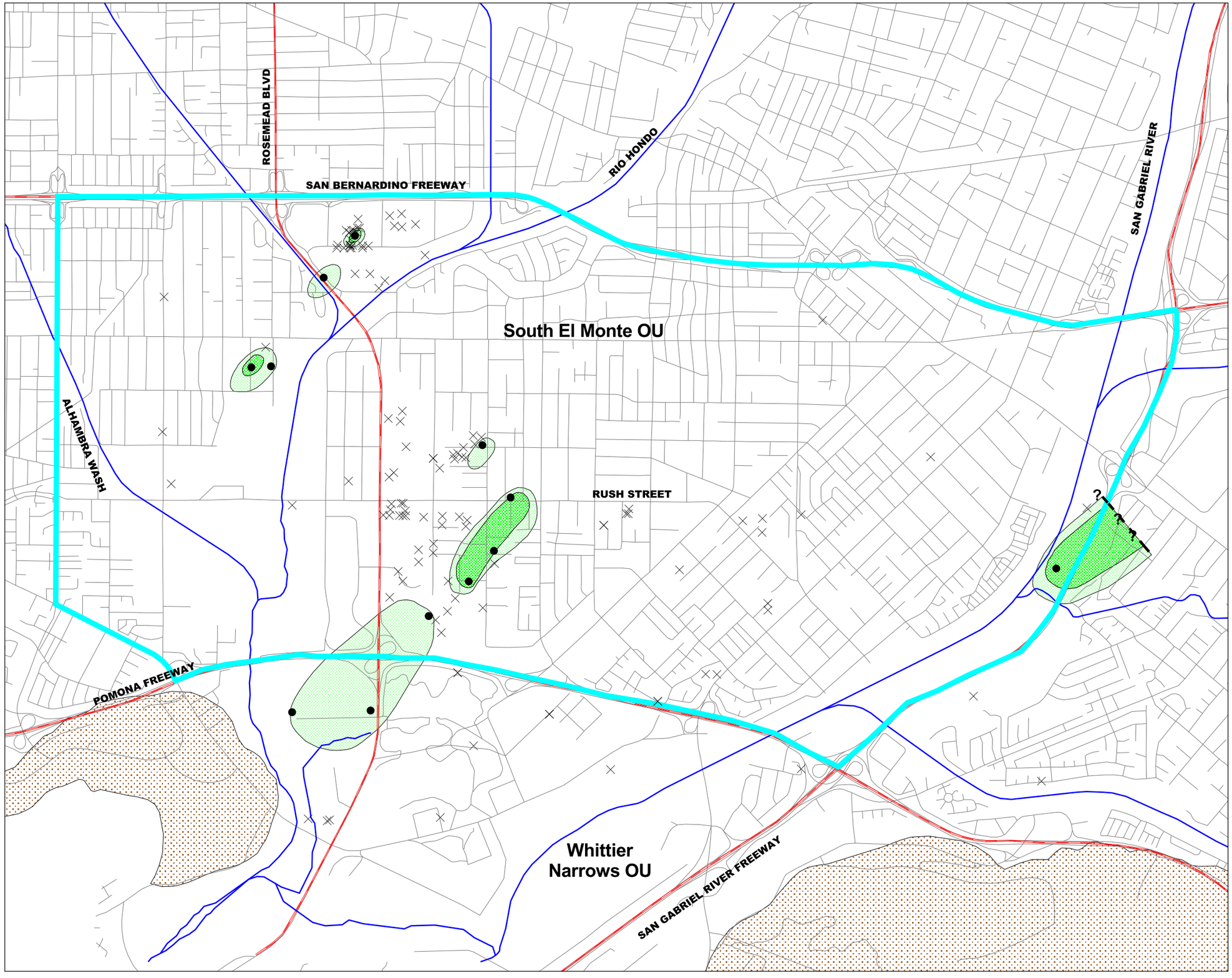
THE AREAS OF CONTAMINATION SHOWN REPRESENT SIMPLIFIED APPROXIMATIONS BASED ON THE LAST AVAILABLE CONCENTRATION (THROUGH 03/06/03) OF ANY OF A SELECT LIST OF VOCS. AREAS OF CONTAMINATION ARE BASED ON THE MOST RECENT AND HIGHEST VOC RESULTS AT EACH WELL, DIVIDED BY THE MCL FOR EACH VOC. THE VOC AT EACH WELL WITH THE HIGHEST QUOTIENT WAS THEN USED IN THE CONCENTRATION CONTOURING PROCESS. ONLY WATER QUALITY DATA FROM PRODUCTION AND MONITORING WELLS SCREENED AT DEPTHS GREATER THAN 75 FEET BELOW THE TOP OF THE WATER TABLE WERE USED. DATA POINTS MORE THAN FIVE YEARS OLD WERE GENERALLY NOT CONSIDERED.

BECAUSE CONTAMINATION CONCENTRATIONS VARY WITH TIME, A WELL MAY AT TIMES PRODUCE WATER WITH DIFFERENT CONTAMINANT LEVELS THAN THOSE INDICATED. DIFFERENCES COULD ALSO BE CAUSED BY VERTICAL VARIATIONS IN CONTAMINATION (THE FIGURE IS A TWO-DIMENSIONAL DEPICTION OF CONTAMINATION THAT ACTUALLY VARIES WITH DEPTH).

THE FIGURE SHOWS ONLY REGIONAL VARIABILITY IN CONTAMINATION IN MUCH OF THE BASIN. DISTANCES BETWEEN DATA POINTS ARE IN THE 1,000S OF FEET. THUS, THERE IS SIGNIFICANT UNCERTAINTY IN THE TRUE LOCATIONS OF THE CONCENTRATION CONTOURS.

Figure 3
Intermediate Groundwater Zone
(>100 to 400 feet below ground surface)
VOC Contamination
Through March 2003

South El Monte OU ESD



N

2500 0 2500 Feet

BEDROCK

PERCHLORATE CONTAMINATION POTENTIALLY > NL

PERCHLORATE CONTAMINATION POTENTIALLY RANGING FROM LABORATORY DETECTION LIMITS TO < NL

MAJOR TRANSPORTATION

WELL ABOVE NON-DETECT

NON-DETECT WELL

DASHED AND/OR QUERIED WHERE UNCERTAIN

SOUTH EL MONTE OPERABLE UNIT BOUNDARY

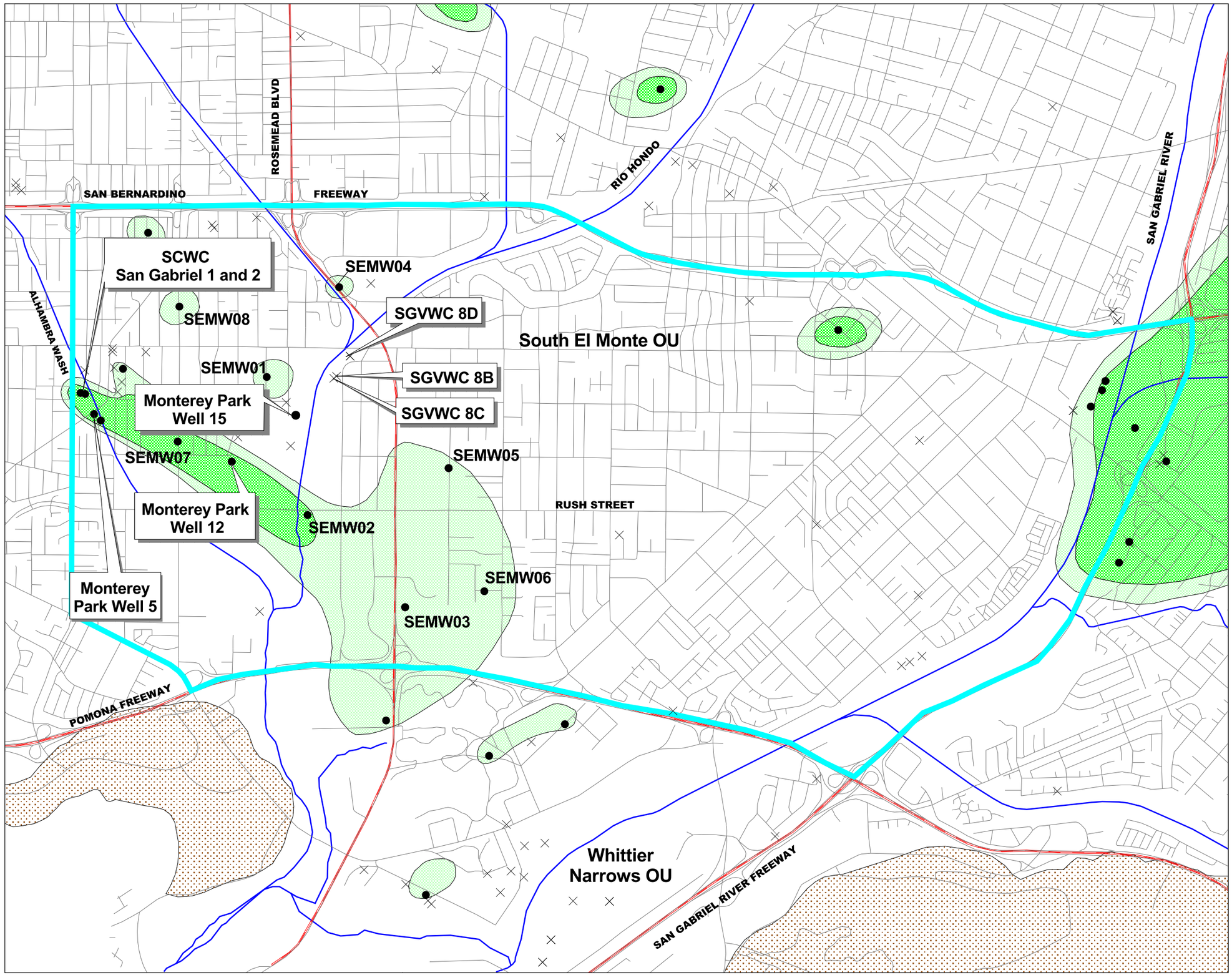
THE AREAS OF CONTAMINATION SHOWN REPRESENT SIMPLIFIED APPROXIMATIONS BASED ON THE LAST AVAILABLE CONCENTRATION (THROUGH 5/03) OF PERCHLORATE. ONLY WATER QUALITY DATA FROM PRODUCTION AND MONITORING WELLS SCREENED AT DEPTHS LESS THAN 75 FEET BELOW THE TOP OF THE WATER TABLE WERE USED.

BECAUSE CONTAMINANT CONCENTRATIONS VARY WITH TIME, A WELL MAY AT TIMES PRODUCE WATER WITH DIFFERENT CONTAMINANT LEVELS THAN THOSE INDICATED. DIFFERRENCES COULD ALSO BE CAUSED BY VERTICAL VARIATIONS IN CONTAMINATION (THE FIGURE IS A TWO-DIMENSIONAL DEPICTION OF CONTAMINATION THAT ACTUALLY VARIES WITH DEPTH).

THE FIGURE SHOWS ONLY REGIONAL VARIABILITY IN CONTAMINATION. IN MUCH OF THE BASIN, DISTANCES BETWEEN DATA POINTS ARE IN THE 1,000'S OF FEET. THUS, THERE IS SIGNIFICANT UNCERTAINTY IN THE TRUE LOCATIONS OF THE CONCENTRATION CONTOURS.

Figure 4
Shallow Groundwater Zone
(<100 feet below ground surface)
Perchlorate Contamination
Through May 2003

South El Monte OU ESD



N

2500 0 2500 Feet

- BEDROCK
- PERCHLORATE CONTAMINATION POTENTIALLY > NL
- PERCHLORATE CONTAMINATION POTENTIALLY RANGING FROM LABORATORY DETECTION LIMITS TO < NL
- MAJOR TRANSPORTATION
- WELL ABOVE NON-DETECT
- NON-DETECT WELL
- SOUTH EL MONTE OPERABLE UNIT BOUNDARY

THE AREAS OF CONTAMINATION SHOWN REPRESENT SIMPLIFIED APPROXIMATIONS BASED ON THE LAST AVAILABLE CONCENTRATION (THROUGH 5/03) OF PERCHLORATE. ONLY WATER QUALITY DATA FROM PRODUCTION AND MONITORING WELLS SCREENED AT DEPTHS GREATER THAN 75 FEET BELOW THE TOP OF THE WATER TABLE WERE USED.

BECAUSE CONTAMINANT CONCENTRATIONS VARY WITH TIME, A WELL MAY AT TIMES PRODUCE WATER WITH DIFFERENT CONTAMINANT LEVELS THAN THOSE INDICATED. DIFFERRENCES COULD ALSO BE CAUSED BY VERTICAL VARIATIONS IN CONTAMINATION (THE FIGURE IS A TWO-DIMENSIONAL DEPICTION OF CONTAMINATION THAT ACTUALLY VARIES WITH DEPTH).

THE FIGURE SHOWS ONLY REGIONAL VARIABILITY IN CONTAMINATION. IN MUCH OF THE BASIN, DISTANCES BETWEEN DATA POINTS ARE IN THE 1,000'S OF FEET. THUS, THERE IS SIGNIFICANT UNCERTAINTY IN THE TRUE LOCATIONS OF THE CONCENTRATION CONTOURS.

Figure 5
Intermediate Groundwater Zone
(>100 to 400 feet below ground surface)
Perchlorate Contamination
Through May 2003

South El Monte OU ESD