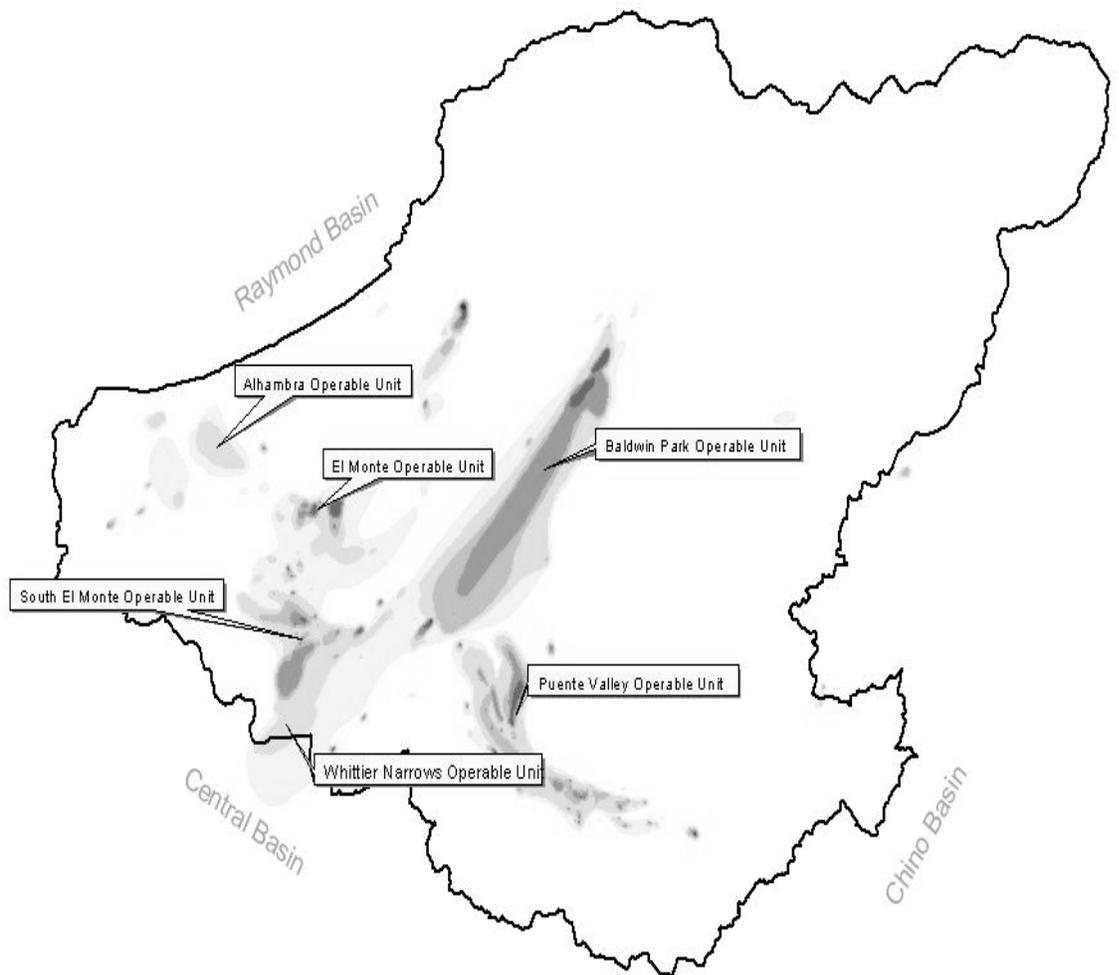

JANUARY 2004

State Water Resources Control Board

REPORT TO THE LEGISLATURE



ACTIVITIES OF THE SAN GABRIEL BASIN
WATER QUALITY AUTHORITY
1992 THROUGH 2003



STATE OF CALIFORNIA

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State of California
STATE WATER RESOURCES CONTROL BOARD

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EXECUTIVE SUMMARY

The San Gabriel Basin Water Quality Authority (WQA) is a local entity created in 1992 by Senate Bill (SB) 1679. This bill recognized that the groundwater contamination issues affecting the San Gabriel Groundwater Basin (Basin) were complex and required expedient cleanup. The Basin is listed as a Superfund site on the United States Environmental Protection Agency's (USEPA) National Priority List (NPL). Over one million residents in the Basin rely primarily on these local groundwater resources for their potable water supply.

A subsequent re-authorization bill, Assembly Bill (AB) 2544 (Calderon, 2000), requires the State Water Resources Control Board (SWRCB), on or before January 1, 2004, to report to the Legislature on progress made by the WQA, and any recommendations for improving the progress of the authority.

The WQA was created to coordinate response actions to the contamination in the Basin with all stakeholders. Stakeholders include, but are not limited to, the USEPA, the U. S. Bureau of Reclamation (USBR), the Department of Toxic Substances Control (DTSC), the SWRCB, the Los Angeles Regional Water Quality Control Board (LARWQCB), the Department of Health Services (DHS), the WQA, the Main San Gabriel Basin Watermaster, cities affected by the Basin's groundwater contamination, water purveyors in the Basin, and the Potentially Responsible Parties (PRPs).

The San Gabriel Valley Superfund Site is subdivided into Operable Units (OUs). The OUs include Baldwin Park, El Monte, South El Monte, Whittier Narrows, Puente Valley, and Alhambra. The WQA has been instrumental in the implementation of remediation projects in most of the OUs. Additional remediation projects have been implemented in Non-Operable Unit areas within the Basin, such as, the City of Monrovia and Amarillo Mutual Water Company. Most projects have included the installation of groundwater wellhead treatment facilities, the funding of groundwater treatment systems, and the installation of new drinking water production wells.

The WQA's goals are to: 1) Accelerate removal of contaminant mass in the Basin; 2) Prevent migration of contaminant into critical groundwater supplies; 3) Integrate cleanup with water supply; and 4) Minimize economic impact to the public.

To expedite cleanup and contain groundwater contamination, the WQA encourages technical and financial partnerships and considers providing financial support to remedial activities that can expeditiously be implemented. If partnerships cannot be voluntarily formed in a timely manner, the WQA seeks ways to move forward and implement the necessary cleanup while considering all options to require financial participation from those responsible for the contamination. Where appropriate, the WQA combines groundwater cleanup objectives with water supply needs.

A considerable degree of coordination among the WQA and federal, state, and local regulatory agencies has occurred since the WQA was formed. There are, however, important areas that need to be addressed. First and foremost is the need for more transparency to assure that this quasi-governmental agency is held to the same accountability standards as its sister regulatory agencies. To gain a clearer view of the WQA's contribution to groundwater cleanup efforts in the Basin more information needs to be shared with stakeholders with regard to the rationale used to prioritize funded projects and what corresponding benefits have been realized.

The WQA must be applauded for funding much needed groundwater remediation infrastructure projects to provide drinking water and restore the basin's beneficial uses for groundwater. The focus should now shift to contaminant mass removal. Based on information provided by the WQA (Table 1), the WQA has spent about \$98.7 million (capital costs, operation and maintenance {O&M}) to remove 26,000 pounds of volatile organic compounds (VOCs) from the impacted aquifers in San Gabriel Basin between 1992 and 2003. Though these costs will be amortized over many years, O&M costs may increase in the long-term due to the uniqueness of the contaminants and the remedial technologies used.

1. INTRODUCTION

1.1. POLICY STATEMENT

The WQA was created by state legislation (Appendix A – SB 1679, Russell, 1992, San Gabriel Basin Water Quality Authority Act [WQA Act]). The legislators recognized that: 1) the groundwater contamination issues in the Basin (Figure 1 – San Gabriel Basin Contamination) were complex; 2) the response from the USEPA alone may not adequately address the urgent needs or incorporate local issues; and 3) over one million residents rely primarily on the Basin for potable water supplies. The WQA was created to complement the USEPA Superfund process by facilitating and assisting in the planning, financing, and construction of groundwater treatment facilities in the Basin and putting the water to beneficial use.

1.2. BACKGROUND INFORMATION

1.2.1. OVERVIEW OF GROUNDWATER CONTAMINATION

The groundwater in the Basin is contaminated from ground disposal, dating back to World War II, from synthetic organic compounds used primarily as solvents in industrial and commercial activities.

High concentrations of VOCs were discovered in a groundwater production well in the Azusa area of the Basin in 1979, near a major industrial complex. Further investigation revealed that widespread VOC groundwater contamination had significantly impacted the Basin. This discovery led USEPA on May 9, 1984 to place four portions of the Basin on the NPL under authority of the federal Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), also known as the Superfund program.

Unfortunately in 1997, newly detected emergent contaminants including perchlorate and n-nitrosodimethylamine (NDMA) from liquid/solid rocket fuel along with a VOC stabilizer chemical called 1,4-dioxane, complicated and delayed groundwater cleanup progress. Most notably affected was the largest geographical area of the San Gabriel Valley Superfund site known as the Baldwin Park Operable Unit (BPOU). This led USEPA, state, and local agencies to conduct further investigation of the sources and to evaluate treatment technologies available for remediating contaminated groundwater.

More recently, increased levels of perchlorate have threatened other areas of the Superfund site, namely the South El Monte Operable Unit (SEMOU) and the Puente Valley Operable Unit (PVOU).

1.2.2. OVERVIEW OF WQA AUTHORITY

The WQA was formed by a special act of the California Legislature (Appendix A). The WQA Act gives the WQA authority, *inter alia*, to plan for and to coordinate among several agencies with authority affecting cleanup of the Basin. The WQA Act requires the WQA to develop and adopt a basinwide groundwater quality management and remediation plan that includes:

- 1) characterization of the Basin's contamination;
- 2) development and implementation of a comprehensive Basin cleanup plan;
- 3) financing of the design, construction, operation, and maintenance of groundwater cleanup facilities;
- 4) provision for a public information and participation program;
- 5) coordination with federal, state, and local entities; and
- 6) consistency with the National Contingency Plan, any applicable USEPA records of decision, and all LARWQCB requirements.

1.2.3. HISTORY OF WQA PLANNING

The WQA first adopted a *Basin-wide Groundwater Quality Management and Remediation Plan in June of 1993*. This plan provided the guiding principles used over the following six years of early action projects to remove and contain contamination. The plan also characterized the extent and movement of contamination at that time. The WQA officially adopted the amended Plan on March 6, 2000. The pre-existing rules, regulations, and standards are Applicable or Relevant and Appropriate Requirements (ARARs) at the various OUs in the Basin.

1.2.4. WQA ORGANIZATIONAL CHART

(Appendix B – San Gabriel Basin Water Quality Authority / 2003 Organizational Chart)

2. WQA GOALS

Originally, the WQA goals were developed as a result of discussions with federal, state, and local agencies, various stakeholders, and comments heard at public workshops and hearings. Each year the goals are re-evaluated to determine applicability and whether any additional goals should be added. The goals have experienced some modifications through the years. Currently, the goals are:

- 2.1. Accelerate removal of contaminant mass in the Basin;
- 2.2. Prevent migration of contaminant into critical groundwater supplies;
- 2.3. Integrate cleanup with water supply; and
- 2.4. Minimize economic impact to the public.

2.1. GOAL 1: ACCELERATE REMOVAL OF CONTAMINANT MASS

Primarily engaging the regulatory processes of other agencies of the State of California fulfills this goal, and whenever possible, prompting the implementation of activities ahead of the time required under the applicable regulatory process. In the past, the WQA identified and focused its accelerated removal activities on projects that could immediately be implemented to remove contaminant mass. Due to the ever-growing list of impacted water supply wells, the focus has changed to the early implementation (early action) of several treatment facilities (Table 1 – Major Activities and Milestones). Water purveyors have constructed these facilities, individually and jointly, with the WQA and/or other agencies (i.e., Main San Gabriel Basin Watermaster and Upper San Gabriel Valley Municipal Water District).

More of these types of early actions are necessary to either: (1) remove contaminant mass to immediately prevent further degradation of downgradient aquifers; (2) contain the spread of contaminant to protect critical water supplies; (3) restore critical water supplies; or (4) combine the aforementioned.

Although early actions are implemented before a regulatory mandate, there has and will continue to be coordination with USEPA and LARWQCB to link the early actions to the eventual mandate. Several crisis situations exist within the Basin that demand this type of immediate action. Waiting on mandated actions has already shown to have severe financial impacts in many parts of the Basin.

The WQA must be applauded for funding much needed groundwater remediation infrastructure projects to provide drinking water and restore the basin's beneficial uses for groundwater. The focus should now shift to contaminant mass removal. Based on information provided by the WQA (Table 1), the WQA has spent about \$98.7 million (capital costs, operation and maintenance {O&M}) to remove 26,000 pounds of VOCs from the impacted aquifers in San Gabriel Basin between 1992 and 2003. Though these costs will be amortized over many years, O&M costs may increase in the long-term due to the uniqueness of the contaminants and the remedial technologies used.

2.2. GOAL 2: PREVENT MIGRATION OF CONTAMINATION INTO CRITICAL GROUNDWATER SUPPLY

In many parts of the Basin, the contamination continues to spread and threatens groundwater supply wells. The goal to contain the contamination is supported with actions that specifically address threats to groundwater pumping centers. Loss of major production centers will continue to impair the water supply unless these types of threats are immediately addressed in a cleanup plan. The threat from migrating contamination through the soil has been dramatically reduced by remedial actions directed by the LARWQCB and USEPA.

The WQA follows the existing rules and regulations of DHS and the Main San Gabriel

Basin Watermaster, which govern the location and production of water wells for water quality purposes.

2.3. GOAL 3: INTEGRATE CLEANUP WITH WATER SUPPLY

With so much of the local water supply impaired due to VOC contamination, it is essential that impacted groundwater treated from the cleanup projects be returned into the drinking water supply system. These desired objectives are achieved by maximizing the use of existing water treatment facilities that have either been shut down or have been impaired. If new facilities are needed, they will be integrated into the drinking water supply of the appropriate water purveyor. Without maximizing the use of existing water treatment facilities, many water purveyors will be forced to build redundant well-head treatment facilities on impaired wells or look for an alternative drinking water supply, including surface water supplies from Northern California and the Colorado River. Currently, the predominant source of water supply in the valley is from the local groundwater. Despite the widespread areas of contamination, the Basin aquifer continues to provide approximately 90 percent of the domestic water supply for the one million residents.

The necessity to develop new sources and to fully utilize existing sources of groundwater is evident in recent court decisions within the state and the Colorado River Watershed. For instance, water available from the Colorado River is being reduced as Arizona and Nevada utilize more of their share.

The WQA intends to engage the existing rules, regulations, and standards of the Main San Gabriel Basin Watermaster, LARWQCB, and the DHS to promote the reasonable and beneficial use of water produced and treated under mandate from the USEPA. The WQA recognizes that a number of voluntary or consensual arrangements ultimately are required to implement the objective to integrate water cleanup operations and water supply operations in the Basin. Under the WQA Act, the WQA has authority to seek recovery of the WQA's cost to respond to and cleanup groundwater contamination in the Basin. These cost recovery efforts, though necessary, require more coordination with other regulatory agencies to exact equitable settlements or the avoidance of litigation altogether.

2.4. GOAL 4: MINIMIZE ECONOMIC IMPACT TO THE PUBLIC

To accommodate potentially conflicting goals between accelerating cleanup and minimizing impact to water rate payers, the WQA has identified high priority response actions that can be implemented ahead of USEPA's mandate using available financial resources, including federal reimbursement funding and financial participation from PRPs. Where the WQA is required to use its own assessment to quickly assist in the development of a project, the WQA always considers cost recovery actions to minimize cost borne by the public.

3. FUNDING

If funds cannot be generated from PRPs to begin an identified early action project, the WQA will work with individual purveyors, Watermaster and/or other local agencies to develop funding for the project using federal and/or state funds, the WQA member agency funds, including individual purveyors, and only if necessary, its own assessment. When federal or state funds are required, the WQA will provide the necessary accountability and transparency to demonstrate effectiveness.

3.1. POTENTIALLY RESPONSIBLE PARTIES

The WQA seeks to recover funds from those responsible for the contamination. If the process of acquiring those funds is unilaterally stalemating or stalling the project, the WQA moves forward without this source of funds to ensure necessary cleanup/water supply projects are implemented. In this event, the WQA may choose to initiate cost recovery actions (legal actions).

3.2. FEDERAL GOVERNMENT

Congress has authorized two federal programs specifically for the Basin. Both of these reimbursement programs are administered through the USBR directly to the WQA. The WQA adopted a set of procedures called the Federal Funding Program Administration (Appendix C – Federal Funding Program Administration by the San Gabriel Basin Water Quality Authority, revised March 11,2003) to guide the allocation process for both programs.

3.3. SAN GABRIEL BASIN RESTORATION FUND

The United States House of Representatives passed HR910, The San Gabriel Basin Water Quality Initiative that was introduced by Congressman David Dreir on March 2, 1999. The authorization of the “Restoration Fund” will provide \$75 million in support of groundwater cleanup in the San Gabriel Basin. In addition, this bill will allow WQA to use federal funds to promote consensus cleanup efforts at the local level for the contamination in the San Gabriel Basin. The Restoration Fund will also provide \$10 million to prevent the spread of pollutants into the Central Basin and \$25 million for national research into more cost-effective methods for cleaning up contaminants, such as perchlorate. To date, a total of \$49 million has been appropriated and allocated to cleanup projects throughout the Basin.

This program requires a 35 percent non-federal match. Non-federal funds are classified as funds that are not from the Department of the Interior, but rather PRPs funds, state funds, local municipality funds, purveyor funds, the WQA assessment funds or non-profit funds. Funds from this program may be used for design, construction, and operation and maintenance for up to ten years following construction. The Restoration Fund for groundwater cleanup is administered via the USBR in conjunction with the WQA for use within the San Gabriel Basin.

Due to the emergency nature of the contamination and the threat it poses to the local groundwater supply, Congress allowed the use of past expenditures to be credited towards the 35 percent non-federal matching requirement under this program. The USBR is responsible for approving all qualifying prior expenditures. However, the WQA, at its discretion, will use this credit to meet the 35 percent matching requirement and eliminate the need to deposit additional funds into the Restoration Fund.

3.4. TITLE XVI

In 1992, Congress authorized the San Gabriel Basin Demonstration Project to implement conjunctive use projects in the Basin. By implementing cleanup projects that provide a reliable source of water and reduce the need for outside sources of water, many of the Basin's cleanup projects are eligible for this program.

This program requires a 75 percent match from non-federal sources. Funds from this program may be used for design and construction only. The Title XVI fund is administered via the USBR directly to the WQA for use within the Basin.

3.5. STATE GOVERNMENT

Proposition 13, introduced by Assembly Member Machado and Senator Costa on February 26, 1999, authorizes, pursuant to the State General Obligation Bond Law, bonds in the amount of \$1,970,000,000 for purposes of financing safe drinking water, water quality, flood protection, and water reliability programs. The WQA requested \$7 million in bond funds to be used with Federal and local funding sources to ensure that the necessary groundwater remediation facilities are constructed within the next two years and remain operational to restore and protect the drinking water supply of over 1 million San Gabriel Valley residents.

The WQA will focus on securing the \$30 million non-federal match through the recently passed Proposition 50, the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002. Also, the WQA will continue to work on having the Proposition 13 loan forgiven.

3.6. WATER QUALITY AUTHORITY

The WQA may impose an annual assessment for capital and operational costs not to exceed ten dollars per acre-foot. In the past, it has been the WQA's policy to utilize assessment dollars to 1) implement priority projects where no PRP or other funding is available; and/or 2) provide incentives for PRPs to provide funds in order to move forward on a given project. If PRPs do not voluntarily provide funds to a project, then the WQA will, on a project-by-project basis, consider the use of its assessment funds to underwrite the project costs with or without other local dollars. In these cases, the WQA's focus will be to first implement the project and later recover the costs from PRPs through negotiated settlements or litigation.

3.7. WATER PURVEYORS/CITIES/MEMBER AGENCIES/OTHER LOCAL WATER AGENCIES

As of January 2001, all potential projects requesting WQA participation must go through WQA's Procedure 38, "WQA Project Participation"(see Appendix C, Exhibit A). If PRP funds are not available, the WQA requires the impacted water purveyor to fund a minimum of 25 percent of capital costs. In the event projects cannot be otherwise fully funded using any or all of the above funding sources, the WQA will work with an affected city, member water agency and/or other local water agencies to develop potential funding sources. The WQA will pursue the recovery of these funds on behalf of the participating agency, if necessary.

4. LITIGATION

The WQA Act authorizes the WQA to bring legal action against responsible parties to recover the cost incurred in connection with remedial actions in the Basin.

The WQA may bring suit under CERCLA to any person or entity that owns or operates a facility from which there has been an actual or threatened release of a hazardous substance which has caused the WQA to incur response costs. That person or entity is liable for the costs of response. Liability similarly is imposed on persons and entities that previously owned or operated a facility at the time such hazardous substance(s) were released.

CERCLA further allows the WQA to seek to hold all PRPs jointly and severally liable for these response costs, recover prejudgment interest, and obtain a declaration from the court that the responsible parties are liable for future response costs. In addition, the WQA may seek to recover its attorney's fees incurred in bringing legal action (Appendix D – Litigation Strategies and Options, Tatro, Coffino, Zeavin, & Bloomgarden LLP, March 1, 2000).

5. COORDINATION WITH OTHER AGENCIES

The WQA was created to fulfill a need to coordinate response actions to the contamination in the Basin. The WQA calls for the involved federal, state, and local agencies to unite with all stakeholders to work more effectively and efficiently. Although there has been coordination between the WQA, the USEPA, the LARWQCB, and other regulatory agencies over the past 10 years with respect to groundwater cleanup, additional coordination and outreach efforts would be beneficial to all agencies involved. Since the WQA is a quasi-governmental agency, it needs to attain a higher level of transparency and accountability with respect to inter-agency cooperation/coordination. The WQA should notify the LARWQCB, with the following information prior to the approval of projects: (a) how projects are prioritized for funding; (b) what groundwater cleanup projects have been identified; (c) where has the WQA targeted its resources to address threatened drinking water supplies; (d) how contractors are selected; (e) what criteria are used to quantitatively evaluate projects for effectiveness; and (f) what factors played a critical role in reaching key project funding decisions.

To this end, more information is needed with respect to the rationale used for project

prioritization, alternative solutions and cost-benefit analyses. Stakeholders who will benefit from this include, but are not limited to, the USEPA, USBR, the DTSC, the SWRCB, the LARWQCB, the DHS, the Main San Gabriel Basin Watermaster, cities affected by the Basin groundwater contamination, water purveyors in the Basin, and PRPs.

5.1. COORDINATION OF REMEDIAL STANDARDS

Section 102(b) of the WQA Act declares legislative intent directing the WQA to coordinate among state and federal government agencies to plan and implement groundwater cleanup. The Remedial Standards established by the WQA's Basinwide Groundwater Quality Management and Remediation Plan (as required by the WQA Sec. 106) incorporate rules, regulations and standards previously adopted by other agencies of the State of California. The Remedial Standards harmonize and coordinate the requirements of the Main San Gabriel Basin Watermaster, the SWRCB, the LARWQCB, and the DHS. One purpose of the Remedial Standards is to help integrate groundwater cleanup objectives with water supply objectives, according to the legislative intent directive set forth in Section 102(a) of the WQA Act.

The USEPA has recently recognized some of these Remedial Standards as ARARs. Federal Superfund Law requires parties responsible for pollution to comply with ARARs in the process of carrying out federal cleanup orders. ARARs include any state standard that is: (1) more stringent than any Federal requirement; (2) validly promulgated; and (3) either "applicable" or "relevant and appropriate" and has been identified by the state to the USEPA. Due in part to the efforts of the WQA, the USEPA's Unilateral Administrative Order (No.2003-17) for remedial design and remedial action in the SEMOU of the San Gabriel Valley Superfund Sites, issued on August 28, 2003: (1) encourages the parties identified as responsible for the pollution to integrate their cleanup obligations with water supply projects that exist or are under development; and (2) directs compliance with ARARs, such as meeting water quality standards for potable water service established by DHS and/or for discharge of the product water established by the LARWQCB.

6. PUBLIC INFORMATION

The public information program employs a variety of methods to reach everyone from specialized audiences, such as the local water community and legislators in Sacramento and Washington, to the general public in the San Gabriel Valley and beyond. This outreach effort is essential to gain public support and future funding.

6.1. WEB SITE

The WQA updates its web site (<http://www.wqa.com>) to provide instant access to public information, including news releases, publications, agendas, minutes of meetings and reports on projects. Providing information regarding inter-agency coordinated action responses in high priority areas is designed to inform the public and demonstrate how groundwater cleanup objectives are being fulfilled. Though the website provides useful information, it does not provide status reports on how many wells are off

production due to contamination, what actions WQA took to assist in rectifying the problem and what funds are being or have been expended to resolve the problem. With regard to the website, it does not have a search tool to assist users and most of the information contained within the website needs to be updated. The site news release sections and other portions addressing USEPA Superfund Areas are at least 1-½ years out of date. In addition, more reporting on the number of drinking water wells returned to active service would be useful. It would be helpful to have a technology sub-page to educate the website visitors on deployed groundwater technologies used to cleanup identified groundwater contaminants. In addition, the lawsuit against the PRPs in SEMOU is not mentioned. Finally, it would be useful to have WQA post on the website their groundwater cleanup performance reports to publicize their accomplishments.

6.2. MEETINGS WITH FEDERAL AND STATE LEGISLATORS

The WQA keeps the local offices of federal and state legislators informed of any developments and the progress of water cleanup issues in the Greater San Gabriel Basin. These efforts include office visits, tours of treatment facilities and invitations to participate in the WQA legislative committee. The WQA has begun to host a bi-monthly Legislative Water Forum Luncheon in which local legislators are invited to provide updates on state legislation as it pertains to the Basin water community. In addition, the WQA has developed an effective dialogue with federal legislators and has also organized several well-attended events featuring key lawmakers, such as U.S. Senator Dianne Feinstein, U.S. Senator Barbara Boxer, and Congressman David Dreier.

6.3. WRITTEN PUBLICATIONS

The WQA uses a variety of written publications to carry its message. These may include annual reports, brochures, bulletins for specific projects, and periodic news inserts in the *San Gabriel Valley Tribune*, *Pasadena Star News*, and the *Whittier Daily News* which are all published by the Los Angeles News Group. The WQA works with major news outlets, such as the *Los Angeles Times*, and foreign language publications, such as *La Opinion* and the *Chinese Daily News*. The WQA provides information to other local newspapers, city and chambers of commerce newsletters, publications directed at water and environmental interests.

6.4. PUBLIC MEETINGS AND WORKSHOPS

The WQA Board, through public meetings and workshops, interacts with the public to provide information and to solicit input. In addition, the WQA works with other agencies on information projects and participates with other agencies on public outreach efforts.

6.5. OTHERS

All projects involving the WQA follow an established process, including all applicable federal, state and local regulations. Because the San Gabriel Valley is a Superfund site, the process always includes meeting requirements under the National Contingency Plan, including its public participation component, in order to ensure maximum cost recovery potential. In addition, the WQA works closely with water purveyors to help them meet the extensive public outreach requirements set forth in the DHS, Technical Memorandum 97-005.

7. REMEDIATION PROJECTS

7.1. BALDWIN PARK OPERABLE UNIT

Of the five areas of contamination in the Basin, the BPOU is considered the most significant because of the geographic size and degree of contamination (Figure 2 – Baldwin Park Operable Unit). By 1994 under USEPA, a general consensus had been obtained on the technical approach including a financial arrangement whereby sales from the water produced by the treatment plant would be used to offset the costs of the project. However, just as the designs were being prepared, the discovery of new contaminants prompted a complete reevaluation of cleanup plans.

In response to the spreading contamination and loss of local water supply, the WQA with the assistance of the State of California and local water districts constructed two VOC treatment facilities. The first treatment facility was the *Arrow/Lante Treatment Facility* with a capacity of 3,000 gallons per minute (gpm) constructed in 1992 utilizing air-stripping technology with off-gas vapor-phase carbon treatment. A summary of the project cost and funding source is presented in Table 2 – Project Cost and Funding Source. The second treatment facility was the *Big Dalton Treatment Facility* with a capacity of 3,000 gpm constructed in 1995 utilizing liquid-phase granular activated carbon. Both treatment facilities operated until the discovery of emergent chemicals in the BPOU.

In 1997, perchlorate, a contaminant derived from solid rocket fuel, was discovered in many of the active production wells within the operable unit and forced the shut down of the *Arrow/Lante* and *Big Dalton Treatment* facilities. This discovery had widespread impact, primarily because traditional treatment methods were ineffective in removing perchlorate from the groundwater. The new discovery not only disrupted the design of the CERCLA remedy, but also shut down many of the existing treatment plants that had been operating for water supply purposes. In one case, a water purveyor's (La Puente Valley County Water District [LPVCWD]) complete water supply was shut down due to excessive concentrations of perchlorate that could not be removed by currently installed treatment facilities. This forced the water purveyor to buy imported water at about five times the cost of water production before the discovery of perchlorate. Based on the discovery of perchlorate, USEPA updated its Record of Decision (ROD)

and issued a plan update (Appendix E – San Gabriel Valley Superfund Sites / Baldwin Park Operable Unit, USEPA, Region 9, May 1999). This update was similar to the original ROD except that the containment requirement in the southern portion of the operable unit was shifted further downgradient to address the new contaminants and the larger VOC plume. The USEPA plan requires that about 22,000 gpm of contaminated groundwater be extracted and treated.

In 1998, USEPA accepted a good faith offer from a portion of the BPOU PRPs to extract water from specified locations, treat the water at centralized facilities, and then discharge the water into nearby surface water channels. USEPA's approach focused on overall containment of the plume.

The WQA prescribes a cleanup plan developed by the Main San Gabriel Basin Watermaster (Figure 2) that will integrate cleanup and water supply objectives. In 1999, the WQA, Watermaster, and Upper San Gabriel Valley Municipal Water District joined resources and began implementation of the plan by constructing the first facility to treat both perchlorate and NDMA for drinking water at the LPVCWD well site at a capacity of 2,500 gpm. Additional early actions were prescribed by the WQA that build on the *LPVCWD Project* development model.

Southern Remedy

A new 7,800 gpm treatment facility located at the *San Gabriel Valley Water Company (SGVWC) B6 Plant* near the southern extension of the plume is prescribed for immediate implementation (Figure 2). The project also includes the construction of four new extraction wells (SA3-1A, SA3-1B, SA3-2A, and SA3-2B) and transmission pipelines connecting the extraction wells to the *SGVWC B6 Plant* treatment facility. The project will halt the flow of contamination and protect downgradient water supply sources currently active in the BPOU area.

The next component of the remedy prescribed for the southern area is a new 7,800 gpm treatment facility that will be located at the *SGVWC B5 Plant*. The *SGVWC B5 Plant* treatment facility will process water from a new well (B5B) on site and from the existing City of Industry Well No. 4 (or a new replacement well) to the south. The project will allow these purveyors to meet their respective water supply demand and will serve as a final containment point. To date, this project is in its initial design phase and is expected to be completed by the end of 2004. The project is estimated to cost \$20 million of which the WQA will provide more than \$5 million (Table 2).

Northern Remedy

The plan prescribes a new 7,800 gpm treatment facility at the Valley County Water District (VCWD) Arrow/Lante wellfield (Figure 2). New extraction wells (SA1-1 and SA1-2) will be constructed east of the treatment facility. Information on the cost of the *VCWD Arrow/Lante SA1* treatment facility is included in Table 2. The plan also includes a treated water pipeline to deliver some of the treated water to the Suburban Water Systems (SWS).

Implementation of the northern remedy will provide significant removal of mass from the Basin and is a necessary component of the overall BPOU plan. However, with the exception of the Arrow/Lante wellfield, the northern remedy provides only ancillary benefits towards preventing migration of contamination towards critical water supplies. This project is in its final construction phase and will be completed by early 2004. Of the estimated \$36 million construction cost, the WQA will fund up to approximately \$9 million (Table 2).

Other Remedies

California Domestic Water Company's (CDWC) well No. 14 (Figure 2) is threatened by contamination emanating from the BPOU, including perchlorate and NDMA. CDWC expanded its existing 5,000 gpm VOC and NDMA treatment systems by including an additional 5,000 gpm treatment system to remove perchlorate. The *CDWC Well 14* treatment facility is also designed to protect CDWC's downgradient wells. Construction was completed in June of 2002. Table 2 summarizes the cost of the project.

After losing its Plant 139 wellfield to the BPOU contamination, SWS constructed as an interim project a new *Production Well and Pipeline at Plant 121 and Plant 142* for a combined capacity of 6,000 gpm. The pipeline will allow better operational flexibility and provide additional supply to its affected service area.

In 2002, eight of the twenty PRPs of BPOU entered into a comprehensive project agreement with the WQA, Watermaster, and local purveyors to fund the prescribed remedy.

7.2. SOUTH EL MONTE OPERABLE UNIT

The SEMOU is generally characterized by shallow groundwater contamination that is mostly contained in the upper 100 feet of the aquifer (Figure 3 – South El Monte Operable Unit). However, some contamination in the northwest and southern portions of the operable unit has migrated below 100 feet into the intermediate zone aquifers currently used for potable supplies. Contamination in the SEMOU is predominantly VOCs with perchlorate in certain areas. Furthermore, the presence of low concentrations of 1,4-dioxane in the southern portion of the operable unit has complicated cleanup.

The contamination in the SEMOU presents significant threats to local water supplies (Figure 3). One threat is to the aquifers and groundwater supply centers to the northwest of the operable unit and the other is directed towards the Whittier Narrows Dam and the Central Basin to the south. The threat to the northwest has already impacted several critical water supply wells, primarily those owned by the City of Monterey Park (MP), SGVWC, and Southern California Water Company (SCWC). Continued migration of the contamination past the Whittier Narrows Dam threatens many production wells and the sensitive recharge areas within the Central Basin.

USEPA released its Interim ROD (Appendix F – San Gabriel Valley Superfund Site South El Monte Operable Unit, Proposed Plan, USEPA, Region 9, September 1999) in September 2000 to address the VOC groundwater contamination in the SEMOU (Figure 3). The ROD specifies extraction from the intermediate zone at or near MP's well No. 5, MP's existing well No. 12, and SGVWC's existing wellfield No. 8, and SCWC's existing San Gabriel (SG1 and SG2) wellfield. USEPA's plan also includes a new extraction well (MP No. 15) northeast of MP No. 12. USEPA's goal is to contain the flow of contaminants and prevent exposure to downgradient pumping centers operated by MP, SGVWC, and other purveyors. After the discovery of perchlorate in several SEMOU wells, USEPA is considering issuing a ROD Amendment to include treatment for the emergent chemicals, perchlorate and 1,4-dioxane.

Northwest Intermediate Aquifer

To address the threat presented in the northwest portion of the operable unit (Figure 3), the WQA's prescribed action includes the existing 2,500 gpm VOC treatment facility at *MP Well No. 5*, the newly constructed 4,500 gpm VOC and perchlorate treatment facility at *MP Well No. 12*, the 5,000 gpm *SGVWC Plant 8*, and the 2,100 gpm *SCWC SG1 and SG2* facility. Additionally, the plan specifies the construction of a new pipeline that connects the proposed *MP Well No. 15* with the existing treatment facility at *MP Well No. 12*. Table 2 summarizes the cost and funding source of these projects and other projects within the SEMOU.

This plan promotes the beneficial use of the treated water by the appropriate water purveyors. To that end, the WQA entered into funding contracts in the year 2000 with MP, SCWC, and SGVWC to construct VOC treatment projects ahead of enforcement action by USEPA.

SGVWC Plant 8 VOC treatment facility was completed in October 2000 and is currently operating. Both VOC treatment facilities *MP Well No. 12* and *SCWC SG1 and SG2* were completed in early 2002. However, the wells for both plants were contaminated with perchlorate and immediately shut down. As a result, both purveyors are evaluating construction of perchlorate treatment facilities for those wells.

The construction of *MP Well No. 15* and the associated pipeline to *MP Well No. 12* will be completed in 2003. Additionally, the City of Monterey Park has proposed to connect existing *MP Well No. 6* to the existing VOC treatment facility at *MP Well No. 5*. The treatment facility has enough capacity to treat both Well No. 5 and Well No. 6. The City of Monterey Park has also proposed to construct a 4,500 gpm VOC treatment facility at its Delta Plant to treat VOC contamination that was recently discovered in *MP Well No. 1, 3, and 10*. The project is consistent with USEPA's ROD.

SGVWC is moving forward with its plans to construct a 1,200 gpm VOC treatment facility at its Plant G4 located within the SEMOU. The *SGVWC Plant G4* project is also consistent with USEPA's ROD.

These actions will accelerate removal of contaminant mass and help to prevent

migration of contamination into critical water supplies. In addition, integrating the cleanup action with the surrounding water supply will mitigate the current water supply crisis caused by the presence of the contamination.

South El Monte Extraction Barrier

Part of the WQA's prescribed remedy to address the threat to Central Basin is the South El Monte Shallow Extraction Barrier (*South El Monte Barrier*) (Figure 3). The 1,000 gpm *South El Monte Barrier* was constructed under a voluntary partnership including the WQA, several local businesses, and the City of South El Monte. The objective of the remedial action is to halt the flow of contaminants near the primary source areas within the SEMOU. The project consists of two extraction wells, treatment facilities, and discharge pipes, which allow the treated water to infiltrate back into the aquifer downgradient of the extraction. The project was originally constructed to remove VOCs and later modified with ozone/peroxide treatment to remove 1,4-dioxane. Table 2 provides information about the project cost.

7.3. EL MONTE OPERABLE UNIT

The El Monte Operable Unit (EMOU) investigation phase has been completed and the remedial objectives have been specified in the USEPA ROD. This operable unit is generally characterized by shallow groundwater VOC contamination that is mostly contained in the upper 100 feet of the aquifer (Figure 4 – El Monte Operable Unit).

The predominantly shallow VOC groundwater contamination simplifies the cleanup approach. However, a significant threat to the deeper drinking water supplies exists. Fortunately, several of the water purveyors have already responded to the spread of contamination by installing wellhead treatment facilities to restore impaired sources of supply. However, the City of El Monte lost several wells and experienced a shortage of supply. In 1999, the WQA assisted the City of El Monte by providing two surplus granular activated carbon (GAC) vessels from its Arrow Well project for the City's wellhead treatment facility. In addition, in 2002, the WQA provided the City with two additional surplus GAC vessels from its Whittier Narrows Barrier project to allow the City to further restore its lost supply.

In response to contamination in the EMOU, USEPA released its Interim ROD (Appendix G – San Gabriel Valley Groundwater Contamination Superfund Site / El Monte Operable Unit, Proposed Plan, USEPA, Region 9, October 1998) in June 1999, which requires containment and treatment of the shallow plume on the western and eastern sides of the operable unit with estimated extraction rates of 120 gpm and 180 gpm respectively, and containment of the intermediate plume on the northwestern and southern edges of the operable unit. In 2002, USEPA released an Explanation of Significant Differences that requires the containment of emerging chemicals in addition to VOCs. The existing 2,250 gpm *SCWC Encinita Plant* treatment facilities owned and operated by SCWC and a new 800 gpm *Adams Ranch Mutual Water Company (ARMWC) West Deep Plant* will address the deep plume in the northwestern sector (Figure 4). The *West Deep Plant* will be owned and operated by ARMWC and will

treat VOCs. Pursuant to the ROD, the Northwest El Monte Community Task Force (Task Force) in conjunction with California American Water Company (CAWC) will implement the *CAWC East Deep Extraction* treatment facility. This project includes the installation of one or two extraction wells in the intermediate zone in the southeastern sector with a total capacity of approximately 1,000 gpm to control migration of low levels of VOCs. The treated water will be conveyed into CAWC's existing distribution system in the area.

The WQA's prescribed remedy for the EMOU addresses the need to accelerate cleanup in the shallow aquifer and the need to integrate cleanup with water supply. With respect to the shallow aquifer, the WQA is prescribing the immediate implementation of two shallow extraction barriers to accelerate the removal of mass and stop the flow of contamination on the western and eastern portion of the operable unit (Figure 4). Anticipating that this type of removal would be required, the WQA and many of the PRPs for the EMOU have executed agreements that will fund the construction of these projects. As part of this early response, the WQA sponsored three projects (extraction and treatment at the *Clayton Manufacturing* facility and individual extractions with centralized treatment at the *Hermetic Seal*, and *Crown City Plating* facilities) which are already in place and operational. Table 2 summarizes the cost of these projects.

Because the water extracted from the shallow aquifer is not desirable for use (high TDS and Nitrates), local water purveyors are not interested in integrating the treated water into the local supply. Thus, the water obtained from the shallow extraction barriers should be put to beneficial use for industrial applications.

The WQA's prescribed remedies for the intermediate aquifers include SCWC's Encinita Plant extraction and treatment facility, ARMWC's extraction well and treatment facility and CAWC's extraction wells and treatment facility (Figure 4). Together, all of these facilities will serve to contain the migration of the contamination in the intermediate (potable) aquifers and prevent the further spread of contamination into critical groundwater supplies. The WQA also prescribes that treated water from all these facilities be beneficially used in the respective potable water supplies. The WQA is currently working with SCWC, ARMWC, CAWC, and the PRPs to provide federal reimbursement funds for their respective facilities.

7.4. WHITTIER NARROWS OPERABLE UNIT

In 1999, USEPA issued an amendment to the ROD for the Whittier Narrows Operable Unit (WNOU) which identifies the need for a groundwater extraction barrier approximately ¼ mile north of the Whittier Narrows Dam (Appendix H – San Gabriel Valley Superfund Site: Whittier Narrows Operable Unit, Proposed Plan, USEPA, Region 9, October 1998) to halt the flow of contamination traveling towards Central Basin (Figure 5 – Whittier Narrows Operable Unit). To form an effective barrier, five or six extraction sites were required to remove and treat a total of 12,000 gpm. USEPA was implementing this remedy under its “fund lead” authority, the responsibility for administering the design, construction, and operation of the comprehensive cleanup

facility was USEPA. Table 2 summarizes the WQA's cost associated with this project. Recently, USEPA entered into an agreement with the City of Whittier to integrate a portion of the treated water into its delivery system.

In 2000, the WQA in conjunction with certain SEMOU PRPs constructed the *WNOU Early Action Barrier* as an interim remedial measure in the period of time before USEPA finished construction on the comprehensive WNOU project. By extracting shallow zone groundwater containing high concentrations of VOCs, the Early Action Barrier aims to inhibit VOC migration toward Central Basin and remove VOC mass from the shallow zone aquifer. The system extracts groundwater from existing well EW4-3 and is routed through a 1,500 gpm liquid phase granular activated carbon treatment facility.

In recognition of the immediate threat to downgradient water supplies in Central Basin, the WQA proposed that well EW4-3 (Figure 5) be integrated in the comprehensive potable treatment facility proposed by USEPA. The WQA implemented the construction of a temporary treatment facility located at well EW4-3. In 2002, USEPA completed construction of its centralized treatment facility and integrated well EW4-3 into its extraction system.

7.5. PUENTE VALLEY OPERABLE UNIT

In 1998, the USEPA released in Interim Record of Decision (ROD) for the PVOU (Figure 6 – Puente Valley Operable Unit) that described, in part, USEPA's selected remedy for both shallow and intermediate zone contamination (Appendix I –San Gabriel Valley Superfund Site / Puente Valley Operable Unit, Proposed Plan, USEPA, Region 9, January 1998). It stated that the remedial action for the shallow zone shall prevent contaminated groundwater from migrating beyond its current lateral and vertical extent as described in the Remedial Investigation/Feasibility Study (RI/FS). The remedial action selected by USEPA for the intermediate zone shall prevent contaminated groundwater from migrating beyond the B7 Well Field Area and the contaminated area downgradient of those wells. Furthermore, perchlorate was recently discovered in the B7 Well Field area causing USEPA to further evaluate remedy options.

USEPA will be implementing the *USEPA Shallow Zone Remedy* under its "fund lead" authority in 2005. The shallow zone remedy will consist of the installation of extraction wells at the mouth of the valley and treatment for VOCs at a capacity of 1,300 gpm. Since water from the shallow zone is not suitable for potable use, the treated water may be conveyed in the City of Industry's reclaimed water system or discharged to neighboring creeks. It is expected that USEPA will recoup all of its expenses for implementation of the shallow zone remedy from recalcitrant PRPs in the PVOU.

The PVOU Steering Committee (PVOUSC) lead by Northrop Grumman (formerly TRW) has submitted the *PVOUSC Intermediate Zone Plan* to USEPA for approval. The PVOUSC plans to construct several new extraction wells and an estimated 1,500-gpm VOC treatment facility. The PVOUSC is currently negotiating with local purveyors to put the water to beneficial use. The WQA continues to facilitate discussions between parties to address the intermediate zone remedy and the affected water supply in this area. Table 2 shows the estimated cost of the project.

The San Gabriel Valley Company (SGVWC) has proposed two separate treatment projects within the PVOU, the *SGVWC Plant B11* and the *SGVWC Plant B24* treatment facilities (Figure 6). The B11 project would utilize a new replacement well, and an existing well with VOC treatment at an estimated capacity of 2,500 gpm, SGVWC also proposes to drill two new water production wells at the new B24 treatment facility (located east of the B7 treatment facility) to treat VOC contamination at an estimated capacity of 5,000 gpm. The WQA has reserved funds to offset the cost of these cleanup projects and to provide an incentive to expedite their construction. Table 2 summarizes the estimated cost of these projects. However, PRPs and USEPA are analyzing new data from modeling results to identify the most effective extraction location(s) for containment and removal efforts.

7.6. ALHAMBRA OPERABLE UNIT

In 1999, USEPA began RI/FS investigations in the Alhambra Operable Unit. The purpose of the RI/FS is to determine the nature and extent of soil and groundwater contamination and to identify likely sources (Appendix J). Future work includes the installation of additional monitoring wells in order to collect additional data to assess the extent of the contamination and its relationship to suspected source areas.

VOC contamination in the area impacted the City of Alhambra's Well No. 7 (Figure 7 – Alhambra Operable Unit), as a result, the City decided to construct the *City of Alhambra Phase I Pump and Treat Program*. Phase I consists of a 1,600 gpm treatment facility at Well No. 7. Additionally, the City is in the process of designing the *City of Alhambra Phase II Pump and Treat Program*. Phase II will consist of a 5,400 gpm treatment facility to address contamination affecting Wells No. 8, 11, and 12. The WQA supports the construction of these VOC treatment facilities and has reimbursed the City of Alhambra for a portion of its Phase I treatment facility and allocated funding for the construction of Phase II treatment facility for Wells No. 8, 11, and 12.

While this OU has been on the USEPA's list, it was not a priority until this past year. The WQA has also prioritized this area due to the increasing level of contaminants and has reserved funds to assist the City of Alhambra. Because the USEPA has only recently begun its process in this OU, no PRPs have yet been identified to fund the cleanup.

7.7. NON-OPERABLE UNIT PROJECTS

The necessity for cleanup in the Basin is not limited to the specific locations designated by USEPA's OUs. USEPA's RODs do not address remedial actions necessary to restore water supply wells in areas that are outside of USEPA's OU geographical boundaries. Many contaminated water supply wells are facing imminent shutdown or have already been shut down and remain in this state largely due to overburdened regulatory agencies. The WQA prescribes the treatment of the water at these wells to restore the water supplies and to remove contaminant mass from the Basin.

One of these remedial actions is in the City of Monrovia (Monrovia). Monrovia is located in the northern portion of the Basin, west of the large BPOU contamination plume. In 1994, the WQA, State of California, and Monrovia entered into a joint agreement to construct the *Monrovia Treatment Facility* with capacity of 5,400 gpm. The treatment facility removed VOCs from three of Monrovia's water supply wells using air-stripping technology. Recently, Monrovia is experiencing increased contamination in its water supply wells due to the ever growing contamination plume. To combat the increased contamination, the WQA has allocated the use of federal funds to assist Monrovia in the construction of an additional 6,000 gpm VOCs treatment facility (*City of Monrovia GAC Treatment Facility*).

Another of these remedial actions is the allocation of federal funds to assist Amarillo Mutual Water Company (AMWC) in the construction of a VOCs treatment facility (*AMWC Treatment Facility*). AMWC is a small water purveyor in the Basin outside of the SEMOU.

8. CONCLUSIONS

- a) The completion of WQA-funded treatment facilities has helped maintain the drinking water supply for the Basin communities. The treatment facilities have also contributed to the overall cleanup effort (mass removal) of groundwater contaminants. The pump and treat remedial efforts have helped to control migration of contaminants throughout the Basin and into the Central Basin. The WQA has been instrumental since its inception in expediting the funding of treatment facilities and implementing groundwater cleanup in the Basin, specifically, in Baldwin Park, South El Monte, El Monte, and Whittier Narrows OUs. These efforts require a considerable amount of coordination with Federal, State, and local regulatory agencies. However, this coordination and inclusion of other regulatory agencies in the project prioritization decision-making process needs to be improved.
- b) The efforts of WQA must be acknowledged for funding much needed groundwater remediation infrastructure projects to provide drinking water and restore the basin's beneficial uses for groundwater. The focus should now shift to maximizing contaminant mass removal. Based on information provided by the WQA (Table 1), the WQA has spent about \$98.7 million (capital costs, operation and maintenance {O&M}) to remove

26,000 pounds of volatile organic compounds (VOCs) from the impacted aquifers in the Basin between 1992 and 2003. Though these costs will be amortized over many years, O&M costs may increase in the long-term due to the higher costs associated with the remedial technologies used and the uniqueness of the emergent chemicals (perchlorate, 1,4 dioxane, and NDMA) involved.

9. RECOMMENDATIONS

- a) Although there has been coordination between the WQA, the USEPA, the LARWQCB, and other regulatory agencies over the past 10 years with respect to groundwater cleanup, additional coordination and outreach efforts would be beneficial for all agencies involved. As a quasi-governmental agency, the WQA needs to attain a higher level of transparency and accountability with respect to inter-agency cooperation/coordination. The WQA should document how projects are prioritized and selected for funding and how contractors are selected. The WQA should also identify criteria used to quantitatively evaluate projects for effectiveness. The WQA should increase coordination with USEPA which has the ultimate authority to approve projects that address both water supply and Superfund groundwater cleanups, since the Basin is a Superfund site.
- b) Improvements with respect to increased periodic reporting will be helpful to all stakeholders involved in groundwater cleanup efforts in the Basin. To achieve these improvements, the WQA needs to provide more frequent reporting (quarterly or semi-annually) to USEPA, the SWRCB and the LARWQCB. These regulatory agencies will benefit from: (1) receiving periodic update and performance reports that specify the location and details of cleanup projects funded; (2) a status report on groundwater quality; (3) the results of the WQA's coordinated groundwater cleanup efforts; and (4) the quantity of groundwater contaminants removed
- c) The WQA should invest the time and effort to update their website, since this is an important source of information for all stakeholders with an interest in groundwater cleanup issues in the San Gabriel Valley.