

**SECOND FIVE-YEAR REVIEW REPORT FOR  
NEWMARK GROUNDWATER CONTAMINATION SUPERFUND SITE  
SAN BERNARDINO, CALIFORNIA**



PREPARED BY

United States Environmental Protection Agency

Approved by:

*Kathleen Salyer*

Date:

*9/27/13*

Kathleen Salyer, Assistant Director

California Site Cleanup Branch, Superfund Division

U.S. EPA Region 9

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# Executive Summary

This is the second Five-Year Review of the Newmark Groundwater Contamination Superfund Site (Site) located in San Bernardino, California. The purpose of this Five-Year Review is to review information to determine if the remedy is and will continue to be protective of human health and the environment.

The Newmark Site includes groundwater contamination covering approximately eight square miles and is located in the northwestern and west-central portions of the City of San Bernardino. The Site consists of three operable units (OUs), including the Newmark, Muscoy, and Source OUs. At the time of this FYR the source remedial investigation/feasibility study (RI/FS) phase of the Superfund process was underway for the Source OU (i.e. the entire site).

In 1980 the VOCs trichloroethylene (TCE) and perchloroethylene (PCE) were detected in several municipal water supply wells within the northern San Bernardino/Muscoy region.

The Newmark OU Interim Record of Decision (ROD) was signed in 1993. The Newmark remedy consists of containment of contaminated groundwater through groundwater extraction (pumping) and treatment consisting of liquid phase granular activated carbon (LPGAC) groundwater treatment technology. The Newmark remedial action has the following features: 1) groundwater extraction (pumping) 2) removal of contaminants using a LPGAC treatment facility; and 3) transfer of groundwater to the City for a drinking water end use. The Newmark OU systems was determined to be operational and functional in October 2000.

The Muscoy OU Interim ROD was signed in March 1995. Like Newmark the Muscoy OU remedy consists of containment of contaminated groundwater through groundwater extraction (pumping) and treatment consisting of liquid phase granular activated carbon (LPGAC) groundwater treatment technology. The remedy for the Muscoy OU is an interim remedial action that has the same features as the Newmark OU, i.e. extraction, LPGAC treatment, and a drinking water end use.

In 2004 EPA issued an ESD to supplement the Newmark and Muscoy interim RODs by introducing an Institutional Controls component to the remedies. On March 20<sup>th</sup>, 2006, the City of San Bernardino enacted this ordinance placing restrictions on any new well drilled within the Newmark Site management zone. To address the rights of regional water purveyors in the greater Bunker Hill Basin of which Newmark is a part, San Bernardino and thirteen cities entered into an agreement entitled *Agreement to Develop and Adopt an Institutional Controls Groundwater Management Program* (ICGMP). The ICGMP program provides for restrictions on production and spreading plans that are revealed to adversely impact the remedies.

To date, the extraction and treatment systems are functioning as intended by the decision documents. Based on the sampling of monitoring and extraction wells since system start-up, it appears that the Muscoy and Newmark OU containment systems have been successful in meeting the goal of preventing migration of contaminants and reducing contaminant mass. Concentrations downgradient

of the extraction wells are generally well below the drinking water standards, where detectible, and the concentrations generally do not exhibit increasing trends where there are verified detections. Opportunities to improve performance and reduce costs have been implemented with proposals for additional optimizations. Institutional controls have now been fully implemented. There have been no changes in the applicable or relevant and appropriate requirements (ARARs) that would affect the protectiveness of the remedy.

In conclusion, the EPA finds the remedy at the Newmark Superfund Site is protective of human health and the environment.

## Five-Year Review Summary Form

SITE IDENTIFICATION		
<b>Site Name:</b> Newmark Groundwater Contamination Superfund Site		
<b>EPA ID:</b> CAD981434517		
<b>Region:</b> 9	<b>State:</b> CA	<b>City/County:</b> San Bernardino/San Bernardino
SITE STATUS		
<b>NPL Status:</b> Final		
<b>Multiple OUs?</b> Yes	<b>Has the site achieved construction completion?</b> No	
REVIEW STATUS		
<b>Lead agency:</b> EPA If “Other Federal Agency” was selected above, enter Agency name: <a href="#">Click here to enter text.</a>		
<b>Author name (Federal or State Project Manager):</b> Zizi Searles		
<b>Author affiliation:</b> EPA		
<b>Review period:</b> 09/25/2008 – 09/25/2013		
<b>Date of site inspection:</b> 12/12/2012-12/13/2012		
<b>Type of review:</b> Statutory		
<b>Review number:</b> 2		
<b>Triggering action date:</b> 09/25/2008		
<b>Due date (five years after triggering action date):</b> 09/25/2013		

## Five-Year Review Summary Form (continued)

Issues/Recommendations
<b>OU(s) without Issues/Recommendations Identified in the Five-Year Review:</b>
Newmark OU, Muscoy OU

Protectiveness Statement(s)		
<b><i>Operable Unit:</i></b> Newmark OU	<b><i>Protectiveness Determination:</i></b> Protective	<b><i>Addendum Due Date (if applicable):</i></b> <a href="#">Click here to enter date.</a>
<b><i>Protectiveness Statement:</i></b> The remedy at the Newmark OU is protective of human health and the environment.		
<b><i>Operable Unit:</i></b> Muscoy OU	<b><i>Protectiveness Determination:</i></b> Protective	<b><i>Addendum Due Date (if applicable):</i></b> <a href="#">Click here to enter date.</a>
<b><i>Protectiveness Statement:</i></b> The remedy at the Muscoy OU is protective of human health and the environment.		

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## List of Abbreviations

amsl	above mean sea level
ARAR	Applicable, relevant, and appropriate requirement
CD	Consent Decree
CDPH	California Department of Public Health
CFR	Code of Federal Regulations
COCs	Contaminant(s) of concern
DCE	cis-1,2-dichloroethene
DTSC	California Department of Toxic Substances Control
EPA	Environmental Protection Agency
ESD	Explanation of Significant Differences
FS	Feasibility Study
FYR	Five-year review
gpd/ft	gallons per day per foot
gpm	gallons per minute
HQ	Hazard Quotient
IC	Institutional Controls
ICGMP	Institutional Controls Groundwater Management Program
MCL	Maximum contaminant level
NAAQS	National Ambient Air Quality Standards
NPL	National Priorities List
O&F	Operational and Functional
O&M	Operations and Maintenance
OU	Operable Unit
PCE	Perchloroethylene
ppb	parts per billion
RA	Remedial Actions
RI	Remedial Investigation
RfD <sub>o</sub>	Oral Reference Dose
RSL	Regional Screening Level
SARWQCB	Santa Ana Regional Water Quality Control Board
SBBA	San Bernardino Basin Area
SBMWD	San Bernardino Municipal Water Department
SBVMWD	San Bernardino Valley Municipal Water District
SCAQMD	South Coast Air Quality Management District
SOURCE IA	Source Investigation Area
SFO	Oral slope factor
TCE	Trichloroethylene
TTHM	Total trihalomethanes
USACE	U.S. Army Corps of Engineers
VOC	Volatile organic compound

# Second Five-Year Review Report

## for

### Newmark Groundwater Contamination Superfund Site

## 1. Introduction

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy will continue to be protective of human health and the environment. The methods, findings, and conclusions of FYRs are documented in five-year review reports. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Contingency Plan. CERCLA 121 states:

*“If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.”*

EPA interpreted this requirement further in the National Contingency Plan; 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii), which states:

*“If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such actions no less often than every five years after the initiation of the selected remedial action.”*

In support of EPA, the United States Army Corps of Engineers (USACE) conducted the FYR and prepared the initial draft report regarding the remedy implemented at the Newmark Groundwater Contamination Superfund Site (Newmark Site or Site) in the City of San Bernardino, San Bernardino County, California. EPA is the lead agency for developing and implementing the remedy for the Site. The California Department of Toxic Substances Control (DTSC), as the support agency representing

the State of California, has reviewed all supporting documentation and provided input to EPA during the FYR process.

This is the second FYR for the Newmark Site. The triggering action for this statutory review is the previous FYR signed on 25 September 2008. The FYR is required due to the fact that VOC hazardous substances remain at the site above levels that prevent unlimited use and unrestricted exposure of the groundwater.

The Site consists of three operable units (OUs), including the Newmark, Muscoy, and Source OUs. The Newmark OU (OU 1) is located in the north-central portion of the City; the Muscoy OU (OU 2) is located in the west-central part of the City and part of the unincorporated area known as Muscoy. The Source OU (OU3) was designated to find site-wide sources for the contaminant plumes. The Source OU is still in the RI/FS phase of the Superfund process. The Source IA is located in the northwest portion of the site, and denotes the focus of source investigation activities (Figure 1). Since there is no remedial action activity at the Source OU, an assessment of that OU is not included as part of this FYR.

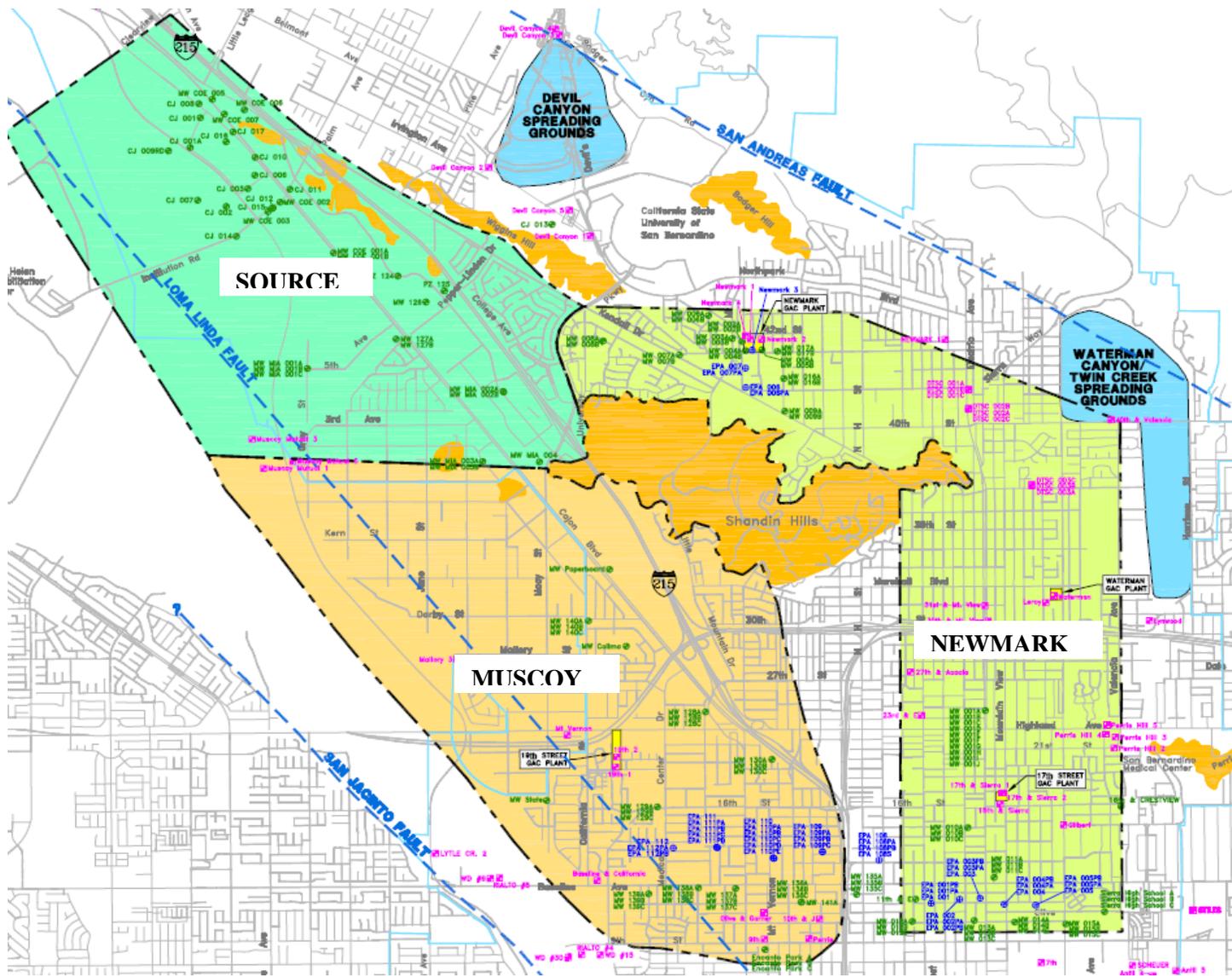


Figure 1. Map of Operable Units and Investigation Area at the Newmark Superfund Site

## 2. Site Chronology

The following table lists the dates of important events for the Newmark Superfund Site.

**Table 1. Chronology of Site Events**

<b>Event</b>	<b>Date</b>
Initial discovery of contamination	1980
State funds interim treatment facilities for contaminated City production wells	1986
Newmark Site placed on the NPL	1989
RI/FS Report for Newmark OU completed	1993
Newmark OU Interim ROD signed	1993
RI/FS Report for Muscoy OU completed	1994
Muscoy OU Interim ROD signed	1995
Newmark treatment systems on-site construction complete	1998
Newmark OU Operational and Functional	2000
Remedial design completed for Muscoy OU and construction started (treatment plant)	2003
Explanation of Significant Differences for Newmark and Muscoy OUs	2004
Consent Decree signed with San Bernardino	2005
Muscoy treatment system on-site construction complete	2005
Passage of City Ordinance restricting construction of new water supply wells by non-municipal entities	2006
Muscoy OU Operational and Functional	2007
First Five-Year Review	2008

## 3. Background

### *3.1. Physical Characteristics*

The Newmark Site includes groundwater contamination covering approximately eight square miles and is located in the northwestern and west-central portions of the City of San Bernardino (Figure 2).

Groundwater contamination at the Newmark Superfund Site impacts the drinking water resource in the 110 square mile Bunker Hill Basin aquifer, a primary source of drinking water for cities located in

inland Southern California (Figure 3). Bunker Hill Basin is bounded by the San Bernardino and San Gabriel Mountains to the north, the Crafton Hills and badlands on the southeast, and by a hydrogeologic barrier formed by the San Jacinto fault along the southwest (Figure 4). Waters flowing from all parts of the aquifer join in a confined "artesian zone" before leaving the basin where the Santa Ana River crosses the San Jacinto faultline.

Most of the western portion of the Bunker Hill Basin is an unconfined aquifer with no substantial barriers to infiltration from the surface. In the lowest area of the aquifer (the south-central portion around the Santa Ana River), several extensive clay layers form an aquitard overlying and capping the water-bearing sand and gravel aquifers. This confined portion of the aquifer produces tremendous supplies of water for nearby communities. Recharge sources for the aquifer include rainfall, precipitation runoff from the surrounding mountains, floodwater from rivers, creeks, and washes, and water imported from outside the region that is spread over percolation basins. According to the San Bernardino Municipal Water District, the Bunker Hill Basin is capable of storing approximately 5 million acre-feet (1.6 trillion gallons) and producing 250,000 acre-feet (81 billion gallons) per year making this groundwater resource very important to the viability of the region.

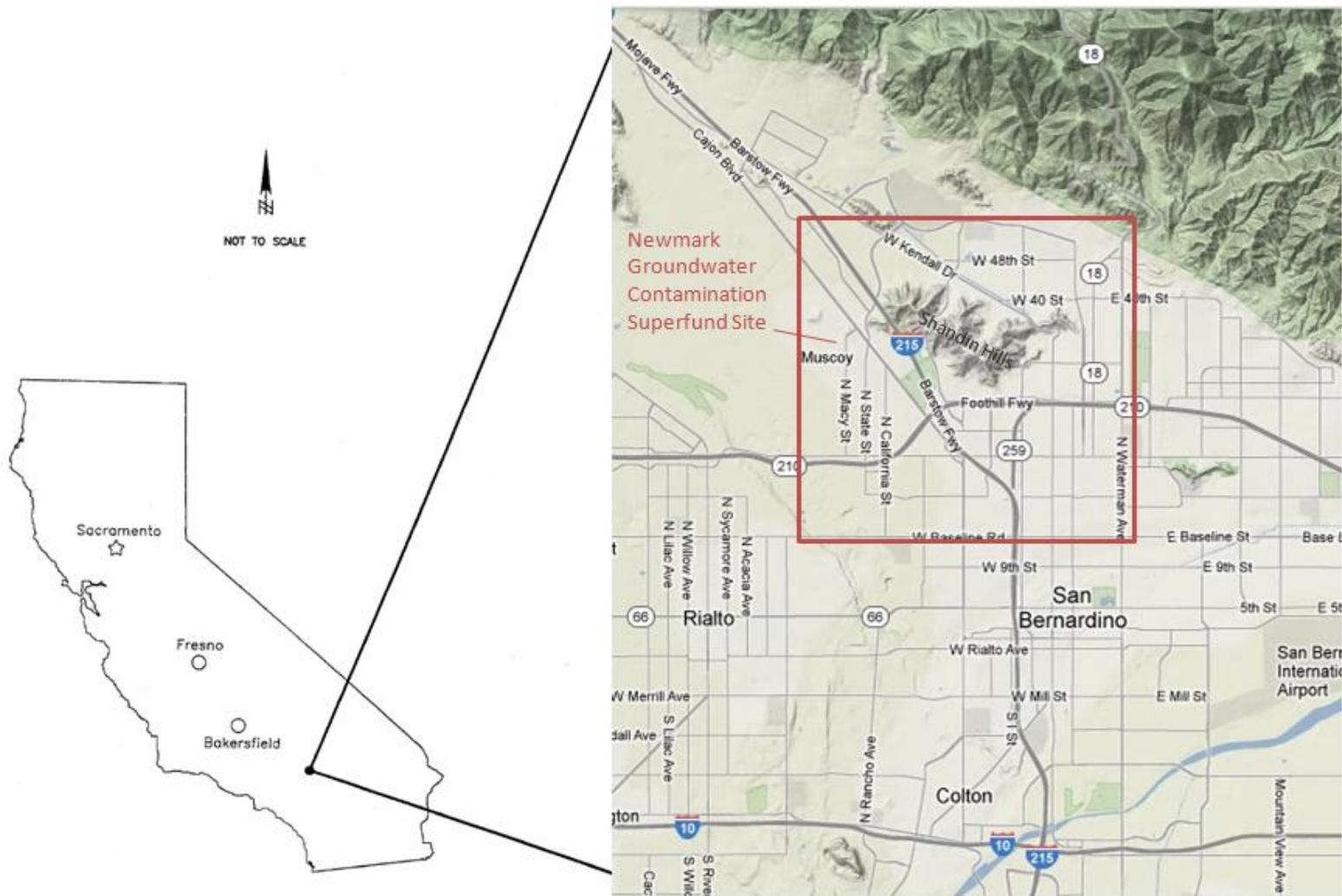


Figure 2. Location Map for the Newmark Superfund Site

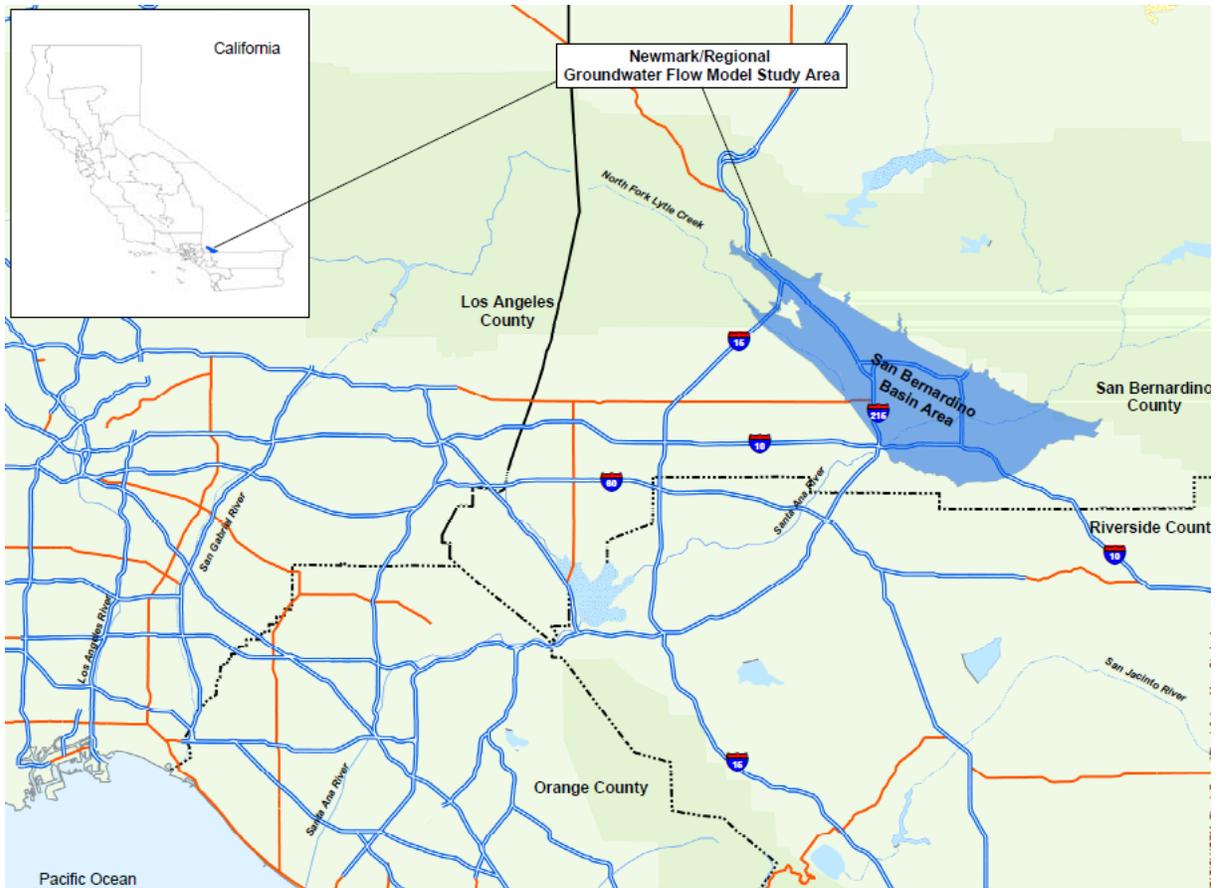


Figure 3. Location Map of San Bernardino Basin Area

## *3.2. Hydrogeology*

### **Regional Hydrogeology**

Coarse erosional material (alluvial and river channel deposits) have accumulated in this area of the basin to depths of 400 to over 1900 feet, atop bedrock formations that act as barriers to further vertical movement. River channel deposits are among the most permeable sediments in the San Bernardino area with hydraulic conductivities ranging from 40 to 100 feet per day. The Source IA is located adjacent to and in river channel deposits. A very important geologic feature impacting the flow dynamics of groundwater is the Shandin Hills. The Shandin Hills is a structurally compressive feature created by southern California tectonic forces that have caused bedrock to buckle upwards and surface as hills and mountains. Groundwater that encounters this feature will flow to the east or west of this feature depending on water levels before resuming a southward path toward the Santa Ana River.

Most of the western portion of the basin is an unconfined aquifer, with no substantial barriers to infiltration from the surface. In the lowest area of the basin (the south-central portion around the Santa Ana River), several extensive clay layers have formed an aquitard, overlying and capping the water-bearing sand and gravel aquifers. This confined portion of the aquifer produces a large supply of water for nearby communities. The southern area of the Newmark Superfund Site transitions into this confined region. The aquifer receives rainfall and natural runoff from the surrounding mountains, collected floodwater from rivers, creeks and washes, and water imported from outside the region that is spread over percolation basins. Representative geologic cross-sections are given in Appendix H.

### **Site-Specific Hydrogeology**

The alluvial deposits in the Newmark and Muscoy areas consist mostly of sand, gravel, boulders, and occasional discontinuous clay lenses. These clay lenses increase in thickness and number toward the south and the central portion of the basin. In the Newmark OU RI/FS, the alluvium in the Newmark OU area was divided into three depositional sequences:

- The northern depositional sequence (located north of the Shandin Hills) which forms a single unconfined aquifer consisting of predominantly coarse-grained sediments;
- The middle or transition depositional sequence (located from the northeast edge of Shandin Hills and extending south to approximately west of Perris Hill) which forms a single unconfined aquifer consisting primarily of coarse-grained sediments with minor discontinuous fine grains (silt and clay) lenses;
- The southern depositional sequence (starting near the 16<sup>th</sup> Street Well and extending south) which form separate aquifers: an upper unconfined aquifer and a lower confined aquifer.

Sediments in the northern depositional sequence consist primarily of sand, gravel, and boulders with little or no clay. Groundwater in this area is unconfined. Depth to groundwater ranges from 100 to 220 feet below ground surface (bgs) and fluctuates with season.

The middle depositional sequence consists mostly of sand and silt with significant intervals of gravel and boulders. Some thin clay lenses were found in this area and are concentrated between 185 to 550 feet bgs. Sediments in this area appeared to be in the transition zone between the single unconfined aquifer to the north/northwest and the layered unconfined/confined aquifers to the south/southeast, although these clay lenses did not seem to form a significant confining zone to the coarse alluvium below. Depth to groundwater ranged from 100 to 300 feet bgs and fluctuates with season.

The southern depositional sequence consists of silt, sand, and gravel with many clay lenses. In this area, a clay confining layer divides groundwater into unconfined and confined flow regimes. In this area a 200-300 ft zone of interfingering clay lenses located approximately 75 feet bgs demarcates the boundary between the upper unconfined aquifer and lower confined aquifer. Depth to groundwater in this area of the site is 50 to 180 feet bgs and fluctuates with season.

In general, groundwater in the Source IA flows from northwest to southeast parallel to the longitudinal axis of the basin (Figure 6). Groundwater flows from northwest to southeast with minor variations where local streams (Devil Canyon Creek and Waterman Creek) enter the basin. Valley-fill alluvium in this portion of the SBBA is relatively thin and not conducive to groundwater production. The primary components that influence groundwater elevations are mountain front and stream recharge from the upper portion of Cajon Creek. Groundwater elevations in the Newmark OU area range from 1,900 feet above mean sea level (amsl) to 850 feet amsl. As groundwater moves down gradient past the Shandin Hills, the flow direction transitions to a more southerly direction as a result of local pumping and subsurface underflow discharge near the intersection of the San Jacinto fault and the Santa Ana River (near the intersection of Interstate Highways 10 and 215). Groundwater flow in the Muscoy OU area ranges from approximately 1,900 feet amsl to approximately 850 feet amsl and flows from the northwest to the southeast parallel to the Loma Linda fault. Below the Shandin Hills, the groundwater flow direction transitions to a more southerly direction as a result of local pumping and subsurface underflow discharge near the intersection of the San Jacinto fault and the Santa Ana River. Water flowing from all parts of the aquifer joins in a confined “artesian zone” before leaving the basin where the Santa Ana River crosses the San Jacinto fault (*Newmark and Muscoy RI/FS documents*; Newmark: 1993, Muscoy: 1994).

Site-specific geologic cross-sections are included in Appendix H.

### *3.3. Land and Resource Use*

The area covered by the Newmark and Muscoy OUs is largely used for light industrial, commercial, and residential purposes. The Source IA includes areas largely for industrial and commercial purposes. Portions of the Source IA also include a closed landfill, undeveloped land, and some residential developments.

The contamination present in the groundwater at the Newmark Site represents a potential risk to the population who depend on groundwater for municipal supply. Groundwater from the Bunker Hill Basin represents the primary water source for the City of San Bernardino and surrounding area. The contaminated plumes can potentially affect drinking water sources of an estimated population of 600,000 or more.

### *3.4. History of Contamination*

In the 1980, the California Department of Health Services (now the California Department of Toxic Substances Control) initiated a monitoring program in San Bernardino to test for the presence of industrial chemicals in the water from public supply wells. The results of initial tests and of subsequent testing revealed the presence VOCs, including perchloroethylene (PCE), trichloroethylene, (TCE), and Freon, decomposition byproducts from these compounds, and other contaminants in large portions of the groundwater of the Bunker Hill Basin.

EPA placed the Newmark Site on the National Priorities List (NPL) in March 1989.

### *3.5. Initial Response*

The California Department of Toxic Substances Control (DTSC) and the Santa Ana Regional Water Quality Control Board (SARWQCB) found that the Newmark and Muscoy plumes threatened public health. In 1986, DTSC contracted with the SBMWD to construct, operate, and maintain four treatment systems consisting of air stripping and liquid granular activated carbon units at existing SBMWD facilities. These systems were intended to treat water pumped for public supply and were not intended to treat or contain the contaminant plume.

### *3.6. Basis for Taking Action*

Detection of the contamination occurred in 1980 with the institution of a water supply monitoring program, although the suspected disposal may have occurred as early as the 1940s. The discovery of the contaminants, including chlorinated solvents, PCE, and TCE, resulted in the closing of 20 water supply wells within a 6-mile radius of the site. The presence of these contaminants in groundwater above MCLs provided the basis for taking action. PCE and TCE are considered possible and/or probable human carcinogens.

## 4. Remedial Actions

### *4.1. Remedy Selection*

#### **Newmark OU**

In August 1993, EPA issued an Interim ROD that identified the methods that EPA would use to contain and clean up the Newmark OU groundwater contamination. The remedy for the Newmark plume is an interim remedial action (containment) which consists of the following features: 1) groundwater extraction (pumping) and treatment facilities at two locations in the aquifer (the North and South Areas); 2) removal of contaminants from groundwater using liquid phase granular activated carbon (LPGAC); and 3) the final use of treated water as drinking water.

The remedial objectives of the Newmark OU are:

- To inhibit migration of groundwater contamination into clean portions of the aquifer;
- To limit additional contamination from continuing to flow into the Newmark OU plume area;
- To begin to remove contaminants from the groundwater plume for eventual restoration of the aquifer to beneficial uses. (This is a long-term project objective rather than an immediate objective of the interim action.)

#### **Muscoy OU**

The Muscoy OU Interim ROD was signed in March 1995. The Muscoy OU Interim ROD selected an interim remedial action focusing on preventing contamination from spreading to clean parts of the aquifer south and west of the Shandin Hills. Much of the analysis for selecting a cleanup plan for the Newmark OU groundwater contamination was directly applicable to the Muscoy plume. The remedy for the Muscoy plume is an interim remedial action which consists of the following features: 1) groundwater extraction (pumping) from a line of five wells located north of Base Line Road (eventually Well EPA 001 was added, formerly part of the Newmark OU located near 11<sup>th</sup> and Stoddard); 2) removal of contaminants using liquid phase granular activated carbon at the 19<sup>th</sup> Street Treatment Plant; and 3) transfer to a public drinking water supply agency for reuse.

The objectives of the Muscoy OU are:

- To inhibit migration of groundwater contamination into clean portions of the aquifer;
- To protect downgradient municipal supply wells south and southwest of the Shandin Hills;
- To begin to remove contaminants from the groundwater plume for eventual restoration of the aquifer to beneficial uses. (This is a long-term project objective rather than an immediate objective of the interim action.)

## **Explanation of Significant Differences**

The Newmark and Muscoy interim RODs were supplemented by an Explanation of Significant Differences (ESD) issued by EPA in 2004. The ESD added an institutional controls program “to assure that the Newmark and Muscoy extraction and treatment systems remain effective in meeting the objectives of capturing contaminated groundwater and inhibiting the migration of groundwater contamination into clean portions of the aquifer.” The ESD required an ordinance to be adopted by the City of San Bernardino to prohibit extraction within the zone of influence of the Newmark and Muscoy systems that would interfere with their integrity.

### *4.2. Remedy Implementation*

#### **Newmark OU**

Construction of the Newmark OU extraction and treatment system began with well installation in 1996. Construction of the new piping and LPGAC treatment facilities at the Waterman and Newmark Water Treatment plants began in 1997 and all construction was completed in October 1998. The Newmark OU system was determined to be operational and functional in October 2000. Operations and maintenance began in October 2000.

The extraction systems include three extraction wells (EPA 006, 007, and Newmark 003) in the north area (Newmark North) and five extraction wells (EPA 001 through 005) in the south area (Waterman Plume Front) (Figure 7). Two of the Newmark North wells were installed as part of the remedy construction and one is an existing City of SBMWD production well (Newmark 003). These wells form a roughly north-south line across the Newmark plume north of the Shandin Hills along Western Drive north of Kendall Drive. The wells are from 340 to 495 feet deep with 70-190 feet of screen. All three wells have vertical line-shaft turbine pumps, driven by fixed-rate electric motors. The design flow rates range from 1,000-1,600 gallons per minute (gpm) for a total of 3,600 gpm for the Newmark North wells.

The five Newmark South area wells are approximately 800 to 1,200 feet deep and screened over a total of 420 to 730 feet. The wells were generally installed in an east-west line oriented perpendicular to groundwater flow near Baseline Street. All wells have electric submersible pumps with variable-frequency motor controllers. The design flow rates range from 2,000 to 2,200 gpm, for a total of 10,200 gpm for the Newmark South wells.

The extraction wells are connected to separate treatment facilities through appropriately sized buried piping that generally follows surface streets. Water from the three Newmark North extraction wells is treated at the Newmark treatment plant near the intersection of West 42<sup>nd</sup> Street and Western Avenue. The five Newmark South extraction wells were initially connected to two treatment plants as follows: EPA 001, 002, 004, and 005 were connected to the Waterman Plant on Waterman Avenue (near the intersection of LeRoy Street and 31<sup>st</sup> Street), and EPA 003 was connected to the 17<sup>th</sup> Street Plant on 17<sup>th</sup> Street (near the intersection of Mountain View Avenue and 17<sup>th</sup> Street).

Extracted water from EPA 001, which was initially treated at the Waterman Treatment Plant, is now being treated at the 19<sup>th</sup> Street Treatment Plant (Muscoy OU). Extracted water from EPA 005, which was initially being treated at the Waterman Treatment Plant, was reconfigured to directly discharge into SBMWD's distribution system commencing in the first quarter of 2007. As part of the 2007 reconfiguration, extracted water from EPA 003 was rerouted from the 17<sup>th</sup> Street Treatment Plant to the Waterman Treatment Plant, freeing up the 17<sup>th</sup> Street Treatment Plant for other potential beneficial uses. The 17<sup>th</sup> Street Treatment Plant is currently offline, but remains available for future interim remedial actions if needed. In June 2012, EPA 005 was reconnected to the Waterman Treatment Plant.

Performance monitoring of the Newmark South extraction system is supported by a network of multi-level monitoring wells located near the extraction wells, both up- and down-gradient of the extraction well line. The Newmark North facilities also include five monitoring well clusters that are used to monitor water levels and VOC concentrations for evaluating the effectiveness of the Newmark North extraction well network (Figure 7). The Newmark Plume Front facilities also include six monitoring well clusters that are used to monitor water levels and VOC concentrations for evaluating the effectiveness of the Newmark Plume Front extraction well network (Figure 7).

### **Muscoy OU**

Construction of the Muscoy OU extraction and treatment system began with installation of two extraction wells in 2001 to help finalize the design of the treatment system. Construction of the remaining three extraction wells and the treatment system started in 2003. Construction of the piping and a treatment facility located near the intersection of North Pennsylvania Avenue and 19<sup>th</sup> Street, referred to as the 19<sup>th</sup> Street Water Treatment Plant, was completed in August 2005. The Muscoy OU was declared operational and functional on September 30, 2007, after 18 months of monitoring and data evaluation (July 2005- February 2007). Operations and maintenance started in October 2007.

The extraction system includes six extraction wells (EPA 108 through 112 and EPA 108S), all located near Base Line Road near the southern edge of the plume (Figure 7). EPA 108S was installed in January 2007 and was intended to address capture of the easternmost shallow portion of the Muscoy plume. The wells are approximately 490 to 1,260 feet deep and are screened over a total of 225 to 1,250 feet. The wells were generally installed in an east-west line oriented perpendicular to groundwater flow. The Muscoy Plume facilities also include eight monitoring well clusters that are used to monitor water levels and VOC concentrations for evaluating the effectiveness of the Muscoy plume extraction well network (Figure 7).

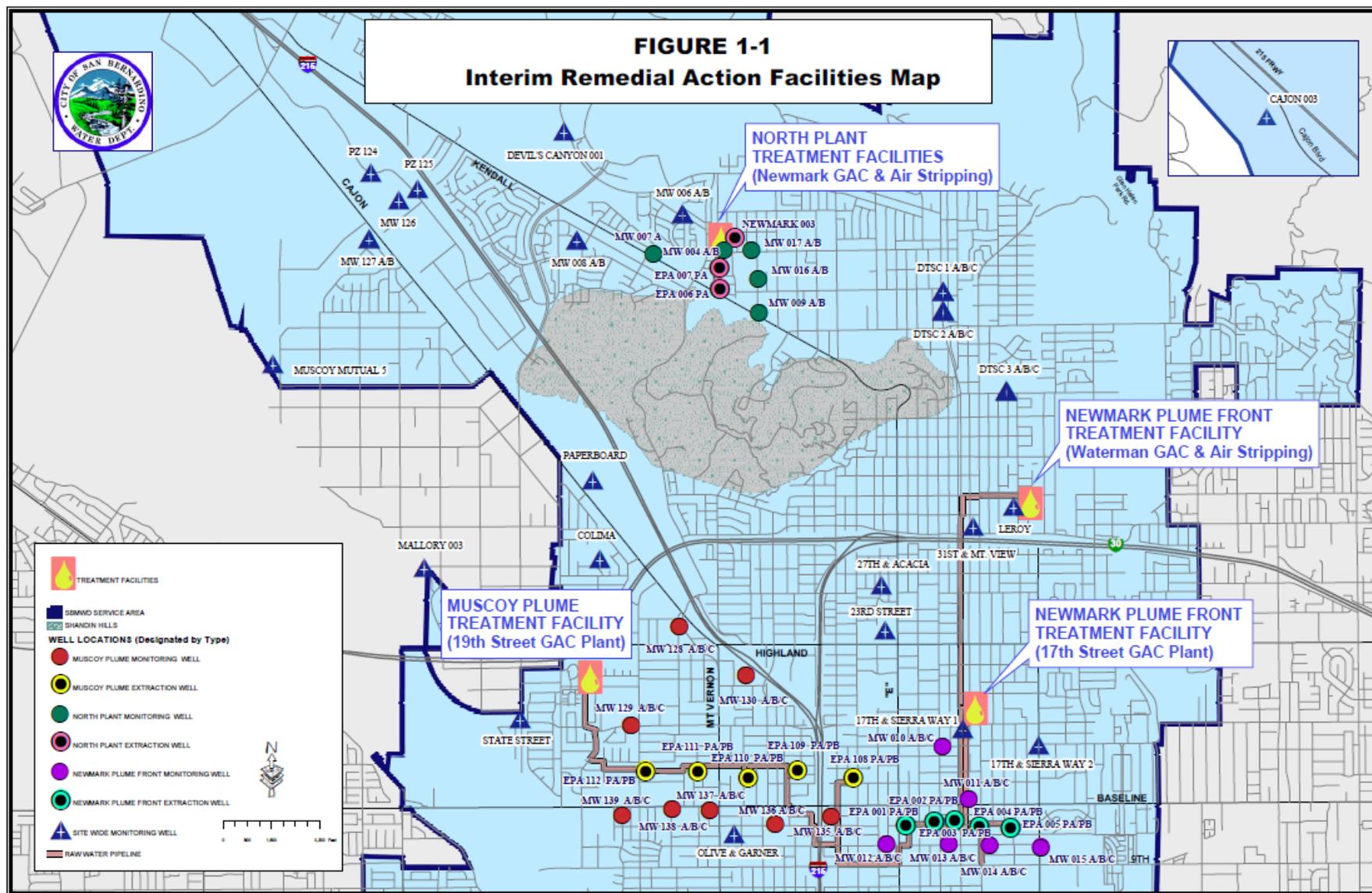


Figure 4. Extraction Wells, Monitoring Wells and Treatment Facilities for the Newmark and Muscoy OUs

## **Institutional Controls**

On March 20, 2006, the City of San Bernardino adopted the necessary ordinance placing requirements on any new domestic well drilled within the Newmark Site management zone (Chapter 13.25 in the San Bernardino Municipal Code). Local water purveyors are exempt from the permitting and other requirements of San Bernardino's municipal code because they have entered into an agreement entitled *Agreement to Develop and Adopt an Institutional Controls Groundwater Management Program* (ICGMP). The program provided for short-term restrictions on production and spreading to protect the remedies while the groundwater model was refined and a long-term agreement was negotiated. The temporary Agreement among the water purveyors to keep all production rates constant, and the restriction of domestic wells per City, ensured the effectiveness of the Institutional Control system. After the refinement of the groundwater model for the SBBA was completed, the temporary Agreement was terminated and replaced by a permanent ICGMP Agreement on June 30, 2010. The major provisions of the permanent Agreement are similar to those of the temporary Agreement.

### *4.3. Operation and Maintenance (O&M)*

#### **O&M Activities**

SBMWD prepares and submits semi-annual O&M progress reports to EPA and DTSC. Each Progress Report provides a table with a description of routine maintenance performed, problems encountered, process improvements implemented, and deviations from the operational requirements of the Consent Decree for extraction well operations, treatment plant operations, and water level monitoring.

#### **Performance Criteria**

Two sets of criteria are to be evaluated periodically based on the data collected during the operation and monitoring of the treatment facilities: 1) flow Performance and 2) contaminant performance.

Flow performance is determined by analyzing water levels over 3 month periods to ensure an inward cone of depression and MODFLOW particle capture modeling demonstrating capture analysis to determine if the system is meeting the following target capture rates of 90% particle capture for Newmark, 80% for the Muscoy shallow aquifer, and 85% for the Muscoy deep aquifer. Contaminant performance is based on evaluating reported VOC concentrations for groundwater samples collected from monitoring well clusters located downgradient of the subject extraction well network. Reported concentrations are compared to criteria established in the SOW, which include contaminant trend criteria and criteria for comparison to drinking water maximum contaminant levels (MCLs). The evaluation of contaminant performance is performed and reported following the sampling of the identified wells and the validation of the resulting laboratory data. The methodology for evaluating contaminant trends is provided in the OSAP.

Contaminant performance is based on evaluating reported VOC concentrations for groundwater samples collected from monitoring well clusters located downgradient of the subject extraction well

network. Reported concentrations are compared to criteria contaminant trend criteria and criteria for comparison to drinking water maximum contaminant levels (MCLs). Wells that exceed 1.0 ug/l are monitored quarterly. Wells that are below 1 ug/l for VOCs for eight consecutive quarters of monitoring are monitored annually or semi-annually. If a well exceeds 1 ug/l at any time after it has been taken off the quarterly sampling schedule then the quarterly schedule will be reinstated for that well.

Compliance summaries for flow performance and contaminant performance are given in each O&M Progress Report. A compliance summary for the first half of 2012 is shown in Table 5.

### **Extraction Rates and Contaminant Removal**

From July 2011 – June 2012, monthly treated water volumes ranged from about 1,800 to 2,100 acre-ft. Over the same period, estimated monthly mass removal from GAC vessels ranged from 13.4 to 19.8 pounds. Cumulative estimated mass removal is also given. Figures 8, 9, and 10 illustrate the volume of groundwater extracted and the mass of VOCs removed from the Newmark OU and Muscoy OU treatment plants.

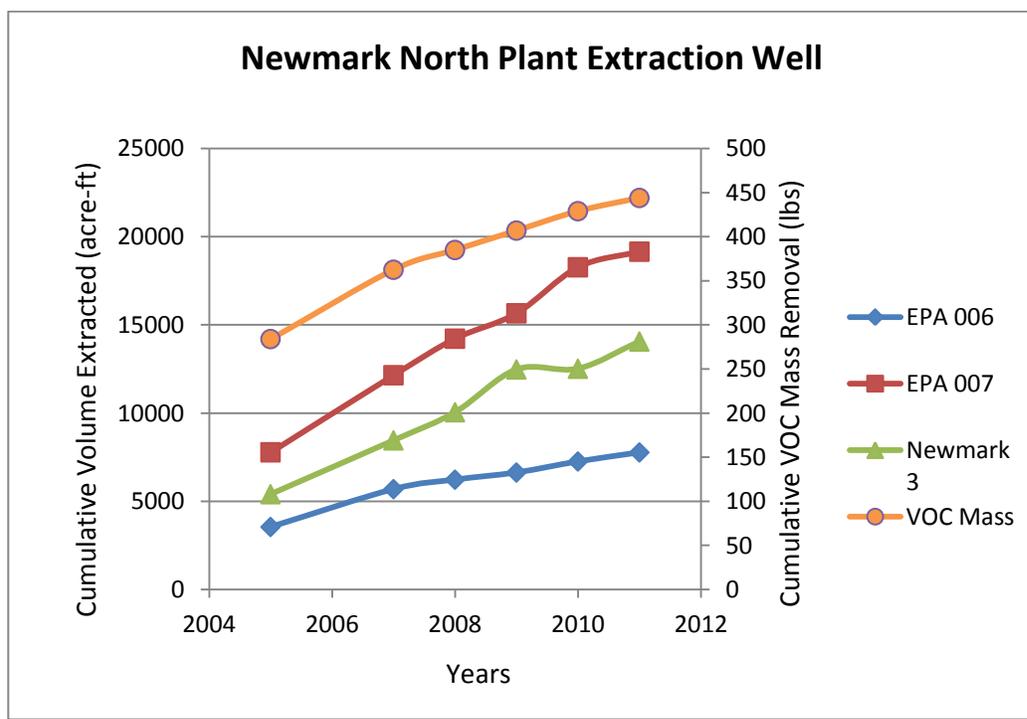


Figure 5. Summary of Newmark North Groundwater Extraction and Treatment System Performance

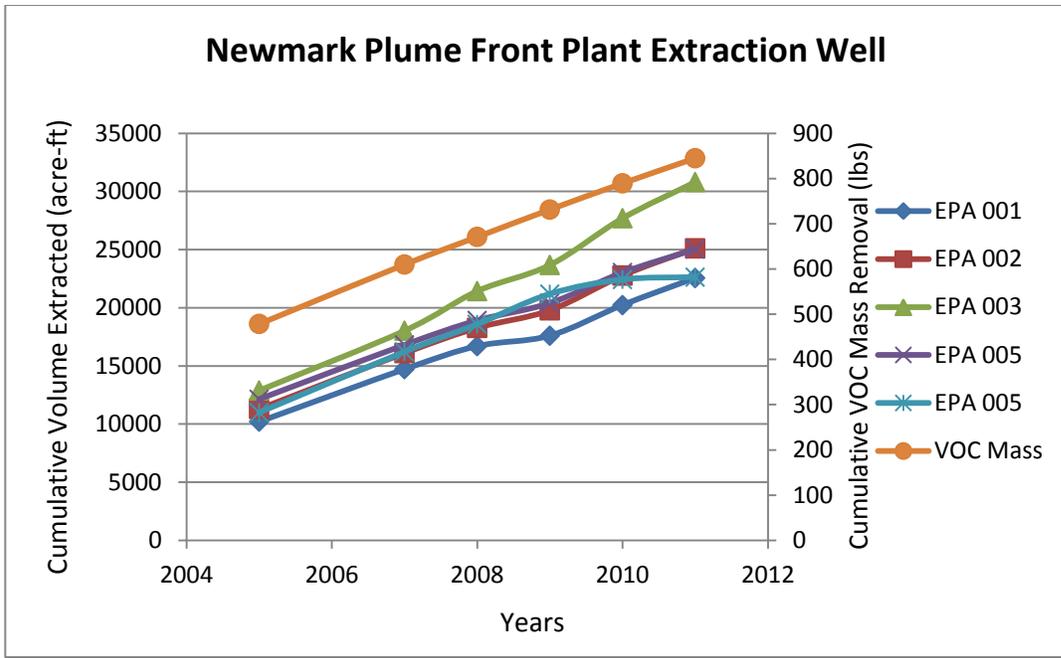


Figure 6. Summary of Newmark Plume Front Groundwater Extraction and Treatment System Performance

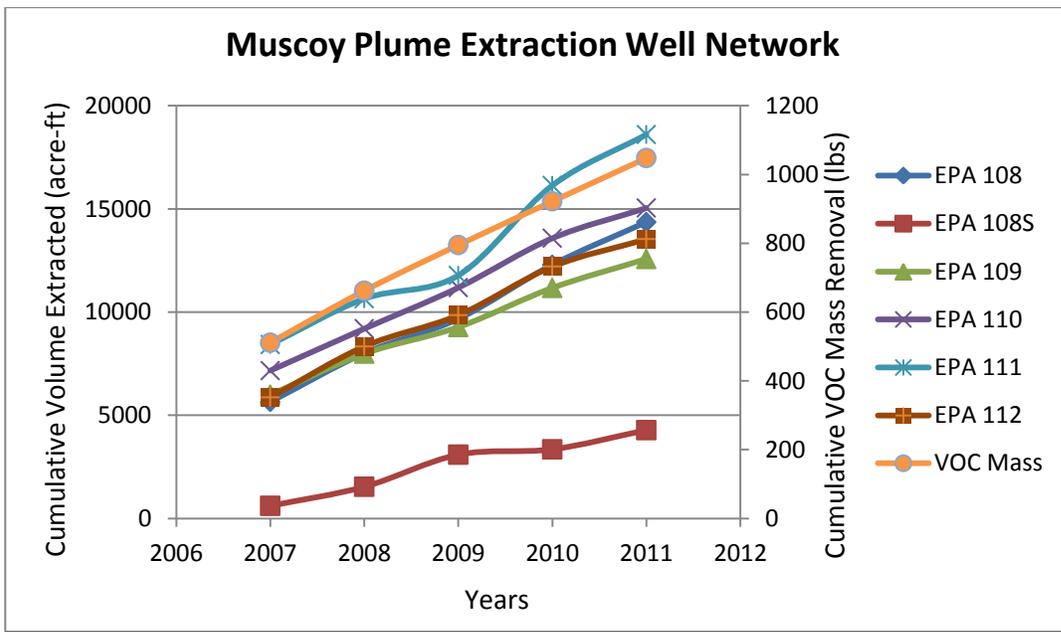


Figure 7. Summary of Muscoy Plume Front Groundwater Extraction and Treatment System Performance

## Annual O&M Costs

The annual operating costs for the Newmark and Muscoy OU treatment systems are summarized below in Table 7. Costs include labor, utilities, materials, sampling and analysis, maintenance, and administrative fees for approved activities as specified in the Consent Decree.

**Table 2. Annual Combined Newmark and Muscoy OU System O&M Costs**

<b>Date Range</b>	<b>Total Cost (rounded to the nearest \$1,000)</b>
April 2005 – December 2005	\$1,200,000*
January 2006 – December 2006	\$2,200,000
January 2007 – October 2007	\$2,000,000
November 2007 – December 2007	not available
January 2008 – December 2008	not available
January 2009 – December 2009	not available
January 2010 – May 2010	not available
July 2010 – June 2011	\$1,900,000
July 2011 – June 2012	\$1,400,000

\*Note that 2005 data do not include operating costs for the Muscoy system.

## 5. Progress Since the Last Five-Year Review

### *5.1. Previous Five-Year Review Protectiveness Statement and Issues*

The protectiveness statement from the first FYR for the Newmark Site stated the following:

*“The remedy at Newmark is protective of human health and the environment because exposure pathways that could result in unacceptable risks are being controlled. However, the long-term protectiveness of the remedies relies upon full implementation of the institutional controls program as described in Section 7.1.2. Since the remedy systems were designed and built taking into account all existing water production, the temporary Groundwater Management Agreement among the water purveyors to keep all production rates constant, and the coverage of any remaining water purveyors by the City Ordinance, insure the effectiveness of the current Institutional Control system. However, since the Groundwater Management Agreement expires at the end of 2008, it needs to be extended, and once the groundwater model is implemented, be replaced by a permanent agreement using the groundwater model as a tool for groundwater management. Subject to EPA approval, the final agreement among most of the water purveyors, in combination with the City Ordinance,*

*which applies to the remaining water purveyors, would then constitute a full implementation of the Institutional Controls.”*

The first FYR contained one issue and recommendation. The recommendation and the current status are discussed below.

**Table 3. Status of Recommendations from the 2008 FYR**

<b>Issues from previous FYR</b>	<b>Recommendations</b>	<b>Party Responsible</b>	<b>Milestone Date</b>	<b>Action Taken and Outcome</b>	<b>Date of Action</b>
Institutional Controls program only partially implemented	Finalize a draft agreement signed by water purveyors exempted from City ordinance to keep all water production stable until the groundwater model is fully implemented	SBMWD	2009	The temporary agreement was extended until it was ultimately terminated and replaced in June 2010 with a permanent agreement. The groundwater model was refined and implemented, leading to a permanent ICGMP.	June 30, 2010

## *5.2. Work Completed at the Site During this Five Year Review Period*

### **Optimization (shallow well/aquifer)**

Extraction well EPA 111 is being modified with the installation of packers to limit flow contribution from the deep aquifer in an attempt to enhance production from the shallow aquifer. Upon completion, plans are to continue this same modification in Extraction well EPA 110.

### **Response to perchlorate migration**

A source of the perchlorate is attributed to a regional plume to the east of the Site and is unrelated to the PCE/TCE plume targeted by the Newmark Plume Front extraction well network. However, the perchlorate plume has migrated to some of the easternmost extraction wells (MUNI-24, EPA-004, and EPA-005). MUNI-24 was shut down in 2008 as a result and SBMWD is developing designs for an ion exchange system to be installed at the well head. Well EPA-005 was taken offline in 2010. A CDPH approved blend plan was implemented in the beginning of May 2012 to mitigate increasing perchlorate concentrations observed in EPA 005. Per the blend plan, water extracted from EPA 005 was rerouted to the Waterman treatment plant, thereby blending with water extracted from EPA002,

EPA 003, and EPA 004 so that the perchlorate level should not exceed 4.8 µg/L. Perchlorate samples are collected weekly from the Waterman GAC Treatment Plant effluent line.

### **Institutional Controls**

The Institutional Controls Program has been fully implemented with the signing of a permanent ICGMP Agreement (effective beginning June 30, 2010), following the implementation of the refined groundwater model.

## **6. Five-Year Review Process**

### *6.1. Administrative Components*

EPA Region 9 initiated the FYR in July 2012 and scheduled its completion for September 2013. The EPA review team was led by Zi Zi Searles of EPA, Remedial Project Manager (RPM) for the Newmark Site. Jackie Lane is the Community Involvement Coordinator. Contractor support was provided by USACE (Richard Garrison, Geologist and Aaron King, Environmental Engineer).

### *6.2. Administrative Components*

On 29 November 2012, public notices were published in the *San Bernardino Sun and the Precinct Reporter* announcing the commencement of the Five-Year Review process for the Newmark Site, providing EPA's Community Involvement Coordinators contact information, and inviting community participation. The press notices are available in Appendix B.

The Five-Year Review report will be made available to the public once it has been finalized. Copies of this document will be placed in the designated public repositories: 1) San Bernardino Water Department, 300 N. D St. 5<sup>th</sup> Floor, San Bernardino (S.B.), CA; 2) Water District Office, 1350 South E. St., S.B., CA; 3) John M. Pfau Library, Cal-State San Bernardino, 5500 University Pkwy., S.B., CA; and 4) Superfund Records Center, 95 Hawthorne St., San Francisco, CA. Upon completion of the FYR, a public notice will be placed in the *San Bernardino Sun and the Precinct Reporter* to announce the availability of the final FYR report in the Site document repository.

### *6.3. Document Review*

This FYR included a review of relevant, site-related documents including the ROD, remedial action reports, and recent monitoring data. A complete list of the documents reviewed can be found in Appendix A.

## ARARs Review

Section 121 (d)(2)(A) of CERCLA specifies that Superfund remedial actions (RAs) must meet any federal standards, requirements, criteria, or limitations that are determined to be legally ARARs. Applicable or Relevant and Appropriate Requirements (ARARs) are those standards, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site.

Changes (if any) in ARARs are evaluated to determine if the changes affect the protectiveness of the remedy. The 1993 Newmark and 1995 Muscoy OU RODs identified only chemical- and action-specific ARARs for the site. Each ARAR and any change to the applicable standard or criterion are discussed below.

Chemical-specific ARARs identified in the selected remedy within the RODs for the ground water at this Site and considered for this FYR for continued ground water treatment and monitoring are listed in Table 9. The RODs for both OUs identified Federal and State Maximum Contaminant Levels (MCLs) as chemical specific ARARs for the site. Federal MCLs are found at 40 CFR Part 141. California MCLs for organics are found at 22 California Code of Regulations (CCR) §64444. Changes in MCLs for COCs were evaluated for all operable units. There have been no changes in the Federal or State MCLs that would affect the protectiveness of the remedy.

Both interim RODs identified California Secondary Drinking Water standards as ARARs for the site (22 CCR §64449).

No changes have been made to secondary MCLs since the first FYR that would affect the protectiveness of the remedy.

**Table 4. Summary of Ground Water ARAR Changes**

<b>Contaminants of Concern</b>	<b>1993 and 1995 ROD ARARs (ug/L)</b>	<b>2008 First Five-Year Review</b>	<b>Current<sup>a</sup> Regulations (ug/L)</b>	<b>ARARs Changed since First FYR?</b>
<b>Newmark Operable Unit</b>				
1,1-Dichloroethane (1,1-DCA)	5 <sup>b</sup>	5 <sup>b</sup>	5 <sup>b</sup>	No
1,1,1-Trichloroethane (1,1,1-TCA)	200 <sup>b</sup>	200 <sup>b</sup>	200 <sup>b</sup>	No
1,2-Dichloropropane	5 <sup>b</sup>	5 <sup>b</sup>	5 <sup>b</sup>	No
cis-1,2-Dichloroethene (DCE)	6 <sup>b</sup>	6 <sup>b</sup>	6 <sup>b</sup>	No
Trichloroethylene (TCE)	5 <sup>c</sup>	5 <sup>c</sup>	5 <sup>c</sup>	No
Perchloroethylene (PCE)	5 <sup>c</sup>	5 <sup>c</sup>	5 <sup>c</sup>	No

Contaminants of Concern	1993 and 1995 ROD ARARs (ug/L)	2008 First Five-Year Review	Current <sup>a</sup> Regulations (ug/L)	ARARs Changed since First FYR?
Dichloromethane (Methylene chloride)	--	5 <sup>c</sup>	5 <sup>c</sup>	No
Chloroform	100 <sup>c,d</sup>	80 <sup>c,d</sup>	80 <sup>c,d</sup>	No
Carbon tetrachloride	0.5 <sup>b</sup>	0.5 <sup>b</sup>	0.5 <sup>b</sup>	No
<b>Muscoy Operable Unit</b>				
DCA	5 <sup>b</sup>	5 <sup>b</sup>	5 <sup>b</sup>	No
DCE	6 <sup>b</sup>	6 <sup>b</sup>	6 <sup>b</sup>	No
TCE	5 <sup>c</sup>	5 <sup>c</sup>	5 <sup>c</sup>	No
PCE	5 <sup>c</sup>	5 <sup>c</sup>	5 <sup>c</sup>	No
Dichlorodifluoromethane (Freon 12)	--	--	--	No
Trichlorofluoromethane (Freon 11)	150 <sup>b</sup>	--	150 <sup>b</sup>	No <sup>e</sup>

Notes:

<sup>a</sup> The ARAR is established as the more stringent of the State and Federal MCL value.

<sup>b</sup> California MCL

<sup>c</sup> Federal MCL

<sup>d</sup> MCL value was for total trihalomethanes (TTHM) in 40 CFR 141.64.

<sup>e</sup> The Freon 11 standard was not listed in the 2008 FYR, but has not changed since the signing of the RODs

Pertinent federal and state laws and regulations other than the chemical-specific ARARs are described in Table 10; a more detailed discussion of these ARARs is located in Appendix F. ARARs identified in the 1993 Newmark or 1995 Muscoy RODs that were once applicable and relevant but have ceased to be are not included in the table. For a more extensive discussion on past and present ARARs, refer to Appendix F. There have been no revisions to laws and regulations that affect the protectiveness of the remedy.

**Table 5. Applicable or Relevant and Appropriate Requirements Evaluation**

<b>Requirement</b>	<b>Citation</b>	<b>Document</b>	<b>Description</b>	<b>Effect on Protectiveness</b>	<b>Comments</b>	<b>Amendment Date</b>
Air Quality Standards	South Coast Air Quality Management District (SCAQMD) Regulation XIV, Rule 1401	1993 Newmark and 1995 Muscoy RODs	Requires the Best Available Control Technology for toxics (T-BACT) be used for new stationary operating equipment emitting toxic air pollutants. Establishes limits for maximum individual cancer risk (MICR) from new, modified, or relocated sources emitting toxic air contaminants.	The change to this regulation does not affect protectiveness.	The SCAQMD permit issued for the site limits air stripper operations to 90,000 gallons per day for 20 days per year at maximum PCE and TCE concentrations of 120 and 20 µg/L, respectively. PCE and TCE levels at the site are well below these limits, so there is no need to install T-BACT on the air stripping units	Expansion of Toxic Air Contaminants Table; September 10, 2010
Air Quality Standards	SCAQMD Regulation XIV, Rule 401, 402, and 403	1993 Newmark and 1995 Muscoy RODs	Regulate visible emissions (401), prohibit emissions that are odorous or causes injury, nuisance, or annoyance (402), and regulate downwind particulate emissions (403)	There have been no changes to these regulations and it does not affect protectiveness.		
Hazardous Waste Management	22 California Code of Regulations (CCR) §66264.600 - .603	1993 Newmark and 1995 Muscoy RODs	Requires a miscellaneous unit to be located, designed, constructed, operated, maintained, and closed in a manner that will ensure the protection of human health and the environment.	There have been no changes to these regulations and it does not affect protectiveness.	Air strippers and GAC contactors qualify as miscellaneous units.	
Hazardous Waste Management	22 CCR §66264.111-.115	1993 Newmark and 1995 Muscoy RODs	Owners and operators of hazardous waste management facilities shall close the facility in a manner that a) minimizes the need for further maintenance, and b) controls, minimizes, or eliminates post-closure escape of hazardous waste	There have been no changes to these regulations and it does not affect protectiveness.		

## Human Health Risk Assessment Review

Preliminary Baseline Risk Assessments were completed for the Newark OU Remedial Investigation/Feasibility Study (1993) and the Muscoy OU RI/FS (1994). The risk assessment was reviewed to identify any changes in exposure or toxicity that would impact protectiveness.

The potential exposure pathway evaluated in the risk assessments was the consumption of untreated, contaminated drinking water (i.e., oral intake or oral ingestion). Table 7 summarizes the site risks for the oral ingestion pathway for average exposure and reasonable maximum exposure (RME) scenarios as shown in the RI/FS documents. Based on the Baseline Risk Assessment, no unacceptable non-cancer hazards or cancer risks were identified. The basis for taking action was the exceedence of TCE and PCE MCL's in groundwater that served as a drinking water source. The current remedy treats contaminated groundwater to non-detect values and the institutional controls prevent the installation of wells in areas that would affect the performance of the remedy. Dermal contact with untreated, contaminated water was also considered, but EPA found that it did not pose significant risk. No new exposure pathways were identified.

**Table 6. Site risks identified in the RI/FS documents for the oral ingestion pathway**

Exposure Scenario	Non-cancer Hazard Index	Cancer Risk
<b>Newmark OU</b>		
Average	0.1	1.2E-05
RME	0.11	1.4E-05
<b>Muscoy OU</b>		
Average	0.09	4E-06
RME	0.14	2E-05

Vapor Intrusion: EPA's understanding of contaminant migration from soil gas and/or groundwater into buildings has evolved over the past few years leading to the conclusion that vapor intrusion may have a greater potential for posing risk to human health than assumed when the ROD was prepared. In September 2002, EPA released an external review draft version of its vapor intrusion guidance titled "Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils" (EPA 2002). The EPA vapor intrusion guidance (EPA 2002) states that the vapor intrusion pathway should be considered if volatile chemicals in soil or groundwater are located 100 feet or less in depth. Because depth to contaminated groundwater in both the Newmark and Muscoy OUs is greater than 100 feet, vapor intrusion is unlikely to be a significant exposure route.

Toxicity Values: EPA's Integrated Risk Information System (IRIS) has a program to update toxicity values used by the Agency in risk assessment when newer scientific information becomes available. In the past five years, there have been a number of changes to the toxicity values for certain contaminants of concern at the Site. Revisions to the toxicity values for PCE, TCE, cis-1,2-DCE, carbon tetrachloride, and methylene chloride indicate changes in risk from exposure to these chemicals.

Groundwater results are compared to EPA Regional Screening Levels (RSLs) as a first step in determining whether response actions may be needed to address potential human health exposures. The RSLs are chemical-specific concentrations that correspond to an excess cancer risk level of  $1 \times 10^{-6}$  (or a Hazard Quotient (HQ) of 1 for noncarcinogens) developed for standard exposure scenarios (e.g., residential and commercial/industrial). RSLs are not de facto cleanup standards for a Superfund site, but they do provide a good indication of whether actions may be needed. In September 2011, EPA completed a review of the TCE toxicity literature and posted on the Integrated Risk Information System both cancer and non-cancer toxicity values which resulted in lower RSLs for TCE. The screening level for chronic exposure for cancer excess risk level of  $1 \times 10^{-6}$  is 0.44  $\mu\text{g/L}$ . EPA uses an excess cancer risk range between  $10^{-4}$  and  $10^{-6}$  for assessing potential exposures, which means a TCE concentration between 0.44 and 44  $\mu\text{g/L}$ . The current Maximum Contaminant Level (MCL) for TCE of 5  $\mu\text{g/L}$  which is within the revised protective carcinogenic risk range. EPA's 2011 Toxicological Review for TCE also developed safe levels that include at least a 10 fold margin of safety for health effects other than cancer. Any concentration below the non-cancer RSL indicates that no adverse health effect from exposure is expected. Concentrations significantly above the RSL may indicate an increased potential of non-cancer effects at the site. The non-cancer screening level for TCE is 2.6  $\mu\text{g/L}$ . EPA considers the TCE MCL of 5  $\mu\text{g/L}$  protective for both cancer and non-cancer effects.

EPA also recently reassessed PCE toxicity literature for both cancer and non-cancer effects and released the toxicological review in February 2012. The reassessment determined that risk for cancer excess of  $1 \times 10^{-6}$  was less stringent than previously assumed, and has raised the cancer RSL for PCE to 9.7  $\mu\text{g/L}$ . The non-cancer RSL was also revised based on adverse neurological effects and resulted in a non-cancer risk RSL of 35  $\mu\text{g/L}$ . The PCE MCL of 5  $\mu\text{g/L}$  remains protective for both carcinogenic and non-cancer effects. Table 8 shows a summary of drinking water RSLs for PCE and TCE.

In addition to the revisions made for TCE and PCE, revisions to the toxicity values for methylene chloride (November 2011), cis-1,2-DCE (September 2010), and carbon tetrachloride (March 2010) indicate changes in risk from exposure to these chemicals. Oral slope factor (SFO) and oral reference dose (RfD<sub>o</sub>) values from the 2008 FYR, EPA Region 9's 2004 PRG table, and EPA's 2012 RSL table are listed in Table 12 to show changes in toxicity and chemical-specific information for PCE, TCE, cis-1,2-DCE, carbon tetrachloride, and methylene chloride. SFO and RfD<sub>o</sub> values for cis-1,2-DCE, and methylene chloride all decreased from previous values, indicating a decreased cancer risk and an increased non-cancer risk than previously assumed for these chemicals. For carbon tetrachloride, SFO decreased and RfD<sub>o</sub> increased from previous values, indicating a decrease in cancer risk and non-cancer risks than previously assumed.

**Table 7. Changes to toxicity and chemical-specific information for oral ingestion pathway**

Contaminant	SFO (kg-day/mg)		RfD <sub>o</sub> (mg/kg-day)		Change
	Previous Value	2012 RSL Table Value	Previous Value	2012 RSL Table Value	
PCE	5.4E-01 <sup>a</sup>	2.1E-03	1.0E-02 <sup>a</sup>	6.0E-03	Cancer: Less stringent; Non-cancer: More stringent
TCE	1.3E-02 <sup>a</sup>	4.6E-02	3.0E-04 <sup>b</sup>	5.0E-04	Cancer: More stringent; Non-cancer: Less stringent
cis-1,2-DCE	--	--	1.0E-02 <sup>b</sup>	2.0E-03	Cancer: No change; Non-cancer: More stringent
Carbon tetrachloride	1.3E-01 <sup>b</sup>	7.0E-02	7.0E-04 <sup>b</sup>	4.0E-03	Cancer: Less stringent; Non-cancer: Less Stringent
Methylene chloride	7.5E-03 <sup>b</sup>	2.0E-03	6.0E-02 <sup>b</sup>	6.0E-03	Cancer: Less stringent; Non-cancer: More Stringent

Notes

<sup>a</sup> As listed in Appendix D of previous FYR

<sup>b</sup> As listed in EPA Region 9 2004 PRG Table because toxicity values from the original risk assessments or previous FYR were not available

## **Ecological Review**

Ecological assessments were completed in the Newmark OU and Muscoy OU RI/FS. Land use in both OUs and the surrounding area is a mixture of residential, commercial, and industrial. No potential receptors were identified for the Newmark OU because a significant wildlife population was not indicated based on the current land use. The Muscoy RI/FS identified two endangered plant species (Santa Ana River woollystar and slender-horned spineflower) and several threatened reptiles, birds, and mammals in areas of the Muscoy OU. The ecological stressor of primary concern for both OUs was the potential discharge of contaminated groundwater to surface water. There is no information, though, to indicate that there is a hydrogeologic groundwater-to-surface water connection in the area of contamination, nor is there any known point or non-point discharge of untreated groundwater to a surface water source. Consequently, there is no complete exposure pathway to potential ecological receptors in either the Newmark or Muscoy OUs. There have been no changes at the site since the previous FYR that change the ecological assessment.

### *6.4. Data Review*

The purpose of this data review is to identify trends in the information collected from groundwater monitoring to support an evaluation of whether the implemented groundwater remedies at the site remain protective of human health and the environment. Chemical concentration data from the Newmark and Muscoy wells and capture analysis for the Newmark and Muscoy OUs are included in this review. Additionally, chemical concentration data from the Source IA monitoring is included.

## **Contaminant Performance Evaluation**

Contaminant concentration data are collected at the treatment plants, extraction wells, and monitoring wells. At the treatment plants, combined influent concentration is monitored quarterly, and combined effluent concentration is monitored weekly as part of the carbon change out requirement. Combined effluent concentrations from all the treatment plants have been non-detect (less than 0.5 µg/L) since treatment started. Contaminant concentrations are monitored semi-annually at the extraction systems (both the extraction wells and the monitoring wells used to monitor the performance of the extraction wells), and annually site-wide. The O&M Progress Reports give data for these wells for the reporting period (e.g., Appendix G) and also show the results of Mann-Kendall trend analyses for shallow contaminant performance monitoring wells (Table 13).

**Table 8. Results of Mann-Kendall Trend Analyses for Shallow Aquifer Contaminant Performance Monitoring Wells, January 1, 2005 – May 30, 2012**

Well	Analyte	Count <sup>(1)</sup>	Number of Detects	MK (S) <sup>(2)</sup>	Confidence in Trend <sup>(3)</sup>	COV <sup>(4)</sup>	Concentration Trend <sup>(5)</sup>	Comments
MW 012A	PCE	35	24	251	100%	0.44	Increasing	Maximum concentration of 1.1 µg/L
MW 013A	PCE	25	1	-53	89%	0.37	Stable	
MW 014A	PCE	27	25	236	100%	0.34	Increasing	Maximum concentration of 1.1 µg/L
MW 135A	PCE	27	27	-192	100%	0.48	Decreasing	
MW 135B	PCE	24	6	38	82%	1.01	No Trend	
MW 136A	PCE	20	2	-21	74%	0.29	Stable	
MW 137A	PCE	21	11	-72	99%	1.58	Decreasing	
MW 138A	PCE	27	26	-131	100%	0.57	Decreasing	
MW 139A	PCE	18	17	0	49%	0.23	Stable	
MW 139B	PCE	22	1	-47	90%	0.29	Probably Decreasing	
MW 141A	PCE	22	2	-59	95%	0.3	Probably Decreasing	
<b>Notes:</b>								
MW 012A	TCE	35	31	486	100%	0.61	Increasing	Maximum concentration 2.2 µg/L. Appears to be stabilizing.
MW 013A	TCE	25	0	-81	97%	0.38	Non-Detect	
MW 014A	TCE	27	7	55	87%	0.38	No Trend	
MW 135A	TCE	27	27	-173	100%	0.4	Decreasing	
MW 135B	TCE	24	6	38	82%	0.58	No Trend	
MW 136A	TCE	20	3	-9	60%	0.3	Stable	
MW 137A	TCE	21	9	-61	97%	1.03	Decreasing	
MW 138A	TCE	27	7	-48	84%	0.44	Stable	
MW 139A	TCE	20	0	-35	86%	0.23	Non-Detect	
MW 139B	TCE	22	1	-60	95%	0.23	Probably Decreasing	
MW 141A	TCE	22	5	50	92%	0.27	Probably Increasing	Maximum concentration of 1.9 µg/L

Notes:

(1) Count indicates the number of samples used for the Mann-Kendall test.

(2) The Mann-Kendall Statistic (S) measures the trend in the data. Positive values indicate an increase in constituent concentrations over time, whereas negative values indicate a decrease in constituent concentrations over time. The strength of the trend is proportional to the magnitude of the Mann-Kendall Statistic (i.e., large magnitudes indicate a strong trend).

(3) The Confidence in Trend is the statistical confidence that the constituent concentration is increasing (S>0) or decreasing (S<0)

(4) The Coefficient of Variation (COV) is a statistical measure of how the individual data points vary about the mean value. The coefficient of variation, defined as the standard deviation divided by the average. Values near 1.00 indicate that the data form a relatively close group about the mean value. Values either larger or smaller than 1.00 indicate that the data show a greater degree of scatter about the mean.

(5) MAROS MANN-KENDALL ANALYSIS DECISION MATRIX

Mann-Kendall Statistic	Confidence in Trend	Concentration Trend
S > 0	> 95%	Increasing
S > 0	90 - 95%	Probably Increasing
S > 0	< 90%	No Trend
S ≤ 0	< 90% and COV ≥ 1	No Trend
S ≤ 0	< 90% and COV < 1	Stable
S < 0	90 - 95%	Probably Decreasing
S < 0	95%	Decreasing

Over the period from August 2009 to June 2012, performance criteria were met in all of the contaminant performance monitoring wells, i.e., no performance monitoring wells showed PCE or TCE concentrations above the respective MCLs.

Mann-Kendall analysis shows increasing or probably increasing trends in some performance monitoring wells, though MCLs have never been exceeded. Well MW 012A has increasing trends for PCE and TCE, though the maximum concentrations observed in this well have never been higher than 1.1 and 2.2 µg/L, respectively; it was noted in the last FYR that MW 012A had increasing trends. Well MW 014A has an increasing trend for PCE, though the maximum PCE concentration observed in this well have never exceeded 1.1 µg/L. Well MW 141A has a probably increasing trend for TCE, though the maximum TCE concentration in this well has never exceeded 1.9 µg/L.

In two samples from performance monitoring well MW 137A after it was reinstated into the contaminant performance evaluation program, PCE and TCE concentrations were elevated from their pre-reinstatement levels. On May 23, 2012, PCE and TCE concentrations were 4.3 and 0.95 µg/L, respectively; on June 21, 2012, PCE and TCE concentrations were 2.1 and 0.72 µg/L, respectively. None of these concentrations are above MCLs, so this well is currently meeting contaminant

performance criteria. Mann-Kendall trend analysis indicates PCE and TCE concentrations to be decreasing in MW 137A.

From August 2009 to June 2012, EPA 001, 002 and 108S are the only extraction wells with at least one sample having a PCE concentration above the MCL. The maximum PCE concentrations observed in wells EPA 001, 002, and 108S were 5.3, 6.8, and 6.9 µg/L, respectively. Some piezometers that are co-located with the extraction wells had at least one detection of PCE above the MCL. These piezometers included EPA 007PA (8.5 µg/L), EPA 109PB (max 9.9 µg/L), EPA 110PB (max 11 µg/L), EPA 110PC (max 18 µg/L), EPA 110PD (max 6.2 µg/L), EPA 111PB (max 10 µg/L), and EPA 111PC (max 12 µg/L). TCE was not detected above the MCL in any extraction wells. TCE was detected above the MCL in one sample in co-located piezometer EPA 111PC (5.3 µg/L). Extraction wells are screened through the depths of the piezometer screens.

Other monitoring wells that had at least one PCE detection above the MCL from August 2009 to June 2012 include MW 009B, MW 010C, MW 011C, MW 128A, MW 129B, MW 130B, MW 140C (near the intersection of Darby Street and North California Street), and the 31st and Mt. View Well. The only other monitoring well that had at least one TCE detection above the MCL from August 2009 to June 2012 was MW 128A. These wells are used to evaluate the effectiveness of the extraction system and are not part of the contaminant performance evaluation program. The maximum concentrations of PCE at the site are both found at well CJ-10. CJ-10 is a landfill screened beneath the closed county landfill, the Cajon landfill area, in the northwest area of the site. In the past five years PCE has been as high as 47 ug/L, and TCE as high as 2.3 ug/L (December 2012).

### **Flow Performance Evaluation**

Capture analysis was evaluated using particle tracking (40 particles) across the PCE plumes (from the 2.5 µg/L contours). The contaminant concentration contours are generated using the chemical concentration data from the designated sampling event. The percent capture is then compared to the flow performance criteria as described in section 4.3.

Capture zone analysis was performed for the Newmark extraction system (EPA 001-005) monthly during O&F (1998-2000) and reported in the two Newmark Performance reports (URS 2000), annually during O&M (2000-2007) and reported in the Capture Zone Evaluation (CH2MHill, 2008), and quarterly during O&M by SBMWD in their quarterly progress reports (semi-annually starting in 2012). Complete capture (100% capture) of this plume was achieved during this entire period. Capture zone analysis in June 2012 for the Newmark plume is shown in Figure 12. Figure 13 highlights the Newmark PCE plumes in 2008 and 2012, which indicate some reduction in the size of the plume during this O&M period.

Capture zone analysis was performed for the two aquifer zones where contamination is found in the Muscoy OU. During the O&F period (Aug 2005-Mar 2007), capture zone analyses were performed monthly by EPA, with capture of the shallow plume in May 2007 analyzed from the pump test results of the new extraction well EPA 108S. During this period, capture of the shallow plume was 80% -

93%, and capture of the intermediate plume was 100%. Capture zone evaluation of the Muscoy extraction system began in April 2008. The 100% capture achieved in April-June 2008 for the Muscoy shallow plume shows the effective contribution to capture from EPA 108S, which went online in May 2007. Capture of both the shallow and intermediate plumes was 100% from July 2011 to June 2012. Flow performance criteria for each zone have been met since capture zone analyses began. Capture zone analysis in June 2012 for the shallow and intermediate zones of the Muscoy plume are given in Figures 14 and 15, respectively. Figures 16 and 17 compare the shallow and intermediate Muscoy OU PCE plumes, respectively, from 2008 to 2012 that indicate the size of the plumes have reduced during this O&M period.

In summary, all flow performance criteria were achieved throughout the last five years.

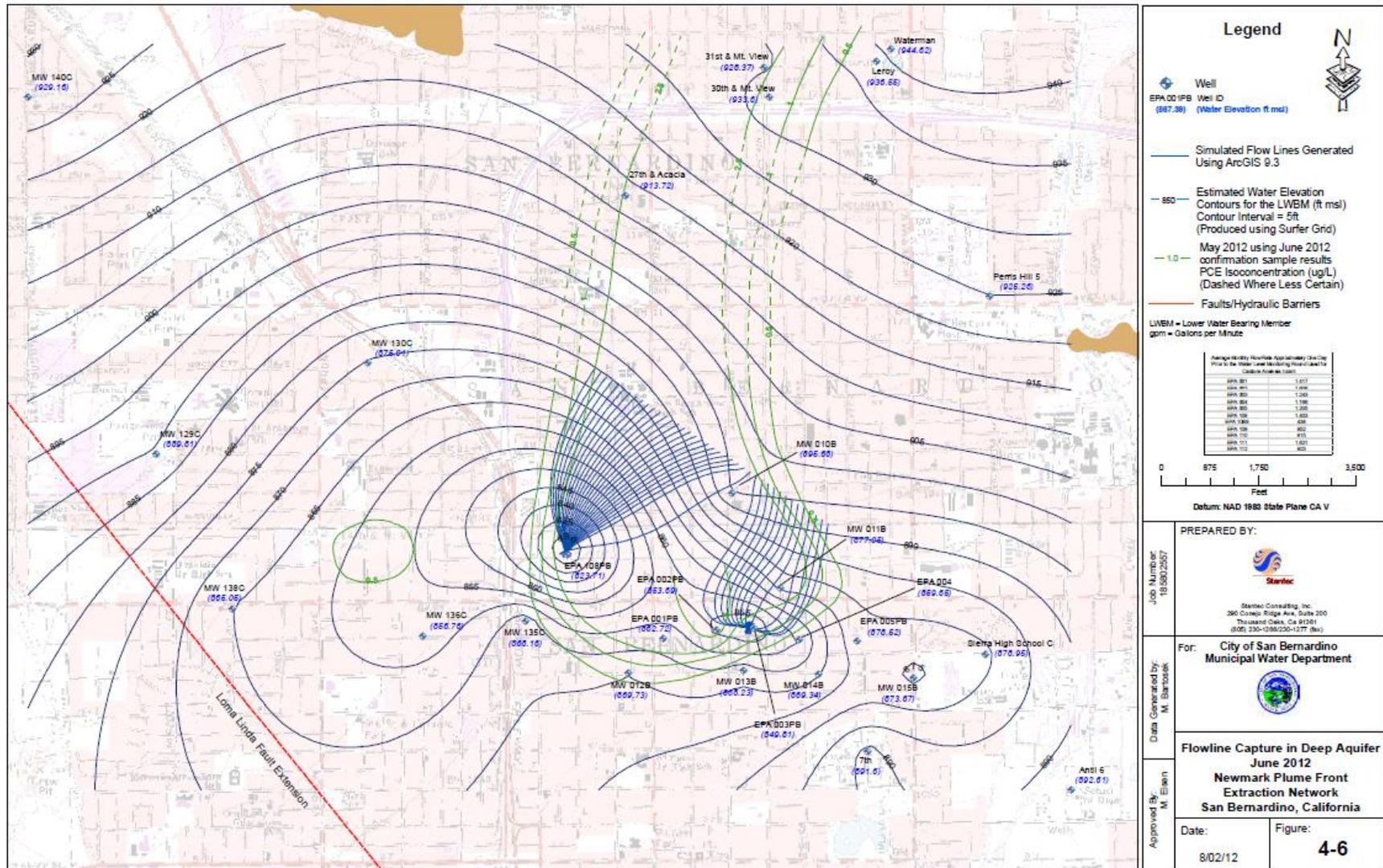


Figure 8. June 2012 Capture Analysis for Newmark Plume

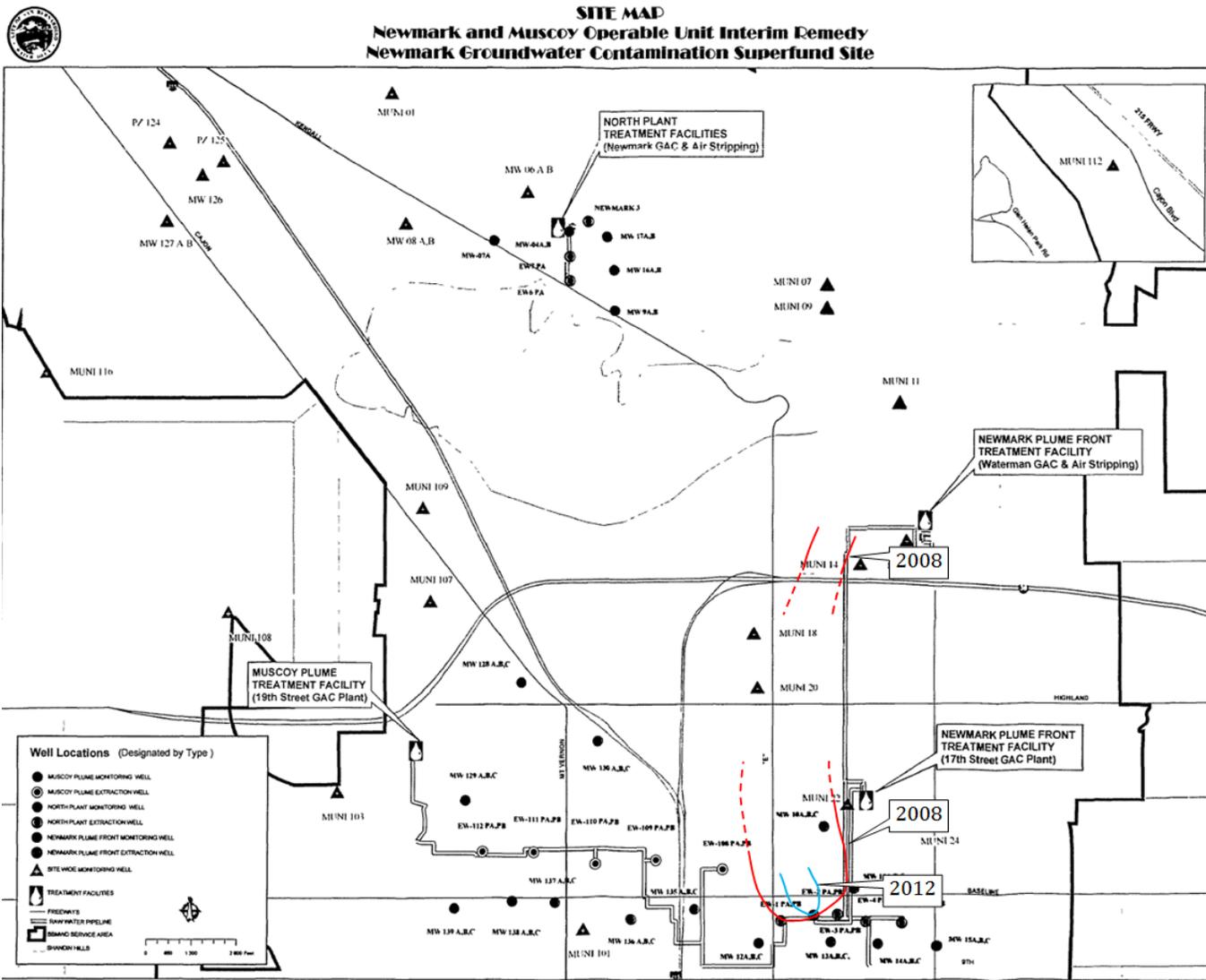


Figure 9. PCE isoconcentration contours at 5.0 µg/L, of the Newmark Plume Front for 2008 and 2012

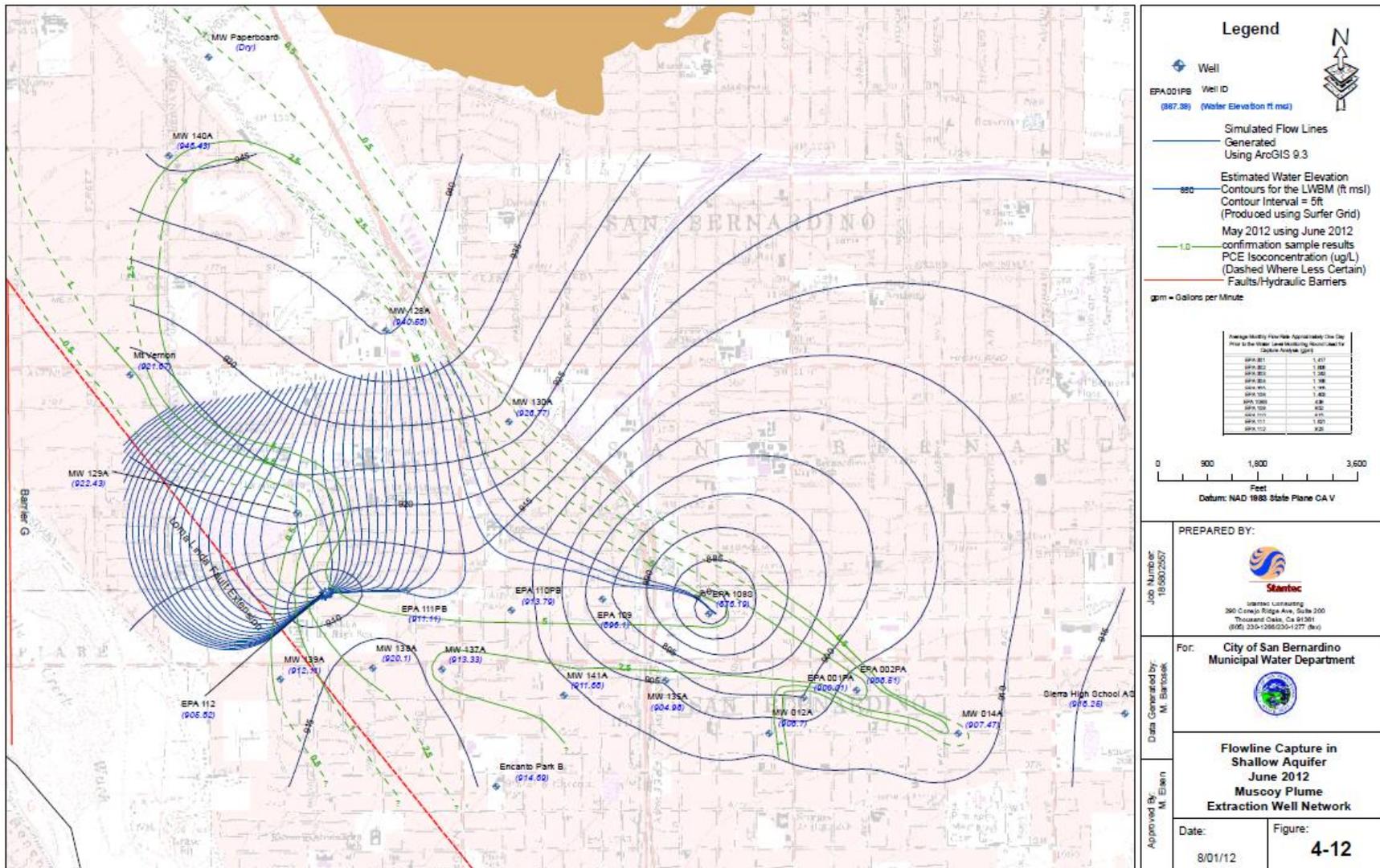


Figure 10. June 2012 Capture Analysis for Shallow Muscoy Plume

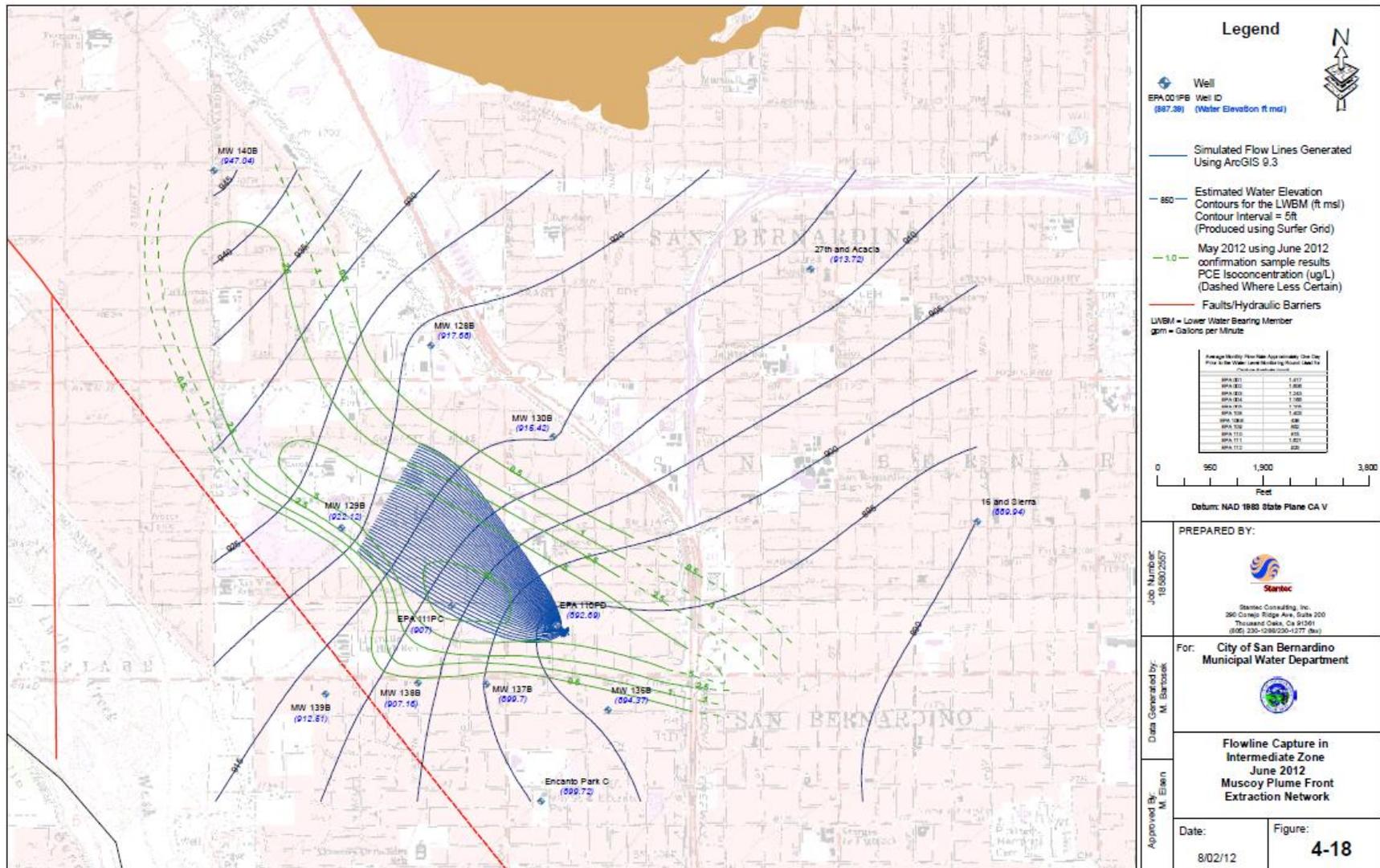


Figure 11. June 2012 Capture Analysis for Intermediate Muscoy Plume





## *6.5. Site Inspection*

The Newmark and Muscoy OU facilities were inspected on Wednesday, December 12, 2012. The site inspection was conducted by Matthew Litchfield (SBMWD, Director), Michael Garland (Operations Superintendent), Mark Eisen (Stantec, Principal Hydrogeologist), Zi Zi Searles (USEPA, Remedial Project Manager), Stephen Niou (DTSC), Richard Garrison (USACE, Geologist), and Aaron King (USACE, Environmental Engineer). The group met at the 19<sup>th</sup> Street Water Treatment Facility. There, Mr. Garland and Mr. Litchfield described the operations of the GAC treatment system and answered questions. The group then visited one of the façade homes associated with the Muscoy OU extraction wells. The façade homes house electrical equipment and conceal the extraction piping on the rear of the properties.

Other sites that were visited include the site of extraction wells EW-108 and EW-108S, the Waterman GAC and Air Stripping treatment facility, and the North Plant GAC and Air Stripping treatment facility. These stops were selected to show examples of extraction wells, treatment facilities, and where upgrades have been implemented, planned, or are being considered. All remedy components appeared to be in good condition and operating as desired and SBMWD appears to be very proactive when it comes to maintaining and optimizing the extraction and treatment systems. Mr. Garland and Mr. Litchfield noted that a trespassing incident occurred at the 19<sup>th</sup> Street Plant, which prompted the installation of three-strand barbed wire along the top of the fencing in 2011. Apparently, some buildings in the area have been victims of copper theft, but the plant has not had any issues of that nature. A small dog (presumed to be a stray) was noticed inside the fence at the 19<sup>th</sup> Street Plant during the walkthrough, but it does not appear that anything at any of the facilities would pose a threat to the health and safety of animals that manage to get through the gates or otherwise onto the facility grounds. Though none was observed during the site inspection, Mr. Garland and Mr. Litchfield noted that spray-paint related vandalism occasionally occurred at some of the facilities, but that O&M crew carried paint with them to cover the vandalism. They also noted that a table and children's playset had to be removed outside of the site of extraction wells EPA-108 and EPA-108S due to concerns over illegal activities and liability. Finally, it was noted that perchlorate contamination associated with agricultural activities to the east in the early 20<sup>th</sup> century has migrated to some of the easternmost extraction wells (MUNI-24, EPA-004, and EPA-005). MUNI-24 was shut down as a result, and SBMWD is developing designs for an ion exchange system to be installed at the well head. Perchlorate contamination in water extracted through EPA-004 and -005 is dealt with through a blending program.

The completed Site Inspection Checklist is given in Appendix D. The full Site Inspection Report with photographs is provided in Appendix E.

## *6.6. Interviews*

During the FYR process, interviews were conducted with parties impacted by the Site, including the current landowners, and regulatory agencies involved in Site activities or aware of the Site. All but one of the interviews were conducted during the Site Visit from December 12-13, 2012. Brenda Romero of the

California Department of Public Health was interviewed by phone on January 31. Interviews are summarized below and complete interviews are included in Appendix C.

CDPH's overall impression of the site is positive. The project has been going smoothly and the obligations laid out in the Consent Decree are being met. There have been no community concerns or complaints regarding the project. Occasional vandalism has been observed at the Newmark and Muscoy OUs facilities, and at wells in the Source IA. Overall, the remedy is performing well. Concentrations in the aquifer are generally decreasing; only a few wells have shown increasing trends.

There have been some minor challenges on the Newmark side regarding Chilean fertilizer derived perchlorate contamination exceeding the CDPH notification level at performance monitoring wells upgradient of Newmark extraction wells. CDPH also discussed the need for SBMWD to improve containment capture in the shallow groundwater zones of the Muscoy OU. Perchlorate contamination at Newmark is sourced from an area east of the NPL boundary. SBMWD is committed to optimizing to improve the capture of shallow groundwater contamination on the Muscoy side. SBMWD told CDPH that they plan to install packers in selected extraction wells and drill two new extraction wells screened in the shallow zone of the aquifer. State representatives interviewed felt well informed about the site's activities and progress. Site operations have generally benefitted the community by providing clean water and cleaning up the aquifer.

### *6.7. Institutional Controls*

The 2004 ESD modified the RODs to require institutional controls (ICs) within the City limits as a long term groundwater management strategy to protect the interim remedies, and to address exposure to hazardous wastes and constituents. The ESD requires the implementation of a groundwater management program that will control and monitor the ability of users to extract or spread water into the area of influence of the extraction well system. This groundwater management program is intended to prevent the remedy from being impaired through the interference of municipal production wells or recharge basins. In accordance with the ESD, the City of San Bernardino adopted an ordinance implementing a management program mandating that any planned installation of new wells, re-equipping of existing wells, expansion of production well capacity or rate of production, or the use of spreading basins be conducted pursuant to a permit, and that the applicant for any such permit demonstrate that its operations will not detrimentally impact the remedies.

On March 20, 2006, the City of San Bernardino adopted the ordinance placing requirements on any new well drilled within the Newmark Site management zone (Chapter 13.25 in the San Bernardino Municipal Code), although most of the water purveyors are exempted from that ordinance. In addition 13 local municipal water purveyors entered into the *Agreement to Develop and Adopt an Institutional Controls Groundwater Management Program* (ICGMP), finalized on June 30, 2010. The ICGMP provides for restrictions on production and spreading to protect the remedies. It also mandates that the water purveyors to keep all production rates constant. A tool used by the ICGMP parties to reach consensus on the impact of new projects is the SBBA groundwater model. Specifically, the groundwater model allows ICGMP parties to use predictive modeling to evaluate the potential impact of new or reconstructed wells

and the construction of new spreading basins on the Newmark Remedy. The ICGMP, along with the well permit requirements outlined in the City Ordinance, ensure an effective institutional control system at the site.

## 7. Technical Assessment

### *7.1. Question A: Is the remedy functioning as intended by the decision documents?*

The remedy is functioning as intended by the decision documents. PCE and TCE has not been detected in treated water since treatment began. Additionally, PCE and TCE concentrations in contaminant performance monitoring wells have never been greater than their respective MCLs, though there are increasing trends in wells MW 012A and MW 014A. The evaluation of the flow performance showed that 100% capture has been achieved during the last five years. Also, the plume appears to be decreasing in size.

Operating procedures, as described in the Final O&M Plan, the Quality Assurance/Quality Control Plan, and the Operation and Sampling Analysis Plan are expected to maintain the effectiveness of the response action.

SBMWD has and is continuing to take steps to focus extraction efforts in the Muscoy plume area to more efficiently capture contaminant mass. Shallow extraction well EPA-108S was installed for this purpose. SBMWD is in the process of installing and testing a packer in EPA-111 to isolate and capture only the contaminated waters, and will perform the same task on EPA-110.

SBMWD is working on a contract with a new carbon supplier that will save roughly \$0.40/lb of carbon (carbon is the highest O&M cost).

The variable frequency drives (VFDs) on some of the extraction well pump motors may be changed to direct drives. The VFDs are more costly from an O&M standpoint, and demand for water has not been variable enough to justify the need for VFDs.

With the implementation of the refined groundwater model and the signing of the ICGMP, the institutional controls program has been fully implemented. The groundwater model allows interested parties to reach sound decisions about the location and installation of new or reconstructed wells and the location and construction of new spreading basins within the Bunker Hill Basin that could affect the performance of the remedies. Thus, the current ICs are adequate for site conditions.

The EPA and SBMWD found no early indicators of potential issues.

### *7.2. Question B: Are the exposure assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives (RAOs) Used at the Time of Remedy Selection Still Valid?*

Exposure assumptions, cleanup levels, and RAOs used at the time of remedy selection are still valid. Some toxicity data have changed since the time of remedy selection, but this does not affect the protectiveness of the remedy. Revisions to the toxicity values for PCE, methylene chloride, TCE, cis-1,2-DCE, and carbon tetrachloride indicate changes in risk from exposure to these chemicals. However, there is no exposure to untreated, contaminated groundwater at the Site. There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. There have been no changes in the ARARs that would affect the protectiveness of the remedy.

Land use on or near the site has not and is not expected to change. In April 2013, EPA released a final draft version of its vapor intrusion guidance, *OSWER Final Guidance for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Sources to Indoor Air (External Review Draft)*, to the public for comments. According to the guidance intrusion pathway should be considered if volatile chemicals in soil or groundwater are located 100 feet or less in depth. Because depth to contaminated groundwater in both the Newmark and Muscoy OUs is greater than 100 feet, vapor intrusion is unlikely to be a significant exposure route.

There were no new human health or ecological routes of exposure or receptors identified, and none of those previously identified have changed. There are no newly identified contaminants or contaminant sources, nor any unanticipated toxic byproducts of the remedy not previously addressed by the decision documents. Physical site conditions or the understanding of these conditions has not changed.

Currently, the remedy is meeting the RAOs and progressing as expected, and remains protective of human health and the environment. ICs for the selected remedy have been fully implemented and are being maintained to ensure that the remedial action remains protective of human health and the environment.

### *7.3. Question C: Has Any Other Information Come to Light That Could Call Into Question the Protectiveness of the Remedy?*

No other information has come to light that could affect the protectiveness of the remedy.

### *7.4. Technical Assessment Summary*

The extraction and treatment systems are functioning as intended by the decision documents. Based on the sampling of monitoring and extraction wells since system start-up, it appears that the Muscoy and Newmark South containment systems have been successful in meeting the goal of preventing migration of contaminants. Concentrations downgradient of the extraction wells are generally well below the drinking water standards, where detectible, and the concentrations generally do not exhibit increasing trends where there are verified detections. Opportunities to improve performance and reduce costs have been

implemented with proposals for additional optimizations. Institutional controls have now been fully implemented.

## 8. Issues

There were no issues identified for the Newmark Site that affect current or future protectiveness.

## 9. Recommendations and Follow-up Actions

There are no recommendations identified for the Newmark Site.

## 10. Protectiveness Statement(s)

### Newmark OU

The remedy at the Newmark OU is protective of human health and the environment.

### Muscoy OU

The remedy at the Muscoy OU is protective of human health and the environment.

## 11. Next Review

This Site requires ongoing FYRs as long as waste is left on site that does not allow for unrestricted use and unlimited exposure. The next FYR will be due within five years of the signature date of this FYR.

# **Appendix A: List of Documents Reviewed**

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## **List of Documents Reviewed**

Consent Decree, Department of Toxic Substances Control and City of San Bernardino vs. the United States of America Department of the Army for costs incurred at the Newmark Groundwater Contamination Superfund Site, Newmark Operable Unit and Muscoy Operable Unit. March 2005.

Draft Newmark Groundwater Flow Model Report, Newmark Groundwater Contamination Superfund Site, San Bernardino, California. Stantec Consulting Corporation. November 2008.

Explanation of Significant Differences, Newmark Groundwater Contamination Superfund Site, San Bernardino, California. EPA Region 9. August 2004.

Final Operation and Maintenance Plan, Muscoy and Newmark Operable Units, City of San Bernardino Municipal Water Department, Revised September 2009.

First Five-Year Review Report for Newmark Groundwater Contamination Superfund Site, San Bernardino, California. EPA Region 9. September 2008.

Institutional Controls Groundwater Management Program Agreement, As of June 30, 2010.

Muscoy Plume Operable Unit Record of Decision, Newmark Groundwater Contamination Superfund Site, San Bernardino, California. EPA Region 9. March 1995.

Muscoy Plume Operable Unit Final Remedial Investigation/Feasibility Study, Newmark Groundwater Contamination Superfund Site, URS Consultants Inc. December 1994.

Newmark Operable Unit Record of Decision, Newmark Groundwater Contamination Superfund Site, San Bernardino, California. EPA Region 9. August 1993.

Newmark Operable Unit Remedial Investigation/Feasibility Study Report, Newmark Groundwater Contamination Superfund Site, URS Consultants Inc. March 1993.

Progress Report for Newmark Groundwater Contamination Superfund Remedial Action: Newmark OU/Muscoy OU Quarterly Report No. 42 3rd Quarter 2011. San Bernardino Municipal Water Department. November 2011.

Progress Report for Newmark Groundwater Contamination Superfund Remedial Action: Newmark OU/Muscoy OU Quarterly Report No. 43 4<sup>th</sup> Quarter 2011. San Bernardino Municipal Water Department. February 2012.

Progress Report for Newmark Groundwater Contamination Superfund Remedial Action: Newmark OU/Muscoy OU Quarterly Report No. 44 1<sup>st</sup> Semi-Annual 2012. San Bernardino Municipal Water Department. August 2012.

## **Appendix B: Press Notices**

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**EPA BEGINS SECOND REVIEW OF CLEANUP AT NEWMARK GROUNDWATER SUPERFUND SITE**

The U.S. Environmental Protection Agency (EPA) has begun a Second Five-Year Review (FYR) of the cleanup at Newmark Groundwater Superfund Site in San Bernardino, California. The review will evaluate the groundwater remedy at the site to determine if it remains protective of human health and the environment. It will also look at recommendations from the prior five-year review to determine whether they have been implemented. According to Superfund law, if a cleanup takes more than five years to complete, it will be reviewed every five years until cleanup goals are achieved.

The last FYR, conducted in 2008, found the cleanup was protective of human health and the environment. The recommendations at the time included fully implementing the institutional controls program. In 2009, the City of San Bernardino and Bunker Hill Basin water purveyors were party to a draft agreement to keep water production stable until completion of the groundwater computer model that underlies the institutional controls program. The FYR will evaluate the progress made towards completion of the groundwater model and the adoption of formal agreements that regulate municipal pumping.

During the upcoming review process, EPA will study information about the site gathered from 2008-2011, conduct facility inspections, and interview state, municipal, contractor and community representatives familiar with implementation of the remedy. The methods, findings and conclusions from the review will be documented in the FYR Report to be issued in 2013. Upon completion, a copy of the final report will be posted on EPA's website and placed in the information repositories listed below. In addition, a notice summarizing the findings and conclusions will be published in a local newspaper.

EPA invites the community to learn more about this review process and provide input to the EPA. For comments, questions, or concerns about the Newmark Groundwater Superfund Site FYR process, please contact Jackie Lane, Community Involvement Coordinator, at (415) 972-3236 or by email at [jlaney@epa.gov](mailto:jlaney@epa.gov). You can obtain further site information at EPA's website: [www.epa.gov/epaospr/superfund/newmark](http://www.epa.gov/epaospr/superfund/newmark).

Information Repositories: EPA maintains repositories containing Newmark Groundwater Superfund Site documents at four locations: 1) San Bernardino Water Department, 300 N. D St. 5<sup>th</sup> floor, S.B., CA; 2) Water District Office, 1350 South E St., S.B., CA; 3) John M. Plau Library, Cal State San Bernardino, 5500 University Pkwy., S.B., CA; and 4) Superfund Records Center, 95 Hawthorne St., S.F., CA 94105, (415) 820-4700.

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PEOPLE WATCH

**Kardashian divorce inches toward trial**



Kris Humphries and Kim Kardashian

**The Associated Press**  
LOS ANGELES — Kim Kardashian's divorce attorney told a judge Wednesday that the reality star wants to move on with her life but is "handcuffed" to her estranged husband because the case is not yet ready for trial.

Kardashian is seeking a traditional divorce and her attorney Laura Wasser has cited both the marriage's short duration and a prenuptial agreement as reasons for why it should be quickly resolved.

Superior Court Judge Stephen Moloney told attorneys for Kardashian and NBA player Kris Humphries to return to court in mid-February to set a trial date to either dissolve or annul the couple's 72-day marriage. He didn't set a deadline for depositions and other pre-trial investigation to be completed, but indicated a trial could be held early next year if it is ready by Feb. 15.

"I don't think his client has a fraud case," Wasser said in court of Humphries' attorney. "I think there's a fishing expedition going on here."

Humphries, a power forward for the Brooklyn Nets, is seeking an annulment on fraud, but his attorney says he needs more time to collect documents from companies that handle Kardashian's reality shows.

Humphries' attorney Marshall Waller said he needed to be sure he had documents from E! Entertainment and NBC Universal before deciding the scope of his case, but that he was narrowing it down.

Wasser however said that unlike in a regular divorce proceeding Kardashian cannot have her marriage dissolved and resolve other issues later. "Ms. Kardashian is now handcuffed to Mr. Humphries," she said.

Kardashian filed for divorce more than a year ago, citing irreconcilable differences just weeks after the couple's star-studded and televised wedding. Humphries later filed for an annulment, claiming the marriage was based on fraud but he has yet to lay out any specific evidence for his claim.

Wasser says Kardashian's mother, Kris Jenner, and current boyfriend, Kanye West, have been deposed in the case.

Kardashian, 32, has not yet been deposed in the case. She is the star of the E! Entertainment Television series "Keeping Up with the Kardashians," the network's top-rated show, which averaged more than 3 million viewers in its sixth season. She also appears on other series involving her family.

**Mike Tyson to take his 1-man show nationwide**

**The Associated Press**  
NEW YORK — Mike Tyson, the former champion boxer and convicted rapist, will take his one-man show "Mike Tyson: Undisputed Truth" on a three-city tour

to more than a dozen cities, including Chicago, San Francisco, Los Angeles, Detroit and Washington, D.C.

The two-hour show, directed by Spike Lee and written by Tyson's wife, Kiki, debuted in Las Vegas and

had a limited run on Broadway this summer. The tour starts in Indianapolis in February.

The show traces Iron Mike's rise from violent street hood in Brooklyn to a fearsome athlete.

TODAY IN HISTORY

- Today is the 334th day of 2012. There are 32 days left in the year.**
- In 1864,** a Colorado militia killed at least 150 peaceful Cheyenne Indians in the Sand Creek Massacre.
  - In 1947,** the U.N. General Assembly passed a resolution calling for the partitioning of Palestine between Arabs and Jews.
  - In 1961,** Enos the chimp was launched from Cape Canaveral aboard the Mercury-Atlas 5 spacecraft, which orbited earth twice before returning.
  - In 1972,** the coin-operated video arcade game Pong, created by Atari, made its debut at Andy Capp's Tavern in Sunnyvale.
  - In 1981,** actress Natalie Wood drowned in a boating accident off Santa Catalina Island at age 43.
  - In 1986,** actor Cary Grant died in Davenport, Iowa, at age 82.
  - In 2001,** George Harrison of The Beatles died in Los Angeles following a battle with cancer; he was 58.

SLICE OF WRY

- Thanks to John Forbing of Diamond Bar for today's joke:**
- Murphy's 13 other laws (first of two parts)
    - A fine is a tax for doing wrong. A tax is a fine for doing well.
    - He who laughs last, thinks slowest.
    - A day without sunshine is like ... well, night.
    - Change is inevitable, except from a vending machine.
    - Nothing is foolproof for a sufficiently talented fool.
    - The 50-50-90 rule: Anytime you have a 50-50 chance of getting something right, there's a 90 percent probability you'll get it wrong.
    - If you line up all the cars in the world end-to-end, a Californian will try to pass them.
- Have a favorite joke to share? If so, email [dickhorvath@indianapolispress.com](mailto:dickhorvath@indianapolispress.com) or send your contribution to John Winko, 4030 N. Geneva Blvd., San Bern.

TODAY'S BIRTHDAYS

- Former French President Jacques Chirac is 80. Blues singer-musician John Mayall is 79. Actress Diane Ladd is 77. Composer-musician Chuck Mangione is 72. Pop singer-musician Felix Cavaliere is 70. Olympic skier Suzy Chaffee is 66. Comedian Garry Shandling is 63. Actor Jeff Fahey is 60. Movie director Joel Coen is 58. Actor-comedian-celebrity judge Howie Mandel is 57. Homeland Security Director Janet Napolitano is 55. The mayor of Chicago, Rahm Emanuel, is 53. Actress Cathy Moriarty is 52. Actress Kim Delaney is 51. Actor Tom Sizemore is 51. Actor Andrew McCarthy is 50. Actor Don Cheadle is 48. Actress Gena Lee Nolin is 41. Actress Anna Faris is 36.



EARTHQUAKES

Taken by USGS from a 24-hour period ending at 5 p.m. Wednesday

Nearest City	Magnitude/Time
Loma Linda	2.1/4:12 a.m.
Aguanga	1.5/7:37 a.m.
Cabazon	1.4/8:25 a.m.

CALIFORNIA LOTTERY

Unofficial results for Wednesday, November 28, 2012

<b>DAILY 3</b> Afternoon: 6, 1, 1; Evening: 4, 2, 8
<b>DAILY 4</b> 2, 3, 8, 4
<b>FANTASY 5</b> 2, 10, 15, 18, 28
<b>SUPER LOTTO PLUS</b> Wednesday drawing 2, 9, 13, 21, 46; Mega number 23

2/10/12  
TDS SW  
(SAN BERNARDINO)  
11/09/12

of learning how to slow the human aging process, he added.

"The argument we are making is that somebody is going to be left behind — and I think we've identified who they are," he said.

### Black Men Die by 65 at Quadruple U.S Rate

Research team member James S. Jackson, a University of Michigan psychologist, called the education effect on longevity "startling."

"These are not small differences. These are not accidental differences," he said. "Is there something about education that you can bottle, turn into a drug, and inject everybody with? And why isn't it as protective for African Americans as it is for non-Hispanic whites?"

The benefit of education for African American males stops at 12 years, he said, and one theory is that young black men in school are safer than they are on the streets. But these men are clearly not beneficiaries of the new longevity: About 40 percent of the least-educated African American males who make it to age 25 will die before they are 65, the study found, as will 22 percent of the most-educated.

For all other groups, the chances of dying by age 65 are only 10 percent.

"It was a little bit shocking," Olshansky said. "It will be very interesting as we move forward to disentangle why this is happening."

African American women also present a puzzle when it comes to the link between obesity and education. For all other groups, higher education means lower chances of becoming obese, but "that is absolutely not true for black women," Olshansky said.

University of Texas biologist Steven N. Austad, commenting on the network's study, said any inquiry into longevity has to include work on Alzheimer's disease.

"The good news is that in the

to slow down," Austad continued, "but all the major diseases have dropped substantially in the last 10 years. Only one of the major causes of death has not dropped: Alzheimer's disease. This is one of the prices we're paying for extended longevity, and this is emerging as a huge human problem."

The terminal brain disorder, which robs sufferers of their memories and their very personalities, affects some 5.4 million people in the United States, including more than 450,000 in Florida. With the aging of the baby boomer generation, the national number is projected to climb to 16 million by 2050 — unless progress is made in the search for preventions and cures.

Barbara Peters-Smith wrote

under the county transitional assistance program are already on the agency's list to receive a gift, she added.

For food, things are much tighter this time around. Last year, CAP provided a total of 15,344 holiday baskets and meals during Thanksgiving and Christmas and worked with 128 nonprofits to get 367,808 pounds of food out to the community.

This year, she only has about 5,160 food baskets and meals on

*this article for the Sarasota Herald-Tribune as a John A. Hartford Foundation Journalists in Aging Fellow, a collaboration of the MetLife Foundation, New America Media and the Gerontological Society of America.*



### EPA BEGINS SECOND REVIEW OF CLEANUP AT NEWMARK GROUNDWATER SUPERFUND SITE

The U.S. Environmental Protection Agency (EPA) has begun a Second Five-Year Review (FYR) of the cleanup at Newmark Groundwater Superfund Site in San Bernardino, California. The review will evaluate the groundwater remedy at the site to determine if it remains protective of human health and the environment. It will also look at recommendations from the prior five-year review to determine whether they have been implemented. According to Superfund law, if a cleanup takes more than five years to complete, it will be reviewed every five years until cleanup goals are achieved.

The last FYR, conducted in 2008, found the cleanup was protective of human health and the environment. The recommendations at the time included fully implementing the institutional controls program. In 2008, the City of San Bernardino and Bunker Hill Basin water purveyors were party to a draft agreement to keep water production stable until completion of the groundwater computer model that underlies the institutional controls program. The FYR will evaluate the progress made towards completion of the groundwater model and the adoption of formal agreements that regulate municipal pumping.

During the upcoming review process, EPA will study information about the site gathered from 2008-2013, conduct facility inspections, and interview state, municipal, contractor and community representatives familiar with implementation of the remedy. The methods, findings and conclusions from the review will be documented in the FYR Report to be issued in 2013. Upon completion, a copy of the final report will be posted on EPA's website and placed in the information repositories listed below. In addition, a notice summarizing the findings and conclusions will be published in a local newspaper.

EPA invites the community to learn more about this review process and provide input to the EPA. For comments, questions, or concerns about the Newmark Groundwater Superfund Site FYR process, please contact Jackie Lane, Community Involvement Coordinator, at (415) 972-3236 or by email at [jackie@epa.gov](mailto:jackie@epa.gov). You can obtain further site information at EPA's website: [www.epa.gov/region09/Newmark](http://www.epa.gov/region09/Newmark)

Information Repositories: EPA maintains repositories containing Newmark Groundwater Superfund Site documents at four locations: 1) San Bernardino Water Department, 300 N. D St. 5<sup>th</sup> floor, S.B., CA; 2) Water District Office, 1350 South E St., S.B., CA; 3) John M. Pfau Library, Cal-State San Bernardino, 5500 University Pkwy., S.B., CA; and 4) Superfund Records Center, 95 Hawthorne St., S.F., CA 94105, (415) 820-4700.

CNS#2409601

2409601  
PRECINCT  
REPORTER  
11/29/12



## **Appendix C: Interview Forms**

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# Interview Forms

Five-Year Review Interview Record			
<b>Site:</b> Newmark Groundwater Contamination Superfund Site	<b>EPA ID No:</b> CAD981434517		
<b>Interview Type:</b> Visit      X			
<b>Location of Visit:</b> City of San Bernardino Municipal Water Department (SBMWD) Offices 300 North D Street, San Bernardino, California 92418			
<b>Date:</b> 12/12/2012 <b>Time:</b> 2:00 PM			
<b>Interviewer:</b> Richard Garrison, Aaron King	<b>Title:</b> Geologist, Environmental Engineer	<b>Organization:</b> USACE	
Individual Contacted			
<b>Name:</b> Matt Litchfield, Mark Eisen	<b>Title:</b> Director of Water Utilities, Principal Hydrogeologist	<b>Organization:</b> SBMWD, Stantec Consulting	
<b>Telephone:</b> (909) 384-5107, (805) 719-9338			
Summary of Conversation			
1) What is your overall impression of the project (general sentiment)?  <b>It's working very well. The basin is cleaning up. Obligations laid out in the Consent Decree are being met. Operators have done a fine job operating the system.</b>			
2) What is your current role and your agency's role with respect to the site?  <b>Matt Litchfield- Director of Water Utilities, in charge of all aspects of the project from SBMWD perspective</b>  <b>Mark Eisen- Contractor for the City, Principal Hydrogeologist, Professional expert, Prepares progress reports, groundwater model</b>			
3) Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give the purpose and results.  <b>Yes. Every site (treatment facility) is visited at least twice a day by operators. Some sites have remote operations, SCADA, and electronic logbooks. Routine meetings are held to discuss the operation by conference call as it relates to the Consent Decree.</b>			
4) Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and the results of the responses.  <b>No noise or traffic complaints.</b>			
5) Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.  <b>Vandalism occurs occasionally, but O&amp;M crew carries paint with them to cover vandalism when observed. There was occasional trespassing at the 19th Street plant, but not since new security measures were installed. These measures included three-strand barbed wire, an infrared trip beam system, intrusion alarms, and security cameras.</b>			
6) Is the remedy functioning as expected? How well is the remedy performing?			

**Yes. The remedy is performing very well; however, there are always challenges. The Newmark remedy has been working well, but the Muscoy remedy has more uncertainty for a couple of reasons. First, there was pre-existing contamination at the downgradient performance monitoring wells. Second, the hydrostratigraphy in the Muscoy area is more complex, with more interbedded, fine-grained units. However, the City now has a better understanding of site hydrostratigraphy and contaminant mass locations and is taking steps to focus extraction efforts in shallower areas of the Muscoy plume where more efficient contaminant removal can be achieved.**

7) What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?

**Refer to the trend analysis in the last progress report. Overall, concentrations in upgradient wells and those on the Newmark side are decreasing. On the Newmark side, concentrations are all wells except EPA 108S and EPA 001 are below MCLs. EPA 004 has cleaned up, and other wells have decreasing trends. On the Muscoy side, concentrations are generally pretty stable, but are decreasing in some places.**

8) Is there a continuous on-site O&M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspection and activities.

**Yes. Operations staff visits facilities at least twice a day. Water quality sampling occurs 2-3 times per week. The facilities are SCADA operated. The system notifies the SBMWD offices when there is a problem, whether it be an operational or security issue.**

9) What are the annual O&M costs for your organization's involvement at the site?

**Mr. Litchfield provided the O&M costs at a later date.**

10) Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness of the remedy? Please describe changes and impacts.

**Not since the last five-year review. The only change has been the reporting frequency, which is now semi-annual rather than quarterly. This change does not affect the protectiveness of the remedy.**

11) Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.

**Capturing shallow groundwater on the Muscoy side was an unexpected difficulty. Shallow extraction well EPA-108S was installed. The installation of other shallow wells and/or packer systems to focus extraction in the contaminated shallow zone is being considered.**

12) Have there been opportunities to optimize O&M or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.

**In addition to those described previously, SBMWD is working on a contract with a new carbon supplier that will save roughly \$0.40/lb of carbon (carbon is the highest O&M cost). Also, SBMWD may consider changing the variable frequency drives (VFD) on the extraction well pump motors to direct drives; VFD's are more costly from an O&M standpoint, and aren't needed at this site.**

13) What effects have site operations had on the surrounding community?

**The water supply has been maintained under contaminated conditions and the aquifer is cleaning up. There have been no community complaints.**

14) Are you aware of any community concerns regarding the site or its operation and administration? If so, please summarize the concerns.

**No noise or traffic complaints.**

15) Are you aware of any changes in Federal/State/County/Local laws and regulations that may impact the protectiveness of the site?

**No.**

16) Do you have any comments, suggestions, or recommendations regarding the site's management, operation, or any other aspects of

the site?

**No.**

## Five-Year Review Interview Record

<b>Site:</b> Newmark Groundwater Contamination Superfund Site		<b>EPA ID No:</b> CAD981434517	
<b>Interview Type:</b>		Visit    X	
<b>Location of Visit:</b>		935 N Waterman Avenue San Bernardino, CA	
<b>Date:</b>	12/13/2012	<b>Time:</b>	12:30 PM
<b>Interviewer:</b>	Aaron King	<b>Title:</b>	Environmental Engineer
		<b>Organization:</b>	USACE
<b>Individual Contacted</b>			
<b>Name:</b>	Stephen Niou	<b>Title:</b>	RPM
		<b>Organization:</b>	California Department of Toxic Substances Control
<b>Telephone:</b>			
<b>Summary of Conversation</b>			
<p>1) What is your overall impression of the project (general sentiment)?</p> <p><b>Everything is going smoothly and according to the Consent Decree.</b></p> <p>2) What is your current role and your agency's role with respect to the site?</p> <p><b>RPM for DTSC. DTSC conducts oversight of O&amp;M activities.</b></p> <p>3) Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give the purpose and results.</p> <p><b>Yes. O&amp;M inspections occur at least once annually.</b></p> <p>4) Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and the results of the responses.</p> <p><b>No.</b></p> <p>5) Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.</p> <p><b>Occasional vandalism.</b></p> <p>6) Is the remedy functioning as expected? How well is the remedy performing?</p> <p><b>The remedy is performing great.</b></p> <p>7) What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?</p> <p><b>Data show decreasing trends.</b></p> <p>8) Is there a continuous on-site O&amp;M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspection and activities.</p>			

**Yes. City of San Bernardino Municipal Water Department provides a continuous presence. For DTSC, there is no continuous staff or activities.**

9) Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness of the remedy? Please describe changes and impacts.

**No. SBMWD follows their O&M manual. Changes to the O&M manual require DTSC and EPA approval.**

10) Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.

**No.**

11) Have there been opportunities to optimize O&M or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.

**Yes. The City has and continues to optimize the system; they take care of everything in that regard. For example, the City is looking into installing more shallow wells to better capture some contamination.**

12) What effects have site operations had on the surrounding community?

**Benefits the community. The community gets clean water. Parks were installed near some plant/extraction well locations, though they have since been removed due to vandalism.**

13) Are you aware of any community concerns regarding the site or its operation and administration? If so, please summarize the concerns.

**No.**

14) Do you feel well informed about the site's activities and progress?

**Yes.**

15) Are you aware of any changes in Federal/State/County/Local laws and regulations that may impact the protectiveness of the site?

**No.**

16) Do you have any comments, suggestions, or recommendations regarding the site's management, operation, or any other aspects of the site?

**No.**

## Five-Year Review Interview Record

<b>Site:</b> Newmark Groundwater Contamination Superfund Site		<b>EPA ID No:</b> CAD981434517	
<b>Interview Type:</b> Visit X			
<b>Location of Visit:</b> 935 N Waterman Avenue San Bernardino, CA			
<b>Date:</b> 12/13/2012		<b>Time:</b> 12:30 PM	
<b>Interviewer:</b>	Richard Garrison	<b>Title:</b>	Geologist
<b>Organization:</b>	USACE		
<b>Individual Contacted</b>			
<b>Name:</b>	Thomas Beer	<b>Title:</b>	Senior Chemist/Project Manager
<b>Organization:</b>	ITSI Gilbane		
<b>Telephone:</b>	(925) 260-8695		
<b>Summary of Conversation</b>			
<p>1) What is your overall impression of the project (general sentiment)?</p> <p><b>The sampling program is a smooth cog in the process. He agrees with EPA's remedial approach</b></p> <p>2) What is your current role and your agency's role with respect to the site?</p> <p><b>Contractor Program Manager; ITSI is a RAC 2 contractor to EPA</b></p> <p>3) Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give the purpose and results.</p> <p><b>Approximately monthly communications with EPA; approximately weekly and on site meetings with EPA during the field sampling period</b></p> <p>4) Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.</p> <p><b>He does notice and reports vandalism, as needed.</b></p> <p>5) What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?</p> <p><b>Monitoring data shows decreasing trends primarily due to flushing/dilution. PCE in Well CJ-10, for instance, has gone from 36 ppb to 22 ppb. Though groundwater recharge pushes the contaminant level up, again. Significant groundwater elevations changes are due to storm events.</b></p> <p>6) Are you aware of any community concerns regarding the site or its operation and administration? If so, please summarize the concerns.</p> <p><b>Not aware of any community concerns</b></p>			

7) Do you feel well informed about the site's activities and progress?

**Yes**

8) Are you aware of any changes in Federal/State/County/Local laws and regulations that may impact the protectiveness of the site?

**Not aware of any changes that would affect this project.**

9) Do you have any comments, suggestions, or recommendations regarding the site's management, operation, or any other aspects of the site?

**A. Recommends another well constructed near well CJ-10 to better define the limits of high levels of contamination in CJ-10. There is no well laterally southwest, and the nearest well down gradient is about 800 feet away.**

**B. EPA should recommend in-situ remedies when the Feasibility Report is written.**

**C. Care is needed when contouring the plume - it seems the hotter the contaminants; the narrower the contours suggesting that the higher contamination falls off quickly, though that may not be the case.**

## Five-Year Review Interview Record

<b>Site:</b> Newmark Groundwater Contamination Superfund Site	<b>EPA ID No:</b> CAD981434517
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**Interview Type:** Telephone    X

**Location of Visit:** N/A

**Date:** 1/31/2012    **Time:** 10:00 AM

<b>Interviewer:</b> Aaron King	<b>Title:</b> Environmental Engineer	<b>Organization:</b> USACE
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### Individual Contacted

<b>Name:</b> Brenda Romero Sean McCarthy	<b>Title:</b> District Engineer	<b>Organization:</b> California Department of Public Health
<b>Telephone:</b> (909) 383-6029		

### Summary of Conversation

1) What is your overall impression of the project (general sentiment)?

**Been involved with the City for a number of years. The City has been in compliance. The remedy has performed well and all the drinking water standards have been met.**

2) What is your current role and your agency's role with respect to the site?

**Regulatory agency for all public water utilities; permitting and oversight.**

3) Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give the purpose and results.

**Yes. City sends monthly treatment plant reports. In addition, CDPH completed a sanitary survey of the SBMWD system and found no deficiencies.**

4) Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and the results of the responses.

**No violations that have required a response. No complaints.**

5) Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

No.

6) Is the remedy functioning as expected? How well is the remedy performing?

**Yes. The remedy is functioning as expected. Non-detect values for PCE and TCE in the plant effluent. Low-levels of PCE and TCE in the combined influent.**

7) What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?

**Compared to October 2010 combined influent data, the combined influent concentrations of PCE and TCE have generally decreased.**

8) Is there a continuous on-site O&M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspection and activities.

**No continuous on-site staff. SBMWD staff makes regular visits to the site to take grab samples.**

9) Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness of the remedy? Please describe changes and impacts.

**No changes have been made.**

10) What effects have site operations had on the surrounding community?

**The remedy protects the City's other supply wells. No new VOC contamination has been detected.**

11) Are you aware of any community concerns regarding the site or its operation and administration? If so, please summarize the concerns.

No.

12) Do you feel well informed about the site's activities and progress?

**Yes. SBMWD provides monthly treatment reports. CDPH and SBMWD meet on a regular basis.**

13) Are you aware of any changes in Federal/State/County/Local laws and regulations that may impact the protectiveness of the site?

No.

14) Do you have any comments, suggestions, or recommendations regarding the site's management, operation, or any other aspects of the site?

No.

# **Appendix D: Site Inspection Checklist**

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## Site Inspection Checklist

<b>I. SITE INFORMATION</b>																	
<b>Site name:</b> Newmark Groundwater Contamination Superfund Site	<b>Date of inspection:</b> 12 Dec 2012- 13 Dec 2012																
<b>Location:</b> San Bernardino, CA	<b>EPA ID:</b> CAD981434517																
<b>Agency, office, or company leading the five-year review:</b> USACE Seattle District	<b>Weather/temperature:</b> Mild and sunny (12 Dec 2012); cool and rainy (13 Dec 2012)																
<b>Remedy Includes:</b> (Check all that apply) <table style="width: 100%; margin-top: 10px;"> <tr> <td><input type="checkbox"/> Landfill cover/containment</td> <td><input type="checkbox"/> Monitored natural attenuation</td> </tr> <tr> <td><input checked="" type="checkbox"/> Access controls</td> <td><input type="checkbox"/> Groundwater containment</td> </tr> <tr> <td><input checked="" type="checkbox"/> Institutional controls</td> <td><input type="checkbox"/> Vertical barrier walls</td> </tr> <tr> <td><input checked="" type="checkbox"/> Groundwater pump and treatment</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Surface water collection and treatment</td> <td></td> </tr> <tr> <td colspan="2"><input type="checkbox"/> Other: _____</td> </tr> </table>		<input type="checkbox"/> Landfill cover/containment	<input type="checkbox"/> Monitored natural attenuation	<input checked="" type="checkbox"/> Access controls	<input type="checkbox"/> Groundwater containment	<input checked="" type="checkbox"/> Institutional controls	<input type="checkbox"/> Vertical barrier walls	<input checked="" type="checkbox"/> Groundwater pump and treatment		<input type="checkbox"/> Surface water collection and treatment		<input type="checkbox"/> Other: _____					
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<input type="checkbox"/> Surface water collection and treatment																	
<input type="checkbox"/> Other: _____																	
<b>Attachments:</b> <input type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached																	
<b>II. INTERVIEWS</b> (Check all that apply) <i>Interviews will be provided separately.</i>																	
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">1. <b>O&amp;M site manager</b></td> <td style="width: 30%;"><b>Mike Garland</b></td> <td style="width: 20%;">Operations Manager</td> <td style="width: 20%;">12 December 2012</td> </tr> <tr> <td></td> <td style="text-align: center;">Name</td> <td style="text-align: center;">Title</td> <td style="text-align: center;">Date</td> </tr> <tr> <td colspan="4" style="padding-top: 10px;">           Interviewed <input checked="" type="checkbox"/> at site   <input type="checkbox"/> at office   <input type="checkbox"/> by phone    Phone no. 909-379-2618         </td> </tr> <tr> <td colspan="4" style="padding-top: 10px;">           Problems, suggestions; <input type="checkbox"/> Report attached; Mike has a T5 Treatment Officer certification, and a D5 Distribution Operator certificate. Four years as Operations Manager for SBMWD.         </td> </tr> </table>		1. <b>O&amp;M site manager</b>	<b>Mike Garland</b>	Operations Manager	12 December 2012		Name	Title	Date	Interviewed <input checked="" type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone    Phone no. 909-379-2618				Problems, suggestions; <input type="checkbox"/> Report attached; Mike has a T5 Treatment Officer certification, and a D5 Distribution Operator certificate. Four years as Operations Manager for SBMWD.			
1. <b>O&amp;M site manager</b>	<b>Mike Garland</b>	Operations Manager	12 December 2012														
	Name	Title	Date														
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Problems, suggestions; <input type="checkbox"/> Report attached; Mike has a T5 Treatment Officer certification, and a D5 Distribution Operator certificate. Four years as Operations Manager for SBMWD.																	

2. **Treatment System Director** **Matthew Litchfield, P.E.** Water Utility Director (SBMWD) 12 Dec2012

Name Title Date

Interviewed  at site  at office  by phone Phone no. 909-379-5107

Problems, suggestions;  Report attached \_\_\_\_\_

\_\_\_\_\_

3. **Treatment System Contractor** **Mark Eisen** Stantec Hydrogeologist 12 Dec2012

Name Title Date

Interviewed  at site  at office  by phone Phone no.

Problems, suggestions;  Report attached

Mr. Eisen provides technical support to SBMWD; revising the groundwater model and report

4. **Groundwater Sampling Contractor** **Thomas Beer** ITSI Gilbane Project Chemist 13 Dec 2012

Name Title Date

Interviewed  at site  at office  by phone **Phone no.**

Problems, suggestions;  Report attached

Mr. Beer is Senior Chemist and Project Manager of ITSI's groundwater sampling program in the Source Investigation Area.

5. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency: **California Department of Toxic Substance Control**

Contact: **Stephen Niou** RPM 12 Dec 2012-13 Dec 2012

Name Title Date Phone no.

Problems; suggestions;  Report attached \_\_\_\_\_

\_\_\_\_\_

Agency: **California Department of Public Health**

Contact: **Brenda Romero** 909-383-6029

Name Title Date Phone no.

Problems; suggestions;  Report attached \_\_\_\_\_

\_\_\_\_\_

Agency **California Department of Public Health**

Contact **Sean McCarthy** 909-383-4328

Name Title Date Phone no.

Problems; suggestions;  Report attached \_\_\_\_\_

\_\_\_\_\_

Agency \_\_\_\_\_

Contact \_\_\_\_\_

Name Title Date Phone no.

Problems; suggestions;  Report attached \_\_\_\_\_

\_\_\_\_\_

**III. ON-SITE DOCUMENTS & RECORDS VERIFIED** (Check all that apply)

**1. O&M Documents**

- |   |   |  |                              |
|---|---|--|------------------------------|
| <input checked="" type="checkbox"/> O&M manual        | <input checked="" type="checkbox"/> Readily available | <input checked="" type="checkbox"/> Up to date | <input type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> As-built drawings | <input checked="" type="checkbox"/> Readily available | <input checked="" type="checkbox"/> Up to date | <input type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Maintenance logs  | <input checked="" type="checkbox"/> Readily available | <input checked="" type="checkbox"/> Up to date | <input type="checkbox"/> N/A |

Remarks: On file at Water Department office

**2. Site-Specific Health and Safety Plan**       Readily available     Up to date     N/A

- Contingency plan/emergency response plan     Readily available     Up to date     N/A

Remarks: at Water Department office; Emergency response procedures updated in 2010. Cal Accidental Release & Prevention, and Chlorine SOP are at the treatment sites.

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**3. O&M and OSHA Training Records**       Readily available       Up to date       N/A

Remarks: Chlorine spill response training about once per year; task training for each discipline, as required.

**4. Permits and Service Agreements**

- |   |   |  |   |
|---|---|--|---|
| <input type="checkbox"/> Air discharge permit                   | <input type="checkbox"/> Readily available            | <input type="checkbox"/> Up to date            | <input checked="" type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Effluent discharge          | <input checked="" type="checkbox"/> Readily available | <input checked="" type="checkbox"/> Up to date | <input type="checkbox"/> N/A            |
| <input type="checkbox"/> Waste disposal, POTW                   | <input type="checkbox"/> Readily available            | <input type="checkbox"/> Up to date            | <input checked="" type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Other permits: NPDES permit | <input checked="" type="checkbox"/> Readily available | <input checked="" type="checkbox"/> Up to date | <input type="checkbox"/> N/A            |

Remarks: GAC backwash discharged to storm drain.

**5. Gas Generation Records**       Readily available       Up to date       N/A

Remarks \_\_\_\_\_  
 \_\_\_\_\_

6.	<b>Settlement Monument Records</b>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks _____ _____				
7.	<b>Groundwater Monitoring Records</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: Reported semi-annually; many wells are remotely instrumented for groundwater elevations and validated monthly.				
8.	<b>Leachate Extraction Records</b>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks _____ _____				
9.	<b>Discharge Compliance Records</b>			
	<input type="checkbox"/> Air	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Water (effluent)	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks _____ _____				
10.	<b>Daily Access/Security Logs</b>	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: At each site – daily logs describing conditions, tank levels, pressure readings, and chlorine residuals.				
<b>IV. O&amp;M COSTS</b>				
1.	<b>O&amp;M Organization</b>			
	<input type="checkbox"/> State in-house	<input type="checkbox"/> Contractor for State		
	<input type="checkbox"/> PRP in-house	<input type="checkbox"/> Contractor for PRP		
	<input type="checkbox"/> Federal Facility in-house	<input type="checkbox"/> Contractor for Federal Facility		
	<input checked="" type="checkbox"/> Other: SBMWD operates the extraction wells and treatment facilities. EPA monitors wells in the Source Investigation Area.			

2. **O&M Cost Records**

Readily available       Up to date

Funding mechanism/agreement in place

Original O&M cost estimate      Not available       Breakdown attached

Total annual cost by year for review period if available

From	<u>July 2010</u>	To	<u>June 2011</u>	<u>\$1,900,000</u>	<input checked="" type="checkbox"/> Breakdown attached
	Date		Date	Total cost	
From	<u>July 2011</u>	To	<u>June 2012</u>	<u>\$1,400,000</u>	<input checked="" type="checkbox"/> Breakdown attached
	Date		Date	Total cost	

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3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: No unusual or unanticipated O&M costs.

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**V. ACCESS AND INSTITUTIONAL CONTROLS**     Applicable     N/A

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**A. Fencing**

1. **Fencing damaged**       Location shown on site map       Gates secured       N/A

Remarks:

---

**B. Other Access Restrictions**

1. **Signs and other security measures**       Location shown on site map       N/A

Remarks: Signs identifying water plants/wells as part of EPA Newmark system are present. Motion sensors with remote alarm at 19<sup>th</sup> St. and North plants. Barbed wire added atop fence at 19<sup>th</sup> St. plant.

**C. Institutional Controls (ICs)** *Institutional controls in the form of deed restriction is not part of the remedy.*

**1. Implementation and enforcement**

Site conditions imply ICs not properly implemented  Yes  No  N/A

Site conditions imply ICs not being fully enforced  Yes  No  N/A

Type of monitoring (*e.g.*, self-reporting, drive by) SBMWD personnel visits each plant twice per day.

Responsible party/agency SBMWD

Contact : Mike Garland Operations Manager, SBMWD 12/12/12 909-397-2618

Name	Title	Date	Phone no.
------	-------	------	-----------

Reporting is up-to-date  Yes  No  N/A

Reports are verified by the lead agency  Yes  No  N/A

Specific requirements in deed or decision documents have been met  Yes  No  N/A

Violations have been reported  Yes  No  N/A

Other problems or suggestions:  Report attached

**2. Adequacy**  ICs are adequate  ICs are inadequate  N/A

Remarks:

**D. General**

**1. Vandalism/Trespassing**  Location Shown On Site Map  No Vandalism Evident

Remarks: At 19<sup>th</sup> Street Plant, Barbed Wire Added Along Top Of Perimeter Wall Following Evidence Of Trespassing In 2011. Infrared Motion Sensors In Place At 19<sup>th</sup> St. And At North Plants. At EPA-108 site, table and playground equipment were removed due to illicit activities and liability.

**2. Land use changes on site**  N/A

Remarks:

3.	<b>Land use changes off site</b> <input checked="" type="checkbox"/> N/A
	Remarks:
<b>VI. GENERAL SITE CONDITIONS</b>	
<b>A. Roads</b>	<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A
1.	<b>Roads damaged</b> <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Roads adequate <input type="checkbox"/> N/A
	Remarks _____ _____
<b>B. Other Site Conditions</b>	
<b>VII. LANDFILL COVERS</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
<b>VIII. VERTICAL BARRIER WALLS</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	

<b>IX. GROUNDWATER/SURFACE WATER REMEDIES</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A	
<u>The groundwater treatment in the ROD required the installation of GAC systems to treat the water supply wells used by the SBMWD. The ROD assumed that these systems would not only provide clean water (below MCLs for PCE and TCE) but also contribute to the remediation of the contaminated aquifer.</u>	
<b>A. Groundwater Extraction Wells, Pumps, and Pipelines</b>	<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A

1.	<p><b>Pumps, Wellhead Plumbing, and Electrical</b></p> <p><input checked="" type="checkbox"/> Good condition      <input checked="" type="checkbox"/> All required wells properly operating    <input type="checkbox"/> Needs Maintenance G N/A</p> <p>Remarks: Only observed wells at 19<sup>th</sup> St. and North plants, and EPA-108.</p>
2.	<p><b>Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b></p> <p><input checked="" type="checkbox"/> Good condition      <input type="checkbox"/> Needs Maintenance</p> <p>Remarks _____</p> <p>_____</p>
3.	<p><b>Spare Parts and Equipment</b></p> <p><input checked="" type="checkbox"/> Readily available      <input type="checkbox"/> Good condition    <input type="checkbox"/> Requires upgrade    <input type="checkbox"/> Needs to be provided</p> <p>Remarks: 6", 8", and 10" column well pipe in stock, plus spare electric motors</p>
<p><b>B. Surface Water Collection Structures, Pumps, and Pipelines</b>      <input type="checkbox"/> Applicable    <input checked="" type="checkbox"/> N/A</p>	
1.	<p><b>Collection Structures, Pumps, and Electrical</b></p> <p><input type="checkbox"/> Good condition      <input type="checkbox"/> Needs Maintenance</p> <p>Remarks _____</p> <p>_____</p>
2.	<p><b>Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b></p> <p><input type="checkbox"/> Good condition      <input type="checkbox"/> Needs Maintenance</p> <p>Remarks _____</p> <p>_____</p>
3.	<p><b>Spare Parts and Equipment</b></p> <p><input type="checkbox"/> Readily available      <input type="checkbox"/> Good condition    <input type="checkbox"/> Requires upgrade    <input type="checkbox"/> Needs to be provided</p> <p>Remarks _____</p> <p>_____</p>

**C. Treatment System**

Applicable     N/A

1. **Treatment Train** (Check components that apply)

- Metals removal                       Oil/water separation                       Bioremediation
- Air stripping                               Carbon adsorbers
- Filters \_\_\_\_\_
- Additive (e.g., chelation agent, flocculent) Stopped using poly phosphate in air strippers. Chlorine added to the GAC treated groundwater prior to discharging into the distribution system.
- Others \_\_\_\_\_
- Good condition                       Needs Maintenance
- Sampling ports properly marked and functional
- Sampling/maintenance log displayed and up to date
- Equipment properly identified
- Quantity of groundwater treated monthly 1,800-2,100 acre-ft
- Quantity of surface water treated annually \_\_\_\_\_

Remarks: Four treatment systems; three of them active. Influent groundwater treated through lead & lag tanks filled with GAC. Effluent is treated with chlorine before distribution to city reservoirs. During period of high demand (mid-summer), when GAC system is at capacity, excess groundwater is treated with air strippers that were left over from the original treatment plan by the State before EPA developed the ROD, but the air strippers are not part of this remedy.

2. **Electrical Enclosures and Panels** (properly rated and functional)

- N/A                       Good condition                       Needs Maintenance

Remarks \_\_\_\_\_  
\_\_\_\_\_

3. **Tanks, Vaults, Storage Vessels**

- N/A                       Good condition                       Proper secondary containment                       Needs Maintenance

Remarks \_\_\_\_\_  
\_\_\_\_\_

4.	<p><b>Discharge Structure and Appurtenances</b></p> <p> <input type="checkbox"/> N/A      <input checked="" type="checkbox"/> Good condition      <input type="checkbox"/> Needs Maintenance </p> <p>Remarks _____</p> <p>_____</p>
5.	<p><b>Treatment Building(s)</b></p> <p> <input type="checkbox"/> N/A      <input checked="" type="checkbox"/> Good condition (esp. roof and doorways)      <input type="checkbox"/> Needs repair </p> <p><input checked="" type="checkbox"/> Chemicals and equipment properly stored</p> <p>Remarks:</p>
6.	<p><b>Monitoring Wells</b> (pump and treatment remedy)</p> <p> <input checked="" type="checkbox"/> Properly secured/locked      <input checked="" type="checkbox"/> Functioning      <input checked="" type="checkbox"/> Routinely sampled      <input checked="" type="checkbox"/> Good condition </p> <p> <input type="checkbox"/> All required wells located      <input type="checkbox"/> Needs Maintenance      <input type="checkbox"/> N/A </p> <p>Remarks: Due to the extent of the site and number of wells, only a few wells were checked and found in good condition. All wells are flush mounts with locking vault lid. Solar panels, where used, are mounted about 20 feet high and have not been stolen or vandalized.</p>
<b>D. Monitoring Data</b>	
1.	<p>Monitoring Data</p> <p> <input checked="" type="checkbox"/> Is routinely submitted on time      <input checked="" type="checkbox"/> Is of acceptable quality </p>
2.	<p>Monitoring data suggests:</p> <p> <input checked="" type="checkbox"/> Groundwater plume is effectively contained      <input checked="" type="checkbox"/> Contaminant concentrations are declining </p> <p><u>Contaminant concentrations are declining in some locations; but not others.</u></p>

<b>D. Source Investigation Area</b>	
1.	<p><b>Monitoring Wells (Source IA)</b></p> <p> <input checked="" type="checkbox"/> Properly secured/locked      <input checked="" type="checkbox"/> Functioning    <input checked="" type="checkbox"/> Routinely sampled      <input checked="" type="checkbox"/> Good condition  <input type="checkbox"/> All required wells located      <input type="checkbox"/> Needs Maintenance      <input type="checkbox"/> N/A </p> <p>Remarks: Mix of flush mount and stand up wells. Well CJ-07 was vandalized two weeks prior to our visit, though this well was not visited and is not part of the Source Investigation Area monitoring program at this time.</p>
<b>X. OTHER REMEDIES</b>	
<p>If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.</p>	
<b>XI. OVERALL OBSERVATIONS</b>	
<b>A.</b>	<b>Implementation of the Remedy</b>
<p>Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).</p> <p><u>See Five-Year Review Report.</u></p>	
<b>B.</b>	<b>Adequacy of O&amp;M</b>
<p>Describe issues and observations related to the implementation and scope of O&amp;M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.</p> <p><u>O&amp;M practices are good and effective.</u></p>	
<b>C.</b>	<b>Early Indicators of Potential Remedy Problems</b>
<p>Describe issues and observations such as unexpected changes in the cost or scope of O&amp;M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.</p> <p><u>There were no early indicators of potential remedy problems.</u></p>	
<b>D.</b>	<b>Opportunities for Optimization</b>

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

SBMWD has and is continuing to take steps to focus extraction efforts in the Muscoy plume area to more efficiently capture contaminant mass. Shallow extraction well EPA-108S was installed for this purpose. SBMWD is in the process of installing and testing a packer in EPA-111 to isolate and capture only the contaminated waters, and will perform the same task on EPA-110.

SBMWD is working on a contract with a new carbon supplier that will save roughly \$0.40/lb of carbon. Carbon is the highest O&M cost.

The VFDs on some of the extraction well pump motors may be changed to direct drives. The VFDs are more costly from an O&M standpoint, and demand for water has not been variable enough to justify the need for VFDs.

**City of San Bernardino Municipal Water Department**

*Policy Number 778-3901*

**AIG Annual O&M Cost Breakdown**

*Period Covered: FY 10-11 (7/1/10 - 6/30/11)*

<b>Task No.</b>	<b>Task Name</b>	<b>Amount</b>
<b>1.0</b>	<b>Analytical (e.g., lab costs):</b>	<b>91,221.75</b>
1.1	Newmark Plume	51,248.50
1.2	Muscoy Plume	39,973.25
<b>2.0</b>	<b>Materials (e.g., treatment chemicals, cap materials):</b>	<b>539,880.00</b>
2.1	Newmark Plume	245,400.00
2.2	Muscoy Plume	294,480.00
<b>3.0</b>	<b>Oversight (e.g., project management):</b>	<b>163,905.20</b>
3.1	In-house Labor and Equipment	17,567.74
3.2	Subcontractor Charges	146,337.46
<b>4.0</b>	<b>Monitoring (e.g., groundwater sampling):</b>	<b>125,648.84</b>
4.1	Sitewide Monitoring	125,648.84
4.2	Groundwater Modeling	-
<b>5.0</b>	<b>Utilities (e.g., electric, gas, phone, water):</b>	<b>362,086.48</b>
5.1	Newmark Plume	108,121.54
5.2	Muscoy Plume	253,964.94
<b>6.0</b>	<b>IC's (e.g., implementation and enforcement):</b>	<b>544,112.98</b>
6.1	Newmark Plume	274,104.70
6.2	Muscoy Plume	270,008.28
<b>7.0</b>	<b>Other (e.g., capital improvements, equipment repairs):</b>	<b>101,308.09</b>
7.1	Newmark Plume	43,156.30
7.2	Muscoy Plume	58,151.79
	<b>TOTAL</b>	<b>1,928,163.34</b>

## City of San Bernardino Municipal Water Department

*Policy Number 778-3901*

### AIG Annual O&M Cost Breakdown

*Period Covered: FY 11-12 (7/1/11 - 6/30/12)*

Task No.	Task Name	Amount
<b>1.0</b>	<b>Analytical (e.g., lab costs):</b>	<b>105,152.35</b>
1.1	Newmark Plume	55,331.65
1.2	Muscoy Plume	49,820.70
<b>2.0</b>	<b>Materials (e.g., treatment chemicals, cap materials):</b>	<b>130,880.00</b>
2.1	Newmark Plume	130,880.00
2.2	Muscoy Plume	-
<b>3.0</b>	<b>Oversight (e.g., project management):</b>	<b>22,228.77</b>
3.1	In-house Labor and Equipment	10,025.02
3.2	Subcontractor Charges	12,203.75
<b>4.0</b>	<b>Monitoring (e.g., groundwater sampling):</b>	<b>129,628.44</b>
4.1	Sitewide Monitoring	129,628.44
4.2	Groundwater Modeling	-
<b>5.0</b>	<b>Utilities (e.g., electric, gas, phone, water):</b>	<b>326,940.84</b>
5.1	Newmark Plume	109,881.72
5.2	Muscoy Plume	217,059.12
<b>6.0</b>	<b>IC's (e.g., implementation and enforcement):</b>	<b>413,558.94</b>
6.1	Newmark Plume	222,548.29
6.2	Muscoy Plume	191,010.65
<b>7.0</b>	<b>Other (e.g., capital improvements, equipment repairs):</b>	<b>272,279.40</b>
7.1	Newmark Plume	92,238.09
7.2	Muscoy Plume	180,041.31
	<b>TOTAL</b>	<b>1,400,668.74</b>

# **Appendix E: Site Inspection Report with Photographs**

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## Site Inspection Report with Photographs

### SITE INSPECTION TRIP REPORT

NEWMARK SUPERFUND SITE, SAN BERNARDINO, CA  
(EPA ID: CAD981434517)

#### Attendees

##### USACE:

Richard Garrison	Geologist	(206) 764-3312
Aaron King	Environmental Engineer	(206) 764-6744

##### USEPA:

Zi Zi Searles	Remedial Project Manager	(415) 972-3178
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##### City of San Bernardino Municipal Water Department:

Matthew Litchfield	Director	(909) 384-5107
Michael Garland	Operations Superintendent	(949) 384-5087

##### Stantec:

Mark Eisen	Principal Hydrogeologist	(805) 719-9338
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##### ITSI Gilbane Company:

Thomas Beer	Senior Chemist/Project Manager	(925) 946-3100
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##### California Department of Toxic Substances Control

Stephen Niou

Name	Organization	Phone Number	e-mail	Attendance	
				12 Dec 2012	13 Dec 2012
Richard Garrison	USACE	(206) 764-3312	<a href="mailto:richard.o.garrison@usace.army.mil">richard.o.garrison@usace.army.mil</a>	X	X
Aaron King	USACE	(206) 764-6744	<a href="mailto:aaron.s.king@usace.army.mil">aaron.s.king@usace.army.mil</a>	X	X
Zi Zi Searles	USEPA	(415) 972-3178	<a href="mailto:searles.zizi@epa.gov">searles.zizi@epa.gov</a>	X	X
Matthew Litchfield	SBMWD	(909) 384-5107	<a href="mailto:litchfield_ma@sbcitywater.org">litchfield_ma@sbcitywater.org</a>	X	
Michael Garland	SBMWD	(949) 384-5087	<a href="mailto:garland_mi@sbcitywater.org">garland_mi@sbcitywater.org</a>	X	
Mark Eisen	Stantec	(805) 719-9338	<a href="mailto:mark.eisen@stantec.com">mark.eisen@stantec.com</a>	X	
Stephen Niou	DTSC		<a href="mailto:stephen.niou@dtsc.ca.gov">stephen.niou@dtsc.ca.gov</a>	X	X
Thomas Beer	ITSI	(925) 946-3100	<a href="mailto:tbeer@itsi.com">tbeer@itsi.com</a>		X

## **Purpose**

Newmark is a USEPA-led CERCLA site in which a five-year review is being conducted with technical assistance provided by an interdisciplinary USACE team. A site visit was conducted to provide information about the site's status and to visually inspect and document the conditions of the remedy, the site, and the surrounding area for inclusion into the second five-year review site inspection checklist and report. A Site Inspection Checklist is the responsibility of the USACE as detailed in the Newmark Statement of Work.

## Summary

Aaron King and Rick Garrison arrived at the San Bernardino 19th Street Water Treatment Plant at approximately 10 AM. They met Matt Litchfield and Mick Garland of the City of San Bernardino Municipal Water Department (SBMWD); Zi Zi Searles, EPA Region 9 RPM; and Mark Eisen, Stantec. The weather was mild and sunny. Mr. Garland and Mr. Litchfield described the operations and answered questions.

Following the 19th Street plant tour, the team made a brief visit of one of the “facade homes” associated with Muscoy OU wells located within residential neighborhoods, along the drive-bys and brief visits of extraction well site, EPA-108 and EPA-108S; the Waterman GAC and Air Stripping treatment facility; and the North Plant treatment facility. These stops were selected to show examples of extraction wells, treatment facilities and where upgrades are planned or in process.

After a lunch break, USACE, DTSC, and EPA assembled at the water department offices to hear and view Mr. Eisen’s hydrogeologic description of the project, using maps from the recent draft groundwater report. USACE conducted interviews and filled out the site checklist with Mr. Eisen and Mr. Litchfield covering subjects regarding operations, costs, problems, and the future of this remedial work. The meeting concluded at approximately 4 PM.

Next morning, USACE and EPA assembled at 8:30 AM with Thomas Beer, a chemist with ITSI. ITSI is a sampling contractor to EPA. Everyone moved to a coffee shop to have Mr. Beer lay out sampling result maps and describe his impressions of the source of PCE and TCE contamination. The group drove through and made brief selected stops within the source OU (though we are told that EPA prefers to describe this OU as the Footprint of Source Investigation Area). The stops allowed us to view and otherwise examine some of the monitoring wells, the closed county landfill, and the extent of the former Army post. About 11:30 AM, we concluded the source OU tour and reconvened near 10th Street and Waterman Avenue to inspect one of the monitoring wells and the instrumentation used to telemeter the groundwater data to the Water Department office. A water department employee opened the vault that secures the flush mount wells, and also opened the adjacent panel that contains the instrumentation electronics. At about 12:30 PM, our group gathered at a fast food restaurant to conduct interviews with Tom Beers and Stephen Niou. Our site visit concluded by early afternoon.

## Discussion

The Superfund site extends about three miles by five miles incorporating the city center and then northwestward into a rural area at the base of the San Bernardino Mountains. Three operable units comprise the remedial efforts. Two OUs use extraction wells to filter the groundwater with GAC and, as needed, air stripping systems. The third OU is meant to seek and isolate the probable source of groundwater contamination. The Newmark OU became operational in 1998; the Muscoy OU came online in 2005.

The information below is presented by subject and is intended to summarize observations made during the site visits and meetings with the other participants.

## Treatment Plants

The City is treating water from extraction wells at three locations. Our site inspection made a detailed look at the 19<sup>th</sup> Street (Muscoy) plant and brief stops at the Newmark Waterman facility and the Newmark North Plant. We did not visit the Newmark 17<sup>th</sup> Street GAC plant. That plant is off line and the extracted water is routed to the Waterman plant.

Twelve pairs of lead-lag GAC systems at the 19<sup>th</sup> Street plant treat water extracted from six Muscoy extraction wells that were installed between 2001 and 2005, and another four pairs of GAC systems treat water from Newmark well EW-1. Two visits per day are made to each site by Water Department staff to make a visual check of the operations, take gauge readings and chemical injection readings. Though many of the gauges and other instrumentation are automated and transmitted to the water department offices, operations staff will check and calibrate all instruments weekly, monthly, or annually as per the operating manual. GAC in the lead unit is changed whenever confirmation readings of PCE exceed 0.5 µ/L. During change out, the influent is routed to the lag unit, only, and now becomes the lead unit. During our visit to the Waterman treatment plant, replaced GAC material in units 5 and 6 were getting backwashed. The backwashed water is routed to the storm drain, as permitted. After filtration, the water is chlorinated with 1 pound chlorine per 10,000 gallons of water. This water is conveyed to reservoirs for immediate community use. The sites appear to be well maintained with no evident safety hazards. Air stripping units are present at the Waterman and North Plant locations. These are left over from the original state groundwater treatment activities and are not part of the remedy, but are still in use when water demand is high. Emissions and the high cost of air filters to treat the air stripping vapor effluent compelled the use of the GAC systems. Each site is secured with high quality fencing with privacy slats, and remotely operating gates. The 19<sup>th</sup> Street plant has security cameras and infrared sensors. This site has had some trespassing and spray-paint-related vandalism, prompting the installation of barbed wire along the top of the fencing in 2011. Since then, no other evidence of trespassing has been observed. A small dog (presumed to be a stray) was noticed inside the fence at the 19<sup>th</sup> Street Plant during the walkthrough, but it does not appear that anything at any of the facilities would pose a threat to the health and safety of animals that manage to get through the gates. Mr. Litchfield and Mr. Garland noted that SBMWD intends to build a structure at the North Plant in the near future to house generators. The operations manuals, as-built drawings, maintenance logs, training records, and permits are kept at the Water Department Office, and a copy Site-specific Health and Safety Plan (HASP) is kept at each treatment plant and at each well site. We looked at the HASP document kept at the MW-15 well site.

## Wells

Well 19<sup>th</sup> No. 2 has the capacity to pump about 1,200 gallons per minute (gpm), but currently pumps 790 gpm, because of the condition of the pump. The City uses turbine pumps wherever possible, and submersible pumps where noise would be a nuisance in residential settings. Every well is subject to periodic preventative maintenance to include checking the pump for wear and efficiency, changing the oil and checking the packing and electrical connections of the motor, checking the condition and range of motion of valves, checking for the correct operation of air release valves, checking the calibration of the pressure transducers and flow meters, and inspecting the panels, indicator lights, radio alignment, and connections of the SCADA system and panels. A pump is pulled for rehabilitation or replacement if pump efficiency drops below 50-60 percent. While the pump is removed, the well screen is inspected with by video and is scrubbed and flushed. However, Mr.

Garland states that no screens have shown signs of scaling or other adverse conditions. Currently, the City is installing a packer in well EPA-111 to isolate and capture only the contaminated deeper aquifer waters. When completed, they will next perform the same task at EPA-110. The City operations staff noted that well, EPA-112 is pumping 1,200 gpm, but they would like to replace the existing variable frequency drive pumps with standard vertical turbine pumps of higher capacity. The existing pumps are expensive to operate and produce less volume. At well site EPA-108 and EPA-108S, City staff noted the spot, outside the fenced area, where they had a table and a children's playset, until those were removed in 2010, because of illegal activities and liability. That area is now fenced in. Newmark Well No. 1, located at the Newmark North Plant site had to replace their 12-in. pump with a 4-in. pump, in 2010, after ground displacement at around 500 ft, below ground surface created a severe deflection in the borehole. The displacement is attributed to an unspecified earthquake event. The new pump reduces extraction capacity from 1,500 gpm to 300 gpm. The City would like to re-drill this borehole. Many of their other wells also show deflections, though not enough to affect pump operations. These deflections may represent drilling deviations or from seismic displacements. In 2008, the Gilbert Street Well (MUNI-24) was shut down when detections of perchlorate increased to 5 µ/L. The Water Department is developing designs for an ion exchange system to be installed at the well head. Detections of perchlorate have also been increasing, though below action levels, in wells EPA-004 and EPA-005, and are dealt with through a blending program at the Waterman Treatment Plant. These increasing levels of contamination are attributed to fertilizer use, to the east, in the early years of the 20<sup>th</sup> century.

#### Reports and Investigations

A report of the revised groundwater model has been reviewed, but not yet finalized. Mark Eisen, Stantec hydrogeologist, summarized the hydrogeological conditions of the project site, using selected figures from the report. The Water Department will present a report to EPA of installation and modification of two extraction wells. The report should be available in 2013.

#### Footprint of Source Investigation Area (Source OU)

Camp Ono existed for the last couple of years of World War II, and used as a supply depot for the desert training, coordination point during the internment of Japanese-American citizens, and holding Italian prisoners-of-war. EPA has contracted ITSI to monitor the groundwater in the area adjacent to and north of Shandin Hills for PCE and TCE contaminant plumes. We were told that EPA management prefers to term this OU as Footprint of Source Investigation Area (or similar), rather than Source OU.

The wells to be monitored are those constructed by EPA, Corps of Engineers, San Bernardino County, and a municipal well located at a former gravel operations formerly owned by Vulcan Materials. EPA monitoring wells are located in the southern portion of the study area and are sampled through the use of passive diffusion bags (PDBs). Corps of Engineers monitoring wells are generally located in the middle and northern portions of the study area, and are sampled through the use of PDBs. The county wells are located in and around the closed Cajon Landfill. The county requires that their contractor to accompany ITSI and perform the purging and pumping activity on the county wells, leaving ITSI only to collect the samples. The county uses bailers, bladder pumps, and submersible pumps to collect groundwater. The submersible pumps challenge the ability to meet low-flow pumping standards. Mr. Beer said that they're able to pump as low as 400-600 mL/min, which is considered within the upper range of standard operating procedure. County well, CJ-10 has the highest concentration of PCE at this site. Mr. Beer believes the contaminant is slowly diffusing out of the clay layer that the well is

screened in. Mr. Beer noted that county well CJ-07 was vandalized two weeks ago, though the well is not part of the current sampling plan. The municipal well (MUNI-201) on the former Vulcan property is sampled through a spigot. There is still power to the pump, though utilities to the rest of the property are shut off and severely vandalized despite surrounding high fencing and a locked gate, though the lock had been chopped. The pump is located out of the way with its own fencing, and has not been vandalized. This area of the project site is also subject to vandals evidently looking for copper wiring and tubing. Mr. Beer and Ms. Searles also stated that the current owner of the property is unknown, and that if the gate is locked with a new lock, there could be access issues to MUNI-201 until the identity of the owner is discovered.

Mr. Beer says that a draft Investigation Report will soon be released.

Richard Garrison, L.G. Geologist, CENWS-EN-GB-GE

Aaron King, EIT Environmental Engineer, CENWS-EN-GB-ET

## **PHOTOGRAPHS**





Photo 3. Four pairs of 20,000 lb GAC vessels on the south side of the 19<sup>th</sup> Street Plant constructed as part of DTSC and SBMWD initial response



Photo 4. 19<sup>th</sup> Street Plant extraction well EW-2



Photo 5. GAC vessels and EW-2 on the south side of the 19<sup>th</sup> Street Plant



Photo 6. Twelve pairs of 30,000 lb GAC vessels constructed on the north side of the 19<sup>th</sup> Street Plant as part of the Muscoy OU remedial action



Photo 7. Closer view of 30,000 lb GAC vessels constructed on the north side of the 19<sup>th</sup> Street Plant as part of the Muscoy OU remedial action



Photo 8. 19<sup>th</sup> Street Plant reservoir pump/control room building



Photo 9. View of SCADA in 19<sup>th</sup> Street Plant control room



Photo 10. 19<sup>th</sup> Street Plant control room and booster pumps



Photo 11. 19<sup>th</sup> Street Plant chlorine control room



Photo 12. 19<sup>th</sup> Street Plant chlorine storage room



Photo 13. Caustic soda chlorine treatment unit



Photo 14. 19<sup>th</sup> Street Plant reservoir pumps and reservoir water level indicator



Photo 15. Infrared trip beam security system (black unit on the left side) at the 19<sup>th</sup> Street Plant



Photo 16. Extraction Well EPA-112



Photo 18. Façade home in front of EPA-112



Photo 19. Gate to Extraction Wells EPA-108 and EPA-108S



Photo 20. Extraction wells EPA-108 (foreground) and EPA-108S (background)



Photo 21. Location near EPA-108 and EPA-108S where playground was removed and fence was installed



Photo 22. Aerial view of the Waterman Treatment Plant



Photo 23. Eight pairs of 20,000 lb GAC vessels at Waterman Plant



Photo 24. Air stripping units at the Waterman Plant



Photo 25. Seven pairs of 20,000 lb GAC vessels at the Newmark North Plant



Photo 26. Newmark-1 extraction well on the Newmark North Plant property



Photo 27. Air stripping units at the Newmark North Plant



Photo 28. Monitoring Well MW-015. Flush mount well with instrumentation box and solar panel



Photo 29. MW 015 Instrumentation Box



Photo 30. Shandin Hills from the northwest (picture taken near the intersection of University and Hallmark Parkways)



Photo 31. Monitoring well CJ-10



Photo 32. Cajon Landfill from the east



Photo 33. Monitoring well MWCOE-004 on the Apex Property



Photo 34. Chopped lock on gate to property where MUNI-201 is located



Photo 35. Electrical wires cut and stolen from transformer on property near MUNI-201



Photo 36. Monitoring well MWCOE-003 and sign indicating its location



Photo 37. Monitoring well MWCOE-007



Photo 38. Open monitoring well MWCOE-007



Photo 39. Passive diffusion bag setup in MWCOE-007



Photo 40. Passive diffusion bag setup in MWCOE-007

# **Appendix F: Detailed ARARs Review**

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## Detailed ARARs Review

Action-specific ARARs identified in the RODs include Air Quality Standards, Water Quality Standards for ReInjection and Discharges of Treated Water to Surface Water, and Hazardous Waste Management Regulations.

Air Quality Standards: The RODs for both the Newmark and Muscoy OUs listed the Clean Air Act and California Health and Safety Code §39000 as containing ARARs for emission of VOCs from the site. In particular, the South Coast Air Quality Management District (SCAQMD) was identified as the district regulating air quality in the San Bernardino area.

SCAQMD Regulation XIV, Rule 1401, was listed as an ARAR for the site. Rule 1401 requires the Best Available Control Technology for toxics (T-BACT) be used for new stationary operating equipment emitting toxic air pollutants. This regulation establishes limits for maximum individual cancer risk (MICR) from new, modified, or relocated sources emitting toxic air contaminants. Paragraph d(1) of the regulation states that a permit to construct a new source emitting toxic pollutants shall be denied unless the applicant can substantiate the cumulative increase in MICR will not result in:

- An increase in MICR greater than  $10^{-6}$  if T-BACT is not used;
- An increase in MICR greater than  $10^{-5}$  if T-BACT is used;
- A cancer burden greater than 0.5.

Rule 1401 was amended in September of 2010 to expand the list of chronic and acute toxic air contaminants, though As Rule 1401 is a pre-construction regulation, it is assumed that all applicable requirements were attained before the treatment units went on-line. Presently, there is no emission control equipment installed on any of the groundwater treatment units. However, given that emissions from the carbon treatment units should be negligible and that the regulations allows for no T-BACT as long as the increase in MICR is not greater than  $10^{-6}$ , the lack of emission control equipment on the carbon treatment units should not present an exceedence of the allowable limits. When the carbon units are taken off-line and the air stripping units are utilized for short periods for carbon change-out or other maintenance, a worst case scenario mass balance calculation for the Water Treatment Unit shows that a maximum of 1.6 pounds per day of total VOCs would be emitted. This assumes a conservatively high average total VOC concentration of 20 µg/L in groundwater, 100% volatilization, and a pumping rate of 7,000 gpm. The SCAQMD permit issued for the site limits air stripper operations to 90,000 gallons per day for 20 days per year at maximum PCE and TCE concentrations of 120 and 20 µg/L, respectively. As the PCE and TCE levels at the site are well below these limits, there is no need to install T-BACT on the air stripping units.

In addition, the substantive portions of SCAQMD Regulation XIII, Rules 1301 through 1313 on new source review were also applicable to the site. These rules regulate the construction of new, modified, or relocated sources to ensure their operation does not interfere with attaining National Ambient Air Quality Standards in the SCAQMD. It requires the use of the Best Available Control Technology

(BACT) for new sources. The pollutants covered by this regulation and potentially present in groundwater treatment unit emissions include ozone depleting substances and certain VOCs. The Rules require the use of BACT unless specific conditions are met as described in paragraph b(1) of Rule 1303. As Rules 1301-1313 are pre-construction requirements that must be prior to commencing construction, it is assumed that applicable requirements therein were attained before the treatment units went on-line.

Finally, SCAQMD Rules 401 (regulating visible emissions), 402 (prohibiting emissions that are odorous or causes injury, nuisance, or annoyance), and 403 (regulating downwind particulate emissions) were determined by EPA to be applicable. There have been no changes to substantive requirements in these rules that would affect either the operation or protectiveness of the remedy.

Water Quality Standards for Re-injection and Discharge of Treated Water to Surface Water: The RODs for both the Newmark and Muscoy OUs listed several ARARs associated with re-injection of treated groundwater into the aquifer and discharges of treated groundwater to surface water.

Underground Injection Control Program regulations (40 CFR Parts 144-147 and RCRA Section 3020) were identified in both RODs. These regulations would apply to any re-injection of treated groundwater to the aquifer should the San Bernardino Water System be unable to accept treated water. 40 CFR 144.13(c) contains a CERCLA exemption to the prohibition on Class IV injection wells (which is how injections for this site would most likely be classified). The exemption states that the prohibition does not apply to wells used to inject contaminated groundwater that has been treated and is being re-injected into the same formation from which it was drawn if such injection is approved by EPA, or a State, pursuant to provisions for cleanup of releases conducted under CERCLA. In addition, the RCRA Section 3020(a) ban on the disposal of hazardous waste into a formation which contains an underground source of drinking water does not apply to the injection of contaminated groundwater into an aquifer if the injection is part of a CERCLA response, if the water is treated to substantially reduce hazardous constituents prior to injection and the response action, upon completion, will be protective of human health and the environment. After accounting for such exemptions, the only remaining substantive requirements of the regulations that would be considered ARARs for the site are found in 40 CFR 146. These regulations contain standards for construction, operation, and maintenance of injection wells. As of this five-year review, no injection wells have been constructed at the site, nor are any planned for the future. Therefore, any changes in the regulations would not affect the protectiveness of the remedy.

Though it contains no substantive requirements in and of itself, State Water Resources Board Resolution 68-16 (Anti-degradation Policy), contains provisions for discharges to the waters of the State such that existing water quality, when higher than established policies and standards, will be maintained. There have been no changes to Resolution 68-16 since the signing of the previous FYR or the RODs.

The ARAR for any groundwater that is discharged, on a short-term basis, to surface waters is the NPDES Program, which is implemented by the SARWQCB. Based on the waste discharge limitations

adopted by the SARWQCB in Order No. 91-63-043, EPA has determined that groundwater to be discharged, on a short-term basis, to surface waters on-site must meet Federal or State MCLs (whichever is more stringent) for PCE, TCE, DCE, and DCA. Changes in MCLs are discussed above.

Hazardous Waste Management Regulations: The State of California has been authorized by the EPA to develop and enforce its own hazardous waste regulations in lieu of the Federal program. These requirements are found in 22 CCR Division 4.5. The source of the VOCs in groundwater is unknown and, therefore, cannot be definitively classified as listed hazardous wastes. However, EPA determined in both RODs that the contaminants are sufficiently similar in nature to listed hazardous wastes that certain substantive requirements of California's hazardous waste regulations are relevant and appropriate at the site.

Several ARARs were identified in the RODs as requirements for VOC treatment plants, including 22 CCR §66264.14 (security requirements), §66264.18 (location standards), and §66264.25 (precipitation standards). In addition, an air stripper or GAC contactor would qualify as a RCRA miscellaneous unit if the contaminated water constitutes hazardous waste. EPA determined that the substantive requirements for miscellaneous units set forth in 22 CCR §66264.600 - .603 and related substantive closure requirements set forth in 22 CCR §66264.111- .115 are appropriate and relevant for the air stripper or GAC contactor. There have been no changes to any of these regulations since the issuance of the first FYR (or the RODs) affecting the protectiveness of the remedy.

The RODs identified Land Disposal Restrictions (LDRs) in 22 CCR §66268 as ARARs for any on-site disposal of contaminated groundwater or spent carbon. As noted in the first FYR, there have been significant changes to both Federal and State LDR regulations since the signing of the two RODs. However, because on-site disposal has not been performed for either groundwater or spent carbon, the changes to these regulations do not affect the protectiveness of the remedy. If on-site disposal of either groundwater or spent carbon is to be conducted in the future, EPA will consider whether the substantive requirements of the then-current regulations should be adopted as ARARs.

The container storage requirements in 22 CCR §66262.34 and §66264.170-.178 are relevant and appropriate for the on-site storage of contaminated groundwater or spent carbon over 90 days. In July 1997, new subsections (d) and (e) were added to §66264.175 as follows:

“(d) Storage areas that store containers holding only hazardous wastes that do not contain free liquids need not have a containment system as specified by subsection (b) of this section, except as provided by subsection (e) of this section or provided that:

- (1) The storage area is sloped or is otherwise designed and operated to collect and remove liquid resulting from precipitation, or
- (2) The containers are elevated or are otherwise protected from contact with accumulated liquid

(e) Storage areas that store containers holding the following wastes listed that do not contain free liquids must have a containment system as specified by subsection (b) of this section: F020, F021, F022, F023, F026, and F027.”

In August 2006, new subsections (g) and (h) were added to §66262.34 as follows:

“(g) This subsection takes effect on September 5, 2006. Except as provided in Health and Safety Code section 25160.6, subdivision (e), a generator who sends a shipment of hazardous waste to a designated facility with the understanding that the designated facility can accept and manage the waste and later receives that shipment back as a rejected load or residue in accordance with the manifest discrepancy provisions of sections 66264.72 or 66265.72 may accumulate the returned waste on-site for 90 days or less, in accordance with the requirements of paragraph (1) of subsection (a) of this section. Upon receipt of the returned shipment, the generator shall:

- (1) sign Item 18c of the manifest, if the transporter returned the shipment using the original manifest; or
- (2) sign Item 20c of the manifest, if the transporter returned the shipment using a new manifest;
- (3) submit a copy of the signed manifest to the department within 30 days of receipt. Mail the legible manifest copy, specifically the Designated Facility-to-Destination State manifest copy (Page 1 of the manifest as provided in section 66262.21, subsection (d)) to: DTSC Facility Manifests P.O. Box 3000, Sacramento, CA 95812-3000

(h) The generator of the rejected hazardous waste shall label or mark the hazardous waste in a manner that indicates that it is rejected hazardous waste and shall include the date it was received by the generator. If the generator of the rejected hazardous waste commingles it with other hazardous wastes, the shorter of any applicable accumulation time limits shall apply to the commingled hazardous waste.”

These changes do not affect the protectiveness of the remedy because there is no waste from the treatment systems kept on site. The contaminated carbon changed out from the GAC vessels is transported away by the vendor. The Operation and Maintenance Plan describes the chain-of-custody procedures and forms to track carbon disposal. A certificate of destruction of the contaminated carbon is received from the disposal/recycling facility.

**Appendix G: Extraction and Monitoring Well  
Sampling Results, October 2011 -  
2012**

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## Extraction and Monitoring Well Sampling Results, October 2011 – June 2012

Well	Screen Depths (ft bgs)	Date Sampled	Type	PCE Conc. (µg/L)	Qual	TCE Conc. (µg/L)	Qual
<b>Newmark OU North Extraction Well Monitoring</b>							
EPA 006	115-315	10/12/2011	N	1.9		0.35	NJ
		4/11/2012	N	1.8		0.37	
EPA 006PA	230-250	11/17/2011	N	1.8		0.3	NJ
		5/23/2012	N	<0.50	U	<0.50	U
EPA 007	200-470	10/12/2011	N	2.6		0.3	NJ
		4/11/2012	N	2.1		0.25	
EPA 007PA	320-340	11/17/2011	N	8.5		1.6	
		5/23/2012	N	<0.50	U	<0.50	U
Newmark 3	232-270, 283-305, 331-462	10/12/2011	N	1.9		<0.50	U
		4/11/2012	N	0.53		<0.50	U
MW 004A	265-275	11/17/2011	N	<0.25	U	<0.25	U
		11/17/2011	FD	<0.25	U	<0.25	U
		5/24/2012	N	<0.50	U	<0.50	U
MW 004B	385-395	11/17/2011	N	<0.25	U	<0.25	U
		5/24/2012	N	<0.50	U	<0.50	U
MW 007A	305-325	11/17/2011	N	0.42	NJ	<0.25	U
		5/24/2012	N	1.4		0.26	
		5/24/2012	FD	1.4		0.25	
MW 007B	486-506	11/17/2011	N	2.4		<0.25	U
		5/24/2012	N	2		<0.50	U
MW 009A	265-285	11/17/2011	N	3.8		0.98	
		5/24/2012	N	4.5		0.87	
MW 009B	345-365	11/17/2011	N	4.9		1.8	
		5/24/2012	N	4.8		1.4	
MW 016A	220-240	11/17/2011	N	<0.25	U	<0.25	U
		5/24/2012	N	0.3		<0.50	U
MW 016B	430-450	11/17/2011	N	0.54		<0.25	U
		5/24/2012	N	1.4		<0.50	U
MW 017A	270-290	11/18/2011	N	<0.25	U	<0.25	U
		5/24/2012	N	0.3		<0.50	U
MW 017B	400-420	11/17/2011	N	1.6		<0.25	U
		5/24/2012	N	<0.50	U	<0.50	U

Well	Screen Depths (ft bgs)	Date Sampled	Type	PCE Conc. (µg/L)	Qual	TCE Conc. (µg/L)	Qual
<b>Newmark OU Plume Front Extraction &amp; Monitoring</b>							
EPA 001	600-1190	10/12/2011	N	4.2		0.99	
		4/11/2012	N	4		0.89	
EPA 001PA	380-400	11/17/2011	N	0.44	NJ	<0.25	U
		5/22/2012	N	<0.50	U	<0.50	U
EPA 001PB	980-1000	11/17/2011	N	0.45	NJ	<0.25	U
		11/17/2011	FD	0.46	NJ	<0.25	U
		5/22/2012	N	<0.50	U	<0.50	U
		5/22/2012	FD	<0.50	U	<0.50	U
EPA 002	500-1070	10/12/2011	N	5.9		1.6	
		4/11/2012	N	5.5		1.4	
EPA 002PA	230-250	11/17/2011	N	4.1		1.6	
		5/22/2012	N	2.7		1	
EPA 002PB	880-900	11/17/2011	N	3.7		1.5	
		5/22/2012	N	2		1	
EPA 003	500-800	10/12/2011	N	1.2		<0.50	U
		10/12/2011	FD	1.2		<0.50	U
		4/11/2012	N	1.1		<0.50	U
		4/11/2012	FD	1.1		<0.50	U
EPA 003PA	230-250	11/17/2011	N	<0.25	U	<0.25	U
		5/22/2012	N	<0.50	U	<0.50	U
EPA 003PB	760-780	11/17/2011	N	<0.25	U	<0.25	U
		5/22/2012	N	<0.50	U	<0.50	U
EPA 004	490-1180	10/12/2011	N	0.31	NJ	<0.50	U
		4/11/2012	N	0.31		<0.50	U
EPA 004PA	310-330	11/17/2011	N	0.56		<0.25	U
		5/22/2012	N	0.32		<0.50	U
EPA 004PB	980-1000	11/17/2011	N	1.3		0.25	NJ
		5/22/2012	N	<0.50	U	<0.50	U
EPA 005	400-1130	10/12/2011	N	<0.50	U	<0.50	U
		4/11/2012	N	<0.50	U	<0.50	U
EPA 005PA	230-250	11/17/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	<0.50	U	<0.50	U
EPA 005PB	880 - 900	11/17/2011	Obstructed	NS		NS	
		5/23/2012	Obstructed	NS		NS	
MW 010A	350-380	11/16/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	0.3		<0.50	U

Well	Screen Depths (ft bgs)	Date Sampled	Type	PCE Conc. (µg/L)	Qual	TCE Conc. (µg/L)	Qual
MW 010B	490-520	11/16/2011	N	0.41	NJ	<0.25	U
		5/23/2012	N	0.48		<0.50	U
MW 010C	750-780	11/16/2011	N	3.8		0.67	
		5/23/2012	N	3.6		0.48	
MW 011A	500-530	11/16/2011	N	0.26	NJ	<0.25	U
		5/23/2012	N	0.34		<0.50	U
MW 011B	770-800	11/16/2011	N	0.68		<0.25	U
		5/23/2012	N	0.68		<0.50	U
MW 011C	1070-1100	11/16/2011	N	4.8		4	
		5/23/2012	N	4.4		3.5	
MW 012A	240-270	11/16/2011	N	0.8		2.2	
		11/16/2011	FD	0.84		2.2	
		3/14/2012	N	0.52		1.5	
		5/23/2012	N	1.1		2.1	
		5/23/2012	FD	1.1		2	
MW 012B	670-700	11/16/2011	N	<0.25	U	0.49	NJ
		5/23/2012	N	0.42		<0.50	U
MW 012C	1040-1070	11/16/2011	N	0.63		0.64	
		5/23/2012	N	0.62		<0.50	U
MW 013A	365-395	11/16/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	0.37		<0.50	U
MW 013B	525-555	11/16/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	0.59		<0.50	U
MW 013C	815-845	11/16/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	<0.50	U	<0.50	U
MW 014A	270-300	11/16/2011	N	1.1		<0.25	U
		5/23/2012	N	0.96		<0.50	U
		5/23/2012	FD	0.93		<0.50	U
MW 014B	570-600	11/16/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	0.42		<0.50	U
MW 014C	1060-1090	11/16/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	0.46		<0.50	U
MW 015A	520-550	11/16/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	0.55		<0.50	U

Well	Screen Depths (ft bgs)	Date Sampled	Type	PCE Conc. (µg/L)	Qual	TCE Conc. (µg/L)	Qual
MW 015B	690-720	11/16/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	0.38		<0.50	U
MW 015C	1020-1050	11/16/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	0.4		<0.50	U
<b>Muscoy OU Extraction &amp; Monitoring</b>							
EPA 108	510-590, 670-1000	10/12/2011	N	3.2		0.85	
		4/11/2012	N	2.9		0.8	
EPA 108PA	370-390	11/17/2011	N	3.6		1.3	
		5/24/2012	N	1.6		0.51	
EPA 108PB	740-760	11/17/2011	N	1.4		0.43	NJ
		5/24/2012	N	0.59		<0.50	U
		5/24/2012	FD	1.6		0.57	
EPA 108S	265-285, 305-350, 370-450	10/12/2011	N	5.6		1.6	
		10/12/2011	FD	4.6		1.4	
		4/11/2012	N	5.2		1.6	
		4/11/2012	FD	4.7		1.5	
EPA 109	260-330, 420-500, 550-610, 710-840	10/12/2011	N	3.7		0.8	
		4/11/2012	N	3.2		0.75	
EPA 109PA	310 -330	11/17/2011	Dry	NS		NS	
		5/24/2012	Dry	NS		NS	
EPA 109PB	430-450	11/17/2011	N	5.6		3.2	
		5/24/2012	N	4.7		2.6	
EPA 109PC	800-820	11/17/2011	N	0.44	NJ	<0.25	U
		5/24/2012	N	<0.50	U	<0.50	U
EPA 110	225-270, 305-650, 715-855	10/12/2011	N	3.3		0.8	
		4/11/2012	N	3.2		0.85	
EPA 110PA	193-243	11/17/2011	N	4.3		1.1	
		5/24/2012	N	4.6		1.2	
EPA 110PB	301-321	11/17/2011	N	4.2	J	1.4	J
		11/17/2011	FD	5.5		1.9	
		5/24/2012	N	5.2		1.6	
		5/24/2012	FD	4.9		1.6	
EPA 110PC	411-431	11/17/2011	N	12		3.1	
		5/24/2012	N	11		3.2	

Well	Screen Depths (ft bgs)	Date Sampled	Type	PCE Conc. (µg/L)	Qual	TCE Conc. (µg/L)	Qual
EPA 110PD	491-511	11/17/2011	N	4.1		4.5	
		5/24/2012	N	5.5		5	
EPA 110PE	830-850	11/17/2011	N	<0.25	U	<0.25	U
		5/24/2012	N	0.74		<0.50	U
EPA 111	235-265, 305-660, 765-1250	10/12/2011	N	0.93		<0.50	U
		4/11/2012	N	1		<0.50	U
EPA 111PA	193 - 243	11/17/2011	Dry	NS		NS	
		5/24/2012	Dry	NS		NS	
EPA 111PB	375-395	11/17/2011	N	9		3.2	
		5/24/2012	N	6.4		2	
EPA 111PC	456-476	11/17/2011	N	11		5.3	
		5/24/2012	N	12		4.9	
EPA 111PD	780-800	11/17/2011	N	<0.25	U	<0.25	U
		5/24/2012	N	<0.50	U	<0.50	U
EPA 112	280-740, 800-890	10/12/2011	N	3.7		0.48	NJ
		4/11/2012	N	4		0.47	
EPA 112PA	300 - 320	11/17/2011	Dry	NS		NS	
		5/24/2012	Dry	NS		NS	
EPA 112PB	660-680	11/17/2011	N	0.45	NJ	<0.25	U
		5/24/2012	N	<0.50	U	<0.50	U
MW 128A	410-440	11/16/2011	N	15		5.8	
		5/23/2012	N	16		5.6	
MW 128B	690-720	11/16/2011	N	<0.50	U	<0.50	U
		11/16/2011	FD	<0.50	U	<0.50	U
		5/23/2012	N	<0.50	U	<0.50	U
		5/23/2012	FD	<0.50	U	<0.50	U
MW 128C	860-890	11/16/2011	N	<0.50	U	<0.50	U
		5/23/2012	N	<0.50	U	<0.50	U
MW 129A	443-473	11/16/2011	N	<0.50	U	<0.50	U
		5/23/2012	N	0.33		<0.50	U
MW 129B	730-760	11/16/2011	N	3.6		0.55	
		5/23/2012	N	3.2		0.44	
MW 129C	851-881	11/16/2011	N	<0.50	U	<0.50	U
		5/23/2012	N	<0.50	U	<0.50	U

Well	Screen Depths (ft bgs)	Date Sampled	Type	PCE Conc. (µg/L)	Qual	TCE Conc. (µg/L)	Qual
MW 130A	340-370	11/16/2011	N	0.84		0.41	NJ
		5/23/2012	N	0.85		0.38	
MW 130B	550-580	11/16/2011	N	6.2		2.8	
		5/23/2012	N	6.1		2.6	
MW 130C	890-920	11/16/2011	N	<0.50	U	<0.50	U
		5/23/2012	N	<0.50	U	<0.50	U
MW 135A	360-380	11/16/2011	N	1.8		0.79	
		11/16/2011	FD	1.8		0.71	
		2/29/2012	N	1.6		0.83	
		2/29/2012	FD	1.6		0.82	
		5/23/2012	N	2.4		1	
		5/23/2012	FD	2.6		0.99	
MW 135B	620-640	11/16/2011	N	0.87		0.42	NJ
		2/29/2012	N	0.77		0.49	NJ
		5/23/2012	N	1.3		0.55	
MW 135C	850-870	11/16/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	0.25		<0.50	U
MW 136A	420-440	11/16/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	0.38		0.37	
MW 136B	500-520	11/16/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	<0.50	U	<0.50	U
MW 136C	730-750	11/16/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	<0.50	U	<0.50	U
MW 137A	330-350	11/16/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	4.3		0.95	
		6/21/2012	N	2.4		0.72	
MW 137B	520-540	11/16/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	0.31		<0.50	U
MW 137C	790-810	11/16/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	<0.50	U	<0.50	U
MW 138A	320-340	11/16/2011	N	<0.25	U	<0.25	U
		2/29/2012	N	0.99		<0.50	U
		5/23/2012	N	3.1		0.6	
		6/21/2012	N	2.6		0.48	

Well	Screen Depths (ft bgs)	Date Sampled	Type	PCE Conc. (µg/L)	Qual	TCE Conc. (µg/L)	Qual
MW 138B	550-570	11/16/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	0.65		<0.50	U
		6/21/2012	N	<0.50	U	<0.50	U
MW 138C	960-980	11/16/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	<0.50	U	<0.50	U
MW 139A	360-380	11/16/2011	N	0.47	NJ	<0.25	U
		5/23/2012	N	1.1		<0.50	U
		6/21/2012	N	0.52		<0.50	U
		6/21/2012	FD	0.51		<0.50	
MW 139B	540-560	11/16/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	0.57		<0.50	U
		6/21/2012	N	<0.50	U	<0.50	U
MW 139C	790-810	11/16/2011	N	<0.25	U	<0.25	U
		5/23/2012	N	0.42		<0.50	U
MW 141A	310-340	11/16/2011	N	1.1		<0.25	U
		11/16/2011	FD	1.1		<0.25	U
		2/29/2012	N	1.9		0.36	NJ
		5/23/2012	N	1.4		0.26	
		5/23/2012	FD	1.4		<0.50	U
<b>Site-Wide Monitoring</b>							
16th & Sierra	490-680, 658-680	4/11/2012	N	<0.50	U	<0.50	U
27th & Acacia	243-259, 290-410, 442-	4/24/2012	N	2.3		0.33	
31st & Mt. View	373-523	4/24/2012	N	3.3		0.46	
Cajon 3	150-347	5/22/2012	N	<0.50	U	<0.50	U
Devil Canyon 1	186-236	5/22/2012	N	<0.50	U	<0.50	U
Gilbert	480 - 603, 625 - 685	5/24/2012	Offline	NS		NS	
Leroy	450-660	4/24/2012	N	0.33		<0.50	U
Mallory 3	380 - 448, 478 - 484, 510 - 628	5/24/2012	Offline	NS		NS	
Muscoy Mutual 5	144-625	5/22/2012	N	<0.50	U	<0.50	U
Olive & Garner	350-1050	4/24/2012	N	2.1		0.32	
DTSC 001B	236-246	5/24/2012	N	<0.50	U	<0.50	U
DTSC 001C	389-399	5/24/2012	N	<0.50	U	<0.50	U
DTSC 002B	252-262	5/24/2012	N	0.4		<0.50	U
DTSC 002C	418-428	5/24/2012	N	<0.50	U	<0.50	U

Well	Screen Depths (ft bgs)	Date Sampled	Type	PCE Conc. (µg/L)	Qual	TCE Conc. (µg/L)	Qual
DTSC 003A	199-209	5/24/2012	N	<0.50	U	<0.50	U
DTSC 003C	492-502	5/24/2012	N	2.4		0.31	
MW 006A	250 - 270	5/24/2012	N	<0.50	U	<0.50	U
MW 006B	317 - 337	5/24/2012	N	<0.50	U	<0.50	U
MW 008A	275 - 295	5/24/2012	N	<0.50	U	<0.50	U
MW 008B	470 - 490	5/24/2012	N	4.0	U	<0.50	U
MW 126	220 - 240	5/24/2012	Dry	NS		NS	
MW 127A	341-361	5/24/2012	N	0.28		<0.50	U
		5/24/2012	FD	0.27		<0.50	U
MW 127B	431-451	5/24/2012	N	<0.50	U	<0.50	U
MW 140A	300-400	5/24/2012	N	2.2		0.26	
MW 140B	530-560	5/24/2012	N	2		<0.50	U
MW 140C	680-690	5/24/2012	N	7.2		1.5	
		5/24/2012	FD	7.6		1.5	
MW Paperboard	227 - 431	5/24/2012	Dry	NS		NS	
MW State	60 - 128, 248 - 345	5/24/2012	N	<0.50	U	<0.50	U
PZ 124	120 - 160	5/24/2012	Dry	NS		NS	
PZ 125	180 - 200	5/24/2012	Dry	NS		NS	

**Notes:**

U = The analyte was analyzed for, but not detected above the reported sample quantitation limit.

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ = The analyte was not detected above the reported samples quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to

NJ = The analysis indicates the presence of an analyte that has been "tentatively identified" and the

Nc = Result confirmed by re-analysis.

Nh = The result for this analyte in this sample is consistent with historical data.

N = Normal sample

FD = Field duplicate sample

NS = Not sampled

**Appendix H: Representative Geologic Cross-sections of the San Bernardino Basin Area**

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# **Representative Geologic Cross-sections of the San Bernardino Basin Area**